traffic impact assessment

for bunderra stage 2 local environmental study

prepared on behalf of Fitzwalter Group (a division of WSP Environmental Pty. Ltd) by
TRAFFIX traffic & transport planners
ref: 09101 version3, 26 august 2009

traffix
traffic & transport planners

level 2/55 mountain st
broadway nsw australia 2007
po box 697 broadway nsw 2007
t: (02) 9211 3352 **f:** (02) 9211 2740
e: enquiries@traffix.com.au
director graham pindar
acn: 065132961
abn: 66065132961

contents

1. introduction

TRAFFIX has been commissioned by Fitzwalter Group (a division of WSP Environmental Pty. Ltd.) to undertake a traffic impact assessment in support of the Bunderra Stage 2 Local Environmental Study. The closure of the Pasminco smelter and the Incitec operations has created an opportunity for a new strategic direction for the site and there have already been a series of strategic planning initiatives taken by the Council and the owners of the Pasminco and Incitec sites.

The balance of the site is now to be redeveloped consistent with the strategic planning policies of Council and the State Government. The redevelopment provides significant opportunity for infill residential and employment generating development.

A comprehensive site analysis has been undertaken to identify the environmental constraints to development and opportunities for development. This resulted in the preparation of a master plan which outlines the preferred land uses and indicative areas and this forms the basis for the preparation of the subject Local Environmental Study.

Pasminco has lodged a number of rezoning applications with the Council. These applications were intended to allow for the staged disposal of land and included an application to rezone a parcel of land in proximity to the Cardiff Industrial Park and to Argenton; and an application to rezone land immediately to the east of Boolaroo for residential development as a logical eastern extension of Boolaroo. Council is currently finalising the Stage 1 Draft LEP. This Stage 2 rezoning is also consistent with the agreed strategy of a staged approach to rezoning

The report is structured as follows:

- Section 2: Describes the site and its location
- Section 3: Documents existing traffic conditions

- Section 4: Describes the proposed development
- Section 5: Assesses the traffic impacts
- Section 6: Presents the overall study conclusions.

2. location and site

The site is situated is located approximately 13km south west of Newcastle between Boolaroo in the south, Argenton and Glendale in the north, Cardiff in the north east, Cockle Creek in the west and Munibung Hill in the east. The site lies approximately 1.5 km to the north of Lake Macquarie.

The site has access to the arterial road network with frontages to Lake Road (which becomes T.C. Frith Avenue adjacent to the site) providing a link to the north and the Newcastle Freeway, including the centres of Glendale, Cardiff and Kotara, and Toronto to the south. Main Road traverses through the site and provides access to Speers Point and Warners Bay to the east of the lake

A Location Plan is presented in **figure 1.** Reference should also be made to the Photographic Record presented in **appendix a**, which provides an appreciation of the general character of roads and other key attributes in proximity to the site.

3. existing traffic conditions

3.1 road hierarchy

The road hierarchy in the vicinity of the site is shown in **figure 2** with the following roads of particular interest:

- T.C Frith Avenue forms part of Main Road 217 and is an arterial road. It is known as Lake Road to the north of Main Road and Five Islands Road to the south of The Esplanade. It carries generally one traffic lane in each direction, with additional lanes provided on approach to key intersections. The intersection of Main Road with T.C.Frith Avenue mid way on the western boundary of the site is a 'seagull' treatment which incorporates a right turn lane on the southern approach of T.C.Frith Avenue and a right turn storage/merge lane in Lake Road for the right turn movement out of Main Road. Main Road approaches this intersection on an acute angle and this approach diverges locally to form a right-angled approach to its intersection with T.C.Frith Avenue/Lake Road. The movement from Lake Road into Main Road operates under free-flow conditions and incorporates a dedicated left turn lane on Lake Road (the northern approach)

  T.C Frith Avenue enjoys 'limited access controls' over the majority of its length between Main Road and The Esplanade, with access only available via priority controlled intersections with Second Street and Seventh Street. First Street as well as Third to Sixth Streets inclusive on the western side of the Boolaroo Township are all closed on their approaches to T.C.Frith Avenue (eastern side).

- The Esplanade is also an arterial road and forms part of Main Road 674. It extends to the east of Boolaroo and Speers Point to traverse the eastern side of Lake Macquarie, connecting to MR 527 (Macquarie Drive) south of Warners Bay. The Esplanade forms a cross-intersection with T.C.Frith Avenue to the south of the subject site and this intersection is under roundabout control, with two lanes locally on all approaches and with two lanes for circulating

traffic. It carries generally single lane traffic flow in each direction over the majority of its length.

Main Road may be described as a local collector road which provides the main 'spine road' through the Boolaroo Township. It provides single lane traffic flow in each direction with additional parallel parking lanes on both sides within the township and extending between First Street and The Esplanade. The section between First Street and T.C.Frith Avenue adjacent to the site (including along the entire eastern boundary of the subject site) is constructed with one lane in each direction and unsealed shoulders over the majority of its length (north of the Fire Station). The majority of intersections along Main Road through the township are priority controlled (either Give Way or Stop signs), with the priority movement being along Main Road. It also incorporates pedestrian crossings between First and Second Streets, between Second and Third Streets and at Fourth Street.

To the south of the site (and the Boolaroo Township), Main Road forms the stem of a 'T' junction with The Esplanade. This intersection is constructed with a 'seagull' treatment, with a right turn bay provided on the eastern approach of The Esplanade. This intersection also provides a dedicated lane in The Esplanade for the left turn movement out of Main Road

All other roads in the vicinity of the site are local roads which constitute the majority of the Boolaroo Township. There are a number of public roads that terminate at the site boundary. These include

- Munibung Road which is a collector road adjoining the north eastern boundary of the site and providing the main access to Cardiff Industrial Estate from Macquarie Road
- First, Second, Third, Fourth and Lake View Streets within Boolaroo that terminate at the site boundary and provide an opportunity for several access points; and
- The Delaware Drive extension from Macquarie Hills residential estate to the east of the site.

These roads provide an opportunity to integrate the site into the surrounding urban form.

3.2 public transport

The site is in close proximity to Cockle Creek Railway Station, with the northernmost part of the site being about 250 metres away. A distance of 800 metres is considered reasonable for commuter trips to the railway station and are in accordance with current practice. In addition, it is noted that regular schedules bus services operate along Main Road including STA Route 363 which operates between Cockle Street Station and Lake Road, traversing the township of Boolaroo.

There are plans for a new rail station, overpass (not recognised by the RTA as likely to happen) and bus interchange at Glendale to the north east of the site at Pennant Street. There is also a potential for significantly improved public transport access to the area as a consequence of this development and the construction of access roads through the site will have beneficial effects on the operation of the public transport system in the area by providing alternative inter-connective street opportunities.

3.3 cycle and pedestrian access

Cycle paths in the vicinity of the site include the extensive cycle path around Lake Macquarie from Booragul to Eleebana and a more localised connection between Dalmeny Drive and Neegalbah Park in Macquarie Hills. The development of the site provides the opportunity for integrating cycle paths and pedestrian movement systems into the local street pattern and for improving linkages to surrounding areas.

3.4 existing intersection performances

This report is focussed on the required road infrastructure improvements to provide the capacity to accommodate growth in background traffic in the region generally, traffic associated with land uses under the Glendale Draft Urban Structure Plan (including Pennant Street overpass), and traffic associated with the PCCS site which is the subject of this LES. Accordingly, the assessment of existing traffic conditions is not of concern in itself in the context of this Study and reliance should therefore be made on previous reports. It is noted that the RTA does not recognise the Pennant Street overpass which is not included in its regional modelling.

It is emphasised that the long term road capacity (intersection) requirements have been established based on all available information, sufficient to give certainty that the land use mix and intensity of development proposed under the master plan can be supported. There will however need to be further assessment of internal road geometry and intersection controls in support of subsequent development applications.

Nevertheless, additional surveys were undertaken in July 2009 during both peak periods to assist an understanding of local traffic movements within existing residential areas. These included the intersection of Second Street with Main Road within the Boolaroo township; and the intersection of Delaware Drive, Lawson Road and Delasala Drive in the vicinity of Macquarie Hills Estate. These were selected to enable local amenity impacts to be addressed on roads that are under consideration for access as outlined above.

The results of these surveys were assessed using the Sidra computer program and delays were found to be negligible, with level of service A for all movements at both intersections. These results are provided in **appendix c**.

4. description of proposed development

Based on the detailed analysis of the site and its context, an indicative development concept (Master Plan) has been prepared for the site which provides the pattern and nature of land uses proposed. The master plan deals with issues such as access and movement on main roads as well as local connectivity, the location of open spaces and open space linkages, provision of utility services and other required infrastructure. The indicative development concept under the master plan has therefore guided the development of the current LES, including the concept plan and road network.

The indicative development concept is based on all site investigations including access and internal circulation; as well as road capacity and environmental amenity considerations.

Approximately 800 additional dwellings are proposed under the LES based on an overall density of 15 dwelling units per hectare. A detailed description of the proposed development is provided in the Planning Report prepared by BBC Consulting Planners of which this report forms a part.

The traffic/transport and parking impacts arising from the development are discussed in Section 5. It is emphasised that this assessment deals with the cumulative impacts under long term land use as discussed, with the residential development providing only one component. With regard for the latter, reference should be made to the plans submitted separately to Council which are presented at reduced scale in **appendix b.** This includes the concept master plan and the road network masterplan.

