12 TRANSPORTATION

12.1 INTRODUCTION

This chapter outlines road transportation requirements related to the Wandoan Coal Project (the Project), including a road impact assessment. A detailed transportation technical report is presented in TR 12-1-V1.5 Transport Impact Study. Note that figures/documents with numbering ending in V1.5 refer to figures/documents contained in Volume 1, Book 5 of the EIS.

This chapter also assesses the impacts of the proposed 500,000 tonne initial mining planned during Year -2 and Year -1 (see Chapter 6 Project Operations). Due to the interrelated impacts on transport of the mine and pipelines, this chapter also covers impacts related to a raw water supply pipeline (which are otherwise covered in Volumes 2, 3 and 4 of the EIS).

12.2 METHODOLOGY OF ASSESSMENT

In order to accurately assess the likely road impacts during the construction and operation of the Project, scenarios with and without the Project have been developed. Potential impacts have been quantified and the nature of their significance established.

The following tasks were undertaken as part of the traffic and transport assessment within the Project study area:

- field survey of the state controlled roads (SCRs) and intersections
- description of the current road conditions and intersection arrangements
- review of historic maintenance records for major roads
- assessment of road operations impacts as a result of increased traffic during construction and operation of the Project
- assessment of pavement impacts (in terms of equivalent standard axles (ESAs)) as a result of increased traffic during construction and operation of the Project.

Arrangements for coal transport, handling and storage are provided in Chapter 6 Project Operations. Discussion on potential air transport options (an upgraded airstrip at Taroom or a new airstrip at Wandoan) are also provided in Chapter 6. These items are not included in any assessment in this chapter.

There are also three water supply options under consideration by the WJV – two coal seam methane water pipeline options and a third involving water supply from the raising of Glebe Weir (see Chapter 1 Introduction). The impacts on SCRs are considered for all three options within this chapter. However, for local road impacts, this chapter only assesses the coal seam methane water supply options. Impacts on local roads resulting from the Glebe Weir water supply option are discussed in Volume 4 of the EIS.

12.2.1 SUMMARY OF PROVIDED DATASETS

A number of different datasets, provided by the Department of Main Roads (DMR), were used in this assessment and are listed below. The role of each piece of information in this assessment is described below:

- annual average daily traffic (AADT) and the percentage of commercial vehicles (%CV) data cover the 2008 calendar year, including yearly growth rates
  - this information is the latest information available at the time of this assessment and was extrapolated to determine base traffic for future years (e.g. 10-year design horizon) along various sections of the relevant SCRs.
- equivalent standard axle (ESA) analysis
  - this analysis provides an initial indication of the likely pavement impacts resulting from the Project.

In addition to the above, input was sought from the various specialists involved with the Project, specifically on material quantities for the various elements of the mine, for example the coal handling and preparation plant (CHPP), rail spur, mining equipment, power, etc.

12.3 EXISTING ENVIRONMENT

12.3.1 EXISTING ROAD NETWORK

The region generally has well established road infrastructure as shown in Figure 12-1-V1.3.

The Leichhardt Highway is located directly to the east of the Project area and connects Miles, Wandoan and Taroom. From Miles the Leichhardt Highway continues in a northerly direction through the towns of Theodore and Banana. At the town of Banana the Leichhardt Highway connects to the Dawson Highway which in turn connects to the Port of Gladstone. From Banana, the Leichhardt Highway continues north passing through the towns of Dululu before it terminates as it intersects the Capricorn Highway.

The Capricorn Highway runs east to west and connects Yeppoon and Rockhampton to Emerald via towns such as Dingo and Blackwater. The Fitzroy Developmental Road runs between the Peak Downs Highway to the north and Dingo to the south, then continues on south to Bauhinia and beyond. Dysart-Middlemount Road connects Dysart to Fitzroy Developmental Road.

To the southeast of the Project, the Warrego Highway connects Miles to Toowoomba and continues further east to Brisbane.

To the northwest of the Project, Roma-Taroom Road runs between the Carnarvon Highway and Taroom.

The Project area itself is traversed by a number of roads, most notably Jackson-Wandoan Road which is a state controlled road.

Road works have recently been undertaken on the Dawson Highway between Banana and Prospect Creek (reconstructed, completed November 2007), and on the Leichhardt Highway north of Wandoan (shoulder reseal, ongoing). Future road works planned by the

Department of Main Roads on roads to be used for the Project are detailed in Section 2.2.2 of TR 12-1-V1.5 Transport Impact Study.

12.3.2 BACKGROUND AND FUTURE TRAFFIC ENVIRONMENT 'WITHOUT DEVELOPMENT' SCENARIO

Projected traffic volumes for future years without the Project are summarised in Table 12-1. This data is used as a baseline for comparison during the construction and mine operations impact analysis.

As per the Guidelines for Assessment of Road Impacts of Developments (DMR 2006), traffic impacts have been assessed to a ten year horizon after the completion of construction. The calendar year 2025 (Year 14 of mine operation) is therefore employed as the base year for operations assessment. Draglines 4 and 5 will be assembled during Years 15 and 17 of mine operation (calendar years 2026 and 2028) respectively and baseline traffic for these years are also included in Table 12-1. A greater number of roads are affected in Years -2 and -1 due to the proposed bulk sample transportation in these years.

Further assessment of the 'without development' scenario, including the underlying projected growth rates, additional years of assessment, traffic volumes and commercial traffic volumes are presented in TR 12-V1.5: Transport Impact Study.

12.4 DESCRIPTION OF PROPOSED DEVELOPMENT

The proposed coal pit locations will result in a number of temporary road closures, new sections of roads and road relocations within and adjacent to the MLA areas. Apart from Jackson-Wandoan Road, these roads are local government owned.

