T4 PROJECT

ENVIRONMENTAL ASSESSMENT

Prepared for Port Waratah Coal Services Limited | February 2012

Appendices - Volume 6

Appendix O	Traffic assessment
Appendix P	Visual assessment
Appendix Q	Heritage assessment
Appendix R	Economics assessment
Appendix S	Social assessment

EMM
EMGA Mitchell McLennan

PWCS

VOLUME 6

Appendix O > Traffic assessment
Appendix P > Visual assessment
Appendix Q > Heritage assessment
Appendix R > Economics assessment
Appendix S > Social assessment

6

APPENDIX O

TRAFFIC ASSESSMENT

0

T4 PROJECT

TRAFFIC ASSESSMENT

Prepared for Port Waratah Coal Services Limited | 16 February 2012

EMM

EMGA Mitchell McLennan

T4 Project

Traffic Assessment

Prepared for Port Waratah Coal Services | 16 February 2012

Prepared by	**Tim Brooker**	Approved by	**Brett McLennan**
Position	Associate – Transport Planning	Position	Director
Signature		Signature	
Date	16 February 2011	Date	16 February 2012

This Report has been prepared in accordance with the brief provided by the Client and has relied upon the information collected at or under the times and conditions specified in the Report. All findings, conclusions or recommendations contained within the Report are based only on the aforementioned circumstances. Furthermore, the Report is for the use of the Client only and no responsibility will be taken for its use by other parties.

Document Control

Version	Date	Prepared by	Reviewed by
Draft 1	8 November 2011	Dr Tim Brooker	Brett McLennan
Draft 2	17 November 2011	Dr Tim Brooker	Brett McLennan
Draft 3	22 November 2011	Dr Tim Brooker	Brett McLennan
Draft 4	31 January 2012	Dr Tim Brooker	Brett McLennan
Final	16 February 2012	Dr Tim Brooker	Brett McLennan

EMGA MitchellMcLennan

Planning + Environment + Acoustics

T + 61 (0)2 9493 9500 | F + 61 (0)2 9493 9599

Ground Floor | Suite 01 | 20 Chandos St | St Leonards | New South Wales | 2065 | Australia

emgamm.com

"This page has been intentionally left blank"

Executive Summary

ES1 Introduction

This report responds to the Director General's Requirements (DGRs) for the assessment of traffic and transport planning issues for the T4 Project.

ES2 Existing road network and traffic volumes

Historically, the Hunter River has been a major barrier to the development of land transport routes in the local area and today, there are only two road bridges, the Tourle Street Bridge and the Stockton Bridge, which provide vehicular access for persons visiting Kooragang Island, from either the north or the south. These two bridges form part of the arterial road route, Main Road 108 (MR 108) which connects Newcastle with Stockton, Fern Bay, Port Stephens and the Newcastle Airport at Williamtown. This road serves both a regional access function and a local traffic access function for developments on Kooragang Island.

The historic growth in the daily traffic volumes on the major road network has been determined from Roads and Maritime Services (RMS) annual average daily traffic (AADT) data for the years from 1995 to 2010. This data shows current traffic growth rates for the major road network in the Kooragang area for 2010/2011 (based on the historic traffic growth projection) of + 1.6% per annum for the Stockton Bridge and + 1.3% per annum for the Tourle Street Bridge. The current daily traffic volumes, based on the RMS 2010 surveys are 21,732 on the Stockton Bridge and 29,173 on the Tourle Street Bridge respectively.

MR 108 is being progressively being developed to a four lane capacity standard. However, there remains a significant two lane section along Cormorant Road, including the Tourle Street Bridge. The Tourle Street Bridge was recently reconstructed between 2007 and 2009 with a new road bridge with wider sealed shoulders, a separated pedestrian footpath and a higher navigational clearance for river traffic.

ES3 Existing traffic conditions

A program of peak hour intersection traffic counts were undertaken during March 2011 at the main Tourle Street/Industrial Drive and Cormorant Road/Teal Street intersections and during October 2011 at a further seven minor unsignalised intersections. These counts determined the existing traffic conditions at all intersections in the area. During both the morning and afternoon peak traffic periods, the eastbound and westbound traffic flows on Kooragang Island are frequently slow and congested, in particular in the westbound direction, where the remaining two-lane sections of Cormorant Road and the Tourle Street Bridge restrict traffic flow currently.

In an urban area, the capacity of the road network is generally determined by the capacity of the intersections. Several intersections are currently operating at congested conditions for turning traffic at multiple am and pm peak hour periods Level of Service (LoS) is a basic performance parameter used to describe the operation of an intersection. LoS ranges from A, indicating good intersection operation, to F, indicating over saturated conditions with long delays and queues.

The SIDRA intersection analysis program has been used to determine these traffic conditions, with results as summarised below.

Table E.1 Summary of existing intersection capacity results – LoS Year 2011

Intersection	Type	Early am peak hour 6.00-7.00 am	Actual am peak hour 7.30-8.30 am typically	Actual pm peak hour 4.00-5.00 pm typically	Later pm peak hour 5.00-6.00 pm
Industrial Drive/Woodstock Street	Give Way	F	F	F	F
Industrial Drive/Tourle Street	Traffic Signals	C	B	B	B
Cormorant Road/Delta EMD Road	Give Way	E	D	F	F
Cormorant Road/Pacific National	Give Way	F	C	F	D
Cormorant Road/NCIG Wharf Access	Give Way	C	F	F	F
Cormorant Road/Egret Street	Give Way	E	D	F	C
Cormorant Road/Teal Street	Roundabout	B	B	B	B
Teal Street/Raven Street	Give Way	B	C	F	B
Cormorant Road/Curlew Street	Give Way	B	A	A	A

Notes: Shaded cells denote intersections operating at LoS E and F
LoS E = intersection operating at capacity
LoS F = intersection operating beyond capacity
For roundabouts and unsignalised intersections, average delay is calculated for the worst affected movement

The existing situation traffic conditions assessment has determined that the most critical intersections for access to the project area currently are:

- The Industrial Drive/Woodstock Street intersection, which was operating over capacity (LoS F) during all of the four peak hour traffic periods considered.
- The Cormorant Road/NCIG Wharf Access Road intersection, which was operating over capacity (LoS F) during three of the four peak hour traffic periods considered, with capacity problems occurring at different peak times for both the unsignalised right turn movement into the minor road and the left turn egress from the minor road.
- The Cormorant Road/Pacific National Access Road intersection and the Cormorant Road/Delta EMD Access Road intersection, which were both operating over capacity (LoS F) during two of the four peak hour traffic periods considered, mainly because of the high eastbound through traffic flows on Kooragang Island restricting the unsignalised left turn egress from these roads during the peak traffic periods.

- The Cormorant Road/Egret Street intersection and the Teal Street/Raven Street intersection, which were both operating over capacity (LoS F) during one of the four peak hour traffic periods considered (the 4.00 – 5.00 pm actual pm peak period), also because of the high eastbound through traffic flows on Kooragang Island restricting the left turn egress from these roads during the peak traffic period.

ES4 Future traffic changes during project construction

Future construction traffic generated during each stage of the project has been defined and assessed for the predicted peak years of construction, which are:

- 2015 for Stage 1;
- 2018 for Stage 2; and
- 2021 for Stage 3.

Approximately 85% of the predicted construction workforce (1,275 persons at the peak of stage 1 construction) will operate to dayshift working times, working either 10, 11 or 12 hour shifts, commencing at either 6.00 or 6.30 am potentially seven days per week. Without intervention or mitigation, this dayshift construction workforce would potentially generate approximately 1,000 car driver trips arriving at Kooragang Island each weekday morning and approximately 1,000 car driver trips departing from Kooragang Island each weekday afternoon.

Site dayshift shuttle bus operations are proposed which will transport approximately 300 persons of the proposed peak workforce at the peak of Stage 1 construction, to and from the main project area worksites at Kooragang Island using an off-site parking location on the south side of the Hunter River South Arm. The remaining 975 persons of the main project area dayshift workforce will then generate approximately 780 car driver trips to and from the main project area worksites on Kooragang Island at the following peak times approximately:

- 260 car trips arriving between 5.00 and 6.00 am;
- 520 car trips arriving between 6.00 and 7.00 am;
- 260 car trips departing between 4.00 and 5.00 pm; and
- 520 car trips departing between 5.00 and 6.00 pm.

The remaining 15% of the construction workforce (225 persons at the peak of Stage 1 construction) will work on the dredging and land reclamation operations which will continue 24 hours per day, operating as two 12 hour shifts commencing at 5.00 am and 5.00 pm respectively. This workforce will generate approximately 200 car driver trips in each direction each weekday, generally arriving at and departing from Kooragang Island at the following times:

- 100 car trips arriving shortly before 5.00 am;
- 100 car trips departing shortly after 5.00 am;
- 100 car trips arriving shortly before 5.00 pm; and
- 100 car trips departing shortly after 5.00 pm.

The future predicted construction workforce during Stages 2 and 3 of construction (578 persons) will be significantly lower than either the current Kooragang Island construction workforce (1,200 persons) or the peak Stage 1 construction workforce (1,511 persons).

For this reason detailed future assessment of the peak hour traffic impacts of Stages 2 and 3 construction workforce traffic on Kooragang Island is not generally required as even with additional future background traffic growth to and from the Stockton Bridge direction during the intervening period, the significant traffic reductions compared to the current construction workforces at Newcastle Coal Infrastructure Group (NCIG) and Kooragang Coal Terminal (KCT), the future Stage 1 construction workforces will mean that the Kooragang Island traffic congestion impacts during Stages 2 and 3 will clearly be lower than during the peak of Stage 1 construction in 2015.

Notwithstanding the above, a detailed traffic assessment has been undertaken of the proposed Stage 2 and Stage 3 project construction traffic access impacts in the years 2018 and 2020 at the Industrial Drive/Woodstock Street intersection and the proposed Tourle Street left turn access, to confirm the feasibility of the proposed intersection improvements and any potential flow on traffic queuing impacts at the nearby Industrial Drive/Tourle Street intersection.

ES5 Mitigation measures

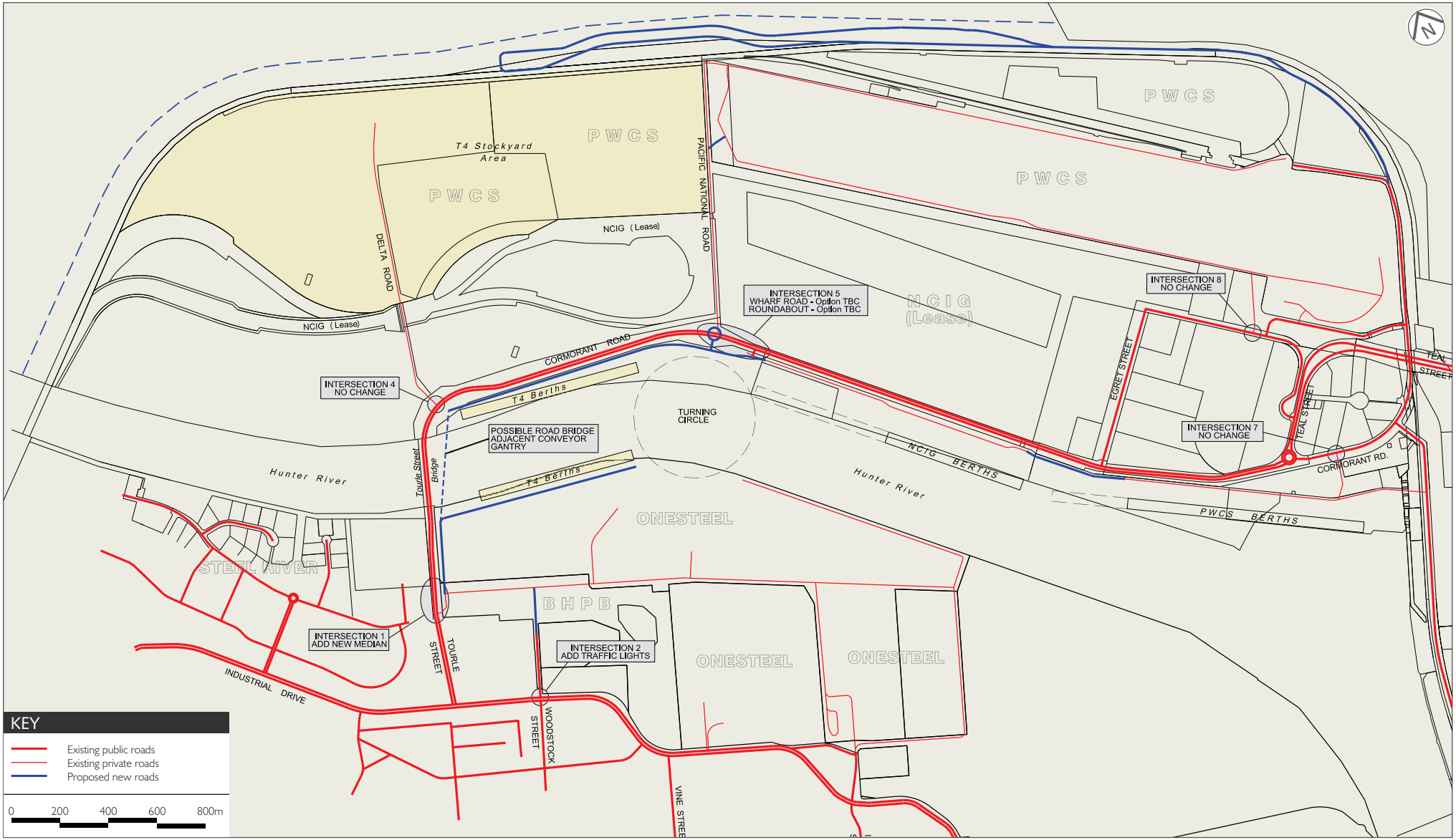
Based on existing traffic conditions and consideration of Stage 1 construction traffic, it was determined that five specific traffic impact mitigation measures were required for the T4 Project (refer to Figure E.1), namely:

- construct a roundabout (or alternative) to replace the existing Pacific National Access Road and NCIG Wharf Access Road T-intersections on Cormorant Road, approximately 1.5 km east of the Tourle Street Bridge;
- increased spreading of the afternoon peak hour access period, between 4.00 pm and 6.00 pm for the pm peak hour construction traffic for the project during Stage 1;
- signalisation of the Industrial Drive/Woodstock Street, when required, for Stages 2 and 3;
- construction of a median in the centre of the roadway in Tourle Street, approximately 300 m south of the Tourle Street Bridge, to enforce the site vehicular access from Tourle Street as left turn access only, and
- shuttle bus to transport approximately 300 persons during the peak of Stage 1 construction, to and from the worksites at Kooragang Island using an off-site parking location(s) on the south side of the Hunter River South Arm.

ES6 Stage 1 construction traffic impacts

For the traffic assessment, the year 2015, 2018 and 2020 base traffic conditions have been adjusted by + 8% to + 15% approximately to include the base traffic growth each year on Industrial Drive and from the Stockton Bridge direction, which will be continuing to occur at rates of + 1.3% and + 1.6% per annum each year from 2011 onwards.

This continuing base traffic growth on the major road network is assumed to also include potential future traffic growth which may be generated by the construction or operations of other proposed or approved developments in the area, eg Incitec Pivot, Knauf Glass Wool Manufacturing and future port developments with access via Industrial Drive.



Integrated Design Solutions | 030418 EA Rev A - 7 February 2012

EMM

PWCS

Future site access plan showing proposed intersection improvements

T4 Project - Traffic Assessment

FIGURE E.1

The future traffic conditions for the project at key intersections, during Stage 1 construction in 2015 were assessed as summarised in Table E.2, with the identified traffic mitigation measures in place. These future intersection traffic assessment results for the year 2015 show that all future intersections will be operating at an acceptable LoS during the main construction traffic peak hour periods.

The assessment is based on redistributions of peak hour traffic between intersections on Kooragang Island, but no net future increase in the peak hour or daily construction traffic movements at the external road connections to and from Kooragang Island, via the Tourle Street Bridge and the Stockton Bridge. Traffic increases from Stage 1 construction are effectively cancelled out by the removal of the current Kooragang island construction traffic activity from the current (October 2011) construction workforce of approximately 1,200 persons at KCT and NCIG.

Table E.2 Summary of Stage 1 construction intersection performance

Intersection	Type	Early am peak hour 6.00-7.00 am	Later pm peak hour 5.00-6.00 pm
Industrial Drive/Woodstock Street	New Traffic Signals	A	A
Industrial Drive/Tourle Street	Traffic Signals	C	C
Cormorant Road/Delta EMD Road	Give Way left turn only	E	D
Cormorant Road/Pacific National/NCIG Wharf Access	New four way roundabout	B	B
Cormorant Road/Egret Street	Give Way no right turn egress	D	D
Cormorant Road/Teal Street	Roundabout	B	B
Teal Street/Raven Street	Give Way left turn only	B	C
Cormorant Road Curlew Street	Give Way	A	A

Note: Shaded cells denote intersections operating at LoS E
LoS E = intersection operating at capacity
For roundabouts and unsignalised intersections, average delay is calculated for the worst affected movement

ES7 Stage 2 and 3 construction traffic impacts

A comparative assessment of the existing and future traffic intersection levels of service was undertaken at three intersections in the local area which will be utilised for Stage 2 and Stage 3 project construction access, with traffic utilising intersections on via Industrial Drive, Tourle Street and Woodstock Street for access. A summary of the intersection traffic level of service assessment results is presented in Table E.3.

Table E.3 Summary of Stage 2 and 3 construction intersection performance

Intersection	Time Period	Year 2011 Base	Year 2018 Stage 2	Year 2020 Stage 3
Industrial Drive/Woodstock Street	5.00 – 6.00 am	A	A	A
	6.00 – 7.00 am	A	A	A
	8.00 – 9.00 am	A	A	A
	4.00 – 5 00 pm	A	A	A
	5.00 – 6.00 pm	A	A	A
Industrial Drive/Tourle Street	5.00 – 6.00 am	B	B	B
	6.00 – 7.00 am	C	C	C
	8.00 – 9.00 am	B	C	C

Table E.3 Summary of Stage 2 and 3 construction intersection performance

Intersection	Time Period	Year 2011 Base	Year 2018 Stage 2	Year 2020 Stage 3
	4.00 – 5 00 pm	B	B	B
	5.00 – 6.00 pm	B	C	C
Tourle Street Left Turn Access	5.00 – 6.00 am	A	A	A
	6.00 – 7.00 am	B	E	F
	8.00 – 9.00 am	C	F	F
	4.00 – 5 00 pm	E	C	C
	5.00 – 6.00 pm	C	C	C

Notes: Shaded cells denote intersections operating at LoS E and LoS F

The results of the traffic assessment for Stage 2 and 3 construction indicate that the Woodstock Street/Industrial Drive intersection will continue to operate at LoS A.

The Industrial Drive/Tourle Street intersection is currently operating at peak hour LoS B or C with a Degree of Saturation (DoS) in the range 0.77 to 0.86 in four of the five peak hour traffic periods considered in the year 2011 base traffic assessment. For Stage 2 and 3 construction, the future intersection peak hour LoS will remain at either B or C, although the intersection peak hour DoS will increase to between 0.79 and 0.89 for Stage 2 construction and to between 0.81 and 0.91 for Stage 3 construction.

Access into the southern wharf area from Tourle Street is currently operating at a poor LoS (LoS E) during the 4.00 – 5.00 pm afternoon traffic peak, but the intersection operations are generally better (A, B or C) in the morning peak traffic periods. For Stage 2 and Stage 3 construction, this intersection's operations will generally improve to LoS C during the 4.00 – 5.00 pm afternoon peak period but will worsen to LoS E or F during the two morning peak hour traffic periods considered (6.00 – 7.00 am and 8.00 – 9.00 am). The additional traffic delays associated with the future morning peak hour levels of service E and F at the intersection will primarily only affect the project worksite traffic which will be making left turn egress movements from the southern wharf area work site under congested traffic conditions. No other traffic will generally be affected so there will generally be no adverse impact for other road users. Stage 2 and Stage 3 construction traffic which will l also have the option of using the Woodstock Street intersection as an alternative egress route from the area, as that intersection will be continuing to operate at LoS A under all the future peak hour traffic scenario which have been considered.

ES8 Traffic safety

The two major traffic safety issues for traffic currently on Kooragang Island are:

- the relatively high occurrence of rear end traffic accidents due to the slow moving peak hour traffic on the island currently; and
- the high right turn traffic delays increasing traffic safety issues at unsignalised intersections.

Right turns (in particular the right turn egress movement) are currently banned at most of the intersections on the island, primarily due to the high right turn traffic delays reducing the available gaps for safe right turning traffic, leading in turn to more risky traffic turning behaviour by motorists.

The first safety issue will effectively only be fully addressed when the four lane duplication of the Tourle Street and Cormorant Road route, is completed over the full length between the Industrial Drive intersection and the Egret Street intersection at a date to be determined by RMS.

The second safety issue for the T4 Project construction access will be improved by construction of the roundabout (or traffic signals) on Cormorant Road. This new intersection will replace the two existing T intersections at the Pacific National Access Road and the NCIG Wharf Access Road, which will permit all future right turn egress traffic movements to occur directly at the new intersection, thereby also reducing the current high right turn traffic delays for traffic involving detours and multiple left and right turns currently.

ES9 Car parking

Future car parking areas for the construction workforce will be distributed around the worksites in proportion to the predicted peak workforce car parking demand at each location.

A peak total of 980 on-site car parking spaces will be provided for Stage 1 construction. This car parking supply will generally be provided in gravel surfaced car parking areas located as follows:

- stockyard worksite – 400 car parking spaces;
- wharf area worksites – 200 car parking spaces;
- dredging and land reclamation worksite areas – 200 car parking spaces; and
- rail construction worksite – 180 car parking spaces.

During Stages 2 and 3, a smaller total construction workforce will be engaged on the project and the areas required for the provision of on-site car parking will be able to be reduced accordingly.

ES10 Public transport access and facilities for pedestrians and cyclists

A basic minimum level of service provisions exist for public transport access to and from Kooragang Island by means of bus services on routes 130 and 131. However public transport usage in the Kooragang Island area is generally limited in practice because of the long walking distances from any public transport stops on Cormorant Road to workplaces.

A dayshift shuttle bus is proposed to transport approximately 300 persons during the peak of Stage 1 construction, to and from the worksites at Kooragang Island using an off-site parking location(s) on the south side of the Hunter River South Arm.

The shuttle bus can also potentially form the basis of a future WTP to be implemented in conjunction with existing coal terminals and other industrial operations on Kooragang Island. Future dedicated shuttle bus services, operating to and from Kooragang Island in the peak hours could operate from a range of key locations in the Newcastle urban area, such as Central Newcastle, Broadmeadow, Belmont, Cardiff, Wallsend, Sandgate and Stockton.

With the recent completion of the footpath/cycleway on the Tourle Street Bridge, a basic minimum level of pedestrian accessibility is now provided on Kooragang Island to and from both the Newcastle and Stockton directions, for any persons who may wish to either walk or cycle to or from their workplace on Kooragang Island.

Table of Contents

Table of Contents *(Cont'd)*

Tables

Tables

Figures

Figures

Photographs

Appendices

1 Introduction

Port Waratah Coal Services Limited (PWCS) proposes to construct and operate a new coal export terminal at the Port of Newcastle, New South Wales (NSW). PWCS currently owns and operates the Kooragang Coal Terminal (KCT) at Kooragang Island and Carrington Coal Terminal (CCT) at Carrington, both in the Port of Newcastle (Figure 1.1). The proposal, known as the Terminal 4 Project (T4 Project), is essentially an extension to KCT. The T4 Project will provide additional port capacity required to accommodate the projected future growth in coal exports from the Hunter Valley and broader NSW.

The T4 Project is proposed to include new rail tracks, coal stockyard, conveyors and ancillary facilities on Kooragang Island, adjacent to KCT. Wharves, berths, ship loaders and ancillary facilities will be constructed and operated within the Hunter River South Arm and along its northern and southern banks (Figure 1.1).

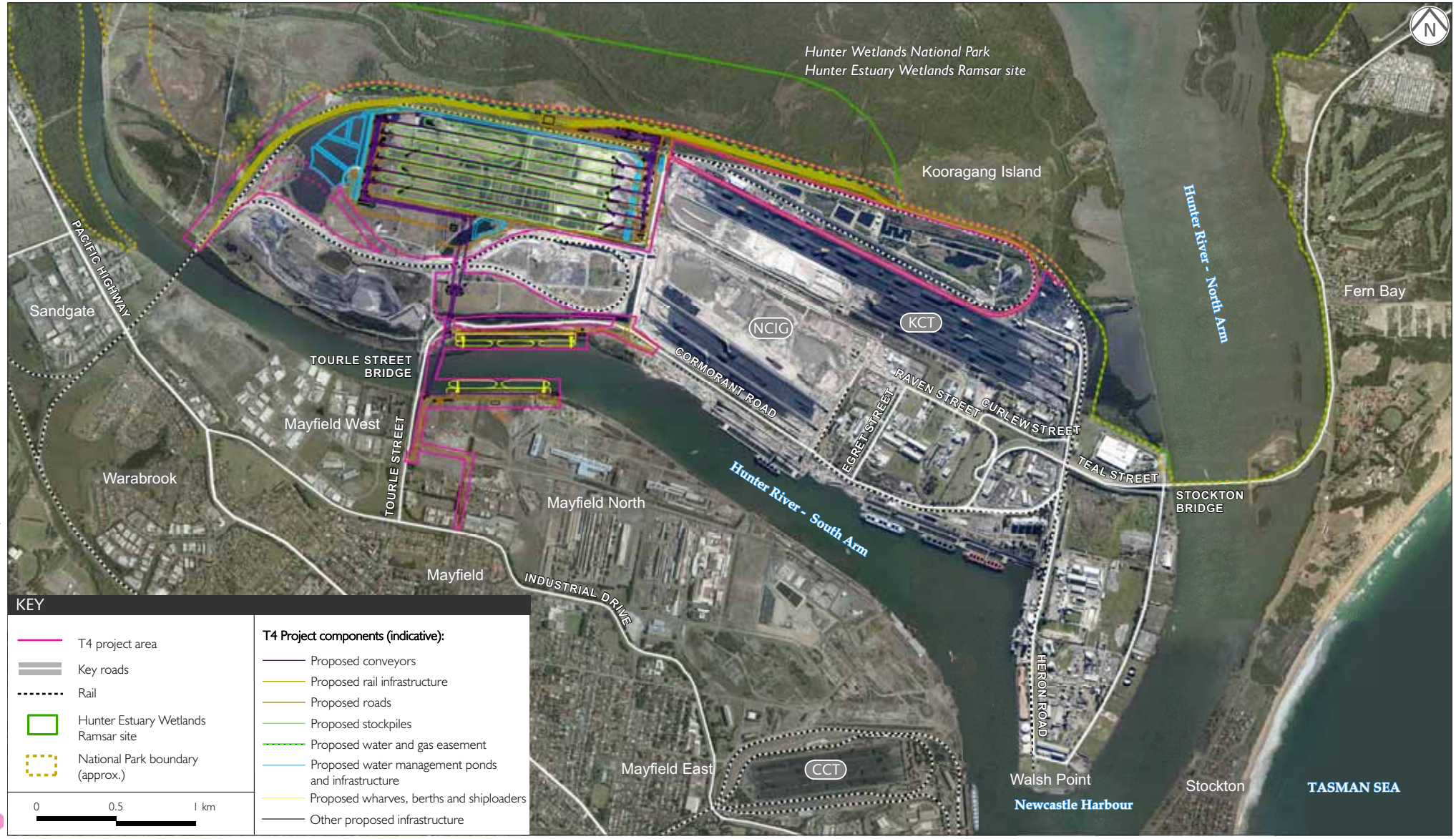
Approval for the T4 Project is being sought under Part 3A of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) and the Commonwealth *Environment Protection Biodiversity and Conservation Act 1999* (EPBC Act). The Commonwealth has accredited the Part 3A process as the appropriate Commonwealth assessment pathway for the T4 Project. An environmental assessment (EA) of the T4 Project is a requirement of the Part 3A approval process. EMGA Mitchell McLennan Pty Limited (EMM) has been engaged by PWCS to undertake the traffic component of the EA. This report documents the methodology and results of a traffic impact assessment as well as the proposed mitigation measures. Consideration has also been given to management of rail movements associated with the T4 Project.

1.1 T4 Project area

The T4 Project is proposed to be located at the Port of Newcastle, in the Newcastle local government area, approximately 6 km north-west of the Newcastle central business district (Figure 1.1). The T4 Project area is located on Kooragang Island, adjacent to KCT and the Newcastle Coal Infrastructure Group (NCIG) coal terminal, and on the south bank of the Hunter River South Arm, at Mayfield North and includes a section of the Hunter River bed.

Mayfield North and the southern part of Kooragang Island, where the most of the T4 Project area is located, is dominated by industrial, transport, distribution and port facilities, including KCT and NCIG. To the north and west of the Kooragang Island industrial and port area are estuarine wetlands, mangroves, saltmarsh and pastured and forested lands, subject to agricultural and conservation activities. This includes the Hunter Wetlands National Park, part of which is a Ramsar site. The nearest residential areas are at Fern Bay and Stockton to the east and south-east, and Mayfield and Warabrook to the south and south-west (Figure 1.1).

The T4 Project area is predominately reclaimed land which has previously been used for disposal of industrial waste and dredge material. It is a largely modified landscape dominated by bare ground, disturbed grassland and artificially constructed drainage depressions and ponds, which now support wetland communities. There is some remnant mangrove and saltmarsh vegetation along the north bank of the Hunter River South Arm, at the location of the proposed wharves and berths, as well as to the north and west of the existing rail line (Figure 1.1).



Aerial Imagery : 2011 Sinclair Knight Merz Pty Ltd.

EMM PWCS

T4 Project components

T4 Project - Traffic Assessment

FIGURE 1.1

1.2 T4 Project overview

The T4 Project is proposed to be developed progressively over an estimated 10 year timeframe, in response to demand for increased coal export capacity. The maximum coal throughput capacity for the T4 Project will increase from 70 million tonnes per annum (Mtpa) in the first stage to a nominal 120 Mtpa at full development. All coal will be received by rail, stockpiled and then shipped to market. The T4 Project components are illustrated in Figure 1.1 and include the following:

- Ground treatments, including pre-loading, to create suitable foundation conditions for development. Sand dredged from the Hunter River South Arm is proposed to be pumped to the proposed stockyard area, to provide pre-load and fill material for the project. This will be supplemented by engineering fill (sand and rock) trucked in from elsewhere.

- Relocation of some existing infrastructure and services, such as electricity transmission lines, gas lines, water lines, fibre optic cable, ship navigation aids, the existing KCT rail tracks and the Ausgrid wind turbine. Minor modification to local roads may also be required.

- Progressive construction and operation of rail receival infrastructure, generally located along the same alignment as the existing rail lines servicing Kooragang Island. At full development there will be up to eight arrival tracks leading into up to four dump stations and on to eight departure sidings, which combine into a single departure track around the outside of the existing KCT rail loop.

- Progressive construction and operation of a coal stockyard, including coal stockpiles and yard equipment for stacking and reclaiming coal. At full development there will be up to seven stockpiles.

- Progressive construction and operation of coal conveyors, feeders and transfer stations that extend throughout the stockyard to deliver coal from the dump stations to the stockpiles, and to the wharves to deliver coal to the shiploaders, via buffer bins.

- Progressive construction and operation of wharf and berth facilities on both sides of the Hunter River South Arm, near the Tourle Street Bridge. At full development, up to five berths and four shiploaders are proposed, which accommodate vessels ranging from Handy size to Cape size.

- Development of water and wastewater management infrastructure including drainage works, water management ponds, pump stations and water tanks.

- Ancillary facilities, including electricity supply, dust suppression and fire fighting systems, fencing, amenities, landscaping, internal access roads, car parking areas and potentially, washdown facilities, refuelling facilities, administration and workshop buildings.

- Use of some existing KCT infrastructure, systems and workforce, including administration and maintenance facilities and environmental management and monitoring systems.

- Habitat creation and enhancement.

Further details of the proposed T4 Project are provided in the EA.

1.3 Project workforce

The T4 Project will be constructed on land adjoining KCT and NCIG. Following the completion of construction, it will largely be operated and controlled by the existing KCT workforce and will not result in any real increase in the current KCT operations workforce of approximately 400 persons on Kooragang Island.

Significant construction work is currently taking place on Kooragang Island for expansion of KCT and NCIG. PWCS have advised that in October 2011 there were two large construction workforces, of approximately 600 persons each, engaged in the expansion of these terminals.

These workforces will reduce to zero by the time the T4 Project construction workforce reaches its anticipated peak level of construction activity during Stage 1. The proposed T4 Project construction workforce is illustrated in Figure 1.2.

It is anticipated that construction work for Stage 1 of the T4 Project will commence in January 2013. The Stage 1 construction will progressively ramp up over a two year period before reaching a peak of approximately 1,500 persons in March 2015.

The Stage 1 construction will then ramp down progressively over a two year period, before the Stage 2 construction work commences in 2017.

Much smaller peak construction workforces of about 580 persons will be required during the peaks of project construction in Stage 2 and Stage 3 during the years 2018 and 2020.

Further details of the proposed project workforce and worksite locations during all three stages of construction are provided in Section 3.4 and Section 4.1 of this report.

1.4 Objective

The key objective of this traffic impact assessment is to address the Director-General's requirements (DGRs) relating to traffic, transport and access as summarised in Table 1.1.

This report generally follows the recommended structure for a traffic impact assessment report, as defined by the *Guide to Traffic Generating Developments* (RTA 2002). It primarily assesses construction stage traffic impacts and implications of the project, given that the T4 Project will mostly be operated from and controlled by KCT's existing workforce. As such there will generally be no net increase in the PWCS workforce based at Kooragang Island, with no related traffic impacts on an ongoing basis following the completion of construction.

