Traffic Assessment

Appendix G

Appendix G — Traffic Assessment

G

Traffic Assessment

Battery Recycling Facility
129 Mitchell Avenue Kurri Kurri

Prepared for Pymore Recyclers International Ltd | 28 October 2016

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Traffic Assessment

Final

Report J15156RP1 | Prepared for Pymore Recyclers International Ltd | 28 October 2016

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1 Introduction

1.1 Purpose of report

Pymore Recyclers International Pty Ltd (Pymore) proposes to construct a facility to recycle used lead acid batteries (ULABs) in Kurri Kurri, NSW (the project). The facility would recycle approximately 60,000 tonnes per annum (tpa) of ULABs. It is intended to reuse components recovered from the ULABs (lead from lead paste, grids and poles, and polypropylene from the cases) for use in the manufacture of new lead-acid batteries. Sodium sulphate recovered during the process can also be reused in many industrial applications.

The project is to be located at 129 Mitchell Avenue, Kurri Kurri (the site). The site is in the Cessnock local government area (LGA), approximately 40 kilometres (km) north-west of Newcastle. The site will occupy part of the site on which the Weston Aluminium Dross Recycling Plant (the aluminium plant) is located.

This traffic assessment has been prepared to assess potential traffic impacts of the project. It has been prepared in accordance with:

- the requirements identified by the Secretary's Environmental Assessment Requirements (SEARs); and
- the Roads and Traffic Authority (RTA), now Roads and Maritime Services (RMS) *Guide to Traffic Generating Developments* (2002), which is the main reference guidance for traffic assessments in NSW.

1.2 The project

1.2.1 Overview

The project would have four main processes – crushing, screening and separation; desulphurisation; crystallisation; and lead recovery. The recycling process converts a ULAB into materials which are used in new products. Lead and plastics recovered are used in the production of new batteries. Sodium sulphate crystals are a by-product of the recycling process and are readily used in other products such as detergents.

1.2.2 Site access

The site access routes within the regional and local road networks are shown in Figures 1.1 and 1.2.

The future internal site access roadways and parking areas for truck loading and car parking within the site are shown on the site plan which is attached as Appendix A. The main site driveway will be used for both the project construction and operating phases and will be suitable for use by both heavy vehicle access and car traffic.

The proposed site access is located on the north side of Mitchell Avenue, approximately 20 metres (m) offset from the intersection with Johnson Avenue, which is on the south side. A new intersection design will be constructed which incorporates the existing intersection of Mitchell and Johnson avenues.

The new vehicular access to the site from Mitchell Avenue will incorporate localised lane and shoulder widening on Mitchell Avenue and will be designed to accommodate the vehicle swept paths for the

largest type of vehicles (ie B-double trucks) which are proposed to utilise the site. The revised intersection design will allow vehicles to enter and depart from the site from the relevant eastbound and westbound traffic flow lanes on Mitchell Avenue.

1.2.3 Traffic generation

i Operations

The project operations will normally generate 150 daily car movements and 40 daily truck movements.

Approximately 60 full time operational staff and 13 contractors will be employed by the project. Workforce shift operations will typically result in three shifts on weekdays for the majority (63 persons) of the site workforce, with approximately twenty one persons travelling in to the site by car and twenty one persons travelling out from the site by car at each shift changeover period. Ten administration staff would typically work normal business hours and there would be additional site visitor car traffic movements occurring at a variety of times, generally during business hours on weekdays.

Employee car traffic will use a number of routes, including routes to the east, west and south of Kurri Kurri.

The operations stage daily truck movements for the project would comprise:

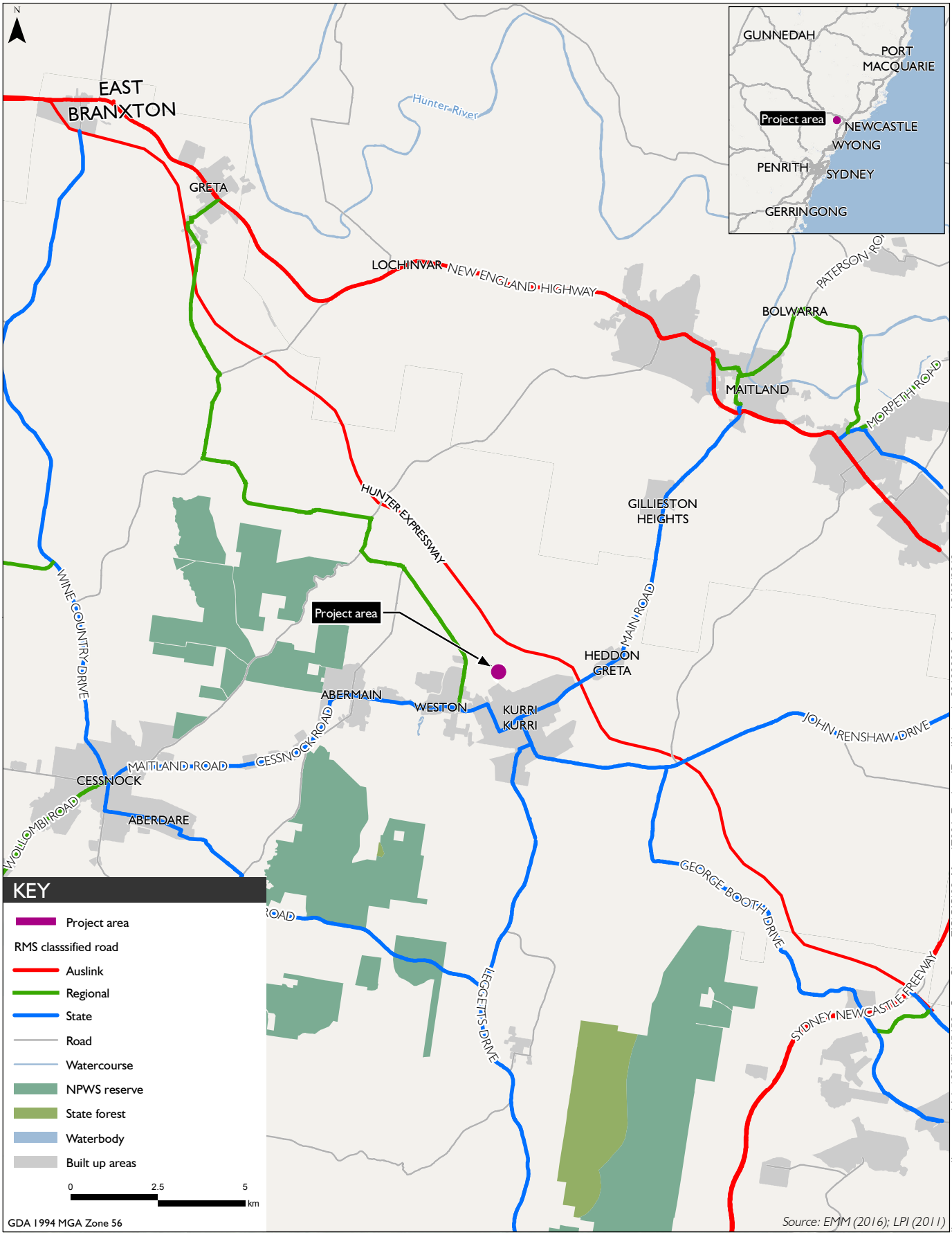
- up to 10 truck loads per day (20 truck movements) of ULABs and other raw materials being brought to the site;
- up to six truck loads per day (12 truck movements) for products transported from the site including, lead bullion, slag, PE separators, anhydrous sodium sulphate and polypropylene; and
- up to four truck loads per day (eight truck movements) for general site consumables and waste removal and maintenance related deliveries to the site.

The raw materials for site processing (ULABs) would be primarily sourced from the major metropolitan areas of the states in eastern Australia. These raw material deliveries and the site product deliveries would normally utilise either semi trailer or B-double trucks with a typical payload of between 30 to 40 tonnes (t). These trucks would mainly travel via the Hart Road and Government Road route to and from the Hunter Expressway as this is the most direct access route to the expressway from Mitchell Avenue.

The site car and truck traffic is assessed in this report based on a 24 hour analysis of the most likely travel periods for both car and truck traffic. It identifies the proportions of the site car and truck traffic movements which could coincide with the existing morning and/or afternoon peak hour traffic periods on the surrounding roads.

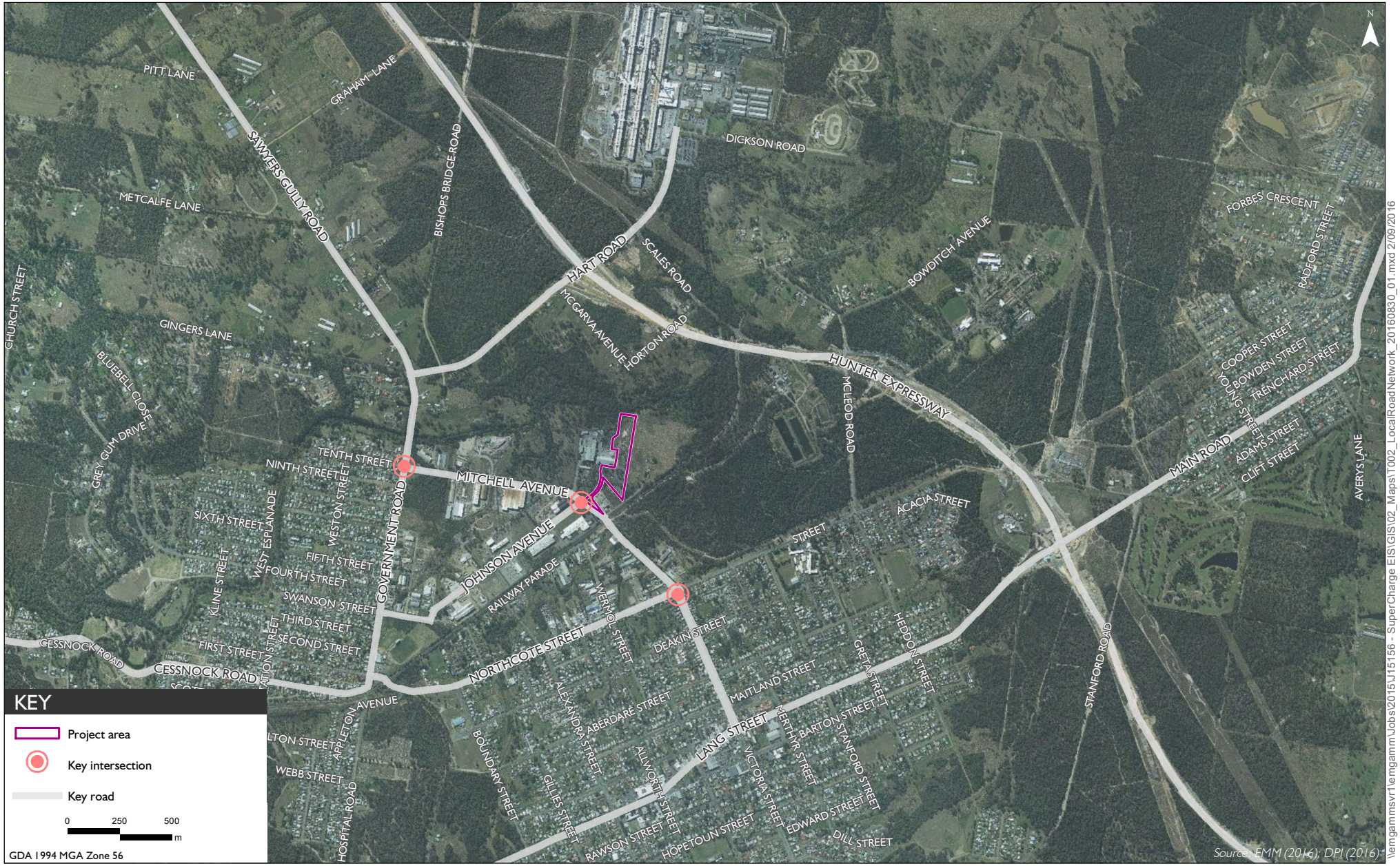
ii Construction

Construction generated car and truck traffic movements have been assessed on a similar basis to the operations traffic movements for the peak stage of construction when approximately 70 persons would be working at the site and up to 30 daily heavy vehicles deliveries may take place for concreting and other site works. The combined site construction activities would take approximately 18 months. A construction stage traffic management plan will be required for the management of the project site access (including any travel requirements for oversize vehicles) during the construction stage. This plan will be prepared prior to construction commencing.



Regional road network

Kurri Kurri Battery Recycling Facility
Traffic Assessment
Figure 1.1



Local road network
Kurri Kurri Battery Recycling Facility
Traffic Assessment
Figure 1.2

1.3 Secretary's environmental assessment requirements

The SEARs for the project include the following requirements for this traffic assessment.

- details of site access, internal road layout and vehicular parking required as a result of the development;
- accurate predictions of the traffic generated by the development during construction and operation;
- details of proposed haul routes, site access, internal roads and parking required for the development;
- an assessment of the potential impacts of the development on the capacity efficiency and safety of the road network during construction and operation, and
- details of any required upgrades to road infrastructure.

These requirements are all addressed in this traffic assessment.

In an additional agency submission to the SEARs requirements, RMS have requested that 10 year future traffic growth projections be assessed for the project, in addition to undertaking current traffic counts for the locality road network.

Current locality traffic counts were undertaken in March 2016 at three nearby intersections on Mitchell Avenue at Kurri Kurri.

Significant locality traffic reductions have occurred in recent years in this area of Kurri Kurri, with the opening of the Hunter Expressway bypass and the closure of the Hydro aluminium smelter. The major road network in the area now has a high degree of spare traffic capacity such that further analysis of 10 year future traffic growth projections for the area would be unlikely to show any significant changes in the project traffic impacts compared to the assessment under the current (March 2016) surveyed traffic volumes.

2 Existing conditions

2.1 Site location and access

The site's location in relation to the regional and local road networks is shown on Figure 1.1 and Figure 1.2. The proposed layout of the site is shown in Appendix A.

Views of Mitchell Avenue at the site frontage, at the location of the proposed site access driveway are shown in Photograph 2.1 and Photograph 2.2. The future site access driveway will be located on the north side of Mitchell Avenue, approximately 20 m east of the intersection with Johnson Avenue. A modified intersection design will be required for the site access, which will accommodate the proposed site truck access movements in addition to the existing intersection turning traffic movements at Johnson Avenue.

The current speed limit on Mitchell Avenue at the site frontage is 60 km per hour (km/hr). Approximately 200 m east of the site access, there is a railway level crossing. East of that level crossing, the speed limit remains at 60 km/hr along the Mitchell Avenue route through Kurri Kurri, including at the roundabout at Northcote Street (Photograph 2.3).

The currently approved (RMS) B-double access routes in the Kurri Kurri area are shown in Figure 1.2. B-double access is currently approved for most of the routes which will be utilised by the project traffic in the Kurri Kurri area. The future site truck transport operations will utilise a combination of semi trailer and B-double trucks.

2.2 Road network and intersections

2.2.1 Road network

The local and major road networks in the vicinity of the Mitchell Avenue site are illustrated in Figure 1.1 and Figure 1.2. The key intersections which are likely to be used by project traffic when travelling either east or west via Mitchell Avenue are also shown in Figure 1.2. The key roads in the locality are:

- Mitchell Avenue – is a two lane road in the vicinity of the site. It is classified by RMS as a regional road which is under the control of Cessnock Council. It connects from Government Road through the Kurri Kurri urban area to the major traffic routes east of Kurri Kurri, which are John Renshaw Drive (towards Newcastle) and Main Road, which connect to the Hunter Expressway, north east of Kurri Kurri and Maitland. Mitchell Avenue is four lanes wide through the main urban areas of Kurri Kurri.

- Government Road – is a two lane road and a major traffic route which connects through the Weston area of Kurri Kurri, in a north –south direction, from Cessnock Road in the south to Sawyers Gully Road in the north, where the route also connects via Hart Road to the Hunter Expressway.

- Hart Road – is a two lane road that connects the main industrial areas of Kurri Kurri to the Hunter Expressway, where the interchange ramps connect to the Hunter Expressway to and from the south east. Heavy vehicle traffic which is travelling to and from the north west of Kurri Kurri can make U turns at the Main Road interchange to use the Hart Road route to access industrial areas.

- Johnson Avenue - is a local industrial road which connects between Mitchell Avenue, opposite the site, and Government Road in a south westerly direction.

Photograph 2.1 **Mitchell Avenue near the proposed site entrance looking east**

Photograph 2.2 **Mitchell Avenue near the proposed site entrance looking west**

Approved B Double access routes in the Kurri Kurri area

Kurri Kurri Battery Recycling Facility
Traffic Assessment
Figure 2.1

Photograph 2.3 **Mitchell Avenue looking east at the Northcote Street roundabout**

Photograph 2.4 **Mitchell Avenue connecting at the western end to Government Road**

2.2.2 Intersections

The three intersections which will be used by site traffic in the immediate locality of the site are the intersections of Mitchell Avenue with:

- Johnson Avenue – which combined with the site access, will be an offset four way intersection;
- Northcote Street – which is an existing four way intersection with a roundabout, and
- Government Road – which is also a four way intersection, where the connection to the west is a minor local road (Tenth Street, which is shown in Photograph 2.4).

Government Road north of Mitchell Avenue connects via Hart Road to the Hunter Expressway, about 1.5 km north of Kurri Kurri. The Hunter Expressway interchanges at Hart Road and other locations have been recently constructed and should have additional capacity to accommodate projected locality traffic growth for a 20 year future design period. For this reason, detailed analysis of the traffic volumes at Hart Road and other Hunter Expressway interchanges has not been undertaken in this traffic report.

2.3 Traffic volumes

The existing traffic volumes using the road network in the locality of Mitchell Avenue have been determined by peak hour traffic surveys at the three identified intersections in March 2016.

The full intersection traffic survey details are shown in Appendix B. The hourly traffic volumes for each road are summarised in Table 2.1, including the estimated daily traffic volumes and heavy vehicle traffic proportions for each route.

Table 2.1 Summary of existing traffic volumes from intersection traffic surveys

Road	Intersection survey location	Morning peak hour volume	Afternoon peak hour volume	Estimated daily traffic*	Average week day heavy vehicles*	% heavy vehicles
Government Road	North of Mitchell Avenue	802	891	9,300	205	2.2
Government Road	South of Mitchell Avenue	699	771	8,100	122	1.5
Mitchell Avenue	East of Government Road	171	241	2,300	147	6.4
Mitchell Avenue	West of Johnson Avenue	254	282	2,900	145	5.0
Johnson Avenue	South of Mitchell Avenue	54	46	550	74	13.4
Mitchell Avenue	East of Johnson Avenue	294	314	3,300	172	5.2
Mitchell Avenue	West of Northcote Street	310	399	3,900	215	5.5
Mitchell Avenue	East of Northcote Street	815	990	9,900	446	4.5
Northcote Street	South of Mitchell Avenue	757	882	9,000	198	2.2

*Notes: *Average daily traffic is estimated as 11 times the average peak hourly traffic for all roads. Daily heavy vehicle numbers and their % have been determined from the highest am or pm peak period heavy vehicle traffic proportions.*

The daily traffic volume using Mitchell Avenue between Government Road and Northcote Street varies between 2,300 daily vehicle movements at the western end and 3,900 at the eastern end. The heavy vehicle traffic proportion is between 4.5% and 6.4% which is relatively low for an industrial locality. This heavy vehicle traffic proportion is influenced by the significant commuter traffic flows using the route. during the morning and afternoon peak hours which reduce the overall heavy vehicle traffic proportion.

The Johnson Avenue route, south of Mitchell Avenue, has a higher heavy vehicle traffic proportion (13.4%) which is more typical of the expected traffic composition for an industrial locality.

2.4 Intersection performance

The existing morning and afternoon peak hourly traffic conditions and levels of service at the Mitchell Avenue intersections at Government Road, Johnson Avenue and Northcote Street have been determined using the SIDRA intersection traffic model.

The existing intersection levels of services (LoS) for the morning and afternoon peak hour periods are compared to RMS defined ranges (Table 2.2) which range from A (best) to F (worst). The RMS Guideline (Roads and Traffic Authority, 2002) also considers the intersection degree of saturation and recommends an upper limit degree of saturation 0.9 noting that satisfactory intersection operation is generally achieved with a degree of saturation 0.7 to 0.8.

Table 2.2 LoS definitions

Description	LoS	Average vehicle delay (sec)
Very good	A	<14.5
Good	B	14.5 to ≤28.5
Satisfactory	C	28.5 to ≤42.5
Near capacity	D	42.5 to ≤56.5
At capacity	E	56.5 to ≤70.5
Over capacity	F	≥70.5

The detailed SIDRA intersection results for the existing locality peak hour traffic conditions are provided in Appendix C. The SIDRA intersection analysis results for each intersection are summarised in Table 2.3.

Table 2.3 Existing intersection SIDRA traffic operations summary

Intersection	Hourly volume	Degree of saturation	LoS	Average delay for all traffic movements (secs)	Max queue (m)
Mitchell Avenue and Government Road (7.30 to 8.30 am)	891	0.23	B	16.7	13
Mitchell Avenue and Government Road (5.00 to 6.00 pm)	1,018	0.38	B	18.8	12
Mitchell Avenue and Johnson Avenue (8.00 to 9.00 am)	317	0.09	A	10.9	4
Mitchell Avenue and Johnson Avenue (3.30 to 4.30 pm)	338	0.09	A	11.0	4
Mitchell Avenue and Northcote Street (8.00 to 9.00 am)	1,148	0.27	A	12.9	11
Mitchell Avenue and Northcote Street (3.15 to 4.15 pm)	1,378	0.36	A	13.6	17

The Mitchell Avenue and Government Road intersection is currently operating with relatively uncongested morning and afternoon peak hour traffic conditions, with a degree of saturation between 0.23 and 0.38 and average intersection delays of 16.7 and 18.8 seconds corresponding to LoS B.

The Mitchell Avenue and Johnson Avenue intersection which is near the proposed site access, is currently operating with low morning and afternoon peak hour traffic volumes, with a degree of saturation of 0.09 in both peak hours and average intersection delays of 10.9 and 11.0 seconds corresponding to LoS A.

The Mitchell Avenue and Northcote Street roundabout is also operating with relatively uncongested morning and afternoon peak hour traffic conditions, with a degree of saturation between 0.27 and 0.36 and average intersection delays of 12.9 and 13.6 seconds corresponding to LoS A.

2.5 Existing site traffic and parking usage

The existing site daily traffic movements are minimal as the site is vacant currently and not used by traffic on a regular daily basis. No adjustment will need to be made to the predicted project traffic volumes to account for any existing site traffic usage.

2.6 Public transport

Bus routes in the Kurri Kurri area are operated by Rover Coaches under contract from Transport for NSW (TfNSW)and operate from Cessnock or Kurri Kurri to Maitland and/or Newcastle. Four bus routes (164. 166, 171 and 172) operate through various parts of the Kurri Kurri urban area. These routes are shown on the map in Figure 2.2. No bus routes currently operate via Mitchell Avenue in the vicinity of the site.

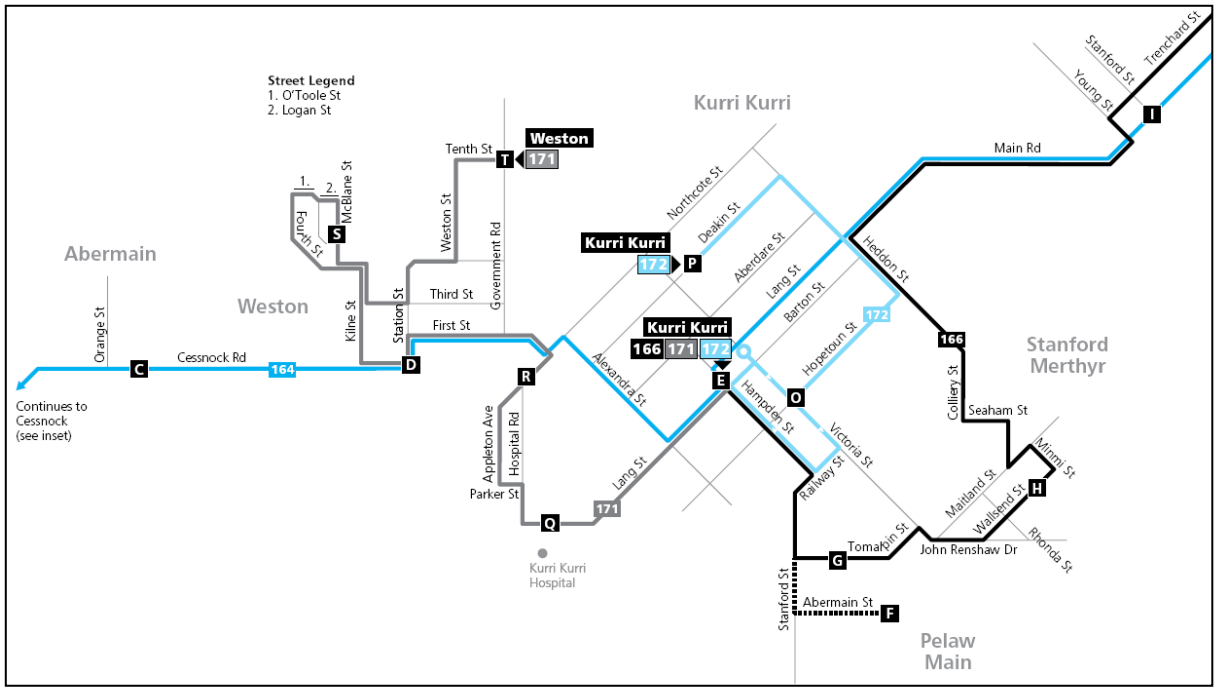


Figure 2.2 Bus routes operating through Kurri Kurri

2.7 Pedestrian and cycling access

Within the locality of the site on Mitchell Avenue and other roads within the Kurri Kurri industrial area, the unpaved road verges provide some hard surfaces suitable for pedestrian or cyclist access, as shown in Photographs 2.1 and 2.2.

Pedestrian and cyclist access to and from the site's driveway on Mitchell Avenue is generally feasible from either the east or the west, which are directions from which persons are most likely to travel to or from the site by either walking or cycling.

2.8 Safety and traffic management

Traffic safety in the locality of Mitchell Road at Kurri Kurri is illustrated by the accident history map for the Kurri Kurri urban area for the five year period from 2009-2013, which is shown in Figure 2.3.

The year 2009 to 2013 accident data, which is available from a TfNSW interactive database of NSW accident statistics, shows no fatal traffic accidents occurred within the Kurri Kurri urban area during the five year period which was analysed.

The Mitchell Avenue route through the Kurri Kurri Industrial area, between Government Road and Northcote Street, had three minor/moderate recorded traffic accidents over the five year period. This indicates the route has a relatively good accident history with no high accident risk locations currently.

