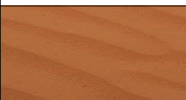


TRAFFIC IMPACT ASSESSMENT



APPENDIX 8



CLIENTS | PEOPLE | PERFORMANCE

Centennial Coal

Report for Awaba Colliery

Traffic Assessment

September 2010

Revision 2



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Executive Summary

Awaba Colliery is a small underground coal mine operated by Centennial Coal. The mine entry is located on Wilton Road, approximately one kilometre south of the Awaba village and 5.5 kilometres south west of Toronto on the western side of Lake Macquarie.

The objective of this assessment is to examine the existing public road condition in the area around the Awaba Colliery and any impact of the proposed Mining Project.

The scope of the traffic assessment is the intersection of Wilton Road and the Awaba Colliery access road and its approaches.

Wilton Road

Wilton Road is an unclassified road under the control of Lake Macquarie City Council (LMCC). At the township of Awaba, Wilton Road joins to Awaba Road. There are two junctions to the broader road network: one at Wangi Road in the south and one at Cessnock Road in the north.

Road Crashes

In the last five years, there were no crashes in the vicinity of the intersection; the nearest crash was located 540 metres from Colliery intersection.

Road Capacity

Wilton Road has sufficient capacity projected for at least the next 10 years.

Colliery Access

In accordance with Lake Macquarie Council Development Control Plan, the minimum sight distance requirements applying to the colliery access are those applicable to an access driveway.

Sight distances on both approaches to the Colliery are adequate for a local driveway access.

Signage and Guideposts

An improvement to the signage is proposed. These changes would provide early warning to motorists of the Colliery intersection.

Missing guideposts should be replaced on Wilton Road.



1. Introduction

This traffic assessment has been prepared on behalf of Centennial Coal.

1.1 Background

Awaba Colliery is a small underground coal mine operated by Centennial Newstan Pty Ltd (Newstan), a wholly owned subsidiary of Centennial Coal Company Ltd (Centennial). The mine entry and primary surface facilities are located approximately one kilometre south of the Awaba village and 5.5 kilometres (km) south west of Toronto on the western side of Lake Macquarie, near Newcastle NSW.

Awaba Colliery has been producing coal by bord and pillar method since 1947. The site is situated on crown land under lease to Centennial for the purpose of mining under Consolidated Coal Lease CCL746, and is adjacent to the Newstan-Eraring haul road owned by Eraring Energy. The locality of the mine is illustrated on Figure 1-1.

Awaba Colliery is a small operation with approximately 100 employees and contractors, historically producing around 800,000 tonnes of thermal coal annually. Since commencing mining operations in 1947, over 30 million tonnes of coal has been won from the Great Northern Seam using a combination of first workings development, pillar extraction, pillar quartering, and pillar stripping.

A form of pillar extraction of narrow panels is used to recover coal in pillars developed previously by bord and pillar methods. Development of bords (roadways) and pillars is ongoing but in some areas were developed many years ago. This mining method currently utilises continuous miners. Mine planning ensures panels are not extracted where depth of cover or surface constraints preclude total extraction. This mining method has been developed in consultation with the Department of Primary Industries – Mineral Resources (now known as Industry and Investment, NSW (I&I)) and has been used successfully to date, and is proposed to be continued for the Project.

Mining operations commenced at the Awaba Colliery in 1947, prior to the commencement of any planning controls, and have continued without abandonment since that time. Consequently, the Awaba Colliery presently operates pursuant to section 109(1) of the NSW Environmental Planning and Assessment Act 1979 (EP&A Act) and clause 6B(1) of the State Environmental Planning Policy (Major Development) 2005. An application for a Part 3A Project Approval has been lodged by Centennial for the Awaba Colliery Mining Project (the “Project”), which seeks approval from the Minister of Planning to allow an extension of underground mining and the ongoing use of associated surface operations. A detailed description of the Project and the Project Application Area (the “Application Area”) (including focus study areas) is detailed further in Sections 1.2 and 1.3 below.

Minimal changes are proposed to existing surface operations, with one proposed additional surface disturbance relating to increased pollution control dam capacity located in a previously disturbed area. No significant changes to coal handling are proposed. Underground mining areas requiring approval to allow continued mine operations and production are outlined in Sections 1.2 and 1.3 below.

At present, it is anticipated that the Project will recover approximately 2.0 million tonnes of coal which will be extracted from those areas depicted in Study Area 2 and Study Area 3 (refer Section 1.2.1) over a period of approximately five years or more, depending on actual mining conditions and relevant market drivers. The application for the proposed Project is supported by an Environmental Assessment (“EA”).



1.2 Project Application Area

The Project Application Area (the “Application Area”) is illustrated on Figure 1-2. The Application Area has been identified as the footprint of the proposed Project including proposed mining areas and related surface operations that are considered relevant to the continuation of Awaba Collieries operations, as well as, the existing workings areas that will continue to be relied upon for ventilation and other mining related purposes, access to proposed mining areas or for any required emergency evacuation.

The Application Area has been broken into a number of Study Areas based on the types of activities to be undertaken for the Project. These Study Areas are outlined below in Section 1.2.1. The extent of the existing workings has not been included as a Study Area as it is considered inappropriate to obtain retrospective approval for historical operations. Additionally, there are no activities proposed in these areas for the Project and ongoing management of these areas is covered by the existing Awaba Colliery Mining Lease conditions.

1.2.1 Study Areas

The Study Areas that have been assessed as part of this EA are shown on Figures 2.1a and 2.1b and include the following:

- ▶ Study Area 1 – Surface Facilities and Ancillary Infrastructure – This area includes the colliery pit top facilities (including office and amenities buildings, existing coal crushing plant, workshop and storage areas) ventilation shafts, an existing quarry and mine dewatering bore (10 South Bore).
- ▶ Study Area 2 – Continued Mining within Existing Main South Area staged SMP Approval Areas (including the Remaining Coal to be Mined within Stage 2 and the Revised Stage 3) – The impacts associated with mining in these areas have previously been assessed in Subsidence Management Plan (SMP) Applications. The Stage 2 Area application was approved by Industry and Investment in September 2008, with the SMP Application for the Revised Stage 3 Area submitted to I&I in December 2009 awaiting approval. These areas are defined by a 26.5 degree angle of draw (as per DPI-MR SMP Guidelines, 2003). The outcomes from the SMP assessment will be summarised along with any impacts that are not considered to have been adequately addressed for this EA. It is important to note that, in relation to Stage 2 Area, only the coal remaining from the 1st of August will require approval for this Project (this boundary has been indicated on Figure 2.1b); and
- ▶ Study Area 3 – Proposed Project Mining Areas - Consideration of the proposed Mining Area (East B Area) defined as the proposed workings plus 26.5 degree angle of draw (i.e. as per DPI-MR SMP Guidelines, 2003);
- ▶ Study Area 4 – Existing Internal Private Haul Road – This haul road will be utilised for transporting coal from the Awaba Colliery operations to Newstan Collieries existing Run of Mine Stockpile or Rail Loop and subsequently transported to the Port of Newcastle or Port Kembla for shipping to export markets (to be undertaken in accordance with the Newstan Colliery development consent) and also to the Eraring Power Station. It is noted that a modification to the Newstan Colliery development consent (DA 73-11-98) will be applied for under Section 96(1A) of the EP&A Act to allow for the preparation of coal sourced from the Awaba Colliery using the existing Newstan Colliery infrastructure.



In general, potential environmental impacts associated with mine access, ventilation and other services provided through the existing workings areas to the active and proposed mining areas will also be addressed in the EA.

1.3 Project Description

Awaba Colliery is seeking an approval from the Minister of Planning under the provisions of Part 3A of the EP&A Act to:

- ▀ Continue bord and pillar development and pillar extraction by continuous miners within the “Main South Area” (being the remaining sections of Stage 2 and Revised Stage 3, refer Study Area 2);
- ▀ Extend bord and pillar development and pillar extraction by continuous miners into the “East B” Area (refer Study Area 3);
- ▀ Produce, handle and distribute up to 880,000 tonnes of Run of Mine coal per annum (financial year) using existing surface facilities;
- ▀ Continue the use of existing ancillary surface facilities (all Study Areas);
- ▀ Expand the existing final Pollution Control Dam (refer Study Area 1);
- ▀ Continue the delivery of coal to the Newstan Colliery and/or the Eraring Power Station using the existing private haul road/transport facilities (refer Study Area 4).

The proposed East B Area contains a proportion of coal that extends beyond the existing footprint of mining at Awaba Colliery and includes areas of both existing workings and areas requiring new workings to be developed. Subsequently, areas of new workings are lateral extensions to the mine footprint which will require new development approval (being sought under the current Part 3A application). The East B area is located to the east of the Main South Stage 2 Area. The overlying surface in the East B Area is predominantly bush land on crown land leased to Centennial Newstan and contains no significant surface infrastructure. This area forms Study Area 3 for the Project, as illustrated on Figures 2.1a and 2.1b.

Mining will also be continued at Awaba Colliery in two (2) separate areas, these have been outlined below and illustrated as Study Area 2 on Figures 2.1a and 2.1b:

- ▀ Remaining sections of Stage 2 of the Main South Area (currently being mined) – this area was approved by I&I in September 2008 following an SMP application (as modified) under the NSW Mining Act, 1992.
- ▀ Revised Stage 3 Area (of Main South Area) – this area has recently undergone a number of specialist surveys relating to a SMP application submitted in December 2009 (approval currently awaited from I&I prior to December 2010).

At present, it is anticipated that the Project will recover approximately 2.0 million tonnes of coal which will be extracted from those areas depicted in Study Area 2 and Study Area 3 (see Figure 2.1b) over a period of approximately five years or more, depending on actual mining conditions and relevant market drivers.

All existing ancillary surface facilities, supporting infrastructure, workings and their associated uses will continue to be relied upon by the Awaba Colliery (no significant change) as outlined further below. These aspects of the Project will continue to be used until such time as the Awaba Colliery is placed on care and maintenance, and thereafter throughout that phase also. When the Awaba Colliery is placed on care and maintenance, this will be done in accordance with the Life of Mine Plan approved by I&I NSW in 2009, until such time that a final Detailed Life of Mine Strategy has been developed.



Annual production, handling and distribution of approximately 880,000 tonnes per financial year is required.

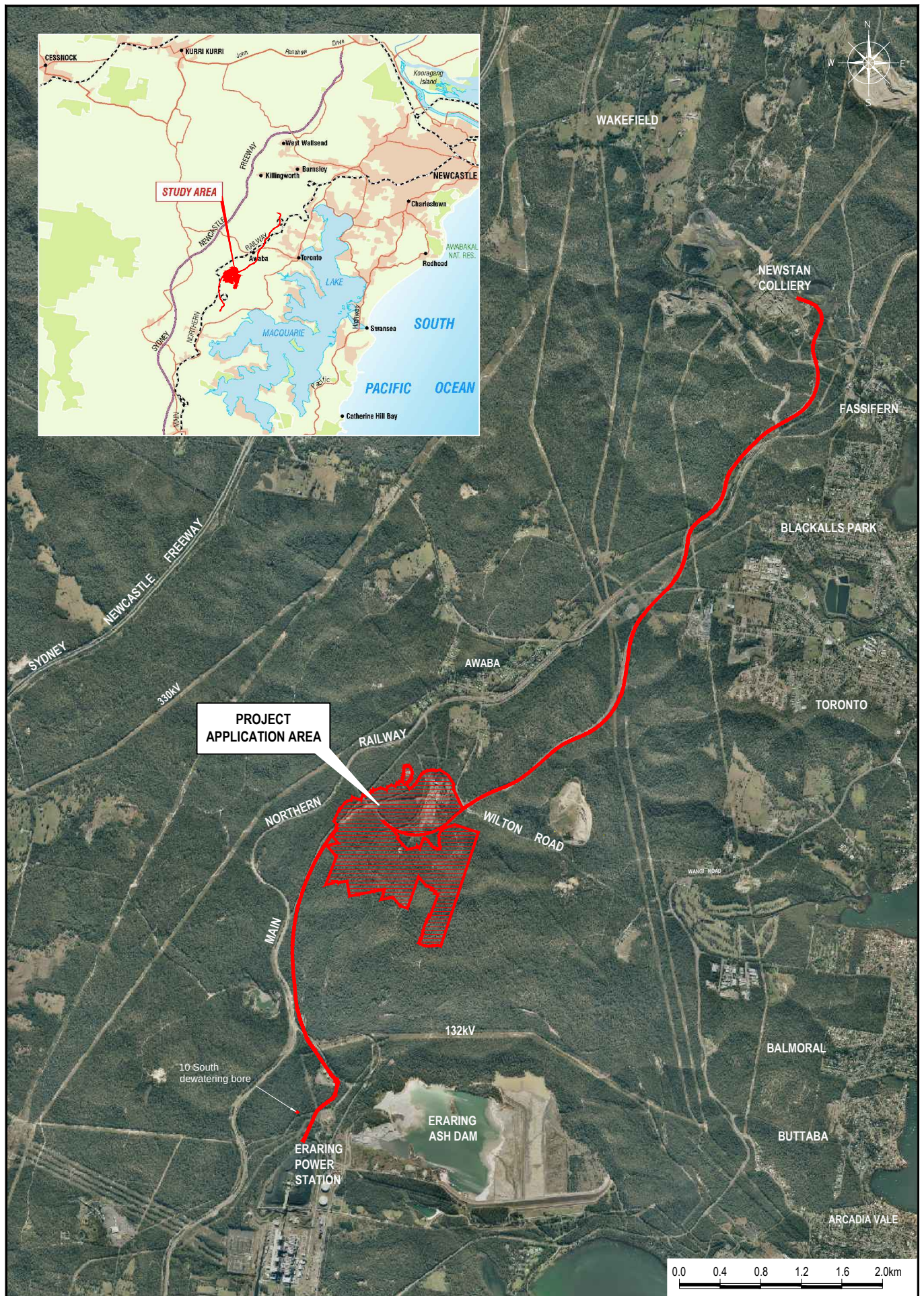
Awaba Colliery requires approval to deliver coal via the private haul road to the Newstan Colliery ROM coal stockpile (in addition to the Rail Loop stockpile). This is assessed within Study Area 4. Newstan Colliery has submitted an application to modify its development consent in order to process coal received from the Awaba Colliery.