This report specifically addresses the road traffic issues relating to the T4 Project, including road based public transport and pedestrian/cycling facilities. It does not provide details on the capacity of the existing and proposed rail infrastructure network serving the Port of Newcastle or any associated rail traffic impacts. These issues have been separately addressed by the Australian Rail Track Corporation's (ARTC) *2011-2020 Hunter Valley Corridor Capacity Strategy Consultation Document* (March, 2011) which is summarised in Chapter 14 of the EA (Volume 1).

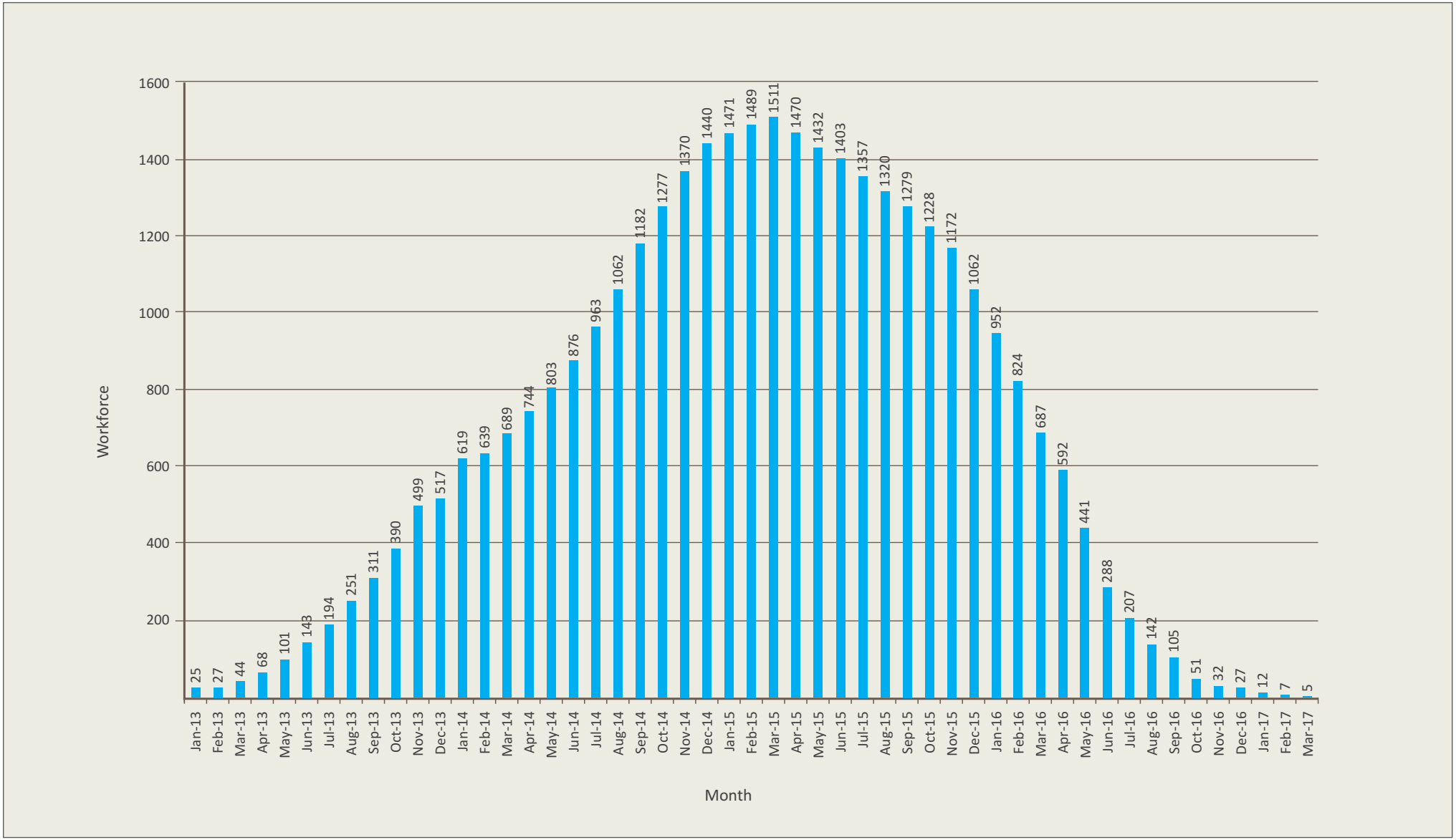
Also, this report also does not address in detail, future navigational issues in the Hunter River or the use of the river for recreational traffic. Impacts of access to recreational uses in the area are documented in the Social Impact Assessment (SIA) is Appendix S of this EA.

Also, there is a specific future requirement for a sustainable workplace travel plan (WTP) to be implemented for the continuing PWCS workforce which is to be based on Kooragang Island. This report outlines the basis for the implementation of such a scheme, including workforce traffic management proposals for the project construction stage, which may be continued if feasible during the future longer term operating life of the project.

Table 1.1 DGRs for traffic, transport and access

Requirement	Addressed in this report
• a Traffic and Transport Study to assess the transport and access impacts of the proposal for both construction and operation. The Study must address: – all vehicular traffic routes and intersections for access to, from, and within the site, including existing road constraints and proposed upgrading (supported by concept drawings) if any; and access to the proposed shipping berths on the Hunter River (South Arm) adjacent to Tourle Street Bridge; – current traffic counts for all of the traffic routes and intersections; – expected additional vehicular traffic to be generated from the proposed development and associated trip distribution on the road network;	Yes (construction stage only as there is no proposed increase in operational workforce or traffic).
• impacts on existing and proposed intersections and the performance of the local and regional road network (particularly during construction), taking into account the Guide to Traffic Generating Developments (RTA, 2002;	Yes.
• consideration of the cumulative traffic impact of other proposed developments in the area;	Yes (subject to available information regarding project timing and background traffic growth on the major road network).
• details of existing and proposed rail infrastructure, including capacity to service the proposed operation of the project and details of rail traffic impacts on the broader rail network;	No (refer below).
• impacts (direct and indirect) on navigation and access to recreational uses in the area; and	No (refer below).
• potential for implementing a location specific sustainable travel plan such as a Workplace Travel Plan for workers at the future site.	Yes.

Additional requirements provided by Roads and Maritime Services (RMS), which was formerly the Roads and Traffic Authority (RTA), and the Newcastle City Council (NCC) are summarised below in Table 1.2.



Estimated stage 1 construction workforce

T4 Project - Traffic Assessment

FIGURE 1.2

Table 1.2 Summary of RMS (formerly RTA) and NCC requirements

Issue	Response
• Refer to Department of Planning EIS Guidelines.	Included.
• Refer to Section 2 of the RTA Guide to Traffic Generating Developments.	Included.
• Assessment of all relevant vehicle routes and intersections to/from the subject site for both construction and operational phases.	Construction stage only, there is no proposed increase in operational workforce or traffic.
• Current traffic count data for traffic routes and intersections.	Included.
• Anticipated additional vehicle trips and associated trip distribution on the road network during both construction and operation phases.	Included.
• Consideration of the traffic impacts on existing and proposed intersections and the capacity of the local and classified road network to safely and efficiently cater for the additional vehicular traffic generated by the proposed developments. The traffic impact assessment shall include the cumulative traffic impact of the other proposed developments in the area.	Yes (subject to available information regarding project timing and background traffic growth on the major road network).
• Identify the necessary road network infrastructure upgrades that are required to maintain existing levels of service on both the local and classified road network including submitting any strategic concept designs for road upgrades. Any identified road infrastructure upgrades will need to be to the satisfaction of the RTA and NCC.	Intersection improvements are identified for three existing intersections.
• Intersection analysis (SIDRA) shall be completed to determine the need for intersection and road capacity upgrades.	Included.
• Impact of construction traffic on the classified road network in the vicinity of the development site. A Construction Management Plan shall be prepared to the satisfaction of the RTA and Council.	Post approval.
• The cumulative impacts of the construction need to be reviewed, due to the number of other large projects that are planned for the Kooragang Island locality.	Included, the project construction stage traffic impact assessments in the years 2015, 2018 and 2020 have included continuing background traffic growth on major roads, which accounts for these projects.
• Confirmed that the limit of the impact assessment should be along Tourle Street/ Cormorant Road from the intersection with Industrial Drive Street to the intersection with Teal Street.	Noted.
• There has been a previous approval for a roundabout to be constructed at the intersection of Cormorant Road and Pacific National Access Road. This was subsequently removed from as a condition of consent.	These works are now included as part of the project.
• RTA has prepared plans for the upgrade of Cormorant Road and Tourle Street. No timeframe is currently provided for construction.	Noted.
• RTA has highlighted the requirement to review project shift times for both construction and operation. Moving the shift times outside the traditional peaks will reduce impacts on the road network.	The project shift start and finish times are proposed to be moved resulting in more project traffic occurring outside the existing Kooragang Island am and pm peak traffic periods.
• RTA has advised access from Tourle Street to land on the southern side of the Hunter River is not desirable. Alternative access is recommended to be developed via Woodstock Street with the potential installation of traffic signals.	Left turn only access is proposed at Tourle Street and the Industrial Drive/ Woodstock Street access intersection is proposed to be signalised as a project mitigation measure.
• NCC has requested a 10 year future traffic growth period to be included in the project intersection traffic analysis.	This is included in the consideration of the Stage 2 and 3 construction traffic impacts in 2018 and 2020.

"This page has been intentionally left blank"

2 Existing traffic conditions

2.1 The locality

The T4 Project area and the surrounding major road network are illustrated in Figure 2.1. The T4 Project area is located approximately 6 km due north-west of the Newcastle CBD, and approximately 10 km travel distance from the CBD by road.

The nearest residential areas to the T4 Project area are the suburbs of Mayfield and Mayfield West, where the nearest residential properties are approximately 900 m due south of the southern wharf. The T4 Project area is approximately 8 to 10 km travel distance away by road from the nearest residential areas on the north side of the Hunter River, which are at Stockton and Fern Bay.

Historically, the Hunter River has been a major barrier to the development of land transport routes in the local area. Two road bridges, the Tourle Street Bridge and the Stockton Bridge, provide the only vehicular access to Kooragang Island, from either the north or the south. These two bridges form part of the arterial road route (MR 108), which connects Newcastle with Stockton, Fern Bay, Port Stephens and the Newcastle Airport at Williamtown. This road serves both a regional access and a local traffic access function for industry on Kooragang Island.

Following the completion of the T4 Project there will be limited land available for major new industrial developments on the Island. The only significant new industrial developments which may be constructed on the island are a new Santos (formerly Eastern Star) gas pipeline and LNG export facility at Walsh Point (for which a preliminary environmental assessment (PEA) was published in 2010) and the Manildra Park marine fuel and diesel fuel storage/biodiesel manufacturing facility, which was approved in 2008 but is not yet constructed.

However there will be some continuing further intensification of the operations of existing industrial sites (eg potential Orica and Incitec Pivot expansions, one of which was approved in 2009) and the total future employment numbers on Kooragang Island will generally continue to increase for several years to come.

There are also two other newly approved industrial developments on the south side of the Hunter River with vehicular access via Industrial Drive, the Knauf Glass Wool Manufacturing Plant which was approved in 2009 and the Multi User Terminal on the former BHPB steelworks site, which was originally approved in 2001 and has been subject to numerous subsequent modifications, the latest of which was approved in 2009).

The additional traffic growth from these developments, during their construction and subsequent operations, will also potentially affect the future peak hour car traffic access capacity to and from Kooragang Island as these developments will affect the future background traffic growth on Industrial Drive, which will then have a flow-on effect on future traffic congestion at the Tourle Street/Industrial Drive intersection.

2.2 Road network and intersections

The local road network which will be directly utilised for future vehicular access to and from the T4 Project area, and the existing access intersections on these roads, are shown in Figure 2.2. A brief description of the most relevant roads and intersections is provided below.

Source: Douglas Partners

Integrated Design Solutions | 030418 EA Rev C - 21 February 2012

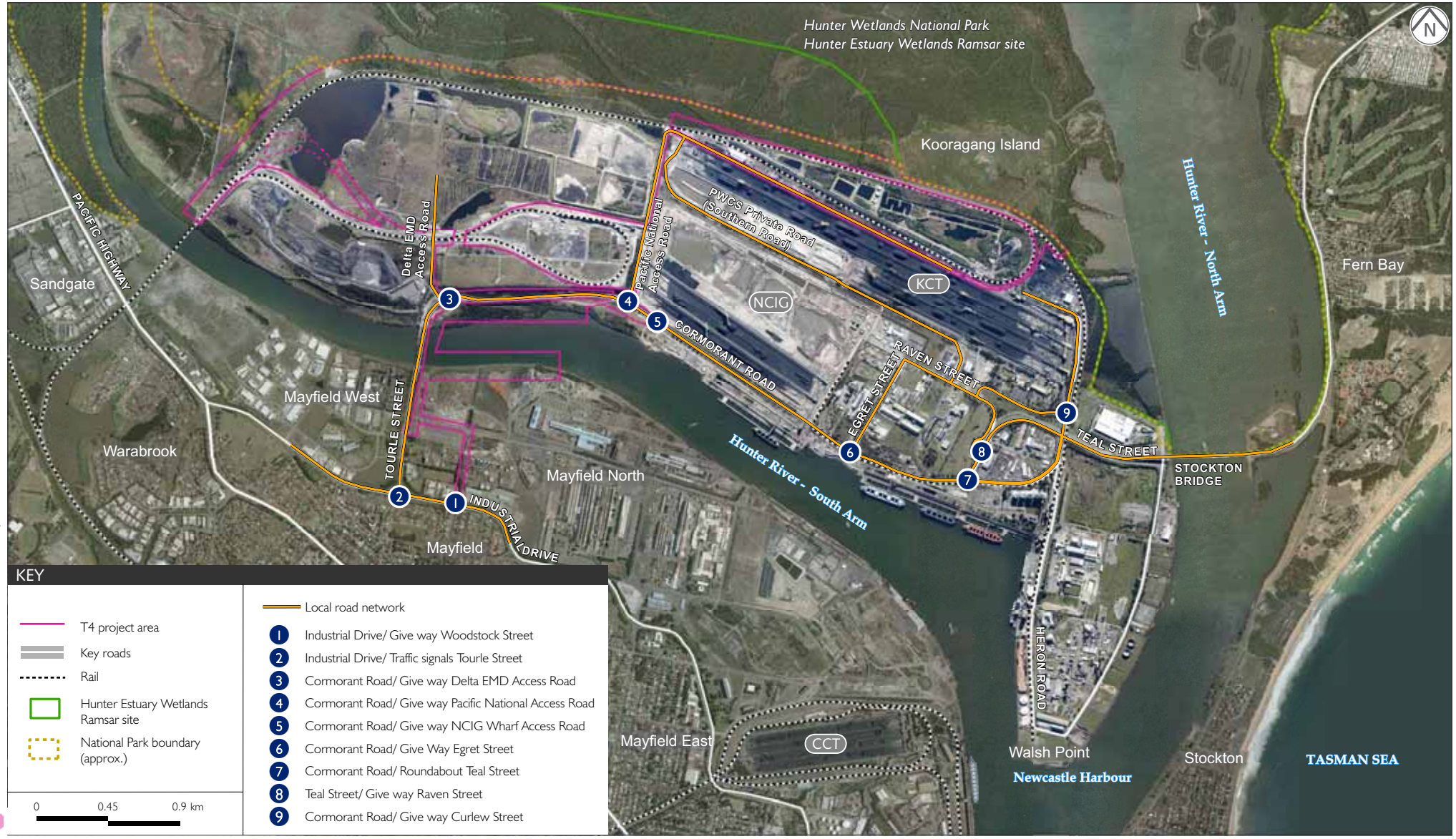
EMM

PWCS

Major road network

T4 Project - Traffic Assessment

FIGURE 2.1



Aerial Imagery : 2011 Sinclair Knight Merz Pty Ltd.

EMM PWCS

Local road network and intersections

T4 Project - Traffic Assessment

FIGURE 2.2

2.2.1 Industrial Drive

This main road (MR 316) is generally a four to six lane dual carriageway road, with an 80 km/hour speed limit, which connects from the Pacific Highway at Warabrook to the Newcastle CBD, via the Stewart Street railway level crossing or Lee Wharf Road.

In the vicinity of the T4 Project area, between Mayfield and Steel River, most of the major access intersections are controlled by traffic signals. However the intersection of Industrial Drive with Woodstock Street at Mayfield, which will potentially provide access to the worksite area on the southern bank of the Hunter River South Arm (southern wharf), is unsignalised.

Photograph 2.1 Industrial Drive at the Tourle Street Intersection – looking east

2.2.2 MR 108 route via Tourle Street, Cormorant Road and Teal Street

Tourle Street, Cormorant Road and Teal Street form the major arterial traffic route (MR 108) across Kooragang Island between Industrial Drive and the Stockton Bridge, after which the road becomes Nelson Bay Road. This route generally has an 80 km/hour speed limit and is being developed to a four lane capacity standard. However, there remains a two lane section, including the Tourle Street Bridge. The two lane section south of the Tourle Street bridge has a 60 km/hr speed limit. The Tourle Street Bridge was recently reconstructed during 2007-2009, with a new road bridge with wider sealed shoulders, a separated pedestrian footpath and a higher navigational clearance for river traffic.

The remaining two lane section of MR 108, Cormorant Road continues for a further 2.5 km to the east of the Tourle Street Bridge. This section has also recently been improved by RMS roadworks to undertake sealed shoulder widening and includes the three intersections with the Delta EMD Access Road, the Pacific National Access Road and the NCIG Wharf Access Road.

At the Egret Street, Teal Street and Raven Street intersections, the roadway of MR 108 is now four lanes capacity.

Photograph 2.2 **Tourle Street – looking north towards the new bridge – opened in 2009**

Photograph 2.3 **Cormorant Road at the westbound traffic merge point – west of Egret Street**

At all the minor road intersections on the MR 108 section of Cormorant Road, either one or both of the right turn movements are banned to minimise the potential traffic congestion and safety conflicts between the through and right turning traffic.

The existing roundabout at Cormorant Road/Teal Street currently provides a U-turn facility for the potential right turning traffic from Egret Street which is affected by a right turn egress traffic restrictions.

Existing U-turn facilities have been designed in to the minor roads at both the Pacific National Access Road and the NCIG Wharf Access Road intersections with Cormorant Road which assist in the detoured right turn egress traffic from these roads currently, achieving alternative access with minimal detour distances. However, the high existing egress traffic delays at these two intersections mean that alternative intersection control should nevertheless be considered.

Either a single roundabout could be installed on Cormorant Road to combine the two existing T-intersections (Pacific National Access Road and the NCIG Wharf Access Road) as a single four way intersection, or alternatively temporary traffic signal control could be installed at either one or both of these intersections, during the main project (Stage 1) construction period.

2.2.3 Local road section of Cormorant Road (east of Teal Street)

To the east of Teal Street, Cormorant Road continues as a local road, providing access to some existing PWCS facilities and numerous other industrial sites in the Walsh Point precinct of Kooragang Island (eg Orica, Incitec Pivot, Cargill Bulk Liquids, Sawmillers Exports, GrainCorp, Patrick, and Hi-Fert) and also (Mountain Industries) at a small industrial precinct at the northern end cul-de-sac.

This local road section of Cormorant Road has a 60 km/hour speed limit and is more lightly trafficked than the MR 108 section, but is still constructed to a good industrial road standard with a 15 m wide carriageway between kerbs.

Photograph 2.4 Teal Street, looking south towards the roundabout on Cormorant Road

Photograph 2.5 Teal Street, looking east towards the Stockton Bridge

Photograph 2.6 KCT outbound conveyors built over the local road section of Cormorant Road

2.2.4 Woodstock Street

On the eastern side of Industrial Drive, Woodstock Street is a private road is a wide sealed road which provides access to existing industrial developments on the northern side of Industrial Drive, approximately 300 m east of Tourle Street. Woodstock Street is a potential access route to the southern wharf, subject to appropriate local access easements being negotiated.

2.2.5 Delta EMD Access Road

This private access road connects with Tourle Street/Cormorant Road at the first local access intersection on Kooragang Island, approximately 150 m north-east of the Tourle Street Bridge. The road is currently a narrow sealed two lane road, generally constructed to rural road design standards. The road is currently predominantly used by BHP Billiton traffic, which travel to and from the site from the south bank of the Hunter River.

Only left turns are currently permitted at the intersection. This results in significant traffic detours for any right turn entry traffic, for any traffic approaching from the east, which effectively has to travel a further 2 km across the Tourle Street Bridge, via Industrial Drive into the Steel River Site to make a U-turn at the roundabout on the main access road there.

Photograph 2.7 Delta EMD Access Road Intersection with Tourle Street/Cormorant Road

2.2.6 Pacific National Access Road

This private access road connects with Cormorant Road, approximately 1.3 km east of the Tourle Street Bridge. It originally provided access to the Pacific National locomotive crewing and servicing depot on Kooragang Island and now also provides access for KCT and NCIG, where construction is still ongoing although is anticipated to be completed by mid-late 2012.

Photograph 2.8 NCIG rail unloading (inbound) conveyor built over Pacific National Road

2.2.7 NCIG Wharf Access Road

This local access road intersection is located a further 150 m to the east along Cormorant Road, from the Pacific National Access Road intersection. The intersection currently carries significant volumes of construction traffic for the NCIG wharf construction. The two intersections currently operate as a staggered pair of T-intersections, where the right turn out traffic manoeuvre is banned at each intersection and the right turn egress traffic consequently has to turn left out, then right in, make a U-turn and then turn left out again at the other intersection to achieve the right turn egress currently.

2.2.8 Egret Street, Raven Street and Curlew Street

These three roads are all industrial standard, 15 m wide, local roads which create a network of 60 km/hour local roads, providing access to most of the existing industrial sites on the eastern part of Kooragang Island including Boral cement, Cargill, Transpacific, NCIG and KCT. Right turn egress and both right turn entry and egress are currently banned at the Egret Street and Raven Street intersections respectively. However other routes, such as Curlew Street, which connects via the local road section of Cormorant Road to the roundabout at Cormorant Road/Teal Street, provide an alternative egress route for the right turn traffic departing from the area back towards Newcastle.

2.2.9 Southern Access Road (PWCS Private Road)

This private road connects with Raven Street, approximately 50 m west of Curlew Street. It is currently used to provide access to numerous KCT expansion worksites and will in the future also provide construction worksite access for most of the fill emplacement area traffic for the T4 Project, which will be generally travelling to and from the east via the Stockton Bridge.

Photograph 2.9 Pacific National access road intersection – looking west on Cormorant Road

Photograph 2.10 NCIG Wharf access road intersection – looking east on Cormorant Road

2.3 Traffic volumes

The current traffic volumes in the local area have been determined from a combination of tube traffic counts and intersection traffic counts, undertaken at key locations on the road network.

The historic growth trend in the daily traffic volumes on the major road network has been determined from a summary of the RMS daily traffic counts as indicated in Table 2.1 below.

Table 2.1 Historic growth in daily traffic volumes on the major road network

Year	Stockton Bridge	Tourle Street Bridge	Industrial Drive (west)	Industrial Drive (east)
2010	21,732	29,173		
2009	20,881			
2008	20,061			
2007	20,233			
2006	19,691			
2005	19,581			
2004	18,966	24,052	23,339	30,717
2003	18,404			
2002	17,954			
2001	17,357	23,650	21,559	30,334
2000	17,489			
1999	17,626			
1998	17,482	24,637	21,608	29,549
1997	17,351			
1996	16,542			
1995	16,532	23,393	22,952	29,746

Source: RMS

The Stockton Bridge has the most complete record of the historic growth in daily traffic volumes as this bridge contains a RMS permanent traffic count station. The Tourle Street Bridge traffic growth has generally only been surveyed every three years on average. There was no RMS traffic survey of the Tourle Street Bridge during either 2007 or 2008 as the bridge was being reconstructed at that time. The 2010 RMS traffic survey at the Tourle Street Bridge was undertaken in October 2010 on the relocated south approach of the new bridge, after the new bridge was opened in May 2009.

Over the 15 year period from 1995 to 2010, the long term traffic growth on the Stockton and the Tourle Street bridges was + 5,200 and + 5,800 vehicles respectively. As a future projection, the corresponding average annual growth increments + 347 and + 385 vehicles represent ongoing future traffic growth rates of + 1.6% per annum for the Stockton Bridge and + 1.3% per annum for the Tourle Street Bridge respectively.

Historically since 1995, the main sources of the long term traffic growth on the Tourle Street Bridge have been strongly related to traffic growth from ongoing land use development in areas north of Stockton and Fern Bay, towards Williamtown and Nelson Bay and less generally related to traffic growth from ongoing industrial land use development on Kooragang Island.

However, since 2006 there has been a significant recent boost to employment numbers and economic activity on Kooragang Island with major growth in number of short term construction workforce employees on the island, working on projects such as the construction of the NCIG and expansion of the KCT coal terminals and the BHP Billiton fill emplacement area operations. Also there has been some growth in the permanent operations workforce at existing industrial facilities on the island, eg Cargill oilseed processing.

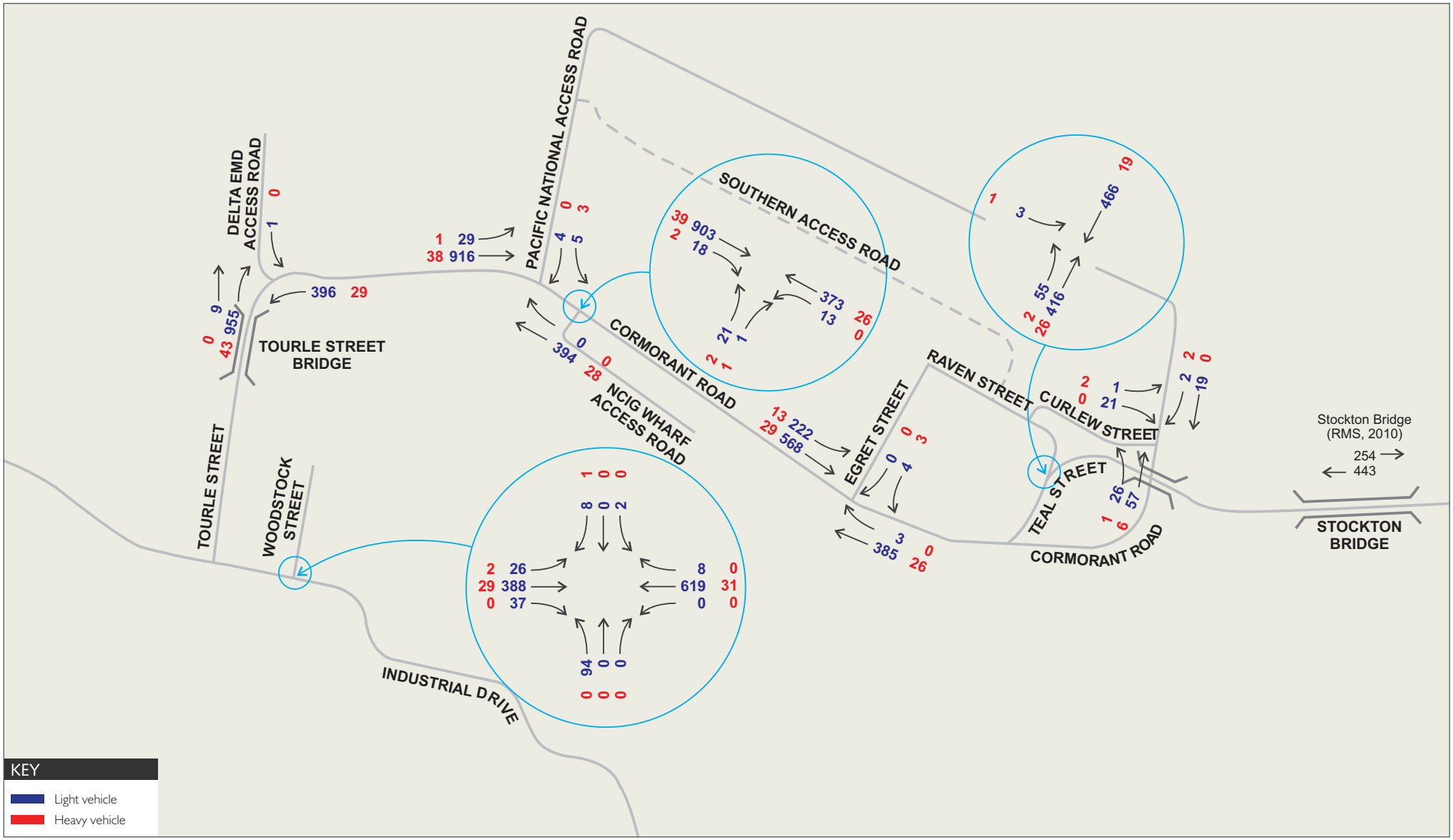
As a result of the recent high growth in construction traffic activity on Kooragang Island, there are now generally multiple morning and afternoon peak traffic periods for the construction traffic and the other general commuter traffic in the area. These multiple am and pm peak hour traffic periods were surveyed on Tuesday 25 October 2011 at a number of existing intersections in order to gain a more detailed understanding of the existing morning and afternoon peak hour traffic patterns, for both the industrial and construction workforce traffic and the general commuter peak traffic activity on Kooragang Island.

The intersection traffic counts commenced at 5.00 am. The traffic count data is included as an attachment in Appendix A of this report. The range of existing am and pm hourly traffic volumes at each intersection is shown by the traffic plots in Figure 2.3 to Figure 2.7 of this report.

The existing peak hourly traffic movements on all the local roads on Kooragang Island in the vicinity of the T4 Project area, as recorded by these intersection traffic counts, are summarised in Table 2.2.

