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14. TRANSPORT

14.1. INTRODUCTION

This Section describes the potential impacts of the South Galilee Coal Project (SGCP) on the existing transportation network, including road, rail, air and port, and details mitigation strategies where required. The Section includes a description of the existing conditions in the vicinity of the SGCP; an assessment of potential traffic and pavement impacts specific to the SGCP; and a description of the requirements of the external road network where traffic generated by development activities may result in 'significant' impacts.

This transport assessment identifies impacts on existing transport infrastructure during the construction and operational phases of the SGCP, and to develop potential mitigation strategies in accordance with Local and State Government guidelines and requirements.

The assessment was based upon consultation with the Department of Transport and Main Roads (DTMR), Queensland Rail (QR) and Barcaldine Regional Council (BRC).

The outcomes summarised in this Section are part of an overall technical report provided in **Appendix K—Transport Technical Report**.

14.1.1. Environmental Values

The environmental values considered in this Section include the existing utilisation of transport infrastructure, including traffic volumes and all subsequent changes to transport infrastructure and its level of utilisation resulting from the SGCP.

Potential impacts of transport associated with the amenity, human health and ecological values as a result of dust, noise, vibration and any other environmental impacts as well as appropriate mitigation measures are discussed in **Section 10—Air Quality**, **Section 12—Noise and Vibration** and **Section 19—Hazard and Risk**. Although there is potential for air quality impacts associated with vehicle movements on unsealed roads, rail load-out and coal dust entrainment from train wagons, these impacts are anticipated to be minimal. As discussed in **Section 10—Air Quality**, dust deposition levels are predicted to be within 10 % of ambient levels within 5 kilometres (km) of the SGCP.

As discussed in **Section 12—Noise and Vibration**, increased noise emissions from traffic are unlikely to adversely impact any noise sensitive receptor as there are no noise sensitive receptors located immediately adjacent to the railway loop. A minor increase in rail traffic will result from the SGCP operations and only minor corresponding impacts on sensitive receptors along the rail network are anticipated.

As discussed in **Section 19—Hazard and Risk**, it is considered that the risk of an increased frequency of traffic accidents associated with the SGCP is low.

The transport network associated with the SGCP is predicted to have minor impacts on watercourses and overland flows and these are discussed further in **Section 9—Water Resources**.

The nature conservation values associated with the SGCP are provided in **Section 8—Nature Conservation**. Traffic impacts on flora and fauna associated with the SGCP are expected to be minor.

A description of the natural environment of the infrastructure corridor associated with the SGCP has been included in **Section 7—Land**.

The objective of the proposed mitigation measures is to minimise the potential impacts on the environmental values identified.

14.1.2. Relevant Legislation and Approvals

Transport information was gathered from a number of sources to meet requirements of the State legislation and guidelines described below. All relevant requirements have been considered as part of this Environmental Impact Statement (EIS).

14.1.2.1. Transport Infrastructure Act 1994

The objectives of the *Transport Infrastructure Act 1994 (TI Act)* are to permit and promote integrated planning and management of transport infrastructure. It outlines the various regimes for all modes of transport including air, rail, sea, bus ways and light rail. It is the primary legislation administered by DTMR in that it sets out the powers DTMR has for managing the State Controlled Road (SCR) network. A permit is required under this *Act* if there is interference proposed with an SCR.

An assessment of the potential impacts on transport infrastructure is discussed in this Section. Minor amounts of additional traffic will be generated by the SGCP during the construction and operational phases and no interference is proposed to the SCR network.

14.1.2.2. Transport Operation (Road Use Management) Act 1995

The overall objectives of the *Transport Operation (Road Use Management) Act 1995 (TO Act)* are to provide for the effective and efficient management of road use in Queensland and to provide a scheme that will promote the effective and efficient movement of people, goods and services.

The *TO Act* seeks to contribute to the strategic management of road infrastructure in ways consistent with the *TI Act*. It also provides mechanisms to improve road safety and the environmental impact of road use in ways that contribute to overall transport effectiveness and efficiency.

14.1.2.3. Transport Planning and Coordination Act 1994

The objectives of the *Transport Planning and Coordination Act 1994 (TPC Act)* are to improve the economic, trade and regional development performance of Queensland, and the quality of life of people living in Queensland by achieving overall transport effectiveness and efficiency through strategic planning and management of transport resources.

The SGCP will achieve the objectives of the *TPC Act* through effective and efficient transport management, although little impact on traffic and transport networks is anticipated. Further discussion of the potential impacts on the traffic and transport networks is provided in this Section.

14.1.2.4. Guidelines for Assessment of Road Impacts of Developments

The purpose of the Guidelines for Assessment of Road Impacts of Developments (GARID) (Department of Transport and Main Roads (DTMR), 2006) is to assist industry to assess the road impacts of their development proposals. While use of the GARID is not mandatory, they provide the basis for open and expeditious dealings between developers and DTMR on road issues.

The GARID provide developers with clear, open and accountable advice on information that DTMR requires when addressing road issues, and ensures that a consistent approach is adopted across a range of development projects. The GARID have been utilised throughout this assessment.

14.1.2.4.1. Assessment Method

A number of desktop studies supported by field observations and meetings with relevant councils and key stakeholders were used to generate baseline/existing conditions. Historic data was used to generate future traffic growth for the region.

The assessment of the SGCP's transport impacts are based on the current:

- development timeframes
- SGCP configuration
- forecast material requirements
- forecast workforce profile and travel arrangements
- existing road network details such as network geometry, existing road hierarchy and posted speed limits (provided by DTMR and BRC)
- future road network provision (provided by DTMR and BRC)
- tube count data, along with associated historical growth rates (provided by DTMR and BRC)
- Existing capacity and provisions for air and port travel and future upgrades proposed
- existing pavement condition data (provided by DTMR)

- intersection count data at the Capricorn Highway/Clermont-Alpha Road/Shakespeare junction in Alpha (surveys undertaken by AusTraffic).

Further details of the assessment method are provided in **Appendix K—Transport Technical Report**.

A summary of the information and assumptions used for the road transport assessment is as follows:

- timelines for each phase of construction and operation
- anticipated location for each traffic generating component of the SCGP
- expected employee and visitor requirements during each phase of construction and operation
- assumed employee shift times
- expected number of heavy vehicle movements to and from the site by times of day and vehicle type
- likely origins and destinations for construction materials
- likely modes of transport used during the construction and operational phases.

14.1.2.4.2. Road Network

The Transport Impact Assessment for the construction and operation of the SGCP has been completed in accordance with the GARID.

Additionally, the road network assessment has been prepared with due consideration of the following reference resources:

- Road Planning and Design Manual (RPDM) (DTMR, 2006)
- Assessment of Road Impacts of Development Proposals – Notes for Contribution Calculations (DTMR, 2008)
- Road Implementation Program 2009–10 to 2013–14 (DTMR, 2009)
- Guide to Traffic Management Part 3: Traffic Studies and Analysis (Austroads, 2009)

The key performance criteria used to assess operating performance on roads and key intersections included Level of Service (LOS), Percentage Increase in Average Annual Daily Traffic (ADDT) and Percentage Increase in Pavements Equivalent Standard Axles (ESAs).

14.1.2.4.3. Level of Service

Level of Services (LOS) is a qualitative measure describing operational conditions within a traffic stream and the perception of these by motorists. LOS measures from A to F, with definitions as follows:

- LOS A – this is the highest measure of LOS. It is a condition of free flow and individual drivers are virtually unaffected by others in the traffic stream
- LOS B – This level is in the zone of stable flow and drivers still have reasonable freedom to select their desired speed and to manoeuvre within the traffic stream
- LOS C – most drivers are restricted to some extent in their freedom to select their desired speed and to manoeuvre within the traffic stream
- LOS D – This level is close to the limit of stable flow. All drivers are severely restricted in their freedom to select their desired speed and to manoeuvre in the traffic stream
- LOS E – this occurs when traffic volumes are at or close to capacity and there is virtually no freedom to select desired speeds or to manoeuvre within the traffic stream. Flow is unstable and minor disturbances within the traffic stream may lead to a traffic jam
- LOS F – this service level is in the zone of forced flow. Flow breakdowns occur and queuing and delays result.

14.1.2.4.4. Annual Average Daily Traffic

Annual Average Daily Traffic (AADT) is a common measure of traffic volume equivalent to the total volume of traffic passing a roadside observation point over the period of one year, divided by the number of days in the year.

14.1.2.4.5. Equivalent Standard Axles

Equivalent Standard Axles (ESA) is a measure defining the cumulative damaging effect to pavements by design traffic. It is expressed in terms of the equivalent number of 80 kilonewton (kN) axles passing over the pavement up to the design horizon.

14.1.2.4.6. Intersection Impact

An intersection impact is the impact that a proposed development may have at an intersection due to an increase in traffic volumes. The Guidelines for Assessment of Road Impacts of Development (DTMR, 2006) states that the impact is considered insignificant (and therefore does not normally require further analysis) if development generated traffic volumes do not result in increases of greater than 5 % of existing background traffic volumes for any left, through or right turn movement.

14.1.2.4.7. Link Impact

A link impact is the impact that a proposed development may have on a section of roadway due to an increase in traffic volumes. The GARID states that the impact is considered insignificant (and therefore does not normally require further analysis) if development generated traffic volumes do not result in increases of greater than 5 % of existing AADT.

14.1.2.4.8. Pavement Impact

A pavement impact is the impact that a proposed development may have on a section of pavement due to an increase in ESAs. The GARID states that the impact is considered insignificant (and therefore does not normally require further analysis) if development generated traffic volumes do not result in increases of greater than 5 % of existing ESAs.

14.1.2.4.9. Pavement Rehabilitation

Pavement rehabilitation involves the group of activities that restore the structural capacity and condition of the carriageway, without altering the geometric standards.

Pavements are designed to withstand a number of repeated standard axles, or ESAs. Increases in heavy vehicle traffic raise the rate at which the number of these repetitions is applied to the pavement, and the design life of the pavement in years is therefore reduced. Once the design life is reached, rehabilitation should occur to extend the operating life of the pavement.

14.1.2.4.10. Trip Ends

A one way vehicular movement from one point to another excluding the return journey. Therefore, a return trip to/from a land use is counted as two trip ends.

14.2. EXISTING CONDITIONS

14.2.1. Road Network

The following provides details of the existing conditions of road network proposed to be used by the SGCP during the construction and operations phases.

During the SGCP's construction and operational phases, inputs are proposed to be sourced from the following locations:

- 50 % from Brisbane
- 30 % from Gladstone
- 20 % from Mackay.