Existing mining areas, will continue to be utilised for ongoing mining operations including (but not limited to) mine access, emergency management and underground services and infrastructure.

Continuing Mine Operations:

For the purposes of environmental assessment, further to the information above regarding continued mining areas, it is noted that the following aspects of mine operations are proposed to continue and remain unchanged. Existing mining operations are presented in detail in Section 3 of the Environmental Assessment (EA) and, where relevant, components are discussed further in this specialist report.

- ▀ **Coal Handling, preparation and stockpiles** – No changes are proposed to the current coal handling, preparation or stockpile procedures to the existing operations;
- ▀ **Mine support facilities and site access** – No changes are proposed to the current infrastructure and facilities, with the only exclusion being the expansion of the Pollution Control Dam (PCD) mentioned earlier above, with related water management considerations. Mine access from Wilton Road will continue to be utilised and no significant change is anticipated from current use;
- ▀ **Plant and equipment** – No changes are proposed to the typical plant and equipment used at the Awaba Colliery;
- ▀ **Transportation procedures** – No changes are proposed to the current transport procedures. The Project will continue to use the Newstan-Eraring private haul road to transport coal from the operations to Newstan and Eraring;
- ▀ **Mining methodology** – There will be no significant changes to current mining methods for the Project. This includes predicted subsidence levels and operational structure. Production rates may be slightly increased from approximately 800,000 to 880,000 tonnes per annum (financial year), depending on mining efficiency and market demands;
- ▀ **Operational water management** – the domestic wastewater generation rate from the Pit Top facilities will be similar to that which currently exists as there is no plan for an increase or significant change in staff numbers. Disposal of the domestic wastewater will remain as currently exists at site;
- ▀ **Mine dewatering procedures** – the 10 South Bore will continue to be used for groundwater management and dewatering during both continued operation and care and maintenance conditions.