5. traffic impacts

5.1 developed road hierarchy

The road hierarchy underpinning the LES is shown on the road system master plan provided in **appendix b**. The hierarchy responds to the views of the RTA for the possibility of staging access onto TC Frith Avenue.

The road hierarchy is therefore underpinned by the provision of a single intersection with TC Frith Avenue, on the alignment of Munibung Road. Munibung Road is therefore proposed as a collector road over its entire length. The diverted route of Main Road to its intersection with Munibung Road is also proposed as a collector road, as this route provides the main Boolaroo township access for traffic approaching and departing from/to the north along TC Frith Avenue.

All other roads are recommended to be designated as local roads. This includes the three additional local road accesses which are the extension of Second Street to the east; the extension of Lake View Street to the north; and the extension of Delaware Street to the north-east.

Main Road is diverted to the north-east to connect with Munibung Road. Boolaroo is provided with a route to/from the north and in addition, the potential for infiltration by heavy vehicles is considered moderate. It can also be managed as necessary by load limits, road geometry, traffic management measures and the like. It will be noted in this regard that the alternative road layout would involve the diversion of Munibung Road to the south to connect Main Road in closer proximity to the township. This is considered to be an inferior outcome to the preferred arrangement with Munibung Road extended as proposed.

In summary, the developed road hierarchy for roads within the LES area is considered logical and will be readily interpreted by drivers.

5.2 external road network performance

The assessment of required intersection capacity is focussed on the connectivity to TC Frith Avenue based upon predicted traffic volumes using the RTA's EMME2 computer model as previously provided (for 2016 scenario), with manual adjustments to accommodate traffic associated with the PCCS site as well as traffic under the Glendale Draft Urban Structure Plan, which were excluded from the RTA's modelling. The volumes assessed are therefore likely to be significantly higher than those used by the RTA in reaching its separate conclusions that a single intersection is appropriate.

The proposed solution with a single intersection at the intersection of Munibung Road with TC Frith Avenue (as recommended by the RTA) has been assessed and performs satisfactorily under either dual lane roundabout control or traffic signal control. This intersection is located about 270 metres south of the railway overbridge, which enables the development of industrial land to occur while minimising the potential for heavy industrial traffic intrusion which is removed as far as possible from the Boolaroo township. Satisfactory access to TC Frith Avenue to/from the north is nevertheless maintained through the provision of a reasonably direct route via Main Road (diverted as proposed) to intersect with Munibung Road.

The secondary intersection of Main Road with Munibung Road operates satisfactorily with a single circulating lane roundabout and this form of control is recommended.

The results of the Sidra modelling undertaken in reaching the above conclusions are provided in **appendix d**.

Notwithstanding that roundabouts operate satisfactorily in terms of capacity considerations, it is noted that they do not make as safe provision for pedestrians as do signals, particularly those wishing to access the railway station, which has been a longstanding Council requirement. Therefore, traffic signal control is preferred at the intersection of Munibung Road with TC Frith Avenue. This has been assessed as shown in appendix c and the geometry can be refined as the planning process proceeds and more accurate land use information is available.

5.3 longer term road system

It is recognised that the proposed traffic solution can be supplemented if so desired by the Council with a second intersection with TC Frith to be provided by the relocation of the northern part of Main Road through the "Triangular Paddock" to form a new intersection. This option can be readily accommodated in the indicative development concept.

5.4 Internal intersections

The secondary intersections along the route of Main Road (as diverted) to connect with Munibung Road (involving three intersections) will all operate satisfactorily with single lane roundabout control. This conclusion would benefit from more detailed assessment based on the changed land use patterns and yields arising from the revised road layout, as well as a review of more recent RTA regional modelling that should ideally include all proposed Council and State government links and the traffic associated with full development under the Glendale Draft Structure Plan.

5.5 residential amenity impacts

New links are provided to improve connectivity to the Boolaroo township. Three potential links have been analysed. The first is a new local road connection onto Second Avenue. This road

was surveyed in July 2009 and presently carries about 30 veh/hr during peak periods. The second new connection is via a short link to the "New Residential Link Road" which is an extension of Lake View Street. This route presently carries no traffic at its northern end and moderate traffic further south. The third link is the proposed extension of Delaware Drive in East Macquarie Hills.

The ability of these roads to accommodate traffic volumes is based on the concept of environmental capacity, as discussed in the RTA's Guide to Traffic generating developments."

The potential impacts of the development on the amenity of existing residents is most appropriately assessed having regard to traffic volumes on affected road sections, based upon the concept of 'environmental capacity'. In doing so, it must be acknowledged that the concept of the 'environmental capacity' of a road is not an exact science. It is dependent upon many factors, including the function (classification) of the road, historic traffic levels, traffic composition (notably the percentage of heavy vehicles), vehicle speeds, road widths, road gradients, road surface conditions, distances to building façades and type of building construction. In addition, individual people have different responses to the prevailing conditions so that circumstances that one person finds unacceptable may be acceptable to another. These variables are set out in Section 4.10 of the Roads and Traffic Authority's Guide to Traffic Generating Developments.

Nevertheless, the Roads and Traffic Authority has formulated design criteria for local and collector residential streets that take due account of amenity and safety considerations. These include an environmental goal and a maximum goal for a collector road as follows:

Road Class	Environmental Goal (veh/h)	Maximum Volume (veh/h)
Local Street	200	300
Collector Street	300	500

It is evident that the existing volumes are well below the 200 veh/hr environmental goal for a local residential street as established by the RTA's Guide to Traffic Generating Developments.

In the case of Second Street, this route should be limited to no more than an additional 170 veh/hr, which is equivalent to about 200 dwellings. This threshold is unlikely to be achieved but if necessary, traffic management measures are able to limit use of this corridor to the required extent. The use of this route will need to be managed through detailed design, to limit volumes to 200 veh/hr during peak periods. This will also be assisted by the designation of the "New Residential Link Road" as a local road as proposed and as discussed above. The imposition of a 3 tonne load limit on this road is also recommended.

In the case of Lake View Road, this will also need to be managed through detailed design, to limit volumes to 200 veh/hr during peak periods, which equates to about 235 dwellings. This will similarly be assisted by the designation of the "New Residential Link Road" as a local road, together with the imposition of a 3 tonne load limit.

The proposed extension of Delaware road will result in a relatively circuitous and indirect link between East Macquarie Hills to Boolaroo. It is considered unlikely that this will carry more than 100 veh/hr during peak periods although more detailed assessment will be required at development application stage. Even if higher volumes were to occur, the opportunity is

available to implement local traffic management measures. This is not proposed at this stage however.

5.6 bus routes

It is recommended that Munibung Road, the diverted Main Road route to Munibung Road, "New Residential Link Road" and the connection to Delaware Drive all be designed to accommodate bus services. The use of indented bus bays is not favoured by the Ministry of Transport and accordingly, road cross sections will need to conform with Austroads Guidelines with on-road (kerbside) bus facilities.

5.7 internal design aspects

It is evident that "New Residential Link Road" accesses a small industrial precinct at its northern end, on the south-east corner of its intersection with Munibung Road. It is recommended that use of this road by heavy vehicles be limited as far as practicable, with consideration given to a 'threshold' treatment adjacent to the southern boundary of this site, to create a gateway into the residential precinct.

A new road link is provided to Delaware Drive at Macquarie Hills. This is also recommended to be constructed as a local road, providing only a local access function. The use of this route by buses does not warrant a collector status due to its curvilinear alignment and predominant local access function.

Finally, it is recommended that detailed design incorporate cycle and pedestrian facilities, in consultation with Council officers.

5.8 other matters raised by council

- Council has raised the potential for connections to First, Third and Fourth Streets in Boolaroo. It is considered that the proposed connections via Second Street and Lake View Street are sufficient. They do however result in traffic concentrations at the intersection of these two roads. This intersection will therefore need to be carefully assessed at development application stage, although volumes using Second Street in particular are expected to be moderate;

- The need to develop bus routes is acknowledged and reliance is proposed on the routes discussed above. The final routes and frequencies will be in response to demands and this can be further assessed at development application stage;

- The provision of an integrated pedestrian/cycle link between the residential and industrial areas is acknowledged and will need to be included in later development applications. The provision of an off-road shared pathway along the alignment of Munibung Road to connect over the railway line at Pennant Street is supported; and

- The culs de sac incorporated in the master plan have been deleted from the amended plans.

In summary, all matters raised by Council have been addressed or are able to be addressed at a later development application stage.

6. conclusions

In summary:

- The road hierarchy underpinning the LES responds to the views of the RTA for the possibility of staging access onto TC Frith Avenue;

- The proposed intersection of Munibung Road with TC Frith Avenue is located about 270 metres south of the railway overbridge. This enables the development of industrial land to occur as heavy industrial traffic is removed from the Boolaroo township to the maximum extent practicable. Satisfactory access to TC Frith Avenue to/from the north is nevertheless maintained through the provision of a reasonably direct route via Main Road (diverted as proposed) and Munibung Road. This intersection is capable of accommodating traffic from Munibung Road and the entire development of the Bunderra site.

