



APPENDIX H ROAD TRANSPORT ASSESSMENT





Wilpinjong Coal Mine
Modification
Wilpinjong NSW
Road Transport Assessment

transportation planning, design and delivery

Wilpinjong Coal Mine

Modification, Wilpinjong NSW

Road Transport Assessment

Issue: A 19/07/13

Client: Wilpinjong Coal Pty Ltd

Reference: 13S9013000

GTA Consultants Office: NSW

Quality Record

Issue	Date	Description	Prepared By	Checked By	Approved By
A	19/07/13	Final	Penny Dalton	Jason Rudd	Jason Rudd

© GTA Consultants (GTA Consultants (NSW) Pty Ltd) 2013

The information contained in this document is confidential and intended solely for the use of the client for the purpose for which it has been prepared and no representation is made or is to be implied as being made to any third party. Use or copying of this document in whole or in part without the written permission of GTA Consultants constitutes an infringement of copyright. The intellectual property contained in this document remains the property of GTA Consultants.



MELBOURNE • SYDNEY • BRISBANE • CANBERRA
ADELAIDE • GOLD COAST • TOWNSVILLE

www.gta.com.au

Table of Contents

1. Introduction	1
2. Existing Road Environment	2
2.1 Location	2
2.2 Road Network	2
2.3 Traffic Survey Program	3
2.4 Surveyed Midblock Traffic Volumes	6
2.5 Existing Roadway Efficiency	8
2.6 2012 Intersection Operation	10
2.7 Surveyed WCM Traffic Distribution	12
2.8 Road Safety	13
2.9 School Buses	15
3. Existing Operations and the Modification	16
3.1 Existing Operations at Wilpinjong Coal Mine	16
3.2 2012 Traffic Generation and Distribution	16
3.3 Description of the Modification	22
3.4 Road Transport Aspects of the Modification	23
3.5 Future Scenarios	23
3.6 Future WCM Traffic Generation	24
3.7 Traffic Distribution	26
4. Changes to the Road Environment	29
4.1 Ulan Road Strategy	29
4.2 Ulan Coal Continued Operations Project	29
4.3 Moolarben Coal Project Stage 2	31
4.4 Mt Penny Coal Mine	32
4.5 Bowdens Silver Mine	34
4.6 Temporary Build Site on Ulan-Wollar Road	35
4.7 Background Traffic Growth	36
5. Future Road Environment	38
5.1 Future Midblock Traffic Volumes	38
5.2 Future Roadway Efficiency	39
5.3 Future Intersection Operation	41
5.4 Road Safety Implications	42
5.5 Measures to Maintain Road Network Operations	42
5.6 Car Parking	43

5.7 School Buses	43
6. Conclusions	44
 Attachments	
A: Traffic Survey Results	
B: WCM Traffic Distribution by Trip Types	
C: Non-Mine Traffic	
 Figures	
Figure 1: Traffic Survey Locations	4
Figure 2: Traffic Survey Locations – Wilpinjong	5
 Tables	
Table 2.1: Surveyed Average Weekday Traffic December 2012	7
Table 2.2: Level of Service Criteria for Two Lane Highways	9
Table 2.3: Estimated Percent-Time-Spent Following and Levels of Service 2012	10
Table 2.4: Peak Hour Two Way Traffic at Intersections December 2012 (vehicles/hour)	11
Table 2.5: Level of Service Criteria at Priority Intersections	11
Table 2.6: 2012 Peak Hour Intersection Operating Conditions (December 2012)	11
Table 2.7: Origins of Trips to WCM 13 December 2012 (vehicles)	12
Table 2.8: Destinations of Trips from WCM 13 December 2012 (vehicles)	12
Table 2.9: WCM Vehicles from O-D Survey (6am to 6pm 13 December 2012)	13
Table 2.10: Reported Crash Types (2007 to 2011)	14
Table 3.1: Average Weekday Person Arrivals at WCM 6-15 December 2012	17
Table 3.2: Average Weekday WCM Traffic Generation by Vehicle Type December 2012	18
Table 3.3: WCM Traffic Generation by Trip Type December 2012 (vehicles)	20
Table 3.4: Distribution of 2012 WCM Traffic on Road System (%)	20
Table 3.5: December 2012 Peak Hour and Daily Operational WCM Traffic	21
Table 3.6: WCM Operational Workforce	24
Table 3.7: WCM Workforce Vehicle Trip Generation	25
Table 3.8: 2012 and Future WCM Delivery Vehicle Trip Generation	25
Table 3.9: 2012 and Future WCM Visitor Vehicle Trip Generation	26
Table 3.10: WCM Construction Phase Trip Generation Year 2014	26

Table 3.11:	Average Weekday WCM Traffic with Modification in 2014 and 2024	27
Table 3.12:	Change in WCM Traffic from 2012 to 2014 and 2024	28
Table 4.1:	Weekday Average Traffic Increases Above 2012 Due to Ulan Continued Operations Project	30
Table 4.2:	Ulan Coal Continuation Project Future Additional Traffic	31
Table 4.3:	Moolarben Coal Project Stage 2 Future Additional Traffic	32
Table 4.4:	Mt Penny Project Future Additional Traffic (vehicles)	34
Table 4.5:	WCM Temporary Construction Activity Future Additional Traffic	36
Table 4.6:	Additional Background Non-Mine Traffic (1.8% per annum)	37
Table 5.1:	December 2012 ^A and Future with Modification Traffic Volumes	38
Table 5.2:	Contribution of WCM with Modification to Total Daily Traffic	39
Table 5.3:	Future Percent Time-Spent-Following and Levels of Service with Modification	40
Table 5.4:	Future Peak Hour Intersection Operating Conditions	41

References

- ARRB Group Ltd (2011) *Ulan Road Strategy*.
- Austrroads (2006) *Guide to Road Design Part 2: Design Considerations*.
- Austrroads (2009) *Guide to Traffic Management Part 3: Traffic Studies and Analysis*.
- Halcrow (2010) *Wilpinjong Coal Mine – Mining Rate Modification Road Transport Assessment* (letter to Keith Downham of WCPL).
- Roads and Traffic Authority (2002) *Guide to Traffic Generating Developments*.
- SKM (2008) *Moolarben Coal Project Stage 2 Traffic Impact Assessment*.
- Transport & Urban Planning (2009), *Traffic and Transport Impact Assessment for The Ulan Coal Continued Operations Project*.
- Transportation Research Board (2000) *Highway Capacity Manual*.
- Wells Environmental Services (2011) *Mt Penny Coal Project Preliminary Environmental Assessment*.

1. Introduction

This report has been prepared on behalf of Wilpinjong Coal Pty Ltd (WCPL) to present the results of an assessment of the road transport implications of a Modification to the Wilpinjong Coal Mine (WCM). This report accompanies an Environmental Assessment under section 75W of the New South Wales (NSW) *Environmental Planning and Assessment Act, 1979*. The Modification proposes minor incremental extensions to the existing open cut pits to access additional coal reserves and to alter the sequence of open cut mining. With regard to road transport implications, in the short term, the Modification would result in an increased construction workforce travelling to and from WCM, incremental increases in deliveries of consumables, and delivery of additional mobile plant to the site. Over a longer period of time, the workforce would decrease to lower than its current level, with corresponding decreases in vehicle trips.

This study considers the potential road transport implications of the Modification with regard to the capacity, efficiency and safety of the road network, and with regard to the planned changes to the road system as described in the *Ulan Road Strategy* (ARRB Group Ltd [ARRB], 2011), which was prepared to meet applicable Project Approval conditions for the Ulan, Wilpinjong and Moolarben Coal Mines.

The assessment has been prepared in accordance with the *Guide to Traffic Generating Developments* NSW Roads and Traffic Authority, 2002), the Austroads *Guide to Road Design* and *Guide to Traffic Management* series and the accompanying Roads and Maritime Services (RMS) Supplements. All road agencies across Australia have now adopted the Austroads guides to provide a level of consistency across all jurisdictions. The Austroads guides and the Australian Standards referenced in them are the primary technical references for use within RMS.

The remainder of the report is set out as follows:

- Section 2 describes the existing road traffic environment, including traffic volumes and composition, operation of intersections, Levels of Service and crash history of the relevant roads.
- Section 3 describes the existing and proposed operations at the WCM.
- Section 4 discusses changes expected on the surrounding road system which are unrelated to the Modification, including road upgrades, planned or approved developments in the region and background growth in traffic.
- Section 5 presents the future road transport conditions with the Modification and the other planned changes to the road environment, including traffic volumes, roadway efficiency and safety implications.
- Section 6 presents the conclusions of the assessment.

2. Existing Road Environment

2.1 Location

WCM is located approximately 40 kilometres (km) north-east of Mudgee in central NSW. It is an open cut coal mining operation which commenced construction in February 2006, and is approved to produce a maximum of 15 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal. Coal products are moved by rail to domestic customers for use in electricity generation and to port for export. The mine currently generates road traffic relating to the movement of employees and consumables/deliveries. Vehicular access to the WCM is via a sealed WCM Access Road from Ulan-Wollar Road.

2.2 Road Network

The road network serving WCM is briefly described below. It is noted that some of the roads are known by several names. For consistency throughout this report, the names below will be used to refer to the relevant sections of road as described here.

Ulan-Wollar Road is a local rural road which provides an east-west connection between the villages of Ulan and Wollar. WCPL funded the upgrading of approximately 6km of Ulan-Wollar Road between Ulan and the WCM Access Road, and this section is sealed with a carriageway width of about 8.0 metres (m) with unsealed shoulders. A short section (approximately 2.3km) was previously sealed and had a 6.0m wide carriageway with unsealed shoulders. Moolarben Coal Mines has subsequently re-aligned and upgraded the older sections to the same general design standard, including some 2.3km that was being re-aligned during the traffic surveys conducted for this traffic assessment. To the east of the WCM Access Road, it is unsealed for the majority of its length, and sealed for approximately 4km on its approach to Wollar. However, Mid Western Regional Council (MWRC) is currently sealing approximately 2km of Ulan-Wollar Road immediately to the east of the WCM Access Road with funding provided by WCPL.

To the west, its intersection with Ulan Road was also upgraded by the owner of the Moolarben Coal Mines, and includes a "CHR" channelised right-turn and passing bay in Ulan Road, allowing northbound vehicles to pass around vehicles turning right into Ulan-Wollar Road, and an "AUL" auxiliary left-turn lane (deceleration lane) in Ulan Road for the left turn into Ulan-Wollar Road, and intersection lighting.

Main Road 208 (MR208) extends between Castlereagh Highway (State Highway 18) at Mudgee and Golden Highway (State Highway 27) at Sandy Hollow. Between Mudgee and Bylong, it is known as **Ulan Road** (Mudgee to Budgee Budgee), **Wollar Road** (Budgee Budgee to Wollar) and **Wollar-Bylong Road** (Wollar to Bylong). MR208 is a two lane rural road with bitumen seal and unsealed shoulders. Between Mudgee and Budgee Budgee, the sealed carriageway is 7.0m to 7.5m wide and the unsealed shoulders are 2.0m to 3.0m wide. Between Budgee Budgee and Sandy Hollow, the sealed carriageway varies in width between 6.0m and 7.5m, and the unsealed shoulders have an average width about 2.0m. A section between Wollar and Bylong Valley Way is also unsealed.

Main Road 214 (MR214) extends from MR208 at Budgee Budgee to the Golden Highway at Cassilis to the north. It is known as **Ulan Road** between Budgee Budgee and Ulan, and as **Ulan-Cassilis Road** between Ulan and Cassilis.

Between Mudgee and the entrance to the Ulan Coal Mines underground surface facilities, Ulan Road (MR208 and MR214) has been the subject of a study, the *Ulan Road Strategy* (ARRB, 2011) which details the road surface conditions such as the road surface condition index, pavement deflection testing and visual rating. That assessment found that nearly 55 percent (%) of Ulan Road is considered to be adequate, while the remainder requires rehabilitation and widening to desirable design standard.

Main Road 598 (MR598) is known as **Cope Road**, and provides an east-west link between Gulgong and Ulan. It is a sealed road with a width of 6.0m to 7.5m, with unsealed 2.0m wide shoulders. This route extends farther to the east of Ulan as Ulan-Wollar Road (see above), and it intersects with MR208 at the Village of Wollar.

2.3 Traffic Survey Program

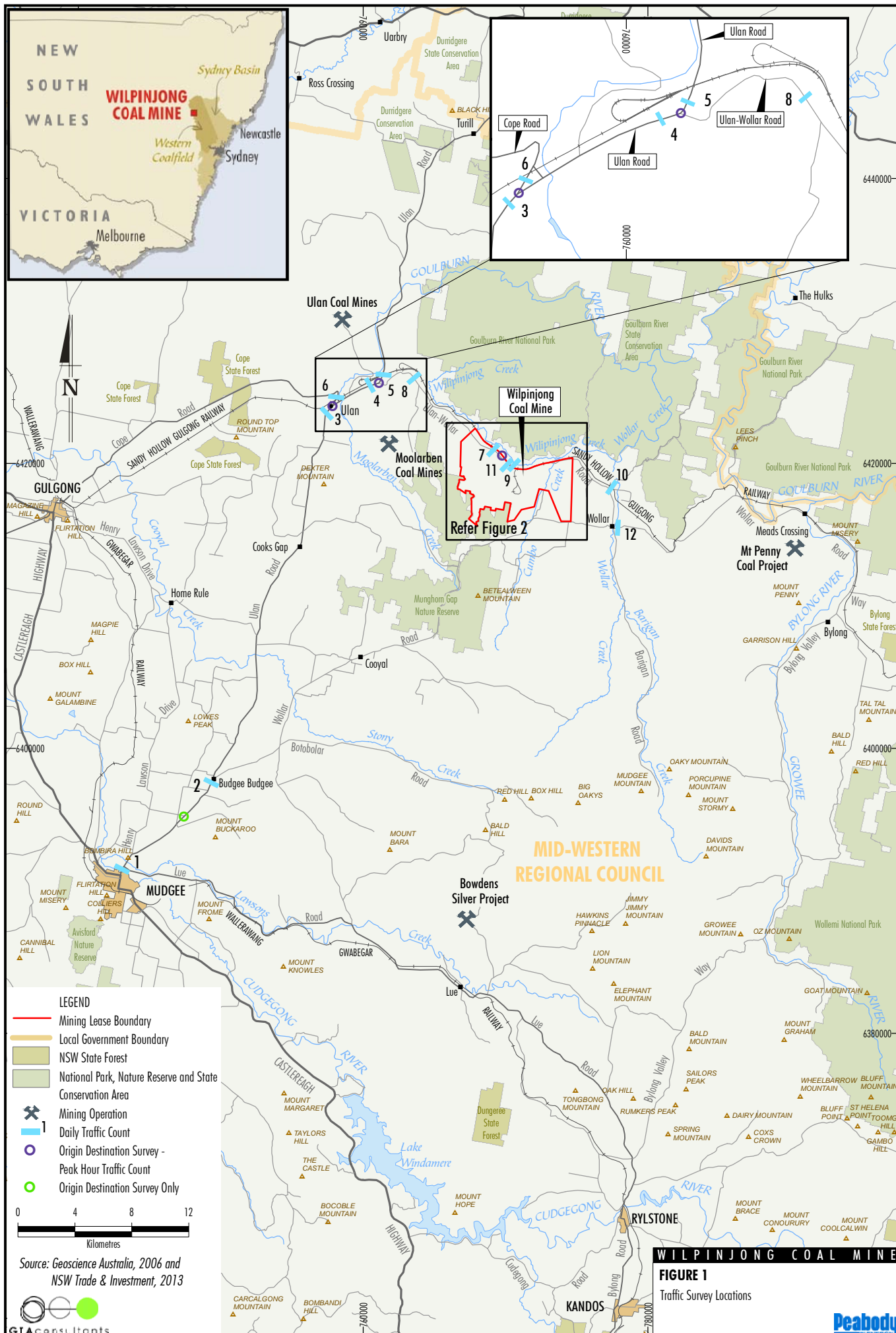
To quantify traffic conditions in the area, a program of traffic surveys was undertaken on the road network serving the WCM during December 2012. The survey program included automatic tube counts, peak period turning movement surveys, and an origin-destination survey (O-D survey). Results are presented in 1.

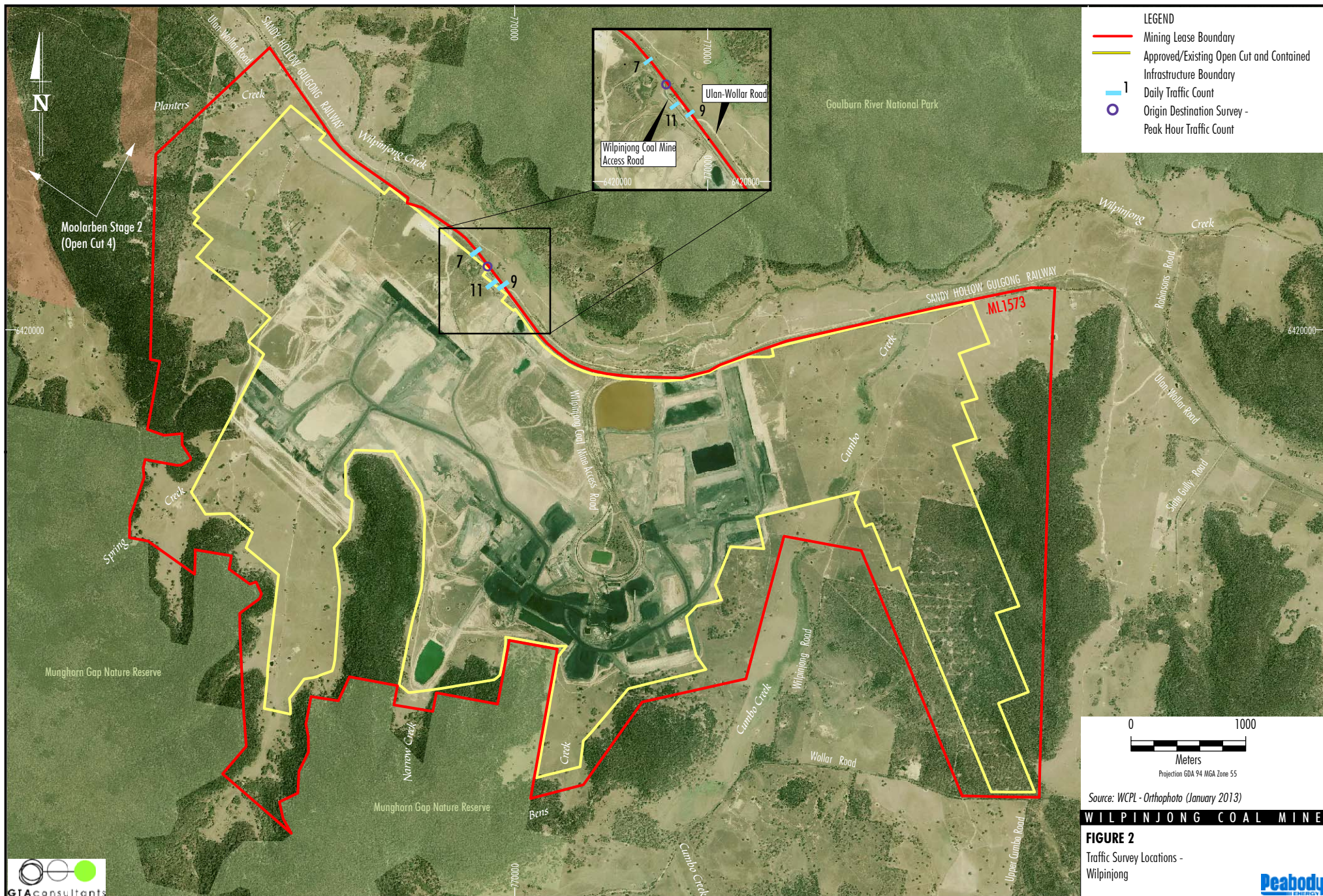
Automatic tube counts were conducted over a minimum of seven consecutive days at the following locations (refer to **Figure 1** and **Figure 2**):

- 1) Ulan Road north of Hollyoak Bridge (Friday 7 to Thursday 13 December 2012);
- 2) Ulan Road south of Wollar Road (Friday 7 to Thursday 13 December 2012);
- 3) Ulan Road south of Cope Road (Friday 7 to Thursday 20 December 2012);
- 4) Ulan Road south of Ulan-Wollar Road (Friday 7 to Thursday 20 December 2012);
- 5) Ulan Road north of Ulan-Wollar Road (Friday 7 to Thursday 20 December 2012);
- 6) Cope Road west of Ulan Road (Friday 7 to Thursday 20 December 2012);
- 7) Ulan-Wollar Road west of WCM Access Road (Friday 7 to Thursday 20 December 2012);
- 8) Ulan-Wollar Road east of Moolarben Access Road (Thursday 13 to Thursday 20 December 2012);
- 9) Ulan-Wollar Road east of WCM Access Road (Friday 7 to Thursday 20 December 2012);
- 10) Ulan-Wollar Road east of Slate Gully Road (Thursday 13 to Thursday 20 December 2012);
- 11) WCM Access Road South of Ulan-Wollar Road (Friday 7 to Thursday 20 December 2012); and
- 12) Wollar-Bylong Road east of Wollar Road (Friday 7 to Thursday 20 December 2012).

Turning movements were surveyed at the following intersections (refer to **Figure 1** and **Figure 2**) during morning and afternoon peak periods of 6.00am to 9.00am on Thursday 13 December 2012, and 3.00pm to 6.00pm on Wednesday 12 December 2012:

- Ulan-Wollar Road and WCM Access Road;
- Ulan Road and Ulan-Wollar Road; and
- Ulan Road and Cope Road.





An O-D survey was conducted with the aim of quantifying the distribution of traffic associated with WCM on the surrounding roads, particularly vehicles travelling between WCM and Mudgee. The survey was conducted over the 12 hour period from 6.00am to 6.00pm on 13 December 2012 and was designed to identify origins of trips to WCM and the destinations of trips from WCM. Video footage was collected at four intersection locations (refer to **Figure 1** and **Figure 2**):

- Ulan-Wollar Road and WCM Access Road;
- Ulan Road and Ulan-Wollar Road;
- Ulan Road and Cope Road; and
- Ulan Road and Eurunderee Road.

By reviewing the video footage, individual vehicles and vehicle platoons were tracked past each of these sites using travel times which were also derived from the data. During the traffic survey program, WCM owner-operator mobile plant construction activity was underway off Ulan-Wollar Road to the west of the WCM Access Road. This construction activity was generating some traffic on the surrounding road system during the surveys, noting that this is a short term activity which will conclude in 2013. The implications of this additional activity on the survey results are discussed in Section 4.6.

The assessment which follows focuses on the “average weekday” conditions, which is calculated by averaging the daily and/or hourly results over the surveyed weekdays, Monday to Friday. This is because the surveyed weekend conditions are distinct from and less busy than weekdays, and it also smooths out the usual variations in traffic which occur from day-to-day for no specific reason. The average weekday is chosen to represent a “typical” weekday rather than a specific day of the week. Over the seven day week, the average weekday represents a busier than average day.

It should be noted that the average weekday volumes differ from the Annual Average Daily Traffic (AADT) and Average Daily Traffic (ADT) referred to in other documents including the RMS published traffic volume data the Ulan Road Strategy. AADT is calculated as the total volume of traffic, measured in either axle pairs or vehicles, recorded at a specific location over a calendar year and divided by the number of days in that year. ADT is the total volume of traffic, measured in either axle pairs or vehicles, recorded at a specific location over seven days and divided by seven. No direct comparison should be drawn between average weekday, AADT and ADT volumes without due consideration of what they each represent and how they are measured or calculated.

Comparison between the surveyed average weekday daily volumes and the ADT volumes at the survey locations indicates that ADT volumes (measured in vehicles) are between 69% and 93% (average 85%) of the weekday average vehicle volumes. Weekend traffic flows are lower than weekday and hence the use of average weekday conditions for this assessment represents busier conditions than ADT.

2.4 Surveyed Midblock Traffic Volumes

Table 2.1 summarises the key findings of the tube count surveys, including the surveyed peak hourly traffic volume during the morning (midnight to midday) and the evening (midday to midnight), the times at which the peak hours occurred, the daily traffic volume, and the proportion of heavy vehicles over the day. Heavy vehicles include single unit trucks and buses, semitrailers and rigid trucks with trailers, B-Doubles and road trains (where permissible).

Table 2.1: Surveyed Average Weekday Traffic December 2012

Site	Survey Location	AM Peak Hour		PM Peak Hour		Daily	
		Vehicles per Hour	Hour Starting	Vehicles per Hour	Hour Starting	Vehicles per Day	Percent Heavy
1	Ulan Road north of Hollyoak Bridge	667	8am	866	5pm	9,727	8.8%
2	Ulan Road south of Wollar Road	333	6am	348	5pm	3,856	8.7%
3	Ulan Road south of Cope Road	428	6am	242	5pm	2,736	14.5%
4	Ulan Road south of Ulan-Wollar Road	453	6am	261	4pm	3,345	11.6%
5	Ulan Road north of Ulan-Wollar Road	307	6am	194	4pm	2,633	20.1%
6	Cope Road west of Ulan Road	156	6am	129	5pm	1,570	15.0%
7	Ulan-Wollar Road west of WCM Access Road	121	6am	72	6pm	693	11.8%
8	Ulan-Wollar Road east of Moolarben Access Road	129	6am	83	5pm	838	19.4%
9	Ulan-Wollar Road east of WCM Access Road	14	7am	12	5pm	164	10.2%
10	Ulan-Wollar Road east of Slate Gully Road	16	7am	14	5pm	142	12.1%
11	WCM Access Road south of Ulan-Wollar Road	133	6am	86	6pm	729	8.4%
12	Wollar-Bylong Road east of Wollar Road	10	7am	13	5pm	141	12.9%

The results of the tube count surveys (Attachment A) indicate that considering the average weekday traffic volumes, the surveyed locations typically demonstrated a similar pattern in the variation in volumes throughout the day, with a reasonably distinct morning peak hour, and a less well defined evening peak. The exceptions to this are the two locations on Ulan-Wollar Road to the east of WCM and the location on Wollar-Bylong Road. The surveyed volumes at these locations were very low and so no distinct pattern occurred through the day.

With the exception of the location on Ulan Road close to Mudgee and the locations to the east of the WCM Access Road, the morning peak hour occurred between 6.00am and 7.00am. Close to Mudgee, the morning peak occurred between 8.00am and 9.00am, which is typical of general business and school traffic influences. The evening peak hour occurred between 5.00pm and 6.00pm at most locations, with the exception of the locations on Ulan Road to the north and south of Ulan-Wollar Road (between 4.00pm and 5.00pm), on Ulan-Wollar Road immediately west of the WCM Access Road and the WCM Access Road (between 6.00pm and 7.00pm). The observed peak hour distributions are generally consistent with previous assessments for WCM and the other mines in the local area.

The results demonstrate that at the majority of locations, traffic volumes during the morning peak hour are higher than those during the evening peak hour. Along Ulan Road, the peak direction for traffic is northbound during the morning peak, and southbound during the evening peak. However, the influence of general commuter traffic (i.e. not mine related) near Mudgee reverses the peak flow direction from that of the rest of Ulan Road during the evening peak hour at the survey location near Hollyoak Bridge. The survey results for Ulan Road also highlight the significant elevation in traffic movements that occur with increasing proximity to Mudgee.

The survey results also show differences between the traffic volumes on Ulan-Wollar Road immediately to the west of the WCM and farther to the west near the Moolarben site. During the survey period, WCM was operating a temporary build site to the west of the main access, which was generating some additional vehicle trips primarily during weekdays, and with the majority of traffic travelling to and from the build site via Ulan Road. In addition, Council road upgrading work was undertaken on Ulan-Wollar Road during the survey period, which would also be expected to generate additional trips between the worksite and Ulan Road than would be typical. The surveyed volumes are therefore considered to be somewhat high with regard to “typical” traffic volumes on the road network.

With respect to heavy vehicles, the survey results indicate that the WCM Access Road had the lowest percentage of heavy vehicles at any location (8.4%), while the highest percentage (20.1%) was identified on Ulan Road north of Ulan-Wollar Road.

2.5 Existing Roadway Efficiency

The Austroads (2009) *Guide to Traffic Management Part 3: Traffic Studies and Analysis* provides guidelines for the capacity of two lane, two way rural roads, which in turn, refers to the *Highway Capacity Manual* (Transportation Research Board, 2000), known as HCM 2000.

The capacity of a road is defined as the maximum hourly rate at which vehicles can reasonably be expected to traverse a point or uniform section of a lane or roadway during a given time period under the prevailing roadway, traffic and control conditions. The capacity of a single traffic lane will be affected by factors such as the pavement width and restricted lateral clearances, the presence of heavy vehicles and grades.

Level of Service (LOS) is defined as a qualitative measure describing the operational conditions within a traffic stream as perceived by drivers and/or passengers. A LOS definition generally describes these conditions in terms of factors such as speed and travel time, freedom to manoeuvre, traffic interruptions, comfort, convenience and safety. LOS A provides the best traffic conditions, with no restriction on desired travel speed or overtaking.

LOS B to D describes progressively worse traffic conditions. LOS E occurs when traffic conditions are at or close to capacity, and there is virtually no freedom to select desired speeds or to manoeuvre in the traffic stream. The service flow rate for LOS E is taken as the capacity of a lane or roadway.

HCM 2000 distinguishes between different categories of two lane two way roads, with Class I being roads on which motorists expect to travel at relatively high speeds. They most often serve long-distance trips or provide connecting links between facilities that serve long-distance trips. Class II roads are those on which motorists do not necessarily expect to travel at high speeds, and may function as access routes to Class I facilities, serve as scenic or recreational routes or pass through rugged terrain.

The LOS criteria for Class I and Class II two-lane highways are as shown in Table 2.2.

Table 2.2: Level of Service Criteria for Two Lane Highways

Level of Service	Class I Highways		Class II Highways
	Percent-Time-Spent-Following	Average Travel Speed (km/h)	Percent-Time-Spent-Following
A	35	> 90	40
B	> 35-50	> 80-90	> 40-55
C	> 50-65	> 70-80	> 55-70
D	> 65-80	> 60-70	> 70-85
E	>80	60	≥ 85

Source: Exhibit 20-2 and Exhibit 20-4, HCM 2000

Note: km/h = kilometres per hour

The LOS for Class I roads is defined in terms of both percent-time-spent-following (PTSF) and average travel speed. On Class II roads, LOS is defined only in terms of PTSF. Most arterial roads are considered to be Class I, however the primary determinant of a road's classification for operational analysis is the drivers' expectations, which may not necessarily agree with the functional classification. The PTSF is a measure of the level of opportunities to overtake.

The roads serving the WCM would typically be considered as Class II roads under the HCM descriptions, as drivers would expect some level of restriction to their freedom of movement along the routes as a result of characteristics of the route such as limits on the opportunities for overtaking (e.g. centre linemarking, sight distances, lack of overtaking lanes). It should be noted that despite the similarity in naming, this classification system is different from the classification system referenced in the *Ulan Road Strategy*, so no comparison should be made between the Class types referred to in this report and that referred to in the *Ulan Road Strategy* report.

The PTSF is estimated from the demand traffic volumes, the directional distribution of that traffic, and the percentage of no-passing zones. As a general review of the existing Levels of Service on the subject roads, the following assumptions/estimates have been made in calculating the PTSF:

- The passenger-car equivalent for heavy vehicles for calculation of PTSF 1.1 (Exhibit 20-10, HCM 2000) – this is a factor which is used to take into account the influence of heavy vehicles on the flow of traffic on a road, assessing each heavy vehicle as a multiple of passenger cars. This factor assumes the terrain generally permits heavy vehicles to maintain approximately the same speed as passenger cars.
- 40% no-passing opportunities along the routes, i.e. along each route, drivers would be restricted from passing another vehicles for 40% of the length. The routes typically have a single travel lane in each direction with no overtaking lanes, so restrictions on overtaking would generally be as a result of centre linemarking which prevents drivers from crossing to the wrong side of the carriageway to overtake due to sight distance or other constraints.
- Peak 15 minute volumes 32% of peak hourly volumes based on the average 15 minute to peak hour ratio from the intersection surveys (refer to results in 1).

On this basis, the surveyed 2012 volumes have been converted to passenger-car units, and the PTSF and Levels of Service results estimated in Table 2.3.

Table 2.3: Estimated Percent-Time-Spent Following and Levels of Service 2012

Site	Location	AM Peak Hour			PM Peak Hour		
		Hour Starting	PTSF	LOS	Hour Starting	PTSF	LOS
1	Ulan Road north of Hollyoak Bridge	8am	30.9	A	5pm	32.3	A
2	Ulan Road south of Wollar Road	6am	31.3	A	5pm	26.9	A
3	Ulan Road south of Cope Road	6am	34.5	A	4pm	27.8	A
4	Ulan Road south of Ulan-Wollar Road	6am	34.6	A	4pm	30.6	A
5	Ulan Road north of Ulan-Wollar Road	6am	31.2	A	5pm	27.1	A
6	Cope Road west of Ulan Road	6am	23.4	A	6pm	20.8	A
7	Ulan-Wollar Road west of WCM Access Road	6am	27.6	A	5pm	19.2	A
8	Ulan-Wollar Road east of Moolarben Access Road	6am	30.4	A	5pm	19.5	A
9	Ulan-Wollar Road east of WCM Access Road	7am	17.6	A	5pm	17.5	A
10	Ulan-Wollar Road east of Slate Gully Road	7am	17.6	A	6pm	17.6	A
11	WCM Access Road south of Ulan-Wollar Road	6am	30.5	A	5pm	19.6	A
12	Wollar-Bylong Road east of Wollar Road	7am	17.5	A	5pm	17.6	A

The results in Table 2.3 indicate that based on the assumptions discussed above, the surveyed locations would be expected to experience good Levels of Service with regard to roadway efficiency and delays during the busiest hours.

2.6 2012 Intersection Operation

At the surveyed intersections, the peak hours were identified by summing the total vehicle movements through the intersection at 15 minute intervals. The morning peak hour occurred between 6.00am and 7.00am at the Ulan Road intersections with Ulan-Wollar Road and Cope Road, and between 6.15am and 7.15am at the WCM Access Road and Ulan-Wollar Road intersection. The evening peak hour occurred between 4.00pm and 5.00pm at the three intersections on the survey days of 12 and 13 December 2012. The variation in the time of the peak hour compared with those of the tube count surveys (Table 2.1) is within expected day-to-day variations, noting that the tube count results are the average of the volumes recorded each hour over the surveyed weekdays whereas the intersection surveys were conducted on a single day.

The results of the intersection turning movement surveys are presented in Attachment A, and the peak hour results are summarised in Table 2.4.

Table 2.4: Peak Hour Two Way Traffic at Intersections December 2012 (vehicles/hour)

Site	Intersection	AM Peak Hour			PM Peak Hour		
		Light	Heavy	Total	Light	Heavy	Total
A	Ulan-Wollar Road and WCM Access Road						
	Ulan-Wollar Road east of WCM Access Road	17	1	18	12	0	12
	Ulan-Wollar Road west of WCM Access Road	126	8	134	59	9	68
	WCM Access Road south of Ulan-Wollar Road	141	7	148	61	9	70
B	Ulan Road and Ulan-Wollar Road						
	Ulan Road north of Ulan-Wollar Road	288	29	317	181	35	216
	Ulan Road south of Ulan-Wollar Road	475	33	508	250	42	292
	Ulan-Wollar Road east of Ulan Road	207	14	221	93	13	106
C	Ulan Road and Cope Road						
	Ulan Road north of Cope Road	553	30	583	269	43	312
	Ulan Road south of Cope Road	460	26	486	228	30	258
	Cope Road west of Ulan Road	167	4	171	103	19	122

The operation of the surveyed intersections has been analysed using the SIDRA Intersection program, an analysis program which determines characteristics of intersections operating conditions including the degree of saturation, average delays, and levels of service. The degree of saturation, or x-value, is the ratio of the arrival rate of vehicles to the capacity. The operating characteristics can be compared with the performance criteria set out in Table 2.5. It is noted that average delay per vehicle is expressed in seconds per vehicle (sec/veh) and is measured for the movement with the highest average delay at priority intersections such as the three surveyed intersections.