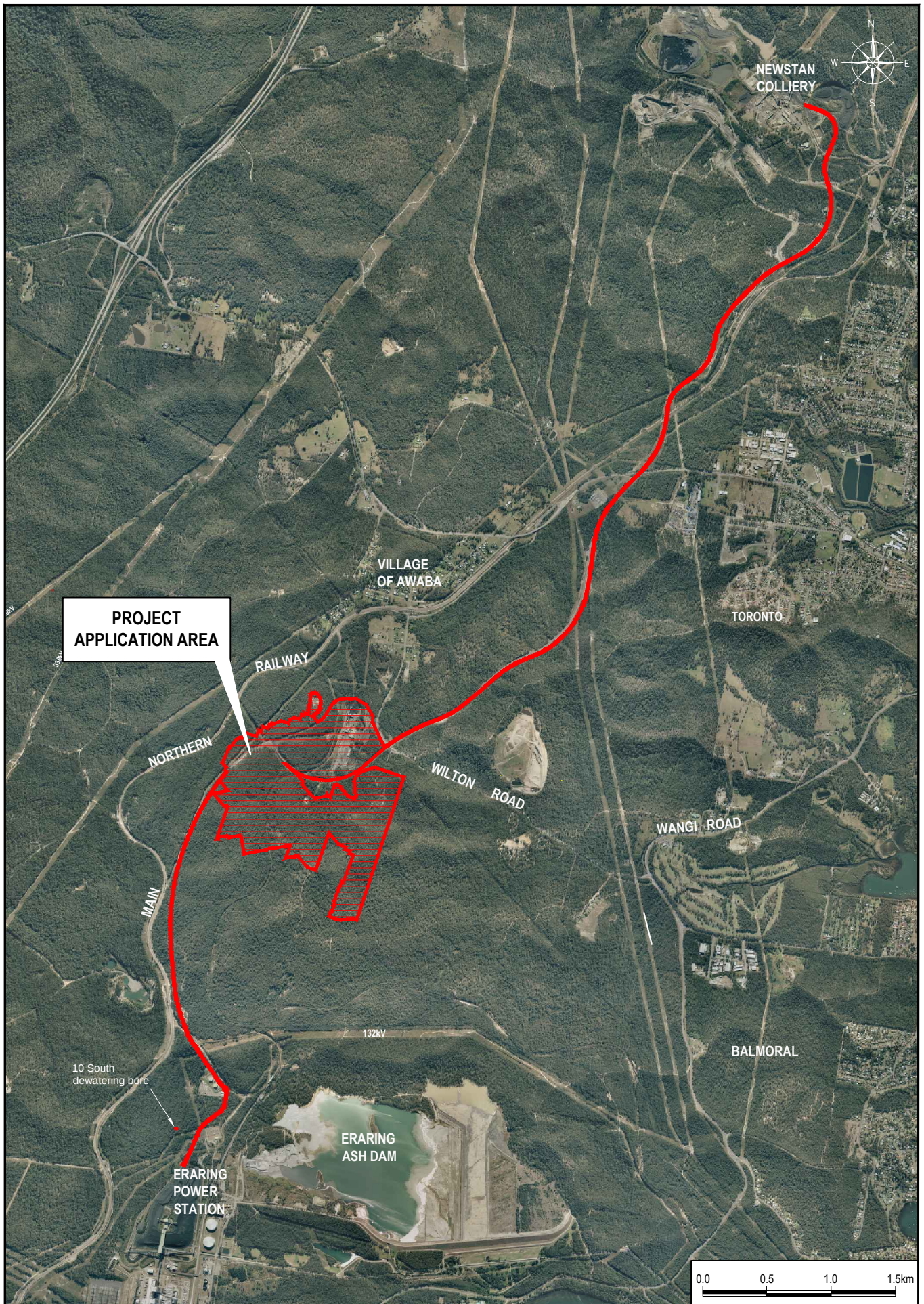


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Location Plan
Figure 1.1



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Project Application Area

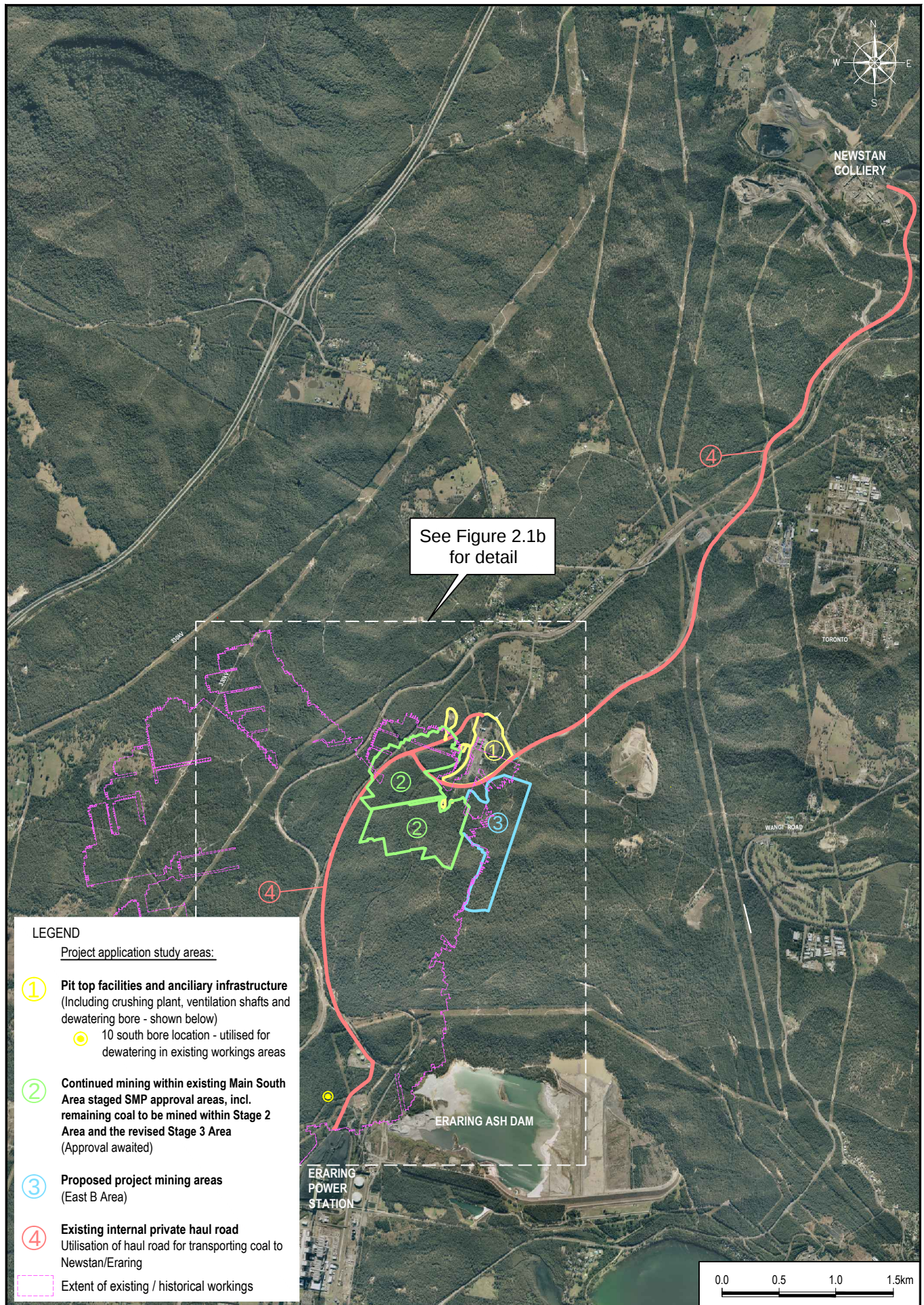
Figure 1.2



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Source: Centennial Coal

Local Road Network

Figure 1.3



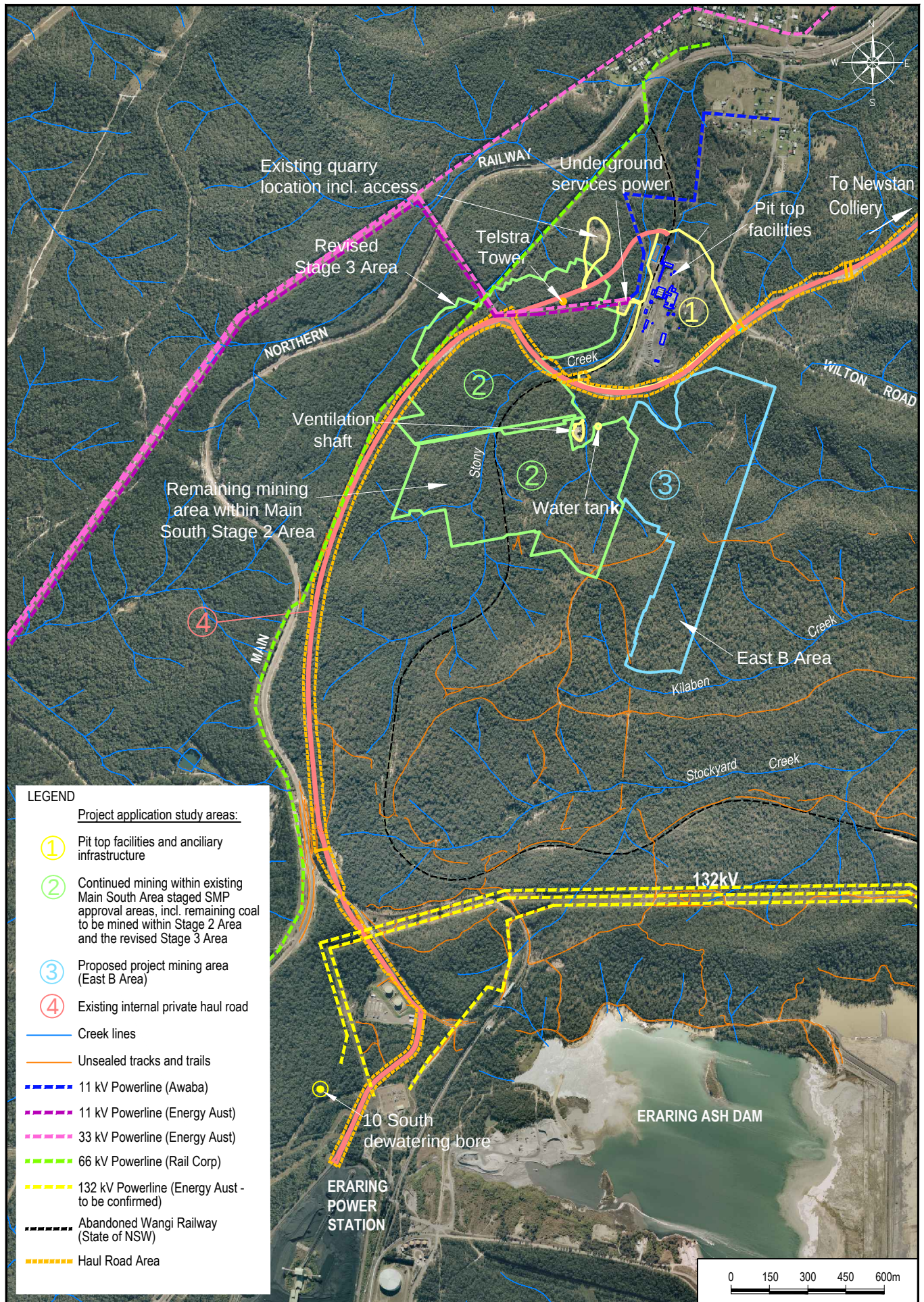
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Project Application Study Areas

Figure 2.1a



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Project Application Study Areas Detailed

Figure 2.1b



1.4 Objectives

The objective of this assessment is to examine the existing public road condition in the area around the Awaba Colliery and to assess any impact of the proposed ongoing operation of the Colliery.

1.5 Scope

The scope of this assessment is the intersection of Wilton Road and the Awaba Colliery access road and its approaches. The assessment is limited to the impact of employee and delivery traffic generated by the existing Colliery operation. All coal haulage traffic is via the Newstan-Eraring haul road owned by Eraring Energy.

In assessing this site, it is noted that there have been no crashes recorded by RTA on Wilton Road in the vicinity of the Colliery access road during the past five years. The nearest crash was recorded as occurring at approximately 500 metres from Colliery access.

1.6 Director General Requirements

The Roads and Traffic Authority (RTA) responded to the Director Generals Requirements (DGR) request for key issues to be addressed in the Environmental Impact Assessment. These are summarised in Table 1-1 and where they have been addressed in this report.

Table 1-1 RTA Director General Requirements

Requirement	Where Addressed
Assessment of all relevant vehicular traffic routes and intersections for access to/from the subject area during the construction and operational phases	No construction phase Section 4.2 Existing Traffic
Current traffic counts for all of the traffic routes and intersections	Section 4.2.1 Wilton Road Traffic
Anticipated additional vehicular traffic generated from the proposed development and associated trip distribution on the road network during both the construction and operation phases	No additional vehicular traffic to be generated
Traffic impacts on existing and proposed intersections, including the cumulative traffic impact of other proposed developments in the area.	Section 4.2 Existing Traffic
Identify the necessary road network infrastructure upgrades that are required to maintain existing levels of service on both the local and classified road network	Road signage improvements discussed in Section 6 Traffic Safety



Requirement	Where Addressed
Intersection analysis	Section 5 Future Conditions and Impact Assessment SIDRA output attached in Appendix A
Impact of construction traffic on the road network in the vicinity of the development and measures to minimise any identified impact	No construction phase traffic. All coal haulage is via a private road.



2. Consultation

2.1 Lake Macquarie City Council

Marc Desmond of Lake Macquarie City Council (LMCC) expressed concern about the lack of signage on the approach to the Colliery. LMCC had no other comment on the condition of Wilton Road in the vicinity of the access road.

LMCC had no current records of traffic flow or traffic crashes on Wilton Road in the immediate vicinity of the Colliery Access Road. The nearest traffic flow information was between MR 217 Wangi Road and Awaba Waste Management Facility.

Through this consultation, and referring to the Development Control Plan, if the number of carparking spaces is below 250, the road may be considered as an access driveway.

2.2 Roads and Traffic Authority

The Roads and Traffic Authority (RTA) advised that it has reviewed the information provided in relation to the traffic impact of the Project. RTA provided written confirmation that it has no objections to or requirements for the Project as it is unlikely to have a significant impact on the classified road network.



3. Methodology

3.1 Assessment of Existing Conditions

A site inspection was undertaken of Wilton Road to obtain intersection geometry, measure sight distances, to confirm traffic movements at a change of shift at the Colliery and to observe traffic movements and driver behaviour in the vicinity of the intersection.

3.2 Standards

This assessment is carried out in accordance with the RTA Guide to Traffic Generating Developments, October 2002, Version 2.2 and with reference to the relevant Austroads publications and Australian Standards relating to road design and road safety.

3.3 Modelling

SIDRA version 4.0 was used to model the Wilton Road intersection. SIDRA is a micro-analytical traffic evaluation tool used to measure capacity, level of service and performance of intersections.

Traffic data from LMCC from 2002 was obtained on Wilton Road from the nearest location, approximately two kilometres to away, and extrapolated to 2010 based on the traffic growth rate of the nearest main road, Wangi Road. The worst hour of traffic data was used to model the peak traffic of the Colliery intersection.

This was further extrapolated to 2015 and 2020 to analyse future road and intersection performance.

Colliery traffic has a scheduled change of shift at 6:30 am, 2:30 pm and 10:30 pm. Although these do not coincide with the commuter peak period on Wilton Road/Awaba Road peak hour, a conservative approach to the analysis was taken by assuming a coincidence between the Colliery peak traffic flow and the public road peak traffic flow. This provides the worst possible combination of movements at the intersection.

4. Existing Conditions

4.1 Existing Road Network

4.1.1 Wilton Road

Wilton Road is an unclassified road under the control of LMCC. At the township of Awaba, Wilton Road joins to Awaba Road. There are two junctions, one at Wangi Road in the south and one at Cessnock Road in the north.

Wilton Road is a two-lane two-way sealed road extending west from Wangi Road (MR 217). The posted speed limit is 80 km/hr between Wangi Road and the Colliery access road. Wilton Road does not have street lighting and passes through land enclosed by thick vegetation. There are generally one-metre wide sealed shoulders on both sides of the road and a double barrier centre line. The Awaba Waste Management Facility is located approximately 1.4 kilometres from Wangi Road and 1.2 kilometres from the Colliery access. The section of Wilton Road in the vicinity of the Awaba Waste Management Facility has a narrower road formation with generally narrow unsealed shoulders. The road alignment through this section is winding. Wilton Road crosses the Colliery haul-road via an overbridge approximately 200 metres to the south of the Colliery access road.

4.1.2 Colliery Access Road

The Colliery access road intersects Wilton Road on a slight bend. There is no hold line or regulatory sign for the side road traffic. An advisory sign for the Colliery is located at the intersection.



Figure 4-1 Wilton Road at the haul road overbridge, looking north



Figure 4-2 Wilton Road at approach to Colliery access, looking north

Approximately 300 metres to the north of Colliery access, the speed limit reduces from 80 km/hr to 60 km/hr and the surrounding land use becomes rural-residential with direct driveway access from Wilton Road.

Several guideposts on Wilton Road are missing due to vehicles running off the road on the curve north of the Colliery access.



Guide Post
missing

Figure 4-3 Wilton Road at the Colliery intersection looking north

At Awaba Railway Station, approximately 600 metres north of the Colliery access Wilton Road turns sharply to the west and becomes Awaba Road. One kilometre to the east, Awaba Road passes under Cessnock Road overbridge and terminates at Cessnock Road.



4.1.3 Crash Data

A summary of the crash history was supplied by RTA for Wilton Road between Cessnock Road and Wangi Road covering a period of five years between July 2004 and July 2009.

There were no crashes in the vicinity of the intersection; the nearest crash was located 540 metres from Colliery intersection.

On the 5.4 kilometre length of road, there were:

- ▶ 13 crashes
- ▶ 5 crashes causing injury
- ▶ No fatal crashes.

Four of the five injury crashes occurred on a narrow winding section of Wilton Road in the vicinity of the Waste Management Facility. Several of these crashes involved 'run-off-road- hit-object' type incidents, reflecting the very narrow formation of the road at that location.

Crash Data is shown in Appendix A.

4.1.4 Intersection Geometry and Sight Distance

The intersection of Awaba Colliery and Wilton Road is a T-intersection. There is no hold line or signage, and operates as a Give Way intersection.

From the intersection geometry, the turn paths of 19 metre articulated vehicle were applied to the Colliery intersection to determine the adequacy of the existing pavement to accommodate large turning vehicles. These turn paths are shown in Figure 4-4.

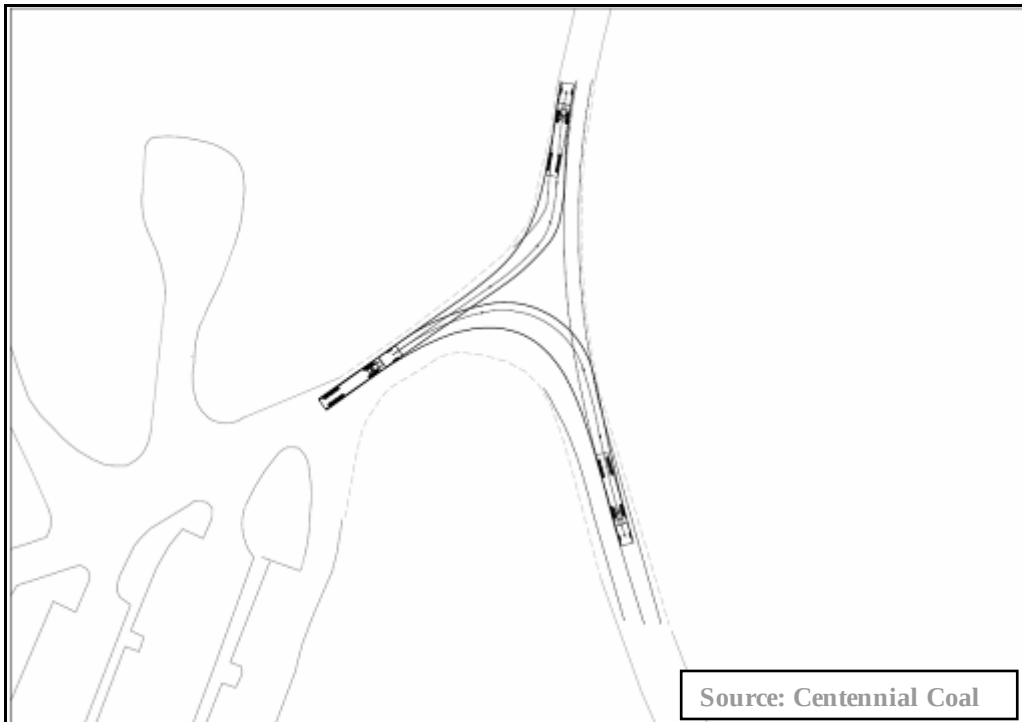


Figure 4-4 Turning Paths

From Figure 4-4 it is evident that the existing intersection is able to satisfactorily accommodate the turn paths of 19 metre articulated vehicles.

Terrain is generally level in the vicinity of the Colliery intersection.

The sight distances measured on Wilton Road on the approaches to the intersection were 130 metres on the northern approach and 220 metres on the southern approach. The sight distances at the Colliery intersection measured during a site inspection are shown in Figure 4-5.

