NEW HOPE GROUP

13. Traffic and Transport

Contents

13 Traffic and Transport

13.1 Introduction

This Chapter provides a description of the existing traffic and transport conditions within the vicinity of the revised Project. It also identifies potential traffic impacts from the revised Project and the required mitigation measures proposed to avoid or minimise any adverse impacts on the transport environment and existing transport infrastructure.

13.2 Regulatory framework

The *Transport Infrastructure Act 1994* (TI Act) is the relevant State legislation concerning the management of transport infrastructure including roads and railways. Where construction and/or maintenance access to government supported transport infrastructure is required, approvals are to be obtained under section 62 of the TI Act and construction approval under section 33 of the TI Act.

The relevant section within the TI Act, namely Chapter 6, Part 2 deals with State Controlled Roads (SCR) and management of the TI Act is the responsibility of the TMR.

If the revised Project would affect SCRs approval or permits under the TI Act would be required to work in, or interfere with, a SCR. In assessing the significance of the revised Project's impacts on SCRs, the TMR Guidelines for Assessment of Road Impacts of Development (TMR, 2006) (GARID) were used. Impacts on roads managed by the TRC have also been assessed in a manner generally consistent with GARID.

13.2.1 Guidelines for Assessment of Road Impacts of Development (GARID)

The GARID guidelines provide information about the steps involved in assessing the road impacts of a proposed development and identify measures to mitigate any road impacts the revised Project may have. These guidelines have therefore been used as a reference in the assessment of transport impacts presented in this Chapter. This approach has been undertaken as a means of providing the relevant authorities with sufficient information to assess the transport impacts of the revised Project.

For the purposes of the guidelines, the process of compiling and analysing information on the road impacts of development proposals is termed a Road Impact Assessment (RIA). When a project is referred to the TMR as part of the development approval processes, a RIA is considered necessary when the road impacts are likely to be significant.

Principle 3 of the guidelines states that in general, TMR considers a development's road impacts to be insignificant if the development generates an increase in traffic on SCRs of no more than 5% of existing levels. This can be measured either in terms of annual average daily traffic (AADT) or equivalent standard axles (ESAs). These two measures are generally used as a basis for assessing the respective traffic and pavement impacts on the roads.

The guidelines separate the RIA process into four stages:

- Stage 1: Development profile and future traffic volumes.
- Stage 2: Scope of assessment and criteria to be adopted.
- Stage 3: Impact assessment and determination of impact mitigation measures.
- Stage 4: Determination of development conditions or developer contribution required.

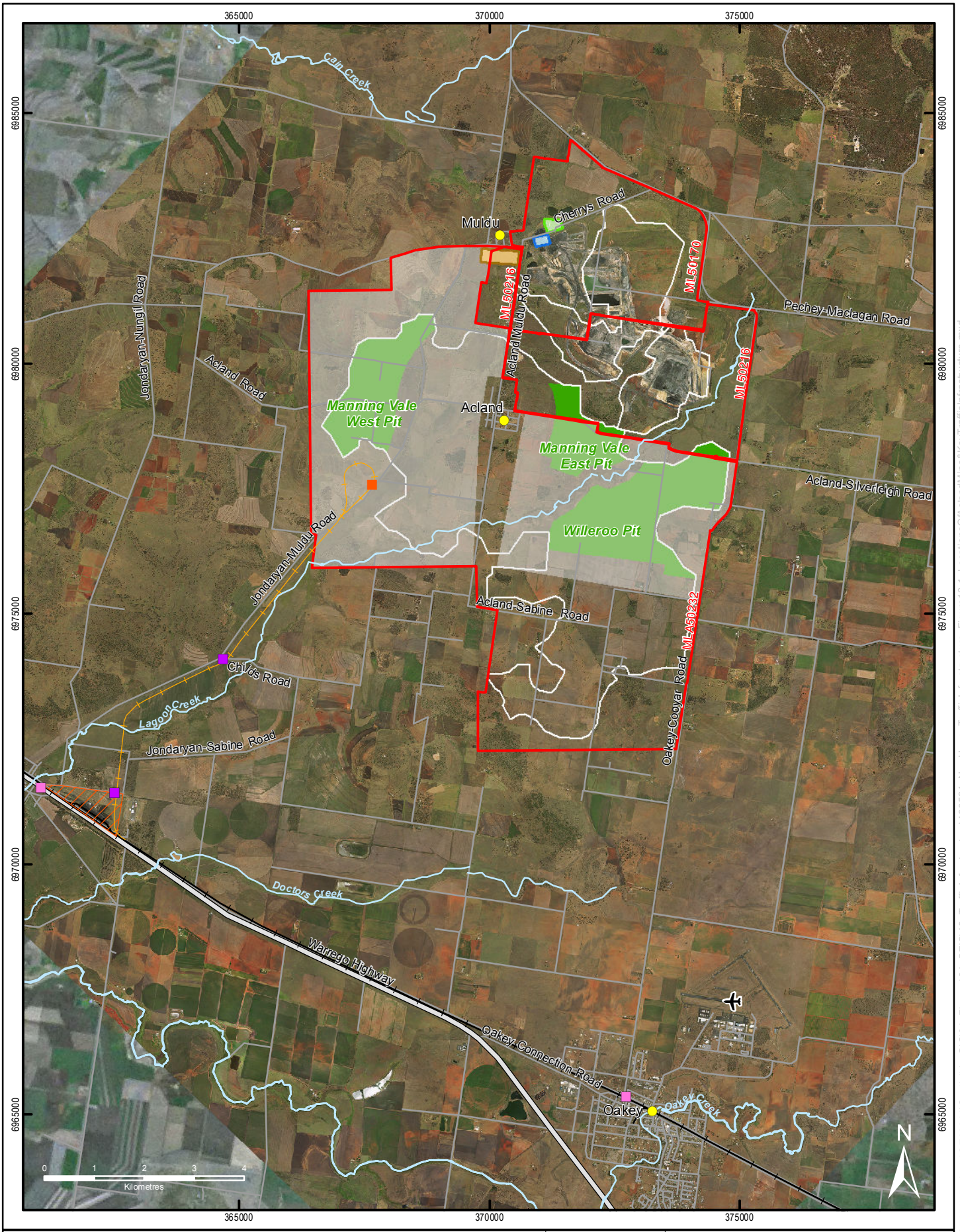
This EIS addresses stages 1, 2 and 3. Stage 4 of the RIA process will be finalised upon the TMR's assessment of the revised Project as a referral agency through the EIS process. This may require the development of detailed traffic management plans (TMPs) and road use management (RUM) plans.

The TMR guidelines apply in particular to development approvals processes, and do not specifically discuss the use of the EIS process. This Chapter is considered to encompass the development proposal and RIA.

13.3 Existing traffic and transport environment

13.3.1 Description of existing infrastructure

The key road and rail network within the Study area is depicted in **Figure 13–1**. Construction and ultimate operational activities for the revised Project will be mainly dependent on the road network. The operation phase will also depend on the rail transport network for coal transportation.



LEGEND

- Oakey Airport
- Towns and Localities
- Train Loadout Facility
- Level Crossing
- At Grade / Grade separated Rail Crossing
- Creeks
- Roads
- Highway
- Rail Spur
- Western Rail Line
- JRLF
- Mining Tenements
- Proposed Extent of Surface Rights Area
- Coal Resource Area
- Stage 3 Pit Areas
- CHPP Precinct
- Material Handling Facility
- Mine Industrial Area

NEW HOPE GROUP

SKM

NEW ACLAND COAL MINE STAGE 3 PROJECT

Figure 13-1 - Locations of Acland Mine & Key Traffic Infrastructure

Scale 1:100,000 on A4

Projection: Australian Geodetic Datum – Zone 56 (AGD84)

Produced: 22/08/2013 Path: I:\QENV2\Projects\QE06644\Spatial\ArcGIS\01_Figures\01_SEIS\13_TrafficInfrastructure\130531_NewHope_TrafficInfrastructure_Figure13-1_LocationsOfAclandMine&KeyTrafficInfrastructure.mxd

13.3.2 State controlled roads

Warrego Highway (18B) serves as a major traffic route connecting the coastal centres to the south western areas of Queensland. The Warrego Highway extends 750 km from the end of the Ipswich Motorway (near Ipswich), joining the Mitchell Highway at Charleville. Major settlements along the Warrego Highway, or just off it, include Toowoomba, Oakey, Dalby, Chinchilla, Miles, Roma, Mitchell, Morvan and Charleville. The Warrego Highway is a two-way, two-lane road in flat to rolling terrain with a speed limit ranging from 50 km/h in urban areas to 110 km/h in rural stretches of the road.

At the vicinity of the Study area, the Warrego Highway provides the main link between Toowoomba and the townships of Oakey, Jondaryan and Dalby. The New England Highway (22A) and the Gore Highway (22B) connect to the Warrego Highway at Toowoomba. TMR manages the section of the Warrego Highway between Toowoomba and Dalby.

Oakey Connection Road (326) is a state controlled road that provides the main access to Oakey from the Warrego Highway. The road is also known as Toowoomba Road, Campbell Street, Davidson Street and Bridge Street within the vicinity of Oakey. It will be referred to as the Oakey-Connection Road in this Chapter. It is a two-way, two-lane rural road in rolling terrain, with a speed limit of 60 km/h.

Oakey-Cooyar Road (417) is a state controlled road and links the Warrego Highway at Oakey and the New England Highway at Cooyar to the north. The current road alignment passes to the east and north of the Study area. It is an undivided two-way, two-lane rural road in rolling terrain, with a speed limit of 60km/h in urban areas and 100 km/h in all rural stretches of the) roadway.

Pechey-Maclagan Road (418) is a sealed state controlled road and links the New England Highway at Pechey and Dalby Cooyar Road. It provides access to Quinalow and passes to the north of the Study area. It is an undivided two-way, two-lane rural road in rolling terrain, with a speed limit of 100 km/h.

The key characteristics (these vary through residential and built-up areas) of each of these sections are outlined in **Table 13–1**.

Table 13–1 Key characteristics of state-controlled roads in the Study area

Road	Name	Road Classification	Permitted Maximum Size of vehicle
18B	Warrego Highway (Toowoomba-Dalby)	National Highway (AusLink road)	Type 1 road trains, B- triples, 23 m and 25 m B-doubles only
22A	New England Highway (Yarraman – Toowoomba)	National Highway (AusLink road)	Type 1 road trains, 23 m and 25 m B-doubles only
28B	Gore Highway (Millmerran –Goondiwindi)	National Highway (AusLink road)	Type 1 road trains, B- triples, 23 m and 25 m B-doubles only
417	Oakey-Cooyar Road	District Road	Type 1 road trains, 23 m and 25 m B-doubles only
418	Pechey-Maclagan Road	District Road	Type 1 road trains, 23 m and 25 m B-doubles only
326	Oakey–Connection Road	District Road	Type 1 road trains, B- triples, 23 m and 25 m B-doubles only

Source: TMR Queensland's B-Triple Network, May 2009. Accessed 7 May 2013

Available at http://www.tmr.qld.gov.au/Business-industry/Heavy-vehicles/Multi-combination-vehicles/B-triple-road-network-access.aspx

Source: TMR Guidelines for Multi-Combination Vehicles in Queensland. Accessed 7 May 2013

Available at http://www.tmr.qld.gov.au/Business-and-industry/Heavy-vehicles/Multi-combination-vehicles/Maps.aspx

13.3.3 Local roads

Jondaryan-Muldu Road is a sealed local road that runs north-east from Warrego Highway at Jondaryan to Muldu and passes to the west of the revised Project site. It provides the main access to the Mine and Acland. It is a two-way, two-lane rural road in rolling terrain, with a speed limit of 100 km/h. The Jondaryan-Muldu Road is currently owned and managed by TRC.

Jondaryan-Nungil Road is a sealed local road that runs from the Jondaryan-Muldu Road to its intersection with Pechey-Maclagan Road. It is a two-way, two-lane rural road in rolling terrain, with a speed limit of 100 km/h. The Jondaryan-Nungil Road is currently owned and managed by TRC.

Jondaryan-Sabine Road is a sealed local road that runs north-east from Warrego Highway to Acland-Sabine Road. The road is also known as Duke Street at Jondaryan and will be referred to as Jondaryan-Sabine Road. It provides secondary access to Acland and the surrounding local community. It is a two-way, two-lane unsealed rural road in rolling terrain, with a speed limit of 80 km/h. The Jondaryan-Sabine Road is currently owned and managed by TRC.

Acland-Sabine Road runs north-west connecting the Sabine area with Acland. It is an unsealed two-way, undivided two-lane rural road in rolling terrain. Acland-Sabine Road is currently owned and managed by TRC.

Acland Road is a sealed local road that runs east-west from Jondaryan-Muldu Road to Acland. It provides the main access to Acland. It is a two-way, two-lane rural road in rolling terrain, with a speed limit of 100 km/h. The Acland Road is currently owned and managed by TRC.

