HANCOCK PROSPECTING PTY LTD

Alpha Coal Project Supplementary Environmental Impact Statement

AB Railway Corridor – Traffic Impact Assessment

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Hancock Prospecting Pty Ltd

Report for Alpha Coal Project (Rail) Supplementary EIS

Traffic Impact Assessment

April 2011

INFRASTRUCTURE | MINING & INDUSTRY | DEFENCE | PROPERTY & BUILDINGS | ENVIRONMENT

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1. Introduction

1.1 Background

GHD has been commissioned by Hancock Prospecting Pty Ltd (HPPL) to prepare an Environmental Impact Statement (EIS) for the proposed railway line from the Alpha Coal Mine to the proposed Port of Abbot Point, otherwise referred to in this report as the Alpha Rail Project.

The Alpha Rail Project is a 495 km long standard gauge railway line to be constructed for the purposes of transporting processed coal from the Alpha Coal Mine to the proposed Abbot Point Multi Cargo Facility (MCF) located at the Port of Abbot Point located 25 km northwest of Bowen.

This report examines the traffic impacts of the Alpha Rail Project as input to a Supplementary Environmental Impact Statement (SEIS) being prepared by GHD for the proponents, HPPL.

1.2 Scope and Context of this Report

The report provides an assessment of traffic impact during the construction stage of the proposed railway line and identifies mitigating measures to address the impacts. This report examines the traffic implications of road haulage of railway material, transport of plant equipment and vehicular traffic generated by construction employees. The traffic impacts associated during construction will have on the higher order road network (i.e. state controlled network) has also been examined.

1.3 Methodology

The traffic impact assessment has been undertaken with reference to DMR's *Guidelines for Assessment of Road Impacts of Development* (GARID - April 2006). While not mandatory, the guideline suggest a process and methodology to undertake the Traffic Impact Assessment. The traffic operation assessment process outlined in the guidelines stipulates that the operating characteristics need to be compared with performance criteria. The main performance criteria adopted for the assessment is detailed in Table 1.

Table 1 Performance Criteria

Performance Measure	Criteria Adopted
Level of Service	LOS C can be considered the minimum standard in a rural context, although LOS D is considered satisfactory in circumstances involving event traffic. LOS E should be considered the limit of acceptable urban area operation and remedial works would be needed if LOS F would otherwise result.
Percentage Increase in existing AADT on the State Controlled Road (SCR) network	Increases within 5% are generally considered acceptable
Percentage Increase on pavements (ESA's)	Increases within 5% are generally considered acceptable

The traffic impact assessment involved undertaking a desktop assessment to establish the baseline conditions in the study area. This entailed a review of aerial photography and other mapping information provided by the Client to identify the access roads and other transport infrastructure in the study area.

Existing traffic count data for state-controlled roads was obtained from the Department of Main Roads (DMR), and for local roads from the relevant Regional Councils. Historical traffic data, where available, was used to inform the study of the potential future growth in traffic along the main corridors. Traffic surveys were not undertaken for the purpose of this study, due to the availability of recent 2008 traffic volume data for subject state controlled roads.

1.4 Assumptions and Limitations

A Transport Logistic Plan (Ref CJVP10007-Rep-G-024) prepared by Calibre Rail was used to inform this report on potential traffic generation and distribution attributed to the construction of the railway. Where necessary, further assumptions have been made within this report examining a worst-case scenario resulting in a conservative approach to the assessment process.

This assessment provides an overview of the potential impacts associated with the project. More detailed traffic management plans will need to be developed and submitted for approval with the relevant authorities for each element of the project during the detailed design phase.

Further limitations to the scope include:

- only a desktop assessment of associated pavement impacts was undertaken and no field assessments were carried out for existing road conditions;
- a detailed assessment of transport infrastructure relating to regional airports was not provided at the time of preparing this assessment;
- a detailed construction plan was not provided at the time of preparing this assessment; and
- an appraisal of bridge structures was not undertaken as part of this assessment.

1.5 Report Structure

The report has been structured as follows:

- An overview of the project background and an outline of the assumptions and limitations of this report is presented in Section 2;
- Section 3 provides an overview of the existing road and transport conditions that will influence the development of the project;
- Section 4 provides details of the anticipated traffic generation due to the construction works associated with the project;
- Section 5 examines the traffic implications of the project on the external road network in terms of traffic efficiency and road safety; and,
- Section 6 provides a summary of the findings of the assessment.

2. Project Site

This section provides a guide as to the location of the proposed railway line and the existing land uses near the vicinity of the project site. The section also highlights the key roads being traversed by the railway line.

2.1 Location and Alignment of the Project Site

The project site traverses the Barcaldine Regional Council in the Central West Region, and Isaac and Whitsunday Regional Councils in the Mackay/Whitsunday Region of Queensland. (refer to Figure 1)

The railway line starts at the Alpha Coal Mine, approximately 38 km north-west of Alpha and 450 km west of Rockhampton. From there, the railway heads in a north-easterly direction and crosses the Gregory Developmental Road north-west the township of Kilcummin at Ch 155 km. The railway maintains a north-easterly path crossing the Suttor Developmental Road at Ch 250 km and the Collinsville-Elphinstone Road at Ch 290 km until reaching the western end of Kangaroo Creek at Ch 300 km. From Ch 310 km the route changes direction and heads north–west crossing the Bowen Developmental Road at Ch 330 km. It continues in the north-west direction up to Ch 405 km after which it shifts to the north-east direction until it reaches the Port of Abbot Point.

2.2 Existing Land Uses in the Vicinity of the Project Site

The land uses adjoining the project site are predominantly rural, particularly grazing land and open fields, and associated isolated rural residences.

LEGEND

- Town
- Camp
- Marshalling Yards
- Construction Depot
- Proposed Alignment
- State Road
- Existing Railway
- Local Government Area

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

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0 5 10 20 30 40 50

Kilometres

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia 1994
Grid: Map Grid of Australia, Zone 55

N W E S

HANCOCK PROSPECTING PTY LTD

Alpha Coal Project
Supplementary Environmental Impact Statement

PROJECT AREA

Job Number	41-23742
Revision	C
Date	02-03-2011

Figure: 1

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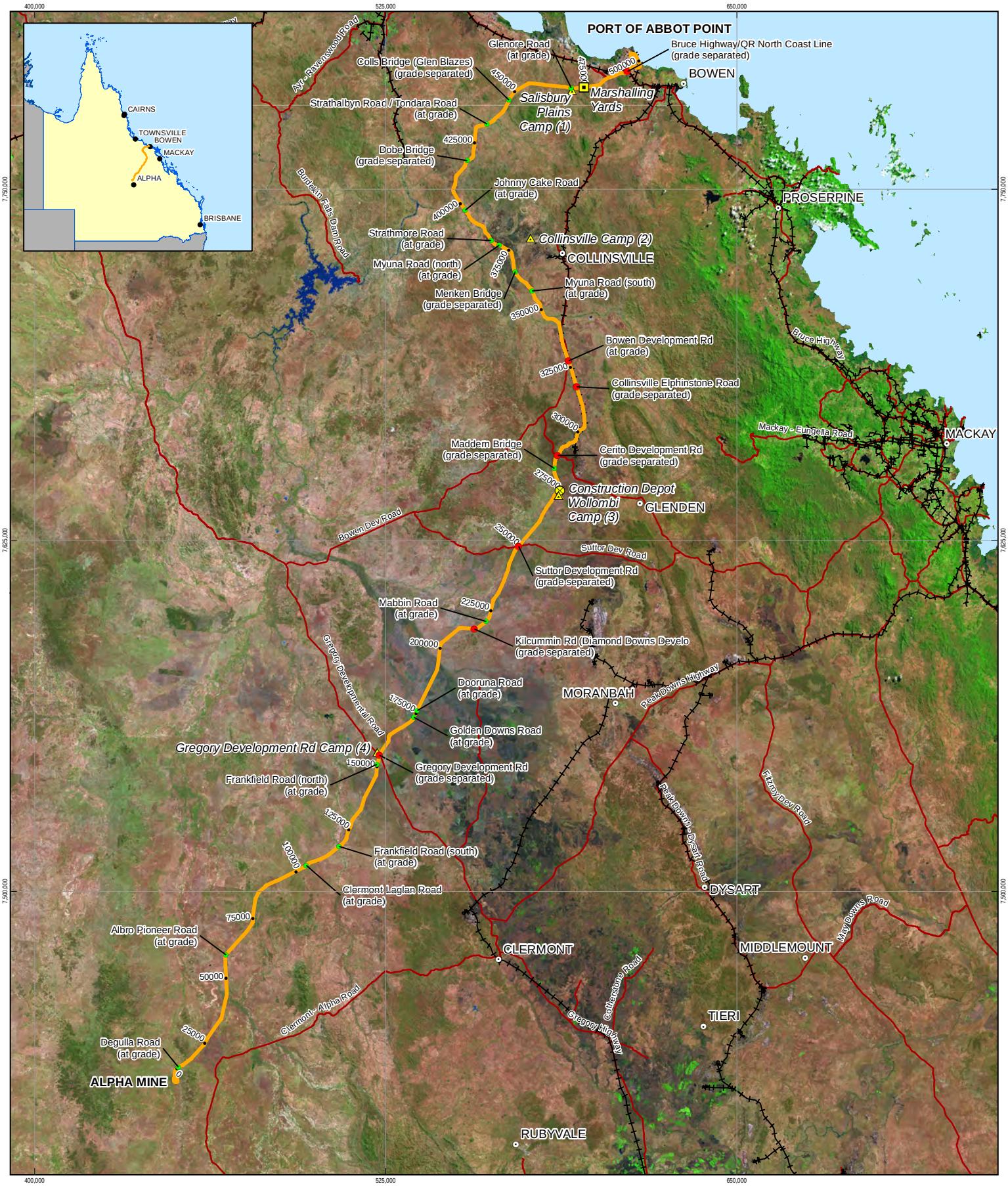
2.3 Alpha Rail Crossing Locations

The proposed railway line is expected to intersect with the State Controlled Road (SCR) network as well as local road network. The railway line will cross one (1) SCR with a level crossing and six (6) SCRs with grade-separated intersections comprising four (4) road-over-rail crossings and two (2) rail-over-road crossings. The railway line will cross 14 local roads which will require at-grade railway crossings at these locations. The at-grade crossing locations are proposed to be flashing light crossings.

The local roads and SCRs that intersect with the Alpha railway line are shown in Figure 2. The local road crossings are indicated as black dots and SCR crossings are indicated as red dots. The affected local roads are located in the Whitsunday Regional Council, Isaac Regional Council and Barcaldine Regional Council.



LEGEND

- Town
- Camp
- Marshalling Yards
- Construction Depot

Crossing
- State
- Local

- Proposed Alignment
- State Road
- Local Road
- Existing Railway

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

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0 5 10 20 30 40 50

Kilometres

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia 1994
Grid: Map Grid of Australia, Zone 55

N W E S

HANCOCK PROSPECTING PTY LTD

Alpha Coal Project
Supplementary Environmental Impact Statement

ROAD CROSSINGS

Job Number	41-23742
Revision	C
Date	07-04-2011

Figure: 2

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The seven locations where the Alpha railway line will intersect with the SCRs are summarised in Table 2.

Table 2 Key Roads to be crossed by the Rail Route

Assigned Crossing Number	Road ID	Road Name	Classification	Chainage	Crossing Type
Level Crossing					
17	88B	Bowen Developmental Road (Collinsville – Belyando Crossing)	District	327.3	At Grade Crossing
Grade Separated Crossing					
7	98A	Gregory Developmental Road (Clermont-Belyando Crossing)	State Strategic Road	154.2	Road-over-Rail
10	5309	Kilcummin Diamond Downs Road	District	215.6	Road-over-Rail
13	82A	Suttor Developmental Road (Nebo-Mount Coolon)	Regional Road	250.2	Road-over-Rail
15		Cerito Development Road	Regional Road	288.4	Road-over-Rail
16	5307	Collinsvale Elphinstone Road	District	317.6	Rail-over-Road
24	10K	Bruce Highway (Bowen-Ayr)	National	492.7	Rail-over-Road

A summary of the local roads that intersect with the Alpha railway line are tabulated in Table 3. The list below includes 2 locations which are unlikely to be public crossing,

Table 3 List of Local Council Roads that Intersect with Proposed Alpha Railway Line

Assigned Crossing No.	Road	Chainage	Proposed Intersection Type
Barcaldine Regional Council			
1[1]	Degula Road	12.2	Level Crossing (alternate to crossing 2)
2[1]	Surbiton Wendourse Road	14.1	Level Crossing
Isaac Regional Council			
3	Albro Pioneer Road	5806	Level Crossing and Stock Crossing
4	Clermont Laglan Road	104.2	Level Crossing and Stock Crossing
5	Frankfield Road (South)	117.9	Level Crossing and Stock Crossing

Assigned Crossing No.	Road	Chainage	Proposed Intersection Type
6	Frankfield Road (North)	150.9	Level Crossing
8	Golden Downs Road	173.2	Level Crossing
9	Dooruna Road	175.9	Level Crossing
11	Mabbin Road	220.7	Level Crossing
12[2]	Chesterfield Road	240.2	Level Crossing
14[3]	Wollombi Road	274.6	Level Crossing and Stock Crossing
Whitsunday Regional Council			
18	Myuna Road (South)	357.4	Level Crossing
19	Myuna Road (North)	378.8	Level Crossing
20	Strathmore Road	382.3	Level Crossing and Stock Crossing
21	Johnny Cake Road	397.0	Level Crossing
22	Strathalbyn Road	434.6	Level Crossing and Stock Crossing
23	Glenore Road	471.1	Level Crossing

Notes:

[1] Only one public crossing will happen, most likely at Surbiton-Wendoree Road. Exact location to be confirmed during detail design.

[2] Chesterfield Road is a private crossing

[3] Located at the road reserve of Wollombi Road which is unmade and will not be a public crossing.

3. Existing Transport Context

This section reviews the existing road and transport conditions that will influence the development of the proposed Alpha Railway line. For the purposes of this assessment it is important to understand the operation of the existing road and transport network serving the current project site within the local and regional context.

3.1 Existing Road Network Conditions

The road network surrounding the project site serves several different functions and these are reviewed in the following subsections.

3.1.1 Existing Road Classification

The classification of roads along the existing road network can be used as an indication of the functional role each road plays with respect to the volume of traffic they should appropriately carry. The Department of Main Roads (DMR) has developed a set of road hierarchy classifications detailed in Table 4. The table provides typical nominal volumes expressed in terms of average annual daily traffic (AADT) serviced by various classes of roads.

Table 4 Functional Classification of Roads

Type of Road		Traffic Volume (vpd)[1]	Peak Hour Volume (vph) [2]
Arterial Road	Highway	Volumes not restricted	>2,000
	Arterial	Volumes not restricted	
	Arterial Main	< 20,000	
Sub-Arterial Road	Traffic Distributor	Volumes not restricted	800 – 1,000
	Controlled Distributor	< 10,000	
	Sub Arterial Main	< 10,000	
Collector Road	Major Collector	< 6,000	300 – 600
	Minor Collector	< 3,000	
Local Road	Access Street	< 750	0 – 200
	Access Place	< 100	

1 vpd = vehicles per day
2 vph = vehicles per hour

DMR has jurisdiction over roads of State significance and has four administrative classifications in its hierarchy of roads. These are:

- National Highway (NH);

- State Strategic Road (SSR);
- Regional Road (RR); and
- District Road (DR).

3.1.2 Existing Road Network

The project area encompasses several nationally and regionally significant transport routes. Roads under the State Controlled network that serve as key transport routes in the study area are listed in Table 5 and further described below.

Table 5 Key Roads in the Study Area

Road ID	Road Name	Classification
10J	Bruce Highway (Proserpine-Bowen)	National
10K	Bruce Highway (Bowen-Ayr)	National
88A	Bowen Developmental Road (Bowen-Collinsville)	District
88B	Bowen Developmental Road (Collinsville – Belyando Crossing)	District
98A	Gregory Developmental Road (Clermont-Belyando Crossing)	State Strategic Road
27B	Gregory Highway (Emerald-Clermont)	State Strategic Road
27C	Gregory Highway (Clermont-Mt Douglas)	State Strategic Road
82A	Suttor Developmental Road (Nebo-Mount Coolon)	Regional Road
5307	Collinsvale Elphinstone Road	District
33A	Peak Downs Highway (Clermont – Nebo)	State Strategic Road
33B	Peak Downs Highway (Nebo – Mackay)	State Strategic Road
16C	Capricorn Highway (Emerald – Alpha)	State Strategic Road
552	Clermont – Alpha Road	Regional Road
5309	Kilcummin-Diamond Downs Road	District

Bruce Highway

The Bruce Highway forms part of the Australian National Highway Network (AUSLINK) and is a major northwest-southeast route along the Brisbane-Cairns corridor. North of Brisbane, the Bruce Highway is a divided multi-lane road but for most of its length to Cairns, the Bruce Highway is essentially a two lane rural highway with sections of four lanes at regional centres along the corridor.

The Bruce Highway links the regional centres of Rockhampton, Mackay and Townsville via Proserpine and Bowen.

Bowen Developmental Road

The Bowen Developmental Road is a sealed road that commences in the township of Delta. The Bowen Developmental Road is a State controlled road that runs in a north-south direction connecting the Bruce Highway at its northern end, Gregory Developmental Road at its southern end, and crossing Rutherford Road, Strathalbyn Road, Strathmore Road, Suttor Developmental Road and the Upper Don River Road. Bowen Developmental Road runs through Mount Coolon, Collinsville, Almoola, Briaba, Binbee and Armuna.

At the Bowen township, Bowen Developmental Road intersects with the Bruce Highway at a T-intersection. The road then proceeds in a south western direction passing Bogie and Mt. Coolon and the town of Collinsville. The road also crosses Mt. Wyatt Road, Power House Road, Corduroy Creek Road, Collinsville Elphinstone Road, Cerito Road, Ilamatha Road with a T-intersection at Gregory Developmental Road. It currently functions as a sub-arterial road carrying approximately 900-1400 vehicles per day (*based on 2009 TMR Traffic Count Data)* between Bowen and Collinsville and has a posted speed limit of 100 km/h. Most of the Bowen Development Road south of Collinsville has undergone recent resurfacing works.

Gregory Developmental Road

The Gregory Developmental Road is a two lane undivided sealed road with gravel shoulders. The road was recently upgraded as a dual lane bitumen road. South of Clermont, the road is known as Gregory Highway which serves the major coal-mining centres of Central Queensland.

The Gregory Developmental Road runs in the north-south direction and connects from the north to south with the Blue Range Road, the Bowen Developmental Road, the Flinders Highway, the Forsayth Einasleigh Road, the Greenvale Camel Creek Road, the Gregory Highway, the Gulf Developmental Road, the Harvest Home Road, the Hervey Range Developmental Road, the Kennedy Developmental Road, the Kennedy Developmental Road - Gregory Developmental Road, the Moray Bulliwallah Road, Mosman Street and the Peak Downs Highway.

The Gregory Development Road currently carries 300-400 vehicles per day (*based on 2009 TMR Traffic Count Data)* and is commonly used by large road trains. Its functional classification is denoted to be a collector road.

Suttor Developmental Road

The Suttor Developmental Road is a State controlled regional road under the jurisdiction of the TMR. The road is partly sealed and connects from Mount Coolon to the west to near Nebo to the east.

The Suttor Developmental Road currently carries an average of 50-70 vehicles per day which is a lightly trafficked road. It stretches from the suburb of Mount Coolon at a T-intersection with Bowen Developmental Road. The road continues east passing Stratford Road and Glenavon Road and Eaglefield. The road continues east passing Red Hill Road, Ellensfield Road, Collinsville Elphinstone Road and Elphinstone Suburb. The road continues east passing Hail Creek Road, Kemmis Creek Road and Turrawilla Road and Leggets Road. Suttor Developmental Road culminates in a T-intersection with Peak Downs Highway.

Collinsville Elphinstone Road

The Collinsville Elphinstone Road is State controlled road and intersects with Bowen Development Road at its northern end. The road continues in a south eastern direction passing Mount Leslie Road and Cerito Road. The road also passes beside Glenden Town and Glenden Newlands Road and Perry Drive. From Glenden Town, the road passes Mount Goodhart Road and terminates in an intersection with Suttor Developmental Road.

The Collinsville Elphinstone Road is a sealed road and currently carries an average of 500-700 vehicles per day.

Cerito Development Road

The Cerito Development Road is a newly built 23km sealed road between Bowen Development Road at its western end to the Newlands-Glenden Road at its eastern end. The two-lane road was built to improve access between Collinsville and the Newlands Mine and in conjunction with the sealed Collinsville-Elphinstone Road, to replace the old access road to the Newlands mine.

Peak Downs Highway

The Peak Downs Highway is a sealed road and connects from near Bathampton to Ooralea. The Peak Downs Highway is located within undulating terrain along its 265 km length, with about 1.2 km of its length steeper than a vertical grade of 5%.

The Peak Downs Highway connects with Annandale Road, Blue Mountain Road, Bruce Highway, Eton - Homebush Road, Fitzroy Developmental Road, Gregory Developmental Road, Gregory Highway, Mackay - Eungella Road, Marian - Eton Road, Moranbah Access Road, North Eaton Road, Oxford Downs - Sarina Road, Suttor Developmental Road and Winchester Road.

Peak Downs Highway runs through Eton, Drapers, Walkerston and Alexandra townships.

Capricorn Highway

The Capricorn Highway provides an east-west link connecting the City of Rockhampton with western Queensland. The highway is approximately 560 kilometres long and joins the Landsborough Highway at Barcaldine. The Capricorn Highway is a sealed road that services the towns of Gracemere, Westwood, Duaringa, Dingo, Blackwater, Emerald, Bogantungan, Alpha and Jericho.

Clermont Alpha Road

The Clermont Alpha Road is a partly sealed road and connects the townships of Alpha and Clermont. The Clermont Alpha Road connects with the Capricorn Highway, the Clermont Connection Road, the Clermont Laglan Road, the Craven Road and the Laglan Pioneer Road.

3.1.3 Existing Traffic Volumes on State-Controlled Roads

Existing traffic count data was obtained from the regional offices of the Department of Main Roads. These counts were mostly 2008 counts and presented movements in annual average daily traffic (AADT). Data on the percentage of heavy vehicles were available for some road sections. It should be noted that the road sections have multiple count sites along its length and the corresponding AADT for each count site is presented in **Error! Reference source not found.** and illustrated in

Figure 3. (Refer to Appendix A for listing).

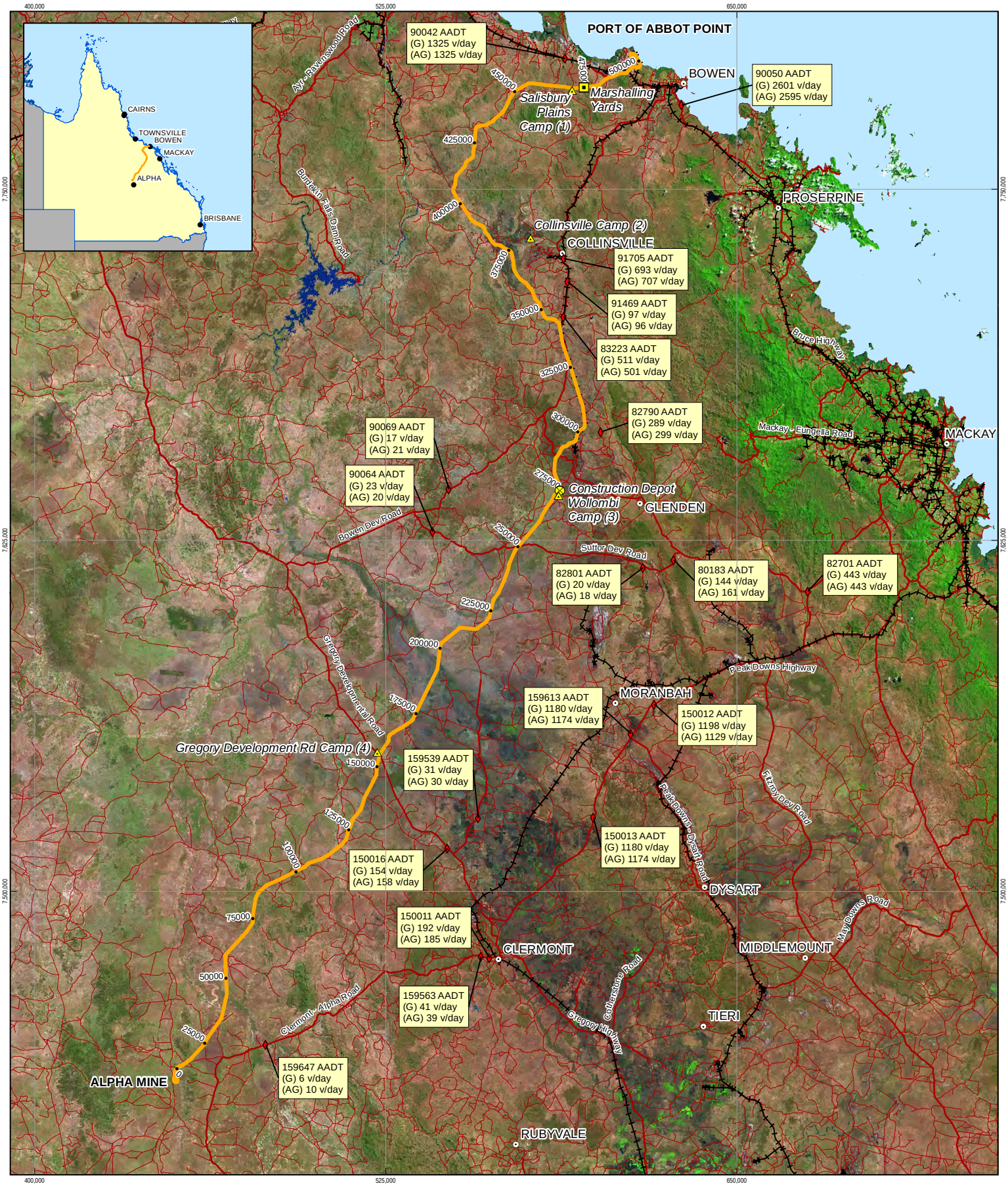
Table 6 Road Network Capacity Assessment of Existing Network

Road ID	Road Name	AADT	% HV
10J	Bruce Highway (Proserpine-Bowen)		
	Site 90003	3,189	NA
	Site 90050	5,196	17.5%
10K	Bruce Highway (Bowen-Ayr)		
	Site 90051	6,404	NA
	Site 90042	2,650	19.1%
	Site 91439	6,946	11.4%
	Site 90004	8,518	10.1%
	Site 91396	10,695	3.8%
88A	Bowen Developmental Road		
	(Bowen –Collinsville)		
	Site 91705	1,400	15.4
	Site 90019	758	NA
	Site 91468	859	16.9%
	Site 91421	2,985	7.44
88B	Bowen Developmental Road	1,012	2.7%
	(Collinsville – Belyando Crossing)		
	Site 91545	754	24.3%
	Site 91469	193	NA
	Site 90069	38	45.2%
98A	Gregory Developmental Road (Clermont-Belyando Crossing)	312	31.9%
	Site 150016		
27B	Gregory Highway (Emerald-Clermont)		
	Site 150025	2,235	17.5%
	Site 159565	1,624	18.4%
	Site 150015	1,006	24.0%
27C	Gregory Highway (Clermont-Mt Douglas)		
	Site 159536	2,339	19.8%
	Site 159640	1,001	22.4%
82A	Suttor Developmental Road		

	(Nebo-Mount Coolon)		
	Site 82701	876	19.2%
	Site 80183	305	16.6%
	Site 82801	38	22.1%
	Site 90064	43	22.9%
5307	Collinsvale Elphinstone Road		
	Site 83223	1,012	12.9%
	Site 82790	588	19.3%
	Cerito Development Road		
5309	Kilcummin-Diamond Downs Road Site		
	Site 159539	61	31.6%
33A	Peak Downs Highway (Clermont-Nebo)		
	Site 80147	3,377	15.2%
	Site 80146	2,706	17.4%
	Site 80197	3,379	17.8%
	Site 82884	3,241	17.3%
33B	Peak Downs Highway (Nebo-Mackay)		
	Site 80009	3,645	16.4%
	Site 83159	4,460	16.3%
	Site 80020	5,426	11.1%
	Site 82777	8,614	9.2%
	Site 82778	14,799	9.2%
	Site 82838	10,728	12.8%
	Site 82839	11,676	11.1%
552	Clermont Alpha Road		
	Site 150011	377	12.2%
	Site 159563	80	24.4%
	Site 159647	16	30.9%
	Site 159564	83	26.4%

Notes:

NA - no data available



LEGEND

- Traffic Count Location
- Town
- Camp
- Marshalling Yards
- Construction Depot
- Proposed Alignment
- State Road
- Local Road
- Existing Railway

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

1:1,250,000 (at A3)

0 5 10 20 30 40 50

Kilometres

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia 1994
Grid: Map Grid of Australia, Zone 55

N W E S

HANCOCK PROSPECTING PTY LTD

Alpha Coal Project
Supplementary Environmental Impact Statement

AVERAGE ANNUAL DAILY TRAFFIC COUNT

Job Number	41-23742
Revision	C
Date	05-04-2011

Figure: 3

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3.1.4 Existing Traffic Volumes on Local Council Roads

No traffic count data was provided for the local roads located in the Barcaldine and Whitsunday Regional Council. Isaac Regional Council provided historical traffic count data (2000 to 2007) for Clermont Laglan Road and Golden Downs Road. The count data revealed that the volumes recorded from the previous counts indicate very low traffic levels, mostly under 50 vehicles per day with a small number of count sites registering over a 100 vehicles per day. It is assumed that these local roads are lightly trafficked and can provide access to the proposed railway corridor at controlled access locations.