The mine will be accessed via a newly constructed access road which will intersect the Leichhardt Highway approximately 6 km to the north of the Wandoan Township. The mine access road will provide safe traffic movement to and from the mine site and also connect the accommodation facilities with the mine infrastructure area (MIA) via security facilities at the main gate to the mine site.

12.4.1 CONSTRUCTION

Early works covering design and approvals are expected to commence in mid to late 2009, with construction occurring in 2010 (Year -2) until mid to late 2011 (Year -1). Some construction activities will continue over the first four years of mine operations (2012 to 2016, or Year 1 to 4). The construction traffic is expected to be spread over the six year period from Year -2 until Year 4.

A fourth and fifth dragline are proposed to be installed in Year 15 and Year 17 respectively (i.e. while the mine is in operation). Therefore, the effects of these draglines are considered during the operations phase.

The majority of materials and plant are expected to come from Brisbane and will be delivered to site via the Warrego and Leichhardt Highways. Some of the larger components, such as transformers, draglines and parts for the wash plant will come through the Port of Gladstone and will be delivered to site via the Dawson Highway and Leichhardt Highway to the north of the MLAs. Gravel, to be used as sub-base and base

material in road construction and as aggregate in concrete, and sand for pipeline bedding, will be from local sources. Several sources that lie within a 50 km radius of the MIA are currently being investigated.

From the Leichhardt Highway, materials and plant will be delivered via the new mine access road and stored on site within the MLAs for distribution internally when needed.

Workforce

The construction workforce is estimated to vary between 15 and 1,375 over the six years of construction on the MLA areas. This figure excludes an additional 50 persons who are also expected to be engaged for the proposed water and gas pipelines construction. Construction workers will be transported to and from the construction site by bus from the accommodation facilities to the north of the mine along the mine access roads. While the accommodation facilities are planned to cater for the entire construction crew, it is likely that some, including the WJV staff, may choose to live outside these facilities. Based on previous mine development experience, the WJV expects that about 30 persons will likely choose this option during Year -1.

Transport between the accommodation facilities and employees home bases will not be provided by the WJV and the workforce are expected to organise their own travel arrangements. Assuming that half of the total workforce is on-site at a time, there will be approximately 700 workers travelling to and from the Project site during shift changes (during Year -1). Assuming about a third of the workforce car pool, this results in approximately 460 private vehicle trips to/from the Project site every 10 days (i.e. the length of a shift). The construction workforce will be sourced from various locations with a possible distribution being Brisbane/Toowoomba/etc (40%), Roma/Mitchell/etc (10%), Rockhampton (30%), Gladstone (20%). For this assessment the 460 vehicles associated with these movements have been dispersed along the road network accordingly.

Table 12-1: Predicted traffic without the Project

Road/section	Background (2008)		Year -2 (2010)		Year 4 (2015)		Year 14 (2025)		Year 15 2026		Year 17 2028	
	Daily ESAs	AADT	Daily ESAs	AADT	Daily ESAs	AADT	Daily ESAs	AADT	Daily ESAs	AADT	Daily ESAs	AADT
Leichhardt Highway (26A)												
1.62 km south of Fitzroy Developmental Road	666	537	707	569	819	660	1,101	887	1,134	914	1,203	969
Leichhardt Highway (26B)												
Taroom – Jackson-Wandoan Road intersection	661	654	702	694	813	804	1,093	1,081	1,126	1,113	1,194	1,181
Jackson-Wandoan Road intersection – Miles	711	638	755	677	875	785	1,176	1,055	1,211	1,086	1,285	1,152
Jackson-Wandoan Road (4302)												
Jackson – chainage 68.5 km	50	66	53	70	61	81	82	109	84	112	89	119
Chainage 68.5 km – Wandoan	95	132	101	140	117	162	157	218	162	225	172	238
Warrego Highway (18C)												
Main Roads district boundary – Miles	1,500	1,846	1,591	1,958	1,844	2,270	2,479	3,051	2,553	3,143	2,708	3,334
Warrego Highway (18B)												
Dalby – Road 325 intersection	3,012	5,639	3,211	6,011	3,768	7,054	5,187	9,713	5,356	10,028	5,710	10,691
Road 325 intersection – chainage 27.0 km	3,375	4,433	3,746	4,921	4,864	6,389	8,198	10,769	8,638	11,346	9,588	12,595
Chainage 27.0 km – chainage 10.5 km	4,802	11,482	5,178	12,381	6,252	14,948	9,113	21,788	9,463	22,625	10,203	24,396

