

Traffic Impact Assessment

Rix's Creek Continuation of Mining Project



Traffic Impact Assessment

Rix's Creek Continuation of Mining Project

Client: Rix's Creek Pty Ltd

ABN: 76 000 106 972

Prepared by

AECOM Australia Pty Ltd

Level 21, 420 George Street, Sydney NSW 2000, PO Box Q410, QVB Post Office NSW 1230, Australia

T +61 2 8934 0000 F +61 2 8934 0001 www.aecom.com

ABN 20 093 846 925

15-Oct-2015

Job No.: 60289290

AECOM in Australia and New Zealand is certified to the latest version of ISO9001, ISO14001, AS/NZS4801 and OHSAS18001.

© AECOM Australia Pty Ltd (AECOM). All rights reserved.

AECOM has prepared this document for the sole use of the Client and for a specific purpose, each as expressly stated in the document. No other party should rely on this document without the prior written consent of AECOM. AECOM undertakes no duty, nor accepts any responsibility, to any third party who may rely upon or use this document. This document has been prepared based on the Client's description of its requirements and AECOM's experience, having regard to assumptions that AECOM can reasonably be expected to make in accordance with sound professional principles. AECOM may also have relied upon information provided by the Client and other third parties to prepare this document, some of which may not have been verified. Subject to the above conditions, this document may be transmitted, reproduced or disseminated only in its entirety.

Quality Information

Document Traffic Impact Assessment

Ref 60289290

Date 15-Oct-2015

Prepared by Jacky Leung

Reviewed by Nick Bernard

Revision History

Revision	Revision Date	Details	Authorised	
			Name/Position	Signature
A	16-Jun-2014	Draft Report	Simon Murphy Senior Environmental Planner	
B	08-Jul-2014	GB Comments	Simon Murphy Senior Environmental Planner	
C	18-Aug-2015	Revised Draft Report	Simon Murphy Senior Environmental Planner	
D	15-Oct-2015	Final	Simon Murphy Senior Environmental Planner	

Table of Contents

Executive Summary	i
1.0 Introduction	A-1
1.1 Background	A-1
1.2 Overview of the Project	A-1
1.3 Purpose and scope of TIA	A-3
1.4 Report structure	A-4
2.0 Transport and planning policy	A-5
2.1 Standards and Guidelines	A-5
3.0 Existing conditions	A-6
3.1 Site location and access	A-6
3.2 Road network	A-8
3.2.1 New England Highway (A15)	A-8
3.2.2 Rixs Creek Lane	A-9
3.2.3 New England Highway / Rixs Creek Lane intersection	A-9
3.3 Traffic volumes	A-12
3.3.1 Historical traffic data	A-12
3.3.2 Traffic surveys	A-14
3.4 Existing intersection performance – New England Highway / Rixs Creek Lane	A-15
3.5 Approved B-Double routes	A-16
3.6 Public transport, pedestrian and cycle network	A-17
3.7 Crash analysis	A-17
4.0 Future conditions (without Project)	A-18
4.1 Future road upgrades	A-18
4.1.1 Singleton Bypass	A-18
4.2 Background traffic growth	A-18
4.3 Intersection performance	A-18
5.0 The proposed project	A-20
5.1 Development description	A-20
5.1.1 Mining method	A-20
5.1.2 Transportation of Product Coal to Port of Newcastle	A-20
5.1.3 Vehicular access	A-20
5.1.4 Parking	A-20
5.1.5 New cut and cover tunnel under the New England Highway	A-20
5.1.6 Construction Traffic Management Plan (CTMP)	A-22
5.2 Project operation workforce	A-23
6.0 Impact of the proposed project	A-24
6.1 Traffic generation	A-24
6.2 Traffic distribution and assignment	A-24
6.3 Impact of generated traffic	A-25
7.0 Conclusion	A-26
Appendix A	
SIDRA Results	A
Appendix B	
Side Track Road Concept Design	B-A
Appendix C	
Standard TCPS From Roads and Maritime's Traffic Control At Work Sites Manual	C-A

List of Tables

Table 1	SIDRA analysis results – New England Highway / Rixs Creek Lane intersection	i
Table 2	Director-General Requirements applicable to the Traffic Impact Assessment	A-3
Table 3	Level of Service criteria for intersections	A-5
Table 4	New England Highway (A15)	A-8
Table 5	Rixs Creek Lane	A-9
Table 6	New England Highway / Rixs Creek Lane intersection	A-10
Table 7	Existing safety issue on New England Highway	A-11
Table 8	Existing safety issues at New England Highway / Rixs Creek Lane intersection	A-11
Table 9	Historical traffic volumes and growth	A-12
Table 10	2014 intersection performance – New England Highway / Rixs Creek Lane intersection	A-16
Table 11	Crash statistics for Pacific Highway / Old Punt Road intersection, 2008-2013	A-17
Table 12	Historical trend of crashes by casualty 2008-2013	A-17
Table 13	2023 intersection assessment without proposed development – New England Highway / Rixs Creek Lane intersection	A-19
Table 14	Estimated operation workforce comparison	A-23
Table 15	2023 peak hour intersection performance comparison – New England Highway / Rixs Creek Lane intersection	A-25
Table 16	SIDRA analysis results – New England Highway / Rixs Creek Lane intersection	A-26

List of Figures

Figure 1	Local context	A-2
Figure 2	Existing Road Network	A-7
Figure 3	ADT data in the vicinity of the site	A-13
Figure 4	2014 intersection peak hour flows	A-14
Figure 5	Existing intersection layout as modelled in SIDRA	A-15
Figure 6	Heavy vehicle travel restrictions	A-16
Figure 7	2023 intersection peak hour flows – without proposed development	A-18
Figure 8	Estimated operation workforce (2014 to 2038)	A-23
Figure 9	2023 intersection peak hour flows – with Project	A-24

Executive Summary

This report presents an assessment of the traffic impacts associated with the Rix's Creek Continuation of Mining Project. The Project relates to continue the existing 1.5Mtpa mining operation to mine up to 4.5Mtpa ROM coal per year. Current (2014) employee numbers are expected to increase by about three-quarters by 2023, when they are expected to be peak at approximately 234 people.

The Rix's Creek Mine site is located approximately five kilometres north-west of Singleton in the Hunter Coalfields of NSW. The site is accessed via the intersection of Rixs Creek Lane and New England Highway.

The New England Highway / Rixs Creek Lane intersection has been assessed for:

- 2014 existing conditions
- 2023 without the Project operations generated traffic
- 2023 with the Project operations generated traffic.

Table 1 SIDRA analysis results – New England Highway / Rixs Creek Lane intersection

Year	Demand Flow (veh/h)	Level of Service*	Degree of Saturation (v/c)	Ave Delay* (sec)	95% Back of Queue (m)	Approach with longest delay
AM peak						
2014 Existing	1,538	D	0.68	44	1.2	Rixs Creek Lane (E) right turn movement
2023 Base	1,679	E	0.75	61	1.3	Rixs Creek Lane (E) right turn movement
2023 + Project	1,735	E	0.75	65	2.3	Rixs Creek Lane (E) right turn movement
PM peak						
2014 Existing	962	B	0.31	19	0.9	Rixs Creek Lane (E) right turn movement
2023 Base	1,047	B	0.34	22	1.0	Rixs Creek Lane (E) right turn movement
2023 + Project	1,115	B	0.34	23	1.9	Rixs Creek Lane (E) right turn movement

* Average delay and overall Level of Service for the worst movement are reported for sign-controlled intersection.

Source: AECOM 2014

The intersection is forecast to operate at an acceptable level of service (LoS B) during the PM peak period in all scenarios. For the AM peak, the results show that the intersection is likely to perform at LoS E in the future due to the low right turning volumes from Rixs Creek Lane (six vehicles per hour) experiencing relatively longer delays. Upgrading the intersection is not justified based on long delays to a small number of vehicles. In addition, the historical crash data indicates that there is not a safety issue at the intersection.

Overall, the traffic modelling suggests that there is not a requirement for road network upgrades to cater for the additional traffic generated by the Project operations.

The construction of a new tunnel under the New England Highway is also planned as part of the Project. The design would be similar to the existing tunnel and would be located to the north of the existing tunnel. A Construction Traffic Management Plan (CTMP) would be put in place to manage the traffic generated during construction of the tunnel.

1.0 Introduction

1.1 Background

AECOM has been engaged by Rix's Creek Pty Limited to produce to an Environmental Assessment (EA) for the proposed Rix's Creek Continuation of Mining Project (the Project) at Rix's Creek Mine, NSW. This Traffic Impact Assessment (TIA) serves as input into the Environmental Impacts Statement (EIS) for the Project.

1.2 Overview of the Project

Rix's Creek Mine (the Mine) is owned and operated by Bloomfield Collieries Pty Limited (Bloomfield). The Mine is an open cut coal mine approximately 5 kilometres north-west of Singleton in the Hunter Valley Coalfields of NSW. The Mine currently produces approximately 1.5 million tonnes per annum (Mtpa) of product coal from its existing operations.

Bloomfield is seeking approval for the Project, which relates to the ongoing processes of the existing open cut coal mine operations, as well as other mining and related activities across the Mine. The Project would allow the Mine to continue to operate as an open cut mine, accessed via its existing infrastructure facilities, to mine up to 4.5Mtpa Run of Mine (ROM) coal per year.

The Project seeks to extend the life of the existing open cut mining operation at Rix's Creek until approximately 2037. The continuation of mining operations will extend in a north-westerly direction. The continuation of operations will utilise the existing mine access, CHPP, coal stockpiling and rail facilities.

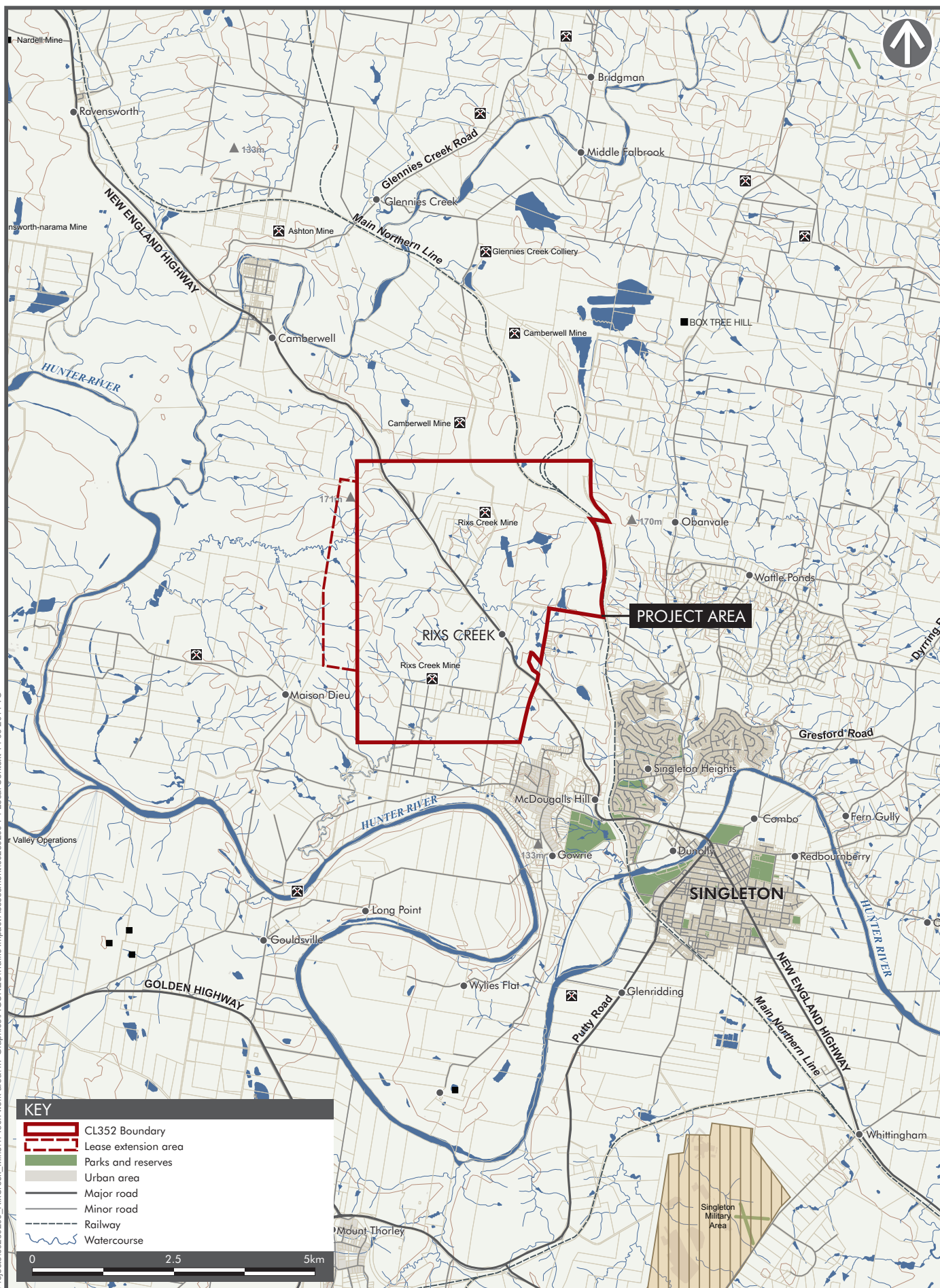
Mining methods will be the same as those currently employed at the Mine, namely multi-seam bench open cut techniques. ROM coal will continue to be processed onsite at the existing CHPP which has capacity to accept the proposed increase in throughput. Product coal will then be transported by trucks on Mine haul roads to the rail loader for transport to the Port of Newcastle. It is estimated that the Mine could yield a total of 32 million saleable tonnes of coal over the life of the approval.