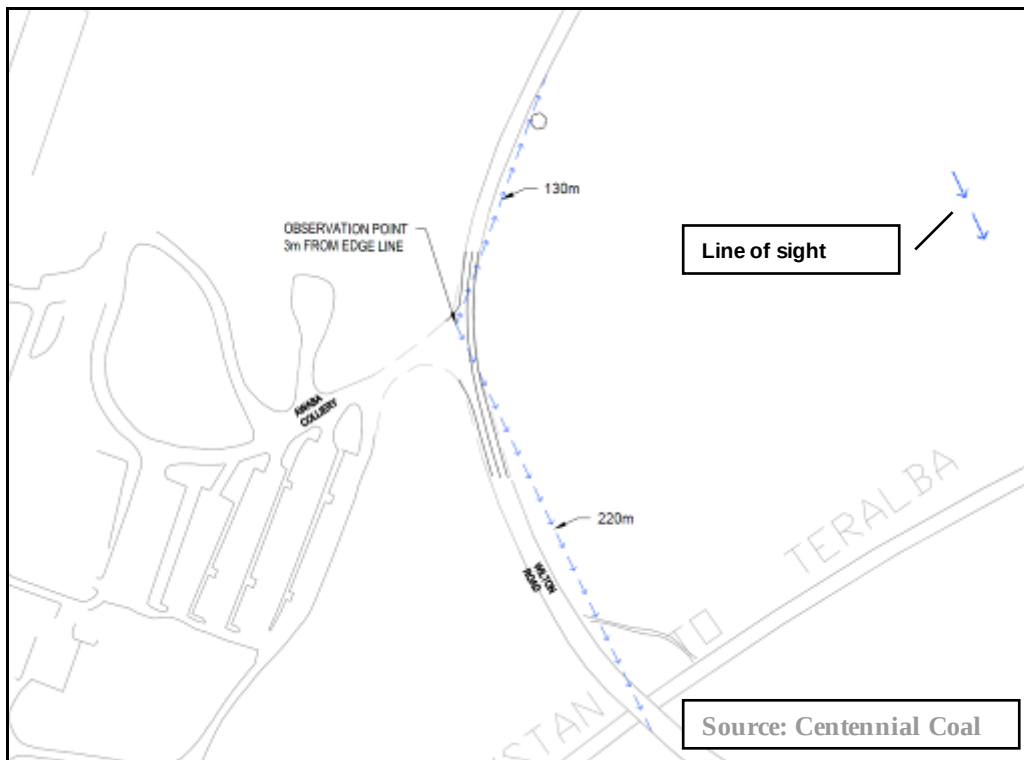


Figure 4-5 Sight Distance

To provide safe access for vehicles from the Colliery to the local road network, minimum sight distances for intersecting traffic are required.

Lake Macquarie Council Development Control Plan Number 1 Part 2.6 *Transport, Parking, Access and Servicing* specifies minimum sight distances for access driveways in Section 2.6.8 Table 13. For a driveway providing access for between 25 and 250 car spaces in an 80 km/hr speed zone, the absolute minimum sight distance is 105 metres.

As there are 200 car parking spaces at the Colliery, the access is described as a driveway and there is sufficient sight distance at the intersection.

4.1.5 Signage

There is no advance signage warning drivers on Wilton Road of traffic turning at the Colliery Access. The sign at the intersection pointing to the Colliery is too small and is obscured by vegetation.

4.2 Existing Traffic Conditions

4.2.1 Wilton Road Traffic

Traffic flow and traffic speed data for Wilton Road was supplied by LMCC. The peak hour traffic flow is summarised in Table 4-1.



Table 4-1 LMCC 2002 Traffic Data

Year of Survey	2002
Two-way Average Daily Volume (Weekday)	1951
Peak hour AM	8am-9am
Peak hour PM	2pm-3pm
Two-way peak of traffic	178
Vehicle Classes 1-2	74.5%
Vehicle Classes 3-12	25.4%

The traffic count data showed the classes of vehicles using Wilton Road over the surveyed week. The Austroads classifications range from 1 to 12. Classes 1 and 2 are considered as light vehicles, ie motorcycles and cars. Classes 3 to 12 are considered as heavy vehicles.

During the traffic survey, between 10 and 17 January 2002, 25% of the vehicles surveyed were classified as heavy vehicles. It should be noted that the survey site was located between MR 217 Wangi Road and Awaba Waste Management Facility and service vehicles accessing this facility would not generally drive past the Colliery. This data has been used for modelling and would be considered a very conservative estimate of traffic volumes passing the Colliery access. The traffic data is shown in Appendix A.

AADT data was recorded on MR217 Wangi Road at Stockyard Creek Bridge, approximately 200 metres south of the Wilton Road intersection. The data shows that between 1995 and 2004 growth was approximately 1-2% a year. Therefore, in the absence of other information, a growth of 2% pa was applied to the 2002 traffic count data to estimate the 2010 traffic volume on Wilton Road.

4.2.2 Colliery Traffic

There are currently approximately 100 contractors and staff at the Colliery and it is in operation 24 hours a day, seven days a week. In general:

- ▶ There are three shifts per day:
 - 45 employees 6:30 am – 2:30 pm
 - 30 employees 2:30 pm – 10:30 pm
 - 25 employees 10:30 pm – 6:30 am.
- ▶ There are eight deliveries per day.
- ▶ The distribution of traffic is approximately 50% turning north towards Awaba village and 50% turning south towards Balmoral.

To model the Colliery Intersection, the following assumptions were made for traffic movements during the peak period:

- ▶ Traffic growth on Wilton Road is assumed to be 2% per year.
- ▶ 50%-50% distribution of traffic entering and exiting from Wilton Road.
- ▶ 45 staff arriving and 30 leaving in light vehicles at the peak shift changeover.
- ▶ 4 delivery trucks arrive and leave (4 in/4 out).

The most significant traffic volume would be when a change of shift occurs in conjunction with a number of deliveries. Figure 4-6 shows the potential Colliery traffic generated at the change of shift at 2:30 pm.

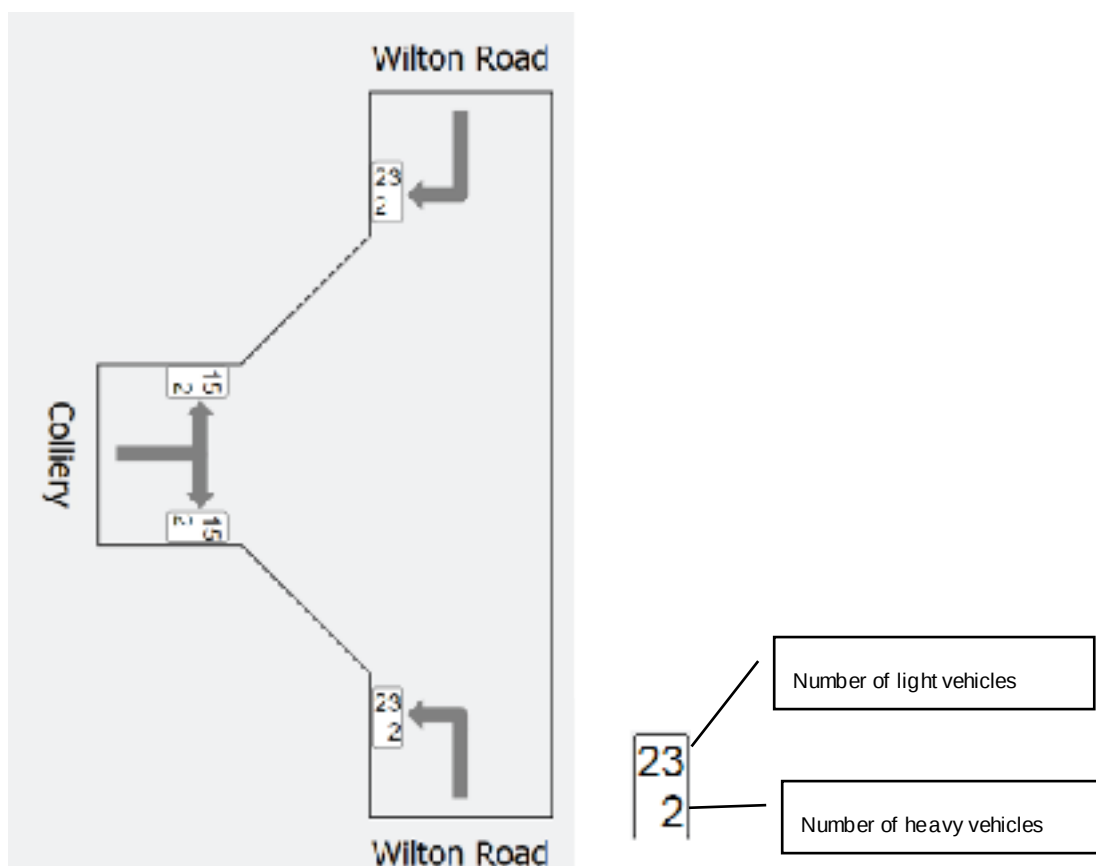


Figure 4-6 Colliery Traffic Breakdown in the Peak Hour

4.2.3 Existing Level of Service

Wilton Road

A summary of the traffic volumes on Wilton Road are shown in Table 4-2.



Table 4-2 Wilton Road Traffic Volumes

Year	Two-way Peak Hour Volume (Weekday)	% HV	One-way Peak Hour Volume LV	One-way Peak Hour Volume HV
2002	178	25%	67	23
2010	209	25%	79	27

All volumes were rounded up to the next whole vehicle.

The LOS criteria on two-lane two-way rural roads, as defined in RTA's Guide to Traffic Generating Developments, is shown in Table 4-3. These threshold values are based on a design speed of 80 km/hr and rolling terrain with 40% 'no overtaking'.

Table 4-3 Peak Hour Flow on Two-Lane Rural Road (Vehicles/Hour)

Level of Service	Veh/hr
B	264
C	485
D	595
E	1283

Source: RTA Guide to Traffic Generating Developments, October 2002, Version 2.2

As the estimated existing traffic volume on Wilton Road is below the threshold volume for level of service B, the existing level of service for traffic using Wilton Road can be described as A/B. This indicates a free flow to stable flow conditions with spare capacity.

Wilton Road/Colliery Access Intersection

Given that the waste management facility is approximately 1.3 kilometres from Wangi Road, it is reasonable to assume that most of the heavy vehicles identified in the traffic survey are entering and leaving via Wangi Road, and not passing the Colliery. It is therefore conservative to apply all of these heavy vehicles to the intersection.

The peak of movements at the Colliery is at shift changes at 6:30 am, 2:30 pm and 10:30 pm. These times are outside of the peak recorded in the traffic survey. The worst combination of change of shift traffic peak and Wilton Road traffic peak has been used to model the performance of the intersection. This is also a conservative approach to the analysis and represents a 'worst-case' scenario.

The estimated intersection turning flows for 2010 in vehicles per hour are shown in Figure 4-7. The existing performance of the Wilton Road/Colliery Access intersection was assessed by analysing the estimated peak period traffic flows using SIDRA Version 4. The results are shown in Figure 4-8. The SIDRA output file is supplied in Appendix A.

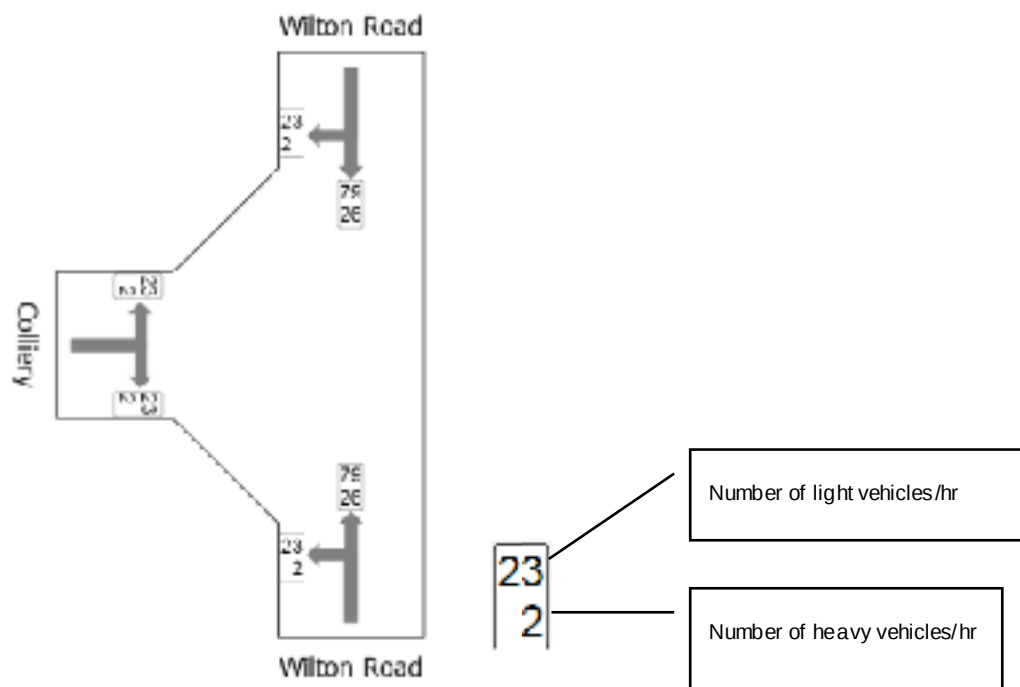


Figure 4-7 Modelled Flow Volumes in the Peak Hour for the Year 2010

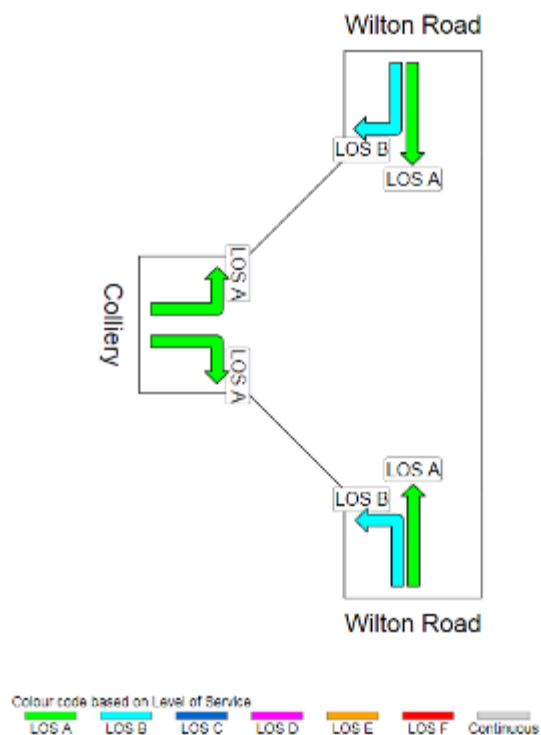


Figure 4-8 Existing 2010 Intersection LOS



A description of the various levels of service for intersections is given in Table 4-4. From the analysis results, it is evident that the existing intersection operates at a good level of service (LOS A) and has spare capacity.