Table 2.5: Level of Service Criteria at Priority Intersections

Level of Service	Worst Movement Average Delay per Vehicle (sec/veh)	Operational Character
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
F	> 70	Extreme delay, traffic signals or other major treatment required

The results of the analyses are summarised in Table 2.6.

Table 2.6: 2012 Peak Hour Intersection Operating Conditions (December 2012)

Intersection	X-value		Average Delay (sec/veh)		Level of Service	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
Ulan-Wollar Road and WCM Access Road	0.06	0.05	10.6	10.3	A	A
Ulan Road and Ulan-Wollar Road	0.20	0.10	25.6	17.3	B	B
Ulan Road and Cope Road	0.23	0.11	14.1	14.3	B	B

The SIDRA Intersection results indicate that the three surveyed intersections operate at good Levels of Service during the morning and evening peak hours, with spare capacity and short delays to most vehicles.

The results show that at the intersection of Ulan Road and Ulan-Wollar Road, vehicles turning right out of Ulan-Wollar Road experience average delays of 25.6 and 17.3 sec/veh during the morning and evening peak hours respectively. It is noted that only six and nine vehicles turned right during the peak hours, and the majority of drivers would experience significantly shorter delays.

2.7 Surveyed WCM Traffic Distribution

The results of the O-D survey provide information on how the surrounding road network is used by vehicles travelling to and from the WCM between 6.00am and 6.00pm. Table 2.7 and Table 2.8 summarise the results of the surveys for the trips to and from the WCM respectively. Origins and destinations listed in the form "Road A to Road B" in these tables refer to trips which have started or ended in that section of Ulan Road between the survey station at Road A and the survey station at Road B. During the 12 hours surveyed, 298 vehicles arrived at the site, and 289 vehicles departed the site.

Table 2.7: Origins of Trips to WCM 13 December 2012 (vehicles)

Origin Zone	6am-8am	8am-10am	10am-12pm	12pm-2pm	2pm-4pm	4pm-6pm	12 Hour Total
South of Eurunderee Road	104	12	1	5	2	7	131
Eurunderee Road to Cope Road	14	2	2	3	3	4	28
Cope Road	31	4	5	5	3	5	53
Cope Road to Ulan-Wollar Road	3	0	0	1	1	0	5
North of Ulan-Wollar Road	9	3	5	4	3	3	27
WCM to Ulan Road	4	2	2	7	1	6	22
Wollar and East	3	0	8	2	9	10	32
Total	168	23	23	27	22	35	298

Table 2.8: Destinations of Trips from WCM 13 December 2012 (vehicles)

Destination Zone	6am-8am	8am-10am	10am-12pm	12pm-2pm	2pm-4pm	4pm-6pm	12 Hour Total
South of Eurunderee Road	30	5	4	24	11	41	115
Eurunderee Road to Cope Road	6	0	1	11	2	16	36
Cope Road	11	1	6	14	3	23	58
Cope Road to Ulan-Wollar Road	2	0	0	4	2	2	10
North of Ulan-Wollar Road	1	5	1	5	3	7	22
WCM to Ulan Road	0	3	4	5	3	1	16
Wollar and East	0	3	6	5	6	12	32
Total	50	17	22	68	30	102	289

Table 2.9 summarises the 12-hour volumes of WCM traffic at key locations on the surrounding network as identified from the O-D survey results.

Table 2.9: WCM Vehicles from O-D Survey (6am to 6pm 13 December 2012)

Location	Inbound	Outbound	Two Way
WCM Access Road			
South of Ulan-Wollar Road	298	289	587
Ulan-Wollar Road			
East of WCM Access Road	32	32	64
West of WCM Access Road	266	257	523
East of Ulan Road	244	241	485
Cope Road			
West of Ulan Road	53	58	111
Ulan Road			
North of Ulan-Wollar Road	27	22	49
South of Ulan-Wollar Road	217	219	436
North of Cope Road	212	209	421
South of Cope Road	159	151	310
South of Eurunderee Road	131	115	246

The survey identified that 246 vehicles travelled directly between the WCM and Ulan Road south of Eurunderee Road during the 12 hour survey period. The actual number of trips at some locations would however be higher than stated here, as a result of vehicles which do not travel directly to or from the WCM. For example, a contractor vehicle which travels from Mudgee to the Ulan Coal Mine access on Ulan Road north of Cope Road, stops there for a period of time then travels on to the WCM would only be identified in the O-D survey as travelling on the road between Ulan Coal Mine and WCM. The implications of this are discussed in Section 3.2.6.

2.8 Road Safety

Road crash data was obtained from RMS for the most recent five year period available on key roads serving the WCM. The data covers the period from 2007 to 2011 inclusive. In providing this data, RMS noted that while crash data for the vast majority of western NSW roads does not change, or is going down slightly, the subject roads have been experiencing some increases in crashes, which is anecdotally attributed to an increase in mining activity, and hence traffic volumes in the area.

Table 2.10 summarises the number and general types of crashes which occurred on the sections of road under consideration.

Table 2.10: Reported Crash Types (2007 to 2011)

Road	Pedestrian	Multiple Vehicles					Single Vehicle			Other
		Adjacent Approaches	Opposing Directions	Same Direction	U-turn/Parking	Overtaking	On Path	Off Path on Straight	Off Path on Curve	
Ulan-Wollar Road Ulan Road to the Village of Wollar	-	-	-	-	-	-	-	-	3	-
Wollar-Bylong Road Wollar to Bylong	-	-	-	-	-	-	-	1	1	-
Cope Road Gulgong to Ulan	-	1	-	-	-	2	1	6(A)	6	-
Wollar Road Ulan Road to the Village of Wollar	-	-	1	1	-	-	1	2	10(B)	-
Ulan Road Mudgee to Wollar Road	1	4	1	7	2	1	-	9	4	1
Ulan Road Wollar Road to Ulan	-	-	1	4	1	2	6	15	7	1
Total by Crash Type	1	5	3	12	3	5	8	33	31	2

^A including 3 fatal crashes

^B including 1 fatal crash

Table 2.10 demonstrates that over all the roads investigated, the most common types of crashes involved single vehicles leaving the carriageway. Four of these resulted in fatalities, three on Cope Road and one on Wollar Road.

The review did not identify any particular location at which multiple crashes occurred, rather the crashes were generally spread along the routes.

Outside of the period under investigation, a fatal crash occurred on Ulan Road in December 2012 when a person reportedly standing by a parked vehicle near Buckaroo Lane was struck by a northbound station wagon which crossed to the wrong side of the carriageway.

The *Ulan Road Strategy* (ARRB, 2011) reviewed the crash history along Ulan Road between Mudgee and the entrance to the Ulan Coal Mines in detail, including crash rates and casualty rates. The recommended upgrades to intersections and the road profile (refer to Section 4.1) are expected to reduce the crash rate along Ulan Road.

2.9 School Buses

Ulan Road is currently used by school buses operated by Eggtranz Pty Ltd (Eggtranz). It is understood that the school buses operate on Ulan Road between 7.35am and 8.45am (southbound), and 3.35pm and 4.45pm (northbound). The school buses therefore operate on Ulan Road over a period of approximately 1 hour and 10 minutes each morning and afternoon.

A condition of the WCM approval is that the on-site shift change times be scheduled to occur outside of school bus hours and that shift change times be coordinated with neighbouring mining operations to minimise the potential cumulative impacts.

The shift start and finish times at WCM do not coincide with the school bus hours. During the morning, a number of shifts start or finish between 6.00am and 7.00am, and during the afternoon/evening, a number of shifts start or finish between 6.00pm and 7.00pm. The end of shift is normally staggered dependent on the location of mine equipment and the time it takes for replacement staff to access the area. Staff who work Monday to Friday generally start work between 6.30am and 7.30am and finish between 4.00pm and 5.30pm. On Fridays, some staff may have an earlier finish commencing at 3.00pm, although these are relatively low numbers from a traffic movement perspective. Employees therefore tend to travel before the morning school bus hours and after the afternoon school bus hours.

3. Existing Operations and the Modification

3.1 Existing Operations at Wilpinjong Coal Mine

Mining activity at WCM commenced in September 2006. ROM coal is mined at a rate of up to 15 Mtpa and transported by haul trucks along internal haul roads. Materials handling systems and the Coal Handling and Preparation Plan (CHPP) were upgraded in 2010. The WCM operates 24 hours per day, seven days per week.

Product coal is loaded onto trains 24 hours per day, seven days per week. On average, six trains are loaded per day, with a maximum of 10 trains per day during peak coal transport periods. Coal is railed east via the Sandy Hollow-Gulgong Railway to domestic power generation customers and the Port of Newcastle for export.

The existing WCM workforce is approximately 550 permanent employees and on-site contractors. During late 2012, when the traffic surveys were conducted, the WCM workforce ranged between approximately 470 and 520 employees and contractors. When the traffic counts were conducted in December 2012, the WCM workforce was approximately 470 to 520 employees and contractors. The assessment which follows is based on the more conservative estimate of there being a total of 470 employees and contractors at the time of the traffic surveys in December 2012, for the purpose of establishing baseline traffic generation estimates. Only a proportion of the workforce are present on any one day, and based on previous assessments of shift and roster information, this assessment assumes 198 employees and 175 contractors, i.e. approximately 80% of the total workforce, are present on the weekday represented by the traffic survey data in December 2012.

It is noted that although the existing (2013) workforce is up to 550 employees and contractors, the survey and assessment of 2012 traffic conditions associated with the WCM is based on the lower number of 470 employees and contractors, as the traffic surveys were conducted in December when site staffing levels were lower. Allowance for the incremental growth in the workforce between 2012 and 2013 has been incorporated into the assessment that follows. Estimated employee and contractor movements on the public road network are provided in Section 3.2.3.

3.2 2012 Traffic Generation and Distribution

3.2.1 Log-in Records

Records of people arriving and departing the WCM over 10 days in December 2012 have been reviewed. The number and type of person arrivals each day are summarised in Table 3.1, which includes people logging in at both the main WCM access and at the temporary build site on Ulan-Wollar Road. All deliveries are not included in the records, as delivery vehicle drivers are not required to log in at the WCM main access, however they would be regarded as visitors at the temporary build site.

Table 3.1: Average Weekday Person Arrivals at WCM 6-15 December 2012

Log-in Location	Visitors	Employees	Contractors	Total
Main Gate	21	206	175	402
Temporary Build Site	4	1	14	19
Total	25	207	189	421

Further review of the data suggests that there was an average of 1.1 visitors per vehicle, thus visitors generate an average of 23 vehicle arrivals per day on weekdays over both sites (19 arrivals at main gate and 4 arrivals at build site).

The majority of visitor trips (arrivals and departures) occurred between 6.00am and 7.00pm. Comparing the average weekday person arrivals at the main gate with the surveyed vehicle arrivals at the main gate (370 vehicle arrivals per day, including 5 delivery vehicle arrivals), the contractors and employees generated some 346 vehicle arrivals. Employees and contractors combined therefore travel with an average of 1.1 persons per vehicle.

The distribution of person arrivals and departures throughout the day has been analysed, which indicates that overall, the busiest hours were 6.00am to 7.00am and 6.00pm to 7.00pm, which is consistent with the automatic tube survey results at the WCM access (refer Section 2.4).

During these times, the total arrivals and departures were made up of the following:

6.00am to 7.00am:

- 3% Visitors;
- 37% Contractors; and
- 60% Employees.

6.00pm to 7.00pm:

- 2% Visitors;
- 27% Contractors; and
- 71% Employees.

3.2.2 Visitors and Deliveries

The distribution of delivery vehicles on the external road system has been determined by reference to the sources of deliveries. The main source of consumables is Mudgee, which is the source for an estimated 89% of the major consumables and deliveries to the site. All deliveries from Mudgee are assumed to use Ulan Road and Ulan-Wollar Road. Some 9% of deliveries come from Newcastle, and 2% from Orange. It is assumed that deliveries from Newcastle would travel via Golden Highway and Ulan-Cassilis Road. Delivery vehicles from Orange are assumed to travel on Mitchell Highway to Wellington and Gulgong, and approach WCM on Cope Road.

Delivery trips typically occur during the day between approximately 6.00am and 6.00pm. There is an average of five deliveries per day, which generate 10 heavy vehicle trips per day.

Visitors to WCM are assumed to have similar origins as the delivery vehicles, and so would be generally distributed on the road system in a similar way to the delivery vehicles. Visitors generate an average of 40 light vehicle trips per day on weekdays.

3.2.3 Employees and Contractors

Employees and contractors generate traffic on the external road system as they travel between home and the worksite at the start and end of their shifts. Based on the travel characteristics, the 198 employees in 2012 generated approximately 360 vehicle trips per day on weekdays, and the 175 contractors in 2012 generated approximately 318 vehicle trips per day. It is estimated that approximately 50 vehicle trips per day made by contractors are by smaller heavy vehicles, such as two-axle and three-axle trucks.

3.2.4 Traffic Composition

The estimated composition of the WCM traffic in 2012 is presented in Table 3.2, which assumes all visitors and employees travel in light vehicles, all deliveries are made by heavy vehicles, and contractors use a mix of light and small heavy vehicles. The composition of the morning and evening peak hour traffic generation by trip type has been estimated with reference to the gate records (Section 3.2.1) and the surveyed peak hour traffic generation of WCM (Table 2.1).

Table 3.2: Average Weekday WCM Traffic Generation by Vehicle Type December 2012

	Visitor	Delivery	Employee	Contractor	Total
Average Weekday (vehicles/day)					
Light Vehicles	40	0	360	268	668
Heavy Vehicles	0	10	0	50	60
Total Trips	40	10	360	318	728
AM Peak Hour (vehicles/hour)					
Light Vehicles	3	0	78	48	129
Heavy Vehicles	0	1	0	4	5
Total Trips	3	1	78	52	134
PM Peak Hour (vehicles/hour)					
Light Vehicles	1	0	60	23	84
Heavy Vehicles	0	0	0	2	2
Total Trips	1	0	60	25	86

It is noted that the traffic generation of the WCM during the peak hours is lower than would be expected by direct comparison with shift start and finish times. For example, assuming that employees arrive and depart within 30 minutes of the start and end of their shifts, it would be expected that 34% of the daily employee trips would occur between 6.00am and 7.00am. Table 3.2 indicates that the morning peak hour is approximately 22% of the daily employee trips. The peak traffic therefore spreads over more time than is suggested by a theoretical assessment based on shift times. The peak hour for employee travel is estimated to be approximately 65% of the theoretical peak hour. The evening peak is more spread than the morning peak, and the theoretical assessment of travel based on shift times is more closely aligned with the results in Table 3.2.

Anecdotally, the reduction in the morning peak hour from the theoretical peak is a result of some staff arriving up to half an hour earlier than the start of their shift to allow time for social engagement with other staff, and for pre-work smokos. Some staff also have showers following their shifts, which may add up to half an hour to their departure time. The spread of the traffic is most noticeable during the morning, as this is the busiest period for staff arrivals and departures.

3.2.5 Internal Trips

The O-D survey results (Section 2.7) indicate that a number of trips to/from the WCM main access had an origin or destination on Ulan-Wollar Road between the WCM main Access Road and Ulan Road. Many of these trips can be considered as “internal” to WCM activity, as they are attributable to:

- employee and contractor trips between alternative entrances to the WCM and WCM-owned lands, including the temporary WCM build site activity on Ulan-Wollar Road at the time of the surveys; and
- smokers exiting the site to smoke, then returning to the site.

Review of WCM gate records and discussion with WCPL suggests that over the 12 hours of the survey, these internal trips account for approximately:

- 6 inbound and 6 outbound trips to and from the west of WCM Access Road; and
- 5 inbound and 5 outbound trips to and from the east of WCM Access Road.

These 22 vehicle trips per day do not contribute to traffic on the general road system beyond the section of Ulan-Wollar Road close to the WCM.

3.2.6 Multipurpose Trips

It is likely that a number of visitors, deliveries and contractors visit other local mine sites “back-to-back” with their visit to WCM. This is shown by the number of trips which the O-D survey report as having an origin or destination on Ulan-Wollar Road between the WCM and Ulan Road, i.e. where Moolarben Coal Mines has an access, and on Ulan Road between Ulan Road and Cope Road, i.e. where Ulan Coal Mines has an access. Over the 12 hour day, the following is suggested by the O-D survey results, noting the internal trips (Section 4):

- 10 outbound trips from WCM to Moolarben access on Ulan-Wollar Road;
- 16 inbound trips to WCM from Moolarben access on Ulan-Wollar Road;
- 10 outbound trips from WCM to Ulan access on Ulan Road north of Cope Road; and
- 5 inbound trips to WCM from Ulan access on Ulan Road north of Cope Road.

In addition, some multipurpose trips may also occur between the WCM and the other accesses for Moolarben and Ulan Coal Mines, which are located to the north on Ulan-Cassilis Road. These trips would be included in the O-D survey trips to and from Ulan Road north of Ulan-Wollar Road. In the absence of information to quantify these multipurpose trips, this assessment does not make specific allowance for them, noting that as these trips would be made to or from the Ulan and Moolarben Coal Mines, the trips are included in the traffic allowances made for those mines (refer Section 4).

Based on the 2012 composition of traffic at WCM from the gate records, it is assumed that the multi-purpose trips are made up of:

- 12% visitors;
- 85% contractors; and
- 3% deliveries.

3.2.7 Traffic Distribution

From the results of the O-D survey, and the other travel characteristics discussed above, the number and types of trips generated by the WCM during the 12 hour O-D survey have been assessed and are presented in Table 3.3 together with the estimated trips for the average weekday.

Table 3.3: WCM Traffic Generation by Trip Type December 2012 (vehicles)

	Visitor	Delivery	Employee	Contractor	Total
6am to 6pm					
Direct to WCM	33	9	276	206	524
Internal Trips	0	0	13	9	22
Multipurpose Trips	5	1	0	35	41
- via UCM south of Ulan-Wollar	2	0	0	13	15
- via Moolarben on Ulan-Wollar Road	3	1	0	22	26
Total Trips	38	10	289	250	587
Average Weekday 24 hours					
Direct to WCM	35	9	344	262	650
Internal Trips	0	0	16	11	28
Multipurpose Trips	5	1	0	45	51
- via UCM south of Ulan-Wollar	2	0	0	17	19
- via Moolarben on Ulan-Wollar Road	3	1	0	28	32
Total Trips	40	10	360	318	728

Taking into account the results of the O-D survey, and the internal and multipurpose trips, the overall distribution of those vehicles which travel directly to and from the WCM has been assessed at the surveyed locations and is presented in Table 3.4. The O-D survey results do not provide data on how WCM traffic splits at Wollar, however Halcrow (2010) found that of the WCM traffic travelling to and from the east on Ulan-Wollar Road, one-third had an origin or destination in or near Wollar, one-third had an origin or destination farther to the east on Wollar-Bylong Road, and one-third had an origin or destination to the south along Wollar Road. This same split has therefore been applied to the WCM traffic to and from the east on Ulan-Wollar Road.

Table 3.4: Distribution of 2012 WCM Traffic on Road System (%)

Site	Survey Location	Workforce	Deliveries and Visitors
1	Ulan Road north of Hollyoak Bridge	43.4	89.0
2	Ulan Road south of Wollar Road	43.4	89.0
3	Ulan Road south of Cope Road	56.6	89.0
4	Ulan Road south of Ulan-Wollar Road	79.5	91.0
5	Ulan Road north of Ulan-Wollar Road	9.3	9.0
6	Cope Road west of Ulan Road	22.8	2.0
7	Ulan-Wollar Road west of WCM Access Road	82.6	100.0
8	Ulan-Wollar Road east of Moolarben Access Road	82.6	100.0
9	Ulan-Wollar Road east of WCM Access Road	11.2	0.0
10	Ulan-Wollar Road east of Slate Gully Road	11.2	0.0
11	WCM Access Road south of Ulan-Wollar Road	100.0	100.0
12	Wollar-Bylong Road east of Wollar Road	3.7	0.0

Percentages are for direct travel to WCM only 6am to 6pm

3.2.8 Total Wilpinjong Coal Mine Traffic

Table 3.5 presents the overall spread of 2012 average weekday WCM traffic on the surrounding road system during the morning and evening peak hours and over the average weekday. This is the estimated traffic generated by the operations at the WCM at the time of the traffic surveys (2012), and does not include the traffic associated with the temporary build site on Ulan-Wollar Road.

Table 3.5: December 2012 Peak Hour and Daily Operational WCM Traffic

Site	Survey Location	6.00am to 7.00am (vehicles/hour)			6.00pm to 7.00pm (vehicles/hour)			Weekday (vehicles/day)		
		Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total
1	Ulan Road north of Hollyoak Bridge	55	2	57	35	1	36	297	30	327
2	Ulan Road south of Wollar Road	55	2	57	35	1	36	297	30	327
3	Ulan Road south of Cope Road	71	3	74	46	1	47	377	36	413
4	Ulan Road south of Ulan-Wollar Road	99	4	103	64	2	66	517	48	564
5	Ulan Road north of Ulan-Wollar Road	12	0	12	8	0	8	60	5	65
6	Cope Road west of Ulan Road	28	1	29	18	0	19	138	11	150
7	Ulan-Wollar Road west of WCM Access Road	106	4	110	69	2	70	552	51	602
8	Ulan-Wollar Road east of Moolarben Access Road	103	4	107	67	2	68	538	50	587
9	Ulan-Wollar Road east of WCM Access Road	16	0	16	11	0	11	79	6	85
10	Ulan-Wollar Road east of Slate Gully Road	14	0	14	9	0	9	68	5	73
11	WCM Access Road south of Ulan-Wollar Road	129	5	134	84	2	86	668	60	728
12	Wollar-Bylong Road east of Wollar Road	5	0	5	3	0	3	23	2	24

3.2.9 Traffic Management

A car pool reimbursement scheme is available for employees of Peabody Energy, which reimburses employees for each vehicle removed from the road. Such a scheme encourages employees who travel similar routes at similar times to travel together in order to reduce the overall traffic generation of the WCM.

A review of the complaints registered with WCPL over the period 2006 to 2012 indicates that of the total 726 complaints recorded, 21 were categorised as relating to traffic. Of those 21 complaints, 14 occurred in 2006 (one of which was unrelated to WCM traffic), two occurred in 2007, one occurred in each of 2008 and 2009, none occurred in 2010, one occurred in 2011 and two occurred in 2012.

The majority of traffic complaints were related to aspects of the behaviour of truck drivers on the surrounding roads, and the register indicates that corrective action for such typically involved toolbox talks to drivers regarding road safety awareness and obligations. The decline in the number of complaints suggests that these actions adequately addressed the concerns raised.

In addition, WCPL has committed to a number of measures to minimise the impacts of mine traffic on school bus operations on Ulan Road, including:

- incorporate the need to minimise mine traffic during school bus hours in all contractor and staff site inductions;
- schedule contractor activity to minimise interaction with school buses where practical;
- incorporate school bus times, and the need to avoid them, in toolbox talks with staff and contractors regarding traffic minimisation and car pooling;
- incorporate the requirement for mine traffic to adhere to the 40km/h speed limit when the school bus lights are flashing into all contractor and staff site inductions;
- investigate incorporating a message regarding driver behaviour when passing school buses at all interactive lookout points;
- incorporate the speed reduction requirement when school bus lights are flashing into toolbox talks with staff and contractors regarding traffic minimisation and car pooling; and
- incorporate, where possible, a requirement for all oversize vehicles travelling to/from WCM to operate outside of the school bus hours on Ulan Road, unless specifically scheduled for this period due to NSW Police requirements.

3.3 Description of the Modification

Following a review of mine planning, CHPP capacity, waste rock bulking factors, planned building and demolition works and light vehicle servicing requirements, WCPL has determined that a number of minor alterations to the approved WCM are required, including:

- development of incremental extensions to the existing open cut pits that would extend the open cuts by approximately 70 hectares and would result in the recovery of approximately 3 million tonnes (Mt) of additional ROM coal;
- higher rates of annual waste rock production (from 28 million bank cubic metres (Mbcm) up to approximately 33.3 Mbcm in order to maintain approved ROM coal productions);
- minor CHPP upgrades to improve fine coal reject management (installation of a belt press filter) and an increase in the rate of ROM coal beneficiation in the CHPP to approximately 9 Mtpa;
- upgrade of the existing Reverse Osmosis Plant to a Water Treatment Facility with the addition of pre-filtration and flocculation/dosing facilities to improve plant efficiency;
- amendment of the waste emplacement strategy to include:
 - development of an elevated waste rock emplacement landform (up to approximately 450m Australian Height Datum) within the footprint of Pit 2;
 - disposal of some inert building and demolition waste that is produced from off-site building demolition in the approved mine waste rock emplacements;
 - co-disposal of fine coal reject material produced by the belt press filter with coarse rejects; and
- operation of a new light vehicle servicing workshop at an existing farm shed located in the north of the Project area.

The Modification involves the development of minor open cut extension areas that immediately adjoin the existing approved open cut limits, resulting in the recovery of approximately 3 Mt of additional ROM coal. In addition, higher rates of annual waste rock production (from 28 Mbcm) of to approximately 33.3 Mbcm per annum would result within the approved open cut limits and the proposed extension areas.

No changes are proposed to the approved rates of ROM coal (15 Mtpa) or product coal (12.5 Mtpa), however the proportion of ROM coal that is subject to beneficiation in the CHPP would increase to 9 Mtpa. The Modification does not include any extension to the approved 21 year mine life. The average and maximum number of trains per day would remain unchanged.

The mining sequence and rate of mining would continue to be subject to review on the basis of market conditions and customer demands, or unforeseen changes to mining operations.

3.4 Road Transport Aspects of the Modification

It is anticipated that the increases in the rates of CHPP processing and waste rock production, in combination with the proposed on-site disposal of inert building waste would result in some limited increase in heavy vehicle deliveries to the site. The proposed disposal of limited volumes of building and demolition inert waste material on-site would reduce heavy vehicle movements on local roads around Mudgee.

The existing maximum total workforce of 550 employees and contractors would remain unchanged until approximately 2019. Thereafter, as the ROM coal production rate and waste rock production reduce, the maximum workforce would be expected to fall back to approximately 460 permanent employees and contractors, which is similar to the level at the time of the traffic surveys during December 2012.

Construction activity during 2014 would attract up to 20 additional employees and would also be expected to generate some additional heavy vehicle movements into and out of the WCM.

Overall, the Modification's impact on traffic levels would be modest.

3.5 Future Scenarios

The future stages of particular interest to the Modification with regard to road transport conditions which have been considered in this assessment are:

- Year 2014 – with peak operational workforce of 550 people, and short term construction workforce of 20 people and associated increased heavy vehicle deliveries.
- Year 2024 – with operational workforce of 460 people.

These two scenarios have been adopted to examine the anticipated maximum traffic movements in the short-term and comparative traffic movements later in the life of the WCM, when production and staffing levels would be lower.

3.6 Future WCM Traffic Generation

During 2014, the WCM would generate additional traffic on the surrounding road system above the December 2012 levels as a result of the Modification construction activity, and increase in site activity. The components of the traffic changes expected to result from the Modification are discussed below.

3.6.1 Operational Workforce

The existing (2013) operational workforce of 550 people is expected to be maintained until approximately 2019, after which it is expected to decline to approximately 460 people by 2024. Not all of the workforce would be present on any one day, and based on the 2012 attendance rate and proportions of employees and contractors, Table 3.6 summarises the expected changes in the number of people working on site between December 2012 and the future scenarios.

The assessment which follows assumes that the existing (2013) workforce of 550 employees would be present in 2014, noting that the workforce present at the time of the traffic surveys during December 2012 was lower. The increase in the operational workforce and its traffic generation from December 2012 is therefore not related to the Modification.

Table 3.6: WCM Operational Workforce

	December 2012	2014 ^A	2024
Total Workforce	470	550	460
Total Employees Present per Day	198	232	194
Contractors Present per Day	175	205	172

^A Increase to maximum 550 workforce has already occurred in 2013 and is not related to the Modification

The distribution of arrivals and departures of employees throughout the day is a result of the shift times, which have not been altered. The additional operational employees are spread over the shifts, and so the number of employees and contractors arriving and departing during the peak hours remains the same proportion of the daily total as in December 2012. Table 3.7 summarises the expected daily and peak hourly external traffic generation of the workforce at WCM.

Table 3.7: WCM Workforce Vehicle Trip Generation

	December 2012	2014 ^A	2024
Total Workforce	470	550	460
Employees			
On-Site per Day	198	232	194
Vehicle Trips per Day	360	422	352
Vehicle Trips in Peak AM Hour (6.00am to 7.00am)	78	91	76
Vehicle Trips in Peak PM Hour (6.00pm to 7.00pm)	60	70	59
Contractors			
On-Site per Day	175	205	172
Vehicle Trips per Day	318	372	312
Vehicle Trips in Peak AM Hour (6.00am to 7.00am)	52	61	51
Vehicle Trips in Peak PM Hour (6.00pm to 7.00pm)	25	29	25

^A Increase to maximum 550 workforce has already occurred in 2013 and is not related to the Modification

3.6.2 Operational Deliveries

WCPL has advised that an average of 25 deliveries to the WCM occurred each week in 2012. The increase in activity at the site as a result of the Modification (i.e. waste rock production and ROM coal beneficiation) is expected to result in some increase in the number of deliveries, as additional consumables may be required. As production levels decrease, the number of deliveries would also be expected to decrease. Table 3.8 summarises the estimated traffic generation of operational delivery vehicles, which assumes that the proportion of daily delivery trips which occur in the peak hours would remain the same as existing.

Table 3.8: 2012 and Future WCM Delivery Vehicle Trip Generation

	December 2012	2014	2024
Deliveries per Week	25	30	20
Deliveries per Day	5	6	4
Vehicle Trips per Day	10	12	8
Vehicle Trips in AM Peak Hour	1	1	1
Vehicle Trips in PM Peak Hour	0	0	0

As at present, delivery trips would be drawn primarily from Mudgee, with a small number from Newcastle and Orange.

3.6.3 Operational Visitors

The number of visitors to WCM would be expected to increase as production and general activity on the site increases. As production levels decrease, the number of visitors would also be expected to decrease. For the purpose of this assessment, all visitors are assumed to travel in light vehicles, such as cars, 4WDs and utilities. Table 3.9 summarises the estimated traffic generation of visitor vehicles, with peak hourly generation based on the existing proportion of daily visitor trips which occur during the peak hours.

Table 3.9: 2012 and Future WCM Visitor Vehicle Trip Generation

	December 2012	2014	2024
Visitors per Day	22	25	20
Vehicle Trips per Day	40	46	36
Vehicle Trips in AM Peak Hour	3	4	3
Vehicle Trips in PM Peak Hour	1	1	1

3.6.4 Construction Workforce and Deliveries

The construction workforce of some 20 people would visit the site during 2014. For the purpose of this assessment, it is assumed that construction employees would each travel independently, i.e. one vehicle per person. On this basis, the construction workforce would generate 40 vehicle trips per day. It is expected that construction activity would typically occur during the day, with most employees arriving during the morning peak hour, and departing during the evening peak hour.

Construction activity is estimated to generate an average of four deliveries per day, which would generate eight vehicle trips per day until the end of 2014. At times, building waste disposal would generate some additional trips, as materials are removed from rural lands in the vicinity of Wilpinjong and deposited at the WCM. While these would be infrequent and small in number, such trips are included here to ensure a robust assessment of the implications of the Modification.

The average weekday construction trip generation is summarised in Table 3.10.

Table 3.10: WCM Construction Phase Trip Generation Year 2014

	Employees	Deliveries and Building Waste Disposal	Total
Vehicle Trips per Day	40	12	52
Vehicle Trips in AM Peak Hour	20	1	21
Vehicle Trips in PM Peak Hour	20	0	20

3.7 Traffic Distribution

The distribution of vehicle trips on the surrounding road network is not expected to alter significantly over time from the existing distribution, as the sources of deliveries and residential distribution of employees and contractors is not expected to alter significantly. Table 3.11 presents the assumed distribution of the existing WCM and Modification traffic by each trip type for the future scenarios.

Table 3.11: Average Weekday WCM Traffic with Modification in 2014 and 2024

Site	Location	Year 2014			Year 2024		
		AM Peak	PM Peak	Daily	AM Peak	PM Peak	Daily
1	Ulan Road north of Hollyoak Bridge	77	52	409	56	36	316
2	Ulan Road south of Wollar Road	77	52	409	56	36	316
3	Ulan Road south of Cope Road	99	67	516	72	46	400
4	Ulan Road south of Ulan-Wollar Road	137	94	703	100	64	548
5	Ulan Road north of Ulan-Wollar Road	16	11	81	12	8	65
6	Cope Road west of Ulan Road	38	26	185	28	18	146
7	Ulan-Wollar Road west of WCM Access Road	146	100	749	107	69	585
8	Ulan-Wollar Road east of Moolarben Access Road	143	97	732	104	67	570
9	Ulan-Wollar Road east of WCM Access Road	22	15	105	16	11	84
10	Ulan-Wollar Road east of Slate Gully Road	19	13	90	14	9	71
11	WCM Access Road south of Ulan-Wollar Road	178	122	905	131	84	708
12	Wollar-Bylong Road east of Wollar Road	6	4	30	5	3	24

Table 3.12 presents the expected overall changes to traffic travelling to and from the WCM as a result of the existing WCM and Modification in 2014 and 2024. As the number of employees and contractors would decrease below current levels by 2024, there would be a decrease in the generated traffic in 2024 compared with 2012.

Table 3.12: Change in WCM Traffic from 2012 to 2014 and 2024

Site	Location	2012 to 2014			2012 to 2024		
		AM Peak	PM Peak	Daily	AM Peak	PM Peak	Daily
1	Ulan Road north of Hollyoak Bridge	19	15	82	-2	-1	-11
2	Ulan Road south of Wollar Road	19	15	82	-2	-1	-11
3	Ulan Road south of Cope Road	25	20	102	-2	-1	-13
4	Ulan Road south of Ulan-Wollar Road	35	28	138	-3	-2	-16
5	Ulan Road north of Ulan-Wollar Road	4	3	16	0	0	0
6	Cope Road west of Ulan Road	10	8	36	-1	0	-3
7	Ulan-Wollar Road west of WCM Access Road	36	29	147	-3	-2	-17
8	Ulan-Wollar Road east of Moolarben Access Road	36	29	144	-3	-2	-17
9	Ulan-Wollar Road east of WCM Access Road	5	4	19	0	0	-2
10	Ulan-Wollar Road east of Slate Gully Road	5	4	17	0	0	-2
11	WCM Access Road south of Ulan-Wollar Road	44	35	176	-3	-2	-20
12	Wollar-Bylong Road east of Wollar Road	2	1	6	0	0	-1

It is noted that the increases in traffic generated by the Modification as described in this report are those associated with construction and modest increases in operational deliveries and operational visitors expected to occur in 2014, after which, the construction traffic component would cease. Increases from December 2012 associated with the operational workforce have already occurred in 2013 and are not related to the Modification. The operational component of the additional Modification traffic would continue until approximately 2018, after which the traffic generation of the WCM would begin to decrease, and is expected to be below current levels by 2024 in the absence of any further approvals to extend the WCM.

4. Changes to the Road Environment

The road environment is expected to change over time from that surveyed in December 2012, regardless of the Modification. These changes, and the developments which may result in changes to the road environment, are described in this section.

4.1 Ulan Road Strategy

ARRB recently prepared the *Ulan Road Strategy*, which presents recommendations regarding improvements works along Ulan Road between Mudgee and the access to the Ulan Coal Mines. Traffic forecasts in the *Ulan Road Strategy* include projections of vehicle use associated with the Ulan Coal Mines, Moolarben Coal Mines and WCM. The report identifies road works to upgrade and maintain Ulan Road over the operating life of the mines, including upgrading over 20 intersections, typically to either basic left-turn (BAL)/ basic right-turn (BAR), or channelised left-turn (CHL)/channelised right-turn (CHR) configurations, upgrading of Ulan Road to a desirable design formation of two 3.5m wide sealed lanes with 1.0m wide sealed shoulders and 1.0m wide unsealed shoulders, and adoption of noise attenuation measures.