- The intersection of Munibung Road with TC Frith Avenue has been analysed to determine its required geometry based on the need to accommodate all traffic associated with the full development of the PCCS site, as well as traffic associated with general growth in traffic in the region and traffic under the Glendale Draft Urban Structure Plan. This analysis has been based on manual adjustments to the outputs from the RTA's EMME2 computer model as previously provided (for 2016 scenario). The analysis has established that the intersection will operate satisfactorily under either dual lane roundabout control or under traffic signal control. This is consistent with the RTA's separate analysis, although the assumptions underpinning the RTA's modelling have not been provided but are thought not to include the Pennant Street link or the Glendale traffic at full development under the Draft Structure Plan;

- Notwithstanding the above, the intersection with TC Frith will need to accommodate safe pedestrian movements and accordingly, the provision of traffic signal control with pedestrian crossings on all approaches is the preferred form of control;

- There is the potential for a second intersection with TC Frith formed by a relocation of the northern part of Main Road through the Triangular Paddock to form a new intersection approximately 260 metres south of the proposed Munibung Road extension intersection;

- The secondary intersections along the route of Main Road (as diverted) to connect with Munibung Road (three intersections) all operate satisfactorily with single lane roundabout control although this requires more detailed assessment based on the revised road layout, as well as (ideally) a review of more recent RTA regional modelling that should include the Pennant Street link and the Glendale Draft Structure Plan;

- The developed road hierarchy is considered logical and is therefore easily interpreted by drivers. It is recommended that Munibung Road over its entire length as well as the diverted Main Road route between Boolaroo and Munibung Road be accorded collector road status. All other roads are considered local roads;

- Two new links are provided to improve connectivity to the Boolaroo township. The first is a new local road connection onto Second Avenue. This road presently carries about 30 veh/hr during peak periods which is substantially less than the 200 veh/hr environmental goal for a residential street as established by the RTA's Guide to Traffic Generating Developments. This route should therefore be limited to no more than an additional 170 veh/hr, which is equivalent to about 200 dwellings. This threshold is unlikely to be achieved but if necessary, traffic management measures are able to limit use of this corridor to the required extent. The second new connection is via a short link to the "New Residential Link Road" which is an extension of Lake View Street. This route presently carries no traffic at its northern end and moderate traffic further south. Again, use of this route will need to be managed through detailed design, to limit volumes to 200 veh/hr during peak periods. This will also be assisted by the designation of the "New Residential Link Road" as a local road as discussed above. The imposition of a 3 tonne load limit on both roads is also recommended;

- There is potential for additional links to Boolaroo. Interconnectivity is encouraged;

- It is evident that "New Residential Link Road" accesses a small industrial precinct at its northern end, on the south-east corner of its intersection with Munibung Road. It is recommended that use of this road by heavy vehicles be limited as far as practicable, with consideration given to a 'threshold' treatment adjacent to the southern boundary of this site, to create a gateway into the residential precinct;

- A new road link is provided to Delaware Drive at Macquarie Hills. This is recommended to be constructed as a local road, providing only a local access function;

- It is recommended that Munibung Road, the diverted Main Road route to Munibung Road, “New Residential Link Road” and the connection to Delaware Drive all be designed to accommodate bus services. The use of indented bus bays is not favoured by the Ministry of Transport; and

- It is recommended that detailed design incorporate cycle and pedestrian facilities, in consultation with Council officers.

Having regard for the above, it is concluded that the proposed LES, the Draft LEP and the indicative master plan development are supportable on traffic and transport planning grounds.

appendix a

photographic record

View looking south along Main Road within Boolaroo at Second Street.

View looking north along TC Frith Avenue at Second Street.

View looking north along TC Frith Avenue at Main Road.

View looking north-east across the intersection of Main Road with TC Frith Avenue.

View looking south along TC Frith on approach to Main Road.

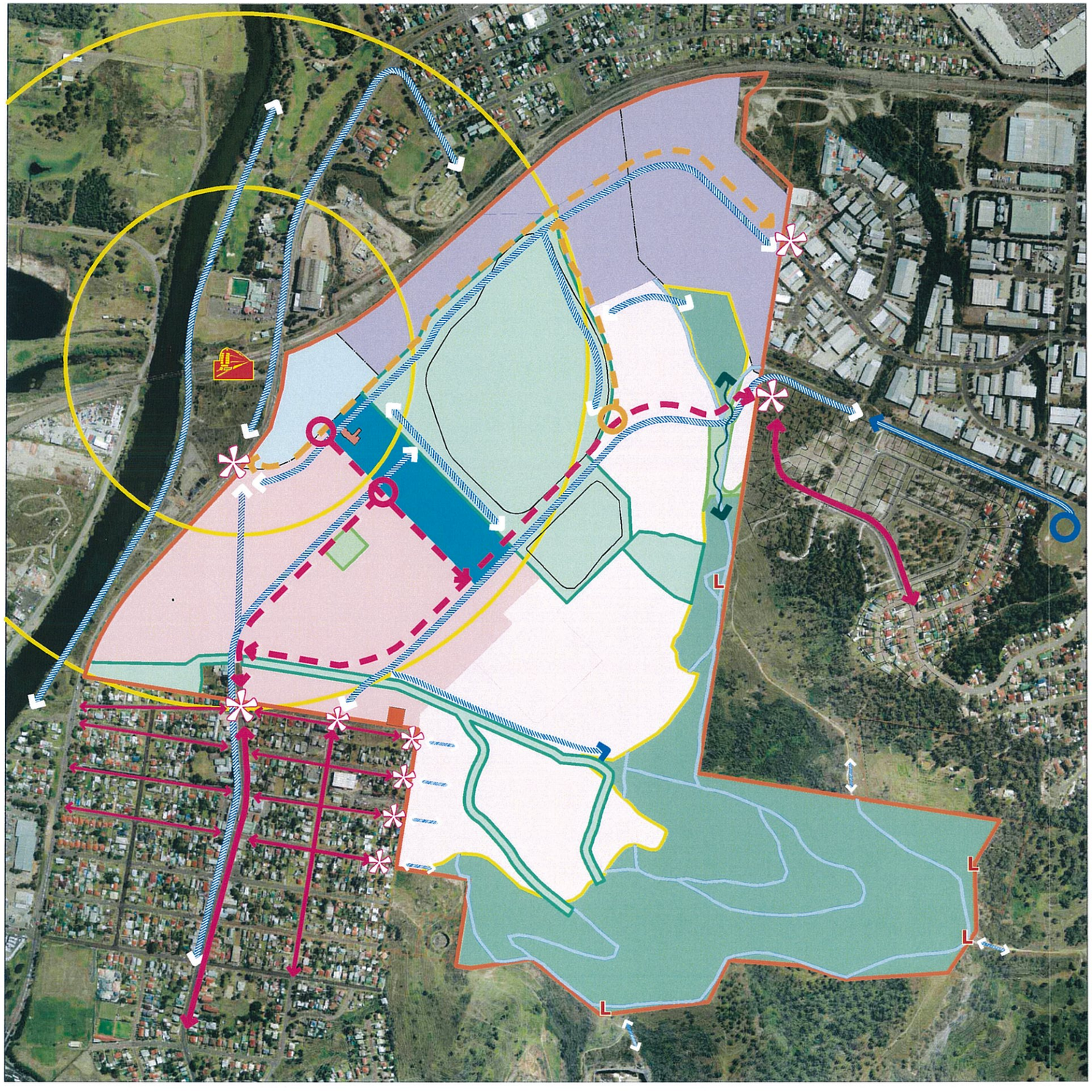
View looking east along Second Avenue towards Main Road and the site.

appendix b

reduced plans

MASTERPLAN PRINCIPLES LEGEND

- Residential
- Residential (Urban Living)
- Light Industrial
- Mixed use / Redevelopment
- Urban Centre
- Containment Cells & Riparian links
- Munibung Hill Reserve & Angophora Inopina reserve
- Parks
- Fire trails (pedestrian connectivity)
- Proposed Road Intersection
- Proposed Industrial Main Road /Link
- Proposed Residential Main Road /Link
- Potential Pedestrian / Cycleway Link
- Existing Pedestrian / Cycleway Link
- Proposed Ridge Vegetation Regeneration link
- Cockle Creek Train Station
- Major Site Access / Egress Points



NOTES:

ALL LEVELS AND DIMENSIONS TO BE VERIFIED PRIOR TO COMMENCEMENT OF WORK.
USE FIGURED DIMENSIONS ONLY. DO NOT SCALE.

ALL WORK TO COMPLY WITH CURRENT REGULATIONS AND S.A.A. STANDARDS.