Road / section	Background (2008)		Year -2 (2010)		Year 4 (2015)		Year 14 (2025)		Year 15 2026		Year 17 2028	
	Daily ESAs	AADT	Daily ESAs	AADT	Daily ESAs	AADT	Daily ESAs	AADT	Daily ESAs	AADT	Daily ESAs	AADT
Chainage 10.5 km – intersection McDougall Street, Toowoomba	3,892	13,068	4,242	14,241	5,258	17,653	8,080	27,128	8,435	28,318	9,191	30,859
Dawson Highway (46B)												
1 km east of Banana	818	1,384	960	1,624	1,432	2,422	3,184	5,386	3,449	5,834	4,047	6,846
900 m west of Burnett Highway (41E)	996	1,832	1,095	2,014	1,386	2,549	2,221	4,086	2,328	4,283	2,558	4,707
700 m west of Burnett Highway (41D)	2,236	6,091	2,903	7,906	5,572	15,176	20,530	55,917	23,390	63,706	30,360	82,691
Roma-Taroom Road (4397)												
0.14 km north of Wybara Road	40	52	44	57	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.28 km south of Taroom	78	94	86	103	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Leichhardt Highway (26A)												
Sandy Creek	873	906	943	979	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
11 km south of Wowan	576	687	635	757	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
100 m north of Woolein Creek	596	690	632	732	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
300 m south of Fairview	591	664	627	705	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Bowen Street west of Banana	1,572	2,458	2,123	3,318	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Branch Creek	701	681	737	716	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
400 m south of The Boulevard	545	737	562	760	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Road / section	Background (2008)		Year -2 (2010)		Year 4 (2015)		Year 14 (2025)		Year 15 2026		Year 17 2028	
	Daily ESAs	AADT	Daily ESAs	AADT	Daily ESAs	AADT	Daily ESAs	AADT	Daily ESAs	AADT	Daily ESAs	AADT
Tim Shay Creek	520	515	571	566	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Capricorn Highway (16A)												
41 Mile Creek	1,962	2,717	2,231	3,090	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
500 m west of Dawson River	2,127	2,651	2,440	3,042	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Capricorn Highway (16B)												
1.5 km east of Dingo Roadhouse	2,092	2,702	2,429	3,138	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Fitzroy Developmental Road (85C)												
2.8 km North of Capricorn Highway	834	860	1,011	1,043	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6 km South of Mackenzie River	720	812	899	1,014	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
South of Middlemount Turnoff	559	662	672	796	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Dysart-Middlemount Road (519)												
West of Middlemount	1,028	2,254	1,214	2,662	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Construction materials

Construction materials that require transportation to site include the following elements of the Project:

- mine access road, internal roads and relocation of existing roads
- mine infrastructure area
- coal handling and preparation plant
- rail spur
- dragline facility
- accommodation facilities
- power and communication infrastructure
- overland coal conveyors
- gas supply pipeline (if required)
- raw water supply pipeline
- initial mining (500,000 tonne bulk sample during Year -2 and Year -1).

Quantities of construction materials required for the above infrastructure items, as well as the likely origin of each material, is presented in Table 12-2.

Table 12-2: Summary of construction material quantities

Material	Total weight (tonnes)	Origin
Bitumen	7,600	Brisbane
Cable	300	Brisbane
Cement	123,400	Brisbane
Concrete — precast	1,300	Brisbane
Miscellaneous items	115,600	Brisbane
Rail Sleepers	8,400	Gladstone
Special items	800	Brisbane
Steel — reinforcement	1,500	Brisbane
Steel — structural	108,300	Brisbane
Pipe — raw water supply	16,500	Brisbane
Pipe — gas	4,100	Brisbane
Crushed rock/gravel/sand	820,000	Local sources
TOTAL	**1,207,800**	

Miscellaneous items include items such as paint for line marking and buildings, road signs, signals, building blocks and valves for the pipelines. Special items refer to items such as transformers, that need to be transported via ‘low-loaders’. Miscellaneous items include items such as paint for line marking and buildings, road signs, signals, building blocks and valves for the pipelines. Special items refer to items such as transformers, that need to be transported via ‘low-loaders’. Also, while an allowance for 320,000 tonnes of gravel for construction of the product coal stockpile pad has been included in the above estimate, the

WJV is investigating the use of alternative materials sourced from the mine site. Accordingly, the estimated total quantity of construction materials in Table 12-2 may overstate the total quantities to be transported. This will be confirmed in detailed design.

Delivery of mining fleet and plant

The mining method will be based on a dragline, plus truck and excavator operation. During the mine start-up period the mining fleet will be made up as detailed in Table 12-3 below. With the exception of some of the larger components, such as those required for the draglines, all plant is expected to come from Brisbane.

Table 12-3: Anticipated mining fleet delivered to site during Year -1 to Year 4

Plant	Major specifications	Quantity	Total weight (tonnes)	Origin
Dragline	110 m³ bucket	3	22,500	Gladstone
Medium hydraulic excavator	550 tonne machine, 27 m³ bucket	2	1,266	Brisbane
Small hydraulic excavator	350 tonne machine, 21 m³ bucket	2	806	Brisbane
Large front end loader	30 m³ bucket	2	200	Brisbane
Large rear dump truck	220 tonne capacity (combo body)	26	3,034	Brisbane
Large overburden drill	Diesel overburden drill — 760 hp	5	156	Brisbane
Medium overburden drill	Diesel overburden drill — 475 hp	1	23	Brisbane
Large tracked dozer	850 hp diesel dozer	18	1,358	Brisbane
Large wheel dozer	800 hp diesel dozer	3	298	Brisbane
Large wheeled grader	24' blade/ 500 hp diesel grader	3	186	Brisbane
Large water truck	110,000 litre water truck	3	224	Brisbane
	TOTALS	**68**	**30,089**	

In addition to the plant listed in Table 12-3, draglines 4 and 5 will be delivered and assembled in Years 15 and 17 respectively.

Construction traffic

The majority of construction work will take place during Year -2 and Year -1. For simplicity the total tonnage on road for deliveries of construction materials has been spread over the six year construction period, proportioned in accordance with the anticipated construction workforce numbers for each year. This method allows for a robust assessment in terms of traffic operations as the year with the bulk of the construction workforce on site (Year -1) will also be the year with most materials deliveries. Table 12-4 below shows the percentage values and resultant tonnage (for materials) on road for each year. In addition, tonnage of plant (to be delivered to site) is also shown to give a total tonnage on road for each of the years between Year -2 and Year 4.