The proposed intersection upgrades generally involve widening of the carriageway to allow through vehicles to pass around vehicles slowing to turn into or out of side roads. "CHR" refers to provision of a channelised right-turn only bay on the major road. "CHL" refers to a channelised left-turn only bay on the major road for vehicles turning into the minor road, and/or a channelised left-turn only bay on the minor road for vehicles turning into the major road. The report presents an indicative program for the upgrades, based on consideration of priorities relating to the pavement conditions, crash history, traffic volumes and timing of other nearby works.

The Strategy's recommended desirable design standard for Ulan Road is a carriageway width of 11.0m, consisting of two 3.5m wide sealed lanes, two 1.0m wide sealed shoulders and two 1.0m unsealed shoulders. Where road widening works would be impractical, a minimum design standard with an 8.2m formation width is recommended.

4.2 Ulan Coal Continued Operations Project

The Ulan Coal Mines are located approximately 1.5km from the Village of Ulan, and is approximately 38km north-east of Mudgee. The Ulan Coal Continued Operations Project was approved in November 2010, and involves an extension to the open cut operations as well as concurrently mining the approved Ulan No. 3 Underground and Ulan West under a modified mine plan for 20 years. A traffic and transport impact assessment for that Modification was undertaken by Transport & Urban Planning (2009), which found that the peak workforce and traffic generation of the mine would occur in Year 4.

Based on planning at the time of the study, Year 1 of the Continued Operations Project was expected to occur in 2010, thus the peak in Year 4 was expected to occur in 2013. The *Ulan Road Strategy* refers to commencement of the Continued Operations Project in 2011, thus the Year 4 peak can now be expected to occur in 2014.

The traffic surveys conducted in December 2012 can therefore be considered to include the Year 2 traffic generation of the Ulan Continued Operations Project, estimated to be 1,486 trips per day by workforce and visitors, and 34 deliveries per day. Table 4.1 summarises the expected changes to the traffic generation of the Ulan Coal Mines as a result of the Continued Operations Project.

Table 4.1: Weekday Average Traffic Increases Above 2012 Due to Ulan Continued Operations Project

	Year 4 2014	Year 6 2016	Year 10 2020	Year 13 2023	Year 14 2024	Year 21 2031
Workforce	416	72	-156	-492	-828	-1,038
Deliveries	0	0	-2	-10	-18	-22
Total Increase	416	72	-158	-502	-846	-1,060

Two Modifications have since been approved, however neither involves changes to the number of employees, so no further significant changes to the traffic generation are expected to occur.

Based on the assessment presented by Transport & Urban Planning (2009), the anticipated changes in traffic from those surveyed in 2012 as a result of the Ulan Coal Continued Operations Project have been quantified for the recent survey locations, and are presented in Table 4.2. The original assessment considered the Friday morning peak hour, as this would be the busiest hour through the week for that site. Comparison between the theoretical Friday morning peak hourly generation and distribution and the surveyed average weekday traffic volumes in December 2012 suggests that the theoretical Friday morning peak hour generation is higher than actually occurs over the typical weekday. This could be the result of a number of factors, including variations in day-to-day activity, the spread of peak hours similar to that seen at WCM, and that the theoretical peak hour was the busiest hour expected during the whole week. This assessment has reduced the morning peak hour traffic expected to be generated by the Ulan Coal Continued Operations Project, consistent with surveyed volumes on the surrounding roads and the finding that the morning peak traffic generation of WCM is also lower than would be expected based on simple conservative assumptions regarding shift change times.

Table 4.2: Ulan Coal Continuation Project Future Additional Traffic

Site	Location	AM Peak Hour (vehicles/hour)		PM Peak Hour (vehicles/hour)		Weekday (vehicles/day)	
		2014	2024	2014	2024	2014	2024
1	Ulan Road north of Hollyoak Bridge	85	-168	5	-12	287	-578
2	Ulan Road south of Wollar Road	85	-168	5	-12	287	-578
3	Ulan Road south of Cope Road	85	-168	5	-12	287	-578
4	Ulan Road south of Ulan-Wollar Road	63	-239	6	-14	225	-805
5	Ulan Road north of Ulan-Wollar Road	63	-239	6	-14	225	-805
6	Cope Road west of Ulan Road	40	-66	2	-4	131	-226
7	Ulan-Wollar Road west of WCM Access Road	0	0	0	0	0	0
8	Ulan-Wollar Road east of Moolarben Access Road	0	0	0	0	0	0
9	Ulan-Wollar Road east of WCM Access Road	0	0	0	0	0	0
10	Ulan-Wollar Road east of Slate Gully Road	0	0	0	0	0	0
11	WCM Access Road south of Ulan-Wollar Road	0	0	0	0	0	0
12	Wollar-Bylong Road east of Wollar Road	0	0	0	0	0	0

4.3 Moolarben Coal Project Stage 2

The Moolarben Coal Project Stage 2 is currently under assessment. Sinclair Knight Merz [SKM] (2008) prepared a traffic impact assessment for the project, which proposes an additional access on Ulan-Wollar Road.

The construction phase of the Stage 2 project is expected to take place over 18 months, and generate 200 car arrivals between 6.00am and 7.00am, and 200 car departures between 6.00pm and 7.00pm. A peak of 20 concrete trucks would arrive per day, and typically up to 6 trucks per day at other times. Throughout the construction phase, approximately 100 wide loads are anticipated.

Once operational, Stage 2 is expected to employ an additional 122 employees over three shifts on weekdays only. The three shifts are 7.00am to 5.00pm (41 additional employees), 6.30am to 7.00pm (41 additional employees) and 6.30pm to 7.00am (40 additional employees). SKM (2008) estimated the operational employee traffic generation of Stage 2 on the basis of car occupancy of 1.0 people per vehicle. The majority of employees were assumed to reside in Gulgong and Mudgee, and several options were investigated, the most likely being that 80% of employees reside in Mudgee and 20% in Gulgong.

As this does not yet have approval, the timing of Stage 2 remains uncertain. Given the expected length of the construction phase, it would be unlikely that operations would commence before late 2014 or early 2015.

Based on the assessment in SKM (2008), the traffic changes as a result of the Moolarben Coal Project Stage 2 have been quantified at the locations of the recent traffic surveys, and are presented in Table 4.3. This assumes for the purpose of this assessment that peak construction for Moolarben Coal Project Stage 2 would occur in 2014, and it would be operational thereafter. As above for the Ulan Coal Mine Continued Operations Project, the morning peak traffic generation has been reduced from that expected by direct review of theoretical shift change times, as this typically overestimates the actual morning peak hour generation that is observed in practice.

Table 4.3: Moolarben Coal Project Stage 2 Future Additional Traffic

Site	Location	AM Peak Hour (vehicles/hour)		PM Peak Hour (vehicles/hour)		Weekday (vehicles/day)	
		2014	2024	2014	2024	2014	2024
1	Ulan Road north of Hollyoak Bridge	109	43	165	32	362	195
2	Ulan Road south of Wollar Road	109	43	165	32	362	195
3	Ulan Road south of Cope Road	109	43	165	32	362	195
4	Ulan Road south of Ulan-Wollar Road	136	53	206	40	452	244
5	Ulan Road north of Ulan-Wollar Road	0	0	0	0	0	0
6	Cope Road west of Ulan Road	27	11	41	8	90	49
7	Ulan-Wollar Road west of WCM Access Road	0	0	0	0	0	0
8	Ulan-Wollar Road east of Moolarben Access Road	0	0	0	0	0	0
9	Ulan-Wollar Road east of WCM Access Road	0	0	0	0	0	0
10	Ulan-Wollar Road east of Slate Gully Road	0	0	0	0	0	0
11	WCM Access Road south of Ulan-Wollar Road	0	0	0	0	0	0
12	Wollar-Bylong Road east of Wollar Road	0	0	0	0	0	0

4.4 Mt Penny Coal Mine

A Preliminary Environmental Assessment (PEA) has been prepared and Director-General's Requirements (DGRs) issued in relation to a proposed coal mine at Mt Penny, located approximately 3km north-west of the Village of Bylong. Cascade Coal submitted its Environmental Assessment for the project in August 2012, but it has not yet been placed on public exhibition.

As the transport assessment has not yet been made publicly available, the PEA (Wells Environmental Services, 2011) provides the only information regarding the potential impacts of the development.

The PEA provides no information regarding traffic implications of the project, noting only that operational employment is proposed for 250 people working in three shifts, and that realignment of a portion of Wollar Road would be required. The mine is projected to produce 5 Mtpa of ROM coal over 20 years, with operations occurring 24 hours per day and seven days per week.

Coal would be transported by rail, utilising a staged, bi-directional rail loop with associated train loading and provisioning facilities. Traffic impacts once operational would therefore be expected to be the result of employees and delivery/visitor vehicles travelling to and from the site.

Considering its regional location, Mt Penny Coal Mine would be likely to attract employees from Mudgee, Gulgong, Rylstone, and perhaps from locations farther east such as Denman and Muswellbrook. With regard to the potential for Mt Penny employees to generate traffic on the same routes as used by WCM traffic, Mt Penny employees travelling to and from Gulgong may use Ulan-Wollar Road and Cope Road. Those employees travelling to and from Mudgee would have the choice to use either Ulan Road and Ulan-Wollar Road or Wollar Road. Wollar Road is the shorter route however Ulan Road and Ulan-Wollar Road is the better quality route. The DGRs issued for the Mt Penny Coal Mine include reference to “realignment and widening requirements of Wollar Road and the Bylong Valley Way” thus it is not clear whether any significant upgrading of Wollar Road would occur should the project proceed.

The timing of the Mt Penny Coal Mine, if approved, is uncertain. For the purpose of this assessment, assumptions have been made about the possible road transport implications of the Mt Penny project:

- 2014 scenario – construction activity at Mt Penny;
- 2024 scenario – operational activity at Mt Penny;
- 150 construction employees, 1.0 vehicle per person, 40% travel during each of the peak hours;
- 250 operational employees, 1.0 vehicle per person, 40% travel during each of the peak hours;
- 30 construction delivery trips per day between 6am and 6pm;
- 50 operational delivery trips per day between 6am and 6pm;
- 50% all vehicles travel to/from Mudgee via Wollar Road; and
- 10% all vehicles travel to/from Gulgong via Ulan-Wollar Road.

The resulting estimates of peak hour and daily traffic generated by the Mt Penny project are presented in Table 4.4.

Table 4.4: Mt Penny Project Future Additional Traffic (vehicles)

Site	Location	AM Peak Hour (vehicles/hour)		PM Peak Hour (vehicles/hour)		Weekday (vehicles/day)	
		2014	2024	2014	2024	2014	2024
1	Ulan Road north of Hollyoak Bridge	61	102	60	100	165	275
2	Ulan Road south of Wollar Road	61	102	60	100	165	275
3	Ulan Road south of Cope Road	0	0	0	0	0	0
4	Ulan Road south of Ulan-Wollar Road	12	20	12	20	33	55
5	Ulan Road north of Ulan-Wollar Road	0	0	0	0	0	0
6	Cope Road west of Ulan Road	12	20	12	20	33	55
7	Ulan-Wollar Road west of WCM Access Road	12	20	12	20	33	55
8	Ulan-Wollar Road east of Moolarben Access Road	12	20	12	20	33	55
9	Ulan-Wollar Road east of WCM Access Road	12	20	12	20	33	55
10	Ulan-Wollar Road east of Slate Gully Road	12	20	12	20	33	55
11	WCM Access Road south of Ulan-Wollar Road	0	0	0	0	0	0
12	Wollar-Bylong Road east of Wollar Road	74	123	72	120	198	330

4.5 Bowdens Silver Mine

A PEA has been prepared and submitted to NSW Department of Planning and Infrastructure in relation to a proposed silver mine north of Lue, and DGRs have recently been issued for this assessment. The indicative schedule for the project, if approved, is that construction would commence mid-2014 and operations would commence late 2015.

The PEA suggests that the Bowdens Silver Project would employ some 300 people during construction, and 200 people once operational. Operational employees would be encouraged to reside in Mudgee, Lue, Kandos and Rylstone. The majority of the construction workforce is expected to be drawn from the surrounding communities with a small number of specialists being brought in from outside the immediate districts. Based on the likely residential locations of the workforce, Bowdens Silver Mine construction and operational employees are not likely to use the routes used by WCM traffic, and so would not significantly impact on the future traffic volumes on those roads.

Bulk silver/lead concentrate and zinc concentrate would be transported off-site for further refining and treatment. It is understood that the concentrates would be transported by truck to a port, and that trucks would travel to and from the east of Lue. The trucks would therefore not use the same routes as the WCM traffic.

The Bowdens Mine is therefore not likely to use the same roads as the WCM traffic, and so its impacts in the longer term are not included in this assessment.

4.6 Temporary Build Site on Ulan-Wollar Road

As noted in Section 2.3, WCPL was undertaking temporary mobile equipment assembly activity off Ulan-Wollar Road to the west of the WCM Access Road at the time of the traffic survey program. New mining equipment was being constructed at a designated build site, with components being trucked in and assembled at that site by a temporary workforce. The build site had its own temporary access point from Ulan-Wollar Road located immediately west of the WCM Access Road.

This activity contributed additional traffic on the surrounding road system which will not continue. This contribution should therefore be removed from the assessment of the longer term implications of the WCM on the road system. The contribution of this construction activity to the surveyed traffic conditions is discussed in this section.

Table 3.1 demonstrates that on the average weekday, the build site attracted 19 people. Based on the average vehicle occupancies and some duplicate log-ins, it is estimated that the temporary build site generated an average of 30 vehicle trips per day on Ulan-Wollar Road. In addition, the construction activity attracted an average of four deliveries per day, which generated eight heavy vehicle trips per day.

As the temporary build site activity would not occur in the future scenario years, the generated traffic has been removed from the road system for the future scenarios, as presented in Table 4.5. For the purpose of this assessment it is assumed that all traffic associated with the build site travels directly to and from the site.

Table 4.5: WCM Temporary Construction Activity Future Additional Traffic

Site	Location	AM Peak Hour (vehicles/hour)		PM Peak Hour (vehicles/hour)		Weekday (vehicles/day)	
		2014	2024	2014	2024	2014	2024
1	Ulan Road north of Hollyoak Bridge	-4	-4	-3	-3	-27	-27
2	Ulan Road south of Wollar Road	-4	-4	-3	-3	-27	-27
3	Ulan Road south of Cope Road	-5	-5	-3	-3	-31	-31
4	Ulan Road south of Ulan-Wollar Road	-6	-6	-4	-4	-38	-38
5	Ulan Road north of Ulan-Wollar Road	-1	-1	-1	-1	-4	-4
6	Cope Road west of Ulan Road	-2	-2	-1	-1	-7	-7
7	Ulan-Wollar Road west of WCM Access Road	-6	-6	-5	-5	-28	-28
8	Ulan-Wollar Road east of Moolarben Access Road	-7	-7	-5	-5	-41	-41
9	Ulan-Wollar Road east of WCM Access Road	-1	-1	-1	-1	-3	-3
10	Ulan-Wollar Road east of Slate Gully Road	-1	-1	-1	-1	-3	-3
11	WCM Access Road south of Ulan-Wollar Road	-0	-0	-0	-0	-0	-0
12	Wollar-Bylong Road east of Wollar Road	-0	-0	-0	-0	-1	-1

4.7 Background Traffic Growth

The *Ulan Road Strategy* (ARRB, 2011) adopted a growth rate of 1.8% per annum, which was applied to the general community traffic over the 21 year period of operation of the mines. Table 4.6 summarises the estimated growth in non-mine traffic at the survey locations for the two future scenarios.

Table 4.6: Additional Background Non-Mine Traffic (1.8% per annum)

Site	Location	AM Peak (vehicles/hour)		PM Peak (vehicles/hour)		Weekday (vehicles/day)	
		2014	2024	2014	2024	2014	2024
1	Ulan Road north of Hollyoak Bridge	15	93	26	160	273	1,640
2	Ulan Road south of Wollar Road	4	20	8	48	62	373
3	Ulan Road south of Cope Road	6	37	4	22	18	111
4	Ulan Road south of Ulan-Wollar Road	6	34	4	21	31	186
5	Ulan Road north of Ulan-Wollar Road	5	31	4	24	39	234
6	Cope Road west of Ulan Road	3	13	2	16	27	164
7	Ulan-Wollar Road west of WCM Access Road	0	2	0	0	3	19
8	Ulan-Wollar Road east of Moolarben Access Road	0	3	0	2	7	45
9	Ulan-Wollar Road east of WCM Access Road	0	0	0	0	2	16
10	Ulan-Wollar Road east of Slate Gully Road	0	0	0	1	2	15
11	WCM Access Road south of Ulan-Wollar Road	0	0	0	0	0	0
12	Wollar-Bylong Road east of Wollar Road	0	1	0	2	5	24

5. Future Road Environment

5.1 Future Midblock Traffic Volumes

The future morning and evening peak hour and daily traffic volumes at the surveyed locations with the combined impacts of the Modification and the other changes to the road environment described in Section 4 are presented in Table 5.1. To ensure a robust assessment of the future peak hour traffic conditions, the additional peak hourly traffic expected to be generated by the Modification and other developments has been added to the surveyed peak hour volumes, regardless of which hour that peak occurred.

Table 5.1: December 2012^A and Future with Modification Traffic Volumes

Site	Location	AM Peak (vehicles/hour)			PM Peak (vehicles/hour)			Weekday (vehicles/day)		
		2012	2014	2024	2012	2014	2024	2012	2014	2024
1	Ulan Road north of Hollyoak Bridge	667	952	733	866	1,134	1,142	9,727	10,868	11,220
2	Ulan Road south of Wollar Road	333	606	325	348	599	512	3856	4,786	4,082
3	Ulan Road south of Cope Road	428	647	335	242	432	279	2736	3,474	2,420
4	Ulan Road south of Ulan-Wollar Road	453	697	314	261	513	322	3345	4,186	2,971
5	Ulan Road north of Ulan-Wollar Road	307	378	99	194	207	204	2633	2,909	2,058
6	Cope Road west of Ulan Road	156	245	132	129	193	168	1570	1,879	1,601
7	Ulan-Wollar Road west of WCM Access Road	121	168	139	72	112	90	693	872	746
8	Ulan-Wollar Road east of Moolarben Access Road	129	170	143	83	119	99	838	981	880
9	Ulan-Wollar Road east of WCM Access Road	14	31	34	12	27	31	164	215	229
10	Ulan-Wollar Road east of Slate Gully Road	16	32	35	14	29	34	142	191	207
11	WCM Access Road south of Ulan-Wollar Road	133	178	130	86	121	84	729	905	709
12	Wollar-Bylong Road east of Wollar Road	10	85	133	13	86	134	141	348	493

^A Excluding traffic to/from temporary build site on Ulan-Wollar Road

The results indicate that on the main access roads, total traffic volumes would decline between 2014 and 2024. This is largely due to the expected significant reductions in traffic generated by the Ulan Coal Mines, which would exceed the expected increase in background traffic not associated with the mines. WCM traffic would also decline over that period.

The contribution of WCM to traffic volumes on the surrounding roads would decline over time, as presented in Table 5.2.

Table 5.2: Contribution of WCM with Modification to Total Daily Traffic

Site	Location	WCM Traffic (vehicles/day)			Total Traffic (vehicles/day)			WCM Percent of Total Traffic		
		2012 ^A	2014	2024	2012	2014	2024	2012	2014	2024
1	Ulan Road north of Hollyoak Bridge	327	409	316	9727	10,868	11,220	3	4	3
2	Ulan Road south of Wollar Road	327	409	316	3856	4,786	4,082	8	9	8
3	Ulan Road south of Cope Road	413	516	400	2736	3,474	2,420	15	15	17
4	Ulan Road south of Ulan-Wollar Road	564	703	548	3345	4,186	2,971	17	17	18
5	Ulan Road north of Ulan-Wollar Road	65	81	65	2633	2,909	2,058	2	3	3
6	Cope Road west of Ulan Road	150	185	146	1570	1,879	1,601	10	10	9
7	Ulan-Wollar Road west of WCM Access Road	602	749	585	693	872	746	87	86	78
8	Ulan-Wollar Road east of Moolarben Access Road	587	732	570	838	981	880	70	75	65
9	Ulan-Wollar Road east of WCM Access Road	85	105	84	164	215	229	52	49	36
10	Ulan-Wollar Road east of Slate Gully Road	73	90	71	142	191	207	51	47	35
11	WCM Access Road south of Ulan-Wollar Road	728	905	708	729	905	709	100	100	100
12	Wollar-Bylong Road east of Wollar Road	24	30	24	141	348	493	17	9	5

^A Excluding traffic to/from temporary build site on Ulan-Wollar Road

5.2 Future Roadway Efficiency

The PTSF and LOS for the future peak hour traffic volumes has been calculated, applying the same assumptions as described in Section 2.5 with respect to passenger-car equivalent factor, proportion of no-passing opportunities and the peak 15 minute volume as a proportion of peak hour. The results are presented in Table 5.3 for the busiest hours for traffic generation of the WCM, being 6.00am to 7.00am and 6.00pm to 7.00pm. It is noted that these hours do not necessarily correlate with the peak hours identified at each location individually (refer to Table 2.1 and Table 2.3).

The results in Table 5.3 indicate that with the combined influences of the Modification and the other changes to the road environment described in Section 4, the operational conditions on the surrounding roads would remain good, with PTSF remaining below 40% during the peak hours at all surveyed locations.

Table 5.3: Future Percent Time-Spent-Following and Levels of Service with Modification

Site	Survey Location	AM Peak Hour						PM Peak Hour					
		2012		2014		2024		2012		2014		2024	
		PTSF	LOS	PTSF	LOS	PTSF	LOS	PTSF	LOS	PTSF	LOS	PTSF	LOS
1	Ulan Road north of Hollyoak Bridge	30.9	A	22.1	A	18.8	A	32.3	A	24.0	A	27.2	A
2	Ulan Road south of Wollar Road	31.3	A	31.6	A	22.2	A	26.9	A	20.8	A	23.1	A
3	Ulan Road south of Cope Road	34.5	A	35.5	A	30.1	A	27.8	A	25.0	A	23.1	A
4	Ulan Road south of Ulan-Wollar Road	34.6	A	33.1	A	26.8	A	30.6	A	25.3	A	22.7	A
5	Ulan Road north of Ulan-Wollar Road	31.2	A	30.3	A	19.3	A	27.1	A	23.3	A	25.4	A
6	Cope Road west of Ulan Road	23.4	A	20.4	A	32.8	A	20.8	A	20.2	A	19.2	A
7	Ulan-Wollar Road west of WCM Access Road	27.6	A	28.2	A	24.8	A	19.2	A	18.5	A	18.4	A
8	Ulan-Wollar Road east of Moolarben Access Road	30.4	A	31.1	A	30.3	A	19.5	A	19.4	A	18.4	A
9	Ulan-Wollar Road east of WCM Access Road	17.6	A	17.6	A	17.7	A	17.5	A	17.6	A	17.7	A
10	Ulan-Wollar Road east of Slate Gully Road	17.6	A	17.6	A	17.7	A	17.6	A	17.7	A	17.7	A
11	WCM Access Road south of Ulan-Wollar Road	30.5	A	27.7	A	27.5	A	19.6	A	19.3	A	18.5	A
12	Wollar-Bylong Road east of Wollar Road	17.5	A	18.4	A	19.1	A	17.6	A	18.4	A	19.0	A

5.3 Future Intersection Operation

The surveyed intersections have been re-analysed using the SIDRA Intersection software to determine what the expected operating conditions would be for the two future scenarios, with the combined impacts of the Modification and the other changes to the road environment described in Section 4. As the 2024 volumes would be lower than 2014, only the 2014 scenario has been assessed, as it would be the more critical with regard to intersection capacity. The results of the analyses are summarised in Table 5.4, noting that these represent the surveyed peak hourly volumes together with the expected changes to the volumes resulting from the Modification and the other planned or possible cumulative developments for the peak hours 6.00am to 7.00am and 6.00pm to 7.00pm.

The *Ulan Road Strategy* recommends that the intersection of Cope Road and Ulan Road be upgraded to a "CHR/CHL" design. "CHR" refers to provision of a channelised right-turn only bay on the major road. "CHL" refers to a channelised left-turn only bay on the major road for vehicles turning into the minor road, for and/or a channelised left-turn only bay on the minor road for vehicles turning into the major road. The *Ulan Road Strategy* does not distinguish which "CHL" it refers to, or if both major and minor road upgrades are recommended. For the purpose of this analysis, it is conservatively assumed that the upgrading of the intersection does not occur before 2014.

Table 5.4: Future Peak Hour Intersection Operating Conditions

Intersection	X-value		Average Delay (sec/veh)		Level of Service	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
Surveyed December 2012						
Ulan Road and Ulan-Wollar Road	0.20	0.10	25.6	17.3	B	B
Ulan Road and Cope Road	0.23	0.11	14.1	14.3	B	B
Ulan-Wollar Road and WCM Access Road	0.06	0.05	10.6	10.3	A	A
2014 with Modification						
Ulan Road and Ulan-Wollar Road	0.29	0.24	34.3	24.4	C	B
Ulan Road and Cope Road	0.33	0.17	15.6	13.9	B	A
Ulan-Wollar Road and WCM Access Road	0.09	0.07	10.6	10.3	A	A

The SIDRA Intersection results suggest that with the combined impacts of the Modification and the other changes to the road environment described in Section 4, the intersections would continue to operate at satisfactory levels of service. It is noted that the average delay reported for the intersection of Ulan-Wollar Road and Ulan Road of 34.3 sec/veh would only be experienced by the very low volume of vehicles turning right into Ulan Road. All other vehicles at the intersection would experience average delays consistent with LOS A.

The SIDRA results indicate that the intersections would have sufficient capacity to accommodate the additional traffic in 2014, with spare capacity and short delays to most vehicles.

5.4 Road Safety Implications

The review of road crashes did not identify any locations with a record of multiple crashes, which might indicate an inherent safety or design issue with that particular location. With no changes to the road environment, it would generally be expected that the rate of crashes per vehicle kilometres travelled would remain unchanged. With the expected increases in traffic over time (resulting from the combined impacts of the Modification and the other planned developments), the number of crashes would therefore be expected to increase over time, and decline as traffic volumes decline. This is as anecdotally indicated by RMS with regard to these roads, with an increase in crashes over time resulting from increases in traffic volumes.

The Modification would result in a small increase in traffic generated by the WCM from 2012 to 2014, then a decrease by 2024, to below the current level.

With the planned upgrades to Ulan Road (refer to Section 4.1), which are to be partly funded by WCM, the other mines and MWRC, it is expected that the rate of crashes on Ulan Road will decrease below the current levels. In general terms, the recommended intersection upgrades involve localised widening at the intersections to allow through vehicles on Ulan Road to pass around vehicles slowing to turn into side roads. This would tend to reduce the likelihood of multiple vehicle crashes involving vehicles travelling in the same direction. The recommended road profile upgrade would tend to reduce the likelihood of single vehicle crashes by improving the alignment and width of the carriageway and providing wider shoulders for a more forgiving road environment.

It is considered that the small changes in traffic generation resulting from the Modification would not warrant any additional measures to improve the safety of the road environment on Ulan Road and its intersections.

The review of the crash history on Cope Road found that single vehicle crashes dominated the recorded crashes, making up 13 of the 16 crashes (refer to Table 2.10). On Cope Road, WCM contributes approximately 10% of the total weekday traffic, and the Modification and existing WCM workforce increases would result in a minor increase of 36 vehicles per day from 2012 to 2014, and a decrease of 3 vehicles per day from 2012 to 2024. These variations are well within the day-to-day variations in traffic volumes expected on any road. Such minor variations would have a negligible effect on the vehicle kilometres travelled, and hence the number of crashes on Cope Road. It is considered that the traffic changes that are expected to result from the Modification would not warrant any measures to improve road safety.

5.5 Measures to Maintain Road Network Operations

The foregoing assessment allows any measures to be identified which may be required to maintain the capacity, efficiency and safety of the road network in the surrounding area.

The planned changes to Ulan Road described in the *Ulan Road Strategy* are expected to improve the capacity, efficiency and safety of Ulan Road to such an extent that additional measures would not be warranted by the very minor changes expected to result from the Modification (Table 3.12).

The existing WCM car pool reimbursement scheme (refer to Section 3.2.9) encourages employees who travel similar routes at similar times to travel together in order to reduce the overall traffic generation of the WCM. The foregoing assessment assumes that the car occupancy rate would remain at its current level, hence any added incentives to reduce traffic generation may reduce the impact of the WCM on traffic conditions on the surrounding roads below that estimated in this assessment.

The assessment has found that no additional measures would be required to maintain the efficiency or safety of the road transport environment as a direct result of the Modification.

5.6 Car Parking

The additional construction workforce would not result in any material increase in the demand for car parking at WCM, and the existing parking facilities on site are expected to be adequate.

5.7 School Buses

The increases in traffic generated by the WCM are not expected to significantly impact on the potential for interaction with the school buses operating on Ulan Road (Section 5.6). The existing and future peak hours for traffic generation of WCM would continue to occur between 6.00am and 7.00am, and 6.00pm and 7.00pm, which are outside of the hours during which the school buses operate.

WCPL has recently consulted with Eggtranz with regard to concerns about mine traffic impacting on the school bus operating on Ulan Road. In addition to the various measures that WCPL has already committed to (Section 3.2.9), WCPL would continue work with Eggtranz to minimise any impacts of WCM traffic on the school buses operating on Ulan Road.

6. Conclusions

This study has found that the proposed recovery of an additional 3 Mt of ROM coal at the WCM and some minor upgrades to site infrastructure would have negligible impacts on the operation of the surrounding road system.

No significant impacts on the performance, capacity, efficiency and safety of the road network are expected to arise as a result of the Modification.

No specific management or mitigation measures are considered to be warranted by the Modification, noting that Ulan Road is planned to be widened and its intersections upgraded irrespective of the Modification.

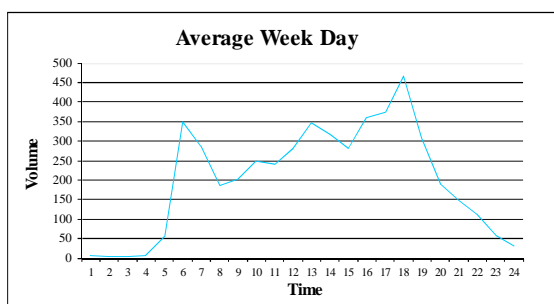
Attachment A

Traffic Survey Results

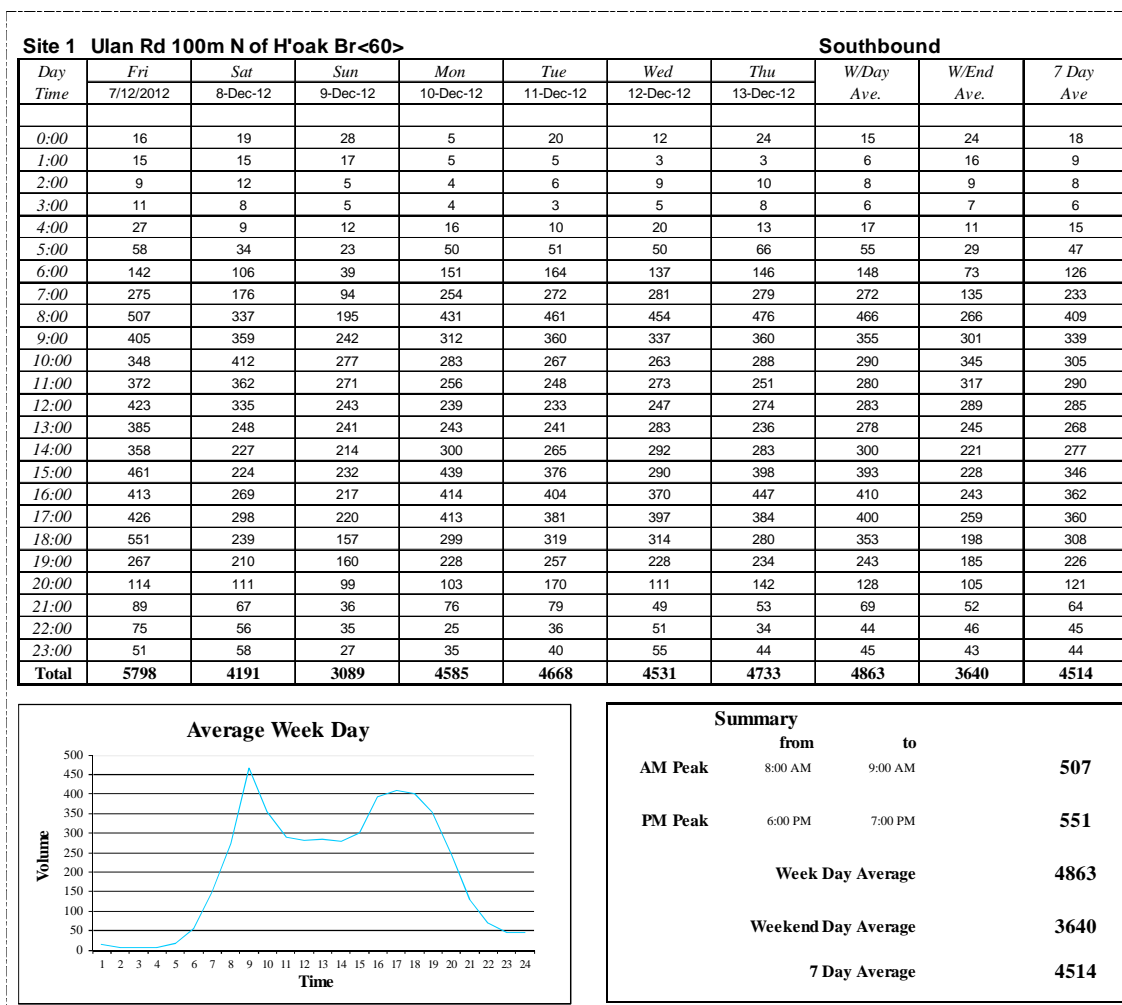
Attachment A

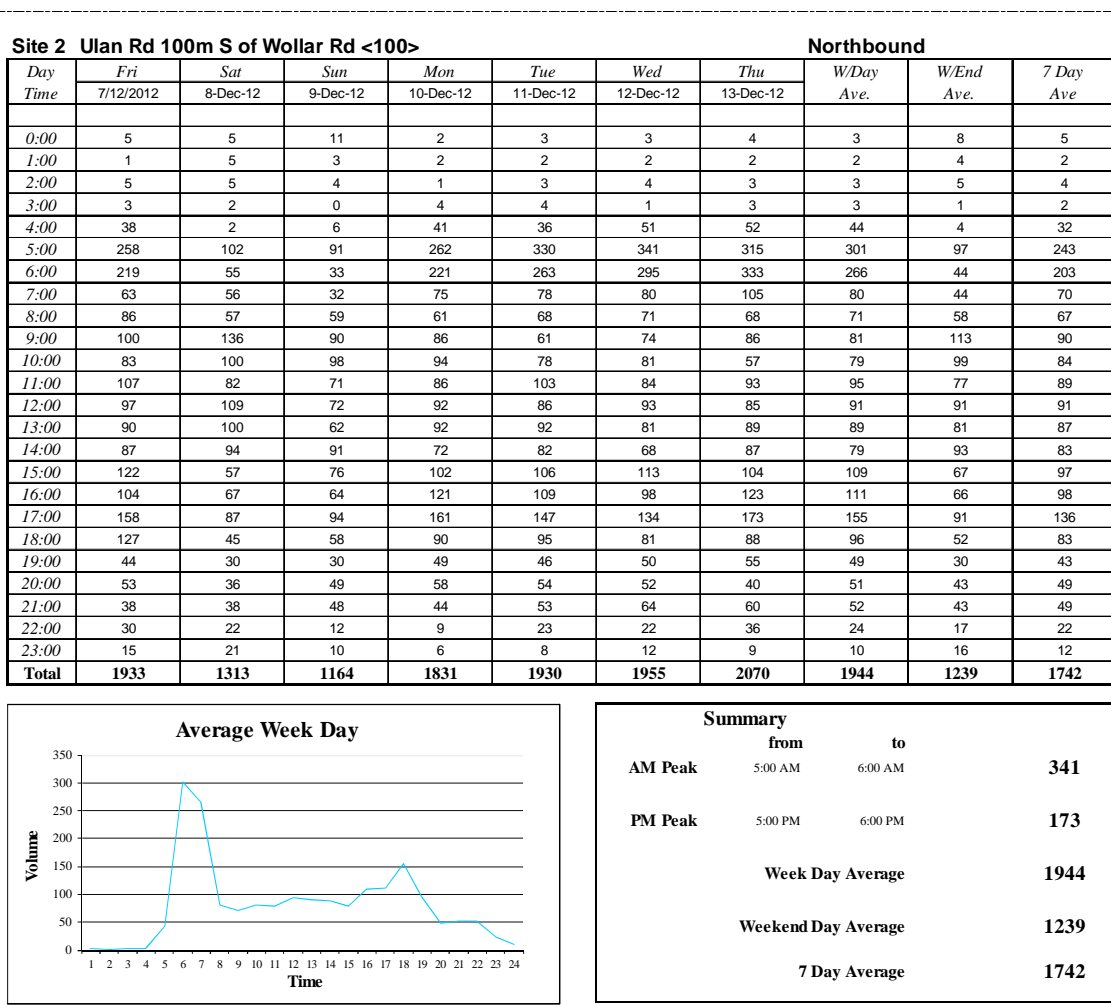
Site 1 Ulan Rd 100m N of H'oak Br<60>
Northbound