As such, the following haulage and transportation routes are proposed to the SGCP:

- **Brisbane to SGCP**: Port of Brisbane Motorway → Gateway Motorway → Logan Motorway → Ipswich Motorway → Warrego Highway → Carnarvon Development Road → Carnarvon Highway → Dawson Highway → Gregory Highway → Capricorn Highway.
  (with regards to Brisbane to SGCP route, only the roads between the Carnarvon Highway and Capricorn Highway were assessed in this study. The road sections between the Port of Brisbane Motorway and Carnarvon Highway were excluded due to the analysis providing a clear indication that SGCP input deliveries are not expected to create a significant impact on this portion of the proposed haulage route)
- **Gladstone to SGCP**: Gladstone → Mount Larcom Road → Bruce Highway → Capricorn Highway.
  (with regards to the Gladstone to SGCP route, the Gladstone-Mount Larcom Road section was excluded due to the analysis providing a clear indication that SGCP input deliveries are not expected to create a significant impact on this portion of the proposed haulage route)
- **Mackay to SGCP**: Peak Downs Highway → Clermont-Alpha Road → Capricorn Highway.
  (with regards to the Mackay to SGCP route, the Peak Downs Highway sections were excluded due to the analysis providing a clear indication that SGCP input deliveries are not expected to create a significant impact on this portion of the proposed haulage route)
- **Quarry to infrastructure corridor**: Capricorn Highway.

Of the proposed haulage and transportation routes, the following provides a description of the existing:

- road network conditions
- traffic flows (link and intersection volumes)
- pavement loads.

14.2.1.1. State Controlled Roads

This Section summarises the State Controlled Roads (SCRs) that comprise the main transport routes to the SGCP. These routes are depicted in **Figure 14-1**. The current link volumes and pavements loads for these roads are shown in **Table 14-1** and are based on data collected and presented in **Appendix K—Transport Technical Report**.

14.2.1.1.1. Capricorn Highway

The Capricorn Highway (refer to **Figure 14-1**) is the predominant road infrastructure in the vicinity of the SGCP. The highway is a SCR connecting Rockhampton to the east with Barcaldine to the west. The highway is approximately 560 km long, and joins the Landsborough Highway at Barcaldine. The highway is fully sealed, with sealed shoulders and overtaking lanes and a speed limit of up to 100 km/hr.

The draft Queensland Infrastructure Plan for Central Queensland (2011) specifies minor road improvement projects to be undertaken on the Capricorn Highway, involving an upgrade to an industrial access road at Gracemere, west of Rockhampton, and the construction of a new overtaking lane east of Barcaldine. It is not expected that these works will have an impact on the SGCP's use of the Capricorn Highway. Some sections of the Capricorn Highway are currently degraded; however, this is expected to be improved with the planned restoration works as a part of the Natural Disaster Relief and Recovery Arrangements (NDRRA).

Link volumes, (AADT and percentage heavy vehicles), pavement loads (ESA and design life) and future traffic flows, are provided in **Table 14-1**.

Existing load limits and heavy vehicle restrictions for this link permit Type 1 and 2 road trains on the Capricorn Highway west of Alpha. Type 2 road trains are not permitted on the Capricorn Highway east of Alpha. B-Doubles (23 metre and 25 metre long) are permitted on the Capricorn Highway.

14.2.1.1.2. Clermont-Alpha Road

The Clermont-Alpha Road (refer to **Figure 14-1**) is a SCR connecting Alpha to Clermont. The highway is fully sealed, however the shoulders are unsealed. The Road has a speed limit of up to 100 km/hr.

Link volumes, (AADT and percentage heavy vehicles), pavement loads (ESA and design life) and future traffic flows are provided in **Table 14-1**.

Existing load limits and heavy vehicle restrictions for this link permit Type 1 and 2 road trains and B-Doubles on the Clermont-Alpha Road.

There are no proposed works specified in the draft Queensland Infrastructure Plan for Central Queensland (2011) for the Clermont-Alpha Road. Some sections of Clermont-Alpha Road are currently degraded; however, this is expected to be improved with the planned restoration works as a part of the NDRRA.

LEGEND

- MLA70453
- Road - Mackay to SGCP
- Road - Gladstone to SGCP
- Road - Brisbane to SGCP
- National Railway
- Waratah Railway
- Hancock Railway
- River

Data Source:Topography - Geoscience Australia.

Alpha Coal Pty Ltd

South Galilee Coal Project

Major Road Transport Routes

50 0 50

Kilometres

Scale: 1:400,000 (A4)

24/08/2012

Proj. : MGA Z55
Datum: GDA 1994

FIGURE 14-1

S:\PROJECTS\AM001 STHGALILEE_EIS\GIS\ MAPINFO\WSPACES\SECT_14\AM001_FIG 14-1 MAJOR ROAD TRANSPORT ROUTES.WOR

Table 14-1 Existing Link Volumes, Pavement Loads and Future Traffic Flow on State Controlled Roads

State Controlled Roads		Link Volumes		Pavement Loads		Future Traffic Flows (AADT 2-way)				
SCR Number and title	Description	AADT (2-Way)	CV (%)	ESAs (2012)	Design Traffic (20 year life)	2013	2014	2016	2019	2029
16D: Capricorn Highway (West to East)	SGCP to Infrastructure Corridor	377	25 %	58,231	1,611,617	410	420	440	480	590
	Infrastructure Corridor to Clermont-Alpha Road	377	25 %	58,231	1,611,617	410	420	440	480	590
16C: Capricorn Highway (West to East)	Clermont-Alpha Rd to Willows Gemfields Rd	403	23 %	56,379	1,560,369	440	450	480	510	630
	Willows Gemfields Rd to Anakie-Sapphire Rd	524	23 %	73,112	2,023,475	570	590	620	670	820
	Anakie-Sapphire Rd to Tyson Rd	1,263	16 %	128,880	3,566,935	1,380	1,410	1,490	1,600	1,980
	Tyson Rd to Selma Rd	2,745	13 %	222,963	6,170,826	2,990	3,070	3,240	3,490	4,310
	Selma Rd to Gregory Hwy	7,769	10 %	504,445	13,961,261	8,470	8,700	9,170	9,870	12,200
16B: Capricorn Highway (West to East)	Gregory Hwy to Ensham Rd	3,396	17 %	352,007	9,742,308	3,700	3,800	4,010	4,310	5,330
	Ensham Rd to Blackwater-Cooroorah Rd	2,316	22 %	311,089	8,609,859	2,520	2,590	2,730	2,940	3,640
	Blackwater-Cooroorah Rd to Arthur St	3,959	17 %	407,665	11,282,744	4,320	4,430	4,670	5,030	6,220
	Arthur St to Fitzroy Development Rd	2,786	26 %	456,556	12,635,866	3,040	3,120	3,290	3,540	4,370
	Fitzroy Development Rd to Duaringa Connection Rd	2,935	19 %	341,318	9,446,493	3,200	3,290	3,460	3,730	4,610

Table 14-1 Existing Link Volumes, Pavement Loads and Future Traffic Flow on State Controlled Roads (cont)

State Controlled Roads		Link Volumes		Pavement Loads		Future Traffic Flows (AADT 2-way)				
SCR Number and title	**Description**	**AADT (2-Way)**	**CV (%)**	**ESAs (2012)**	**Design Traffic (20 year life)**	**2013**	**2014**	**2016**	**2019**	**2029**
16A: Capricorn Highway (West to East)	Start Point to Duaringa Connection Rd	2,892	22 %	394,013	10,904,902	3,150	3,240	3,410	3,670	4,540
	Leichhardt Hwy to End Point	3,216	21 %	412,652	11,420,744	3,510	3,600	3,790	4,080	5,050
	Powerstation Rd to Leichhardt Hwy	4,253	16 %	401,576	11,114,224	3,770	3,870	4,080	4,390	5,420
	Kabra Rd to Powerstation Rd	4,891	22 %	412,643	11,420,507	4,640	4,760	5,020	5,400	6,680
	Powerstation Rd to Gavial-Gracemere Rd	15,741	11 %	651,817	18,039,991	5,330	5,480	5,770	6,210	7,680
	Gavial-Gracemere Rd to Bruce Hwy	23,132	11 %	1,080,586	29,906,826	17,160	17,630	18,570	19,990	24,710
552: Clermont-Alpha Road (South to North)	Capricorn Hwy to Hobartville	88	25 %	43,368	1,200,277	100	100	100	110	140
	Hobartville to Pioneer-Clydevale Rd	21	14 %	6,815	188,618	20	20	20	30	30
	Pioneer-Clydevale Rd to Start Point	81	14 %	1,859	51,458	90	90	100	100	130
	End Point to Clermont Connection	472	15 %	13,630	377,243	510	530	560	600	740

Table 14-1 Existing Link Volumes, Pavement Loads and Future Traffic Flow on State Controlled Roads (cont)

State Controlled Roads		Link Volumes		Pavement Loads		Future Traffic Flows (AADT 2-way)				
SCR Number and title	Description	AADT (2-Way)	CV (%)	ESAs (2012)	Design Traffic (20 year life)	2013	2014	2016	2019	2029
27A: Gregory Highway (North to South)	Capricorn Hwy to Mayfair Dr	6392	7 %	289,495	1,717,813	6,970	7,160	7,540	8,120	10,040
	Mayfair Dr to Airport Turn Off	3020	22 %	403,407	3,173,055	3,290	3,380	3,560	3,840	4,740
	Airport Turn Off to Glenorina Rd	1298	19 %	156,094	4,320,146	1,410	1,450	1,530	1,650	2,040
	Glenoria Rd to HV Bypass	1039	18 %	114,648	11,164,876	1,130	1,160	1,230	1,320	1,630
	HV Bypass to Springsure Start Point	1423	7 %	62,068	8,012,211	1,550	1,590	1,680	1,810	2,230
46D: Dawson Highway (North to South)	Springsure End Point to Comet St	1404	19 %	162,666	4,502,015	1,530	1,570	1,660	1,780	2,200
	Comet St to Wealwandeangie Rd	1541	35 %	337,409	9,338,291	1,680	1,730	1,820	1,960	2,420
	Wealwandangie Rd to Gap Ln	1027	28 %	178,926	4,952,038	1,120	1,150	1,210	1,300	1,610
	Gap Ln to Orion 10 Chn	658	22 %	89,321	2,472,102	720	740	780	840	1,030
	Orion 10 Chn to Injune Turn Off	597	18 %	66,726	1,846,754	650	670	700	760	940
	Injune Turn Off to Start Point	631	6 %	25,333	701,136	690	710	740	800	990

Table 14-1 Existing Link Volumes, Pavement Loads and Future Traffic Flow on State Controlled Roads (cont)

State Controlled Roads		Link Volumes		Pavement Loads		Future Traffic Flows (AADT 2-way)				
SCR Number and title	**Description**	**AADT (2-Way)**	**CV (%)**	**ESAs (2012)**	**Design Traffic (20 year life)**	**2013**	**2014**	**2016**	**2019**	**2029**
24E: Carnarvon Highway (North to South)	Dawson Hwy to Wyseby Rd	407	35 %	41,960	1,161,304	440	460	480	520	640
	Wyseby Rd to Maranoa Regional Council Bdy	357	32 %	32,381	896,205	390	400	420	450	560
	Maranoa Regional Council Bdy to Start Point	367	29 %	59,415	1,644,386	400	410	430	470	580
24D: Carnarvon Highway (North to South)	Start Point to Roma Taroom Rd	643	26 %	117,243	3,244,886	700	720	760	820	1,010
	Roma Taroom Rd to Start Point	1421	15 %	286,043	7,916,660	1,550	1,590	1,680	1,800	2,230
	Start Point to Bowen St	2128	17 %	463,298	12,822,468	2,320	2,380	2,510	2,700	3,340

CV= Commercial Vehicles

14.2.1.1.3. Gregory Highway

The Gregory Highway (refer to **Figure 14-1**) is an SCR connecting Springsure to Clermont where it connects with the Peak Downs Highway. The highway is fully sealed with sealed shoulders and overtaking lanes and a speed limit of up to 100 km/hr.