3.1.5 Roadway Capacity for Two-Lane Two-Way Rural Roads

It is noted that majority of the access routes to the project site are two-lane two-way rural roads (one lane per direction), with the exception of the road sections on the state highways that lead into the major urban centres. The AUSTROADS *Guide to Traffic Engineering Practice - Part 2: Roadway Capacity* defines level of service as a qualitative measure describing operational conditions within a traffic stream. The term Level of Service (LOS) and its characteristics for rural roads is defined in **Error! Reference source not found.**.

Table 7 Level of Service (LOS) for Rural Roads

LOS	Description	AADT	Description
A	Free, unrestricted flow	1,100	Very good
B	Mostly free flow, few disruptions	2,800	Very good
C	Stable flow	5,200	Good
D	Mostly stable flow, some delays	8,000	Acceptable
E	Congested flow, delays common	14,800	Bad
F	Forced flow	n/a	Bad

Source: *AUSTROADS Guide to Traffic Engineering Practice Part 2: Roadway Capacity*

The volume and composition of traffic on a given road determines the level of interaction between vehicles and is measured as its LOS. For a particular roadway capacity the LOS deteriorates with increasing traffic volumes. LOS A, LOS B and LOS C in a rural context are all satisfactory. LOS D can be satisfactory in some circumstances.

The AUSTROADS Guide further indicates that two-lane rural highways have a capacity of 2,800 passenger cars per hour total for both directions of flow (1,400 passenger cars per hour per direction), under ideal conditions where there are no restrictive roadway, terrain or traffic conditions.

In cases where traffic, terrain or geometric data may not be precisely known, the AUSTROADS Guide provides planning guidance on maximum AADT values that two-lane, two-way rural roads can accommodate under various terrain conditions.

Table 8 shows the values for various Levels of Service for a rural road in level terrain, with varying ratios of design hour volume to AADT.

Table 8 Maximum AADTs for Various Levels of Service on Two-Lane Two-Way Rural Roads on Level Terrain, vehicles per day

Design Hour Volume to AADT Ratio	Level of Service (LoS)				
	A	B	C	D	E
0.10	2,400	4,800	7,900	13,500	22,900
0.11	2,200	4,400	7,200	12,200	20,800
0.12	2,000	4,000	6,600	11,200	19,000
0.13	1,900	3,700	6,100	10,400	17,600
0.14	1,700	3,400	5,700	9,600	16,300
0.15	1,600	3,200	5,300	9,000	15,200

Source: *AUSTROADS Guide to Traffic Engineering Practice, Part 2: Roadway Capacity*, Table 3.9, from TRB Highway Capacity Manual (1985) Table 8.10.

Error! Reference source not found. shows the values for various Levels of Service for a rural road in rolling terrain with varying ratios of design hour volume to AADT.

Table 9 Maximum AADTs for Various Levels of Service on Two-Lane Two-Way Rural Roads on Rolling Terrain, vehicles per day

Design Hour Volume to AADT Ratio	Level of Service				
	A	B	C	D	E
0.10	1,100	2,800	5,200	8,000	14,800
0.11	1,000	2,500	4,700	7,200	13,500
0.12	900	2,300	4,400	6,600	12,300
0.13	900	2,100	4,000	6,100	11,400
0.14	800	2,000	3,700	5,700	10,600
0.15	700	1,800	3,500	5,300	9,900

Source: AUSTROADS Guide to Traffic Engineering Practice, Part 2: Roadway Capacity, Table 3.9

For a Level of Service C, the maximum AADT values range from 3,500 to 7,900 depending on the design hour volume to AADT ratio and the terrain. Comparing these values with the existing AADT levels along the key roads indicate that the roadway has spare capacity to accommodate additional traffic (refer to **Error! Reference source not found.**. Assuming ratio of design hour volume to AADT is 10% and majority of the road sections are in level terrain, the corresponding level of service for each section has been determined.

Table 10 Road Network Capacity Assessment of Existing Network

Road ID	Road Name	AADT	Peak Hour Two way Flow	Two way Flow Capacity	V/C[1]	LOS
10J	Bruce Highway (Proserpine-Bowen)					
	Site 90003	3,189	319	2800	0.11	B
	Site 90050	5,196	520	2800	0.19	C
10K	Bruce Highway (Bowen-Ayr)					
	Site 90051	6,404	640	2800	0.23	C
	Site 90042	2,650	265	2800	0.09	B
	Site 91439	6,946	695	2800	0.25	C
	Site 90004	8,518	852	2800	0.30	D
	Site 91396	10,695	1,070	2800	0.38	D
88A	Bowen Developmental Road (Bowen –Collinsville)					
	Site 91705	1,400	140	2800	0.05	A
	Site 90019	758	76	2800	0.03	A
	Site 91468	859	86	2800	0.03	A
	Site 91421	2,985	299	2800	0.11	B
88B	Bowen Developmental Road (Collinsville – Belyando Crossing)					
	Site 91545	754	75	2800	0.03	A
	Site 91469	193	19	2800	0.01	A
	Site 90069	38	4	2800	0.001	A
98A	Gregory Developmental Road (Clermont-Belyando Crossing) Site 150016	312	31	2800	0.01	A
27B	Gregory Highway (Emerald-Clermont)					
	Site 150025	2,235	224	2800	0.08	A
	Site 159565	1,624	162	2800	0.06	A
	Site 150015	1,006	101	2800	0.04	A
27C	Gregory Highway (Clermont-Mt Douglas)	2,339	234	2800	0.08	A

Road ID	Road Name	AADT	Peak Hour Two way Flow	Two way Flow Capacity	V/C[1]	LOS
	Site 159536	1,001	100	2800	0.04	A
	Site 159640					
82A	Suttor Developmental Road					
	(Nebo-Mount Coolon)					
	Site 82701	876	88	2800	0.03	A
	Site 80183	305	31	2800	0.01	A
	Site 82801	38	4	2800	0.001	A
	Site 90064	43	4	2800	0.001	A
5307	Collinsvale Elphinstone Road					
	Site 83223	1,012	101	2800	0.04	A
	Site 82790	588	59	2800	0.02	A
	Cerito Development Road	NA[2]				
5309	Kilcummin-Diamond Downs Road Site					
	Site 159539	61	6	2800	0.002	A
33A	Peak Downs Highway (Clermont-Nebo)[3]					
	Site 80147	3,377	338	2800	0.12	C
	Site 80146	2,706	271	2800	0.10	B
	Site 80197	3,379	338	2800	0.12	C
	Site 82884	3,241	324	2800	0.12	C
33B	Peak Downs Highway (Nebo-Mackay)[3]					
	Site 80009	3,645	365	2800	0.13	C
	Site 83159	4,460	446	2800	0.16	C
	Site 80020	5,426	543	2800	0.19	C
	Site 82777	8,614	861	2800	0.31	D
	Site 82778	14,799	1,480	2800	0.53	E
552	Clermont Alpha Road					
	Site 150011	377	38	2800	0.01	A
	Site 159563	80	8	2800	0.003	A
	Site 159647	16	2	2800	0.00	A
	Site 159564	83	8	2800	0.003	A

Notes:

[1] NA - no data available

[2] Assuming ratio of design hour volume to AADT is 10% and road sections are in level terrain

[3] Peaks Down Road is situated in undulating terrain

3.2 Development Pavement Loadings

3.2.1 Overview

- For the purpose of calculating the axle loadings on the various roads, one ESA has been based on loadings of 8.2 tonne on single axle dual wheels and 5.4 tonne on single axle single wheels. The subgrade and unbound pavement damage power factor is 4 in accordance with the DMR Pavement Design Manual.
- The loading applied by these vehicles has been assessed as:
- Loaded (all axle groups 100% of legal loads 42.5 GVM) 4.9 ESA's
- Unloaded (19.5 GVM) 1.3 ESA's
- Load per Round Trip 6.2 ESA's
- Vehicle loadings of 6.2 ESAs per vehicle per round trip would create higher total loadings than may actually occur, as not all vehicles will have a GVM of 42.5 tonnes when loaded.
- For vehicles used for plant and equipment, the loading applied has been assessed as above but with a factor of 1.5 to account for loading of plant and equipment on standard haulage vehicles:
- Vehicles used for accommodation unit transportation may have 35.5 GVM when loaded and 25.5 GVM with a resultant decrease in total loadings on the road pavements.
- On this basis, the calculated pavement loadings are considered conservative in that the total loadings should be less than the adopted ESA value per vehicle used for this assessment.

3.2.2 Current Pavement Loadings

Data on traffic volumes and percentage of commercial vehicles (for selected roads) were provided by the Department of Main Roads (DMR) for the State Controlled Road.

The current Equivalent Standard Axles (ESA) on the road networks was calculated based on 3.2 ESAs per commercial vehicle in accordance with the Central Region's current practice. The calculations adopt the traffic volume percentages of commercial vehicles provided by the DMR. As data on growth rates was unavailable, a 3% growth rate was assumed. The calculation provided in set out:

- The ESAs per day at the time of the traffic count information; and
- ESAs over a 20-year design life of the pavement based on current daily ESAs. The table calculates the life that the pavement was designed for if the current age of the pavement is 5 years, 10 years, 15 years or 20 years.
- The estimated traffic loadings per road section are shown in Appendix C.

3.3 Existing Port Facilities

There are seven (7) ports in the vicinity of the Project site. They are located at:

- Townsville;
- Abbot Point;
- Bowen;
- Mackay;
- Hay Point;
- Port Alma; and
- Gladstone.

The above port facilities have been assessed in terms of capacity and viability to service the requirements of the Project. The assessment was undertaken by Calibre Rail (Ref CJVP10007-Rep-G-024) to identify the primary port to be utilised for the cargo transport requirements for the Alpha rail Coal Project. The results of the assessment are summarised in Table 11.

Table 11 Assessment of Port Facilities

Port Location	Description	Assessment	Outcome Summary
Townsville	Major port in Queensland that handles a large range of international shipping services	9 working berths with one which handles general cargo Cranes at port capable of unloading all cargo needs for the Project Storage capabilities for up to 1,900 shipping containers Warehousing available within 4 km of the port	While the Port of Townsville can handle all cargo needs for the Alpha Rail Project, it is 200 km north of the northern end of the alignment. Road haulage distances are found to be excessive
Abbot Point	Located 30 km northwest of Bowen Existing coal loading port at the northern end of the proposed Alpha Coal Railway.	Port does not currently handle importation of general cargo There is a proposal to expand the port to incorporate an additional terminal with facilities for loading and unloading general freight. This is planned for completion in 2013 and may be available for the late stages of the project	Abbot Point Port facility is unable to service the requirements for the early stages of the Alpha Rail Project
Bowen	Has a 700m long jetty mainly used as a domestic facility and is the base for tugs servicing the Abbot Point Coal terminal	No longer an active cargo port	Not a suitable port for the Alpha Coal Rail Project
Mackay	Located at Mackay Harbour and handles a large range of international shipping	Has 4 working berths Cranes at port are capable of unloading all cargo needs for the Alpha Rail Project	Recommended as the main port for importing rail and other general cargo.

Port Location	Description	Assessment	Outcome Summary
	services	Regularly handles delivery of short rail strings No rail spur extending into the port. Short rail strings and other cargo would need to be road hauled to the rail freight depot in Paget, South Mackay which is 10 km from the port. Facilities include a 2,000m^2 cargo storage yard and a 600 m^2 warehouse facility	Offers the shortest road haul distance to the main track construction depot at Wollombi and has the potential for rail transport
Hay Point	Located in Dalrymple bay south of Mackay and is the largest coal export port	Facility does not handle general freight and is unsuitable for importing materials required for the Alpha Rail Project	Not a suitable port for the Alpha Coal Rail Project
Port Alma	Located 62km east of Rockhampton	Has 3 berths, two for general cargo and one dolphin berth for handling bulk liquids. Facility is suitable for smaller ships of up to 180m in length with maximum draught of 5.5m. Has a 540 m^2 warehouse and container storage yard No rail spur extending into the port. Short rail strings and other cargo would need to be road hauled to the rail freight depot in Bajool which is 20 km from the port. Located south of the proposed Alpha Mine site and is less central to Wollombi than Mackay.	Not recommended as the main port of use for the Alpha Rail Coal Project to its location and vessel size restrictions but could be a secondary port.
Gladstone	Primary port for Central Queensland	Has 15 operational berths, one of which is a container handling berth Facilities include: a mobile crane, 3.5 ha of heavy storage area, 1.5 ha of general storage area and a large (2,100m^2) storage/packing shed. Rail access is available, enabling rail strings and other materials to be directly loaded to freight trains from the port's general cargo and container	Not recommended as the primary port due to its location.

Port Location	Description	Assessment	Outcome Summary
		facilities for rail transport to the Wollombi track construction depot.	

3.4 Existing Airport Facilities

There are six (6) regional airports and an additional six (6) airstrips in the vicinity of the Alpha Coal Rail Project, The regional Airports are located at:

- Townsville;
- Mackay;
- Proserpine;
- Emerald;
- Barcaldine; and
- Moranbah.

For the purpose of this assessment, air transport was not considered a viable form of transport for freight required for the Alpha Rail Coal Project but will be utilised for the transport of personnel. The proposed personnel transport strategy for the rail construction phase will be on a fly-in fly-out basis with the workforce utilising coaches to transport personnel between each construction camp and a regional airport.

In addition to these regional airports, airstrips have been found to be located at:

- Alpha (sealed);
- Bowen (unsealed);
- Clermont (sealed);
- Collinsville (unsealed);
- Glenden (unsealed); and
- Suttor (unsealed)

It is envisaged that rail construction staff will nominally fly from Brisbane to a regional location. The options being investigated for air transport include:

- Commercial flights;
- Chartered flights to regional airports; and
- Chartered flights to private airstrips.

Air transport movements to and from the regional airports will need to be coordinated with Brisbane Airport. There does not appear to be substantial constraints on using these regional airports in terms of ability to accept increased air traffic resulting from workforce travel demands, though particular attention should be given to:

- Ensuring transfers operate smoothly, safely and efficiently;

- Holding and processing areas are adequately catered for; and
- Landside access/egress points are adequately catered for.

4. Construction Traffic Generation

The sources of vehicular construction traffic on the external road network, namely employee traffic, and haulage of construction materials/equipment to and from the project site is described below. The specific details of the proposed construction traffic operations have also been examined.

4.1 Construction Activities

It is anticipated that the construction activity will occur over a period of approximately 36 months. Traffic volumes generated by the construction personnel and by materials delivery will vary depending on the construction timetable. The sequence of activities is as follows:

- Investigation works generally include detailed ground breaking geotechnical investigation and possibly water bore drilling;
- Pioneering works generally include the clearing of a trace line along the rail centreline, installation of temporary fencing, construction of laydown areas for long lead material delivery and contractor area, and where required, the upgrade of existing tracks and the construction of intersections with public roads nominated to be used for construction works;
- Camp construction will be comprised of transportable modules and include accommodation rooms, laudries and central facility buildings;
- Culvert manufacturing generally includes the delivery of steel sheets to site and the rolling of corrugated steel pipes on site;
- Reinforced concrete box culverts likely be manufactured off-site and transported to site;
- Earthworks construction includes site preparation, clearing, topsoil stripping, haul road construction, foundation preparation, drill and blast, material haulage, embankment construction, drainage construction, sub-ballast construction and rehabilitation;
- Bridgework include piling, erection of formwork and false work, installation of reinforcement, concrete pours, lifting of precast concrete units and structural steel work, and delivery of material for bridge construction;
- Track work will include ballast production, sleeper manufacturing, rail welding, rail supply, turnout supply, level crossing panel supply, and track construction.

4.2 Construction Hours

Standard hours of construction for the duration of the construction program are anticipated to be 12 hours per day (including travel – 2 hours for travel and 10 hours working) 13 day fortnight, 3 weeks on 1 week off roster. Haulage of materials and plant will be on a seven-day-per-week operation, but will not be continuous throughout construction.

4.3 Construction vehicles and equipment

Various machinery will be necessary for the construction of the railway. Heavy vehicles that will most likely be required at the construction site were identified as follows:

- Standard 19m trucks or extendable tri-axle trailers and where permissible, B-Double transports, to transport plant and material to the site;
- Tipper trucks, to transport bedding sand on-site and excavated burden off-site;
- Craneage to lift the rail sections into position;
- Excavation machinery;
- Drill rigs, D10 dozers, backhoes and watercarts; and,
- Equipment for directional drilling and horizontal boring.

- Heavy rigid bodied trucks with a payload of 20 tonnes are expected to be travelling along the road corridor aside from the vehicles used by construction personnel. Crane, excavator, bulldozer, drilling and boring machinery will be brought to the project site by truck floats, and can be transferred between sites along the rail corridor without the need to traverse on the external road network for the duration of the construction.

4.4 Construction Staging

- The construction of the railway is anticipated to commence around the 4th Quarter of 2011 and be completed on the 4th Quarter of 2014, for an estimated 36 months. Table 12 presents the likely staging of the works with indication of expected duration.

Table 12 Staging of Construction Component

Activity	Mobilisation	Works start	Works finish	Demobilisation	Comments
Investigation works	Q4 2011	Q4 2011	Q4 2012	Q4 2012	Heavy vehicles to use public roads during mobilisation and demobilisation. Works to generally occur along rail corridor. Where required to cross a major river crossing, vehicles will be relocated to the other side using public road.
Pioneering works	Q4 2011	Q4 2011	Q2 2012	Q2 2012	Once plant is mobilised to site, works will be undertaken along the rail corridor
Camp construction	Q4 2011	Q4 2011	Q4 2012	Q4 2012	Concrete will generally be batched on site for each camp, with the exception of Camp 1. Pre mixed concrete from Bowen will be used for Camp 1.
Culvert	Q4 2011	Q2 2012	Q4 2012	Q4 2012	Once plant and facility

Activity	Mobilisation	Works start	Works finish	Demobilisation	Comments
manufacturing					is mobilised to site, they will manufacture their first lot of culverts, then relocate to another site to manufacture the second lot and so on. The relocation works and steel coil delivery will be done using public roads.
Reinforced concrete box culverts		Q2 2012	Q4 2012		Reinforced concrete box culverts will likely be manufactured in Mackay and transported to site.
Earthworks Construction	Q4 2011 – Q3 2012	Q4 2011	Q1 2014	Q3 2013 - Q1 2014	Majority of the works will be in the rail formation and traffic movements will typically be on temporary construction haul roads adjacent to the proposed formation.
Bridge Work	Q2 2012 – Q3 2012	Q2 2012	Q3 2013	Q2 2013 – Q3 2014	Majority of the works will be in the rail formation and traffic movements will typically be on temporary construction haul roads adjacent to the proposed formation.
Bridge Material		Q2 2012	Q3 2013		Materials for the bridge work might be obtained from overseas or from the domestic market.
Track work	Q2 2012	Q3 2012	Q4 2013	Q4 2014	Ballast quarries are expected to be developed on site at three locations along the rail alignment
Sleeper manufacturing	Q4 2011 – Q1 2012	Q2 2012	Q4 2013	Q4 2014	The proposed location for the manufacture of the sleeper on site is at Ch 470 km
Rail welding	Q4 2011 Q2 2012	Q3 2012	Q4 2013	Q4 2014	The proposed location of the onsite flashbutt welding facility is at Ch

Activity	Mobilisation	Works start	Works finish	Demobilisation	Comments
					470 km
Rail supply		Q3 2012	Q3 2013		The supply of rail is likely to be from overseas and delivered at the port of Mackay. The rail will be transported in 25m lengths to the rail welding facility at Ch 470
Turnout Supply		Q1 2013	Q3 2013		Turnouts will likely be manufactured in Mackay and transported to site
Level crossing panel supply		Q1 2013	Q3 2013		Precast concrete level crossing panels will likely be manufactured in Mackay and transported to site
Track construction	Q3 2013	Q3 2013	Q3 2014	Q3 2013 – Q2 2014	Once mobilised, majority of the works will be on the rail formation.
Rolling Stock	Q3 2013	Q3 2013	Q1 2014	Q1 2014	Rolling stock will be procured from overseas and delivered to the Port of Mackay then onwards to the marshalling yard at Ch 470 km

Source: Calibre Rail (CJVP10007-REP-G-024)

4.5 Transport Routes

The likely transport corridors to be used for construction traffic have been provided by Calibre Rail for the purpose of assessing construction and material transport movements. These corridors comprise the major public roads and the relevant minor local roads to be used to access certain sections of the construction site. Table 13 lists the key transport corridors that would be used for the project requirements.

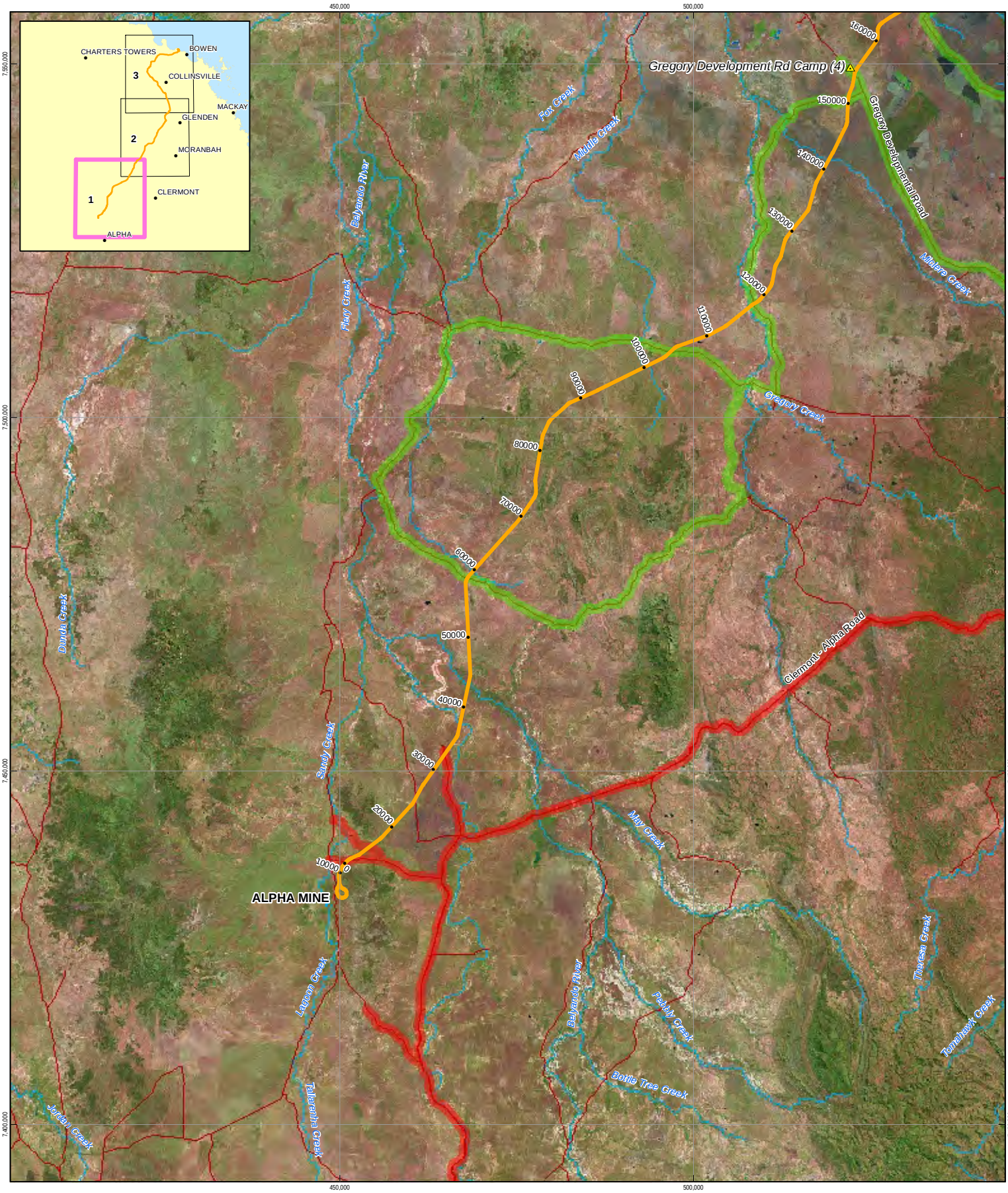
Table 13 Transport Routes

Transport Corridor ID	Highway Route	Major Road	Minor Roads	Comments
TC 01	Bruce Highway (Sealed)			Access to Ch 470 – 510 km

Transport Corridor ID	Highway Route	Major Road	Minor Roads	Comments
				Highway crossing Rail crossing
		-	Glenore Road (unsealed)	Access to Ch 465 – 480 km Access to Camp 1 Access to Rail Yard and Elliot River
		-	Nevada Road (unsealed)	Access to Ch 455 – 465 km
	Rangemore Road (unsealed)			Access to Ch 435 – 455 km
TC 02	Bruce Highway; Bowen Developmental Road (Sealed)			Access to Ch 320 – 350 km Access to Highway and Bowen River
		Collinsville – Elphinstone Road		Access to Ch 300 – 320 km Minor road crossing
			Bowen Service Road	Minor road crossing
		Mynua Road South (unsealed)		Access to Ch 350 – 370 km Major road crossing
		Mynua Road North (unsealed)		Access to Ch 370 – 380 km Major road crossing
		Strathmore Road (unsealed)		Access to Ch 380 – 385 km Access to Camp 2 Major road crossing
		Johnny Cake Road (unsealed)		Access to Ch 380 – 415 km Major road crossing
		Strathalbyn Road (unsealed)		Access to Ch 415 – 435 km Major road crossing Access to Bogie River
		Rangemore Road (unsealed)		Access to Ch 435 – 455 km

Transport Corridor ID	Highway Route	Major Road	Minor Roads	Comments
TC 03	Peak Downs Highway; Cerito Developmental Road; Newlands Access Road (Sealed)			Access to Ch 280 – 290 km Highway Crossing
		Wollombi Road (unsealed)		Access to Ch 260 – 280 km Access to Camp 3 Major road crossing Access to Wollombi Construction Depot
			Cerito Road (unsealed)	Access to Ch 290 – 300 km Minor road crossing
TC 04	Peak Downs Highway, Suttor Developmental Road; (Partly Sealed)			Access to Ch 245 – 265 km Highway crossing
		-	Chesterfield Road	Access to Ch 225 – 245 km
		Mabbin Road (unsealed)		Access to Ch 215 – 225 km Major road crossing
TC 05	Gregory Developmental Road (Sealed)			Access to Ch 150 – 160 km Access to Camp 4 Highway crossing
		-	Frankfield Road (unsealed)	Access to Ch 130 – 150 km
		Diamond Downs – Eaglefield Road (unsealed)		Access to Ch 195 – 215 km Major road crossing
			Dooruna Road (unsealed)	Access to Ch 170 – 195 km Minor road crossing
		Golden Downs Road (unsealed)		Access to Ch 160 – 170 km Major road crossing
		Clermont –		Access to Ch 80 – 110 km

Transport Corridor ID	Highway Route	Major Road	Minor Roads	Comments
		Lagian Road (unsealed)		Major road crossing
			Frankfield Road (unsealed)	Access to Ch 110 – 150 km Two minor road crossings Access to Mistake Creek
		Albor – Pioneer Road (unsealed)		Access to Ch 40 – 170 km Major road crossing
		Lagian – Albor Road (unsealed)		Access to Ch 40 – 110km
TC 06	Capricorn Highway (Sealed); Clermont – Alpha Road		Degulla Road (unsealed)	Access to Ch 000 – 010 km Access to Camp 5 and Alpha Mine Site Minor road crossing
			Surbiton – Wendouree Road (unsealed)	Access to Ch 10 – 20km Access to depot Minor road crossing
			Eulmbie Road (unsealed)	Access to Ch 20 – 40km Access to Belyando River



LEGEND

- Town
- Camp
- Marshalling Yards
- Depot
- Proposed Alignment
- State Road
- Local Road
- Existing Railway
- Watercourse
- Waterbody

Transport Corridors

- TC1
- TC2
- TC3
- TC4
- TC5
- TC6

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

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0 2.5 5 10 15 20 25

Kilometres

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia 1994
Grid: Map Grid of Australia, Zone 55

N W E S

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Alpha Coal Project
Supplementary Environmental Impact Statement