Day Time	Fri 7/12/2012	Sat 8-Dec-12	Sun 9-Dec-12	Mon 10-Dec-12	Tue 11-Dec-12	Wed 12-Dec-12	Thu 13-Dec-12	W/Day Ave.	W/End Ave.	7 Day Ave
0:00	14	25	27	5	9	4	7	8	26	13
1:00	8	15	15	3	1	3	3	4	15	7
2:00	10	15	13	2	4	7	4	5	14	8
3:00	9	9	8	6	4	3	8	6	9	7
4:00	55	13	13	59	49	59	63	57	13	44
5:00	318	124	106	284	386	394	358	348	115	281
6:00	263	85	42	245	279	302	344	287	64	223
7:00	190	124	74	169	178	196	199	186	99	161
8:00	243	210	152	183	193	197	191	201	181	196
9:00	320	334	284	246	204	220	256	249	309	266
10:00	302	329	302	237	235	222	205	240	316	262
11:00	403	375	262	235	274	241	260	283	319	293
12:00	585	446	245	281	269	306	296	347	346	347
13:00	517	330	228	244	286	258	272	315	279	305
14:00	380	325	207	256	261	269	244	282	266	277
15:00	370	295	200	404	333	331	367	361	248	329
16:00	390	249	190	399	347	349	384	374	220	330
17:00	471	252	236	529	445	416	466	465	244	402
18:00	385	189	140	294	338	250	276	309	165	267
19:00	194	124	104	186	224	175	166	189	114	168
20:00	163	105	103	150	152	144	131	148	104	135
21:00	117	88	74	81	114	131	120	113	81	104
22:00	79	58	39	28	64	44	76	58	49	55
23:00	49	49	23	20	12	29	40	30	36	32
Total	5835	4168	3087	4546	4661	4550	4736	4866	3628	4512



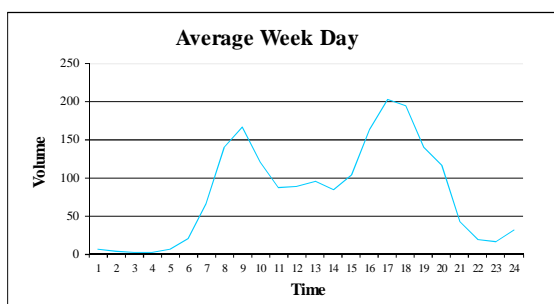
Summary			
	from	to	
AM Peak	11:00 AM	12:00 PM	403
PM Peak	12:00 PM	1:00 PM	585
Week Day Average			4866
Weekend Day Average			3628
7 Day Average			4512



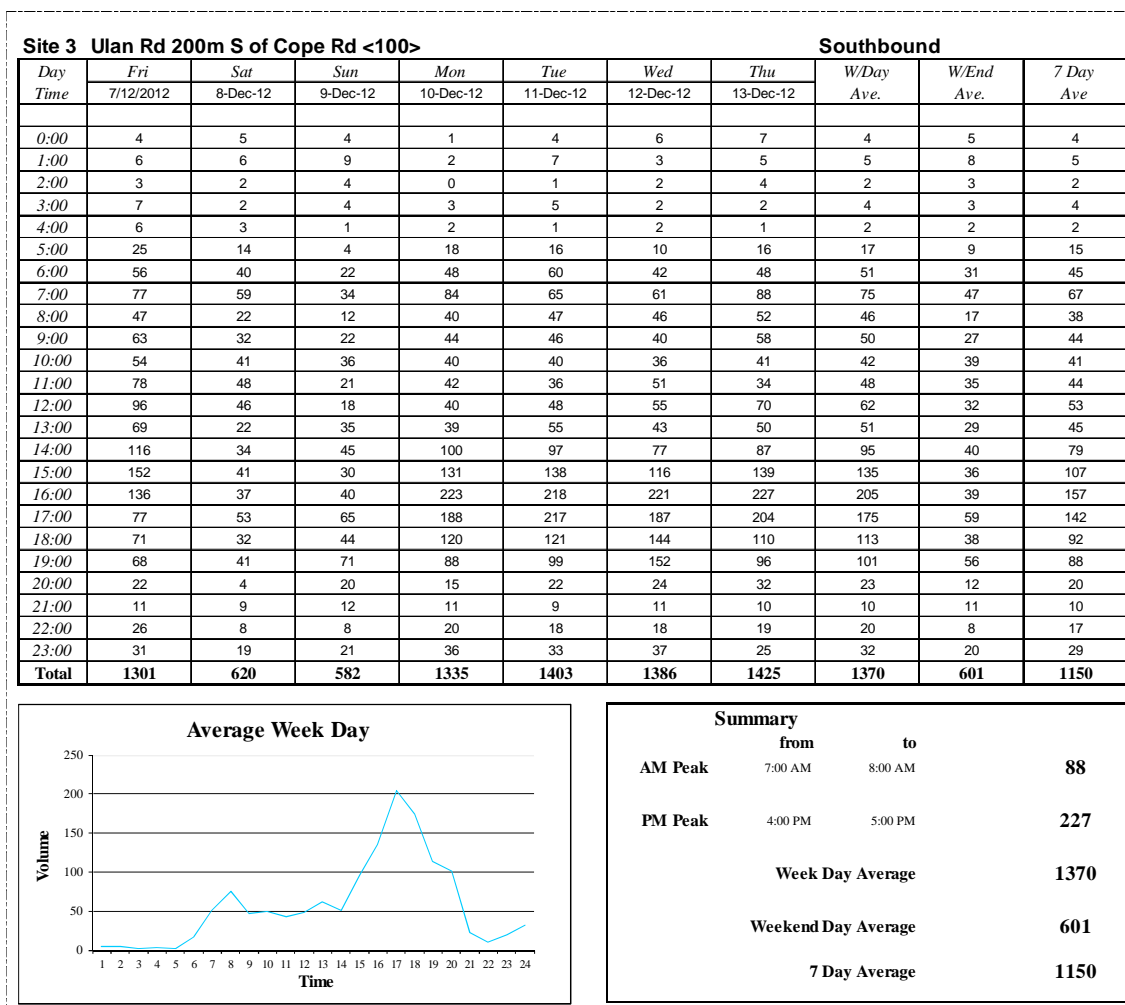


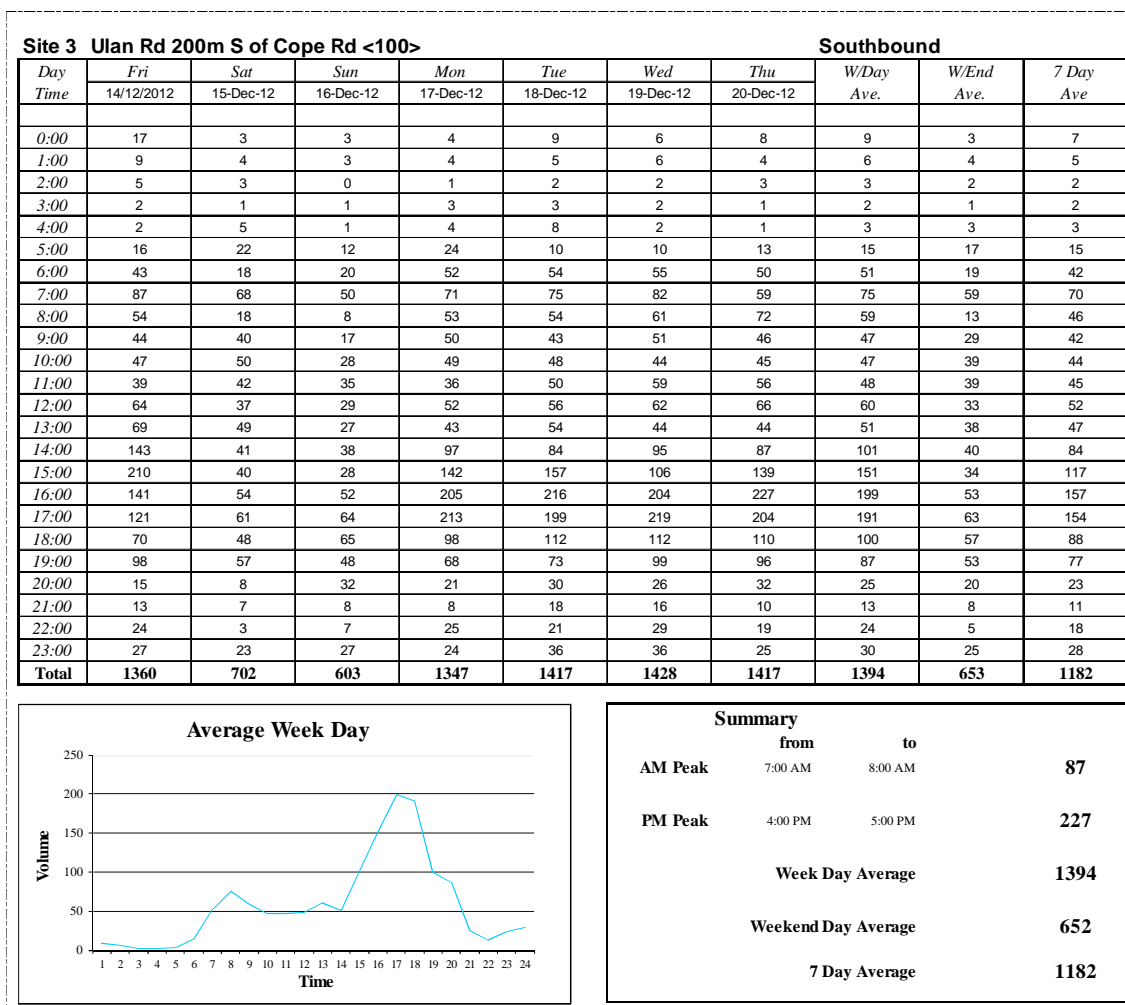
Site 2 Ulan Rd 100m S of Wollar Rd <100>
Southbound

Day Time	Fri 7/12/2012	Sat 8-Dec-12	Sun 9-Dec-12	Mon 10-Dec-12	Tue 11-Dec-12	Wed 12-Dec-12	Thu 13-Dec-12	W/Day Ave.	W/End Ave.	7 Day Ave
0:00	8	8	7	2	4	7	13	7	8	7
1:00	6	7	6	2	2	2	3	3	7	4
2:00	1	3	1	1	1	3	4	2	2	2
3:00	5	1	1	1	1	3	1	2	1	2
4:00	9	8	2	5	8	7	4	7	5	6
5:00	24	18	11	19	21	16	24	21	15	19
6:00	61	48	19	78	75	57	62	67	34	57
7:00	127	88	43	138	147	139	146	139	66	118
8:00	187	103	43	148	154	179	164	166	73	140
9:00	141	99	70	100	120	111	131	121	85	110
10:00	114	102	83	78	79	67	95	87	93	88
11:00	109	95	73	77	86	87	79	88	84	87
12:00	146	80	66	79	74	83	94	95	73	89
13:00	104	73	77	77	80	82	75	84	75	81
14:00	125	50	67	116	101	84	90	103	59	90
15:00	191	61	64	168	156	124	178	163	63	135
16:00	151	75	89	199	224	197	237	202	82	167
17:00	108	87	92	217	224	221	197	193	90	164
18:00	94	63	57	143	159	168	135	140	60	117
19:00	88	66	105	101	117	158	116	116	86	107
20:00	58	43	34	30	29	39	53	42	39	41
21:00	14	18	20	20	20	16	24	19	19	19
22:00	24	9	10	10	11	17	15	15	10	14
23:00	31	21	18	34	29	27	34	31	20	28
Total	1926	1226	1058	1843	1922	1894	1974	1912	1142	1692



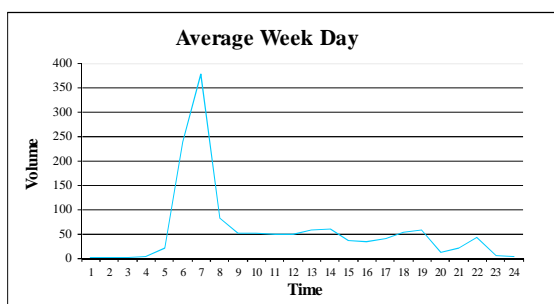
Summary			
	from	to	
AM Peak	8:00 AM	9:00 AM	187
PM Peak	4:00 PM	5:00 PM	237
Week Day Average			1912
Weekend Day Average			1142
7 Day Average			1692



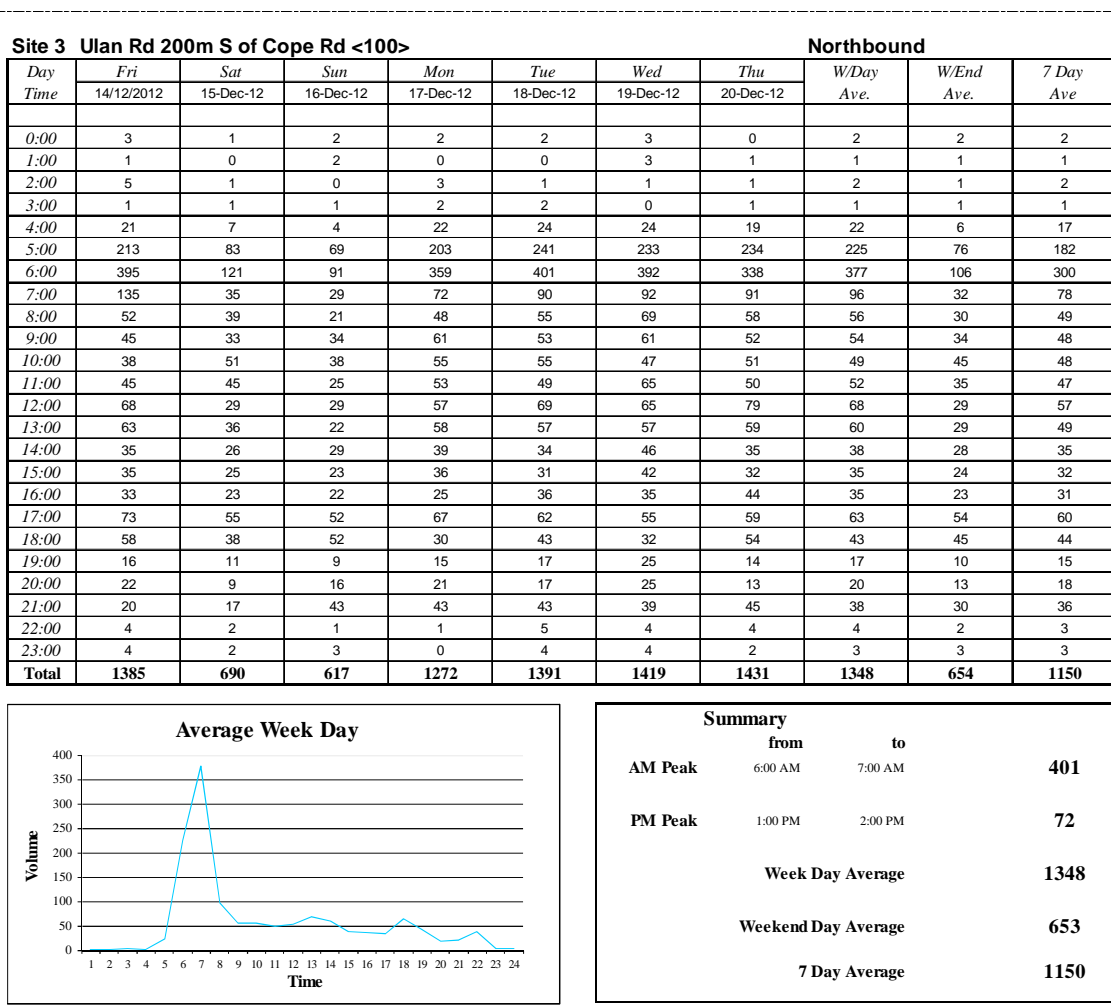


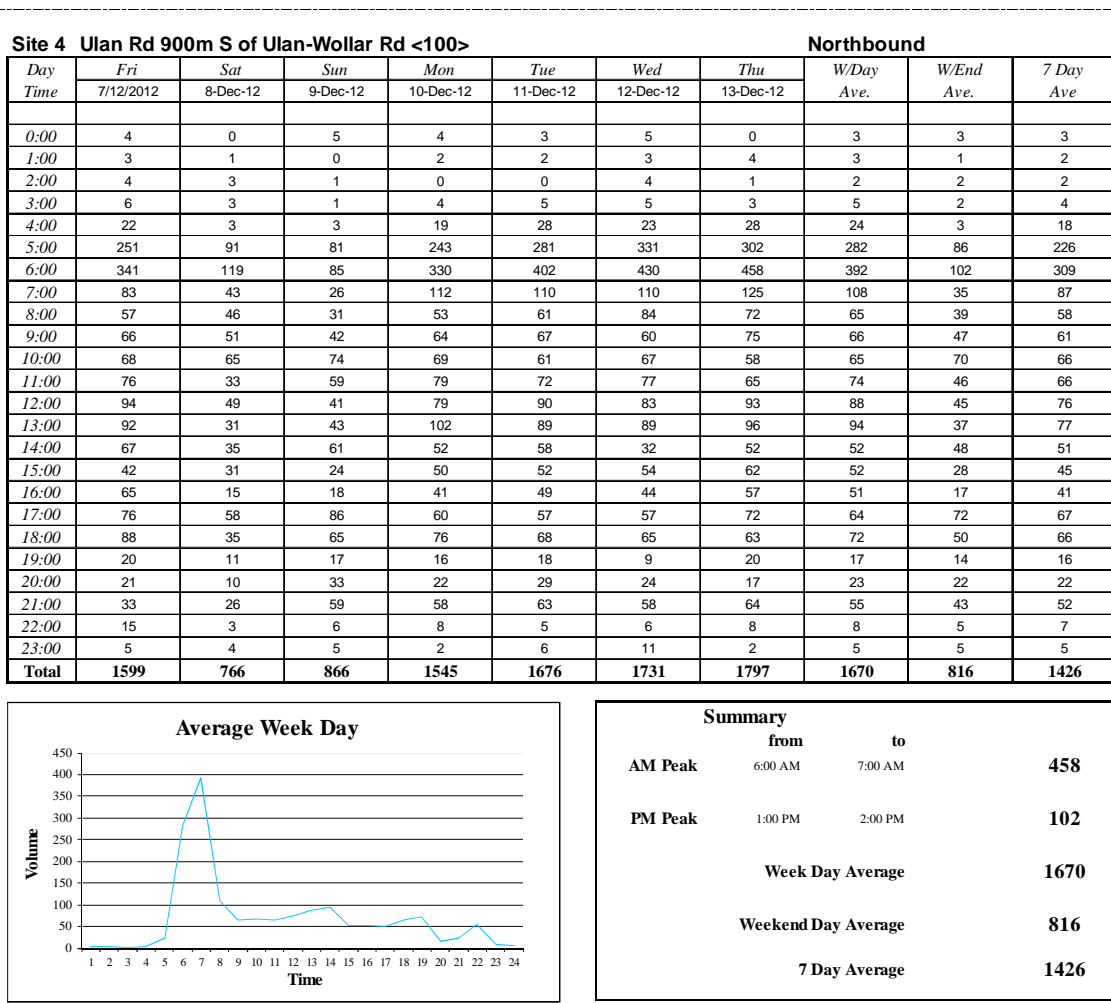
Site 3 Ulan Rd 200m S of Cope Rd <100>
Northbound

Day Time	Fri 7/12/2012	Sat 8-Dec-12	Sun 9-Dec-12	Mon 10-Dec-12	Tue 11-Dec-12	Wed 12-Dec-12	Thu 13-Dec-12	W/Day Ave.	W/End Ave.	7 Day Ave
0:00	3	1	3	1	2	3	0	2	2	2
1:00	1	2	1	1	3	3	1	2	2	2
2:00	3	3	0	0	0	2	0	1	2	1
3:00	5	2	1	2	4	1	3	3	2	3
4:00	20	1	3	18	25	20	24	21	2	16
5:00	203	83	65	198	238	291	260	238	74	191
6:00	325	89	69	323	401	409	433	378	79	293
7:00	63	34	23	87	81	80	95	81	29	66
8:00	48	35	24	43	51	55	56	51	30	45
9:00	41	42	34	56	50	49	58	51	38	47
10:00	52	45	55	59	47	43	43	49	50	49
11:00	54	29	49	47	56	50	39	49	39	46
12:00	63	25	27	58	54	58	58	58	26	49
13:00	58	27	21	72	59	50	59	60	24	49
14:00	43	31	41	30	38	28	35	35	36	35
15:00	34	29	24	34	31	35	32	33	27	31
16:00	58	20	18	35	28	32	44	39	19	34
17:00	64	49	65	53	47	48	59	54	57	55
18:00	70	38	54	67	53	49	54	59	46	55
19:00	15	12	16	13	16	5	14	13	14	13
20:00	18	4	31	26	23	25	13	21	18	20
21:00	22	23	43	46	49	46	45	42	33	39
22:00	9	3	6	5	5	4	4	5	5	5
23:00	5	3	3	2	4	6	2	4	3	4
Total	1277	630	676	1276	1365	1392	1431	1348	653	1150



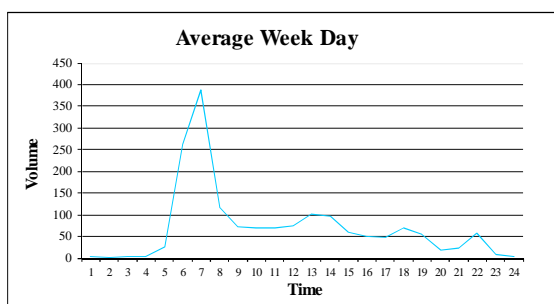
Summary			
	from	to	
AM Peak	6:00 AM	7:00 AM	433
PM Peak	1:00 PM	2:00 PM	72
Week Day Average			1348
Weekend Day Average			653
7 Day Average			1150



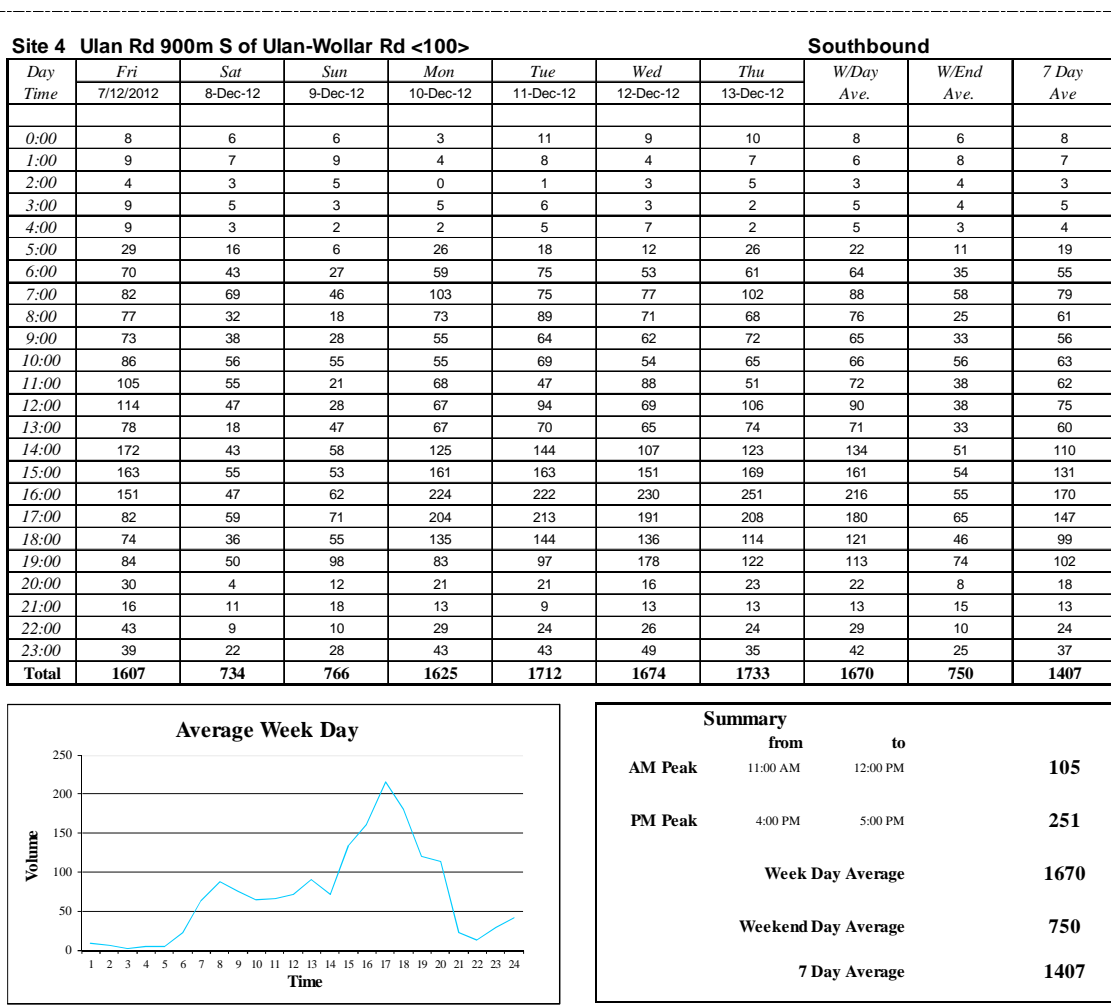


Site 4 Ulan Rd 900m S of Ulan-Wollar Rd <100>
Northbound

Day Time	Fri 14/12/2012	Sat 15-Dec-12	Sun 16-Dec-12	Mon 17-Dec-12	Tue 18-Dec-12	Wed 19-Dec-12	Thu 20-Dec-12	W/Day Ave.	W/End Ave.	7 Day Ave
0:00	3	2	1	4	3	5	2	3	2	3
1:00	1	0	2	0	1	3	1	1	1	1
2:00	4	1	1	6	1	2	2	3	1	2
3:00	2	2	1	1	6	1	5	3	2	3
4:00	22	8	5	28	27	26	27	26	7	20
5:00	265	103	86	234	271	268	276	263	95	215
6:00	404	127	100	360	404	410	355	387	114	309
7:00	174	34	35	93	103	113	94	115	35	92
8:00	69	43	29	73	59	78	83	72	36	62
9:00	64	36	55	70	65	80	75	71	46	64
10:00	65	54	46	68	86	66	60	69	50	64
11:00	70	40	36	73	69	81	74	73	38	63
12:00	106	39	42	89	98	100	111	101	41	84
13:00	103	40	42	91	90	88	111	97	41	81
14:00	55	45	43	57	67	65	54	60	44	55
15:00	50	36	33	50	36	53	62	50	35	46
16:00	46	26	39	43	42	47	57	47	33	43
17:00	75	61	73	69	64	67	72	69	67	69
18:00	78	42	56	48	51	36	63	55	49	53
19:00	16	13	17	17	17	24	20	19	15	18
20:00	24	15	25	25	22	25	17	23	20	22
21:00	33	27	61	71	61	56	64	57	44	53
22:00	9	4	6	5	9	6	8	7	5	7
23:00	3	3	6	0	3	6	2	3	5	3
Total	1741	801	840	1575	1655	1706	1695	1674	821	1430

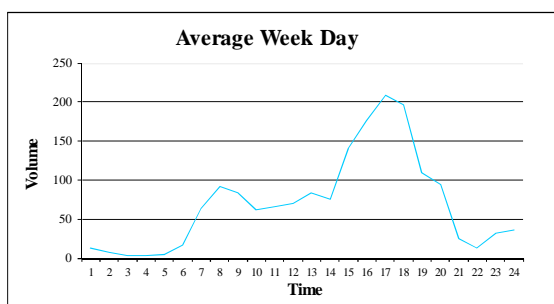


Summary			
	from	to	
AM Peak	6:00 AM	7:00 AM	410
PM Peak	12:00 PM	1:00 PM	111
Week Day Average			1674
Weekend Day Average			821
7 Day Average			1430

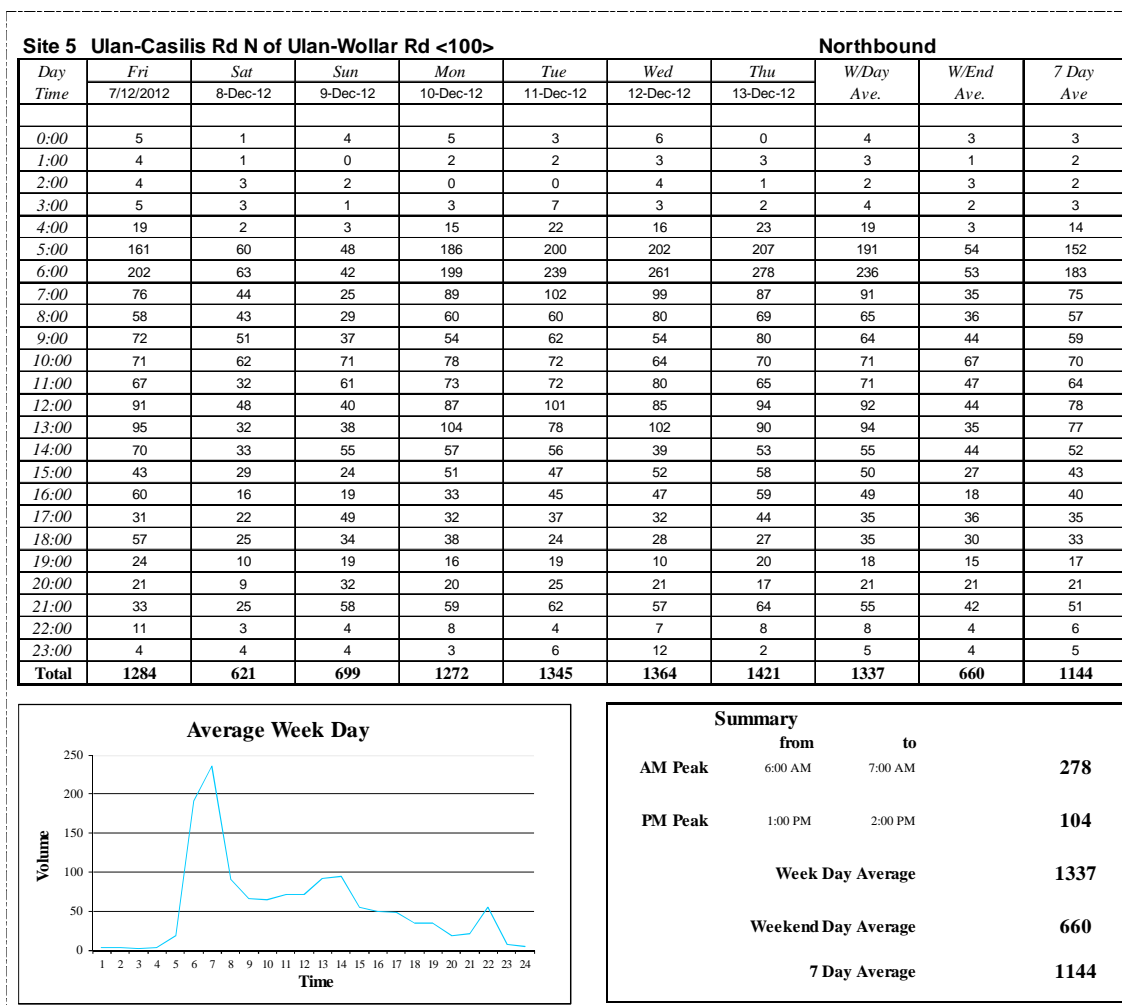


Site 4 Ulan Rd 900m S of Ulan-Wollar Rd <100>
Southbound

Day Time	Fri 14/12/2012	Sat 15-Dec-12	Sun 16-Dec-12	Mon 17-Dec-12	Tue 18-Dec-12	Wed 19-Dec-12	Thu 20-Dec-12	W/Day Ave.	W/End Ave.	7 Day Ave
0:00	21	3	5	6	16	8	12	13	4	10
1:00	11	5	3	6	6	6	5	7	4	6
2:00	5	4	1	1	2	3	5	3	3	3
3:00	4	3	0	5	4	3	1	3	2	3
4:00	5	5	2	4	11	6	1	5	4	5
5:00	24	22	14	26	11	9	13	17	18	17
6:00	57	23	25	75	60	63	61	63	24	52
7:00	104	74	60	99	86	87	84	92	67	85
8:00	75	25	14	84	84	87	86	83	20	65
9:00	51	52	21	60	61	72	68	62	37	55
10:00	74	65	46	59	75	55	64	65	56	63
11:00	64	48	32	60	59	92	77	70	40	62
12:00	81	37	39	75	100	70	94	84	38	71
13:00	92	42	39	70	66	64	84	75	41	65
14:00	195	38	51	120	130	122	133	140	45	113
15:00	234	38	51	170	179	128	169	176	45	138
16:00	156	63	73	209	220	206	251	208	68	168
17:00	123	66	68	225	198	230	208	197	67	160
18:00	73	50	75	113	131	119	114	110	63	96
19:00	112	66	83	73	71	92	122	94	75	88
20:00	23	8	19	27	29	25	23	25	14	22
21:00	18	9	14	9	15	11	13	13	12	13
22:00	41	4	9	33	29	35	24	32	7	25
23:00	34	26	34	31	45	38	35	37	30	35
Total	1677	776	778	1640	1688	1631	1747	1677	777	1420

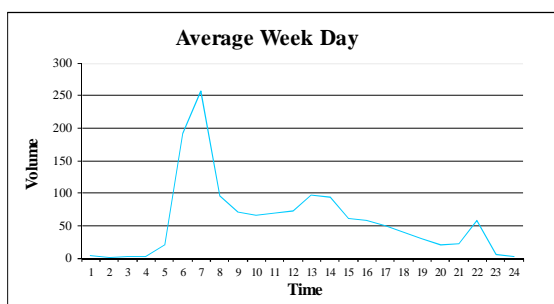


Summary			
	from	to	
AM Peak	7:00 AM	8:00 AM	104
PM Peak	4:00 PM	5:00 PM	251
Week Day Average			1677
Weekend Day Average			777
7 Day Average			1420