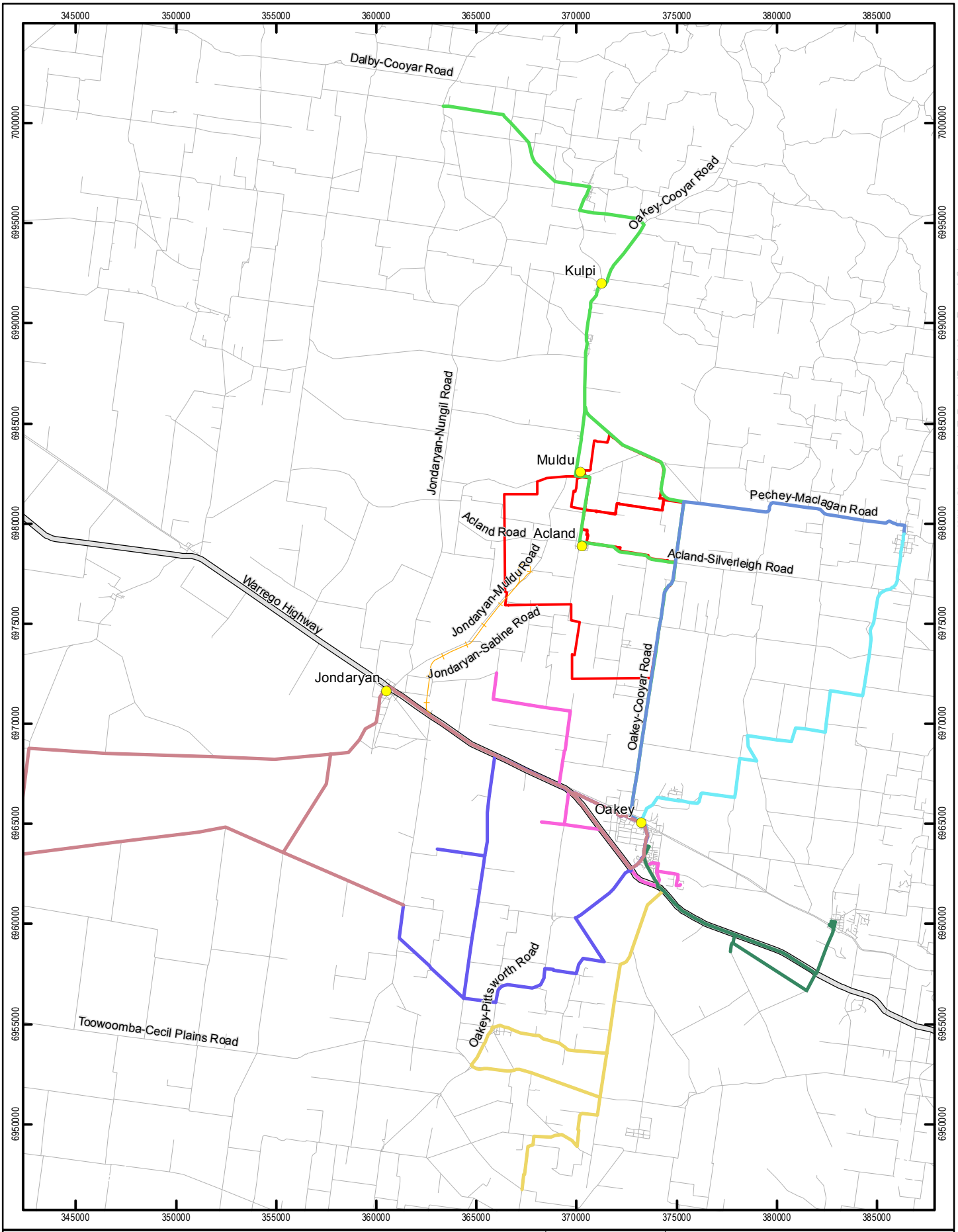
Cherrys Road is a public road under NAC control that is unsealed and provides access to the mine from Pechey-Maclagan Road and Acland Muldu Road.

13.3.4 School bus routes

There are eight bus routes that operate within the vicinity of the Study area, which are as follows and as outlined within **Figure 13–2**:

- *Route S24* (standard service) – travels between Quinalow and Oakey State High School;
- *Route S119* (standard service) – travels between Goombungee to Oakey State High School;
- *Route P185* (loop service) – travels between East Prairie to Jondaryan State school and Oakey State High School;
- *Route S435* (standard service) – travels between Goombungee, Boodua and Oakey State High School;
- *Route P698* (standard service) – travels between Tangkam, Biddeston and Oakey State School;
- *Route P854* (standard service) – travels between Devon Park and Oakey State School;
- *Route P1036* (loop service) – travels between Gowrie Mountain and Oakey State School; and
- *Route P1526* (loop service) – travels between Yargullen to Oakey State School.

Of the eight bus routes outlined, only bus route (S24) will be affected by the revised Project, the impact and the associated mitigation measures are discussed in **Section 13.12**.



LEGEND

- Towns and Localities
- Rail Spur
- Road
- Highway
- Mining Tenements

Bus Route

- P1036
- P1526
- P185
- P698
- P854
- S119
- S24
- S435

NEW HOPE GROUP

SKM

NEW ACLAND COAL MINE STAGE 3 PROJECT

Figure 13-2 - Bus Route Within Close Proximity to Revised Project Area

Scale 1:250,000 on A4

Projection: Australian Geodetic Datum – Zone 56 (AGD84)

Produced: 17/05/2013 Path: I:\QENV2\Projects\QE06644\Spatial\ArcGIS\01_Figures\01_SEIS\13_TrafficInfrastructure\130514_NewHope_TrafficInfrastructure_Figure13-2_BusRouteWithinCloseProximityToRevisedProjectArea-Example2.mxd

13.3.5 Road crash data

Crash data has been sourced for the Warrego Highway from TMR for the Toowoomba to Dalby section. The available crash data records were assessed for a seven year period between 2005 and 2012. Crash incidents in terms of severity are summarised in **Table 13–2**. Detailed crash data records are attached within **Appendix G.8.1**. Crash data for local roads were not available from TRC database.

Table 13–2: Summary of Warrego Highway Crash Statistics (2005-2012)

Severity	Number of incidents	Percentage
Fatal	39	3%
Hospitalisation	318	23%
Medical treatment	255	18%
Minor injury	189	14%
Property damage	589	42%
TOTAL	**1390**	**100%**

Source: TMR, data received 26/04/2013

A review of the crash data revealed that 50% of incidents involved a single vehicle and 41% occurred mid-block. The crash distribution does not indicate any obvious correlation to mine shift start or end times; 15% occur in the period 5 am to 9 am and 23% in the period 4 pm to 7 pm. The greatest majority of crashes occurred in the day off-peak between 9 am and 4 pm (52%).

13.3.6 Scheduled road improvements

The Queensland Transport and Roads Investment Program 2013–14 to 2016–17 (QTRIP) details the current transport and road projects that the Queensland Government plans to deliver over the next 4 years. The improvements of traffic signals are proposed to be undertaken at Warrego Highway between Hursley Road - Tor Street and Gore Highway and South Street intersection as referred to in QTRIP and other scheduled improvements for pavements and widening shoulder works between Oakey and Cooyar. The detailed QTRIP document is attached in **Appendix G.8.2**.

13.3.7 Police and emergency services

The nearest Queensland Police Service (QPS) stations and hospital to the Study area are located in Toowoomba, Jondaryan (police only) and Oakey. The nearest Queensland Fire and Rescue Service (QFRS) stations are located in Toowoomba and Dalby.

13.3.8 Public transport services

Based on the TransLink's website (http://jp.translink.com.au/travel-information/network-information/stops-and-stations/stops-near-you/map), there is one bus stop located within close proximity to the revised Project site. The bus stop is located at Jondaryan off the Jondaryan-Sabine Road with no bus services operating at the specified stop.

13.3.9 Rail and Port facilities

The revised Project lies within Queensland's Western Coal Supply System, which links mines in the Surat and Clarence-Moreton Basins to the Port of Brisbane. Aurizon (ex QR National) provides coal freight services for the Mine. Dalby is the regional rail node connecting the Western Rail Line and the Glenmorgan, Bell and Jandowae branch lines. The Western Rail Line system supports rural industries in the Darling Downs region and provides freight line services to the Port of Brisbane.

QBH is a subsidiary of NHG and operates a bulk handling facility at the Port of Brisbane. The current capacity of the QBH Terminal is 12 Mtpa, with a stockpile capacity of 909,000 tonnes of which 600,000 tonnes are allocated to NAC. This will be more than adequate to meet the requirements of the revised Project's annual export requirements. All coal that is exported from QBH is currently transported to the ship loading facility by rail. A very small percentage of coal will be distributed locally with the road network.

13.3.10 Airport services

The main airports within the vicinity of the revised Project are the Toowoomba Airport, Oakey Civilian Airport and Oakey Army Air Force Base. The nearest commercial, interstate and international airport are located in Brisbane.

Toowoomba Airport currently has a 1,121 m runway providing capacity for light aircraft up to Dash 8 or equivalent. The Oakey Civilian Airport, located 30 km from Toowoomba, maintains a regular commercial service and charters. At present, there is a twice weekly service operating between Brisbane and Oakey with a capacity of 18 passengers per flight.

A major airport construction is currently in progress at Wellcamp south-west of Toowoomba. This airport will have a 3000m runway and handle up to Boeing 747 size aircraft. Airport completion for flight commencement is scheduled for late 2014.

13.3.11 Infrastructure requirements

A detailed description of the revised Project and the associated infrastructure requirements are presented in **Chapter 3**.

13.4 Background traffic

13.4.1 Existing (2012) traffic volumes

The existing traffic volumes have been sourced from TMR and TRC. TMR traffic counts for Warrego Highway, Oakey Connection Road and Oakey- Cooyar Road were collated for the 2012 Average annual daily traffic (AADT) year, which are summarised within **Table 13–3**.

Table 13–3 State-Controlled Roads Existing Traffic Levels

Road	Name	Counting Site	2012 AADT (vpd)	Percentage of Commercial (Heavy) Vehicles
18B	Warrego Highway (Toowoomba-Dalby)	Clifford Gardens intersection (Toowoomba)	19,000	17%
		Hursley Road intersection (West Toowoomba)	14,610	20%
		West of Boundary Street intersection (West Toowoomba)	15,560	9%
		East of Oakey	9,700	21%
		Oakey Bypass	6,040	24%
		West of Oakey (at Jondaryan)	6,170	27%
		West of Jondaryan	6,130	23%
326	Oakey Connection Road	250 m north of Warrego Highway	3,520	9%
		600 m east of Warrego Highway	1,070	19%
417	Oakey-Cooyar Road	600 m North of Railway crossing	1,530	18%
		500 m North of Acland Road	730	21%
		600 m south of Pechey-Maclagan Road	720	20%
		3.5 km south of Haden Road	390	26%
		2.5 km west of new England Highway	790	22%
418	Pechey-Maclagan Road	500 m east of Gormaren Creek Culvert	250	14%
		At Blacks' Road Sign on Lhs	350	10%
		3 km East of Myall Ck	310	17%

Note: * Information obtained from TRC via email dated 9 April 2013

The latest AADT data sourced from TRC for the local roads within close proximity to the revised Project are were limited to Jondaryan-Nungil Road, which was estimated to carry approximately 810 vehicles per day (two-way total), with 41% commercial/ heavy vehicles.

Local roads such as Jondaryan Muldu Road, Acland Muldu Road and Cherrys Road effectively only provide access to the Mine, Muldu and Acland and the traffic volumes are considered to be minor. No

existing traffic data was available for other local roads within the vicinity of the Study area. The 2012 AADT data sourced from TMR are detailed in **Appendix G.8.1**.

13.5 Existing road level of service

13.5.1 Performance criteria

The performance criterion for road links is the Level of Service (LOS) as defined in *Austroads Guide to Traffic Management – Part 3 – Traffic Studies and Analysis.* Section 3.2.2 of Austroads defines LOS C as traffic being: 'In the zone of stable flow, but most drivers are restricted to some extent in their freedom to select their desired speed and to manoeuvre within the traffic stream. The general level of comfort and convenience declines noticeably at this level'.

In rural areas, LOS 'D' can be considered to be the minimum standard, changes between the LOS ranking below LOS 'D' imply remedial measures to maintain the required LOS.

The Austroads level of service criteria for level terrain, two-lane, two-way roads has been applied using the common industry standard ratio of 0.10 between the design hour volume and the AADT as presented in below.

The resulting LoS levels are as follows:

- 1 veh/day < LoS **A** < 4,900 veh/day
- 4,900 veh/day < LoS **B** < 7,800 veh/day
- 7,800 veh/day < LoS **C** < 11,900 veh/day
- 11,900 veh/day < LoS **D** < 18,300 veh/day
- 18,300 veh/day < LoS **E** < 32,000 veh/day

13.5.2 Existing level of service - 2012

Based on the criteria in **Section 13.5.1** and the 2012 daily traffic volumes sourced from TMR and TRC, the current LoS for key road links are estimated in **Table 13–4**.

Table 13–4 Existing LoS for key roads

Road	Name	Counting Site	2012 AADT[1] (vpd)	2012 LoS
18B	Warrego Highway (Toowoomba-Dalby)	Clifford Gardens intersection (Toowoomba)	19,000	E
		Hursley Road intersection (West Toowoomba)	14,610	D
		West of Boundary Street intersection (West Toowoomba)	15,560	D
		East of Oakey	9,700	C
		Oakey Bypass	6,040	B
		West of Oakey (at Jondaryan)	6,170	B
		West of Jondaryan	6,130	B
326	Oakey Connection Road	250 m north of Warrego Highway	3,520	A
		600 m east of Warrego Highway	1,070	A
417	Oakey-Cooyar Road	600 m North of Railway crossing	1,530	A
		500 m North of Acland Road	730	A
		600 m south of Pechey-Maclagan Road	720	A
		3.5 km south of Haden Road	390	A
		2.5 km west of new England Highway	790	A
418	Pechey-Maclagan Road	500 m east of Gormaren Creek Culvert	250	A
		At Blacks' Road Sign on Lhs	350	A
		3 km East of Myall Creek	310	A
N/A	Jondaryan-Nungil Road	At the proximity of Jondaryan township	810	A

13.5.3 Existing intersection counts

Existing intersection turn volumes for the key intersections within close proximity to the Study area have been sourced from TMR. TMR provided intersection count data for Jondaryan-Sabine Road/Warrego Highway intersection only. The intersection count for Jondaryan Sabine Road/ Warrego Highway was undertaken on Wednesday, 30 November 2011 between 6:00 am and 6:15 pm. The 2011 intersection count is detailed within **Appendix G.8.1.** No existing intersection count data were available from TMR and TRC for other key intersections within the vicinity of the Study area.

13.5.4 Historic traffic growth

The historic growth on key surrounding roads has varied widely dependent on the proximity to the Mine. It was observed that the growth rate for the key roads within the network were not consistent (with negative growth trends). The following range of growth has been observed for a 10 year (based on the 2012 AADT obtained from TMR):

- Warrego Highway - 0% to 18%;
- Oakey Connection Road - negative traffic growth;
- Oakey- Cooyar Road - negative traffic growth; and
- Pechey-Maclagan Road - 1% to 2%.

13.5.5 Background traffic growth

Background traffic growth rates have been sourced from the TMR report *Traffic Growth Projections for the Surat Basin 2011* (TMR 2011) and represent the most likely future year scenario (2026) for the Study area. Section 16.1 of the TMR 2011 traffic growth projection report indicates that Warrego Highway (Toowoomba – Dalby-Miles - Roma) is a high growth road while Oakey-Cooyar Road is a medium growth road. Based on the TMR 2011 report, the projected traffic growth rates for the key state controlled roads within close proximity to the revised Project area for the 2027 horizon are:

- Warrego Highway – 3.5%;
- Oakey Connection Road – 4.7%;
- Oakey- Cooyar Road – 5.6%;

Consultation with TMR on the subject has indicated that the high annual growth rates are representative of on-going development in the area and scenario 3A high scenario should be adopted for future year forecasting for a 2026 horizon.

13.5.6 Committed developments

It is assumed that the growth rates described above and applied in this assessment is sufficient to account for growth generated by committed development in the area; this is in line with advice received from TMR. This is considered an appropriate approach as the compound growth rate applied in the assessment is based on forecast future growth, which will be largely driven by development in the mining industry and not based on past growth that do not reflect this change.