INDICATIVE TRANSPORT CORRIDORS

Job Number	41-23742
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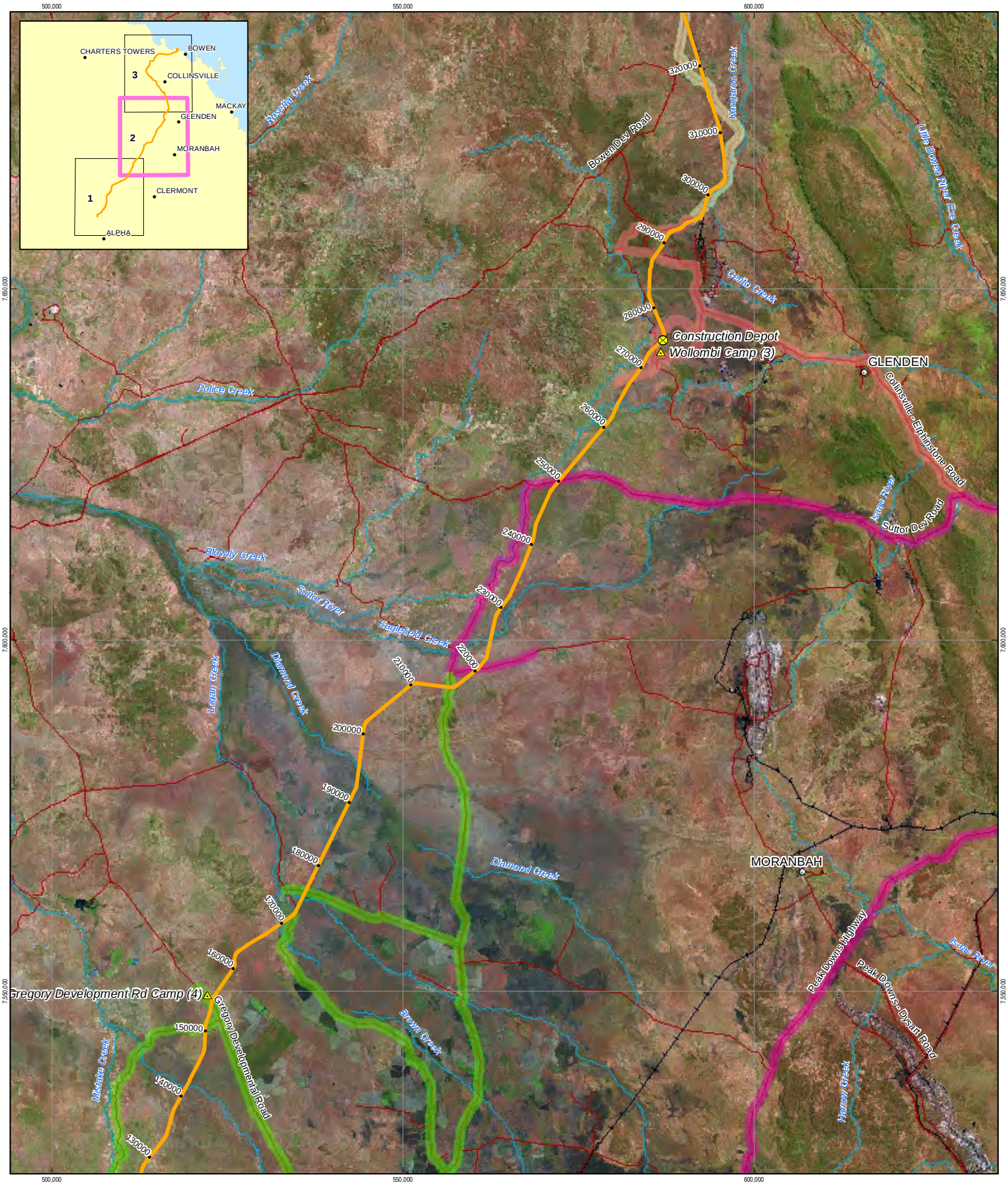

LEGEND

- Town
- Camp
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- Proposed Alignment
- State Road
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Transport Corridors

- TC1
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1:500,000 (at A3)

0 2.5 5 10 15 20 25

Kilometres

Map Projection: Universal Transverse Mercator
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LEGEND

- Town
- Camp
- Marshalling Yards
- Depot
- Proposed Alignment
- State Road
- Local Road
- Existing Railway
- Watercourse
- Waterbody

Transport Corridors

- TC1
- TC2
- TC3
- TC4
- TC5
- TC6

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1:500,000 (at A3)

0 2.5 5 10 15 20 25

Kilometres

Map Projection: Universal Transverse Mercator
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4.6 Construction Vehicular Movements

4.6.1 Haulage Vehicles

The majority of the Alpha Coal Rail works will occur in areas not currently serviced by existing rail freight services which limits the use of rail as a mode for the transportation during the construction. It is anticipated that the majority of construction traffic movements will occur on the surface transport system (i.e. road network).

The main traffic generated through the construction phase will be from plant, equipment and material deliveries, as listed in Table 14.

Table 14 Construction Plant and Material

Construction Component	Plant and material required
Pre construction Investigation and Testing	drill rigs, D10 dozers, backhoes, excavators, and watercarts
Pioneering works	graders, water carts, dozers, excavators, small dump trucks, roller, temporary offices and heavy freight vehicles to transport temporary offices and facilities
Camp construction	graders, loaders, forklifts, mobile cranes, excavators, dump trucks and compactors Building modules are generally transported using a low-loader. Other equipment and materials will be transported using multi combination vehicles consistent with regulations for each road
Culvert manufacturing	mobile culvert rolling machine, forklifts, water carts, delivery of temporary portable buildings, and delivery of steel coils
Earthworks construction	temporary portable offices, workshop facilities, graders, dozers, water carts, excavators, loaders, haul trucks, road trains, scrapers, rollers, cranes, drill; and blast equipment, construction water equipment, mobile concrete batch plants, and other earthmoving equipment
Bridge construction	temporary portable offices, workshop facilities, mobile concrete batch plants, piling rigs, small and large cranes, excavators, compactors, and other plant required for bridge construction
Bridge Material	precast piles, pile casings, cement, aggregate, sand, reinforcement, formwork, false work, precast concrete decks, precast concrete piers, precast concrete headstock, prefabricated structural steel and bridge bearings
Trackwork	Temporary portable offices, crushing plant, excavators, loaders, haulage trucks, drill and blast equipment, explosives
Track construction • Sleepers • Short rail sting supply	Temporary portable offices, workshop facilities, locomotives, wagons, flatbeds, rail train, track layer, tampers, grinders, water carts, loaders, road trains, cranes, and other major track construction equipment

Construction Component	Plant and material required
◗ Rail string welding ◗ Long rail strings (to be transported by rail) ◗ Turnouts ◗ Level crossing panels ◗ Ballast production ◗ Track laying	
Rolling stock	Heavy vehicle transport for delivery of rolling stock to the marshalling yard at Ch 470km

◗ Source: Calibre Rail (CJVP10007-REP-G-024)

◗ For each of the construction components in Table 14, the *Transport Logistic Paper* (Calibre Rail CJVP10007-REP-G-024) provided an estimate of total heavy vehicle transport movements expected to occur during mobilisation, works, and demobilisation on each of the proposed haulage transport corridors. This information was further analysed to determine the accumulated peak volume of heavy vehicle generation for each transport corridor (refer to Table 15 and Figure 5) considering that the construction components would be undertaken concurrently.

◗ Based on the construction staging detailed in Table 12, the total number of heavy vehicle movements associated for each construction component was distributed over the period and duration for which the construction component is expected to occur and assigned to the transport corridor that was nominated as the haulage route for the construction component. The worst case scenario of heavy vehicle movements is then taken as the maximum volume of total accumulated truck movements for each transport corridor per quarter. The total accumulated heavy vehicle movements per quarter for each transport corridor is summarised in Table 15.

Table 15 Estimated Total Accumulated Heavy Vehicle Movements per Quarter By Transport Corridor Used*

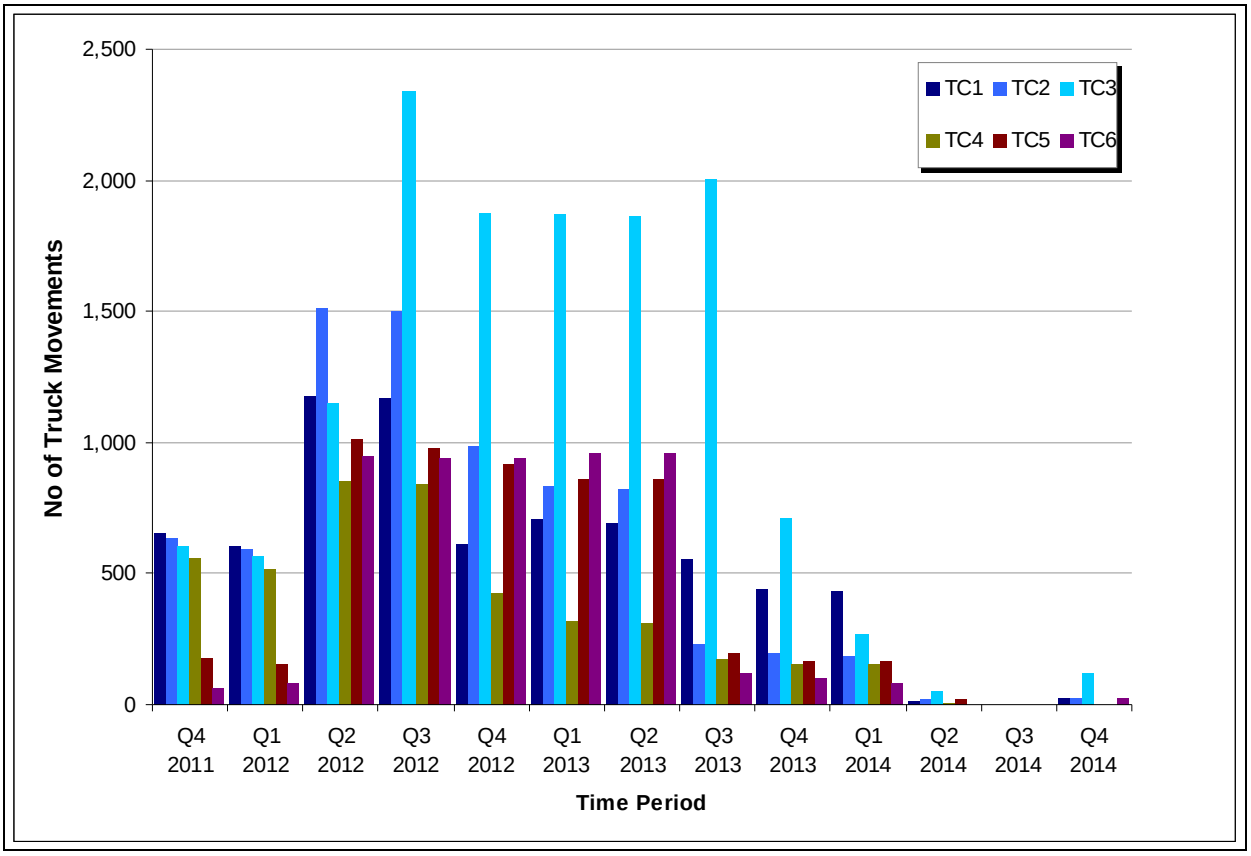
Quarter		TC 01	TC 02	TC 03	TC 04	TC 05	TC 06
Q4	2011	655	638	605	559	179	63
Q1	2012	604	591	564	517	153	83
Q2	2012	**1178**	**1517**	1154	**850**	**1014**	950
Q3	2012	1168	1502	**2339**	839	982	942
Q4	2012	608	987	1874	424	917	943
Q1	2013	704	832	1872	318	859	**961**
Q2	2013	696	823	1864	309	859	**961**
Q3	2013	555	228	2005	170	198	120
Q4	2013	440	200	712	150	167	102

Quarter		TC 01	TC 02	TC 03	TC 04	TC 05	TC 06
Q1	2014	433	183	267	150	67	85
Q2	2014	10	17	53	3	20	2
Q3	2014	0	0	0	0	0	0
Q4	2014	25	25	120	0	0	25

*Note: Refer to Appendix B for spreadsheet of calculations

From Table 15, it can be seen that for transport corridors TC01, TC02, TC04 and TC05, the highest number of heavy vehicle movements during a quarter is expected to occur during the second quarter of 2012 (Q2 2012). For TC03, the highest volume during a quarter is during Q3 2012 while for TC06, the highest volume is expected to occur during Q1 2013 and Q2 2013.

Figure 5 Estimated Peak Heavy Vehicle Movements Per Quarter for the Duration of the Project



For an indication of the worst case scenario for the daily volume, the highest accumulated total per quarter for each transport corridor was divided by 60, assuming a 10 week work period per quarter and a 6 day work period per week. (refer to Table 16).

Table 16 Estimated Peak Heavy Vehicle Generation

Transport Corridor	Quarter with maximum volume	Peak Quarterly Heavy Vehicle Generation	Estimated Peak Daily Heavy Vehicle Generation	State Controlled Roads to be Impacted
TC 01	Q2	1178	20	Bruce Highway
TC 02	Q2	1517	26	Bruce Highway Bowen Developmental Road Collinsville-Elphinstone Road
TC 03	Q3	2339	39	Peak Downs Highway Cerito Developmental Road
TC 04	Q2	850	15	Peak Downs Highway Suttor Developmental Road
TC 05	Q2	1014	17	Gregory Developmental Road Gregory Highway
TC 06	Q1	961	17	Capricorn Highway Clermont – Alpha Road
Total		7859	134	

- Note: This is calculated assuming a 10 week work period per quarter and a 6 day work period per week.

Table 16 provides an estimate for peak daily heavy vehicle generation for each transport corridor. This represents the additional volume to be added to the daily traffic of each road section along the nominated transport corridor particularly to the SCRs that form part of the transport corridor.

4.6.2 Construction Workforce (Construction Camps)

The construction workforce will comprise of approximately 2,300 workers to be accommodated at five main construction camps located within close proximity to the railway alignment (refer to

Figure 4). The workers will travel to and from the rail corridor via the local road network. The locations of the construction work camps are:

- Salisbury Plains;
- Collinsville;
- Wollombi;
- Gregory; and,
- Alpha Mine.

- It is planned to have the above work camps constructed concurrently. All construction personnel will be employed on the basis of a Fly-In-Fly-Out work roster, working three weeks on site followed by one week of rest and recreation. This means that each person generally travels to and from the camp site once every 4 weeks. Coach trips to transport the workforce to and from the rail construction camps will connect with routine commercial flights or charter flights at the regional airport.

- The workforce is expected to leave the camp between the hours of 6:00 and 7:00 a.m. and return between 5:00 and 6:00 p.m. The transport of construction personnel will be made by a 50 seat coach. Staff movements from the camp-sites to the railway line is expected to be short distances and confined within the rail corridor.

- Camps 1 to 4 are expected to be operational by January 2012 while Camp 5 would commence operation in April 2012. The period of occupation of Camp 1 would be 3.5 years and would be longer by one year compared to Camps 2, 3 and 4. Camp 5 would be occupied for 2 years. Figure 6 shows the period and duration of each camp and outlines the period of peak manning.

- Table 17 details the camp size and the associated vehicle movements and access routes.

Figure 6 Period of Occupation and Peak Manning of Camps

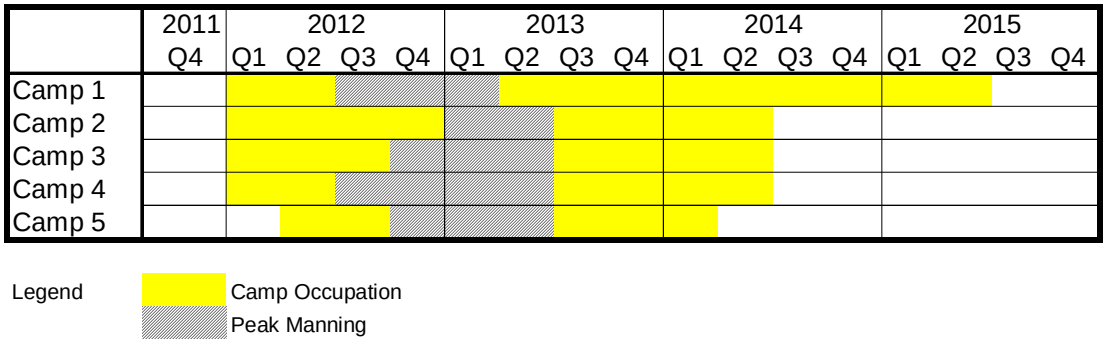


Table 17 Details of Camp and Proposed Coach Route to Camp

Camp	Location	Peak Occupancy	Peak Coach Movements Per Week	Peak Drive-in/ Drive-out Per Week	Proposed FIFO Airport	Proposed Coach Route
1	Salisbury	570	4	195	Proserpine	Proserpine to Camp 1

Camp	Location	Peak Occupancy	Peak Coach Movements Per Week	Peak Drive-in/ Drive-out Per Week	Proposed FIFO Airport	Proposed Coach Route
	Plains					via Bruce Highway to Salisbury Plains
2	Collinsville	450	4	65	Proserpine	Proserpine to Camp 2 via Bruce Highway, Bowen Developmental Road
3	Wollombi	700	4	10	Mackay	Mackay to Camp 3 via Peak Downs Highway, Collinsville-Elphinstone Road or Suttor Developmental Road
4	Gregory	470	4	0	Emerald	Emerald to Camp 4 via Gregory Developmental Road
5	Alpha Mine	380	4	0	Alpha	Capricorn Highway to Alpha Mine Camp
Total		2570	20	270		

- Source: Calibre Rail (CJVP10007-REP-G-024)

4.6.3 Other light vehicle generation

- It is also anticipated that a small number of people will drive to site in personal vehicles. Camp 1 located at Salisbury Plains and Camp 2 located at Collinsville is in close proximity to existing residential areas where a proportion of the workforce would potentially be residing and who would select to drive to work from home.

- Additional vehicle movements will also be generated by service vehicles supplying the camps. This would typically include services such as food transport, linen laundering, fuel supplies, waste management contractors and maintenance servicemen (e.g. air conditioning, generators, potable water and waste water treatment plants). Movements attributed to service vehicles are assumed to be light vehicle movements and are likely to be spread out throughout the day.

- It is estimated that approximately up to 20 service vehicle movements occur per week at each camp.

4.6.4 Total Vehicle Generation

Heavy vehicles will comprise of coach movements for personnel transport from the nominated airports to the camp sites and heavy vehicle movements attributed to transport and delivery of plant and material.

Coach vehicle movements will total 20 vehicle movements per week for personnel transport from the various airports to the campsites. It is likely that the arrival of personnel will occur before the AM peak hour but departure could coincide during the PM peak hour.

Heavy vehicle movements attributed to plant and material supply deliveries were estimated for each transport corridor, as shown in Table 15. The proportion of these movements occurring during the AM and PM peak periods is conservatively estimated at approximately 50%.

In summary, the estimated total vehicle movements for the worst-case scenario are shown in Table 18.

Table 18 Estimated Total Vehicle Movements (Worst-case Scenario)

Vehicle Movements	Maximum Daily (vehicles per day)[1]	Average Daily (vehicles per day)[2]	Peak Hour (vehicles per hour)[3]
Light vehicle movements by service personnel	34		17
Heavy vehicle movements on			
◗ Bruce Highway	48	20	24
◗ Bowen Developmental Road	28	10	14
◗ Peaks Down Highway	56	25	28
◗ Cerito Developmental Road	39	19	20
◗ Collinsville Elphinstone	17	10	9
◗ Suttor Developmental Road	17	8	9
◗ Gregory Developmental Road	19	8	10
◗ Capricorn Highway	19	7	10
◗ Clermont – Alpha Road	17	7	9
◗ Total heavy vehicle movements	260	114	133

[1] Calculated based on the identified transport corridors and estimated truck movements per corridor. The maximum is taken from the highest volume for a quarter divided by 10 weeks per quarter and 6 days per week.

[2] The average number of vehicles per day was calculated by taking the total vehicle movements for each corridor for the duration of the project and divided by the number of days the transport corridor will be used for haulage.

[3] The peak hour volume is conservatively estimated as 50% of the daily volume.

Table 18 summarises the total number of additional vehicle movements per day on the impacted road sections. In the case of haulage vehicles, the impacted roads have been determined based on the routes defined for each transport corridor (refer to Table 16). For coach vehicles, the impacted roads have been identified based on the travel routes to be taken from the airport of origin to the destination camp (refer to Table 17).

5. Traffic Impact of the Proposal

This section examines the traffic implications of the project on the external road network in terms of traffic efficiency and road safety**.**

5.1 Impact of Construction on the State Controlled Road Network

The increase in traffic volumes on transport corridors, and the State Controlled Road network is summarised in Table 19. In absolute terms, increases in traffic volumes are minor. Even if allowing a conservative car equivalence for trucks, volumes are below problem thresholds.

Table 19 presents the impact of the additional traffic movements on the key roads and the anticipated level of service assuming worst-case scenario. In totality, this additional volume is unlikely to impact on the existing road network operations as it is expected to have spare capacity beyond this additional volume.

Table 19 Impact of Additional Traffic Movements on the State-Controlled Roads

Road ID	Road Name	Existing		Additional Vehicles With Project				Percent Increase	
		AADT (2009 TMR Counts)	Percent Heavy Vehicles	Light Vehicles (per day)	Heavy Vehicles (per day)	ADT	Percent Heavy Vehicles	Percent Increase in AADT	Percent Increase in Heavy Vehicles
10 J	Bruce Highway (Proserpine-Bowen)								
	Site 90003	3,189	17.5%	-	4	3,193	17.6%	0.1%	0.1%
	Site 90050	5,196	17.5%	-	4	5,200	17.5%	0.1%	0.0%
10K	Bruce Highway (Bowen-Ayr)								
	Site 90051	6,404	11.1%	34	48	6,486	11.7%	1.3%	0.6%
	Site 90042	2,650	19.1%	34	48	2,732	20.3%	3.1%	1.2%
	Site 91439	6,946	11.4%	34	48	7,028	11.9%	1.2%	0.5%
	Site 90004	8,518	10.1%	34	48	8,600	10.6%	1.0%	0.5%
	Site 91396	10,695	3.8%	34	48	10,777	4.2%	0.8%	0.4%
88A	Bowen Developmental Road (Bowen-Collinsville)								
	Site 91705	1,400	15.4%	10	28	1,438	16.9%	2.7%	1.5%
	Site	758	13.2%	10	28	796	16.1%	5.0%	2.9%

Road ID	Road Name	Existing		Additional Vehicles With Project				Percent Increase	
		AADT (2009 TMR Counts)	Percent Heavy Vehicles	Light Vehicles (per day)	Heavy Vehicles (per day)	ADT	Percent Heavy Vehicles	Percent Increase in AADT	Percent Increase in Heavy Vehicles
	90019								
	Site 91468	859	16.9%	10	28	897	19.3%	4.4%	2.4%
	Site 91421	2,985	7.4%	10	28	3,023	8.2%	1.3%	0.8%
88B	Bowen Developmental Road (Collinsville – Belyando Crossing)								
	Site 91545	754	24.3%	-	26	780	26.8%	3.4%	2.5%
	Site 91469	193	34.8%	-	26	219	42.5%	13.5%	7.7%
	Site 90069	38	45.2%	-	26	64	67.5%	68.4%	22.3%
98A	Gregory Developmental Road (Clermont-Belyando Crossing								
	Site 150016	312	31.9%	4	19	335	35.4%	7.4%	3.5%
27B	Gregory Highway (Emerald-Clermont)								
	Site 150025	2,235	17.5%	4	19	2,256	18.2%	0.9%	0.7%
	Site 159565	1,624	18.4%	4	19	1,647	19.3%	1.4%	0.9%
	Site 150015	1,006	24.0%	4	19	1,029	25.3%	2.3%	1.3%
27C	Gregory Highway (Clermont-Mt Douglas)								
	Site 159536	2,339	19.8%	4	19	2,362	20.4%	0.9%	0.6%
	Site 159640	1,001	22.4%	4	19	1,024	23.8%	2.3%	1.4%
82A	Suttor Developmental Road (Nebo-Mount Coolon)								
	Site 82701	876	19.2%	14	17	907	20.4%	3.5%	1.2%
	Site 80183	305	16.6%	14	17	336	20.1%	10.2%	3.5%
	Site 82801	38	22.1%	14	17	69	36.8%	81.6%	14.7%
	Site 90064	43	22.9%	14	17	74	36.3%	72.1%	13.4%

Road ID	Road Name	Existing		Additional Vehicles With Project				Percent Increase	
		AADT (2009 TMR Counts)	Percent Heavy Vehicles	Light Vehicles (per day)	Heavy Vehicles (per day)	ADT	Percent Heavy Vehicles	Percent Increase in AADT	Percent Increase in Heavy Vehicles
5307	Collinsvale Elphinstone Road								
	Site 83223	1,012	12.9%	14	26	1,052	14.9%	4.0%	2.0%
	Site 82790	588	19.3%	14	26	628	22.2%	6.8%	2.9%
	Cerito Development Road								
		NA		-	39				
33A	Peak Downs Highway (Clermont – Nebo)								
	Site 80147	3,377	15.2%	14	56	3,447	16.5%	2.1%	1.3%
	Site 80146	2,706	17.4%	14	56	2,776	18.9%	2.6%	1.5%
	Site 80197	3,379	17.8%	14	56	3,449	19.1%	2.1%	1.3%
	Site 82884	3,241	17.3%	14	56	3,442	21.6%	3.0%	1.7%
33B	Peak Downs Highway (Nebo – Mackay)								
	Site 80009	3,645	16.4%	14	56	3,715	17.6%	1.9%	1.2%
	Site 83159	4,460	16.3%	14	56	4,530	17.3%	1.6%	1.0%
	Site 80020	5,426	11.1%	14	56	5,496	11.9%	1.3%	0.8%
	Site 82777	8,614	9.2%	14	56	8,684	9.7%	0.8%	0.5%
	Site 82778	14,799	9.2%	14	56	14,869	9.5%	0.5%	0.3%
	Site 82838	10,728	12.8%	14	56	10,798	13.2%	0.6%	0.4%
	Site 82839	11,676	11.1%	14	56	11,746	11.5%	0.6%	0.4%
552	Clermont Alpha Road								
	Site 150011	377	12.2%	-	17	394	16.0%	4.5%	3.8%
	Site 159563	80	24.4%	-	17	97	37.6%	21.2%	13.2%

Road ID	Road Name	Existing		Additional Vehicles With Project				Percent Increase	
		AADT (2009 TMR Counts)	Percent Heavy Vehicles	Light Vehicles (per day)	Heavy Vehicles (per day)	ADT	Percent Heavy Vehicles	Percent Increase in AADT	Percent Increase in Heavy Vehicles
	Site 159647	16	30.9%	-	17	33	66.5%	106.2%	35.6%
	Site 159564	83	26.4%	-	17	100	38.9%	20.5%	12.5%
16C	Capricorn Highway								
		NA		4	19				

Notes : Site numbers refer to DMR Count sites

[1] NA - no data available

The DMR's Guidelines for Assessment of Road Impacts for Development (April 2006) stipulates that the extent of impact of the project on the SCR network can be assessed on the basis of percentage increase in existing AADT. Where the construction or operational traffic generated by the development equals or exceeds 5% of the existing AADT on the road section, traffic operation impacts need to be considered.

As shown in Table 19 above, the estimated traffic generated by the project will exceed the threshold 5% increase in AADT at two of the road sections listed above. However, it is also noted that the actual traffic volumes are very low (generally less than 350 vehicles per day) and is therefore not considered to have a significant impact on the performance and operation of the road network, and will any case apply for not more than six months. This corresponds to the time period within the overall duration of the project where heavy vehicle movements are expected to be highest.

Table 20 shows the expected increase in traffic on these roads from the construction activity are considered minor and the analysis of the expected future volumes indicates there is ample spare capacity during peak and daily conditions. It should be noted that the level of service of the road sections have not change significantly.