Link volumes, (AADT and percentage heavy vehicles), pavement loads (ESA and design life) and future traffic flows are provided in **Table 14-1**.

Existing load limits and heavy vehicle restrictions for this link permit Type 1 and 2 road trains on the Gregory Highway north of Clermont. Type 2 road trains, however, are not permitted on the Gregory Highway South of Clermont. B-Doubles are permitted on the Gregory Highway.

The draft Queensland Infrastructure Plan does not propose any works for the Gregory Highway.

14.2.1.1.4. Dawson Highway

The Dawson Highway (refer to **Figure 14-1**) is an SCR that connects Springsure and Gladstone. The highway is fully sealed, with sealed shoulders, overtaking lanes, and speed limits of up to 100 km/hr.

Link volumes, (AADT and percentage heavy vehicles), pavement loads (ESA and design life) and future traffic flows, are provided in **Table 14-1**.

Existing load limits and heavy vehicle restrictions for this link permit Type 1 road trains and B-Doubles on the Dawson Highway.

The draft Queensland Infrastructure Plan specifies that a deviation in the Calliope Range elevation will be undertaken on the Dawson Highway.

14.2.1.1.5. Carnarvon Highway

The Carnarvon Highway (refer to **Figure 14-1**) is an SCR connecting Rolleston to the north of Roma with Moree to the south (in New South Wales). The highway is fully sealed, with sealed shoulders and overtaking lanes and a speed limit of up to 100 km/hr.

Link volumes, (AADT and percentage heavy vehicles), pavement loads (ESA and design life) and future traffic flows, are provided in **Table 14-1**.

Existing load limits and heavy vehicle restrictions for this link permit Type 1 road trains and B-Doubles on the Carnarvon Highway.

The draft Queensland Infrastructure Plan for Central Queensland (2011) specifies that from Mungindi (on the Queensland/New South Wales border) to Rolleston, there is a proposal to widen some sections of the Carnarvon Highway.

14.2.1.1.6. Bruce Highway

The Bruce Highway (refer to **Figure 14-1**) is a part of the Australian National Highway and connects Brisbane to Cairns in Far North Queensland. It is a sealed, two-way road and has a maximum posted speed limit of 110 km/hr. Overtaking lanes are provided along the route.

Existing load limits and heavy vehicle restrictions for this link permit B-Doubles, but do not permit road trains on the Bruce Highway.

The draft Queensland Infrastructure Plan for Central Queensland (2011) specifies small projects planned for the Bruce Highway, involving intersection upgrades and restoration works as a part of the NDRRA. It is not expected that these works will have an impact on the Project's use of the Bruce Highway.

14.2.1.1.7. Peak Downs Highway

The Peak Downs Highway is an SCR that connects Clermont and Mackay. It is a fully sealed road with sealed shoulders, overtaking lanes and a maximum posted speed limit of 100 km/hr.

Existing load limits and heavy vehicle restrictions for this link do not permit B-Doubles on the Peaks Down Highway.

There is a proposal in the draft Queensland Infrastructure Plan to construct a bypass of the township of Walkerston on the Nebo to Mackay section of the Peak Downs Highway. Also proposed are safety-related upgrades on the Eton Range and the City Gates to Mackay sections of the highway.

14.2.1.2. Local Roads

The SGCP will be connected directly to the Capricorn Highway by a dedicated sealed access road from the site. No existing local roads will be required for mine access. The connection to the Capricorn Highway will consist of a priority controlled, three-way T-intersection 8.8 km west of Alpha.

The SGCP's internal road network will include parking for operational personnel and visitors, including appropriate disabled parking facilities.

14.2.1.3. Public Transport

There is currently no public transport network in the vicinity of the SGCP. Consequently the SGCP will have no impacts on public transport.

14.2.1.4. Intersection Volumes

A peak hour intersection survey was undertaken for the Capricorn Highway/Clermont-Alpha Road/Shakespeare Street intersection within the township of Alpha.

Peak hour traffic surveys were undertaken during the morning period of 5:30 AM to 8:30 AM and the evening period of 3:00 PM to 6:00 PM. The raw data for this survey are provided in **Appendix K—Transport Technical Report**.

Based on the survey data, the identified peak hours (**Figure 14-2**) were:

- morning: 6:45 AM to 7:45 AM
- evening: 3:15 PM to 4:15 PM.

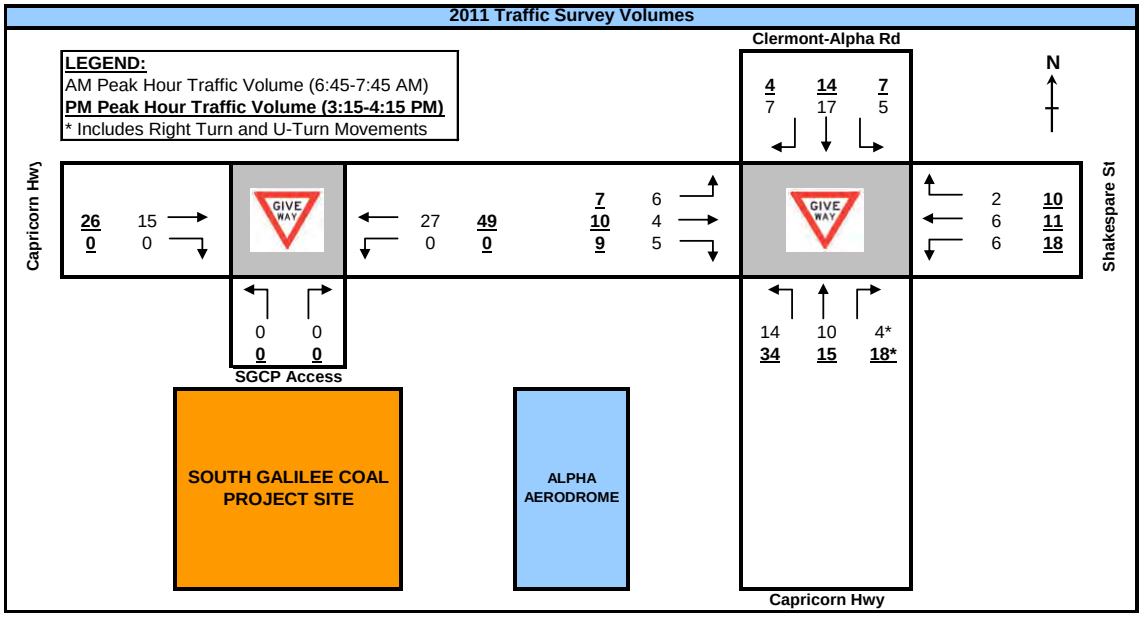


Figure 14-2 Background 2011 AM and PM Peak Traffic Volumes

14.2.1.5. Performance Indicators

14.2.1.5.1. Link Performance

Two-lane, two-way rural roads provide one lane for use by traffic travelling in each direction, while overtaking of slower vehicles on these roads requires the use of the opposing traffic lane when sight distance and gaps in the opposing traffic stream and road markings permit.

The analysis for links of this type has been undertaken on the basis of the *Guide to Traffic Management Part 3: Traffic Studies and Analysis*. These guidelines are based on the US *Highways Capacity Manual 2000* (TRB, 2000) which provides the levels of service (LOS) of two-lane highways as shown in **Table 14-2**.

Table 14-2 LOS Criteria for Two-lane Highways

LOS	Service Flow Rate (2-way)		Description
	pcu*/hr	pcu/day**	
A	490	3,270	LOS A represents the highest quality of traffic service, when motorists are able to travel at their desired speed. Overtaking demand is well below overtaking capacity and bunches of three or more vehicles are rare.
B	780	5,200	LOS B characterises traffic flow with slightly lower than desired speeds, the demand for overtaking to maintain desired speeds becomes significant.
C	1,190	7,940	LOS C describes a further increase in traffic flow resulting in increased bunch size and frequency of overtaking impediments. Traffic flow is still stable at this LOS, however it is susceptible to congestion due to turning traffic and slow moving vehicles.
D	1,830	12,200	LOS D describes unstable traffic flow. The two opposing traffic streams begin to operate separately at higher volumes as overtaking becomes extremely difficult. Mean bunch sizes of five to 10 vehicles are common. Turning vehicles and roadside distractions cause major shock waves in the traffic stream.
E	3,200	21,340	LOS E describes the capacity of the highway where the traffic flow makes overtaking virtually impossible and bunching becomes intense as slower vehicles and other interruptions are encountered. Operating conditions at capacity are unstable and difficult to predict.
F	> 3,200	>21,340	LOS F represents heavily congested flow with traffic demand exceeding capacity. Volumes are lower than capacity and speeds are highly variable.

Source: Adapted from the Austroads Guide to Traffic Management Part 3: Traffic Studies and Analysis

* pcu = passenger car units or equivalents

** assumes the peak hour represents 15 % of daily traffic as referenced in GARID

14.2.1.6. Intersection Performance

Analysis of intersection capacity, either 'with' or 'without' the SGCP is considered unnecessary for T-intersections where the volume of through traffic and turning is considered low. This summarised in **Table 14-3**. Note that the three columns of numbers represent different volume scenarios for the light cross and turning volumes.