N

LEGEND:

No	DATE	REVISION / ISSUE DETAILS
A	31.03.08	Approval
B	13.05.08	Information
C	03.06.08	Approval
D	05.08.09	Approval
E	06.08.09	Approval

CONSULTANT
FITZWALTER
620 Harris Street, Ultimo NSW 2007, Australia
phone (02) 9211 6633
fax (02) 9211 0299
email admin@fitzwalter.com.au

CONSULTANT
BBC CONSULTING PLANNERS
Level 2, 55 Mountain Street, Broadway NSW 2007, Australia
phone (02) 9211 4099
fax (02) 9211 2740
email bbc@bbcplanners.com.au

CONSULTANT
TRAFFIX
Level 2, 55 Mountain Street, Broadway NSW 2007, Australia
phone (02) 9211 3352
fax (02) 9211 2740
email traffix@traffix.com.au

CONSULTANT
AC OR
Level 1, 24 Falcon St, Crows Nest, NSW 2065, Australia
phone (02) 9438 5096
fax (02) 9438 5398
email acor@acor.com.au

CONSULTANT
SITE IMAGE
24-26 Bowden St, Alexandria, NSW 2015, Australia
phone (02) 9699 2699
fax (02) 9699 2677
email lcopas@siteimage.com.au

ARCHITECTS
morrisbrayarchitects
Morris Bray Architects
106-108 Willoughby Rd, Crows Nest NSW 2067 Australia
ABN 16 001 298 211
[P] +612 9439 6622
[F] +612 9436 4073
[E] info@morrisbray.com.au
[W] www.morrisbray.com.au
NSW Architects Registration Board Nominated Architects: Jerry Morris 3354 Garry Bray 3555

CLIENT
FERRIER HODGSON
Level 29, 600 Bourke Street, Melbourne VIC 3000
phone (03) 9600 4322
fax (03) 9642 5697
email ffmelb@melb.fh.com.au

CLIENT
PacLib Group
Suite 2, Level 4, 65 Epping Road, North Ryde NSW 2113
phone (02) 9889 5777
fax (02) 9889 5099
email enquiry@paclib.com

PROJECT
Pasminco Cockle Creek Smelter Site
Cockle Creek, NSW

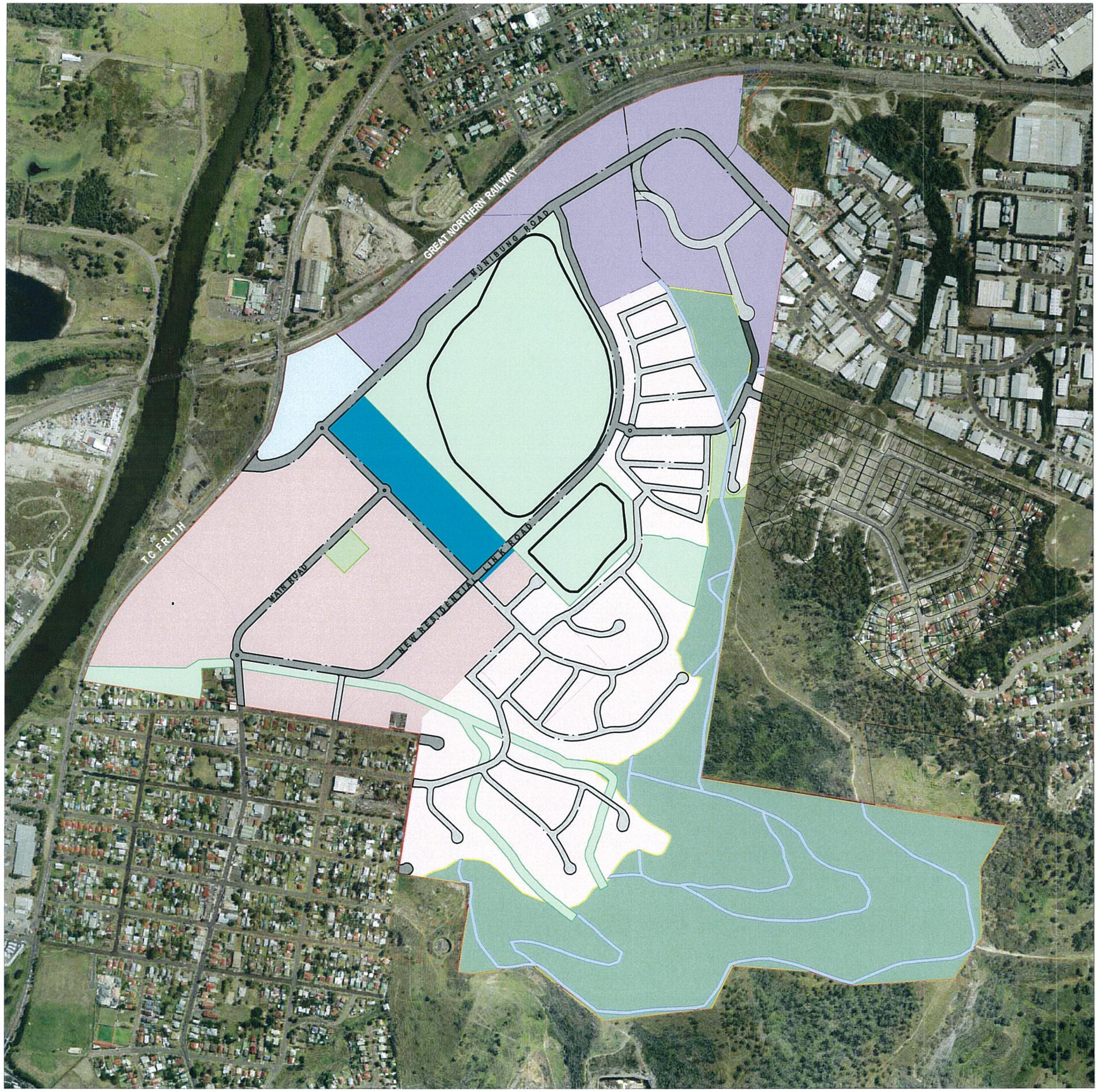
DRAWING TITLE
Concept Masterplan

SCALE	DRAWN BY	PLOT DATE	CHECKED	QA
1:5000 @A1		6/08/2009		

PROJECT NUMBER	DRAWING NUMBER	ISSUE
05055	DA-01	E

ROAD NETWORK CONCEPT LEGEND

- Residential
- Residential (Urban Living)
- Light Industrial
- Mixed use / Redevelopment
- Urban Centre
- Cointainment Cells & Riparian links
- Munibung Hill Reserve & Angophora Inopina reserve
- Parks
- Primary Roads
- Secondary Roads (Indicative only)
- Temporary bus connection road
- Fire trails (pedestrian connectivity)



NOTES:

ALL LEVELS AND DIMENSIONS TO BE VERIFIED PRIOR TO COMMENCEMENT OF WORK
USE FIGURED DIMENSIONS ONLY. DO NOT SCALE

ALL WORK TO COMPLY WITH CURRENT REGULATIONS AND S.A.A STANDARDS.

LEGEND:

N

No.	DATE	REVISION / ISSUE DETAILS
A	31 03 08	Approval
B	13 05 08	Information
P1	14 08 08	Information
C	05 08 09	Approval
D	06 08 09	Approval

CONSULTANT
FITZWALTER
633 Harris Street
Ultimo NSW 2007
Australia
phone (02) 9211 6633
fax (02) 9211 9299
email admin@fitzwalter.com.au

CONSULTANT
BBC CONSULTING PLANNERS
Level 2, 55 Mountain Street
Broadway NSW 2007
Australia
phone (02) 9211 4099
fax (02) 9211 2740
email bbc@bbcplanners.com.au

CONSULTANT
TRAFFIX
Level 2, 55 Mountain Street
Broadway NSW 2007
Australia
phone (02) 9211 3352
fax (02) 9211 2740
email traffix@traffix.com.au

CONSULTANT
ACOR
Level 1, 24 Falcon St
Crows Nest, NSW 2065
Australia
phone (02) 9438 5098
fax (02) 9438 5398
email acor@acor.com.au

CONSULTANT
SITE IMAGE
24-26 Bowden St
Alexandria, NSW 2015
Australia
phone (02) 9698-2899
fax (02) 9698-2877
email lscape@siteimage.com.au

ARCHITECTS
morrisbrayarchitects
Morris Bray Architects
186-188 Willoughby Rd
Crows Nest NSW 2067 Australia
ABN 16 001 268 211
NSW Architects Registration Board Nominated Architects: Terry Morris 3354 Garry Bray 3555
[P] +612 9439 6622
[F] +612 9436 4873
[E] info@morrisbray.com.au
[W] www.morrisbray.com.au

CLIENT
FERRIER HODGSON
Level 29
600 Bourke Street
Melbourne VIC 3000
phone (03) 9600 4922
fax (03) 9642 5887
email fhmelb@melb.fh.com.au

CLIENT
PacLib Group
Suite 2, Level 4
65 Epping Road
North Ryde NSW 2113
phone (02) 9889-5777
fax (02) 9889-5999
email enquiry@paclib.com