Table 20 Road Network Capacity Assessment of Impacted SCR Network

Road ID	Road Name	AADT	Peak Hour Two way Flow	Two way Flow Capacity	V/C[1]	LOS
10J	Bruce Highway (Proserpine-Bowen)					
	Site 90003	3,193	319	2800	0.11	B
	Site 90050	5,200	520	2800	0.19	C
10K	Bruce Highway (Bowen-Ayr)					
	Site 90051	6,486	649	2800	0.23	C

Road ID	Road Name	AADT	Peak Hour Two way Flow	Two way Flow Capacity	V/C[1]	LOS
	Site 90042	2,732	273	2800	0.09	B
	Site 91439	7,028	703	2800	0.25	C
	Site 90004	8,600	860	2800	0.31	D
	Site 91396	10,777	1,078	2800	0.38	D
88A	Bowen Developmental Road					
	(Bowen –Collinsville)					
	Site 91705	1,438	144	2800	0.05	A
	Site 90019	796	80	2800	0.03	A
	Site 91468	897	90	2800	0.03	A
	Site 91421	3,023	302	2800	0.11	B
88B	Bowen Developmental Road					
	(Collinsville – Belyando Crossing)					
	Site 91545	780	78	2800	0.03	A
	Site 91469	219	22	2800	0.01	A
	Site 90069	64	74	2800	0.002	A
98A	Gregory Developmental Road (Clermont-Belyando Crossing)	335	34	2800	0.01	A
	Site 150016					
27B	Gregory Highway (Emerald-Clermont)					
	Site 150025	2,256	226	2800	0.08	A
	Site 159565	1,647	165	2800	0.06	A
	Site 150015	1,029	103	2800	0.04	A
27C	Gregory Highway (Clermont-Mt Douglas)	2,362	236	2800	0.08	A
	Site 159536	1,024	102	2800	0.04	A
	Site 159640					
82A	Suttor Developmental Road					
	(Nebo-Mount Coolon)					
	Site 82701	997	100	2800	0.04	A
	Site 80183	336	34	2800	0.01	A
	Site 82801	69	7	2800	0.002	A

Road ID	Road Name	AADT	Peak Hour Two way Flow	Two way Flow Capacity	V/C[1]	LOS
	Site 90064	74	7	2800	0.003	A
5307	Collinsvale Elphinstone Road					
	Site 83223	1,052	106	2800	0.04	A
	Site 82790	628	63	2800	0.02	A
	Cerito Development Road	NA[2]				
5309	Kilcummin-Diamond Downs Road Site					
	Site 159539	61	6	2800	0.012	A
33A	Peak Downs Highway (Clermont-Nebo) [3]					
	Site 80147	3,447	348	2800	0.12	C
	Site 80146	2,776	278	2800	0.10	B
	Site 80197	3,449	345	2800	0.12	C
	Site 82884	3,442	344	2800	0.13	C
33B	Peak Downs Highway (Nebo-Mackay) [3]					
	Site 80009	3,715	371	2800	0.13	C
	Site 83159	4,530	453	2800	0.16	C
	Site 80020	5,496	550	2800	0.19	D
	Site 82777	8,684	868	2800	0.31	D
	Site 82778	14,869	1,487	2800	0.53	E
	Site 82838	10,798	1,080	2800	0.39	E
	Site 82839	11,746	1,175	2800	0.42	E
552	Clermont Alpha Road					
	Site 150011	394	39	2800	0.01	A
	Site 159563	97	10	2800	0.003	A
	Site 159647	33	3	2800	0.00	A
	Site 159564	100	10	2800	0.004	A

Notes:

[1] NA - no data available

[2] Assuming ratio of design hour volume to AADT is 10% and road sections are in level terrain

[3] Peaks Down Road is situated in undulating terrain

5.2 Impact of Level Crossing Construction

The method of construction to be applied at each level crossing is yet to be determined. The temporary closures of at least one lane is likely to be required and a traffic management plan will be developed in consultation with the relevant road authority prior to construction. Given the low levels of traffic on most roads, it is expected that minimal delays would be experienced. However, appropriate traffic management plans will need to be developed to ensure safety and efficiency is maintained during construction activities, for all road users.

5.3 Impact of Grade Separated Crossing Construction

Construction of grade separated crossings is unlikely to cause any significant traffic delays on existing roads. It may be necessary to close one lane on a short term basis during construction. This will be addressed through a construction traffic management plan to be developed during the detailed design stage of the project, to ensure safety and efficiency is maintained for all road users.

5.4 Traffic Impact during Railway Operation

When the railway is operational, occasional access to and from the corridor will be required to conduct periodic inspections and maintenance works. However, it is anticipated that traffic volumes associated with these activities will be minimal and infrequent.

However, where maintenance works coincide with rail/road crossings and safety requirements require the closure of road lanes to road traffic, a traffic management plan should be prepared in consultation with the local authorities.

Traffic impacts associated with railway operations at crossings can be further assessed when a more detailed operational plan has been developed for the transport of coal from the Alpha Mine to the Port of Abbot Point. Standard safety procedures for rail operations, however, will apply at these road crossings and special procedures will be identified in the traffic management plan to be prepared to regulate and control access.

5.5 Impact on School Bus Routes and Pubic Routes

Access routes for the project may overlap with school bus routes. The relatively low number of school bus services and the relatively short time of operation within the day, it is expected that there would be a negligible impact on operation of existing school bus routes. Any potential impacts will be addressed in detail when traffic management plans for construction and operation.

Communication and awareness will be critical to managing impacts on school bus routes during both construction and operation, such that school bus operators are aware of any safety issues, and the construction workforce is aware of the routes and timing of school buses. If necessary, bus stops can be temporarily or permanently relocated to avoid conflict with level crossings.

Special safety precautions will need to be addressed as part of the Traffic Management Plan. These will include minimising the exposure of school bus travel to trucking operations, making truck drivers aware of the presence of school buses etc.

5.6 Impact on Road Network

The base case assessment has been on the basis of the daily haulage loading on the daily ESAs currently on the road elements without the haulage for the railway. The assessment is based on:

- Current commercial vehicles detail as derived from data provided by the DMR;
- Proposed road haulage use; and
- Assumed growth rate of 3%.

- The growth rate was applied to determine the traffic volume applicable at the time of design, for a pavement that is now 5 years, 10 years, 15 years, or 20 years old. The design ESAs for the existing pavement have been calculated based on the estimated traffic volume for a pavement with a 20 year design life from the time of opening. Pavements 20 years old have the lowest number of design ESAs. All impacts are discussed below on the basis of the pavements being 20 years old.

- The railway construction scenario assessment has considered the pavement loading incurred by the haulage of the railway materials. The proportion of the total base case pavement life used by the haulage is set out in Appendix C. Appendix C shows, the maximum daily ESAs generated by the construction of the railway on state controlled roads will exceed the 5% increase limit set by the Department of Main Roads on Bowen Development Road (Sites 90019, 90069), Suttor Development Road (Sites 82801, 90064), and Peaks Down Highway (Site 80146) . However, this increase in daily ESA is only applicable during specific periods within the 36-month construction period.

- It is noted that the Project does not result in long-term increase of ESA above 5% on any state controlled road as ongoing heavy trucks will not be regularly used subsequent to completion of the construction phase.

- The data in Appendix D also indicate that if the pavements are 20 years old, the pavement design life used during the haulage of the construction plant and materials is generally less than 1% of the total pavement life. The only roads on the selected routes where the increase in the pavement loading is greater than 1% of the pavement life for pavements 20 years old are Bruce Highway (Site 91396) and Peak Downs Highway (Sites 82777, 82778, 82838, 83839).

- In summary, the majority of the SCR are suitable to trucking operations and improvements to pavement condition, carriageway alignment and widths, are not required based on the desktop assessment. If repair work is are required during construction activities, a contribution to improvement work will be made by Hancock Prospecting Pty Ltd.

6. Summary and Conclusions

6.1 Overview

The traffic impact assessment has examined a wide range of issues relation to traffic impacts of the proposed Alpha Rail project. From the traffic point of view, the assessment has sought to address the following key issues:

- Examine the traffic implications for road haulage during the construction activities;
- Undertake and assessment of the road environment and traffic conditions;
- Determine impact of haulage on pavement conditions; and
- Consider mitigation measures to address any adverse impacts.

Key off-site traffic issues mainly relate to:

- Use of identified road segments on the SCR network for access by heavy vehicles for delivery of plant and material;
- Disruption to traffic due to road/lane closures brought about by construction activities at road crossings;
- Increase in travel time to existing road users;
- Ability of the roads to handle the volume of construction traffic particularly in regard to over-size and over-mass vehicles;
- Road safety; and
- Traffic management measures.

6.2 Key Findings

6.2.1 Traffic Impact

The volume and intensity of truck movements will increase over varying amounts during the 36 month construction period. The short-term increases in traffic volumes on the road network and their duration have been determined. Based on the nominal capacity of the road network, the additional construction traffic due to the project can be adequately accommodated at acceptable levels of service.

The delivery of materials and equipment that will be spread over the construction period can be regulated wherever possible to minimise any adverse impacts on the local community. Construction of level crossings will be planned and managed to minimise delays as well as to ensure that adequate warning is available to motorists.

6.2.2 Road Impact

- It is noted that the Project does not result in long-term increase of ESA above 5% on any state controlled road as ongoing heavy trucks will not be regularly used subsequent to completion of the construction phase.

- The majority of the SCR are suitable to trucking operations and improvements to pavement condition, carriageway alignment and widths, are not required based on the desktop assessment. If repair work is are required during construction activities, a contribution to improvement work will be made by Hancock Prospecting Pty Ltd.

6.2.3 Road Safety Measures

Special safety precautions would need to be provided regarding any conflicts with local traffic. Truck movements within the urban areas would be limited and truck drivers would be made aware of the bus services for local transport and school transport and locations of stops and lay-bys.

6.3 Key Conclusions

The following conclusions are made based on the above investigations:

- The existing road conditions are generally considered satisfactory to accommodate the additional number and type of vehicles to be generated by the construction works;
- The assessment of the additional traffic demand as a consequence of the construction works indicate that it would be modest when distributed on the surrounding road network and would not result in any major adverse effects on the operational performance or capacity and have minimal impact on the current network operations;
- The additional traffic demand, as a consequence of the proposed construction works is not likely to have a significant effect on the pavement conditions and if damage results during the construction, repairs will be undertaken by Hancock Prospecting Pty Ltd. to restore conditions to its normal condition.
- Traffic management issues shall be addressed through the preparation and implementation of a Traffic Management Plan (TMP), to be developed during the detailed design phase. This TMP shall be developed in consultation with the relevant DMR Regional offices, police and local authorities of councils impacted. This document will be considered a live document that can be amended to suit special or unforeseen situations or address specific concerns that may arise during the construction works. The traffic management plan will address key safety and logistical issues that may arise due to:
  - vehicle crossings at major and minor road intersections;
  - safety risks brought about by increased heavy vehicle traffic;
  - lane closures; and the use of single-lane local access roads.
  - Mitigation measures will be identified to address each of these issues. Where, and when necessary, a separate site-specific local traffic management plan will be prepared.

6.4 Mitigation Measures

A number of mitigating measures have been identified to ensure that transport and traffic impacts arising from the construction and operation are minimised. These measures will be incorporated into the TMP. An important mitigation measure relating to construction traffic impacts is the implementation of a community information and awareness program. This program will need to be initiated prior to construction commencing and continue throughout the entire construction period to ensure that local residents are fully aware of the construction activities, with particular regard to construction traffic issues.

The awareness program shall identify communication protocols for community feedback on issues relating to construction vehicle driver behaviour and construction-related matters.

Other initiatives that need to be undertaken as part of the Traffic Management Plan include:

- In consultation with the DMR, identify mitigation measures to address the relative increase in traffic levels (>5% or a percentage value to be nominated by Main Roads) on affected road sections of the SCR network;
- In consultation with DMR, ensure general signposting of access roads with appropriate heavy vehicle and construction warning signs;
- Review of speed restrictions along SCR network and where necessary, additional signposting of speed limitations;
- Installation of specific warning signs at local access roads to the construction corridor to warn existing road users of entering and exiting traffic;
- Distribution of day warning notices to advise local road users of scheduled construction activities;
- Advance notice of road/lane closures and advice on alternative routes;
- Installation of appropriate traffic control and warning signs for areas identified where potential safety risk issues exist;
- Manage the transportation of construction materials to maximise vehicle loads to therefore minimise vehicle movements;
- Whenever practical vehicles associated with the construction works should use internal and haulage access roads instead of public roads; and
- Induction of truck and vehicle operators on the requirements of the Traffic Management Plan.

Appendix A

AADT Data for Selected Road Sections

DTMR Count Sites

							Class 3		Class 4		Class 5		Class 6		Class 7		Class 8		Class 9		Class 10		Class 11		Class 12	
							G	A	G	A	G	A	G	A	G	A	G	A	G	A	G	A	G	A	G	A
Year	Road	**Site No**	**Description**	**Gazettal**	**Against Gazettal**	**Both**																				
2008	Bowen to Ayr	90042	WiM site Guthalungra	1325	1325	2650	4.52%	5.32%	1.39%	1.39%	0.18%	0.17%	0.30%	0.27%	0.46%	0.45%	0.80%	0.78%	6.17%	5.56%	5.58%	4.52%	0.10%	0.22%	0.00%	0.01%
2008	Proserpine to Bowen	90050	1km south of Bowen connection	2601	2595	5196	5.14%	5.46%	2.24%	1.36%	0.41%	0.21%	0.23%	0.26%	0.48%	0.52%	0.54%	0.56%	4.48%	4.36%	4.29%	4.11%	0.19%	0.18%	0.01%	0.01%
2008	Bowen to Collinsville	91705	WiM site Collinsville	693	707	1400	8.45%	7.10%	1.74%	1.88%	0.50%	0.51%	8.00%	8.00%	0.16%	0.16%	0.43%	0.52%	3.17%	3.23%	1.31%	1.40%	0.05%	0.07%	0.00%	0.00%
2008	Bowen to Collinsville	91468	300m North of Garrick St	430	429	859	8.15%	7.59%	2.00%	1.91%	0.71%	0.77%	0.36%	0.32%	0.32%	0.27%	0.54%	0.51%	2.22%	2.53%	1.74%	1.82%	0.99%	0.99%	0.05%	0.04%
2008	Bowen to Collinsville	91421	Adj. Collinsville Police Stn	1501	1457	2958	3.79%	5.18%	0.90%	0.79%	0.23%	0.24%	0.10%	0.12%	0.12%	0.11%	0.15%	0.13%	0.64%	0.76%	0.50%	0.54%	0.29%	0.30%	0.01%	0.01%
2008	Collinsville to Belyando crossing	91545	100m West of Aerodrome road	378	376	754	11.13%	10.28%	5.09%	5.14%	1.47%	1.46%	0.18%	0.16%	0.49%	0.46%	0.28%	0.14%	2.85%	3.21%	1.86%	2.03%	0.73%	0.85%	0.13%	0.12%
2008	Collinsville to Belyando crossing	91469	5km West of Bowen river	97	96	193									*No Traffic Class Data Found*											
2009	Collinsville to Elphinstone Road	83223	East of Sandy Creek	511	501	1012	6.28%	6.84%	1.17%	1.02%	0.51%	0.40%	0.25%	0.23%	0.07%	0.19%	0.40%	0.45%	1.49%	1.29%	2.02%	2.01%	0.44%	0.58%	0.05%	0.05%
2009	Collinsville to Elphinstone Road	82790	30m west of Isaacs River	289	299	588	7.08%	7.00%	2.15%	1.88%	0.93%	1.01%	0.36%	0.32%	0.30%	0.28%	0.91%	0.34%	3.04%	3.33%	3.44%	4.13%	0.99%	0.97%	0.04%	0.04%
2009	Nebo to Mt. Coolon	82701	East of Cattle Creek	443	443	876	7.29%	7.43%	2.78%	2.70%	1.07%	0.87%	14.00%	0.22%	0.38%	0.36%	0.49%	1.02%	2.73%	2.58%	3.69%	2.93%	0.72%	0.91%	0.05%	0.01%
2009	Nebo to Mt. Coolon	80183	50m West of Isaacs River Bridge	144	161	305	7.35%	7.20%	3.20%	3.38%	0.95%	0.92%	0.10%	0.19%	0.38%	0.19%	0.38%	0.09%	1.92%	2.49%	1.43%	1.64%	0.59%	0.60%	0.03%	0.06%
2009	Nebo to Mt. Coolon	82801	Floodway West of North Goonyella	20	18	38	11.56%	13.09%	2.04%	2.18%	0.68%	0.00%	0.34%	0.00%	0.34%	0.73%	0.00%	0.36%	1.02%	1.09%	1.36%	0.36%	2.38%	2.91%	1.70%	2.18%
2008	Nebo to Mt. Coolon	90064	300m South of Bowen dev. Road	23	20	43	13.68%	14.09%	0.75%	1.08%	0.00%	0.00%	0.25%	0.54%	0.75%	0.54%	0.50%	1.08%	1.49%	2.17%	1.00%	0.81%	2.24%	1.63%	1.74%	1.63%
2008	Collinsville to Belyando crossing	90069	3km East of Mt Coolon	17	21	38	7.82%	6.92%	2.04%	1.54%	0.34%	0.00%	1.02%	0.77%	1.02%	0.26%	3.06%	1.03%	6.80%	3.33%	3.74%	1.03%	11.90%	36.15%	0.00%	0.26%
2009	Clermont to Nebo	150012	150m West of Isaac River	1198	1129	2372	7.88%	9.97%	2.15%	2.16%	0.89%	0.93%	0.22%	0.24%	0.54%	0.59%	0.20%	0.22%	2.85%	2.69%	3.20%	3.18%	0.95%	0.98%	0.03%	0.02%
2009	Clermont to Nebo	159613	Between Dysart T/O amd Moranbah Access Rd.	1180	1174	2354	9.95%	9.70%	1.89%	1.88%	0.91%	0.93%	0.27%	0.28%	0.45%	0.46%	0.17%	0.17%	2.26%	2.21%	2.59%	2.63%	1.61%	1.59%	0.04%	0.02%
2009	Clermont to Nebo	150013	33 A between Moranbaj T/O and Dysart T/O	1180	1174	2354	5.93%	5.95%	2.13%	2.11%	1.38%	1.40%	0.30%	0.29%	0.67%	0.69%	0.36%	0.42%	2.99%	3.29%	4.31%	4.21%	2.49%	2.44%	0.03%	0.02%
2009	Kilcummin to Diamond Downs Road	159539	1km North of 98A	31	30	61	16.86%	22.16%	2.22%	1.53%	0.15%	0.15%	0.15%	0.36%	1.26%	1.53%	0.96%	1.17%	2.37%	2.41%	0.81%	1.38%	2.81%	2.62%	0.89%	1.46%
2009	Clermont to Belyando Crossing	150016	Greg Dev. 70m N Kilcummin-Diamond Dwns Rd.	154	158	312	6.80%	7.81%	1.09%	1.81%	0.21%	0.35%	0.54%	0.65%	1.37%	1.50%	0.55%	0.65%	4.04%	5.25%	4.17%	5.66%	9.64%	8.17%	1.92%	1.78%
2009	Clermont to Alpha Road	150011	350m West of Clermont Connect Road	192	185	377	6.09%	11.40%	1.01%	0.96%	0.04%	0.17%	0.07%	0.09%	0.35%	0.49%	0.13%	0.21%	0.51%	0.47%	0.57%	0.51%	0.69%	0.50%	0.29%	0.05%
2009	Clermont to Apha Road	159563	4km from Clermont	41	39	80	16.69%	14.28%	1.44%	1.83%	0.05%	0.18%	0.27%	0.13%	0.63%	0.71%	0.81%	1.07%	1.71%	1.78%	0.99%	0.62%	1.22%	1.56%	1.35%	1.34%
2009	Clermont to Alpha Road	159647	100m W of Mistake Creek State School	6	10	16	15.20%	6.22%	3.22%	1.40%	0.00%	0.31%	0.88%	0.31%	1.46%	0.47%	0.88%	0.78%	4.09%	2.49%	4.09%	0.78%	7.60%	5.13%	7.31%	4.82%

Appendix B

Calculated Truck Movements

Haulage for Transport Corridors

Pre-Construction Investigation and Testing

		TC1	TC2	TC3	TC4	TC5	TC6
Q4	2011	8.67	8.67	8.67	9.5	12.5	
Q1	2012	2	2	2	3	1.25	
Q2	2012	2	2	2	3	1.25	
Q3	2012	2	2	2	3	1.25	
Q4	2012	2	2	2	3	1.25	
Q1	2013	8.67	8.67	8.67	9.5		
Q2	2013						
Q3	2013						
Q4	2013						
Q1	2014						
Q2	2014						
Q3	2014						
Q4	2014						

Pioneering Works

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		TC1	TC2	TC3	TC4	TC5	TC6
Q4	2011	31.67	31.67	31.67	31.67	31.67	
Q1	2012	16.67	16.67	16.67	16.67	16.67	20
Q2	2012	31.67	31.67	31.67	31.67	31.67	
Q3	2012						
Q4	2012						
Q1	2013						
Q2	2013						
Q3	2013						
Q4	2013						
Q1	2014						
Q2	2014						
Q3	2014						
Q4	2014						

Camps and Construction Depots

		TC1	TC2	TC3	TC4	TC5	TC6
Q4	2011	480	445	380	380		
Q1	2012	450	420	360	360		
Q2	2012	450	420	360	360		
Q3	2012	480	445	380	380		
Q4	2012						
Q1	2013						
Q2	2013						
Q3	2013						
Q4	2013						
Q1	2014						
Q2	2014						
Q3	2014						
Q4	2014						

Earthworks and Drainage

		TC1	TC2	TC3	TC4	TC5	TC6
Q4	2011	135	150	135	135	135	62.5
Q1	2012	135	150	135	135	135	62.5
Q2	2012	135	150	135	135	135	62.5
Q3	2012	135	150	135	135	135	62.5
Q4	2012	100	100	100	100	100	66.67
Q1	2013	100	100	100	100	100	66.67
Q2	2013	100	100	100	100	100	66.67
Q3	2013	146.67	166.67	146.67	146.67	146.67	83.34
Q4	2013	146.67	166.67	146.67	146.67	146.67	83.34
Q1	2014	146.67	166.67	146.67	146.67	146.67	83.34
Q2	2014						
Q3	2014						
Q4	2014						

Corrugated Steel

		TC1	TC2	TC3	TC4	TC5	TC6
Q4	2011		2.5		2.5		
Q1	2012		2.5		2.5		
Q2	2012	30	126.67	30	100		
Q3	2012	30	126.67	30	100		
Q4	2012		131.67		105		
Q1	2013						
Q2	2013						
Q3	2013						
Q4	2013						
Q1	2014						
Q2	2014						
Q3	2014						
Q4	2014						

Reinforced Box Culverts

		TC1	TC2	TC3	TC4	TC5	TC6
Q4	2011						
Q1	2012						
Q2	2012	16.67	66.67	26.67	26.67	100	
Q3	2012	16.67	66.67	26.67	26.67	100	
Q4	2012	16.67	66.67	26.67	26.67	100	
Q1	2013						
Q2	2013						
Q3	2013						
Q4	2013						
Q1	2014						
Q2	2014						
Q3	2014						
Q4	2014						

Bridges

		TC1	TC2	TC3	TC4	TC5	TC6
Q4	2011						
Q1	2012						
Q2	2012	23.33	33.33	28.33	8.33	38.33	4.17
Q3	2012	23.33	33.33	28.33	8.33	38.33	4.17
Q4	2012	8.33	8.33	8.33	3.33	8.33	1.67
Q1	2013	8.33	8.33	8.33	3.33	8.33	1.67
Q2	2013	8.33	8.33	8.33	3.33	8.33	1.67
Q3	2013	8.33	8.33	8.33	3.33	8.33	1.67
Q4	2013	10	16.67	13.33	3.33	20	1.67
Q1	2014	10	16.67	13.33	3.33	20	1.67
Q2	2014	10	16.67	13.33	3.33	20	1.67
Q3	2014						
Q4	2014						

Bridge Material

		TC1	TC2	TC3	TC4	TC5	TC6
Q4	2011						
Q1	2012						
Q2	2012	464	661.2	92.2	185.6	707.6	858.4
Q3	2012	464	661.2	92.2	185.6	707.6	858.4
Q4	2012	464	661.2	92.2	185.6	707.6	858.4
Q1	2013	464	661.2	92.2	185.6	707.6	858.4
Q2	2013	464	661.2	92.2	185.6	707.6	858.4
Q3	2013						
Q4	2013						
Q1	2014						
Q2	2014						
Q3	2014						
Q4	2014						

SUMMARY

	TC1	TC2	TC3	TC4	TC5	TC6
Q4 2011	655.34	637.84	605.34	558.67	179.17	62.5
Q1 2012	603.67	591.17	563.67	517.17	152.92	82.5
Q2 2012	1177.67	1516.54	1154.44	850.27	1013.85	950.07
Q3 2012	1167.67	1501.54	2339.44	838.6	982.18	941.74
Q4 2012	607.67	986.54	1874.44	423.6	917.18	943.41
Q1 2013	704.34	831.54	1872.44	318.43	859.26	961.41
Q2 2013	695.67	822.87	1863.77	308.93	859.26	961.41
Q3 2013	555.01	228.34	2004.91	170	198.33	119.68
Q4 2013	440.01	200.01	711.91	150	166.67	101.68
Q1 2014	433.34	183.34	266.67	150	166.67	85.01
Q2 2014	10	16.67	53.33	3.33	20	1.67
Q3 2014	0	0	0	0	0	0
Q4 2014	25	25	120	0	0	25

Sleeper

		TC1	TC2	TC3	TC4	TC5	TC6
Q4	2011			30			
Q1	2012			30			
Q2	2012			428.57			
Q3	2012			428.57			
Q4	2012			428.57			
Q1	2013			428.57			
Q2	2013			428.57			
Q3	2013			428.57			
Q4	2013			428.57			
Q1	2014						
Q2	2014						
Q3	2014						
Q4	2014			60			

Short Rail String Supply

		TC1	TC2	TC3	TC4	TC5	TC6
Q4	2011						
Q1	2012						
Q2	2012						
Q3	2012			1200			
Q4	2012			1200			
Q1	2013			1200			
Q2	2013			1200			
Q3	2013			1200			
Q4	2013						
Q1	2014						
Q2	2014						
Q3	2014						
Q4	2014						

Rail String Welding

		TC1	TC2	TC3	TC4	TC5	TC6
Q4	2011			20			
Q1	2012			20			
Q2	2012			20			
Q3	2012			16.67			
Q4	2012			16.67			
Q1	2013			16.67			
Q2	2013			16.67			
Q3	2013			16.67			
Q4	2013			16.67			
Q1	2014						
Q2	2014						
Q3	2014						
Q4	2014			60			

Turnouts

		TC1	TC2	TC3	TC4	TC5	TC6
Q4	2011						
Q1	2012						
Q2	2012						
Q3	2012						
Q4	2012						
Q1	2013	90	10	10	10	10	10
Q2	2013	90	10	10	10	10	10
Q3	2013	90	10	10	10	10	10
Q4	2013						
Q1	2014						
Q2	2014						
Q3	2014						
Q4	2014						

Level Crossing panels

		TC1	TC2	TC3	TC4	TC5	TC6
Q4	2011						
Q1	2012						
Q2	2012						
Q3	2012						
Q4	2012						
Q1	2013	16.67	26.67	8	10	33.33	8
Q2	2013	16.67	26.67	8	10	33.33	8
Q3	2013	16.67	26.67	8	10	33.33	8
Q4	2013						
Q1	2014						
Q2	2014						
Q3	2014						
Q4	2014						

Ballast Production

		TC1	TC2	TC3	TC4	TC5	TC6
Q4	2011						
Q1	2012						
Q2	2012	25	25				25
Q3	2012	16.67	16.67				16.67
Q4	2012	16.67	16.67				16.67
Q1	2013	16.67	16.67				16.67
Q2	2013	16.67	16.67				16.67
Q3	2013	16.67	16.67				16.67
Q4	2013	16.67	16.67				16.67
Q1	2014						
Q2	2014						
Q3	2014						
Q4	2014	25	25				25

Tracklaying

		TC1	TC2	TC3	TC4	TC5	TC6
Q4	2011						
Q1	2012						
Q2	2012						
Q3	2012						
Q4	2012						
Q1	2013						
Q2	2013						
Q3	2013			186.67			
Q4	2013			106.67			
Q1	2014			106.67			
Q2	2014			40			
Q3	2014						
Q4	2014						

Rolling Stock

		TC1	TC2	TC3	TC4	TC5	TC6
Q4	2011						
Q1	2012						
Q2	2012						
Q3	2012						
Q4	2012						
Q1	2013						
Q2	2013						
Q3	2013	276.67					
Q4	2013	266.67					
Q1	2014	276.67					
Q2	2014						
Q3	2014						
Q4	2014						

Appendix C

Calculated ESALS for Selected Road Sections

DTMR Count Sites

Appendix C Estimated Traffic Loading per Road Section

Road ID	Road Name	Existing					Additional Vehicles With Project				Percent Increase in Annual Heavy Vehicle Traffic
		AADT (2009 TMR Counts)	Percent Heavy Vehicles	No. of Heavy Vehicles per Day	ESA per Day	ESA per Year	Average Heavy Vehicles (per day)	Construction Traffic ESA/Day	Construction Duration	Total Construction Traffic ESA	
10 J	Bruce Highway (Proserpine-Bowen)										
	Site 90003	3,189	17.50%	558	1,786	651,832	4	25	120	2,976	0.5%
	Site 90050	5,196	17.50%	909	2,910	1,062,062	4	25	120	2,976	0.3%
10K	Bruce Highway (Bowen-Ayr)										
	Site 90051	6,404	11.10%	711	2,275	830,266	20	124	170	21,080	2.5%
	Site 90042	2,650	19.10%	506	1,620	591,183	20	124	170	21,080	3.6%
	Site 91439	6,946	11.40%	792	2,534	924,874	20	124	170	21,080	2.3%
	Site 90004	8,518	10.10%	860	2,753	1,004,851	20	124	170	21,080	2.1%
	Site 91396	10,695	3.80%	406	1,301	474,687	20	124	170	21,080	4.4%
88A	Bowen Developmental Road (Bowen-Collinsville)										
	Site 91705	1,400	15.40%	216	690	251,821	10	62	96	5,952	2.4%
	Site 90019	758	13.20%	100	320	116,865	10	62	96	5,952	5.1%
	Site 91468	859	16.90%	145	465	169,560	10	62	96	5,952	3.5%
	Site 91421	2,985	7.40%	221	707	258,000	10	62	96	5,952	2.3%
88B	Bowen Developmental Road (Collinsville – Belyando Crossing)										