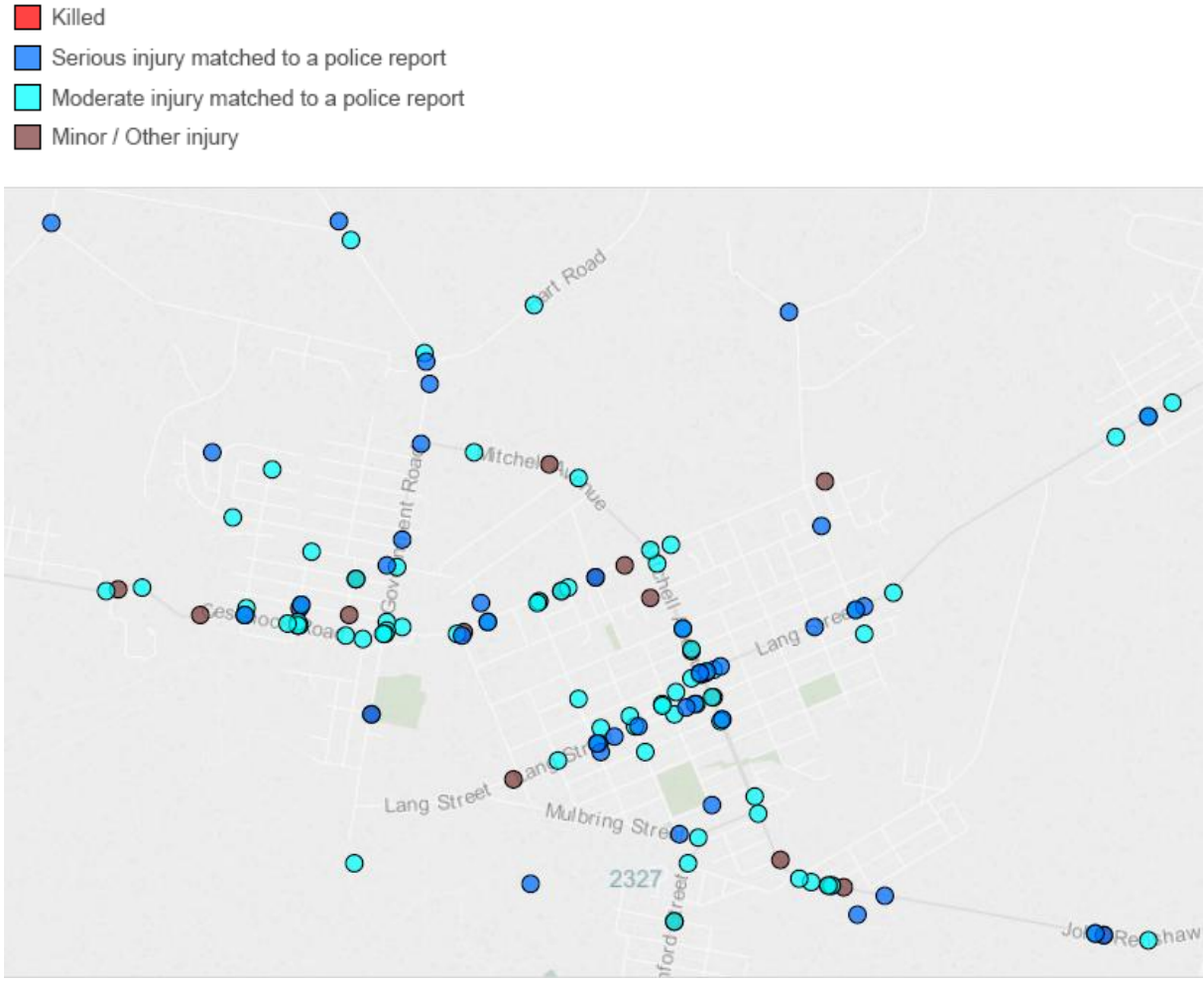


Figure 2.3 Accident history map for Kurri Kurri urban area 2009 - 2013

2.9 Regional traffic changes following RMS road upgrades

In early 2014, RMS completed the construction of the Hunter Expressway and the route was opened to traffic in April of that year. The expressway has subsequently reduced the previous traffic volumes on many arterial road routes east of Kurri Kurri which had previously been the major access routes to Newcastle and the Lake Macquarie urban area from Kurri Kurri and Cessnock LGA.

The post-expressway changes to the regional daily traffic volumes are summarised from the latest published RMS traffic survey data in Table 2.4, although there is no recent traffic data available for George Booth Drive, which was formerly the most direct road route from Kurri Kurri to Newcastle.

Table 2.4 Changes in regional daily traffic after the Hunter Expressway opening in 2014

	2011	2012	2013	2014	2015
John Renshaw Drive west of Leneghans Drive (Station 05.683)	8,941	8,808	8,563	4,730	4,885
Branxton Toronto Road, north of Palmers Road (Station 05.196)	11,195	11,872	11,808	8,939	-
New England Highway east of Maitland (Station 05.140)	47,425	-	-	-	40,681
Cessnock Road, Neath at Railway Level Crossing (Station 05.194)	15,010	15,073	14,874	14,854	14,833
Hunter Expressway, south of John Renshaw Drive (east of Kurri Kurri)	-	-	-	-	25,504 (9% Heavy Vehicles
Hunter Expressway, east of Sawyers Gully Road (west of Kurri Kurri)	-	-	-	-	9,349 (15% Heavy Vehicles

Notes: Source RMS Website Daily Traffic Volumes.

The data in Table 2.4 shows the Hunter Expressway route east of Kurri Kurri is now carrying over 25,000 vehicles daily. To the west of Kurri Kurri the daily traffic volumes on routes such as Cessnock Road at Neath have remained generally unchanged. The Hunter Expressway has also substantially reduced the daily traffic volumes using the New England Highway route at Maitland. The main identified daily traffic reductions for the routes for which the RMS traffic data is available, have been as follows:

- 7,000 daily vehicle movements on the New England Highway route at Maitland
- 4,000 daily vehicle movements on the John Renshaw Drive route, and
- 3,000 daily vehicle movements on the Branxton-Toronto route.

The corresponding daily traffic reductions on the George Booth Drive route are not available from the latest RMS traffic survey data.

The difference in the daily traffic volumes for the Hunter Expressway route east and west of Kurri Kurri in Table 2.4, indicate that there are now at least 16,000 daily vehicles joining the Hunter Expressway route at Kurri Kurri, either at the Main Road or the Hart Road interchanges.

As these two interchanges, which are shown in Figure 2.4 and Figure 2.5, it is assumed that the intersections have been designed with adequate traffic capacity to accommodate the projected locality access traffic growth for a 20 year future design period.

Due to the relative newness of this infrastructure, the current daily traffic volumes and the traffic capacity of the intersections and ramps at these interchanges have not been investigated in detail in this traffic assessment.

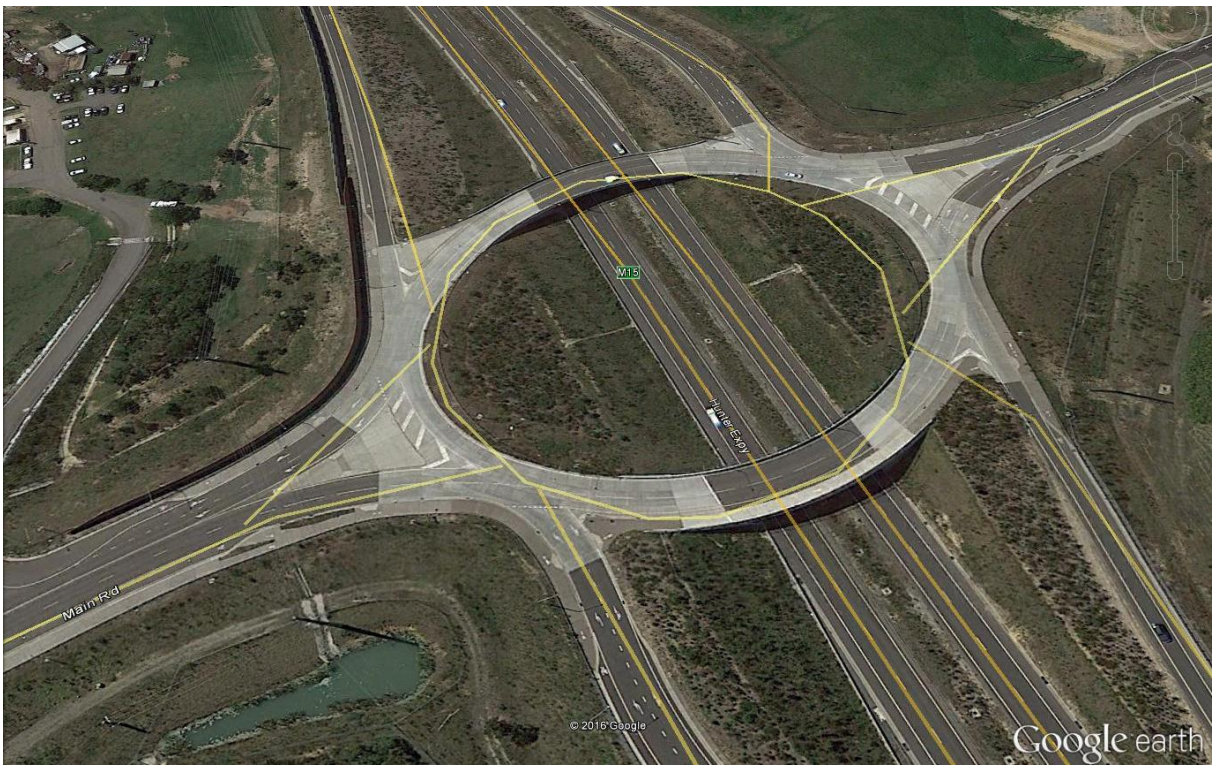


Figure 2.4 Recently constructed interchange on the Hunter Expressway at Main Road

Figure 2.5 Recently constructed interchange on the Hunter Expressway at Hart Road

3 The project

3.1 Internal site layout and circulation

The proposed internal site layout and general traffic circulation paths are shown on the site plan in Appendix A. The key truck access and egress swept paths for the site are also shown in Appendix E for the incoming raw materials and product delivery trucks, travelling to and from their respective loading points within the site.

The truck loading areas within the site have been designed to current industrial site standards, and will comply with the current requirements of AS 2890.2 for the internal site vehicle access movements for heavy vehicle traffic.

The site weighbridge is a combined entry and exit weighbridge which will be used by all trucks travelling in both directions when entering and leaving the site. The weighbridge is located along the main site entry roadway, where there is sufficient room for several trucks (up to three large semi trailer or B-double trucks) to queue within the site boundary, thereby not affecting any external traffic movements on Mitchell Avenue.

Due to the relatively narrow width of the main site roadway which has a 10 m wide access easement, alternating two-way traffic flow will be required, using traffic signal control, for the other site traffic to bypass the site weighbridge when using the access road.

The proposed site car parking area has 46 car parking spaces. The car park may also connect to another potential future site vehicle access easement in the south east corner, which may provide additional access for the site car park traffic in the future.

3.2 Traffic generation and distribution

Daily and peak-hourly traffic generation movements for the site (for both car and truck traffic) have been calculated based on the site workforce and the predicted daily truck volumes during both the construction and operation periods.

3.2.1 Construction stage

The total construction period will be approximately 18 months with a peak construction workforce of 70 persons and 20-30 persons generally during the early stage earthworks.

The typical journey to work car driver percentage for the Kurri Kurri locality of Cessnock LGA is approximately 90%, which would correspond to a daily total of 126 two-way car movements, for the peak construction workforce of 70 persons. Additional construction visitor car traffic movements on a typical weekday would further increase the total daily site car traffic to approximately 140 two way movements typically.

The construction stage project truck numbers would include a total of 60 container truck loads of new site plant and equipment being delivered during the later stages of construction.

During the peak stages of the project construction there could potentially be up to 30 truck deliveries per day for concrete, formwork, reinforcement and other building materials being delivered to the site on a busy day during this period.

The anticipated geographic distribution of the project construction light vehicle traffic has been estimated from the current morning and afternoon peak hour directional traffic distributions on Mitchell Avenue at the site frontage and will be approximately 60% to and from the west and 40% from the east.

The daily and peak hourly construction heavy vehicle traffic movements will also be travelling primarily to and from the west on Mitchell Avenue and the proportions are estimated at approximately 80% travelling to and from the west and 20% from the east. These proportions will be influenced by the more direct access which is available to the Hunter Expressway at the Hart Road interchange, which is the closest interchange to the site.

3.2.2 Operations stage

When the project is completed and fully operating, there is proposed to be a total site workforce of 73 persons (including contractors). Of these, approximately 10 will be administration staff and managers, and the remaining 63 would be mainly operating to a three shift system with an average of 21 persons per shift, working to either:

- 6.00 am to 2.00 pm daytime morning shift times;
- 2.00 pm to 10.00 pm afternoon/evening shift times; or
- 10.00 pm to 6.00 am night shift times.

The typical journey to work car driver percentage for the Kurri Kurri (Heddon Greta) locality of Cessnock LGA is approximately 90%, which would correspond to a daily total of 132 two-way car movements, for the total workforce of 73 persons. Additional site visitor car traffic movements on a typical weekday during site operations would further increase the daily total site car traffic to approximately 150 two way vehicle movements on busy days.

The operations stage daily truck movements for the project would include

- up to 10 truck loads per day (20 truck movements) of ULABs and other raw materials being brought to the site;
- up to six truck loads per day (12 truck movements) for products transported from the site including, lead bullion, slag, PE separators, anhydrous sodium sulphate and polypropylene; and
- up to four truck loads per day (eight truck movements) for general site consumables and waste removal and maintenance related deliveries to the site.

The anticipated geographic distribution of the project operations workforce and car traffic will also be related to the current morning and afternoon peak hour directional traffic distribution on Mitchell Avenue at the site frontage which is approximately 60% to and from the west and 40% from the east.

The daily and peak hourly site raw materials and product delivery truck traffic movements will also be travelling primarily to and from the west on Mitchell Avenue with proportions approximately 80% to and from the west and 20% from the east. These truck movements would also be influenced by the more direct access which is available to the Hunter Expressway via the Hart Road interchange, which is the closest interchange to the site.

3.2.3 Hourly traffic movements

The hourly traffic volumes that the project would generate during peak stage construction activity have been determined from the daily traffic volumes and are summarised in Table 3.1.

Table 3.1 Hourly traffic generation summary for the project peak construction stage

Hourly interval commencing	Light vehicles arriving	Heavy vehicles arriving	Light vehicles departing	Heavy vehicles departing	All daily traffic movements
12 midnight	-	-	-	-	-
1 am	-	-	-	-	-
2 am	-	-	-	-	-
3 am	-	-	-	-	-
4 am	-	-	-	-	-
5 am	1	1	-	-	2
6 am	53	3	1	1	58
7 am	7	4	1	3	15
8 am	**5**	**4**	**1**	**4**	**14**
9 am	1	3	1	4	9
10 am	1	3	1	3	8
11 am	1	3	2	3	9
12 midday	1	2	2	3	8
1 pm	-	2	2	2	6
2 pm	-	2	4	2	8
3 pm	-	1	8	2	11
4 pm	**-**	**1**	**32**	**1**	**34**
5 pm	-	1	15	1	17
6 pm	-	-	-	1	1
7 pm	-	-	-	-	-
8 pm	-	-	-	-	-
9 pm	-	-	-	-	-
10 pm	-	-	-	-	-
11 pm	-	-	-	-	-
Total	**70**	**30**	**70**	**30**	**200**

The peak period for construction car traffic movements would normally be between 6.00 am to 7.00 am for the main construction workforce arriving at the site in the mornings and between 4.00 pm to 5.00 pm for the main construction workforce departing from the site in the afternoons.

The peak site hourly construction traffic movements would not generally coincide with the normal morning commuter traffic peak hour (which is 8.00 am to 9.00 am in the locality) but could potentially coincide with the normal afternoon commuter traffic peak hour (which can occur at times between 4.00 pm to 5.00 pm) at some of the identified intersections in the locality.

As shown in Table 3.1, the peak hourly total site construction traffic will be approximately 14 hourly vehicle trips in total during the normal morning peak hour, which is between 8.00 am to 9.00 am and approximately 34 hourly vehicle trips in total during the normal afternoon peak hour, which is between 4.00 pm to 5.00 pm.

The hourly traffic volumes for the operations workforce and other site operations traffic are summarised in Table 3.2.

Table 3.2 Hourly traffic generation summary for project operations

Hourly interval commencing	Light vehicles arriving	Heavy vehicles arriving	Light vehicles departing	Heavy vehicles departing	All daily traffic movements
12 midnight	-	-	-	-	-
1 am	-	-	-	-	-
2 am	-	-	-	-	-
3 am	-	-	-	-	-
4 am	-	-	-	-	-
5 am	19	1	-	-	20
6 am	1	2	19	1	23
7 am	1	2	1	2	6
8 am	**9**	**2**	**1**	**2**	**14**
9 am	1	2	1	2	6
10 am	1	2	1	2	6
11 am	1	1	1	2	5
12 midday	1	1	1	1	4
1 pm	19	1	1	1	22
2 pm	1	1	19	1	22
3 pm	1	2	1	1	5
4 pm	**1**	**2**	**4**	**2**	**9**
5 pm		1	6	2	9
6 pm	-	-	-	1	1
7 pm	-	-	-	-	-
8 pm	-	-	-	-	-
9 pm	19	-	-	-	19
10 pm	-	-	19	-	19
11 pm	-	-	-	-	-
Total	**75**	**20**	**75**	**20**	**190**

The hourly traffic distribution in Table 3.2 shows the peak periods for the operations workforce shift traffic will primarily be the hours around the 6.00 am, 2.00 pm and 10.00 pm shift change times.

These times would not coincide with the normal peak traffic periods for the surrounding roads and intersections which are mostly between 8.00 am to 9.00 am and between 4.00 pm to 5.00 pm.

During these periods, when the site is operating at maximum production, there will be no corresponding site employee shift change-over car traffic and there would be relatively low levels of site administration and site visitor car traffic and truck delivery movements.

As shown in Table 3.2, these trips will be approximately 14 hourly vehicle trips in total during the normal morning peak hour, which is between 8.00 am to 9.00 am and approximately nine hourly vehicle trips in total during the normal afternoon peak hour, which is between 4.00 pm to 5.00 pm.

3.3 Site car parking

On page C1.4 of the *Cessnock Development Control Plan 2013* (Cessnock DCP), the car parking requirement for industrial sites is specified as whichever is greater of one space per 75 square metres (m^2) of gross floor area (GFA) or one space per two employees.

The proposed site car parking area has 44 car parking spaces, which is equivalent to just over 60% of the proposed total project workforce of 73 persons (60 employees and 13 contractors) and represents a car parking ratio of one space per 1.66 persons of the total site workforce. Two disabled parking spaces are also provided to the east of the administration building.

On a floor area basis, the proposed total GFA is over 10,250 m^2, which would require approximately 137 car parking spaces. However, this requirement is considered to be excessive, and unwarranted, for the project as the actual site car parking demand based on the proposed workforce and contractor numbers will be significantly lower than this amount, as summarised above.

The site car park design which is shown in Appendix A may also connect to another potential vehicle access easement which is in the south east corner of the site.

This additional access to the site car park (which is not yet confirmed) would enable the future site vehicular access to be fully separated for the truck access (where all vehicles would be travelling via the weighbridge on the main site access road) and the car park and site visitor access would use a separate access route via the south east corner of the site.

4 Traffic impact assessment

4.1 External traffic impacts on local roads

From the construction traffic generation summary in Section 3.2.1, the additional site generated daily traffic movements during peak construction are estimated to be 200 vehicle movements, comprising 140 light vehicle (car) traffic movements and 60 heavy vehicle traffic movements.

From the operations traffic generation summary in Section 3.2.2, the additional site generated daily traffic movements during project operations are estimated to be 190 vehicle movements, comprising 150 light vehicle (car) traffic movements and 40 heavy vehicle traffic movements.

The estimated locality road network traffic increases from these vehicle movements are presented in Table 4.1 and Table 4.2 for the construction and operations stages, in comparison to the existing locality traffic volumes which were surveyed in 2016, assuming the future daily traffic movements are distributed as follows:

For the site generated daily car traffic movements:

- 60% will travel west of the site via Mitchell Avenue (then distributed as follows):
  - 40% via Government Road north of Mitchell Avenue;
  - 20% via Government Road south of Mitchell Avenue;
- 40% will travel east of the site via Mitchell Avenue (then distributed as follows):
  - 20% via Mitchell Avenue east of Northcote Street; and
  - 20% via Northcote Street south of Mitchell Avenue.

For the site generated daily truck traffic movements:

- 80% will travel west of the site via Mitchell Avenue (then distributed as follows):
  - 70% via Government Road north of Mitchell Avenue;
  - 10% via Government Road south of Mitchell Avenue;
- 20% will travel east of the site via Mitchell Avenue (then distributed as follows):
  - 10% via Mitchell Avenue east of Northcote Street; and
  - 10% via Northcote Street south of Mitchell Avenue.

Table 4.1 Summary of additional generated daily traffic movements during construction

Road	Intersection survey location	Existing average weekday traffic*	Existing average weekday heavy vehicles*	Additional future site daily traffic movements	Additional future site daily heavy vehicle movements	% Daily traffic increase
Mitchell Avenue	West of the site	2,300	147	132	48	5.7
Government Road	North of Mitchell Avenue	9,300	205	98	42	1.1
Government Road	North of Mitchell Avenue	8,100	122	34	6	0.4
Mitchell Avenue	East of the site to Northcote Street	3,900	215	68	12	1.7
Mitchell Avenue	East of Northcote Street	9,900	446	34	6	0.3
Northcote Street	South of Mitchell Avenue	9,000	198	34	6	0.4

*Notes: *Existing daily vehicle numbers have been determined from the am and pm peak period heavy vehicle traffic proportions.*

Table 4.2 Summary of additional generated daily traffic movements during operations

Road	Intersection survey location	Existing average weekday traffic*	Existing average weekday heavy vehicles*	Additional future site daily traffic movements	Additional future site daily heavy vehicle movements	% Daily traffic increase
Mitchell Avenue	West of the site	2,300	147	122	32	5.3
Government Road	North of Mitchell Avenue	9,300	205	88	28	0.9
Government Road	North of Mitchell Avenue	8,100	122	34	4	0.4
Mitchell Avenue	East of the site to Northcote Street	3,900	215	68	8	1.7
Mitchell Avenue	East of Northcote Street	9,900	446	34	4	0.3
Northcote Street	South of Mitchell Avenue	9,000	198	34	4	0.4

*Notes: *Existing daily vehicle numbers have been determined from the am and pm peak period heavy vehicle traffic proportions.*

The future generated daily traffic movements during both the site construction and operations periods would be proportionately greatest on the section of Mitchell Avenue west of the site, between Johnson Avenue and Government Road. The future project generated daily traffic increases on this section of Mitchell Avenue would be between +5.7% and +5.3%.

On the other adjacent section of Mitchell Avenue west of the site between Johnson Avenue and Northcote Street, the future project generated daily traffic increases would be significantly lower, at +1.7% during both the site construction and operations periods.

On other traffic routes, such as Government Road and Northcote Street, the future site generated traffic increases would be generally around +1% or less and not generally noticeable.

These roads have one traffic lane generally in each direction currently (except for Mitchell Avenue east of Northcote Street) which will continue to remain adequate for the future predicted traffic usage, including the additional project generated traffic and these roads would not require any general road widening or additional traffic controls.

However at the future site access intersection with Mitchell Avenue, which is located approximately 20 m east of the existing intersection with Johnson Avenue, additional localised widening of the roadway will be required to provide an urban type road cross section with two traffic lanes through the intersection in both directions. This will facilitate safe turning movements by both car and truck traffic in the future, at both Johnson Avenue and the site access road.

These additional intersection improvements are discussed further in the context of the project intersection traffic impacts assessment in Section 4.2 below.

4.2 External traffic impact at intersections

The calculated additional site peak hourly traffic movements for the project construction and operations stages are summarised in Table 4.3.

Table 4.3 Summary of additional site generated traffic during peak hourly periods

Peak Traffic Period	Type of traffic	Hourly vehicles (in)	Hourly vehicles (out)	Distribution
Morning peak hour during construction	Car traffic for employees and site visitors	5	1	Assumed 60% west via Mitchell Avenue
	Truck traffic deliveries for materials, waste and maintenance	4	4	Assumed 80% west via Mitchell Avenue
Afternoon peak hour during construction	Car traffic for employees and site visitors	0	32	Assumed 60% west via Mitchell Avenue
	Truck traffic deliveries for materials, waste and maintenance	1	1	Assumed 80% west via Mitchell Avenue
Morning peak hour during operations	Car traffic for employees and site visitors	9	1	Assumed 60% west via Mitchell Avenue
	Truck traffic deliveries for materials, waste and maintenance	2	2	Assumed 80% west via Mitchell Avenue
Afternoon peak hour during operations	Car traffic for employees and site visitors	1	4	Assumed 60% west via Mitchell Avenue
	Truck traffic deliveries for materials, waste and maintenance	2	2	Assumed 80% west via Mitchell Avenue

The external road network impacts of the additional project traffic have been assessed at the future site access intersection, which will effectively be an offset four way intersection with Johnson Avenue and at the two other surveyed Mitchell Avenue intersections at Government Road and Northcote Street.

The proposed site future construction and operations traffic impacts are assessed for the prevailing current locality traffic volumes (surveyed in March 2016) as in the short term future these locality traffic volumes are unlikely to change significantly, in comparison to the recent locality traffic changes which have occurred following the opening of the Hunter Expressway in April 2014.

The SIDRA intersection program measures the intersection capacity and performance by calculating parameters such as average vehicle delay, maximum queue length, degree of saturation and LoS, based on the RTA/RMS *Guide to Traffic Generating Developments* standards listed in Table 2.2, which were developed from the international *Highway Capacity Manual* standards.

The detailed SIDRA intersection analysis results are included in Appendix D and a summary of the results for each intersection is provided in Table 4.4, Table 4.5 and Table 4.6.