Table 2.2 Existing peak hourly traffic movements on T4 Project access roads

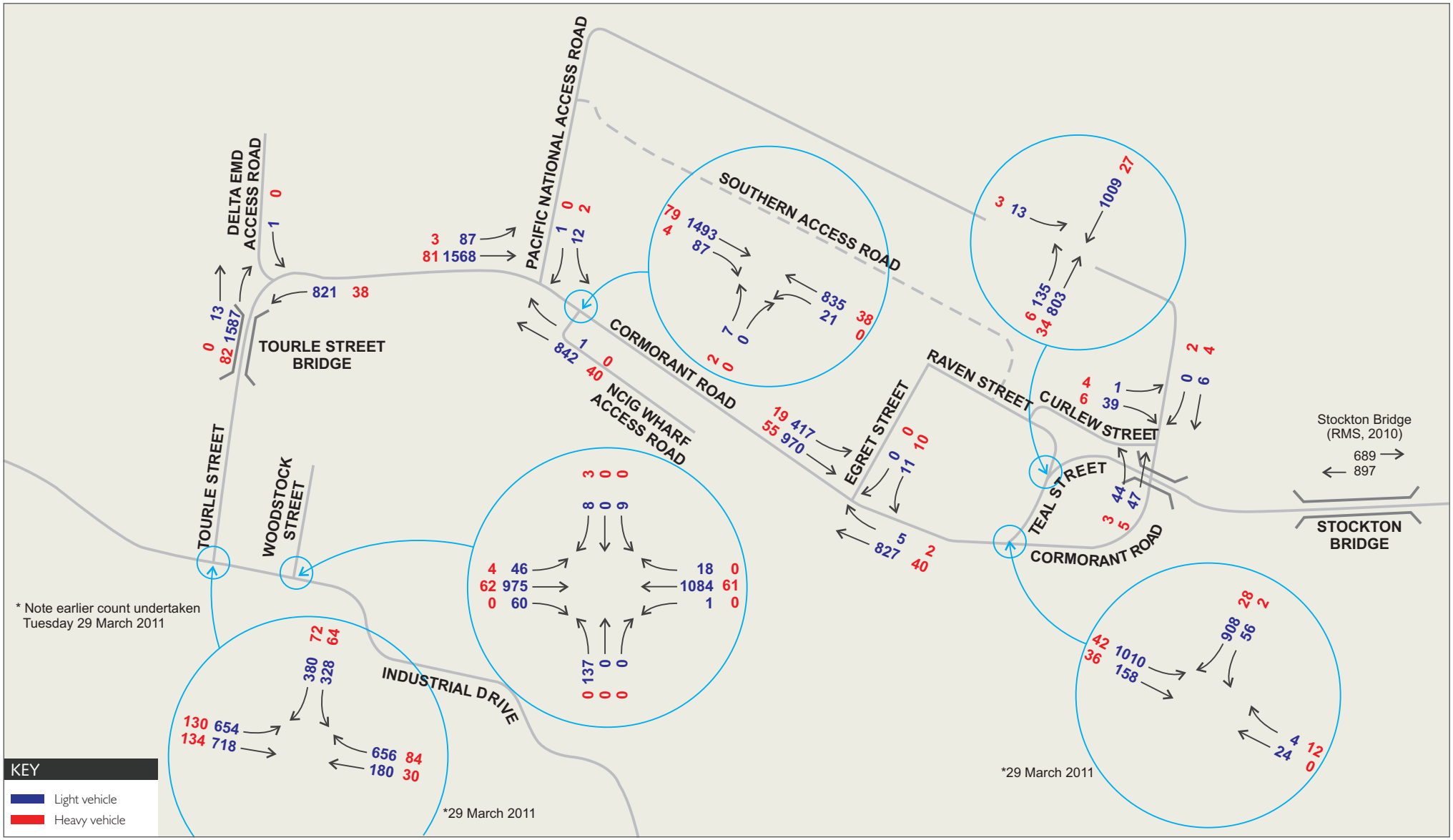
Road	Vehicles arriving in the very early am peak 5.00-6.00 am		Vehicles arriving in the early am peak hour 6.00-7.00 am		Vehicles arriving in the actual am peak hour 7.30-8.30 am typically		Vehicles departing in the actual pm peak hour 4.00-5.00 pm typically		Vehicles departing in the later pm peak hour 5.00-6.00 pm	
	Cars	Trucks	Cars	Trucks	Cars	Trucks	Cars	Trucks	Cars	Trucks
Delta EMD Access Road	9	0	13	0	8	3	16	4	0	1
Pacific National Access Road	29	1	88	3	46	9	81	5	29	0
NCIG Wharf Access Road	31	2	108	4	48	7	107	5	68	2
Egret Street	225	13	422	21	140	33	154	6	61	3
Raven Street	55	2	135	6	42	32	202	4	85	3
Curlew Street	26	1	44	3	30	5	204	21	116	5
Cormorant Road north end	57	6	47	5	37	9	43	7	44	3
Total	**432**	**25**	**857**	**42**	**351**	**98**	**807**	**52**	**403**	**17**



Existing traffic volumes - Very early peak (5-6 am) Tuesday 25th October 2011

T4 Project - Traffic Assessment

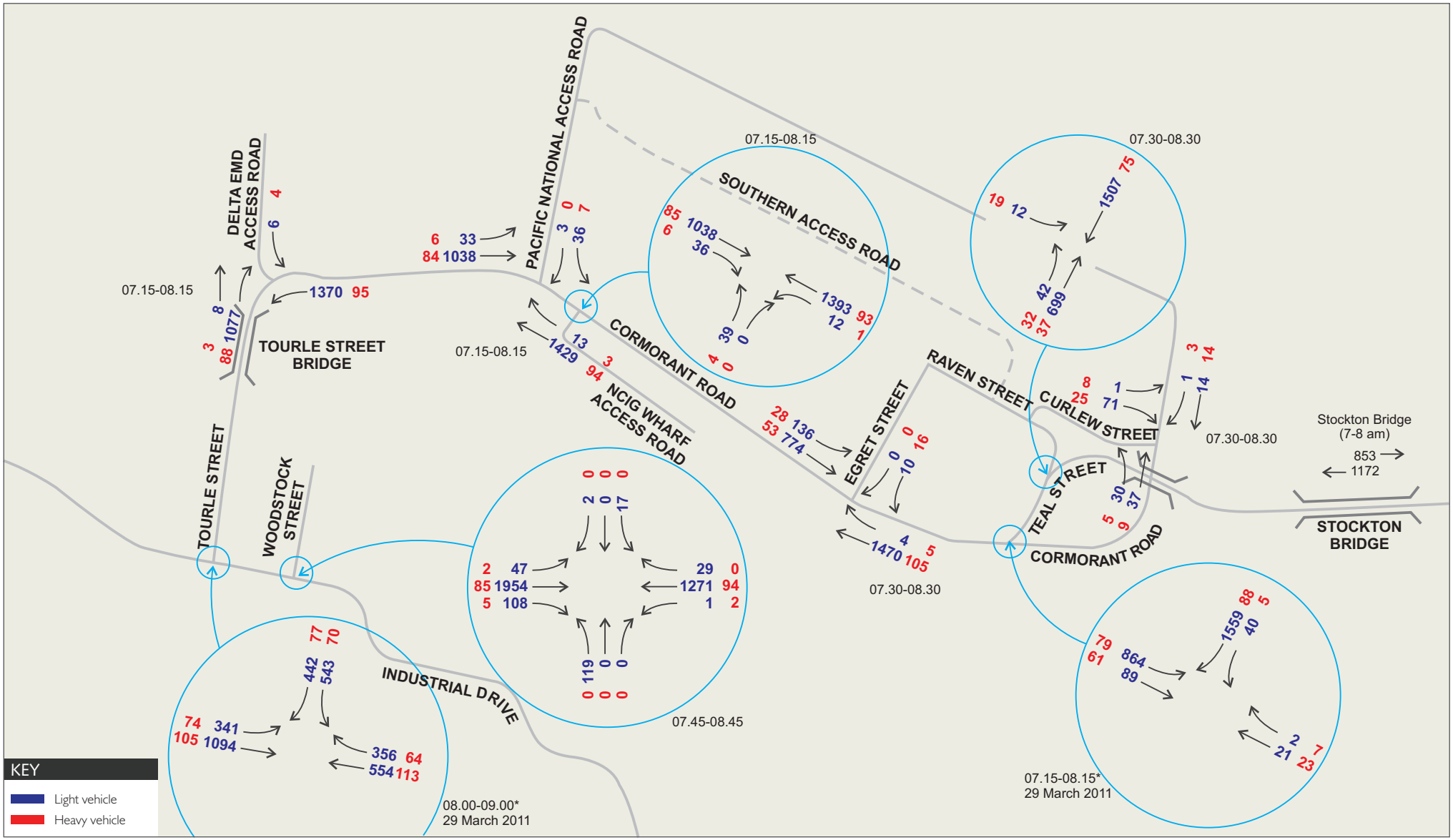
FIGURE 2.3



Existing traffic volumes - Early am peak (6-7 am) Tuesday 25th October 2011

T4 Project - Traffic Assessment

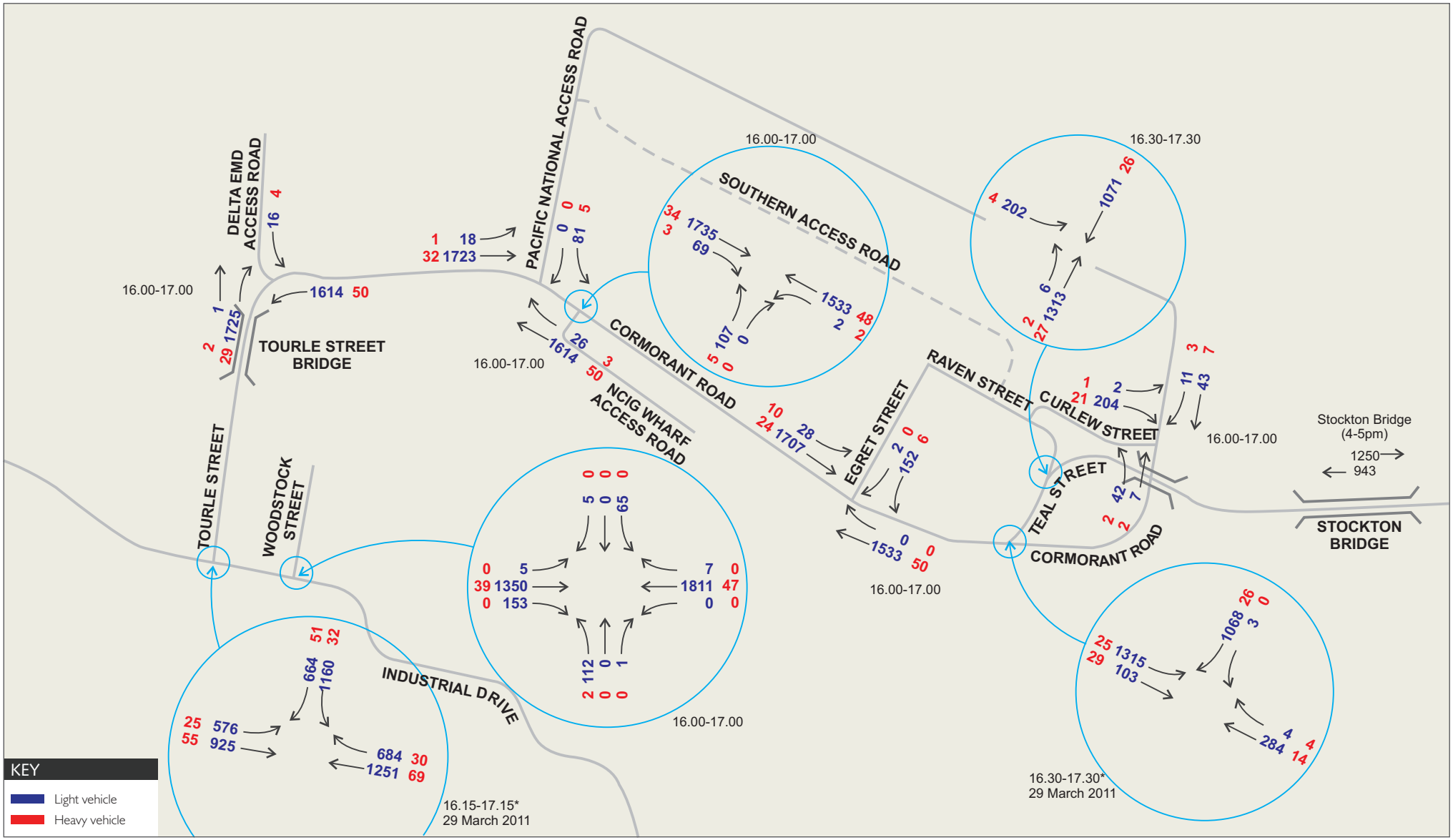
FIGURE 2.4



Existing traffic volumes - Actual am peak (8-9 am varies) Tuesday 25th October 2011

T4 Project - Traffic Assessment

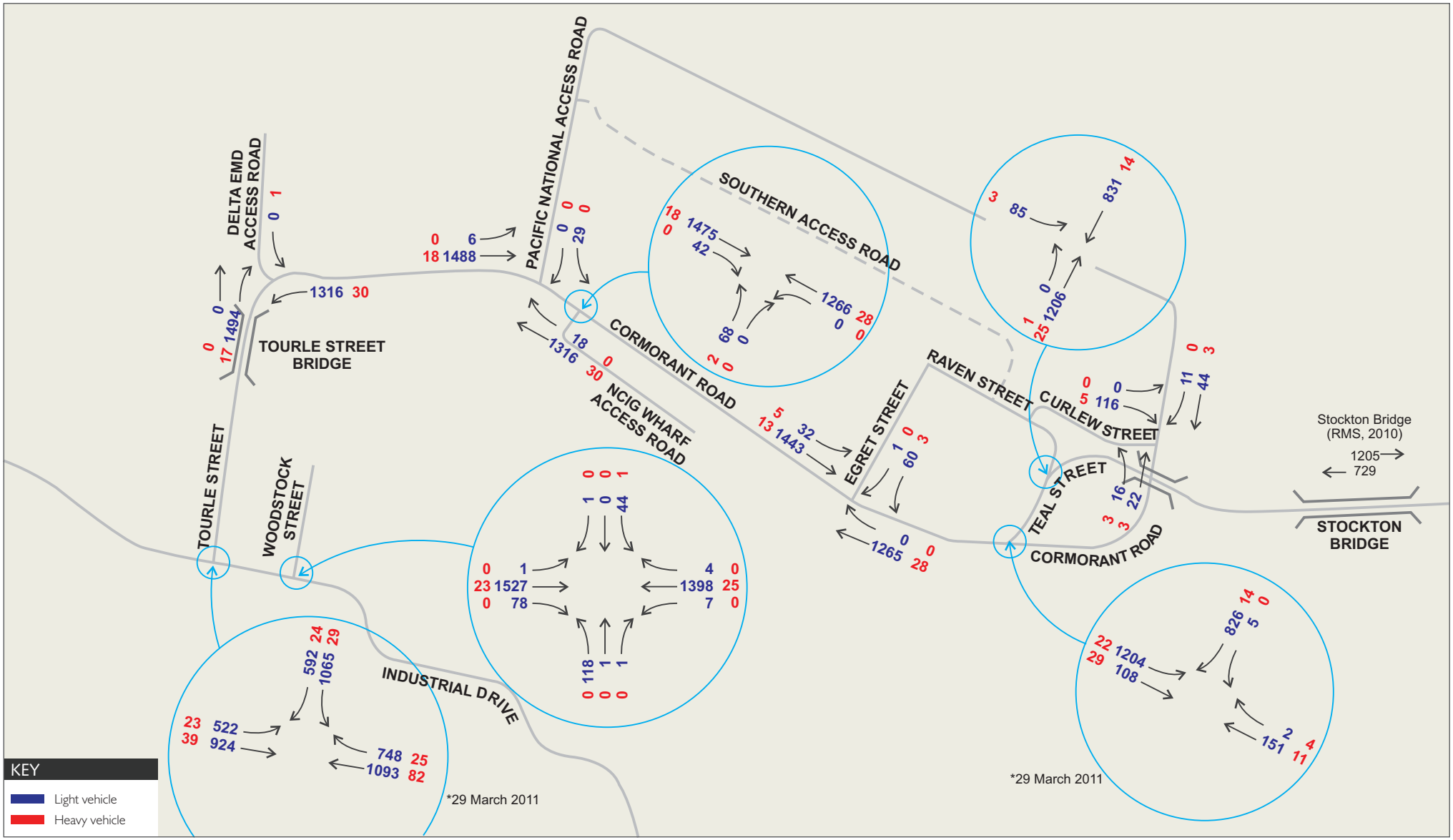
FIGURE 2.5



Existing traffic volumes - Actual pm peak (4-5 pm varies) Tuesday 25th October 2011

T4 Project - Traffic Assessment

FIGURE 2.6



Existing traffic volumes - Later pm peak (5-6 pm) Tuesday 25th October 2011

T4 Project - Traffic Assessment

FIGURE 2.7

PWCS has advised that based on gate access data, approximately one third of the current construction workforce typically arrives before 6.00 am and the remainder, during the period 6.00 to 7.00 am. This is confirmed by the local road traffic count summary in Table 2.2 which show an approximate one-third to two-thirds split between the 5.00 to 6.00 am and the 6.00 to 7.00 am hourly car traffic arrivals in the vicinity of the KCT and NCIG worksites. There is also a clear separation during the morning peak currently between the construction workforce traffic arrivals, which generally occur between 5.00 to 6.00 am and 6.00 to 7.00 am and the actual am peak traffic period (when the Cormorant Road through traffic flows are greatest), which generally occurs later, at 7.30 to 8.30 am typically.

In the afternoon peak currently, this separation is less clear, with the current peak periods of construction traffic egress from the area also generally coinciding with the actual pm peak traffic periods for other traffic, with both generally occurring during the periods 4.00 to 5.00 pm, and the current construction traffic egress volumes are significantly lower during the later pm peak traffic period 5.00 to 6.00 pm.

2.4 Heavy vehicles

Within the ”actual am” and “actual pm” peak hourly periods, which are 7.30 to 8.30 am and 4.00 to 5.00 pm typically, the existing truck traffic flows are already a significant component of the total hourly traffic movements on Kooragang Island (10 to 20% approximately). In the traffic count summary in Table 2.2, approximately 351 car traffic movements and 98 truck traffic movements were recorded arriving in the area during the actual am peak hour, and approximately 807 car traffic movements and 52 truck traffic movements were recorded departing from the area during the actual pm peak hour, on 25 October 2011.

2.5 Intersection capacity

In an urban area, the capacity of the road network is generally determined by the capacity of the intersections. Level of Service (LoS) is a basic performance parameter used to describe the operation of an intersection. LoS ranges from A, indicating good intersection operation, to F, indicating over saturated conditions with long delays and queues. Table 2.3 provides a summary of the LoS based on RMS’s *Guide to Traffic Generating Development* (RTA 2002).

Table 2.3 Level of Service

LoS	Average delay (seconds per vehicle)	Traffic signals, roundabout	Priority intersection (‘Stop’ and ‘Give Way’)
A	Less than 14	Good operation.	Good operation.
B	15 to 28	Good with acceptable delays and spare capacity.	Acceptable delays and spare capacity.
C	29 to 42	Satisfactory.	Satisfactory, but accident study required.
D	43 to 56	Operating near capacity.	Near capacity and accident study required.
E	57 to 70	At capacity. At signals, incidents will cause excessive delays. Roundabouts require other control mode.	At capacity. Requires other control mode
F	Greater than 71	Unsatisfactory with excessive queuing.	Unsatisfactory with excessive queuing. Requires other control mode.

Source: RMS

The intersection Degree of Saturation (DoS) also gives a measure of the performance of intersections. At intersections controlled by traffic signals, both queue length and delays increase rapidly as DoS approaches 1.0. When DoS exceeds 0.80 – 0.85 overflow queues start to become noticeable. Satisfactory intersection operation is generally achieved with a DoS of 0.8 or less in the case of isolated signalised intersections, with a cycle length of about 120 seconds. However, in co-ordinated signal systems higher DoS may occur at key intersections.

The existing intersection capacity and LoS of each intersection has been determined by the SIDRA intersection analysis program for four peak hour periods and the detailed results for each intersection are presented in Table 2.4 to Table 2.7 below. A further summary matrix table of the existing intersection LoS during each of the am and pm peak traffic periods assessed, is presented in Table 2.8 .

Table 2.4 Existing intersection capacity results – early am peak hour 6.00 – 7.00 am

Intersection	Type	DoS	LoS	Average Vehicle Delay (sec)	Maximum Queue Length (m)
Industrial Drive/Woodstock Street	Give Way	1.000	F	586 (Woodstock Street north)	28 (Woodstock Street north)
Industrial Drive/Tourle Street	Traffic Signals	0.768	C	30.0	164 (Industrial Drive west)
Cormorant Road/Delta EMD Road	Give Way - left turn only	0.930	E	59.7 (Delta EMD LT)	1 (Delta EMD LT)
Cormorant Road/Pacific National Access	Give Way - no right turn egress	0.919	F	115 (Pacific National LT)	8 (Pacific National LT)
Cormorant Road/NCIG Wharf Access	Give Way - no right turn egress	0.876	C	39.9 (Cormorant Road west RT)	17 (Cormorant Road west RT)
Cormorant Road/Egret Street	Give Way - no right turn egress	0.293	E	64.9 (Egret Street LT)	9 (Egret Street LT)
Cormorant Road/Teal Street	Roundabout	0.427	B	20.1 (Cormorant Road east RT)	23 (Cormorant Road west)
Teal Street/Raven Street	Give Way - left turn only	0.284	B	20.5 (Raven Street LT)	2 (Raven Street LT)
Cormorant Road/Curlew Street	Give Way	0.067	B	14.6 (Cormorant Road north RT)	2 (Curlew Street RT)

Notes: Shaded cells denote intersections operating at LoS E and F
LoS E = intersection operating at capacity
LoS F = intersection operating beyond capacity
For roundabouts and unsignalised intersections, average delay is calculated for the worst affected movement

In the early am "construction" peak period (6.00 to 7.00 am), Table 2.4, two of the nine intersections are currently operating over capacity at LoS F and a further two intersections are operating at close to capacity, LoS E.

In the actual am peak hour (7.30 to 8.30 am typically), Table 2.5, two of the nine intersections are already operating over capacity at LoS F.

In the actual pm peak hour (4.00 to 5.00 pm typically), Table 2.6, six of the nine intersections are already operating over capacity at LoS F, indicating generally congested traffic operations throughout the area.

In the later pm peak hour (5.00 to 6.00 pm), Table 2.7, three of the nine intersections are already operating over capacity at LoS F.

Table 2.5 Existing intersection capacity results – actual am peak hour 7.30 – 8.30 am typically

Intersection	Type	DoS	LoS	Average Vehicle Delay (sec)	Maximum Queue Length (m)
Industrial Drive/Woodstock Street	Give Way	1.000	F	3,757 (Woodstock Street north)	29 (Woodstock Street north)
Industrial Drive/Tourle Street	Traffic Signals	0.777	B	26.0	202 (Industrial Drive west)
Cormorant Road/Delta EMD Road	Give Way - left turn only	0.824	D	56.3 (Delta EMD LT)	4 (Delta EMD LT)
Cormorant Road/Pacific National Access	Give Way - no right turn egress	0.855	C	35.3 (Pacific National LT)	8 (Pacific National LT)
Cormorant Road/NCIG Wharf Access	Give Way - no right turn egress	1.000	F	246 (Cormorant Road west RT)	40 (Cormorant Road west RT)
Cormorant Road/Egret Street	Give Way - no right turn egress	0.444	D	43.3 (Egret Street LT)	8 (Egret Street LT)
Cormorant Road/Teal Street	Roundabout	0.677	B	24.8 (Cormorant Road east RT)	43 (Teal Street RT)
Teal Street/Raven Street	Give Way - left turn only	0.440	C	32.7 (Raven Street LT)	7 (Raven Street LT)
Cormorant Road/Curlew Street	Give Way	0.169	A	12.8 (Cormorant Road north RT)	6 (Curlew Street RT)

Notes: Shaded cells denote intersections operating at LoS E and F
LoS E = intersection operating at capacity
LoS F = intersection operating beyond capacity
For roundabouts and unsignalised intersections, average delay is calculated for the worst affected movement

Table 2.6 Existing intersection capacity results – actual pm peak hour 4.00 – 5.00 pm typically

Intersection	Type	DoS	LoS	Average Vehicle Delay (sec)	Maximum Queue Length (m)
Industrial Drive/Woodstock Street	Give Way	1.601	F	3842 (Woodstock Street south)	238 (Woodstock Street south)
Industrial Drive/Tourle Street	Traffic Signals	0.857	B	27.6	197 (Industrial Drive west)
Cormorant Road/Delta EMD Road	Give Way - left turn only	0.957	F	283 (Delta EMD LT)	21 (Delta EMD LT)
Cormorant Road/Pacific National Access	Give Way- no right turn egress	1.509	F	574 (Pacific National LT)	174 (Pacific National LT)
Cormorant Road/NCIG Wharf Access	Give Way - no right turn egress	1.432	F	485 (NCIG Wharf LT)	27 (NCIG Wharf LT)
Cormorant Road/Egret Street	Give Way - no right turn egress	1.785	F	783 (Egret Street LT)	374 (Egret Street LT)
Cormorant Road/Teal Street	Roundabout	0.482	B	15.7 (Cormorant Road east RT)	28 (Cormorant Road west)
Teal Street/Raven Street	Give Way - left turn only	1.100	F	163 (Raven Street LT)	146 (Raven Street LT)
Cormorant Road/Curlew Street	Give Way	0.323	A	10.1 (Curlew Street RT)	12 (Curlew Street RT)

Notes: Shaded cells denote intersections operating at LoS E and F
LoS E = intersection operating at capacity
LoS F = intersection operating beyond capacity
For roundabouts and unsignalised intersections, average delay is calculated for the worst affected movement

Table 2.7 Existing intersection capacity results – later pm peak hour 5.00 – 6.00 pm

Intersection	Type	DoS	LoS	Average Vehicle Delay (sec)	Maximum Queue Length (m)
Industrial Drive/Woodstock Street	Give Way	1.000	F	4022 (Woodstock Street south)	31 (Woodstock Street south)
Industrial Drive/Tourle Street	Traffic Signals	0.830	B	26.3	176 (Industrial Drive west)
Cormorant Road/Delta EMD Road	Give Way - left turn only	0.822	F	1092 (Delta EMD LT)	9 (Delta EMD LT)
Cormorant Road/Pacific National Access	Give Way - no right turn egress	0.819	D	49.5 (Pacific National LT)	6 (Pacific National LT)
Cormorant Road/NCIG Wharf Access	Give Way - no right turn egress	0.812	F	102(Cormorant Road west RT)	17 (Cormorant Road west RT)
Cormorant Road/Egret Street	Give Way - no right turn egress	0.426	C	39.0 (Egret Street LT)	11 (Egret Street LT)

Table 2.7 Existing intersection capacity results – later pm peak hour 5.00 – 6.00 pm

Intersection	Type	DoS	LoS	Average Vehicle Delay (sec)	Maximum Queue Length (m)
Cormorant Road/Teal Street	Roundabout	0.445	B	15.2 (Cormorant Road east RT)	23 (Cormorant Road west)
Teal Street/Raven Street	Give Way - left turn only	0.390	B	27.8 (Raven Street LT)	11 (Raven Street LT)
Cormorant Road/Curlew Street	Give Way	0.163	A	9.5 (Curlew Street RT)	5 (Curlew Street RT)

Notes: Shaded cells denote intersections operating at LoS E and F
LoS E = intersection operating at capacity
LoS F = intersection operating beyond capacity
For roundabouts and unsignalised intersections, average delay is calculated for the worst affected movement

Table 2.8 Summary of existing intersection capacity results – LoS

Intersection	Type	Early am peak hour 6.00-7.00 am	Actual am peak hour 7.30-8.30 am typically	Actual pm peak hour 4.00-5.00 pm typically	Later pm peak hour 5.00-6.00 pm
Industrial Drive/Woodstock Street	Give Way	F	F	F	F
Industrial Drive/Tourle Street	Traffic Signals	C	B	B	B
Cormorant Road/Delta EMD Road	Give Way	E	D	F	F
Cormorant Road/Pacific National Access	Give Way	F	C	F	D
Cormorant Road/NCIG Wharf Access	Give Way	C	F	F	F
Cormorant Road/Egret Street	Give Way	E	D	F	C
Cormorant Road/Teal Street	Roundabout	B	B	B	B
Teal Street/Raven Street	Give Way	B	C	F	B
Cormorant Road/Curlew Street	Give Way	B	A	A	A

Notes: Shaded cells denote intersections operating at LoS E and F
LoS E = intersection operating at capacity
LoS F = intersection operating beyond capacity
For roundabouts and unsignalised intersections, average delay is calculated for the worst affected movement

The most critical intersections for access to the T4 Project are:

- The Industrial Drive/Woodstock Street intersection, which was operating over capacity (LoS F) during all of the four peak hour traffic periods considered.

- The Cormorant Road/NCIG Wharf Access Road intersection, which was operating over capacity (LoS F) during three of the four peak hour traffic periods considered, with capacity problems occurring at different peak times for both the unsignalised right turn movement into the minor road and the left turn egress from the minor road.

- The Cormorant Road/Pacific National Access Road intersection and the Cormorant Road/ Delta EMD Access Road intersection, which were both operating over capacity (LoS F) during two of the four peak hour traffic periods considered, mainly because of the high eastbound through traffic flows on Kooragang Island restricting the unsignalised left turn egress from these roads during the peak traffic periods.

- The Cormorant Road/Egret Street intersection and the Teal Street/Raven Street intersection, which were both operating over capacity (LoS F) during one of the four peak hour traffic periods considered (the 4.00-5.00 pm actual pm peak period), also because of the high eastbound through traffic flows on Kooragang Island restricting the left turn egress from these roads during the peak traffic period.

2.6 Traffic safety

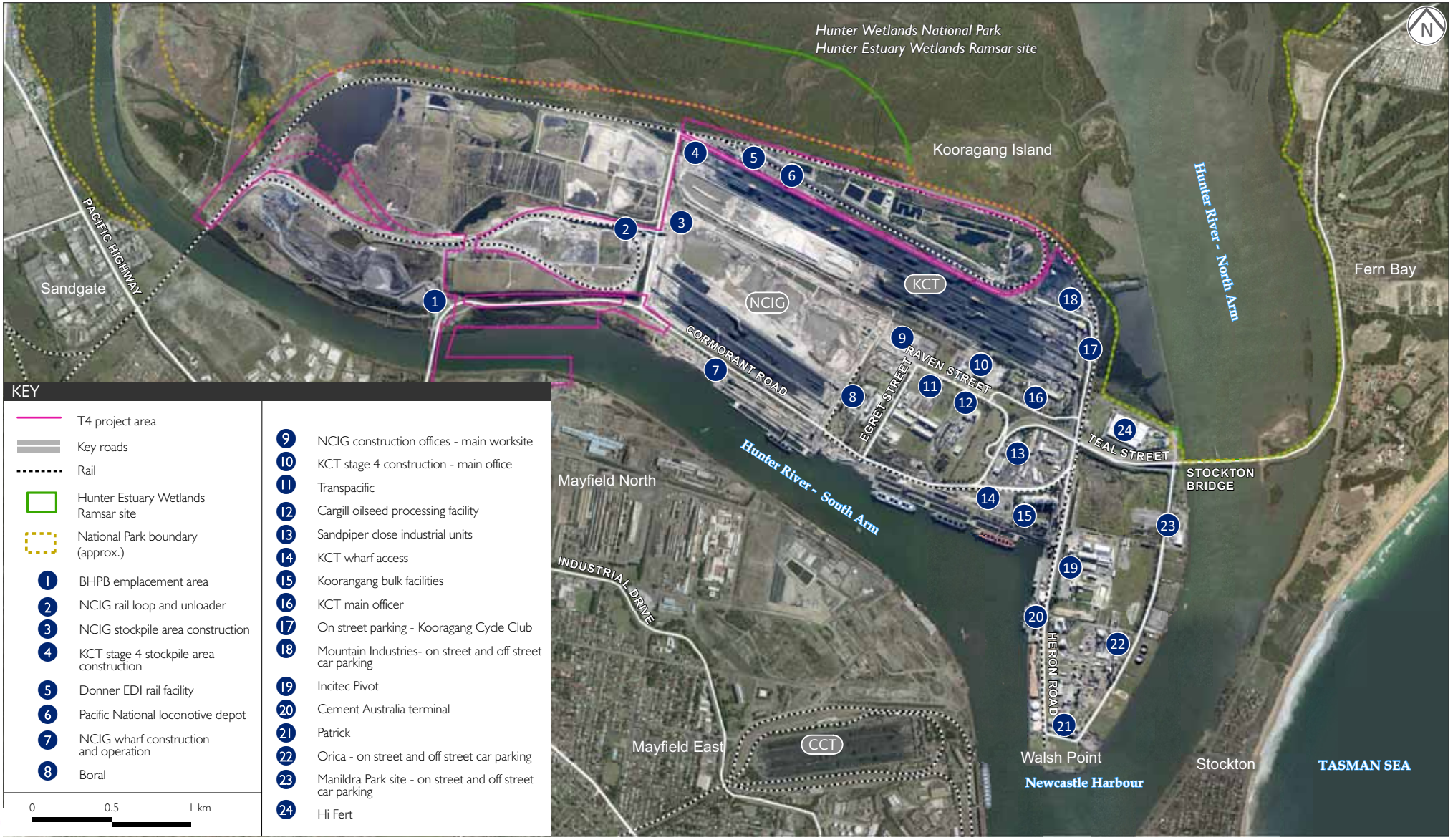
The accident history for MR 108, Tourle Street and Cormorant Road, has been provided by the RMS for the five year period from 1 July 2005 to 30 June 2010. The data shows a total of 83 recorded accidents, which include both personal injury and non-personal injury type accidents but no fatalities. The accidents include a high proportion of rear-end type traffic accidents, which is characteristic of the congested peak hour traffic operating conditions on this section of road.

The length of this section of road is approximately 5 km. As the average daily traffic flow has been between 25,000 to 29,000 vehicles per day during period 2005 to 2010, the total of 83 recorded accidents represents an average accident frequency rate of 1.68 accidents per million kilometres travelled, which is relatively high in comparison to recent NSW state average rates which have been in the range 0.65 to 0.81 accidents per million vehicle kilometres travelled during the years 2004 to 2008 inclusive.

2.7 Car parking

Most of the existing industrial facilities and construction worksites on Kooragang Island provide off street car parking for all their employees. A survey undertaken on Tuesday 11 October 2011 identified a total of 24 existing car parking locations on the island, where a combination of off street and/or on-street parking was utilised (refer Figure 2.8).

It was noted that at all of the existing KCT and NCIG construction worksites on the island, adequate off-street car parking capacity was currently provided for all the workforce requirements and there was no observed overflow of on-street car parking at any of these construction worksites.



Aerial Imagery : 2011 Sinclair Knight Merz Pty Ltd.

EMM PWCS

Integrated Design Solutions | 030418 EA Rev B - 21 February 2012

Car parking locations

T4 Project - Traffic Assessment

FIGURE 2.8

2.8 Public transport

Direct public transport services to Kooragang Island are currently operating from the Newcastle and Nelson Bay directions via existing bus routes 130 and 131 (Port Stephens Coaches). The main bus stops on Kooragang Island are located on Cormorant Road, near the NCIG Wharf Access Road and near Egret Street and on Teal Street, near Sandpiper Close.

There are a combined total of 18 bus-coach services daily in each direction on Routes 130 and 131 and the typical journey time between central Newcastle and Kooragang Island (excluding the walking and waiting time) is approximately 18 to 23 minutes.

Another bus service (Route 136) also operates from Stockton which connects with the Route 130 bus services at Fern Bay and also with the Newcastle to Stockton Ferry at Stockton. This bus route service provides additional bus access by connecting bus services to enable persons to travel from residential areas of Stockton and Fern Bay to and from Kooragang Island.

2.9 Pedestrian and cycling facilities

Pedestrian footpath and/or cycle path connections are now provided to and from Kooragang Island via both the Stockton and Tourle Street bridges, Photographs 2.11 and 2.12.

The Tourle Street Bridge has a new pedestrian footpath and bikeway constructed along the eastern side, although there is no paved footpath connection to the bridge at either end. The Stockton Bridge, which opened in 1971, has a footpath constructed between the two road carriageways. This footpath is accessible by means of steps underneath the bridge at either end. To avoid use of the carriageway, cyclists must access the footpath via the steps.

Photograph 2.11 Pedestrian footpath facility on the eastern side of the Tourle Street Bridge

Photograph 2.12 Pedestrian footpath located on the left of photograph - between the carriageways of the Stockton Bridge

3 T4 Project

3.1 Construction staging

It is expected that the proposed new terminal capacity will be constructed in three stages of 70 Mtpa, 25 Mtpa and 25 Mtpa capacity respectively.

The timing and sizing of stages will be dictated by future coal demand (refer to Figure 3.1). The Stage 1 construction will be the largest stage of construction with the greatest construction workforce and will be constructed over a four year period, 2013 to 2016 inclusive.

The construction work for the remaining two stages will follow sequentially. Indicatively Stage 2 would occur over a three year period from 2017 to 2019 inclusive and Stage 3 also over three years from 2020 to 2022 inclusive.

3.2 Site access routes

The project will comprise a series of separate worksites, each with generally separate access routes, as follows:

- new rail lines and dump stations on the north side of the existing KCT rail loop;
- main stockyard infrastructure and drainage works, train unloading and ship loading conveyor areas, on the south side of the existing KCT rail loop;
- Stage 1 wharf construction worksites on the north bank of the Hunter River south Arm (northern wharf); and
- Stages 2 and 3 construction worksites on the south bank of the Hunter River (southern wharf).

The proposed vehicular access routes for both car (light vehicle) and truck access to each worksite are illustrated in Figure 3.2.