Road ID	Road Name	Existing					Additional Vehicles With Project				Percent Increase in Annual Heavy Vehicle Traffic
		AADT (2009 TMR Counts)	Percent Heavy Vehicles	No. of Heavy Vehicles per Day	ESA per Day	ESA per Year	Average Heavy Vehicles (per day)	Construction Traffic ESA/Day	Construction Duration	Total Construction Traffic ESA	
	Site 91545	754	24.30%	183	586	214,003	10	62	96	5,952	2.8%
	Site 91469	193	34.80%	67	215	78,448	10	62	96	5,952	7.6%
	Site 90069	38	45.20%	17	55	20,062	10	62	96	5,952	29.7%
98A	Gregory Developmental Road (Clermont-Belyando Crossing)										
	Site 150016	312	31.90%	100	318	116,249	8	50	64	3,174	2.7%
27B	Gregory Highway (Emerald-Clermont)										
	Site 150025	2,235	17.50%	391	1,252	456,834	8	50	64	3,174	0.7%
	Site 159565	1,624	18.40%	299	956	349,017	8	50	64	3,174	0.9%
	Site 150015	1,006	24.00%	241	773	282,002	8	50	64	3,174	1.1%
27C	Gregory Highway (Clermont-Mt Douglas)										
	Site 159536	2,339	19.80%	463	1,482	540,926	8	50	64	3,174	0.6%
	Site 159640	1,001	22.40%	224	718	261,894	8	50	64	3,174	1.2%
82A	Suttor Developmental Road (Nebo-Mount Coolon)										
	Site 82701	876	19.20%	168	538	196,448	8	50	55	2,728	1.4%
	Site 80183	305	16.60%	51	162	59,136	8	50	55	2,728	4.6%
	Site 82801	38	22.10%	8	27	9,809	8	50	55	2,728	27.8%
	Site 90064	43	22.90%	10	32	11,501	8	50	55	2,728	23.7%
5307	Collinsvale Elphinstone Road										

Road ID	Road Name	Existing					Additional Vehicles With Project				Percent Increase in Annual Heavy Vehicle Traffic
		AADT (2009 TMR Counts)	Percent Heavy Vehicles	No. of Heavy Vehicles per Day	ESA per Day	ESA per Year	Average Heavy Vehicles (per day)	Construction Traffic ESA/Day	Construction Duration	Total Construction Traffic ESA	
	Site 83223	1,012	12.90%	131	418	152,480	10	62	96	5,952	3.9%
	Site 82790	588	19.30%	113	363	132,549	10	62	96	5,952	4.5%
	Cerito Development Road										
		d.n.a.					19				
33A	Peak Downs Highway (Clermont – Nebo)										
	Site 80147	3,377	15.20%	513	1,643	599,539	25	155	189	29,295	4.9%
	Site 80146	2,706	17.40%	471	1,507	549,946	25	155	189	29,295	5.3%
	Site 80197	3,379	17.80%	601	1,925	702,508	25	155	189	29,295	4.2%
	Site 82884	3,241	17.30%	561	1,794	654,889	25	155	189	29,295	4.5%
33B	Peak Downs Highway (Nebo – Mackay)										
	Site 80009	3,645	16.40%	598	1,913	698,207	25	155	189	29,295	4.2%
	Site 83159	4,460	16.30%	727	2,326	849,113	25	155	189	29,295	3.5%
	Site 80020	5,426	11.10%	602	1,927	703,470	25	155	189	29,295	4.2%
	Site 82777	8,614	9.20%	792	2,536	925,626	25	155	189	29,295	3.2%
	Site 82778	14,799	9.20%	1362	4,357	1,590,241	25	155	189	29,295	1.8%
	Site 82838	10,728	12.80%	1373	4,394	1,603,879	25	155	189	29,295	1.8%
	Site 82839	11,676	11.10%	1296	4,147	1,513,770	25	155	189	29,295	1.9%

Road ID	Road Name	Existing					Additional Vehicles With Project				Percent Increase in Annual Heavy Vehicle Traffic
		AADT (2009 TMR Counts)	Percent Heavy Vehicles	No. of Heavy Vehicles per Day	ESA per Day	ESA per Year	Average Heavy Vehicles (per day)	Construction Traffic ESA/Day	Construction Duration	Total Construction Traffic ESA	
552	Clermont Alpha Road										
	Site 150011	377	12.20%	46	147	53,721	7	43	6	260	0.5%
	Site 159563	80	24.40%	20	62	22,799	7	43	6	260	1.1%
	Site 159647	16	30.90%	5	16	5,775	7	43	6	260	4.5%
	Site 159564	83	26.40%	22	70	25,593	7	43	6	260	1.0%
16C	Capricorn Highway										
		d.n.a.			0	0	7	43	61		

Note: Site numbers refer to TMR Count sites

Appendix D

Impact of Haulage on Pavement Loadings

DTMR Count Sites

Appendix D Impact of Haulage

Road ID	Road Name	Additional Vehicles With Project				Segment Length	Assumed Growth Rate	Proportion of 20 Year Pavement Design Life Used by Current Pavement Age							
								5 years		10 years		15 years		20 years	
		Average Heavy Vehicles (per day)	Construction Traffic ESA/Day	Construction Duration	Total Construction Traffic ESA			Design	%life used	Design	%life used	Design	%life used	Design	%life used
10 J	Bruce Highway (Proserpine-Bowen)														
	Site 90003	4	25	120	2,976	29.9	3%	2.6.E+05	0.01%	2.2.E+05	0.01%	1.9.E+05	0.02%	1.7.E+05	0.02%
	Site 90050	4	25	120	2,976	2.8	3%	2.5.E+04	0.12%	2.1.E+04	0.14%	1.8.E+04	0.16%	1.6.E+04	0.19%
10K	Bruce Highway (Bowen-Ayr)														
	Site 90051	20	124	170	21,080	7.0	3%	6.1.E+04	0.35%	5.3.E+04	0.40%	4.5.E+04	0.47%	3.9.E+04	0.54%
	Site 90042	20	124	170	21,080	91.3	3%	8.0.E+05	0.03%	6.9.E+05	0.03%	5.9.E+05	0.04%	5.1.E+05	0.04%
	Site 91439	20	124	170	21,080	4.6	3%	4.0.E+04	0.52%	3.5.E+04	0.60%	3.0.E+04	0.70%	2.6.E+04	0.81%
	Site 90004	20	124	170	21,080	7.7	3%	6.7.E+04	0.31%	5.8.E+04	0.36%	5.0.E+04	0.42%	4.3.E+04	0.49%
	Site 91396	20	124	170	21,080	1.6	3%	1.4.E+04	1.56%	1.2.E+04	1.81%	1.0.E+04	2.10%	8.7.E+03	2.43%
88A	Bowen Developmental Road (Bowen-Collinsville)														
	Site 91705	10	62	96	5,952	9.1	3%	7.9.E+04	0.08%	6.8.E+04	0.09%	5.9.E+04	0.10%	5.1.E+04	0.12%
	Site 90019	10	62	96	5,952	68.6	3%	6.0.E+05	0.01%	5.2.E+05	0.01%	4.4.E+05	0.01%	3.8.E+05	0.02%
	Site 91468	10	62	96	5,952	2.3	3%	2.0.E+04	0.30%	1.7.E+04	0.34%	1.5.E+04	0.40%	1.3.E+04	0.46%
	Site 91421	10	62	96	5,952	1.2	3%	1.1.E+04	0.56%	9.2.E+03	0.65%	7.9.E+03	0.75%	6.8.E+03	0.87%

Road ID	Road Name	Additional Vehicles With Project				Segment Length	Assumed Growth Rate	Proportion of 20 Year Pavement Design Life Used by Current Pavement Age							
								5 years		10 years		15 years		20 years	
		Average Heavy Vehicles (per day)	Construction Traffic ESA/Day	Construction Duration	Total Construction Traffic ESA			Design	%life used	Design	%life used	Design	%life used	Design	%life used
88B	Bowen Developmental Road (Collinsville – Belyando Crossing)														
	Site 91545	10	62	96	5,952	7.3	3%	6.4.E+04	0.09%	5.5.E+04	0.11%	4.7.E+04	0.13%	4.1.E+04	0.15%
	Site 91469	10	62	96	5,952	36.0	3%	3.1.E+05	0.02%	2.7.E+05	0.02%	2.3.E+05	0.03%	2.0.E+05	0.03%
	Site 90069	10	62	96	5,952	113.8	3%	9.9.E+05	0.01%	8.6.E+05	0.01%	7.4.E+05	0.01%	6.4.E+05	0.01%
98A	Gregory Developmental Road (Clermont-Belyando Crossing														
	Site 150016	8	50	64	3,174	157.9	3%	1.4.E+06	0.00%	1.2.E+06	0.00%	1.0.E+06	0.00%	8.8.E+05	0.00%
27B	Gregory Highway (Emerald-Clermont)														
	Site 150025	8	50	64	3,174	16.2	3%	1.4.E+05	0.02%	1.2.E+05	0.03%	1.0.E+05	0.03%	9.0.E+04	0.04%
	Site 159565	8	50	64	3,174	35.9	3%	3.1.E+05	0.01%	2.7.E+05	0.01%	2.3.E+05	0.01%	2.0.E+05	0.02%
	Site 150015	8	50	64	3,174	53.8	3%	4.7.E+05	0.01%	4.0.E+05	0.01%	3.5.E+05	0.01%	3.0.E+05	0.01%
27C	Gregory Highway (Clermont-Mt Douglas)														
	Site 159536	8	50	64	3,174	9.8	3%	8.6.E+04	0.04%	7.4.E+04	0.04%	6.4.E+04	0.05%	5.5.E+04	0.06%
	Site 159640	8	50	64	3,174	4.2	3%	3.6.E+04	0.09%	3.1.E+04	0.10%	2.7.E+04	0.12%	2.3.E+04	0.14%
82A	Suttor Developmental Road (Nebo-Mount Coolon)														

Road ID	Road Name	Additional Vehicles With Project				Segment Length	Assumed Growth Rate	Proportion of 20 Year Pavement Design Life Used by Current Pavement Age							
								5 years		10 years		15 years		20 years	
		Average Heavy Vehicles (per day)	Construction Traffic ESA/Day	Construction Duration	Total Construction Traffic ESA			Design	%life used	Design	%life used	Design	%life used	Design	%life used
	Site 82701	8	50	55	2,728	52.8	3%	4.6.E+05	0.01%	4.0.E+05	0.01%	3.4.E+05	0.01%	3.0.E+05	0.01%
	Site 80183	8	50	55	2,728	17.0	3%	1.5.E+05	0.02%	1.3.E+05	0.02%	1.1.E+05	0.02%	9.5.E+04	0.03%
	Site 82801	8	50	55	2,728	52.0	3%	4.5.E+05	0.01%	3.9.E+05	0.01%	3.4.E+05	0.01%	2.9.E+05	0.01%
	Site 90064	8	50	55	2,728	39.9	3%	3.5.E+05	0.01%	3.0.E+05	0.01%	2.6.E+05	0.01%	2.2.E+05	0.01%
5307	Collinsvale Elphinstone Road														
	Site 83223	10	62	96	5,952	25.4	3%	2.2.E+05	0.03%	1.9.E+05	0.03%	1.6.E+05	0.04%	1.4.E+05	0.04%
	Site 82790	10	62	96	5,952	24.6	3%	2.1.E+05	0.03%	1.9.E+05	0.03%	1.6.E+05	0.04%	1.4.E+05	0.04%
	Cerito Development Road														
		19													
33A	Peak Downs Highway (Clermont – Nebo)														
	Site 80147	25	155	189	29,295	26.2	3%	2.3.E+05	0.13%	2.0.E+05	0.15%	1.7.E+05	0.17%	1.5.E+05	0.20%
	Site 80146	25	155	189	29,295	21.4	3%	1.9.E+05	0.16%	1.6.E+05	0.18%	1.4.E+05	0.21%	1.2.E+05	0.25%
	Site 80197	25	155	189	29,295	14.3	3%	1.2.E+05	0.24%	1.1.E+05	0.27%	9.2.E+04	0.32%	8.0.E+04	0.37%
	Site 82884	25	155	189	29,295	14.6	3%	1.3.E+05	0.23%	1.1.E+05	0.27%	9.4.E+04	0.31%	8.1.E+04	0.36%
33B	Peak Downs Highway (Nebo – Mackay)														
	Site 80009	25	155	189	29,295	44.5	3%	3.9.E+05	0.08%	3.3.E+05	0.09%	2.9.E+05	0.10%	2.5.E+05	0.12%
	Site 83159	25	155	189	29,295	17.2	3%	1.5.E+05	0.20%	1.3.E+05	0.23%	1.1.E+05	0.26%	9.6.E+04	0.31%

Road ID	Road Name	Additional Vehicles With Project				Segment Length	Assumed Growth Rate	Proportion of 20 Year Pavement Design Life Used by Current Pavement Age							
								5 years		10 years		15 years		20 years	
		Average Heavy Vehicles (per day)	Construction Traffic ESA/Day	Construction Duration	Total Construction Traffic ESA			Design	%life used	Design	%life used	Design	%life used	Design	%life used
	Site 80020	25	155	189	29,295	14.7	3%	1.3.E+05	0.23%	1.1.E+05	0.26%	9.6.E+04	0.31%	8.2.E+04	0.36%
	Site 82777	25	155	189	29,295	4.5	3%	3.9.E+04	0.75%	3.4.E+04	0.87%	2.9.E+04	1.00%	2.5.E+04	1.16%
	Site 82778	25	155	189	29,295	4.3	3%	3.8.E+04	0.78%	3.2.E+04	0.90%	2.8.E+04	1.05%	2.4.E+04	1.22%
	Site 82838	25	155	189	29,295	1.3	3%	1.2.E+04	2.53%	1.0.E+04	2.93%	8.6.E+03	3.40%	7.4.E+03	3.94%
	Site 82839	25	155	189	29,295	0.8	3%	7.2.E+03	4.05%	6.2.E+03	4.70%	5.4.E+03	5.44%	4.6.E+03	6.31%
552	Clermont Alpha Road														
	Site 150011	7	43	6	260	3.0	3%	2.6.E+04	0.01%	2.3.E+04	0.01%	1.9.E+04	0.01%	1.7.E+04	0.02%
	Site 159563	7	43	6	260	41.4	3%	3.6.E+05	0.00%	3.1.E+05	0.00%	2.7.E+05	0.00%	2.3.E+05	0.00%
	Site 159647	7	43	6	260	104.2	3%	9.1.E+05	0.00%	7.8.E+05	0.00%	6.8.E+05	0.00%	5.8.E+05	0.00%
	Site 159564	7	43	6	260	29.9	3%	2.6.E+05	0.00%	2.3.E+05	0.00%	1.9.E+05	0.00%	1.7.E+05	0.00%
16C	Capricorn Highway														
		7	43	61			3%								

Note: Site numbers refer to TMR Count sites

Appendix E

Logistics Plan

calibre RAIL

HANCOCK COAL PTY LTD

Calibre Rail

Alpha Coal Project
Rail Bankable Feasibility Study

Logistics Plan

HC-CRL-24100-RPT-0029
CJVP10007-REP-G-024

MASTER COPY

0	Issued for BFS	TW	SA	TL	GM	Mar 2011
A	Issued for Internal Review	KL				Dec 2010
Rev	**Description**	**Author**	**Checked**	**Approved**	**Authorised**	**Date**

CONTENTS

1.0 PURPOSE

The purpose of this report is to summarise the key logistics issues for construction of the Alpha Coal Railway. This includes an assessment of:

- Existing infrastructure;
- Project requirements for construction traffic, workforce transportation and freight;
- Quality assurance with respect to goods manufacture, delivery and receival; and
- Road improvements, road maintenance and new access tracks.

2.0 PROJECT OVERVIEW

2.1 General

Hancock Coal Pty Ltd (HCPL) is undertaking a Bankable Feasibility Study (BFS) into the development of a 30Mtpa open pit thermal coal mine within the Galilee Basin 50 km north of the Alpha township in central Queensland. This project is known as the Alpha Coal Project.

Of the major scope areas of the study, Calibre Rail (CAR) has been contracted to produce a BFS-level engineering study to optimise the preferred 510 km standard gauge rail configuration, including all necessary services and utilities along the route from the rail loops at Alpha Coal through to the port at Abbot Point Coal Terminal, north of Bowen.

The proposed railway alignment and temporary facility locations are shown in Figure 1. The temporary facility locations are the work front bases to which goods need to be shipped, and materials distributed from.

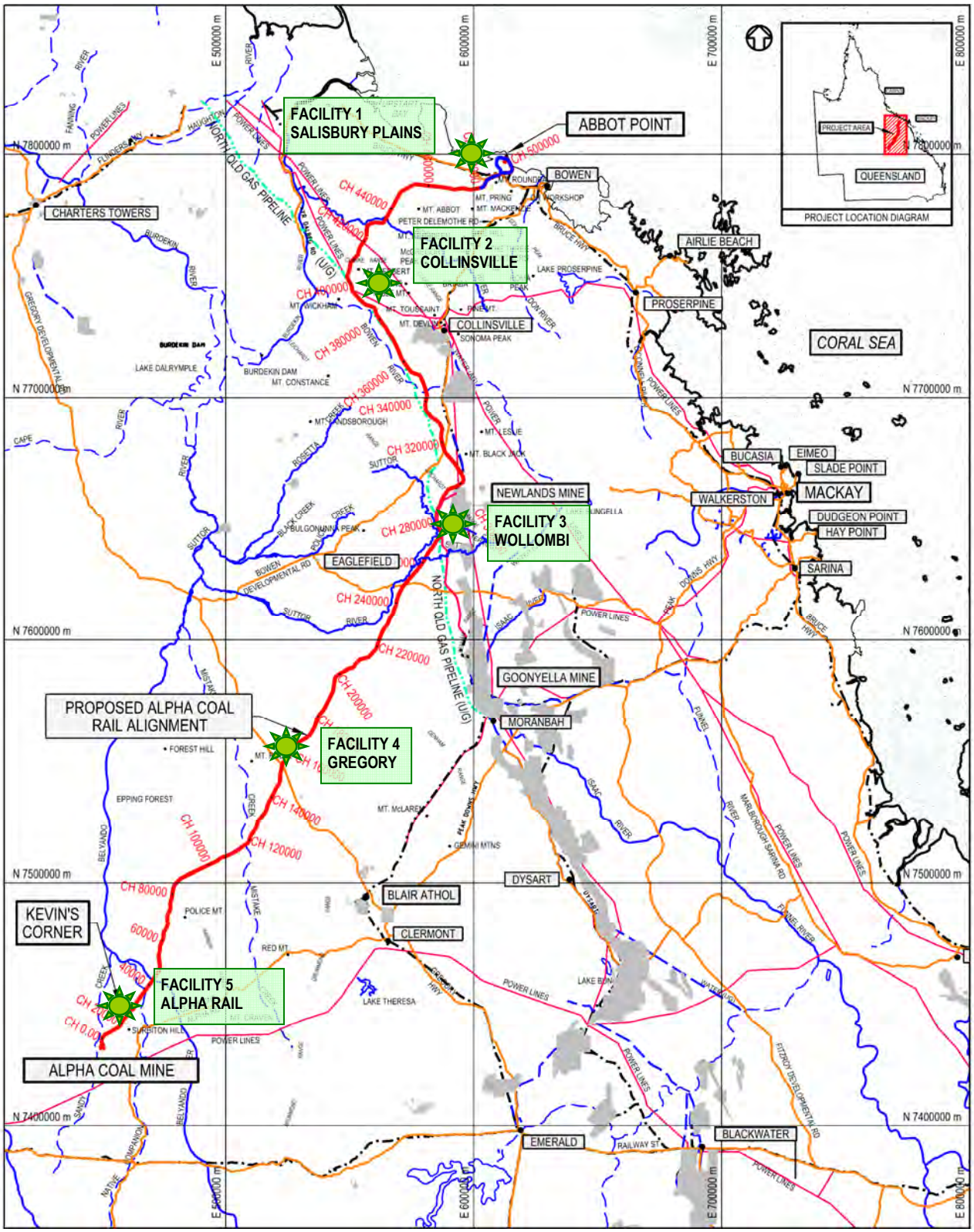


Figure 1 – Proposed Alpha Coal Railway Alignment and Temporary Facilities

3.0 DEFINITIONS

FAT	Factory Acceptance Test
HMCV	Heavy Multi Combination Vehicle
HV	Heavy Vehicle
IRC	Inspection and Release Certificate
LV	Light Vehicle

4.0 EXISTING INFRASTRUCTURE

4.1 Sea Ports

Ports in the vicinity of the Project are found at the following locations:

- Townsville;
- Abbot Point;
- Bowen;
- Mackay;
- Port Alma; and
- Gladstone.

A short summary of each facility follows.

4.1.1 Townsville

A comprehensive Port facility is located within the city of Townsville. The Port is one of Queensland's major facilities and handles a large range of international shipping services.

The Port is operated by the Port of Townsville Limited and serviced by Northern Shipping & Stevedoring and Patrick's Corporation. The Port of Townsville has 9 working berths, one of which handles general cargo. Cranes at the Port are capable of unloading all cargo needs for the Alpha Coal Railway Project. The Port has storage capabilities for up to 1,900 shipping containers and warehousing is available within 4 km of the Port.

Customs and quarantine inspection services are available at the Port of Townsville.

While the Port of Townsville can handle all cargo needs for the Project, it is some 200 km north of the northern end of the alignment. Road haulage distances to the Mine Loop and the main track construction depot at Wollombi are excessive, (refer to Table 1) however the proximity to Salisbury Plains will allow material for the marshalling yard and northern end of the project to be delivered here.

4.1.2 Abbot Point

There is an existing coal loading port at Abbot Point, at the northern end of the proposed Alpha Coal Railway. The facility is located approximately 30 km northwest of Bowen. The port is operated by North Queensland Ports Corporation Limited (NQBP).

The port does not currently handle importation of general cargo. There is proposed Abbot Point Multi Cargo Facility project to expand the port to incorporate an additional terminal with facilities for loading and unloading general freight. This is planned for completion in 2013 and may be available for the later stages of the Alpha Coal Railway Project.

The Abbot Point facility has not been included as a potential cargo port for the purposes of the Alpha Coal Rail BFS due to the lack of general freight capability at this time.

4.1.3 Bowen

The 700 m long Bowen Jetty was built in 1865 but is no longer an active cargo port. The jetty is used as a domestic facility and is the base for tugs servicing the Abbot Point Coal terminal.

Bowen is currently unsuitable as a port for the Alpha Coal Railway Project.

4.1.4 Mackay

A comprehensive port facility is located at Mackay Harbour. The port handles a large range of international shipping services.

The Port of Mackay is operated by North Queensland Ports Corporation Limited (NQBP) and serviced by Northern Stevedoring Services and Patrick's Corporation. The Port of Mackay has 4 working berths. Cranes at the port are capable of unloading all cargo needs for the Alpha Coal Railway Project and the port regularly handles deliveries of short rail strings. Facilities include a 2,000 m^2 cargo storage yard and 600 m^2 warehouse facility.

Customs and quarantine inspection services are available at the Port of Mackay.

There is no rail spur extending into the Port. If materials are transported to the Wollombi track construction depot by rail, short rail strings and other cargo would need to be road-hauled approximately 10 km from the port to the rail freight depot in Paget, South Mackay.

The Port of Mackay is recommended as the main port for importing rail and other general cargo for the Alpha Coal Railway Project. It offers the shortest road haul distance to the main track construction depot at Wollombi (refer to Table 1) and also the potential for rail transport using QR National's existing network.

4.1.5 Hay Point

The Port of Hay Point in Dalrymple Bay south of Mackay is the world's largest coal export port. This facility does not handle general freight and is unsuitable for importing material for the Alpha Coal Railway Project.

4.1.6 Port Alma

Port Alma Shipping Terminal is located 62 km east of Rockhampton on the southern tip of the Fitzroy River delta. The port's storage land totals 140 ha and is situated at nearby Bajool, approximately 20 km from Port Alma Shipping Terminal along the Bruce Highway.

The Port is operated by the Gladstone Port Corporation and has 3 berths, two for general cargo and one dolphin berth for handling of bulk liquids. Berths are supported by infrastructure suitable for handling containers of dry and refrigerated cargo.

The facility is suitable for smaller ships of up to 180 m in length, with maximum draught of approximately 5.5 m.

Port Alma has a 540 m^2 warehouse and container storage yards available for lease. The Port also owns a further 67 ha yard on the port access road near Bajool which could be used as a laydown area for such items as imported rail strings or portable buildings.

Quarantine and custom services are available at Port Alma, although no tugs operate from this location.

There is no rail spur extending into the Port. If materials are transported to the Wollombi track construction depot by rail, short rail strings and other cargo would need to be road-hauled approximately 20 km from the port to a rail freight depot in Bajool. Alternatively, if road only transport is selected, the road haul distance is over 500 km to site.

Port Alma is located south of the project and is less central to Wollombi than Mackay. It is not recommended as the main port of use for the Alpha Coal Railway construction, due to its location and vessel size restrictions, but could be a useful as a secondary port for the southern end of the project.

4.1.7 Gladstone

Gladstone is the primary port for central Queensland. The port is operated by the Gladstone Ports Corporation and serviced by Patrick's Stevedores, K&S Freighters and KG Smith & Co. The Port of Gladstone has 15 operational berths, one of which is a container handling berth. There is a mobile crane at the port. Facilities include 3.5 ha of heavy storage area, 1.5 ha of general storage area and a large (2,100 m^2) storage/packing shed.

There is rail access to the port, enabling imported rail strings and other materials to be directly loaded to freight trains from the port's general cargo and container facilities for rail transport to the Wollombi track construction depot.

The Port of Gladstone is located south of the project site and is not recommended as the primary port for the Alpha Coal Rail Project as it is not as centrally located as the Port of Mackay.

4.1.8 Recommendation

It is recommended to utilise the Mackay Port for the majority of sea freight for the Alpha Coal Project, due to the close proximity to the Track Construction Depot at Wollombi. It

may also be efficient to utilise the ports at Townsville and Gladstone / Port Alma for materials to be delivered to the northern and southern extents of the project.

Table 1 shows the approximate distance by road from each Port with suitable facilities to key locations on the proposed Alpha Coal Railway.

Port	Salisbury Plains Marshalling Yards (km)	Wollombi Track Construction Depot (km)	Alpha Mine Loop (km)
Townsville	180	460	640
Mackay	250	190	410
Port Alma	630	560	550
Gladstone	690	620	610

Table 1 - Approximate Road Travel Distances to Port Facilities

4.2 Airports and Airstrips

Regional airports in the vicinity of the Alpha Coal Rail alignment are located at:

- Townsville
- Mackay
- Proserpine
- Emerald
- Barcaldine
- Moranbah

In addition to these regional airports, airstrips already exist at the following locations:

- Alpha (sealed)
- Bowen (unsealed)
- Clermont (sealed)
- Collinsville (unsealed)
- Glenden (unsealed)
- Suttor (unsealed)

Air transport is not economically viable for freighting construction materials for the Project. Air traffic is only relevant with respect to personnel transport, as discussed in Section 6.

The above locations may be viable for emergency services to utilise in the event of an urgent medical situation, and in the case of an evacuation event personnel could be transported away from site.

4.3 Road Network and Vehicle Size Restrictions

Maps showing multi combination heavy vehicle routes in the Project region are included in Appendix A.

Routes inland from major ports to the rail alignment are generally restricted to single trailer road trains (36.5 m overall length) or B-Doubles (up to 23 m overall length).

The main road network constraint exists around Wollombi where there is no existing high-capacity network. There are four options for upgrading the access to provide an efficient heavy-haulage route to the proposed track construction depot:-

1. Upgrade 10 km of road between the Newlands Access Road and Wollombi. The Newlands Access Road is restricted to 23 m B-Doubles only (no road trains), which will limit the load size to the track construction depot;
2. Negotiate with Sunwater to use the existing water pipeline access track as the main access route from the Suttor Developmental Road and then upgrade 22 km of this maintenance access track. This option would enable 23 m B-Doubles or Type 1 (36.5 m) road trains to be used for road freight to Wollombi;
3. Negotiate with QR National to use the newly constructed Missing Link maintenance track to access Wollombi from the Suttor Developmental Road. This option requires works to 24 km of road and would enable 23 m B-Doubles or Type 1 (36.5 m) road trains to be used for road freight to Wollombi. If the access track was used for materials haulage during construction of the Missing Link rail, the section of road required to access Wollombi may only require minimal work to make it suitable for use in the construction of the Alpha Coal Railway;
4. Construct a new 5 km road in the gazetted Wollombi Road reserve between Newlands Access Road and Wollombi. This option would limit the road freight load size to 23 m B-Doubles due to the existing load limits on the Newlands Access Road.