Table 14-3 Intersection Volumes Below Which Capacity Analysis Is Considered Unnecessary

Type of Road	Light Cross and Turning Volumes Maximum Design Hour Volumes (two-way vehicles per hour)		
Two-lane Major Road	400	500	650
Cross Road	250	200	100
Four Lane Major Road	1,000	1,500	2,000
Cross Road	100	50	25

14.2.2. Rail

During construction, the rail transportation of goods to the SGCP will utilise the existing narrow gauge Central Line Railway operated by QR. The Central Line Railway is an electrified track from Burngrove west to Emerald. The Central Line Railway could potentially be used to transport limited quantities of coal.

West of Emerald, the track is not electrified. The railway system has three loops between Burngrove (to the east) and Alpha.

This is a single track system with four crossing loops between Burngrove and Emerald, and nine crossing loops between Emerald and Alpha, including one at Alpha.

14.2.2.1. Passenger Rail

Twice a week, QR's The Spirit of the Outback passenger train passes though Alpha on the QR Central Line travelling between Longreach and Brisbane.

14.2.2.2. Commercial Rail

Commercial rail connections to Alpha are maintained by QR and use the QR Central Line.

Presently, no major coal haulage system exists from the Galilee Basin. The Galilee Basin is currently not connected to a major coal haulage railway system. However, Waratah Coal Pty Ltd, the GVK Group, Adani Mining Pty Ltd and QR National Ltd have all proposed to construct railway systems from the Galilee Basin to the Abbot Point Coal Terminal (APCT). All of these Proponents have indicated to the Proponent that their respective rail infrastructure will be open to third party access. Irrespective of which Proponent(s) ultimately establish rail infrastructure to the APCT, the line(s) will be a standard gauge rail system. On June 6, 2012, the GVK-Hancock Coal rail alignment was approved by state government to allow third party access for the transportation of coal from the Galilee Basin to the APCT.

14.2.3. Air

The existing Alpha Aerodrome is located approximately 5 km west of Alpha on the Alpha Aerodrome Access Road which connects to the Capricorn Highway from the south.

The Alpha Aerodrome is listed as a registered aerodrome with the Civil Aviation Safety Authority (CASA - Registration Number R076) and is owned and operated by the BRC. The existing runway is currently 1,450 m long and 30 m wide. The aerodrome is not currently equipped to cater for commercial passenger flights and is currently used irregularly only by small aircraft.

There are a number of other airfields and aerodromes in the region, including:

- Emerald Airport (located 170 km east of the SGCP, serviced by Qantas and Virgin Australia)
- Barcaldine Aerodrome
- Aramac Airfield
- Jericho Airfield
- Muttaburra Airfield.

The SGCP will utilise the existing Alpha Aerodrome for the Fly-In Fly-Out (FIFO) workforce. The SGCP is located approximately 4 km west of the Aerodrome.

No formal car parking or bus layover areas are designated at the aerodrome, however sufficient space is provided to allow for parking and manoeuvring of cars and buses.

14.2.4. Port

The port proposed to be used by the SGCP is the APCT. The APCT currently comprises a rail in-loading facility, coal handling and stockpile areas, a single trestle jetty and conveyor connected to a berth and shiploader, located 2.75 km off-shore. During the 2010–11 financial year, the APCT had a total throughput of approximately 15 million tonnes, handling a total of 190 ships. The live stockpile capacity is 260,000 tonnes on each side of the stacker. A further provision of 750,000 tonnes of 'dead' capacity can be created on the western stockpile by dozing from the live stockpile.

In May 2011, the Queensland Government announced the 99-year lease of the X50 APCT had been awarded to Mundra Port Pty Ltd. Under the lease, the State will retain ownership of the port land and fixed infrastructure such as the jetty and the wharf. The State will also continue to facilitate future private-sector funded expansion of export infrastructure within the broader port precinct, such as Terminal 2 and Terminal 3. North Queensland Bulk Ports remains the port authority for the APCT.

A number of major expansion projects are proposed for the APCT, including the Terminal 2 and Terminal 3 projects. This will involve the development of two additional separate tranches of coal terminal capacity (preferred Developers are the GVK Group and BHP Billiton Limited).

The proposed rail connection from to the APCT would connect to the expanded terminal. APCT has an existing rail station within the terminal.

14.3. TRANSPORT GENERATED BY SGCP

14.3.1. Road

The anticipated vehicle movements for the SCGP were determined through:

- consultation with the Proponent regarding SGCP specific details
- conversion of the SGCP's development details into peak hour flows for the intersection impact assessment
- conversion of these development details into daily flows for the link assessment
- conversion of these development details into annual traffic flows for the Pavement Impact Assessment (PIA).

Traffic was distributed onto the road network based on origin and destination information and haul route data provided by the Proponent.

The impact analysis was based upon the principles defined within GARID. In particular, the following reference holds the general directive as to how the assessment of impacts is considered:

> "In general, DTMR considers a development's road impacts to be insignificant if the development generates an increase in traffic on SCR's of no more than 5 % of existing levels. Traffic operation impacts need to be considered for any section of a SCR where the construction or operational traffic generated by the development equals or exceeds 5 % of the existing AADT on the road section, intersection movements or turning movements".

Traffic conditions were assessed for both 'with' and 'without' SGCP scenarios with the percentage increases caused by the SGCP used to determine whether GARID triggers were met.

No vulnerable bridges or structures were identified along proposed haulage routes.

14.3.1.1. Workforce Trips

The traffic generation of workforce related journeys (to and from work trips) is dependent on a number of factors, these being:

- number of staff required for each shift
- number of shifts per day
- mode of travel to work (e.g. bus or private car trips).

For the purposes of this assessment, **Table 14-4** details the assumed workforce requirements and typical shift times that have been considered. Workforce requirements and shift schedules will be the subject of further detailed project planning.

Consultation with the Queensland Police Service (QPS) and DTMR indicates that the driving distance to work should be minimised as far as practicable to minimise potential road safety and driver fatigue impacts. In addition to the SGCP being a FIFO operation, the journey to work trips have been limited to 20 minutes (effectively from within Alpha and the immediate surrounds).

The SGCP accommodation village will be located on-site and employees will be transported from the village to work areas via the SGCP internal road network. Consequently, there will be no external road network traffic impacts of employee movements who reside at the SGCP accommodation village. The movement of shuttle buses to transport employees to and from the accommodation village at the start and end of each major shift rotation have, however, been assessed.

Table 14-4 Anticipated Employee Requirements

	Personnel				
	Construction Period		Operational Period*		
	2013	2014	2016	2019	2029
Total Employee Requirements (peak)	1,600	1,600	507	1,288	1,288
Total FIFO Employees	1,592	1,592	504	1,282	1,282
Total Alpha-based Employees	8	8	3	6	6
Number of Employees per Shift (typical average)	711	711	225	573	573
Number of Shifts per Day	2	2	2	2	2
Anticipated Shift Times	Day Shift: 6:00 - 18:00 Night Shift: 18:00 – 6:00				
Residence of Employees	**SGCP Accommodation Village and Alpha**				
Mode of Travel to Work • SGCP Accommodation Village	Internal shuttle bus	Internal shuttle bus	Internal shuttle bus	Internal shuttle bus	Internal shuttle bus
• Alpha	Private Vehicle	Private Vehicle	Private Vehicle	Private Vehicle	Private Vehicle

*On-going construction activities associated with the staged operational ramp-up will mean there is some overlap in construction and operations. However, as the majority of construction is anticipated to be undertaken during the two year construction period 2013 to 2014, construction and operational transport were considered discretely for the purposes of this assessment.

With regards to estimating the daily traffic generation of the small number of employees based in Alpha, the following conservative assumptions have been made:

- all non-FIFO employees will reside in the township of Alpha and travel to the SGCP using the Capricorn Highway
- vehicle occupancy will be 1.2 persons per vehicle
- two vehicle trips are made per day (i.e. to and from SGCP work site)
- 100 % of township based employees work at the SGCP every day.

When considering trip generation for the construction and operational phases, the following movements should be taken into account:

- Morning Peak Period – employee OUT movement for night shift + employee IN movement for day shift
- Evening Peak Period – employee OUT movement for day shift + employee IN movement for night shift
- Daily – sum of morning and afternoon peak movements.

With regards to FIFO personnel, the construction and operational workforce will be transported to and from the Alpha Aerodrome via 50 seat shuttle buses along the Capricorn Highway. Personnel are expected to be based on a FIFO schedule as follows:

- construction (e.g. 2013/2014) - 21 days on and 7 days off
- operations (e.g. 2014, 2016, 2019, 2029) - 7 days on and 7 days off.

Based on the assumptions above, the estimated daily traffic generation from Alpha-based personnel and the FIFO airport bus trips to the SGCP is presented in **Table 14-5**.

Table 14-5 Estimated External Road Network Personnel Traffic Generation

Year	Personnel Base		Vehicle Trip Ends		Shift End Personnel*	Daily Bus Trip Ends	Total Daily Vehicle Trip Ends
	Accommodation Village	Alpha	Peak	Daily			
2013	1,592	8	7	14	64	4	18
2014	1,592	8	7	14	64	4	18
2016	504	3	3	6	20	2	8
2019	1,282	6	5	10	51	4	14
2029	1,282	6	5	10	51	4	14

* Based on assumed 4 % of total camp-based personnel movement at shift end.

Visitors to the SGCP during the construction and operational phases are expected to travel the short distance from Alpha and the Alpha Aerodrome by car. The volume, composition and timing of visits cannot accurately be predicted at this stage. Visitor transport and parking on-site will be addressed by the Transport Management Plan (TM Plan).

Adequate transport access for people with a disability will be provided at the SGCP, including the accommodation village, and will be addressed in the TM Plan.

14.3.1.2. Heavy Vehicle Generated Movement

The proposed haulage activities for the construction and operational phases are shown in **Table 14-6** and **Table 14-7** respectively.

The haulage of coal to the Coal Handling and Preparation Plan (CHPP) will be via an internal network of haul roads and conveyors, and will therefore not impact any State-controlled Roads. Once coal has been processed at the CHPP, it will be conveyed and stockpiled for off-site transport via the proposed rail network to the APCT.

Based on the information provided in **Table 14-6** and **Table 14-7**, the number of expected annual truck deliveries required for each phase of construction and operation can be calculated. **Table 14-8** details the anticipated heavy vehicle generation used in the Transport Assessment.