Table 12-4: Deliveries to site: tonnage on road by year

Year	Construction workforce (No.)	Construction workforce (%)	Construction materials (tonnes)	Plant (tonnes)	Total on road (tonnes)
Year -2	1,190	37.9%	457,733	-	457,733
Year -1	1,425	45.4%	548,126	11,918	560,044
Year 1	150	4.8%	57,697	8,351	66,049
Year 2	140	4.5%	53,851	9,781	63,632
Year 3	15	0.5%	5,770	39	5,809
Year 4	220	7.0%	84,623	-	84,623
TOTALS	3,140	**100%**	**1,207,800**	**30,089**	**1,237,889**

From the assumed origin of the materials and plant presented in Tables 12-2 and 12-3, traffic distribution (by weight transported) is as follows:

- from Brisbane via the Warrego Highway and Leichhardt Highway — 31.9%
- local aggregate sources (from within a 50km radius of the MIA) via the Leichhardt Highway — 66.2%. Six sources for aggregates are currently being investigated. Based on those investigations, it has been assumed that three of the six are north of the site and three are south of the site.
- from Gladstone via the Dawson Highway and Leichhardt Highway — 1.8%.

Based on the above, Table 12-5 shows the distribution of construction traffic for each segment of the state controlled roads within the study area. Figure 12-2-V1.3 indicates the roads considered for the haulage routes.

Table 12-5: Construction traffic distribution

Road/section	Construction traffic
Leichhardt Highway (26A)	
1.62 km south of Fitzroy Developmental Road	1.82%
Leichhardt Highway (26B)	
Taroom – Jackson-Wandoan Road intersection	34.94%
Jackson-Wandoan Road intersection – Miles	65.06%
Warrego Highway (18C)	
Main Road district boundary – Miles	31.94%
Warrego Highway (18B)	
Dalby – Road 325 intersection	31.94%
Road 325 intersection – chainage 27.0 km	31.94%
Chainage 27.0 km – chainage 10.5 km	31.94%
Chainage 10.5 m – intersection McDougall Street, Toowoomba	31.94%
Dawson Highway (46B)	
1 km east of Banana	1.82%
900 m west of Burnett Highway (41E)	1.82%
700 m west of Burnett Highway (41D)	1.82%

Commercial vehicle fleet

The total number of commercial vehicles required during construction for selected years are presented in Table 12-6. Construction vehicle requirements over all years of construction are provided in TR 12-V1.5: Transport Impact Study. The various vehicle types/classes required are shown, as well as the resultant equivalent standard axles (ESAs) impacting on the state controlled roads. ESAs quoted are the totals for the loaded and unloaded directions combined.

Table 12-6 also contains the annual traffic requirements associated with the operation of the Project during Year 14. Traffic impacts for Year 14 contains only operation impacts, as no construction is expected at this time. ESAs quoted are the totals for the loaded and unloaded directions combined.

As shown in Table 12-6, a significant increase in vehicles and ESA will occur during Year -2 and Year -1 when initial mining is occurring for the proposed bulk sample. This will reduce substantially by the end of Year -1, when there will be approximately an additional 11 vehicles (and 77 ESAs) per day resulting from the Project. During operation (Year 14) there will be an additional nine vehicles and 59 ESAs per day as a result of the Project.

Local road impacts

Roads owned by local councils will also be impacted during the transportation of the proposed bulk sample as well as the pipe sections and related fittings for the two pipelines to be constructed (i.e. raw water pipeline and gas pipeline).

Table 12-6: Construction and operation phase vehicle inventory

Type	Austroads class	Year -2 (2010)		Year -1 (2011)		Year 4 (2015)		Year 14 (2025)	
		No. of vehicles	Total ESAs	No. of vehicles	Total ESAs	No. of vehicles	Total ESAs	No. of vehicles	Total ESAs
Two axle bus	Class 3	0	0.0	0	0.0	1,456	6,697.6	1,456	6,697.6
Three axle bus	Class 4	0	0.0	0	0.0	468	2,480.4	468	2,480.4
Three axle articulated vehicle	Class 6	274	1,644.0	335	2,010.0	52	312.0	0	0.0
Five axle articulated vehicle	Class 8	0	0.0	0	0.0	820	6,150.0	641	4,807.5
Semi trailer	Class 9	2,459	15,829.7	2,984	19,215.6	284	1,902.8	0	0.0
B double	Class 10	8,893	78,258.4	10,879	95,735.2	2,442	22,343.6	758	7,513.2
Type 1 road train	Class 11	12	122.4	14	142.8	3	30.6	0	0.0
Low loader	n/a	4	75.2	5	94.0	1	18.8	0	0.0
25 m B-double	Class 10	224	2,226.8	224	2,226.8	0	0.0	0	0.0
Type 1 Road train with tri-axle dolly	Class 11	224	2,722.9	224	2,722.9	0	0.0	0	0.0
AB-triple with tri-axle dolly	Class 11	3,143	45,002.3	3,143	45,002.3	0	0.0	0	0.0
Total		**15,234**	**145,881.7**	**17,809**	**167,149.6**	**5,526**	**39,935.8**	**3,323**	**21,498.7**

The daily volumes of vehicles that are likely to use these roads have been calculated and are shown in Table 12-7. The total volumes of vehicles that are likely to use these roads have been calculated and are shown in Table 12-7. The water pipeline considered in Table 12-7 is the proposed southern pipeline option, as discussed in Section 4.1.2 of TR 12-V1.5 Transport Impact Study. Further analysis during the detailed design phase may be required once a decision on a preferred pipeline source has been made.