Table 4-4 Performance Criteria for Intersections

LOS	Average Delay/Vehicle (secs/veh)	Give-Way and Stop Signs
A	Less than 14	Good operation
B	15 to 28	Acceptable delays and spare capacity
C	29 to 42	Satisfactory, but accident study required
D	43 to 56	Near capacity and accident study required
E	57 to 70	At capacity; requires other control mode

Source: RTA Guide to Traffic Generating Developments, October 2002, Version 2.2



5. Future Conditions and Impact Assessment

5.1 Coal Haulage

The existing private haul roads will continue to be utilised to transport domestic coal to Newstan Colliery to the north or Eraring Power Station to the South. Grade-separated overpasses along the haul roads avoid any impact to traffic using public roads.

It is understood that there will be no mining near or under public roads.

5.2 Traffic Volume Estimates

No additional traffic will be generated by the Project. The traffic modelling assumed the existing level of traffic generated by the Colliery is expected to remain relatively constant for the life of the mine until 2015

Manning levels for Awaba will reduce towards mine closure. Deliveries are expected to remain similar to current levels until mine closure.

The projected traffic volumes on Wilton Road due to ambient traffic growth to 2020 and based on historic growth trends are shown in Table 5-1.

Table 5-1 Wilton Road Projected Traffic Volumes

Year	LV	HV	Two-way Peak Hour Volume (Weekday)	One-way Peak Hour Volume (Weekday)
2002	67	23	178	90
2010	79	27	209	106
2015	87	29	230	116
2020	96	32	254	128

These volumes have been used in the traffic assessments for 2015 and 2020.

5.3 Traffic Assessment for Future Years

5.3.1 Traffic Analysis

Wilton Road

The LOS criteria on two-lane two-way rural roads, as defined in RTA's Guide to Traffic Generating Developments, is shown in Table 5-2.

Table 5-2 Peak Hour Flow on Two-Lane Rural Road (Vehicles/Hour)

Level of Service	Veh/hr
B	264
C	485
D	595
E	1283

Source: RTA Guide to Traffic Generating Developments, October 2002, Version 2.2

The threshold values in Table 5-2 are based on a design speed of 80 km/hr and rolling terrain with 40% 'no overtaking'. As the estimated future peak hour traffic volumes in 2015 and 2020 on Wilton Road (refer Table 5-1) are below the threshold volumes for level of service B given in Table 5-2, the existing level of service for traffic using Wilton Road can be described as A/B. This indicates a free flow to stable flow conditions with spare capacity.

Wilton Road/Colliery Access Intersection

The estimated future traffic flows at the intersection in 2015 and 2020 were analysed using SIDRA Version 4. The results for level of service are the same in 2015 and 2020 and are shown in Figure 5-1 and Figure 5-2. An output report for this model is in Appendix A.

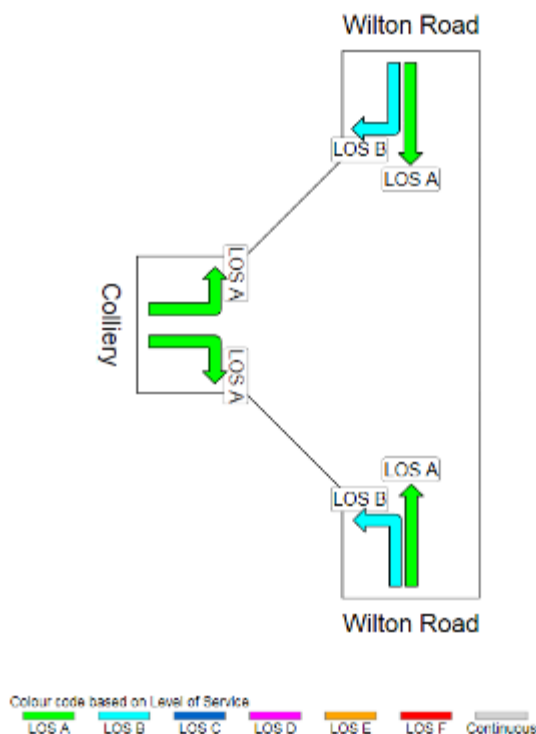


Figure 5-1 Intersection LOS for 2015 Projected Traffic Volumes

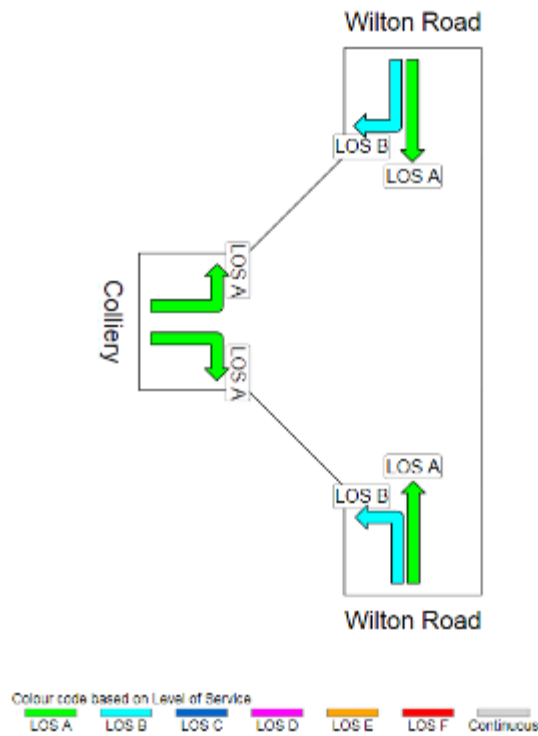


Figure 5-2 Intersection LOS 2020 Projected Traffic Volumes

Based on the intersection Level of Service reported for future years, it is clear that the intersection will continue to operate at a good level of service with minimal delays to traffic and with spare capacity.

6. Traffic Safety

The approach to the Colliery access road is generally legible. The crash data provided by RTA indicated that there were no recorded crashes in the vicinity of the site for the period from 2004 to 2009.

Observations on-site indicate that a tree in the eastern verge opposite the access road is within the 'clear zone' and may be hazardous to a vehicle that runs off the road.



Figure 6-1 Eastern verge showing substandard shoulder and tree in 'clear zone'

The volume of traffic turning right into the Colliery is small and is expected to remain constant or decline over the remaining life of the mine operations. The SIDRA analysis results in Appendix B indicate that it is unlikely that a driver would need to stop before finding a suitable gap in oncoming traffic to turn safely; that is, the probability of a southbound through vehicle having to avoid a vehicle waiting to turn is very low.

The absence of warning signs on Wilton Road advising drivers of the Colliery access road is a safety issue. There is one small direction sign at the Colliery access intersection that is obscured by trees and bushes for southbound traffic. In order to address the potential safety issue, the additional signs indicated on Figure 6-2 are recommended. They would increase drivers' awareness of the intersection and generally improve the legibility of the intersection.

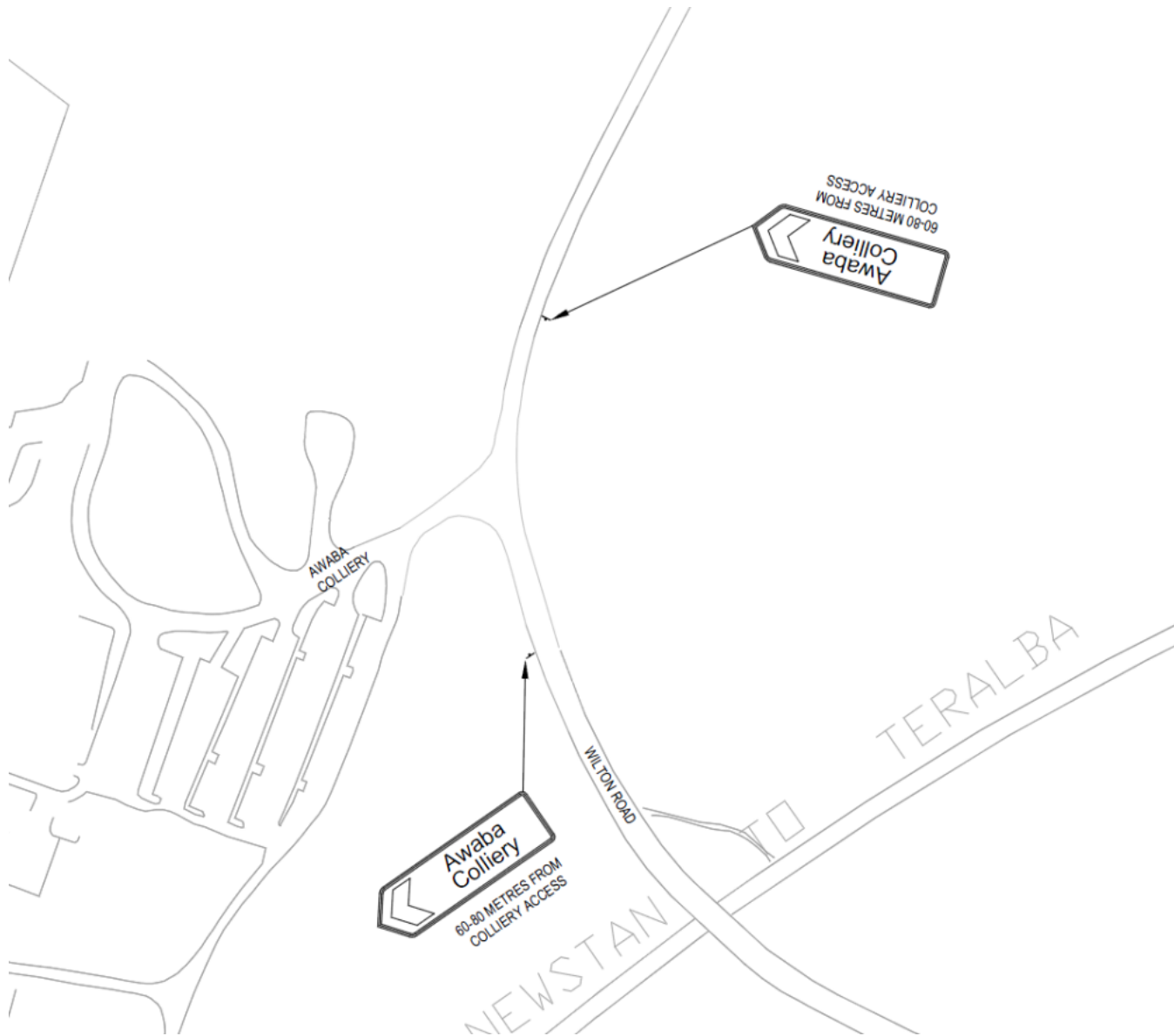


Figure 6-2 Signage Plan



7. Conclusions and Mitigation Measures

7.1 Conclusions

The following conclusions are made based on the assessment:

- ▶ Wilton Road and its intersection with the Colliery access road have sufficient traffic capacity for at least the next 10 years.
- ▶ Sight distance on both approaches to the Colliery is adequate for a local driveway access.
- ▶ Traffic signage on Wilton Road warning approaching drivers of traffic turning at the Colliery access is deficient.
- ▶ Guideposts along sections of Wilton Road near the Colliery access road are missing.
- ▶ The volume of traffic turning right into the Colliery is small and is expected to remain constant or decline over the remaining life of the mine operations.
- ▶ Removal of a tree in the 'clear zone' would provide more space for a through-vehicle to pass to the left of a right turning vehicle. The probability of this manoeuvre being required is very low.