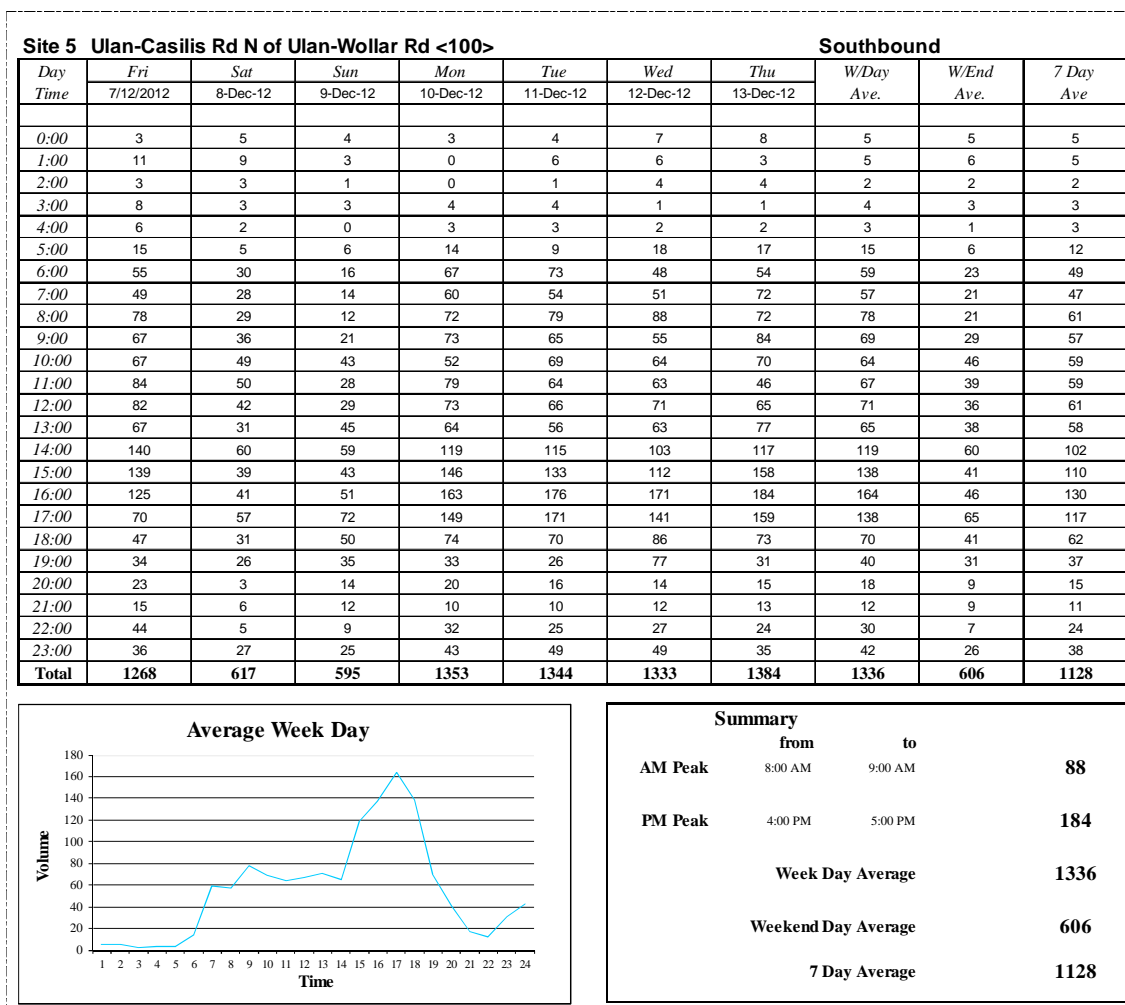


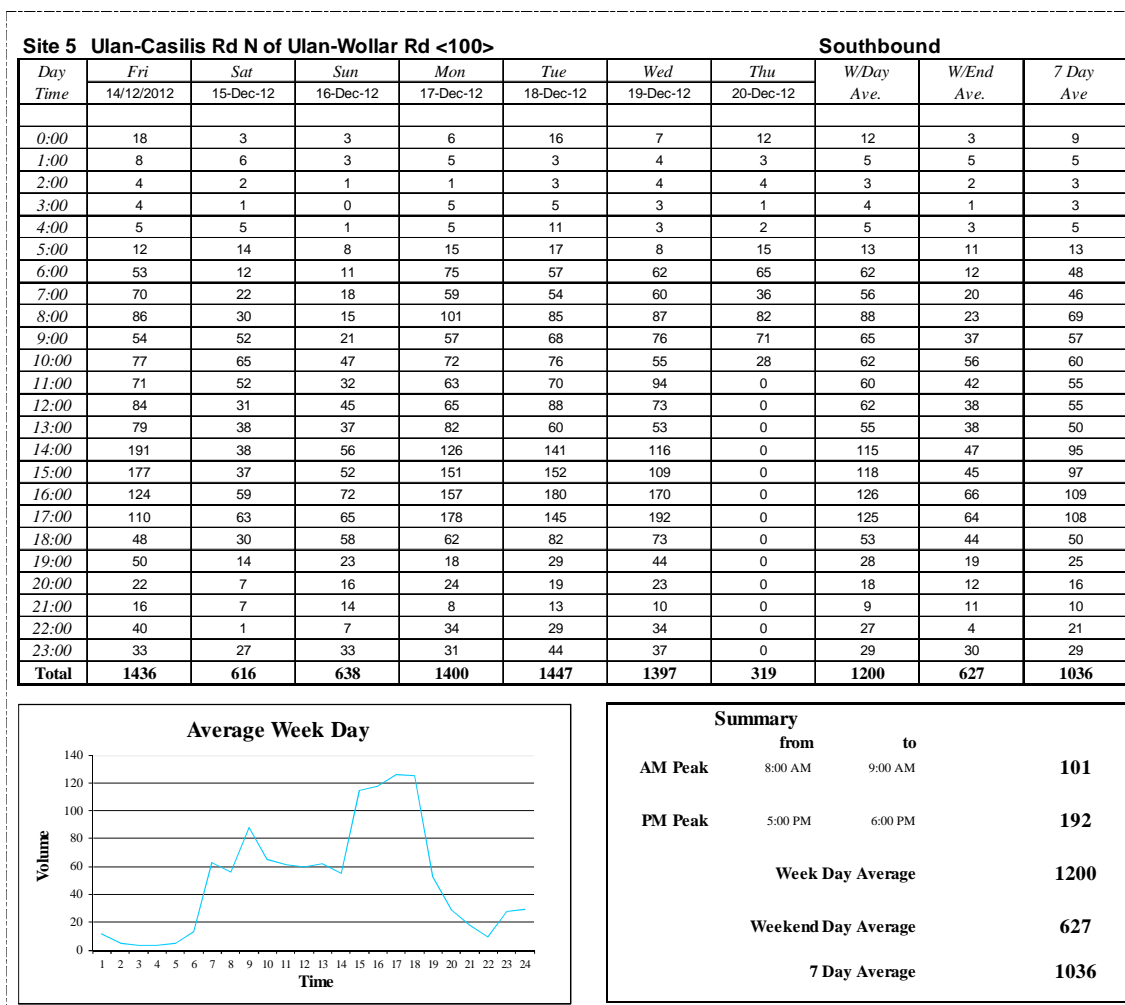
Site 5 Ulan-Casilis Rd N of Ulan-Wollar Rd <100>
Northbound

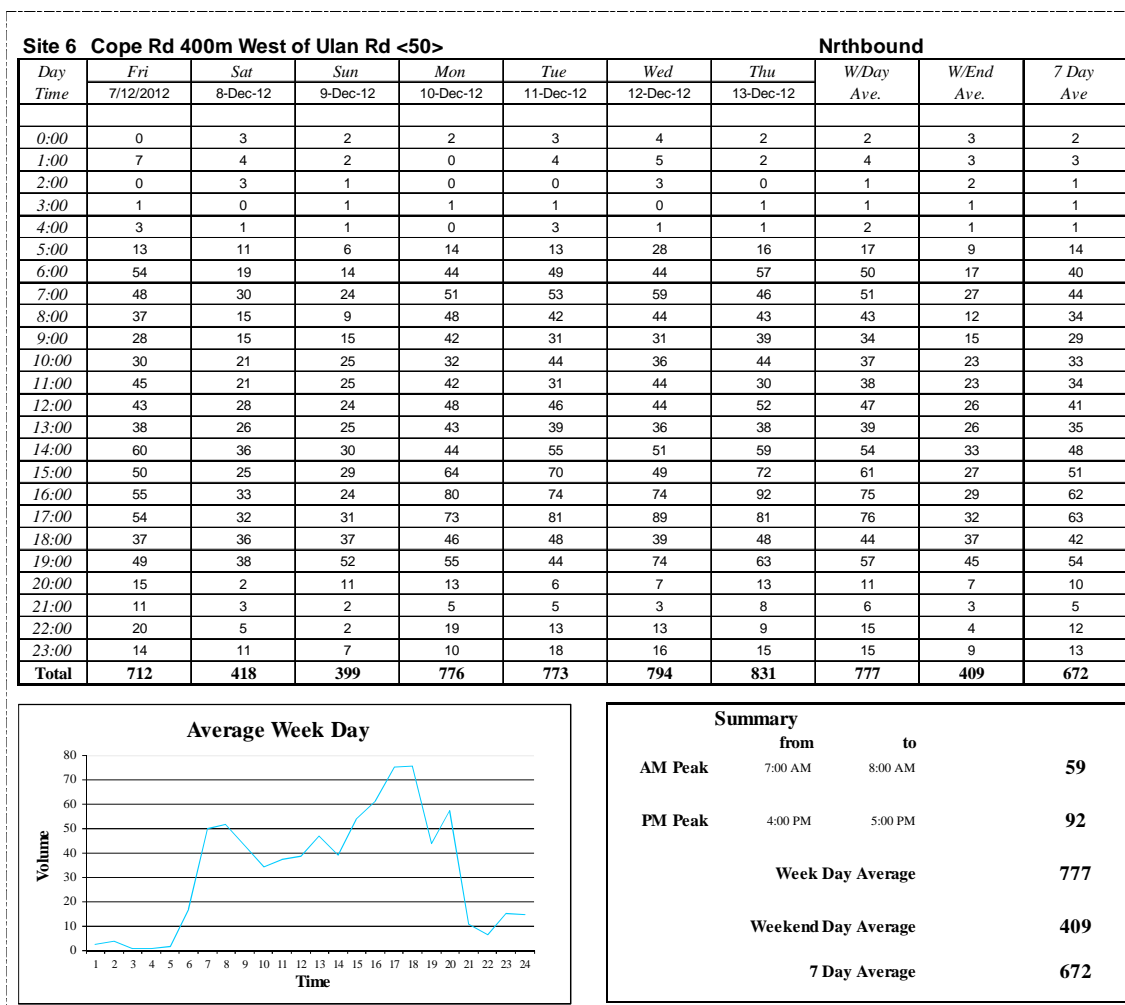
Day Time	Fri 14/12/2012	Sat 15-Dec-12	Sun 16-Dec-12	Mon 17-Dec-12	Tue 18-Dec-12	Wed 19-Dec-12	Thu 20-Dec-12	W/Day Ave.	W/End Ave.	7 Day Ave
0:00	2	3	1	4	4	6	1	3	2	3
1:00	1	1	1	0	1	4	2	2	1	1
2:00	4	1	2	5	2	3	2	3	2	3
3:00	2	0	2	2	4	1	4	3	1	2
4:00	16	5	4	23	20	21	21	20	5	16
5:00	180	50	46	181	211	183	199	191	48	150
6:00	256	83	56	241	268	280	237	256	70	203
7:00	158	37	36	74	86	88	69	95	37	78
8:00	85	44	26	67	54	77	73	71	35	61
9:00	65	39	55	62	64	79	60	66	47	61
10:00	69	53	50	68	77	63	67	69	52	64
11:00	76	41	36	79	65	81	65	73	39	63
12:00	107	35	43	96	91	101	94	98	39	81
13:00	106	49	41	92	90	91	90	94	45	80
14:00	59	44	45	62	65	70	53	62	45	57
15:00	68	40	32	53	50	60	58	58	36	52
16:00	47	26	43	44	47	51	59	50	35	45
17:00	41	22	33	41	30	42	44	40	28	36
18:00	38	16	20	29	41	17	27	30	18	27
19:00	21	16	19	17	21	23	20	20	18	20
20:00	21	15	22	23	21	26	17	22	19	21
21:00	33	23	63	73	64	59	64	59	43	54
22:00	6	4	5	4	7	5	8	6	5	6
23:00	3	0	6	0	4	5	2	3	3	3
Total	1464	647	687	1340	1387	1436	1336	1393	667	1185

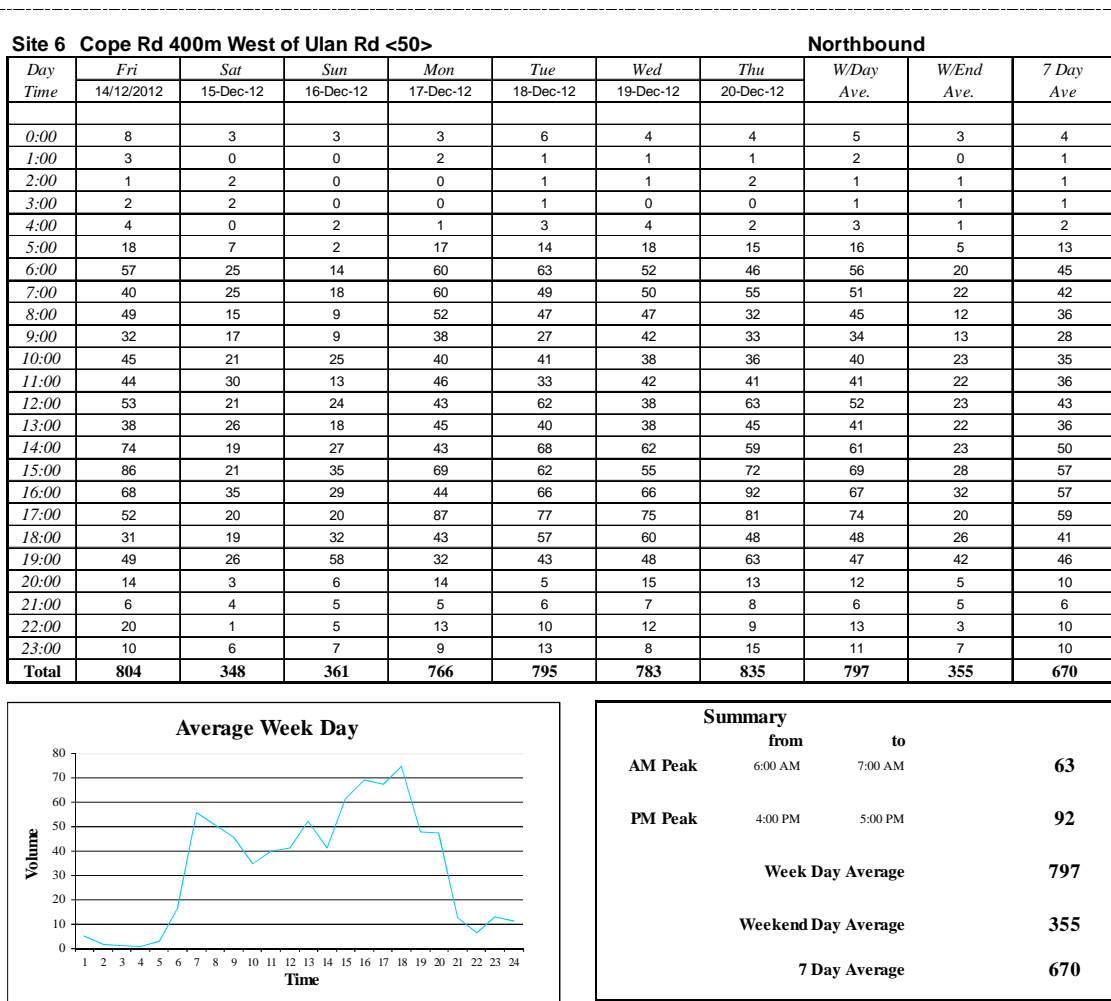


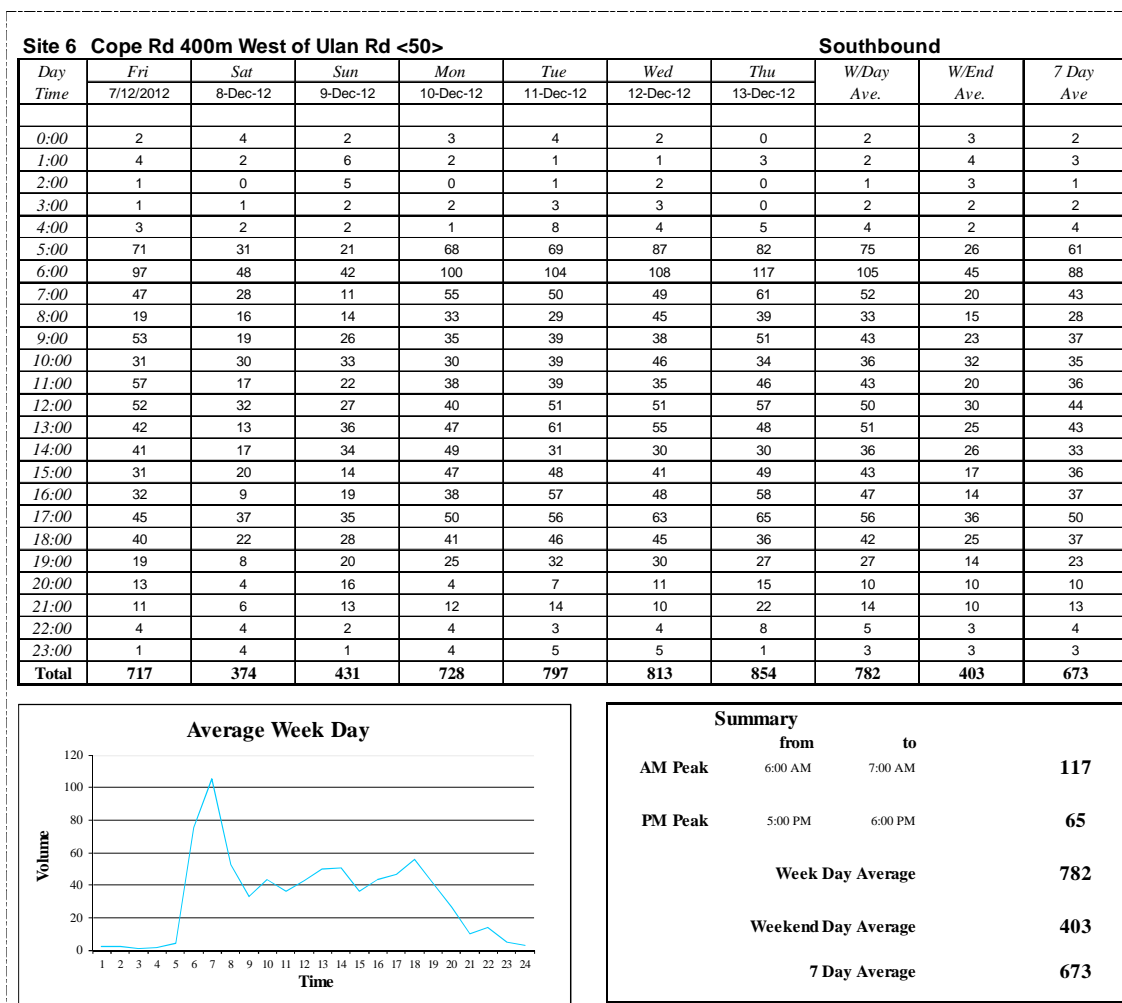
Summary			
	from	to	
AM Peak	6:00 AM	7:00 AM	280
PM Peak	12:00 PM	1:00 PM	107
Week Day Average			1393
Weekend Day Average			667
7 Day Average			1185





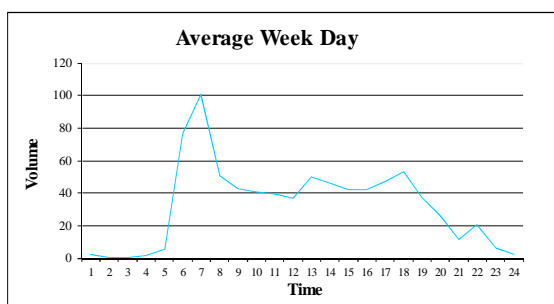




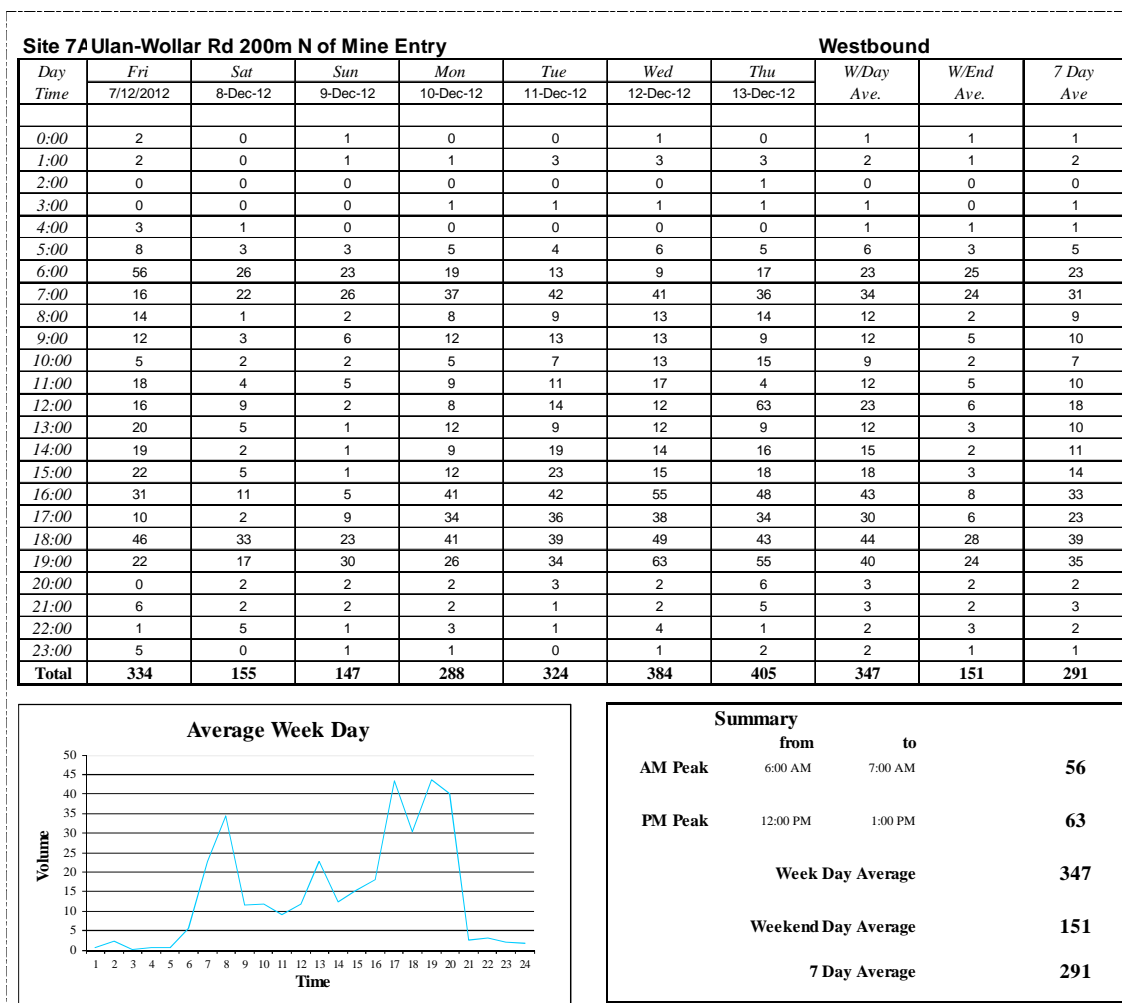


Site 6 Cope Rd 400m West of Ulan Rd <50>
Southbound

Day Time	Fri 14/12/2012	Sat 15-Dec-12	Sun 16-Dec-12	Mon 17-Dec-12	Tue 18-Dec-12	Wed 19-Dec-12	Thu 20-Dec-12	W/Day Ave.	W/End Ave.	7 Day Ave
0:00	2	1	1	2	1	3	2	2	1	2
1:00	1	0	0	0	1	1	0	1	0	0
2:00	1	0	1	1	0	0	1	1	1	1
3:00	0	1	0	0	4	2	3	2	1	1
4:00	3	0	1	4	5	6	11	6	1	4
5:00	88	29	22	71	69	85	70	77	26	62
6:00	97	45	22	83	112	106	107	101	34	82
7:00	58	19	10	58	42	51	45	51	15	40
8:00	45	28	16	43	36	43	48	43	22	37
9:00	48	32	24	53	32	39	32	41	28	37
10:00	48	22	17	45	42	33	30	40	20	34
11:00	39	20	25	33	31	42	39	37	23	33
12:00	53	22	27	51	45	47	54	50	25	43
13:00	56	14	26	38	49	43	45	46	20	39
14:00	44	25	26	34	50	51	30	42	26	37
15:00	50	15	18	37	38	36	49	42	17	35
16:00	49	16	27	35	50	46	58	48	22	40
17:00	44	23	31	56	47	53	65	53	27	46
18:00	36	21	33	34	37	43	36	37	27	34
19:00	19	11	24	19	28	35	27	26	18	23
20:00	5	7	25	11	12	14	15	11	16	13
21:00	12	9	20	26	20	23	22	21	15	19
22:00	5	1	3	4	7	8	8	6	2	5
23:00	2	1	4	1	0	7	1	2	3	2
Total	805	362	403	739	758	817	798	783	383	669

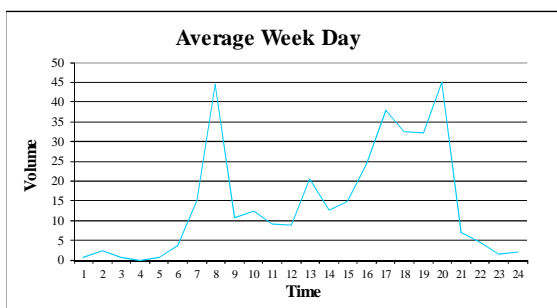


Summary			
	from	to	
AM Peak	6:00 AM	7:00 AM	112
PM Peak	5:00 PM	6:00 PM	65
Week Day Average			783
Weekend Day Average			383
7 Day Average			669

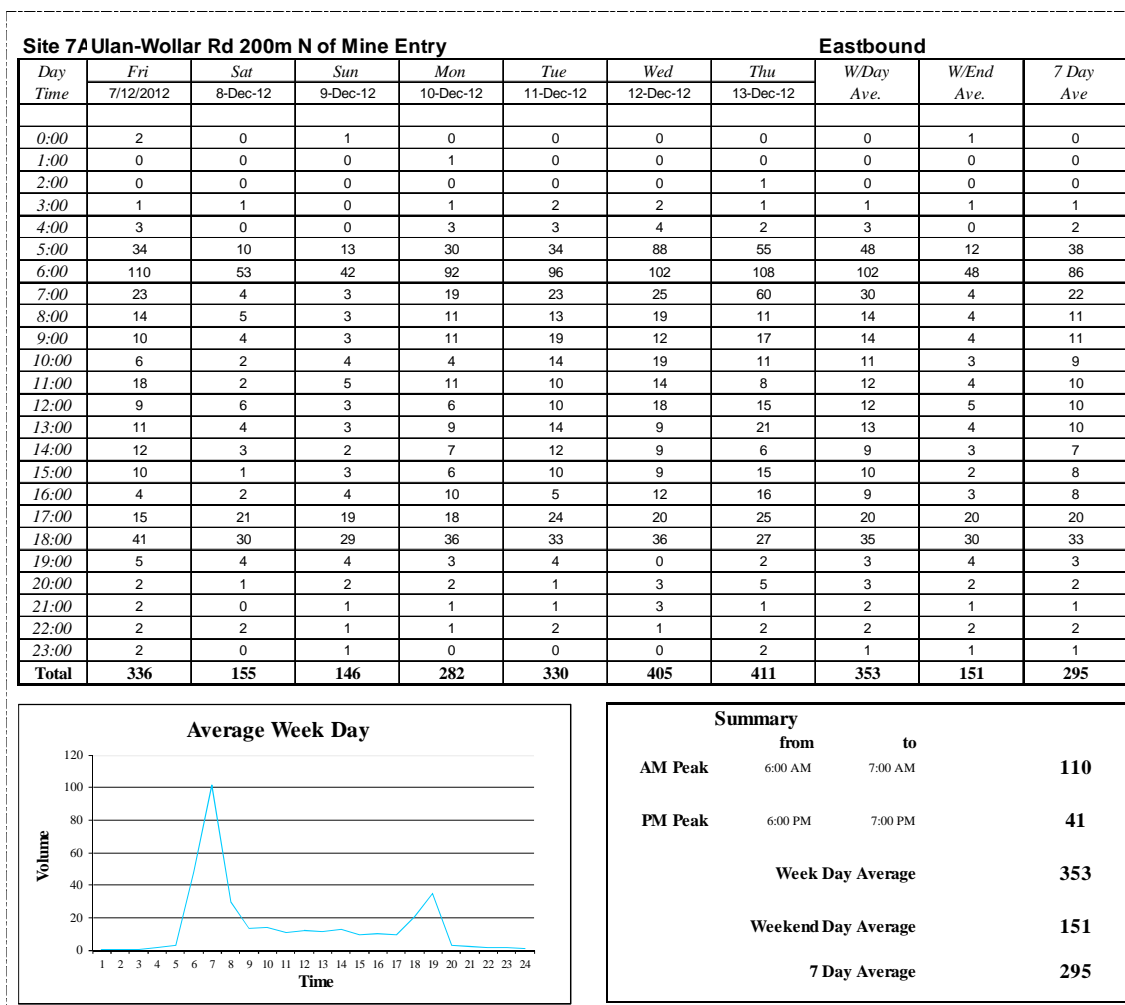


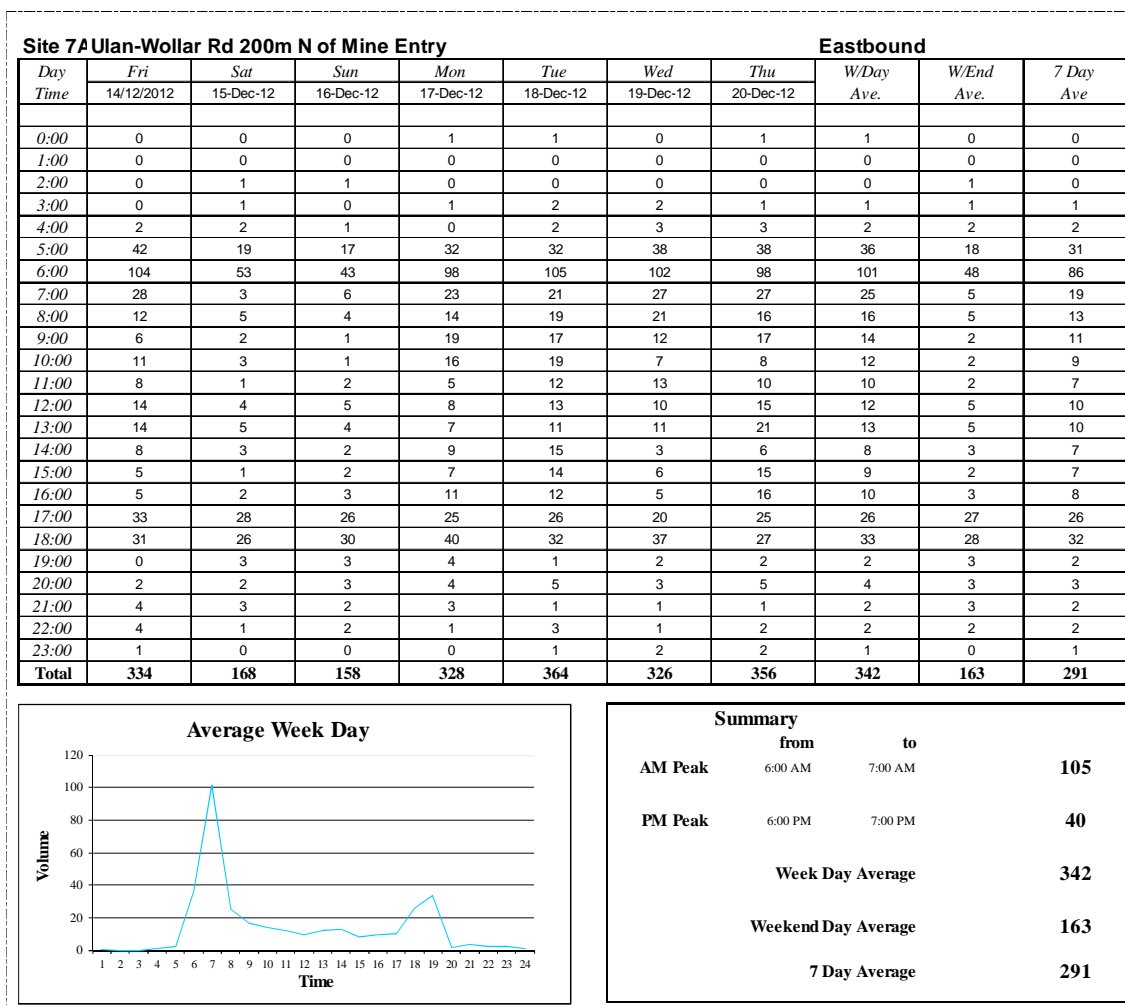
Site 7A Ulan-Wollar Rd 200m N of Mine Entry
Westbound

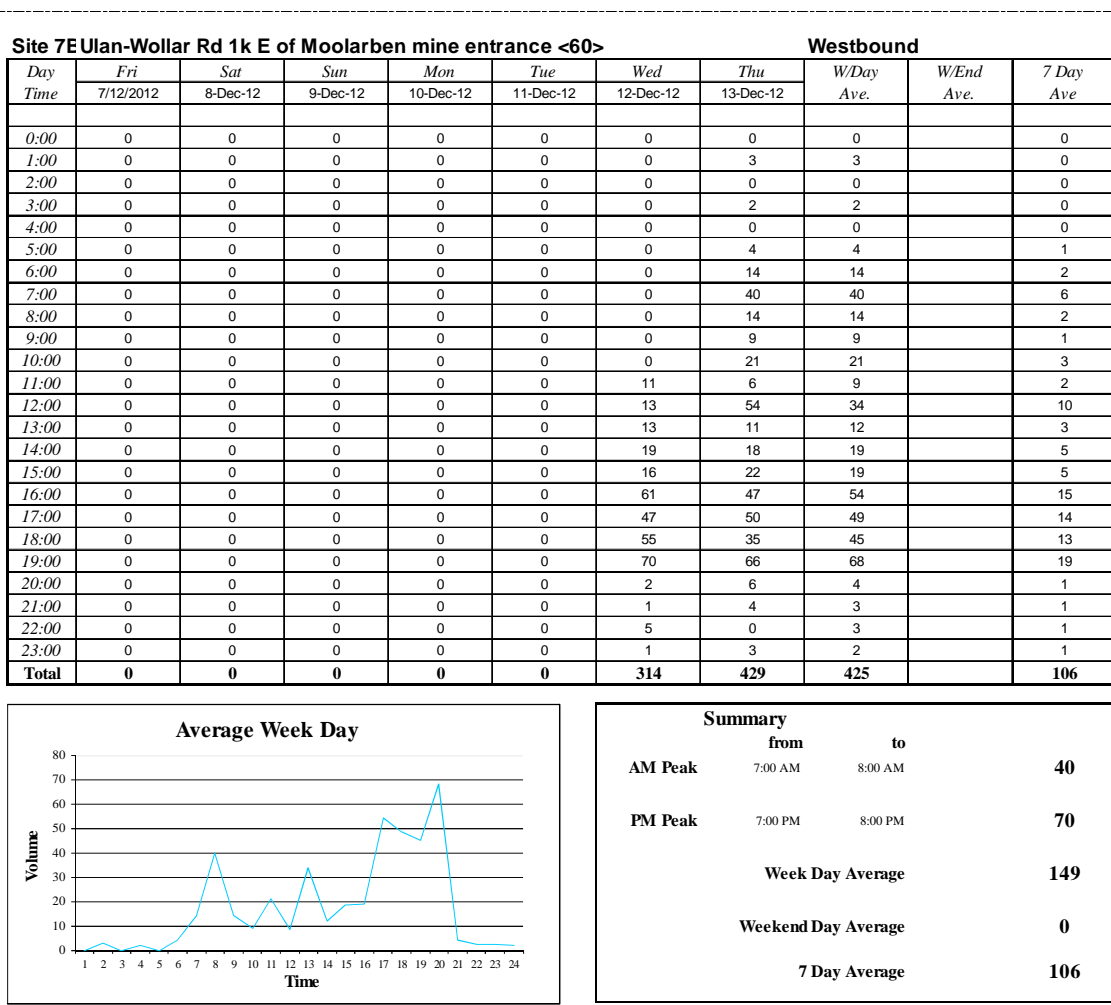
Day Time	Fri 14/12/2012	Sat 15-Dec-12	Sun 16-Dec-12	Mon 17-Dec-12	Tue 18-Dec-12	Wed 19-Dec-12	Thu 20-Dec-12	W/Day Ave.	W/End Ave.	7 Day Ave
0:00	1	1	1	0	2	1	0	1	1	1
1:00	3	0	0	0	3	3	3	2	0	2
2:00	1	2	2	1	0	1	1	1	2	1
3:00	0	0	1	0	0	0	0	0	1	0
4:00	1	0	0	0	1	1	1	1	0	1
5:00	3	1	1	6	2	4	4	4	1	3
6:00	16	19	16	13	17	16	14	15	18	16
7:00	38	41	38	53	43	40	48	44	40	43
8:00	9	6	0	6	12	17	9	11	3	8
9:00	12	3	1	11	11	13	15	12	2	9
10:00	9	2	2	8	9	13	7	9	2	7
11:00	9	2	1	13	12	5	5	9	2	7
12:00	9	3	3	9	10	12	63	21	3	16
13:00	13	10	2	8	12	21	9	13	6	11
14:00	13	3	1	15	19	11	16	15	2	11
15:00	51	3	4	13	23	17	18	24	4	18
16:00	27	10	6	48	38	28	48	38	8	29
17:00	15	3	4	36	43	35	34	33	4	24
18:00	28	26	33	32	27	31	43	32	30	31
19:00	39	33	26	47	39	45	55	45	30	41
20:00	2	3	6	5	17	4	6	7	5	6
21:00	7	2	2	5	3	2	5	4	2	4
22:00	0	2	1	2	2	3	1	2	2	2
23:00	4	1	2	0	3	1	2	2	2	2
Total	310	176	153	331	348	324	407	344	165	293