The components of the proposed development comprise:

- The ongoing use of, and future additions to, the existing mine fleet;
- Use of the existing mine infrastructure facilities;
- Use of the existing CHPP;
- Use of existing and planned rejects and tailings emplacements;
- Rail transport of product coal to the Port of Newcastle;
- Mine closure and rehabilitation; and
- Environmental management.

The Project Area is shown in **Figure 1**.

I:\Projects\60289290_RixCreek_Mine\4_Tech work area\4.7 Graphics\FIGURES\Traffic Impact Assessment\60289290_F1 Local Context 14.08.2014 TO



1.3 Purpose and scope of TIA

The EA for the Project has been prepared in accordance with Division 4.1, Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) which ensures that the potential environmental effects of a proposal are properly assessed and considered in the decision-making process.

In preparing this TIA, the Director-General's Requirements (DGRs) issued for the Project (SSD 13_6300) on 3 March 2014 have been addressed as required by Clause 75F of the EP&A Act. The key matters raised by the Director-General for consideration in the TIA and where this report addresses the DGR are outlined in **Table 2**.

Table 2 Director-General Requirements applicable to the Traffic Impact Assessment

Director Generals Requirement		Section Addressed
Traffic and Transport	Accurate predictions of the road and rail traffic generated by the development (including a detailed comparison of existing and proposed traffic movements)	Section 3 Existing conditions Section 6 Impact of the proposed project
	A detailed assessment of the potential impacts of the development on the capacity, efficiency and safety of the: - local and regional rail network, having regard to the cumulative impacts on the passenger and freight rail network; and - local and classified road network, with particular regard to a cumulative traffic impacts;	The impacts to the rail network are documented in the main body of the EIS. Section 6 Impact of the proposed project
	Details of mine to port transport movements, including: - train path availability and any required rail infrastructure works on the Main Northern Railway; - details of the arrangement with Integra Mine for the use of its rail loop; and - the likelihood for continued use of Integra Mine's rail loop, and for the development of the approved Rix's Creek rail loop;	The details of train movements are documented in the main body of the EIS
	Details of the proposed New England Highway underpass, including: - a concept design plan; - a justification for its proposed development; and - details of how the underpass would be managed to ensure there would be no impacts on the New England Highway	Section 5 Proposed project
	A detailed description of the measures that would be implemented to maintain and/or improve the capacity, efficiency and safety of the road and rail networks in the surrounding area over the life of the development, including consideration of road maintenance contributions to Singleton Shire Council	Section 6 Impact of the proposed project Section 7 Conclusion

This report presents a traffic impact assessment of the operation of the Project to support the EA submission. The assessment involves determining the level of trip generation associated with the operation of the Project, its impact on the local road network and provides recommendations for mitigation measures to minimise any impacts, if required.

1.4 Report structure

The report is structured as follows:

- **Section 1** outlines the Project and presents the purpose of the report.
- **Section 2** reviews the relevant standards and guidelines regarding Project-related traffic and transport.
- **Section 3** summarises the existing transport conditions in the area surrounding the Project site.
- **Section 4** considers the likely future transport conditions in the area without the Project.
- **Section 5** provides a description of the Project in terms of its operations, as well as proposed access and parking arrangements.
- **Section 6** provides an assessment of the trip generation and distribution associated with the Project, together with a review of their impacts on the local road network.
- **Section 7** summarises the findings and recommendations for the transport requirements of the Project.

2.0 Transport and planning policy

2.1 Standards and Guidelines

Roads and Maritime Services (formerly Roads and Traffic Authority) Guide to Traffic Generating Developments (2002)

Roads and Maritime's (formerly Roads and Traffic Authority) Guide to Traffic Generating Developments outlines all aspects of traffic generation considerations relating to developments. The information provided gives background into the likely impacts of traffic from various types of development.

The guide provides a section on various land use traffic generation and a section on interpretation of traffic impacts. The impact on traffic efficiency at intersections is used in this study and intersection performance is based on the following level of service criteria for intersections, as shown in **Table 3**.

Table 3 Level of Service criteria for intersections

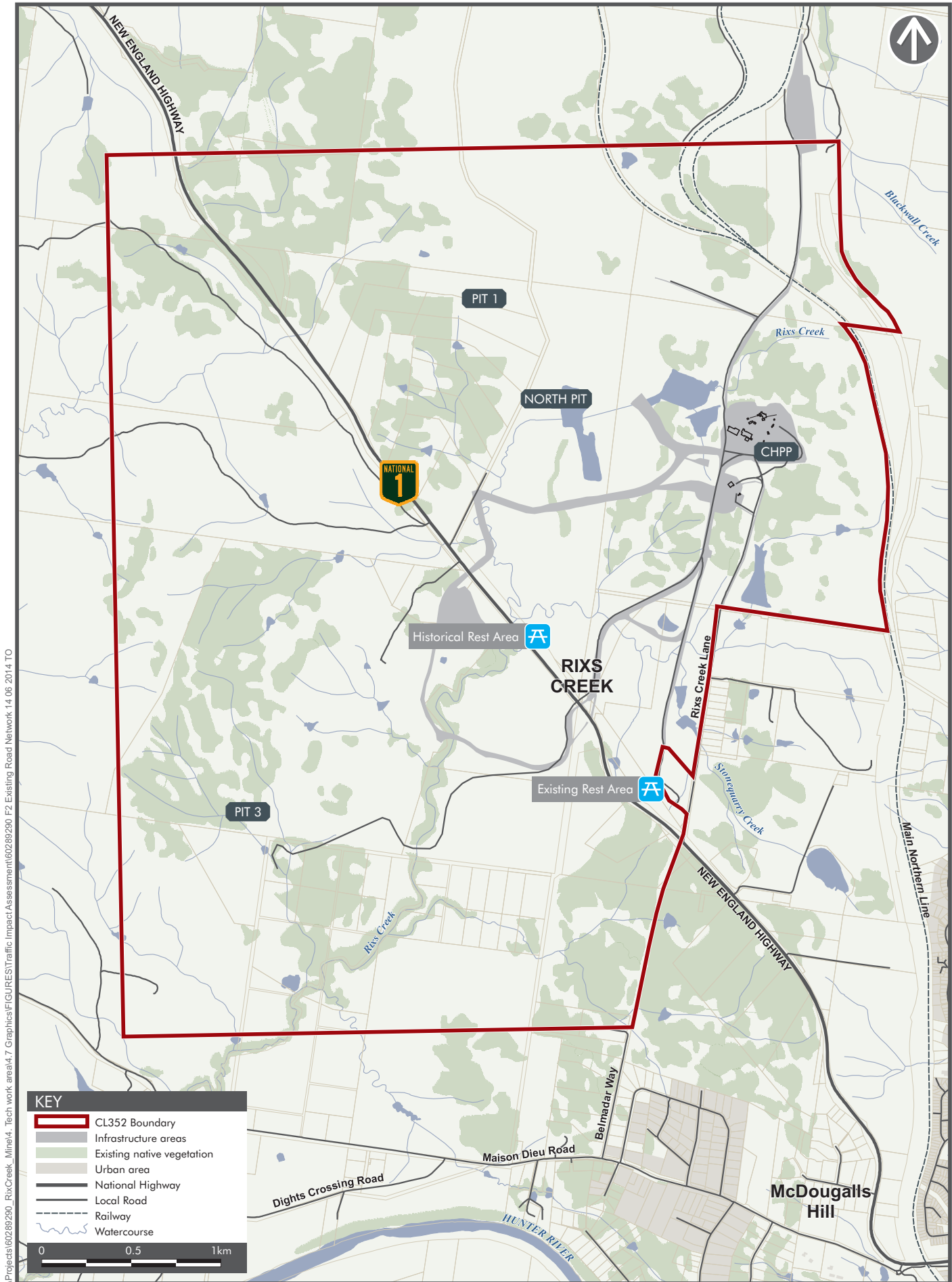
Level of Service	Average Delay (secs/veh)	Traffic Signals and Roundabouts	Give Way and Stop Signs
A	Less than 14	Good Operation	Good Operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity and accident study required
E	57 to 70	At capacity; at signals incidents will cause excessive delays	At capacity; requires other control mode
F	>70	Roundabouts require other control mode	At capacity; requires other control mode

Source: Roads and Maritime Services, 2002

3.0 Existing conditions

3.1 Site location and access

The site is located approximately 5 kilometres north-west of Singleton in the Hunter Coalfields of NSW. The site is accessed via the intersection of Rixs Creek Lane and New England Highway, as shown on **Figure 2**.



I:\Projects\60289290_RixCreek_Mine\4_Tech work area\4.7 Graphics\FIGURES\Traffic Impact Assessment\60289290_F2 Existing Road Network 14 06 2014.TIF

3.2 Road network

3.2.1 New England Highway (A15)

The A15 New England Highway is an 887 kilometre major transport route which links the Hunter Region and Tamworth before continuing north of Queensland. The section of the New England Highway in the vicinity of the site is an undivided carriageway with one lane in each direction and a speed limit that varies between 80km/h and 100km/h. The route generally provides sealed shoulders which are delineated by edge lines.

There is a bridge over the New England Highway approximately one kilometre north of Rixs Creek Lane. It connects Pit 2 and the West Pit to the surface facilities. The West Pit is also connected to the surface facilities by a shorter haul route through a cut-and-cover tunnel under the Highway about two kilometres north of Rixs Creek Lane.

Table 4 New England Highway (A15)

Looking northbound on New England Highway towards the bridge connecting Pit 2 and the West Pit	Looking northbound on New England Highway towards the tunnel connecting the West Pit and the eastern side of the site
	

Source: AECOM 2014

Overburden Blasting

In accordance with Schedule 2, Condition 12 of the existing Project Approval (DA49/94) under which the Mine currently operates, blasting within 500m of the New England Highway can only take place when the highway is closed to traffic. An agreement and associated management plan are currently in place between the Mine and Roads and Maritime Services to manage blasting events and the operation of the New England Highway

3.2.2 Rixs Creek Lane

Rixs Creek Lane is a sealed, single carriageway which connects to the New England Highway from the east in an all-movements, priority controlled, T-junction. It provides access to Rix's Creek Mine's current operations and associated surface infrastructure facilities. A rest area with toilet facilities is located approximately 150 metres south of New England Highway.

Rixs Creek Lane is approximately six to eight metres wide with a posted speed limit of 60km/h. No line marking has been provided on the road.

Table 5 Rixs Creek Lane

Looking north-westbound on Rixs Creek Lane	Looking north-westbound on Rixs Creek Lane towards the intersection with the rest area
	

Source: AECOM 2014

3.2.3 New England Highway / Rixs Creek Lane intersection

The intersection is a T-junction with the New England Highway as the northern and southern main road approaches and Rixs Creek Lane as the eastern and terminating approach. The Rixs Creek Lane approach is a give way control.

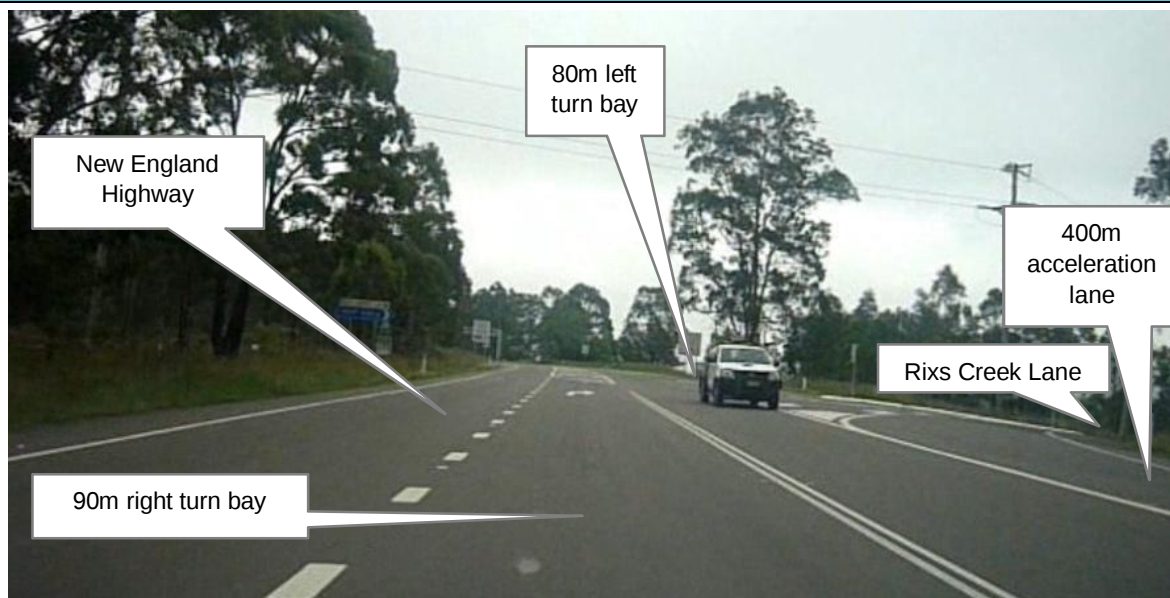
The intersection configuration is a channelised right turn (CHR) facility with a 90m right turn bay and an 80m left turn bay onto Rix's Creek Road. A 400m long acceleration lane has been provided for the left turn from Rixs Creek Lane to New England Highway. The Rixs Creek Lane approach is a two-lane, two-way road with a splitter island on approach to New England Highway.