Table 4.4 Comparison of SIDRA intersection traffic operations at the site access intersection

Intersection traffic conditions	Peak hour	Degree of saturation	LoS	Average delay for all traffic movements (secs)	Max queue (m)
Current three way intersection with existing traffic	8.00 to 9.00 am	0.09	A	10.9	4
	3.30 to 4.30 pm	0.09	A	11.0	4
Modified four way intersection including site construction traffic	8.00 to 9.00 am	0.07	B	18.8	4
	3.30 to 4.30 pm	0.07	A	12.7	3
Modified four way intersection including site operations traffic	8.00 to 9.00 am	0.07	B	17.4	4
	3.30 to 4.30 pm	0.07	B	16.2	3

*Note: * Average vehicle delay and level of service are calculated for all vehicle movements at a signalised intersection.*

Table 4.5 Comparison of SIDRA intersection traffic operations at Government Road intersection

Intersection traffic conditions	Peak hour	Degree of saturation	LoS	Average delay for all traffic movements (secs)	Max queue (m)
Current four way intersection with existing traffic	7.30 to 8.30 am	0.23	B	16.7	13
	5.00 to 6.00 pm	0.38	B	18.8	12
Four way intersection including site construction traffic	7.30 to 8.30 am	0.23	B	17.7	13
	5.00 to 6.00 pm	0.44	B	19.6	15
Four way intersection including site operations traffic	7.30 to 8.30 am	0.23	B	17.8	13
	5.00 to 6.00 pm	0.39	B	19.1	13

*Note: * Average vehicle delay and level of service are calculated for all vehicle movements at a signalised intersection.*

Table 4.6 Comparison of SIDRA intersection traffic operations at Northcote Street intersection

Intersection traffic conditions	Peak hour	Degree of saturation	LoS	Average delay for all traffic movements (secs)	Max queue (m)
Current roundabout intersection with existing traffic	8.00 to 9.00 am	0.27	A	12.9	11
	3.15 to 4.15 pm	0.36	A	13.6	17
Roundabout intersection including site construction traffic	8.00 to 9.00 am	0.27	A	12.9	11
	3.15 to 4.15 pm	0.36	A	13.6	17
Roundabout intersection including site operations traffic	8.00 to 9.00 am	0.27	A	12.9	12
	3.15 to 4.15 pm	0.36	A	13.6	17

*Note: * Average vehicle delay and level of service are calculated for all vehicle movements at a signalised intersection.*

The future site access intersection on Mitchell Avenue, which is proposed to be modified as a four way intersection including Johnson Avenue, would continue to operate at a very low degree of saturation. The degree of saturation would actually reduce from 0.09 to 0.07 during the typical peak traffic hours (Table 4.4) as a result of the increased roadway width on Mitchell Avenue with the modified intersection design.

The future intersection operation including the project traffic will be either at LoS A or B, with average traffic delays of 12.7 to 18.8 seconds for the right turning traffic onto Mitchell Avenue from the site access road. This traffic will be primarily truck traffic at most of the current locality peak hour traffic periods which are analysed in Table 4.4.

During the normal morning and afternoon commuter traffic peak periods at the Government Road, Mitchell Avenue and Tenth Street intersection, there will be only marginal changes to the future intersection traffic delays or the LoS which would remain at 'B' during all the future morning and afternoon peak hour traffic conditions. The average morning peak hour intersection traffic delays will increase from 16.7 to 17.7 or 17.8 seconds with the site traffic and the average afternoon peak hour intersection traffic delays will increase from 18.8 to 19.1 or 19.6 seconds.

During the morning peak hours, the intersection degree of saturation will be unaffected but will increase from 0.38 to between 0.39 and 0.44 with the site traffic (Table 4.5).

During the normal morning and afternoon commuter traffic peak periods at the Mitchell Avenue and Northcote Street intersection, there will be virtually no changes to the future intersection traffic delays or the LoS which would remain at 'A' during all the future morning and afternoon peak hour traffic scenarios considered in Table 4.6.

There will be only minor and inconsequential changes to the maximum traffic queue lengths at the intersection in any of the future intersection traffic scenarios which are considered in Table 4.6.

4.3 Safety and traffic management

The future potential road safety related traffic impacts from the proposed site activity during both construction and operations have primarily been considered for the Mitchell Avenue route, in the vicinity of the proposed site access which is near Johnson Avenue and at the existing Government Road and Northcote Street intersections with Mitchell Avenue.

Future road widening is recommended for Mitchell Avenue in the vicinity of the site access intersection and Johnson Avenue, which would provide a four lane 'urban' type cross section for the road which would provide sufficient road width to enable through traffic using Mitchell Avenue to safely pass vehicles turning either left or right into either Johnson Avenue or the site access road at the intersection. The indicative extent of the proposed road widening is shown on the SIDRA intersection layout plan for the proposed intersection, which is in Appendix D.

At the Government Road, Mitchell Avenue and Tenth Street intersection, the existing intersection visibility for turning traffic is considered to be good as the approach roads are all straight and level at the intersection. The intersection has also been approved for B-double turning movements between the northern (Government Road) and the eastern (Mitchell Avenue) approaches to the intersection. No additional traffic safety improvements will be required at the intersection for the site generated car and truck traffic movements.

The roundabout intersection at Mitchell Avenue and Northcote Street, is considered to have a good traffic safety record despite being one of the busiest intersections in the Kurri Kurri urban area. The intersection is currently operating with minimal traffic delays and a high level of service (LoS A) for traffic during the peak hours. No additional traffic safety improvements will be required at the intersection for the site generated car and truck traffic movements

Additional site traffic management measures (including a code of conduct for the site truck drivers) will be considered to help specify preferred transport routes which will minimise the potential future traffic

safety, noise and residential amenity impacts of the site truck traffic in the vicinity of the urban areas of Kurri Kurri urban area.

4.4 Provision of car and truck parking

The proposed provision of the site parking with 46 car parking spaces (in a designated car parking area) is considered to be more than adequate for the highest site demand for car parking as the future total site employees, administration staff and contractors (73) will mainly be split between three shifts and the maximum number of staff and visitors at the site would not normally exceed 46 persons.

Due to the relatively large building floor area which is required for this type of facility, the proposed car parking does not meet the formally specified (floor space based) car parking requirement under the Cessnock DCP, but the proposed site car parking is nevertheless considered to be reasonable as it is based on the actual site employee car parking demand.

All the site car parking space dimensions and surfacing would be designed to comply with the requirements of the Australian Standard AS 2890.1.

For the site truck parking areas, the dimensions of the areas required for the parking of individual trucks will be based on the typical dimensions (with appropriate clearances between the vehicles) for the types of trucks (either semi-trailer, B-double ,or truck and dog trailer) which will be visiting the site.

Further details of the trucks swept paths for the specified vehicles visiting the site, are shown in Appendix E, for all areas of the site.

4.5 Pedestrian, cycling and public transport access

Within the locality of the site on Mitchell Avenue and other roads within the Kurri Kurri industrial area, the unpaved road verges provide some hard surfaces suitable for pedestrian or cyclist access, as shown in Photographs 2.1 and 2.2.

Bus routes in the Kurri Kurri area are operated by Rover Coaches under contract from TfNSW. Bus services operate from Cessnock and Kurri Kurri to Maitland and/or Newcastle. However, no bus routes currently operate via Mitchell Avenue in the vicinity of the site at Kurri Kurri.

The anticipated travel demand for persons travelling to or from the site, by either walking, cycling or public transport, will be minimal.

5 Summary and conclusions

5.1 Site layout and traffic generation

This report has assessed the traffic impacts of Pymore's proposed battery recycling plant at 129 Mitchell Avenue, Kurri Kurri. The site is approximately 40 km north west of Newcastle, within the established Mitchell Avenue industrial precinct of Kurri Kurri. The site is within approximately 1.5 km of the Hunter Expressway routes and has relatively direct access to the expressway via either the Hart Road or Main Road interchanges.

Processing is proposed to be a maximum 60,000 tpa which corresponds to average daily throughput of approximately 240 t on weekdays, with a maximum of 20 truckloads daily (40 truck movements) for the supply of raw materials, recycled products, consumables, general waste removal and maintenance deliveries.

The maximum future site operations workforce traffic will comprise approximately 75 daily car visits to the site (150 daily car traffic movements). The site employees, administration staff and contractors (73 persons) will be split between three shifts and the maximum number of staff and visitors at the site would not normally exceed 44 persons, which is the number of car spaces proposed to be provided at the site.

For the site truck parking areas, the dimensions of the areas required for parking of individual trucks will be based on the typical dimensions (with appropriate clearances between the vehicles) for the types of trucks (either semi-trailer, B-double, or truck and dog trailer) which will be visiting each part of the site.

The site's existing accessibility for walking, cycling and public transport users has also been reviewed and found to be satisfactory for the anticipated levels of usage by these travel modes.

5.2 Assessment of traffic impacts and mitigation measures

The project's construction activities would extend over approximately 18 months and would involve similar maximum workforce and daily vehicular traffic movements to the subsequent project operations. The project traffic impacts for the surrounding road network and intersections have therefore been assessed for both the peak construction activity and maximum project operations.

A construction stage traffic management plan will also be prepared for the management of the site access and project traffic impacts during construction. Additional site traffic management measures (including a code of conduct for the site truck drivers) will be considered to help specify preferred transport routes which will minimise the potential future traffic safety, noise and residential amenity impacts of the site truck traffic in the vicinity of other nearby urban areas of Kurri Kurri.

The external road network impacts of the additional project traffic have been assessed at three intersections, which are at the future site access intersection from Mitchell Avenue (near Johnson Avenue) and at the Mitchell Avenue/Government Road and Mitchell Avenue/Northcote Street intersections.

The SIDRA analysis shows that there would be only minimal changes to the existing intersection operations with the future site traffic, and the future intersection operations would remain at either LoS A of B. The future site access intersection will be combined as a four way intersection with Johnson Avenue, which is on the opposite side of Mitchell Avenue. The future intersection LoS will change from A to B, primarily as a result of the change in the intersection configuration from a T-intersection to a four way intersection, as the proportional traffic increases at the intersection, with the site traffic, will be relatively minor.

On the surrounding roads, the future generated daily traffic movements during both the site construction and operations periods would be proportionately greatest on the section of Mitchell Avenue west of the site, between Johnson Avenue and Government Road. The future project generated daily traffic increases on this section of Mitchell Avenue would be between +5.7% and +5.3%.

On the other adjacent section of Mitchell Avenue east of the site between Johnson Avenue and Northcote Street, the future project generated daily traffic increases would be significantly lower, at +1.7% during both the site construction and operations periods. On other traffic routes, such as Government Road and Northcote Street, the future site generated traffic increases would be generally around +1% or less and not generally noticeable.

The existing design standard and the width of these roads, which have one traffic lane generally in each direction (except for Mitchell Avenue east of Northcote Street) will continue to remain adequate for the future predicted traffic usage, including the additional project generated traffic and would not require any additional road widening or traffic controls.

However, at the future site access intersection on Mitchell Avenue, where the site access road is located approximately opposite the existing intersection with Johnson Avenue, additional localised widening of the roadway will be provided to enable two traffic lanes through the intersection in both directions. This localised road widening is effectively providing an urban type road cross section which will facilitate safe turning movements in the future for both car and truck traffic and minimise any potential delays to the Mitchell Avenue through traffic by the right turning traffic at either Johnson Avenue or the site access road.

References

Austroads (2010) *Guide to Road Design*, Part 4A, Unsignalised and Signalised Intersections.

Roads and Traffic Authority (2002) *Guide to Traffic Generating Developments*.

Appendix A

Site layout plans

KKBR BUILDINGS BUILDING AREAS		
BUILDING	AREA	DESCRIPTION
BLDG. 1	25M²	GUARD HOUSE/TRUCK SCALE RM.
BLDG. 2	409M²	QA & LAB/WORKSHOP/ PARTS & REFRACTORY STORE ROOM
BLDG. 3	672M²	ADMIN BLDG./CANTEEN/CLINIC
BLDG. 4	224M²	CHANGING ROOM
BLDG. 5	5040M²	PRODUCTION BLDG/CRYSTALLIZER BLDG
BLDG. 6	117M²	AIR COMPRESSOR ROOM
BLDG. 7	292M²	OXYGEN PLANT
BLDG. 8	1415M²	ULAB WAREHOUSE
BLDG. 9	749M²	WWTP
TOTAL		

PLANT BUILDING

1.The contractor shall verify the necessity of an air natural drafting system in order to maintain the inner temperature in according to the Australian safety and occupational rules. During the hot season the hourly heat generated in the plant in operation is the following :

-Furnace area	280000 Kca l/h;
-Slag demolition area	150000 Kca l/h;
-Refinery area	100000 Kca l/h;
-Crystallizer tower	100000 Kca l/h;

2. The building design shall include louvers capable to allow the following air intake :

-Battery breaker room	16000 Nm3/h;
-Charge preparation room	25000 Nm3/h;
-Furnace and refinery room	95000 Nm3/h;
-Slag demolition room	12000 Nm3/h;

3. The control room shall be equipped with the hvac system and the light shall have an intensity of 500 lux.

4. The drawing shows the main doors. Those access shall be of to kinds: the swinging type and the rolling type. The main doors shall have a glass window. spring return closing mechanism. and anti panic handle device. the drawing does not show any type of windows. however the window may be foreseen in according to the civil engineer design.

5. The building diffused lighting shall have an intensity of 250-300 lux. Emergency light are also required to maintain safe work conditions during the possible power black out. The emergency lighting intensity will be granted of 150 lux. The machinery equipments lighting and services (where it is required) will be part of detailed engineering.

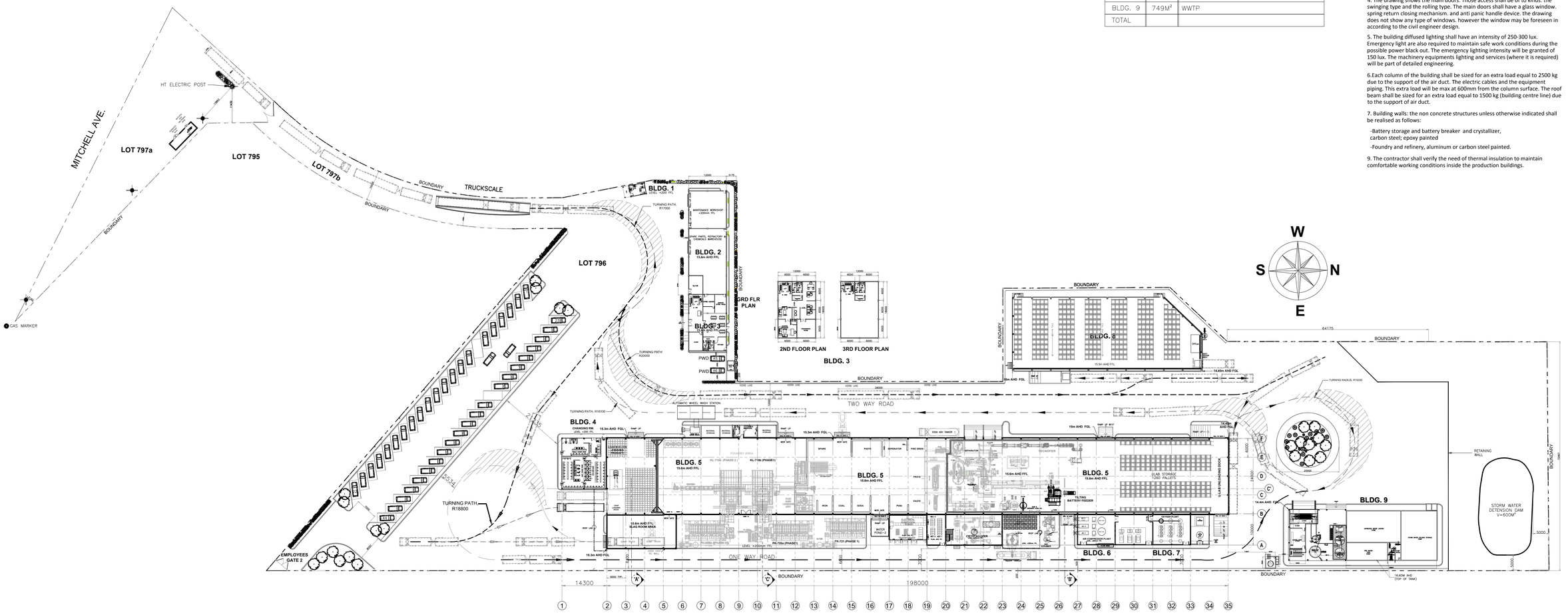
6.Each column of the building shall be sized for an extra load equal to 2500 kg due to the support of the air duct. The electric cables and the equipment piping. This extra load will be max at 600mm from the column surface. The roof beam shall be sized for an extra load equal to 1500 kg (building centre line) due to the support of air duct.

7. Building walls: the non concrete structures unless otherwise indicated shall be realised as follows:

-Battery storage and battery breaker and crystallizer, carbon steel; epoxy painted

-Foundry and refinery, aluminum or carbon steel painted.

9. The contractor shall verify the need of thermal insulation to maintain comfortable working conditions inside the production buildings.



GENERAL SITE LAYOUT & MACHINE ARRANGEMENT

REVISIONS	NO.	DATE	DESCRIPTION	DRAWN	CHECK'D	APPR'D
	0	09/06/16	First issue	AAM	LCC	
	1	09/13/16	Delete bldg. 10 (slag block making)	AAM	LCC	
	2	09/23/16	1. Furnaces made closer to the building S wall. 2. Furnaces burners have been shifted on the external side of the building with rain protection shelter to be installed. 3. Flue dust unit has been located in a corner of the charge preparation room. 4. Burner cooling water unit has been located outdoor.	AAM	LCC	
	3	10/12/16	1. Revised Floor level. 2. Revised Storm Water Detention Dam. 3. Add Diesel Tank beside WWTP building. 4. Add Septic tank at the front of PWD parking.	AAM	LCC	
	4	10/21/16	1. Revert back to original Detention Dam lacation	AAM	LCC	

EVERGREEN ENVIRONMENTAL RESOURCES INC.

PROJECT: KURRI-KURRI BATTERY RECYCLING PROJECT		DESIGN BY:	LCC
CLIENT: PYMORE RECYCLERS INTERNATIONAL PTY. LTD.		DRAWN BY:	AAM/MC
TITLE: GEN. SITE LAYOUT & MACHINE ARRANGEMENT		CHECKED BY:	LCC
DRAWING NO: KKBR-0001	REV. 4	APPROVED BY:	MW
NOTE: THIS DRAWING IS PROPERTY OF EVERGREEN ENVIRONMENTAL RESOURCES INC. AND SUCH MUST NOT BE REPRODUCED COPIED IN PART OR IN WHOLE WITHOUT CONSENT.		DATE:	10.21.2016
		SCALE:1:650	SHT NO: 1/1

ALL DIMENSION ARE IN MILLIMETER UNLESS OTHERWISE SPECIFIED.

Appendix B

Intersection traffic counts

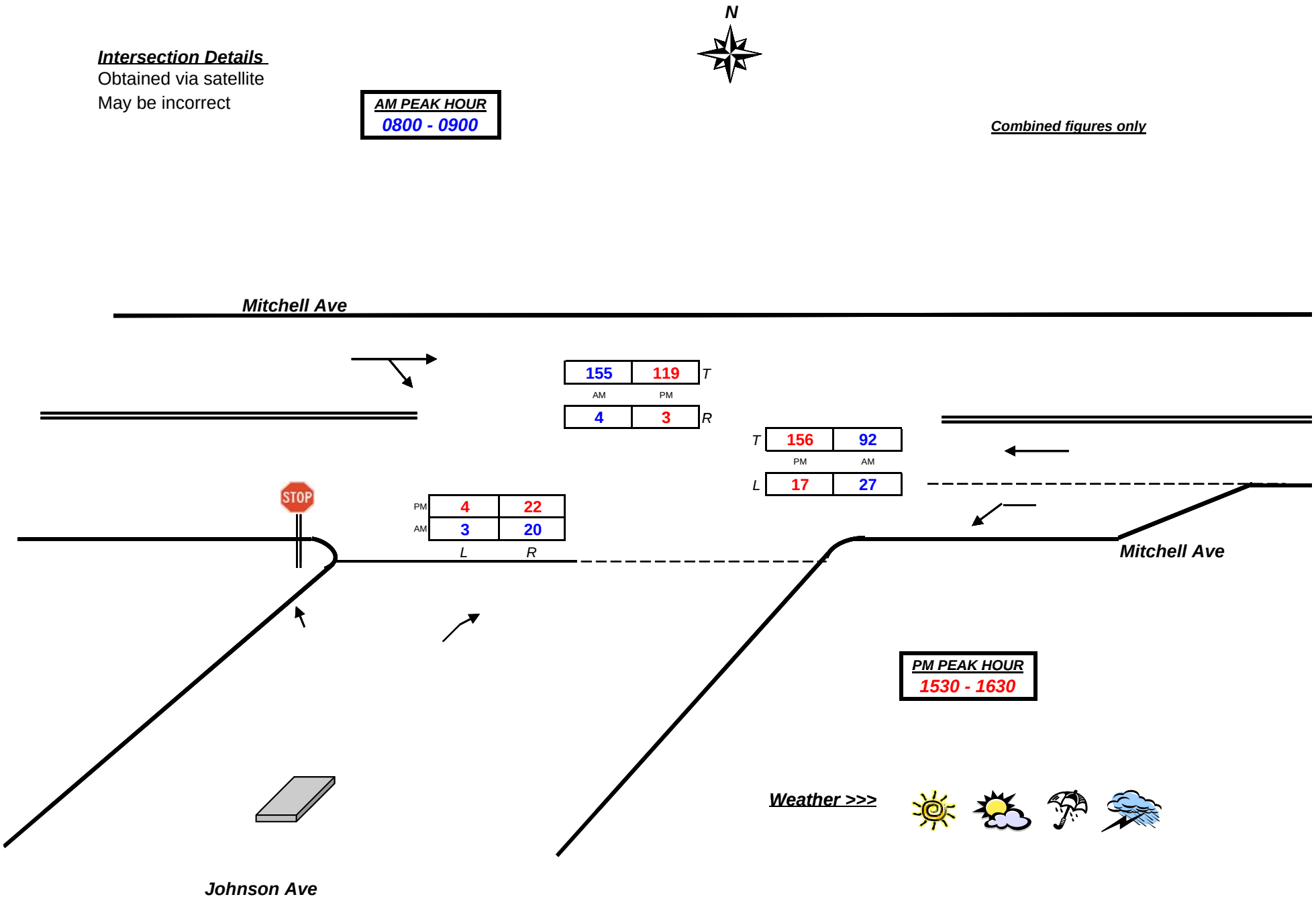
R.O.A.R. DATA
Reliable, Original & Authentic Results
Ph.88196847, Fax 88196849, Mob.0418-239019

Client : EMM
Job No/Name : 5955 KURRI KURRI Mitchell Ave
Day/Date : Tuesday 8th March 2016

Intersection Details
Obtained via satellite
May be incorrect

AM PEAK HOUR
0800 - 0900

Combined figures only



R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849.

Mobile.0418239019

Client : EMM

Job No/Name : 5955 KURRI KURRI Mitchell Ave

Day/Date : Tuesday 8th March 2016

PEDS	WEST	SOUTH	EAST	
Time Per	*Mitchell Av*	*Johnson Av*	*Mitchell Av*	TOT
0600 - 0615				**0**
0615 - 0630				**0**
0630 - 0645		*Not*		**0**
0645 - 0700		*Required*		**0**
0700 - 0715				**0**
0715 - 0730				**0**
0730 - 0745				**0**
0745 - 0800				**0**
0800 - 0815				**0**
0815 - 0830				**0**
0830 - 0845				**0**
0845 - 0900				**0**
Per End	**0**	**0**	**0**	**0**

PEDS	WEST	SOUTH	EAST	
Peak Per	*Mitchell Av*	*Johnson Av*	*Mitchell Av*	TOT
0600 - 0700	0	0	0	**0**
0615 - 0715	0	0	0	**0**
0630 - 0730	0	0	0	**0**
0645 - 0745	0	0	0	**0**
0700 - 0800	0	0	0	**0**
0715 - 0815	0	0	0	**0**
0730 - 0830	0	0	0	**0**
0745 - 0845	0	0	0	**0**
0800 - 0900	0	0	0	**0**
PEAK HR	**0**	**0**	**0**	**0**

Lights	WEST		SOUTH		EAST		
	Mitchell Av		*Johnson Av*		*Mitchell Av*		
Time Per	T	R	L	R	L	T	TOT
0600 - 0615	10	3	0	1	5	14	**33**
0615 - 0630	8	2	0	0	3	15	**28**
0630 - 0645	10	0	1	0	1	17	**29**
0645 - 0700	14	4	1	0	4	18	**41**
0700 - 0715	15	3	1	1	6	11	**37**
0715 - 0730	14	1	0	1	3	12	**31**
0730 - 0745	16	1	2	1	2	15	**37**
0745 - 0800	22	0	1	1	5	18	**47**
0800 - 0815	18	1	1	0	7	12	**39**
0815 - 0830	27	0	2	4	5	20	**58**
0830 - 0845	43	1	0	6	7	33	**90**
0845 - 0900	60	1	0	7	6	25	**99**
Per End	**257**	**17**	**9**	**22**	**54**	**210**	**569**

Heavies	WEST		SOUTH		EAST		
	Mitchell Av		*Johnson Av*		*Mitchell Av*		
Time Per	T	R	L	R	L	T	TOT
0600 - 0615	0	0	0	1	0	1	**2**
0615 - 0630	0	0	0	0	0	1	**1**
0630 - 0645	0	0	0	1	0	0	**1**
0645 - 0700	0	0	0	0	0	0	**0**
0700 - 0715	0	1	0	1	0	1	**3**
0715 - 0730	1	1	1	0	0	1	**4**
0730 - 0745	0	1	0	1	0	2	**4**
0745 - 0800	3	0	0	0	0	2	**5**
0800 - 0815	1	0	0	1	0	1	**3**
0815 - 0830	2	1	0	1	1	0	**5**
0830 - 0845	2	0	0	1	0	0	**3**
0845 - 0900	2	0	0	0	1	1	**4**
Per End	**11**	**4**	**1**	**7**	**2**	**10**	**35**

Combined	WEST		SOUTH		EAST		
	Mitchell Av		*Johnson Av*		*Mitchell Av*		
Time Per	T	R	L	R	L	T	TOT
0600 - 0615	10	3	0	2	5	15	**35**
0615 - 0630	8	2	0	0	3	16	**29**
0630 - 0645	10	0	1	1	1	17	**30**
0645 - 0700	14	4	1	0	4	18	**41**
0700 - 0715	15	4	1	2	6	12	**40**
0715 - 0730	15	2	1	1	3	13	**35**
0730 - 0745	16	2	2	2	2	17	**41**
0745 - 0800	25	0	1	1	5	20	**52**
0800 - 0815	19	1	1	1	7	13	**42**
0815 - 0830	29	1	2	5	6	20	**63**
0830 - 0845	45	1	0	7	7	33	**93**
0845 - 0900	62	1	0	7	7	26	**103**
Per End	**268**	**21**	**10**	**29**	**56**	**220**	**604**

Lights	WEST		SOUTH		EAST		
	Mitchell Av		*Johnson Av*		*Mitchell Av*		
Peak Per	T	R	L	R	L	T	TOT
0600 - 0700	42	9	2	1	13	64	**131**
0615 - 0715	47	9	3	1	14	61	**135**
0630 - 0730	53	8	3	2	14	58	**138**
0645 - 0745	59	9	4	3	15	56	**146**
0700 - 0800	67	5	4	4	16	56	**152**
0715 - 0815	70	3	4	3	17	57	**154**
0730 - 0830	83	2	6	6	19	65	**181**
0745 - 0845	110	2	4	11	24	83	**234**
0800 - 0900	148	3	3	17	25	90	**286**
PEAK HR	**148**	**3**	**3**	**17**	**25**	**90**	**286**