13.6 Project overview

13.6.1 Project time frames

The peak scenarios for traffic assessments relate to the revised Project timeline and milestones as outlined in **Table 13–5**.

Table 13–5 Project timelines

Phase	Time frame
Construction period	Feb 2015 – March 2017
Peak period of construction	2016
Operation commence	April 2017
Traffic operation assessment horizon	2027

13.6.2 Proposed site access and haul roads

The revised Project's proposed dedicated site accesses for heavy and light vehicles and key internal haulage roads in the context of the surrounding road network are illustrated in **Figure 13–3**.

Site access to the revised Project site is proposed via the following routes:

- the re-aligned Jondaryan-Muldu Road will provide access for heavy and light vehicles; and
- the re-aligned Cherrys Road will provide access for light vehicles only.

The re-aligned Jondaryan-Muldu Road as shown in **Figure 13–3** runs north-east to the west of the Manning Vale West resource area. This re-aligned road will link the revised Project site at Muldu to the Warrego Highway to enable product coal transportation to local customers in southeast Queensland and to allow daily light and heavy vehicle deliveries to the revised Project site during the construction and operation phase.

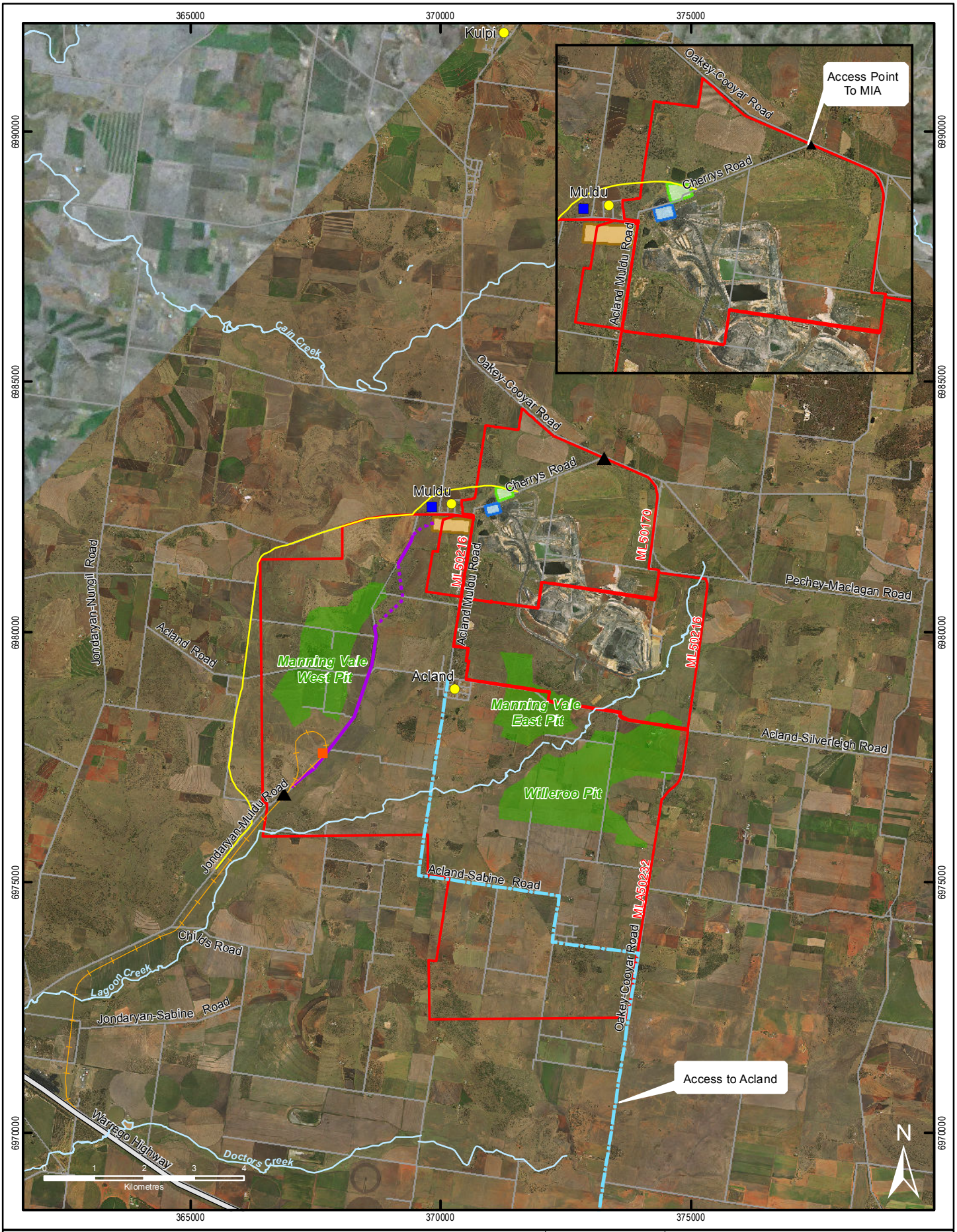
The re-aligned Cherrys Road will link the revised Project site to Oakey-Cooyar Road via Pechey-Maclagan Road and will provide the main access for light vehicles. The Cherrys Road realignment will be independent of the internal haulage road network to ensure minimal operational conflicts. It is anticipated that majority of the construction and operation workforce will access the revised Project site via Cherrys Road for mine site industrial area developments and the Jondaryan-Muldu Road for the Railway line and train load out infrastructure.

Existing internal access tracks will be used for all mining operations to minimise disturbance areas. Current haul and internal service roads on MLs 50170 and 50216 will be maintained and upgraded as required to accommodate the expansion in mining operations. Access and egress through the revised Project site will be limited to controlled access points only.

The existing Jondaryan-Muldu Road that traverses to the east of the Manning Vale West resource area will be used as an internal haul road connecting the CHPP Precinct within the MIA to the TLF as shown in **Figure 13–3**. The northern section of the Jondaryan-Muldu Road at Campbells-Creber

Road will be re-aligned to the east of the Manning Vale West resource area to accommodate mining operations. Other new haul and internal service roads will be constructed on an as required basis and where possible will utilise existing tracks within the new ML.

Mine haul roads will follow existing design criteria subject to the requirements of the CMSH Act, including a design speed of 60 km/h, at least 30 m wide and two-way lanes. The maximum grade of the haul roads outside the mine pit areas will be 10% with a maximum cross fall of 3%. Safety barriers will be constructed in areas where required.



LEGEND

- Towns and Localities
- Access Point
- Train Loadout Facility
- Potential site for Telecom Exchange
- Rail Spur
- Creeks
- Jondaryan-Muldu Road Diversion
- Access to Acland
- Internal Haulage Road Diversion
- Internal Road Haulage
- Mining Tenements
- Stage 3 Pit Areas
- CHPP Precinct
- Material Handling Facility
- Mine Industrial Area

NEW HOPE GROUP

SKM

NEW ACLAND COAL MINE STAGE 3 PROJECT

Figure 13-3 - Site Access & Internal Haulage Road

Scale 1:100,000 on A4

Projection: Australian Geodetic Datum – Zone 56 (AGD84)

Produced: 22/08/2013 Path: I:\QENV2\Projects\QE06644\Spatial\ArcGIS\01_Figures\01_SEIS\13_Traffic\Infrastructure\130531_NewHope_Traffic\Infrastructure_Figure13-3_SiteAccess&InternalHaulageRoad.mxd

13.6.3 Proposed road diversions and closures

Road diversions

The existing alignment of the Jondaryan-Muldu Road traverses the eastern portion of the Manning Vale West resource area. Therefore, the construction of the Jondaryan-Muldu Road realignment is critical to allow NAC access to the Manning Vale West resource area under the revised Project's mine plan.

The re-aligned section of Jondaryan-Muldu Road will follow the existing road reserves and traverse property owned by APC as illustrated in **Figure 13–4**. The re-aligned Jondaryan-Muldu Road will remain a public road under TRC control and will provide the primary heavy vehicle and secondary light vehicle access routes to the revised Project site. The current alignment of Jondaryan-Muldu Road should not be closed until the re-aligned road is available for use. Should the proposed diversion of Jondaryan-Muldu Road not be feasible an alternative route that runs along Jondaryan - Nungil Road and Muldu-Brymaroo Road exists.

NAC possess sufficient base materials for the construction of the proposed road diversion to support a high mass road for heavy vehicle transport. Works associated with the construction of the road re-alignment are expected to start during 2015 to coincide with the grant of MLA 50232.

The TRC has a long term contract with NAC for the maintenance and upgrade of the existing Jondaryan-Muldu Road alignment. NAC's relationship with TRC for this type of ancillary works has been economically beneficial for the local area. NAC will continue to advance discussions with the regulatory agencies in relation to the re-aligned Jondaryan-Muldu Road. NAC will also consult with local landowners potentially impacted by the Jondaryan-Muldu Road diversion to ensure appropriate detours are available.

The existing alignment of Cherrys Road runs from Pechey-Maclagan Road and traverses north of the MIA site. Currently, Cherry's Road intersects with the internal haulage road which provides access to the revised Project site. The realignment of Cherrys Road will be independent of the internal haulage road system.

The following access roads are proposed along the realigned Cherrys Road during the operation phase of the revised Project as shown within the insert of **Figure 13–4**:

- Car Park Access Road - provides light vehicle access to the car park facility adjacent to the MIA; and
- Service Road - provides access for services vehicles entering the MIA and CHPP Precinct.

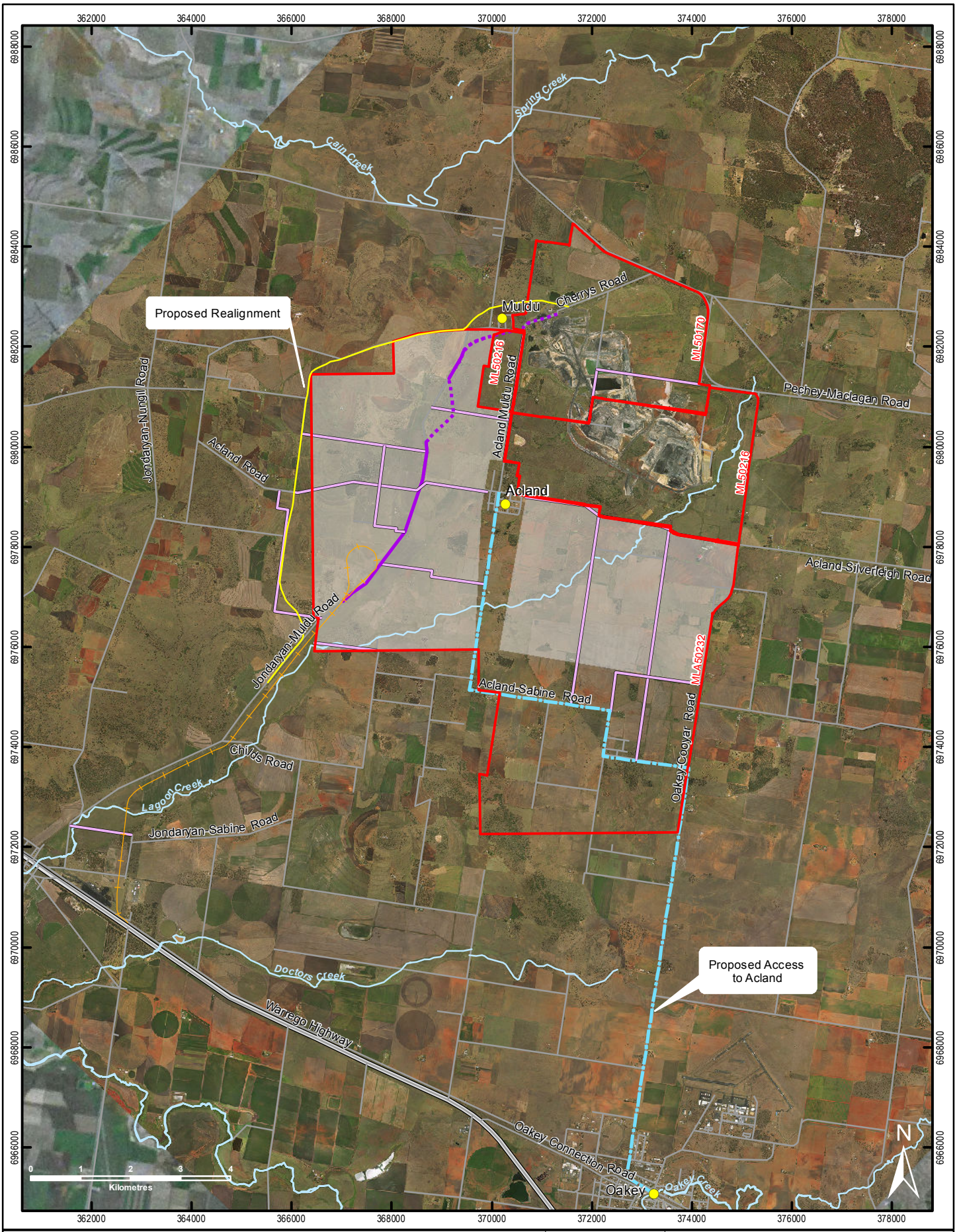
Cherrys Road will remain a public road under NAC control and will be used as the primary light vehicle access route to the MIA and the car park facility for the revised Project site. Access to Cherrys Road will be via Pechey-Maclagan Road, Oakey Cooyar Road and the Warrego Highway at Oakey. Detailed description of the access provisions along Cherrys Road for the revised Project is presented in **Chapter 3**.

Road closures

The road closures required within MLA 50232 are summarised within **Table 13–6** and illustrated in **Figure 13–4**. All road closures will be implemented on permanent basis for the life of the revised Project. NAC will consult with the relevant agencies to ensure the regulatory requirements for the road closures are completed to coincide with the grant of MLA 50232.