The gradient of New England Highway around the intersection is generally flat with a crest and horizontal curve approximately 100m north of the intersection.

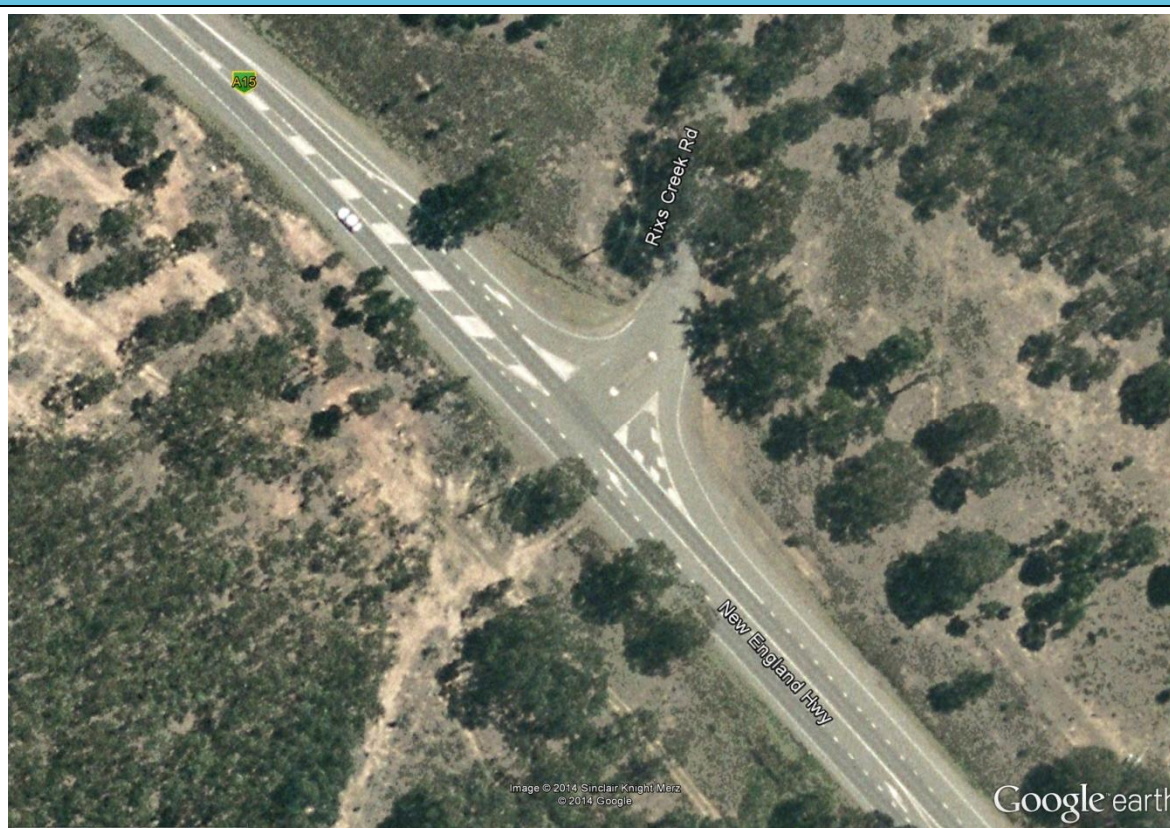
A school bus stop is located on the New England Highway in the southbound direction approximately 200 metres south of the intersection.

Table 6 New England Highway / Rixs Creek Lane intersection

Looking northbound on New England Highway



Aerial Photo

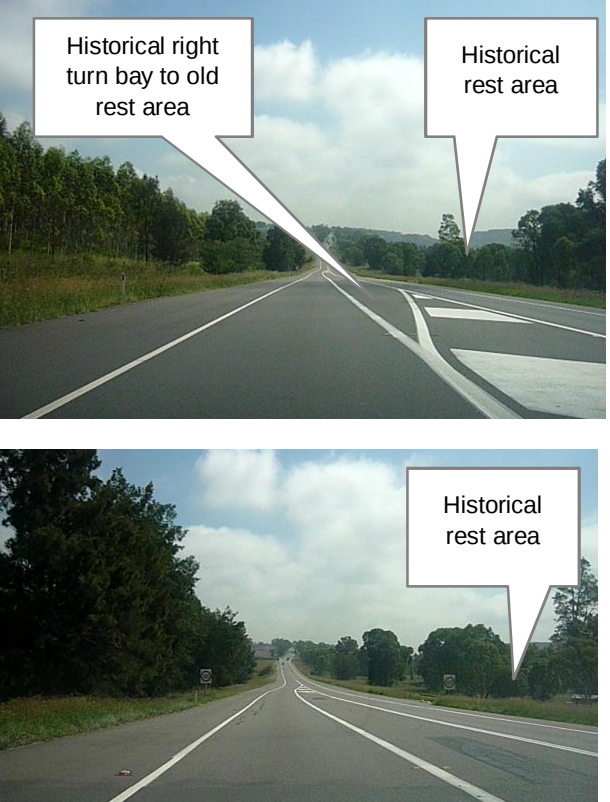


Note: the aerial photo does not show the upgraded 80m left turn bay on New England Highway

Source: AECOM 2014, Google Earth Pro 2014

Existing safety issues observed in the vicinity of the site are summarised in **Table 7** and **Table 8**.

Table 7 Existing safety issue on New England Highway

Safety Issues	Photo
Previously, there was a rest area located on the eastern side of the New England Highway approximately 1.4 kilometres north of Rixs Creek Lane. This rest area has now been relocated to Rixs Creek Lane. (See Figure 2) When removing the line marking for the right turn bay to the old rest area location, the continuity line (entering an auxiliary right turn lane) was changed to an unbroken lane line to discourage lane changing. However, the painted chevron has not been extended and motorists may be confused and think there is an overtaking lane. This may result in conflict between lanes. It is recommended that the chevron marking be extended through the old right turn bay, which is no longer used.	 The top photograph shows a road with a chevron marking and a callout 'Historical right turn bay to old rest area'. The bottom photograph shows a road with a callout 'Historical rest area'.

Source: AECOM 2014

Table 8 Existing safety issues at New England Highway / Rixs Creek Lane intersection

Safety Issues	Photo
Approach Sight Distance (ASD) to the give way line on the Rixs Creek Lane approach to the New England Highway intersection is not provided in accordance with Austroads and Roads and Maritime Services guideline. The guidelines state that 64 metres is required but approximately 40 metres has been provided. This may lead to overshooting accidents.	 The photograph shows a road approaching an intersection. There are trees and a utility pole visible in the background.

Source: AECOM 2014

3.3 Traffic volumes

3.3.1 Historical traffic data

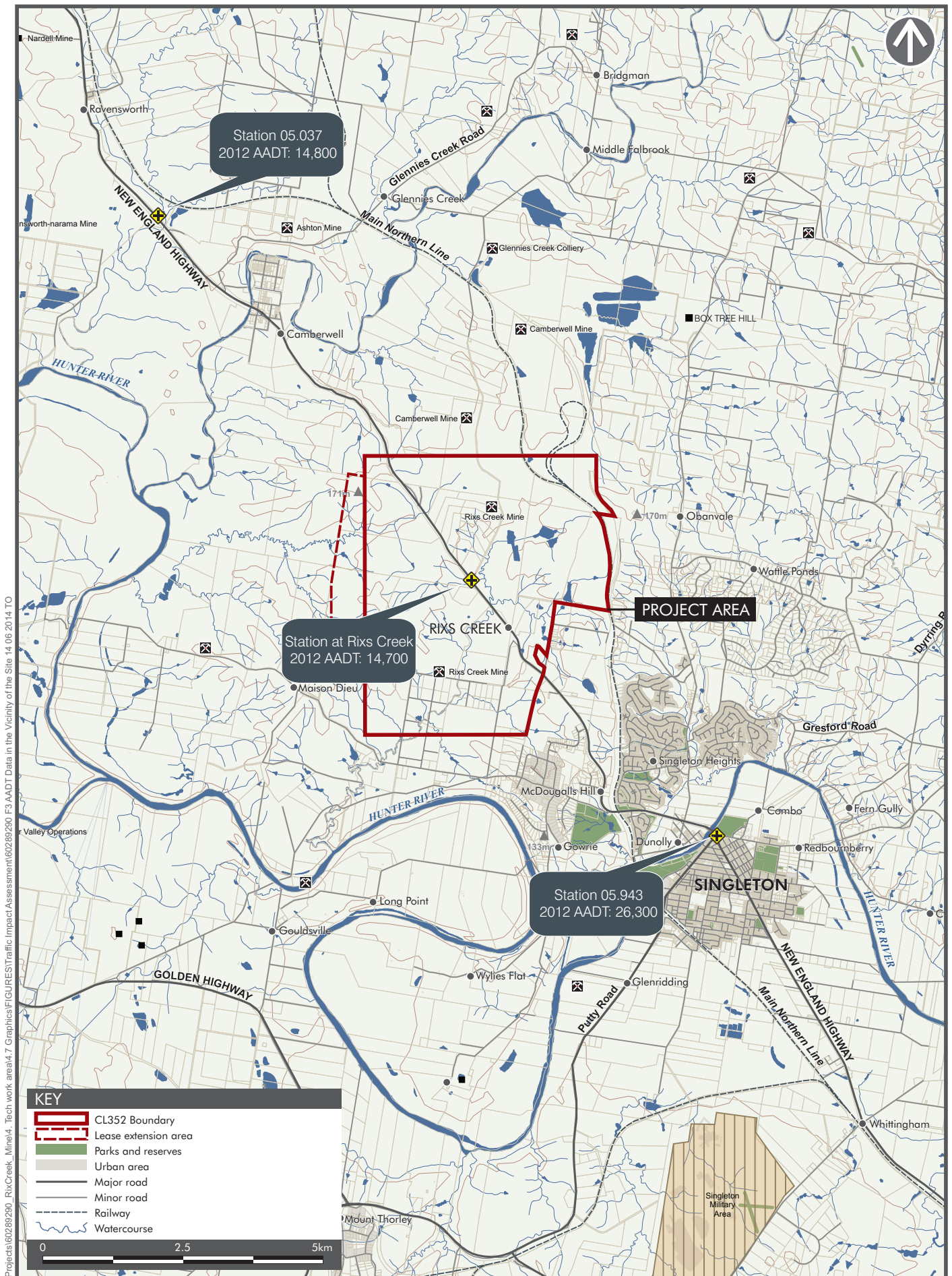
Traffic volume data has been obtained from Roads and Maritime to determine the historical traffic growth and mid-block traffic flows in the surrounding area. **Table 9** shows historical Average Daily Traffic (ADT) volumes at stations in the vicinity of the site. The location of the stations and the ADT for 2004 at these stations is shown in **Figure 3**.

Table 9 Historical traffic volumes and growth

Site #	Locations Description	2001	2004	2007	2012	Per annum growth ('01-'12)
05.037	New England Hwy at Foy Brook Bridge	9,100	9,300	8,700	14,800	4.5%
-	New England Hwy at Rixs Creek	--	--	--	14,700	--
05.943	New England Hwy at Hunter Bridge	19,500	--	20,300	26,300	2.8%

Source: Roads and Maritime Traffic Volume Data, Roads and Maritime Preliminary Feasibility Assessment Report – Singleton Bypass

Note: The ADT has been converted from axle pair to vehicle data by using a factor of 0.81. This conversion factor was derived from the Foy Brook Bridge site which was surveyed with automatic traffic counts reporting both axle pairs and vehicles, as indicated in the Roads and Maritime, Preliminary Feasibility Assessment Report – Singleton Bypass, June 2013.