Heavies	WEST		SOUTH		EAST		
	Mitchell Av		*Johnson Av*		*Mitchell Av*		
Peak Per	T	R	L	R	L	T	TOT
0600 - 0700	0	0	0	2	0	2	**4**
0615 - 0715	0	1	0	2	0	2	**5**
0630 - 0730	1	2	1	2	0	2	**8**
0645 - 0745	1	3	1	2	0	4	**11**
0700 - 0800	4	3	1	2	0	6	**16**
0715 - 0815	5	2	1	2	0	6	**16**
0730 - 0830	6	2	0	3	1	5	**17**
0745 - 0845	8	1	0	3	1	3	**16**
0800 - 0900	7	1	0	3	2	2	**15**
PEAK HR	**7**	**1**	**0**	**3**	**2**	**2**	**15**

Combined	WEST		SOUTH		EAST		
	Mitchell Av		*Johnson Av*		*Mitchell Av*		
Peak Per	T	R	L	R	L	T	TOT
0600 - 0700	42	9	2	3	13	66	**135**
0615 - 0715	47	10	3	3	14	63	**140**
0630 - 0730	54	10	4	4	14	60	**146**
0645 - 0745	60	12	5	5	15	60	**157**
0700 - 0800	71	8	5	6	16	62	**168**
0715 - 0815	75	5	5	5	17	63	**170**
0730 - 0830	89	4	6	9	20	70	**198**
0745 - 0845	118	3	4	14	25	86	**250**
0800 - 0900	155	4	3	20	27	92	**301**
PEAK HR	**155**	**4**	**3**	**20**	**27**	**92**	**301**

R.O.A.R. DATA

Client : EMM

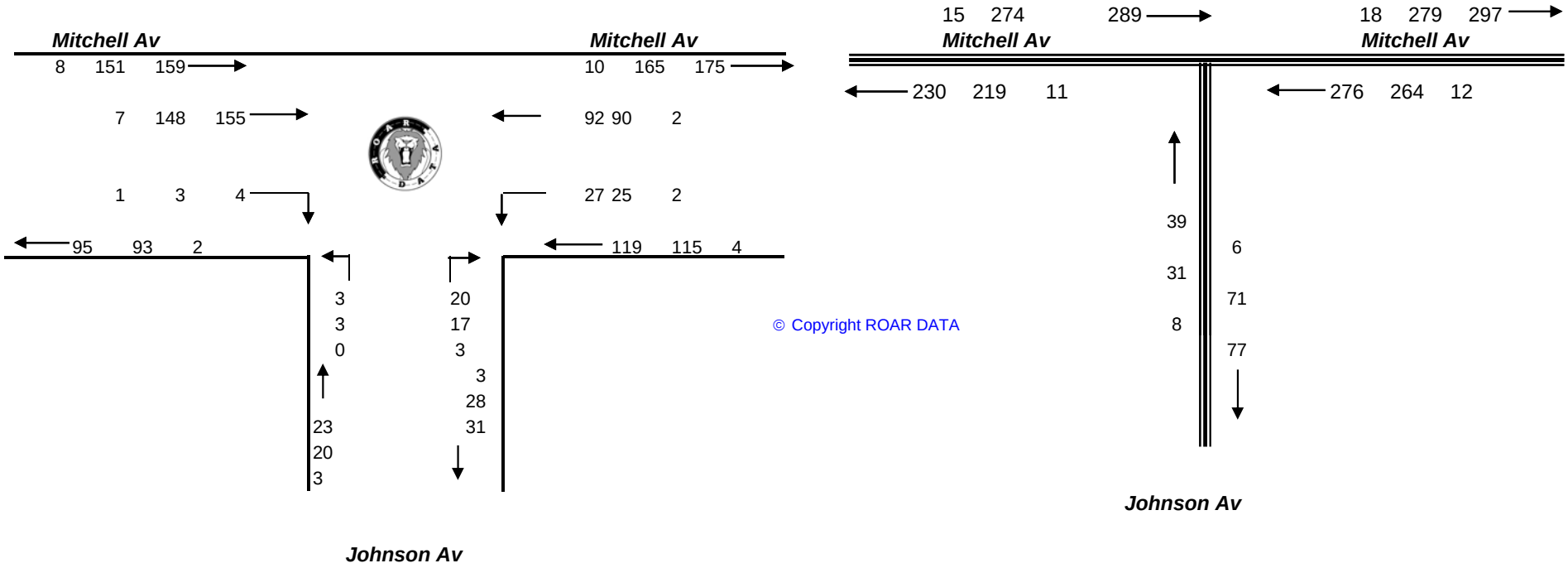
Reliable, Original & Authentic Results
Ph.88196847, Fax 88196849, Mob.0418-239019

Job No/Name : 5955 KURRI KURRI Mitchell Ave
Day/Date : Tuesday 8th March 2016

AM PEAK
0800 - 0900

N

TOTAL VOLUMES FOR COUNT PERIOD



R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849.
Mobile.0418239019

Client : EMM
Job No/Name : 5955 KURRI KURRI Mitchell Ave
Day/Date : Tuesday 8th March 2016

PEDS	WEST	SOUTH	EAST	
Time Per	*Mitchell Av*	*Johnson Av*	*Mitchell Av*	TOT
1500 - 1515				**0**
1515 - 1530				**0**
1530 - 1545		*Not*		**0**
1545 - 1600		*Required*		**0**
1600 - 1615				**0**
1615 - 1630				**0**
1630 - 1645				**0**
1645 - 1700				**0**
1700 - 1715				**0**
1715 - 1730				**0**
1730 - 1745				**0**
1745 - 1800				**0**
Per End	**0**	**0**	**0**	**0**

PEDS	WEST	SOUTH	EAST	
Peak Per	*Mitchell Av*	*Johnson Av*	*Mitchell Av*	TOT
1500 - 1600	0	0	0	**0**
1515 - 1615	0	0	0	**0**
1530 - 1630	0	0	0	**0**
1545 - 1645	0	0	0	**0**
1600 - 1700	0	0	0	**0**
1615 - 1715	0	0	0	**0**
1630 - 1730	0	0	0	**0**
1645 - 1745	0	0	0	**0**
1700 - 1800	0	0	0	**0**
PEAK HR	**0**	**0**	**0**	**0**

Lights	WEST		SOUTH		EAST		
	Mitchell Av		*Johnson Av*		*Mitchell Av*		
Time Per	T	R	L	R	L	T	TOT
1500 - 1515	28	1	0	2	5	19	**55**
1515 - 1530	26	0	2	6	4	22	**60**
1530 - 1545	35	0	1	6	3	47	**92**
1545 - 1600	25	2	1	8	5	56	**97**
1600 - 1615	27	0	1	2	2	22	**54**
1615 - 1630	29	0	1	3	6	28	**67**
1630 - 1645	25	1	1	5	3	36	**71**
1645 - 1700	18	0	0	5	6	19	**48**
1700 - 1715	25	0	0	2	1	41	**69**
1715 - 1730	15	0	0	2	3	35	**55**
1730 - 1745	26	0	0	3	3	21	**53**
1745 - 1800	23	0	0	1	0	28	**52**
Per End	**302**	**4**	**7**	**45**	**41**	**374**	**773**

Heavies	WEST		SOUTH		EAST		
	Mitchell Av		*Johnson Av*		*Mitchell Av*		
Time Per	T	R	L	R	L	T	TOT
1500 - 1515	2	2	1	2	0	0	**7**
1515 - 1530	0	0	0	0	0	1	**1**
1530 - 1545	2	0	0	1	0	1	**4**
1545 - 1600	0	0	0	1	0	2	**3**
1600 - 1615	1	1	0	1	0	0	**3**
1615 - 1630	0	0	0	0	1	0	**1**
1630 - 1645	0	0	0	0	1	0	**1**
1645 - 1700	0	0	0	0	2	0	**2**
1700 - 1715	1	0	0	0	0	0	**1**
1715 - 1730	1	0	0	0	1	0	**2**
1730 - 1745	0	0	0	0	0	1	**1**
1745 - 1800	0	1	0	0	0	0	**1**
Per End	**7**	**4**	**1**	**5**	**5**	**5**	**27**

Combined	WEST		SOUTH		EAST		
	Mitchell Av		*Johnson Av*		*Mitchell Av*		
Time Per	T	R	L	R	L	T	TOT
1500 - 1515	30	3	1	4	5	19	**62**
1515 - 1530	26	0	2	6	4	23	**61**
1530 - 1545	37	0	1	7	3	48	**96**
1545 - 1600	25	2	1	9	5	58	**100**
1600 - 1615	28	1	1	3	2	22	**57**
1615 - 1630	29	0	1	3	7	28	**68**
1630 - 1645	25	1	1	5	4	36	**72**
1645 - 1700	18	0	0	5	8	19	**50**
1700 - 1715	26	0	0	2	1	41	**70**
1715 - 1730	16	0	0	2	4	35	**57**
1730 - 1745	26	0	0	3	3	22	**54**
1745 - 1800	23	1	0	1	0	28	**53**
Per End	**309**	**8**	**8**	**50**	**46**	**379**	**800**

Lights	WEST		SOUTH		EAST		
	Mitchell Av		*Johnson Av*		*Mitchell Av*		
Peak Per	T	R	L	R	L	T	TOT
1500 - 1600	114	3	4	22	17	144	**304**
1515 - 1615	113	2	5	22	14	147	**303**
1530 - 1630	116	2	4	19	16	153	**310**
1545 - 1645	106	3	4	18	16	142	**289**
1600 - 1700	99	1	3	15	17	105	**240**
1615 - 1715	97	1	2	15	16	124	**255**
1630 - 1730	83	1	1	14	13	131	**243**
1645 - 1745	84	0	0	12	13	116	**225**
1700 - 1800	89	0	0	8	7	125	**229**
PEAK HR	**116**	**2**	**4**	**19**	**16**	**153**	**310**

Heavies	WEST		SOUTH		EAST		
	Mitchell Av		*Johnson Av*		*Mitchell Av*		
Peak Per	T	R	L	R	L	T	TOT
1500 - 1600	4	2	1	4	0	4	**15**
1515 - 1615	3	1	0	3	0	4	**11**
1530 - 1630	3	1	0	3	1	3	**11**
1545 - 1645	1	1	0	2	2	2	**8**
1600 - 1700	1	1	0	1	4	0	**7**
1615 - 1715	1	0	0	0	4	0	**5**
1630 - 1730	2	0	0	0	4	0	**6**
1645 - 1745	2	0	0	0	3	1	**6**
1700 - 1800	2	1	0	0	1	1	**5**
PEAK HR	**3**	**1**	**0**	**3**	**1**	**3**	**11**

Combined	WEST		SOUTH		EAST		
	Mitchell Av		*Johnson Av*		*Mitchell Av*		
Peak Per	T	R	L	R	L	T	TOT
1500 - 1600	118	5	5	26	17	148	**319**
1515 - 1615	116	3	5	25	14	151	**314**
1530 - 1630	119	3	4	22	17	156	**321**
1545 - 1645	107	4	4	20	18	144	**297**
1600 - 1700	100	2	3	16	21	105	**247**
1615 - 1715	98	1	2	15	20	124	**260**
1630 - 1730	85	1	1	14	17	131	**249**
1645 - 1745	86	0	0	12	16	117	**231**
1700 - 1800	91	1	0	8	8	126	**234**
PEAK HR	**119**	**3**	**4**	**22**	**17**	**156**	**321**

R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849, Mob.0418-239019

Client : EMM

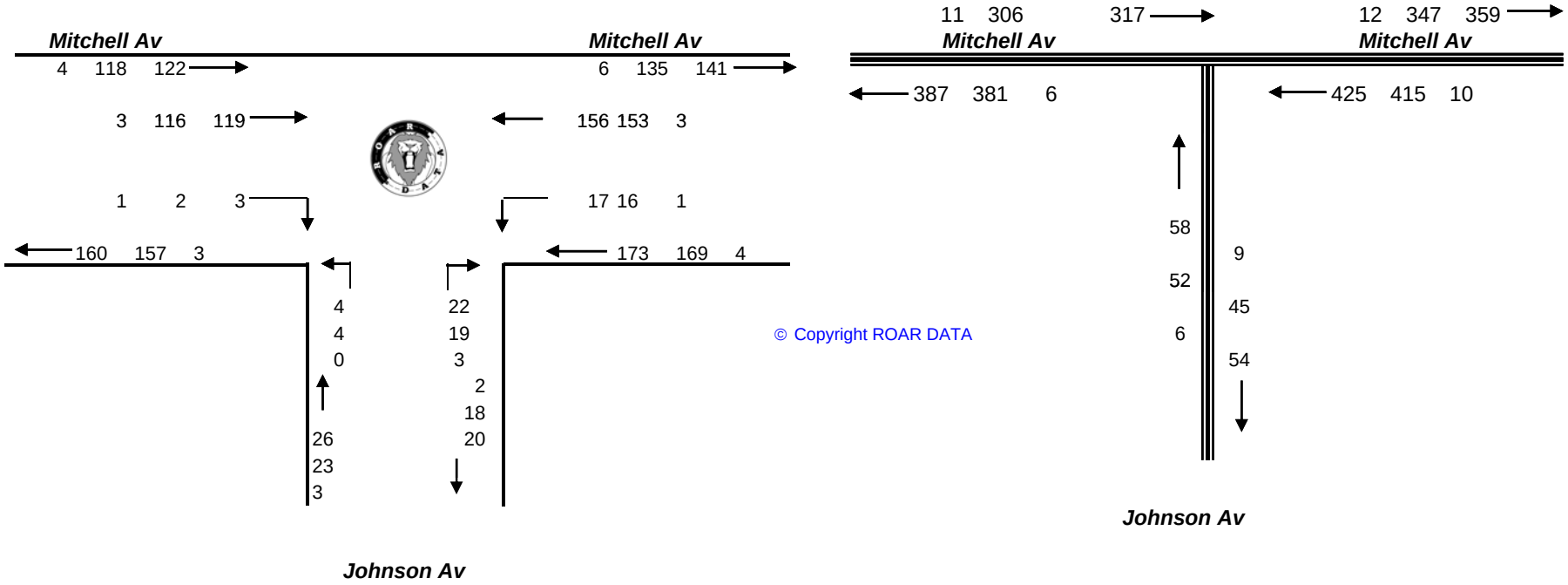
Job No/Name : 5955 KURRI KURRI Mitchell Ave

Day/Date : Tuesday 8th March 2016

PM PEAK
1530 - 1630

N

TOTAL VOLUMES FOR COUNT PERIOD



R.O.A.R. DATA

Reliable, Original & Authentic Results

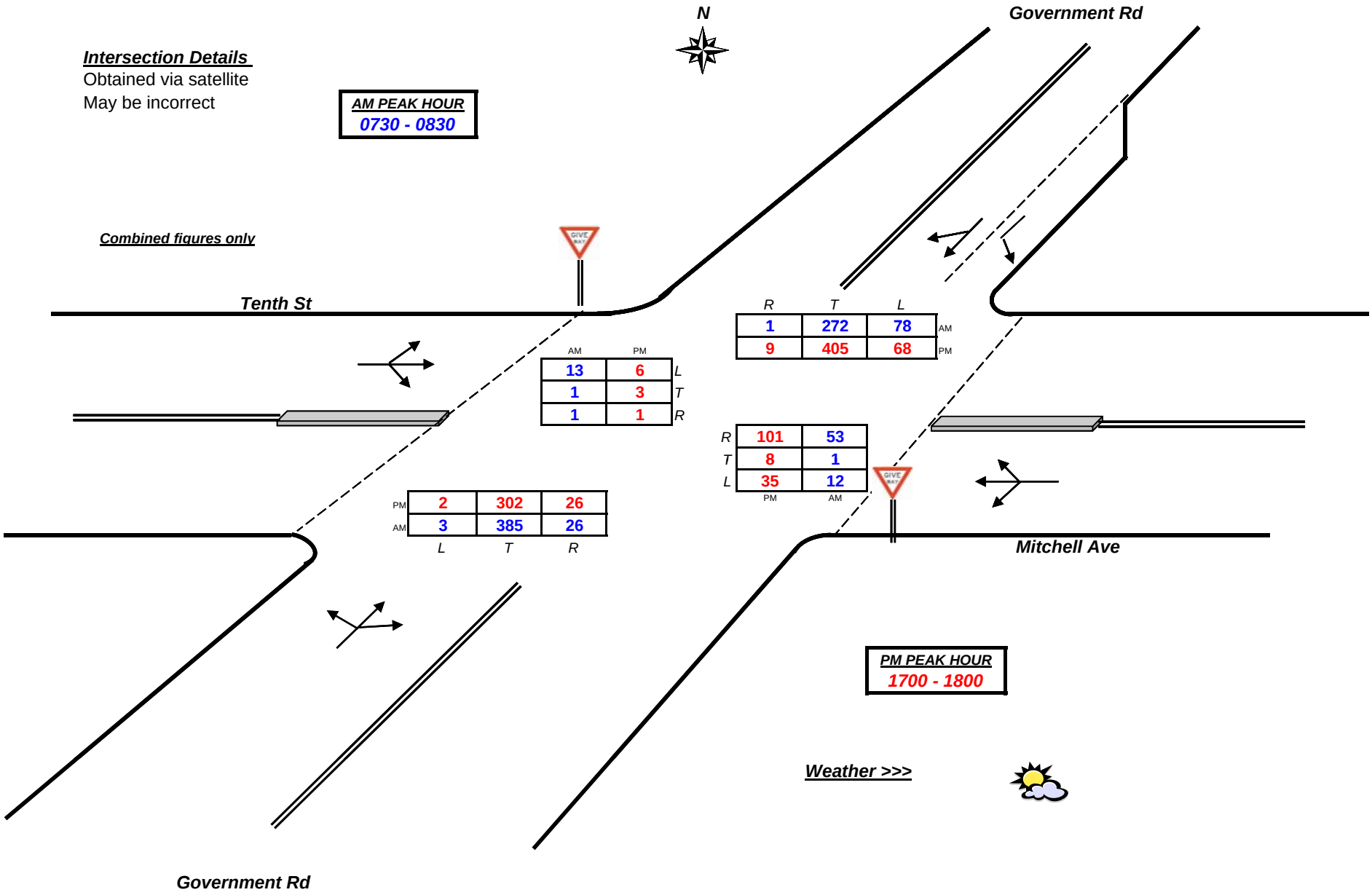
Ph.88196847, Fax 88196849, Mob.0418-239019

Client : EMM
Job No/Name : 5955 KURRI KURRI Mitchell Ave
Day/Date : Tuesday 8th March 2016

Intersection Details
Obtained via satellite
May be incorrect

AM PEAK HOUR
0730 - 0830

Combined figures only



PM PEAK HOUR
1700 - 1800

Weather >>>

R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849, Mob.0418-239019

Client : EMM
Job No/Name : 5955 KURRI KURRI Mitchell Ave
Day/Date : Tuesday 8th March 2016

Lights

Time Per	NORTH Governmeny Rd L	T	R	WEST Tenth St L	T	R	SOUTH Government Rd L	T	R	EAST Mitchell Av L	T	R	TOT
0600 - 0615	9	16	1	2	2	0	0	51	7	1	1	9	**99**
0615 - 0630	13	33	1	3	0	0	0	79	1	1	0	6	**137**
0630 - 0645	5	24	0	3	1	2	0	83	0	2	0	15	**135**
0645 - 0700	14	34	2	2	2	0	1	56	7	0	0	10	**128**
0700 - 0715	13	42	0	2	3	0	0	69	5	2	0	8	**144**
0715 - 0730	14	35	1	8	1	0	0	88	2	0	2	8	**159**
0730 - 0745	17	71	1	6	0	1	0	117	6	3	0	15	**237**
0745 - 0800	23	87	0	3	1	0	1	134	8	5	0	12	**274**
0800 - 0815	11	43	0	4	0	0	2	66	6	3	0	9	**144**
0815 - 0830	22	68	0	0	0	0	0	66	5	0	1	13	**175**
0830 - 0845	32	53	0	2	1	0	0	78	11	7	2	21	**207**
0845 - 0900	46	87	0	1	3	0	1	82	12	6	3	15	**256**
Period End	**219**	**593**	**6**	**36**	**14**	**3**	**5**	**969**	**70**	**30**	**9**	**141**	**2095**

Lights

Peak Time	NORTH Governmeny Rd L	T	R	WEST Tenth St L	T	R	SOUTH Government Rd L	T	R	EAST Mitchell Av L	T	R	TOT
0600 - 0700	41	107	4	10	5	2	1	269	15	4	1	40	**499**
0615 - 0715	45	133	3	10	6	2	1	287	13	5	0	39	**544**
0630 - 0730	46	135	3	15	7	2	1	296	14	4	2	41	**566**
0645 - 0745	58	182	4	18	6	1	1	330	20	5	2	41	**668**
0700 - 0800	67	235	2	19	5	1	1	408	21	10	2	43	**814**
0715 - 0815	65	236	2	21	2	1	3	405	22	11	2	44	**814**
0730 - 0830	73	269	1	13	1	1	3	383	25	11	1	49	**830**
0745 - 0845	88	251	0	9	2	0	3	344	30	15	3	55	**800**
0800 - 0900	111	251	0	7	4	0	3	292	34	16	6	58	**782**
PEAK HOUR	**73**	**269**	**1**	**13**	**1**	**1**	**3**	**383**	**25**	**11**	**1**	**49**	**830**

Heavies

Time Per	NORTH Governmeny Rd L	T	R	WEST Tenth St L	T	R	SOUTH Government Rd L	T	R	EAST Mitchell Av L	T	R	TOT
0600 - 0615	1	1	0	0	0	0	0	1	0	1	0	1	**5**
0615 - 0630	3	1	0	0	0	0	0	1	0	0	0	1	**6**
0630 - 0645	0	0	0	0	0	0	0	2	1	0	0	0	**3**
0645 - 0700	0	0	0	0	0	0	0	0	0	0	0	1	**1**
0700 - 0715	2	2	0	0	0	0	0	0	0	0	0	1	**5**
0715 - 0730	2	0	0	0	0	0	0	0	0	0	0	1	**3**
0730 - 0745	0	0	0	0	0	0	0	2	0	1	0	1	**4**
0745 - 0800	2	0	0	0	0	0	0	0	0	0	0	1	**3**
0800 - 0815	1	0	0	0	0	0	0	0	1	0	0	1	**3**
0815 - 0830	2	3	0	0	0	0	0	0	0	0	0	1	**6**
0830 - 0845	3	2	0	0	1	0	0	1	0	0	0	0	**7**
0845 - 0900	0	3	0	0	0	0	0	0	1	1	0	1	**6**
Period End	**16**	**12**	**0**	**0**	**1**	**0**	**0**	**7**	**3**	**3**	**0**	**10**	**52**

Heavies

Peak Per	NORTH Governmeny Rd L	T	R	WEST Tenth St L	T	R	SOUTH Government Rd L	T	R	EAST Mitchell Av L	T	R	TOT
0600 - 0700	4	2	0	0	0	0	0	4	1	1	0	3	**15**
0615 - 0715	5	3	0	0	0	0	0	3	1	0	0	3	**15**
0630 - 0730	4	2	0	0	0	0	0	2	1	0	0	3	**12**
0645 - 0745	4	2	0	0	0	0	0	2	0	1	0	4	**13**
0700 - 0800	6	2	0	0	0	0	0	2	0	1	0	4	**15**
0715 - 0815	5	0	0	0	0	0	0	2	1	1	0	4	**13**
0730 - 0830	5	3	0	0	0	0	0	2	1	1	0	4	**16**
0745 - 0845	8	5	0	0	1	0	0	1	1	0	0	3	**19**
0800 - 0900	6	8	0	0	1	0	0	1	2	1	0	3	**22**
PEAK HOUR	**5**	**3**	**0**	**0**	**0**	**0**	**0**	**2**	**1**	**1**	**0**	**4**	**16**

Combined

Time Per	NORTH Governmeny Rd L	T	R	WEST Tenth St L	T	R	SOUTH Government Rd L	T	R	EAST Mitchell Av L	T	R	TOT
0600 - 0615	10	17	1	2	2	0	0	52	7	2	1	10	**104**
0615 - 0630	16	34	1	3	0	0	0	80	1	1	0	7	**143**
0630 - 0645	5	24	0	3	1	2	0	85	1	2	0	15	**138**
0645 - 0700	14	34	2	2	2	0	1	56	7	0	0	11	**129**
0700 - 0715	15	44	0	2	3	0	0	69	5	2	0	9	**149**
0715 - 0730	16	35	1	8	1	0	0	88	2	0	2	9	**162**
0730 - 0745	17	71	1	6	0	1	0	119	6	4	0	16	**241**
0745 - 0800	25	87	0	3	1	0	1	134	8	5	0	13	**277**
0800 - 0815	12	43	0	4	0	0	2	66	7	3	0	10	**147**
0815 - 0830	24	71	0	0	0	0	0	66	5	0	1	14	**181**
0830 - 0845	35	55	0	2	2	0	0	79	11	7	2	21	**214**
0845 - 0900	46	90	0	1	3	0	1	82	13	7	3	16	**262**
Period End	**235**	**605**	**6**	**36**	**15**	**3**	**5**	**976**	**73**	**33**	**9**	**151**	**2147**

Combined

Peak Per	NORTH Governmeny Rd L	T	R	WEST Tenth St L	T	R	SOUTH Government Rd L	T	R	EAST Mitchell Av L	T	R	TOT
0600 - 0700	45	109	4	10	5	2	1	273	16	5	1	43	**514**
0615 - 0715	50	136	3	10	6	2	1	290	14	5	0	42	**559**
0630 - 0730	50	137	3	15	7	2	1	298	15	4	2	44	**578**
0645 - 0745	62	184	4	18	6	1	1	332	20	6	2	45	**681**
0700 - 0800	73	237	2	19	5	1	1	410	21	11	2	47	**829**
0715 - 0815	70	236	2	21	2	1	3	407	23	12	2	48	**827**
0730 - 0830	78	272	1	13	1	1	3	385	26	12	1	53	**846**
0745 - 0845	96	256	0	9	3	0	3	345	31	15	3	58	**819**
0800 - 0900	117	259	0	7	5	0	3	293	36	17	6	61	**804**
PEAK HOUR	**78**	**272**	**1**	**13**	**1**	**1**	**3**	**385**	**26**	**12**	**1**	**53**	**846**