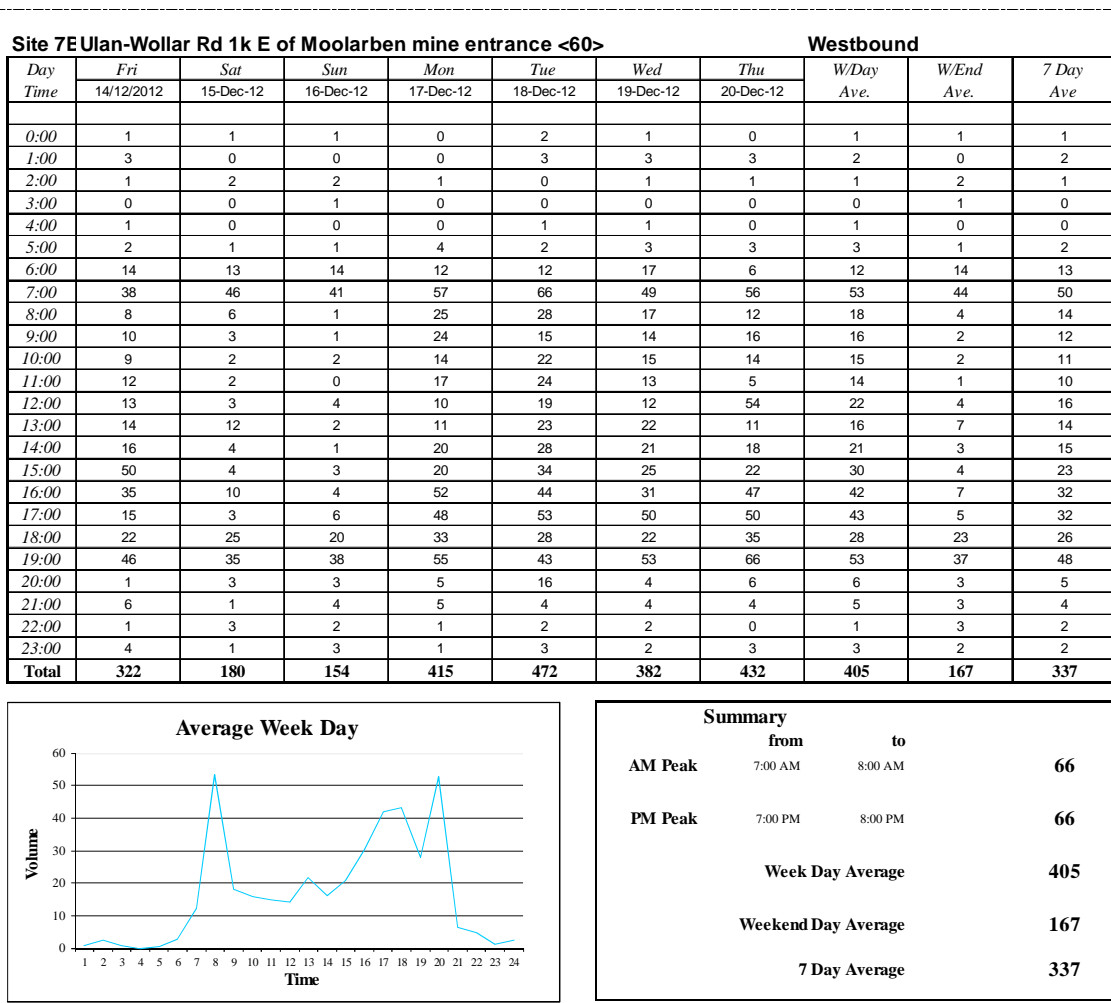


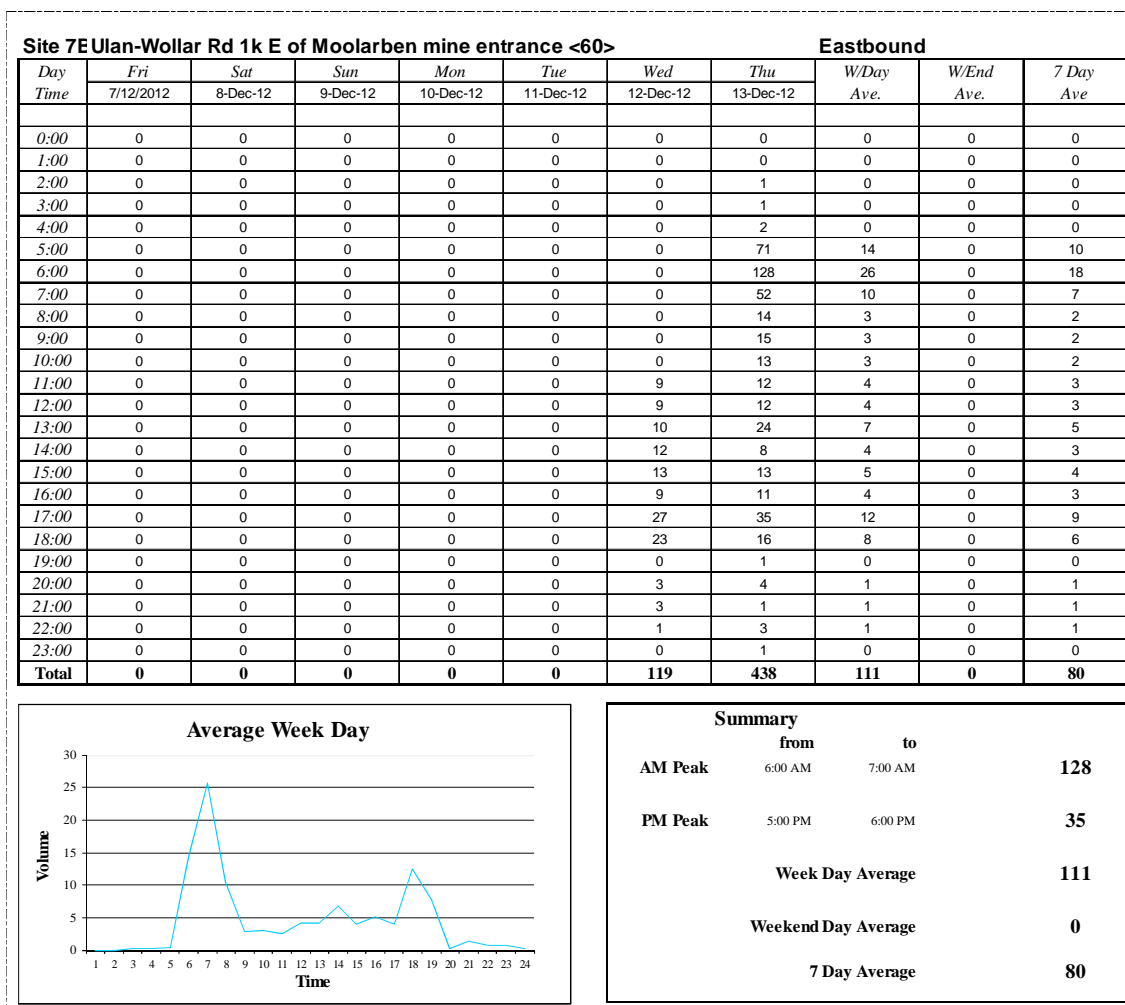
Summary			
	from	to	
AM Peak	7:00 AM	8:00 AM	53
PM Peak	12:00 PM	1:00 PM	63
Week Day Average			344
Weekend Day Average			165
7 Day Average			293