I:\Projects\60289290_RixCreek_Mine\4_Tech work area\4.7 Graphics\FIGURES\Traffic Impact Assessment\60289290_F3 AADT Data in the Vicinity of the Site 14 06 2014 TO

3.3.2 Traffic surveys

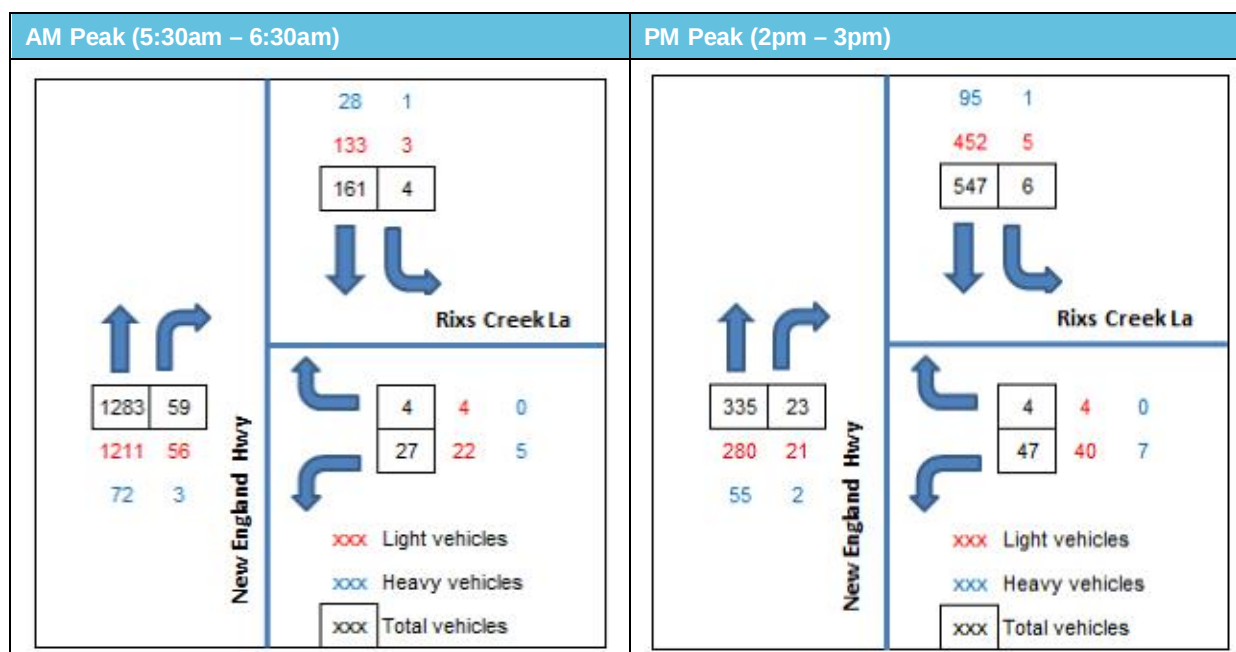
Traffic surveys were undertaken in April 2014 to measure current traffic volumes at the New England Highway / Rixs Creek Lane intersection. Classified turning movement counts were undertaken by Austraffic Pty Ltd during the morning (5am to 8am) and afternoon (1pm to 7pm) peak periods on 9 April 2014. This intersection is considered to be critical in regard to movement to and from the site, as it is the main intersection connecting to the arterial road network (New England Highway).

Based on the traffic turning in and out of Rixs Creek Lane, the intersection counts indicated that the AM and PM peak hours were 5.30am to 6.30am and 2pm to 3pm. The peak hours align with the current operational shift hours of Rix's Creek Mine.

Traffic survey video footage showed a few oversized trucks turning right from Rixs Creek Lane during the morning peak period. Traffic control vehicles with flashing lights were observed stopping the through traffic to allow the trucks to turn out of Rixs Creek Lane. To avoid underestimating the intersection performance, these oversized trucks and traffic control light vehicles are excluded in the model.

Figure 4 shows the 2014 AM and PM peak hour flows for the intersection.

Figure 4 2014 intersection peak hour flows



Note: Oversized trucks and traffic control vehicles are excluded in the AM peak count.

Source: Austraffic, April 2014

3.4 Existing intersection performance – New England Highway / Rixs Creek Lane

The existing peak hour performance of the New England Highway / Rixs Creek Lane intersection has been assessed using *SIDRA Intersection 6*, a computer based modelling package designed for calculating isolated intersection performance. SIDRA 6 is widely accepted in the industry for intersection analysis.

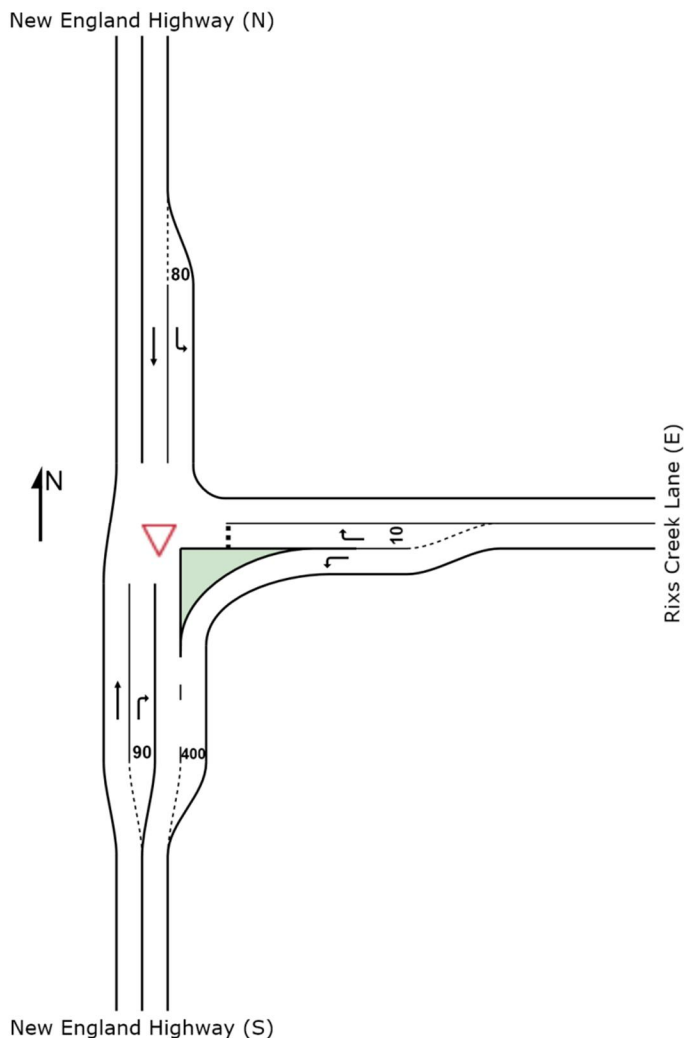
The main performance indicators for SIDRA 6 include:

- Degree of Saturation (DoS) – a measure of the ratio between traffic volumes and capacity of the intersection is used to measure the performance of isolated intersections. As DoS approaches 1.0, both queue length and delays increase rapidly. Satisfactory operations usually occur with a DoS range between 0.7-0.8 or below.
- Average Delay – duration, in seconds, of the average vehicle waiting at an intersection.
- Level of Service (LoS) – a measure of overall performance of the intersection (as explained in **Table 3**).

The intersection model has been calibrated using the observed average delay for right turning vehicles from Rixs Creek Lane from the traffic survey video footage.

Figure 5 illustrates the existing intersection layout, while **Table 10** summarises the SIDRA results.

Figure 5 Existing intersection layout as modelled in SIDRA



Source: AECOM 2015

Table 10 2014 intersection performance – New England Highway / Rixs Creek Lane intersection

Peak Hour	Demand Flow (veh/h)	Level of Service*	Degree of Saturation (v/c)	Ave Delay* (sec)	95% Back of Queue (m)	Approach with longest delay
AM Peak	1,538	D	0.68	44	1.2	Rixs Creek Lane (E) right turn movement
PM Peak	962	B	0.31	19	0.9	Rixs Creek Lane (E) right turn movement

* Average delay and overall Level of Service for the worst movement are reported for sign-controlled intersection.

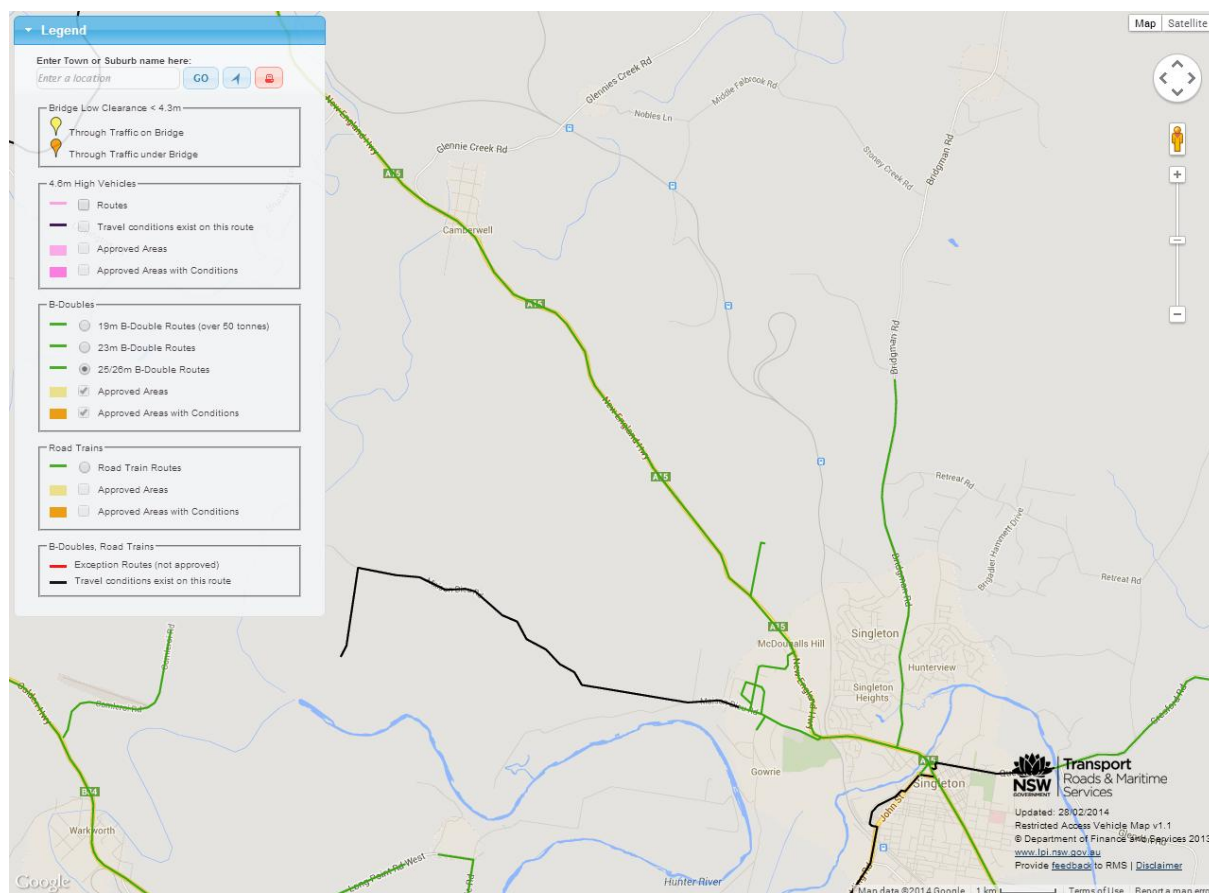
Source: AECOM 2014

The results show that during the AM peak the intersection operates at Level of Service (LoS) D for the right turn movement from the minor (east) approach as it is opposed by the heavy northbound through traffic. Only four vehicles per hour make this movement.

The PM peak results show that overall the intersection is operating at LoS B with an average delay of the worst movement (the same right turn movement) of 18.7 seconds per vehicle.

3.5 Approved B-Double routes

All of the major roads in the vicinity of the site are approved for 26m B-Double use, according to Roads and Maritime Services. These include the New England Highway and Rixs Creek Lane. **Figure 6** shows the existing designated B-Double truck routes in Singleton area.

Figure 6 Heavy vehicle travel restrictions

Source: Roads and Maritime Services, 2014

3.6 Public transport, pedestrian and cycle network

Public transport in the vicinity of the site is limited. There are no regular local bus services along New England Highway. Greyhound Buses provide a daily service between Sydney and Brisbane via Singleton.

There are no designated cycle routes in the vicinity of the site along the New England Highway or Rixs Creek Lane.

There are no pedestrian footpaths in the vicinity of the site. Pedestrian activity is generally not encouraged along Highways such as the New England Highway.

In addition to being used for freight, primarily coal The Main North Rail Line

3.7 Crash analysis

Crash analysis has been undertaken using historical crash data provided by Roads and Maritime for a five year period from 1 July 2008 to 30 June 2013. The crash data was provided for the section of New England Highway from 0.25km south to 5 km north of Rixs Creek Lane including the intersection of New England Highway with Rixs Creek Lane.

Between 2008 and 2013, a total of 17 crashes were recorded on this section of the New England Highway, including two crashes within 250m of the New England Highway and Rixs Creek Lane intersection. Seven crashes involved injury-related crashes and ten were tow away crashes. No fatal crash was recorded during this period and no crashes were recorded on Rixs Creek Lane.