Table 12-7: Construction traffic using local roads (totals for Years -2 and -1)

Road/section	Annual volume
Raw water supply pipeline	
Baileys Road	394
Fosters Road	784
Gas Pipeline	
Nathan Road	241
Bulk sample	
Crinum Road	7,183

12.4.2 OPERATION

All coal will be transported via the proposed Surat Basin Rail to port facilities in Gladstone. Mining operations commence during Year 1 with a predicted initial workforce of 502 people. Over the following three years (to Year 4), the number of operational employees is expected to increase to the full compliment of staff and operators (including shut down personnel) of 844. It is anticipated that the number of employees and operators will remain relatively constant from there on, subject to future mine development.

Personnel movement assumptions for the operational phase include that:

- the mine will operate 24/7 with two shifts per day:
- day shift — 6:00 to 18:00
- night shift — 18:00 to 6:00
- regional town-based accommodation is anticipated to be around 125-150 persons by full operations, with an assumed 60:20:20 split for residing in Wandoan, Taroom and Miles respectively. It is assumed that the remainder of the construction and mining personnel will reside in the accommodation facilities.

Shuttle buses will be provided for employees travelling daily from the towns of Wandoan, Taroom and Miles. A total of four return trips are estimated by the shuttle buses every day (that is, two return trips between Miles, Wandoan and the mine and two return trips between Taroom and the mine).

While air transport is proposed as an option to allow employees to fly in and out during shift changes, it has been assumed for the purposes of this assessment that transport will be provided solely in the form of coaches which will travel between Wandoan and Brisbane. This will allow for a worst case scenario in this traffic assessment. This scenario (with shuttle buses) also covers any vehicle travel to/from the airstrip by the community should the airstrip option proceed. Based on anticipated shift changes and numbers of personnel

requiring transportation, five return trips per week between the MLA and Brisbane will to be required during Year 1. This will gradually increase to a maximum of nine return trips per week by Year 4.

In addition, various deliveries will be required for the operation of the mine, including fuel and supplies. Table 12-8 shows the quantities to be delivered during the mine operation from Years 1 to 17.

Table 12-8: Annual delivery quantities (Year 1 to Year 17)

Material	Annual quantity	Source
Fuel (Diesel)	Between 24 to 50 million litres	Brisbane
Explosives (ammonium nitrate)	Between 12,000 – 39,000 tonnes	north of the MLAs (possibly Moura)
Supplies (bread, milk, etc)	Approximately 4,100 tonnes	Brisbane and Gladstone

Some of these deliveries such as fuel and ammonium nitrate are classified as hazardous materials. Hazardous materials, including the transport and handling of these materials, are discussed in more detail in Chapter 23 Hazard and Risk and Chapter 24 Health and Safety.

12.5 POTENTIAL IMPACTS

Under the Guidelines for Assessment of Road Impacts of Development (Main Roads 2006), traffic impacts need to be considered where traffic due to a development equals or exceeds 5% of the existing traffic levels.

To determine the potential impacts of the Project, the additional traffic generated by the Project for both the construction and operations phases is compared to the projected future traffic for each of the six years from Year -2 through to Year 4.

The distribution of construction traffic, as discussed in Section 12.4.1, has been used to determine the AADT and ESAs along each segment of road for the 'with development' scenario. For simplicity it has been assumed that all construction traffic will return along the same route to its place of origin, that is, the volume of construction traffic is equal for the loaded and unloaded direction.

The proposed mining pit locations will also result in a number of temporary road closures, new sections of road and road relocations. These changes to the road network will result in slightly longer journey times. Details of the proposed mining schedule can be found in Chapter 5 Project Construction and Chapter 6 Project Operations in Volume 1.

12.5.1 TRAFFIC IMPACT ASSESSMENT

AADT is a measure of the number of vehicles using a road per day, and the impact of the Project on existing AADT levels is presented in Table 12-9. Further assessment for all years of construction is presented in TR 12-V1.5 Transport Impact Study.

A greater number of road segments are impacted during Year -2 and Year -1 due to construction of the pipelines and the movement of the proposed bulk sample.

Table 12-9: AADT projected increase with the Project

Road/section	Increase in AADT				
	Year -1 (2011)	Year 4 (2015)	Year 14 (2025)	Year 15 (2026)	Year 17 (2028)
Leichhardt Highway (26A)					
1.62 km south of Fitzroy Developmental Road	3.0%	0.0%	0.2%	0.2%	0.2%
Leichhardt Highway (26B)					
Taroom – Jackson-Wandoan Road intersection	4.7%	0.7%	0.2%	0.2%	0.2%
Jackson-Wandoan Road intersection – Miles	4.7%	1.3%	0.8%	0.7%	0.7%
Warrego Highway (18C)					
Main Roads district boundary – Miles	0.8%	0.2%	0.3%	0.3%	0.2%
Warrego Highway (18B)					
Dalby – Road 325 intersection	0.3%	0.1%	0.1%	0.1%	0.1%
Road 325 intersection – chainage 27.0 km	0.3%	0.1%	0.1%	0.1%	0.1%
Chainage 27.0 km – chainage 10.5 km	0.1%	0.0%	0.0%	0.0%	0.0%
Chainage 10.5 km – intersection McDougall Street, Toowoomba	0.1%	0.0%	0.0%	0.0%	0.0%
Dawson Highway (46B)					
1 km east of Banana	0.1%	0.0%	0.0%	0.0%	0.0%
900 m west of Burnett Highway (41E)	0.1%	0.0%	0.0%	0.0%	0.0%
700 m west of Burnett Highway (41D)	0.0%	0.0%	0.0%	0.0%	0.0%
Leichhardt Highway (26A)					
Sandy Creek	1.6%	NA	NA	NA	NA
11 km south of Wowan	2.0%	NA	NA	NA	NA
100 m north of Woolein Creek	2.1%	NA	NA	NA	NA
300 m south of Fairview	2.2%	NA	NA	NA	NA
Bowen Street west of Banana	0.4%	NA	NA	NA	NA
Branch Creek	2.2%	NA	NA	NA	NA
400 m south of The Boulevard	2.1%	NA	NA	NA	NA
Tim Shay Creek	2.7%	NA	NA	NA	NA
Capricorn Highway (16A)					
41 Mile Creek	0.5%	NA	NA	NA	NA
500 m west of Dawson River	0.5%	NA	NA	NA	NA
Capricorn Highway (16B)					
1.5 km east of Dingo Roadhouse	0.5%	NA	NA	NA	NA