7.2 Mitigation Measures

The following mitigation measures are made to improve safety at the Colliery access:

- ▶ Improve signage as shown in Figure 6-2.
- ▶ Replace missing guideposts on Wilton Road in the vicinity of the colliery access.



8. References

Australian Standard 2009, *AS 1742.2 – 2009 Manual of uniform traffic control devices*, October 2009, Standards Australia, Sydney, NSW.

Austroads 2009, *Guide to road design: Part 4A: Unsignallised and Signalised Intersections*, Austroads, Sydney, NSW.

Lake Macquarie City Council 2009, *Development Control Plan No.1 Principles of Development* Revision 4, November 2009.

GSS Environmental 2010, *Preliminary Environmental Assessment Awaba Colliery Continuation of Mining*, February 2010.

RTA 2002, *Guide to Traffic Generating Development*, October 2002 Issue 2.2, Roads and Traffic Authority of New South Wales, Sydney, NSW.



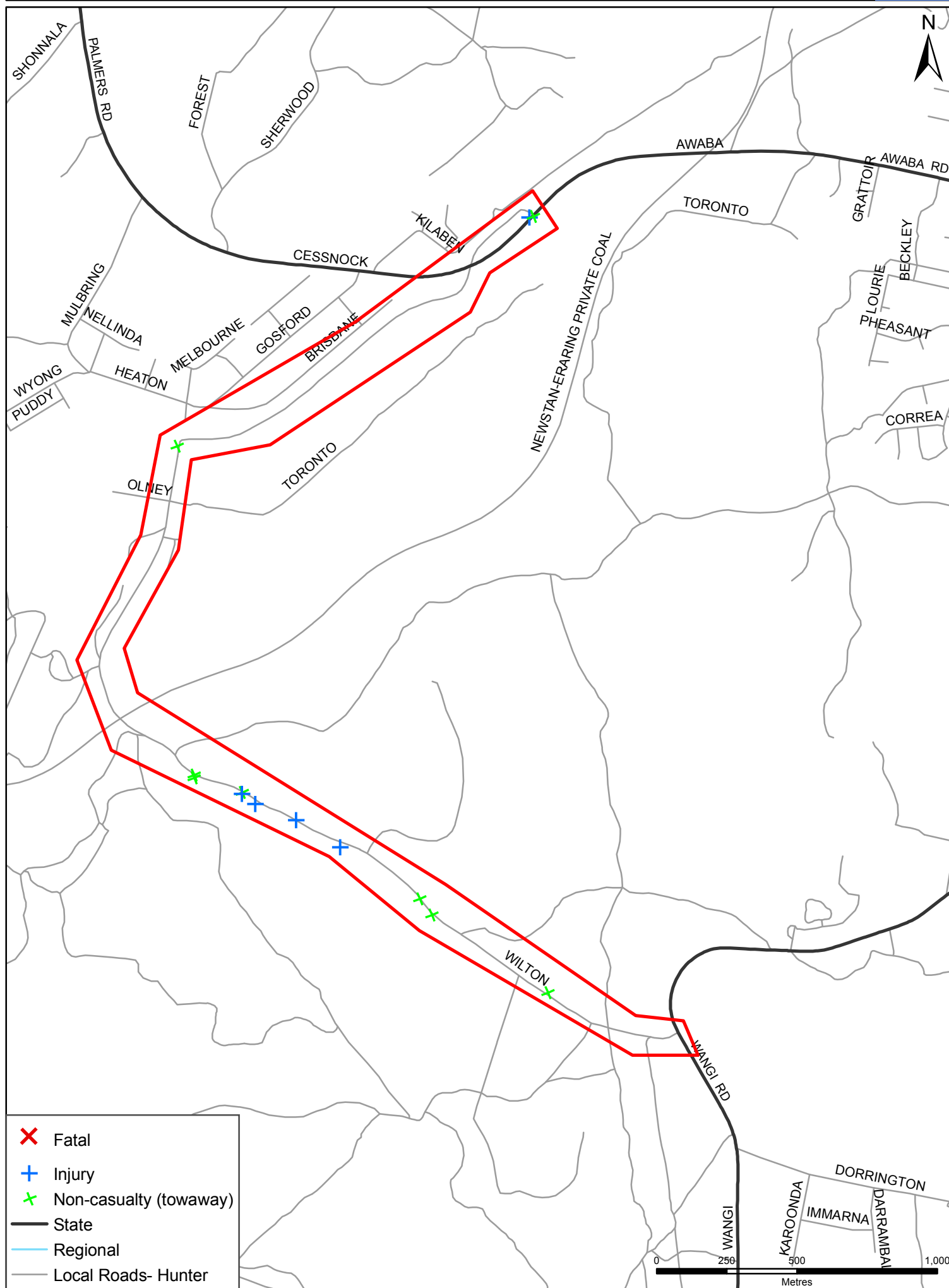
Appendix A Crash Data

RTA

Wilton Road between Awaba Road and Wangi Road, Awaba

Crashes period 1/7/2004 to 30/6/2009 (Finalised data).

Plus Provisional data (which is incomplete & subject to change) from March Quarter 2009.





Summary Crash Report

# Crash Type			Contributing Factors			Crash Movement			CRASHES			CASUALTIES					
Car Crash	9	69.2%	Speeding	5	38.5%	Intersection, adjacent approaches	2	15.4%	Fatal crash	0	0.0%	Killed	0	0.0%			
Light Truck Crash	4	30.8%	Fatigue	2	15.4%	Head-on (not overtaking)	2	15.4%	Injury crash	5	38.5%	Injured	5	100.0%			
Rigid Truck Crash	1	7.7%				Opposing vehicles; turning	0	0.0%	Non-casualty crash	8	61.5%	^ Unrestrained	1	20.0%			
Articulated Truck Crash	0	0.0%				U-turn	1	7.7%	^ Belt fitted but not worn, No restraint fitted to position OR No helmet worn								
'Heavy Truck Crash	(1)	(7.7%)	Weather			Rear-end	0	0.0%	Time Group		% of Day		Crashes		Casualties		
Bus Crash	0	0.0%	Fine	10	76.9%	Lane change	0	0.0%	00:01 - 02:59	3	23.1%	12.5%	1	2010	0		
"Heavy Vehicle Crash	(1)	(7.7%)	Rain	2	15.4%	Parallel lanes; turning	0	0.0%	03:00 - 04:59	1	7.7%	8.3%	1	2009	0		
Emergency Vehicle Crash	0	0.0%	Overcast	1	7.7%	Vehicle leaving driveway	0	0.0%	05:00 - 05:59	0	0.0%	4.2%	3	2008	0		
Motorcycle Crash	1	7.7%	Fog or mist	0	0.0%	Overtaking; same direction	0	0.0%	06:00 - 06:59	0	0.0%	4.2%	2	2007	1		
Pedal Cycle Crash	0	0.0%	Other	0	0.0%	Hit parked vehicle	0	0.0%	07:00 - 07:59	1	7.7%	4.2%	3	2006	2		
Pedestrian Crash	0	0.0%	Road Surface Condition			Hit railway train	0	0.0%	08:00 - 08:59	0	0.0%	4.2%	2	2005	1		
' Rigid or Artic. Truck " Heavy Truck or Heavy Bus			Wet	2	15.4%	Hit pedestrian	0	0.0%	09:00 - 09:59	0	0.0%	4.2%	1	2004	1		
# These categories are NOT mutually exclusive			Dry	11	84.6%	Permanent obstruction on road	0	0.0%	10:00 - 10:59	0	0.0%	4.2%	~ School Travel Time				
Location Type			Snow or ice	0	0.0%	Hit animal	0	0.0%	11:00 - 11:59	2	15.4%	4.2%	Involvement			2	15.4%
*Intersection	2	15.4%	Natural Lighting			Off road, on straight	1	7.7%	12:00 - 12:59	0	0.0%	4.2%	McLean Periods			% Week	
Non intersection	11	84.6%	Dawn	0	0.0%	Off road on straight, hit object	0	0.0%	13:00 - 13:59	0	0.0%	4.2%	A	2	15.4%	17.9%	
* Up to 10 metres from an intersection			Daylight	5	38.5%	Out of control on straight	0	0.0%	14:00 - 14:59	0	0.0%	4.2%	B	0	0.0%	7.1%	
~ 07:30-09:30 or 14:30-17:00 on school days			Dusk	0	0.0%	Off road, on curve	2	15.4%	15:00 - 15:59	2	15.4%	4.2%	C	2	15.4%	17.9%	
Collision Type			Darkness	8	61.5%	Off road on curve, hit object	4	30.8%	16:00 - 16:59	0	0.0%	4.2%	D	0	0.0%	3.5%	
Single Vehicle	8	61.5%	Speed Limit			Out of control on curve	0	0.0%	17:00 - 17:59	0	0.0%	4.2%	E	0	0.0%	3.6%	
Multi Vehicle	5	38.5%	~ 40km/h or less			Other crash type	1	7.7%	18:00 - 18:59	1	7.7%	4.2%	F	1	7.7%	10.7%	
Road Classification			40 km/h or less						19:00 - 19:59	0	0.0%	4.2%	G	2	15.4%	7.1%	
Freeway/Motorway	0	0.0%	50 km/h zone						20:00 - 21:59	1	7.7%	8.3%	H	1	7.7%	7.1%	
State Highway	0	0.0%	60 km/h zone						22:00 - 24:00	2	15.4%	8.3%	I	1	7.7%	12.5%	
Other Classified Road	2	15.4%	70 km/h zone						Street Lighting Off/Nil		% of Dark		J	4	30.8%	10.7%	
Unclassified Road	11	84.6%							8	of	8 in Dark	100.0%					
Day of the Week			# Holiday Periods			New Year	0	0.0%	Queen's BD	0	0.0%	Easter SH	1	7.7%			
Monday	1	7.7%	Thursday	2	15.4%	Sunday	2	15.4%	Aust. Day	0	0.0%	Labour Day	0	0.0%	June/July SH	0	0.0%
Tuesday	3	23.1%	Friday	2	15.4%	WEEKDAY	9	69.2%	Easter	0	0.0%	Christmas	0	0.0%	Sept./Oct. SH	0	0.0%
Wednesday	1	7.7%	Saturday	2	15.4%	WEEKEND	4	30.8%	Anzac Day	0	0.0%	January SH	0	0.0%	December SH	1	7.7%

Crashid dataset Wilton Road between Awaba Road to Wangi Road, Awaba . Crash Period 01/07/04 to 30/06/09. Plus provisional data

Note: Data for the 9 month period prior to the generated date of this report are incomplete and are subject to change.

Percentages are percentages of all crashes. Unknown values for each category are not shown on this report.