Table 11 shows the crash statistics for this period and **Table 12** summarises annual crash incidents by casualty from 2008 to 2013. Less than five crashes have occurred each year over the last five years, with only one crash recorded in 2011. A total of ten injuries were reported from 2008 to 2013.

Table 11 Crash statistics for Pacific Highway / Old Punt Road intersection, 2008-2013

Location	Total crashes	Fatal crashes	Injury crashes	Non-casualty crashes
New England Highway (from 0.25km south to 5km north of Rixs Creek Lane)	15	0	7	8
New England Highway / Rixs Creek Lane intersection	2	0	0	2

Source: AECOM, based on Roads and Maritime Services Crash Report 2008-2013

Table 12 Historical trend of crashes by casualty 2008-2013

	2008 (6 mths)	2009	2010	2011	2012	2013 (6 mths)	Total
New England Highway (from 0.25km south to 5km north of Rixs Creek Lane)							
Crashes	2	3	4	1	5	2	17
Casualties (injuries, not fatalities)	1	2	2	0	2	3	10
At New England Highway / Rixs Creek Lane intersection							
Crashes	0	0	1	0	0	1	2
Casualties (injuries, not fatalities)	0	0	0	0	0	0	0

Source: AECOM, based on Roads and Maritime Services Crash Report 2008-2013

4.0 Future conditions (without Project)

4.1 Future road upgrades

4.1.1 Singleton Bypass

Roads and Maritime has undertaken investigations into a New England Highway bypass of Singleton. Four strategic route options were identified in the feasibility study and Roads and Maritime is currently undertaking work to identify a preferred option for the planning stage. It is not expected to have a direct impact on the section of New England Highway in the vicinity of the site.

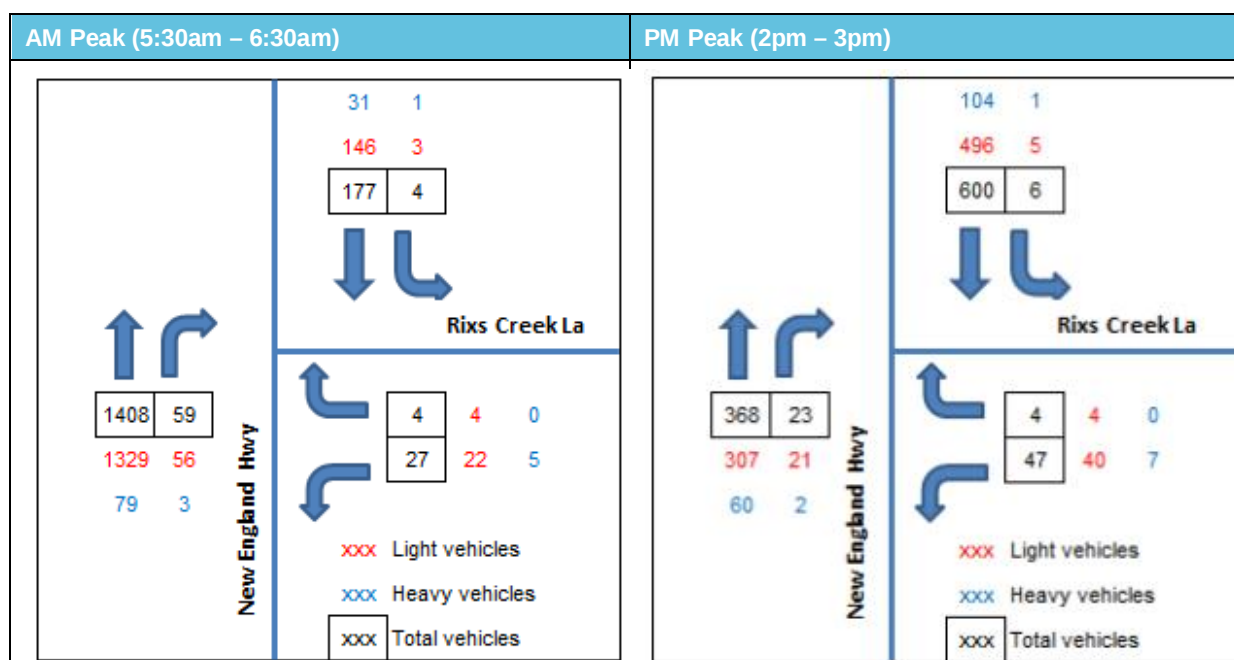
4.2 Background traffic growth

The year 2023 was selected as the future modelled year because the workforce for the Project is expected to peak in 2023. Based on the medium growth scenario in Roads and Maritime's Singleton Bypass Report¹, the resultant growth rate of New England Highway at Rixs Creek from 2014 to 2023 is 9.7% (compound growth 4.5% for 2 years and 0.06% for 7 years). This growth rate was used for the background traffic growth on New England Highway through traffic for the future year analysis in this study.

4.3 Intersection performance

The 2023 AM and PM peak hour traffic flows without the proposed development are illustrated in **Figure 7** and **Table 13** presents the intersection performance for year 2023.

Figure 7 2023 intersection peak hour flows – without proposed development



Source: AECOM, April 2014

¹ HW9 (New England Highway) Singleton Bypass Preliminary Feasibility Assessment Report, Roads and Maritimes June 2013

Table 13 2023 intersection assessment without proposed development – New England Highway / Rixs Creek Lane intersection

Peak Hour	Demand Flow (veh/h)	Level of Service*	Degree of Saturation (v/c)	Ave Delay* (sec)	95% Back of Queue (m)	Approach with longest delay
AM Peak	1,679	E	0.75	61	1.3	Rixs Creek Lane (E) right turn movement
PM Peak	1,047	B	0.34	22	1.0	Rixs Creek Lane (E) right turn movement

* Average delay and overall Level of Service for the worst movement are reported for sign-controlled intersection.

Source: AECOM 2014

The results show that with the increased background traffic growth, the traffic turning right from Rixs Creek Lane is likely to experience increased delays. The intersection is forecast to perform at LoS E during the AM peak and LoS B during PM peak. The LoS E is due to the increase in through traffic volumes, which causes the low right turning volume (four vehicles in the AM peak hour) to experience relatively longer delays than the existing situation.

The degree of saturation (75%) indicates that the intersection would generally still be within the acceptable intersection capacity.

5.0 The proposed project

5.1 Development description

The project would involve the continuation of existing mining activities. As part of this project, Bloomfield is seeking approval to increase extraction up to 4.5 Mtpa of ROM coal. It is estimated that the Mine could yield a total of 32 million tonnes of saleable coal over the life of the Project. Currently, the combined production of both Rix's Creek Mine and the Bloomfield Colliery Open Cut Mine service their contracts by supplying around 4.2 to 4.5 Mtpa of ROM coal. Since the Bloomfield Colliery Open Cut Mine is forecast to deplete its ROM coal resource, the project would ensure Bloomfield's future supply of coal to meet its current contractual obligations and to meet the estimated annual ROM production rates.

5.1.1 Mining method

Mining technology would remain the same as currently applied. It involves the sequential removal of overburden, the coal, then interburden between the recoverable seams. The coal produced would be transported by trucks to the rail loader for distribution to the Port of Newcastle. It is estimated that the Mine could yield a total of 32 million saleable tonnes of coal at an overburden ratio of approximately 10:5:1 before coal seams are exhausted.

5.1.2 Transportation of Product Coal to Port of Newcastle

The project would continue to transport product coal from the rail loading facility to the Port of Newcastle for blending and export. The proposed project would see the quantity of product coal transported from the Mine to the Port of Newcastle increase from around 1.5 Mtpa to around 2.5 Mtpa.

The Department of Planning and Environment approved an application (DA 49/94 MOD 5) to build a rail loop and coal loading facility within the mine area. The construction and operation of this rail loop is subject to commercial forces. However, regardless of whether this rail loop goes ahead, all future coal would be transported via the Mine's own rail loop or from the neighbour Integra Mines rail loop, as is currently the practice. Regardless, there would be no heavy vehicle transportation of coal on the road network.

5.1.3 Vehicular access

The existing access would be maintained and is located on Rixs Creek Lane off the New England Highway. The increased workforce is anticipated to use this primary access to the site.

5.1.4 Parking

The design of the car parking area for the employees would comply with the relevant Singleton DCP guidelines. Car park provision is to be determined at a later stage when detailed planning is complete with confirmed expected number of employees on site.

Based on the commute to work statistics from the Household Travel Survey (2013 release)², a vehicle occupancy rate of 1.1 people per vehicle is appropriate. With the operational workforce for the Project working in the day shift expected to be peak at 117 people in 2023, about 106 parking spaces would be required on site.

5.1.5 New cut and cover tunnel under the New England Highway

It is proposed to construct a second tunnel under the New England Highway to provide unrestricted access for mine vehicles to transport coal across the highway, without impacting the traffic on the highway. The new tunnel would be located to the north of the existing cut and cover tunnel.

The new tunnel design would be similar to the existing tunnel and would be constructed in a similar manner, which is described as a top down construction sequence that can be staged to progressively construct across the highway corridor, while keeping the highway open to traffic via a temporary deviation or 'side-track'. The construction procedure / elements and the side track concept design are described in the next section.

² Bureau of Transport Statistics, 2011/12 Household Travel Survey Summary Report 2013 Release

5.1.5.1 Construction activities

Construction activities for the new cut and cover tunnel would be scheduled as follows:

- Barricades (jersey barriers) would be placed along the New England Highway to provide separation between road users and the construction works. This would provide physical separation of the side track and the New England Highway.
- On approach on the New England Highway to the construction area, traffic management systems including fixed and variable message signage would be installed to slow the traffic from 100km/h to 80km/h typically, with provision to slow the traffic to 40km/hr for short periods of time for the barrier installation and traffic switches. The existing 80km/h speed zone at approximately 2km south of the new tunnel site would be extended to cover the entire side track.
- A New England Highway deviation or 'side track' designed for an 80km/hr speed limit would be constructed along the western side of the highway to divert traffic around the tunnel construction site. This would involve typical road construction equipment.
- Service relocations would include the relocation of a fibre optic cable.
- Stripping of topsoil, stockpiling and installation of erosion and sediment control works would be undertaken across the construction disturbance area.
- Preliminary excavation work would commence on the eastern side of the highway to allow access to the piling rig that would be used to install the bored cast *in situ* concrete piles.
- Installation of the bored piles and capping beam would commence on the eastern side of the highway. Traffic would be switched to operate on the side track following its completion and the piling would continue over the existing highway alignment. This work would involve piling equipment, concrete trucks and pumps and some earth moving equipment.
- When the piling across the highway is completed, precast concrete girders would be lifted into position to form the highway deck over the tunnel. A cast *in situ* concrete deck and traffic barriers would then be constructed over the girders using concrete trucks and pumps. Protection screens would then be fitted to the bridge to prevent items falling or being thrown from vehicles landing on the mine haul road below.
- When the deck is completed the new bridge deck would be connected back into the existing highway. Traffic would then be switched back onto the existing highway alignment.
- Sheet piling would then be removed and piling works would continue to the west of the bridge deck.
- The side track and traffic barriers would be removed and the area where the side track was located would be reinstated, via removal of the road pavement and replacement with top soil, turfing and grass seeding.
- After the piling is completed, excavation under the bridge would commence. The excavation is likely to be undertaken by mine personnel. As the excavation progresses it would be necessary for the Mine to install rock anchors to stabilise the pile walls. This would require the use of a rock drill and grout mixings and pumping equipment. The gaps between the piles would then be sealed with shotcrete.
- The mine haul road would then be completed.

Construction of the cut and cover tunnel is expected to take approximately 20 weeks.

5.1.5.2 Ancillary Facilities

A site compound with site sheds, parking and material set down areas would be established within the mine lease area, adjacent to the construction zone.

5.1.5.3 Public Utilities Adjustment

To undertake the Project, relocation of a PowerTel owned fibre optic cable is required. Consultation with the service provider would be undertaken during the detailed design.

5.1.5.4 Property Acquisition

The scope of works is contained within the existing road corridor and the mine lease area and as such property acquisition is not required. As all land adjoining the corridor is owned by the Mine, no access agreements would be required, if additional land access is required during construction. Approval from Roads and Maritime would be obtained for the Project within the road corridor.

5.1.5.5 Side track design

The indicative side track concept design is contained in **Appendix B**. It provides for a 3.5m traffic lane in each direction. The stopping sight distance of the side track should be designed to exceed the minimum requirement of 103m for design speed of 80km/h from Austroads (2010) with Roads and Maritime supplement guide (2011).