It is recommended to implement Option 1, as it presents the least cost and most direct route to site. 5km of the road is unsealed but in good condition as it services a nearby mine, with the latter 5km requiring a full upgrade from the current farm access track.

4.4 Road Condition Assessment

A full baseline road condition assessment will need to be undertaken prior to Project implementation. This would include an assessment of the bridges and causeways within the transport corridors to determine their condition and load limit, if not already known by the local authority. Table 2 summarises road conditions observed during BFS preliminary field investigations for roads that intersect the proposed rail alignment.

Road	Approximate Intersection Rail Chainage (km)	Notes
Degulla Road	12.5	Reasonable – areas with black soil require upgrades for heavy vehicle usage.
Surbiton – Wendouree Road	14.0	Gazetted reserve but no road constructed
Eulmbie Road	33.0	Reasonable – areas with black soil require upgrades for heavy vehicle usage.
Albro – Pioneer Road	58.7	Reasonable – unsealed, some gradient in sections
Clermont – Laglan Road	104.4	Reasonable – some river crossings may not suit B-doubles.
Frankfield Road (South)	118.0	Reasonable – some sections are narrow and have short sight distances. Heavy vehicle speeds may be restricted to 60 km/hr.
Frankfield Road (North)	150.8	Reasonable – some sections are steep, narrow and have short sight distances. Heavy vehicle speeds may be restricted to 60 km/hr.
Gregory Developmental Road	154.3	Good -sealed
Golden Downs Road	172.2	Reasonable – areas with black soil require upgrades for heavy vehicle usage.
Dooruna Road	176.1	Reasonable but narrow
Diamond Downs – Eaglefield Road	215.7	Reasonable
Mabbin Road	220.9	Reasonable
Chesterfield Road	240.4	Track only
Suttor Developmental Road	250.4	Good - unsealed
Wollombi Road	274.7	Good / Farm access track
Cerito Developmental Road	288.5	Good - sealed
Cerito Road	299.0	Reasonable - unsealed
Collinsville – Elphinstone Road	317.7	Reasonable – unsealed, sharp gradients / corners in sections
Bowen Developmental Road	327.5	Good - sealed
Myuna Road (South)	357.6	Reasonable - unsealed
Myuna Road (North)	378.9	Reasonable - unsealed
Strathmore Road	382.5	Reasonable - unsealed
Johnny Cake Road	397.8	Reasonable - unsealed

Road	Approximate Intersection Rail Chainage (km)	Notes
Strathalbyn Road	434.3	Reasonable - unsealed
Tondara Road	Access	Reasonable - unsealed
Nevada Road	464.5	Reasonable - unsealed
Glenore Road	471.3	Reasonable - unsealed
Bruce Highway	492.9	Good -sealed

Table 2 – Qualitative Road Condition Assessment

4.5 Temporary Construction Roads

Temporary access roads and crossings will need to be built to facilitate construction of the Alpha Coal Railway. The main works required include:-

- Haul roads along the rail alignment;
- Temporary creek and river crossings for haul roads; and
- Temporary rail crossings.

5.0 VEHICLE MOVEMENTS GENERATED BY CONSTRUCTION ACTIVITIES

5.1 Proposed Transport Corridors

Figure 2 shows and Table 3 details the major public roads and relevant minor public roads that will be used to access the rail construction works. For the purpose of assessing the expected heavy vehicle construction and material transport movements, specific transport corridor identifications have been provided.

The transport corridors generally originate from the larger centres on the coast, where the main sea ports for importation and other material sources are located.

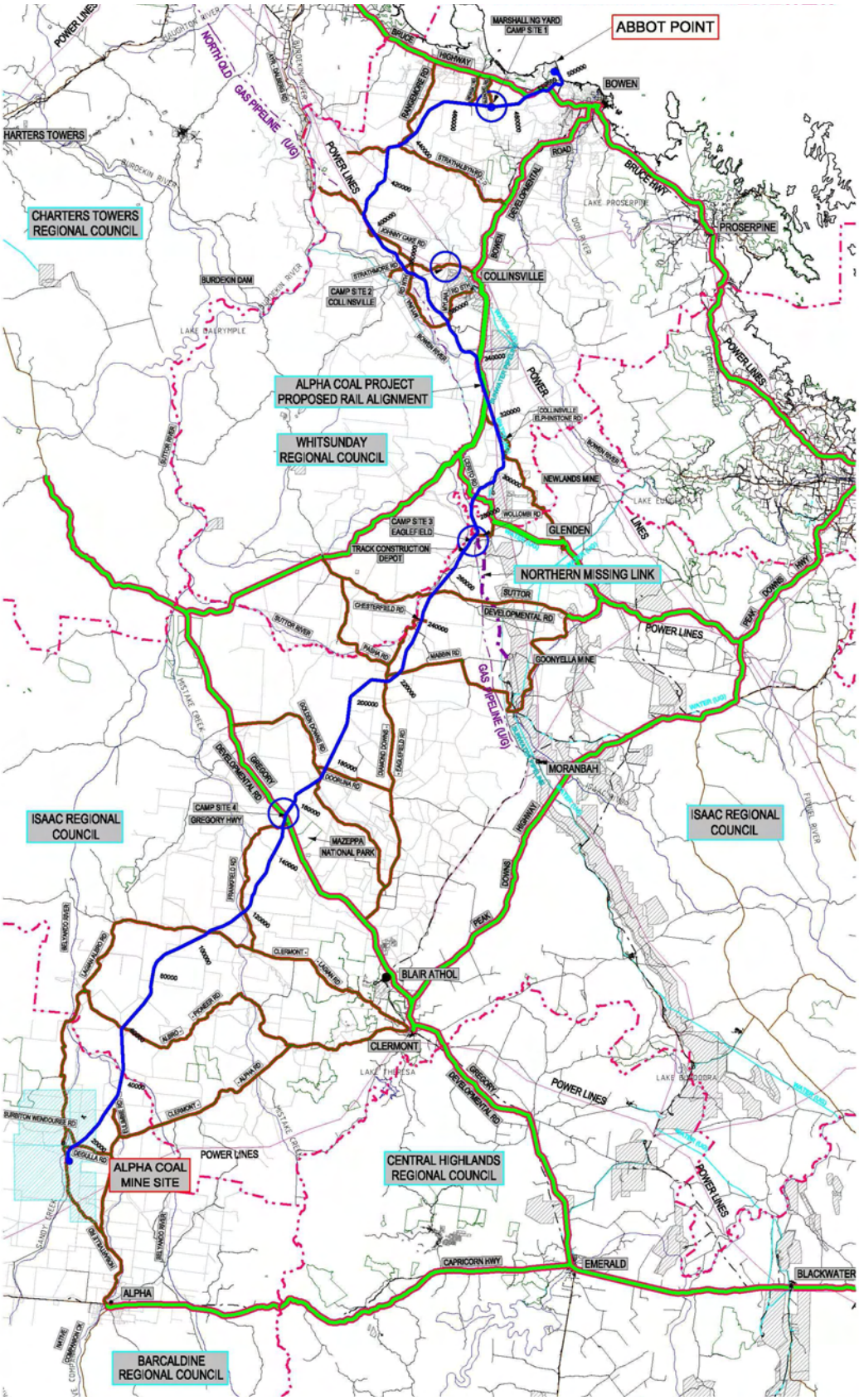


Figure 2 – Proposed Alpha Coal Railway Alignment and Road Network

Transport Corridor ID	Highway Route	Major Road	Minor Road	Areas Accessed	Features
TC1	Bruce Highway (Sealed)			CH 480 – 510 km	Highway Crossing, Rail Crossing
			Glenore Road (unsealed)	CH 465 – 480 km	Camp 1, Marshalling Yard, Elliott River
			Nevada Road (unsealed)	CH 455 – 465 km	
		Tondara Rd (unsealed)		CH 435 – 455 km	
TC2	Bowen Developmental Rd (Sealed)	Strathalbyn Rd (unsealed)		CH 415 – 435 km	Minor Crossing, Bogie River
		Strathmore Rd (unsealed)	Johnny Cake Rd (unsealed)	CH 380 – 415 km	Minor Crossing
		Strathmore Rd (unsealed)		CH 380 – 385 km	Minor Crossing, Camp 2
		Strathmore Rd (unsealed)	Myuna Rd North (unsealed)	CH 370 – 380 km	Minor Crossing
			Myuna Rd South (unsealed)	CH 350 – 370 km	Minor Crossing
				CH 320 – 350 km	Highway Crossing, Bowen River
		Collinsville – Elphinstone Rd (unsealed)		CH 300 – 320 km	Major Crossing
		Cerito Development Road (sealed)	Wollombi Rd (unsealed)	CH 260 – 300 km	Access, Camp 3, Construction facility, Major crossing

Transport Corridor ID	Highway Route	Major Road	Minor Road	Areas Accessed	Features
TC3	Peak Downs Hwy (Sealed);	Cerito Developmental Rd; (Sealed) Newlands Access Rd (Sealed)	Cerito Road (unsealed)	CH 290 – 300 km	Minor Crossing
				CH 280 – 290 km	Major Crossing
			Wollombi Rd (unsealed)	CH 260 – 280 km	Camp 3, Construction facility
TC4	Peak Downs Hwy (Sealed);	Suttor Developmental Rd; (Partly Sealed)		CH 245 – 260 km	Major Crossing
			Chesterfield Rd (unsealed)	CH 225 – 245 km	
			Mabbin Road (unsealed)	CH 215 – 225 km	Minor Crossing
TC5	Gregory Developmental Rd (Sealed)	Diamond Downs – Eaglefield Rd (unsealed)		CH 195 – 215 km	Major Crossing
		Diamond Downs – Eaglefield Rd (unsealed)	Dooruna Rd (unsealed)	CH 170 – 195 km	Minor Crossing
		Diamond Downs – Eaglefield Rd (unsealed)	Golden Downs Rd (unsealed)	CH 160 – 170 km	Minor Crossing
				CH 150 – 160 km	Camp Site 4, Major Crossing
			Frankfield Rd (unsealed)	CH 110 – 150 km	2 Minor Crossings, Mistake Creek
		Clermont – Laglan Rd (unsealed)		CH 80 – 110 km	Minor Crossing
		Albro – Pioneer Rd (unsealed)		CH 040 – 070 km	Minor Crossing
		Laglan – Albro Rd (unsealed)		CH 040 – 110km	Access

Transport Corridor ID	Highway Route	Major Road	Minor Road	Areas Accessed	Features
TC6	Capricorn Hwy (Sealed),	or Clermont – Alpha Road (unsealed)	Eulmbie Rd (unsealed)	CH 020 – 040 km	Kevin's Corner Area, Native Companion Creek, Belyando River
			Degulla Rd (unsealed)	CH 000 – 020 km	Camp 5, Alpha Mine Site, Minor Crossing, Depot

Table 3 – Major Transport Corridors

The following sections detail the sources of predicted construction-related traffic for the Alpha Coal Project Railway, and the forecast periods when this traffic will occur. Some of the construction traffic will travel directly to the Camp / Depot locations, with much of the heavy vehicle traffic suppling material to the project progressing straight to the work front site.

5.2 Pre-Construction Investigation and Testing

Investigation works generally include detailed ground breaking geotechnical investigation and construction water bore drilling. The works are planned to commence at the start of Q2 2011 and conclude by the end of Q2 2012.

Major plant likely to be used for these works includes drill rigs, backhoes, excavators, and water carts.

It is anticipated that once plant is mobilised to site it will generally work within the rail corridor with little need to re-use public roads. If plant is unable to cross a major river crossing, it may then be relocated to the other side of the waterway using public roads.

Light vehicles movements will be necessary on public roads for these activities until the camps and temporary haul roads are established.

The estimated number of heavy vehicle transport movements is summarised in Table 4 below:

Work Description	Transport Corridor	Estimated No of Heavy Vehicle Movement		
		Mobilisation	During Works	Demobilisation
Investigation Works Ch 435 – 510 km	TC1	30	15	30
Investigation Works Ch 300 – 435 km	TC2	20	10	20
Investigation Works Ch 260 – 300 km	TC3	20	10	20
Investigation Works Ch 215 – 260 km	TC4	20	10	20
Investigation Works Ch 040 – 215 km	TC5	30	15	30
Investigation Works Ch 000 – 040 km	TC6	10	10	10

Table 4 – Estimated Investigation Phase Heavy Vehicle Movements

5.3 Pioneering Works

Pioneering works generally include the clearing of a trace line along the rail centreline, installation of temporary fencing, construction of laydown areas for long lead material delivery and contractor areas, and, where required, the upgrade of existing tracks and the construction of intersections with public roads.

The major plant likely to be used for these works includes graders, water carts, dozers, excavators, trucks, rollers and drill rigs. Heavy freight vehicles will also be required to transport temporary offices and facilities to the worksites.

The works are planned to commence at the start of Q4 2011 and conclude by Q2 2012. All plant is required to be mobilised in Quarter 4 2011.

It is anticipated that once plant is mobilised to site it will generally work along the rail corridor without the need to re-use public roads. There are likely to be intersections where public roads will be used to relocate plant. The estimated number of heavy vehicle transport movements is summarised in Table 5 below:

Work Description	Transport Corridor	Estimated No of Heavy Vehicle Movement		
		Mobilisation	During Works	Demobilisation
Pioneering Works Ch 435 – 510 km	TC1	15	50	15
Pioneering Works Ch 300 – 435 km	TC2	15	50	15
Pioneering Works Ch 260 – 300 km	TC3	15	50	15
Pioneering Works Ch 215 – 260km	TC4	15	50	15
Pioneering Works Ch 040 – 215 km	TC5	15	50	15
Pioneering Works Ch 000 – 040 km	TC6		20	

Table 5 – Estimated Pioneering Works Heavy Vehicle Movements

5.4 Camps and Construction Depots

Buildings for camps may be obtained overseas or from the domestic market. Buildings that are procured from overseas are likely to be unloaded at the Port of Mackay then transported by road to the required camp sites. The majority of other construction materials will be sourced from the domestic market.

Camp construction works are planned to commence at the start of Quarter 4 2011 and be concluded by late Q3 2012.

Heavy vehicle movements for camp construction will generally include the transportation of transportable building modules on low-loaders and general materials freight (piping sections, cable drums, etc) using multi combination vehicles consistent with regulations for each road. Oversize loads requiring escort are not anticipated.

Construction plant such as graders, loaders, forklifts, mobile cranes, excavators, trucks and compactors will also need to be transported to site by road.

Concrete will generally be batched on site for each of the camps, with the exception of Camp 1. Pre-mixed concrete obtained from Bowen will nominally be used for Camp 1 construction. On site batching requires transport of cement. Aggregate and fines will be sourced from local quarries where possible, but may need to be transported from existing commercial facilities.

The estimated number of heavy vehicle transport movements is summarised in Table 6 below:

Work Description	Transport Corridor	Estimated No of Heavy Vehicle Movement		
		Mobilisation	During Works	Demobilisation
Camp Construction Camp 1 (Salisbury Plains)	TC1	25	1,680	25
Camp Construction Camp 2 (Collinsville)	TC2	20	1,440	20
Camp Construction Camp 3 (Wollombi)	TC3	30	1,800	30
Camp Construction Camp 4 (Gregory)	TC5	20	1,440	20

Table 6 – Estimated Camp Construction Heavy Vehicle Movements

5.5 Earthworks and Drainage

Earthworks and drainage activities include the preparation of temporary haul roads, constructing the rail formation and drainage works such as causeways and crossing natural (minor) water courses.

The works will involve a significant number of heavy vehicles, generally working in a number of localised areas once they have been mobilised to the required work front.

5.5.1 Earthworks and Material Haul

Earthworks construction includes site preparation, clearing, topsoil stripping, haul road construction, foundation preparation, drill and blast, material haulage, embankment construction, drainage construction, sub-ballast construction and rehabilitation.

Mobilisation of the earthworks contractors is likely to commence in Q1 2012 and be completely mobilised by early Q3 2012. Earthworks construction will commence on site in

Q2 2012 and will continue to Q1 2014. Demobilisation is likely to commence in Q3 2013 and be concluded by Q1 2014.

Plant and material that will typically be mobilised include temporary portable offices, workshop facilities, graders, dozers, water carts, excavators, loaders, haul trucks, road trains, scrapers, rollers, cranes, drill and blast equipment, construction water equipment, mobile concrete batch plants, and other major earthmoving equipment.

Once mobilised, the majority of works will be on the rail formation and traffic movements will typically be on temporary construction haul roads constructed adjacent to the proposed rail formation. Traffic movement on public roads are expected to be kept to a minimum.

Additional vehicle movements will also be created by service vehicles that will be part of earthworks construction. This would typically include services such as fuel supplies, waste removal, spare parts delivery and the like.

The estimated number of heavy vehicle transport movements is summarised in Table 7 below:

Work Description	Transport Corridor	Estimated No of Heavy Vehicle Movement		
		Mobilisation	During Works	Demobilisation
E/W Construction Ch 435 – 510 km	TC1	140	1,000	140
E/W Construction Ch 300 – 435 km	TC2	200	1,000	200
E/W Construction Ch 260 – 300 km	TC3	140	1,000	140
E/W Construction Ch 215 – 260 km	TC4	140	1,000	140
E/W Construction Ch 040 – 210 km	TC5	140	1,000	140
E/W Construction Ch 000 – 040 km	TC6	50	200	50

Table 7 – Estimated Earthworks Heavy Vehicle Movements

5.5.2 Corrugated Steel Culverts

Culvert manufacturing generally includes the delivery of steel sheets to site and the rolling of corrugated steel pipes on site.

The major plant and materials likely to be used of these works include mobile culvert rolling machines, forklifts, water carts, and heavy freight vehicles for the delivery of temporary portable buildings and steel coils.

Mobilisation will occur in Quarter 1 of 2012. The works are planned to commence at the start of Q2 2012 and steel coils will be delivered on site progressively between Q2 2012 and Q4 2012. Demobilisation will occur towards the end of Q4 2012.

It is anticipated that once plant and office facility is mobilised to site they will manufacture their first lot of culverts, then relocate to another site to manufacture their second lot and so on. The relocation works and steel coil material delivery will be done using the public roads. The estimated number of heavy vehicle transport movements is summarised in Table 8 below.

Work Description	Transport Corridor	Estimated No of Heavy Vehicle Movement		
		Mobilisation	During Works	Demobilisation
Culvert Manufacturing Ch 435 – 510 km	TC1		130	20
Culvert Manufacturing Ch 300 – 435 km	TC2	20	170	20
Culvert Manufacturing Ch 260 – 300 km	TC3	40	300	40
Culvert Manufacturing Ch 215 – 260 km	TC4			
Culvert Manufacturing Ch 040 – 215 km	TC5	20	270	20
Culvert Manufacturing Ch 000 – 040 km	TC6	20	200	20

Table 8 – Estimated Heavy Vehicle Movements for Steel Culvert Production

5.5.3 Precast Concrete Drainage Products

Reinforced Concrete Box Culverts (RCBC) and Reinforced Concrete Pipes (RCP) for the Project will likely be manufactured in Mackay, Townsville or received from overseas and transported to each work front.

The RCPs are designated for use within the Marshalling Yard, and the RCBCs are nominated for the northern end of the alignment in the marine environment around the Port loop. As such, all of the transport movements for these precast concrete items are confined to TC1.

The delivery of pipes and box culverts is planned to commence at the start of Q2 2012 and conclude by Q2 2013.

The estimated number of heavy vehicle freight movements is summarised in Table 9 below:

Work Description	Transport Corridor	Estimated No of Heavy Vehicle Movement		
		Mobilisation	During Works	Demobilisation
Precast Concrete Deliveries Ch 435 – 510 km	TC1		70	

Table 9 – Estimated Freight Movements for Reinforced Concrete Culverts

5.6 Bridges

Approximately 11,000 truck movements are estimated to complete the bridge construction required by the Alpha Coal Railway Project.

Bridge construction includes piling, erection of formwork and false work, installation of reinforcement, concrete pours, lifting of precast concrete units and structural steel work.

Mobilisation of the bridge contractors is forecast to commence in Q2 2012 and be completely mobilised by early Q3 2012. Bridge construction will commence on site in Q2 2012 and will continue to Q3 2013. Demobilisation is forecast to conclude early Q4 2014.

5.6.1 Transportation of Bridge Plant

Plant and material typically mobilised for bridge construction includes temporary portable offices, workshop facilities, mobile concrete batch plants, piling rigs, small and large cranes, excavators, and compactors.

Once mobilised, the majority of works will be on the rail formation and traffic movements will typically be on temporary construction haul roads adjacent to the proposed rail formation. Heavy vehicle movements on public roads are expected to be kept to a minimum.

Pre-mixed concrete for bridge construction will be transported from the closest on site Project concrete batch plant.

The estimated number of heavy vehicle transport movements is summarised in Table 10 below:

Work Description	Transport Corridor	Estimated No of Heavy Vehicle Movement		
		Mobilisation	During Works	Demobilisation
Bridge Construction Ch 435 – 510 km	TC1	30	50	30
Bridge Construction Ch 300 – 435 km	TC2	50	50	50
Bridge Construction Ch 260 – 300 km	TC3	40	50	40

Work Description	Transport Corridor	Estimated No of Heavy Vehicle Movement		
		Mobilisation	During Works	Demobilisation
Bridge Construction Ch 215 – 260 km	TC4	10	20	10
Bridge Construction Ch 040 – 215 km	TC5	60	50	60
Bridge Construction Ch 000 – 040 km	TC6	5	10	5

Table 10 – Estimated Heavy Vehicle Movements for Bridge Construction

5.6.2 Transportation of Bridge Material

Material for bridge construction includes pile casings, cement, aggregate, sand, reinforcement, formwork, false work, precast concrete girders, precast concrete headstocks, prefabricated structural steel work and bridge bearings.

Material for bridge work may be obtained from overseas or from the domestic market. Materials procured from overseas are likely to be unloaded at the port in Mackay then transported by road to the required bridge sites.

All precast bridge units are also likely to be obtained from the Mackay area.

Delivery of material for bridge construction is required to commence in Q2 2012 and will continue through to Q3 2013.

The estimated number of heavy vehicle transport movements is summarised in Table 11 below, based on an estimated materials freight requirement of 60 loads per bridge pier, comprising of offices and preliminaries, pile casings, pile reinforcing, formwork, false work, pre-cast items, girders, handrails, walkways and waste removal.

Transport Corridor	Bridge Tag	Bridge Name	Truck Movements	Total per Corridor
TC1	Bridge-01	Saltwater Creek Bridge	348	1914
	Bridge-02	QR North Coast Line Grade Separation	174	
	Bridge-03	Bruce Highway Grade Separation	174	
	Bridge-04	Splitters Creek Bridge	174	
	Bridge-05	Elliot River Bridge	348	
	Bridge-06	Finley Creek Bridge	464	
	Bridge-07	Sandy Creek Bridge	232	
TC2	Bridge-08	Bogie River Bridge	1102	4234
	Bridge-09	Capsize Creek Bridge	174	

Transport Corridor	Bridge Tag	Bridge Name	Truck Movements	Total per Corridor
	Bridge-10	Herbert Creek Bridge	174	
	Bridge-11	Table Mountain Creek Bridge	290	
	Bridge-12	Pelican Creek Bridge	290	
	Bridge-13	Bowen River Bridge	986	
	Bridge-14	Rosella Creek Bridge 2	290	
	Bridge-15	Rosella Creek Bridge 1	290	
	Bridge-16	Bowen Development Rd	522	
	Bridge-16C	Collinsville – Elphinstone Road	116	
TC3	Bridge-16A	Cerito Development Rd	116	580
	Bridge-17	Suttor Creek Bridge	464	
TC4	Bridge-18	Suttor Development Rd Grade Separation	116	116
TC5	Bridge-19a	Kilcummin Road	116	3074
	Bridge-21	Diamond Creek Bridge	928	
	Bridge-22	Logan Creek Bridge	638	
	Bridge-23	Brown Creek Bridge	754	
	Bridge-24	Gregory Development Rd Grade Separation	116	
	Bridge-27	Mistake Creek Bridge	522	
TC6	Bridge-29	Belyando River	812	1160
	Bridge-30	Native Companion Creek	348	

Table 11 – Estimated Freight Movements for Bridge Materials

5.7 Track Construction Works

5.7.1 Sleepers

There are currently several options for sleeper supply to the project. One option is to construct a manufacturing facility on site, and bring in the raw materials. Another option is to source the sleepers from a major centre nearby, and transport the finished product to site, either by road or on the existing rail network. A third option is to source the sleepers from overseas and freight them to port and on to site. Due to the number of sleepers required in the short construction timeframe, a combination of the above may be necessary to meet the schedule.

Based on the sleeper manufacturing facility being situated on site, it is proposed to establish the operation at the Wollombi track construction depot. Sleepers will be distributed by rail along the alignment as construction progresses. This will reduce the need for transporting sleepers on public roads.

Mobilisation and establishment of the sleeper manufacturing factory is likely to commence in late Q4 2011 and be concluded by Q3 2012. Sleeper manufacturing works are planned to commence in Q3, 2012 and be completed by Q4 2013. Demobilisation is likely to occur in Q1 2014.

During the sleeper production phase, materials for sleeper manufacture, such as reinforcing wire, cement, aggregate and track jewellery will need to be freighted to Wollombi. The estimated number of heavy vehicle transport movements are summarised in Table 12 below:

Work Description	Transport Corridor	Estimated No of Heavy Vehicle Movement		
		Mobilisation	During Works	Demobilisation
Sleeper Manufacture Wollombi Depot Ch 270 km	TC3	60	3,000	60

Table 12 – Estimated Freight Movements for Sleeper Production

It is possible that some sleepers may need to be transported by road at some stages of the project. For example, sections of the marshalling yards near the northern end of the alignment may need to be manually constructed ahead of the main rail laying work front to meet overall Project schedule needs. In this case, use of B-Double vehicles are proposed. The maximum load size possible would be approximately 120 sleepers per vehicle, sufficient for laying 78 m of track.

An alternative to manufacturing sleepers on site is to source some or all of the sleepers from an external facility and transport them to site. Rail transport is the preferred method, utilising the existing rail network to bring sleepers to site. The efficiency of transporting sleepers by rail will be maximised by loading directly from the factory to rail, and from rail to stockpile, negating the need for any road transport. Initial investigations show that this should be possible through a commercial arrangement with QR National and sleeper manufacturers. It is, however, subject to an unloading siding being built in time and suitable commercial terms being agreed to.

A rail unloading facility would need to be constructed adjacent to a spur line from the QR National network, to enable transfer of material. A dual gauge arrangement with the QR National (narrow gauge) track and new Alpha Coal Railway (standard gauge) track with shared crane would be constructed to maximise efficiency at the track construction depot. Space provision has been made for this configuration within the Wollombi facility.

The option of manufacturing sleepers off site and utilising rail freight (or road freight) to transport to Wollombi is still under investigation and has not yet been proven. The base case assumption for the BFS logistics plan is road freight of material for production of sleepers at an on site manufacturing facility at Wollombi.

5.7.2 Short Rail String Supply

It is likely that short rail sections will be delivered by ship to a port on the central Queensland coast, nominally Mackay. The delivery to port is expected to come from overseas, in approximately 10 shipments of 7,000 t each, at intervals of 6 weeks.

The rail will be unloaded at the port and stored in the vicinity before being gradually transported to the Wollombi track construction depot where it will be welded into 400 m long strings for track construction using a flash butt welder.

Trucks will initially be required to move the short rail sections from shipside to a nominated lay down area close to the port. This double handling is necessary to unload the ship as fast as possible and avoid demurrage charges. Rail storage will require a large lay down area for extended periods of time. It will be beneficial to have the facility at or near the port to reduce handling time during unloading.

There are two potential options to transport the short rail strings to site, either by road or rail. The transportation of short rail sections to Wollombi via rail freight on the existing network is an attractive alternative to minimise road traffic. Initial investigations show that this should be possible through a commercial arrangement with QR National. It is, again subject to an unloading siding being built in time and suitable commercial terms being agreed to.

If the road transport option is selected, numerous truck movements will be required to transfer the large tonnage of rail strings to Wollombi. By limiting the truck combination length to 25 m, use of an escort or pilot vehicle can be avoided. This will effectively limit the rail sections to less than 25 m, subject to the length of the truck and rear overhang of the load.

The selection of trucks for rail string transport will need to be discussed with the transport company prior to finalising the short rail string manufacture specification to maximise the string length yet ensure the combination length remains below 25 m.