Road/section	Increase in AADT				
	Year -1 (2011)	Year 4 (2015)	Year 14 (2025)	Year 15 (2026)	Year 17 (2028)
Fitzroy Developmental Road (85C)					
2.8 km North of Capricorn Highway	1.4%	NA	NA	NA	NA
6 km South of Mackenzie River	1.4%	NA	NA	NA	NA
South of Middlemount Turnoff	1.8%	NA	NA	NA	NA
Dysart-Middlemount Road (519)					
West of Middlemount	0.6%	NA	NA	NA	NA

NA – not applicable

As can be seen from Table 12-9, the Project will not result in significant traffic operations impacts on the surrounding road network.

During Years -2 and -1, there will be a movement of private vehicles to and from the MIA every 10 days as construction crews change shifts. This movement, together with the relevant commercial vehicle movements (as it occurs every ten days) is shown in Table 12-10.

Table 12-10: AADT increases with the Project during shift change days

Road/section	Increase in AADT	
	Year -2 (2010)	Year -1 (2015)
Leichhardt Highway (26A)		
1.62 km south of Fitzroy Developmental Road	46.7%	59.1%
Leichhardt Highway (26B)		
Taroom – Jackson-Wandoan Road intersection	29.7%	37.6%
Jackson-Wandoan Road intersection – Miles	29.5%	38.4%
Warrego Highway (18C)		
Main Roads district boundary – Miles	7.8%	10.1%
Warrego Highway (18B)		
Dalby – Road 325 intersection	2.6%	3.3%
Road 325 intersection – chainage 27.0 km	3.1%	3.9%
Chainage 27.0 km – chainage 10.5 km	1.2%	1.6%
Chainage 10.5 km – intersection McDougall Street, Toowoomba	1.1%	1.4%
Dawson Highway (46B)		
1 km east of Banana	4.4%	5.4%
900 m west of Burnett Highway (41E)	3.5%	4.5%
700 m west of Burnett Highway (41D)	0.9%	1.1%

Road/section	Increase in AADT	
	Year -2 (2010)	Year -1 (2015)
Leichhardt Highway (26A)		
Sandy Creek	12.6%	15.4%
11 km south of Wowan	16.3%	19.8%
100 m north of Woolein Creek	16.8%	20.8%
300 m south of Fairview	17.5%	21.6%
Bowen Street west of Banana	5.9%	6.5%
Branch Creek	27.2%	34.2%
400 m south of The Boulevard	25.6%	32.5%
Tim Shay Creek	34.4%	42.4%
Capricorn Highway (16A)		
41 Mile Creek	0.5%	0.5%
500 m west of Dawson River	0.5%	0.5%
Capricorn Highway (16B)		
1.5 km east of Dingo Roadhouse	0.5%	0.5%
Fitzroy Developmental Road (85C)		
2.8 km North of Capricorn Highway	1.5%	1.4%
6 km South of Mackenzie River	1.6%	1.4%
South of Middlemount Turnoff	2.0%	1.8%
Dysart-Middlemount Road (519)		
West of Middlemount	0.6%	0.6%

As shown in Table 12-10, shift changeover during construction will create a significant increase (i.e. more than 5%) in traffic along Leichhardt Highway between Warrego Highway and Capricorn Highway during Years -2 and -1. It should be noted, however, that this impact will not be a daily occurrence, and should only be experienced every 10 days. As the construction crew traffic will be non-commercial vehicles (i.e. private cars), these will have no pavement impacts and as such are not considered during the pavement impact assessment.

12.5.2 PAVEMENT IMPACT ASSESSMENT

An ESA is a unit of measure which converts wheel loads of traffic to an equivalent number of ‘standard’ or ‘equivalent’ loads. It is therefore an effective measuring tool in determining pavement impacts caused by a mix of vehicles. Table 12-11 lists the projected increase in daily ESAs that can be ascribed to the Project.