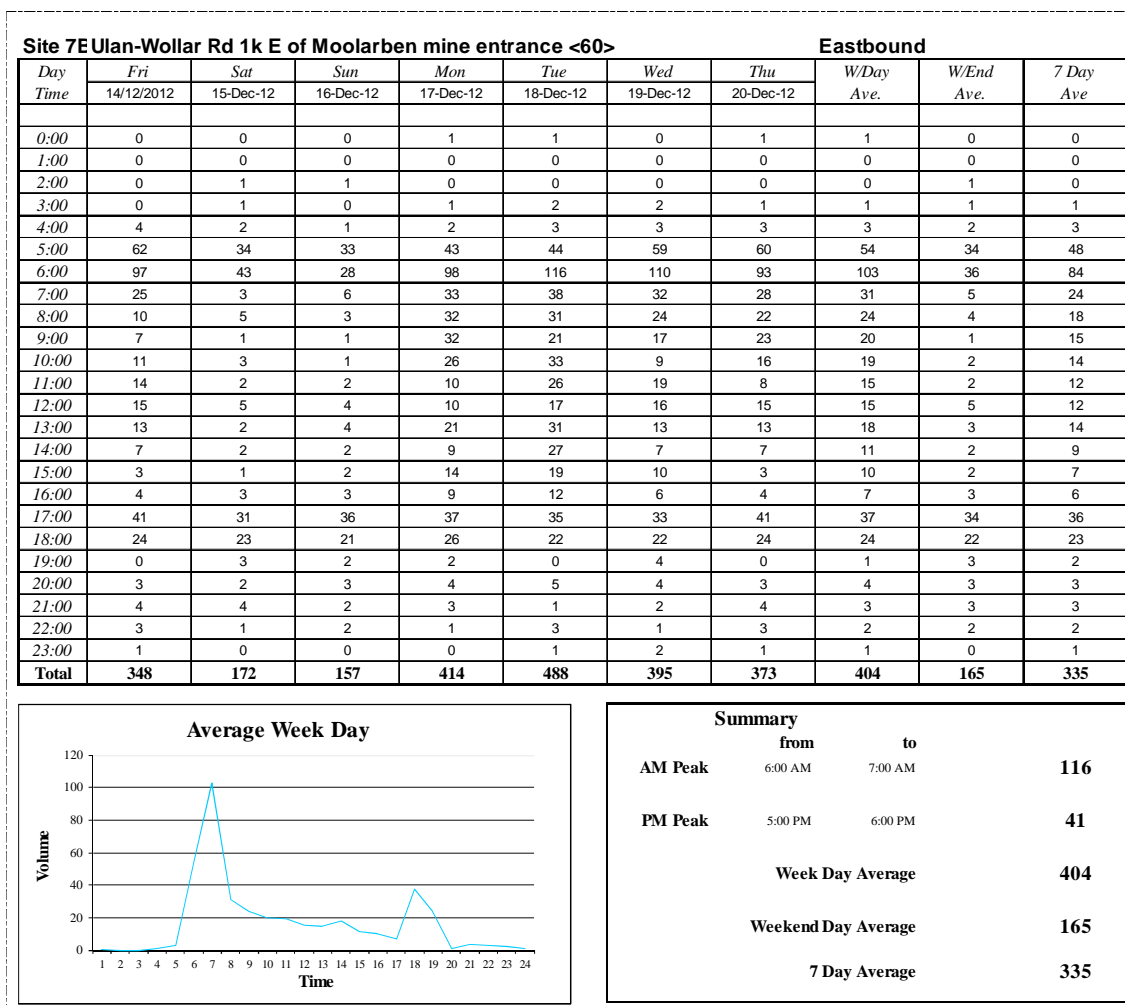


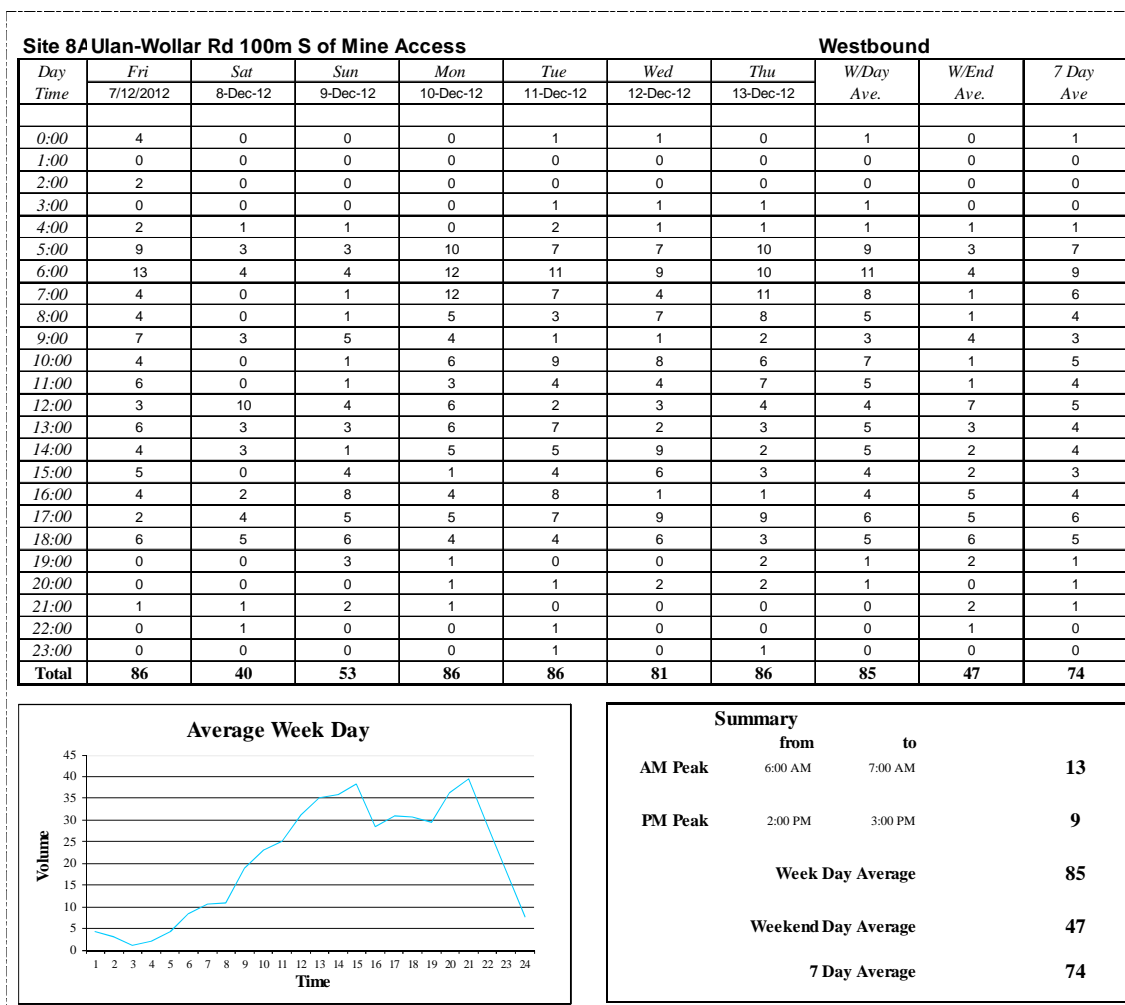


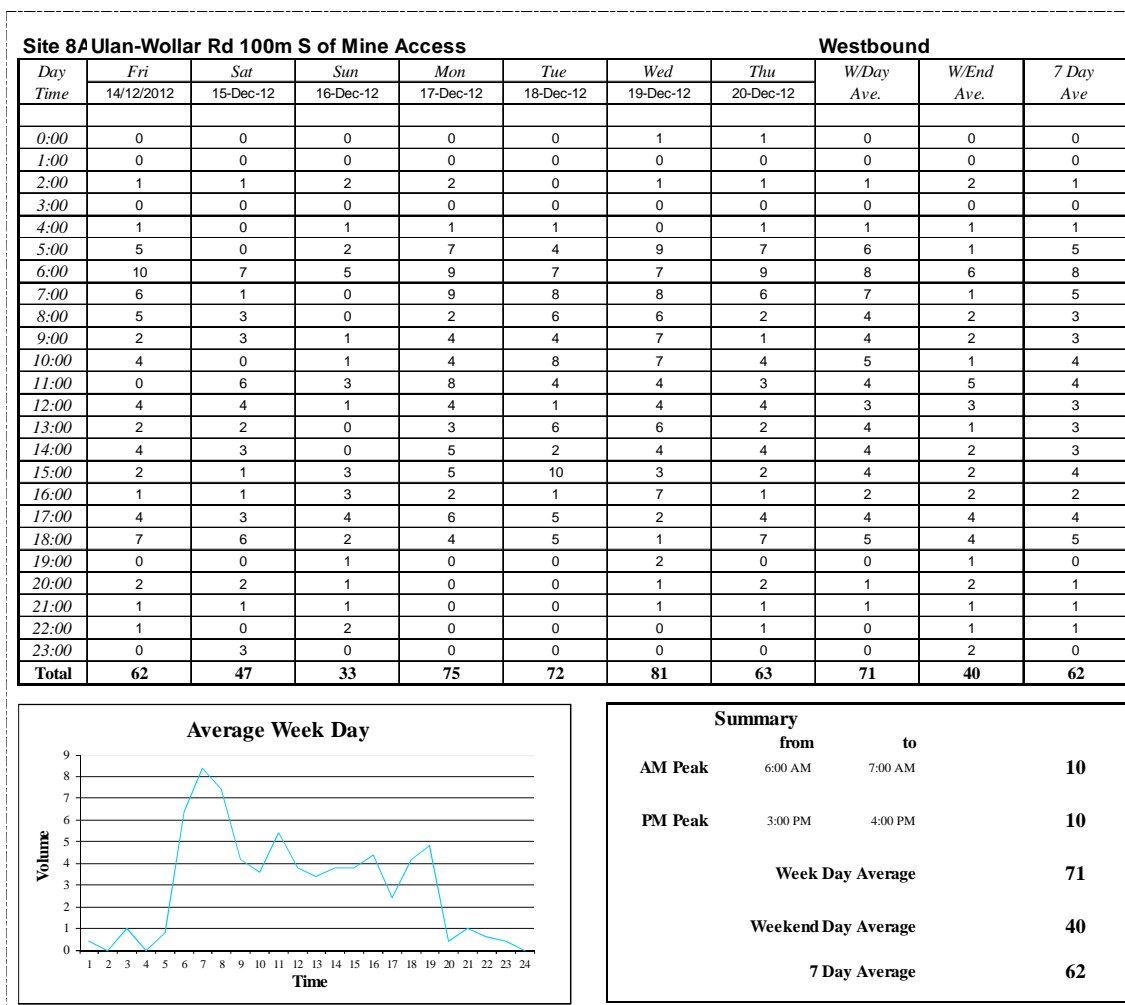


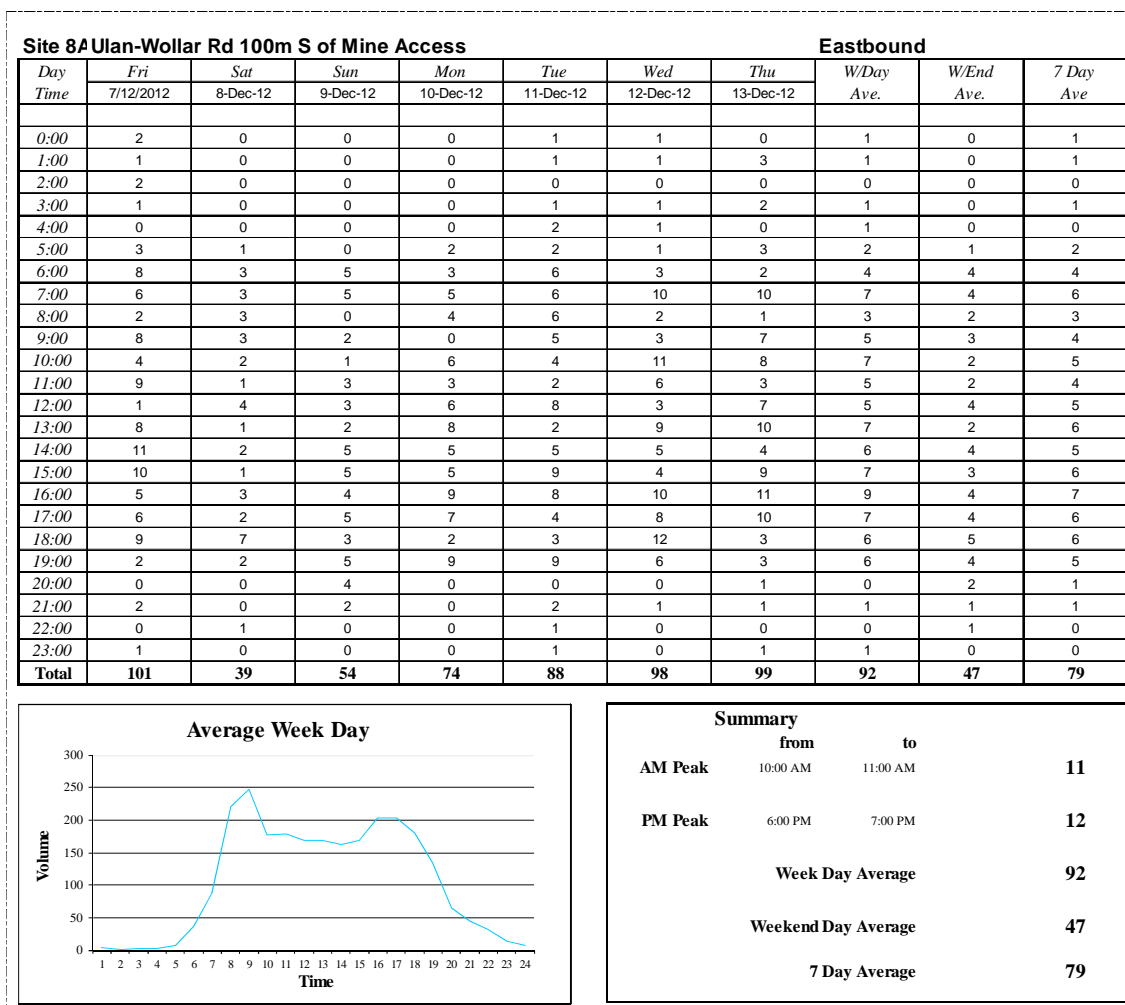


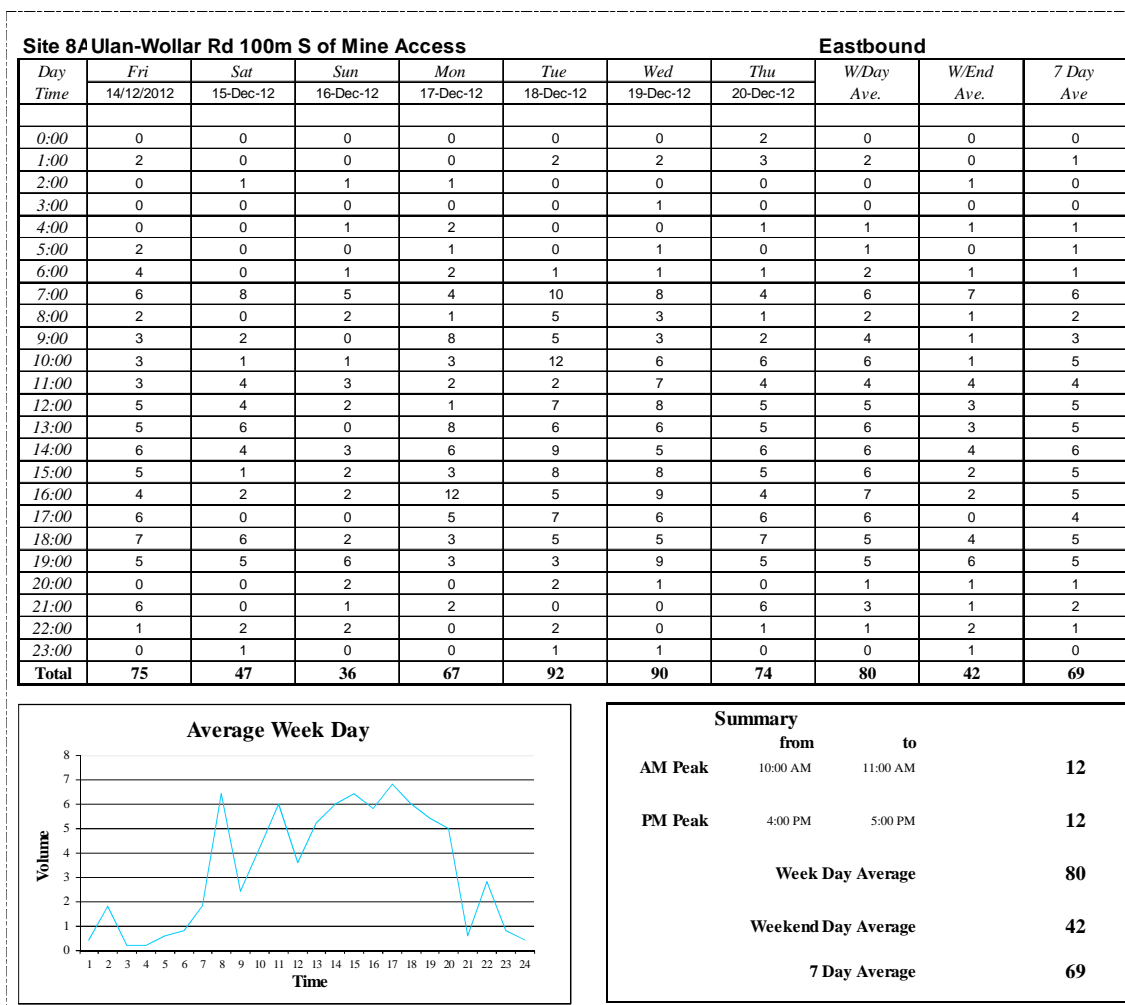


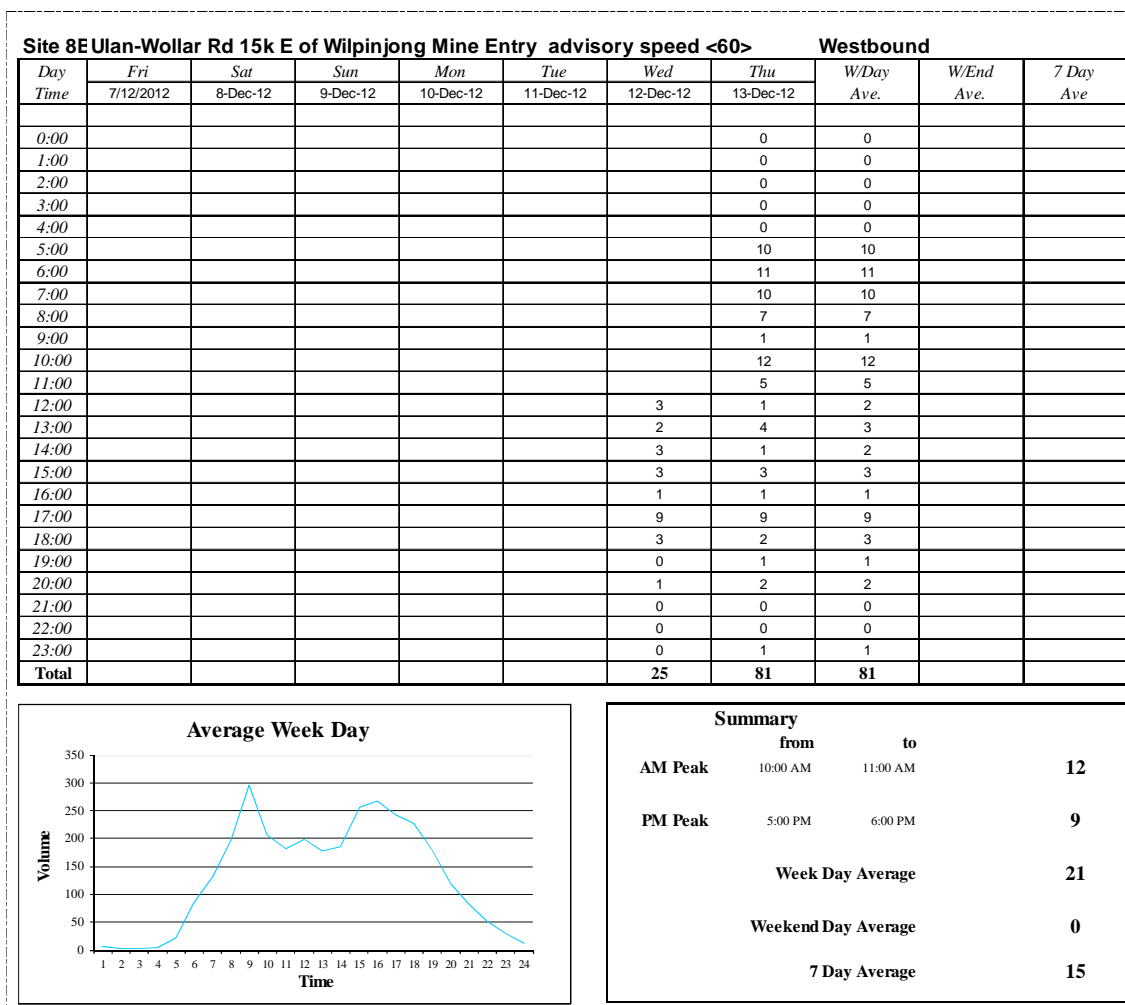


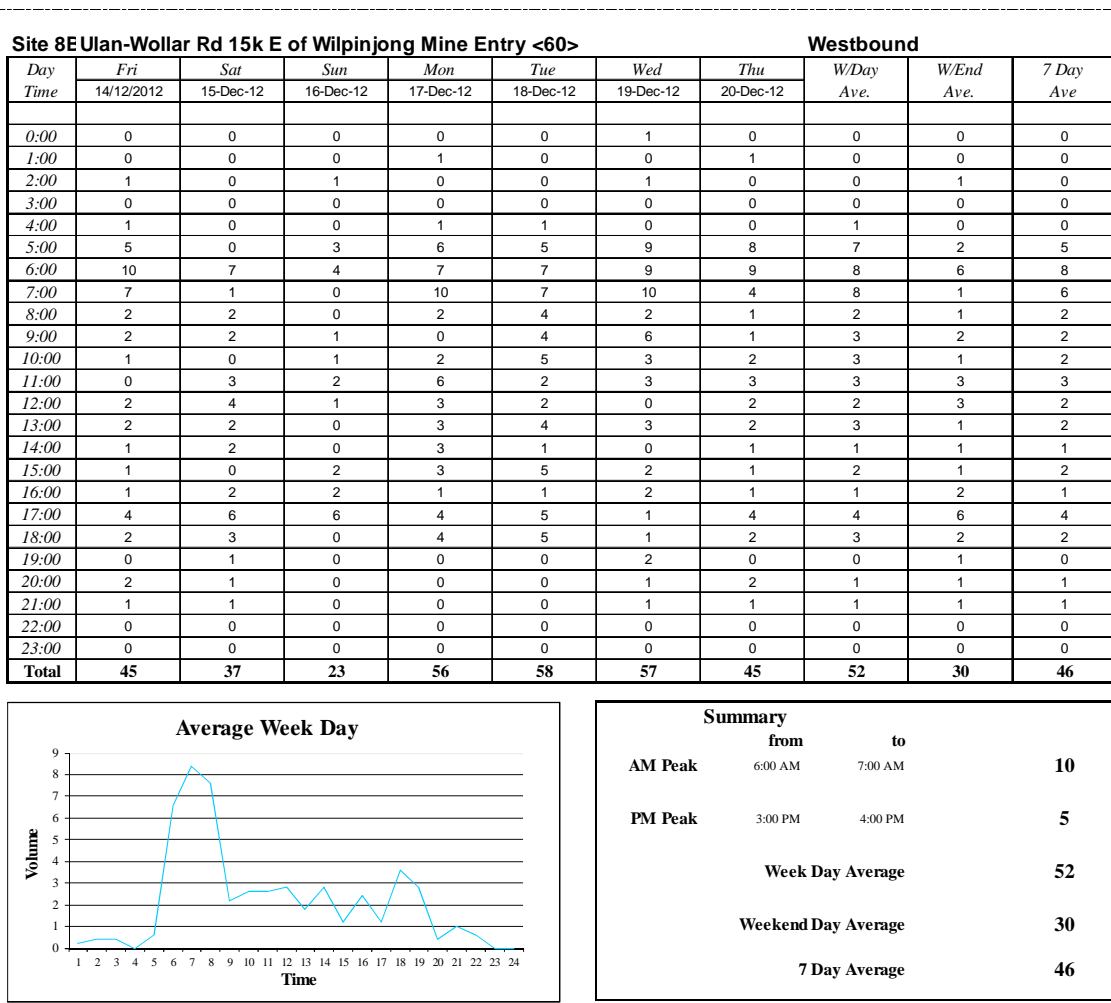


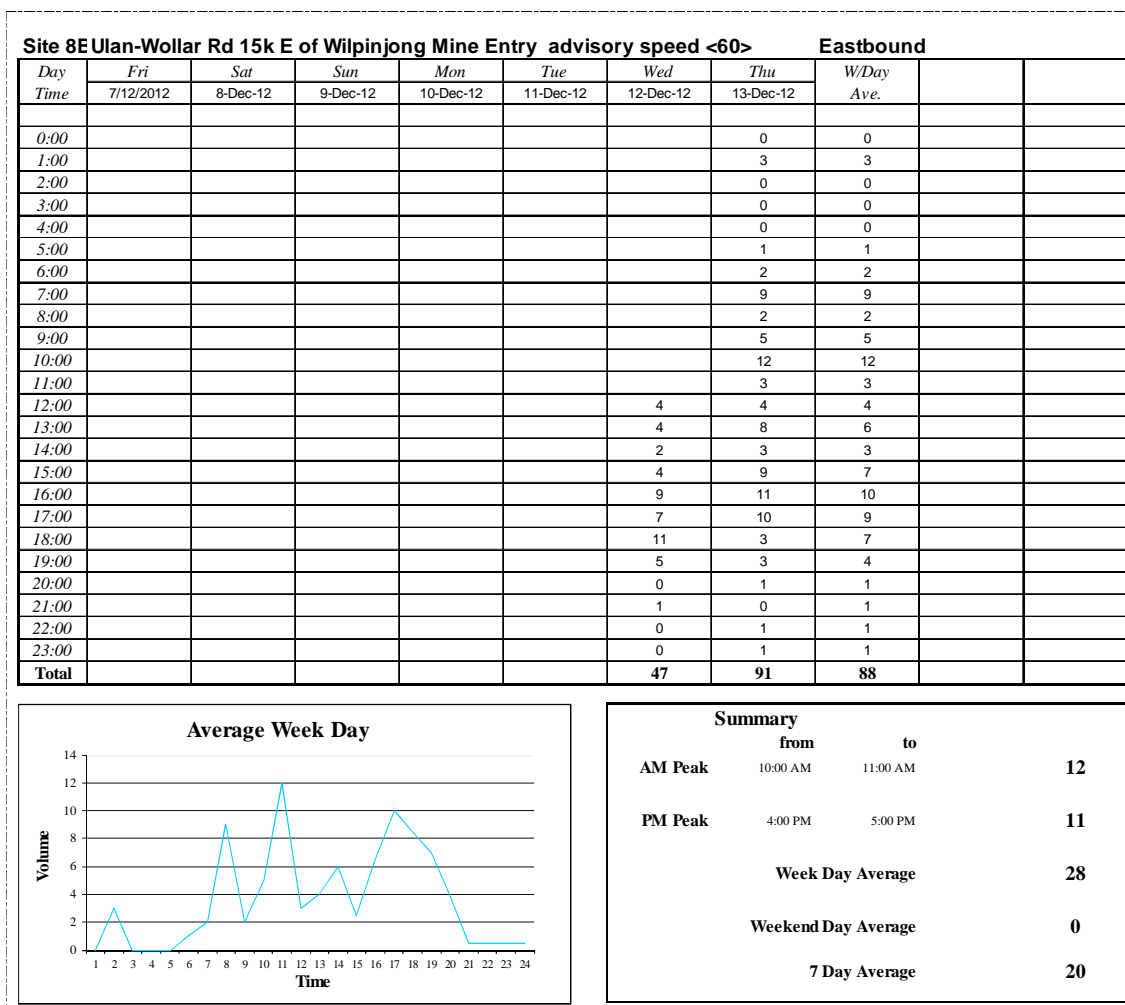


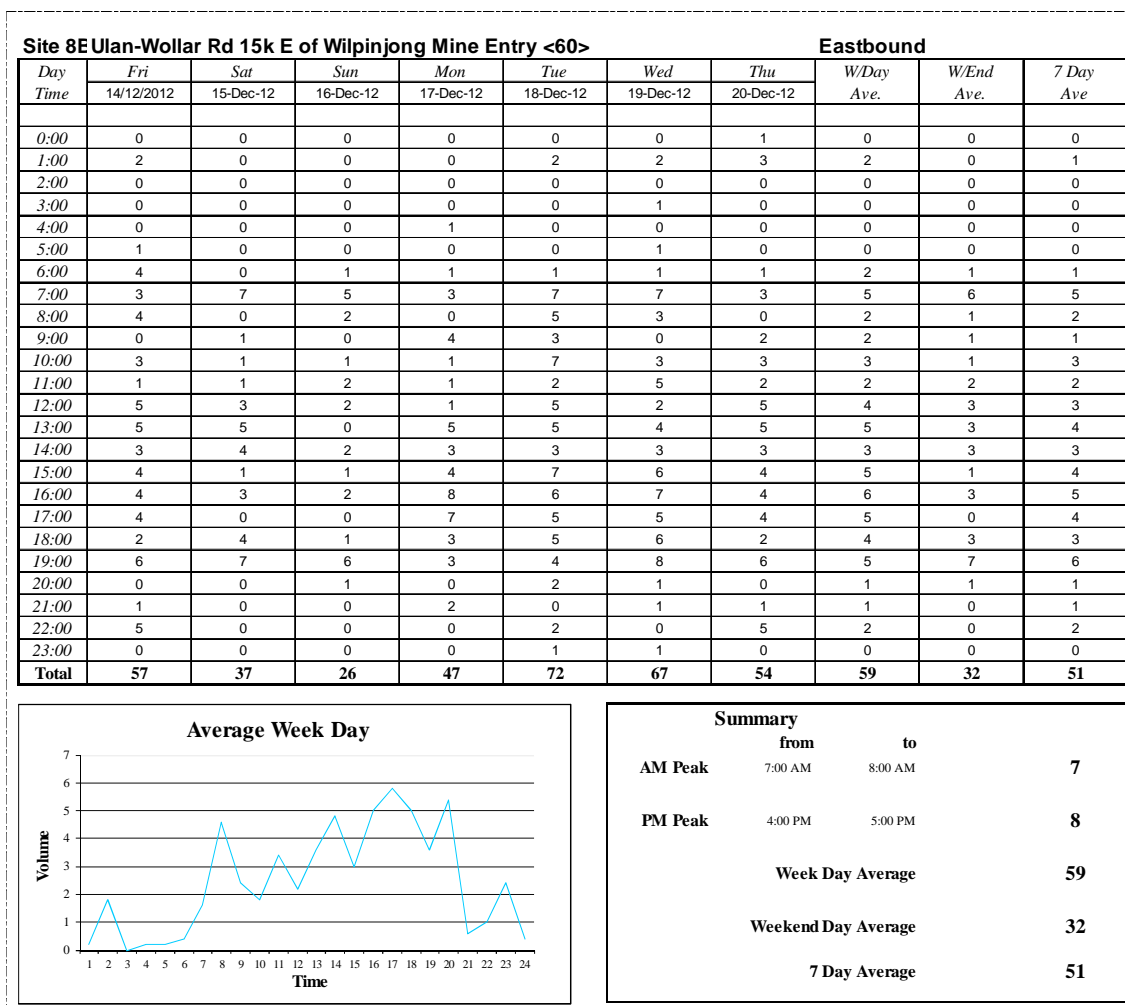


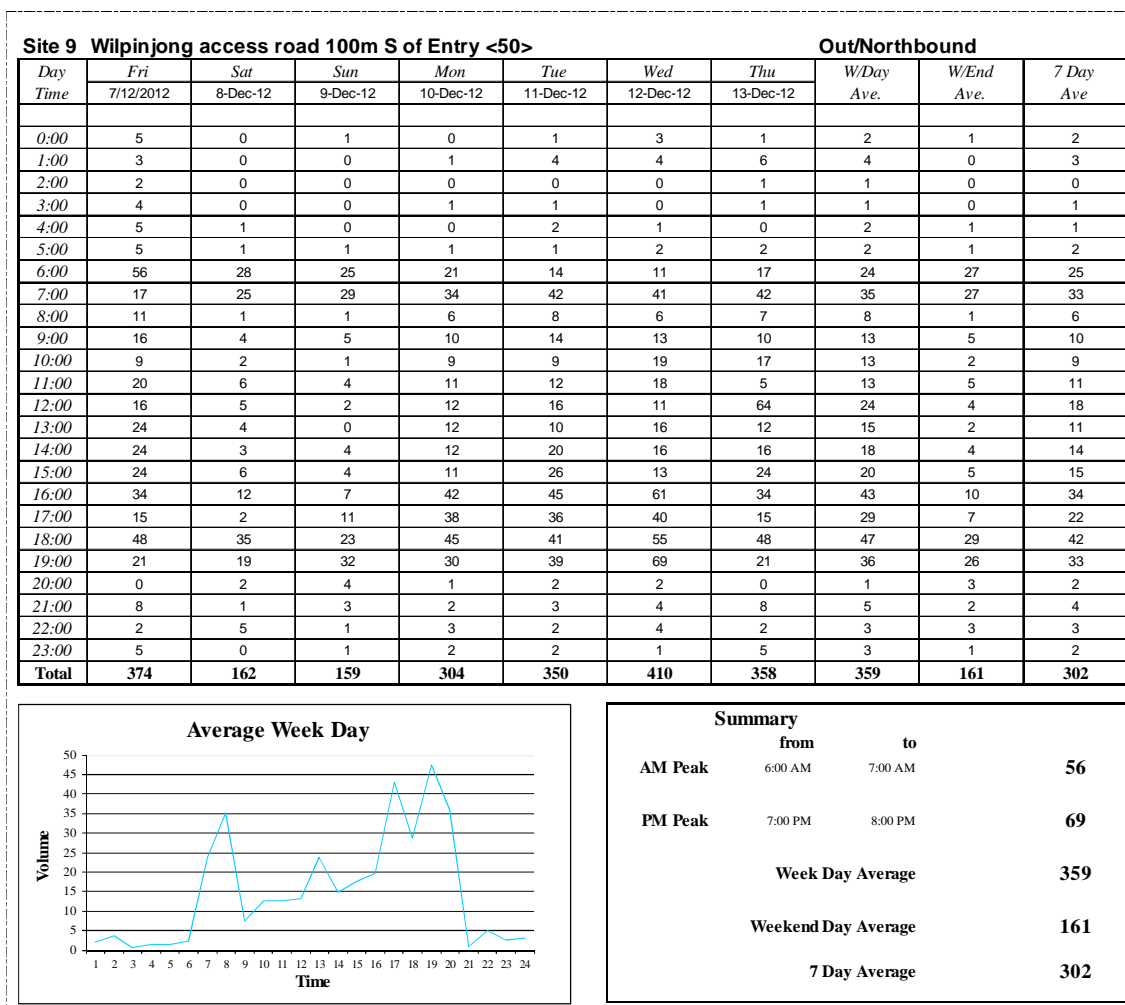


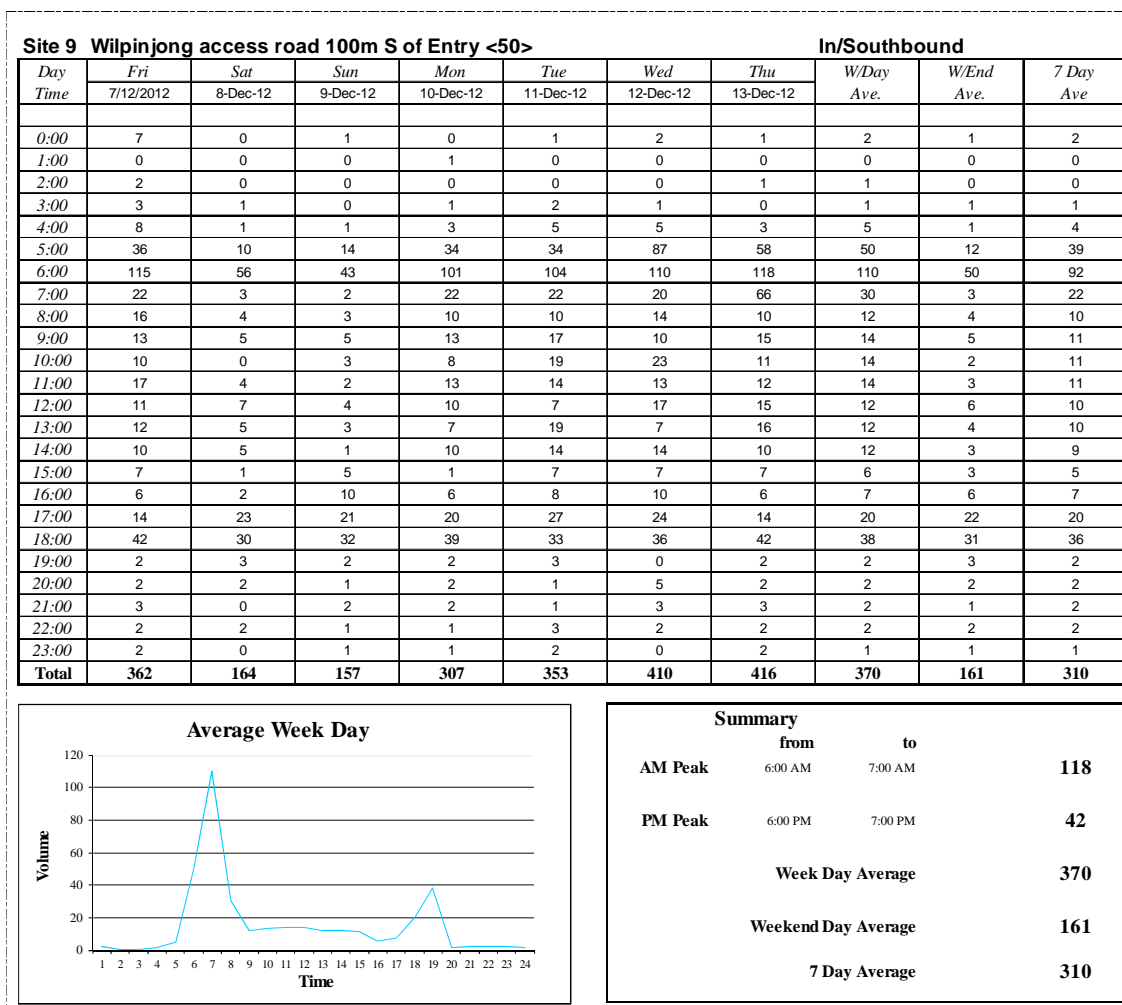


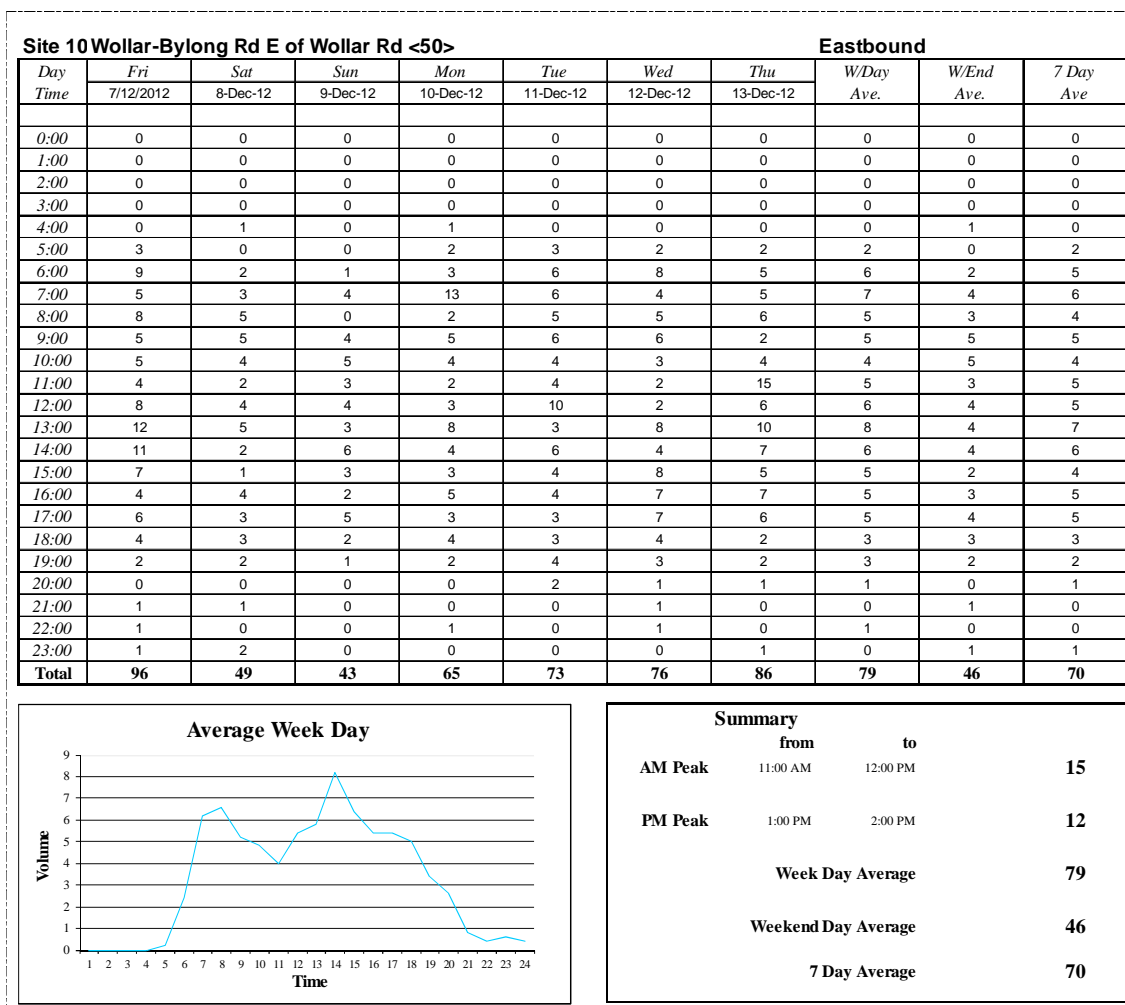


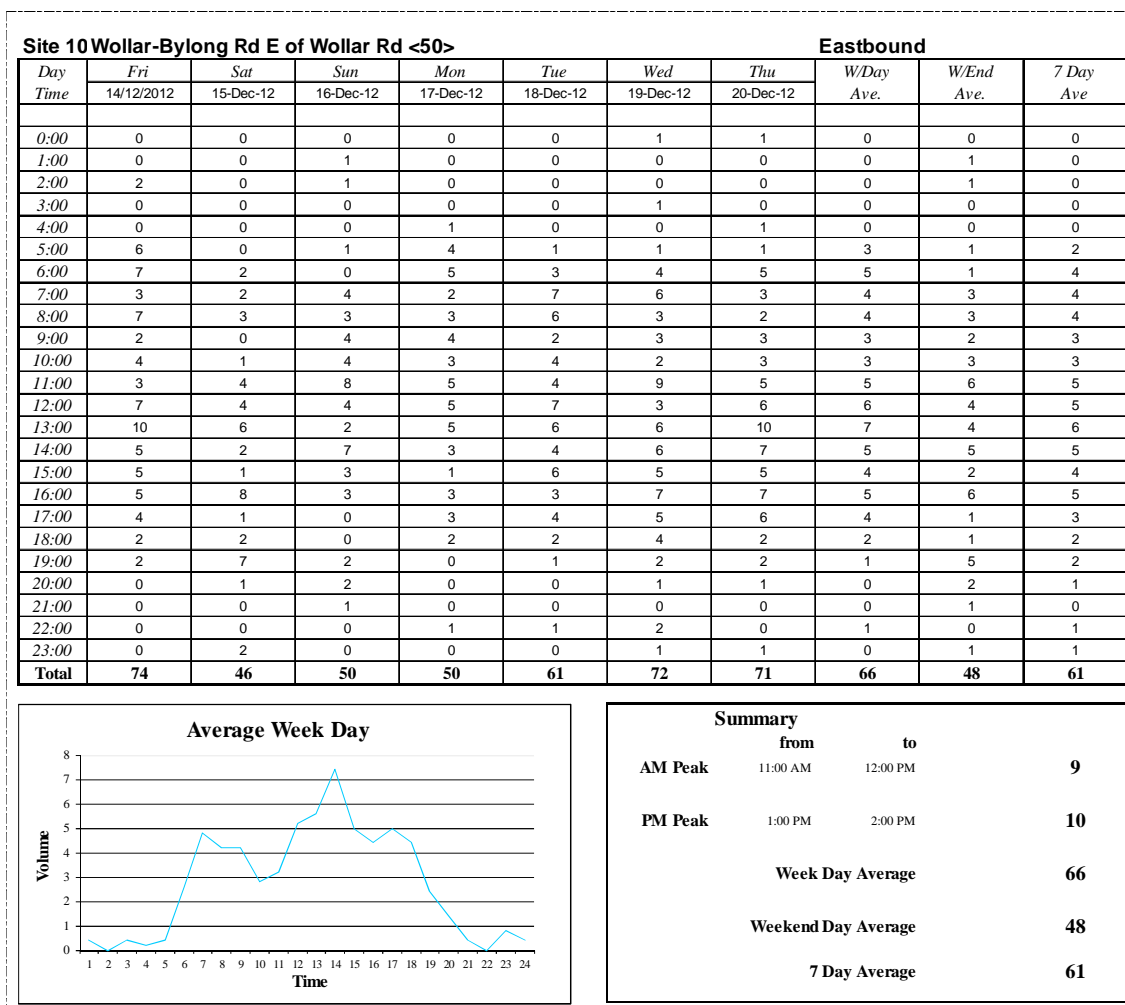


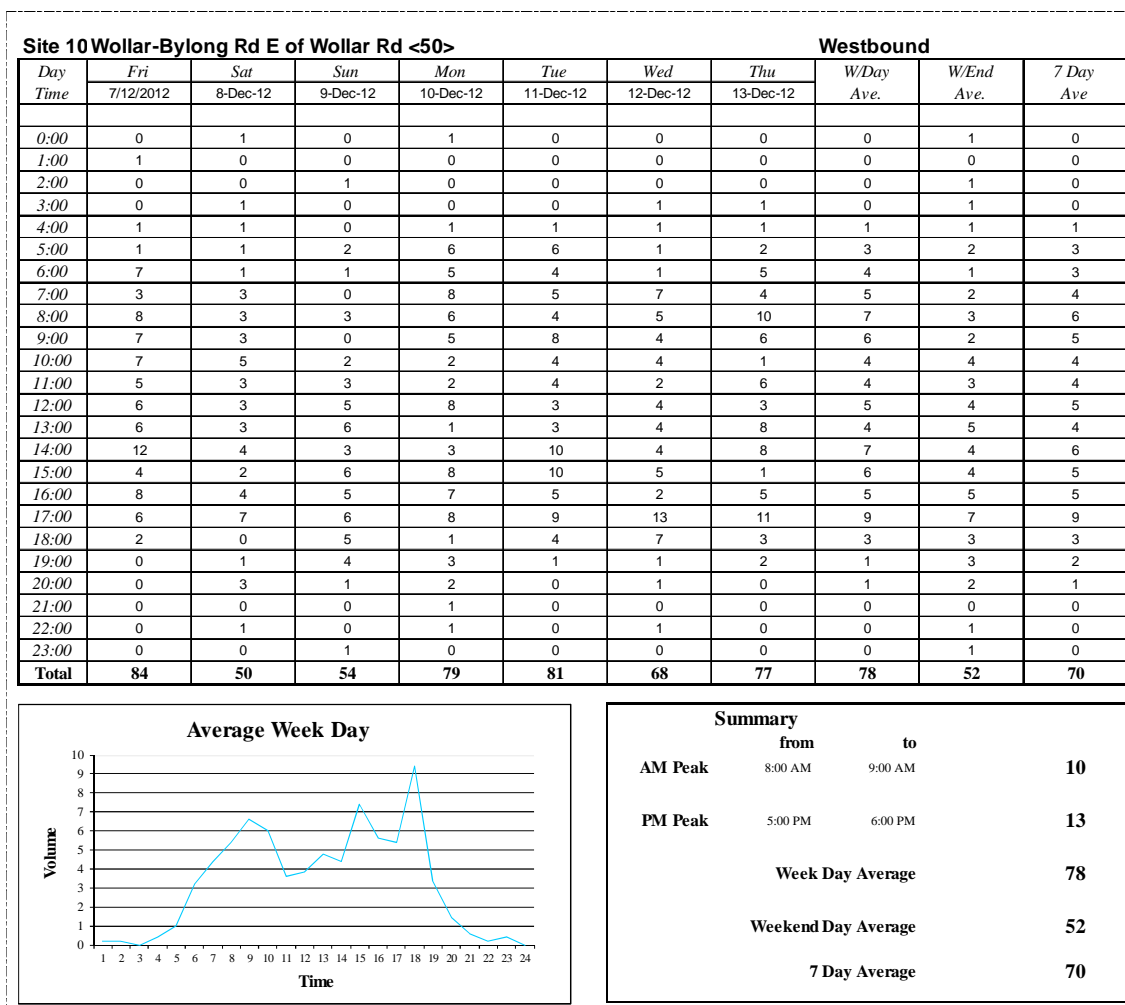


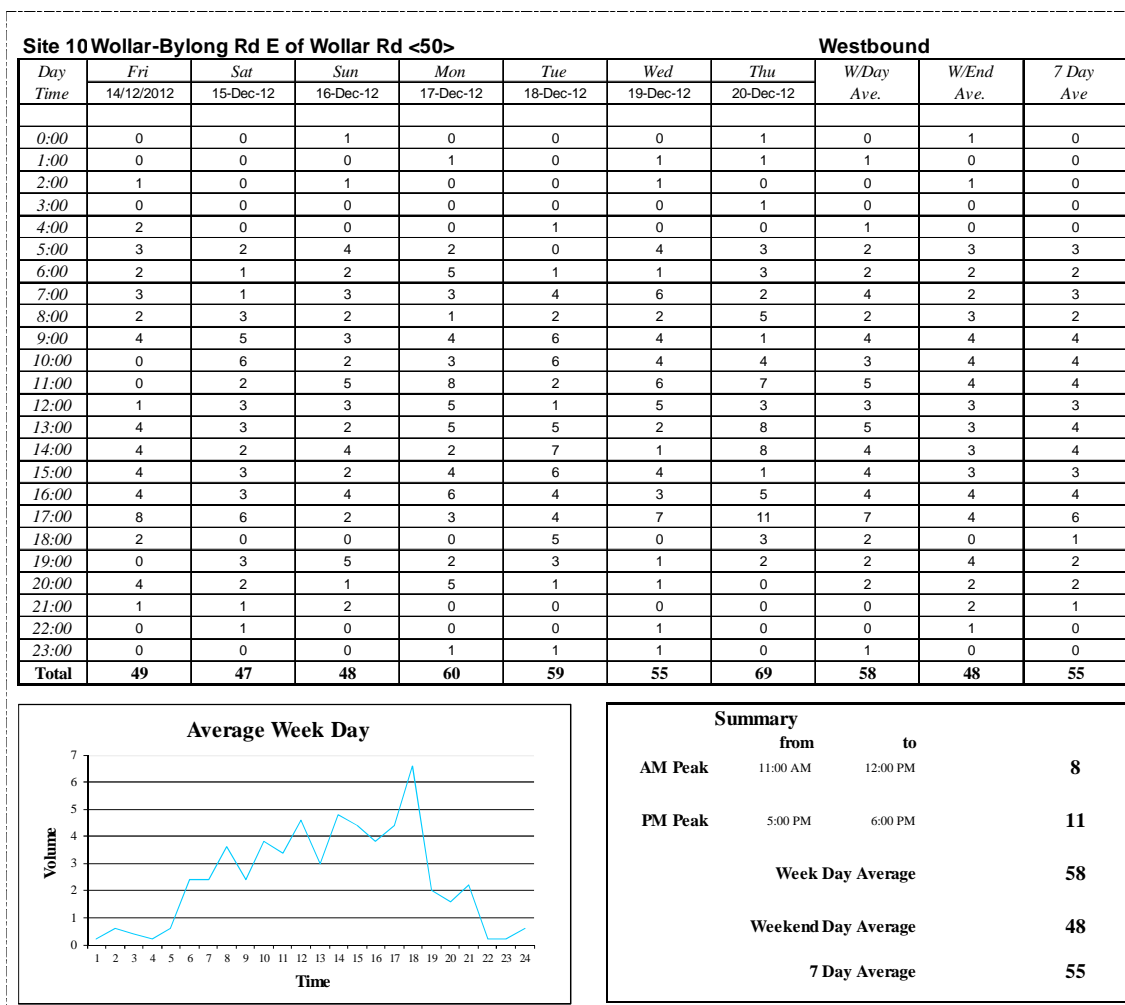


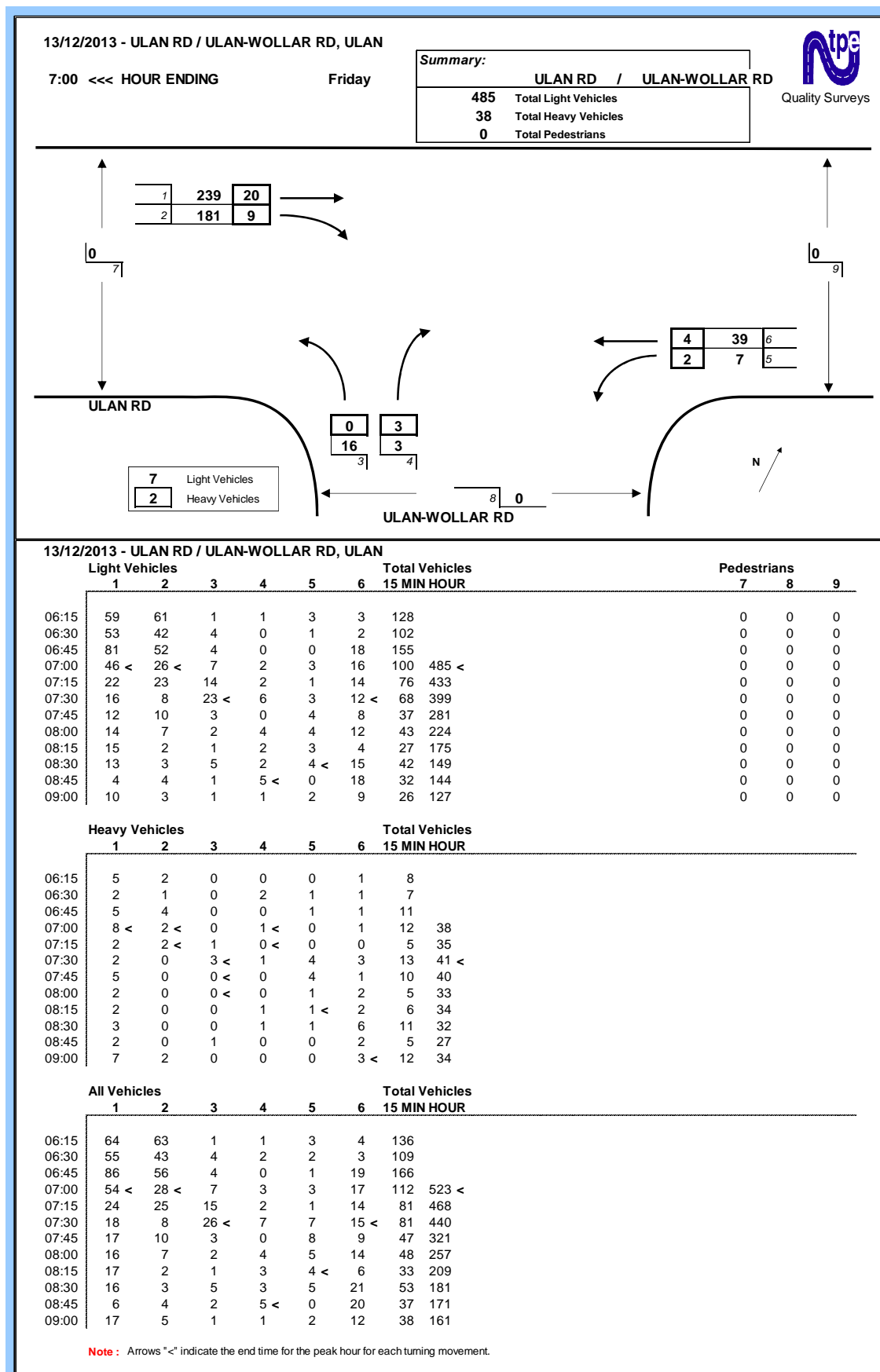


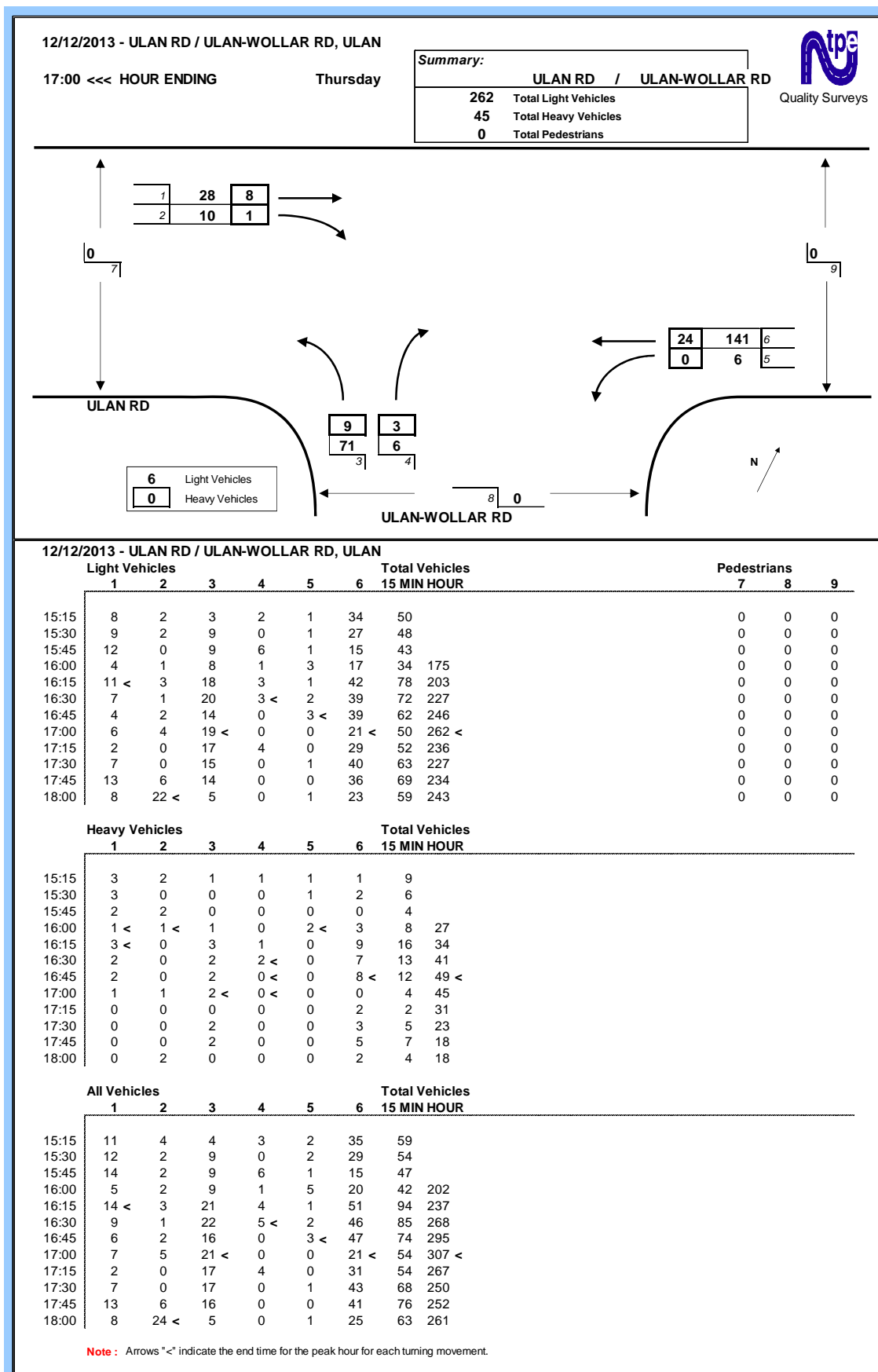


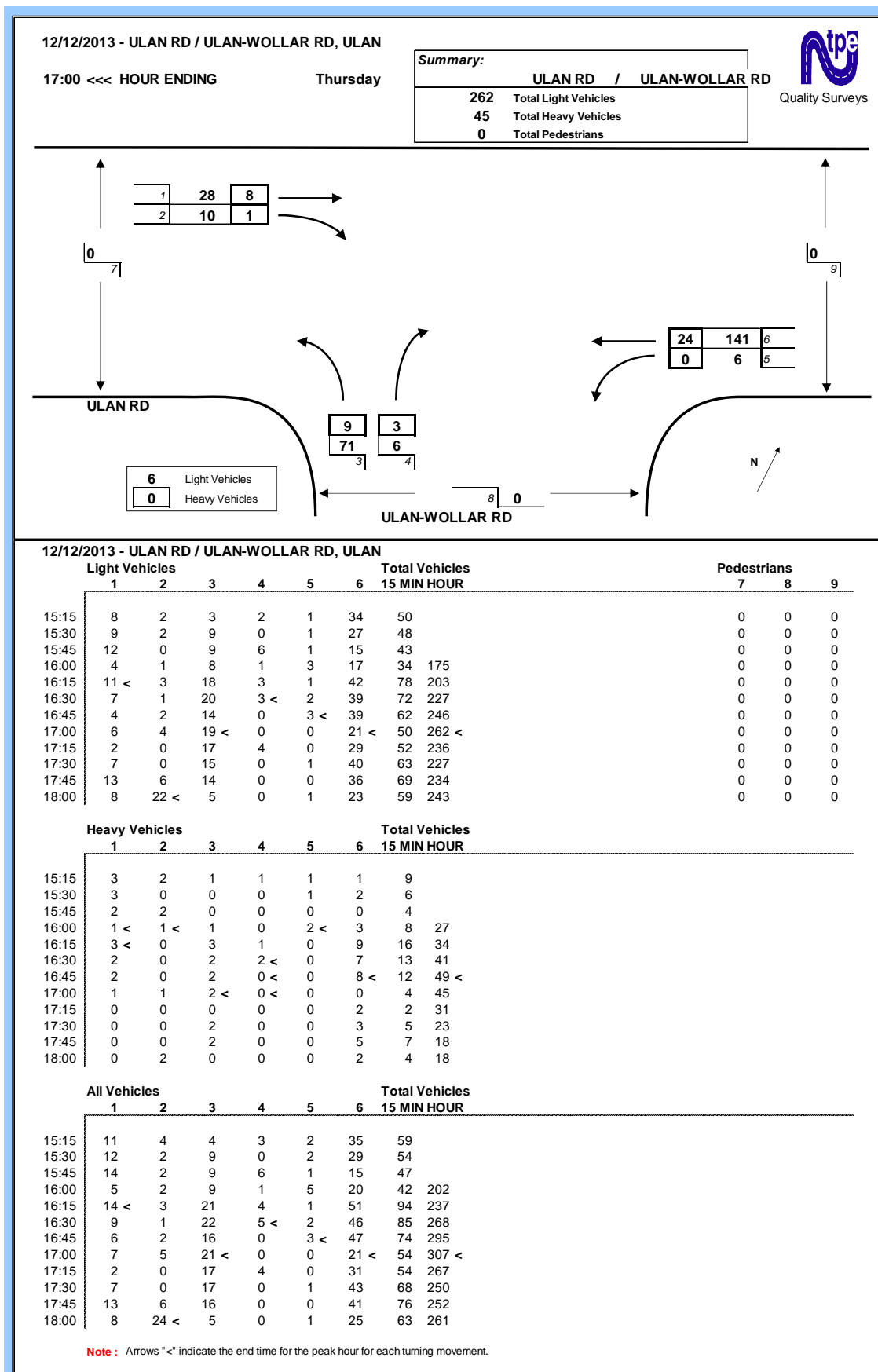


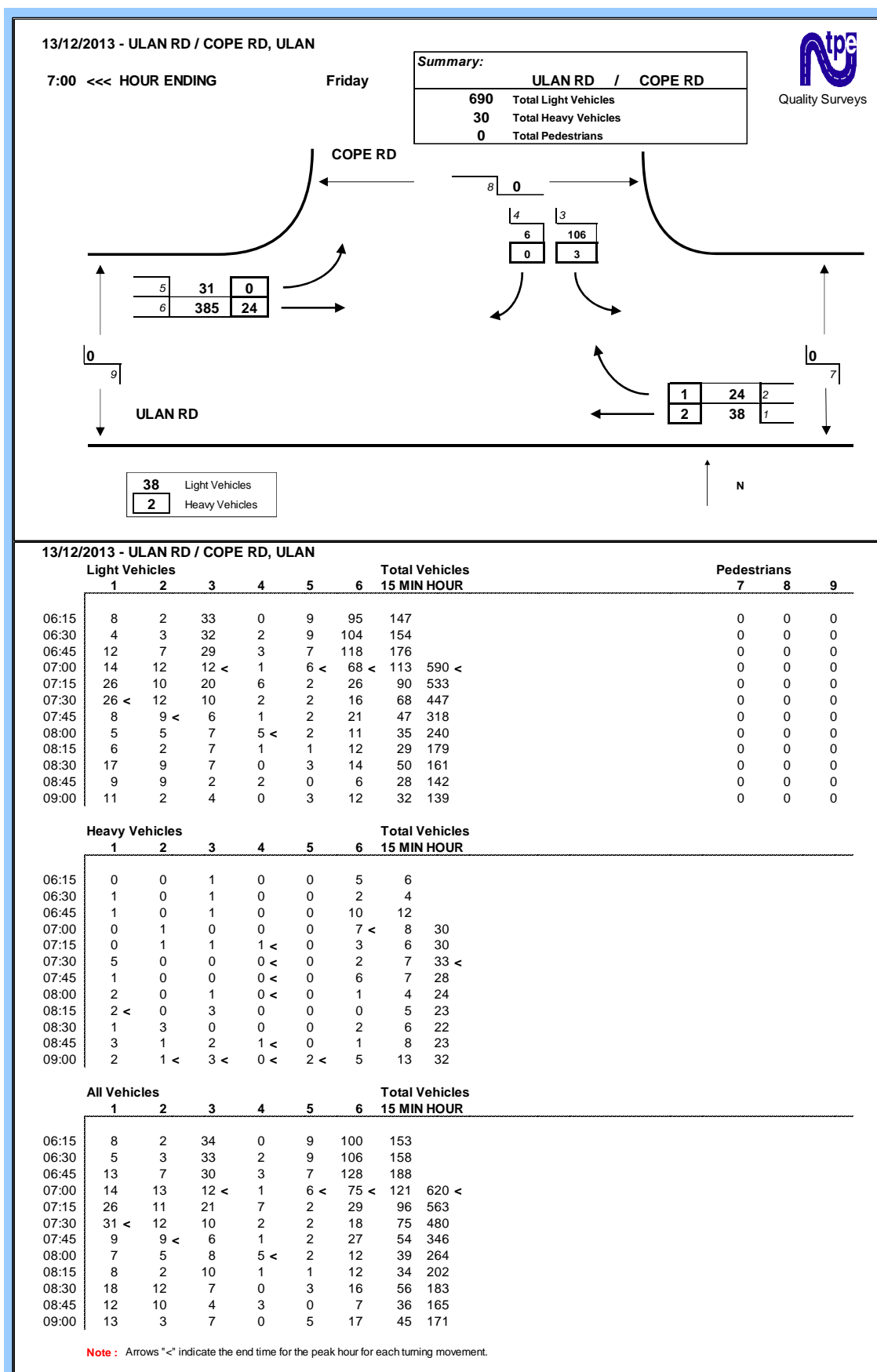


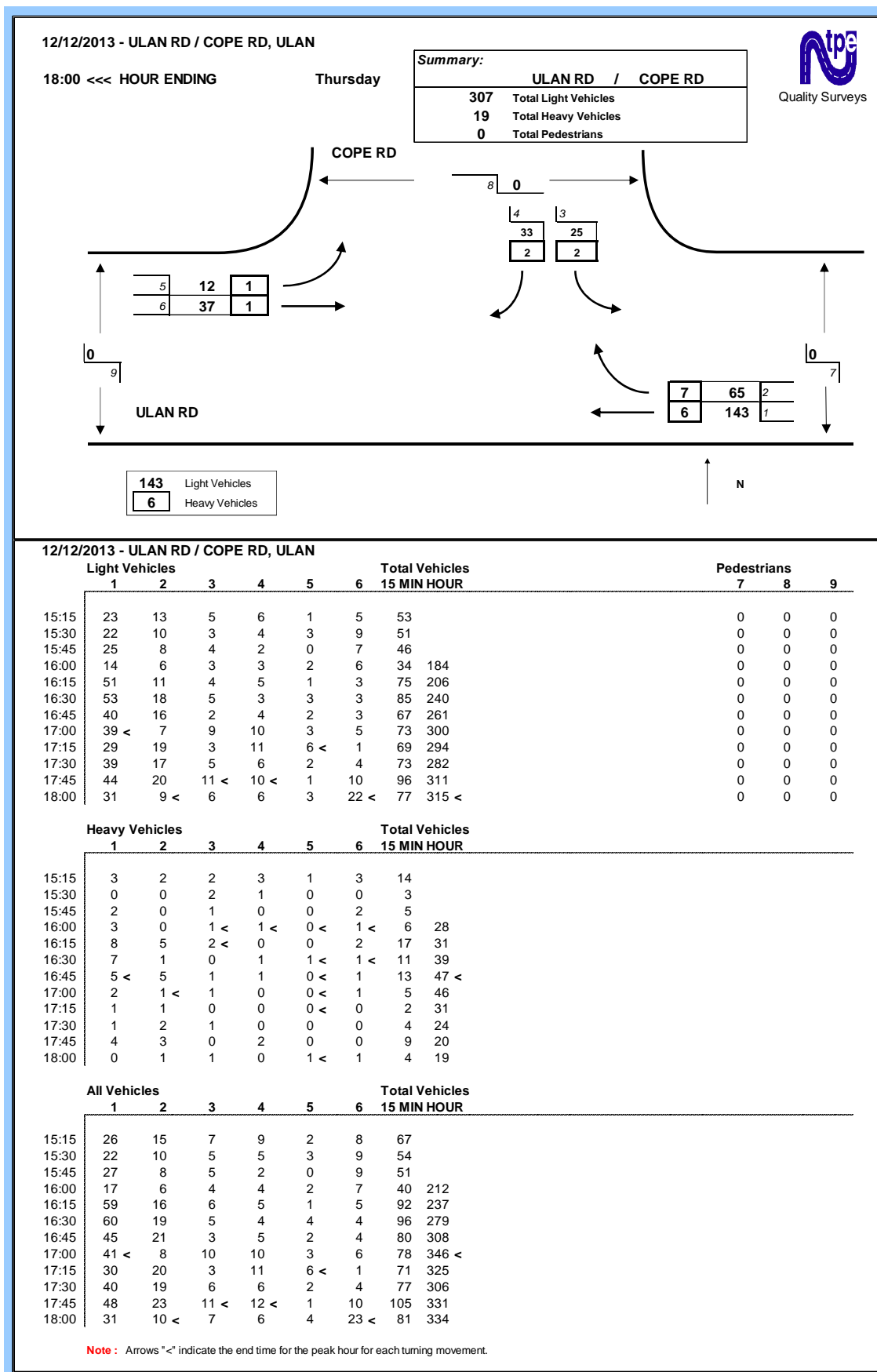


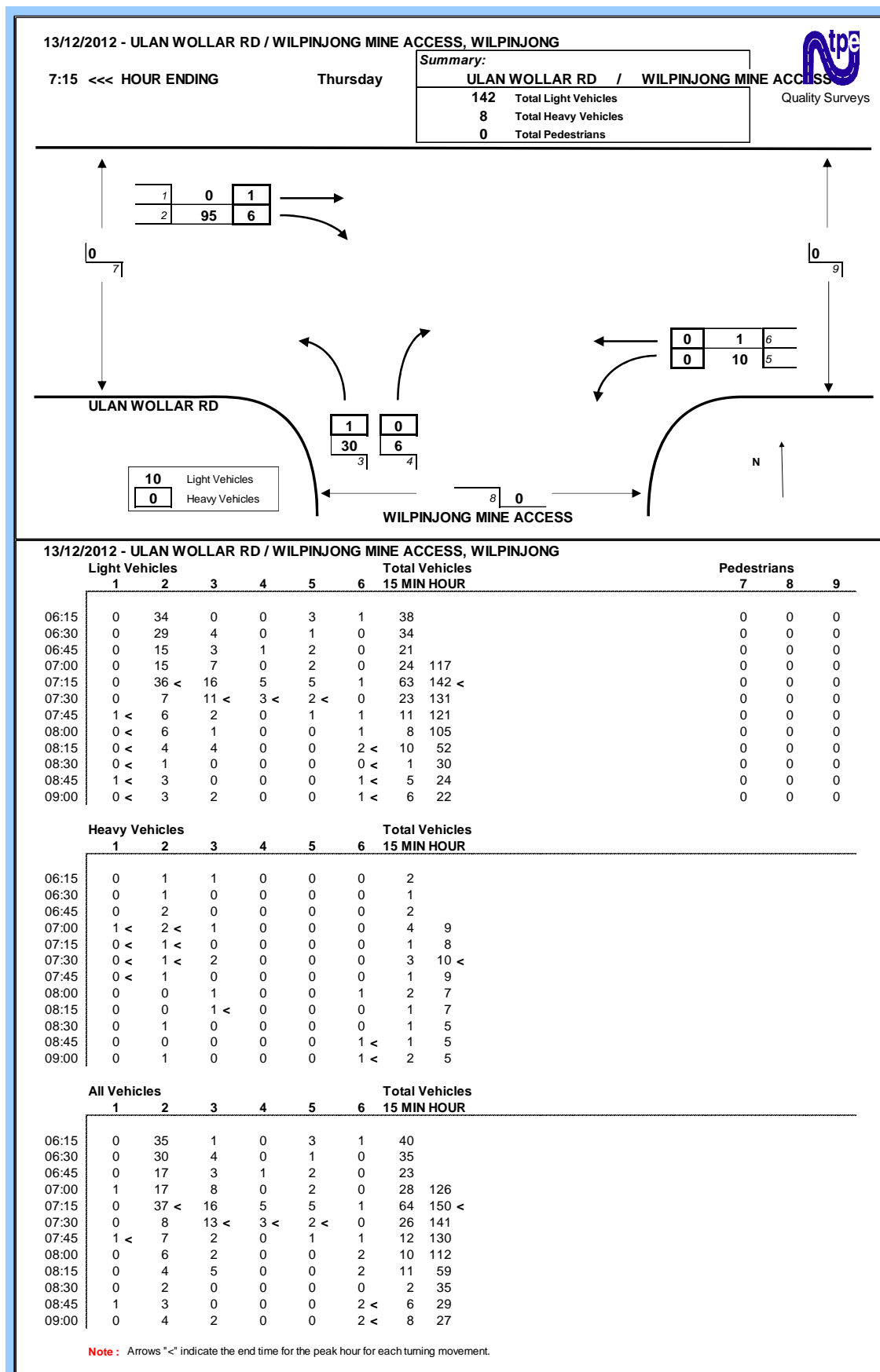


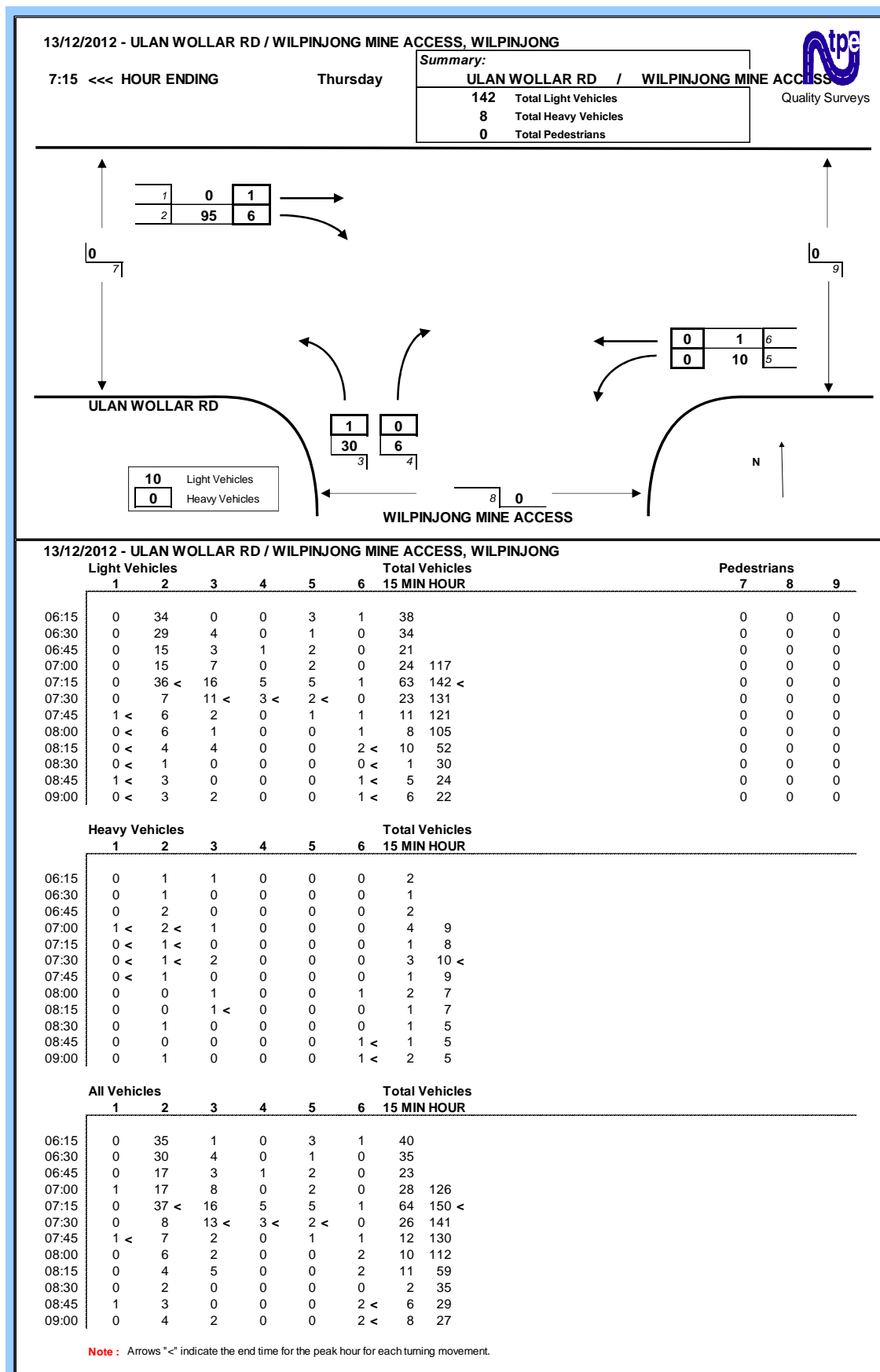












Attachment B

WCM Traffic Distribution by Trip Types

2012 Average Weekday WCM Daily Operational Traffic (vehicles/day)

Site	Survey Location	Light Vehicles			Heavy Vehicles		Light Vehicles	Heavy Vehicles	Total Vehicles
		Employees	Contractors	Visitors	Contractors	Deliveries			
1	Ulan Road north of Hollyoak Bridge	149	112	36	21	9	297	30	327
2	Ulan Road south of Wollar Road	149	112	36	21	9	297	30	327
3	Ulan Road south of Cope Road	195	147	36	27	9	377	36	413
4	Ulan Road south of Ulan-Wollar Road	273	207	37	39	9	517	48	564
5	Ulan Road north of Ulan-Wollar Road	32	24	4	5	1	60	5	65
6	Cope Road west of Ulan Road	78	59	1	11	0	138	11	150
7	Ulan-Wollar Road west of WCM Access Road	293	219	40	41	10	552	51	602
8	Ulan-Wollar Road east of Moolarben Access Road	284	214	40	40	10	538	50	587
9	Ulan-Wollar Road east of WCM Access Road	46	33	0	6	0	79	6	85
10	Ulan-Wollar Road east of Slate Gully Road	39	29	0	5	0	68	5	73
11	WCM Access Road south of Ulan-Wollar Road	360	268	40	50	10	668	60	728
12	Wollar-Bylong Road east of Wollar Road	39	29	0	5	0	68	5	73

Does not include traffic associated with the temporary build site on Ulan-Wollar Road

2012 Average Weekday WCM AM Peak Hour Operational Traffic (vehicles/hour)

Site	Survey Location	Light Vehicles			Heavy Vehicles		Light Vehicles	Heavy Vehicles	Total Vehicles
		Employees	Contractors	Visitors	Contractors	Deliveries			
1	Ulan Road north of Hollyoak Bridge	32	20	3	2	1	55	2	57
2	Ulan Road south of Wollar Road	32	20	3	2	1	55	2	57
3	Ulan Road south of Cope Road	42	26	3	2	1	71	3	74
4	Ulan Road south of Ulan-Wollar Road	59	37	3	3	1	99	4	103
5	Ulan Road north of Ulan-Wollar Road	7	4	0	0	0	12	0	12
6	Cope Road west of Ulan Road	17	11	0	1	0	28	1	29
7	Ulan-Wollar Road west of WCM Access Road	63	39	3	3	1	106	4	110
8	Ulan-Wollar Road east of Moolarben Access Road	62	38	3	3	1	103	4	107
9	Ulan-Wollar Road east of WCM Access Road	10	6	0	0	0	16	0	16
10	Ulan-Wollar Road east of Slate Gully Road	8	5	0	0	0	14	0	14
11	WCM Access Road south of Ulan-Wollar Road	78	48	3	4	1	129	5	134
12	Wollar-Bylong Road east of Wollar Road	8	5	0	0	0	14	0	14

6.00am to 7.00am

Does not include traffic associated with the temporary build site on Ulan-Wollar Road

2012 Average Weekday WCM PM Peak Hour Operational Traffic (vehicles/hour)

Site	Survey Location	Light Vehicles			Heavy Vehicles		Light Vehicles	Heavy Vehicles	Total Vehicles
		Employees	Contractors	Visitors	Contractors	Deliveries			
1	Ulan Road north of Hollyoak Bridge	25	10	1	1	0	35	1	36
2	Ulan Road south of Wollar Road	25	10	1	1	0	35	1	36
3	Ulan Road south of Cope Road	32	13	1	1	0	46	1	47
4	Ulan Road south of Ulan-Wollar Road	46	18	1	2	0	64	2	66
5	Ulan Road north of Ulan-Wollar Road	5	2	0	0	0	8	0	8
6	Cope Road west of Ulan Road	13	5	0	0	0	18	0	19
7	Ulan-Wollar Road west of WCM Access Road	49	19	1	2	0	69	2	70
8	Ulan-Wollar Road east of Moolarben Access Road	47	18	1	2	0	67	2	68
9	Ulan-Wollar Road east of WCM Access Road	8	3	0	0	0	11	0	11
10	Ulan-Wollar Road east of Slate Gully Road	6	2	0	0	0	9	0	9
11	WCM Access Road south of Ulan-Wollar Road	60	23	1	2	0	84	2	86
12	Wollar-Bylong Road east of Wollar Road	6	2	0	0	0	9	0	9

6.00pm to 7.00pm

Does not include traffic associated with the temporary build site on Ulan-Wollar Road

Average Weekday WCM Daily Traffic with Modification in 2014 (vehicles/day)

Site	Survey Location	Light Vehicles				Heavy Vehicles			Light Vehicles	Heavy Vehicles	Total Vehicles
		Employees	Contractors	Visitors	Construction Employees	Contractors	Deliveries	Construction Deliveries			
1	Ulan Road north of Hollyoak Bridge	175	131	39	17	24	11	11	363	46	409
2	Ulan Road south of Wollar Road	175	131	39	17	24	11	11	363	46	409
3	Ulan Road south of Cope Road	228	172	40	23	32	11	11	462	53	516
4	Ulan Road south of Ulan-Wollar Road	320	242	42	32	45	11	11	636	67	703
5	Ulan Road north of Ulan-Wollar Road	38	28	4	4	5	1	1	74	7	81
6	Cope Road west of Ulan Road	92	69	2	9	13	0	0	172	13	185
7	Ulan-Wollar Road west of WCM Access Road	343	257	45	33	47	12	12	678	71	749
8	Ulan-Wollar Road east of Moolarben Access Road	333	250	45	33	46	12	12	662	70	732
9	Ulan-Wollar Road east of WCM Access Road	54	39	0	4	7	0	0	98	7	105
10	Ulan-Wollar Road east of Slate Gully Road	45	34	0	4	6	0	0	84	6	90
11	WCM Access Road south of Ulan-Wollar Road	422	314	46	40	58	12	12	822	82	905
12	Wollar-Bylong Road east of Wollar Road	45	34	0	4	6	0	0	84	6	90

Average Weekday WCM AM Peak Hour Traffic with Modification in 2014 (vehicles/hour)

Site	Survey Location	Light Vehicles				Heavy Vehicles			Light Vehicles	Heavy Vehicles	Total Vehicles
		Employees	Contractors	Visitors	Construction Employees	Contractors	Deliveries	Construction Deliveries			
1	Ulan Road north of Hollyoak Bridge	31	14	3	9	2	1	1	56	4	60
2	Ulan Road south of Wollar Road	31	14	3	9	2	1	1	56	4	60
3	Ulan Road south of Cope Road	41	18	3	11	3	1	1	73	4	77
4	Ulan Road south of Ulan-Wollar Road	57	25	3	16	4	1	1	101	5	106
5	Ulan Road north of Ulan-Wollar Road	7	3	0	2	0	0	0	12	1	12
6	Cope Road west of Ulan Road	16	7	0	5	1	0	0	28	1	29
7	Ulan-Wollar Road west of WCM Access Road	61	26	4	17	4	1	1	107	6	113
8	Ulan-Wollar Road east of Moolarben Access Road	59	26	4	17	4	1	1	105	5	111
9	Ulan-Wollar Road east of WCM Access Road	10	4	0	2	1	0	0	15	1	16
10	Ulan-Wollar Road east of Slate Gully Road	8	4	0	2	1	0	0	14	1	14
11	WCM Access Road south of Ulan-Wollar Road	75	31	4	20	5	1	1	130	6	137
12	Wollar-Bylong Road east of Wollar Road	8	4	0	2	1	0	0	14	1	14

6.00am to 7.00am

Average Weekday WCM PM Peak Hour Traffic with Modification in 2014 (vehicles/hour)

Site	Survey Location	Light Vehicles				Heavy Vehicles			Light Vehicles	Heavy Vehicles	Total Vehicles
		Employees	Contractors	Visitors	Construction Employees	Contractors	Deliveries	Construction Deliveries			
1	Ulan Road north of Hollyoak Bridge	13	11	1	9	1	0	0	34	2	36
2	Ulan Road south of Wollar Road	13	11	1	9	1	0	0	34	2	36
3	Ulan Road south of Cope Road	17	15	1	11	1	0	0	44	2	46
4	Ulan Road south of Ulan-Wollar Road	24	21	1	16	2	0	0	62	2	64
5	Ulan Road north of Ulan-Wollar Road	3	2	0	2	0	0	0	7	0	8
6	Cope Road west of Ulan Road	7	6	0	5	1	0	0	17	1	18
7	Ulan-Wollar Road west of WCM Access Road	26	22	1	17	2	0	0	66	2	68
8	Ulan-Wollar Road east of Moolarben Access Road	25	21	1	17	2	0	0	64	2	67
9	Ulan-Wollar Road east of WCM Access Road	4	3	0	2	0	0	0	10	0	10