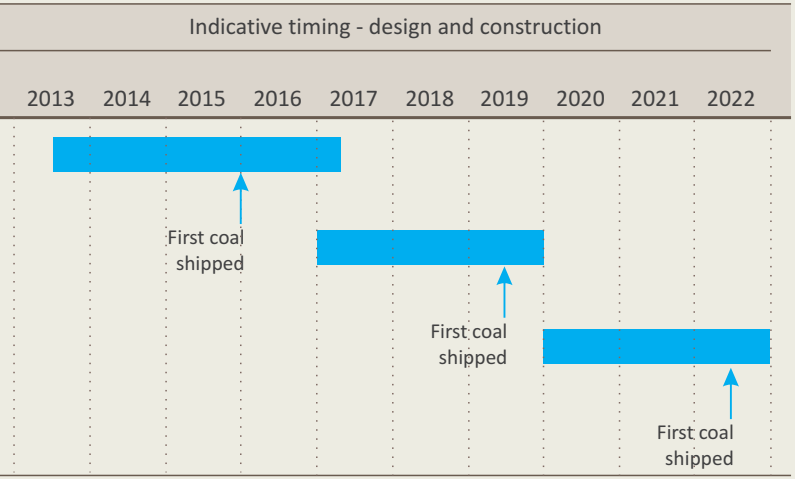
3.3 Internal site traffic circulation

Existing internal site access roads will be utilised during the project where available. Internal roads and bridges will be designed and constructed in accordance with RMS and ARTC standards and meet Australian Standards as required.

3.4 Parking areas

Car parking areas for the T4 Project construction workforce will be distributed around the worksites in proportion to the predicted peak workforce car parking demand at each location. In this analysis it is assumed that shuttle bus transport is provided to and from an off-site location (not on Kooragang Island) for at least 300 persons of the Stage 1 construction workforce each day. The remaining car traffic for Stage 1 construction which will then be generated by the remainder of the peak T4 Project workforce (1,200 persons approximately) will be approximately 980 vehicles travelling to and from the T4 Project worksites each day, requiring on-site car parking.

Stage	Key components (indicative)	Stage capacity (Mtpa)	Stage capacity (Mtpa)
1	2 dump stations, 4 stockpiles, 4 stacker reclaimers, 1 stacker, 2 outloading streams, 3 berths, 2 shiploaders	70	70
2	1 dump station, 2 stockpiles, 2 stacker reclaimers, 1 stacker, 1 outloading stream, 1 berth, 1 shiploader	25	95
3	1 dump station, 1 stockpile, 2 stacker reclaimers, 1 outloading stream, 1 berth, 1 shiploader	25	120



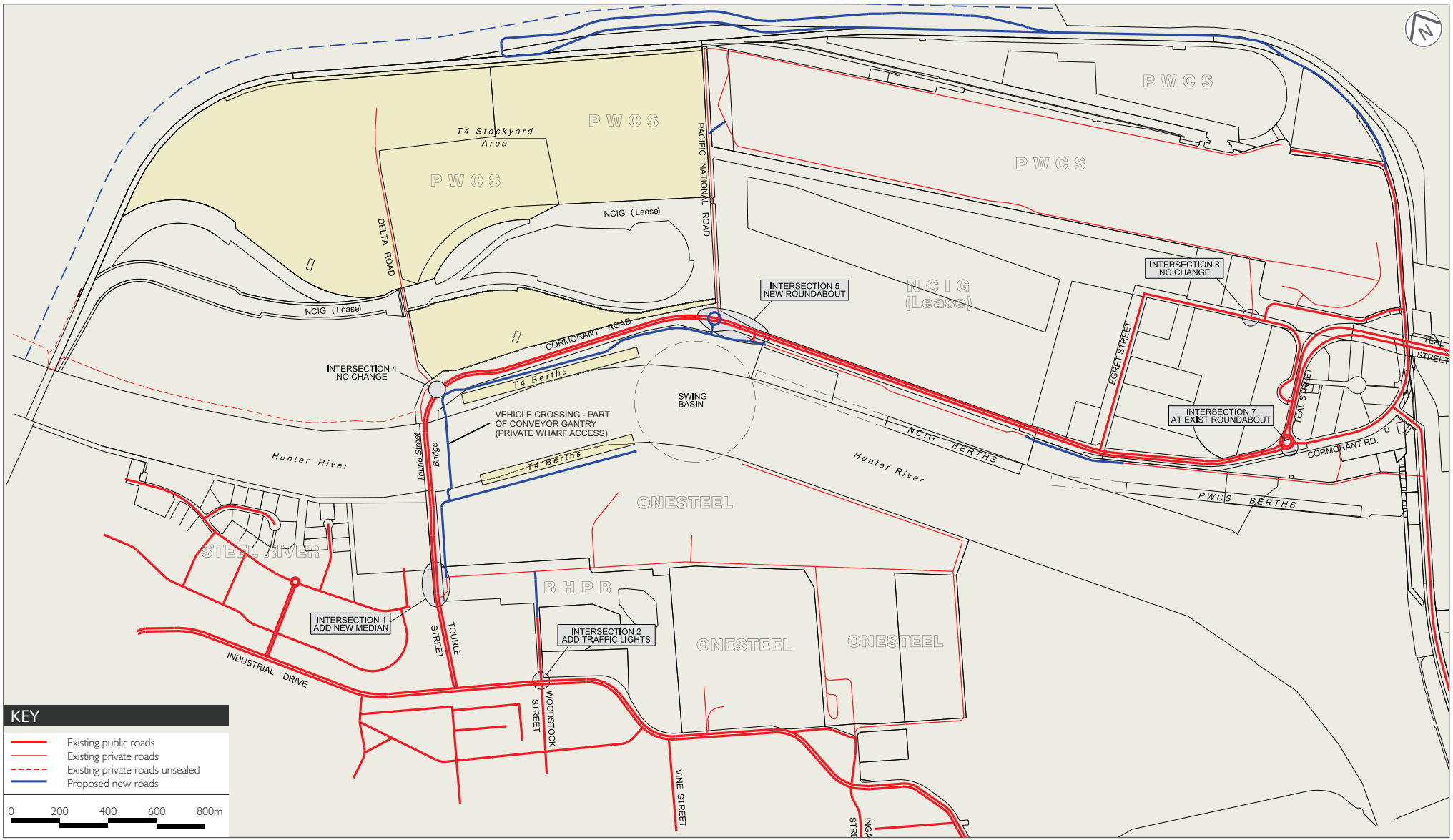
EMM

PWCS

Indicative construction staging

T4 Project - Traffic Assessment

FIGURE 3.1



Integrated Design Solutions | 030418 EA Rev C - 27 February 2012

Future site access plan showing proposed intersection improvements

T4 Project - Traffic Assessment

FIGURE 3.2

A peak total of 980 on-site car parking spaces will be provided in Stage 1. This car parking supply will generally be provided in gravel surfaced car parking areas located as follows:

- stockyard worksite – 400 car parking spaces;
- wharf area worksites – 200 car parking spaces;
- dredging and land reclamation worksite – 200 car parking spaces; and
- rail construction worksite – 180 car parking spaces.

During Stages 2 and 3, a smaller total construction workforce will be engaged on the project and the areas required for the provision of on-site car parking will be able to be reduced accordingly.

4 Impact assessment

4.1 Traffic generation

4.1.1 Workforce and site visitor car traffic

The future T4 Project construction traffic impacts have been assessed for each stage of construction, for the predicted peak years of construction, which are:

- 2015 for Stage 1;
- 2018 for Stage 2; and
- 2021 for Stage 3.

The main component of the T4 Project construction workforce (1,275 persons at the peak of Stage 1 construction, which is 85% of the peak construction workforce) will operate dayshift working times, working either 10, 11 or 12 hour shifts, commencing at either 6.00 or 6.30 am. The project could potentially have 24/7 construction work hours, with the main construction workforce split between a day and a night shift, in which case the potential peak hour traffic congestion impacts would be much lower than for "dayshift only" construction. However "dayshift only" construction work hours have been assessed for the main project construction workforce as a "worst case" assessment.

Site "dayshift" shuttle bus operations are proposed which will transport approximately 300 persons of the main site workforce at the peak of Stage 1 construction, to and from the main project area worksites at Kooragang Island using an off-site parking location on the south side of the Hunter River South Arm. The remaining 975 persons of the main project area dayshift workforce will then generate approximately 780 car driver trips to and from the main project area worksites on Kooragang Island at the following peak times approximately:

- 260 car trips arriving between 5.00 and 6.00 am;
- 520 car trips arriving between 6.00 and 7.00 am;
- 260 car trips departing between 4.00 and 5.00 pm; and
- 520 car trips departing between 5.00 and 6.00 pm.

The remaining 15% of the T4 Project construction workforce (225 persons at the peak of Stage 1 construction) will work on the dredging and land reclamation operations which will continue 24 hours per day, operating as two 12 hour shifts commencing at 5.00 am and 5.00 pm respectively. This workforce will generate approximately 200 car driver trips in each direction each weekday, generally arriving at and departing from Kooragang Island at the following times:

- 100 car trips arriving shortly before 5.00 am;
- 100 car trips departing shortly after 5.00 am;
- 100 car trips arriving shortly before 5.00 pm; and
- 100 car trips departing shortly after 5.00 pm.

It is likely future site visitor car and other light vehicle traffic (including courier vehicle traffic) will continue throughout the daytime period from 7.00 am to 5.00 pm at an hourly rate each hour of approximately 15% of the peak hourly construction workforce traffic movements.

4.1.2 Truck traffic movements

The future T4 Project construction daily and peak hour truck traffic volumes for Stage 1 construction have been estimated based on information provided by Aurecon Hatch for the following activities:

- Dredged and foreshore excavation sand fill = 4 Mm^3 over 2.5 years. This material will be pumped to the site by pipeline and will only generate internal truck movements for its internal distribution and compaction within and around the site reclamation areas.

- Imported sand fill = 1 Mm^3 over 2 years (60,000 truckloads) operating from 7.00 am to 5.00 pm 5 days per week = 120 truck loads per day, 12 per hour, mainly from the Williamtown direction via the Stockton Bridge.

- Imported gravel and rock fill = 0.4 Mm^3 over 2 years (25,000 truckloads) operating from 7.00 am to 5.00 pm 5 days per week = 50 truck loads per day, 5 per hour, probably travelling equally via either the Stockton or Tourle Street bridges.

- Other construction materials (eg steel, concrete, manufactured items) = approximately 10,000 truckloads over a 2.5 year period = 16 truck loads per day, 2 per hour, approximately 90% from the Newcastle area via the Tourle Street Bridge and the remainder delivered by barge to the east of Kooragang Island and then by truck to the T4 Project worksites.

The equivalent future construction stage daily and peak hour truck traffic volumes have been similarly estimated for the subsequent Stages 2 and 3 of the project construction as follows:

- Dredged sand fill = 1.5 Mm^3 over 2 years (if not dredged as part of Stage 1). This material will be pumped to the site by pipeline and will generate only internal truck movements for its internal distribution and compaction within the site reclamation areas.

- No imported sand fill will be required for the stage 2 and stage 3 construction work.

- Imported gravel and rock fill = 0.1 Mm^3 over 2 years (6,250 truckloads) operating from 7.00 am to 5.00 pm 5 days per week = 12-13 truck loads per day, 1-2 per hour, probably travelling equally via either the Stockton or Tourle Street bridges.

- Other construction materials (eg steel, concrete, manufactured items) = approximately 3,000 truckloads over a 2 year period = 6 truck loads per day, 1 per hour, approximately 90% from the Newcastle area via the Tourle Street Bridge and the remainder delivered by barge to the east of Kooragang Island and then by truck to the T4 Project worksites.

4.2 Traffic distribution

The total estimated T4 Project construction traffic movements for each period of the daytime (at the peak of Stage 1 construction during 2015) is summarised in Table 4.1 below, including both workforce and truck traffic.

Table 4.1 Summary of Stage 1 construction traffic movements in 2015

Peak Hour Period	Total hourly vehicle trips generated	Via Tourle Street Bridge	Via Stockton Bridge
Pre - am peak 4.00-5.00 am			
Employee car traffic	100 in	87	13
Very early am peak 5.00-6.00 am			
Employee car traffic	260 in, 100 out	313	47
Early am peak 6.00-7.00 am			
Employee car traffic	520 in	452	68
Site visitor car traffic	0	0	0
Imported sand fill traffic	0	0	0
Imported gravel-rock fill	0	0	0
Other truck and bus traffic	9 in , 9 out	18	0
Actual am peak 7.00-8.00 am and daytime hours until 3.00-4.00 pm			
Employee car traffic	0	0	0
Site visitor car traffic	39 in, 39 out	68	10
Imported sand fill traffic	12 in, 12 out	0	24
Imported gravel-rock fill	5 in, 5 out	5	5
Other truck traffic	2 in, 2 out	4	0
Actual pm peak 4.00-5.00 pm			
Employee car traffic	100 in, 260 out	313	47
Site visitor car traffic	39 in, 39 out	68	10
Imported sand fill traffic	12 in, 12 out	0	24
Imported gravel-rock fill	5 in, 5 out	5	5
Other truck and bus traffic	5 in, 5 out	10	0
Later pm peak 5.00-6.00 pm			
Employee car traffic	620 out	539	81
Site visitor car traffic	0	0	0
Imported sand fill traffic	0	0	0
Imported gravel-rock fill	0	0	0
Other truck and bus traffic	6 in, 6 out	12	0

Shuttle bus transport is proposed for 300 persons approximately which, based on a typical seated capacity of 40 to 50 persons per bus, will require approximately seven bus movements each way each weekday morning within an approximate 1 hour period (from 6.00 to 7.00 am typically) and each weekday afternoon over a 2 hour period (between 4.00 to 6.00 pm typically).

The future construction stage traffic distribution for the workforce has been calculated from the home residential postcodes of the existing KCT expansion workforce, which are approximately 87% to/from the Newcastle area and other areas to the south via the Tourle Street Bridge and 13% to/from the north via the Stockton Bridge. This traffic distribution is consistent with the observed directional traffic patterns of the early am peak and late pm peak traffic movements observed in the October 2011 surveys, which show the great majority of all turning traffic movements at the various intersections in the Kooragang area were observed travelling to and from the Tourle Street Bridge direction, except at intersections where the right turn egress movement was prohibited by right turn traffic restrictions.

To the south of the Tourle Street Bridge at the intersection with Industrial Drive, the 87% proportion of the proposed T4 Project construction traffic, which will be travelling to and from the Newcastle area and other destinations to the south, will generally be equally distributed to and from the east and west on Industrial Drive.

4.3 Traffic safety

The major traffic safety issues for traffic currently on Kooragang Island are:

- the relatively high occurrence of rear end traffic accidents due to the slow moving peak hour traffic on the island currently; and
- the high right turn traffic delays increasing traffic safety concerns at unsignalised intersections.

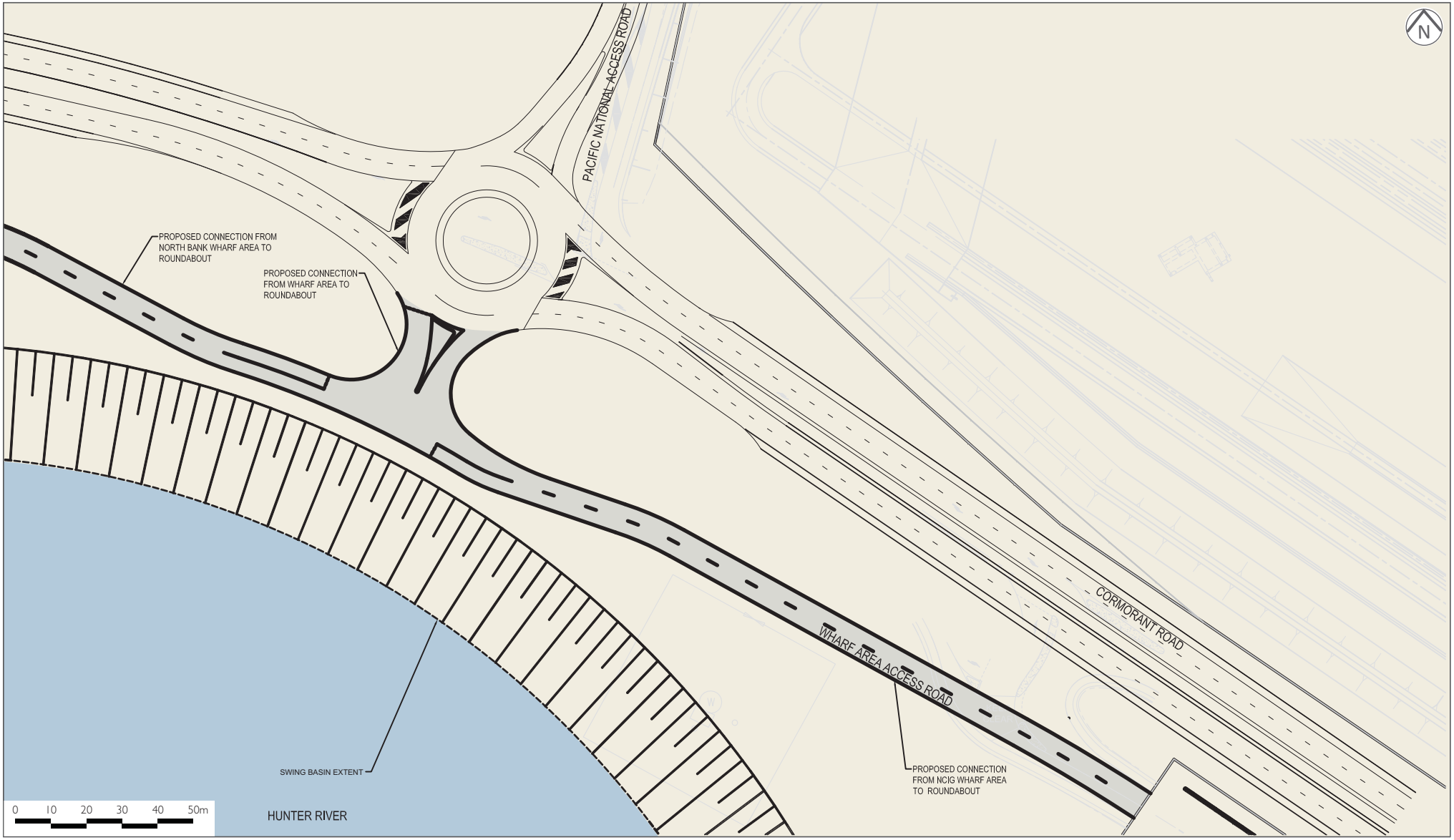
Right turns (in particular the right turning egress traffic) are now banned at most of the intersections on the island, primarily due to the high right turn traffic delays reducing the available gaps for safe right turning traffic leading to more risky traffic turning behaviour by motorists.

This first safety issue will effectively only be fully addressed when the four lane duplication of the Tourle Street and Cormorant Road route is completed over the full length between the Industrial Drive intersection and the Egret Street intersection, at a date to be determined by RMS.

The second safety issue for the T4 Project construction access will be improved when a new intersection is constructed on Cormorant Road, using either roundabout or traffic signal control to either combine and/or relocate the two existing access intersections at the Pacific National Access Road and the NCIG Wharf Access Road, which will permit future right turn traffic movements to occur directly at the relevant intersection or intersections.

A preliminary design for a new roundabout access intersection at this location has been prepared as per the attached plan in Figure 4.1. An alternate option to the new roundabout which may be further considered for the T4 Project is the installation of temporary traffic signals at the NCIG Wharf Access Road, in combination with a new parallel wharf access service road which would link the KCT, NCIG and the T4 Project northern wharf independent of Cormorant Road. The traffic engineering implications of this option have not been examined in detail but may ultimately improve the longer term traffic flow on Cormorant Road (compared to the proposed roundabout) when the duplication of Cormorant Road is completed.

Additionally, further proposed intersection improvements will be implemented for Stage 2 and Stage 3 construction access, including signalisation of the Woodstock Street/Industrial Drive intersection, and the introduction of left turn only access restrictions enforced by a traffic median at the existing southern wharf area access from Tourle Street, as illustrated by the attached plans in Figure 4.2.



Integrated Design Solutions | 030418 EA Rev D - 27 February 2012

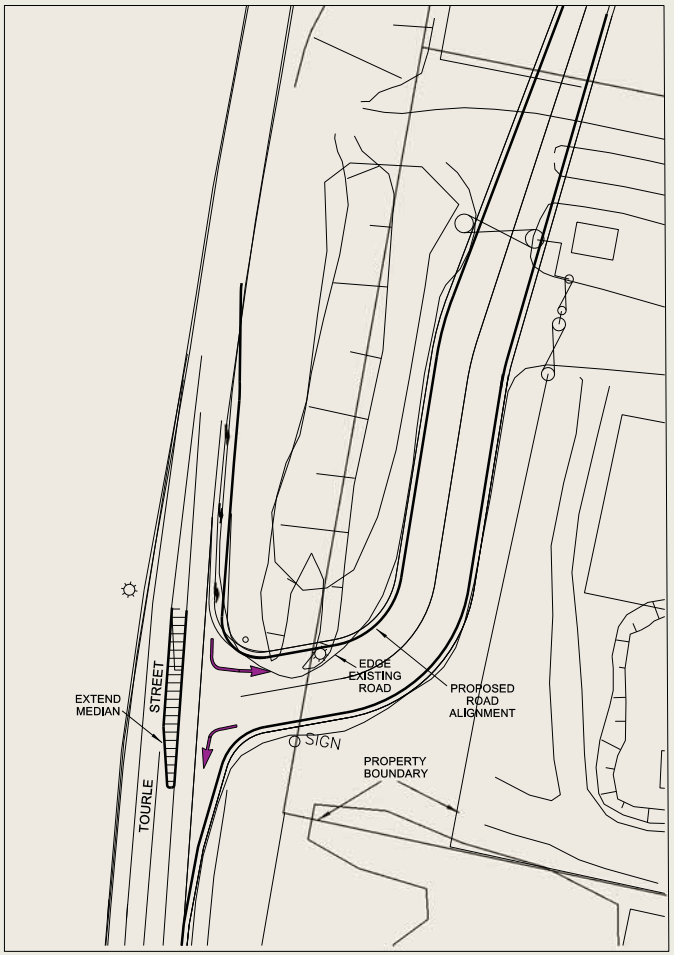
Indicative design of roundabout at intersection of Cormorant Road and Pacific National access road

T4 Project - Traffic Assessment

FIGURE 4.1

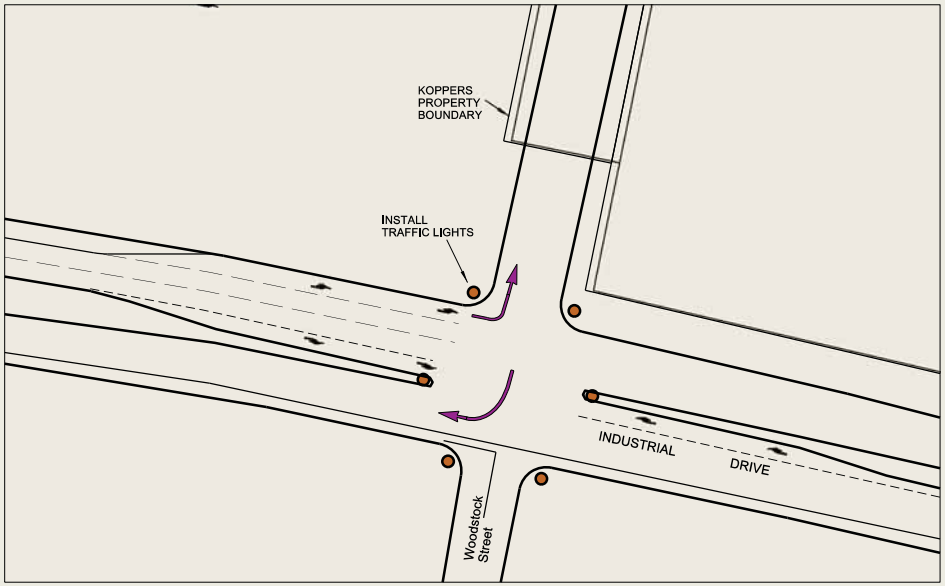
EMM

PWCS



INTERSECTION 1

TOURLE STREET - MEDIAN ADDED



INTERSECTION 2

INDUSTRIAL DRIVE / WOODSTOCK STREET - ENTRY/EXIT
NEW SIGNALS

0 10 20 30 40 50m

Integrated Design Solutions | 030418 EA Rev A - 7 February 2012

EMM

PWCS

Conceptual intersection treatments to intersection of Industrial Drive/ Woodstock Street and access to and from Tourle Street

T4 Project - Traffic Assessment

FIGURE 4.2

4.4 General road network traffic impacts

The general road network traffic impacts of the T4 Project will primarily be experienced during the early morning (6.00 – 7.00 am) and late afternoon (5.00 – 6.00 pm) construction peak traffic periods, when the major proportion of the T4 Project construction workforce traffic movements are proposed to occur on Kooragang Island, to and from the directions of the Tourle Street and the Stockton bridges.

As shuttle bus transport will be utilised to and from an off-site location (not on Kooragang Island) for at least 300 persons during the peak of Stage 1 construction, the remaining car traffic which will be generated (1,200 persons approximately travelling by car), will be no greater than the peak construction car traffic movements which are currently occurring on Kooragang Island as a result of the construction works at KCT and NCIG. In October 2011, the projects combined had a similar construction workforce of approximately 1,200 persons currently travelling to and from Kooragang Island by car.

The relative significance of the construction stage traffic flows on the regional road network (notwithstanding these traffic flows are already present on the road network in the form of existing construction traffic for KCT and NCIG) is illustrated by the following comparison of predicted additional future daily traffic usage versus the existing daily traffic flows on the road network in Table 4.2 below.

The Tourle Street Bridge is the location where the road network traffic effects of the T4 Project construction traffic (as with the current KCT and NCIG construction traffic) will generally be most significant, representing a + 8.6% traffic increase above the equivalent base daily traffic volumes. At all other locations the increase above the equivalent base daily traffic volumes will be either + 5.4% or less.

Table 4.2 Proportional impact of the T4 Project construction traffic on the major road network

Location	Most recent RMS daily traffic volume survey (AADT)	Daily construction traffic at peak of Stage 1 construction	% of peak construction traffic to total daily AADT (Stage 1)	Daily construction traffic at peaks of Stage 2 and 3 construction	% of peak construction traffic to total daily AADT (Stages 2 and 3)
Stockton Bridge (route to/from north)	21,732	646	3.0%	209	1.0%
Tourle Street Bridge (route to/from south)	29,173	2,510	8.6%	1,319	4.5%
Industrial Drive (route to/from west)	23,337	1,255	5.4%	764	3.3%
Industrial Drive (route to/from east)	30,717	1,255	4.1%	764	2.5%

The predicted peak hourly construction traffic movements for the T4 Project will generally effect the existing morning and afternoon peak period hourly traffic flows at the Tourle Street Bridge. However, the peak hour traffic flows which are already using the Tourle Street Bridge currently include the KCT and NCIG construction workforce traffic flows travelling towards Kooragang Island during the morning peak and towards Newcastle during the afternoon peak. These existing construction workforce traffic flows are anticipated to reduce to zero effectively, resulting in no net external traffic impact at the time of the peak Stage 1 construction workforce traffic movements, which will occur in 2015.

4.5 Peak hour traffic impacts at intersections

4.5.1 Stage 1 construction traffic

The traffic surveys on 25 October 2011 commenced from 5.00 am and recorded the peak one hour morning northbound traffic flow on the Tourle Street Bridge (Cormorant Road) as 1,714 vehicles (1,646 cars and 66 trucks) during the period 5.45 to 6.45 am. This flow was very similar to the peak morning traffic flow of 1,715 vehicles per hour northbound, which was recorded between 6.00 and 7.00 am by a tube traffic count survey in May 2011.

The corresponding 25 October 2011 early morning peak southbound hourly traffic flow was only 777 vehicles per hour during the period 5.45 to 6.45am. The actual morning peak period for the total traffic flow on the Tourle Street Bridge (combined northbound and southbound directions) did not occur until later in the morning at 7.15 to 8.15 am, when the corresponding northbound and southbound flows were more equally balanced and the peak hourly traffic flows were 1,465 vehicles per hour in the southbound direction and 1,176 vehicles per hour northbound.

On 25 October 2011, there were also notably high afternoon peak hour traffic flows recorded in both directions on the Tourle Street Bridge, being 1,757 vehicles per hour northbound (1,726 cars and 31 trucks) between 4.00 to 5.00 pm and 1,664 vehicles per hour travelling southbound at the same time.

These October 2011 afternoon peak hourly traffic flows were approximately 200 vehicles per hour higher in both directions than the equivalent afternoon peak hour traffic flows of 1,400 to 1,500 vehicles per hour in each direction, which were recorded in the May 2011 tube traffic count survey.

The weather was heavy rain in the afternoon on the survey day on 25 October 2011 in Newcastle, which may have contributed to the higher than usual early afternoon peak hour traffic flows which were recorded on Kooragang Island, travelling both to and from the Newcastle direction.

PWCS has advised that the total number of construction workers travelling to and from Kooragang Island each weekday in October 2011 was approximately 1,203 persons, including 583 working at the KCT expansion project and 620 working at the NCIG expansion project. For the T4 Project, a predicted future peak construction workforce of 1,511 persons will occur in early 2015, which will be 308 persons above the October 2011 construction workforce numbers for the KCT and NCIG combined.

The Tourle Street Bridge, as of October 2011, effectively does not have any additional spare capacity to accept additional northbound traffic flow during the critical 6.00 to 7.00 am morning peak period or southbound traffic flow during the critical 4.00 to 5.00 pm afternoon peak period. The RMS recommended maximum traffic capacity standard for peak hourly flow in each direction on a two lane urban road is 1,400 vehicles per hour in the peak direction for LoS E. Above this volume, the traffic flow is considered to be at LoS F, the zone of forced flow. This RMS traffic capacity standard is probably conservative as the traffic surveys on 25 October 2011 showed peak hourly northbound and southbound traffic flows in excess of 1,700 vehicles per hour. However these flows would generally have involved very slow travel speeds (typically 10 km/hr or less) through the congested sections of Cormorant Road and Tourle Street and consequently typical delays of at least 10 to 15 minutes per vehicle for traffic travelling in the congested direction.

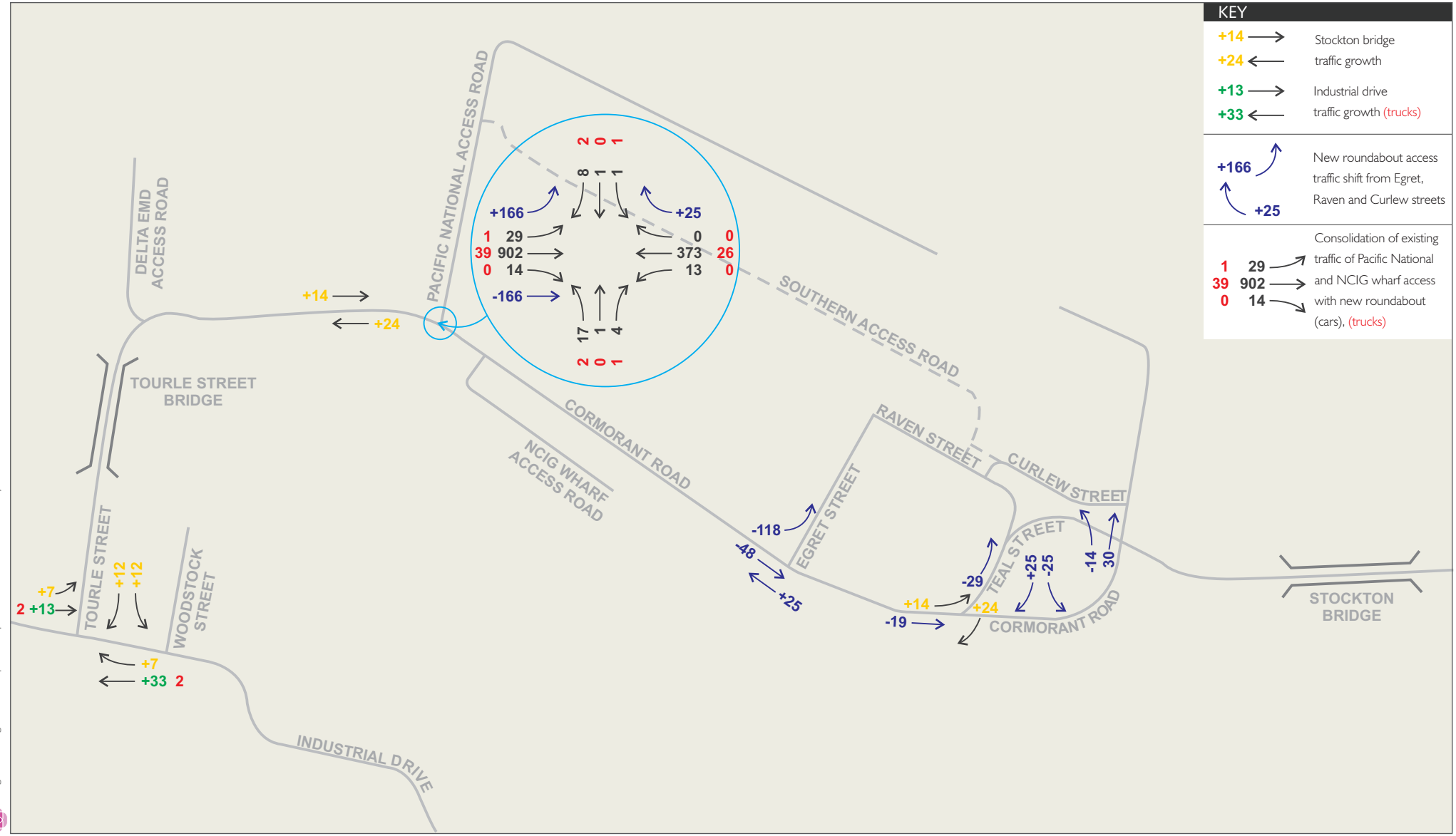
In order to prevent any significant worsening of the current 6.00 to 7.00 am peak hour northbound traffic situation on the Tourle Street Bridge during the predicted peak of Stage 1 construction, provision will need to be made for a future shuttle bus operation to transfer at least 300 employees each day of the peak T4 Project construction workforce, to and from a designated pick up location off Kooragang Island. Potential shuttle bus pick-up locations within the Newcastle urban area will be investigated by the project lead construction contractor and a preferred location(s) selected on the basis that they not cause any adverse or unacceptable traffic or on-street parking impact in the surrounding locality. Further studies will be completed to better understand potential interchange locations and parking facilities for this shuttle bus operation with a preferred option(s) to be indentified in a Traffic Management Plan which will form part of a Construction Environmental Management Plan (CEMP) to be prepared to manage the construction phase for the project. The shuttle bus drop off pick up locations on Kooragang Island bus will be adjacent to car parking areas.