Table 12-11: ESA projected increase with the Project

Road/section	Increase in ESA				
	Year -1 (2011)	Year 4 (2015)	Year 14 (2025)	Year 15 (2026)	Year 17 (2028)
Leichhardt Highway (26A)					
1.62 km south of Fitzroy Developmental Road	62.2%	0.0%	1.1%	1.1%	1.3%
Leichhardt Highway (26B)					
Taroom – Jackson-Wandoan Road intersection	53.3%	4.8%	1.1%	1.1%	1.3%
Jackson-Wandoan Road intersection – Miles	38.9%	8.3%	4.0%	3.9%	3.9%
Warrego Highway (18C)					
Main Roads district boundary – Miles	9.1%	1.9%	1.9%	1.9%	1.8%
Warrego Highway (18B)					
Dalby – Road 325 intersection	4.5%	0.9%	0.9%	0.9%	0.9%
Road 325 intersection – chainage 27.0 km	3.8%	0.7%	0.6%	0.6%	0.5%
Chainage 27.0 km – chainage 10.5 km	2.8%	0.6%	0.5%	0.5%	0.5%
Chainage 10.5 km – intersection McDougall Street, Toowoomba	3.4%	0.7%	0.6%	0.6%	0.5%
Dawson Highway (46B)					
1 km east of Banana	22.8	0.0%	0.0%	0.0%	0.0%
900 m west of Burnett Highway (41E)	20.7	0.0%	0.1%	0.1%	0.1%
700 m west of Burnett Highway (41D)	7.2%	0.0%	0.0%	0.0%	0.0%
Leichhardt Highway (26A)					
Sandy Creek	22.7%	NA	NA	NA	NA
11 km south of Wowan	33.4%	NA	NA	NA	NA
100 m north of Woolein Creek	34.2%	NA	NA	NA	NA
300 m south of Fairview	34.5%	NA	NA	NA	NA
Bowen Street west of Banana	9.0%	NA	NA	NA	NA
Branch Creek	29.4%	NA	NA	NA	NA
400 m south of The Boulevard	39.0%	NA	NA	NA	NA
Tim Shay Creek	37.2%	NA	NA	NA	NA
Capricorn Highway (16A)					
41 Mile Creek	9.4%	NA	NA	NA	NA
500 m west of Dawson River	8.5%	NA	NA	NA	NA
Capricorn Highway (16B)					
1.5 km east of Dingo Roadhouse	8.5%	NA	NA	NA	NA

Road/section	Increase in ESA				
	Year -1 (2011)	Year 4 (2015)	Year 14 (2025)	Year 15 (2026)	Year 17 (2028)
Fitzroy Developmental Road (85C)					
2.8 km North of Capricorn Highway	20.0%	NA	NA	NA	NA
6 km South of Mackenzie River	22.1%	NA	NA	NA	NA
South of Middlemount Turnoff	30.2%	NA	NA	NA	NA
Dysart-Middlemount Road (519)					
West of Middlemount	16.9%	NA	NA	NA	NA

NA – not applicable

As can be seen from Table 12-11, significant pavement impacts due to the Project, i.e. an increase in excess of 5% over existing levels, occur along the Leichhardt Highway (26B) during construction. As can be expected, the construction impacts are highest during the peak construction period (Year -1). For example, an ESA increase as high as 53.3% is predicted along the Leichhardt Highway between Taroom and the (present) Jackson-Wandoan Road intersection, which represents the potential impact along approximately the 6 km stretch between Wandoan township and the new mine access road.

Tables 12-11 also shows that all roads utilised during the bulk sample transportation will incur significant pavement impacts due to these movements. However these roads are only impacted during Year -2 and Year -1. The ESA increase of 53.3% along the Leichhardt Highway near the Taroom Jackson-Wandoan Road intersection during Year -2 is largely due to the vehicles transporting the proposed bulk sample.

During Years -2 and -1 the Warrego Highway (18C) experiences a traffic increase of 9.1% and 5.4% respectively.

The other roads investigated experience load increases below 5% over existing levels for each of the years investigated.

12.5.3 ROAD SAFETY

The construction and operation of the mine will result in increased commercial vehicle activity in the area around the MLAs as well as along the Warrego, Leichhardt and Capricorn Highways. Adherence to and vigilance of road safety considerations is therefore important during the life of the Project.

Shift changes during Years -2 and -1 will result in approximately 460 private vehicles travelling to and from the MIA. This will occur every 10 days (or the duration of the shift). This volume of traffic creates some safety concerns for the surrounding road network, particularly at the new intersection giving access to the MIA. In order to minimise the impact on the road network, these movements will be planned to occur at staggered times (i.e. stipulate that construction crews may only leave the site during set hours of the day). Traffic control measures such as variable message signs will be used to reduce the speed

limit around the new intersection of the MIA access road and the Leichhardt Highway during the hours that construction crews arrive/depart.

Disruptions to traffic movements are likely during the construction phase of the Project due to trenching for the pipeline(s) and due to the temporary road closures and relocations. Chapters 5 and 6 of contain more details pertaining to the temporary road closures and road relocations.

School bus routes

The existing school bus routes in the area use the Leichhardt Highway, Warrego Highway, Jackson-Wandoan Road and Grosmont Road, as shown in Figure 12-3-V1.2. The Project will result in increased commercial vehicle movements along the Leichhardt Highway and Warrego Highway during the construction phase that will interact with the school bus routes.

12.5.4 VIBRATION

Perceptible vibration impacts from commercial vehicle movements along roads may occur as a result of the project. Road traffic vibration impacts are discussed in Chapter 16 Vibration.

12.6 MITIGATION MEASURES

12.6.1 CONSTRUCTION PHASE

Traffic impact assessment

Under the Guidelines for Assessment of Road Impacts of Development (Main Roads 2006), traffic impacts due to construction of the Project are deemed to be insignificant.

As shown in Table 12-9 the Project contributes to increases in traffic levels of less than 5% on the surrounding road network. On that basis, the link capacity of the state controlled roads investigated is considered adequate. As such, no additional mitigation measures are required.

The mine access road intersection with the Leichhardt Highway will be constructed to DMR standards. For safety purposes, appropriate traffic management measures will be implemented during the construction of this intersection, in accordance with the current Manual on Uniform Traffic Control Devices (DMR 2003) requirements.

As discussed in Section 12.4.1 the Project will result in a number of road relocations adjacent to the MLA areas including the Jackson-Wandoan Road. These roads will be constructed to DMR standards and appropriate traffic management measures will be employed during the construction of these roads and their respective intersections as mentioned above.