Table 13–6 Proposed Road Closures

Road	Sections	Closure reason
Acland Road	Between the re-aligned Jondaryan-Muldu Road and western boundary of Acland town	Mining area
Acland Silverleigh Road	Between the Oakey-Cooyar Road and the eastern boundary of Acland town	Mining area
Acland-Muldu Road	Between Francis Street (north of heritage site) and Muldu Road	Mining area
Bothams Road	Between Acland-Sabine Road and Greenwood School Road	Mining area
Campbells-Creber Road	Between the existing Jondaryan-Muldu Road and Acland-Muldu Road	Mining area
Conroys Road	Between the existing Jondaryan-Muldu Road and Acland-Sabine Road	Mining area
Cookes Road	Between existing Jondaryan-Muldu Road and Acland-Brymaroo Road	Re-alignment of Jondaryan-Muldu Road
Greenwood School Road	Between Acland Road and Oakey-Cooyar Road	Mining area
Jondaryan–Muldu Road	North of Cookes Road to Muldu Road	Re-alignment of proposed Jondaryan-Muldu Road
McLaughlins Road	Between existing Jondaryan-Muldu Road and Osheas Road	Mining area
Osheas Road	Between the existing Jondaryan-Muldu Road and the realigned Jondaryan-Muldu Road	Re-alignment of Jondaryan-Muldu Road
Willeroo Mine Road	Between Acland-Sabine Road to Acland Road	Mining area
McKays Road	Between Jondaryan-Muldu Road and the current paved section of Jondaryan Sabine Road	Propose level crossing
Woods Road	First section that runs West-East from the existing Jondaryan Muldu Road	Mining area



LEGEND

- Towns and Localities
- Highway
- Roads
- Rail Spur
- Jondaryan-Muldu Road Diversion
- Access to Acland
- Internal Haulage Diversion Road
- Internal Road Haulage
- Road Closures
- Mining Tenements
- Proposed Extent of Surface Rights Area

NEW HOPE GROUP

SKM

NEW ACLAND COAL MINE STAGE 3 PROJECT

Figure 13-4 - Road Closure & Diversion

Scale 1:100,000 on A4

Projection: Australian Geodetic Datum – Zone 56 (AGD84)

Produced: 22/08/2013 Path: I:\QENV2\Projects\QE06644\SpatialArcGIS\01_Figures\01_SEIS\13_TrafficInfrastructure\130531_NewHope_TrafficInfrastructure_Figure13-4_RoadClosure&Diversion.mxd

These road closures are scheduled to be implemented concurrently once the realignment of Jondaryan-Muldu Road is completed and MLA 50232 is granted. Appropriate signage and infrastructure will be in place when these closures are implemented to warn public of the restricted access. NAC will also ensure that the public are appropriately advised via its various public communication tools (e.g. newsletter) in use throughout the region.

Access to Acland

Access to Acland will be maintained via the existing Acland-Sabine Road which connects to Oakey-Cooyar Road, approximately eight kilometres north of Oakey as highlighted in **Figure 13–3**. Directional signage to Acland will be provided at key locations to ensure the surrounding community are aware of the changes. The Acland-Sabine Road will be upgraded to an appropriate standard to support its role as the main access to Acland.

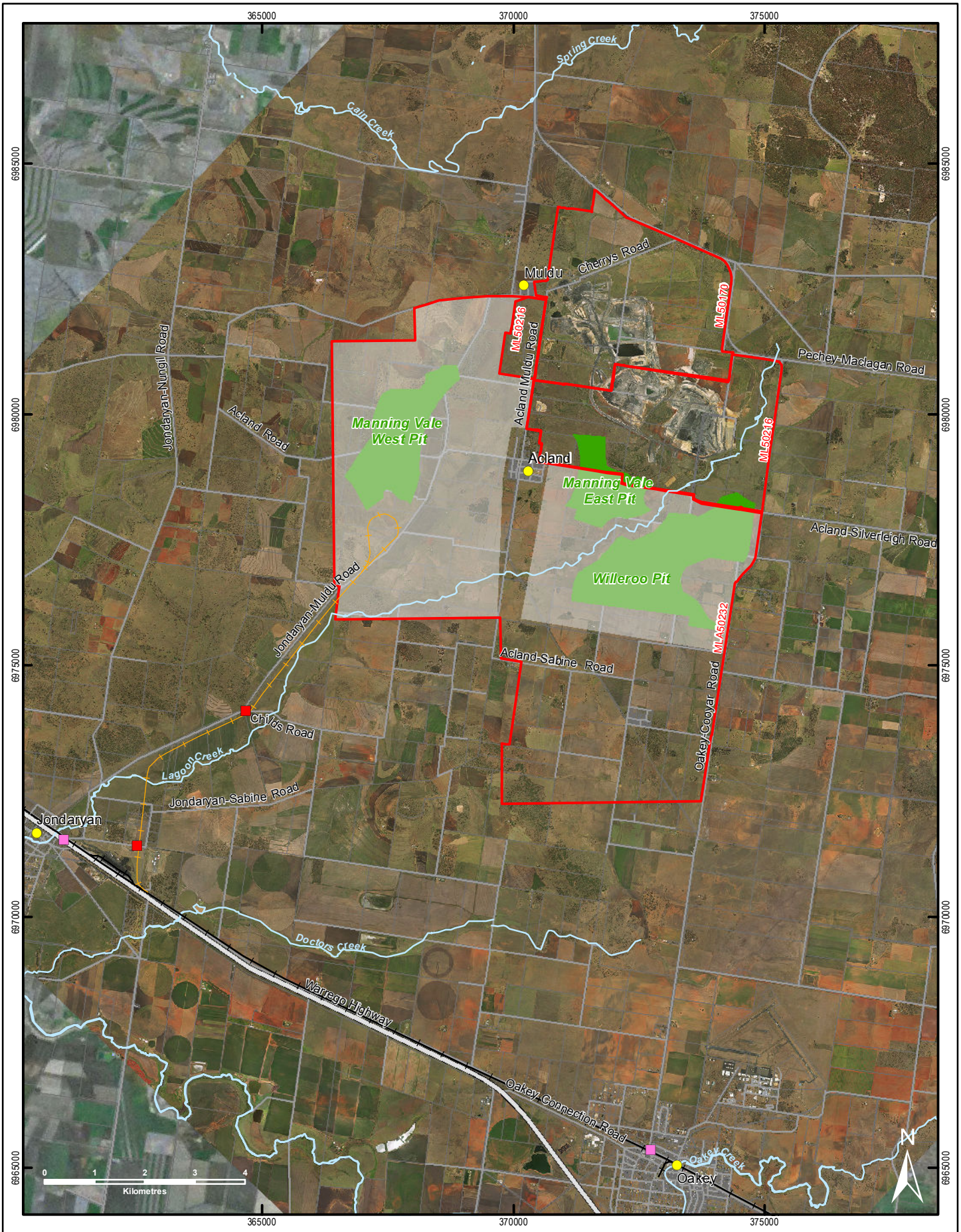
The following roads within Acland will remain accessible to the surrounding community:

- Acland-Sabine Road;
- Francis Street between Church Street and Acland-Sabine Road;
- Francis Street between Church Street and north to the town boundary.
- Church Street between Francis Street and Acland Road;
- Acland Road between Francis Street and west of King Street;
- George Street;
- King Street;
- Mary Street;
- Allen Street;
- Bellevue Street;
- Clark Street;
- South Street; and
- William Street.

Rail-road (level) crossings

The locations of the rail-road (level) crossings that will be impacted by the revised Project are as summarised below and illustrated in **Figure 13–5**:

- Existing level crossing at Oakey Connection Road/ Oakey–Cooyar Road;
- Existing level crossing at Warrego Highway/Jondaryan-Sabine Road;
- Proposed new level crossing at Acland-Sabine Road; and
- Proposed new level crossing at Childs Road.



LEGEND

- Towns and Localities
- Existing At Grade Level Crossing
- Proposed At Grade / Grade separated Rail Crossing
- Roads
- Rail Spur
- Western Rail Line
- Cadastre
- Mining Tenements
- Proposed Extent of Surface Rights Area
- Stage 3 Pit Areas

NEW HOPE GROUP

SKM

NEW ACLAND COAL MINE STAGE 3 PROJECT

Figure 13-5 - Locations of Level Crossing

Scale 1:100,000 on A4

Projection: Australian Geodetic Datum – Zone 56 (AGD84)

Produced: 16/07/2013 Path: I:\QENV2\Projects\QE06644\Spatial\ArcGIS\01_Figures\01_SEIS\13_TrafficInfrastructure\130531_NewHope_TrafficInfrastructure_Figure13-5_LevelCrossing.mxd

A description of the proposed rail spur for the revised Project is presented in **Chapter 3** whilst an overview of**.** The impacts of the traffic generated during the peak construction (2016) phase and the operation (2017) phase at the key level crossings are outlined within **Section 13.12.3**.

13.6.4 Rail transportation

The maximum number of trains per week from current operations at the Mine is fifty-three. Currently, the main constraint on the number of trains that can be loaded at the JRLF is the turnaround rate at the facility. The design of the JRLF means that the train is taken into the siding, the locomotives are then uncoupled and taken to the other end of the train and re-coupled. In the meantime, the next train waits on the passing loop close to Oakey as there is insufficient room for the next train to stand by at the JRLF. The coal stockpiles located at the JRLF are of sufficient length to enable the whole train to be loaded without having to move forward. Generally, two or three loaders are used and the loading time is up to 60 minutes.

Each train has two locomotives positioned at the front. These type 2300 locomotives have two stroke diesel engines with rudimentary silencers. A retrofit program is continuing with most units having already been fitted with turbochargers. The fitting of turbocharges enables the engines to develop more power and operate at a reduced exhaust noise. The trains are currently made up of approximately 41 wagons with a total train length of approximately 651 m. The maximum axle load for the western rail corridor is approximately 15.75 t (this figure is restricted by the configuration and load limits of rail size, formation and bridges, many of which are timber structures). Therefore, the maximum gross wagon weight is approximately 63 t. The maximum payload per train is 1,940 t.

The maximum allowable train speed along the western rail corridor is 80 km/h with lower speed restrictions in certain areas, especially on the Toowoomba range section where 30 km/h speed restrictions apply. The rail line is a single line whereby trains pass each other via passing loops at various locations along the line. The allowable length of each train is restricted by the length of passing loops. Future capacity increases will require upgrades to the rail infrastructure.

NAC is planning to construct a new 8 km rail spur and balloon loop for the revised Project. The will involve the total decommissioning of the JRLF to improve the efficiency and safety of coal transport off-site as the revised Project's coal delivery rates rise beyond those existing for a production rate of 4.8 Mtpa. The new rail spur and balloon configuration and alignment along with at grade/grade separated rail crossing locations is depicted in **Figure 13–4**. The maximum number of trains per week from the revised Project will be up to eighty. Upgrades to the Western Rail Line may be required to facilitate the increase in number of trains associated with the revised Project. Discussions between NHG and Queensland Rail will continue with regard to infrastructure and logistics associated with any required upgrades.

The new rail spur and balloon loop for a large portion of its route is planned to run immediately adjacent the existing Jondaryan-Muldu Road reserve, and will require the following actions that may affect the public during the construction and operational phases:

- closure of the JRLF;
- construction of a passive rail crossing where the rail spur line crosses Childs Road near its intersection with the Jondaryan-Muldu Road; and
- construction of a passive rail crossing where the rail spur line crosses the Jondaryan-Sabine Road near the entrance to the former JRLF.

The JRLF for the Mine is located at a siding loop near Jondaryan off the Western Rail Line. Trains are currently loaded with coal at the Mine by front end loaders from adjacent stock piles and transported by trucks travelling approximately 17 km from the Mine along the Jondaryan-Muldu Road to the JRLF. Since the release of the EIS for the original proposal, NAC has been assessing several options for product transportation.

As a result of this assessment, the preferred product transportation alternative is to construct a new 8 km rail spur and balloon loop from a junction with the Western Rail Line at Jondaryan travelling northeast to the western extremity of the MLA 50232 as depicted in **Figure 13–5**. The balloon loop will be equipped with a TLF involving automated remote loading facilities rated at approximately 3,000 t per hr. The TLF will operate on a seven day, 24 hr basis. Train operations will also occur on a seven day, 24 hr basis. The frequency of train movements for the revised Project will be similar in business hours and after hours.

Larger product volumes can be transferred via rolling stock in comparison to individually loaded trucks. The system improves efficiency because the product is handled once before transfer from the mine, compared to twice under the current arrangement where the JRLF is involved in the handling process. The product coal can be watered once to minimise dust during transit and no open stockpiles will not need to be managed at the TLF. The JRLF would be progressively decommissioned if the revised Project is implemented.

Track design

The preferred rail spur route branches off the Western Rail Line near the JRLF location and heads north crossing Sabine, Childs and McKays Roads. The rail spur then travels along the eastern side of Jondaryan-Muldu Road to MLA 50232's southwestern boundary. The rail spur consists of a single track to the start of the balloon loop whereby a turnout is proposed for the arrival track. Wide track centres are required to cater for the rail grading and earthwork batters.

At the main rail line junction, the track will be on a level grade from the Western Rail Line for approximately one kilometre. At this location, the rail line starts to rise to achieve a level of RL 392 m at Lagoon Creek. Lagoon Creek is an ephemeral creek and at times is subject to flooding. Therefore, the rail line is proposed to be 2 m above the existing surface level near Lagoon Creek. The radius at the junction with the Western Rail Line for the eastern connection will be a minimum of 550 m to cater for a maximum train speed of 80 km/h. The minimum radius on the rail loop and arrival track will be 300 m with a maximum speed of 25 km/h around the rail balloon loop.

The standard requirement for the rail corridor width will be a minimum of 20 m from the track centreline to the boundary fence and widened as required for earthwork batters in deep cuttings and high embankments. In some locations, the toe of the batter falls outside the 20 m offset from the track centreline to the fence. As a result, the boundary will be widened at these locations.

At this stage, there are no plans to upgrade the narrow gauge Western Rail Line to dual gauge. If the Western Rail Line is upgraded in the future to dual gauge, the rail spur and balloon loop could be upgraded to standard gauge subject to the preferred type of rolling stock. The Western Rail Line is not electrified, and therefore, there is no requirements for the rail spur and balloon loop to be electrified at this stage.

Track Construction

NAC is currently using Aurizon (formally known as QR National Pty Ltd) for its coal haulage and the rail movements of the proposed rail line will have to meet Aurizon standards with the following infrastructure attributes:

- train lengths of 700 m;
- track structure suitable for 20 t axle loads at 80 km/h; and
- grade limited to 2% to reduce earthworks and structure costs.

NAC's proposed rail spur will be constructed to meet Aurizon track type 60-3 where a standard track formation consists of:

- 600 mm sub-ballast capping layer;
- 250 mm nominal ballast depth from the underside of the sleeper to the top of the finished formation;
- concrete sleepers, spaced at 685 mm centres;
- continuously welded rail;
- 60 kg/m rail section; and
- Standard Pandrol e-clip (e2003), with associated rail pads and insulators.

Embankment bulk fill will be sourced from the Mine. Queensland Rail (QR) Ltd specifies that this material shall have a liquid limit not greater than 70% and a plasticity index not greater than 50%. The bulk fill material will have a California Bearing Ratio (CBR) > 30.

The following material will be used as bulk fill:

- free-draining material;
- dispersible clays; and
- decomposed granite.