The predicted future peak construction traffic volumes and traffic changes for Stage 1 construction in 2015 are illustrated by the traffic flow maps in Figure 4.3 to Figure 4.7 for five time periods. The impacts of these traffic changes have been assessed in detail at external intersections using the SIDRA intersection analysis program, for the two time periods of the day when the traffic impacts would generally be the greatest, namely the early am period (6.00 to 7.00 am) and the later pm period (5.00 to 6.00 pm). The key results of this SIDRA intersection analysis, which also includes the background traffic growth at each intersection from the Stockton Bridge and Industrial Drive directions are summarised in Table 4.3 and Table 4.4. More detailed intersection summary outputs are included as Appendix B to this report.

Table 4.3 Summary of future intersection performance during Stage 1 construction (early am peak hour 6.00 – 7.00 am) in 2015

Intersection	Type	DoS	LoS	Average Vehicle Delay (sec)	Maximum Queue Length (m)
Industrial Drive/Woodstock Street	New Traffic Signals	0.463	A	9.9	94 (Industrial Drive east)
Industrial Drive/Tourle Street	Traffic Signals	0.801	C	31.1	177 (Industrial Drive west)
Cormorant Road/Delta EMD Road	Give Way - left turn only	0.951	E	65.5 (Delta EMD LT)	1 (Delta EMD LT)
Cormorant Road/Pacific National/NCIG Wharf Access	New four way roundabout	0.632	B	17.5 (Pacific National RT)	47 (Cormorant Road west)
Cormorant Road/Egret Street	Give Way - no right turn egress	0.280	D	49.2 (Egret Street LT)	7 (Egret Street LT)
Cormorant Road/Teal Street	Roundabout	0.426	B	20.8 (Cormorant Road east RT)	22 (Cormorant Road west)
Teal Street/Raven Street	Give Way - left turn only	0.298	B	20.7 (Raven Street LT)	2 (Raven Street LT)
Cormorant Road/Curlew Street	Give Way	0.063	A	13.1 (Cormorant Road north RT)	2 (Curlew Street RT)

Notes: Shaded cells denote intersections operating at LoS E
LoS E = intersection operating at capacity
For roundabouts and unsignalised intersections, average delay is calculated for the worst affected movement

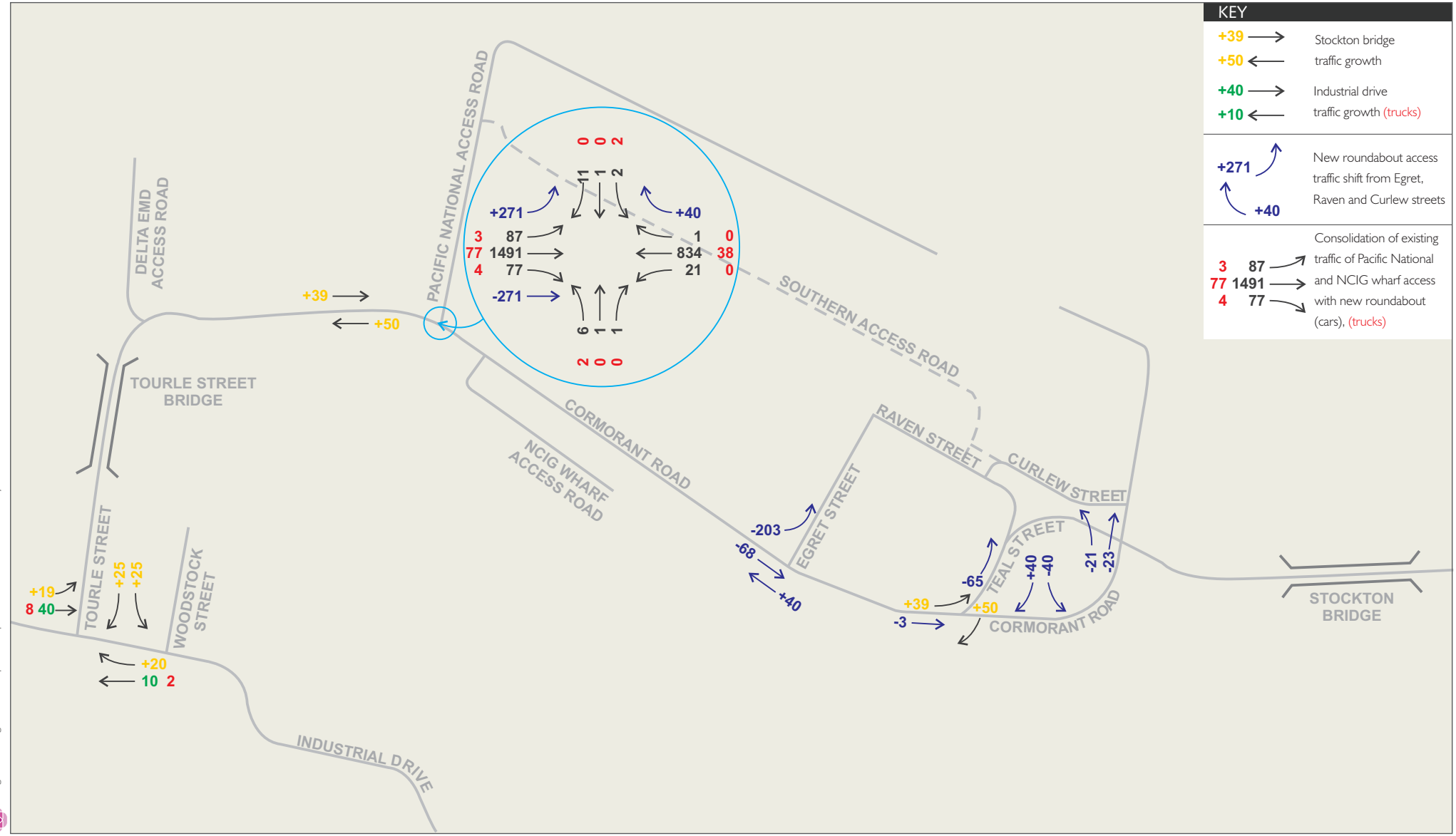


Integrated Design Solutions | J11011 | 030418 EA Rev B - 2 February 2011

Stage 1 (2015) generated traffic 5-6am peak

T4 Project - Traffic Assessment

FIGURE 4.3

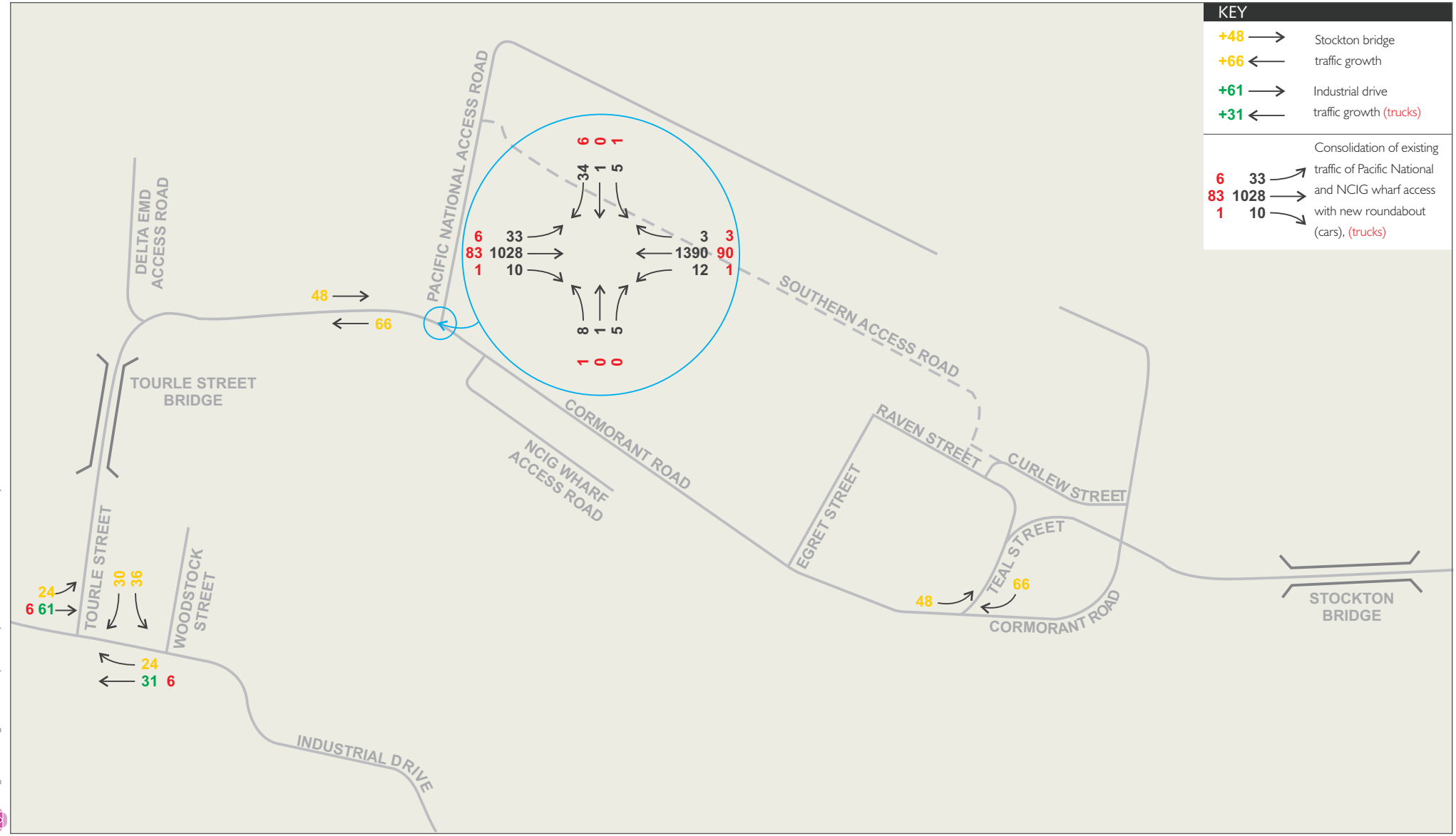


Integrated Design Solutions | J11011 | 030418 EA Rev B - 2 February 2011

Stage 1 (2015) generated traffic 6-7am peak

T4 Project - Traffic Assessment

FIGURE 4.4



Integrated Design Solutions | J11011 | 030418 EA Rev B - 2 February 2011

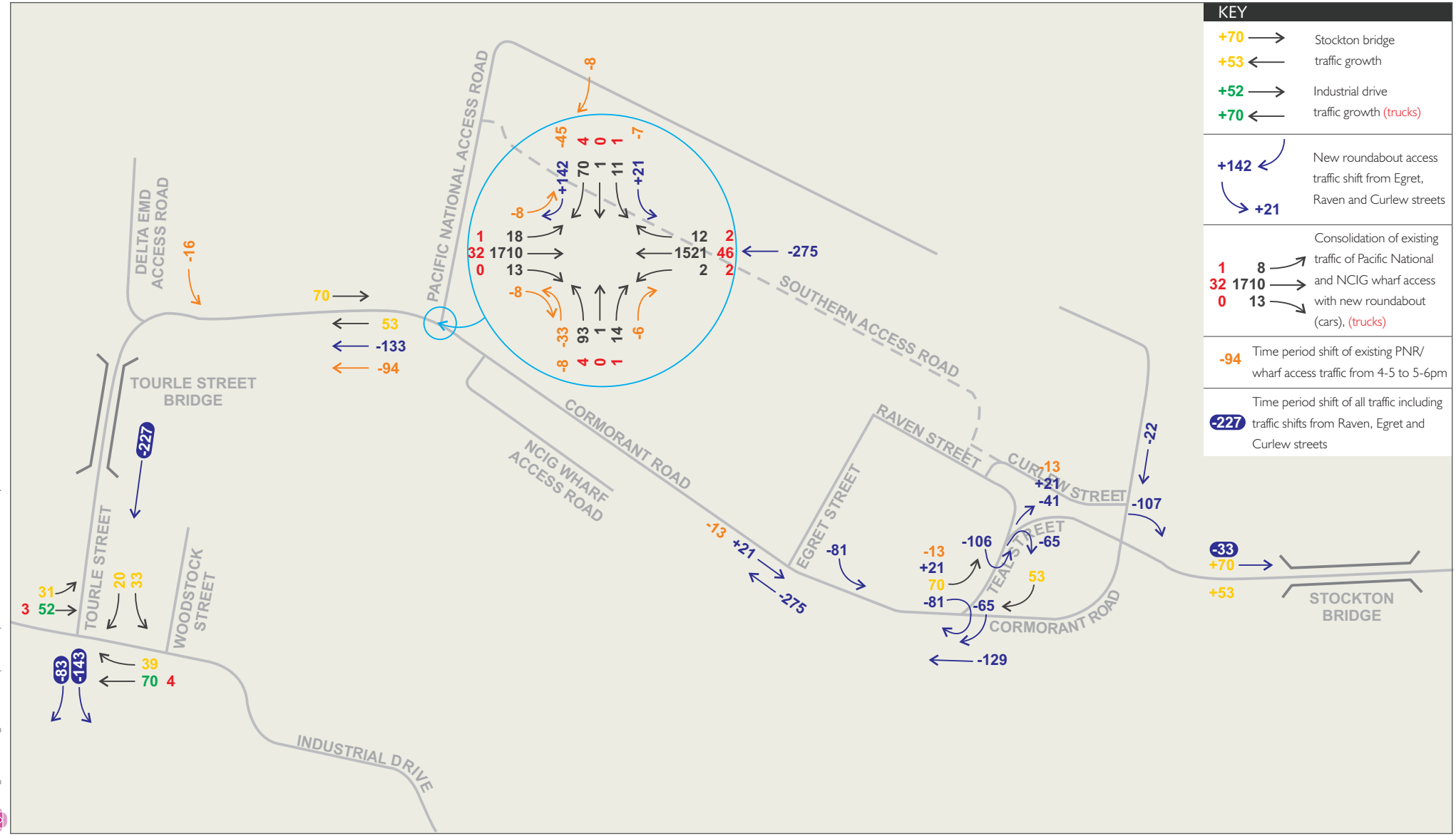
EMM

PWCS

Stage 1 (2015) generated traffic 8-9am peak

T4 Project - Traffic Assessment

FIGURE 4.5

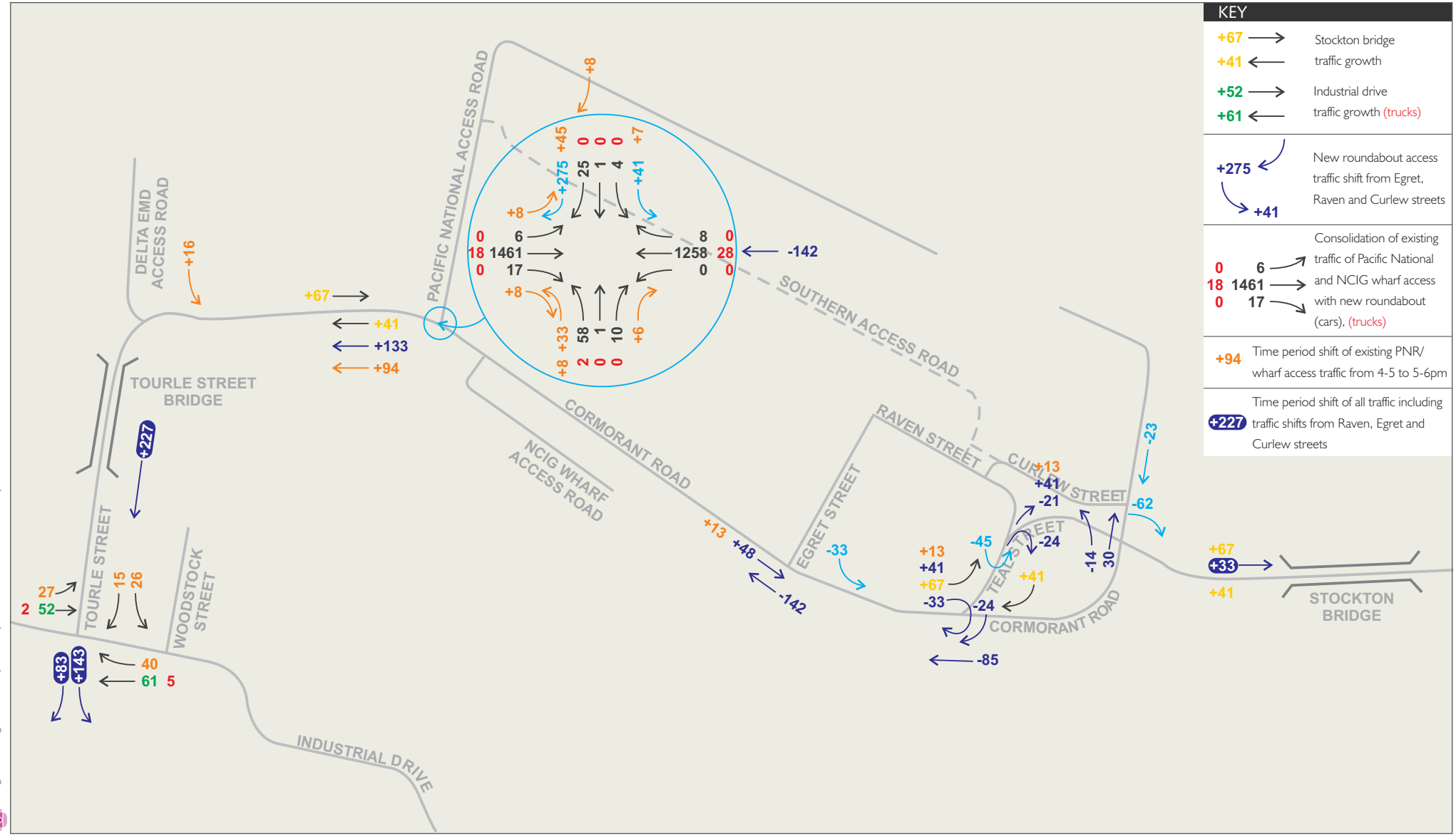


Integrated Design Solutions | J11011 | 030418 EA Rev B - 2 February 2011

Stage 1 (2015) generated traffic 4-5pm peak

T4 Project - Traffic Assessment

FIGURE 4.6



Stage 1 (2015) generated traffic 5-6pm peak

T4 Project - Traffic Assessment

FIGURE 4.7

Table 4.4 Summary of future intersection performance during Stage 1 construction (later pm peak hour 5.00 – 6.00 pm) in 2015

Intersection	Type	DoS	LoS	Average Vehicle Delay (sec)	Maximum Queue Length (m)
Industrial Drive/Woodstock Street	New Traffic Signals	0.626	A	7.9	141 (Industrial Drive west)
Industrial Drive/Tourle Street	Traffic Signals	0.901	C	29.8	211 (Industrial Drive west)
Cormorant Road/Delta EMD Road	Give Way -left turn only	0.882	D	55.6 (Delta EMD LT)	5 (Delta EMD LT)
Cormorant Road/Pacific National/NCIG Wharf Access	New four way roundabout	0.551	B	18.7 (Pacific National Road RT)	37 (Cormorant Road west)
Cormorant Road/Egret Street	Give Way -no right turn egress	0.428	D	48.1 (Egret Street LT)	7 (Egret Street LT)
Cormorant Road/Teal Street	Roundabout	0.474	B	15.9 (Cormorant Road east RT)	26 (Cormorant Road west)
Teal Street/Raven Street	Give Way - left turn only	0.369	C	30.5 (Raven Street LT)	6 (Raven Street LT)
Cormorant Road/Curlew Street	Give Way	0.080	A	9.3 (Curlew Street RT)	2 (Curlew Street RT)

Note: For roundabouts and unsignalised intersections, average delay is calculated for the worst affected movement

The future Stage 1 intersection traffic assessment results are summarised in Table 4.5 below and show that all intersections will be operating at an acceptable LoS (LoS E or better) during the main construction access peak hour traffic periods for the project, which will be 6.00 – 7.00 am and 5.00 – 6.00 pm.

Table 4.5 Summary of Stage 1 construction traffic intersection performance in the year 2015

Intersection	Type	Early am peak hour 6.00-7.00 am	Later pm peak hour 5.00-6.00 pm
Industrial Drive/Woodstock Street	New Traffic Signals	A	A
Industrial Drive/Tourle Street	Traffic Signals	C	C
Cormorant Road/Delta EMD Road	Give Way -left turn only	E	D
Cormorant Road/Pacific National/NCIG Wharf Access	New four way roundabout	B	B
Cormorant Road/Egret Street	Give Way - no right turn egress	D	D
Cormorant Road/Teal Street	Roundabout	B	B
Teal Street/Raven Street	Give Way -left turn only	B	C
Cormorant Road/Curlew Street	Give Way	A	A

Notes: Shaded cells denote intersections operating at LoS E
LoS E = intersection operating at capacity
For roundabouts and unsignalised intersections, average delay is calculated for the worst affected movement

4.5.2 Stage 2 and Stage 3 construction

The total future construction workforce will be significantly reduced in Stages 2 and 3 with an estimated peak workforce of about 580 persons during both of these stages. The peak morning and afternoon construction workforce car traffic movements generated during Stage 2 and 3 construction will be approximately 460 vehicle movements in each direction during the two hour morning 5.00 and 7.00 am and two hour afternoon 4.00 and 6.00 pm peak periods respectively. The future predicted daily and peak hourly construction traffic movements during Stages 2 and 3 of construction, from this workforce, are summarised in Table 4.6.

Table 4.6 Summary of Stage 2 and Stage 3 peak daily construction traffic movements

Peak Hour Period	Total Hourly Vehicle Trips Generated	Via Tourle Street Bridge	Via Stockton Bridge
Pre - am peak 4.00-5.00 am			
Employee car traffic	40 in	35	5
Very early am peak 5.00-6.00 am			
Employee car traffic	140 in, 40 out	157	23
Early am peak 6.00-7.00 am			
Employee car traffic	280 in	244	36
Site visitor car traffic	0	0	0
Imported sand fill traffic	0	0	0
Imported gravel-rock fill	1 in, 1 out	1	1
Other truck traffic	1 in , 1 out	2	0
Actual am peak 7.00-8.00 am and daytime hours until 3.00-4.00 pm			
Employee car traffic	0	0	0
Site visitor car traffic	21 in, 21 out	36	6
Imported sand fill traffic	0	0	0
Imported gravel-rock fill	1 in, 1 out	1	1
Other truck traffic	1 in, 1 out	2	0
Actual pm peak 4.00-5.00 pm			
Employee car traffic	40 in, 140 out	157	23
Site visitor car traffic	21 in, 21 out	36	6
Imported sand fill traffic	0	0	0
Imported gravel-rock fill	1 in, 1 out	1	1
Other truck traffic	1 in, 1 out	2	0
Later pm peak 5.00-6.00 pm			
Employee car traffic	320 out	278	42
Site visitor car traffic	0	0	0
Imported sand fill traffic	0	0	0
Imported gravel-rock fill	1 in, 1 out	1	1
Other truck and bus traffic	1 in, 1 out	2	0

The total daily and peak hour construction traffic movements for the project during Stages 2 and 3 of construction will be significantly lower than either the current Kooragang Island construction workforce traffic movement or those which will be generated by the peak Stage 1 construction workforce of 1,500 persons approximately (1,200 assumed to be travelling by car).

For this reason detailed future assessment of the peak hour traffic impacts of the Stage 2 and Stage 3 construction traffic in the future years 2018 and 2020, will not be necessary at Kooragang Island intersections, as even with additional future predicted background traffic growth from the Stockton Bridge direction during this period, the overall future traffic volumes at the Kooragang Island intersections will clearly be lower than for either the Stage 1 construction or the existing October 2011 traffic situation.

However a SIDRA intersection analysis has been undertaken for Stage 2 and Stage 3 construction traffic in the years 2018 and 2020, in order to prove the feasibility of the proposed construction access routes via the Industrial Drive/Woodstock Street, Industrial Drive/Tourle Street and Tourle Street left turn only access intersections.

The results of this SIDRA intersection analysis for Stage 2 and Stage 3 construction traffic, including a comparison with the current base year (2011) traffic conditions at the three relevant intersections, are summarised in Tables 4.7 to 4.10 below.

Table 4.7 Summary of future intersection performance of proposed Industrial Drive/Woodstock Street traffic signals during Stages 2 and 3 construction

Time period	Intersection performance	Year 2011 Base	Year 2018 Stage 2	Year 2020 Stage 3
5.00 – 6.00 am	DoS	0.266	0.259	0.263
	LoS	A	A	A
	Average Vehicle Delay (sec)	10.5	11.2	11.2
	Maximum Queue Length (m)	47	46	47
6.00 – 7.00 am	DoS	0.457	0.460	0.476
	LoS	A	A	A
	Average Vehicle Delay (sec)	9.9	10.1	10.1
	Maximum Queue Length (m)	90	93	98
8.00 – 9.00 am	DoS	0.725	0.774	0.791
	LoS	A	A	A
	Average Vehicle Delay (sec)	8.1	8.2	8.5
	Maximum Queue Length (m)	189	218	231
4.00 – 5.00 pm	DoS	0.935	0.962	0.980
	LoS	A	A	A
	Average Vehicle Delay (sec)	8.9	9.3	9.2
	Maximum Queue Length (m)	130	153	162
5.00 – 6.00 pm	DoS	0.557	0.583	0,607
	LoS	A	A	A
	Average Vehicle Delay (sec)	8.1	9.0	9.1
	Maximum Queue Length (m)	115	125	131

Table 4.8 Summary of future intersection performance of existing Industrial Drive/Tourle Street traffic signal intersection during Stages 2 and 3 construction

Time period	Intersection performance	Year 2011 Base	Year 2018 Stage 2	Year 2020 Stage 3
5.00 – 6.00 am	DoS	0.351	0.346	0.356
	LoS	B	B	B
	Average Vehicle Delay (sec)	22.8	23.1	23.3
	Maximum Queue Length (m)	64	60	62
6.00 – 7.00 am	DoS	0.768	0.791	0.810
	LoS	C	C	C
	Average Vehicle Delay (sec)	30.0	30.8	31.4
	Maximum Queue Length (m)	164	186	196
8.00 – 9.00 am	DoS	0.777	0.853	0.879
	LoS	B	C	C
	Average Vehicle Delay (sec)	26.0	29.3	30.8
	Maximum Queue Length (m)	202	255	272
4.00 – 5.00 pm	DoS	0.857	0.863	0.883
	LoS	B	B	B
	Average Vehicle Delay (sec)	27.6	26.9	28.1
	Maximum Queue Length (m)	197	218	232
5.00 – 6.00 pm	DoS	0.830	0.888	0.905
	LoS	B	C	C
	Average Vehicle Delay (sec)	26.3	29.8	31.4
	Maximum Queue Length (m)	176	219	235

Table 4.9 Summary of future intersection performance of Tourle Street left turn only access during Stages 2 and 3 construction

Time period	Intersection performance	Year 2011 Base	Year 2018 Stage 2	Year 2020 Stage 3
5.00 – 6.00 am	DoS	0.559	0.502	0.507
	LoS	A	A	A
	Average Vehicle Delay (sec)	5.0	10.5	10.6
	Maximum Queue Length (m)	0	0	0
6.00 – 7.00 am	DoS	0.937	0.835	0.846
	LoS	B	E	F
	Average Vehicle Delay (sec)	15.3	68.9	75.0
	Maximum Queue Length (m)	0	1	1
8.00 – 9.00 am	DoS	0.824	0.882	0.902
	LoS	C	F	F
	Average Vehicle Delay (sec)	38.7	129.5	146.4
	Maximum Queue Length (m)	0	3	3

Table 4.9 Summary of future intersection performance of Tourle Street left turn only access during Stages 2 and 3 construction

Time period	Intersection performance	Year 2011 Base	Year 2018 Stage 2	Year 2020 Stage 3
4.00 – 5.00 pm	DoS	0.959	0.987	1.009
	LoS	E	C	C
	Average Vehicle Delay (sec)	56.7	35.0	37.1
	Maximum Queue Length (m)	0	0	86
5.00 – 6.00 pm	DoS	0.822	0.901	0.922
	LoS	C	C	C
	Average Vehicle Delay (sec)	29.8	32.8	34.4
	Maximum Queue Length (m)	0	6	6

Notes *For roundabouts and unsignalised intersections, average delay is calculated for the worst affected movement*
Shaded cells denote intersections operating at LoS E and LoS F.

Table 4.10 Summary of future intersection LoS for Stages 2 and 3 construction

Intersection	Time oeriod	Year 2011 Base	Year 2018 Stage 2	Year 2020 Stage 3
Industrial Drive/ Woodstock Street	5.00 – 6.00 am	A	A	A
	6.00 – 7.00 am	A	A	A
	8.00 – 9.00 am	A	A	A
	4.00 – 5 00 pm	A	A	A
	5.00 – 6.00 pm	A	A	A
Industrial Drive/ Tourle Street	5.00 – 6.00 am	B	B	B
	6.00 – 7.00 am	C	C	C
	8.00 – 9.00 am	B	C	C
	4.00 – 5 00 pm	B	B	B
	5.00 – 6.00 pm	B	C	C
Tourle Street Left Turn Access	5.00 – 6.00 am	A	A	A
	6.00 – 7.00 am	B	E	F
	8.00 – 9.00 am	C	F	F
	4.00 – 5 00 pm	E	C	C
	5.00 – 6.00 pm	C	C	C

Notes: *Shaded cells denote intersections operating at LoS E and LoS F*

4.6 Summary of the intersection analysis results

To assess likely traffic impacts, the year 2015, 2018 and 2020 base traffic conditions have been adjusted to include the underlying base traffic growth each year from the Stockton Bridge and Industrial Drive directions, which have/will be continuing to occur at rates of + 1.6% per annum and + 1.3% per annum each year from the year 2010 onwards.

Apart from these underlying year 2015, 2018 and 2020 base traffic increases, there are effectively no other increase in the peak hour or daily construction traffic movements assumed to occur from other projects, on the external road network as these additional traffic movements will be included in the background traffic growth on the Industrial Drive, Tourle Street Bridge and the Stockton Bridge routes.

4.6.1 Stage 1 construction

During Stage 1 construction in 2015, there will be a substantial geographic re-distribution of the existing peak hourly construction workforce traffic movements on Kooragang Island, with a significant transfer of up to 300 vehicles per hour of the existing construction workforce traffic movements away from the Egret Street, Raven Street and Curlew Street intersections, to new worksite access locations via the Pacific National Access Road. These traffic redistributions will substantially reduce the high existing afternoon peak hour traffic movements on the western sections of Cormorant Road on Kooragang Island.

On a daily traffic basis, the predicted Stage 1 construction traffic movements from the T4 Project will be directly cancelled by the removal of the current Kooragang Island construction traffic activity from the current (October 2011) construction workforce of approximately 1,200 persons from the KCT and NCIG construction works.

The predicted Stage 1 construction traffic movements will also have a greater proportion of the total construction workforce departing during the later 5.00 to 6.00 pm peak period in the future, rather than during the 4.00 to 5.00 pm peak period that currently occurs (Table 2.2). This change will significantly reduce the current high traffic congestion impacts which are occurring at many Kooragang Island intersections during the 4.00 to 5.00 pm afternoon peak period.

In the Stage 1 intersection analysis, the intersection with the highest future traffic delays (LoS E) will generally be the left turn only intersection of Cormorant Road with the Delta EMD Access Road. At this intersection, the high traffic delays for the left turn egress from the minor road are caused by the effective saturation of the north-east bound traffic flow from the Tourle Street Bridge to Cormorant Road. This cannot easily be addressed by improvements to the intersection design for the left turn egress as this traffic must continue to give way to the major road traffic flow.

The future operation of the Pacific National Access Road and NCIG Wharf Access Road intersections has been assessed in Table 4.3 and Table 4.4 on the basis of the current preliminary design for a new four way roundabout combining these two intersections. This proposed roundabout design is shown in Figure 4.1.

In consultation which has been undertaken with RMS, the suggested length for the associated tie in roads, which will provide the additional approach and departure lanes at the two Cormorant Road approaches to the new intersection, was 200 m in either direction. The preliminary SIDRA intersection analysis which has been undertaken for the Stage 1 construction traffic impact assessment in this report has assumed that 100 m approach lanes and 200 m departure lanes to the east and west on the two Cormorant Road approaches and 60 m approach and departure lanes to the north and south for the Pacific National and New Wharf Access Road approaches) will be provided. This will be sufficient for the roundabout to provide a good LoS (LoS B) for Stage 1 construction.

Other intersection options such as traffic signals may also be considered at this location in more detailed traffic assessments which will be undertaken for the project Traffic Management Plan.