During the construction of the proposed gas, water and services pipelines, there is likely to be some disruptions to the traffic on the road network. The proposed pipelines are required to run across several roads (for example the services and gas pipelines will have to cross the Leichhardt Highway to reach the MIA), which will require trenches to be cut across the affected roads. Appropriate traffic management techniques will be employed during such construction works on the road network (both SCRs and local roads) to ensure the safety

of construction workers as well as the public and to minimise disruptions to the affected traffic. In addition, the road pavement will be maintained and repaired to a suitable condition afterwards.

The *Transport Infrastructure Act 1994* requires written authorisation from the Chief Executive, Queensland Transport, where the pipelines cross the proposed Surat Basin Rail and existing QR corridors or any SCRs. DMR approval will also be necessary in order to use the road reserves of SCRs for the proposed pipeline alignments. Negotiations with local government will be carried out, where necessary, to reach agreement to utilise any local government controlled road reserves for the pipeline alignments.

Pavement impact assessment

As per the Guidelines for Assessment of Road Impacts of Development (Main Roads 2006), significant pavement impacts (that is, in excess of 5%) are predicted along the Leichhardt Highway (26B) between its intersection with the Warrego Highway and the new mine access road for each year from Year -2 through to Year 4 due to the construction of the Project. The Leichhardt Highway (26A and 26B), Capricorn Highway (16A and 16B), Fitzroy Developmental Road (85C) and Dysart-Middlemount Road (519) also incur pavement impacts due to the transportation of the proposed bulk sample during Years -1 and -2.

While the annual maintenance costs have not been determined at this time, the WJV will undertake early consultation and negotiations with DMR (and Dalby Regional Council in relation to local roads) to reach a suitable agreement which will include, where required, provisions for any necessary upgrades, maintenance and rehabilitation, considering the existing and proposed Roads Implementation Program and infrastructure maintenance programs of DMR.

The percentage increases determined in Section 12.5.2 of this report and Section 5.2.1 of TR 12-V1.5: Transport Impact Study will be used as a starting point for these discussions.

12.6.2 OPERATIONAL PHASE

Traffic impact assessment

Similar to the construction phase, traffic impacts during the operation of the Project are less than 5% and are considered insignificant. As such, no additional mitigation measures are required.

Pavement impact assessment

Significant pavement impacts (those being in excess of 5%) are predicted along the Leichhardt Highway (26B) between its intersection with the Warrego Highway and the new mine access road on an ongoing occurrence during the operational phase of the Project. The Warrego Highway (18C) between the DMR Boundary and Miles will also experience significant pavement impacts due to the Project during Year -1.

Consistent with the construction impact mitigation measures, the WJV will undertake early consultation and negotiations with the DMR (and Dalby Regional Council in relation to local roads) to reach a suitable agreement which will include, where required, provisions for any necessary upgrades, maintenance and rehabilitation. The percentage increases determined in Section 12.5.2 of this report and Section 5.2.1 of TR 12-V1.5: Transport Impact Study will be used as a starting point for determining necessary contributions through discussions with DMR.

12.7 RESIDUAL IMPACTS

No residual traffic impacts are predicted due to either the construction or the operation phases of the Project. Safety and environmental impacts are discussed separately below.

12.7.1 SAFETY IMPACTS

In consultation with DMR, Queensland Transport, and the Dalby Regional Council, a Traffic Management Plan will be developed for the road network adjacent to the mine site (State controlled roads and local roads) to ensure the safety of the public (including school buses) and construction workers and to minimise as far is as practicable disruptions to traffic.

Traffic increases due to the Project, that is a maximum of 42 additional commercial vehicles per day during Year -1 and 9 additional commercial vehicles per day in Year 14 (as determined in Section 12.4.1) — are not anticipated to impact negatively on road safety on the links and intersections along the haulage routes in general. However, measures will be implemented in order to ensure that road safety is maintained during the life of the Project, including consideration of Queensland Transport Safe School Travel (SafeST) policies.

Intersection upgrade

The new intersection connecting the MIA to the Leichhardt Highway will be built to the required DMR standards. Haulage vehicles making right turn manoeuvres from the MIA access road to Leichhardt Highway present the biggest safety concern. As per the Road Planning and Design Manual (DMR 2006) there are two fundamental types of right turn treatments for two lane rural roads:

- basic right turn treatment (BAR)
- channelised right turn treatment with a short turn slot (CHR).

The CHR turn treatment is recommended for the mine access road intersection with the Leichhardt Highway. This type of turn treatment requires all through traffic to deviate, it provides safer performance by removing the stationary turning vehicle from the through traffic lane. It provides for a safer traffic environment for both the through traffic along Leichhardt Highway and the traffic turning into the MIA.

12.7.2 ENVIRONMENTAL AND OTHER IMPACTS

The additional traffic due to the construction and operation of the Project may contribute to social and environmental impacts, e.g. noise and air quality issues. These specific issues and related management measures are addressed separately in the respective EIS chapters and other technical reports.

It is recognised that the expected increased development in the region, including mineral resources based development, may cause cumulative traffic impacts on a regional scale. Construction periods for both the Project and the Surat Basin Rail will likely co-incide. The WJV will work together with Dalby Regional Council, Department of Main Roads, the local community and other proponents to manage the cumulative traffic impacts in the region.

12.8 REFERENCES

Queensland Department of Main Roads 2006, *Guidelines for Assessment of Road Impacts of Development.*

Queensland Department of Main Roads 2005, *Pavement Design Manual.*

Queensland Department of Main Roads 2006, *Road Planning and Design Manual.*

Queensland Transport 2008, *Guideline for Multi Combination Vehicles*.