Detailed Crash Report - sorted

Crash No.	Date	Day of Week	Time	Distance	ID Feature	Loc Type	Alignment	Weather	Surface Condition	Speed Limit	No. of Tus	Tu Type/Obj	Age/Sex	Street Travelling	Speed Travelling	Manoeuvre	Degree of Crash	Killed	Injured	Factors
Natural Lighting																				S F
Hunter Region		Lake Macquarie City LGA				Awaba		Wilton Rd												
453383	19/11/2004	Fri	00:45	1.75 km W	WANGI RD	2WY	CRV	Fine	Dry	60	1	WAG	M20	E in WILTON RD	60	Proceeding in lane	I	0	1	S F
E22356979					Darkness	DCA: 804	R	Off left bend into obj				Tree/bush								
Hunter Region		Lake Macquarie City LGA				Awaba		Wilton Rd												
488878	21/08/2005	Sun	15:15	500 m W	WASTE DEPOT ENT	2WY	STR	Fine	Dry	60	2	CAR	M26	W in WILTON RD	30	Perform U-turn	I	0	1	
E24624661					Daylight	DCA: 304		Same - U-turn				M/C	M27	W in WILTON RD	30	Proceeding in lane				
Hunter Region		Lake Macquarie City LGA				Awaba		Wilton Rd												
494144	13/10/2005	Thu	20:03	2 km N	WANGI RD	2WY	CRV	Fine	Dry	80	1	CAR	M31	S in WILTON RD	80	Proceeding in lane	N	0	0	
E25869739					Darkness	DCA: 804	L	Off left bend into obj				Tree/bush								
Hunter Region		Lake Macquarie City LGA				Awaba		Awaba Rd												
508477	03/02/2006	Fri	07:50		at WILTON RD	TJN	STR	Overcast	Dry	90	2	CAR	F79	E in WILTON RD	10	Turning right	I	0	1	
E25946354					Daylight	DCA: 104		Adj - Right-thru from right				CAR	M18	N in AWABA RD	90	Proceeding in lane				
Hunter Region		Lake Macquarie City LGA				Awaba		Wilton Rd												
515105	19/03/2006	Sun	01:25	1.265 km S	AWABA ROAD OP	2WY	CRV	Raining	Wet	60	1	WAG	M33	N in WILTON RD	60	Proceeding in lane	N	0	0	S
E26357817					Darkness	DCA: 801	L	Off cway right bend												
Hunter Region		Lake Macquarie City LGA				Awaba		Wilton Rd												
525704	29/04/2006	Sat	23:00	2 km S	RAILWAY SN	2WY	CRV	Fine	Dry	80	1	TRK	M34	W in WILTON RD	80	Proceeding in lane	I	0	1	S
E26609660					Darkness	DCA: 803	R	Off right bend into obj				Embankment								
Hunter Region		Lake Macquarie City LGA				Awaba		Wilton Rd												
558124	12/02/2007	Mon	04:40	1 km W	WANGI RD	2WY	STR	Raining	Wet	80	1	TRK	M60	W in WILTON RD	70	Proceeding in lane	N	0	0	
E29147135					Darkness	DCA: 607		On path - Hit temp object				Other non fixed object								
Hunter Region		Lake Macquarie City LGA				Awaba		Wilton Rd												
599155	20/11/2007	Tue	11:00	1.6 km W	WANGI RD	2WY	CRV	Fine	Dry	80	2	CAR	M57	W in WILTON RD	65	Incorrect side	I	0	1	S
E32244068					Daylight	DCA: 201		Opp - Head on				TRK	M70	E in WILTON RD	50	Proceeding in lane				
Hunter Region		Lake Macquarie City LGA				Awaba		Wilton Rd												
616589	15/03/2008	Sat	22:00	500 m W	WANGI RD	2WY	STR	Fine	Dry	80	1	CAR	M17	E in WILTON RD	80	Proceeding in lane	N	0	0	F
E33450849					Darkness	DCA: 702		Off carriageway to right												
Hunter Region		Lake Macquarie City LGA				Awaba		Wilton Rd												
625400	29/05/2008	Thu	18:32	250 m E	AWABA COUNCIL ENT	2WY	CRV	Fine	Dry	80	1	CAR	M32	E in WILTON RD	80	Proceeding in lane	N	0	0	
E112826098					Darkness	DCA: 803	R	Off right bend into obj				Embankment								

Detailed Crash Report - sorted

Crash No.	Date	Day of Week	Time	Distance	ID Feature	Loc Type	Alignment	Weather	Surface Condition	Speed Limit	No. of Tus	Tu Type/Obj	Age/Sex	Street Travelling	Speed Travelling	Manoeuvre	Degree of Crash	Killed	Injured	Factors					
Natural Lighting																				S F					
Hunter Region		Lake Macquarie City LGA				Awaba		Wilton Rd																	
637661	27/08/2008	Wed	00:01	2 km W	WANGI RD	2WY	CRV	Fine	Dry	70	1	WAG	M67	E in WILTON RD		Unk Proceeding in lane	N	0	0						
E34715127					Darkness	DCA: 802	L	Off cway left bend																	
Hunter Region		Lake Macquarie City LGA				Awaba		Wilton Rd																	
693483	22/12/2009	Tue	11:15	500 m W	WASTE FACILITY ENT	2WY	CRV	Fine	Dry	80	2	LOR	M41	S in WILTON RD		70 Incorrect side	N	0	0	S					
E75971002					Daylight	DCA: 201		Opp - Head on				LOR	M27	N in WILTON RD		70 Proceeding in lane									
Hunter Region		Lake Macquarie City LGA				Awaba		Cessnock Rd																	
697223	19/01/2010	Tue	15:05		at WILTON RD	TJN	STR	Fine	Dry	90	2	TRK	M50	E in WILTON RD		15 Turning left	N	0	0						
E39455952					Daylight	DCA: 107		Adj - Left-thru from right				TRK	U U	N in CESSNOCK RD		70 Proceeding in lane									
Report Totals:		Total Crashes: 13				Fatal Crashes: 0		Injury Crashes: 5				Killed: 0				Injured: 5									

Crashid dataset Wilton Road between Awaba Road to Wangi Road, Awaba . Crash Period 01/07/04 to 30/06/09. Plus provisional data

Note: Ordered by: Crash Date,Crash Time,Crash No. Data for the 9 month period prior to the generated date of this report are incomplete and are subject to change.



Appendix B

Traffic Data

LMCC

MetroCount Traffic Executive **Class Speed Matrix**

ClassMatrix-57 -- English (ENA)

Datasets:

Site: [10409] WILTON RD AWABA BETWEEN DUMP & MR217
Direction: 6 - West bound A>B, East bound B>A. **Lane:** 0
Survey Duration: 0:00 Thursday, 10 January 2002 => 9:57 Thursday, 17 January 2002
File: 1040916JAN2002.EC0 (Plus)
Identifier: J475Y576 MC55-3 [MC50] (c)Microcom 11/02/99
Algorithm: Factory default
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Thursday, 10 January 2002 => 9:57 Thursday, 17 January 2002
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Speed range: 10 - 160 km/h.
Direction: North, East, South, West (bound)
Separation: All - (Headway)
Name: Default Profile
Scheme: Vehicle classification (ARX)
Units: Metric (meter, kilometer, m/s, km/h, kg, tonne)
In profile: Vehicles = 13520 / 13528 (99.94%)

Class Speed Matrix

ClassMatrix-57

Site: 10409.0WE
Description: WILTON RD AWABA BETWEEN DUMP & MR217
Filter time: 0:00 Thursday, 10 January 2002 => 9:57 Thursday, 17 January 2002
Scheme: Vehicle classification (ARX)
Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12) Dir(NESW) Sp(10,160) Headway(>0)

<u>Speed (km/h)</u>														<u>Speed Totals</u>	
		<u>Class</u>													
		<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>		
10 - 20		7	3	.	.	.	.	.	.	.	.	.	.	10	0.1%
20 - 30		2	1	1	.	1	.	.	.	.	.	.	.	5	0.0%
30 - 40		.	21	2	4	1	.	.	.	.	10	.	.	38	0.3%
40 - 50		2	102	25	18	24	8	.	2	2	183	18	3	387	2.9%
50 - 60		3	213	88	62	70	8	.	1	8	121	27	1	602	4.5%
60 - 70		2	1003	462	165	180	7	8	9	7	21	5	.	1869	13.8%
70 - 80		18	2820	605	167	119	15	5	48	24	126	14	.	3961	29.3%
80 - 90		31	3561	242	107	97	4	3	6	9	114	18	.	4192	31.0%
90 - 100		15	1643	44	49	27	.	.	1	3	20	3	.	1805	13.4%
100 - 110		12	464	12	7	.	.	.	.	1	1	.	.	497	3.7%
110 - 120		8	96	2	3	.	.	.	.	.	.	.	.	109	0.8%
120 - 130		4	24	.	3	.	.	.	.	.	.	.	.	31	0.2%
130 - 140		1	8	.	.	.	.	.	.	.	.	.	.	9	0.1%
140 - 150		.	3	.	.	.	.	.	.	.	.	.	.	3	0.0%
150 - 160		.	2	.	.	.	.	.	.	.	.	.	.	2	0.0%
		105	9964	1483	585	519	42	16	67	54	596	85	4	13520	
		0.8%	73.7%	11.0%	4.3%	3.8%	0.3%	0.1%	0.5%	0.4%	4.4%	0.6%	0.0%		
		Class Totals													

MetroCount Traffic Executive **Weekly Vehicle Counts (Virtual Week)**

VirtWeeklyVehicle-56 -- English (ENA)

Datasets:

Site: [10409] WILTON RD AWABA BETWEEN DUMP & MR217
Direction: 6 - West bound A>B, East bound B>A. **Lane:** 0
Survey Duration: 0:00 Thursday, 10 January 2002 => 9:57 Thursday, 17 January 2002
File: 1040916JAN2002.EC0 (Plus)
Identifier: J475Y576 MC55-3 [MC50] (c)Microcom 11/02/99
Algorithm: Factory default
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Thursday, 10 January 2002 => 9:57 Thursday, 17 January 2002
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Speed range: 10 - 160 km/h.
Direction: North, East, South, West (bound)
Separation: All - (Headway)
Name: Default Profile
Scheme: Vehicle classification (ARX)
Units: Metric (meter, kilometer, m/s, km/h, kg, tonne)
In profile: Vehicles = 13520 / 13528 (99.94%)

Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-56

Site: 10409.0WE

Description: WILTON RD AWABA BETWEEN DUMP & MR217

Filter time: 0:00 Thursday, 10 January 2002 => 9:57 Thursday, 17 January 2002

Scheme: Vehicle classification (ARX)

Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12) Dir(NESW) Sp(10,160) Headway(>0)

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Averages	
								1 - 5	1 - 7
Hour									
0000-0100	5.0	10.0	9.0	7.5	12.0	14.0	9.0	8.5	9.3
0100-0200	2.0	3.0	4.0	8.0	4.0	7.0	7.0	4.8	5.4
0200-0300	1.0	1.0	1.0	1.5	4.0	3.0	4.0	1.7	2.1
0300-0400	4.0	5.0	7.0	8.0	4.0	4.0	0.0	6.0	5.0
0400-0500	11.0	10.0	8.0	9.5	7.0	9.0	1.0	9.2	8.1
0500-0600	55.0	57.0	47.0	59.0	42.0	46.0	15.0	53.2	47.5
0600-0700	102.0	108.0	97.0	87.0	88.0	25.0	39.0	94.8	79.1
0700-0800	119.0	131.0	146.0<	144.0	137.0	59.0	25.0	136.8	113.1
0800-0900	149.0	178.0<	128.0	151.5	158.0<	96.0	71.0	152.7	135.4
0900-1000	155.0	148.0	128.0	70.0	153.0	122.0	114.0	120.7	120.0
1000-1100	158.0<	151.0	136.0	155.0	157.0	148.0	144.0	151.4	149.9
1100-1200	154.0	176.0	134.0	156.0<	148.0	169.0<	160.0<	153.6<	156.7<
1200-1300	120.0	153.0	110.0	159.0<	152.0	151.0	151.0	138.8	142.3
1300-1400	156.0<	163.0<	121.0	150.0	163.0	154.0<	145.0	150.6<	150.3<
1400-1500	138.0	135.0	127.0	118.0	173.0<	151.0	147.0	138.2	141.3
1500-1600	146.0	136.0	138.0<	139.0	164.0	128.0	163.0<	144.6	144.9
1600-1700	133.0	131.0	127.0	125.0	129.0	86.0	94.0	129.0	117.9
1700-1800	133.0	136.0	107.0	131.0	122.0	66.0	88.0	125.8	111.9
1800-1900	69.0	95.0	80.0	90.0	93.0	62.0	60.0	85.4	78.4
1900-2000	45.0	50.0	31.0	41.0	50.0	42.0	47.0	43.4	43.7
2000-2100	42.0	38.0	27.0	35.0	23.0	14.0	32.0	33.0	30.1
2100-2200	28.0	32.0	24.0	33.0	25.0	17.0	27.0	28.4	26.6
2200-2300	18.0	22.0	20.0	22.0	18.0	20.0	23.0	20.0	20.4
2300-2400	22.0	22.0	16.0	18.0	23.0	8.0	11.0	20.2	17.1
Totals									
0700-1900	1630.0	1733.0	1482.0	1588.5	1749.0	1392.0	1362.0	1627.6	1561.9
0600-2200	1847.0	1961.0	1661.0	1784.5	1935.0	1490.0	1507.0	1827.2	1741.5
0600-0000	1887.0	2005.0	1697.0	1824.5	1976.0	1518.0	1541.0	1867.4	1779.1
0000-0000	1965.0	2091.0	1773.0	1918.0	2049.0	1601.0	1577.0	1950.7	1856.4
AM Peak	1000	0800	0700	1100	0800	1100	1100		
	158.0	178.0	146.0	156.0	158.0	169.0	160.0		
PM Peak	1300	1300	1500	1200	1400	1300	1500		
	156.0	163.0	138.0	159.0	173.0	154.0	163.0		

* - No data.