5.1.6 Construction Traffic Management Plan (CTMP)

A Construction Traffic Management Plan (CTMP) would be put in place to manage the traffic generated during construction of the tunnel, even though this traffic is temporary in nature. This would normally be developed by the contractor. Measures in the CTMP might include:

- Where practical, restricting heavy vehicle movements to off-peak hours when traffic volumes are typically lower.
- Ensuring heavy vehicles engaged in construction meet the Australian Road Rules and Roads and Maritime's standards so that road safety is not compromised.
- Transporting oversized equipment and machinery in accordance with the Roads and Maritime's guidelines for oversized movements.
- Implementing appropriate Traffic Control Plan (TCP) and signage to warn road users of the presence of construction vehicles and workers as well as changes to the normal traffic conditions such as diverting traffic to the side track. The related standard TCPs from the Roads and Maritime's *Traffic Control at Work Sites* manual (2010) are contained in **Appendix C**. Adequate advance warning and signage should be provided advising drivers and directing them to safe travel paths. In erecting the signs, the contractor must ensure that all signs are Class 1 reflective and the sign support structure should not create a safety hazard in itself. All signs will be manufactured and erected in accordance with Australian Standards AS1742, AS1742.1 to 1742.13, AS1743 and AS1744.
- Obtaining Roads and Maritime approval / road occupancy licence (Roads and Maritime Form D) and speed zone authorisation, if required.
- Providing safe access points to work areas from the adjacent road network.
- Providing protection of workers and road users, e.g. safety barriers with adequate offsets and deflection allowance, where necessary.
- Securing the worksite outside work hours to avoid vehicle/ pedestrians entering the site and leaving the worksite in a safe condition.

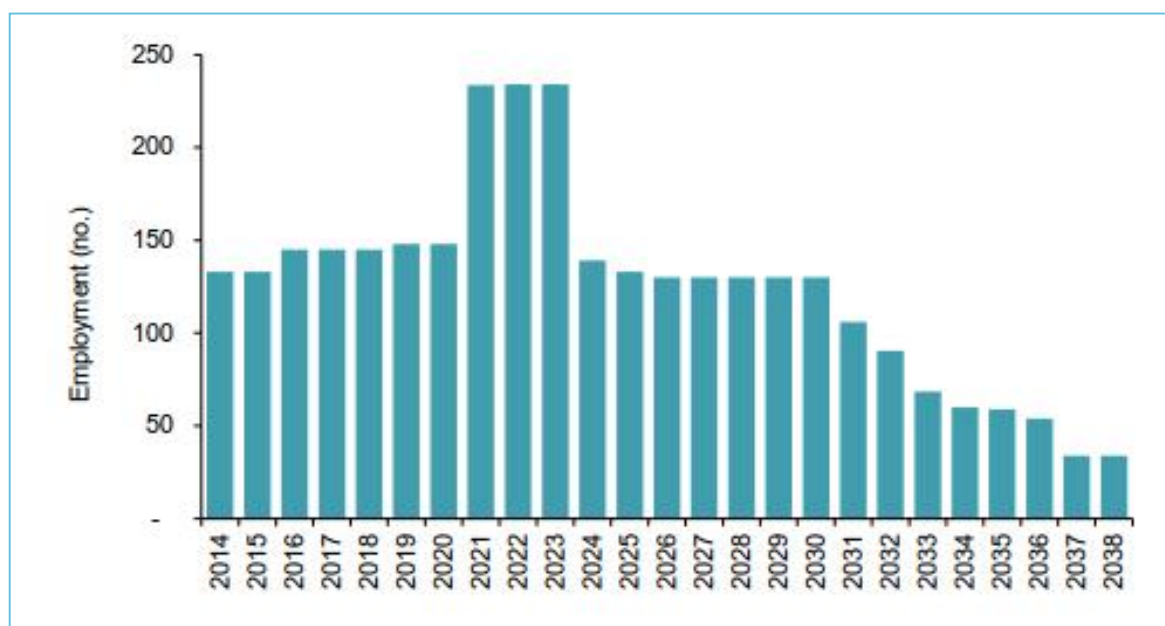
All the construction works should be undertaken in accordance with the Roads and Maritime's *Traffic Control at Work Sites* manual (2010) and Australian Standard AS1742.3 *Manual of uniform traffic control devices Part 3: Traffic control for works on roads* (2009).

5.2 Project operation workforce

At present, there are 133 employees working on site. The operational workforce for the Project is expected to be peak at 234 people in 2023.

Figure 8 shows the expected number of employee working on site from 2014 to 2038 and **Table 14** presents the comparison of workforce between the existing 2014 and the peak 2023.

Figure 8 Estimated operation workforce (2014 to 2038)



Source: AECOM, based on Rix's Creek Pty Limited information provided in 2015

Table 14 Estimated operation workforce comparison

Number of employee	2014 (Existing)	2023 (Peak)	% increase
Day Shift (6.30am to 2.30pm)	61	117	92%
Afternoon Shift (2.30pm to 10.30pm)	40	82	105%
Night Shift (10.30pm to 6.30am)	32	35	9%
Total	133	234	76%

Source: AECOM, based on Rix's Creek Pty Limited information provided in 2015

6.0 Impact of the proposed project

This section provides an assessment of the trip generation and distribution associated with the Project operations. The assessment involves a review of the performance of the New England Highway / Rixs Creek Lane intersection once the peak Project generated traffic is added in 2023.

6.1 Traffic generation

As discussed in **Section 5.2**, the peak workforce for each shift would increase by between nine and 105 per cent from 2014 to 2023, depending on the time of day. The future car occupancy for operational employee was assumed to be the same as the existing. The turning traffic volumes for light vehicles to and from Rixs Creek Lane were then increased according to the growth rate of employees. For example, the incoming and exiting traffic was increased by 92 per cent and nine per cent respectively during the AM peak hour, as the respective night and day shifts ended and started. For the PM peak, the incoming and exiting traffic was increased by 105 per cent and 92 per cent respectively, as the respective day and afternoon shifts ended and started.

These increased turning volumes were used to determine the impact of Project operations-generated traffic on the road network. This would be a worst case scenario as it is expected that other traffic, such as to and from the new rest area, would also increase in the same period.

Project operations is expected to generate an additional 57 light vehicle movements in the AM peak hour and 68 light vehicle movements in the PM peak hour in 2023.

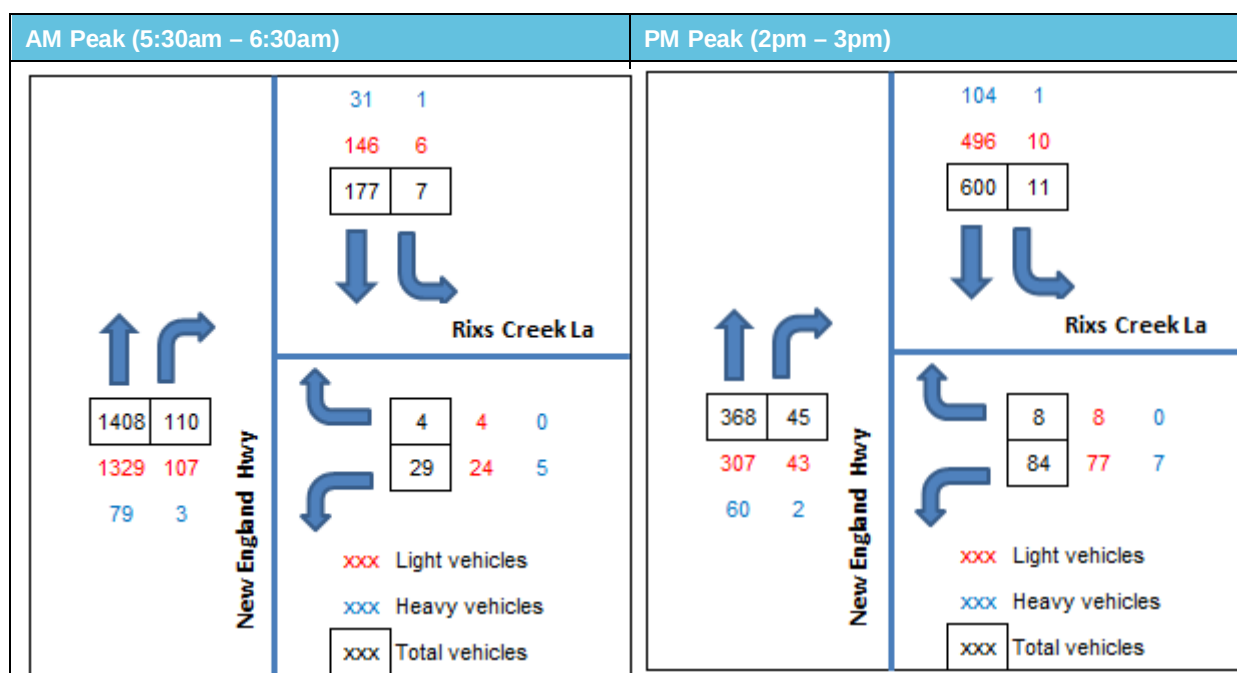
These traffic movements were added to the 2023 future base traffic flows at the intersection of New England Highway / Rixs Creek Lane intersection.

6.2 Traffic distribution and assignment

The trip distribution patterns are assumed to be similar to the existing patterns. These patterns were determined using existing turning counts at the New England Highway / Rixs Creek Lane intersection.

Figure 9 shows the AM and PM peak hour flows for year 2023 with the Project operations-generated traffic.

Figure 9 2023 intersection peak hour flows – with Project



Source: AECOM, April 2014

6.3 Impact of generated traffic

The New England Highway / Rixs Creek Lane intersection was re-assessed using SIDRA 6 and using the existing intersection layout. A comparison of the results of the assessment for the 2023 peak hours with and without the Project operations generated traffic are shown in **Table 15**.

Table 15 2023 peak hour intersection performance comparison – New England Highway / Rixs Creek Lane intersection

Year	Demand Flow (veh/h)	Level of Service*	Degree of Saturation (v/c)	Ave Delay* (sec)	95% Back of Queue (m)	Approach with longest delay
AM peak						
2023 Base	1,679	E	0.75	61	1.3	Rixs Creek Lane (E) right turn movement
2023 + Project	1,735	E	0.75	65	2.3	Rixs Creek Lane (E) right turn movement
PM peak						
2023 Base	1,047	B	0.34	22	1.0	Rixs Creek Lane (E) right turn movement
2023 + Project	1,115	B	0.34	23	1.9	Rixs Creek Lane (E) right turn movement

* Average delay and overall Level of Service for the worst movement are reported for sign-controlled intersection.

Source: AECOM 2014

The results indicate that the additional traffic would have a negligible impact on the intersection performance. The intersection of New England Highway / Rixs Creek Lane is still forecast to operate at an acceptable level of service (LoS B) during the PM peak period.

For the AM peak, the results show that the intersection would still perform at LoS E due to the low right turning volumes from Rixs Creek Lane (six vehicles in AM peak hour) experiencing relatively longer delays. As Rixs Creek Lane is a 'no through' road that primarily carries mine traffic, any delays would generally only occur to mine staff and not the general travelling public.

For a sign-controlled intersection, it can be misleading to only examine the highest average delay for the worst movement. The turning volumes experiencing these long delays should also be taken into account. For instance, only the right turning movement (six vehicles per hour) is operating at LoS E – all the other intersection movements are operating at LoS A during the AM peak. It is therefore not appropriate to define the overall intersection as LoS E as the turning volumes for that movement are very low.

Upgrading the intersection is not justified based on long delays to a small number of vehicles, unless there is a safety issue. Based on the crash data analysis, there were two non-casualty crashes recorded in the last five years, indicating that there is not a safety issue.

In addition, there would also be minimal impacts to the network through traffic and the degree of saturation (75%) indicates that the intersection would generally still be within acceptable intersection capacity.

Rix's Creek Pty Ltd has also advised that some daytime (6.30-2.30) pre-shift overtime could start at 2.30 am and post shift overtime finish at 10.00 am. This will shift some employee generated traffic out of the morning peak period. The right turning movement traffic from Rixs Creek Lane could therefore experience better level of service than the modelled results.

Overall, the traffic modelling suggests that there is not a requirement for road network upgrades to cater for the additional traffic generated by the Project operations.

7.0 Conclusion

The New England Highway / Rixs Creek Lane intersection is the only point of traffic access to the Mine. Rixs Creek Lane is a 'no through' road and carries mainly mine-generated traffic with several dwellings also using Rixs Creek Lane for property access. To determine traffic impacts of the Mine, the New England Highway / Rixs Creek Lane intersection has been assessed for performance against:

- 2014 existing conditions;
- 2023 without the Project operations generated traffic; and
- 2023 with the Project operations generated traffic.

A comparison of the results of the assessment for the above peak hours with and without the Project operations generated traffic is shown in **Table 16**.

Table 16 SIDRA analysis results – New England Highway / Rixs Creek Lane intersection

Year	Demand Flow (veh/h)	Level of Service*	Degree of Saturation (v/c)	Ave Delay* (sec)	95% Back of Queue (m)	Approach with longest delay
AM peak						
2014 Existing	1,538	D	0.68	44	1.2	Rixs Creek Lane (E) right turn movement
2023 Base	1,679	E	0.75	61	1.3	Rixs Creek Lane (E) right turn movement
2023 + Project	1,735	E	0.75	65	2.3	Rixs Creek Lane (E) right turn movement
PM peak						
2014 Existing	962	B	0.31	19	0.9	Rixs Creek Lane (E) right turn movement
2023 Base	1,047	B	0.34	22	1.0	Rixs Creek Lane (E) right turn movement
2023 + Project	1,115	B	0.34	23	1.9	Rixs Creek Lane (E) right turn movement

* Average delay and overall Level of Service for the worst movement are reported for sign-controlled intersection.