4.6.2 Stage 2 and Stage 3 construction

Because of the high existing traffic delays (LoS F for the right turn egress and cross traffic movements from both the north and south Woodstock Street approaches) during all the four am and pm peak hour traffic periods considered in the initial 2011 base year traffic assessment, the Industrial Drive/Woodstock Street intersection will have to be either restricted to left turn only operations or converted to traffic signals for the future project construction access. For the purposes of the assessment, the year 2011 base traffic situation and all future scenarios for the intersection's operation have been analysed with the traffic signal provision incorporated, although these traffic signals will probably not be installed until required for Stage 2 and 3 construction.

In all the year 2011 base and Stage 2 and 3 construction traffic access scenarios, the Woodstock Street/Industrial Drive intersection continues to operate at a very good Level of Service (LoS A) with the traffic signals installed as illustrated by the future intersection plan in Figure 4.2.

It is noted that the future DoS for the peak hour right turn movement from Industrial Drive (west) to Woodstock Street (south) does rise to a relatively high ratio of 0.980 in the future year 2020 scenario. However, this high DoS for one traffic movement does not adversely affect the overall average intersection performance according to the delay and LoS criteria.

The nearby Industrial Drive and Tourle Street traffic signal controlled intersection is currently operating at either peak hour LoS B or C with DoS in the range 0.77 to 0.86 in four of the five peak hour traffic periods considered in the year 2011 base traffic assessment. In the future year 2018 and 2020 Stage 2 and 3 assessments, the future intersection peak hour LoS will remain at either B or C during these four traffic periods. However the future intersection peak hour DoS will increase slightly to the range 0.79 to 0.89 in the year 2018, and then to the range 0.81 to 0.91 in the year 2020.

The proposed Tourle Street left turn access only intersection will remain unsignalised under all existing and future traffic scenarios assessed and the left turn egress capacity for the site egress traffic is practically restricted in most of the peak hour traffic scenarios by the virtually continuous southbound traffic flows from the Tourle Street Bridge which will provide only limited gaps for traffic egress.

Currently this intersection is operating at a poor level of service (LoS E) during the 4.00 – 5.00 pm afternoon traffic peak, but the intersection operations are generally better (LoS A,B or C) at other times. In the proposed project Stage 2 and Stage 3 construction traffic access scenarios, this intersection's operations will improve to LoS C during the 4.00 – 5.00 pm afternoon peak period but will worsen to LoS E and F in two of the morning peak hour traffic periods considered (6.00 – 7.00 am and 8.00 – 9.00 am) primarily due to the increasing morning peak hour southbound traffic flows from ongoing background traffic growth to and from the Stockton Bridge direction over the intervening years. The additional future traffic delays and reduced future morning peak hour levels of service at this intersection will primarily only affect project traffic which will be making left turn egress movements from the southern wharf area worksite under congested traffic conditions. No other traffic movements will be affected so there will be no adverse impact to general road users. For this reason, this project traffic impact is considered to acceptable. In addition, construction traffic which will be departing from the southern wharf area will be able to use the Industrial Drive/Woodstock Street intersection as an alternative egress route when the traffic delays at the Tourle Street egress become too congested.

4.7 Public transport

A basic minimum level of service exists for public transport access to and from Kooragang Island by means of bus services on Routes 130 and 131. However public transport usage in the Kooragang Island area is limited practically by the long walking distances to and from any public transport stops on Cormorant Road to workplaces. Also, the current lack of safe crossing facilities for any pedestrians crossing Cormorant Road, or shelters or seating at any of the bus stops, makes potential public transport usage additionally unattractive for journey to work travel for the workforce on the island.

A future WTP for the T4 Project, in conjunction with the other major employers in the area, could make future public transport travel more attractive for journey to work travel to and from the Kooragang area by addressing the existing deficiencies with public bus services, or alternatively and probably more realistically, by providing new dedicated shuttle bus services operating to and from Kooragang Island in the peak hours from a range of key locations in the Newcastle urban area, such as Central Newcastle, Broadmeadow, Sandgate and Stockton.

Guidelines for the future specification of WTPs for industrial areas and other sites which are remote from existing public transport services are provided by a UK Standard (BSi, 2008). This standard, which is entitled *PAS 500:2008 National specification for WTPs*, contains a number of recommendations and procedures for the future implementation of WTP for either existing or new workplaces. The general procedures which are outlined in the standard include the following general steps:

- define links between the implementation of the WTP and long term management aims of the organisation;
- secure explicit senior management support;
- define the aims and objectives of the WTP;
- undertake staff consultation;
- undertake baseline staff travel survey audit and compare existing trip generation with relevant benchmarks;
- define future targets and timescales (eg five years) for travel demand changes and outcomes to be achieved;
- identify interventions necessary to achieve travel demand change outcomes;
- define implementation strategy and budget required for WTP interventions strategy;
- achieve senior management approval for WTP interventions strategy and budget;
- ensure ongoing monitoring of WTP implementation and performance (eg annually or every two years); and
- continue to monitor, review and revise WTP as long as the facility is in operation.

A summary of the results of the implementation of WTPs at 37 sites in the UK has indicated that an overall average 18% reduction in previous levels of discretionary car travel was typically achieved at the sites considered. A similar target could potentially be considered for the future implementation of a WTP for industry on Koorangang Island.

4.8 Pedestrians and cyclists

The current level of access for pedestrians and cyclists to and from Kooragang Island has recently been improved by the additional pedestrian footpath and wider road shoulders at the new Tourle Street Bridge, opened in May 2009.

A basic minimum level of pedestrian accessibility is now provided to Koorangang Island, to and from the Newcastle and Stockton directions for any persons who may wish to either walk or cycle to or from their workplace on Kooragang Island.

On Kooragang Island itself, the current standard of pedestrian facility provided for pedestrians to either walk along or cross Cormorant Road, is currently poor, but will probably be improved when the future roadway is widened from two to four lanes, at a date which is yet to be determined.

"This page has been intentionally left blank"

5 Mitigation measures

5.1 Road network improvements

Four specific project related road network traffic impact mitigation measures have been identified for the T4 Project, and incorporated in the traffic impact assessment, namely:

- Provision of a new four way roundabout or alternative traffic signal controlled intersection (with a new service road linking all the wharf access locations on the south side of Cormorant Road) is proposed to replace the two existing Pacific National Access Road and NCIG Wharf Access Road T-intersections on Cormorant Road, approximately 1.5 km east of the Tourle Street Bridge. The roundabout or traffic signals would be provided prior to the peak of Stage 1 construction.

- Increased spreading of the peak hour departure period after 5.00 pm for construction traffic during the peak of Stage 1 construction.

- Signalisation of the Industrial Drive/Woodstock Street when required.

- Construction of a median in the centre of Tourle Street, approximately 300 m south of the Tourle Street Bridge, to enforce the site vehicular access from Tourle Street as left turn access only prior to Stage 2 construction.

5.2 Public transport access

Site dayshift shuttle bus operations are proposed to transport approximately 300 persons during the peak of Stage 1 construction, to and from the worksites at Kooragang Island using an off-site parking location on the south side of the Hunter River South Arm. Buses would deliver to/pick up construction workers from the on-site construction car parks.

Potential shuttle bus pick-up locations within the Newcastle urban area will be investigated by the project lead construction contractor and a preferred location or locations will be selected on the basis that they will not cause any adverse or unacceptable traffic or on-street parking impact in the surrounding locality. Further studies will be undertaken by the lead project construction contractor, to further assess the preferred car parking/bus interchange locations which would be utilised for these shuttle bus services in a Traffic Management Plan, agreed to by the RMS and NCC.

These shuttle bus operations can also potentially be continued in the future to form the basis of a future WTP for industry on Kooragang Island. Future dedicated shuttle bus services, operating to and from Kooragang Island in the peak hours could potentially operate from a range of key locations in the Newcastle urban area, such as the Newcastle CBD (Central Station), Broadmeadow, Belmont, Cardiff, Wallsend, Sandgate and Stockton.

"This page has been intentionally left blank"

6 Conclusion

6.1 Existing traffic situation

The existing traffic situation on Kooragang Island has been determined using the SIDRA intersection analysis program, which assesses peak hour intersection traffic operations in terms of intersection degree of saturation, average vehicle delay, LoS and maximum queue length. A program of peak hour intersection traffic counts was undertaken during March 2011 at the Teal Street/Cormorant Road and Tourle Street/Industrial Drive Intersections and during October 2011, at a further seven unsignalised minor road access intersections to fully determine the existing traffic conditions in the locality.

Currently during both the morning and afternoon peak traffic periods, the eastbound and westbound traffic flows on Kooragang Island are generally slow and congested, in particular in the westbound direction, on the remaining two lane sections of Cormorant Road and the Tourle Street Bridge. MR 108 is progressively being developed to a four lane capacity standard. However, there remains a significant two lane section along Cormorant Road, including the Tourle Street Bridge. The Tourle Street Bridge was recently reconstructed during 2007 and 2009, with a new road bridge with wider sealed shoulders, a separated pedestrian footpath and a higher navigational clearance for river traffic.

RMS have prepared future plans for the completion of the upgrading of the Tourle Street Bridge and Cormorant Road route across Kooragang Island to four lanes capacity. However no timeframe is currently provided for the completion of these works. The construction stage traffic impact assessment for the T4 Project has therefore been undertaken on the basis that these works will not be completed until after the peak of the Stage 1 construction work occurs in 2015.

6.2 Traffic changes

From consideration of the existing traffic situation on Kooragang Island and Industrial Drive and detailed analysis of the likely future traffic situation during 2015 with peak Stage 1 construction traffic and during 2018 and 2020 with peak Stage 2 and Stage 3 construction traffic, it was determined that a number of specific traffic impact mitigation measures needed to be incorporated into the T4 Project. The future traffic conditions for the project at key intersections were therefore assessed with these mitigation measures in place, namely:

- Provision of a new four way roundabout access intersection or alternative traffic signal controlled intersection to replace the two existing Pacific National Access Road and NCIG Wharf Access Road T-intersections on Cormorant Road, approximately 1.5 km east of the Tourle Street Bridge.

- Increased spreading of the peak hour departure period after 5.00 pm for the pm peak hour project construction traffic during the peak of Stage 1 construction.

- Signalisation of the Industrial Drive/Woodstock Street when required.

- Construction of a median in the centre of the roadway in Tourle Street, approximately 300 m south of the Tourle Street Bridge, to enforce the site vehicular access from Tourle Street as left turn access only.

- Provision of a dayshift shuttle bus service to transport approximately 300 persons during the peak of Stage 1 construction, to and from the worksites at Kooragang Island using an off-site parking location on the south side of the Hunter River South Arm.

In the future traffic assessment, the year 2015 traffic conditions were also adjusted to include the underlying base traffic growth each year through Kooragang Island to and from the Stockton Bridge direction and on Industrial Drive, which will be continuing to occur at a rates of + 1.6% per annum and + 1.3% per annum respectively, each year from the year 2010 onwards.

6.3 Intersections considered

An assessment of existing traffic conditions, as of 25 October 2011, has determined that the most critical intersections for access to the project area currently are:

- The Industrial Drive/Woodstock Street intersection, which is operating over capacity (LoS F) currently during all of the four peak hour traffic periods considered.

- The Cormorant Road/NCIG Wharf Access Road intersection, which was operating over capacity (LoS F) during three of the four peak hour traffic periods considered, with capacity problems occurring at different peak times for both the unsignalised right turn movement into the minor road and the left turn egress from the minor road.

- The Cormorant Road/Pacific National Access Road intersection and the Cormorant Road/Delta EMD Access Road intersection, which were both operating over capacity (LoS F) during two of the four peak hour traffic periods considered, mainly because of the high eastbound through traffic flows on Kooragang Island restricting the unsignalised left turn egress from these roads during the peak traffic periods.

- The Cormorant Road/Egret Street intersection and the Teal Street/Raven Street intersection, which were both operating over capacity (LoS F) during one of the four peak hour traffic periods considered (the 4.00 and 5.00 pm actual pm peak period), also because of the high eastbound through traffic flows on Kooragang Island which restrict the left turn egress from these roads during the peak traffic periods.

6.4 Traffic assessment

The traffic assessment results for Stage 1 construction in 2015, have determined that with the identified project intersection improvements and other traffic mitigation measures, all the assessed intersections will be operating at an acceptable LoS (LoS E or better) during the main construction peak hour traffic periods.

The future predicted daily and peak hourly construction traffic movements during Stages 2 and 3 of construction have also been assessed for 2018 and 2020, at the three existing or proposed access intersections which are in the vicinity of the southern wharf, in the vicinity of Tourle Street, Woodstock Street and Industrial Drive. At the existing traffic signal controlled intersection of Industrial Drive/Tourle Street, the traffic assessment results for Stage 2 construction traffic in 2018 and the Stage 3 construction traffic in 2020, have determined that the intersections will continue to operate at relatively good LoS (LoS C or better) and further intersection improvements will not be required at this intersections.

At the Industrial Drive/Woodstock Street intersection, where the installation of traffic signals is proposed for access for Stage 2 and Stage 3 construction in the years 2018 and 2020, the traffic assessments results show that once signalised, this intersection will operate at a very good LoS (LoS A) under all the future peak hour traffic scenarios considered.

At the proposed Tourle Street left turn only access intersection for the project, which will be located approximately 300 m south of the Tourle Street Bridge, the future intersection level of service will improve in the afternoon peak traffic periods which have been considered but will generally deteriorate (to LoS E or F with future peak hour left turn traffic egress delays of up to 150 seconds) in the years 2018 and 2020 in two of the future morning peak hour traffic periods considered. However, the additional traffic delays with the reduced future morning peak hour levels of service will primarily only affect project traffic which will be making left turn egress movements from the site under congested traffic conditions. No other traffic will generally be affected so there will be no adverse impact for other road users. For this reason, this impact is considered to acceptable. Also, project traffic which will be departing from the southern wharf area will have the option of using the Woodstock Street intersection as an alternative egress route if the traffic delays at the Tourle Street egress become too congested.

6.5 Traffic safety

The two major traffic safety issues for traffic on Kooragang Island currently are:

- the relatively high occurrence of rear end traffic accidents due to the slow moving peak hour traffic conditions on the island currently; and
- the high right turn traffic delays increasing traffic safety issues at unsignalised intersections.

These existing traffic safety issues will be improved by the proposed new four-way roundabout (or alternative traffic signal controlled intersection) which will be constructed for the T4 Project construction access on Cormorant Road. The new intersection at the Pacific National Access Road will permit all future right turn egress traffic movements, to occur directly at the intersections.

6.6 Car parking and public transport access

Future car parking areas for the T4 Project construction workforce will be distributed around the worksites in proportion to the predicted peak workforce car parking demand at each location. A peak total of 980 on-site car parking spaces will be provided for Stage 1 construction. This car parking supply will generally be provided in gravel surfaced car parking areas. During Stages 2 and 3, a smaller total construction workforce will be engaged on the project and the areas required for the provision of on-site car parking will be able to be reduced accordingly.

A basic minimum level of service provisions exist for public transport access to and from Kooragang Island by means of bus services on Routes 130 and 131. However public transport usage in the Kooragang Island area generally is currently limited in practice because of the long walking distances from any public transport stops on Cormorant Road to workplaces. For the T4 Project, site dayshift shuttle bus operations are proposed which will transport approximately 300 persons during the peak of Stage 1 construction.

Guidelines for the future specification of WTPs for industrial areas and other sites which are remote from existing public transport services are provided by a UK Standard (BSi, 2008). This standard contains a number of recommendations and procedures for the future implementation of WTP for either existing or new workplaces. Based on the UK experience with the implementation of WTPs, an 18% reduction in currently prevailing usage levels of discretionary car travel for work related journeys, could potentially be achieved, if a WTP were implemented for the T4 Project in conjunction with other similar industrial workplaces on Kooragang Island.

A basic minimum level of pedestrian accessibility is provided to Kooragang Island, to and from both the Newcastle and Stockton directions, for any persons who may wish to either walk or cycle to or from their workplace on Kooragang Island.

"This page has been intentionally left blank"

Appendix A

Traffic survey results

"This page has been intentionally left blank"

R.O.A.R. DATA

Reliable, Original & Authentic Results

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

Client : EMGA
Job no/Name : 3826 KOORAGANG ISLAND Traffic Counts
Day/Date : Tuesday 25th October 2011

Lights

	NORTH		WEST		SOUTH		
	Cormorant		*Curlew St*		*Cormorant*		
Time Per	T	R	L	R	L	T	TOT
0500 - 0515	1	0	0	3	2	4	**10**
0515 - 0530	0	0	1	0	6	7	**14**
0530 - 0545	1	0	0	6	7	15	**29**
0545 - 0600	17	2	0	12	11	31	**73**
0600 - 0615	1	0	1	6	9	14	**31**
0615 - 0630	0	0	0	14	14	13	**41**
0630 - 0645	2	0	0	13	9	6	**30**
0645 - 0700	3	0	0	6	12	14	**35**
0700 - 0715	1	0	0	7	3	7	**18**
0715 - 0730	4	2	1	9	6	13	**35**
0730 - 0745	5	0	0	19	6	12	**42**
0745 - 0800	3	1	0	16	9	12	**41**
0800 - 0815	3	0	0	17	9	5	**34**
0815 - 0830	3	0	1	19	6	8	**37**
0830 - 0845	4	0	1	18	8	6	**37**
0845 - 0900	6	1	0	14	10	7	**38**
Per End	**54**	**6**	**5**	**179**	**127**	**174**	**545**

Heavies

	NORTH		WEST		SOUTH		
	Cormorant		*Curlew St*		*Cormorant*		
Time Per	T	R	L	R	L	T	TOT
0500 - 0515	0	0	1	0	0	1	**2**
0515 - 0530	0	1	1	0	0	1	**3**
0530 - 0545	0	1	0	0	0	2	**3**
0545 - 0600	0	0	0	0	1	2	**3**
0600 - 0615	1	0	0	1	0	2	**4**
0615 - 0630	1	1	1	1	0	1	**5**
0630 - 0645	2	0	0	1	1	1	**5**
0645 - 0700	0	1	3	3	2	1	**10**
0700 - 0715	0	0	0	5	0	4	**9**
0715 - 0730	4	2	0	4	0	2	**12**
0730 - 0745	1	1	2	6	2	1	**13**
0745 - 0800	3	0	2	6	0	2	**13**
0800 - 0815	4	2	2	7	0	5	**20**
0815 - 0830	6	0	2	6	3	1	**18**
0830 - 0845	1	2	2	10	0	1	**16**
0845 - 0900	2	2	1	8	1	3	**17**
Per End	**25**	**13**	**17**	**58**	**10**	**30**	**153**

Combined

	NORTH		WEST		SOUTH		
	Cormorant		*Curlew St*		*Cormorant*		
Time Per	T	R	L	R	L	T	TOT
0500 - 0515	1	0	1	3	2	5	**12**
0515 - 0530	0	1	2	0	6	8	**17**
0530 - 0545	1	1	0	6	7	17	**32**
0545 - 0600	17	2	0	12	12	33	**76**
0600 - 0615	2	0	1	7	9	16	**35**
0615 - 0630	1	1	1	15	14	14	**46**
0630 - 0645	4	0	0	14	10	7	**35**
0645 - 0700	3	1	3	9	14	15	**45**
0700 - 0715	1	0	0	12	3	11	**27**
0715 - 0730	8	4	1	13	6	15	**47**
0730 - 0745	6	1	2	25	8	13	**55**
0745 - 0800	6	1	2	22	9	14	**54**
0800 - 0815	7	2	2	24	9	10	**54**
0815 - 0830	9	0	3	25	9	9	**55**
0830 - 0845	5	2	3	28	8	7	**53**
0845 - 0900	8	3	1	22	11	10	**55**
Per End	**79**	**19**	**22**	**237**	**137**	**204**	**698**

Lights

	NORTH		WEST		SOUTH		
	Cormorant		*Curlew St*		*Cormorant*		
Peak Per	T	R	L	R	L	T	TOT
0500 - 0600	19	2	1	21	26	57	**126**
0515 - 0615	19	2	2	24	33	67	**147**
0530 - 0630	19	2	1	38	41	73	**174**
0545 - 0645	20	2	1	45	43	64	**175**
0600 - 0700	6	0	1	39	44	47	**137**
0615 - 0715	6	0	0	40	38	40	**124**
0630 - 0730	10	2	1	35	30	40	**118**
0645 - 0745	13	2	1	41	27	46	**130**
0700 - 0800	13	3	1	51	24	44	**136**
0715 - 0815	15	3	1	61	30	42	**152**
0730 - 0830	14	1	1	71	30	37	**154**
0745 - 0845	13	1	2	70	32	31	**149**
0800 - 0900	16	1	2	68	33	26	**146**
PEAK HR	**14**	**1**	**1**	**71**	**30**	**37**	**154**

Heavies

	NORTH		WEST		SOUTH		
	Cormorant		*Curlew St*		*Cormorant*		
Peak Per	T	R	L	R	L	T	TOT
0500 - 0600	0	2	2	0	1	6	**11**
0515 - 0615	1	2	1	1	1	7	**13**
0530 - 0630	2	2	1	2	1	7	**15**
0545 - 0645	4	1	1	3	2	6	**17**
0600 - 0700	4	2	4	6	3	5	**24**
0615 - 0715	3	2	4	10	3	7	**29**
0630 - 0730	6	3	3	13	3	8	**36**
0645 - 0745	5	4	5	18	4	8	**44**
0700 - 0800	8	3	4	21	2	9	**47**
0715 - 0815	12	5	6	23	2	10	**58**
0730 - 0830	14	3	8	25	5	9	**64**
0745 - 0845	14	4	8	29	3	9	**67**
0800 - 0900	13	6	7	31	4	10	**71**
PEAK HR	**14**	**3**	**8**	**25**	**5**	**9**	**64**

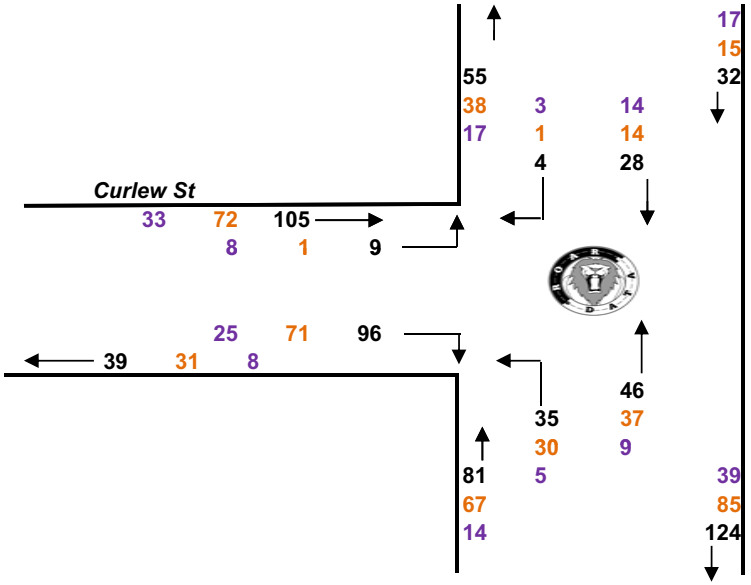
Combined

	NORTH		WEST		SOUTH		
	Cormorant		*Curlew St*		*Cormorant*		
Peak Per	T	R	L	R	L	T	TOT
0500 - 0600	19	4	3	21	27	63	**137**
0515 - 0615	20	4	3	25	34	74	**160**
0530 - 0630	21	4	2	40	42	80	**189**
0545 - 0645	24	3	2	48	45	70	**192**
0600 - 0700	10	2	5	45	47	52	**161**
0615 - 0715	9	2	4	50	41	47	**153**
0630 - 0730	16	5	4	48	33	48	**154**
0645 - 0745	18	6	6	59	31	54	**174**
0700 - 0800	21	6	5	72	26	53	**183**
0715 - 0815	27	8	7	84	32	52	**210**
0730 - 0830	28	4	9	96	35	46	**218**
0745 - 0845	27	5	10	99	35	40	**216**
0800 - 0900	29	7	9	99	37	36	**217**
PEAK HR	**28**	**4**	**9**	**96**	**35**	**46**	**218**

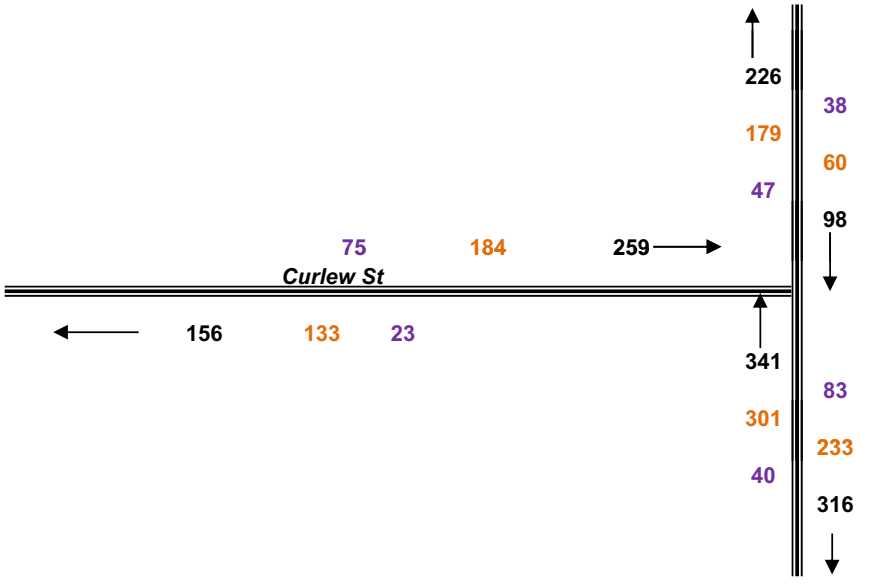
R.O.A.R. DATA
Reliable, Original & Authentic Results
Ph.88196847, Fax 88196849, Mob.0418-239019

Client : EMGA
Job no/Name : 3826 KOORAGANG ISLAND Traffic Counts
Day/Date : Tuesday 25th October 2011

AM PEAK HOUR
0730 - 0830



TOTAL VOLUMES FOR COUNT PERIOD



R.O.A.R. DATA

Reliable, Original & Authentic Results

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

Client : EMGA
Job no/Name : 3826 KOORAGANG ISLAND Traffic Counts
Day/Date : Tuesday 25th October 2011

Lights

	NORTH		WEST		SOUTH		
	Cormorant		*Curlew St*		*Cormorant*		
Time Per	T	R	L	R	L	T	TOT
1500 - 1515	7	2	2	28	3	6	**48**
1515 - 1530	10	0	0	27	8	4	**49**
1530 - 1545	14	0	0	37	7	7	**65**
1545 - 1600	7	0	0	23	6	2	**38**
1600 - 1615	13	2	0	40	2	2	**59**
1615 - 1630	7	0	0	51	3	1	**62**
1630 - 1645	8	1	0	71	24	2	**106**
1645 - 1700	15	8	2	42	13	2	**82**
1700 - 1715	10	1	0	30	4	2	**47**
1715 - 1730	14	3	0	32	3	2	**54**
1730 - 1745	5	2	0	26	7	10	**50**
1745 - 1800	15	5	0	28	2	8	**58**
1800 - 1815	5	0	0	22	5	5	**37**
1815 - 1830	3	0	0	22	4	2	**31**
1830 - 1845	0	0	0	13	3	0	**16**
1845 - 1900	0	0	0	6	0	2	**8**
Per End	**133**	**24**	**4**	**498**	**94**	**57**	**810**

Heavies

	NORTH		WEST		SOUTH		
	Cormorant		*Curlew St*		*Cormorant*		
Time Per	T	R	L	R	L	T	TOT
1500 - 1515	3	1	0	9	0	4	**17**
1515 - 1530	3	0	1	7	0	2	**13**
1530 - 1545	6	0	2	4	3	4	**19**
1545 - 1600	2	4	2	5	2	1	**16**
1600 - 1615	4	1	1	2	2	1	**11**
1615 - 1630	2	2	0	7	0	0	**11**
1630 - 1645	1	0	0	5	0	0	**6**
1645 - 1700	0	0	0	7	0	1	**8**
1700 - 1715	2	0	0	1	2	0	**5**
1715 - 1730	0	0	0	3	0	1	**4**
1730 - 1745	1	0	0	1	1	0	**3**
1745 - 1800	0	0	0	0	0	2	**2**
1800 - 1815	1	0	0	0	0	2	**3**
1815 - 1830	1	0	0	0	0	0	**1**
1830 - 1845	0	0	0	0	0	2	**2**
1845 - 1900	1	0	0	0	0	0	**1**
Per End	**27**	**8**	**6**	**51**	**10**	**20**	**122**

Combined

	NORTH		WEST		SOUTH		
	Cormorant		*Curlew St*		*Cormorant*		
Time Per	T	R	L	R	L	T	TOT
1500 - 1515	10	3	2	37	3	10	**65**
1515 - 1530	13	0	1	34	8	6	**62**
1530 - 1545	20	0	2	41	10	11	**84**
1545 - 1600	9	4	2	28	8	3	**54**
1600 - 1615	17	3	1	42	4	3	**70**
1615 - 1630	9	2	0	58	3	1	**73**
1630 - 1645	9	1	0	76	24	2	**112**
1645 - 1700	15	8	2	49	13	3	**90**
1700 - 1715	12	1	0	31	6	2	**52**
1715 - 1730	14	3	0	35	3	3	**58**
1730 - 1745	6	2	0	27	8	10	**53**
1745 - 1800	15	5	0	28	2	10	**60**
1800 - 1815	6	0	0	22	5	7	**40**
1815 - 1830	4	0	0	22	4	2	**32**
1830 - 1845	0	0	0	13	3	2	**18**
1845 - 1900	1	0	0	6	0	2	**9**
Per End	**160**	**32**	**10**	**549**	**104**	**77**	**932**

Lights

	NORTH		WEST		SOUTH		
	Cormorant		*Curlew St*		*Cormorant*		
Peak Per	T	R	L	R	L	T	TOT
1500 - 1600	38	2	2	115	24	19	**200**
1515 - 1615	44	2	0	127	23	15	**211**
1530 - 1630	41	2	0	151	18	12	**224**
1545 - 1645	35	3	0	185	35	7	**265**
1600 - 1700	43	11	2	204	42	7	**309**
1615 - 1715	40	10	2	194	44	7	**297**
1630 - 1730	47	13	2	175	44	8	**289**
1645 - 1745	44	14	2	130	27	16	**233**
1700 - 1800	44	11	0	116	16	22	**209**
1715 - 1815	39	10	0	108	17	25	**199**
1730 - 1830	28	7	0	98	18	25	**176**
1745 - 1845	23	5	0	85	14	15	**142**
1800 - 1900	8	0	0	63	12	9	**92**

Heavies

	NORTH		WEST		SOUTH		
	Cormorant		*Curlew St*		*Cormorant*		
Peak Per	T	R	L	R	L	T	TOT
1500 - 1600	14	5	5	25	5	11	**65**
1515 - 1615	15	5	6	18	7	8	**59**
1530 - 1630	14	7	5	18	7	6	**57**
1545 - 1645	9	7	3	19	4	2	**44**
1600 - 1700	7	3	1	21	2	2	**36**
1615 - 1715	5	2	0	20	2	1	**30**
1630 - 1730	3	0	0	16	2	2	**23**
1645 - 1745	3	0	0	12	3	2	**20**
1700 - 1800	3	0	0	5	3	3	**14**
1715 - 1815	2	0	0	4	1	5	**12**
1730 - 1830	3	0	0	1	1	4	**9**
1745 - 1845	2	0	0	0	0	6	**8**
1800 - 1900	3	0	0	0	0	4	**7**

Combined

	NORTH		WEST		SOUTH		
	Cormorant		*Curlew St*		*Cormorant*		
Peak Per	T	R	L	R	L	T	TOT
1500 - 1600	52	7	7	140	29	30	**265**
1515 - 1615	59	7	6	145	30	23	**270**
1530 - 1630	55	9	5	169	25	18	**281**
1545 - 1645	44	10	3	204	39	9	**309**
1600 - 1700	50	14	3	225	44	9	**345**
1615 - 1715	45	12	2	214	46	8	**327**
1630 - 1730	50	13	2	191	46	10	**312**
1645 - 1745	47	14	2	142	30	18	**253**
1700 - 1800	47	11	0	121	19	25	**223**
1715 - 1815	41	10	0	112	18	30	**211**
1730 - 1830	31	7	0	99	19	29	**185**
1745 - 1845	25	5	0	85	14	21	**150**
1800 - 1900	11	0	0	63	12	13	**99**

PEAK HR	43	11	2	204	42	7	309

PEAK HR	7	3	1	21	2	2	36

PEAK HR	50	14	3	225	44	9	345

R.O.A.R. DATA

Reliable, Original & Authentic Results

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

Client : EMGA

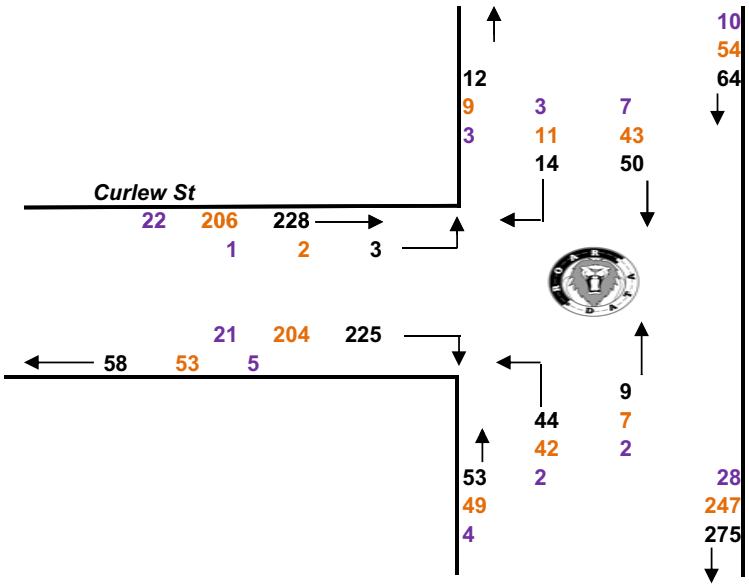
Job no/Name : 3826 KOORAGANG ISLAND Traffic Counts