R.O.A.R DATA

Reliable, Original & Authentic Results

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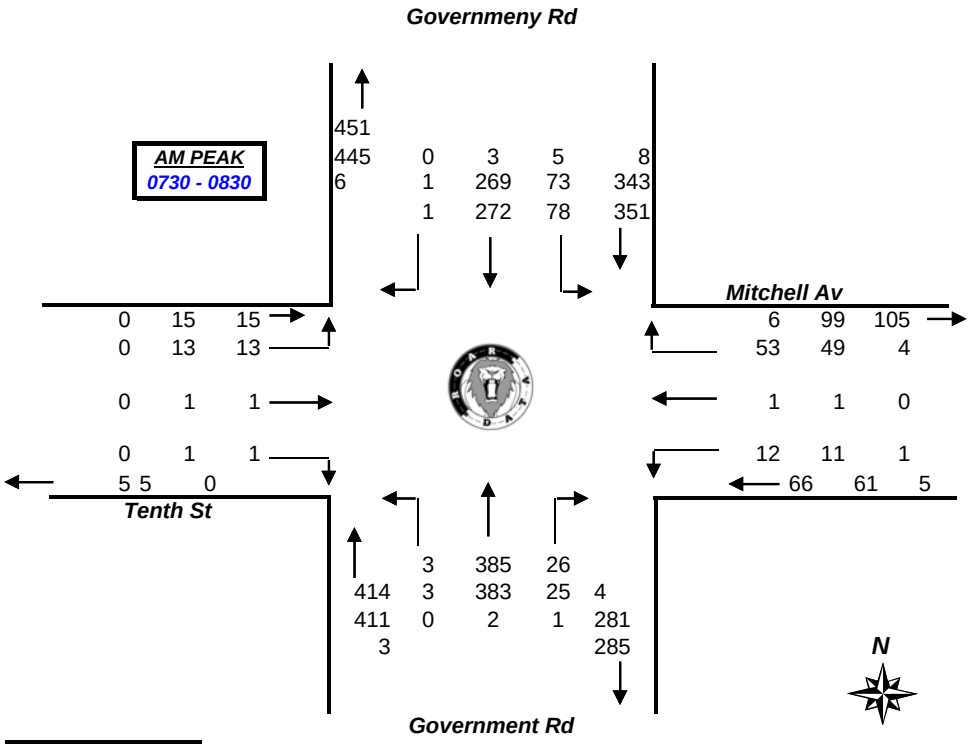
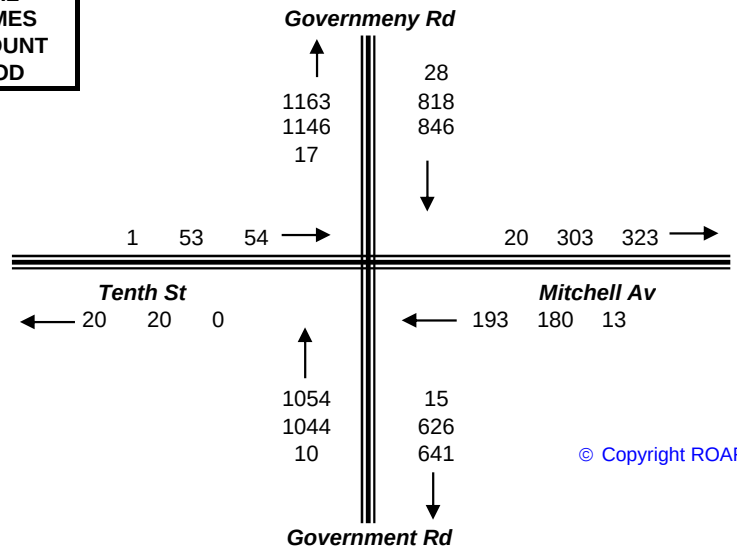
Client : EMM
Job No/Name : 5955 KURRI KURRI Mitchell Ave
Day/Date : Tuesday 8th March 2016

Peds	NORTH	WEST	SOUTH	EAST	
	Governmeny Rd	*Tenth St*	*Government Rd*	*Mitchell Av*	
Time Per	**UNCLASSIFIED**	**UNCLASSIFIED**	**UNCLASSIFIED**	**UNCLASSIFIED**	**TOT**
0600 - 0615					**0**
0615 - 0630					**0**
0630 - 0645		*NOT*	*REQUIRED*		**0**
0645 - 0700					**0**
0700 - 0715					**0**
0715 - 0730					**0**
0730 - 0745					**0**
0745 - 0800					**0**
0800 - 0815					**0**
0815 - 0830					**0**
0830 - 0845					**0**
0845 - 0900					**0**
Period End	**0**	**0**	**0**	**0**	**0**

Peds	NORTH	WEST	SOUTH	EAST	
	Governmeny Rd	*Tenth St*	*Government Rd*	*Mitchell Av*	
Peak Per	**UNCLASSIFIED**	**UNCLASSIFIED**	**UNCLASSIFIED**	**UNCLASSIFIED**	**TOT**
0600 - 0700	0	0	0	0	**0**
0615 - 0715	0	0	0	0	**0**
0630 - 0730	0	0	0	0	**0**
0645 - 0745	0	0	0	0	**0**
0700 - 0800	0	0	0	0	**0**
0715 - 0815	0	0	0	0	**0**
0730 - 0830	0	0	0	0	**0**
0745 - 0845	0	0	0	0	**0**
0800 - 0900	0	0	0	0	**0**
PEAK HR	**0**	**0**	**0**	**0**	**0**



TOTAL VOLUMES FOR COUNT PERIOD



R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849, Mob.0418-239019

Client : EMM
Job No/Name : 5955 KURRI KURRI Mitchell Ave
Day/Date : Tuesday 8th March 2016

Lights

Time Per	NORTH *Governmeny Rd*			WEST *Tenth St*			SOUTH *Government Rd*			EAST *Mitchell Av*			
	L	T	R	L	T	R	L	T	R	L	T	R	TOT
1500 - 1515	28	63	4	2	2	0	1	25	12	8	3	10	**158**
1515 - 1530	16	88	4	3	2	2	0	56	19	8	1	19	**218**
1530 - 1545	18	76	1	4	2	1	2	67	10	11	1	31	**224**
1545 - 1600	17	71	0	1	1	0	0	54	5	16	2	41	**208**
1600 - 1615	19	96	4	1	3	2	1	67	8	7	1	27	**236**
1615 - 1630	16	83	1	2	3	0	2	55	9	9	6	23	**209**
1630 - 1645	17	92	2	3	0	0	1	69	6	5	2	24	**221**
1645 - 1700	13	91	1	4	1	0	1	55	7	9	3	22	**207**
1700 - 1715	17	114	2	1	2	0	0	73	6	7	2	25	**249**
1715 - 1730	12	72	3	3	0	0	0	64	5	14	3	31	**207**
1730 - 1745	18	104	2	0	0	0	0	88	9	6	1	20	**248**
1745 - 1800	20	115	2	2	1	1	2	76	5	8	2	25	**259**
Period End	**211**	**1065**	**26**	**26**	**17**	**6**	**10**	**749**	**101**	**108**	**27**	**298**	**2644**

Lights

Peak Time	NORTH *Governmeny Rd*			WEST *Tenth St*			SOUTH *Government Rd*			EAST *Mitchell Av*			
	L	T	R	L	T	R	L	T	R	L	T	R	TOT
1500 - 1600	79	298	9	10	7	3	3	202	46	43	7	101	**808**
1515 - 1615	70	331	9	9	8	5	3	244	42	42	5	118	**886**
1530 - 1630	70	326	6	8	9	3	5	243	32	43	10	122	**877**
1545 - 1645	69	342	7	7	7	2	4	245	28	37	11	115	**874**
1600 - 1700	65	362	8	10	7	2	5	246	30	30	12	96	**873**
1615 - 1715	63	380	6	10	6	0	4	252	28	30	13	94	**886**
1630 - 1730	59	369	8	11	3	0	2	261	24	35	10	102	**884**
1645 - 1745	60	381	8	8	3	0	1	280	27	36	9	98	**911**
1700 - 1800	67	405	9	6	3	1	2	301	25	35	8	101	**963**
PEAK HOUR	**67**	**405**	**9**	**6**	**3**	**1**	**2**	**301**	**25**	**35**	**8**	**101**	**963**

Heavies

Time Per	NORTH *Governmeny Rd*			WEST *Tenth St*			SOUTH *Government Rd*			EAST *Mitchell Av*			
	L	T	R	L	T	R	L	T	R	L	T	R	TOT
1500 - 1515	0	3	0	0	0	0	0	0	2	1	0	1	**7**
1515 - 1530	0	2	0	0	0	0	0	1	0	0	0	1	**4**
1530 - 1545	1	0	0	0	0	0	0	0	0	0	0	0	**1**
1545 - 1600	0	1	0	0	0	0	0	1	0	0	0	0	**2**
1600 - 1615	0	1	0	0	0	0	0	0	0	0	1	1	**3**
1615 - 1630	0	1	0	0	0	0	0	1	0	0	0	0	**2**
1630 - 1645	0	1	0	0	0	0	0	0	0	0	0	0	**1**
1645 - 1700	0	0	0	0	0	0	0	1	0	0	0	0	**1**
1700 - 1715	1	0	0	0	0	0	0	1	1	0	0	0	**3**
1715 - 1730	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1730 - 1745	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1745 - 1800	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Period End	**2**	**9**	**0**	**0**	**0**	**0**	**0**	**5**	**3**	**1**	**1**	**3**	**24**

Heavies

Peak Per	NORTH *Governmeny Rd*			WEST *Tenth St*			SOUTH *Government Rd*			EAST *Mitchell Av*			
	L	T	R	L	T	R	L	T	R	L	T	R	TOT
1500 - 1600	1	6	0	0	0	0	0	2	2	1	0	2	**14**
1515 - 1615	1	4	0	0	0	0	0	2	0	0	1	2	**10**
1530 - 1630	1	3	0	0	0	0	0	2	0	0	1	1	**8**
1545 - 1645	0	4	0	0	0	0	0	2	0	0	1	1	**8**
1600 - 1700	0	3	0	0	0	0	0	2	0	0	1	1	**7**
1615 - 1715	1	2	0	0	0	0	0	3	1	0	0	0	**7**
1630 - 1730	1	1	0	0	0	0	0	2	1	0	0	0	**5**
1645 - 1745	1	0	0	0	0	0	0	2	1	0	0	0	**4**
1700 - 1800	1	0	0	0	0	0	0	1	1	0	0	0	**3**
PEAK HOUR	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**3**

Combined

Time Per	NORTH *Governmeny Rd*			WEST *Tenth St*			SOUTH *Government Rd*			EAST *Mitchell Av*			
	L	T	R	L	T	R	L	T	R	L	T	R	TOT
1500 - 1515	28	66	4	2	2	0	1	25	14	9	3	11	**165**
1515 - 1530	16	90	4	3	2	2	0	57	19	8	1	20	**222**
1530 - 1545	19	76	1	4	2	1	2	67	10	11	1	31	**225**
1545 - 1600	17	72	0	1	1	0	0	55	5	16	2	41	**210**
1600 - 1615	19	97	4	1	3	2	1	67	8	7	2	28	**239**
1615 - 1630	16	84	1	2	3	0	2	56	9	9	6	23	**211**
1630 - 1645	17	93	2	3	0	0	1	69	6	5	2	24	**222**
1645 - 1700	13	91	1	4	1	0	1	56	7	9	3	22	**208**
1700 - 1715	18	114	2	1	2	0	0	74	7	7	2	25	**252**
1715 - 1730	12	72	3	3	0	0	0	64	5	14	3	31	**207**
1730 - 1745	18	104	2	0	0	0	0	88	9	6	1	20	**248**
1745 - 1800	20	115	2	2	1	1	2	76	5	8	2	25	**259**
Period End	**213**	**1074**	**26**	**26**	**17**	**6**	**10**	**754**	**104**	**109**	**28**	**301**	**2668**

Combined

Peak Per	NORTH *Governmeny Rd*			WEST *Tenth St*			SOUTH *Government Rd*			EAST *Mitchell Av*			
	L	T	R	L	T	R	L	T	R	L	T	R	TOT
1500 - 1600	80	304	9	10	7	3	3	204	48	44	7	103	**822**
1515 - 1615	71	335	9	9	8	5	3	246	42	42	6	120	**896**
1530 - 1630	71	329	6	8	9	3	5	245	32	43	11	123	**885**
1545 - 1645	69	346	7	7	7	2	4	247	28	37	12	116	**882**
1600 - 1700	65	365	8	10	7	2	5	248	30	30	13	97	**880**
1615 - 1715	64	382	6	10	6	0	4	255	29	30	13	94	**893**
1630 - 1730	60	370	8	11	3	0	2	263	25	35	10	102	**889**
1645 - 1745	61	381	8	8	3	0	1	282	28	36	9	98	**915**
1700 - 1800	68	405	9	6	3	1	2	302	26	35	8	101	**966**
PEAK HOUR	**68**	**405**	**9**	**6**	**3**	**1**	**2**	**302**	**26**	**35**	**8**	**101**	**966**

R.O.A.R DATA

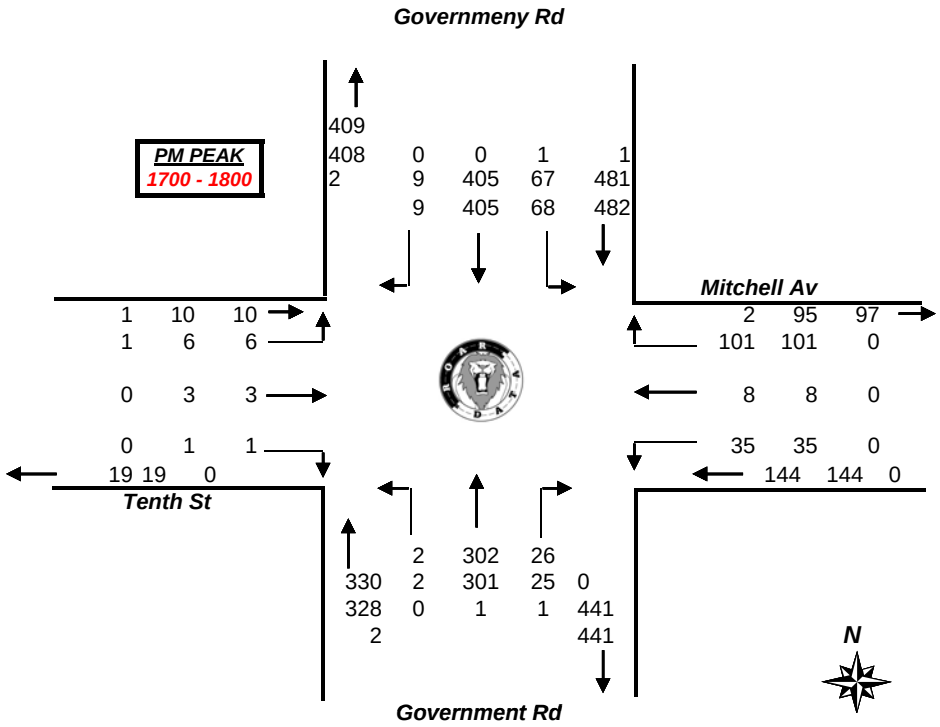
Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849, Mob.0418-239019

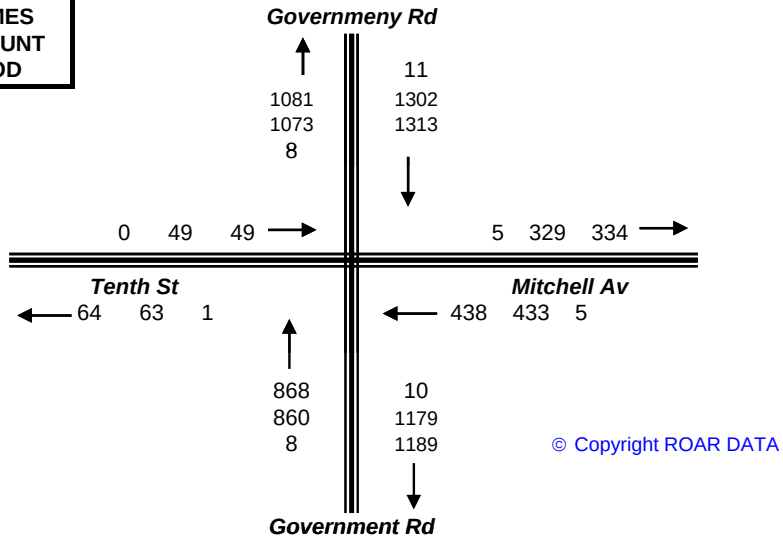
Client : EMM
Job No/Name : 5955 KURRI KURRI Mitchell Ave
Day/Date : Tuesday 8th March 2016

Peds	NORTH	WEST	SOUTH	EAST	
	Governmeny Rd	*Tenth St*	*Government Rd*	*Mitchell Av*	
Time Per	**UNCLASSIFIED**	**UNCLASSIFIED**	**UNCLASSIFIED**	**UNCLASSIFIED**	**TOT**
1500 - 1515					**0**
1515 - 1530					**0**
1530 - 1545		*NOT*	*REQUIRED*		**0**
1545 - 1600					**0**
1600 - 1615					**0**
1615 - 1630					**0**
1630 - 1645					**0**
1645 - 1700					**0**
1700 - 1715					**0**
1715 - 1730					**0**
1730 - 1745					**0**
1745 - 1800					**0**
Period End	**0**	**0**	**0**	**0**	**0**

Peds	NORTH	WEST	SOUTH	EAST	
	Governmeny Rd	*Tenth St*	*Government Rd*	*Mitchell Av*	
Peak Per	**UNCLASSIFIED**	**UNCLASSIFIED**	**UNCLASSIFIED**	**UNCLASSIFIED**	**TOT**
1500 - 1600	0	0	0	0	**0**
1515 - 1615	0	0	0	0	**0**
1530 - 1630	0	0	0	0	**0**
1545 - 1645	0	0	0	0	**0**
1600 - 1700	0	0	0	0	**0**
1615 - 1715	0	0	0	0	**0**
1630 - 1730	0	0	0	0	**0**
1645 - 1745	0	0	0	0	**0**
1700 - 1800	0	0	0	0	**0**
PEAK HR	**0**	**0**	**0**	**0**	**0**



TOTAL VOLUMES FOR COUNT PERIOD

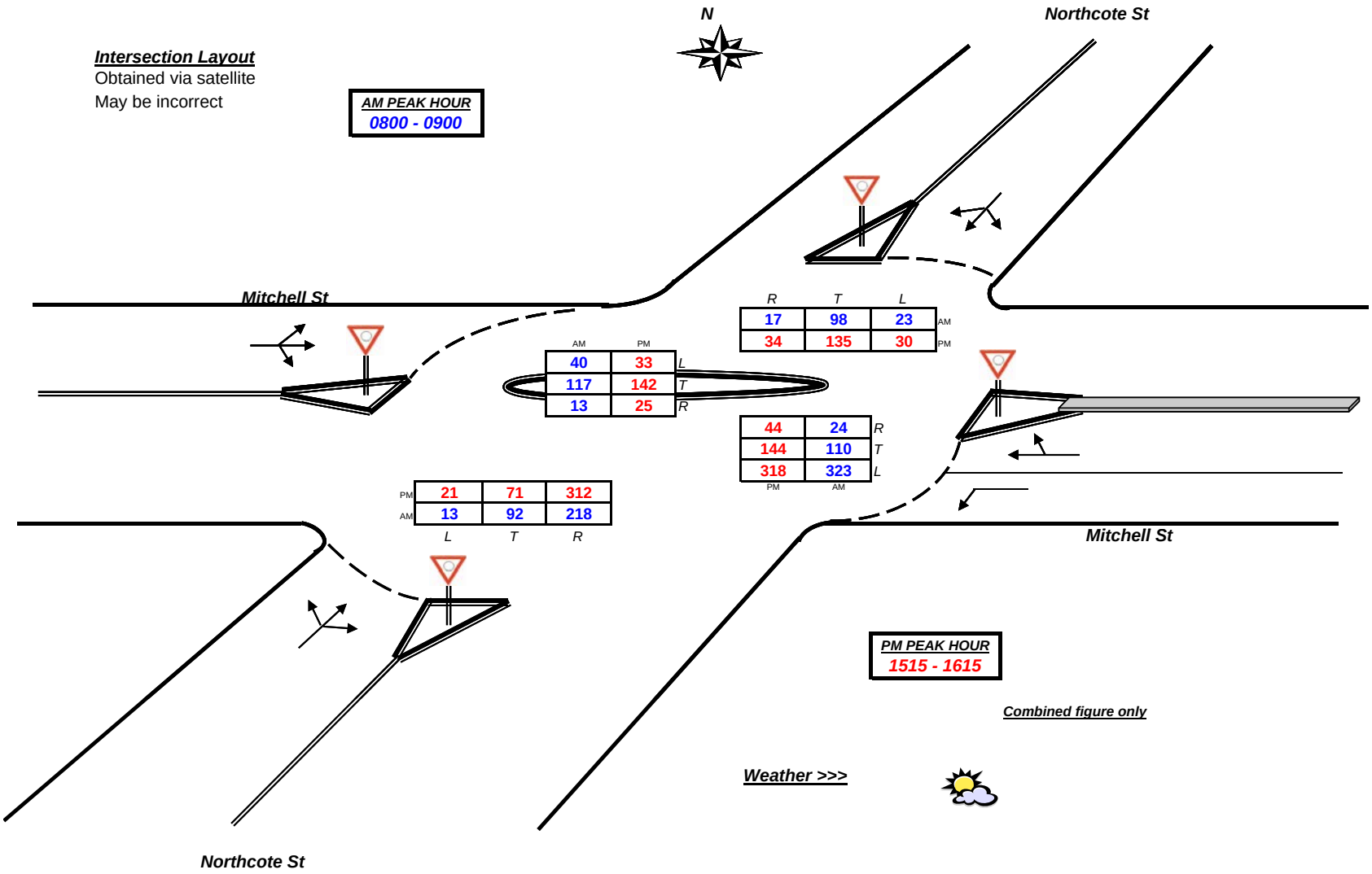


R.O.A.R. DATA
Reliable, Original & Authentic Results
Ph.88196847, Fax 88196849, Mob.0418-239019

Client : EMM
Job No/Name : 5955 KURRI KURRI Mitchell Ave
Day/Date : Tuesday 8th March 2016

Intersection Layout
Obtained via satellite
May be incorrect

AM PEAK HOUR
0800 - 0900



PM PEAK HOUR
1515 - 1615

Combined figure only

Weather >>>

R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849, Mob.0418-239019

Client : EMM
Job No/Name : 5955 KURRI KURRI Mitchell Ave
Day/Date : Tuesday 8th March 2016

Lights

Time Per	NORTH Northcote St L	T	R	WEST Mitchell Av L	T	R	SOUTH Northcote St L	T	R	EAST Mitchell Av L	T	R	TOT
0600 - 0615	1	2	2	1	9	2	5	5	25	35	20	1	**108**
0615 - 0630	1	4	5	4	4	0	7	7	63	45	23	0	**163**
0630 - 0645	2	2	3	0	9	3	2	7	28	32	14	1	**103**
0645 - 0700	0	0	7	2	0	6	7	5	29	43	19	3	**121**
0700 - 0715	3	5	3	7	8	5	7	9	50	52	20	1	**170**
0715 - 0730	2	1	0	1	12	1	0	7	41	28	17	0	**110**
0730 - 0745	1	7	3	2	14	3	1	11	57	63	16	4	**182**
0745 - 0800	2	11	1	5	16	4	1	16	57	77	18	5	**213**
0800 - 0815	3	21	1	1	14	1	2	19	47	58	20	3	**190**
0815 - 0830	6	12	1	2	23	1	1	16	42	77	25	7	**213**
0830 - 0845	7	23	10	14	39	5	5	25	68	96	34	8	**334**
0845 - 0900	5	41	5	20	35	6	4	32	55	83	25	5	**316**
Period End	**33**	**129**	**41**	**59**	**183**	**37**	**42**	**159**	**562**	**689**	**251**	**38**	**2223**

Lights

Peak Time	NORTH Northcote St L	T	R	WEST Mitchell Av L	T	R	SOUTH Northcote St L	T	R	EAST Mitchell Av L	T	R	TOT
0600 - 0700	4	8	17	7	22	11	21	24	145	155	76	5	**495**
0615 - 0715	6	11	18	13	21	14	23	28	170	172	76	5	**557**
0630 - 0730	7	8	13	10	29	15	16	28	148	155	70	5	**504**
0645 - 0745	6	13	13	12	34	15	15	32	177	186	72	8	**583**
0700 - 0800	8	24	7	15	50	13	9	43	205	220	71	10	**675**
0715 - 0815	8	40	5	9	56	9	4	53	202	226	71	12	**695**
0730 - 0830	12	51	6	10	67	9	5	62	203	275	79	19	**798**
0745 - 0845	18	67	13	22	92	11	9	76	214	308	97	23	**950**
0800 - 0900	21	97	17	37	111	13	12	92	212	314	104	23	**1053**
PEAK HOUR	**21**	**97**	**17**	**37**	**111**	**13**	**12**	**92**	**212**	**314**	**104**	**23**	**1053**

Heavies

Time Per	NORTH Northcote St L	T	R	WEST Mitchell Av L	T	R	SOUTH Northcote St L	T	R	EAST Mitchell Av L	T	R	TOT
0600 - 0615	0	0	0	0	1	0	0	0	2	2	0	0	**5**
0615 - 0630	0	0	1	0	1	0	0	0	3	2	0	0	**7**
0630 - 0645	0	0	0	0	1	0	0	0	0	0	0	0	**1**
0645 - 0700	0	0	0	0	0	0	0	0	3	1	0	0	**4**
0700 - 0715	0	0	0	0	1	0	0	0	4	3	0	0	**8**
0715 - 0730	0	0	0	0	1	0	0	0	3	1	0	0	**5**
0730 - 0745	0	0	0	0	4	0	0	0	2	4	2	0	**12**
0745 - 0800	0	0	0	1	5	0	0	1	1	3	2	0	**13**
0800 - 0815	0	0	0	0	2	0	1	0	0	1	2	0	**6**
0815 - 0830	1	0	0	0	1	0	0	0	3	4	2	0	**11**
0830 - 0845	1	0	0	2	2	0	0	0	2	3	0	1	**11**
0845 - 0900	0	1	0	1	1	0	0	0	1	1	2	0	**7**
Period End	**2**	**1**	**1**	**4**	**20**	**0**	**1**	**1**	**24**	**25**	**10**	**1**	**90**

Heavies

Peak Per	NORTH Northcote St L	T	R	WEST Mitchell Av L	T	R	SOUTH Northcote St L	T	R	EAST Mitchell Av L	T	R	TOT
0600 - 0700	0	0	1	0	3	0	0	0	8	5	0	0	**17**
0615 - 0715	0	0	1	0	3	0	0	0	10	6	0	0	**20**
0630 - 0730	0	0	0	0	3	0	0	0	10	5	0	0	**18**
0645 - 0745	0	0	0	0	6	0	0	0	12	9	2	0	**29**
0700 - 0800	0	0	0	1	11	0	0	1	10	11	4	0	**38**
0715 - 0815	0	0	0	1	12	0	1	1	6	9	6	0	**36**
0730 - 0830	1	0	0	1	12	0	1	1	6	12	8	0	**42**
0745 - 0845	2	0	0	3	10	0	1	1	6	11	6	1	**41**
0800 - 0900	2	1	0	3	6	0	1	0	6	9	6	1	**35**
PEAK HOUR	**2**	**1**	**3**	**6**	**6**	**0**	**1**	**0**	**6**	**9**	**6**	**1**	**35**