Source: AECOM 2014

The intersection is forecast to operate at an acceptable level of service (LoS B) during the PM peak period in all scenarios. For the AM peak, the results show that the intersection is likely to perform at LoS E in the future due to the low right turning volumes from Rixs Creek Lane (six vehicles per hour) experiencing relatively longer delays. Upgrading the intersection is not justified based on long delays to a small number of vehicles. In addition, the historical crash data indicates that there is not a safety issue at the intersection.

Overall, the traffic modelling suggests that there is not a requirement for road network upgrades to cater for the additional traffic generated by the Project operations.

The construction of a new tunnel under the New England Highway is also planned as part of the Project. The design would be similar to the existing tunnel and would be located to the north of the existing tunnel. A Construction Traffic Management Plan (CTMP) would be put in place to manage the traffic generated during construction of the tunnel.

Appendix A

SIDRA Results

MOVEMENT SUMMARY



Site: 2014 AM

New England Highway / Rixs Creek Lane
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMo v	Demand Flows		Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		Total	HV				Vehicles veh	Distance m			
		veh/h	%								
South: New England Highway (S)											
2	T1	1283	5.6	0.682	0.0	LOS A	0.0	0.0	0.00	0.00	79.4
3	R2	59	5.1	0.050	7.8	LOS A	0.2	1.2	0.22	0.61	58.0
Approach		1342	5.6	0.682	0.5	NA	0.2	1.2	0.01	0.03	78.1
East: Rixs Creek Lane (E)											
4	L2	27	18.5	0.016	5.8	LOS A	0.0	0.0	0.00	0.52	54.3
6	R2	4	0.0	0.043	44.0	LOS D	0.1	0.9	0.92	0.97	36.2
Approach		31	16.1	0.043	10.7	LOS A	0.1	0.9	0.12	0.58	51.0
North: New England Highway (N)											
7	L2	4	25.0	0.003	7.4	LOS A	0.0	0.0	0.00	0.63	57.8
8	T1	161	17.4	0.092	0.0	LOS A	0.0	0.0	0.00	0.00	80.0
Approach		165	17.6	0.092	0.2	NA	0.0	0.0	0.00	0.02	79.2
All Vehicles		1538	7.1	0.682	0.5	NA	0.2	1.2	0.01	0.04	77.4

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: AECOM AUSTRALIA PTY LTD | Processed: Wednesday, 12 August 2015 11:25:55 AM

Project: \\AUNTL1FP001\Projects\60289290_RixCreek_Mine\4. Tech work area\4.2 Traffic\4.2.3 SIDRA\New England Hwy & Rixs Creek Rd no oversized veh with calibration 20150811.sip6

MOVEMENT SUMMARY



Site: 2023 AM background

New England Highway / Rixs Creek Lane
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	ODMo v	Demand Flows		Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		Total	HV				Vehicles veh	Distance m			
		veh/h	%								
South: New England Highway (S)											
2	T1	1408	5.6	0.748	0.0	LOS A	0.0	0.0	0.00	0.00	79.1
3	R2	59	5.1	0.051	7.8	LOS A	0.2	1.2	0.23	0.61	58.0
Approach		1467	5.6	0.748	0.6	NA	0.2	1.2	0.01	0.02	78.0
East: Rixs Creek Lane (E)											
4	L2	27	18.5	0.016	5.8	LOS A	0.0	0.0	0.00	0.52	54.3
6	R2	4	0.0	0.062	61.0	LOS E	0.2	1.3	0.94	0.98	31.0
Approach		31	16.1	0.062	12.9	LOS A	0.2	1.3	0.12	0.58	49.6
North: New England Highway (N)											
7	L2	4	25.0	0.003	7.4	LOS A	0.0	0.0	0.00	0.63	57.8
8	T1	177	17.5	0.101	0.0	LOS A	0.0	0.0	0.00	0.00	80.0
Approach		181	17.7	0.101	0.2	NA	0.0	0.0	0.00	0.01	79.3
All Vehicles		1679	7.1	0.748	0.5	NA	0.2	1.3	0.01	0.03	77.3

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: AECOM AUSTRALIA PTY LTD | Processed: Wednesday, 12 August 2015 11:25:56 AM

Project: \\AUNTL1FP001\Projects\60289290_RixCreek_Mine\4. Tech work area\4.2 Traffic\4.2.3 SIDRA\New England Hwy & Rixs Creek Rd no oversized veh with calibration 20150811.sip6

MOVEMENT SUMMARY

▽ Site: 2023 AM with Project operations generated traffic

New England Highway / Rixs Creek Lane
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMo v	Demand Flows		Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		Total	HV				Vehicles veh	Distance m			
		veh/h	%								
South: New England Highway (S)											
2	T1	1408	5.6	0.748	0.0	LOS A	0.0	0.0	0.00	0.00	79.1
3	R2	110	2.7	0.094	7.8	LOS A	0.3	2.3	0.24	0.62	58.1
Approach		1518	5.4	0.748	0.8	NA	0.3	2.3	0.02	0.05	77.1
East: Rixs Creek Lane (E)											
4	L2	29	17.2	0.018	5.8	LOS A	0.0	0.0	0.00	0.52	54.3
6	R2	4	0.0	0.067	65.0	LOS E	0.2	1.4	0.95	0.98	30.0
Approach		33	15.2	0.067	13.0	LOS A	0.2	1.4	0.11	0.57	49.5
North: New England Highway (N)											
7	L2	7	14.3	0.004	7.2	LOS A	0.0	0.0	0.00	0.63	60.8
8	T1	177	17.5	0.101	0.0	LOS A	0.0	0.0	0.00	0.00	80.0
Approach		184	17.4	0.101	0.3	NA	0.0	0.0	0.00	0.02	79.0
All Vehicles		1735	6.9	0.748	0.8	NA	0.3	2.3	0.02	0.05	76.5

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: AECOM AUSTRALIA PTY LTD | Processed: Wednesday, 12 August 2015 11:25:57 AM

Project: \\AUNTL1FP001\Projects\60289290_RixCreek_Mine\4. Tech work area\4.2 Traffic\4.2.3 SIDRA\New England Hwy & Rixs Creek Rd no oversized veh with calibration 20150811.sip6

MOVEMENT SUMMARY



Site: 2014 PM

New England Highway / Rixs Creek Lane
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMo v	Demand Flows		Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		Total	HV				Vehicles	Distance			
		veh/h	%				veh	m			
South: New England Highway (S)											
2	T1	335	16.4	0.190	0.0	LOS A	0.0	0.0	0.00	0.00	79.9
3	R2	23	8.7	0.035	10.7	LOS A	0.1	0.9	0.55	0.75	55.4
Approach		358	15.9	0.190	0.7	NA	0.1	0.9	0.04	0.05	77.7
East: Rixs Creek Lane (E)											
4	L2	47	14.9	0.028	5.8	LOS A	0.0	0.0	0.00	0.52	54.4
6	R2	4	0.0	0.016	18.7	LOS B	0.1	0.4	0.78	0.88	48.3
Approach		51	13.7	0.028	6.8	LOS A	0.1	0.4	0.06	0.55	53.9
North: New England Highway (N)											
7	L2	6	16.7	0.004	7.2	LOS A	0.0	0.0	0.00	0.63	60.1
8	T1	547	17.4	0.312	0.0	LOS A	0.0	0.0	0.00	0.00	79.9
Approach		553	17.4	0.312	0.1	NA	0.0	0.0	0.00	0.01	79.6
All Vehicles		962	16.6	0.312	0.7	NA	0.1	0.9	0.02	0.05	76.9

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: AECOM AUSTRALIA PTY LTD | Processed: Wednesday, 12 August 2015 11:25:58 AM

Project: \\AUNTL1FP001\Projects\60289290_RixCreek_Mine\4. Tech work area\4.2 Traffic\4.2.3 SIDRA\New England Hwy & Rixs Creek Rd no oversized veh with calibration 20150811.sip6

MOVEMENT SUMMARY

▽ Site: 2023 PM background

New England Highway / Rixs Creek Lane
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMo v	Demand Flows		Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		Total	HV				Vehicles	Distance			
		veh/h	%				veh	m			
South: New England Highway (S)											
2	T1	367	16.3	0.208	0.0	LOS A	0.0	0.0	0.00	0.00	79.9
3	R2	23	8.7	0.038	11.3	LOS A	0.1	1.0	0.57	0.78	54.9
Approach		390	15.9	0.208	0.7	NA	0.1	1.0	0.03	0.05	77.8
East: Rixs Creek Lane (E)											
4	L2	47	14.9	0.028	5.8	LOS A	0.0	0.0	0.00	0.52	54.4
6	R2	4	0.0	0.020	21.9	LOS B	0.1	0.4	0.82	0.93	46.4
Approach		51	13.7	0.028	7.0	LOS A	0.1	0.4	0.06	0.55	53.7
North: New England Highway (N)											
7	L2	6	16.7	0.004	7.2	LOS A	0.0	0.0	0.00	0.63	60.1
8	T1	600	17.3	0.342	0.0	LOS A	0.0	0.0	0.00	0.00	79.8
Approach		606	17.3	0.342	0.1	NA	0.0	0.0	0.00	0.01	79.6
All Vehicles		1047	16.6	0.342	0.6	NA	0.1	1.0	0.02	0.05	77.1

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: AECOM AUSTRALIA PTY LTD | Processed: Wednesday, 12 August 2015 11:25:58 AM

Project: \\AUNTL1FP001\Projects\60289290_RixCreek_Mine\4. Tech work area\4.2 Traffic\4.2.3 SIDRA\New England Hwy & Rixs Creek Rd no oversized veh with calibration 20150811.sip6

MOVEMENT SUMMARY



Site: 2023 PM with Project operations generated traffic

New England Highway / Rixs Creek Lane
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMo v	Demand Flows		Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		Total	HV				Vehicles	Distance			
		veh/h	%				veh	m			
South: New England Highway (S)											
2	T1	367	16.3	0.208	0.0	LOS A	0.0	0.0	0.00	0.00	79.9
3	R2	45	4.4	0.072	11.2	LOS A	0.3	1.9	0.58	0.81	55.1
Approach		412	15.0	0.208	1.2	NA	0.3	1.9	0.06	0.09	76.2
East: Rixs Creek Lane (E)											
4	L2	84	8.3	0.048	5.7	LOS A	0.0	0.0	0.00	0.52	54.6
6	R2	8	0.0	0.041	23.0	LOS B	0.1	0.9	0.83	0.93	45.8
Approach		92	7.6	0.048	7.2	LOS A	0.1	0.9	0.07	0.56	53.8
North: New England Highway (N)											
7	L2	11	9.1	0.006	7.1	LOS A	0.0	0.0	0.00	0.63	62.4
8	T1	600	17.3	0.342	0.0	LOS A	0.0	0.0	0.00	0.00	79.8
Approach		611	17.2	0.342	0.2	NA	0.0	0.0	0.00	0.01	79.4
All Vehicles		1115	15.6	0.342	1.1	NA	0.3	1.9	0.03	0.08	75.2

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: AECOM AUSTRALIA PTY LTD | Processed: Wednesday, 12 August 2015 11:25:59 AM

Project: \\AUNTL1FP001\Projects\60289290_RixCreek_Mine\4. Tech work area\4.2 Traffic\4.2.3 SIDRA\New England Hwy & Rixs Creek Rd no oversized veh with calibration 20150811.sip6

Appendix B

Side Track Road Concept Design



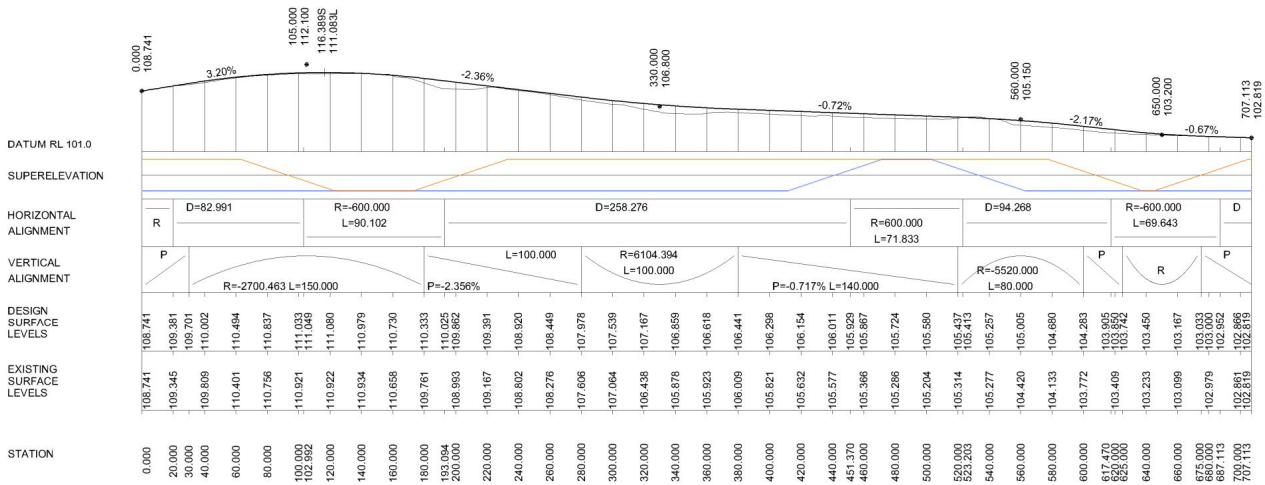
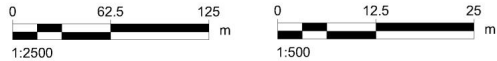