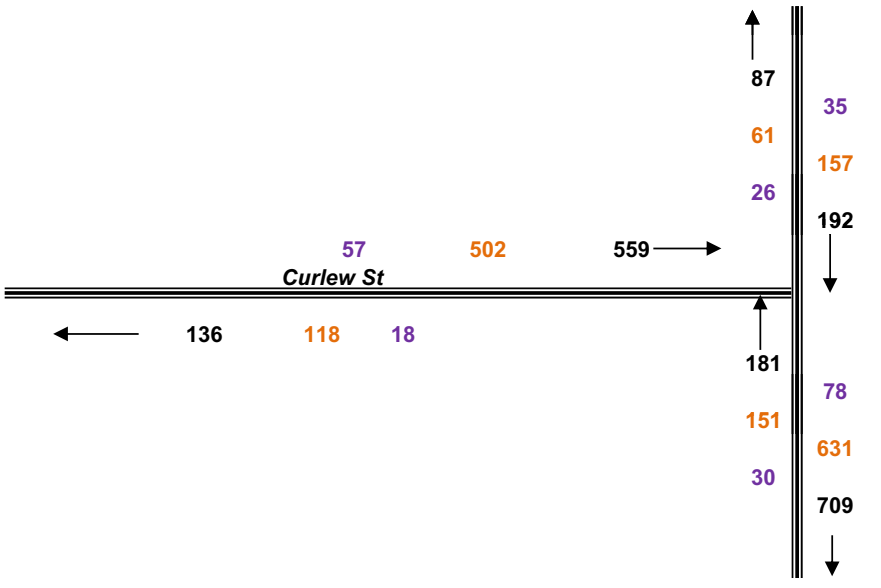
Day/Date : Tuesday 25th October 2011

PM PEAK HOUR

1600 - 1700

TOTAL VOLUMES FOR COUNT PERIOD





R.O.A.R. DATA

Reliable, Original & Authentic Results

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

Client : EMGA
Job no/Name : 3826 KOORAGANG ISLAND Traffic Counts
Day/Date : Tuesday 25th October 2011

Lights

	NORTH		EAST		SOUTH		
	Delta EMD		*Cormorant*		*Cormorant*		
Time Per	T	L	R	L	R	T	TOT
0500 - 0515	0	0	0	47	97	0	**144**
0515 - 0530	0	0	0	71	161	0	**232**
0530 - 0545	0	0	0	118	288	4	**410**
0545 - 0600	0	1	0	160	409	5	**575**
0600 - 0615	0	0	0	150	397	4	**551**
0615 - 0630	0	1	0	164	397	4	**566**
0630 - 0645	0	0	0	272	430	2	**704**
0645 - 0700	0	0	0	235	363	3	**601**
0700 - 0715	0	1	0	249	309	4	**563**
0715 - 0730	0	0	0	285	335	3	**623**
0730 - 0745	0	2	0	354	299	5	**660**
0745 - 0800	0	2	0	385	214	0	**601**
0800 - 0815	0	2	0	346	229	0	**577**
0815 - 0830	0	0	0	367	235	2	**604**
0830 - 0845	0	1	0	395	203	3	**602**
0845 - 0900	0	2	0	375	196	1	**574**
Per End	**0**	**12**	**0**	**3973**	**4562**	**40**	**8587**

Heavies

	NORTH		EAST		SOUTH		
	Delta EMD		*Cormorant*		*Cormorant*		
Time Per	T	L	R	L	R	T	TOT
0500 - 0515	0	0	0	5	7	0	**12**
0515 - 0530	0	0	0	7	12	0	**19**
0530 - 0545	0	0	0	12	11	0	**23**
0545 - 0600	0	0	0	5	13	0	**18**
0600 - 0615	0	0	0	5	10	0	**15**
0615 - 0630	0	0	0	8	23	0	**31**
0630 - 0645	0	0	0	13	20	0	**33**
0645 - 0700	0	0	0	12	29	0	**41**
0700 - 0715	0	0	0	13	14	2	**29**
0715 - 0730	0	1	0	16	22	3	**42**
0730 - 0745	0	3	0	16	22	0	**41**
0745 - 0800	0	0	0	29	19	0	**48**
0800 - 0815	0	0	0	34	25	0	**59**
0815 - 0830	0	0	0	22	14	2	**38**
0830 - 0845	0	2	0	18	17	3	**40**
0845 - 0900	0	3	0	26	22	5	**56**
Per End	**0**	**9**	**0**	**241**	**280**	**15**	**545**

Combined

	NORTH		EAST		SOUTH		
	Delta EMD		*Cormorant*		*Cormorant*		
Time Per	T	L	R	L	R	T	TOT
0500 - 0515	0	0	0	52	104	0	**156**
0515 - 0530	0	0	0	78	173	0	**251**
0530 - 0545	0	0	0	130	299	4	**433**
0545 - 0600	0	1	0	165	422	5	**593**
0600 - 0615	0	0	0	155	407	4	**566**
0615 - 0630	0	1	0	172	420	4	**597**
0630 - 0645	0	0	0	285	450	2	**737**
0645 - 0700	0	0	0	247	392	3	**642**
0700 - 0715	0	1	0	262	323	6	**592**
0715 - 0730	0	1	0	301	357	6	**665**
0730 - 0745	0	5	0	370	321	5	**701**
0745 - 0800	0	2	0	414	233	0	**649**
0800 - 0815	0	2	0	380	254	0	**636**
0815 - 0830	0	0	0	389	249	4	**642**
0830 - 0845	0	3	0	413	220	6	**642**
0845 - 0900	0	5	0	401	218	6	**630**
Per End	**0**	**21**	**0**	**4214**	**4842**	**55**	**9132**

Lights

	NORTH		EAST		SOUTH		
	Delta EMD		*Cormorant*		*Cormorant*		
Peak Per	T	L	R	L	R	T	TOT
0500 - 0600	0	1	0	396	955	9	**1361**
0515 - 0615	0	1	0	499	1255	13	**1768**
0530 - 0630	0	2	0	592	1491	17	**2102**
0545 - 0645	0	2	0	746	1633	15	**2396**
0600 - 0700	0	1	0	821	1587	13	**2422**
0615 - 0715	0	2	0	920	1499	13	**2434**
0630 - 0730	0	1	0	1041	1437	12	**2491**
0645 - 0745	0	3	0	1123	1306	15	**2447**
0700 - 0800	0	5	0	1273	1157	12	**2447**
0715 - 0815	0	6	0	1370	1077	8	**2461**
0730 - 0830	0	6	0	1452	977	7	**2442**
0745 - 0845	0	5	0	1493	881	5	**2384**
0800 - 0900	0	5	0	1483	863	6	**2357**
PEAK HR	**0**	**6**	**0**	**1370**	**1077**	**8**	**2461**

Heavies

	NORTH		EAST		SOUTH		
	Delta EMD		*Cormorant*		*Cormorant*		
Peak Per	T	L	R	L	R	T	TOT
0500 - 0600	0	0	0	29	43	0	**72**
0515 - 0615	0	0	0	29	46	0	**75**
0530 - 0630	0	0	0	30	57	0	**87**
0545 - 0645	0	0	0	31	66	0	**97**
0600 - 0700	0	0	0	38	82	0	**120**
0615 - 0715	0	0	0	46	86	2	**134**
0630 - 0730	0	1	0	54	85	5	**145**
0645 - 0745	0	4	0	57	87	5	**153**
0700 - 0800	0	4	0	74	77	5	**160**
0715 - 0815	0	4	0	95	88	3	**190**
0730 - 0830	0	3	0	101	80	2	**186**
0745 - 0845	0	2	0	103	75	5	**185**
0800 - 0900	0	5	0	100	78	10	**193**
PEAK HR	**0**	**4**	**0**	**95**	**88**	**3**	**190**

Combined

	NORTH		EAST		SOUTH		
	Delta EMD		*Cormorant*		*Cormorant*		
Peak Per	T	L	R	L	R	T	TOT
0500 - 0600	0	1	0	425	998	9	**1433**
0515 - 0615	0	1	0	528	1301	13	**1843**
0530 - 0630	0	2	0	622	1548	17	**2189**
0545 - 0645	0	2	0	777	1699	15	**2493**
0600 - 0700	0	1	0	859	1669	13	**2542**
0615 - 0715	0	2	0	966	1585	15	**2568**
0630 - 0730	0	2	0	1095	1522	17	**2636**
0645 - 0745	0	7	0	1180	1393	20	**2600**
0700 - 0800	0	9	0	1347	1234	17	**2607**
0715 - 0815	0	10	0	1465	1165	11	**2651**
0730 - 0830	0	9	0	1553	1057	9	**2628**
0745 - 0845	0	7	0	1596	956	10	**2569**
0800 - 0900	0	10	0	1583	941	16	**2550**
PEAK HR	**0**	**10**	**0**	**1465**	**1165**	**11**	**2651**

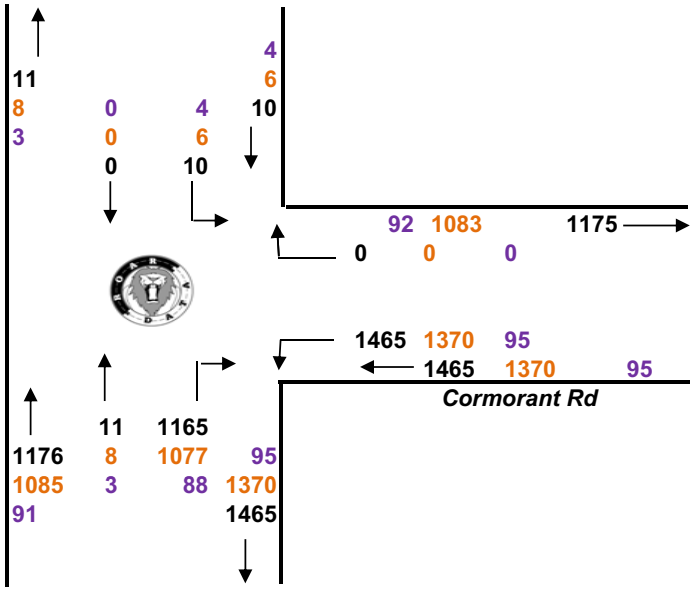
R.O.A.R. DATA
Reliable, Original & Authentic Results
Ph.9415-3971, Fax 9403-5338, Mob.0418-239019

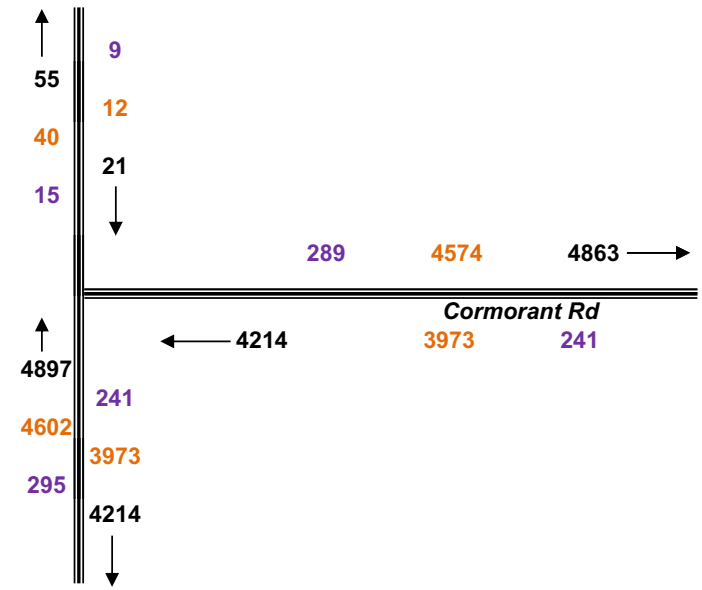
Client : EMGA
Job no/Name : 3826 KOORAGANG ISLAND Traffic Counts
Day/Date : Tuesday 25th October 2011

AM PEAK HOUR
0715 - 0815

TOTAL VOLUMES FOR COUNT PERIOD

N





R.O.A.R. DATA

Reliable, Original & Authentic Results

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

Client : EMGA
Job no/Name : 3826 KOORAGANG ISLAND Traffic Counts
Day/Date : Tuesday 25th October 2011

Lights

	NORTH		EAST		SOUTH		
	Delta EMD		*Cormorant*		*Cormorant*		
Time Per	T	L	R	L	R	T	TOT
1500 - 1515	0	1	0	289	276	2	**568**
1515 - 1530	0	2	0	306	291	1	**600**
1530 - 1545	0	2	0	378	358	1	**739**
1545 - 1600	0	4	0	307	320	0	**631**
1600 - 1615	0	5	0	406	404	0	**815**
1615 - 1630	0	6	0	383	491	1	**881**
1630 - 1645	0	3	0	481	421	0	**905**
1645 - 1700	0	2	0	344	409	0	**755**
1700 - 1715	0	0	0	360	368	0	**728**
1715 - 1730	0	0	0	339	399	0	**738**
1730 - 1745	0	0	0	328	356	0	**684**
1745 - 1800	0	0	0	289	371	0	**660**
1800 - 1815	0	0	0	265	251	0	**516**
1815 - 1830	0	0	0	209	227	0	**436**
1830 - 1845	0	0	0	195	215	0	**410**
1845 - 1900	0	0	0	117	101	0	**218**
Per End	**0**	**25**	**0**	**4996**	**5258**	**5**	**10284**

Heavies

	NORTH		EAST		SOUTH		
	Delta EMD		*Cormorant*		*Cormorant*		
Time Per	T	L	R	L	R	T	TOT
1500 - 1515	0	0	0	17	18	0	**35**
1515 - 1530	0	0	0	20	20	1	**41**
1530 - 1545	0	1	0	19	22	2	**44**
1545 - 1600	0	1	0	16	10	1	**28**
1600 - 1615	0	1	0	10	10	1	**22**
1615 - 1630	0	2	0	19	10	1	**32**
1630 - 1645	0	1	0	15	4	0	**20**
1645 - 1700	0	0	0	6	5	0	**11**
1700 - 1715	0	1	0	15	3	0	**19**
1715 - 1730	0	0	0	7	4	0	**11**
1730 - 1745	0	0	0	2	3	0	**5**
1745 - 1800	0	0	0	6	7	0	**13**
1800 - 1815	0	0	0	3	9	0	**12**
1815 - 1830	0	0	0	4	7	0	**11**
1830 - 1845	0	0	0	4	4	0	**8**
1845 - 1900	0	0	0	6	3	0	**9**
Per End	**0**	**7**	**0**	**169**	**139**	**6**	**321**

Combined

	NORTH		EAST		SOUTH		
	Delta EMD		*Cormorant*		*Cormorant*		
Time Per	T	L	R	L	R	T	TOT
1500 - 1515	0	1	0	306	294	2	**603**
1515 - 1530	0	2	0	326	311	2	**641**
1530 - 1545	0	3	0	397	380	3	**783**
1545 - 1600	0	5	0	323	330	1	**659**
1600 - 1615	0	6	0	416	414	1	**837**
1615 - 1630	0	8	0	402	501	2	**913**
1630 - 1645	0	4	0	496	425	0	**925**
1645 - 1700	0	2	0	350	414	0	**766**
1700 - 1715	0	1	0	375	371	0	**747**
1715 - 1730	0	0	0	346	403	0	**749**
1730 - 1745	0	0	0	330	359	0	**689**
1745 - 1800	0	0	0	295	378	0	**673**
1800 - 1815	0	0	0	268	260	0	**528**
1815 - 1830	0	0	0	213	234	0	**447**
1830 - 1845	0	0	0	199	219	0	**418**
1845 - 1900	0	0	0	123	104	0	**227**
Per End	**0**	**32**	**0**	**5165**	**5397**	**11**	**10605**

Lights

	NORTH		EAST		SOUTH		
	Delta EMD		*Cormorant*		*Cormorant*		
Peak Per	T	L	R	L	R	T	TOT
1500 - 1600	0	9	0	1280	1245	4	**2538**
1515 - 1615	0	13	0	1397	1373	2	**2785**
1530 - 1630	0	17	0	1474	1573	2	**3066**
1545 - 1645	0	18	0	1577	1636	1	**3232**
1600 - 1700	0	16	0	1614	1725	1	**3356**
1615 - 1715	0	11	0	1568	1689	1	**3269**
1630 - 1730	0	5	0	1524	1597	0	**3126**
1645 - 1745	0	2	0	1371	1532	0	**2905**
1700 - 1800	0	0	0	1316	1494	0	**2810**
1715 - 1815	0	0	0	1221	1377	0	**2598**
1730 - 1830	0	0	0	1091	1205	0	**2296**
1745 - 1845	0	0	0	958	1064	0	**2022**
1800 - 1900	0	0	0	786	794	0	**1580**
PEAK HR	**0**	**16**	**0**	**1614**	**1725**	**1**	**3356**

Heavies

	NORTH		EAST		SOUTH		
	Delta EMD		*Cormorant*		*Cormorant*		
Peak Per	T	L	R	L	R	T	TOT
1500 - 1600	0	2	0	72	70	4	**148**
1515 - 1615	0	3	0	65	62	5	**135**
1530 - 1630	0	5	0	64	52	5	**126**
1545 - 1645	0	5	0	60	34	3	**102**
1600 - 1700	0	4	0	50	29	2	**85**
1615 - 1715	0	4	0	55	22	1	**82**
1630 - 1730	0	2	0	43	16	0	**61**
1645 - 1745	0	1	0	30	15	0	**46**
1700 - 1800	0	1	0	30	17	0	**48**
1715 - 1815	0	0	0	18	23	0	**41**
1730 - 1830	0	0	0	15	26	0	**41**
1745 - 1845	0	0	0	17	27	0	**44**
1800 - 1900	0	0	0	17	23	0	**40**
PEAK HR	**0**	**4**	**0**	**50**	**29**	**2**	**85**

Combined

	NORTH		EAST		SOUTH		
	Delta EMD		*Cormorant*		*Cormorant*		
Peak Per	T	L	R	L	R	T	TOT
1500 - 1600	0	11	0	1352	1315	8	**2686**
1515 - 1615	0	16	0	1462	1435	7	**2920**
1530 - 1630	0	22	0	1538	1625	7	**3192**
1545 - 1645	0	23	0	1637	1670	4	**3334**
1600 - 1700	0	20	0	1664	1754	3	**3441**
1615 - 1715	0	15	0	1623	1711	2	**3351**
1630 - 1730	0	7	0	1567	1613	0	**3187**
1645 - 1745	0	3	0	1401	1547	0	**2951**
1700 - 1800	0	1	0	1346	1511	0	**2858**
1715 - 1815	0	0	0	1239	1400	0	**2639**
1730 - 1830	0	0	0	1106	1231	0	**2337**
1745 - 1845	0	0	0	975	1091	0	**2066**
1800 - 1900	0	0	0	803	817	0	**1620**
PEAK HR	**0**	**20**	**0**	**1664**	**1754**	**3**	**3441**

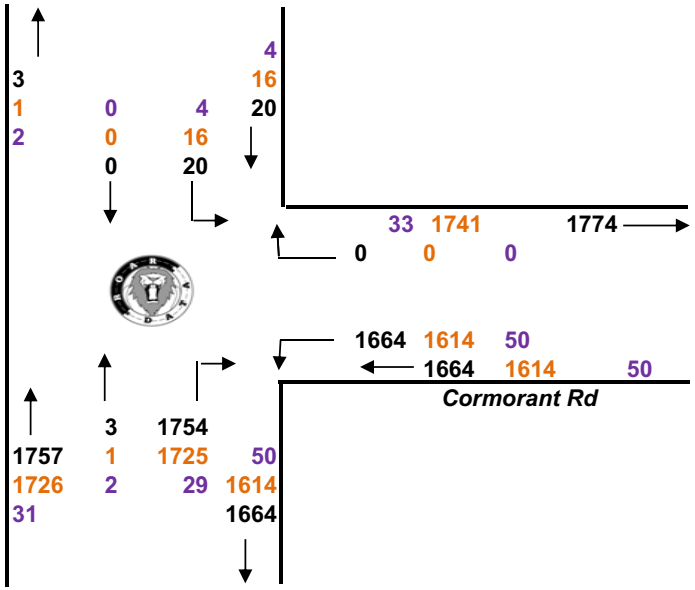
R.O.A.R. DATA
Reliable, Original & Authentic Results
Ph.9415-3971, Fax 9403-5338, Mob.0418-239019

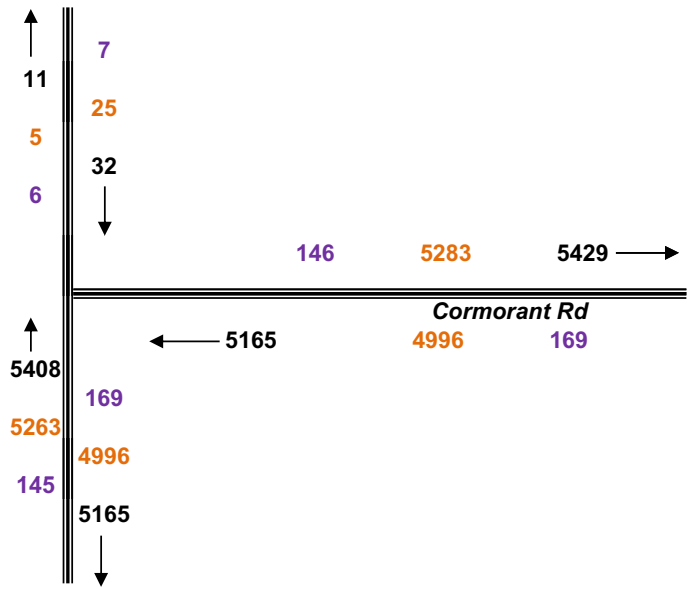
Client : EMGA
Job no/Name : 3826 KOORAGANG ISLAND Traffic Counts
Day/Date : Tuesday 25th October 2011

PM PEAK HOUR
1600 - 1700

TOTAL VOLUMES FOR COUNT PERIOD

N





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

Client : EMGA
Job no/Name : 3826 KOORAGANG ISLAND Traffic Counts
Day/Date : Tuesday 25th October 2011

Lights

	WEST		NORTH		EAST		
	Cormorant		*Egret St*		*Cormorant*		
Time Per	T	L	R	L	R	T	TOT
0500 - 0515	64	13	0	1	0	48	**126**
0515 - 0530	117	33	0	0	0	75	**225**
0530 - 0545	149	70	0	1	0	115	**335**
0545 - 0600	238	106	0	2	3	147	**496**
0600 - 0615	181	175	0	3	2	159	**520**
0615 - 0630	229	109	0	2	2	189	**531**
0630 - 0645	290	65	0	2	0	264	**621**
0645 - 0700	270	68	0	4	1	215	**558**
0700 - 0715	252	26	0	4	4	257	**543**
0715 - 0730	274	32	0	6	3	284	**599**
0730 - 0745	219	44	0	2	0	335	**600**
0745 - 0800	185	29	0	0	1	369	**584**
0800 - 0815	178	32	0	1	2	370	**583**
0815 - 0830	192	31	0	7	1	396	**627**
0830 - 0845	168	17	0	2	2	348	**537**
0845 - 0900	168	20	0	1	4	342	**535**
Per End	**3174**	**870**	**0**	**38**	**25**	**3913**	**8020**

Heavies

	WEST		NORTH		EAST		
	Cormorant		*Egret St*		*Cormorant*		
Time Per	T	L	R	L	R	T	TOT
0500 - 0515	2	1	0	0	0	4	**7**
0515 - 0530	8	3	0	2	0	7	**20**
0530 - 0545	9	6	0	1	0	9	**25**
0545 - 0600	10	3	0	0	0	6	**19**
0600 - 0615	9	1	0	1	0	4	**15**
0615 - 0630	18	2	0	1	0	10	**31**
0630 - 0645	11	6	0	3	0	12	**32**
0645 - 0700	17	10	0	5	2	14	**48**
0700 - 0715	8	5	0	1	0	14	**28**
0715 - 0730	17	5	0	5	1	15	**43**
0730 - 0745	17	5	0	3	1	21	**47**
0745 - 0800	9	7	0	7	3	31	**57**
0800 - 0815	15	8	0	3	0	30	**56**
0815 - 0830	12	8	0	3	1	23	**47**
0830 - 0845	12	2	0	4	1	21	**40**
0845 - 0900	13	4	0	4	1	17	**39**
Per End	**187**	**76**	**0**	**43**	**10**	**238**	**554**

Combined

	WEST		NORTH		EAST		
	Cormorant		*Egret St*		*Cormorant*		
Time Per	T	L	R	L	R	T	TOT
0500 - 0515	66	14	0	1	0	52	**133**
0515 - 0530	125	36	0	2	0	82	**245**
0530 - 0545	158	76	0	2	0	124	**360**
0545 - 0600	248	109	0	2	3	153	**515**
0600 - 0615	190	176	0	4	2	163	**535**
0615 - 0630	247	111	0	3	2	199	**562**
0630 - 0645	301	71	0	5	0	276	**653**
0645 - 0700	287	78	0	9	3	229	**606**
0700 - 0715	260	31	0	5	4	271	**571**
0715 - 0730	291	37	0	11	4	299	**642**
0730 - 0745	236	49	0	5	1	356	**647**
0745 - 0800	194	36	0	7	4	400	**641**
0800 - 0815	193	40	0	4	2	400	**639**
0815 - 0830	204	39	0	10	2	419	**674**
0830 - 0845	180	19	0	6	3	369	**577**
0845 - 0900	181	24	0	5	5	359	**574**
Per End	**3361**	**946**	**0**	**81**	**35**	**4151**	**8574**

Lights

	WEST		NORTH		EAST		
	Cormorant		*Egret St*		*Cormorant*		
Peak Per	T	L	R	L	R	T	TOT
0500 - 0600	568	222	0	4	3	385	**1182**
0515 - 0615	685	384	0	6	5	496	**1576**
0530 - 0630	797	460	0	8	7	610	**1882**
0545 - 0645	938	455	0	9	7	759	**2168**
0600 - 0700	970	417	0	11	5	827	**2230**
0615 - 0715	1041	268	0	12	7	925	**2253**
0630 - 0730	1086	191	0	16	8	1020	**2321**
0645 - 0745	1015	170	0	16	8	1091	**2300**
0700 - 0800	930	131	0	12	8	1245	**2326**
0715 - 0815	856	137	0	9	6	1358	**2366**
0730 - 0830	774	136	0	10	4	1470	**2394**
0745 - 0845	723	109	0	10	6	1483	**2331**
0800 - 0900	706	100	0	11	9	1456	**2282**
PEAK HR	**774**	**136**	**0**	**10**	**4**	**1470**	**2394**

Heavies

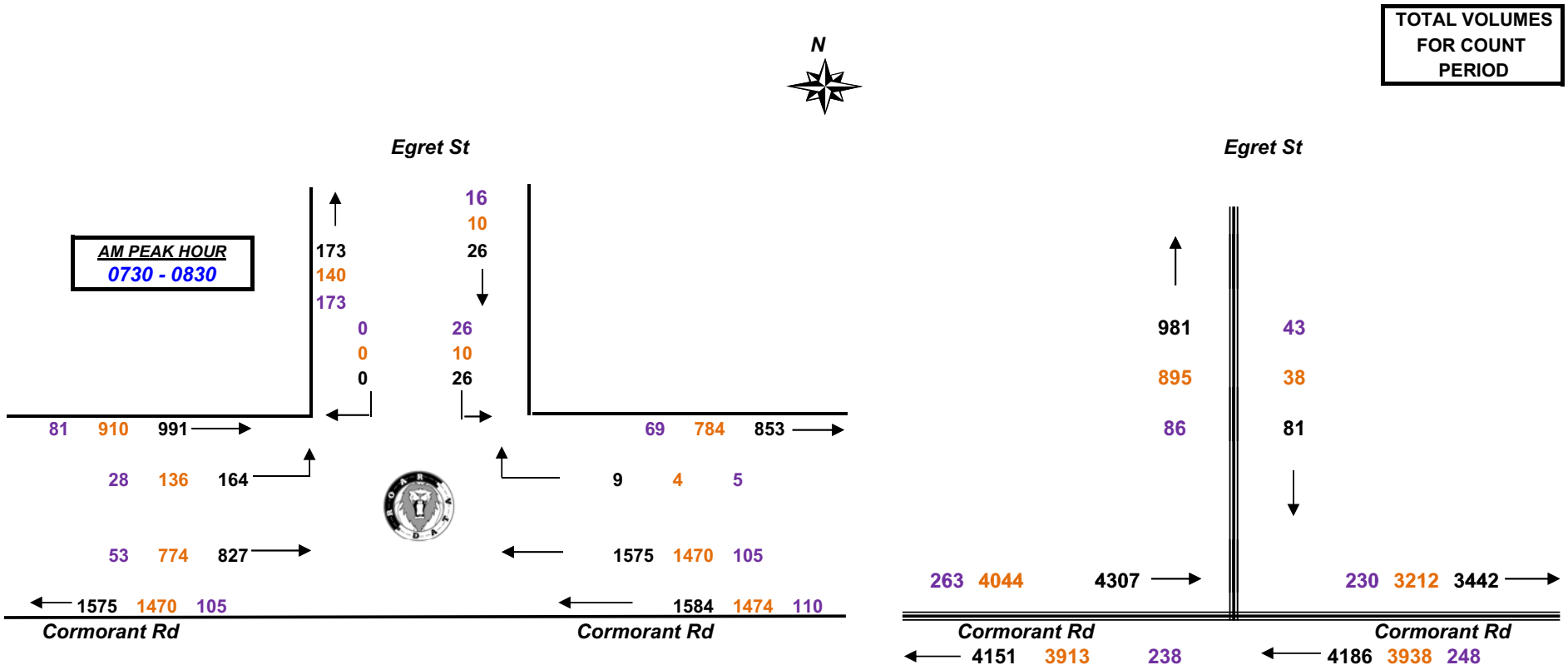
	WEST		NORTH		EAST		
	Cormorant		*Egret St*		*Cormorant*		
Peak Per	T	L	R	L	R	T	TOT
0500 - 0600	29	13	0	3	0	26	**71**
0515 - 0615	36	13	0	4	0	26	**79**
0530 - 0630	46	12	0	3	0	29	**90**
0545 - 0645	48	12	0	5	0	32	**97**
0600 - 0700	55	19	0	10	2	40	**126**
0615 - 0715	54	23	0	10	2	50	**139**
0630 - 0730	53	26	0	14	3	55	**151**
0645 - 0745	59	25	0	14	4	64	**166**
0700 - 0800	51	22	0	16	5	81	**175**
0715 - 0815	58	25	0	18	5	97	**203**
0730 - 0830	53	28	0	16	5	105	**207**
0745 - 0845	48	25	0	17	5	105	**200**
0800 - 0900	52	22	0	14	3	91	**182**
PEAK HR	**53**	**28**	**0**	**16**	**5**	**105**	**207**

Combined

	WEST		NORTH		EAST		
	Cormorant		*Egret St*		*Cormorant*		
Peak Per	T	L	R	L	R	T	TOT
0500 - 0600	597	235	0	7	3	411	**1253**
0515 - 0615	721	397	0	10	5	522	**1655**
0530 - 0630	843	472	0	11	7	639	**1972**
0545 - 0645	986	467	0	14	7	791	**2265**
0600 - 0700	1025	436	0	21	7	867	**2356**
0615 - 0715	1095	291	0	22	9	975	**2392**
0630 - 0730	1139	217	0	30	11	1075	**2472**
0645 - 0745	1074	195	0	30	12	1155	**2466**
0700 - 0800	981	153	0	28	13	1326	**2501**
0715 - 0815	914	162	0	27	11	1455	**2569**
0730 - 0830	827	164	0	26	9	1575	**2601**
0745 - 0845	771	134	0	27	11	1588	**2531**
0800 - 0900	758	122	0	25	12	1547	**2464**
PEAK HR	**827**	**164**	**0**	**26**	**9**	**1575**	**2601**

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

Client : EMGA
Job no/Name : 3826 KOORAGANG ISLAND Traffic Counts
Day/Date : Tuesday 25th October 2011



R.O.A.R. DATA

Reliable, Original & Authentic Results

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

Client : EMGA
Job no/Name : 3826 KOORAGANG ISLAND Traffic Counts
Day/Date : Tuesday 25th October 2011

Lights

	WEST		NORTH		EAST		
	Cormorant		*Egret St*		*Cormorant*		
Time Per	T	L	R	L	R	T	TOT
1500 - 1515		15	2	18	0		35
1515 - 1530		12	0	19	1		32
1530 - 1545		4	0	18	0		22
1545 - 1600		6	0	15	0		21
1600 - 1615		11	2	45	0		58
1615 - 1630		3	0	20	0		23
1630 - 1645		8	0	52	0		60
1645 - 1700		6	0	35	0		41
1700 - 1715		8	0	27	0		35
1715 - 1730		9	1	18	0		28
1730 - 1745		7	0	5	0		12
1745 - 1800		8	0	10	0		18
1800 - 1815		5	0	18	0		23
1815 - 1830		4	0	10	2		16
1830 - 1845		2	0	6	0		8
1845 - 1900		2	1	8	0		11
Per End	**0**	**110**	**6**	**324**	**3**	**0**	**443**

Heavies

	WEST		NORTH		EAST		
	Cormorant		*Egret St*		*Cormorant*		
Time Per	T	L	R	L	R	T	TOT
1500 - 1515		1	0	1	0		2
1515 - 1530		12	0	5	0		17
1530 - 1545		3	0	5	0		8
1545 - 1600		4	0	1	0		5
1600 - 1615		4	0	1	0		5
1615 - 1630		4	0	4	0		8
1630 - 1645		1	0	1	0		2
1645 - 1700		1	0	0	0		1
1700 - 1715		1	0	1	0		2
1715 - 1730		2	0	1	0		3
1730 - 1745		1	0	1	0		2
1745 - 1800		1	0	0	0		1
1800 - 1815		1	0	2	0		3
1815 - 1830		0	0	0	0		0
1830 - 1845		3	0	0	0		3
1845 - 1900		1	0	1	0		2
Per End	**0**	**40**	**0**	**24**	**0**	**0**	**64**