Combined

Time Per	NORTH Northcote St L	T	R	WEST Mitchell Av L	T	R	SOUTH Northcote St L	T	R	EAST Mitchell Av L	T	R	TOT
0600 - 0615	1	2	2	1	10	2	5	5	27	37	20	1	**113**
0615 - 0630	1	4	6	4	5	0	7	7	66	47	23	0	**170**
0630 - 0645	2	2	3	0	10	3	2	7	28	32	14	1	**104**
0645 - 0700	0	0	7	2	0	6	7	5	32	44	19	3	**125**
0700 - 0715	3	5	3	7	9	5	7	9	54	55	20	1	**178**
0715 - 0730	2	1	0	1	13	1	0	7	44	29	17	0	**115**
0730 - 0745	1	7	3	2	18	3	1	11	59	67	18	4	**194**
0745 - 0800	2	11	1	6	21	4	1	17	58	80	20	5	**226**
0800 - 0815	3	21	1	1	16	1	3	19	47	59	22	3	**196**
0815 - 0830	7	12	1	2	24	1	1	16	45	81	27	7	**224**
0830 - 0845	8	23	10	16	41	5	5	25	70	99	34	9	**345**
0845 - 0900	5	42	5	21	36	6	4	32	56	84	27	5	**323**
Period End	**35**	**130**	**42**	**63**	**203**	**37**	**43**	**160**	**586**	**714**	**261**	**39**	**2313**

Combined

Peak Per	NORTH Northcote St L	T	R	WEST Mitchell Av L	T	R	SOUTH Northcote St L	T	R	EAST Mitchell Av L	T	R	TOT
0600 - 0700	4	8	18	7	25	11	21	24	153	160	76	5	**512**
0615 - 0715	6	11	19	13	24	14	23	28	180	178	76	5	**577**
0630 - 0730	7	8	13	10	32	15	16	28	158	160	70	5	**522**
0645 - 0745	6	13	13	12	40	15	15	32	189	195	74	8	**612**
0700 - 0800	8	24	7	16	61	13	9	44	215	231	75	10	**713**
0715 - 0815	8	40	5	10	68	9	5	54	208	235	77	12	**731**
0730 - 0830	13	51	6	11	79	9	6	63	209	287	87	19	**840**
0745 - 0845	20	67	13	25	102	11	10	77	220	319	103	24	**991**
0800 - 0900	23	98	17	40	117	13	13	92	218	323	110	24	**1088**
PEAK HOUR	**23**	**98**	**17**	**40**	**117**	**13**	**13**	**92**	**218**	**323**	**110**	**24**	**1088**

R.O.A.R DATA

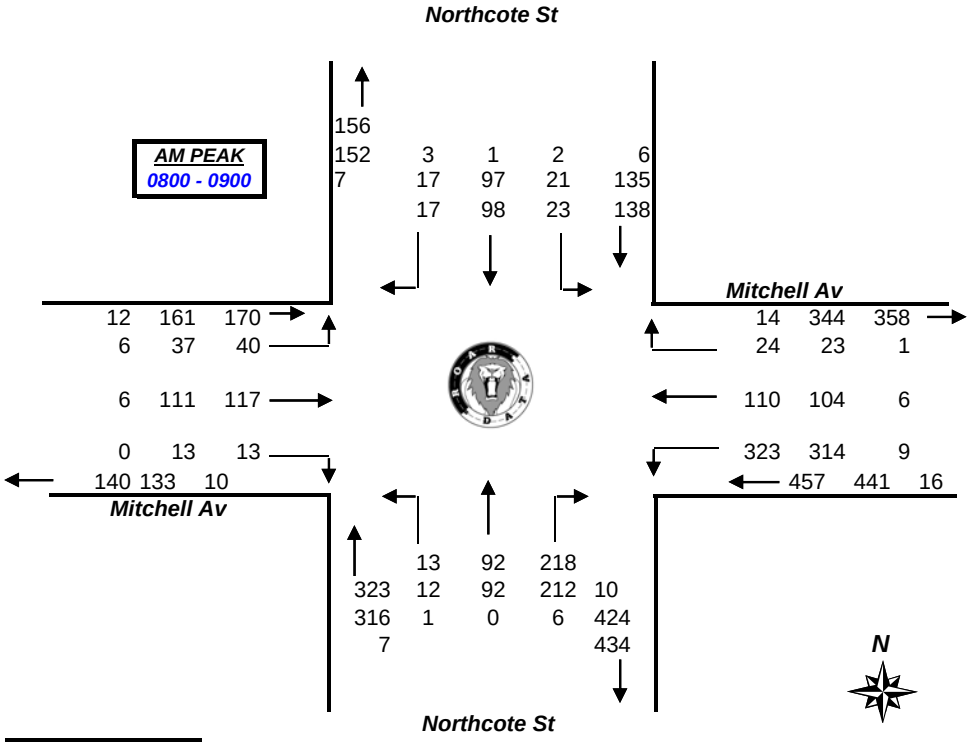
Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849, Mob.0418-239019

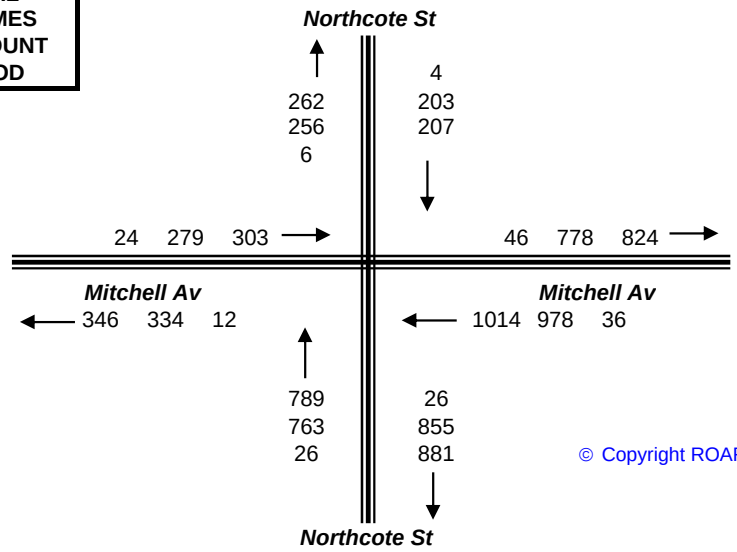
Client : EMM
Job No/Name : 5955 KURRI KURRI Mitchell Ave
Day/Date : Tuesday 8th March 2016

Peds	NORTH	WEST	SOUTH	EAST	
	Northcote St	*Mitchell Av*	*Northcote St*	*Mitchell Av*	
Time Per	**UNCLASSIFIED**	**UNCLASSIFIED**	**UNCLASSIFIED**	**UNCLASSIFIED**	**TOT**
0600 - 0615					**0**
0615 - 0630					**0**
0630 - 0645		*NOT*	*REQUIRED*		**0**
0645 - 0700					**0**
0700 - 0715					**0**
0715 - 0730					**0**
0730 - 0745					**0**
0745 - 0800					**0**
0800 - 0815					**0**
0815 - 0830					**0**
0830 - 0845					**0**
0845 - 0900					**0**
Period End	**0**	**0**	**0**	**0**	**0**

Peds	NORTH	WEST	SOUTH	EAST	
	Northcote St	*Mitchell Av*	*Northcote St*	*Mitchell Av*	
Peak Per	**UNCLASSIFIED**	**UNCLASSIFIED**	**UNCLASSIFIED**	**UNCLASSIFIED**	**TOT**
0600 - 0700	0	0	0	0	**0**
0615 - 0715	0	0	0	0	**0**
0630 - 0730	0	0	0	0	**0**
0645 - 0745	0	0	0	0	**0**
0700 - 0800	0	0	0	0	**0**
0715 - 0815	0	0	0	0	**0**
0730 - 0830	0	0	0	0	**0**
0745 - 0845	0	0	0	0	**0**
0800 - 0900	0	0	0	0	**0**
PEAK HR	**0**	**0**	**0**	**0**	**0**



TOTAL VOLUMES FOR COUNT PERIOD



R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849, Mob.0418-239019

Client : EMM
Job No/Name : 5955 KURRI KURRI Mitchell Ave
Day/Date : Tuesday 8th March 2016

Lights

Time Per	NORTH Northcote St L	NORTH Northcote St T	NORTH Northcote St R	WEST Mitchell Av L	WEST Mitchell Av T	WEST Mitchell Av R	SOUTH Northcote St L	SOUTH Northcote St T	SOUTH Northcote St R	EAST Mitchell Av L	EAST Mitchell Av T	EAST Mitchell Av R	TOT
1500 - 1515	2	14	0	5	41	3	5	10	59	68	27	3	**237**
1515 - 1530	2	17	1	5	38	7	5	14	88	85	23	3	**288**
1530 - 1545	5	25	5	17	29	5	6	38	72	76	44	30	**352**
1545 - 1600	14	71	19	5	45	7	5	14	68	72	41	6	**367**
1600 - 1615	8	21	7	6	28	5	5	5	77	79	35	5	**281**
1615 - 1630	3	17	5	3	29	5	5	8	60	82	33	5	**255**
1630 - 1645	2	19	2	4	30	2	5	10	70	69	36	7	**256**
1645 - 1700	10	19	3	6	32	5	5	14	43	59	29	8	**233**
1700 - 1715	3	19	3	5	30	5	5	18	55	77	37	1	**258**
1715 - 1730	5	16	3	5	20	6	3	16	74	65	34	2	**249**
1730 - 1745	5	37	6	5	23	5	3	16	75	57	26	5	**263**
1745 - 1800	4	15	5	7	32	5	2	17	59	79	27	2	**254**
Period End	**63**	**290**	**59**	**73**	**377**	**60**	**54**	**180**	**800**	**868**	**392**	**77**	**3293**

Lights

Peak Time	NORTH Northcote St L	NORTH Northcote St T	NORTH Northcote St R	WEST Mitchell Av L	WEST Mitchell Av T	WEST Mitchell Av R	SOUTH Northcote St L	SOUTH Northcote St T	SOUTH Northcote St R	EAST Mitchell Av L	EAST Mitchell Av T	EAST Mitchell Av R	TOT
1500 - 1600	23	127	25	32	153	22	21	76	287	301	135	42	**1244**
1515 - 1615	29	134	32	33	140	24	21	71	305	312	143	44	**1288**
1530 - 1630	30	134	36	31	131	22	21	65	277	309	153	46	**1255**
1545 - 1645	27	128	33	18	132	19	20	37	275	302	145	23	**1159**
1600 - 1700	23	76	17	19	119	17	20	37	250	289	133	25	**1025**
1615 - 1715	18	74	13	18	121	17	20	50	228	287	135	21	**1002**
1630 - 1730	20	73	11	20	112	18	18	58	242	270	136	18	**996**
1645 - 1745	23	91	15	21	105	21	16	64	247	258	126	16	**1003**
1700 - 1800	17	87	17	22	105	21	13	67	263	278	124	10	**1024**
PEAK HOUR	**29**	**134**	**32**	**33**	**140**	**24**	**21**	**71**	**305**	**312**	**143**	**44**	**1288**

Heavies

Time Per	NORTH Northcote St L	NORTH Northcote St T	NORTH Northcote St R	WEST Mitchell Av L	WEST Mitchell Av T	WEST Mitchell Av R	SOUTH Northcote St L	SOUTH Northcote St T	SOUTH Northcote St R	EAST Mitchell Av L	EAST Mitchell Av T	EAST Mitchell Av R	TOT
1500 - 1515	0	0	0	0	0	2	0	0	2	4	1	0	**9**
1515 - 1530	0	1	0	0	1	1	0	0	3	1	1	0	**8**
1530 - 1545	0	0	0	0	1	0	0	0	3	3	0	0	**7**
1545 - 1600	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1600 - 1615	1	0	2	0	0	0	0	0	1	2	0	0	**6**
1615 - 1630	0	1	0	0	0	0	0	2	4	1	2	0	**10**
1630 - 1645	1	0	1	0	0	0	1	0	1	2	1	0	**7**
1645 - 1700	0	1	0	0	0	0	0	0	1	3	1	0	**6**
1700 - 1715	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1715 - 1730	0	0	0	0	0	0	0	0	1	1	1	0	**3**
1730 - 1745	0	0	0	0	1	0	0	0	0	0	1	0	**2**
1745 - 1800	0	0	0	0	0	0	0	0	1	0	0	0	**1**
Period End	**2**	**3**	**3**	**0**	**3**	**3**	**1**	**2**	**17**	**17**	**8**	**0**	**59**

Heavies

Peak Per	NORTH Northcote St L	NORTH Northcote St T	NORTH Northcote St R	WEST Mitchell Av L	WEST Mitchell Av T	WEST Mitchell Av R	SOUTH Northcote St L	SOUTH Northcote St T	SOUTH Northcote St R	EAST Mitchell Av L	EAST Mitchell Av T	EAST Mitchell Av R	TOT
1500 - 1600	0	1	0	0	2	3	0	0	8	8	2	0	**24**
1515 - 1615	1	1	2	0	2	1	0	0	7	6	1	0	**21**
1530 - 1630	1	1	2	0	1	0	0	2	8	6	2	0	**23**
1545 - 1645	2	1	3	0	0	0	1	2	6	5	3	0	**23**
1600 - 1700	2	2	3	0	0	0	1	2	7	8	4	0	**29**
1615 - 1715	1	2	1	0	0	0	1	2	6	6	4	0	**23**
1630 - 1730	1	1	1	0	0	0	1	0	3	6	3	0	**16**
1645 - 1745	0	1	0	0	1	0	0	0	2	4	3	0	**11**
1700 - 1800	0	0	0	0	1	0	0	0	2	1	2	0	**6**
PEAK HOUR	**1**	**1**	**2**	**0**	**2**	**1**	**0**	**0**	**7**	**6**	**1**	**0**	**21**

Combined

Time Per	NORTH Northcote St L	NORTH Northcote St T	NORTH Northcote St R	WEST Mitchell Av L	WEST Mitchell Av T	WEST Mitchell Av R	SOUTH Northcote St L	SOUTH Northcote St T	SOUTH Northcote St R	EAST Mitchell Av L	EAST Mitchell Av T	EAST Mitchell Av R	TOT
1500 - 1515	2	14	0	5	41	5	5	10	61	72	28	3	**246**
1515 - 1530	2	18	1	5	39	8	5	14	91	86	24	3	**296**
1530 - 1545	5	25	5	17	30	5	6	38	75	79	44	30	**359**
1545 - 1600	14	71	19	5	45	7	5	14	68	72	41	6	**367**
1600 - 1615	9	21	9	6	28	5	5	5	78	81	35	5	**287**
1615 - 1630	3	18	5	3	29	5	5	10	64	83	35	5	**265**
1630 - 1645	3	19	3	4	30	2	6	10	71	71	37	7	**263**
1645 - 1700	10	20	3	6	32	5	5	14	44	62	30	8	**239**
1700 - 1715	3	19	3	5	30	5	5	18	55	77	37	1	**258**
1715 - 1730	5	16	3	5	20	6	3	16	75	66	35	2	**252**
1730 - 1745	5	37	6	5	24	5	3	16	75	57	27	5	**265**
1745 - 1800	4	15	5	7	32	5	2	17	60	79	27	2	**255**
Period End	**65**	**293**	**62**	**73**	**380**	**63**	**55**	**182**	**817**	**885**	**400**	**77**	**3352**

Combined

Peak Per	NORTH Northcote St L	NORTH Northcote St T	NORTH Northcote St R	WEST Mitchell Av L	WEST Mitchell Av T	WEST Mitchell Av R	SOUTH Northcote St L	SOUTH Northcote St T	SOUTH Northcote St R	EAST Mitchell Av L	EAST Mitchell Av T	EAST Mitchell Av R	TOT
1500 - 1600	23	128	25	32	155	25	21	76	295	309	137	42	**1268**
1515 - 1615	30	135	34	33	142	25	21	71	312	318	144	44	**1309**
1530 - 1630	31	135	38	31	132	22	21	67	285	315	155	46	**1278**
1545 - 1645	29	129	36	18	132	19	21	39	281	307	148	23	**1182**
1600 - 1700	25	78	20	19	119	17	21	39	257	297	137	25	**1054**
1615 - 1715	19	76	14	18	121	17	21	52	234	293	139	21	**1025**
1630 - 1730	21	74	12	20	112	18	19	58	245	276	139	18	**1012**
1645 - 1745	23	92	15	21	106	21	16	64	249	262	129	16	**1014**
1700 - 1800	17	87	17	22	106	21	13	67	265	279	126	10	**1030**
PEAK HOUR	**30**	**135**	**34**	**33**	**142**	**25**	**21**	**71**	**312**	**318**	**144**	**44**	**1309**

R.O.A.R DATA

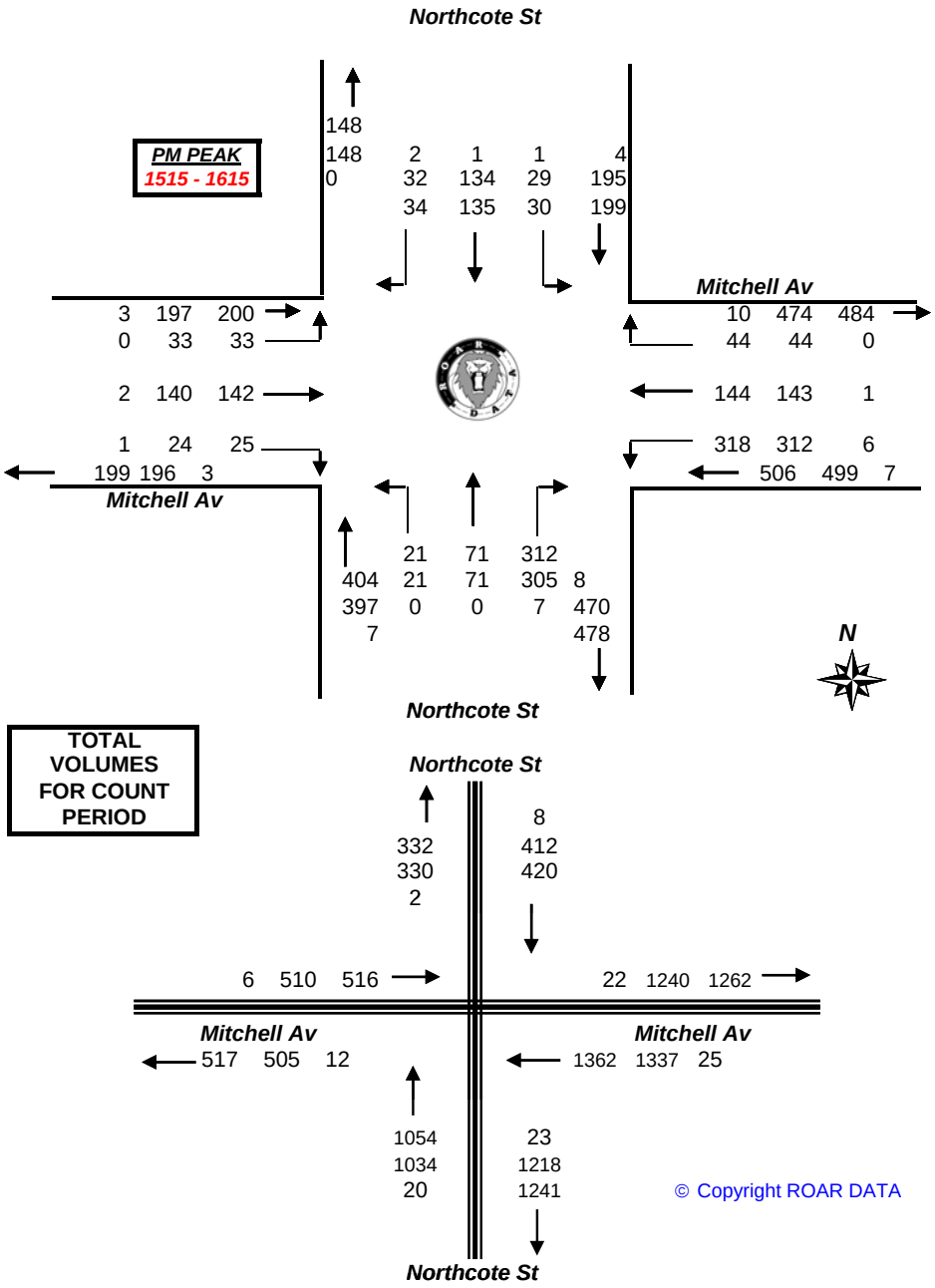
Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849, Mob.0418-239019

Client : EMM
Job No/Name : 5955 KURRI KURRI Mitchell Ave
Day/Date : Tuesday 8th March 2016

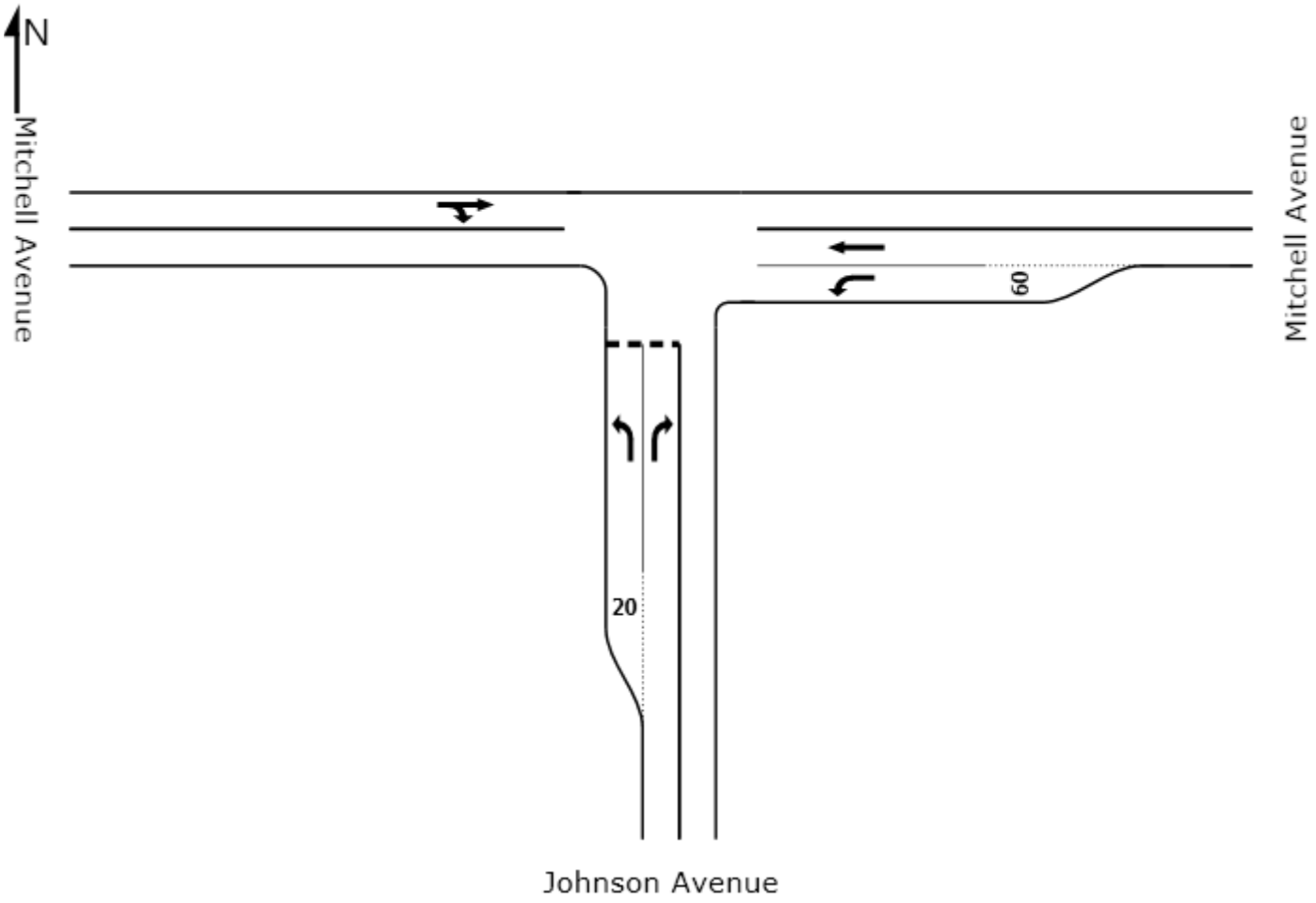
Peds	NORTH	WEST	SOUTH	EAST	
	Northcote St	*Mitchell Av*	*Northcote St*	*Mitchell Av*	
Time Per	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	TOT
1500 - 1515					0
1515 - 1530					0
1530 - 1545		*NOT*	*REQUIRED*		0
1545 - 1600					0
1600 - 1615					0
1615 - 1630					0
1630 - 1645					0
1645 - 1700					0
1700 - 1715					0
1715 - 1730					0
1730 - 1745					0
1745 - 1800					0
Period End	**0**	**0**	**0**	**0**	**0**

Peds	NORTH	WEST	SOUTH	EAST	
	Northcote St	*Mitchell Av*	*Northcote St*	*Mitchell Av*	
Peak Per	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	TOT
1500 - 1600	0	0	0	0	0
1515 - 1615	0	0	0	0	0
1530 - 1630	0	0	0	0	0
1545 - 1645	0	0	0	0	0
1600 - 1700	0	0	0	0	0
1615 - 1715	0	0	0	0	0
1630 - 1730	0	0	0	0	0
1645 - 1745	0	0	0	0	0
1700 - 1800	0	0	0	0	0
PEAK HR	**0**	**0**	**0**	**0**	**0**



Appendix C

SIDRA Existing intersection analysis results


N
Mitchell Avenue
Mitchell Avenue
60
20
Johnson Avenue

MOVEMENT SUMMARY

Site: Mitchell/Johnson Avenue
2016 AM

T Intersection near site access
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Johnson Avenue											
1	L	3	0.0	0.003	8.5	LOS A	0.0	0.1	0.19	0.60	48.1
3	R	21	15.0	0.028	10.9	LOS A	0.1	0.9	0.41	0.67	46.7
Approach		24	13.0	0.028	10.6	LOS A	0.1	0.9	0.38	0.66	46.9
East: Mitchell Avenue											
4	L	28	7.4	0.016	8.5	LOS A	0.0	0.0	0.00	0.67	49.0
5	T	97	2.2	0.050	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		125	3.4	0.050	1.9	NA	0.0	0.0	0.00	0.15	57.1
West: Mitchell Avenue											
11	T	163	4.5	0.089	0.6	LOS A	0.6	4.4	0.29	0.00	54.7
12	R	4	25.0	0.089	9.8	LOS A	0.6	4.4	0.29	0.98	49.1
Approach		167	5.0	0.089	0.8	NA	0.6	4.4	0.29	0.02	54.5
All Vehicles		317	5.0	0.089	2.0	NA	0.6	4.4	0.18	0.12	54.8