MetroCount Traffic Executive **Speed Statistics by Hour**

SpeedStatHour-58 -- English (ENA)

Datasets:

Site: [10409] WILTON RD AWABA BETWEEN DUMP & MR217
Direction: 6 - West bound A>B, East bound B>A. **Lane:** 0
Survey Duration: 0:00 Thursday, 10 January 2002 => 9:57 Thursday, 17 January 2002
File: 1040916JAN2002.EC0 (Plus)
Identifier: J475Y576 MC55-3 [MC50] (c)Microcom 11/02/99
Algorithm: Factory default
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Thursday, 10 January 2002 => 9:57 Thursday, 17 January 2002
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Speed range: 10 - 160 km/h.
Direction: North, East, South, West (bound)
Separation: All - (Headway)
Name: Default Profile
Scheme: Vehicle classification (ARX)
Units: Metric (meter, kilometer, m/s, km/h, kg, tonne)
In profile: Vehicles = 13520 / 13528 (99.94%)

Speed Statistics by Hour

SpeedStatHour-58

Site: 10409.0WE
Description: WILTON RD AWABA BETWEEN DUMP & MR217
Filter time: 0:00 Thursday, 10 January 2002 => 9:57 Thursday, 17 January 2002
Scheme: Vehicle classification (ARX)
Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12) Dir(NESW) Sp(10,160) Headway(>0)

Vehicles = 13520

Posted speed limit = 60 km/h, Exceeding = 12478 (92.29%), Mean Exceeding = 81.46 km/h

Maximum = 154.1 km/h, **Minimum** = 13.5 km/h, **Mean** = 79.1 km/h

85% Speed = 91.4 km/h, **95% Speed** = 99.4 km/h, **Median** = 79.6 km/h

20 km/h Pace = 71 - 91, **Number in Pace** = 8212 (60.74%)

Variance = 183.56, **Standard Deviation** = 13.55 km/h

Hour Bins (Partial days)

Time	Bin		Min	Max	Mean	Median	85%	95%	>PSL 60 km/h	
0000	74	0.5%	62.7	119.7	90.5	87.1	105.5	112.0	74	100.0%
0100	43	0.3%	52.0	135.6	83.9	84.2	91.1	105.8	41	95.3%
0200	17	0.1%	68.9	120.1	91.4	91.1	104.4	107.6	17	100.0%
0300	40	0.3%	33.8	119.4	75.2	73.4	91.1	112.7	32	80.0%
0400	65	0.5%	47.5	120.0	84.0	83.5	92.5	97.2	64	98.5%
0500	380	2.8%	14.2	130.6	84.4	84.2	94.7	103.3	373	98.2%
0600	633	4.7%	53.1	126.7	85.3	84.2	96.1	103.3	628	99.2%
0700	905	6.7%	16.3	125.7	78.2	81.0	91.4	98.3	792	87.5%
0800	1083	8.0%	20.5	122.1	76.6	77.4	89.6	96.1	953	88.0%
0900	960	7.1%	13.5	121.6	75.6	76.3	88.2	95.0	851	88.6%
1000	1049	7.8%	14.2	128.7	74.5	74.9	87.5	93.6	930	88.7%
1100	1097	8.1%	30.5	128.9	75.3	76.0	87.5	94.3	985	89.8%
1200	996	7.4%	27.9	129.7	75.4	76.3	87.1	94.3	895	89.9%
1300	1052	7.8%	35.2	122.1	76.6	76.7	88.9	96.1	950	90.3%
1400	989	7.3%	13.8	141.6	76.6	77.0	88.9	96.1	905	91.5%
1500	1014	7.5%	30.7	130.8	78.5	78.8	90.0	97.6	951	93.8%
1600	825	6.1%	32.5	154.1	81.8	83.2	92.9	102.2	775	93.9%
1700	783	5.8%	21.7	153.1	85.3	85.3	95.0	102.6	761	97.2%
1800	549	4.1%	60.6	133.6	87.0	85.3	96.8	105.5	549	100.0%
1900	306	2.3%	37.1	130.0	86.6	85.7	97.6	106.9	303	99.0%
2000	211	1.6%	56.2	130.6	85.1	83.5	97.9	106.2	209	99.1%
2100	186	1.4%	50.1	147.4	84.5	82.8	95.0	107.6	183	98.4%
2200	143	1.1%	14.0	127.6	82.9	82.4	94.0	105.1	139	97.2%
2300	120	0.9%	57.3	149.0	87.2	86.0	96.8	109.1	118	98.3%
----	13520	100.0%	13.5	154.1	79.1	79.6	91.4	99.4	12478	92.3%



Appendix C

SIDRA Output

Existing 2010
Projected 2015
Projected 2020



Existing 2010

MOVEMENT SUMMARY

Site: Existing Case

Wilton Road Existing Case
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South Wilton Road											
1	L	26	8.0	0.082	18.0	LOS B	0.0	0.0	0.00	1.35	50.4
2	T	112	25.5	0.082	0.0	LOS A	0.0	0.0	0.00	0.00	80.0
Approach		138	22.1	0.082	3.4	LOS B	0.0	0.0	0.00	0.26	70.4
North Wilton Road											
8	T	112	25.5	0.084	0.6	LOS A	0.5	4.5	0.28	0.00	67.5
9	R	26	8.0	0.084	20.5	LOS B	0.5	4.5	0.28	1.23	49.4
Approach		138	22.1	0.084	4.4	LOS B	0.5	4.5	0.28	0.23	62.2
West Colliery											
10	L	18	11.8	0.045	8.1	LOS A	0.2	1.5	0.29	0.53	39.0
12	R	18	11.8	0.045	8.1	LOS A	0.2	1.5	0.29	0.62	39.0
Approach		36	11.8	0.045	8.1	LOS A	0.2	1.5	0.29	0.57	39.0
All Vehicles		312	20.9	0.084	4.4	NA	0.5	4.5	0.16	0.28	60.8

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.

Level of Service (Worst Movement): LOS B. LOS Method for individual vehicle movements: Delay (RTA NSW).

Approach LOS values are based on the worst delay for any vehicle movement.

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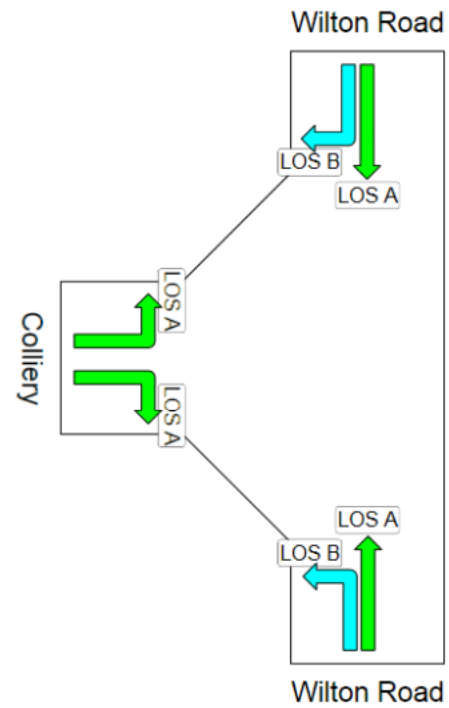


LEVEL OF SERVICE

Level of Service Method: Delay (RTA NSW)

Site: Existing Case

Wilton Road Existing Case
Giveaway / Yield (Two-Way)



Colour code based on Level of Service

LOS A LOS B LOS C LOS D LOS E LOS F Continuous

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Projected 2015

MOVEMENT SUMMARY

Site: 5 Year Projection

Wilton Road 5 Year Projection
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h	
South Wilton Road												
1	L	26	8.0	0.088	18.2	LOS B	0.0	0.0	0.00	1.37	50.2	
2	T	122	25.0	0.088	0.0	LOS A	0.0	0.0	0.00	0.00	80.0	
Approach		148	22.0	0.088	3.2	LOS B	0.0	0.0	0.00	0.24	70.9	
North Wilton Road												
8	T	122	25.0	0.095	0.8	LOS A	0.7	5.5	0.32	0.00	66.4	
9	R	26	8.0	0.095	21.0	LOS B	0.7	5.5	0.32	1.24	49.2	
Approach		148	22.0	0.095	4.4	LOS B	0.7	5.5	0.32	0.22	61.7	
West Colliery												
10	L	18	11.8	0.033	7.6	LOS A	0.2	1.3	0.31	0.53	39.1	
12	R	18	11.8	0.033	7.7	LOS A	0.2	1.3	0.31	0.58	39.2	
Approach		36	11.8	0.033	7.6	LOS A	0.2	1.3	0.31	0.55	39.1	
All Vehicles		333	20.9	0.095	4.2	NA	0.7	5.5	0.17	0.27	61.1	

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.

Level of Service (Worst Movement): LOS B. LOS Method for individual vehicle movements: Delay (RTA NSW).

Approach LOS values are based on the worst delay for any vehicle movement.

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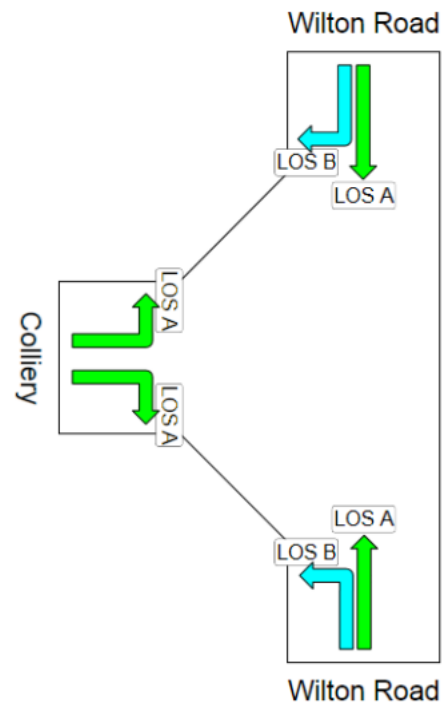


LEVEL OF SERVICE

Level of Service Method: Delay (RTA NSW)

Wilton Road 5 Year Projection
Giveaway / Yield (Two-Way)

Site: 5 Year Projection



Colour code based on Level of Service

LOS A LOS B LOS C LOS D LOS E LOS F Continuous

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Projected 2020

MOVEMENT SUMMARY

Site: 10 Year Projection

Wilton Road 5 Year Projection

Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South Wilton Road											
1	L	26	8.0	0.095	18.5	LOS B	0.0	0.0	0.00	1.40	50.1
2	T	135	25.0	0.095	0.0	LOS A	0.0	0.0	0.00	0.00	80.0
Approach		161	22.2	0.095	3.0	LOS B	0.0	0.0	0.00	0.23	71.5
North Wilton Road											
8	T	135	25.0	0.103	0.9	LOS A	0.7	6.2	0.33	0.00	65.9
9	R	26	8.0	0.103	21.4	LOS B	0.7	6.2	0.33	1.25	49.0
Approach		161	22.2	0.103	4.2	LOS B	0.7	6.2	0.33	0.20	61.7
West Colliery											
10	L	18	11.8	0.034	7.7	LOS A	0.2	1.3	0.32	0.53	39.0
12	R	18	11.8	0.034	7.8	LOS A	0.2	1.3	0.32	0.59	39.2
Approach		36	11.8	0.034	7.8	LOS A	0.2	1.3	0.32	0.56	39.1
All Vehicles		358	21.2	0.103	4.0	NA	0.7	6.2	0.18	0.25	61.5

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.

Level of Service (Worst Movement): LOS B. LOS Method for individual vehicle movements: Delay (RTA NSW).

Approach LOS values are based on the worst delay for any vehicle movement.

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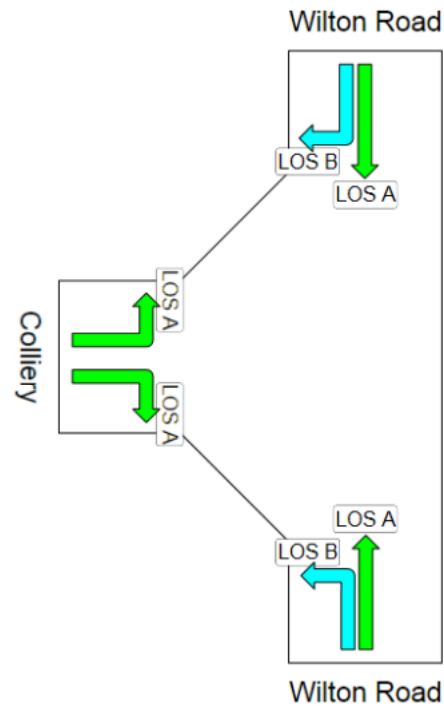
LEVEL OF SERVICE

Level of Service Method: Delay (RTA NSW)

Wilton Road 5 Year Projection

Giveaway / Yield (Two-Way)

Site: 10 Year Projection



Colour code based on Level of Service

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Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	K Burns	M Lyons	<i>M Lyons</i>	P Youman	<i>P Youman</i>	5/7/10
1	K Burns	M Lyons	<i>M Lyons</i>	P Youman	<i>P Youman</i>	3/9/10
2	K Burns	M Lyons	<i>M Lyons</i>	P Youman	<i>P Youman</i>	8.9.10