60289290-SKE-000004.dwg

22-Oct-14 - 16:42



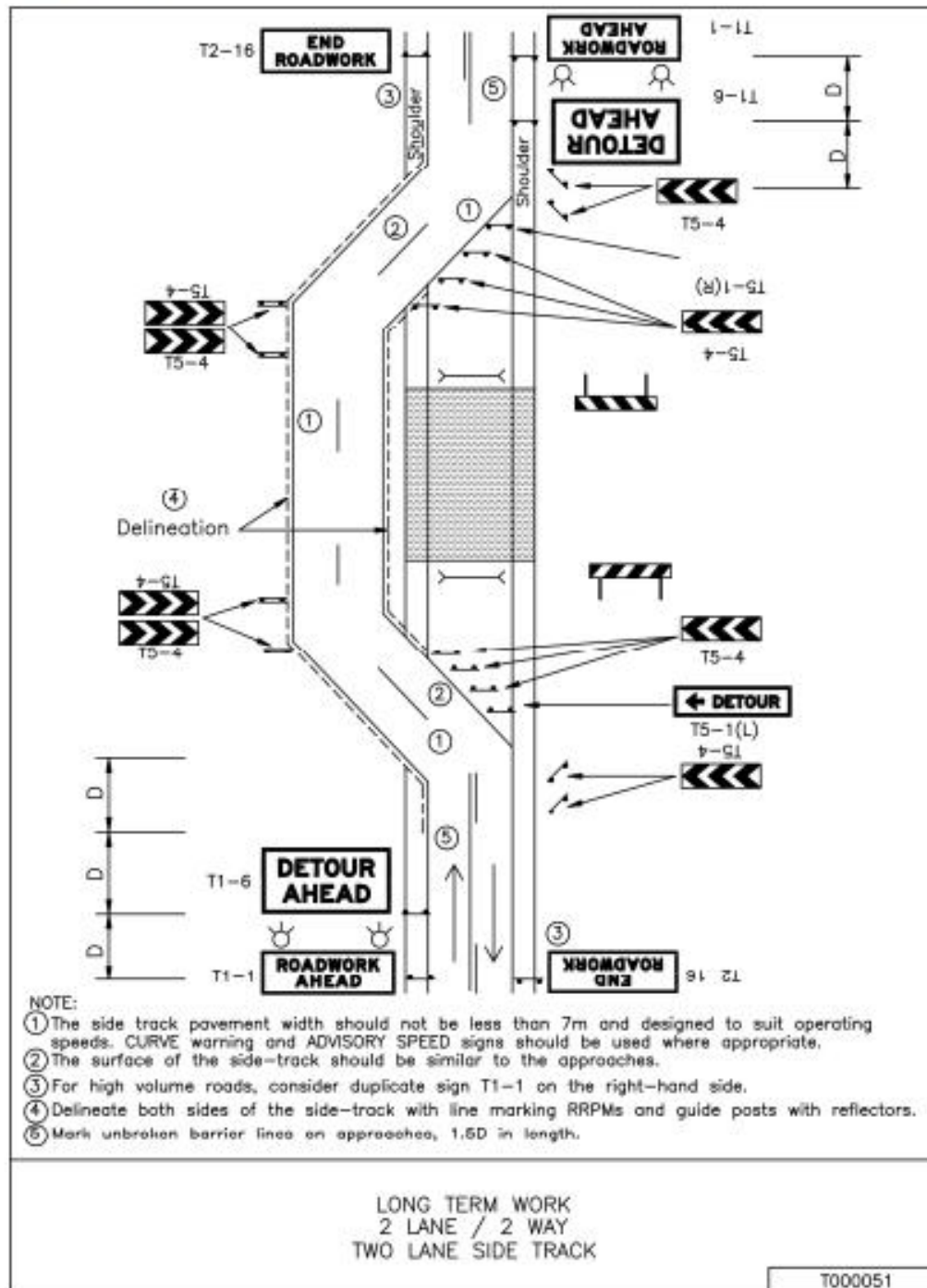
LONGITUDINAL SECTION - NEW ENGLAND HIGHWAY (MCA1)
SCALE 1:2500 HORIZ.
SCALE 1:500 VERT.

Appendix C

Standard TCPS From Roads and Maritime's Traffic Control At Work Sites Manual



Traffic Control at Work Sites



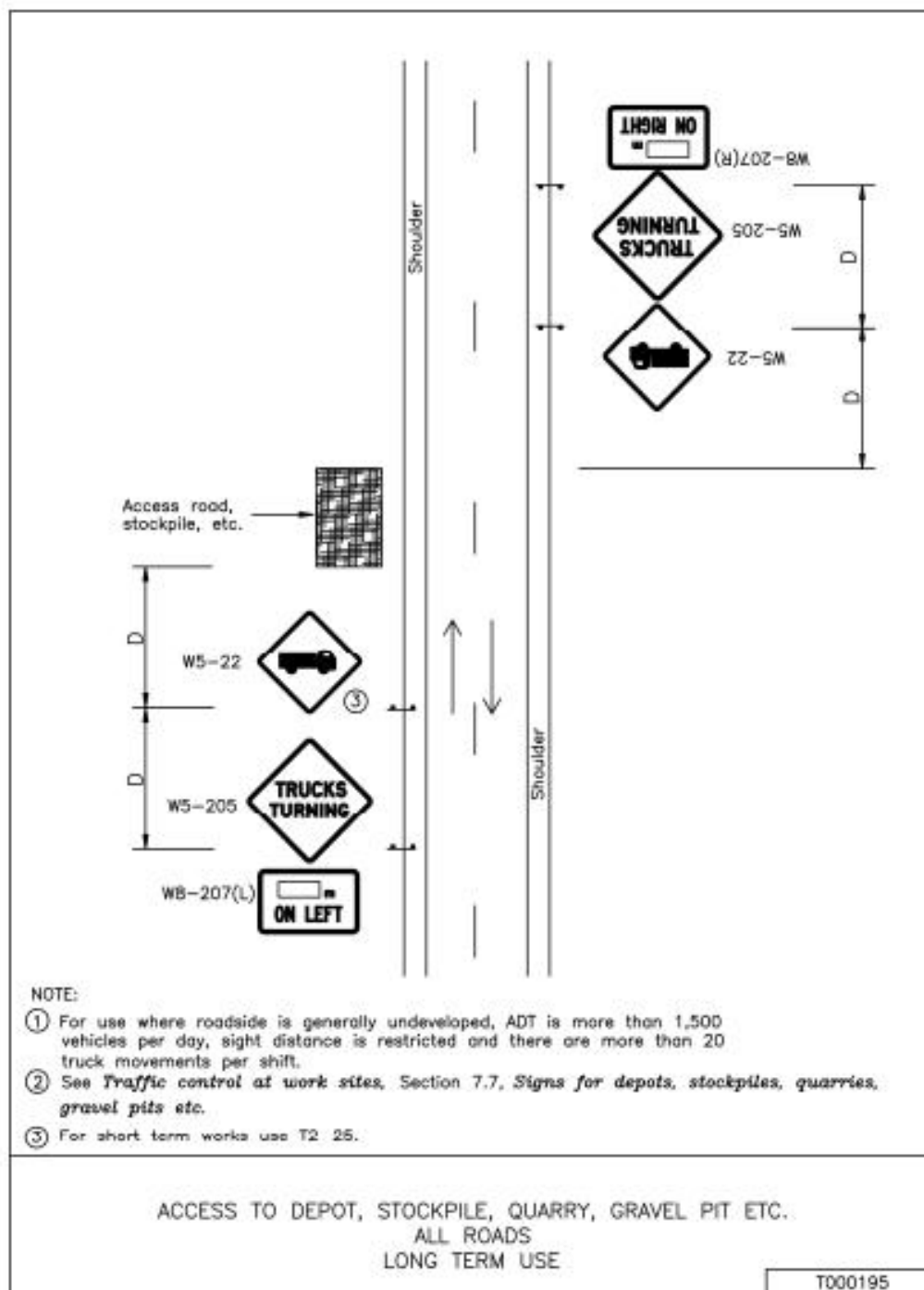
TCP 51

June 2010

Issue 1



Traffic Control at Work Sites



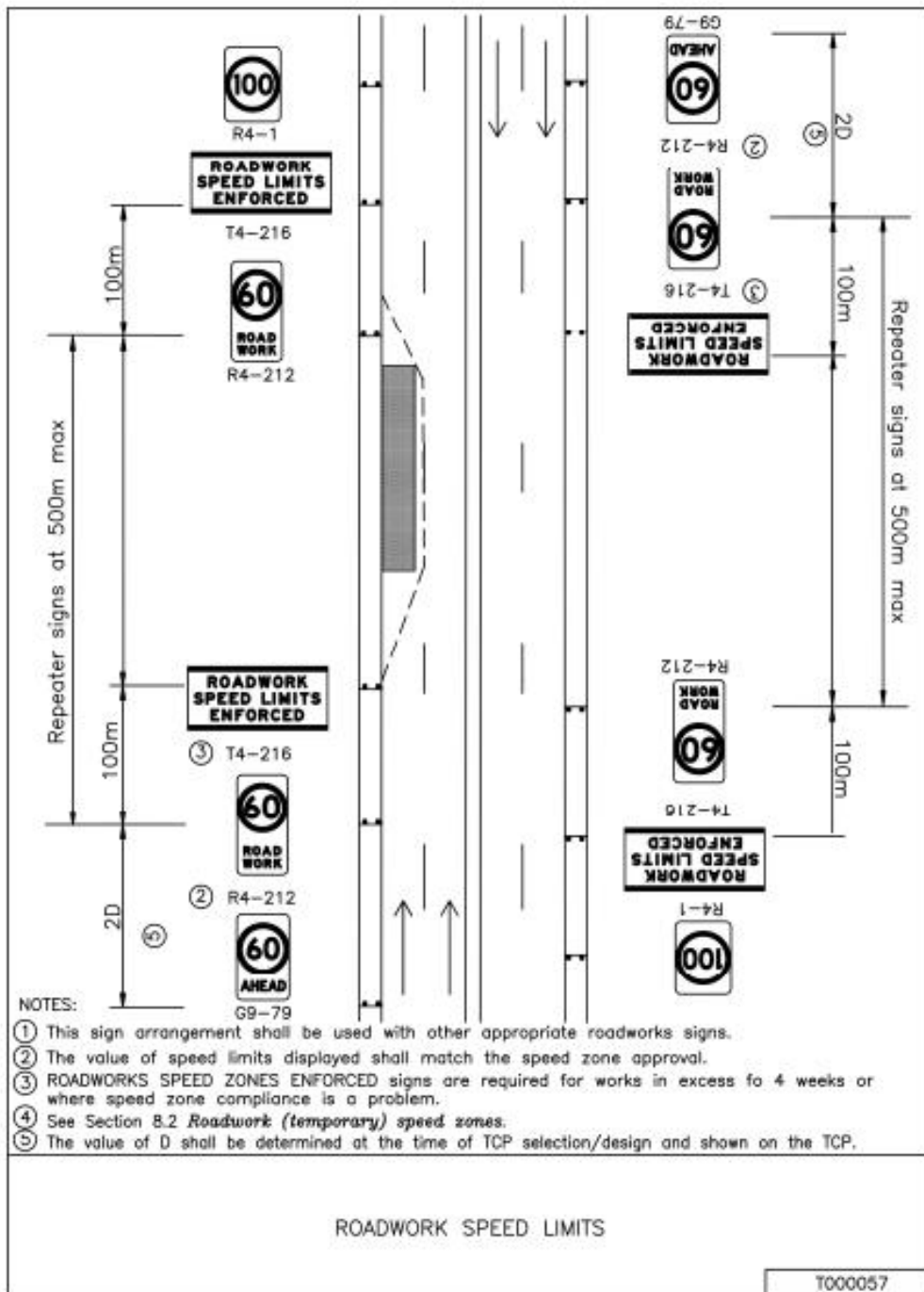
TCP 195

June 2010

Issue 1



Traffic Control at Work Sites

**TCP 57**

June 2010
Issue 1