Rear overhang is limited to 5.5m from the centre of the rear axle group, according to Section 5.3 of the Department of Transport and Main Roads, Guideline for Excess Dimension Vehicles Carrying Indivisible Articles, Special Purpose Vehicles in Queensland, 2010

If a pilot vehicle is used, the combination length can be up to 30 m. The cost of the pilot will need to be compared to the extra welding required, handling capability and transport constraints during detailed design. It is anticipated that the longer sections of rail will deliver overall cost benefits.

Cost for transporting rail, based on an assumed load of 23 t, is in the order of $100 per tonne delivered.

Rail supply is planned to commence during Q3 2012 and be concluded by Q3 2013. The estimated number of heavy vehicle transport movements between the port and Wollombi is summarised in Table 13 below:

Work Description	Transport Corridor	Estimated No of Heavy Vehicle Movement		
		Mobilisation	During Works	Demobilisation
Short Rail String Deliveries Wollombi Depot Ch 270 km	TC3		6,000	

Table 13 – Estimated Short Rail String Freight Movements

As the option of rail freight is still under investigation and has not yet been proven, the based case assumption for the BFS logistics plan is road freight of short rail sections to Wollombi.

5.7.3 Rail Welding

A flash butt welding facility will need to be established at Wollombi track construction depot to manufacture 400 m long rail sections from the short rail strings shipped to site.

Mobilisation and establishment of the flash butt welder is likely to commence in Q1 2012 and be concluded by Q4 2012. Rail welding will commence on site in Q1 2013 and be completed by Q4 2013, with demobilisation forecast for Q1 2014.

Transport for items including welding plant, gantry material and steelwork will be required to establish and operate the flash butt welding facility. The estimated number of heavy vehicle transport movements (excluding short rail string deliveries) is summarised in Table 14 below:

Work Description	Transport Corridor	Estimated No of Heavy Vehicle Movement		
		Mobilisation	During Works	Demobilisation
Flashbutt Welding Facility Wollombi Depot Ch 270 km	TC3	60	100	60

Table 14 – Estimated Freight Movements for the Flashbutt Welding Facility

5.7.4 Turnouts

Turnouts for the Alpha Railway construction are expected to be manufactured locally or received from overseas and transported to each work site by road.

The delivery of turnouts is planned to commence Q1 2013 and be concluded by Q3 2013, and the forecast number of freight movements is summarised in Table 15 below:

Work Description	Transport Corridor	Estimated No of Heavy Vehicle Movement		
		Mobilisation	During Works	Demobilisation
Turnout Supply Ch 435 – 510 km	TC1		270	
Turnout Supply Ch 300 – 435 km	TC2		30	
Turnout Supply Ch 260 – 300 km	TC3		30	
Turnout Supply Ch 215 – 260km	TC4		30	
Turnout Supply Ch 040 – 215 km	TC5		30	
Turnout Supply Ch 000 – 040 km	TC6		30	

Table 15 – Estimated Freight Movements for Turnouts

5.7.5 Level Crossing Panels

Level crossing panels required for the Project are expected to be manufactured locally and transported to each work site by road.

The delivery of panels are planned to commence Q1 2013 and be concluded by Q3 2013. The estimated number of heavy vehicle freight movements is summarised in Table 16 below:

Work Description	Transport Corridor	Estimated No of Heavy Vehicle Movement		
		Mobilisation	During Works	Demobilisation
Level Crossing Panel Supply Ch 435 – 510 km	TC1		44	
Level Crossing Panel Supply Ch 300 – 435 km	TC2		80	
Level Crossing Panel Supply Ch 260 – 300 km	TC3		24	
Level Crossing Panel Supply Ch 215 – 260km	TC4		30	
Level Crossing Panel Supply Ch 040 – 215 km	TC5		100	

Work Description	Transport Corridor	Estimated No of Heavy Vehicle Movement		
		Mobilisation	During Works	Demobilisation
Level Crossing Panel Supply Ch 000 – 040 km	TC6		24	

Table 16 – Estimated Freight Movements for Level Crossing Panels

5.7.6 Ballast Production

Subject to geotechnical ground test results, ballast quarries will be developed at potentially three locations along the rail alignment. These are:

- Mt Roundback Quarry, near Ch 486 km;
- Weetalaba Quarry, near Ch 316 km;
- Surbiton Hill Quarry, near Ch 020 km.

Mobilisation of the quarry contractors is expected in Q2 2012, with ballast production and transport occurring from Q3 2012 to Q4 2013. Demobilisation of plant is likely to occur at the end of 2013.

Plant and material required for ballast supply and transport includes temporary portable offices, crushing plant, excavators, loaders, haulage trucks, drill and blast equipment, explosives, and conveying fuel and miscellaneous supplies.

The estimated number of heavy vehicle transport movements associated with quarrying and ballast production are summarised in Table 17 below:

Work Description	Transport Corridor	Estimated No of Heavy Vehicle Movement		
		Mobilisation	During Works	Demobilisation
Mt Roundback Quarry Ch 486 km	TC1	25	100	25
Weetalaba Quarry CH 316 km	TC2	25	100	25
Surbiton Hill Quarry CH 020 km	TC6	25	100	25

Table 17 – Estimated Freight Movements for Ballast Production

5.7.7 Ballast Transportation

Ballast will be supplied to the rail construction work fronts by train as the track works progress.

The Mt Roundback quarry is located within a few kilometres of the rail alignment at CH 486km. It is proposed to create a ballast stockpile adjacent to the permanent main line passing loop at CH 482km, and utilise this loop for loading and watering of the ballast. The material will be transported from the quarry, either by short on-road haul, or preferably an off-road haul across Splitters Creek. It is expected that the marshalling yard, passing loop, mine loop and main line track from Ch 475km will be serviced from this quarry.

The Weetalaba quarry at Mt Razorback is located close to the rail alignment, at CH 316km. At this site, a ballast stockpile will be created adjacent to the quarry and a ballast loading and watering spur will be constructed from the mainline to enable direct loading of ballast trains from the quarry stockpile. This quarry will service the ballast requirements for the majority of both track laying fronts due to its central location.

A secondary ballast stockpile may also be created at Wollombi Construction depot to supply ballast trains during the initial tracklaying works, before the mainline has been constructed between Wollombi and Weetalaba Quarry. Ballast will need to be road hauled, using the temporary construction haul roads created for formation construction, between Weetalaba and Wollombi. Alternatively, the northern and southern tracklaying works can progress on skeleton track until the northern front reaches CH 316km, then ballasting can commence without the need for haulage.

Surbiton Hill Quarry is approximately 10 km from the proposed rail alignment. Ballast will be trucked from the quarry to a stockpile at the Alpha Rail construction depot for loading onto ballast trains. It is expected that the mine loop and main line track to the Belyando River at CH 43km or passing loop at CH 50km will be serviced from this quarry.

The forecast heavy vehicle movements for road hauling ballast are shown in Table 18 below:

Work Description	Transport Corridor	Estimated No of Heavy Vehicle Movements
Ballast haul Weetalaba to Wollombi (CH 316km - CH 270km)	Construction haul road adjacent to alignment, if skeleton track not used	8,000 (inc both tracklaying fronts until northern front reaches CH 316km)
Ballast haul Surbiton Hill to Alpha Rail Depot (CH 020km – CH 016km)	Construction haul road adjacent to alignment / temporary haul road across paddock	3,500 (inc ballast from CH 0km to CH 50km)
Ballast haul Mt Roundback to Marshalling Yard (CH 486km – CH 480km)	Construction haul road adjacent to alignment or Bruce Highway and Marshalling Yard Access Road.	4,000 (inc main line from CH 475km, marshalling yard, passing loop and port loop

Table 18 – Estimated Ballast Road Haulage Requirements

Notes:

- Based on use of Type 1 road trains with gross combined mass of 79 t for ballast hauling;
- Includes return trips of empty truck to quarry for re-loading.

5.7.8 Tracklaying

Track laying includes sleeper distribution and laying, rail laying and field welding, ballast distribution, tamping, turnout installation, installation of level crossing panels, signalling, positioning of survey monuments and the like.

Mobilisation of the track laying contractors is planned for Q2 2013 with works to commence in Q2 2013 and continue to Q1 2014. Demobilisation is likely to commence in Q1 2014 and be concluded by Q2 2014.

Plant and material typically mobilised includes temporary portable offices, workshop facilities, construction rolling stock (locomotives, wagons, flatbeds, rail train, track layer, tampers, grinders), water carts, loaders, road trains and cranes.

Once mobilised, the majority of works will be on the rail formation and traffic movements will typically be on temporary construction haul roads or the rail formation itself. Traffic movement on public roads will be kept to a minimum, but could include service trucks for the track laying operation.

The estimated number of heavy vehicle transport movements is summarised in Table 19 below:

Work Description	Transport Corridor	Estimated No of Heavy Vehicle Movement		
		Mobilisation	During Works	Demobilisation
Tracklaying Equipment Wollombi Depot, Ch 270 km	TC3	120	200	120

Table 19 – Estimated Heavy Vehicle Movements for Tracklaying

5.8 Rolling Stock

Rolling stock procured for operations and maintenance is expected to be manufactured overseas, shipped to and unloaded at the Port of Mackay.

Rolling stock procured will initially be locomotives (approx 4), coal wagons (approx 280) and necessary maintenance equipment. The remaining operational and maintenance rolling stock is planned to be progressively purchased as the Alpha Mine output ramps up over the first 7 years of operation.

Delivery of rolling stock required for first year operations is planned to commence during Q3, 2013 and be concluded by Q1 2014. All rolling stock is planned to be delivered to the marshalling yard at Ch 470km.

The estimated number of heavy vehicle transport movements is summarised in Table 20 below:

Work Description	Transport Corridor	Estimated No of Heavy Vehicle Movement		
		Mobilisation	During Works	Demobilisation
Rolling Stock Delivery Marshalling Yard, Ch 470 km	TC1	10	800	10

Table 20 – Estimated Heavy Vehicle Movements for Rolling Stock Deliveries

6.0 WORKFORCE TRANSPORTATION

Rail construction personnel for the Alpha Coal Project will be accommodated at five main locations. The proposed personnel transport strategy for the rail construction phase involves a fly-in fly-out (FIFO) workforce utilising coaches to move people between each rail construction camp and a regional airport. Coach trips will connect with routine commercial flights or charter flights.

The nominated work roster for the rail construction is 3 weeks on site, and 1 week off. This means that each person generally travels to and from site once every 4 weeks. Additional ad-hoc personnel movements, such as short-term contractors, visitors, and annual leave will also need to be catered for.

It is expected that the vast majority of people employed in the rail construction will be fly-in fly-out and will be transported by road in coaches to the construction camp facilities. A 50 seat coach is optimum for the forecast rail camp sizes, and a 53 seat Scania mine-specification coach has been used as a nominal vehicle for planning purposes.

A small number of people will also drive-in to site in personal vehicles. For the inland sites, negligible personal drive-in drive-out trips are anticipated and this practise will be discouraged for safety reasons (fatigue while travelling alone). Rail Camps 1 (Salisbury Plains) and 2 (Collinsville) are close enough to existing residential areas that some workers may live locally and choose to drive to work from home.

Additional vehicle movements will also be created by service vehicles supplying the camp. This would typically include services such as food transport, linen laundering, fuel supplies; licensed waste management contractors and maintenance servicemen (e.g. air conditioning, generators, potable water and waste water treatment plants).

6.1 Flights

Rail construction personnel will nominally fly from Brisbane to a regional location from where they will be transported by bus to rail construction camp facilities. Options for air transport include:

- Commercial flights;
- Chartered flights to regional airports; and
- Chartered flights to private airstrips.

Regular commercial flights from Brisbane to regional centres are generally limited to the services shown in Table 21, all of which involve a considerable commute by bus from the airport to the inland camps.

From	To	Operator	Frequency	Flight Duration	Approx Rtn Airfare
Brisbane	Townsville	Qantaslink, Virgin Blue, Jetstar	Numerous flights each day	2 hrs	$600 - $780
Brisbane	Mackay	Qantaslink, Virgin Blue, Jetstar	Numerous flights each day	1 hr 45 min	$640 - $830
Brisbane	Proserpine	Virgin Blue, Jetstar	One flight each day for each airline	1 hr 40 min	$500 - $560
Brisbane	Emerald	Qantaslink	Several flights each day	2 hrs 25 min	$1,040
Brisbane	Barcaldine	Qantaslink	Twice weekly service	2 hrs 20 min	$830
Brisbane	Moranbah	Qantaslink	One or two flights per day, 5 days a week	2 hrs 5 min	$1,070

Table 21 - Commercial Flight Scheduled Travel Times

Note: Prices are those listed on the operators' websites for a flexible fare on 01 October 2011. (Qantas – Flexisaver, Jetstar – Jetflex, Virgin Blue - Flexible)

There is an existing high demand for flights to centres servicing the mining industry (Moranbah and Emerald in particular), and the capacity of existing commercial flights could struggle to meet the Project's demands for travel. It is recommended that the airlines be approached early to secure seats to cater for the construction workforce.

In addition to these regional airports, a preliminary investigation shows that airstrips already exist at the following locations:

- Alpha (sealed);
- Bowen (unsealed);

- Clermont (sealed);
- Collinsville (unsealed);
- Glenden (unsealed);
- Suttor (unsealed).

To reduce road travel times, private airstrip operators should be approached about the feasibility of sharing existing charter flights, or the project running its own charter flights to these airstrips.

The final option for air travel is to construct dedicated airstrips for the Alpha Coal Rail Project. Establishing new airstrips for the rail construction camps is not expected to be economically feasible due to the short operating life of the camps. Further investigation on the strategy to construct airstrips needs to be carried out in the next phase of the project.

It is understood that an airstrip will eventually be developed to service HCPL's mining operations in the area. This could be achieved with an upgrade of the existing airstrip at the Alpha township, an upgrade of an existing airstrip near Kevin's Corner or a new airstrip adjacent to the Alpha Mine. If this airstrip is implemented early, it could be utilised to transport personnel (via charter flights) for the southern end of the rail construction.

The travel basis assumed for the Rail BFS is the use of existing commercial flights and/or commercial flights to existing airports. Table 22 shows the airports selected for the preferred travel routes to each camp.

6.2 Estimated Combined Travel Times

A number of options exist for the transport of construction personnel to each of the proposed camp sites during construction.

The travel route with the lowest combined travel time have generally been selected as the preferred option. However, commercial flights to Barcaldine and Moranbah airports are too limited to provide the required flexibility to service scheduled roster changes and ad-hoc flight needs. Slightly longer travel routes have been selected for travel to Camp 4 (Gregory) and Camp 5 (Alpha) to connect with airports offering a higher volume of commercial passenger seats per week.

The cost of running Project charter flights to Moranbah to service Gregory Camp should be evaluated more thoroughly in the implementation phase. The reduction in road travel time to the camp from Moranbah compared to Mackay might make this feasible.

Option	Airport	Road Route	Flight Time	Connection Time	Road Travel Time	Total Travel Time	Preferred Option
Camp 1 - Salisbury Plains							
Option 1	Townsville	Bruce Hwy to Salisbury Plains Camp	2 hrs	20 min	1 hr 50 min	4 hrs 10 min	
Option 2	Proserpine	Bruce Hwy to Salisbury Plains Camp	1 hr 40 min	20 min	1 hr 10 min	3 hrs 10 min	✓
Option 3	Mackay	Bruce Hwy to Salisbury Plains Camp	1 hr 45 min	20 min	2 hrs 30 min	4 hrs 35 min	
Camp 2 - Collinsville							
Option 1	Townsville	Bruce Hwy & Bowen Developmental Rd to Collinsville Camp	2 hrs	20 min	2 hrs 55 min	5 hrs 15 min	
Option 2	Proserpine	Bruce Hwy & Bowen Developmental Rd to Collinsville Camp	1 hr 40 min	20 min	1 hr 35 min	3 hrs 35 min	✓
Option 3	Mackay	North on Bruce Hwy & Bowen Developmental Rd to Collinsville Camp	1 hr 45 min	20 min	2 hrs 55 min	5 hrs	
Option 4	Mackay	South on Peak Downs Hwy, Suttor Development Rd, Collinsville-Elphinstone Rd & Bowen Developmental Rd to Collinsville Camp	1 hr 45 min	20 min	3 hrs	5 hrs 5 min	
Camp 3 - Wollombi							
	Mackay	Peak Downs Hwy & Collinsville Elphinstone Road or Suttor Developmental Road to Wollombi Camp	1 hr 45 min	20 min	1 hr 55 min	4 hrs	✓
	Moranbah	Goonyella Rd & Suttor Developmental Rd to Wollombi Camp	2 hrs 5 min	20 min	2 hrs 5 min	4 hrs 30 min	

Option	Airport	Road Route	Flight Time	Connection Time	Road Travel Time	Total Travel Time	Preferred Option
Camp 4 - Gregory							
Option 1	Emerald	Gregory Hwy & Gregory Developmental Road to Gregory Camp	2 hrs 25 min	20 min	2 hrs 5 min	4 hrs 50 min	✓
Option 2	Moranbah	Peak Downs Highway & Gregory Developmental Road to Gregory Camp	2 hrs 5 min	20 min	1 hr 45 min	4 hrs 10 min	
Option 3	Barcaldine	Capricorn Highway, Clermont-Alpha Rd & Gregory Developmental Road to Gregory Camp	2 hrs 20 min	20 min	2 hrs 15 min	4 hrs 55 min	
Camp 5 - Alpha							
Option 1	Emerald	Capricorn Hwy to Alpha Mine Camp	2 hrs 25 min	20 min	2 hrs 30 min	5 hrs 15 min	✓
Option 2	Barcaldine	Capricorn Highway to Alpha Camp	2 hrs 20 min	20 min	2 hrs 20 min	5 hrs	

Table 22 - Travel Routes to Alpha Rail Construction Camps

Note:

Travel times exclude travel to and from the person's home to Brisbane airport. An additional 60 – 90 minutes should be allowed for to account for domestic travel in Brisbane and airport check-ins.

Flight times are based on scheduled commercial flight durations. Durations for chartered flights would be longer in the case of smaller (propeller) aircraft being chartered for a route serviced commercially by a larger (jet) aircraft.

6.3 Coach Service Between Camps and Airports

A coach service will be run from each camp to align with the arrival and departure time of scheduled flights. Given the size of the workforce required, it is proposed to run the coach on selected days only. Offering the service on 3 or 4 days a week will cater for the estimated personnel movements, provide flexibility for ad-hoc travel requirements and remain cost effective.

An example coach schedule is shown in Table 23. Actual travel days and trip times will need to be confirmed prior to implementation. The proposed coach schedule requires the coach driver to stay overnight at both the camp being serviced and the regional centre in which the nominated airport is located. This minimises the number of trips the coach makes without passengers, but limits the potential to utilise the bus driver for other duties in the camp (should the driver be provided by the Camp Management Contractor). The arrangement would ideally suit a local charter bus operator as most evenings would be spent in a regional town rather than at camp.

The proposed schedule would enable construction workers to complete a half day of work on the first and last day of their shift.

Day	Morning	Afternoon / Evening
Monday	IN - full	No trip
Tuesday	No trip	OUT - full
Wednesday	IN - full	OUT - empty
Thursday	IN - full	OUT - full
Friday	IN - empty	OUT - full
Saturday	No trip	No trip
Sunday	No trip	No trip

Table 23 - Proposed Coach Schedule

6.4 Forecast Personnel Movements

The sections below summarise the forecast vehicle movements associated with the rail construction camps when they are operational, based on a 3-week on / 1-week off FIFO work roster.

6.4.1 Rail Camp 1 – Salisbury Plains

- Constructed Camp Size: 580 rooms
- Approx. Peak Occupancy: 572 people
- Peak personnel movements per week: 143 people (by coach)
- Proposed FIFO airport: Proserpine

- Timing:
  - Camp occupation from Q2 2012 through to Q2 2015 for post-operational construction.
  - Peak manning occurs September 2012 to September 2013.

Vehicle	Estimated Movements	Trips Per Week (at Peak Camp Occupancy)
Coaches	4 trips per week (3 full, 1 empty)	4
Drive-in / drive out (5% of workforce, daily)	up to 30 vehicles/day, 13 days/fortnight	195
Service vehicles	up to 20 per week (estimate)	20
Total		219

Table 24 – Forecast Personnel Movements for Camp 1

6.4.2 Rail Camp 2 - Collinsville

- Constructed Size: 500 rooms
- Peak Occupancy: 454 people
- Peak personnel movements per week: 114 people (by coach)
- Proposed FIFO airport: Proserpine
- Timing:
  - Camp occupation from Q2 2012 through to Q1 2014 for camp rehabilitation.
  - Peak manning occurs October 2012 to July 2013.

Vehicle	Estimated Movements	Trips Per Week (at Peak Camp Occupancy)
Coaches	4 trips per week (3 full, 1 empty)	4
Drive-in / drive out (5% of workforce, daily)	up to 25 vehicles/day, 13 days/fortnight	163
Service vehicles	up to 20 per week (estimate)	20
Total		**187**

Table 25 – Forecast Personnel Movements for Camp 2

6.4.3 Rail Camp 3 - Wollombi

- Constructed Size: 700 rooms
- Peak Occupancy: 731 people*
- Peak personnel movements per week: 183 people (by coach)
- Proposed FIFO airport: Mackay
- Timing:
  - Camp occupation from Q2 2012 through to Q2 2014 for camp rehabilitation.
  - Peak manning occurs October 2012 to June 2013.

* isolated peak – refer Temporary Infrastructure Report.

Vehicle	Estimated Movements	Trips Per Week (at Peak Camp Occupancy)
Coaches	4 trips per week (3 full, 1 empty)	4
Drive-in / drive out (2% of workforce, weekly)	up to 15 vehicles/week	15
Service vehicles	up to 20 per week (estimate)	20
Total		**39**

Table 26 – Forecast Personnel Movements for Camp 3

6.4.4 Rail Camp 4 - Gregory

- Constructed Size: 500 rooms
- Peak Occupancy: 476 people
- Peak personnel movements per week: 119 people (by coach)
- Proposed FIFO airport: Emerald
- Timing:
  - Camp occupation from Q2 2012 through to Q2 2014 for camp rehabilitation.
  - Peak manning occurs September 2012 to July 2013.

Vehicle	Estimated Movements	Trips Per Week (at Peak Camp Occupancy)
Coaches	4 trips per week (3 full, 1 empty)	4
Drive-in / drive out (0% of workforce)	None	0
Service vehicles	up to 20 per week (estimate)	20
Total		**24**

Table 27 – Forecast Personnel Movements for Camp 4

6.4.5 Rail Camp 5 - Alpha

- Constructed Rail Camp Size: 400 rooms
- Peak Occupancy – Rail Construction: 383 people
- Peak personnel movements per week: 96 people (by coach)
- Proposed FIFO airport: Emerald
- Timing:
  - Rail camp occupation from Q2 2012 through to Q1 2014.
  - Peak rail construction manning occurs September 2012 to June 2013.

Vehicle	Estimated Movements	Trips Per Week (at Peak Camp Occupancy)
Coaches	4 trips per week (3 full, 1 empty)	4
Drive-in / drive out (0% of workforce)	None	0
Service vehicles	up to 20 per week (estimate)	20
Total		**24**

Table 28 – Forecast Personnel Movements for Camp 4

Note that rail construction workers based at Alpha Camp would be transported with the mine construction workers. Provision of a separate coach for rail personnel has not been included in the Alpha Coal Rail BFS.

7.0 PROJECT VEHICLE FLEET

The proposed rail construction vehicle fleet includes coaches, mini-buses, 4WD light vehicles, ambulances and trauma vehicles with the following designated uses:

- Coaches
  - Transport all personnel between airports/airstrips and camps. Transport large groups to work fronts.
- Minibuses
  - Transport personnel from camp to work fronts. Transport small groups from airports/airstrips to camps. Contractors will generally provide their own minibuses.
- Light Vehicles
  - For use by EPCM personnel around work fronts.
- Ambulances
  - Based at Camps and Construction Depots for emergency patient transport to the nearest regional medical facility.
- Trauma Vehicles
  - For first response and paramedic field visits.

Buses will be used to transport personnel wherever possible, and construction personnel will be discouraged from driving private vehicles to camp sites. Private vehicles will not generally be allowed at work fronts along the rail formation.

Table 29 summarises the size of the proposed Project vehicle fleet. These vehicles would be either leased or purchased, depending on the most economical pricing received through a commercial tender process.

Light vehicles would be mix of mine-equipped four wheel drives including dual-cab utilities and wagons. "Mine specification" equipment includes additional safety items such as:

- Roll bars;
- Vehicle UHF radios;
- Battery isolators;
- Roof-mounted flashing beacon lights;
- Roof mounted high visibility flags on whip aerials;
- Cargo barriers;
- Fire extinguishers, first aid kits and break-down triangles;
- Vehicle identification stickers.

Contractors will be required to supply their own mini-buses and vehicles for transporting personnel to and from the camps to their work sites each day.

Specialist emergency response vehicles such as ambulances and fire tenders are required early during the site establishment phase but have a long purchase lead-time. Engaging a specialist emergency response contractor with supply of vehicles included in the contract is recommended to overcome this problem.

Location	Light Vehicles	Coaches (50 seater)	Mini Buses	Fire Tenders	Ambulances	Total
Camp 1	35	1	1	1	1	39
Camp 2	29	1	1	1	1	33
Camp 3	35	1	1	1	1	39
Camp 4	29	1	1	1	1	33
Camp 5	29	By others	1	By others	By others	30
Total	157	4	5	4	4	174

Table 29 – Proposed Project Vehicle Fleet

Notes:

- Service vehicles and coaches at Alpha are outside the scope of the Rail BFS. These will be supplied by the camp operator.

8.0 FREIGHT

A freighting contract will be awarded for the Alpha Coal Railway Project. The Contractor will be required to coordinate all sea, land and air freight requirements for the Project.

8.1 Sea Freight

Major sea freight cargos for the Project include:-

- Rolling stock
- Rolling stock maintenance equipment
- Short rail string sections
- Transportable building modules for rail camps
- Precast concrete items

8.2 Air Freight

Air freight will generally not be used except for "urgent" deliveries of critical path items. These would generally occur in a contingency situation (for example manufacturing delays or re-work) and will be assessed on a case by case basis.

An overnight courier service will be required between the Project Head Office (Brisbane) and each site construction office.

8.3 Rail Freight

The majority of the Alpha Coal Rail works will occur in areas not serviced by existing rail freight services and the potential for utilising rail freight is limited.

Establishing a new unloading siding on QR National's network at Wollombi would offer significant advantages in moving materials to the Project's main track construction depot. Opportunities for rail freight to this site include:-

- Short rail string sections;
- Sleepers;
- General construction materials such as cement, steelwork, reinforcing, cabling, piping, etc;
- Construction plant;
- Diesel fuel.

8.4 Road Freight

The majority of the Project's freight needs will be met by road freight from either the designated importation port or the place of manufacture for items supplied from the domestic market.

Major road freight movements are summarised in Section 5 previously.

8.5 Freight Consolidation and Warehousing

Freight consolidation yards and warehousing space will be required in the vicinity of the Port of Mackay (the designated importation port for the Project).

The main storage demand is likely to be outdoor yard space for short rail string sections and transportable building modules for camps.

8.6 Freight Tracking

The freighting contractor appointed for the Alpha Coal Railway Project will be required to provide a client-accessible freight tracking system. This will nominally be a web based system that will enable all authorised Project personnel to view the current status of specific deliveries.

The tracking system will provide viewers with relevant information such as:-

- Shipping reference number;
- Packing list details;
- Consignment note details;
- Consignment location and status (eg: departed factory, received at port, boarded, unloaded, awaiting customs clearance, in warehouse, received at final destination, etc);
- Actual and scheduled vessel / truck / flight departure and arrivals time;
- Customs and quarantine clearance status.

9.0 QUALITY ASSURANCE

9.1 Inspection and Expediting

A combination of in-house and third-party inspection and expediting services will be utilised to fulfil the Project's needs. Owner representatives and inspectors will be used for goods purchased locally in Queensland. Third party expeditors and inspectors will be engaged for goods originating from overseas or other states in Australia.

Table 30 outlines anticipated key inspection and expediting requirements for the Project.