Table 14-6 Heavy Vehicle Movement Description – Construction Phase

	Movement 1	Movement 2	Movement 3	Movement 4	Movement 5	Movement 6	Movement 7	Movement 8	Movement 9	Movement 10	Movement 11
Haulage Description	1,100 OC equipment supply	1,600 Haul Roads	2,100 UG equipment supply	3,100 OC ROM Receival	3,200 UG ROM Coal Conveyors	3,300 UG ROM Coal Stockyard	3,400 Crushing/Sizing	3,400 Crushing/Sizing	4,100 Raw Coal Conveyors	4,100 Raw Coal Conveyors	4,200 Raw Coal Stockyard
Austroads Vehicle Class	5 % Class 5 8 % Class 9 70 % Class 10 15 % Class 11	11 % Class 5 11 % Class 9 66 % Class 10 10 % Class 11	5 % Class 5 8 % Class 9 70 % Class 10 15 % Class 11	16 % Class 5 16 % Class 9 36 % Class 10 16 % Class 11	17 % Class 5 17 % Class 9 33 % Class 10 17 % Class 11	11 % Class 5 11 % Class 9 65 % Class 10 11 % Class 11	16 % Class 5 16 % Class 9 38 % Class 10 16 % Class 11	16 % Class 5 16 % Class 9 38 % Class 10 16 % Class 11	14 % Class 5 14 % Class 9 47 % Class 10 14 % Class 11	14 % Class 5 14 % Class 9 47 % Class 10 14 % Class 11	11 % Class 5 11 % Class 9 64 % Class 10 11 % Class 11
Description of goods & material to be transported	Dragline, drill, excavator, grader, dump truck, dozer, water truck, wheel dozer and backhoe	Imported gravel	Underground transport requirements including conveyers, development, longwall and mobile equipment	Open-cut run-of-mine (ROM) receival of concrete, steel, electrical supply, mechanical plant, and transformers	Underground ROM coal conveyer requirements including concrete, steel, piles, mechanical plant, electrical, tripper and piping materials	Underground ROM coal stockyard requirements including concrete, electrical and imported gravel materials	Piping materials	Piping materials	Tripper and piping materials	Tripper and piping materials	Imported gravel materials
Quantity of goods to be transported	A total of 189 truck deliveries	A total of 174,548 T of gravel and 770 truck deliveries	A total of 1,242 truck deliveries	A total of 67 truck deliveries	A total of 1,477 T and 54 truck deliveries	A total of 216,428 T and 981 truck deliveries	A total of 2,840 T and 40 truck deliveries	A total of 1,630 T and 23 truck deliveries	A total of 7,295 T and 52 truck deliveries	A total of 7,202 T and 52 truck deliveries	A total of 4,4636 T and 208 truck deliveries
Origin & Destination of goods	Brisbane 50 % Gladstone 30 % Mackay 20 %	Gravel Site	Brisbane 50 % Gladstone 30 % Mackay 20 %	Brisbane 50 % Gladstone 30 % Mackay 20 %	Brisbane 50 % Gladstone 30 % Mackay 20 %	Brisbane 3 % Gladstone 1 % Mackay 1 % Gravel Site 95 %	Brisbane 50 % Gladstone 30 % Mackay 20 %	Brisbane 50 % Gladstone 30 % Mackay 20 %	Brisbane 50 % Gladstone 30 % Mackay 20 %	Brisbane 50 % Gladstone 30 % Mackay 20 %	Brisbane 50 % Gladstone 30 % Mackay 20 %
Is the product hazardous or oversized?	Approx. 36 % oversized	Approx. 1 % oversized	Approx. 2 % oversized	Approx. 15 % oversized	Approx. 17 % oversized	Approx. 2 % oversized	Approx. 15 % oversized	Approx. 13 % oversized	Approx. 10 % oversized	Approx. 10 % oversized	Approx. 3 % oversized
Duration of haul movement	Estimate average delivery of 2 trucks per week from Q1 2013 to Q4 2015 (28 % in 2013 18 % in 2014 54 % in 2015)	Estimated average delivery of 10 trucks per week from Q3 2013 to Q1 2015	Estimated average delivery of 5 trucks per week from Q1 2016 to Q4 2020 (46 % in 2016 6 % in 2017 7 % in 2018 20 % in 2019 21 % in 2020)	Estimated average delivery of 3 trucks per week from Q1 to Q3 2014	Estimated average delivery of 2 trucks per week from Q1 2016 to Q3 2016	Estimated average delivery of 25 trucks per week from Q1 2016 to Q4 2016	Estimated average delivery of 1 truck per week from Q4 2013 to Q3 2014	Estimated average delivery of 1 truck per week from Q1 2016 to Q4 2016	Estimated average delivery of 1 truck per week from Q3 2013 to Q3 2014	Estimated average delivery of 1 truck per week from Q3 2015 to Q3 2016	Estimated average delivery of 8 trucks per week from Q1 to Q3 2014

	Movement 12	Movement 13	Movement 14	Movement 15	Movement 16	Movement 17	Movement 18	Movement 19	Movement 20	Movement 21	Movement 22
Haulage Description	4,200 Raw Coal Stockyard	4,300 Coal Preparation Plant Feed	4,300 Coal Preparation Plant Feed	4,400 Coal Preparation Plant	4,400 Coal Preparation Plant	4,500 Product Coal Conveyors	4,500 Product Coal Conveyors	4,600 Product Coal Stockyard	4,600 Product Coal Stockyard	4,700 Rejects Handling	4,700 Rejects Handling
Austroads Vehicle Class	11 % Class 5 11 % Class 9 64 % Class 10 11 % Class 11	14 % Class 5 14 % Class 9 45 % Class 10 14 % Class 11	14 % Class 5 14 % Class 9 45 % Class 10 14 % Class 11	16 % Class 5 16 % Class 9 35 % Class 10 16 % Class 11	16 % Class 5 16 % Class 9 35 % Class 10 16 % Class 11	16 % Class 5 16 % Class 9 38 % Class 10 16 % Class 11	16 % Class 5 16 % Class 9 38 % Class 10 16 % Class 11	12 % Class 5 12 % Class 9 62 % Class 10 12 % Class 11	12 % Class 5 12 % Class 9 62 % Class 10 12 % Class 11	15 % Class 5 15 % Class 9 43 % Class 10 15 % Class 11	15 % Class 5 15 % Class 9 43 % Class 10 15 % Class 11
Description of goods & material to be transported	Concrete, steel, piles, mechanical plant, electrical and imported gravel materials	Concrete, steel, piles, mechanical plant, electrical and piping materials	Concrete, steel, piles, mechanical plant, electrical and piping materials	Concrete, steel, piles, mechanical plant, electrical and piping materials	Concrete, steel, piles, mechanical plant, electrical and piping materials	Concrete, steel, piles, mechanical plant, electrical, tripper and piping materials	Concrete, steel, piles, mechanical plant, electrical, tripper and piping materials	Concrete, steel, piles, mechanical plant, electrical and imported gravel materials	Concrete, steel, piles, mechanical plant, electrical and imported gravel materials	Concrete, steel, piles, mechanical plant, electrical, tripper and piping materials	Concrete, steel, piles, mechanical plant, electrical, tripper and piping materials
Quantity of goods to be transported	A total of 4,4636 T and 208 truck deliveries	A total of 5,659 T and 43 truck deliveries	A total of 4,393 T and 34 truck deliveries	A total of 1,307 T and 22 truck deliveries	A total of 1,307 T and 22 truck deliveries	A total of 3,424 T and 43 truck deliveries	A total of 2,115 T and 26 truck deliveries	A total of 63,129 T and 295 truck deliveries	A total of 3,729 T and 17 truck deliveries	A total of 7,936 T and 63 truck deliveries	A total of 1,327 T and 11 truck deliveries
Origin & Destination of goods	Brisbane 50 % Gladstone 30 % Mackay 20 %	Brisbane 50 % Gladstone 30 % Mackay 20 %	Brisbane 50 % Gladstone 30 % Mackay 20 %	Brisbane 50 % Gladstone 30 % Mackay 20 %	Brisbane 50 % Gladstone 30 % Mackay 20 %	Brisbane 50 % Gladstone 30 % Mackay 20 %	Brisbane 50 % Gladstone 30 % Mackay 20 %	Brisbane 4 % Gladstone 2 % Mackay 1 % Gravel Site 93 %	Brisbane 50 % Gladstone 30 % Mackay 20 %	Brisbane 50 % Gladstone 30 % Mackay 20 %	Brisbane 50 % Gladstone 30 % Mackay 20 %

Table 14-6 Heavy Vehicle Movement Description – Construction Phase (cont)