PROJECT
Pasminco Cockle Creek Smelter Site
Cockle Creek, NSW

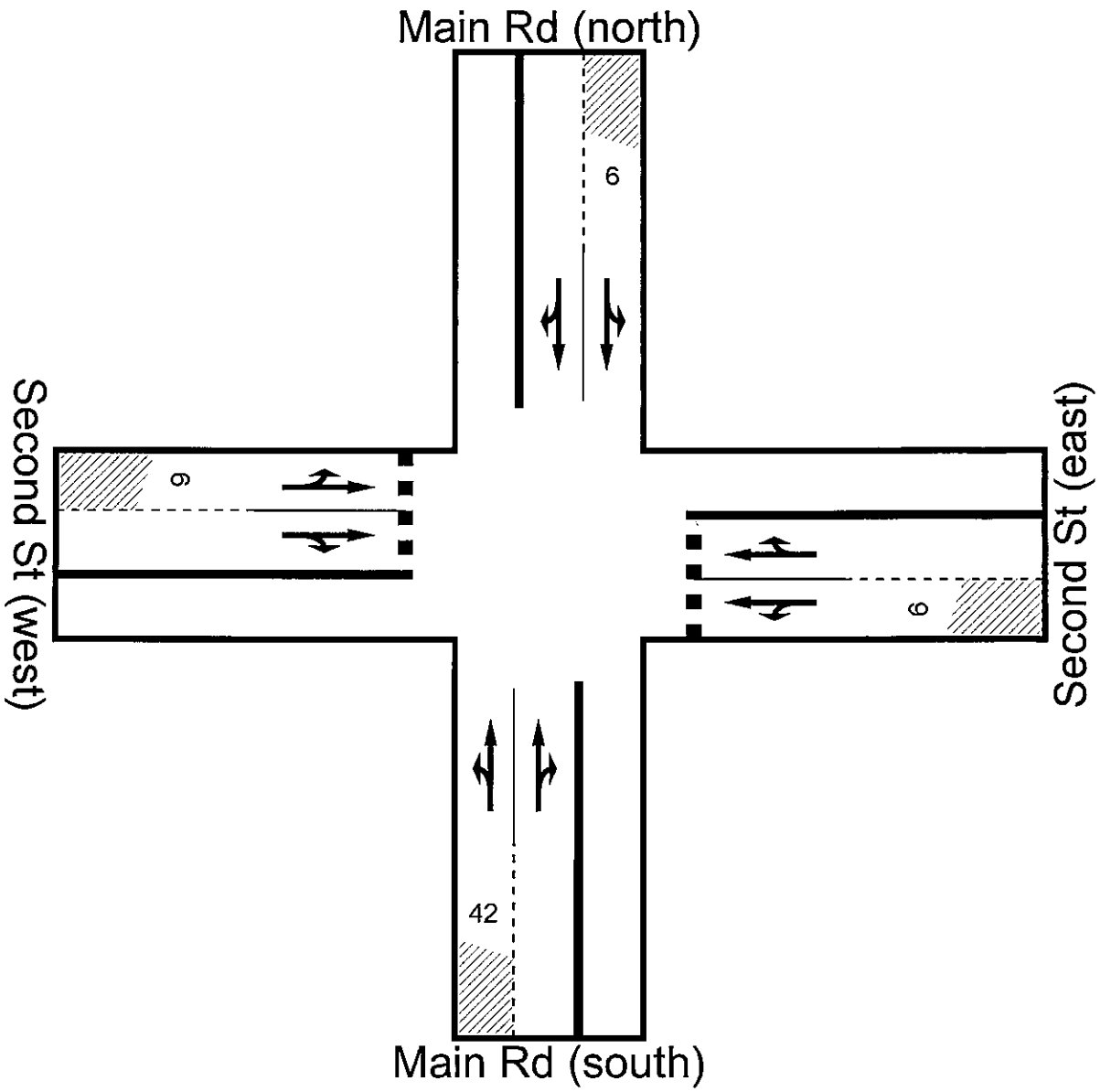
DRAWING TITLE
Road Network Masterplan

SCALE	DRAWN BY	PLOT DATE	CHECKED	QA
1:5000 @A1		6/08/2009		

PROJECT NUMBER	DRAWING NUMBER	ISSUE
05055	DA-02	D

appendix c

existing local intersections -sidra outputs


Main Rd (north)
6
Second St (west)
9
Second St (east)
6
42
Main Rd (south)

SIDRA INTERSECTION

Movement Summary

Main Rd / Second St

AM - Existing

Give-way

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	85% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Main Rd (south)										
1	L	23	0.0	0.025	4.5	LOS A	0	0.00	0.52	36.7
2	T	254	2.0	0.123	1.4	LOS A	7	0.43	0.00	37.8
3	R	4	25.0	0.125	6.2	LOS A	7	0.47	0.59	35.5
Approach		**280**	**2.1**	**0.124**	**1.8**	**LOS A**	**7**	**0.39**	**0.05**	**37.7**
Second St (east)										
4	L	12	8.3	0.034	5.8	LOS A	0	0.33	0.53	35.8
5	T	8	25.0	0.034	11.5	LOS A	1	0.60	0.70	32.7
6	R	4	0.0	0.034	12.2	LOS A	1	0.60	0.73	32.1
Approach		**24**	**12.5**	**0.034**	**8.8**	**LOS A**	**1**	**0.47**	**0.62**	**34.1**
Main Rd (north)										
7	L	2	0.0	0.023	4.5	LOS A	0	0.00	0.52	36.7
8	T	240	2.1	0.115	1.1	LOS A	5	0.35	0.00	38.2
9	R	13	7.7	0.115	5.8	LOS A	5	0.43	0.58	35.6
Approach		**255**	**2.4**	**0.115**	**1.4**	**LOS A**	**5**	**0.35**	**0.03**	**38.0**
Second St (west)										
10	L	14	14.3	0.044	6.2	LOS A	0	0.36	0.55	35.7
11	T	4	0.0	0.037	10.2	LOS A	1	0.59	0.66	33.2
12	R	11	10.0	0.037	11.7	LOS A	1	0.59	0.75	32.5
Approach		**28**	**10.7**	**0.044**	**8.8**	**LOS A**	**1**	**0.47**	**0.64**	**34.1**
All Vehicles		**587**	**3.1**	**0.125**	**2.2**	**Not Applicable**	**7**	**0.38**	**0.09**	**37.5**

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

SIDRA INTERSECTION

Movement Summary

Main Rd / Second St

PM - Existing

Give-way

Vehicle Movements

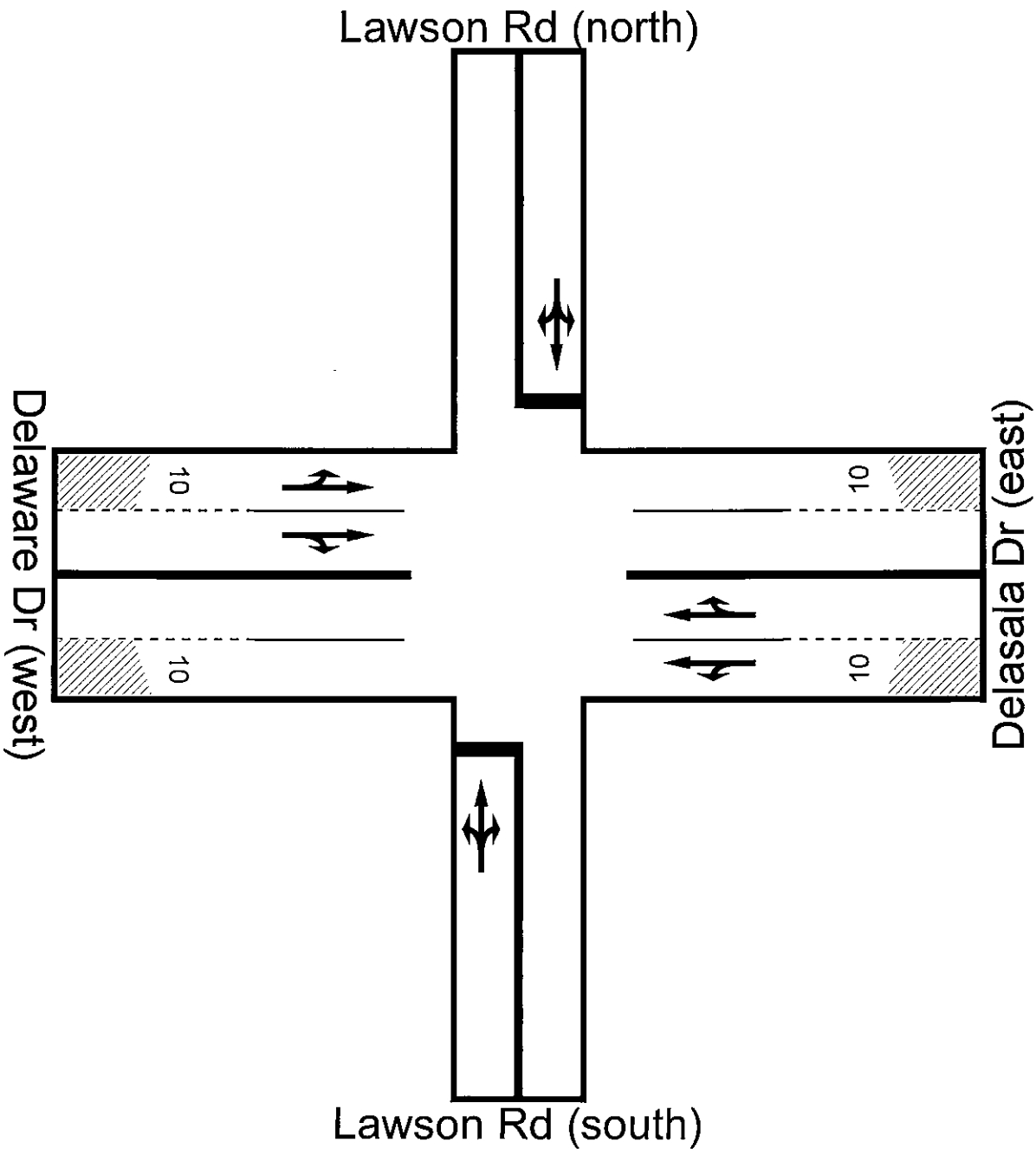
Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	85% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Main Rd (south)										
1	L	11	0.0	0.024	6.4	LOS A	0	0.00	0.61	43.3
2	T	252	2.4	0.120	1.8	LOS A	6	0.45	0.00	46.1
3	R	7	0.0	0.121	8.3	LOS A	6	0.53	0.70	41.5
Approach		**269**	**2.2**	**0.120**	**2.2**	**LOS A**	**6**	**0.44**	**0.04**	**45.8**
Second St (east)										
4	L	12	0.0	0.035	8.6	LOS A	0	0.44	0.64	41.4
5	T	5	0.0	0.051	14.8	LOS B	1	0.68	0.81	36.8
6	R	11	0.0	0.051	15.9	LOS B	1	0.68	0.86	36.2
Approach		**28**	**0.0**	**0.051**	**12.6**	**LOS A**	**1**	**0.57**	**0.76**	**38.4**
Main Rd (north)										
7	L	4	75.0	0.037	8.4	LOS A	0	0.00	0.61	43.3
8	T	413	1.7	0.187	1.1	LOS A	9	0.37	0.00	46.8
9	R	9	0.0	0.188	7.6	LOS A	9	0.44	0.64	41.8
Approach		**425**	**2.4**	**0.187**	**1.3**	**LOS A**	**9**	**0.37**	**0.02**	**46.6**
Second St (west)										
10	L	9	0.0	0.023	7.6	LOS A	0	0.34	0.59	42.1
11	T	6	0.0	0.061	15.0	LOS B	1	0.68	0.83	36.7
12	R	13	0.0	0.061	16.3	LOS B	1	0.68	0.88	35.9
Approach		**28**	**0.0**	**0.061**	**13.2**	**LOS A**	**1**	**0.57**	**0.77**	**37.9**
All Vehicles		**750**	**2.1**	**0.188**	**2.5**	**Not Applicable**	**9**	**0.41**	**0.08**	**45.6**