Earthworks will be constructed to the latest QR standards for a non-electrified track. For the concept design, batter slopes are proposed at a slope of 1 in 2. This slope is subject to further geotechnical investigation at the detailed design phase. A nominal top 600 mm capping layer has been adopted in

accordance with the standard QR drawings. For flood mitigation, the edge of the earthworks will be no lower than the Q100 flood level.

Once all approvals are obtained an indicative timeframe for construction and commissioning is around two years in total. This period allows for:

- 12 to 15 months to construct the earthworks, assuming that bulk fill material is sourced and hauled from the mine site;
- three to four months to construct the track, assuming a ballast train will be used; and
- up to five months to install rail systems and the loading facility.

Associated Infrastructure

The loading of trains is proposed to be in an anti-clockwise direction around the rail loop and will involve the use of an overhead loading bin. The TLF will be located on a straight section of track on level grade. The orientation of the control room towards the north avoids facing the rising or setting sun. The loading rate of the bin will be approximately 3,000 t per hr.

Childs Road will remain open with a proposed at grade level crossing. An ALCAM Assessment has been undertaken for this proposed grade crossing. The ALCAM Assessment is provided in **Appendix G.8.4** which contains further detail on the appropriate level crossing measures required for this at grade crossing. As depicted in **Photograph 13-1**, Childs Road is a formed dirt road and would be classified as a local public road. In general, traffic using this road is infrequent and there is unrestricted alternate access into this area via the Jondaryan-Sabine Road.

Photograph 13-1 Childs Road at the rail crossing (view to the east)

It is also proposed to make McKays Road a no-through road by curtailing it on both sides of the rail spur. This road is not commonly used by the public. Alternate access to Jondaryan-Muldu Road will be available via the Jondaryan-Sabine Road. **Photograph 13-2** shows the view west along McKays Road.

Photograph 13-2 Western view along McKays Road proposed to be closed to through traffic

A passive level crossing on the bitumen sealed Jondaryan-Sabine Road near the existing JRLF may also be constructed since the road use is infrequent and seasonal. A similar passive level crossing is located nearby on the Western Rail Line.

Photograph 13-3 shows the western view and the approximate location of the proposed passive level crossing. The first power pole shows the approximate location of the proposed passive level crossing.

Photograph 13-3 Photograph 3-3 Western view along Jondaryan-Sabine Road

A continuous maintenance access road will be provided alongside the rail corridor. This arrangement is to enable access to signalling and trackside equipment and for train crews to inspect their trains.

Land Acquisition

NAC will initiate discussions on the preferred acquisition process with QR Limited at the appropriate time. Since the rail loop encroaches on MLA 50232, approval to subdivide and construct the rail infrastructure needs to be obtained by NAC prior to the rail corridor being leased to QR Limited or operated privately by NAC.

The management of the rail spur and balloon loop will be carried out under the provisions of the *Transportation Infrastructure Act 1994*. QR Limited's standard workplace health and safety and industrial rail management provisions will be adopted.

To minimise the property impact, the rail line corridor runs adjacent to the boundary with Jondaryan-Muldu Road until it reaches land owned by NAC where the track curves into the balloon loop and TLF. In total, one private property will be impacted by the rail line corridor and the land required for the rail corridor has been minimised in accordance with design standards. NAC continues to consult with the potentially affected landowner to ensure a satisfactory arrangement for land access is achieved.

13.7 Project construction phase

The project construction phase is expected to commence by 2015 after receiving the relevant Federal and State Government environmental and mining approvals. The construction phase for the revised Project will take approximately 26 months during which there will be fluctuations in actual transport requirements. All waste handling and transport will be conducted in accordance with an updated version of NAC's current Waste Management Plan.

The transportation activities of the construction phase of the revised Project will mainly involve the transport of infrastructure components such as, building materials, oil, fuel and mining equipment and workforce demand to revised Project site.

The revised Project at the peak construction stage on-site is expected to require up to 260 construction works at any given time. Mining and construction personnel will travel to and from the Project site based on their specific working arrangements.

The transport and workforce requirement during the peak construction phase (2016) are discussed in the following sections.

13.7.1 Construction working hours

Construction of the revised Project is proposed to be conducted generally between 6:00 am and 6:00 pm, Monday to Saturday, with Sunday available for overtime on specialist tasks. Certain critical path activities such as large concrete pours or commissioning of plant and equipment may require 24 hour operation. During the peak construction phase, the construction activity is estimated to be 12 hours a day, 6 days a week.

The construction phase peak hours in terms of traffic generation have been determined as being:

- 5:00 am to 6:00 am for the morning peak; and
- 6:00 pm to 7:00 pm for the afternoon peak.

13.7.2 Construction workforce traffic

No construction workforce camps will be located on-site during the construction phase of the revised Project. The construction workforces will reside in towns that surround the Project location. The construction workforce will fluctuate over the proposed construction period of 26 months.

For the traffic assessment purposes, the work case scenario of a maximum of 260 workers has been considered. As no construction workforce camps will be located on-site, it has been assumed that the workforce will use their own mode of transport to and from the construction site. However, it is anticipated that some construction workforce will travel to and from the construction site in groups based on their locality. It has been assumed conservatively that approximately 25% of the workforce will be picked-up and dropped-off at central points at key townships, such as Toowoomba, Oakey, Dalby and the surrounding regions.

The remaining 75% of the workforce is expected to travel to and from the construction site via private vehicles with approximately 20% of the workforce anticipated to car pool to site (which is consistent with current practices).

Public transport and cycling are not expected to occur due to the nature of the worksite and the location of the revised Project site relative to public transport and on road/off road cycling provisions. As a result, a total of 166 light vehicle trips are estimated to occur daily (i.e. 166 'into' the construction site during the morning peak period and 166 'out' of the construction site during the afternoon peak period .

As a result, the following workforce traffic generations have been estimated:

- am peak hour (5:00 am to 6:00 am) – 166 light vehicle 'into' the construction site; and
- pm peak hour (6:00 pm to 7:00 pm) – 166 light vehicles 'out' of the construction site.

The following commuting routes to access the revised Project site for the construction phase have been assumed:

- 45% are expected to travel to and from Toowoomba;
- 35% are expected to travel to and from the Jondaryan, Oakey and the surrounding district regions; and
- 20% are expected to travel to and from the Warwick, Goondiwindi, Kingaroy and surrounding district regions.

NAC will continue to implement a Fatigue Management Plan within its Safety and Health Management Systems (Section 31.2.02) with the proposed construction workforce to ensure that all individuals on-site are fit for work, thereby not compromising safety within the workforce. The procedure should be in line with Section 42(2)(c),(d)of the *Coal Mining Safety and Health Regulation 2001* and is intended to reduce the risk of mine workers becoming fatigues whilst travelling to and from work and whilst on the job. NAC's Fatigue Management Policy is located in **Appendix A.4**.

13.7.3 Construction equipment and materials

The construction phase of the revised Project will mainly involve the on-site transport of infrastructure components such as building materials and mining equipment. The construction phase will initially involve the construction of the realigned Jondaryan-Muldu Road.

The traffic movement generated during the peak construction phase for the revised Project are anticipated to be almost entirely associated with heavy vehicles movement for the delivery of construction material, the removal of waste and the delivery of equipment.

The concrete material for the revised Project is anticipated to be batched from local supply within the Toowoomba region. The road base (gravel) for the proposed realignment of Jondaryan- Muldu Road will be sourced within the Study area, hence no traffic movements are proposed to be generated for this material requirement.

Service vehicle movements to and from the revised Project site during the construction phase are expected to include postal deliveries, office supplies and domestic waste removals. Approximately 6 service vehicles (i.e., 3 light vehicles and 3 heavy vehicles) per day are expected during this phase of the revised Project. The service vehicle trips are expected to originate (from) and terminate (at) Oakey (40%) and Toowoomba (60%) and access the revised Project site via Jondaryan-Muldu Road.

The indicative types and quantities of construction materials required for the revised Project and the associated daily peak hour heavy vehicles traffic generation figures are summarised in **Table 13–7**.

Table 13–7 Peak construction phase – material and equipment traffic generation

Material/ Equipment	Estimated Quantity	Number of Transports Required[1] (over 26 months construction period)	Origin/ Destination	Daily Traffic Generation[2] (vpd)[3]
Steel	4,600 tonnes	200	Melbourne	2
Concrete	18,000 m^3	2000	Toowoomba, Oakey	8
Rail Track	8 km	43	Brisbane, NSW	2
Sleepers	12,320 units	122	Brisbane, NSW	6
Refabricated buildings	200 m^2	40	Brisbane	2
Water Pipeline	28 km	14	Brisbane	2
Conveyor belting	11 km	135	Victoria,NSW	2
Platework	ROM, Surge and TLF bins	78	Muswellbrook, NSW	2
Construction Equipment	Various	185	Various	2
TOTAL trips (maximum trips)		**2817**		**28**

[1] Assuming - standard semi-trailer payload of 23t

[2] Assuming - 6 working days a week, 26 months construction period

[3] Vehicles per day

[4] Assuming one round trip = 2vpd (to include both loaded and empty trips)

The key construction materials are expected to account for approximately 90% of construction deliveries to the revised Project during the total construction period. Based on a standard semi-trailer notional payload of 23 t, these materials outlined within **Table 13–7** contribute approximately 2,817 vehicle loads during the construction phase. This equates to an average daily traffic volume of 28 heavy vehicles per day (i.e. 14 loaded and 14 empty).

Most equipment involved with general construction will be sourced from external contractors and is likely to involve various types of earthmoving equipment, cranes, water trucks and an on-site concrete batching plant. The mining equipment totals 185 trips which will be carried out over the construction period and partially over the operational life of the revised Project. The mining equipment traffic generation is expected to be a maximum of two or three vehicle trips on occasional days.

It is estimated that the majority of the materials carried by articulated vehicles, including steel and plant items, will be hauled to the revised Project site from Brisbane and surrounding areas via the Warrego Highway to the realigned Jondaryan-Muldu Road.

13.7.4 Heavy vehicles and oversized vehicles

An estimated 60 oversize loads will be required to deliver construction equipment to the revised Project site throughout the construction period. The origin of these loads is likely to be Brisbane. Standard permit approval processes and arrangements for these deliveries, such as escorting vehicles will apply on an as required basis.

13.7.5 Hazardous and dangerous materials

The transport of any hazardous or dangerous materials during the construction phase of the revised Project will be undertaken in accordance with the *Australian Code for the Transport of Dangerous Goods by Road and Rail, Seventh edition (incorporating Corrigendum 1) 2011.*

13.7.6 Construction phase traffic

To ensure the traffic assessment is robust, it has been assumed that the traffic generated by the revised Project during the peak periods will exit the revised Project site within the nominated peak hours.

The total traffic demand and distribution at key intersections and road sections within close proximity to the revised Project site for the peak construction phase (2016) during peak periods is tabulated within **Table 13–8** and illustrated within **Figure 13–6** and **Figure 13–7**.

The resultant traffic volumes for the peak construction (2016) phase are comprised of the following components:

- 2016 peak construction traffic demand based on workforce, material and equipment traffic generation; and
- "Nominal" demand includes an additional 20 (two-way) movements during the peak periods to ensure the road network can accommodate any additional trip variation generated by the revised Project.

Table 13–8 Total traffic demand for key road sections during peak construction (2016) phase

Road	Segment	Light vehicles		Heavy Vehicles		TOTAL daily trips (LV and HV)
		AM Peak hour (vph)	PM Peak hour (vph)	AM Peak hour (vph)	PM Peak hour (vph)	
Warrego Highway	East of Oakey	86	86	50	46	268
	Oakey and Jondaryan	6	6	44	44	100
	West of Jondaryan	8	8	2	2	20
Oakey Connection Road	East of Oakey	83	83	0	0	166
	West of Oakey	0	0	0	0	0
Jondaryan Sabine Road	At Oakey	53	53	42	42	190
Oakey-Cooyar Road	At Cherrys Road	108	108	0	0	216
Pechey-Maclagan Road	North of the Project Site	8	8	0	0	16
Cherrys Road	Adjacent to MIA	108	108	0	0	216

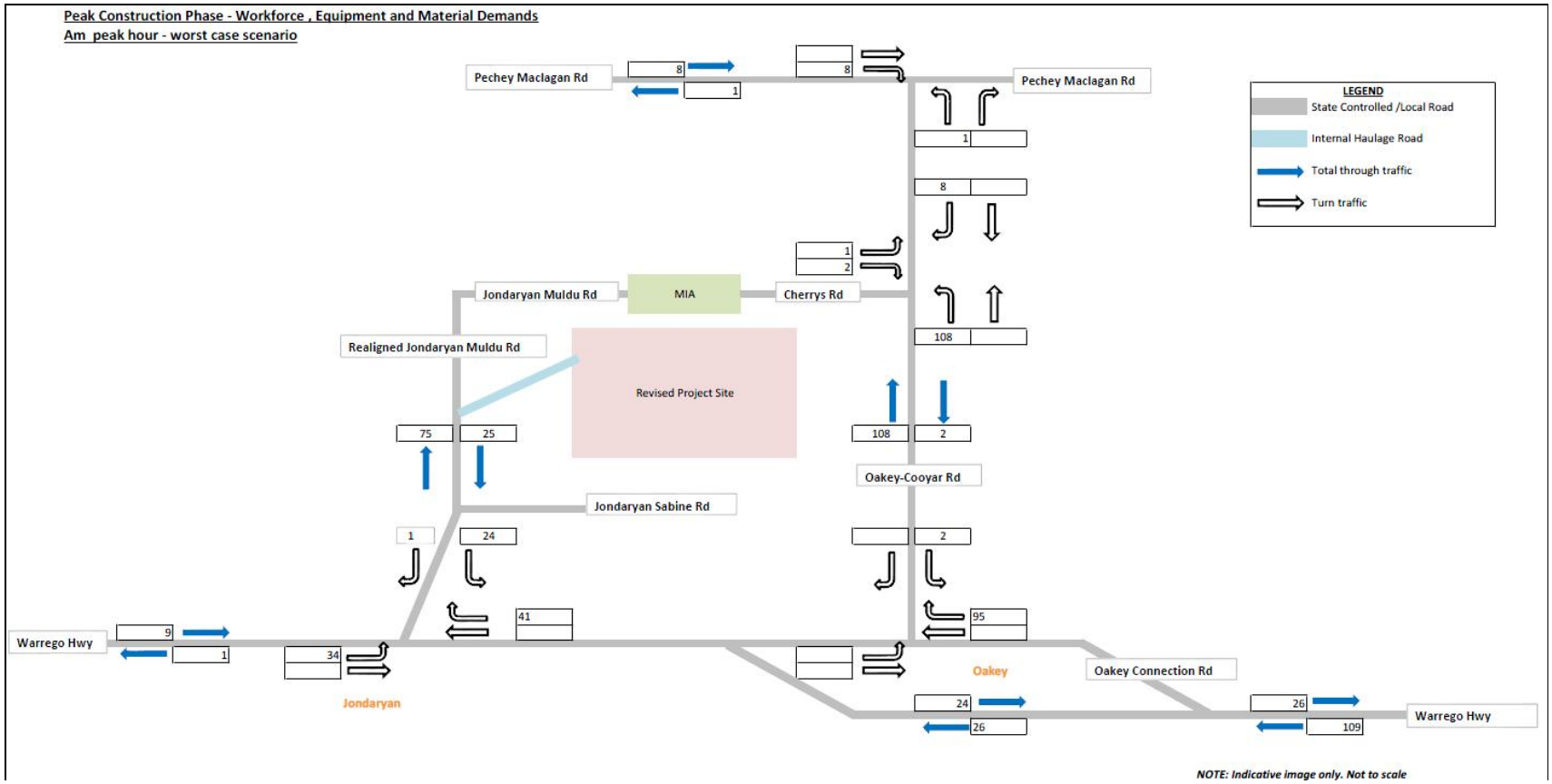


Figure 13–6 Am peak period traffic demand during peak construction (2016) phase only