10	Ulan-Wollar Road east of Slate Gully Road	3	3	0	2	0	0	0	9	0	9
11	WCM Access Road south of Ulan-Wollar Road	32	27	1	20	2	0	0	80	3	83
12	Wollar-Bylong Road east of Wollar Road	3	3	0	2	0	0	0	9	0	9

6.00pm to 7.00pm

Average Weekday WCM Daily Traffic with Modification in 2024 (vehicles/day)

Site	Survey Location	Light Vehicles			Heavy Vehicles		Light Vehicles	Heavy Vehicles	Total Vehicles
		Employees	Contractors	Visitors	Contractors	Deliveries			
1	Ulan Road north of Hollyoak Bridge	146	110	32	21	7	287	28	316
2	Ulan Road south of Wollar Road	146	110	32	21	7	287	28	316
3	Ulan Road south of Cope Road	190	143	32	27	7	366	34	400
4	Ulan Road south of Ulan-Wollar Road	267	202	33	39	7	502	46	548
5	Ulan Road north of Ulan-Wollar Road	31	24	3	6	1	58	7	65
6	Cope Road west of Ulan Road	77	58	1	11	0	135	11	146
7	Ulan-Wollar Road west of WCM Access Road	286	214	36	41	8	536	49	585
8	Ulan-Wollar Road east of Moolarben Access Road	278	209	36	40	8	522	48	570
9	Ulan-Wollar Road east of WCM Access Road	45	33	0	6	0	77	6	84
10	Ulan-Wollar Road east of Slate Gully Road	38	28	0	5	0	66	5	71
11	WCM Access Road south of Ulan-Wollar Road	352	262	36	50	8	650	58	708
12	Wollar-Bylong Road east of Wollar Road	38	28	0	5	0	66	5	71

Average Weekday WCM AM Peak Hour Traffic with Modification in 2024 (vehicles/hour)

Site	Survey Location	Light Vehicles			Heavy Vehicles		Light Vehicles	Heavy Vehicles	Total Vehicles
		Employees	Contractors	Visitors	Contractors	Deliveries			
1	Ulan Road north of Hollyoak Bridge	32	20	2	2	1	54	2	56
2	Ulan Road south of Wollar Road	32	20	2	2	1	54	2	56
3	Ulan Road south of Cope Road	41	26	2	2	1	69	3	72
4	Ulan Road south of Ulan-Wollar Road	58	36	2	3	1	97	4	100
5	Ulan Road north of Ulan-Wollar Road	7	4	0	0	0	11	0	12
6	Cope Road west of Ulan Road	17	10	0	1	0	27	1	28
7	Ulan-Wollar Road west of WCM Access Road	62	38	3	3	1	103	4	107
8	Ulan-Wollar Road east of Moolarben Access Road	60	37	3	3	1	100	4	104
9	Ulan-Wollar Road east of WCM Access Road	10	6	0	0	0	16	0	16
10	Ulan-Wollar Road east of Slate Gully Road	8	5	0	0	0	13	0	14
11	WCM Access Road south of Ulan-Wollar Road	76	47	3	4	1	126	5	131
12	Wollar-Bylong Road east of Wollar Road	8	5	0	0	0	13	0	14

6.00am to 7.00am

Average Weekday WCM PM Peak Hour Traffic with Modification in 2024 (vehicles/hour)

Site	Survey Location	Light Vehicles			Heavy Vehicles		Light Vehicles	Heavy Vehicles	Total Vehicles
		Employees	Contractors	Visitors	Contractors	Deliveries			
1	Ulan Road north of Hollyoak Bridge	24	9	1	1	0	35	1	36
2	Ulan Road south of Wollar Road	24	9	1	1	0	35	1	36
3	Ulan Road south of Cope Road	32	12	1	1	0	45	1	46
4	Ulan Road south of Ulan-Wollar Road	45	17	1	2	0	63	2	64
5	Ulan Road north of Ulan-Wollar Road	5	2	0	0	0	7	0	8
6	Cope Road west of Ulan Road	13	5	0	0	0	18	0	18
7	Ulan-Wollar Road west of WCM Access Road	48	18	1	2	0	67	2	69
8	Ulan-Wollar Road east of Moolarben Access Road	46	18	1	2	0	65	2	67
9	Ulan-Wollar Road east of WCM Access Road	7	3	0	0	0	10	0	11
10	Ulan-Wollar Road east of Slate Gully Road	6	2	0	0	0	9	0	9
11	WCM Access Road south of Ulan-Wollar Road	59	23	1	2	0	82	2	84
12	Wollar-Bylong Road east of Wollar Road	6	2	0	0	0	9	0	9

6.00pm to 7.00pm

Attachment C

Non-Mine Traffic

Average Weekday Estimate of Daily Background Non-Mine Related Traffic in 2012 (vehicles/day)

Site	Survey Location	WCM Operational	WCM Build Site	Ulan Coal Mine	Moolarben Stage 1	Total Mine Traffic	Surveyed	Non-Mine Traffic
1	Ulan Road north of Hollyoak Bridge	327	27	1,426	352	2,132	9,727	7,595
2	Ulan Road south of Wollar Road	327	27	1,426	352	2,132	3,856	1,724
3	Ulan Road south of Cope Road	413	31	1,426	352	2,222	2,736	514
4	Ulan Road south of Ulan-Wollar Road	564	38	1,440	440	2,483	3,345	862
5	Ulan Road north of Ulan-Wollar Road	65	4	1,440	40	1,550	2,633	1,083
6	Cope Road west of Ulan Road	150	7	568	88	813	1,569	756
7	Ulan-Wollar Road west of WCM Access Road	602	3	0	0	606	692	86
8	Ulan-Wollar Road east of Moolarben Access Road	587	41	0	0	628	837	209
9	Ulan-Wollar Road east of WCM Access Road	85	3	0	0	89	164	75
10	Ulan-Wollar Road east of Slate Gully Road	73	3	0	0	76	142	66
11	WCM Access Road south of Ulan-Wollar Road	728	0	0	0	728	728	0
12	Wollar-Bylong Road east of Wollar Road	24	1	0	0	25	140	115

Average Weekday Estimate of AM Peak Hour Background Non-Mine Related Traffic in 2012 (vehicles/hour)

Site	Survey Location	WCM Operational	WCM Build Site	Ulan Coal Mine	Moolarben Stage 1	Total Mine Traffic	Surveyed	Non-Mine Traffic
1	Ulan Road north of Hollyoak Bridge	57	4	143	35	239	667	428
2	Ulan Road south of Wollar Road	57	4	143	35	239	333	94
3	Ulan Road south of Cope Road	74	5	143	35	256	428	172
4	Ulan Road south of Ulan-Wollar Road	103	6	144	44	297	453	156
5	Ulan Road north of Ulan-Wollar Road	12	1	144	4	161	307	146
6	Cope Road west of Ulan Road	29	2	57	9	96	156	60
7	Ulan-Wollar Road west of WCM Access Road	110	1	0	0	110	121	11
8	Ulan-Wollar Road east of Moolarben Access Road	107	7	0	0	113	129	16
9	Ulan-Wollar Road east of WCM Access Road	16	1	0	0	17	14	0 ^A
10	Ulan-Wollar Road east of Slate Gully Road	14	1	0	0	15	16	1
11	WCM Access Road south of Ulan-Wollar Road	134	0	0	0	134	133	0 ^A
12	Wollar-Bylong Road east of Wollar Road	5	0	0	0	5	10	5

^A Small negative volume taken as zero – results from minor fluctuations in the distribution of WCM traffic through the day

Average Weekday Estimate of PM Peak Hour Background Non-Mine Related Traffic in 2012 (vehicles/hour)

Site	Survey Location	WCM Operational	WCM Build Site	Ulan Coal Mine	Moolarben Stage 1	Total Mine Traffic	Surveyed	Non-Mine Traffic
1	Ulan Road north of Hollyoak Bridge	36	3	71	18	128	866	738
2	Ulan Road south of Wollar Road	36	3	71	18	128	348	220
3	Ulan Road south of Cope Road	47	3	71	18	139	242	103
4	Ulan Road south of Ulan-Wollar Road	66	4	72	22	164	261	97
5	Ulan Road north of Ulan-Wollar Road	8	1	72	2	82	194	112
6	Cope Road west of Ulan Road	19	1	28	4	53	129	76
7	Ulan-Wollar Road west of WCM Access Road	70	1	0	0	71	72	1
8	Ulan-Wollar Road east of Moolarben Access Road	68	5	0	0	73	83	10
9	Ulan-Wollar Road east of WCM Access Road	11	1	0	0	11	12	1
10	Ulan-Wollar Road east of Slate Gully Road	9	1	0	0	10	14	4
11	WCM Access Road south of Ulan-Wollar Road	86	0	0	0	86	86	0
12	Wollar-Bylong Road east of Wollar Road	3	0	0	0	3	13	10

Melbourne

A 87 High Street South
PO Box 684
KEW VIC 3101
P +613 9851 9600
F +613 9851 9610
E melbourne@gta.com.au

Sydney

A Level 2, 815 Pacific Highway
CHATSWOOD NSW 2067
PO Box 5254
WEST CHATSWOOD NSW 1515
P +612 8448 1800
F +612 8448 1810
E sydney@gta.com.au

Brisbane

A Level 3, 527 Gregory Terrace
BOWEN HILLS QLD 4006
PO Box 555
FORTITUDE VALLEY QLD 4006
P +617 3113 5000
F +617 3113 5010
E brisbane@gta.com.au

Canberra

A Unit 4, Level 1, Sparta Building, 55 Woolley Street
PO Box 62
DICKSON ACT 2602
P +612 6263 9400
F +612 6263 9410
E canberra@gta.com.au

Adelaide

A Suite 4, Level 1, 136 The Parade
PO Box 3421
NORWOOD SA 5067
P +618 8334 3600
F +618 8334 3610
E adelaide@gta.com.au

Gold Coast

A Level 9, Corporate Centre 2
Box 37
1 Corporate Court
BUNDALL QLD 4217
P +617 5510 4800
F +617 5510 4814
E goldcoast@gta.com.au

Townsville

A Level 1, 25 Sturt Street
PO Box 1064
TOWNSVILLE QLD 4810
P +617 4722 2765
F +617 4722 2761
E townsville@gta.com.au