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement


Lawson Rd (north)
Delaware Dr (west)
Delasala Dr (east)
Lawson Rd (south)
10
10
10
10

SIDRA INTERSECTION

Movement Summary

Delaware Dr / Lawson Rd / Delasala Dr

AM - Existing

Two-way stop

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	85% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Lawson Rd (south)										
1	L	8	12.5	0.058	11.2	LOS A	2	0.25	0.84	40.2
2	T	1	0.0	0.059	10.6	LOS A	2	0.25	0.89	40.2
3	R	34	8.8	0.059	11.1	LOS A	2	0.25	0.89	40.2
Approach		**43**	**9.3**	**0.058**	**11.1**	**LOS A**	**2**	**0.25**	**0.88**	**40.2**
Delasala Dr (east)										
4	L	15	26.7	0.010	7.2	LOS A	0	0.00	0.61	43.3
5	T	34	12.1	0.019	0.3	LOS A	1	0.21	0.00	48.1
6	R	1	0.0	0.019	6.6	LOS A	1	0.21	0.55	42.7
Approach		**49**	**16.3**	**0.019**	**2.6**	**LOS A**	**1**	**0.15**	**0.20**	**46.4**
Lawson Rd (north)										
7	L	4	0.0	0.006	10.0	LOS A	0	0.23	0.86	40.7
8	T	1	0.0	0.006	10.0	LOS A	0	0.23	0.88	40.7
9	R	1	0.0	0.006	10.0	LOS A	0	0.23	0.87	40.7
Approach		**6**	**0.0**	**0.006**	**10.0**	**LOS A**	**0**	**0.23**	**0.86**	**40.7**
Delaware Dr (west)										
10	L	1	0.0	0.010	6.4	LOS A	0	0.00	0.61	43.3
11	T	98	5.1	0.050	0.2	LOS A	2	0.14	0.00	48.7
12	R	9	22.2	0.050	7.1	LOS A	2	0.18	0.55	42.8
Approach		**108**	**6.5**	**0.050**	**0.8**	**LOS A**	**2**	**0.14**	**0.05**	**48.1**
All Vehicles		**206**	**9.2**	**0.059**	**3.7**	**Not Applicable**	**2**	**0.17**	**0.28**	**45.6**

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

SIDRA INTERSECTION

Movement Summary

Delaware Dr / Lawson Rd / Delasala Dr

PM - Existing

Two-way stop

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	85% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Lawson Rd (south)										
1	L	8	0.0	0.041	10.8	LOS A	1	0.31	0.83	40.2
2	T	1	0.0	0.040	10.7	LOS A	1	0.31	0.87	40.2
3	R	21	9.5	0.041	11.3	LOS A	1	0.31	0.86	40.2
Approach		**30**	**6.7**	**0.041**	**11.1**	**LOS A**	**1**	**0.31**	**0.86**	**40.2**
Delasala Dr (east)										
4	L	35	11.4	0.020	6.7	LOS A	0	0.00	0.61	43.3
5	T	94	0.0	0.050	0.2	LOS A	2	0.17	0.00	48.5
6	R	2	0.0	0.050	6.5	LOS A	2	0.17	0.55	42.8
Approach		**131**	**3.1**	**0.050**	**2.1**	**LOS A**	**2**	**0.12**	**0.17**	**46.9**
Lawson Rd (north)										
7	L	2	0.0	0.004	10.1	LOS A	0	0.19	0.86	40.5
8	T	1	0.0	0.004	10.1	LOS A	0	0.19	0.90	40.5
9	R	1	0.0	0.004	10.2	LOS A	0	0.19	0.89	40.5
Approach		**4**	**0.0**	**0.004**	**10.1**	**LOS A**	**0**	**0.19**	**0.88**	**40.5**
Delaware Dr (west)										
10	L	1	0.0	0.006	6.4	LOS A	0	0.00	0.61	43.3
11	T	59	1.7	0.029	0.4	LOS A	1	0.21	0.00	48.1
12	R	4	0.0	0.029	6.7	LOS A	1	0.25	0.55	42.5
Approach		**64**	**1.6**	**0.029**	**0.9**	**LOS A**	**1**	**0.21**	**0.04**	**47.6**
All Vehicles		**229**	**3.1**	**0.050**	**3.1**	**Not Applicable**	**2**	**0.17**	**0.24**	**46.0**

Symbols which may appear in this table:

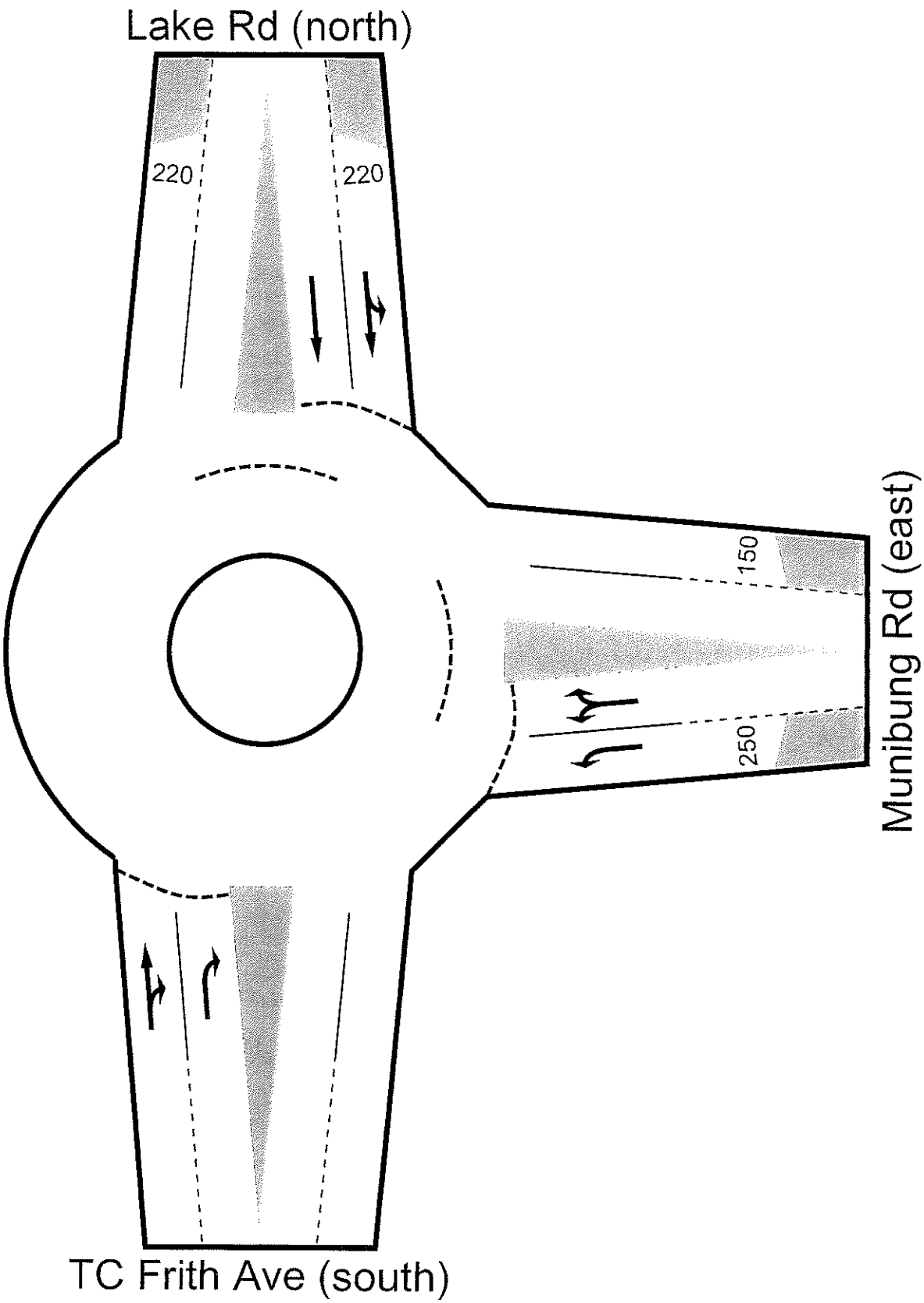
Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

appendix d

future conditions at Munibung/TC Frith and Main/Munibubg - sidra outputs


Lake Rd (north)
220
220
150
250
Munibung Rd (east)
TC Frith Ave (south)