	Movement 12	Movement 13	Movement 14	Movement 15	Movement 16	Movement 17	Movement 18	Movement 19	Movement 20	Movement 21	Movement 22
Is the product hazardous or oversized?	Approx. 3 % oversized	Approx. 12 % oversized	Approx. 12 % oversized	Approx. 32 % oversized	Approx. 32 % oversized	Approx. 14 % oversized	Approx. 15 % oversized	Approx. 3 % oversized	Approx. 6 % oversized	Approx. 13 % oversized	Approx. 9 % oversized
Duration of haul movement	Estimated average delivery of 8 trucks per week from Q4 2015 to Q2 2016	Estimated average delivery of 1 truck per week from Q4 2013 to Q3 2014	Estimated average delivery of 1 truck per week from Q1 to Q4 2016	Estimated average delivery of 1 truck per week from Q1 to Q4 2014	Estimated average delivery of 1 truck per week from Q4 to 2015 to Q3 2016	Estimated average delivery of 1 truck per week from Q4 2013 to Q3 2014	Estimated average delivery of 1 truck per week from Q4 2015 to Q3 2016	Estimated average delivery of 11 trucks per week from Q4 2013 to Q1 2014	Estimated average delivery of 1 truck per week from Q2 to Q3 2016	Estimated average delivery of 3 trucks per week from Q1 to Q3 2014	Estimated average delivery of 2 trucks per month from Q1 to Q3 2016
	Movement 23	**Movement 24**	**Movement 25**	**Movement 26**	**Movement 27**	**Movement 28**	**Movement 29**	**Movement 30**	**Movement 31**	**Movement 32**	**Movement 33**
Haulage Description	4,800 Train Load Out	5,100 Bulk Earthworks	5,200 Roads	5,300 Water & Sewerage Systems	5,400 Rail	5,500 Power Distribution	5,600 MIA Facilities 1	5,700 MIA Facilities 2	5,800 Other Infrastructure	5,900 Camps/Accommodation	7,400 Compressed Air/Reagents/Fuel & Lubes
Description of goods & material to be transported	Concrete, steel, piles, mechanical plant, electrical, tripper and piping materials	Steel and imported gravel materials	Imported gravel materials	Concrete, steel, mechanical plant, electrical, piping and clay materials	Concrete, steel, electrical and imported gravel materials	Concrete and steel materials	Concrete, steel, piles, mechanical plant, electrical and piping materials	Concrete and steel materials	Concrete, steel and piping materials	Building steel, concrete slab and electrical supply materials	Mechanical plant (pumps/motors) materials
Quantity of goods to be transported	A total of 6,426 T and 66 truck deliveries	A total of 38,076 T and 176 truck deliveries	A total of 256,002 T and 1,126 truck deliveries	A total 216,938 T and 996 truck deliveries	A total of 30,355 T and 149 truck deliveries	A total of 33 T and 11 truck deliveries	A total of 35,761 T and 187 truck deliveries	A total of 3,827 T and 46 truck deliveries	A total of 1,081 T and 54 truck deliveries	A total of 3,174 T and 24 truck deliveries	A total of 100 T and 6 truck deliveries
Origin & Destination of goods	Brisbane 50 % Gladstone 30 % Mackay 20 %	Brisbane 1 % Gravel Site 99 %	Gravel Site 100 %	Brisbane 3 % Gladstone1 % Mackay 1 % Clay Site 95 %	Brisbane 4 % Gladstone 2 % Mackay 1 % Gravel Site 93 %	Brisbane 50 % Gladstone 30 % Mackay 20 %	Brisbane 50 % Gladstone 30 % Mackay 20 %	Brisbane 50 % Gladstone 30 % Mackay 20 %	Brisbane 50 % Gladstone 30 % Mackay 20 %	Brisbane 50 % Gladstone 30 % Mackay 20 %	Brisbane 50 % Gladstone 30 % Mackay 20 %
Is the product hazardous or oversized?	Approx. 14 % oversized	Approx. 2 % oversized	Approx. 1 % oversized	Approx. 2 % oversized	Approx. 3 % oversized	Approx. 18 % oversized	Approx. 7 % oversized	Approx. 13 % oversized	Approx. 17 % oversized	Approx. 13 % oversized	Approx. 17 % oversized
Duration of haul movement	Estimated average delivery of 3 trucks per week from Q1 to Q3 2014	Estimated average delivery of 7 trucks per week from Q3 2012 to Q1 2013	Estimated average delivery of 29 trucks per week from Q3 2012 to Q2 2013	Estimated average delivery of 10 trucks per week from Q3 2012 to Q3 2014	Estimated average delivery of 6 trucks per week from Q3 2013 to Q4 2013	Estimated average delivery of 1 truck per month from Q3 2013 to Q3 2014	Estimated average delivery of 5 trucks per week from Q2 2013 to Q1 2014	Estimated average delivery of 2 trucks per week from Q1 to Q3 2014	Estimated average delivery of 4 trucks per week in Q3 2014	Estimated average delivery of 1 truck per fortnight from Q1 to Q3 2013	Estimated average delivery of 1 truck per fortnight from Q2 to Q3 2014

Table 14-7 Heavy Vehicle Movement Description – Operations Phase

	Movement 1	Movement 2	Movement 3	Movement 4	Movement 5	Movement 6	Movement 7	Movement 8	Movement 9	Movement 10	Movement 11	Movement 12
Haulage Description	Oils	Solvents	Magnetite	Flocculants	HANFO	Emulsion Explosives	Water Treatment Chemicals	Heavy Vehicle Tyres	General Consumables	UG Mining General Consumables	UG Mining Stone Dust	UG Mining Concrete
Austroads Vehicle Class	10 % Class 5 50 % Class 9 40 % Class 10	10 % Class 5 50 % Class 9 40 % Class 10	10 % Class 5 50 % Class 9 40 % Class 10	10 % Class 5 50 % Class 9 40 % Class 10	10 % Class 5 50 % Class 9 40 % Class 10	10 % Class 5 50 % Class 9 40 % Class 10	10 % Class 5 50 % Class 9 40 % Class 10	10 % Class 5 50 % Class 9 40 % Class 10	10 % Class 5 50 % Class 9 40 % Class 10	10 % Class 5 50 % Class 9 40 % Class 10	10 % Class 5 50 % Class 9 40 % Class 10	10 % Class 5 50 % Class 9 40 % Class 10
Description of goods & material to be transported	Oils	Chemicals	Bulk concentrate of magnetite	Chemicals	Explosive mixture of heavy ammonium nitrate and heating oils	Explosives	Chemicals	Tyres for mine site heavy vehicles	General Consumables	Underground mining general consumables	Underground mining stone dust	Underground mining concrete
Quantity of goods to be transported	18 trucks delivering 574 T of oil per year	4 trucks delivering 30 T of solvents per year	171 trucks delivering 9,500 T of magnetite per year	5 trucks delivering 101 T of flocculants per year	12 trucks delivering 1,800 T of HANFO per year	6 trucks delivering 900 T of emulsion explosives per year	4 trucks delivering 5 T of water treatment chemicals per year	12 trucks delivering 360 T of tyres per year	28 trucks delivering 850 T of general consumables per year	17 trucks delivering 480 T of UG mining general consumables per year	29 trucks delivering 4600 T of UG mining stone dust per year	10 trucks delivering 1,200 T of UG mining concrete per year
Origin & Destination of goods	Brisbane 50 % Gladstone 30 % Mackay 20 %	Brisbane 50 % Gladstone 30 % Mackay 20 %	Brisbane 50 % Gladstone 30 % Mackay 20 %	Brisbane 50 % Gladstone 30 % Mackay 20 %	Brisbane 50 % Gladstone 30 % Mackay 20 %	Brisbane 50 % Gladstone 30 % Mackay 20 %	Brisbane 50 % Gladstone 30 % Mackay 20 %	Brisbane 50 % Gladstone 30 % Mackay 20 %	Brisbane 50 % Gladstone 30 % Mackay 20 %	Brisbane 50 % Gladstone 30 % Mackay 20 %	Brisbane 50 % Gladstone 30 % Mackay 20 %	Brisbane 50 % Gladstone 30 % Mackay 20 %
Is the product hazardous?	No	Hazardous	No	No	Hazardous	Hazardous	Hazardous	No	No	No	No	No
Duration of haul movement	Estimated average delivery of 3 trucks per 2 months	Estimated average delivery of 1 truck per quarter	Estimated average delivery of 4 trucks per week	Estimated average delivery of 1 truck per quarter	Estimated average delivery of 1 truck per month	Estimated average delivery of 1 truck per 2 months	Estimated average delivery of 1 truck per quarter	Estimated average delivery of 1 truck per month	Estimated average delivery of 1 truck per fortnight	Estimated average delivery of 4 trucks per quarter	Estimated average delivery of 1 truck per fortnight	Estimated average delivery of 1 truck per month

Table 14-8 SGCP Annual Heavy Vehicle Generation

Movement Description	No. Deliveries				
	2013	2014	2016	2019	2029
Construction					
OC equipment supply	53	33	-	-	-
Haul Roads	257	513	-	-	-
UG equipment supply	-	-	574	253	-
OC ROM Receival	-	67	-	-	-
UG ROM Coal Conveyors	-	-	54	-	-
UG ROM Coal Stockyard	-	-	981	-	-
Crushing/Sizing	4	36	23	-	-
Raw Coal Conveyors	17	35	34	-	-
Raw Coal Stockyard	-	208	138	-	-
Coal Preparation Plant Feed	5	39	34	-	-
Coal Preparation Plant	-	22	19	-	-
Product Coal Conveyors	5	38	23	-	-
Product Coal Stockyard	147	147	17	-	-
Rejects Handling	-	63	11	-	-
Train Load Out	-	66	-	-	-
Bulk Earthworks	59	-	-	-	-
Roads	626	-	-	-	-
Water & Sewerage Systems	498	332	-	-	-
Rail	149	-	-	-	-
Power Distribution	4	7	-	-	-
MIA Facilities 1	166	21	-	-	-
MIA Facilities 2	-	46	-	-	-
Other Infrastructure	-	54	-	-	-
Camps/Accommodation	24	-	-	-	-
Compressed Air/Reagents/Fuel & Lubes	-	6	-	-	-
Operation					
Oils	-	-	18	18	18
Solvents	-	-	4	4	4
Magnetite	-	-	171	171	171
Flocculants	-	-	5	5	5
HANFO	-	-	12	12	12
Emulsion explosives	-	-	6	6	6
Water Treatment Chemicals	-	-	4	4	4
Heavy Vehicle Tyres	-	-	12	12	12
General Consumables	-	-	28	28	28
UG Mining General Consumables	-	-	17	17	17
UG Mining Stone Dust	-	-	29	29	29
UG Mining Concrete	-	-	10	10	10
Total Annual Truck Deliveries	**2,014**	**1,733**	**2,224**	**569**	**316**
Total Annual Truck Trip Ends (i.e. Sum of IN:OUT movements)	**4,028**	**3,466**	**4,448**	**1,138**	**632**

Link and intersection analyses are conducted using peak and daily trip generation. **Appendix K—Transport Technical Report** details the process which was applied to convert the information contained in **Table 14-9** into peak and daily breakdowns.

The trip generation by trip purpose, shown in **Table 14-9** is disaggregated by the number of weekly deliveries by each yearly quarter. For example, delivery of magnetite is anticipated to be delivered four times per week for the whole of years of 2016, 2019 and 2029. Delivery of the water and sewerage systems will occur in the whole of 2013 and Q1 to Q3 of 2014, with the frequency of deliveries being ten per week.

Note that the number of truck deliveries presented in **Table 14-9** is taken to be the maximum number of deliveries per week based on the addition of deliveries within each quarter. Therefore, the total weekly truck deliveries represents the critical week for each assessment year.