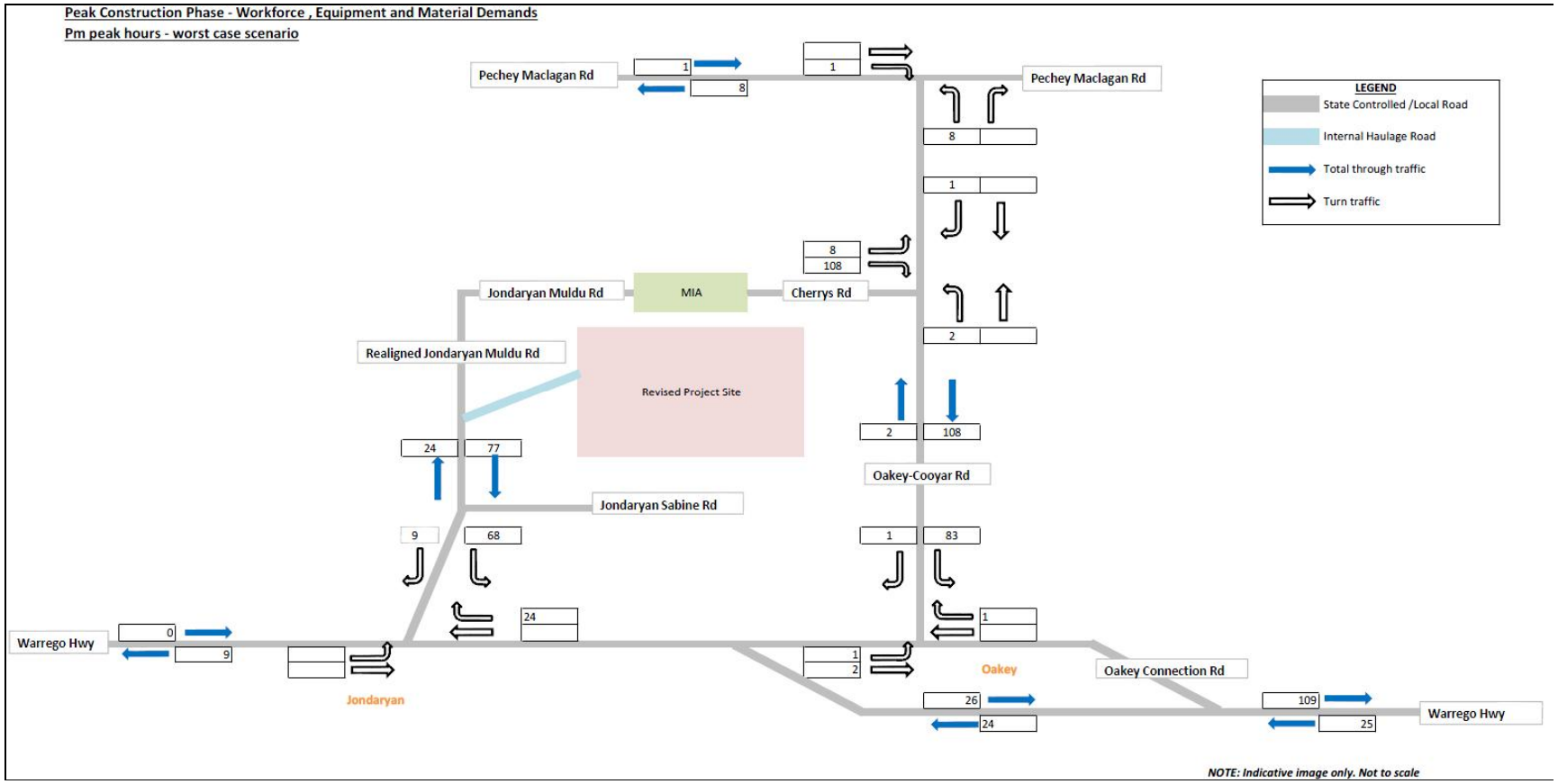


Figure 13–7 Pm peak period traffic demand during peak construction (2016) phase only

13.8 Project operation phase

The operational phase of the revised Project is expected to commence at the end of the construction phase by April 2017 and is expected to extend until 2029.

The operational phase of the revised Project will involve the periodic transportation of general supplies such as delivery of consumables, fuel, removal of water and the staff transportation. The occasional transport of new and replacement mining equipment will also occur throughout the life of the revised Project. Mining personnel will travel to and from the revised Project site based on their specific working arrangements.

Majority of the product coal will be transported via rail with a small portion of product (approximately 0.20 Mtpa) will be transported by road for domestic demand. The revised Project's product coal transport requirements in detail within **Chapter 3, Section 3**.

13.8.1 Operation working hours

Mining activities will be conducted on a 12 hour shift (7:00 am to 7:00 pm), 6 days to 7 days, 24 hour basis depending on the mining schedule and type of mining equipment utilisation. Pre-starts meeting will be held at 6:35 am for the morning shift and 6:35 pm for the evening shift, Certain mining related activities such as blasting will only be undertaken during daylight hours (not on Sundays or public holidays). The CHPP activities will be conducted on a 7 day, 24 hours basis.

Subsequently, the peak hours for the traffic impact assessment have been determined as being:

- 5:30 am to 6:30 am for morning peak; and
- 5:30 pm to 6:30 pm for afternoon/evening peak.

13.8.2 Operation workforce traffic

The revised Project will require approximately 435 people for its operational phase. The mine currently employs approximately 300 personnel. Therefore, an additional 135 people will need to be employed to meet the revised 7.5 Mtpa production rate. Workforce numbers will steadily rise during the life of the revised Project to allow the planned production rate to be maintained.

The new employees will either be sourced local or further abroad. New workforce personnel moving to the region for employments will reside within the key regional centres such as Toowoomba, Oakey, Jondaryan and the surrounding regions.

As no on-site accommodation facilities are provided for the operation workforce, it has been assumed that the operation workforce will use their own mode of transport to and from the revised Project site. It is anticipated that the 20% of the proposed operation workforce will car pool to the revised Project site which is similar to current practice.

Public transport and cycling are not expected to occur due to the nature of the worksite and the location of the Study area relative to public transport and on road/off road cycling provisions. As a result, a total of 111 light vehicle trips are estimated to occur daily (i.e. 111 'into' the revised Project

site during the morning peak period and 111 'out' of the revised Project site during the afternoon peak period.

As the construction workforce arrival and departure times will be staggered by at least half an hour in order to minimise traffic impact and other interactions, the actual peak hour traffic is expected to be 66% of the total traffic generation.

As a result, the following workforce traffic generations have been estimated:

- am peak hour (5:30 am to 6:30 am) – 74 light vehicle 'into' the construction site; and
- pm peak hour (5:30 pm to 6:30 pm) – 74 light vehicles 'out' of the construction site.

The following commuting routes to access the revised Project site for the construction phase have been assumed:

- 45% are expected to travel to and from Toowoomba;
- 35% are expected to travel to and from the Jondaryan, Oakey and the surrounding district regions; and
- 20% are expected to travel to and from the Warwick, Goondiwindi, Kingaroy and surrounding district regions.

NAC will continue adopting the Fatigue Management Plans that is currently being practised by NAC within its Safety and Health Management Systems (Section 31.2.02) with the proposed 130 additional operation workforce to ensure that all individuals' present on-site are fit for work, thereby not compromising safety within the workforce. The procedure should be in line with Section 42(2)(c),(d) of the *Coal Mining Safety and Health Regulation 2001* and is intended to reduce the risk of mineworkers becoming fatigues whilst travelling to and from work and whilst on the job.

13.8.3 Operation equipment and materials

The expected type and quantity of heavy vehicle movement once the revised Project becomes operational is summarised within **Table 13–9**.

Table 13–9 Operation phase - material and equipment traffic generation

Supply	Coal Annual Production (Mtpa[1])	Equivalent Heavy Vehicle Daily Traffic at Maximum Capacity[7] (vpd)
	7.5 Mtpa	
Fuel (MLpa[2])	49	4
Lubricant Oils (KLpa[3])	600	1
Caustic Soda (Lpa[4])	700-900	1
Sodium Hypochlorite(Lpa)	3,600 -4,160	2
Hypersperse SI300UL(Lpa)	610	1
Acid (Sulphuric Acid) (Lpa)	520	1
Batteries (wet - containing acid)	160	1
Others[5] : Coolant (KLpa) Degreaser (KLpa) Grease (tpa[6]) Detergent Truckwash(Lpa)	75 11 85 1,500	1
TOTAL PEAK HOUR trips (maximum trips)		**12**

[1] Mega-tonnes per annum

[2] Mega-litres per annum

[3] Kilo-litres per annum

[4] Litres per annum

[5] Litres per annum

[6] These small quantities will be delivered once a month on one truck to revised Project site

[7] Assuming 6 days per week, 24 days a month delivery and 23t notional capacity of the delivery vehicle

It is therefore estimated that there will be a maximum of 12 two-way heavy vehicle movements associated with the revised Project during a typical operational day. Assuming a 0.10 peak hour factor, there will be a total of 2 two-way heavy vehicle movement during a typical operation peak hour period. Note that not all supply deliveries will occur daily, therefore the forecast of 12 vehicles per day is considered to be conservative. The delivery route for the revised Project equipment and supplies during the operational phase will be mainly along the Warrego Highway travelling west and along the diverted Jondaryan-Muldu Road.

13.8.4 Operation phase coal production

Road coal transportation during the operational phase of the revised Project will mainly involve the haulage of product coal by a licensed contractor. The estimated annual 0.20 Mtpa domestic demand

will equate to approximately 6 two-way heavy vehicle movements during a typical operation peak hour periods. This is based on the assumption that that each delivery vehicle has a 23 tonne capacity, operational activities occur 6 days a week with 52 weeks per year and the standard 0.10 peak hour factor. The road coal transportation will mainly be delivered via the realigned Jondaryan-Muldu toad and Warrego Highway.

13.8.5 Operation phase traffic

The total traffic demand and distribution at key intersections and road sections within close proximity to the revised Project for the operation (2017) phase during peak periods is tabulated within **Table 13–10** and illustrated within **Figure 13–8**.

The resultant peak hour traffic volumes for the operation (2017) phase are comprised of the following components:

- 2017 operation phase traffic demand based on workforce, material and equipment traffic generation;
- "Road coal demand" for approximately 0.2 Mtpa annually which equates to 6 two-way heavy vehicle movement; and
- "Nominal" demand includes an additional 20 (two-way) movements during the peak periods to ensure the road network can accommodate any additional trip variation generated by the revised Project.

Table 13–10 Total traffic demand for key road sections during peak operation (2017) phase

Road	Segment	Light vehicles	Heavy Vehicles	TOTAL daily trips (LV and HV)
		Peak hours (vph)	Peak hours (vph)	
Warrego Highway	East of Oakey	82	24	106
	Oakey and Jondaryan	6	30	36
	West of Jondaryan	8	0	8
Oakey Connection Road	East of Oakey	76	0	76
	West of Oakey	0	0	0
Jondaryan Sabine Road	At Oakey	54	24	78
Oakey-Cooyar Road	At Cherrys Road	100	0	100
Pechey-Maclagan Road	North of the revised Project site	8	0	8
Cherrys Road	Adjacent to MIA	100	0	100

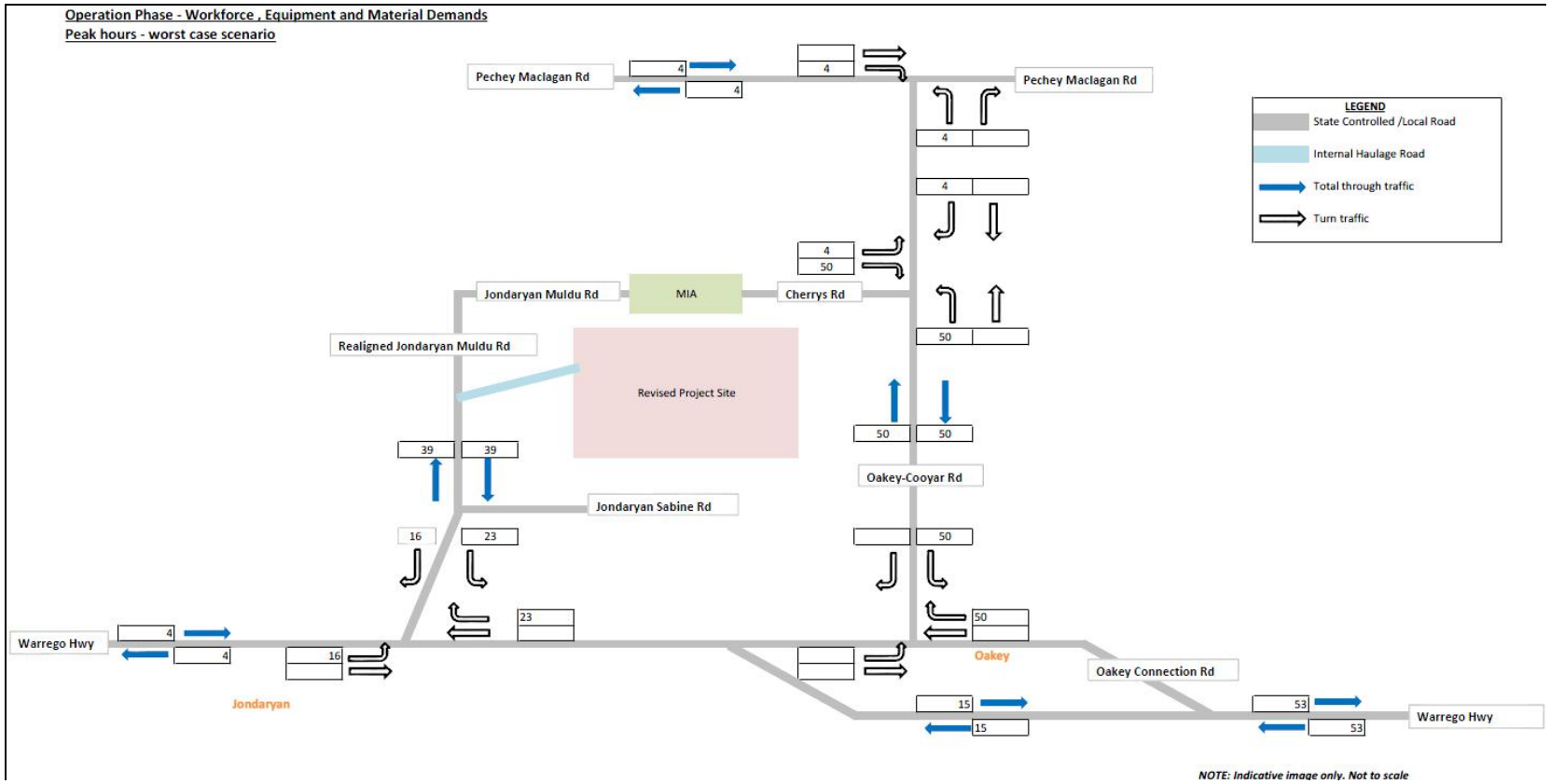


Figure 13–8 Am and pm peak period traffic demand during operation (2017) phase only

13.8.6 Decommission phase traffic

Transport for the decommissioning phase of the revised Project will be minor compared peak construction (2016) phase and operation (2017) phase.