Movement Summary

Scenario 2 TC Frith Ave / Munibung Rd

Scenario 2D - Future (RTA+PCCS+Glendale) - AM

Roundabout

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	85% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
TC Frith Ave (south)										
2	T	1175	5.0	0.995	42.0	LOS C	255	1.00	2.03	28.5
3	R	1026	5.0	0.994	57.6	LOS E	255	1.00	2.07	26.2
Approach		**2201**	**5.0**	**0.995**	**49.3**	**LOS D**	**255**	**1.00**	**2.05**	**27.3**
Munibung Rd (east)										
4	L	644	5.0	0.629	6.6	LOS A	36	0.83	0.72	48.4
6	R	677	5.0	0.629	13.7	LOS A	36	0.83	0.86	44.3
Approach		**1321**	**5.0**	**0.629**	**10.3**	**LOS A**	**36**	**0.83**	**0.79**	**46.0**
Lake Rd (north)										
7	L	504	5.0	0.768	11.8	LOS A	59	1.00	1.18	45.5
8	T	697	5.0	0.768	13.7	LOS A	59	1.00	1.19	44.1
Approach		**1201**	**5.0**	**0.768**	**12.9**	**LOS A**	**59**	**1.00**	**1.19**	**44.7**
All Vehicles		**4723**	**5.0**	**0.995**	**29.1**	**LOS C**	**255**	**0.95**	**1.48**	**34.4**

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

Site: Scenario_02D - Int A - AM
T:\2009\09130\Job Tasks\Modelling\090723 Version 4\TFX 09 130 - Scenario_02.aap
Processed Jul 23, 2009 01:51:46PM

A1835, Traffix, Small Office

Movement Summary

Scenario 2 TC Frith Ave / Munibung Rd

Scenario 2D - Future (RTA+PCCS+Glendale) - PM

Roundabout

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	85% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
TC Frith Ave (south)										
2	T	697	5.0	0.520	4.6	LOS A	34	0.83	0.45	48.5
3	R	644	5.0	0.520	13.6	LOS A	34	0.84	0.80	44.3
Approach		**1341**	**5.0**	**0.520**	**8.9**	**LOS A**	**34**	**0.84**	**0.62**	**46.2**
Munibung Rd (east)										
4	L	1026	5.0	0.997	41.5	LOS C	160	1.00	2.05	28.2
6	R	504	5.0	0.998	54.9	LOS D	128	1.00	1.95	27.0
Approach		**1530**	**5.0**	**0.997**	**45.9**	**LOS D**	**160**	**1.00**	**2.02**	**27.7**
Lake Rd (north)										
7	L	677	5.0	0.838	9.1	LOS A	73	0.94	1.06	47.6
8	T	1175	5.0	0.838	10.8	LOS A	73	0.96	1.14	46.5
Approach		**1852**	**5.0**	**0.838**	**10.2**	**LOS A**	**73**	**0.95**	**1.11**	**46.9**
All Vehicles		**4723**	**5.0**	**0.998**	**21.4**	**LOS B**	**160**	**0.94**	**1.26**	**38.1**

Symbols which may appear in this table:

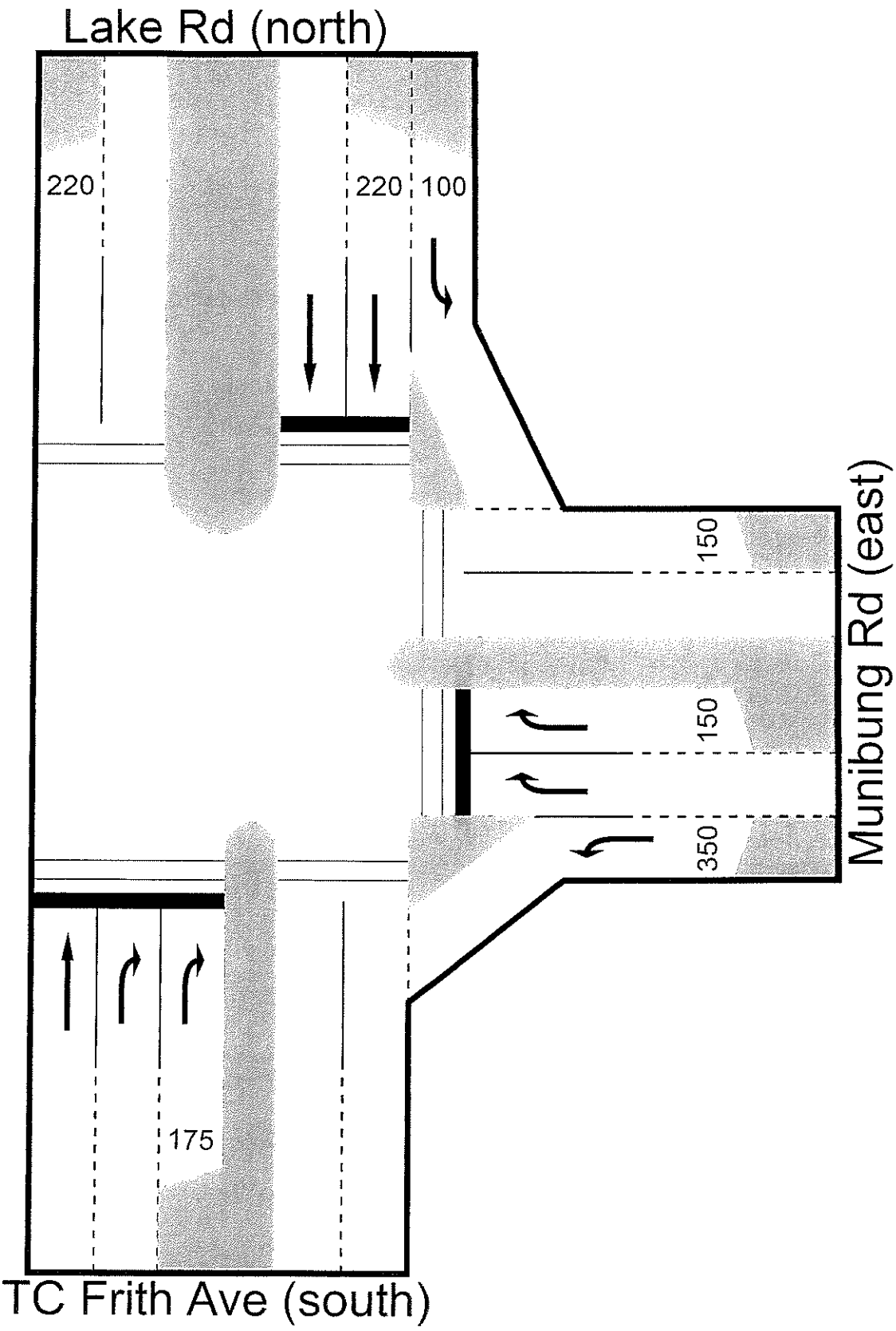
Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

Site: Scenario_02D - Int A - PM
T:\2009\09130\Job Tasks\Modelling\090723 Version 4\TFX 09 130 - Scenario_02.aap
Processed Jul 23, 2009 01:52:26PM

A1835, Traffix, Small Office


Lake Rd (north)
220
220
100
150
150
350
Munibung Rd (east)
175
TC Frith Ave (south)

Movement Summary

Scenario 2 TC Frith Ave / Munibung Rd

Scenario 2C - Future (RTA+PCCS+Glendale) - AM

Signalised - Fixed time **Cycle Time = 90 seconds**

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	85% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
TC Frith Ave (south)										
2	T	1175	4.0	0.943	9.5	LOS A	194	0.52	0.57	47.6
3	R	975	8.0	0.800	36.5	LOS C	147	0.93	0.90	30.1
Approach		**2150**	**5.8**	**0.943**	**21.7**	**LOS B**	**194**	**0.71**	**0.72**	**37.6**
Munibung Rd (east)										
4	L	612	8.0	0.487	13.1	LOS A	58	0.47	0.77	44.4
6	R	643	7.9	0.867	55.1	LOS D	106	1.00	1.04	24.0
Approach		**1255**	**8.0**	**0.866**	**34.6**	**LOS C**	**106**	**0.74**	**0.91**	**31.0**
Lake Rd (north)										
7	L	479	7.9	0.601	19.0	LOS B	71	0.64	0.84	39.8
8	T	662	3.9	0.825	42.6	LOS D	100	1.00	0.97	27.6
Approach		**1141**	**5.6**	**0.825**	**32.7**	**LOS C**	**100**	**0.85**	**0.92**	**31.7**
All Vehicles		**4546**	**6.4**	**0.943**	**28.0**	**LOS B**	**194**	**0.75**	**0.82**	**34.0**