Table 14-9 Heavy Vehicle Generation - Peak and Daily Movements

	Trip Generation				
	2013	**2014**	**2016**	**2019**	**2029**
Construction					
OC Equipment Supply	1/wk (Q1,Q4) & 2/wk (Q2-Q3)	1/wk (Q2-Q3)	-	-	-
Haul Roads	10/wk (Q3-Q4)	10/wk (Q1-Q4)	-	-	-
UG Equipment Supply	-	-	10/wk (Q1,Q4) & 20/wk (Q2-Q3)	2/wk (Q1-Q2) & 10/wk (Q3-Q4)	-
OC ROM Receival	-	3/wk (Q1-Q3)	-	-	-
UG ROM Coal Conveyors	-	-	2/wk (Q1-Q3)	-	-
UG ROM Coal Stockyard	-	-	25/wk (Q1-Q4)	-	-
Crushing/Sizing	1/wk (Q4)	1/wk (Q1-Q3)	1/wk (Q1-Q4)	-	-
Raw Coal Conveyors	1/wk (Q3-Q4)	1/wk (Q1-Q3)	1/wk (Q1-Q3)	-	-
Raw Coal Stockyard	-	8/wk (Q1-Q3)	8/wk (Q1-Q2)		
Coal Preparation Plant Feed	1/wk (Q4)	1/wk (Q1-Q3)	1/wk (Q1-Q4)	-	-
Coal Preparation Plant	-	1/wk (Q1-Q4)	1/wk (Q1-Q3)	-	-
Product Coal Conveyors	1/wk (Q4)	1/wk (Q1-Q3)	1/wk (Q1-Q3)	-	-
Product Coal Stockyard	11/wk (Q4)	11/wk (Q1)	1/wk (Q2-Q3)	-	-
Rejects Handling	-	3/wk (Q1-Q3)	2/mth (Q1-Q3)	-	-
Train Load Out	-	3/wk (Q1-Q3)	-	-	-
Bulk Earthworks	7/wk (Q1)	-	-	-	-

Table 14-9 Heavy Vehicle Generation - Peak and Daily Movements (cont)

	Trip Generation				
	2013	**2014**	**2016**	**2019**	**2029**
Roads	29/wk (Q1-Q2)	-	-	-	-
Water & Sewerage Systems	10/wk (Q1-Q4)	10/wk (Q1-Q3)	-	-	-
Rail	6/wk (Q3-Q4)	-	-	-	-
Power Distribution	1/mth (Q3-Q4)	1/mth (Q1-Q3)	-	-	-
MIA Facilities 1	5/wk (Q2-Q4)	5/wk (Q1)	-	-	-
MIA Facilities 2	-	2/wk (Q1-Q3)	-	-	-
Other Infrastructure	-	4/wk (Q2-Q3)	-	-	-
Camps/Accommodation	2/mth (Q1-Q3)	-	-	-	-
Compressed Air/Reagents/Fuel & Lubes	-	2/mth (Q2-Q3)	-	-	-
Operation					
Oils	-	-	5/qtr (Q1-Q4)	5/qtr (Q1-Q4)	5/qtr (Q1-Q4)
Solvents	-	-	1/qtr (Q1-Q4)	1/qtr (Q1-Q4)	1/qtr (Q1-Q4)
Magnetite	-	-	4/wk (Q1-Q4)	4/wk (Q1-Q4)	4/wk (Q1-Q4)
Flocculants	-	-	1/qtr (Q1-Q4)	1/qtr (Q1-Q4)	1/qtr (Q1-Q4)
HANFO	-	-	1/mth (Q1-Q4)	1/mth (Q1-Q4)	1/mth (Q1-Q4)
Emulsion explosives	-	-	2/qtr (Q1-Q4)	2/qtr (Q1-Q4)	2/qtr (Q1-Q4)
Water treatment chemicals	-	-	1/qtr (Q1-Q4)	1/qtr (Q1-Q4)	1/qtr (Q1-Q4)
Heavy vehicle tyres	-	-	1/mth (Q1-Q4)	1/mth (Q1-Q4)	1/mth (Q1-Q4)
General consumables	-	-	2/mth (Q1-Q4)	2/mth (Q1-Q4)	2/mth (Q1-Q4)
UG mining general consumables	-	-	4/qtr (Q1-Q4)	4/qtr (Q1-Q4)	4/qtr (Q1-Q4)
UG mining stone dust	-	-	2/mth (Q1-Q4)	2/mth (Q1-Q4)	2/mth (Q1-Q4)
UG mining concrete	-	-	1/mth (Q1-Q4)	1/mth (Q1-Q4)	1/mth (Q1-Q4)
Total Weekly Truck Deliveries*	**84**	**66**	**69**	**17**	**7**
Average No. Truck Deliveries per day (Assumes 7 day working week)	12	9	10	2	1
Peak Period Generation (To be conservative, assumes that each trip end coincides with the commuter peak)	12	9	10	2	1
Daily Generation (Sum of IN:OUT movements)	24	18	20	4	2

*Total weekly truck deliveries taken to be the critical week for the year based on the identified yearly quarters.

14.3.1.3. Visitor Movements

The traffic generation of visitor related journeys to and from the SGCP is expected to be made up of a range of visitors, including company representatives, trainers, and sales representatives.

Based on previous project experience, a volume of approximately 20 visitors per day is considered an adequate assumption for the SGCP. It has been assumed that the majority of visitors will visit the mine during the day shift, arriving in the morning peak and leaving in the evening peak. Approximately 50 % of visitors will fly in via the Alpha Aerodrome and arrive at the mine via the bus provided for staff. The visitors are not expected to generate additional bus movements to the mine site. The remaining 50 % of visitors will drive from surrounding mines or major towns using small private vehicles with average vehicle occupancy of 1.2.

Visitors are expected to generate a daily total of 18 vehicle trip ends, made up of nine vehicle trips to the SGCP in the morning peak hour and nine vehicle trips from the SGCP in the evening peak period.

Construction and operational inputs to the SCGP are proposed to be sourced from Brisbane (50 %), Gladstone (30 %) and Mackay (20 %).

There will also be significant haulage to and from the borrow pit on-site. During the construction of the rail and road facilities, haulage will occur via private internal roads and a section of the Capricorn Highway west of Alpha.

A detailed description of the planned haulage movements for the construction and operational phases of the SGCP are detailed in **Appendix K—Transport Technical Report**.

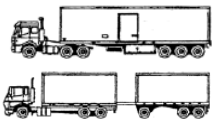
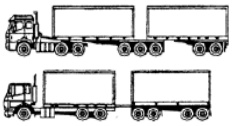
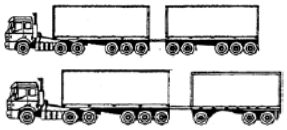
Hazardous and oversized loads will be transported during the construction and operational phases of the SGCP. Risk assessment of these loads has been included in **Section 19—Hazard and Risk**.

The haulage of coal to the CHPP will be conducted on a network of internal roads within the SGCP area. No SCR or local roads will be affected.

14.3.1.4. Equivalent Standard Axles (ESAs)

The calculation of the Equivalent Standard Axles (ESAs) is determined by multiplying annual truck trip ends by an appropriate ESA conversion factor based on the loaded or unloaded status of the vehicles. Details of the ESA conversion factors are detailed in **Table 14-10.**

Table 14-10 ESA Conversion Factors*

AUSTROADS Vehicle Classification		ESA conversion factor	
		Unloaded Vehicle	Loaded Vehicle
Class 5		0.50	4.40
Class 9		0.51	4.93
Class 10		0.53	6.30
Class 11		0.55	8.34
Class 12		0.58	11.75

*These factors have been supplied by DTMR.

These ESAs are based on the assumption that all trips to the site are loaded, while all trips exiting the site are unloaded. The calculations have been undertaken using the split in vehicle classification and traffic distribution as specified by the Proponent.

The inbound values given in **Table 14-11** are for trips towards the SGCP and the outbound values for trips travelling away from the SGCP. These ESAs are inclusive of both construction and operation generated trips.

Table 14-11 ESAs Generated by the SGCP

Road	Road Section	2014		2016		2019		2029	
		In	Out	In	Out	In	Out	In	Out
Capricorn Highway	Site to Clermont-Alpha Road	5,134	408	8,001	673	3,361	298	1,714	163
	Clermont-Alpha Road to Gregory Highway (Emerald)	4,107	326	6,401	538	2,689	238	1,371	131
	Gregory Highway (Emerald) to Rockhampton	1,540	122	2,400	202	1,008	89	514	49
Clermont-Alpha Road	Alpha to Mackay	1,027	81	1,600	135	627	60	343	33
Gregory Highway	Capricorn Highway (Emerald) to Dawson Highway (Springsure)	2,567	204	4,000	336	1,681	149	857	82
Dawson Highway	Gregory Highway (Springsure) to Carnarvon Highway	2,567	204	4,000	336	1,681	149	857	82
Carnarvon Highway	Dawson Highway to Warrego Highway	2,567	204	4,000	336	1,681	149	857	82
Bruce Highway	Capricorn Highway (Rockhampton) to Gladstone	1,540	122	2,400	202	1,008	89	514	49

14.3.2. Rail

Table 14-12 summarises information relating to rail movements by the SGCP. These movements are inclusive of both construction and operation generated trips.

Supply of materials to the SGCP during the construction phase (2013 to 2014) is expected to generate a maximum of nine train movements per week on the QR Central Line. After the commencement of the operations phase, the SGCP will generate minimal rail movements on the QR Central Line, using instead the proposed Galilee Basin Common User Railway for both supply of materials and the transport of product coal to the APCT.

Table 14-12 Project Generated Rail Movements

Rail Section	Maximum Train Movements Generated per Week			
	2013/2014 (Construction)	2016 (Operation and Construction)	2019 (First year of Stage 3 Operations)	2029 (Future Year Operations)
Material Supplies to SGCP via Central Line Railway	9	-	-	-
Material Supplies to SGCP via Galilee Basin Common User Rail Line	-	<1	<1	<1
Product Coal from SGCP to APCT via Galilee Basin Common User Rail Line	-	5	14	14

14.3.3. Air

As a result of the requirements for FIFO workers for the SGCP, the number of air movements generated each week at the Alpha Aerodrome is shown in **Table 14-13**. These air movements are based on aircraft with a capacity of 115 persons, which would require an upgrade of the Alpha Aerodrome.

The peak number of employees (i.e. 1,600) is limited by the capacity of the on-site accommodation village. The number of employees in each assessment year is specified in **Table 14-4.** The proportions of employees travelling to each region were provided by the Proponent.

Additional flights per week as a result of the SGCP are estimated at 17 in 2014, 8 in 2016, 14 in 2019, and 14 in 2029.

Table 14-13 Project Generated Air Movements

FIFO Air Movements Generated/Week	2013/2014 (Construction)	2016 (Stage 1 Operation and Construction)	2019 (First year of Stage 3 Operations)	2029 (Future Year Operations)
South East Queensland (SEQ)	9	3	7	7
Townsville	3	1	2	2
Cairns	2	1	2	2
Bundaberg	1	1	1	1
Maryborough	1	1	1	1
Proserpine/Mackay/Bowen	1	1	1	1
TOTAL	**17**	**8**	**14**	**14**

14.3.4. Port

Provisional product coal volumes for selected years are shown in **Table 14-14**. This coal will be railed to the APCT for export. The SGCP is expected to generate an average of 17 Mtpa of coal.