Materials or Goods	Expected Source Location	Inspection / Expediting Timeframe	In House or Third Party	Expediting Importance (high/med/low)
Temporary Infrastructure				
Camp Kitchens	Local or interstate – transportable building supplier	6 months	In house or third party depending on location	High
Camp Accommodation Buildings	Probably overseas, but may be local or interstate	9-12 months	In house or third party, depending on location	High
Other Camp and Construction Office Buildings	Local, interstate or overseas	6 months	In house or third party, depending on location	Med
Light Vehicles	Local	2 months	In house	Low
Diesel generators / power stations	Local distributor – Caterpillar, Cummins, EPS	4-5 months	Third party	Med
Water and Wastewater Treatment Plants	Local	3-4 months	In house	Med
Fuel tanks and bowsers	Local	3-4 months	In house	Med
Permanent Infrastructure				
Steelwork for buildings and platforms	Local building contractor	3-4 months	In house	Low

Materials or Goods	Expected Source Location	Inspection / Expediting Timeframe	In House or Third Party	Expediting Importance (high/med/low)
HV transformers	Overseas	12 months	Third party	Med
Switchboards and distribution boards	Local, Interstate or Overseas – depending on size	3 – 16 months	Third party	Med
Wheel and Axle Lathes	Interstate - Victoria	8 -10 months	Third party	High
Coal Wagon Lifting Jacks	Local or Interstate - Victoria	8 -10 months	In house or third party	High
Wheel Drop Tables	Local or Interstate - Victoria	6 months	In house or third party	High
Locomotive Wash Station - Manual	Interstate - NSW	3 – 4 months	Third party	Med
Locomotive Wash Station - Automatic	Interstate - NSW	5 – 6 months	Third party	Med
Re-fuelling Facility (tanks, piping, pumps, bowsers, oily water separator, control system)	Local fuel tank fabricator	12 months	Third party	Med
Bridges and Causeways				
Reinforced concrete box culverts	Local		In house	Med
Precast Piles for Bridges	Local		In house	Med
Pile Casings	Local	TBA	In house	Med

Materials or Goods	Expected Source Location	Inspection / Expediting Timeframe	In House or Third Party	Expediting Importance (high/med/low)
Prefabricated Steel for Bridges	Local & Overseas	TBA	In house	Med
Bridge Bearings	Local	TBA	In house	Med
Permanent Way				
Rail (Short Strings)	Overseas - China	6 months	Third party	High
Flash Butt Welding Equipment	Overseas – France, via local supplier	12 months	Third party	High
Turnouts - rail	Local, Interstate or Overseas– Austria, Thailand or New South Wales	6 months	Third party	Med
Turnouts - concrete	Local	6 months	In house	Med
Level crossing panels	Local		In house	Med
Sleepers - concrete	Local / Fabricate on site	12 months	In house	High
Signalling Equipment	TBA	12 months	In house	Med
Operating Centre Equipment	TBA	12 months	In house	High
Rolling Stock (Construction and Operations)				
Tracklaying Machine	TBA	TBA	TBA	High
Rail Train	TBA	TBA	TBA	High

Materials or Goods	Expected Source Location	Inspection / Expediting Timeframe	In House or Third Party	Expediting Importance (high/med/low)
Ballast Train Cars	TBA	TBA	TBA	High
Mainline Tamper	TBA	TBA	TBA	High
Locomotives	Overseas – USA	12 months	Third party	High
Coal Wagons	Overseas – Asia	12 months	Third party	High
Fuel Cars	Overseas – Asia	12 months	Third party	High

Table 30 - Key Inspection and Expediting Requirements

9.2 Inspection and Release Certificates

To minimise construction delays on site, no equipment or material will be released for transport to site until it has been inspected at the place of fabrication to verify that it conforms to the required specification.

Inspection and release certificates will be issued to confirm the item's conformance (and any minor works requiring rectification on site). A copy of the release certificate will accompany the delivery to site.

9.3 Safe Loading and Unloading Procedures

To ensure the utmost safety standards are maintained throughout the works, safe loading and unloading procedures will be developed and issued to fabricators and transport companies. Loads arriving at site that do not comply with the procedure will be turned away and the vendor will be required to re-pack/re-load the item.

The intention of the procedures is to ensure that materials and equipment can be safely handled and unloaded from transport at the receiving site with the equipment available.

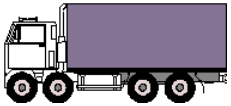
9.3.1 Goods Receival

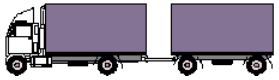
Material controllers will be employed at key sites to coordinate the receival and interim storage of equipment and materials. Laydown areas will be provided for interim storage needs.

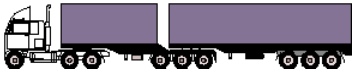
APPENDIX A
HEAVY VEHICLE LOAD RESTRICTIONS AND ROAD ROUTES

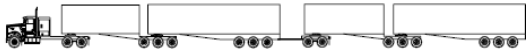
AXLE MASS LIMITS IN QUEENSLAND COMPARISON TABLE

Queensland Government

Vehicle Type	MAXIMUM LENGTH (metres)	AXLE MASS (tonnes)	STEER (tonnes)	SINGLE (tonnes)	TANDEM (tonnes)	TRIAXLE (tonnes)	ALLOWABLE GCM (tonnes)
2 Axle Rigid Truck 	**12.5 m**	**Regulation**	**6**	**9**	**-**	**-**	**15**
		NHVAS (CML)	**6.25**	**9.5**	**-**	**-**	**15.75**
		HML not permitted	**-**	**-**	**-**	**-**	**-**
3 Axle Rigid Truck 	**12.5 m**	**Regulation**	**6**	**-**	**16.5**	**-**	**22.5**
		NHVAS (CML)	**6.25**	**-**	**17**	**-**	**23.25**
		HML	**6**	**-**	**17**	**-**	**23**
4 Axle Twin Steer Rigid Truck 	**12.5 m**	**Regulation**					
		(non-load sharing)	**10**	**-**	**16.5**	**-**	**26.5**
		(load sharing)	**11**	**-**	**16.5**	**-**	**27.5**
		NHVAS (CML)					
		(non-load sharing)	**10**	**-**	**17**	**-**	**27**
		(load sharing)	**12**	**-**	**17**	**-**	**28.5**
		HML	**-**	**-**	**-**	**-**	**-**
		(non-load sharing)	**10**	**-**	**17**	**-**	**27**
		(load sharing)	**11**	**-**	**17**	**-**	**28**

Vehicle Type	MAXIMUM LENGTH (metres)	AXLE MASS (tonnes)	STEER (tonnes)	SINGLE (tonnes)	TANDEM (tonnes)	TRIAXLE (tonnes)	ALLOWABLE GCM (tonnes)
2 Axle Rigid Truck & 2 Axle Dog Trailer  *** The mass of a dog trailer shall not exceed the mass of the motor truck towing it at any time.**	**19 m**	**Regulation**	**6**	**9**	**-**	**-**	**30**
		NHVAS (CML) not permitted	**-**	**-**	**-**	**-**	**-**
		HML not permitted	**-**	**-**	**-**	**-**	**-**
3 Axle Rigid Truck & 3 Axle Dog Trailer  *** For greater mass see Form 18 (includes 4 axle dog trailer)**	**19 m**	**Regulation**	**6**	**-**	**16.5**	**-**	**42.5**
		NHVAS (CML)	**6.25**	**-**	**17**	**-**	**43.5**
		HML not permitted	**-**	**-**	**-**	**-**	**-**
Three Axle Semitrailer 	**19 m**	**Regulation**	**6**	**9**	**-**	**-**	**24**
		NHVAS (CML)	**6.25**	**9.5**	**-**	**-**	**25**
		HML not permitted	**-**	**-**	**-**	**-**	**-**
Five Axle Semitrailer 	**19 m**	**Regulation**	**6**	**-**	**16.5**	**-**	**39**
		NHVAS (CML)	**6.25**	**-**	**17**	**-**	**40**
		HML	**6**	**-**	**17**	**-**	**40**
Six Axle Semitrailer 	**19 m**	**Regulation**	**6**	**-**	**16.5**	**20**	**42.5**
		NHVAS (CML)	**6.25**	**-**	**17**	**21**	**43.5**
		HML	**6**	**-**	**17**	**22.5**	**45.5**

Vehicle Type	MAXIMUM LENGTH (metres)	AXLE MASS (tonnes)	STEER (tonnes)	SINGLE (tonnes)	TANDEM (tonnes)	TRIAXLE (tonnes)	ALLOWABLE GCM (tonnes)
Seven Axle B-double 	**19 m**	**Regulation**	**6** **6**	**-** **-**	**16.5** **16.5**	**-** **-**	**50.0 General Access** **55.5 B-double Routes**
		NHVAS (CML)	**6.25**	**-**	**17**	**-**	**57.25**
		HML	**6**	**-**	**17**	**-**	**57**
Eight Axle B-double 	**25 m**	**Regulation**	**6**	**-**	**16.5**	**20**	**59**
		NHVAS (CML)	**6.25**	**-**	**17**	**21**	**61**
		HML	**6**	**-**	**17**	**22.5**	**62.5**
Nine Axle B-double 	**25 m**	**Regulation**	**6**	**-**	**16.5**	**20**	**62.5**
		NHVAS (CML)	**6.25**	**-**	**17**	**21**	**64.5**
		HML	**6**	**-**	**17**	**22.5**	**68**
B-triple 	**36.5 m**	**Regulation**	**6**	**-**	**16.5**	**20**	**82.5**
		NHVAS (CML)	**6.25**	**-**	**17**	**21**	**84.5**
		HML	**6.7**	**-**	**17**	**22.5**	**91.2**
Type 1 Road Train 	**36.5 m**	**Regulation**	**6**	**-**	**16.5**	**20**	**79**
		NHVAS (CML)	**6.25**	**-**	**17**	**21**	**81**
		HML	**6.7**	**-**	**17**	**22.5**	**85.7**

Vehicle Type	MAXIMUM LENGTH (metres)	AXLE MASS (tonnes)	STEER (tonnes)	SINGLE (tonnes)	TANDEM (tonnes)	TRIAXLE (tonnes)	ALLOWABLE GCM (tonnes)
Type 2 Road Train 	**53.5 m**	**Regulation**	**6**	**-**	**16.5**	**20**	**115.5**
		NHVAS (CML)	**6.25**	**-**	**17**	**21**	**118.5**
		HML	**6.7**	**-**	**17**	**22.5**	**125.2**
BAB-Quad 	**53.5 m**	**Regulation**	**6**	**-**	**16.5**	**20**	**119**
		NHVAS (CML)	**6.25**	**-**	**17**	**21**	**122**
		HML	**6.7**	**-**	**17**	**22.5**	**130.7**
ABB-Quad 	**53.5 m**	**Regulation**	**6**	**-**	**16.5**	**20**	**119**
		NHVAS (CML)	**6.25**	**-**	**17**	**21**	**122**
		HML	**6.7**	**-**	**17**	**22.5**	**130.7**

NHVAS – National Heavy Vehicle Accreditation Scheme

CML – Concessional Mass Limits

HML – Higher Mass Limits

NOTE – These masses are a guide and may change. They are only a reference to Queensland legislation and should not be taken to override the legislation.

– Every effort has been made to alleviate mistakes, if in doubt contact Road System Operations – Heavy Vehicle Access on telephone (07) 3253 4285.

MARKED ROUTES

The following legend indicates which vehicles may/or may not use routes which are marked in the maps.

The vehicle description listed opposite the type of route marking indicates which vehicles are permitted or not permitted on routes depicted in that manner in the maps.

Legend

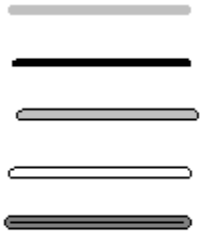
23 metre B-doubles only

23 metre & 25 metre B-doubles only

Type 1 road trains, 23 metre & 25 metre B-doubles only

Type 1 & Type 2 road trains, 23 metre & 25 metre B-doubles

No road trains or B-doubles to operate on these roads



Operations are not permitted on roads where signs prohibit use or as indicated by above legend.

SHADED AREAS

There are two shaded areas indicated on the maps.
These areas indicate that specified types of multi-combination vehicles can operate on most roads within the specified shaded area as per the legend above and text below.

Light Shaded Area
All multi-combination vehicles
(excluding Type 2 road trains)

There are some marked routes in the ***light shaded area*** that cannot be used by road train or B-double combinations. Refer to the marked routes legend to identify these routes on maps.

Dark Shaded Area
All multi-combination vehicles

There are some marked routes in the ***dark shaded area*** that cannot be used by road train or B-double combinations. Refer to the marked routes legend to identify these routes on maps.

There are maps provided for some towns within the shaded areas where operation of road train or B-double combinations is limited to the routes specified (see index to locate these maps which are marked with an asterisk).

Operations in other towns is not restricted unless signs prohibit use or the route is marked for no road train or B-double operations in the guideline.

Operations on local authority roads in shaded areas is not restricted unless signs prohibit use or the route is marked for no road train or B-double operations in the guideline.

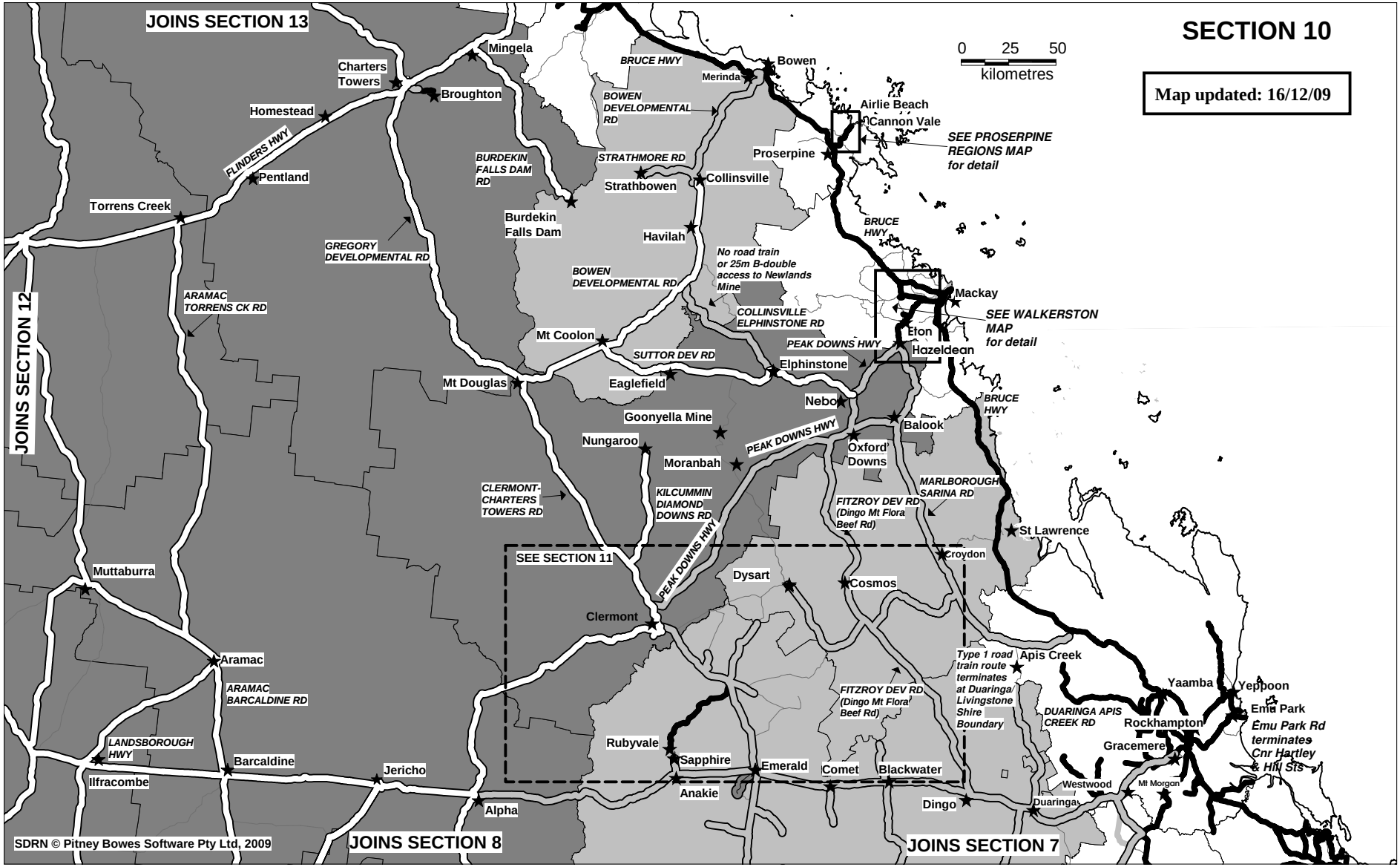
UNSHADED AREA

There is also an unshaded (all white) area where multi-combination vehicles can only operate on marked routes as per the legend above.

All white area
Multi-combination vehicles may operate
only on approved routes shown

MULTI-COMBINATION ROUTES IN QUEENSLAND

Queensland Government



B-DOUBLES
23 metre routes
23 & 25 metre routes

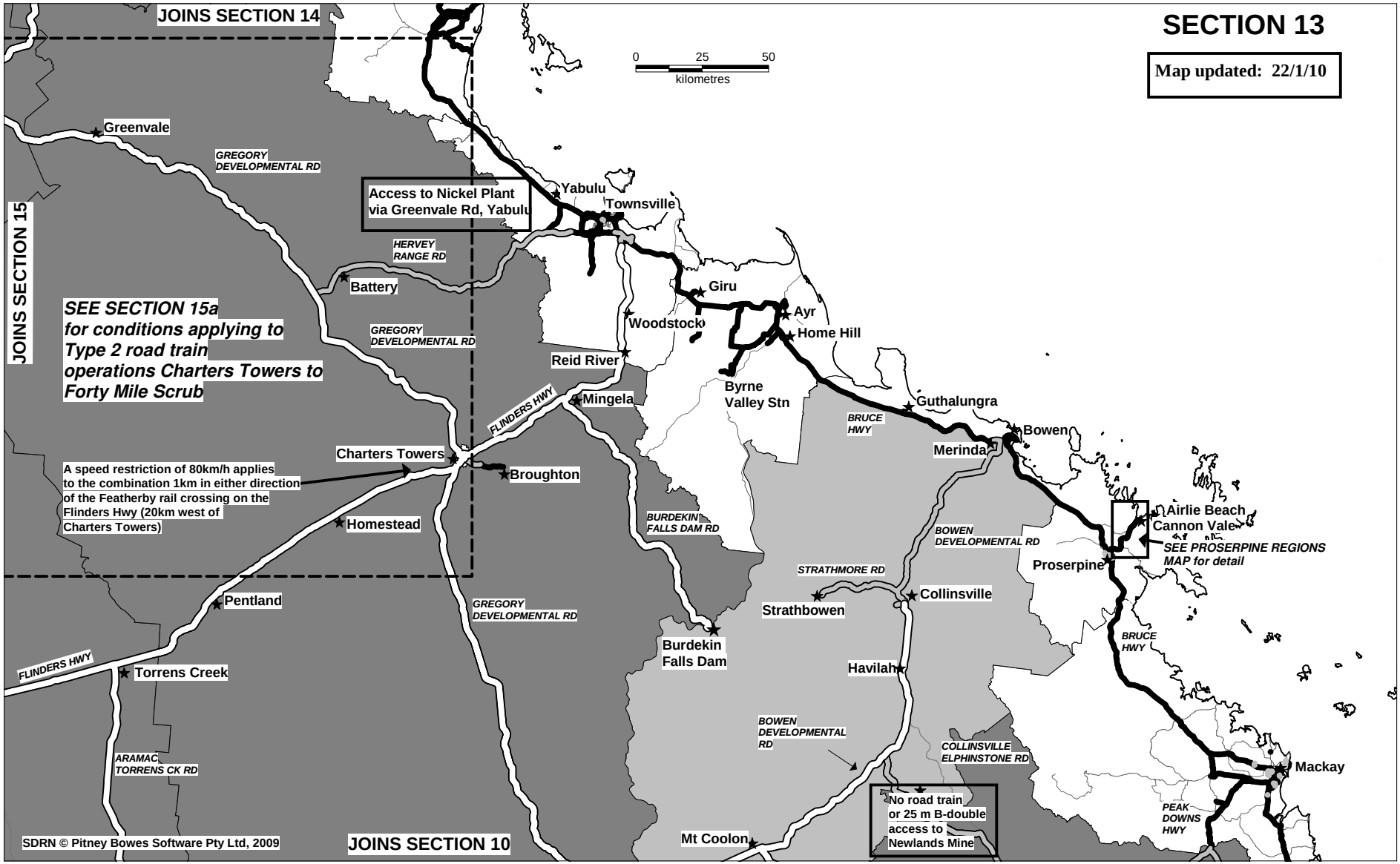
ROAD TRAINS
Type 1 routes
Type 1 & 2 routes

NO ROAD TRAINS or B-DOUBLES

REFER TO LEGEND FOR DETAILS OF OPERATIONS IN THE SHADED AREAS

MULTI-COMBINATION ROUTES IN QUEENSLAND

Queensland Government

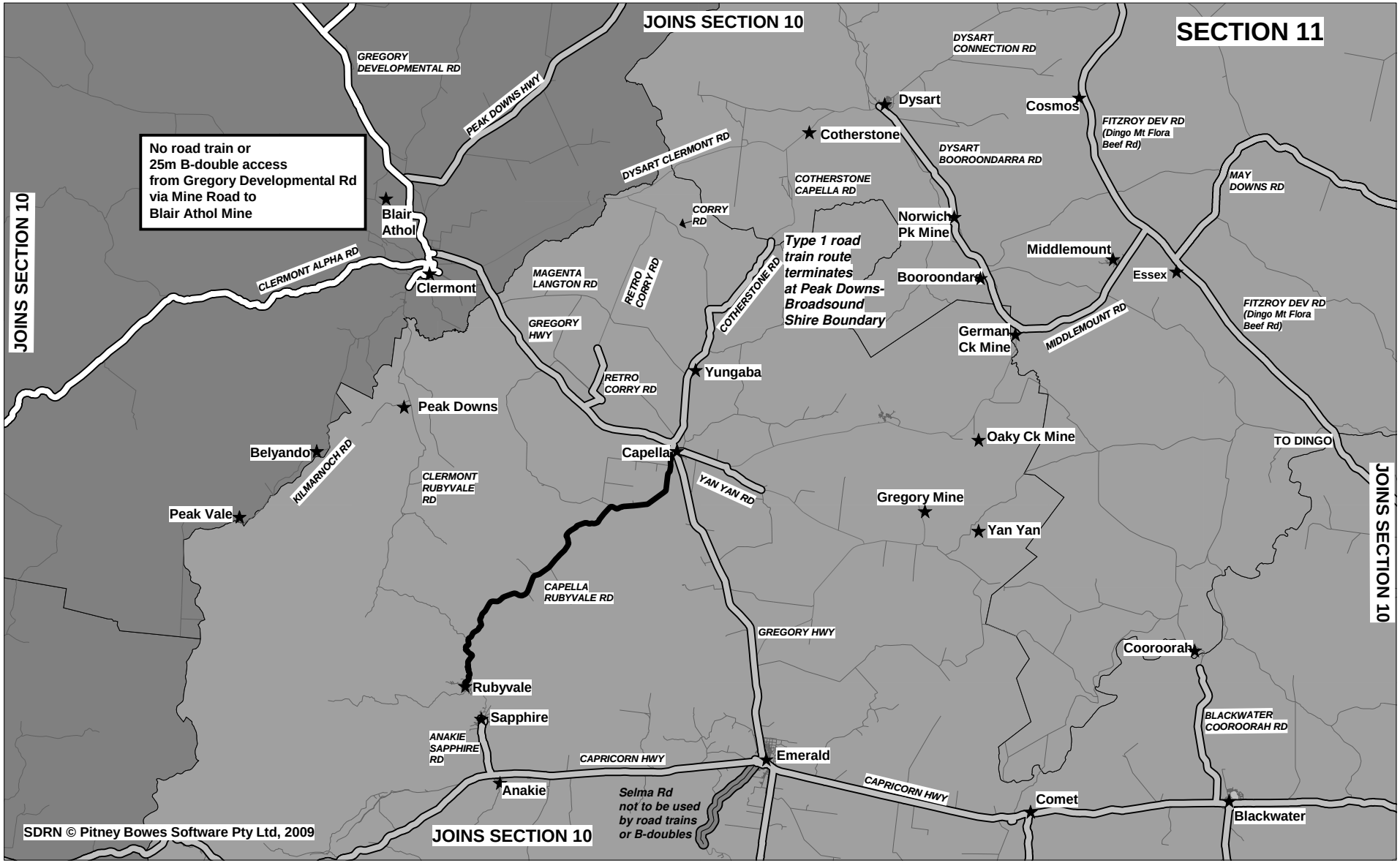


B-DOUBLES	ROAD TRAINS	NO ROAD TRAINS or B-DOUBLES
23 metre routes	Type 1 routes	
23 & 25 metre routes	Type 1 & 2 routes	

REFER TO LEGEND FOR DETAILS OF OPERATIONS IN THE SHADED AREAS

MULTI-COMBINATION ROUTES IN QUEENSLAND

Queensland Government



B-DOUBLES
- 23 metre routes
- 23 & 25 metre routes

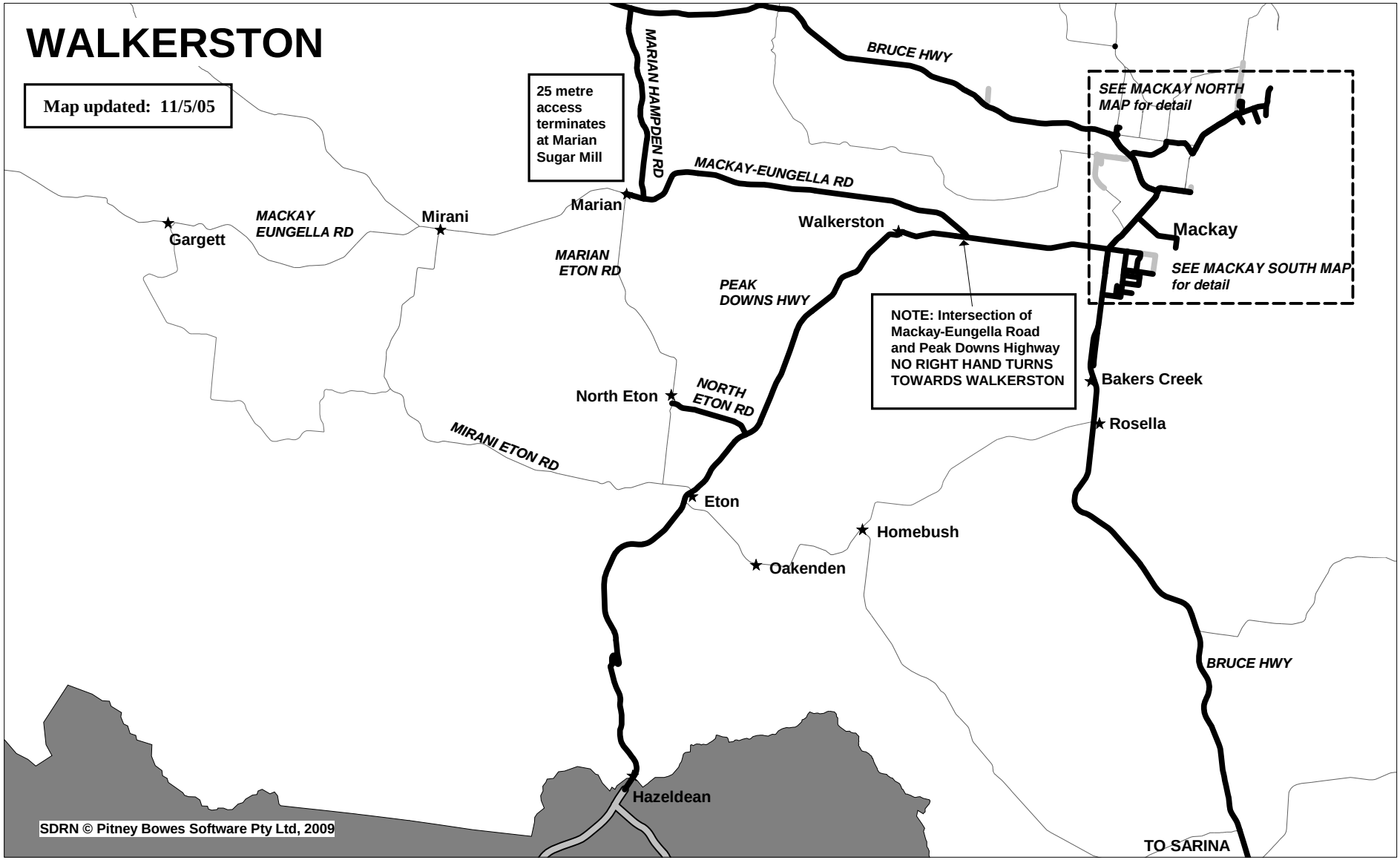
ROAD TRAINS
- Type 1 routes
- Type 1 & 2 routes

NO ROAD TRAINS or B-DOUBLES

REFER TO LEGEND FOR DETAILS OF OPERATIONS IN THE SHADED AREAS

MULTI-COMBINATION ROUTES IN QUEENSLAND

Queensland Government



B-DOUBLES
23 metre routes
23 & 25 metre routes

ROAD TRAINS
Type 1 routes
Type 1 & 2 routes

NO ROAD TRAINS or B-DOUBLES

REFER TO LEGEND FOR DETAILS OF OPERATIONS IN THE SHADED AREAS

GHD

201 Charlotte Street Brisbane QLD 4000
GPO Box 668 Brisbane QLD 4001
T: (07) 3316 3000 F: (07) 3316 3333 E: bnemail@ghd.com.au

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Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
A	SManahan	S Konstas		Philip Bradley		07/04/2011