Transportation of materials off-site during the decommissioning phase of the revised Project will involve the removal of infrastructure for re-sale or recycling and the removal of waste materials by licensed waste contractors. A detailed decommissioning/mine closure plan will be developed at least five years prior to the cessation of mining activities.

Personnel will travel to and from the revised Project site based on their specific working arrangements, which are expected to be mainly day time hours only. It is expected that the number of people travelling to and from the revised Project site during the decommissioning phase will be less than 50.

13.9 Impact assessments

13.9.1 Assessment scenarios

The traffic impact assessment has considered the following assessment scenarios:

- Base year traffic volumes;
- Peak construction (2016);
- Operation year (2017); and
- Ten year horizon (2027).

13.9.2 Assessment peak periods

The revised Project (construction and operation phase) is anticipated to generate peak demands between 5:00 am to 6:00 am (morning) and 6:00 pm to 7:00 pm (afternoon). Review of the traffic data provided by TMR between the 6:00 am and 6:15 pm indicates that the intersection peak periods in the vicinity of the revised Project generally occur at 8.15 am to 9.15 am (morning peak) and 4.00 pm to 5.00 pm (afternoon peak).

For the purposes of this assessment, the traffic data between the hours of 6:00 am to 7:00 am and 5:15 pm to 6:15 pm have been adopted as the background traffic during the anticipated peak time for the revised Project (5:00 am to 6:00 am and 6:00 pm to 7:00 pm). The assumption is considered to be conservative as the background traffic during the sourced data will be higher than the anticipated peak times and will provide NAC flexibility in shift scheduling.

13.9.3 Assessment network volumes

The assessed peak hour traffic volumes are based on the revised Project traffic generation and distribution identified in **Section 13.7.6** and **Section 13.8.5** for the peak construction (2016) phase, operation (2017) phase and ten year horizon (2027) phase.

13.10 Traffic impacts on existing links

13.10.1 Performance criteria

Based on the criteria in **Section 13.5.1** and the daily traffic volumes sourced from TMR (2012 count data) and TRC (2011 count data), the estimated LoS levels for the peak construction phase (2016), operation phase (2017) and ten year horizon phase (2027) are summarised in **Table 13–11**.

The additional traffic generated by the revised Project during the construction phase and operation phase is estimated at a maximum of approximately 360 and 240 vehicles per day respectively. The impact of the additional traffic does not impact on the existing LoS levels on the surrounding roads, which are forecasted to operate within the acceptable threshold of no worse than LoS D for rural areas.

Table 13–11 LoS for key roads during the peak construction (2016) phase, operation (2017) phase and the ten year horizon (2027) phase

Road Name	Type	Section	2012 Background traffic1 (veh/day)	LoS[2]	Project traffic only (veh/day)[3]		Overall traffic volume (veh/day) [4]	LoS[2]
					Heavy veh	Light veh		
Peak construction (2016) phase								
Warrego Highway (Toowoomba-Dalby)	Rural	East of Oakey	9,700	**C**	50	170	9,920	C
		West of Oakey (at Jondaryan)	6,170	**B**	50	10	6,230	B
		West of Jondaryan	6,130	**B**	50	10	6,190	B
Oakey-Cooyar Road	Rural	250m north of Warrego Highway	3,520	**A**	0	170	3,690	A
Oakey Connection Road	Rural	600m North of Railway crossing	1,530	**A**	0	80	1,610	A
Pechey-Maclagan Road	Rural	North of Oakey-Cooyar Road	350	**A**	0	20	370	A
Jondaryan-Sabin Road	Rural	At the proximity of Jondaryan	810	**A**	50	80	940	A
Start of operation (2017) phase								
Warrego Highway (Toowoomba-Dalby)	Rural	East of Oakey	10,040	**C**	30	130	10,200	C
		West of Oakey (at Jondaryan)	6,390	**B**	30	10	6,430	B
		West of Jondaryan	6,340	**B**	30	10	6,380	B
Oakey-Cooyar Road	Rural	250m north of Warrego Highway	3,720	**A**	0	110	3,830	A
Oakey Connection Road	Rural	600m North of Railway crossing	1,600	**A**	0	110	1,710	A
Pechey-Maclagan Road	Rural	North of Oakey-Cooyar Road	350	**A**	0	20	370	A
Jondaryan-Sabin Road	Rural	At the proximity of Jondaryan	810	**A**	30	60	900	A
Ten year horizon (2027) phase								
Warrego Highway (Toowoomba-Dalby)	Rural	East of Oakey	14,160	**D**	30	130	14,320	D
		West of Oakey (at Jondaryan)	9,010	**C**	30	10	9,050	C
		West of Jondaryan	8,950	**C**	30	10	8,990	C
Oakey-Cooyar Road	Rural	250m north of Warrego Highway	6,420	**B**	0	110	6,530	B
Oakey Connection Road	Rural	600m North of Railway crossing	2,530	**A**	0	110	2,640	A
Pechey-Maclagan Road	Rural	North of Oakey-Cooyar Road	350	**A**	0	20	370	A
Jondaryan-Sabine Road	Rural	At the proximity of Jondaryan	810	**A**	30	60	900	A

[1] 2012 background data was based on existing 2011 counts factored up with the agreed cumulative annual traffic growth

[2] 0<LoS A <4,900, 4,900<LoS B<7,800, 7,800<LoS C<11,900, 11,900<LoS D<18,300, 18,300<LoS E<32,000

[3] Rounded to the nearest 10 trips (or a nominal sum of 10)

[4] Calculated as"backgound traffic + peak construction /operation traffic + nominal trips(20)"

13.11 Traffic impacts on the existing intersections

2012 intersection count data is only available for the Warrego Highway/Jondaryan-Sabine Road intersection between 6:00 pm and 6:15 pm. No other intersection data counts are available for key intersections within close proximity to the revised Project site from either TMR or Council. Therefore, for the purposes of this assessment, a SIDRA intersection analysis can only be undertaken for the Warrego Highway/Jondaryan-Sabine Road intersection. The following sections outline the performance of the intersection during the peak construction (2016) phase, operation (2017) phase and ten year horizon (2027) phase with and without the revised Project traffic demands.

13.11.1 Performance criteria

The operation for each intersection has been analysed using SIDRA 5 intersection analysis tool. This program assesses the operation of the intersection based on inputs relating to the layout and geometry of the intersection and traffic volumes. The key performance indicator for intersection is the Degree of Saturation (DoS) defined as the ratio of demand to available capacity for the most critical movement at the intersection.

The GARID guidelines define the following standard DoS thresholds:

- Priority- controlled intersection 0.80
- Roundabout 0.85
- Signalised intersections 0.90

The guidelines also notes that a DoS exceeding these thresholds indicates that an intersection is nearing its practical capacity and upgrades works may be required. If the DoS is above the threshold values, users of the intersections will experience increasing delays and queues.

Intersection delays are assessed based on the intersection LoS. Where the LoS levels of an approach is D or greater, users of the intersection will experience increased delays and queues.

13.11.2 Intersection layout

The existing layout of the Warrego Highway/Jondaryan-Sabine Road intersection and the length of the turning lanes is illustrated in **Figure 13–9**. There is an at-grade level crossing located 15 m north of the intersection.

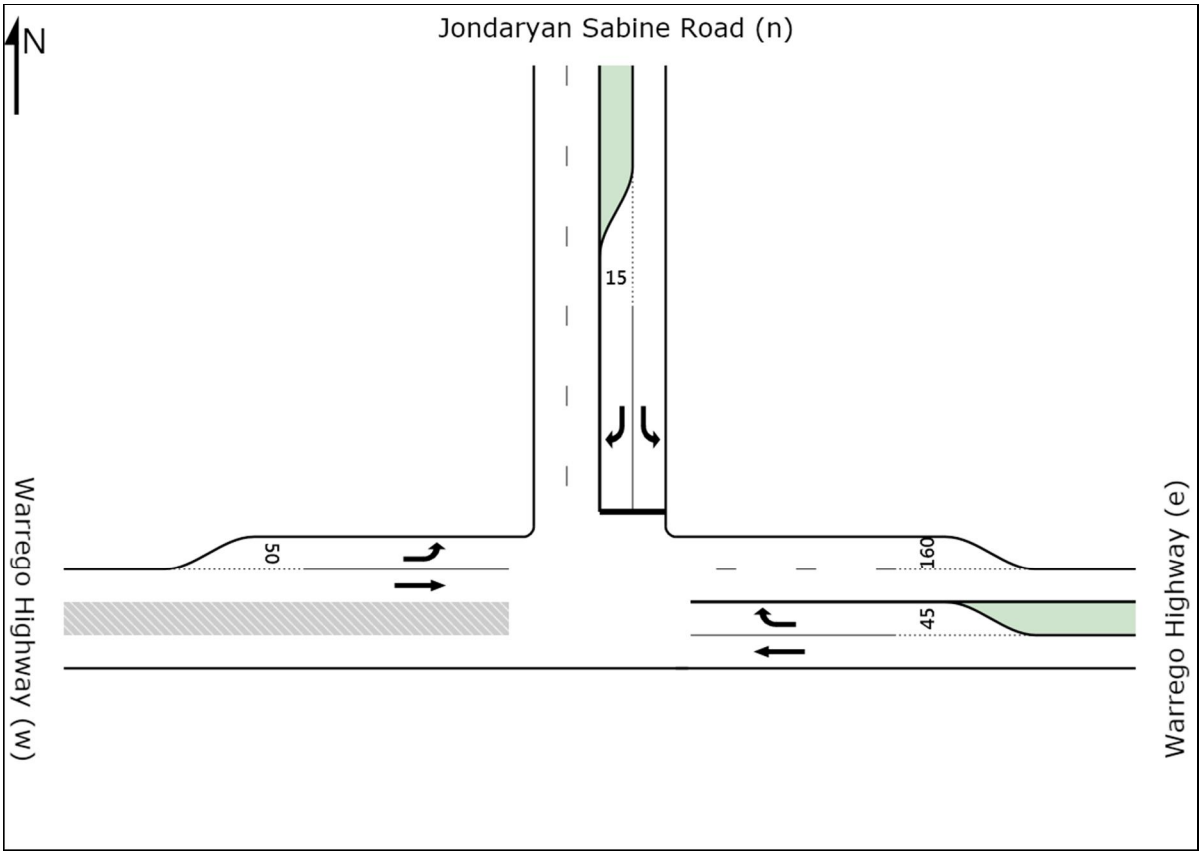


Figure 13–9 Existing intersection layout- Warrego Highway/Jondaryan Sabine Road

13.11.3 Warrego Highway/Jondaryan Sabine Road

The Warrego Highway/Jondaryan-Sabine Road intersection has been analysed using the SIDRA Intersection V5.1 computer package for intersection analysis. The performance of the intersection for the base case (2012 traffic volumes), the peak construction (2016) phase, the operation (2017) phase and the ten year horizon (2027) phase are summarised in **Table 13–12**.

The assessment considers two options for each scenario which are as follows:

- without revised project traffic demands (background traffic adjusted with the nominated growth rates as per **Section 13.5.5**); and
- with revised Project traffic demands.

The outputs of the SIDRA runs are attached in **Appendix G.8.3**.

Table 13–12: SIDRA summary results – Warrego Highway/Jondaryan Sabine Road

Intersection	Control	Peak period	Traffic volumes (veh/h)	Max DoS[1]	Average delay (sec)	Maximum 95th percentile queue length[2] (metres)
Base case (2012)						
Existing conditions	Give Way	am	354	0.130	1.2	1
		pm	311	0.143	2.6	2
Peak construction period (2016)						
Without revised Project	Give Way	am	453	0.167	1.1	1
		pm	583	0.185	2.3	5
With revised Project	Give Way	am	558	0.167	3.2	3
		pm	689	0.254	5.1	9
Completion year (2017)						
Without revised Project	Give Way	am	480	0.178	1.1	1
		pm	620	0.196	2.4	6
With revised Project	Give Way	am	562	0.178	3.5	5
		pm	702	0.372	5.2	14
Ten year horizon (2027)						
Without revised Project	Give Way	am	896	0.334	1.4	3
		pm	1140	1.00	7.4	37
With revised Project	Give Way	am	978	0.652	6.1	23
		pm	1222	1.00	7.6	37

[1] The Degree of Saturation (DoS) represents the ratio of demand to available capacity for the most critical movement at the intersection. A DoS of 0.90 represents a desirable maximum for acceptable operation of signalised intersection and roundabouts. For priority intersections a DoS above 0.80 indicates that more formal control is warranted.
[2] Maximum 95th percentile queue length for intersection.