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

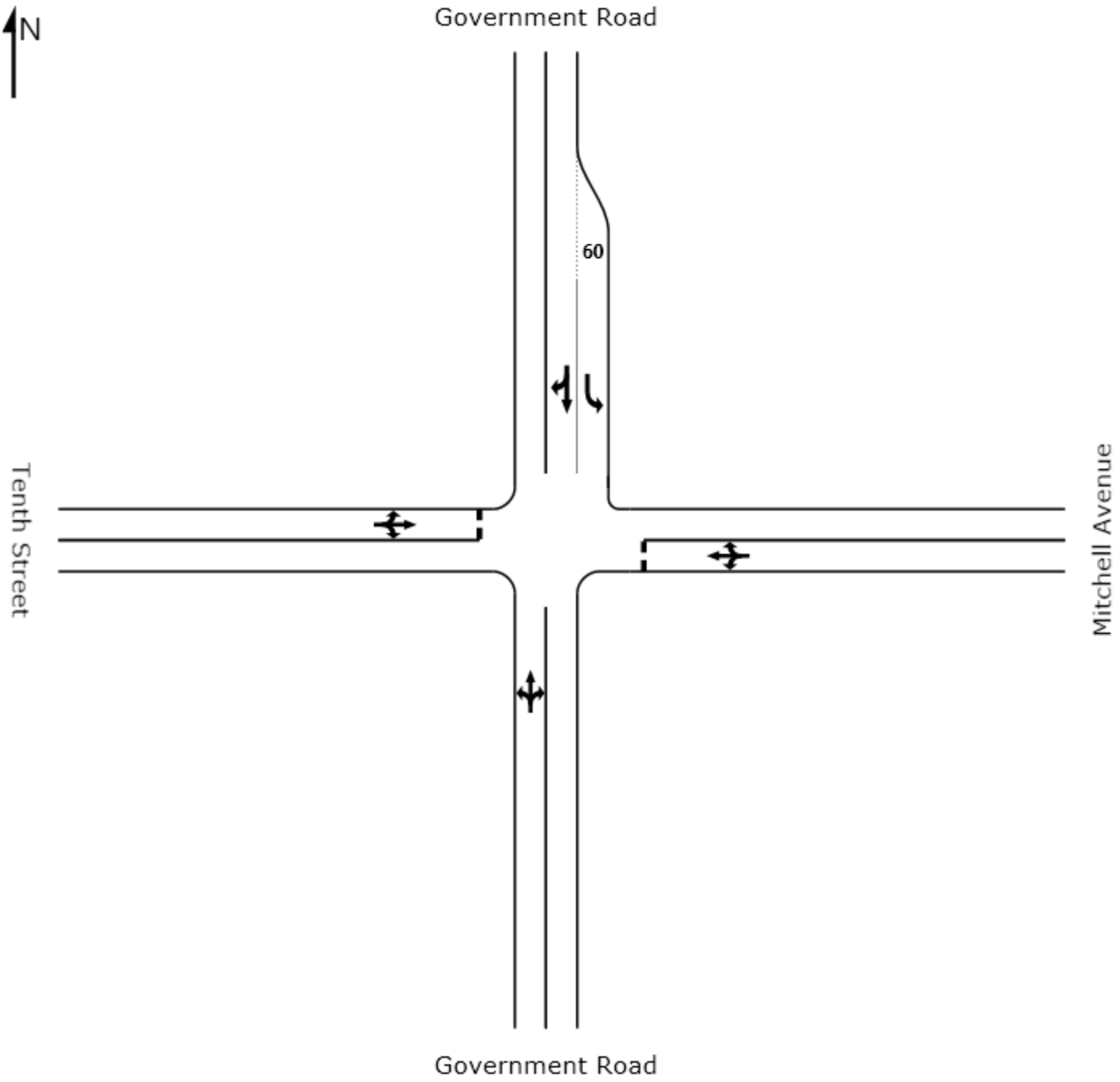
Site: Mitchell/Johnson Avenue
2016 PM

T Intersection near site access
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Johnson Avenue											
1	L	4	0.0	0.004	8.6	LOS A	0.0	0.1	0.25	0.59	47.8
3	R	23	13.6	0.031	11.0	LOS A	0.1	0.9	0.43	0.68	46.5
Approach		27	11.5	0.031	10.6	LOS A	0.1	0.9	0.40	0.66	46.7
East: Mitchell Avenue											
4	L	18	5.9	0.010	8.4	LOS A	0.0	0.0	0.00	0.67	49.0
5	T	164	1.9	0.085	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		182	2.3	0.085	0.8	NA	0.0	0.0	0.00	0.07	58.7
West: Mitchell Avenue											
11	T	125	2.5	0.068	1.0	LOS A	0.5	3.7	0.38	0.00	53.3
12	R	3	33.3	0.068	10.5	LOS A	0.5	3.7	0.38	0.96	49.2
Approach		128	3.3	0.068	1.2	NA	0.5	3.7	0.38	0.02	53.2
All Vehicles		338	3.4	0.085	1.8	NA	0.5	3.7	0.18	0.10	55.4

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.


N
Government Road
60
Tenth Street
Mitchell Avenue
Government Road

MOVEMENT SUMMARY

Site: Government Road/Mitchell Avenue 2016 AM

Four Way Intersection
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Government Road											
1	L	3	0.0	0.231	9.1	LOS A	1.8	12.7	0.51	0.54	49.0
2	T	405	0.5	0.231	1.6	LOS A	1.8	12.7	0.51	0.00	51.0
3	R	27	3.8	0.231	10.2	LOS A	1.8	12.7	0.51	0.95	49.2
Approach		436	0.7	0.231	2.2	NA	1.8	12.7	0.51	0.06	50.9
East: Mitchell Avenue											
4	L	13	8.3	0.180	16.6	LOS B	0.6	4.8	0.64	0.70	41.3
5	T	1	0.0	0.180	14.3	LOS A	0.6	4.8	0.64	0.83	41.3
6	R	56	7.5	0.180	16.7	LOS B	0.6	4.8	0.64	0.89	41.3
Approach		69	7.6	0.180	16.6	LOS B	0.6	4.8	0.64	0.85	41.3
North: Government Road											
7	L	82	6.4	0.046	8.4	LOS A	0.0	0.0	0.00	0.67	49.0
8	T	286	1.1	0.149	1.7	LOS A	1.1	7.9	0.51	0.00	51.2
9	R	1	0.0	0.149	9.5	LOS A	1.1	7.9	0.51	1.05	49.4
Approach		369	2.3	0.149	3.2	NA	1.1	7.9	0.40	0.15	50.7
West: Tenth Street											
10	L	14	0.0	0.018	9.3	LOS A	0.1	0.4	0.46	0.64	42.0
11	T	1	0.0	0.018	8.0	LOS A	0.1	0.4	0.46	0.67	42.7
12	R	1	0.0	0.018	9.6	LOS A	0.1	0.4	0.46	0.78	41.9
Approach		16	0.0	0.018	9.3	LOS A	0.1	0.4	0.46	0.65	42.0
All Vehicles		891	1.9	0.231	3.9	NA	1.8	12.7	0.47	0.17	49.7

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

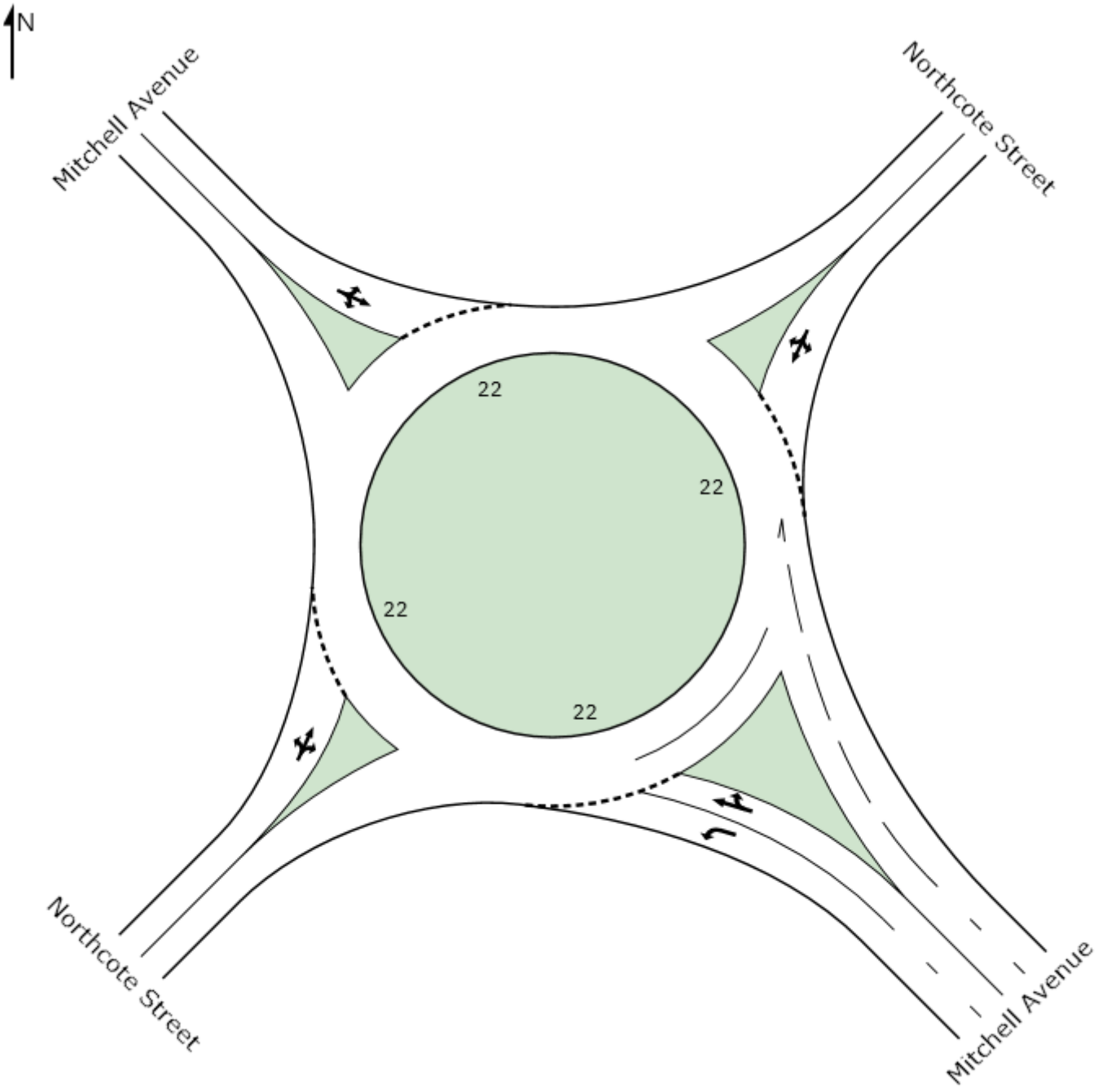
Site: Government Road/Mitchell Avenue 2016 PM

Four Way Intersection
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Government Road											
1	L	2	0.0	0.189	9.7	LOS A	1.5	10.8	0.57	0.47	48.9
2	T	318	0.3	0.189	2.2	LOS A	1.5	10.8	0.57	0.00	50.2
3	R	27	3.8	0.189	10.8	LOS A	1.5	10.8	0.57	0.96	48.9
Approach		347	0.6	0.189	3.0	NA	1.5	10.8	0.57	0.08	50.0
East: Mitchell Avenue											
4	L	37	0.0	0.382	18.7	LOS B	1.8	12.4	0.72	0.92	39.5
5	T	8	0.0	0.382	16.7	LOS B	1.8	12.4	0.72	0.93	39.4
6	R	106	0.0	0.382	18.8	LOS B	1.8	12.4	0.72	0.98	39.5
Approach		152	0.0	0.382	18.7	LOS B	1.8	12.4	0.72	0.96	39.5
North: Government Road											
7	L	72	1.5	0.039	8.2	LOS A	0.0	0.0	0.00	0.67	49.0
8	T	426	0.0	0.226	1.4	LOS A	1.7	11.9	0.48	0.00	51.6
9	R	9	0.0	0.226	9.2	LOS A	1.7	11.9	0.48	1.03	49.3
Approach		507	0.2	0.226	2.5	NA	1.7	11.9	0.41	0.11	51.2
West: Tenth Street											
10	L	7	14.3	0.018	11.3	LOS A	0.1	0.5	0.49	0.63	40.8
11	T	3	0.0	0.018	9.6	LOS A	0.1	0.5	0.49	0.70	41.5
12	R	1	0.0	0.018	11.2	LOS A	0.1	0.5	0.49	0.81	40.7
Approach		12	9.1	0.018	10.8	LOS A	0.1	0.5	0.49	0.66	41.0
All Vehicles		1018	0.4	0.382	5.2	NA	1.8	12.4	0.51	0.23	48.5

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.


N
Mitchell Avenue
Northcote Street
22
22
22
22
Northcote Street
Mitchell Avenue

MOVEMENT SUMMARY

Site: Mitchell Avenue/Northcote Street 2016 AM

Four Way Roundabout
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Mitchell Avenue											
21	L	340	2.8	0.252	6.9	LOS A	1.3	9.5	0.30	0.55	49.3
22	T	116	5.5	0.140	6.0	LOS A	0.6	4.6	0.30	0.48	50.2
23	R	25	4.2	0.140	10.8	LOS A	0.6	4.6	0.30	0.81	45.9
Approach		481	3.5	0.252	6.9	LOS A	1.3	9.5	0.30	0.54	49.3
North East: Northcote Street											
24	L	24	8.7	0.143	7.0	LOS A	0.8	5.6	0.50	0.61	43.6
25	T	103	1.0	0.143	5.9	LOS A	0.8	5.6	0.50	0.55	43.8
26	R	21	15.0	0.143	12.3	LOS A	0.8	5.6	0.50	0.81	41.4
Approach		148	4.3	0.143	7.0	LOS A	0.8	5.6	0.50	0.59	43.4
North West: Mitchell Avenue											
27	L	42	7.5	0.169	7.2	LOS A	1.0	7.0	0.51	0.62	48.2
28	T	123	5.1	0.169	7.1	LOS A	1.0	7.0	0.51	0.58	48.7
29	R	14	0.0	0.169	12.9	LOS A	1.0	7.0	0.51	0.81	45.7
Approach		179	5.3	0.169	7.5	LOS A	1.0	7.0	0.51	0.61	48.3
South West: Northcote Street											
30	L	14	7.7	0.266	7.1	LOS A	1.6	11.3	0.38	0.53	48.9
31	T	97	0.0	0.266	5.2	LOS A	1.6	11.3	0.38	0.44	48.8
32	R	229	2.8	0.266	12.1	LOS A	1.6	11.3	0.38	0.71	45.5
Approach		340	2.2	0.266	9.9	LOS A	1.6	11.3	0.38	0.63	46.5
All Vehicles		1148	3.5	0.266	7.9	LOS A	1.6	11.3	0.38	0.58	47.4

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Mitchell Avenue/Northcote Street 2016 PM

Four Way Roundabout
Roundabout

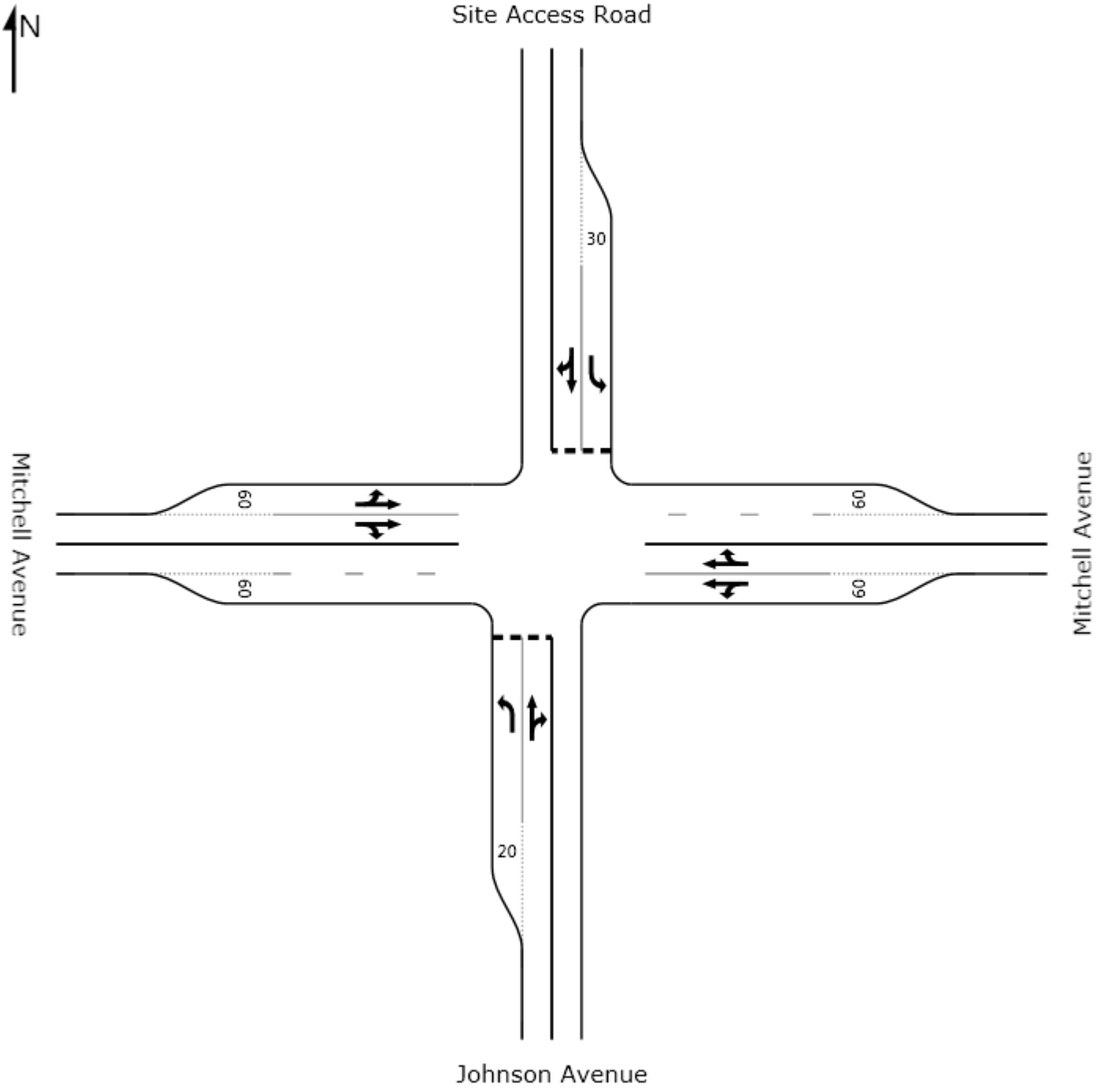
Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Mitchell Avenue											
21	L	335	1.9	0.266	7.2	LOS A	1.4	10.3	0.38	0.58	48.8
22	T	152	0.7	0.187	6.1	LOS A	0.9	6.4	0.37	0.51	49.6
23	R	46	0.0	0.187	10.9	LOS A	0.9	6.4	0.37	0.80	45.8
Approach		533	1.4	0.266	7.2	LOS A	1.4	10.3	0.38	0.58	48.7
North East: Northcote Street											
24	L	32	3.3	0.220	7.8	LOS A	1.3	9.4	0.62	0.69	43.0
25	T	142	0.7	0.220	6.8	LOS A	1.3	9.4	0.62	0.64	43.1
26	R	36	5.9	0.220	13.0	LOS A	1.3	9.4	0.62	0.84	40.8
Approach		209	2.0	0.220	8.0	LOS A	1.3	9.4	0.62	0.68	42.7
North West: Mitchell Avenue											
27	L	35	0.0	0.215	7.6	LOS A	1.3	9.2	0.60	0.67	47.7
28	T	149	1.4	0.215	7.6	LOS A	1.3	9.2	0.60	0.64	48.0
29	R	26	4.0	0.215	13.6	LOS A	1.3	9.2	0.60	0.83	45.3
Approach		211	1.5	0.215	8.3	LOS A	1.3	9.2	0.60	0.67	47.6
South West: Northcote Street											
30	L	22	0.0	0.355	7.4	LOS A	2.3	16.5	0.49	0.58	48.0
31	T	75	0.0	0.355	5.7	LOS A	2.3	16.5	0.49	0.51	47.8
32	R	328	2.2	0.355	12.6	LOS A	2.3	16.5	0.49	0.72	45.0
Approach		425	1.7	0.355	11.1	LOS A	2.3	16.5	0.49	0.67	45.6
All Vehicles		1378	1.6	0.355	8.7	LOS A	2.3	16.5	0.48	0.64	46.5

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model used.

Appendix D

SIDRA Proposed intersection analysis results


N
Site Access Road
30
Mitchell Avenue
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Mitchell Avenue
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Johnson Avenue

MOVEMENT SUMMARY

Site: Mitchell/Johnson Avenue
Construction 2016 AM

New Four Way Intersection at site access
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Johnson Avenue											
1	L	3	0.0	0.003	8.5	LOS A	0.0	0.1	0.19	0.60	48.1
2	T	1	0.0	0.042	10.4	LOS A	0.2	1.2	0.46	0.62	46.2
3	R	21	15.0	0.042	12.4	LOS A	0.2	1.2	0.46	0.71	45.3
Approach		25	12.5	0.042	11.8	LOS A	0.2	1.2	0.43	0.70	45.6
East: Mitchell Avenue											
4	L	28	7.4	0.018	8.5	LOS A	0.0	0.0	0.00	0.70	49.0
5	T	97	2.2	0.052	1.1	LOS A	0.4	3.0	0.37	0.00	53.4
6	R	3	33.3	0.052	10.5	LOS A	0.4	3.0	0.39	0.92	49.2
Approach		128	4.1	0.052	2.9	NA	0.4	3.0	0.29	0.18	52.2
North: Site Access Road											
7	L	1	100.0	0.003	14.8	LOS B	0.0	0.1	0.38	0.61	44.1
8	T	1	0.0	0.018	14.5	LOS B	0.1	0.7	0.53	0.60	42.5
9	R	4	75.0	0.018	18.8	LOS B	0.1	0.7	0.53	0.75	41.8
Approach		6	66.7	0.018	17.4	LOS B	0.1	0.7	0.51	0.70	42.3
West: Mitchell Avenue											
10	L	6	50.0	0.025	10.0	LOS A	0.0	0.0	0.00	1.07	49.0
11	T	163	4.5	0.070	0.5	LOS A	0.5	3.7	0.24	0.00	55.6
12	R	4	25.0	0.070	9.8	LOS A	0.5	3.7	0.31	0.94	49.1
Approach		174	6.7	0.070	1.1	NA	0.5	3.7	0.23	0.06	55.1
All Vehicles		334	7.3	0.070	2.9	NA	0.5	3.7	0.27	0.17	52.9

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Mitchell/Johnson Avenue
Construction 2016 PM

New Four Way Intersection at site access
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Johnson Avenue											
1	L	4	0.0	0.004	8.6	LOS A	0.0	0.1	0.25	0.59	47.8
2	T	1	0.0	0.048	10.9	LOS A	0.2	1.4	0.48	0.63	45.7
3	R	23	13.6	0.048	12.7	LOS A	0.2	1.4	0.48	0.73	44.9
Approach		28	11.1	0.048	12.1	LOS A	0.2	1.4	0.45	0.71	45.3
East: Mitchell Avenue											
4	L	18	5.9	0.025	8.4	LOS A	0.0	0.0	0.00	0.88	49.0
5	T	164	1.9	0.071	0.4	LOS A	0.4	3.1	0.22	0.00	55.9
6	R	1	0.0	0.071	8.7	LOS A	0.4	3.1	0.26	0.93	49.1
Approach		183	2.3	0.071	1.2	NA	0.4	3.1	0.20	0.09	55.1
North: Site Access Road											
7	L	13	0.0	0.014	8.7	LOS A	0.0	0.3	0.22	0.61	48.0
8	T	1	0.0	0.040	10.0	LOS A	0.1	1.1	0.45	0.62	46.6
9	R	22	4.8	0.040	11.5	LOS A	0.1	1.1	0.45	0.71	45.7
Approach		36	2.9	0.040	10.5	LOS A	0.1	1.1	0.37	0.67	46.5
West: Mitchell Avenue											
10	L	1	100.0	0.018	11.9	LOS A	0.0	0.0	0.00	1.26	46.6
11	T	125	2.5	0.052	0.9	LOS A	0.4	3.1	0.29	0.00	54.6
12	R	3	33.3	0.052	10.6	LOS A	0.4	3.1	0.40	0.92	49.2
Approach		129	4.1	0.052	1.2	NA	0.4	3.1	0.29	0.03	54.4
All Vehicles		377	3.6	0.071	2.9	NA	0.4	3.1	0.26	0.17	53.1

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Mitchell/Johnson Avenue
Operations 2016 AM

New Four Way Intersection at site access
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Johnson Avenue											
1	L	3	0.0	0.003	8.5	LOS A	0.0	0.1	0.19	0.60	48.1
2	T	1	0.0	0.042	10.4	LOS A	0.2	1.2	0.46	0.62	46.1
3	R	21	15.0	0.042	12.4	LOS A	0.2	1.2	0.46	0.72	45.2
Approach		25	12.5	0.042	11.8	LOS A	0.2	1.2	0.43	0.70	45.6
East: Mitchell Avenue											
4	L	28	7.4	0.018	8.5	LOS A	0.0	0.0	0.00	0.70	49.0
5	T	97	2.2	0.052	0.6	LOS A	0.3	2.3	0.29	0.00	54.6
6	R	4	0.0	0.052	8.9	LOS A	0.3	2.3	0.31	0.90	49.1
Approach		129	3.3	0.052	2.6	NA	0.3	2.3	0.23	0.18	53.1
North: Site Access Road											
7	L	1	0.0	0.001	8.9	LOS A	0.0	0.0	0.26	0.59	47.8
8	T	1	0.0	0.013	13.4	LOS A	0.0	0.5	0.52	0.59	43.4
9	R	3	66.7	0.013	17.4	LOS B	0.0	0.5	0.52	0.73	42.7
Approach		5	40.0	0.013	14.9	LOS B	0.0	0.5	0.47	0.67	43.8
West: Mitchell Avenue											
10	L	7	28.6	0.025	9.2	LOS A	0.0	0.0	0.00	1.03	49.0
11	T	163	4.5	0.070	0.5	LOS A	0.5	3.7	0.24	0.00	55.6
12	R	4	25.0	0.070	9.8	LOS A	0.5	3.7	0.31	0.94	49.1
Approach		175	6.0	0.070	1.1	NA	0.5	3.7	0.23	0.07	55.1
All Vehicles		335	6.0	0.070	2.7	NA	0.5	3.7	0.25	0.17	53.3

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Mitchell/Johnson Avenue
Operations 2016 PM

New Four Way Intersection at site access
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Johnson Avenue											
1	L	4	0.0	0.004	8.6	LOS A	0.0	0.1	0.25	0.59	47.8
2	T	1	0.0	0.047	10.7	LOS A	0.2	1.4	0.47	0.63	45.9
3	R	23	13.6	0.047	12.6	LOS A	0.2	1.4	0.47	0.73	45.0
Approach		28	11.1	0.047	11.9	LOS A	0.2	1.4	0.44	0.70	45.4
East: Mitchell Avenue											
4	L	18	5.9	0.025	8.4	LOS A	0.0	0.0	0.00	0.88	49.0
5	T	164	1.9	0.071	0.4	LOS A	0.4	3.1	0.22	0.00	55.9
6	R	1	0.0	0.071	8.7	LOS A	0.4	3.1	0.27	0.93	49.1
Approach		183	2.3	0.071	1.2	NA	0.4	3.1	0.20	0.09	55.1
North: Site Access Road											
7	L	2	0.0	0.002	8.7	LOS A	0.0	0.0	0.22	0.60	48.0
8	T	1	0.0	0.015	12.9	LOS A	0.1	0.5	0.52	0.60	43.8
9	R	4	50.0	0.015	16.2	LOS B	0.1	0.5	0.52	0.73	43.1
Approach		7	28.6	0.015	13.6	LOS A	0.1	0.5	0.43	0.67	44.5
West: Mitchell Avenue											
10	L	3	66.7	0.019	10.6	LOS A	0.0	0.0	0.00	1.14	49.0
11	T	125	2.5	0.053	0.9	LOS A	0.4	3.1	0.30	0.00	54.5
12	R	3	33.3	0.053	10.6	LOS A	0.4	3.1	0.40	0.92	49.2
Approach		132	4.8	0.053	1.4	NA	0.4	3.1	0.29	0.05	54.2
All Vehicles		351	4.5	0.071	2.4	NA	0.4	3.1	0.26	0.14	53.6