Table 14-14 SGCP Product Coal

Tonnes of Product Coal per annum	2014 (Construction)	2016 (Stage 1 Operation and Construction)	2019 (First year of Stage 3 Operation Phase)	2029 (Future Year Operations)
Product Coal from SGCP to APCT	-	5,420,000 tonnes	12,990,000 tonnes	15,540,000 tonnes

14.4. POTENTIAL IMPACTS

14.4.1. Road

14.4.1.1. Link Impacts

The full link impact analysis for the SGCP has been included in **Appendix C** of **Appendix K—Transport Technical Report**.

The impact analysis identified potential increases in daily traffic exceeding 5 %, and therefore considered significant by the GARID, on the road sections summarised in **Table 14-15**. All other roads assessed are expected to experience impacts insignificant by GARID standards.

Table 14-15 Roads with Potential Significant Increases in Traffic

Road Section	Per cent Increase over background				
	2013	2014	2016	2019	2029
Capricorn Highway, between Alpha and the SGCP	12.8 %	11.4 %	9.5 %	7.0 %	5.4 %
Clermont-Alpha Road from Pioneer-Clydevale to Hobartville	<5 %	8.3 %	<5 %	11.5 %	<5 %

14.4.1.2. Level of Service

LOS for the Capricorn Highway and Clermont-Alpha Road was calculated based on a comparison of the future year volumes against the daily flow rate thresholds identified in **Table 14-16**.

The critical flow rate across all assessed years was identified and then compared against the service flow rate definitions for each LOS category to determine likely future year performance. The GARID stipulates that a minimum LOS C should be provided.

A comparison of service flow with the expected future year traffic volumes (inclusive of SGCP traffic and cumulative impact traffic) is shown in **Table 14-16**.

Table 14-16 Comparison of Future Year Volumes with LOS

Road Section	Future Year Volumes with Project Only		Future Year Volumes with Project & Cumulative	
	Maximum Future Year Volume[1] pcu[2]/day	LOS[3]	Maximum Future Year Volume[4] pcu[2]/day	LOS[3]
16D: Capricorn Highway (West to East)				
SGCP to Infrastructure Corridor	470	A	1,698	A
Infrastructure Corridor to Clermont-Alpha Rd	470	A	1,698	A
16C: Capricorn Highway (West to East)				
Clermont-Alpha Rd to Willows Gemfields Rd	Insignificant Impact		1,213	A
Willows Gemfields Rd to Anakie-Sapphire Rd	Insignificant Impact		1,353	A
Anakie-Sapphire Rd to Tyson Rd	Insignificant Impact		2,223	A
Tyson Rd to Selma Rd	Insignificant Impact		3,973	B
Selma Rd to Gregory Hwy	Insignificant Impact		9,907	D
16B: Capricorn Highway (West to East)				
Gregory Hwy to Ensham Rd	Insignificant Impact		4,289	B
Ensham Rd to Blackwater-Cooroorah Rd	Insignificant Impact		3,009	A
Blackwater-Cooroorah Rd to Arthur St	Insignificant Impact		4,949	B
Arthur St to Fitzroy Development Rd	Insignificant Impact		3,569	B
Fitzroy Development Rd to Duaringa Connection Rd	Insignificant Impact		3,739	B
16C: Capricorn Highway (West to East)				
Start Point to Duaringa Connection Rd	Insignificant Impact		3,689	B
Leichhardt Hwy to End Point	Insignificant Impact		4,069	B
Powerstation Rd to Leichhardt Hwy	Insignificant Impact		4,359	B
Kabra Rd to Powerstation Rd	Insignificant Impact		5,299	C
Kabra Rd to Gavial-Gracemere Rd	Insignificant Impact		6,053	C
Gavial-Gracemere Rd to Bruce Hwy	Insignificant Impact		18,867	E
552: Clermont-Alpha Road (South to North)				
Capricorn Hwy to Hobartville	Insignificant Impact		208	A
Hobartville to Pioneer-Clydevale Rd	22	A	72	A
Pioneer-Clydevale Rd to Start Point	Insignificant Impact		152	A
End Point to Clermont Connection	Insignificant Impact		612	A

As demonstrated in **Table 14-16**, the maximum future year volumes on links with an increase of over 5 % as a result of the SGCP on both the Capricorn Highway and Clermont-Alpha Road are expected to remain below the accepted daily volumes for a two-lane two-way highway with a LOS A. As such, a minimum LOS A is expected to be provided across all impacted road sections for the life of the SGCP.

Given the above, the future year volumes are considered acceptable and no upgrade works are warranted as a result of the SGCP.

14.4.1.3. Intersection Impacts

The intersection analysis found that no upgrades are required for the intersections that will be used by traffic generated by the SGCP.

14.4.1.4. Pavement Impacts

14.4.1.4.1. Maintenance Contribution

Developer payable road maintenance contributions are typically triggered when an increase in ESAs exceed 5 % of background levels for any road section at each design year. However, the 5 % trigger should be used with discretion as low volume roads may misleadingly report large 'impacts' from small increases in heavy vehicle activity.

In these cases, consideration needs to be given to the construction design standard of the subject road section, and maintenance contributions need to be negotiated on a case by case basis between the Proponent and the relevant DTMR district.

Where ESAs are increased by more than 5 %, developer payable maintenance costs may be applicable. Maintenance costs increase proportionally to the increase in ESAs.

14.4.2. Rail

The SGCP is expected to generate a maximum of nine train movements per week on the QR Central Line supplying materials during the construction phase in 2013 to 2014. This is expected to generate negligible impact on the QR Central Line and its level crossings.

Once the construction of the proposed Common User Rail Line has been completed, all rail movements generated by the SGCP will use this line, rather than the QR Central Line post-construction phase, it is expected that material supply to the SGCP will be reduced to less than one rail movement per week.

Coal from the SGCP is proposed for transport by rail to the APCT approximately 500 km north-east of the Galilee Basin. During the operations phase the SGCP is expected to generate a maximum of 14 rail movements per week though the proposed Common User Rail Line.

No personnel or visitors are expected to use the passenger rail system for travel to Alpha and no impacts on the passenger rail system are expected.

14.4.3. Air

The air movements generated by the SGCP's FIFO workforce and visitors is discussed in **Section 14.3.3**. These air movements are based on the use of aircraft with 115 person capacity, the use of which will necessitate an upgrade of the Alpha Aerodrome.

The volume of air movements (refer to **Table 14-13**) is sufficiently low and is not expected to generate any adverse impacts at the Alpha Aerodrome.

14.4.4. Port

The proposed expansion of the APCT includes planned capacity for the coal generated by the SGCP. It should be noted that the impacts associated with the port are not addressed by this EIS and will be subject of another environmental approvals process.

14.5. POTENTIAL MITIGATION MEASURES

14.5.1. Road

Based on the Road Impact Assessment of the SGCP, the following road impact mitigation techniques have been recommended:

- the development and implementation of a TM Plan prior to the commencement of the construction phase of the SGCP
- the construction of an Auxiliary Right Turn and Auxiliary Left Turn treatments at the intersection of the Carpentaria Highway and the SGCP Mine Access road
- case-by-case assessment of pavement impacts and subsequent maintenance and rehabilitation costs.

14.5.2. Rail

On June 6, 2012, the State government approved an upgrade of the existing Central Line which would potentially allow for the transportation of coal to other Queensland ports.

Other significant projects in the Galilee Basin have proposed the construction of railway systems to provide coal haulage to the APCT. Proponents of these projects have indicated the potential for third-party access to a common, standard gauge, coal haulage railway system. The standard gauge used will provide an increase of 140 % over the carrying capacity of the narrow gauge QR Central Line, decreasing the required rail movements. On June 6, 2012, the GVK-Hancock Coal rail alignment was approved by state government to allow third party access for the transportation of coal from the Galilee Basin to the APCT.

The SGCP will have an on-site rail system that comprises a loading loop, breakdown and fuel siding that will connect to the Common User Rail Line through a proposed railway spur that includes track and appropriate signalling, a passing loop and connecting turnout. A rail underpass at the Capricorn Highway and a rail bridge over the Central Line Railway will also be required.

The APCT will include an unloading loop rail component capable of unloading and stockpiling coal from the common user rail line. The unloading loop is expected to be consistent with the North Queensland Bulk Ports expansion master plan.

14.5.3. Air

An upgrade to the Alpha Aerodrome will be required as a result of the SGCP and other significant projects in the Alpha area. The upgrade will include a runway extension and it is anticipated that commercial air service providers will meet the associated costs.

14.5.4. Port

The Proponent is currently in negotiation for the allocation of port capacity at the APCT. No construction works on sea transport infrastructure are proposed to be directly undertaken by the Proponent.

14.5.5. Impacts to other Transportation Networks

The Final Terms of Reference (ToR) for the SGCP include reference to a range of other transport networks (e.g. pedestrian and cycle network, public transport routes or existing systems and any stock routes). Although the transport assessment considered these networks, no formal networks exist and they were assessed as having no relevance to the SGCP. Accordingly, no impacts to pedestrian, cycle, public transport or stock route transport networks are anticipated.

There will be no reduction of transport safety, efficiency or condition of road operations and assets above what is already in place or has been described above. No significant interruptions to existing transport operations are expected during the construction or operational phases of the SGCP.

14.6. CUMULATIVE IMPACTS

Additional major projects, including other potential mining operations in the SGCP region have the potential to impact on the transport network.

These combined operations may see a large increase in additional road, rail and shipping movements on an annual basis. Therefore cumulative potential impacts on air quality, the acoustic environment, flora and fauna, the marine environment and surface water resources may occur.

Other significant projects currently undertaking EIS processes, that in conjunction with the SGCP have the potential to contribute to cumulative impacts in the region include:

- Alpha Coal Project
- Galilee Coal Project (also known as China First Coal Project)
- Kevin's Corner
- Carmichael Coal Mine and Railway.

Two sections of the Capricorn Highway are predicted to exceed their acceptable daily volume, from Selma Road to the Gregory Highway and between Gavial-Gracemere Road and the Bruce Highway. In both cases, the volume will exceed the acceptable volume with or without the addition of the SGCP.

Cumulative rail impacts will necessitate a calculated rail capacity of 133 Mtpa of which up to 17 Mpta (13 %) will be generated by SGCP.

The effect of cumulative impacts of on the Alpha Aerodrome is expected to be addressed with the capacity of the proposed upgrade to the Alpha Aerodrome. The Alpha Coal Project and the Galilee Coal Project did not provide FIFO movement numbers in their respective EIS documents, so it is difficult to quantify the potential cumulative impacts on air services in the region.

Cumulative port and shipping movement impacts include the amount of coal potentially transported to the APCT and shipped to overseas markets, which may be part of the upgrade projects at APCT.