The results of the SIDRA testing for the intersection capacity impacts show that the Warrego Highway/Jondaryan-Sabine Road intersection would perform within the acceptable range of DoS, delays and queues for the peak construction (2016) phase and the operation (2017) phase.

By 2027, the DoS, delays, queues and LoS at the intersection during the pm peak period would be unacceptable for the base case (background traffic without revised Project traffic demand).

The problem movement would be the right turn movement from Jondaryan-Sabine Road to Warrego Highway which would operate at a LoS F in the pm peak only. The intersection starts performing unsatisfactorily by 2021.

The additional traffic generated during the ten year horizon (2027) phase would have no material impact on the operation of the Warrego Highway/Jondaryan-Sabine Road intersection.

Based on the analysis undertaken, the Warrego Highway/Jondaryan-Sabine Road intersection as currently planned would operate outside DMR's standard DoS thresholds in 2027 irrespective of the additional development traffic.

13.11.4 Further intersection analysis

Further analysis have been undertaken to assess the operation of the intersection during the ten year horizon (2027) phase. As outlined within **Section 13.11.3**, the performance of the intersection becomes unacceptable by 2021 for the base case scenario with the right turn movement from Jondaryan-Sabine Road to Warrego Highway performing unsatisfactorily.

As the intersection is located 15 m south of the existing level crossing, the right turn capacity at the Jondaryan-Sabine Road approach is restricted. With the increase of background traffic along Warrego Highway at TMR's nominated 3.5% per annum and the proposed increase in heavy vehicles movement at this intersection during the construction and operations stage, a signalised control option was considered as a possible intersection upgrade.

The proposed intersection configuration changes are illustrated in **Figure 13–10**.

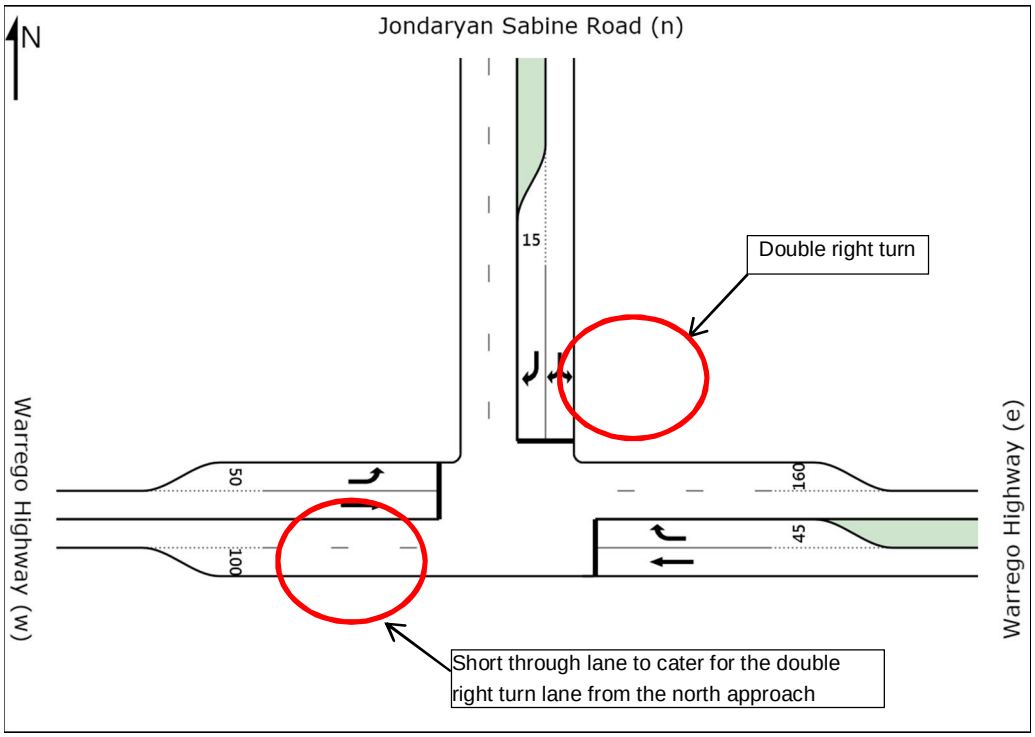


Figure 13–10 Revised intersection layout – Warrego Highway/Jondaryan Sabine Road

The proposed revised intersection configuration has been analysed using the SIDRA Intersection V5.1 computer package for intersection analysis. The performance of the intersection of the revised intersection design are summarised in **Table 13–13**.

Table 13–13: SIDRA summary for further intersection analysis

Intersection	Control	Peak period	Traffic volumes (veh/h)	Max DoS[1]	Average delay (sec)	Maximum 95th percentile queue length[2] (metres)
Further Analysis - Ten year horizon (2027)						
With revised Project	Signalised	am	978	0.835	13.5	86
		pm	1222	0.671	9.3	78

[1] The Degree of Saturation (DoS) represents the ratio of demand to available capacity for the most critical movement at the intersection. A DoS of 0.90 represents a desirable maximum for acceptable operation of signalised intersection and roundabouts. For priority intersections a DoS above 0.80 indicates that more formal control is warranted.
[2] Maximum 95th percentile queue length for intersection.

The results of the SIDRA testing for the intersection capacity impacts show that the Warrego Highway/Jondaryan-Sabine Road intersection would perform within the acceptable range of DoS, delays and queues for the ten year horizon phase (2027) under a signalised control and a revised layout as shown in **Figure 13–10**.

Further consideration should also be given to coordinating the intersection signal phasing with the existing active level crossing signals to ensure that there is never a conflict between the traffic lights and level crossing warning.

Detailed intersection assessment will be undertaken during the preliminary design phase of the revised Project when the traffic demand and other infrastructures are confirmed through the EIS process. Such an assessment would include completing any necessary traffic counts at intersections. NAC will ensure that all road intersections required for the revised Project are adequate to safely cater for the construction and operational traffic volumes. However, given that intersection as currently planned would operate outside DMR's standard DoS thresholds by 2021 irrespective of the additional development traffic, TMR and TRC should take an active role in consultation with NAC in determining the appropriate intersection design.

13.12 Other traffic related impacts

13.12.1 Impacts on school bus routes

School bus service (S24) will be directly affected by the revised Project, as outlined within **Figure 13–2**. The affected school bus route will need to be gradually relocated to the proposed new access road to Acland once the revised Project enters into the construction and operation phase.

Due to the small increase in traffic movements regenerated by the revised Project during the construction and operation phase, no significant impacts are anticipated to the operation and safety of school bus services within close proximity to the revised Project.

13.12.2 Impact on access to Acland

Table 13–6 outlines the roads that are directly impacted by the revised Project within Acland. Access to Acland via Oakey-Cooyar Road will be maintained at all times during the revised Project's construction and operation phase. The local community will be adequately notified of the proposed changes to access and the proposed road closures during the construction and operation phase.

13.12.3 Impacts on train level crossing

There are four key level crossings that will be impacted by the traffic movements generated by the revised Project during the construction and operation phase.

A detailed Australian Level Crossing Assessment Model (ALCAM) has been undertaken to assess the four key level crossings. The ALCAM report attached within **Appendix G.8.4** provides a detailed analysis of the key level crossings, the safety assessment undertaken, the expected outcomes of the ALCAM assessment, best practice requirements and mitigation measures that should be undertaken in consultation with the relevant road and rail authorities.

The ALCAM report outlines the key findings of the level crossing assessment undertaken on the key level crossings located within close proximity to the revised Project site. NAC will ensure that appropriate discussions are undertaken with the relevant road and rail authorities to ensure an appropriate mitigation measures are implemented based on the proposed design considerations outlined within the ALCAM report.

Table 13–6 outlines the roads that are directly impacted by the proposed rail spur infrastructure. Advance warnings signs and alternate access routes will be installed at key points within the road network to prevent public access to the rail corridor and to maintain a safe distance between the local roads and the road corridor.

13.13 Mitigation measures

13.13.1 Peak construction phase mitigation measures

NAC will implement the following mitigation measures throughout the revised Project's construction phase to minimise the impact of traffic movements.

- Working hour arrangements will be modified and haulage tasks avoided during peak traffic periods and school drop-off and pick-up times.
- Established truck routes and arterial roads will be used for the haulage of construction materials and spoil in order to minimise truck traffic on local roads.
- Construction works will be staged to minimise traffic congestion effects.
- Traffic conditions during the construction period will be monitored in order to identify and address any negative impacts.
- The local community will be adequately notified about proposed changes to local traffic conditions due to construction activities, including the provision of advanced notice, clear signage of changed traffic conditions and as required, traffic control personnel.

- Prior to the commencement of any roadwork, bus operators and the local community will be notified about potential delays or disruptions to school bus services and other travel arrangements.
- Traffic control measures designed for the safe movement of vehicles, pedestrians and cyclists accessing the residential properties in the vicinity of the revised Project site will be provided.
- Provide measures to reduce the likelihood of product spill through covering loads and washing down vehicles prior to departure from the construction site.
- Adequate on-site parking will be provided to accommodate for employee vehicles.
- At least one lane will be open for traffic at any time near the construction activities to ensure traffic flow.
- Adequate consultation is undertaken with the appropriate regulatory authorities.
- Access to Acland will be maintained at all times via Oakey-Cooyar Road.

13.13.2 Operational phase mitigation measures

The traffic impact of the operation phase on the surrounding road network will be in the order of 240 vehicles per day (222 light vehicles and 18 heavy vehicles per day). Generally, similar mitigation measures proposed for the construction phase of the revised Project will be necessary to limit the impact of light and heavy vehicles trips on the surrounding road network. NAC will implement the following mitigation measures throughout the operational phase to minimise the impact of traffic movements:

- Working hour arrangements will be modified and haulage tasks avoided during peak traffic periods and school drop-off and pick-up times.
- Established haul routes and arterial roads will be used for coal transportation to minimise traffic on local roads.
- Traffic conditions during the operational phase will be monitored in order to identify and address any negative impacts.
- Local communities will be adequately notified about proposed changes to local traffic conditions during the operational phase, including the provision of advanced notice, clear signage of changed traffic conditions, and as required, traffic control personnel.
- Traffic control measures designed for the safe movement of vehicles, pedestrians and cyclists accessing the revised Project site will be provided.
- Adequate on-site parking will be provided to accommodate employee vehicles.
- Access to Acland will be maintained at all times via Oakey-Cooyar Road.
- Adequate consultation is undertaken with the appropriate regulatory authorities.

13.14 Conclusion

The traffic assessment examined potential traffic impacts from the revised Project, in terms of its construction and operational phases, which include:

- increased vehicle movements on the existing road network associated with the revised Project workforce;
- materials supply during the construction and operational phases; and
- altered traffic patterns and journey times resulting from permanent road relocations.

The traffic assessment found that both the construction and operational phases are not expected to have a significant impact on traffic operations on any of the key road links, with the LoS for each phase estimated to remain unchanged for each road section in comparison to the background traffic volumes. During detailed construction planning, Traffic Control Plans will be prepared to safely manage road works and minimise disruption to traffic during construction.

Detailed intersection assessment should be undertaken during the preliminary design phase of the revised Project when the traffic demand and other infrastructures are confirmed through the EIS process. NAC will ensure that all road intersections required for the revised Project are adequate to safely cater for the construction and operational traffic volumes. However, given that intersection as currently planned would operate outside DMR's standard DoS thresholds in 2027 irrespective of the additional development traffic, TMR and TRC should take an active role in consultation with NAC in determining the appropriate intersection design. One school bus routes (S24) affected by the revised Project will need to be notified about the revised access to Acland township and appropriate rerouting should be considered.

The ALCAM Report outlines the key findings of the level crossing assessment undertaken on the key level crossings located within close proximity to the revised Project site. NAC will ensure that appropriate discussions are undertaken with the relevant road and rail authorities to ensure an appropriate mitigation measures are implemented based on the proposed design considerations outlined within the ALCAM Report.

Recommended mitigation measures include scheduling tasks outside peak traffic periods, conducting materials haulage on established truck and arterial routes, staging of construction works to minimise congestion, notification and consultation as appropriate, implementation of local traffic control measures, provision of adequate parking and utilisation of the private (internal) haul road.

13.15 Summary of mitigation measures and commitments

Table 13–14 :Summary of mitigation measures and commitments

Project Phase	Mitigation Measures and Commitments
Peak Construction (2016) phase	■ Working hour arrangements will be modified and haulage tasks avoided during peak traffic periods and school drop-off and pick-up times. ■ Established truck routes and arterial roads will be used for the haulage of construction materials and spoil in order to minimise truck traffic on local roads. ■ Construction works will be staged to minimise traffic congestion effects. ■ Traffic conditions during the construction period will be monitored in order to identify and address any negative impacts. ■ The local community will be adequately notified about proposed changes to local traffic conditions due to construction activities, including the provision of advanced notice, clear signage of changed traffic conditions and as required, traffic control personnel. ■ Prior to the commencement of any roadwork, bus operators and the local community will be notified about potential delays or disruptions to school bus services and other travel arrangements. ■ Traffic control measures designed for the safe movement of vehicles, pedestrians and cyclists accessing the residential properties in the vicinity of the revised Project site will be provided. ■ Adequate on-site parking will be provided to accommodate for employee vehicles. ■ At least one lane will be open for traffic at any time near the construction activities to ensure traffic flow. ■ NAC will ensure adequate consultation is undertaken with the appropriate regulatory authorities. ■ Access to Acland will be maintained via Oakey-Cooyar Road ■ NAC will ensure discussions are undertaken with the relevant road and rail authorities to ensure an appropriate mitigation measures are implemented based on the proposed design considerations outlined within the ALCAM Report.
Operation (2017) phase	■ Working hour arrangements will be modified and haulage tasks avoided during peak traffic periods and school drop-off and pick-up times. ■ Established haul routes and arterial roads will be used for coal transportation to minimise traffic on local roads. ■ Traffic conditions during the operational phase will be monitored in order to identify and address any negative impacts. ■ Local communities will be adequately notified about proposed changes to local traffic conditions during the operational phase, including the provision of advanced notice, clear signage of changed traffic conditions, and as required, traffic control personnel. ■ Traffic control measures designed for the safe movement of vehicles, pedestrians and cyclists accessing the revised Project site will be provided. ■ Adequate on-site parking will be provided to accommodate employee vehicles.

Project Phase	Mitigation Measures and Commitments
	■ Access to Acland will be maintained at all times via Oakey-Cooyar Road. ■ NAC will ensure discussions are undertaken with the relevant road and rail authorities to ensure an appropriate mitigation measures are implemented based on the proposed design considerations outlined within the ALCAM Report ■ Adequate consultation is undertaken with the appropriate regulatory authorities to ensure the intersection requirements for the key intersections are operating safely during the operation phase.