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Government Road/Mitchell Avenue Construction 2016 AM

Four Way Intersection
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Government Road											
1	L	3	0.0	0.234	9.2	LOS A	1.9	13.2	0.53	0.52	49.0
2	T	405	0.5	0.234	1.7	LOS A	1.9	13.2	0.53	0.00	50.8
3	R	29	7.1	0.234	10.5	LOS A	1.9	13.2	0.53	0.95	49.2
Approach		438	1.0	0.234	2.4	NA	1.9	13.2	0.53	0.07	50.7
East: Mitchell Avenue											
4	L	14	15.4	0.205	17.7	LOS B	0.7	5.7	0.66	0.73	40.6
5	T	1	0.0	0.205	15.2	LOS B	0.7	5.7	0.66	0.84	40.6
6	R	59	10.7	0.205	17.7	LOS B	0.7	5.7	0.66	0.90	40.6
Approach		74	11.4	0.205	17.7	LOS B	0.7	5.7	0.66	0.87	40.6
North: Government Road											
7	L	86	8.5	0.049	8.5	LOS A	0.0	0.0	0.00	0.67	49.0
8	T	286	1.1	0.149	1.7	LOS A	1.1	7.9	0.51	0.00	51.2
9	R	1	0.0	0.149	9.5	LOS A	1.1	7.9	0.51	1.05	49.4
Approach		374	2.8	0.149	3.3	NA	1.1	7.9	0.39	0.16	50.7
West: Tenth Street											
10	L	14	0.0	0.018	9.3	LOS A	0.1	0.5	0.46	0.64	42.0
11	T	1	0.0	0.018	8.0	LOS A	0.1	0.5	0.46	0.67	42.7
12	R	1	0.0	0.018	9.6	LOS A	0.1	0.5	0.46	0.79	41.8
Approach		16	0.0	0.018	9.3	LOS A	0.1	0.5	0.46	0.65	42.0
All Vehicles		901	2.6	0.234	4.1	NA	1.9	13.2	0.48	0.18	49.5

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Government Road/Mitchell Avenue Construction 2016 PM

Four Way Intersection
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Government Road											
1	L	2	0.0	0.189	9.7	LOS A	1.5	10.8	0.57	0.47	48.8
2	T	318	0.3	0.189	2.2	LOS A	1.5	10.8	0.57	0.00	50.1
3	R	27	3.8	0.189	10.9	LOS A	1.5	10.8	0.57	0.96	48.9
Approach		347	0.6	0.189	3.0	NA	1.5	10.8	0.57	0.08	50.0
East: Mitchell Avenue											
4	L	44	0.0	0.435	19.4	LOS B	2.1	15.1	0.73	0.96	39.0
5	T	8	0.0	0.435	17.4	LOS B	2.1	15.1	0.73	0.96	38.8
6	R	121	0.9	0.435	19.6	LOS B	2.1	15.1	0.73	1.00	39.0
Approach		174	0.6	0.435	19.4	LOS B	2.1	15.1	0.73	0.99	39.0
North: Government Road											
7	L	73	2.9	0.040	8.3	LOS A	0.0	0.0	0.00	0.67	49.0
8	T	426	0.0	0.226	1.4	LOS A	1.7	11.9	0.48	0.00	51.6
9	R	9	0.0	0.226	9.2	LOS A	1.7	11.9	0.48	1.03	49.3
Approach		508	0.4	0.226	2.5	NA	1.7	11.9	0.41	0.11	51.2
West: Tenth Street											
10	L	7	14.3	0.018	11.4	LOS A	0.1	0.5	0.49	0.63	40.8
11	T	3	0.0	0.018	9.6	LOS A	0.1	0.5	0.49	0.70	41.5
12	R	1	0.0	0.018	11.2	LOS A	0.1	0.5	0.49	0.81	40.7
Approach		12	9.1	0.018	10.9	LOS A	0.1	0.5	0.49	0.66	41.0
All Vehicles		1041	0.6	0.435	5.6	NA	2.1	15.1	0.52	0.25	48.2

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
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NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Government Road/Mitchell Avenue Operations 2016 AM

Four Way Intersection
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Government Road											
1	L	3	0.0	0.233	9.1	LOS A	1.8	12.8	0.52	0.53	49.0
2	T	405	0.5	0.233	1.7	LOS A	1.8	12.8	0.52	0.00	50.9
3	R	29	3.6	0.233	10.2	LOS A	1.8	12.8	0.52	0.95	49.2
Approach		438	0.7	0.233	2.3	NA	1.8	12.8	0.52	0.07	50.8
East: Mitchell Avenue											
4	L	13	8.3	0.203	17.5	LOS B	0.7	5.6	0.67	0.72	40.6
5	T	1	0.0	0.203	15.3	LOS B	0.7	5.6	0.67	0.84	40.5
6	R	59	10.7	0.203	17.8	LOS B	0.7	5.6	0.67	0.90	40.6
Approach		73	10.1	0.203	17.7	LOS B	0.7	5.6	0.67	0.87	40.6
North: Government Road											
7	L	87	8.4	0.050	8.5	LOS A	0.0	0.0	0.00	0.67	49.0
8	T	286	1.1	0.149	1.7	LOS A	1.1	7.9	0.51	0.00	51.2
9	R	1	0.0	0.149	9.5	LOS A	1.1	7.9	0.51	1.05	49.4
Approach		375	2.8	0.149	3.3	NA	1.1	7.9	0.39	0.16	50.7
West: Tenth Street											
10	L	14	0.0	0.018	9.3	LOS A	0.1	0.5	0.46	0.64	42.0
11	T	1	0.0	0.018	8.0	LOS A	0.1	0.5	0.46	0.67	42.7
12	R	1	0.0	0.018	9.6	LOS A	0.1	0.5	0.46	0.79	41.8
Approach		16	0.0	0.018	9.3	LOS A	0.1	0.5	0.46	0.65	42.0
All Vehicles		901	2.3	0.233	4.1	NA	1.8	12.8	0.48	0.18	49.6

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Government Road/Mitchell Avenue Operations 2016 PM

Four Way Intersection
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Government Road											
1	L	2	0.0	0.189	9.7	LOS A	1.5	10.8	0.57	0.47	48.8
2	T	318	0.3	0.189	2.3	LOS A	1.5	10.8	0.57	0.00	50.1
3	R	27	3.8	0.189	10.9	LOS A	1.5	10.8	0.57	0.96	48.9
Approach		347	0.6	0.189	3.0	NA	1.5	10.8	0.57	0.08	50.0
East: Mitchell Avenue											
4	L	38	0.0	0.394	18.9	LOS B	1.8	13.1	0.72	0.93	39.4
5	T	8	0.0	0.394	16.9	LOS B	1.8	13.1	0.72	0.94	39.2
6	R	109	1.9	0.394	19.1	LOS B	1.8	13.1	0.72	0.98	39.4
Approach		156	1.4	0.394	18.9	LOS B	1.8	13.1	0.72	0.97	39.4
North: Government Road											
7	L	75	4.2	0.041	8.3	LOS A	0.0	0.0	0.00	0.67	49.0
8	T	426	0.0	0.226	1.4	LOS A	1.7	11.9	0.48	0.00	51.6
9	R	9	0.0	0.226	9.2	LOS A	1.7	11.9	0.48	1.03	49.3
Approach		511	0.6	0.226	2.6	NA	1.7	11.9	0.41	0.12	51.2
West: Tenth Street											
10	L	7	14.3	0.018	11.4	LOS A	0.1	0.5	0.49	0.63	40.8
11	T	3	0.0	0.018	9.6	LOS A	0.1	0.5	0.49	0.70	41.5
12	R	1	0.0	0.018	11.2	LOS A	0.1	0.5	0.49	0.81	40.7
Approach		12	9.1	0.018	10.9	LOS A	0.1	0.5	0.49	0.66	41.0
All Vehicles		1025	0.8	0.394	5.3	NA	1.8	13.1	0.51	0.24	48.5

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Mitchell Avenue/Northcote Street Construction 2016 AM

Four Way Roundabout
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Mitchell Avenue											
21	L	340	2.8	0.252	6.9	LOS A	1.3	9.5	0.30	0.55	49.3
22	T	118	6.3	0.143	6.1	LOS A	0.6	4.7	0.30	0.48	50.2
23	R	25	4.2	0.143	10.8	LOS A	0.6	4.7	0.30	0.81	45.9
Approach		483	3.7	0.252	6.9	LOS A	1.3	9.5	0.30	0.54	49.3
North East: Northcote Street											
24	L	24	8.7	0.143	7.0	LOS A	0.8	5.6	0.51	0.61	43.6
25	T	103	1.0	0.143	5.9	LOS A	0.8	5.6	0.51	0.55	43.8
26	R	21	15.0	0.143	12.3	LOS A	0.8	5.6	0.51	0.81	41.4
Approach		148	4.3	0.143	7.0	LOS A	0.8	5.6	0.51	0.59	43.4
North West: Mitchell Avenue											
27	L	42	7.5	0.171	7.2	LOS A	1.0	7.1	0.52	0.62	48.2
28	T	124	5.9	0.171	7.1	LOS A	1.0	7.1	0.52	0.58	48.7
29	R	14	0.0	0.171	12.9	LOS A	1.0	7.1	0.52	0.81	45.7
Approach		180	5.8	0.171	7.6	LOS A	1.0	7.1	0.52	0.61	48.3
South West: Northcote Street											
30	L	15	7.1	0.268	7.1	LOS A	1.6	11.4	0.38	0.53	48.8
31	T	97	0.0	0.268	5.2	LOS A	1.6	11.4	0.38	0.45	48.8
32	R	229	2.8	0.268	12.1	LOS A	1.6	11.4	0.38	0.71	45.5
Approach		341	2.2	0.268	9.9	LOS A	1.6	11.4	0.38	0.63	46.5
All Vehicles		1153	3.7	0.268	7.9	LOS A	1.6	11.4	0.38	0.58	47.4

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Mitchell Avenue/Northcote Street Construction 2016 PM

Four Way Roundabout
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Mitchell Avenue											
21	L	335	1.9	0.267	7.2	LOS A	1.5	10.4	0.39	0.58	48.8
22	T	152	0.7	0.187	6.2	LOS A	0.9	6.4	0.38	0.52	49.6
23	R	46	0.0	0.187	10.9	LOS A	0.9	6.4	0.38	0.80	45.8
Approach		533	1.4	0.267	7.2	LOS A	1.5	10.4	0.38	0.58	48.7
North East: Northcote Street											
24	L	32	3.3	0.222	7.9	LOS A	1.3	9.5	0.63	0.69	43.0
25	T	142	0.7	0.222	6.9	LOS A	1.3	9.5	0.63	0.65	43.0
26	R	36	5.9	0.222	13.1	LOS A	1.3	9.5	0.63	0.84	40.8
Approach		209	2.0	0.222	8.1	LOS A	1.3	9.5	0.63	0.69	42.6
North West: Mitchell Avenue											
27	L	35	0.0	0.227	7.6	LOS A	1.4	9.8	0.61	0.68	47.6
28	T	156	1.4	0.227	7.6	LOS A	1.4	9.8	0.61	0.65	48.0
29	R	33	3.2	0.227	13.6	LOS A	1.4	9.8	0.61	0.83	45.2
Approach		223	1.4	0.227	8.5	LOS A	1.4	9.8	0.61	0.68	47.5
South West: Northcote Street											
30	L	22	0.0	0.355	7.4	LOS A	2.3	16.5	0.49	0.58	48.0
31	T	75	0.0	0.355	5.7	LOS A	2.3	16.5	0.49	0.51	47.8
32	R	328	2.2	0.355	12.6	LOS A	2.3	16.5	0.49	0.72	45.0
Approach		425	1.7	0.355	11.1	LOS A	2.3	16.5	0.49	0.67	45.6
All Vehicles		1391	1.6	0.355	8.7	LOS A	2.3	16.5	0.49	0.64	46.5

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Mitchell Avenue/Northcote Street Operations 2016 AM

Four Way Roundabout
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Mitchell Avenue											
21	L	340	2.8	0.252	6.9	LOS A	1.3	9.5	0.30	0.55	49.3
22	T	118	5.4	0.142	6.0	LOS A	0.6	4.7	0.30	0.48	50.2
23	R	25	4.2	0.142	10.7	LOS A	0.6	4.7	0.30	0.81	45.9
Approach		483	3.5	0.252	6.9	LOS A	1.3	9.5	0.30	0.54	49.3
North East: Northcote Street											
24	L	24	8.7	0.143	7.0	LOS A	0.8	5.6	0.51	0.61	43.6
25	T	103	1.0	0.143	5.9	LOS A	0.8	5.6	0.51	0.55	43.8
26	R	21	15.0	0.143	12.3	LOS A	0.8	5.6	0.51	0.81	41.4
Approach		148	4.3	0.143	7.0	LOS A	0.8	5.6	0.51	0.59	43.4
North West: Mitchell Avenue											
27	L	42	7.5	0.169	7.2	LOS A	1.0	7.0	0.51	0.62	48.2
28	T	123	5.1	0.169	7.1	LOS A	1.0	7.0	0.51	0.58	48.7
29	R	14	0.0	0.169	12.9	LOS A	1.0	7.0	0.51	0.81	45.7
Approach		179	5.3	0.169	7.5	LOS A	1.0	7.0	0.51	0.61	48.3
South West: Northcote Street											
30	L	16	6.7	0.268	7.1	LOS A	1.6	11.5	0.38	0.53	48.8
31	T	97	0.0	0.268	5.2	LOS A	1.6	11.5	0.38	0.45	48.8
32	R	229	2.8	0.268	12.1	LOS A	1.6	11.5	0.38	0.71	45.5
Approach		342	2.2	0.268	9.9	LOS A	1.6	11.5	0.38	0.63	46.5
All Vehicles		1153	3.5	0.268	7.9	LOS A	1.6	11.5	0.38	0.58	47.4

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Mitchell Avenue/Northcote Street Operations 2016 PM

Four Way Roundabout
Roundabout

Movement Performance - Vehicles

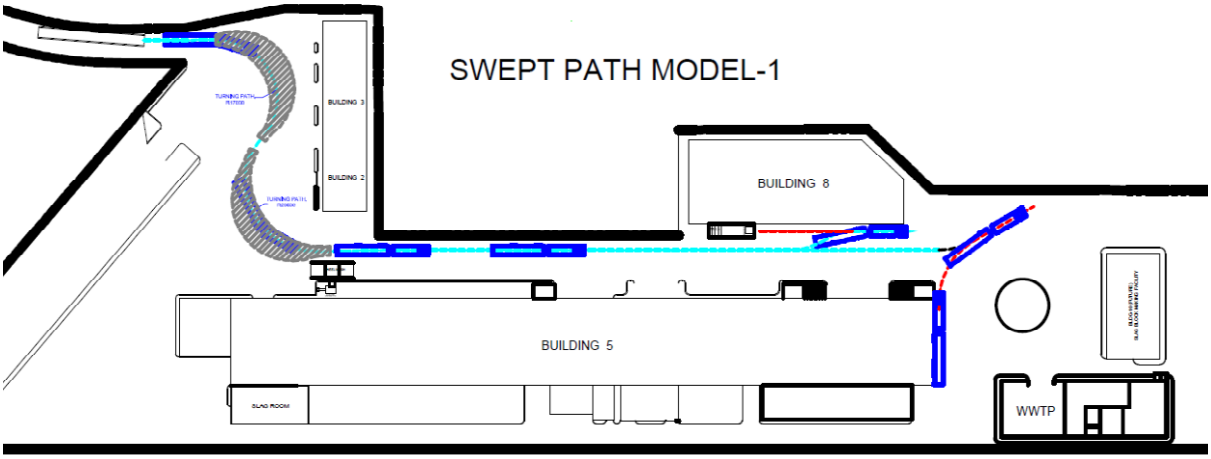
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Mitchell Avenue											
21	L	335	1.9	0.266	7.2	LOS A	1.5	10.3	0.38	0.58	48.8
22	T	152	0.7	0.187	6.1	LOS A	0.9	6.4	0.38	0.51	49.6
23	R	46	0.0	0.187	10.9	LOS A	0.9	6.4	0.38	0.80	45.8
Approach		533	1.4	0.266	7.2	LOS A	1.5	10.3	0.38	0.58	48.7
North East: Northcote Street											
24	L	32	3.3	0.221	7.8	LOS A	1.3	9.4	0.63	0.69	43.0
25	T	142	0.7	0.221	6.8	LOS A	1.3	9.4	0.63	0.64	43.1
26	R	36	5.9	0.221	13.0	LOS A	1.3	9.4	0.63	0.84	40.8
Approach		209	2.0	0.221	8.0	LOS A	1.3	9.4	0.63	0.68	42.6
North West: Mitchell Avenue											
27	L	35	0.0	0.217	7.6	LOS A	1.3	9.3	0.60	0.67	47.7
28	T	151	1.4	0.217	7.6	LOS A	1.3	9.3	0.60	0.65	48.0
29	R	27	3.8	0.217	13.6	LOS A	1.3	9.3	0.60	0.83	45.3
Approach		213	1.5	0.217	8.4	LOS A	1.3	9.3	0.60	0.67	47.6
South West: Northcote Street											
30	L	22	0.0	0.355	7.4	LOS A	2.3	16.5	0.49	0.58	48.0
31	T	75	0.0	0.355	5.7	LOS A	2.3	16.5	0.49	0.51	47.8
32	R	328	2.2	0.355	12.6	LOS A	2.3	16.5	0.49	0.72	45.0
Approach		425	1.7	0.355	11.1	LOS A	2.3	16.5	0.49	0.67	45.6
All Vehicles		1380	1.6	0.355	8.7	LOS A	2.3	16.5	0.48	0.64	46.5

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model used.

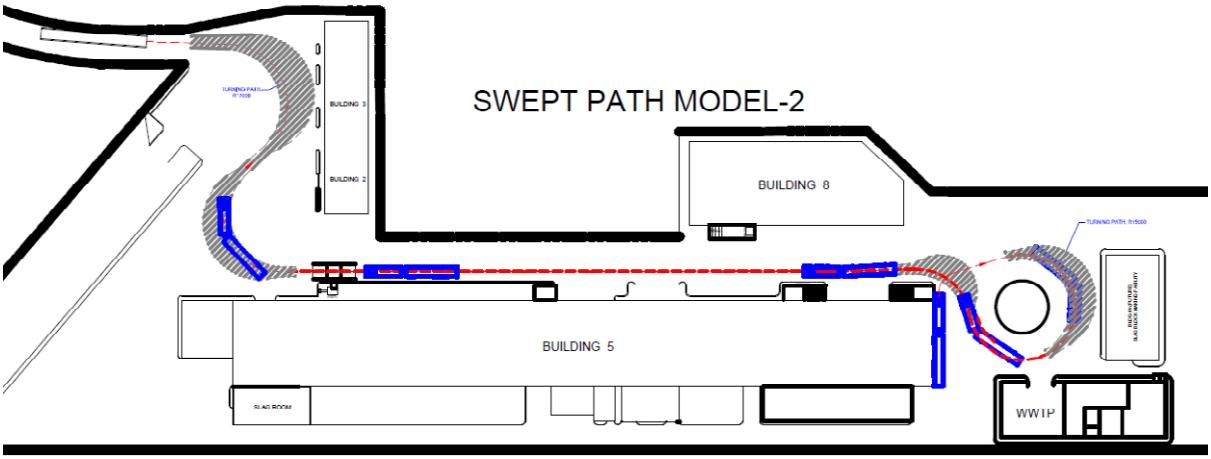
Appendix E

Vehicle turning swept paths for trucks using the site

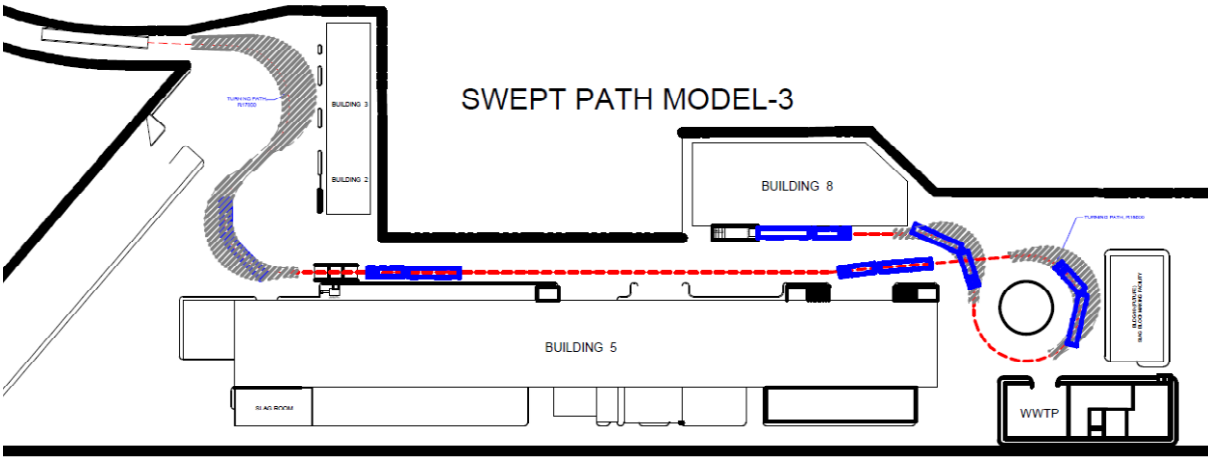
Truck Access Swept Paths for B Double and Semi trailer vehicles



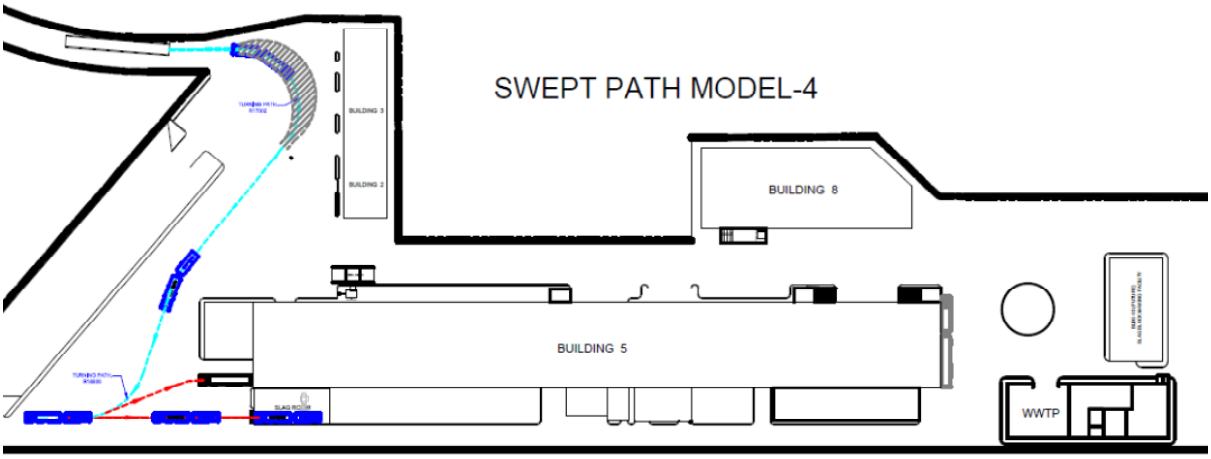
B-DOUBLE TRUCK ENTERS THE PLANT
THROUGH THE WEIGHBRIDGE HEADING
TO BLDG-8, THEN REVERSE TO PARK BY
THE UNLOADING DOCK.



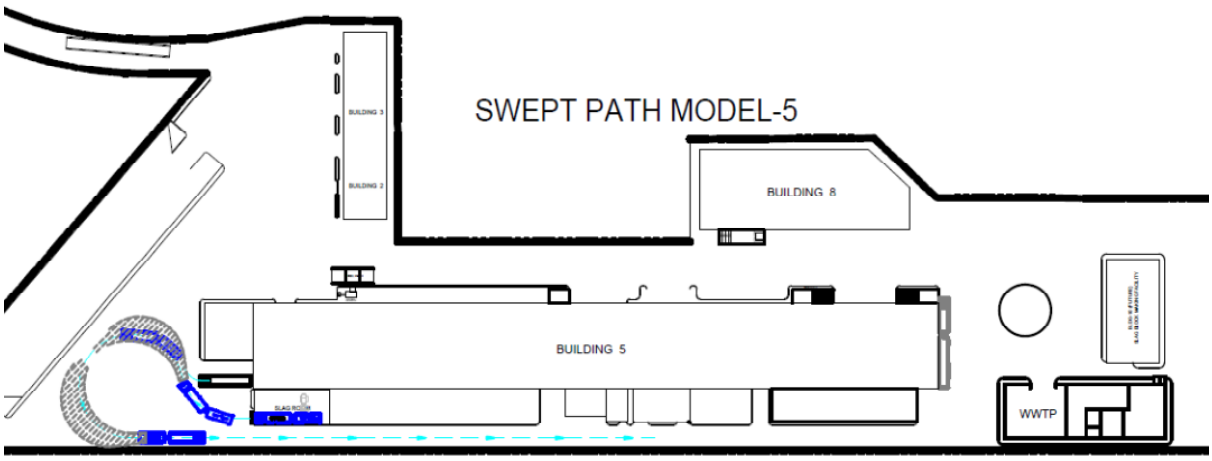
B-DOUBLE TRUCK EXITS
ULAB UNLOADING DOCK AT BLDG-5 THROUGH
ROUND-ABOUT HEADING TO WHEEL WASH STATION
AND MANEUVER TO WEIGHBRIDGE FOR FINAL EXIT



B-DOUBLE TRUCK LEAVES
ULAB WAREHOUSE, THEN
EXITS THROUGH THE ROUND-ABOUT,
THEN PASSES WHEEL WASH STATION
AND MANEUVER TO WEIGHBRIDGE FOR
FINAL EXIT.



SEMI-TRAILER & TRUCK & DOG TRUCKS
ENTER FROM WEIGHBRIDGE THEN REVERSE TO SLAG
ROOM & BULLION LOADING DOCK



SEMI-TRAILER AND TRUCK & DOG TRUCKS EXITING
SLAG ROOM & BULLION LOADING DOCK
THROUGH EASTERN ROAD THEN PASSES THE
ROUND-ABOUT AND WHEEL WASH STATION

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