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	85% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	53	39.2	LOS D	0	0.93	0.93
P3	53	35.6	LOS D	0	0.89	0.89
P5	53	36.5	LOS D	0	0.90	0.90
All Peds	**159**	**37.1**	**LOS C**	**0**	**0.91**	**0.91**

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS

Movement Summary

Scenario 2 TC Frith Ave / Munibung Rd

Scenario 2C - Future (RTA+PCCS+Glendale) - PM

Signalised - Fixed time **Cycle Time = 100 seconds**

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	85% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
TC Frith Ave (south)										
2	T	697	4.0	0.548	1.4	LOS A	25	0.11	0.10	57.8
3	R	612	8.0	0.677	42.6	LOS D	97	0.93	0.84	27.8
Approach		**1309**	**5.9**	**0.677**	**20.6**	**LOS B**	**97**	**0.49**	**0.45**	**38.4**
Munibung Rd (east)										
4	L	975	8.0	0.907	40.6	LOS C	301	0.95	1.15	28.7
6	R	479	7.9	0.649	48.2	LOS D	74	0.97	0.84	25.9
Approach		**1454**	**8.0**	**0.907**	**43.1**	**LOS D**	**301**	**0.95**	**1.05**	**27.7**
Lake Rd (north)										
7	L	643	7.9	0.699	14.6	LOS B	79	0.53	0.80	43.2
8	T	1116	4.0	0.890	46.1	LOS D	193	1.00	1.06	26.5
Approach		**1759**	**5.5**	**0.890**	**34.6**	**LOS C**	**193**	**0.83**	**0.97**	**30.9**
All Vehicles		**4522**	**6.4**	**0.907**	**33.3**	**LOS C**	**301**	**0.77**	**0.84**	**31.5**

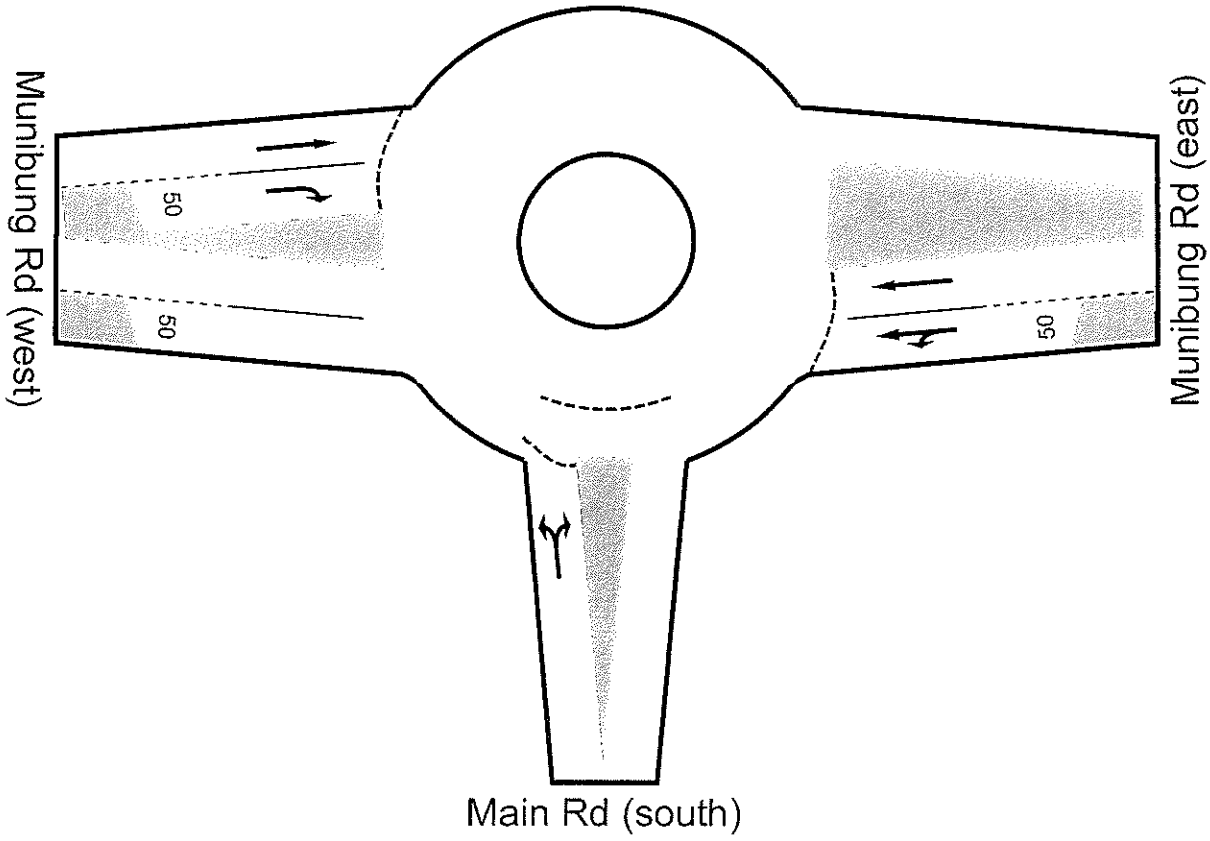
Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	85% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	53	42.3	LOS E	0	0.92	0.92
P3	53	28.9	LOS C	0	0.76	0.76
P5	53	39.6	LOS D	0	0.89	0.89
All Peds	**159**	**36.9**	**LOS C**	**0**	**0.86**	**0.86**

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS


Munibung Rd (west)
50
50
Munibung Rd (east)
50
Main Rd (south)

Movement Summary

Scenario 2 TC Munibung Rd / Main Rd

Scenario 2A - Future (RTA+PCCS+Glendale) - AM

Roundabout

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	85% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Main Rd (south)										
1	L	514	5.1	0.769	16.3	LOS B	46	0.91	1.14	48.2
3	R	11	9.1	0.786	21.3	LOS B	46	0.91	1.15	45.8
Approach		**525**	**5.1**	**0.770**	**16.4**	**LOS B**	**46**	**0.91**	**1.14**	**48.2**
Munibung Rd (east)										
4	L	11	9.1	0.220	9.9	LOS A	8	0.59	0.72	52.3
5	T	807	5.0	0.552	8.0	LOS A	29	0.69	0.69	52.5
Approach		**818**	**5.0**	**0.552**	**8.0**	**LOS A**	**29**	**0.69**	**0.69**	**52.5**
Munibung Rd (west)										
11	T	1165	5.0	0.651	5.6	LOS A	54	0.15	0.43	54.8
12	R	365	4.9	0.359	11.6	LOS A	13	0.53	0.45	50.2
Approach		**1530**	**5.0**	**0.651**	**7.0**	**LOS A**	**54**	**0.24**	**0.44**	**53.6**
All Vehicles		**2873**	**5.0**	**0.786**	**9.0**	**LOS A**	**54**	**0.49**	**0.64**	**52.2**

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

Site: Scenario_02A - INT B - AM
T:\2009\09130\Job Tasks\Modelling\090723 Version 4\TFX 09 130 - Scenario_02.aap
Processed Jul 23, 2009 02:07:52PM

A1835, Traffix, Small Office

Movement Summary

Scenario 2 TC Munibung Rd / Main Rd

Scenario 2A - Future (RTA+PCCS+Glendale) - PM

Roundabout

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	85% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Main Rd (south)										
1	L	365	4.9	0.817	24.6	LOS B	49	0.99	1.25	43.9
3	R	11	9.1	0.846	29.5	LOS C	49	0.99	1.24	42.0
Approach		**376**	**5.1**	**0.817**	**24.7**	**LOS B**	**49**	**0.99**	**1.25**	**43.8**
Munibung Rd (east)										
4	L	11	9.1	0.367	11.5	LOS A	15	0.76	0.85	51.2
5	T	1165	5.0	0.931	23.3	LOS B	138	0.95	1.32	44.5
Approach		**1176**	**5.0**	**0.932**	**23.2**	**LOS B**	**138**	**0.95**	**1.31**	**44.5**
Munibung Rd (west)										
11	T	807	5.0	0.453	5.6	LOS A	28	0.11	0.44	55.0
12	R	514	5.1	0.454	11.7	LOS A	19	0.79	0.32	49.5
Approach		**1321**	**5.0**	**0.455**	**7.9**	**LOS A**	**28**	**0.38**	**0.39**	**52.7**
All Vehicles		**2873**	**5.0**	**0.931**	**16.4**	**LOS B**	**138**	**0.69**	**0.88**	**47.9**

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

Site: Scenario_02A - INT B - PM
T:\2009\09130\Job Tasks\Modelling\090723 Version 4\TFX 09 130 - Scenario_02.aap
Processed Jul 23, 2009 02:07:52PM

A1835, Traffix, Small Office