Combined

	WEST		NORTH		EAST		
	Cormorant		*Egret St*		*Cormorant*		
Time Per	T	L	R	L	R	T	TOT
1500 - 1515	0	16	2	19	0	0	37
1515 - 1530	0	24	0	24	1	0	49
1530 - 1545	0	7	0	23	0	0	30
1545 - 1600	0	10	0	16	0	0	26
1600 - 1615	0	15	2	46	0	0	63
1615 - 1630	0	7	0	24	0	0	31
1630 - 1645	0	9	0	53	0	0	62
1645 - 1700	0	7	0	35	0	0	42
1700 - 1715	0	9	0	28	0	0	37
1715 - 1730	0	11	1	19	0	0	31
1730 - 1745	0	8	0	6	0	0	14
1745 - 1800	0	9	0	10	0	0	19
1800 - 1815	0	6	0	20	0	0	26
1815 - 1830	0	4	0	10	2	0	16
1830 - 1845	0	5	0	6	0	0	11
1845 - 1900	0	3	1	9	0	0	13
Per End	**0**	**150**	**6**	**348**	**3**	**0**	**507**

Lights

	WEST		NORTH		EAST		
	Cormorant		*Egret St*		*Cormorant*		
Peak Per	T	L	R	L	R	T	TOT
1500 - 1600	0	37	2	70	1	0	110
1515 - 1615	0	33	2	97	1	0	133
1530 - 1630	0	24	2	98	0	0	124
1545 - 1645	0	28	2	132	0	0	162
1600 - 1700	0	28	2	152	0	0	182
1615 - 1715	0	25	0	134	0	0	159
1630 - 1730	0	31	1	132	0	0	164
1645 - 1745	0	30	1	85	0	0	116
1700 - 1800	0	32	1	60	0	0	93
1715 - 1815	0	29	1	51	0	0	81
1730 - 1830	0	24	0	43	2	0	69
1745 - 1845	0	19	0	44	2	0	65
1800 - 1900	0	13	1	42	2	0	58
PEAK HR	**0**	**28**	**2**	**152**	**0**	**0**	**182**

Heavies

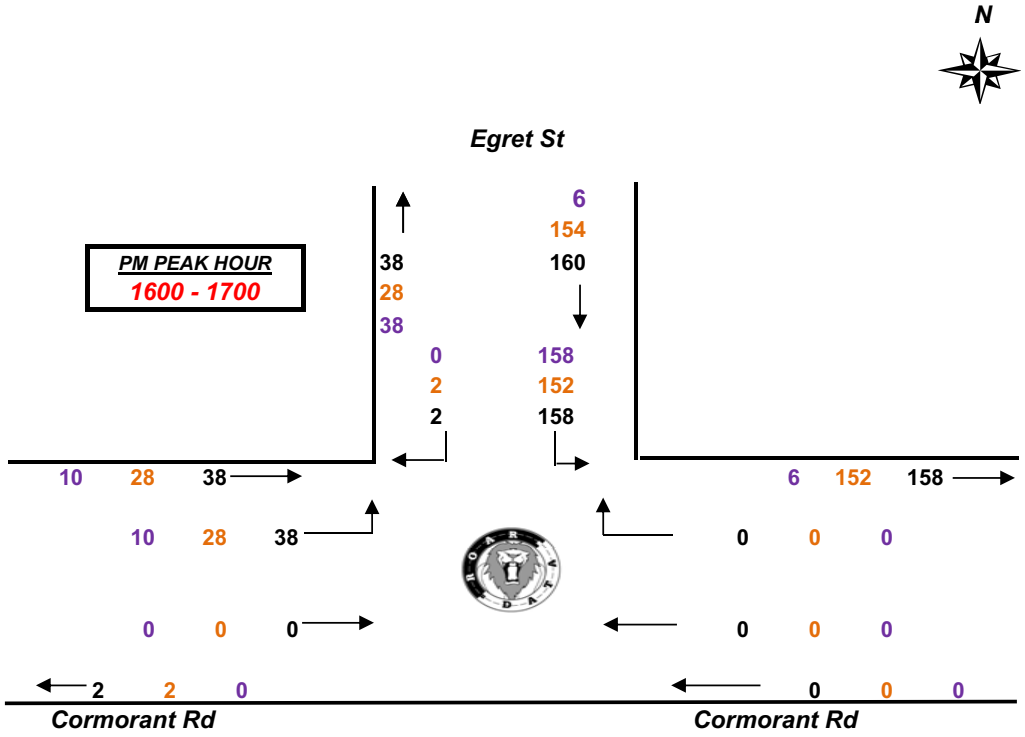
	WEST		NORTH		EAST		
	Cormorant		*Egret St*		*Cormorant*		
Peak Per	T	L	R	L	R	T	TOT
1500 - 1600	0	20	0	12	0	0	32
1515 - 1615	0	23	0	12	0	0	35
1530 - 1630	0	15	0	11	0	0	26
1545 - 1645	0	13	0	7	0	0	20
1600 - 1700	0	10	0	6	0	0	16
1615 - 1715	0	7	0	6	0	0	13
1630 - 1730	0	5	0	3	0	0	8
1645 - 1745	0	5	0	3	0	0	8
1700 - 1800	0	5	0	3	0	0	8
1715 - 1815	0	5	0	4	0	0	9
1730 - 1830	0	3	0	3	0	0	6
1745 - 1845	0	5	0	2	0	0	7
1800 - 1900	0	5	0	3	0	0	8
PEAK HR	**0**	**10**	**0**	**6**	**0**	**0**	**16**

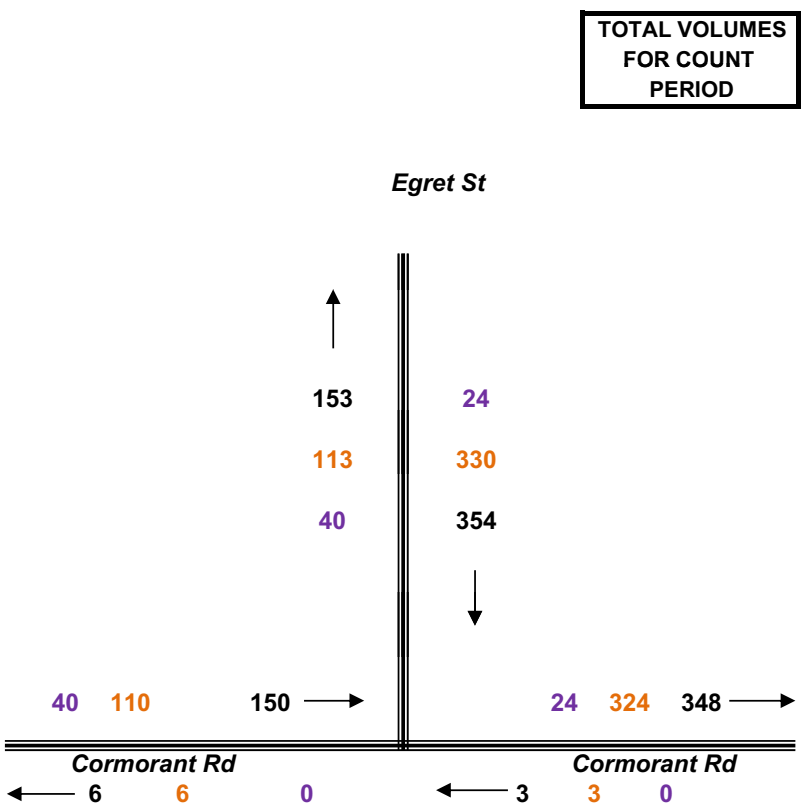
Combined

	WEST		NORTH		EAST		
	Cormorant		*Egret St*		*Cormorant*		
Peak Per	T	L	R	L	R	T	TOT
1500 - 1600	0	57	2	82	1	0	142
1515 - 1615	0	56	2	109	1	0	168
1530 - 1630	0	39	2	109	0	0	150
1545 - 1645	0	41	2	139	0	0	182
1600 - 1700	0	38	2	158	0	0	198
1615 - 1715	0	32	0	140	0	0	172
1630 - 1730	0	36	1	135	0	0	172
1645 - 1745	0	35	1	88	0	0	124
1700 - 1800	0	37	1	63	0	0	101
1715 - 1815	0	34	1	55	0	0	90
1730 - 1830	0	27	0	46	2	0	75
1745 - 1845	0	24	0	46	2	0	72
1800 - 1900	0	18	1	45	2	0	66
PEAK HR	**0**	**38**	**2**	**158**	**0**	**0**	**198**

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

Client	: EMGA
Job no/Name	: 3826 KOORAGANG ISLAND Traffic Counts
Day/Date	: Tuesday 25th October 2011





R.O.A.R. DATA

Reliable, Original & Authentic Results

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

Client : EMGA
Job no/Name : 3826 KOORAGANG ISLAND Traffic Counts
Day/Date : Tuesday 25th October 2011

Lights

	WEST		SOUTH		EAST		
	Cormorant		*Wharf*		*Cormorant*		
Time Per	T	R	L	R	L	T	TOT
0500 - 0515		0	0	1	0		1
0515 - 0530		2	1	0	3		6
0530 - 0545		6	5	0	8		19
0545 - 0600		10	15	0	2		27
0600 - 0615		37	1	0	9		47
0615 - 0630		31	3	0	3		37
0630 - 0645		11	1	0	3		15
0645 - 0700		8	2	0	6		16
0700 - 0715		9	4	0	2		15
0715 - 0730		10	6	0	6		22
0730 - 0745		12	19	0	3		34
0745 - 0800		7	9	0	3		19
0800 - 0815		7	5	0	0		12
0815 - 0830		8	7	0	3		18
0830 - 0845		4	1	0	7		12
0845 - 0900		10	1	0	3		14
Per End	**0**	**172**	**80**	**1**	**61**	**0**	**314**

Heavies

	WEST		SOUTH		EAST		
	Cormorant		*Wharf*		*Cormorant*		
Time Per	T	R	L	R	L	T	TOT
0500 - 0515		0	0	1	0		1
0515 - 0530		2	2	0	0		4
0530 - 0545		0	0	0	0		0
0545 - 0600		0	0	0	0		0
0600 - 0615		1	0	0	0		1
0615 - 0630		0	0	0	0		0
0630 - 0645		1	2	0	0		3
0645 - 0700		2	0	0	0		2
0700 - 0715		1	0	0	1		2
0715 - 0730		0	0	0	0		0
0730 - 0745		2	0	0	1		3
0745 - 0800		1	2	0	0		3
0800 - 0815		3	2	0	0		5
0815 - 0830		3	1	0	0		4
0830 - 0845		3	1	0	0		4
0845 - 0900		3	4	0	0		7
Per End	**0**	**22**	**14**	**1**	**2**	**0**	**39**

Combined

	WEST		SOUTH		EAST		
	Cormorant		*Wharf*		*Cormorant*		
Time Per	T	R	L	R	L	T	TOT
0500 - 0515	0	0	0	2	0	0	2
0515 - 0530	0	4	3	0	3	0	10
0530 - 0545	0	6	5	0	8	0	19
0545 - 0600	0	10	15	0	2	0	27
0600 - 0615	0	38	1	0	9	0	48
0615 - 0630	0	31	3	0	3	0	37
0630 - 0645	0	12	3	0	3	0	18
0645 - 0700	0	10	2	0	6	0	18
0700 - 0715	0	10	4	0	3	0	17
0715 - 0730	0	10	6	0	6	0	22
0730 - 0745	0	14	19	0	4	0	37
0745 - 0800	0	8	11	0	3	0	22
0800 - 0815	0	10	7	0	0	0	17
0815 - 0830	0	11	8	0	3	0	22
0830 - 0845	0	7	2	0	7	0	16
0845 - 0900	0	13	5	0	3	0	21
Per End	**0**	**194**	**94**	**2**	**63**	**0**	**353**

Lights

	WEST		SOUTH		EAST		
	Cormorant		*Wharf*		*Cormorant*		
Peak Per	T	R	L	R	L	T	TOT
0500 - 0600	0	18	21	1	13	0	53
0515 - 0615	0	55	22	0	22	0	99
0530 - 0630	0	84	24	0	22	0	130
0545 - 0645	0	89	20	0	17	0	126
0600 - 0700	0	87	7	0	21	0	115
0615 - 0715	0	59	10	0	14	0	83
0630 - 0730	0	38	13	0	17	0	68
0645 - 0745	0	39	31	0	17	0	87
0700 - 0800	0	38	38	0	14	0	90
0715 - 0815	0	36	39	0	12	0	87
0730 - 0830	0	34	40	0	9	0	83
0745 - 0845	0	26	22	0	13	0	61
0800 - 0900	0	29	14	0	13	0	56
PEAK HR	**0**	**84**	**24**	**0**	**22**	**0**	**130**

Heavies

	WEST		SOUTH		EAST		
	Cormorant		*Wharf*		*Cormorant*		
Peak Per	T	R	L	R	L	T	TOT
0500 - 0600	0	2	2	1	0	0	5
0515 - 0615	0	3	2	0	0	0	5
0530 - 0630	0	1	0	0	0	0	1
0545 - 0645	0	2	2	0	0	0	4
0600 - 0700	0	4	2	0	0	0	6
0615 - 0715	0	4	2	0	1	0	7
0630 - 0730	0	4	2	0	1	0	7
0645 - 0745	0	5	0	0	2	0	7
0700 - 0800	0	4	2	0	2	0	8
0715 - 0815	0	6	4	0	1	0	11
0730 - 0830	0	9	5	0	1	0	15
0745 - 0845	0	10	6	0	0	0	16
0800 - 0900	0	12	8	0	0	0	20
PEAK HR	**0**	**1**	**0**	**0**	**0**	**0**	**1**

Combined

	WEST		SOUTH		EAST		
	Cormorant		*Wharf*		*Cormorant*		
Peak Per	T	R	L	R	L	T	TOT
0500 - 0600	0	20	23	2	13	0	58
0515 - 0615	0	58	24	0	22	0	104
0530 - 0630	0	85	24	0	22	0	131
0545 - 0645	0	91	22	0	17	0	130
0600 - 0700	0	91	9	0	21	0	121
0615 - 0715	0	63	12	0	15	0	90
0630 - 0730	0	42	15	0	18	0	75
0645 - 0745	0	44	31	0	19	0	94
0700 - 0800	0	42	40	0	16	0	98
0715 - 0815	0	42	43	0	13	0	98
0730 - 0830	0	43	45	0	10	0	98
0745 - 0845	0	36	28	0	13	0	77
0800 - 0900	0	41	22	0	13	0	76
PEAK HR	**0**	**85**	**24**	**0**	**22**	**0**	**131**

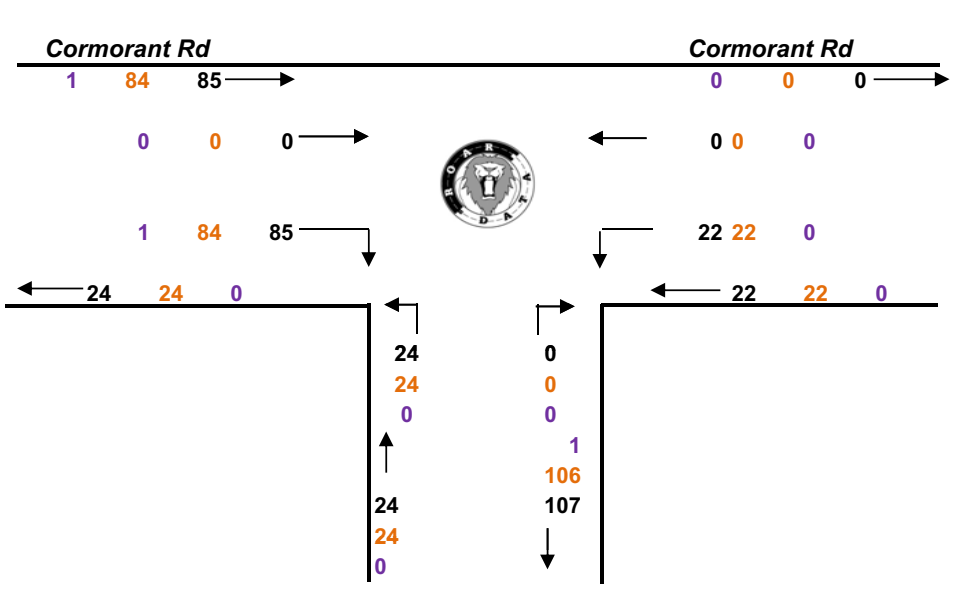
R.O.A.R. DATA
Reliable, Original & Authentic Results
Ph.88196847, Fax 88196849, Mob.0418-239019

Client	: EMGA
Job no/Name	: 3826 KOORAGANG ISLAND Traffic Counts
Day/Date	: Tuesday 25th October 2011

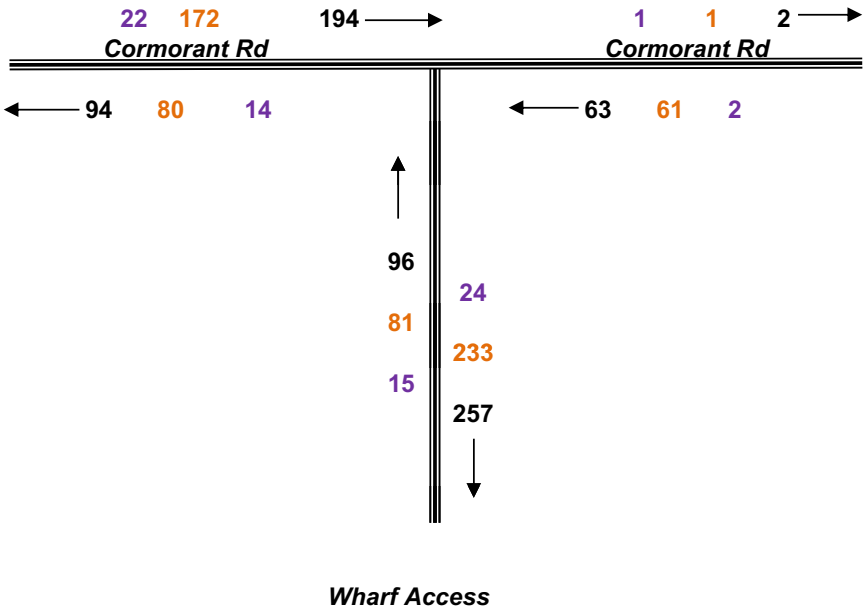
AM PEAK HOUR
0530 - 0630

N

TOTAL VOLUMES FOR COUNT PERIOD



Wharf Access



Wharf Access

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

Client : EMGA
Job no/Name : 3826 KOORAGANG ISLAND Traffic Counts
Day/Date : Tuesday 25th October 2011

Lights

	WEST		SOUTH		EAST		
	Cormorant		*Wharf*		*Cormorant*		
Time Per	T	R	L	R	L	T	TOT
1500 - 1515		3	12	0	1		**16**
1515 - 1530		2	7	0	3		**12**
1530 - 1545		8	14	0	2		**24**
1545 - 1600		12	33	0	1		**46**
1600 - 1615		15	29	0	1		**45**
1615 - 1630		25	53	0	0		**78**
1630 - 1645		18	15	0	1		**34**
1645 - 1700		11	10	0	0		**21**
1700 - 1715		18	22	0	0		**40**
1715 - 1730		5	29	0	0		**34**
1730 - 1745		10	8	0	0		**18**
1745 - 1800		9	9	0	0		**18**
1800 - 1815		6	5	0	0		**11**
1815 - 1830		11	5	0	0		**16**
1830 - 1845		9	4	0	0		**13**
1845 - 1900		9	3	0	0		**12**
Per End	**0**	**171**	**258**	**0**	**9**	**0**	**438**

Heavies

	WEST		SOUTH		EAST		
	Cormorant		*Wharf*		*Cormorant*		
Time Per	T	R	L	R	L	T	TOT
1500 - 1515		2	2	0	2		**6**
1515 - 1530		2	3	0	1		**6**
1530 - 1545		2	3	0	0		**5**
1545 - 1600		3	3	0	1		**7**
1600 - 1615		1	3	0	1		**5**
1615 - 1630		1	2	0	1		**4**
1630 - 1645		1	0	0	0		**1**
1645 - 1700		0	0	0	0		**0**
1700 - 1715		0	0	0	2		**2**
1715 - 1730		0	0	0	0		**0**
1730 - 1745		0	0	0	0		**0**
1745 - 1800		0	0	0	0		**0**
1800 - 1815		0	0	0	0		**0**
1815 - 1830		0	0	0	0		**0**
1830 - 1845		0	1	0	0		**1**
1845 - 1900		0	0	0	0		**0**
Per End	**0**	**12**	**17**	**0**	**8**	**0**	**37**

Combined

	WEST		SOUTH		EAST		
	Cormorant		*Wharf*		*Cormorant*		
Time Per	T	R	L	R	L	T	TOT
1500 - 1515	0	5	14	0	3	0	**22**
1515 - 1530	0	4	10	0	4	0	**18**
1530 - 1545	0	10	17	0	2	0	**29**
1545 - 1600	0	15	36	0	2	0	**53**
1600 - 1615	0	16	32	0	2	0	**50**
1615 - 1630	0	26	55	0	1	0	**82**
1630 - 1645	0	19	15	0	1	0	**35**
1645 - 1700	0	11	10	0	0	0	**21**
1700 - 1715	0	18	22	0	2	0	**42**
1715 - 1730	0	5	29	0	0	0	**34**
1730 - 1745	0	10	8	0	0	0	**18**
1745 - 1800	0	9	9	0	0	0	**18**
1800 - 1815	0	6	5	0	0	0	**11**
1815 - 1830	0	11	5	0	0	0	**16**
1830 - 1845	0	9	5	0	0	0	**14**
1845 - 1900	0	9	3	0	0	0	**12**
Per End	**0**	**183**	**275**	**0**	**17**	**0**	**475**

Lights

	WEST		SOUTH		EAST		
	Cormorant		*Wharf*		*Cormorant*		
Peak Per	T	R	L	R	L	T	TOT
1500 - 1600	0	25	66	0	7	0	**98**
1515 - 1615	0	37	83	0	7	0	**127**
1530 - 1630	0	60	129	0	4	0	**193**
1545 - 1645	0	70	130	0	3	0	**203**
1600 - 1700	0	69	107	0	2	0	**178**
1615 - 1715	0	72	100	0	1	0	**173**
1630 - 1730	0	52	76	0	1	0	**129**
1645 - 1745	0	44	69	0	0	0	**113**
1700 - 1800	0	42	68	0	0	0	**110**
1715 - 1815	0	30	51	0	0	0	**81**
1730 - 1830	0	36	27	0	0	0	**63**
1745 - 1845	0	35	23	0	0	0	**58**
1800 - 1900	0	35	17	0	0	0	**52**

Heavies

	WEST		SOUTH		EAST		
	Cormorant		*Wharf*		*Cormorant*		
Peak Per	T	R	L	R	L	T	TOT
1500 - 1600	0	9	11	0	4	0	**24**
1515 - 1615	0	8	12	0	3	0	**23**
1530 - 1630	0	7	11	0	3	0	**21**
1545 - 1645	0	6	8	0	3	0	**17**
1600 - 1700	0	3	5	0	2	0	**10**
1615 - 1715	0	2	2	0	3	0	**7**
1630 - 1730	0	1	0	0	2	0	**3**
1645 - 1745	0	0	0	0	2	0	**2**
1700 - 1800	0	0	0	0	2	0	**2**
1715 - 1815	0	0	0	0	0	0	**0**
1730 - 1830	0	0	0	0	0	0	**0**
1745 - 1845	0	0	1	0	0	0	**1**
1800 - 1900	0	0	1	0	0	0	**1**

Combined

	WEST		SOUTH		EAST		
	Cormorant		*Wharf*		*Cormorant*		
Peak Per	T	R	L	R	L	T	TOT
1500 - 1600	0	34	77	0	11	0	**122**
1515 - 1615	0	45	95	0	10	0	**150**
1530 - 1630	0	67	140	0	7	0	**214**
1545 - 1645	0	76	138	0	6	0	**220**
1600 - 1700	0	72	112	0	4	0	**188**
1615 - 1715	0	74	102	0	4	0	**180**
1630 - 1730	0	53	76	0	3	0	**132**
1645 - 1745	0	44	69	0	2	0	**115**
1700 - 1800	0	42	68	0	2	0	**112**
1715 - 1815	0	30	51	0	0	0	**81**
1730 - 1830	0	36	27	0	0	0	**63**
1745 - 1845	0	35	24	0	0	0	**59**
1800 - 1900	0	35	18	0	0	0	**53**

PEAK HR	0	70	130	0	3	0	203

PEAK HR	0	6	8	0	3	0	17

PEAK HR	0	76	138	0	6	0	220

R.O.A.R. DATA

Reliable, Original & Authentic Results

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

Client : EMGA

Job no/Name : 3826 KOORAGANG ISLAND Traffic Counts

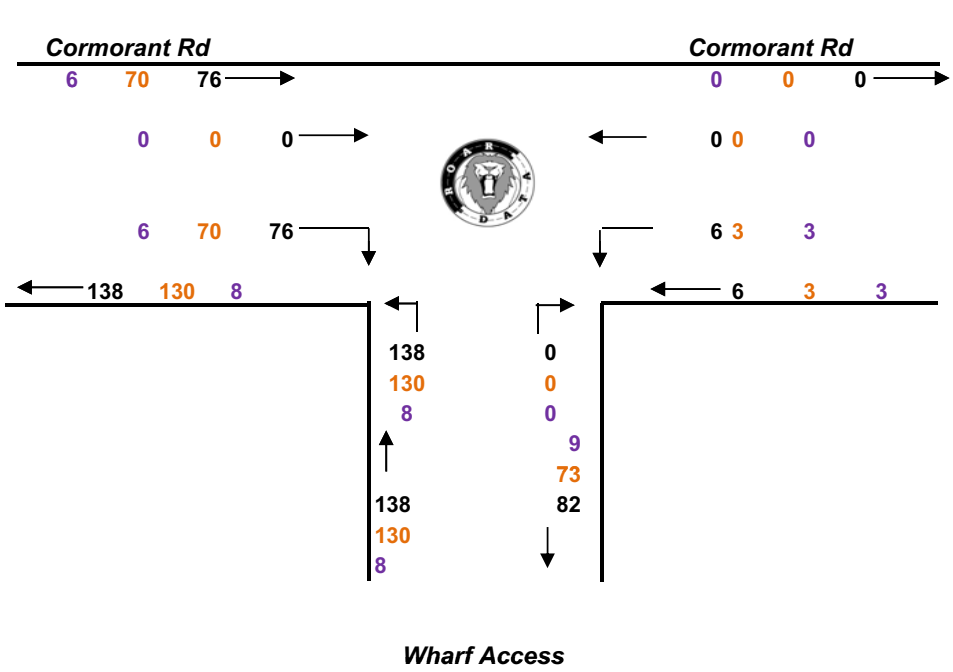
Day/Date : Tuesday 25th October 2011

PM PEAK HOUR

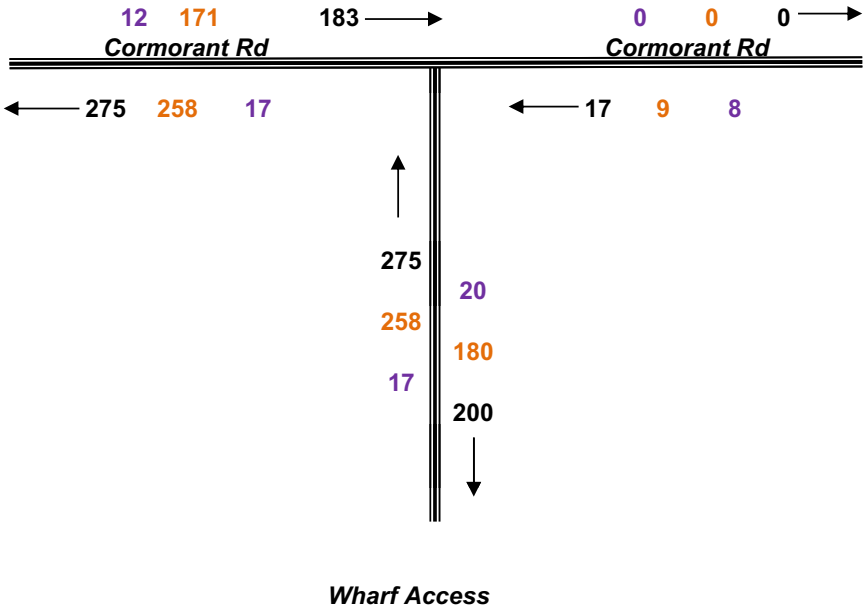
1545 - 1645

N

TOTAL VOLUMES FOR COUNT PERIOD



Wharf Access



Wharf Access

R.O.A.R. DATA

Reliable, Original & Authentic Results

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

Client : EMGA
Job no/Name : 3826 KOORAGANG ISLAND Traffic Counts
Day/Date : Tuesday 25th October 2011

Lights

	WEST		NORTH		EAST		
	Cormorant		*Pacific*		*Cormorant*		
Time Per	T	L	R	L	R	T	TOT
0500 - 0515	89	1	1	1	0	53	**145**
0515 - 0530	159	6	1	1	0	63	**230**
0530 - 0545	277	10	2	2	0	119	**410**
0545 - 0600	391	12	0	1	0	159	**563**
0600 - 0615	391	30	1	3	0	152	**577**
0615 - 0630	381	22	0	3	1	192	**599**
0630 - 0645	407	9	0	4	0	282	**702**
0645 - 0700	389	26	0	2	0	216	**633**
0700 - 0715	299	13	0	9	0	276	**597**
0715 - 0730	339	8	1	12	2	298	**660**
0730 - 0745	271	10	0	15	7	375	**678**
0745 - 0800	217	9	1	3	2	390	**622**
0800 - 0815	211	6	1	6	2	366	**592**
0815 - 0830	226	7	0	7	2	378	**620**
0830 - 0845	184	6	0	7	4	367	**568**
0845 - 0900	191	12	0	10	1	359	**573**
Per End	**4422**	**187**	**8**	**86**	**21**	**4045**	**8769**

Heavies

	WEST		NORTH		EAST		
	Cormorant		*Pacific*		*Cormorant*		
Time Per	T	L	R	L	R	T	TOT
0500 - 0515	6	1	0	0	0	6	**13**
0515 - 0530	9	0	0	2	0	10	**21**
0530 - 0545	11	0	0	0	0	6	**17**
0545 - 0600	12	0	0	1	0	6	**19**
0600 - 0615	11	0	0	0	0	3	**14**
0615 - 0630	24	0	0	1	0	11	**36**
0630 - 0645	17	1	0	1	0	12	**31**
0645 - 0700	29	2	0	0	0	14	**45**
0700 - 0715	14	1	0	0	0	10	**25**
0715 - 0730	21	0	0	0	0	14	**35**
0730 - 0745	20	2	0	2	0	19	**43**
0745 - 0800	16	3	0	4	2	28	**53**
0800 - 0815	27	1	0	1	1	33	**63**
0815 - 0830	15	0	0	3	1	24	**43**
0830 - 0845	17	1	0	0	0	20	**38**
0845 - 0900	24	1	0	2	0	24	**51**
Per End	**273**	**13**	**0**	**17**	**4**	**240**	**547**

Combined

	WEST		NORTH		EAST		
	Cormorant		*Pacific*		*Cormorant*		
Time Per	T	L	R	L	R	T	TOT
0500 - 0515	95	2	1	1	0	59	**158**
0515 - 0530	168	6	1	3	0	73	**251**
0530 - 0545	288	10	2	2	0	125	**427**
0545 - 0600	403	12	0	2	0	165	**582**
0600 - 0615	402	30	1	3	0	155	**591**
0615 - 0630	405	22	0	4	1	203	**635**
0630 - 0645	424	10	0	5	0	294	**733**
0645 - 0700	418	28	0	2	0	230	**678**
0700 - 0715	313	14	0	9	0	286	**622**
0715 - 0730	360	8	1	12	2	312	**695**
0730 - 0745	291	12	0	17	7	394	**721**
0745 - 0800	233	12	1	7	4	418	**675**
0800 - 0815	238	7	1	7	3	399	**655**
0815 - 0830	241	7	0	10	3	402	**663**
0830 - 0845	201	7	0	7	4	387	**606**
0845 - 0900	215	13	0	12	1	383	**624**
Per End	**4695**	**200**	**8**	**103**	**25**	**4285**	**9316**

Lights

	WEST		NORTH		EAST		
	Cormorant		*Pacific*		*Cormorant*		
Peak Per	T	L	R	L	R	T	TOT
0500 - 0600	916	29	4	5	0	394	**1348**
0515 - 0615	1218	58	4	7	0	493	**1780**
0530 - 0630	1440	74	3	9	1	622	**2149**
0545 - 0645	1570	73	1	11	1	785	**2441**
0600 - 0700	1568	87	1	12	1	842	**2511**
0615 - 0715	1476	70	0	18	1	966	**2531**
0630 - 0730	1434	56	1	27	2	1072	**2592**
0645 - 0745	1298	57	1	38	9	1165	**2568**
0700 - 0800	1126	40	2	39	11	1339	**2557**
0715 - 0815	1038	33	3	36	13	1429	**2552**
0730 - 0830	925	32	2	31	13	1509	**2512**
0745 - 0845	838	28	2	23	10	1501	**2402**
0800 - 0900	812	31	1	30	9	1470	**2353**
PEAK HR	**1038**	**33**	**3**	**36**	**13**	**1429**	**2552**

Heavies

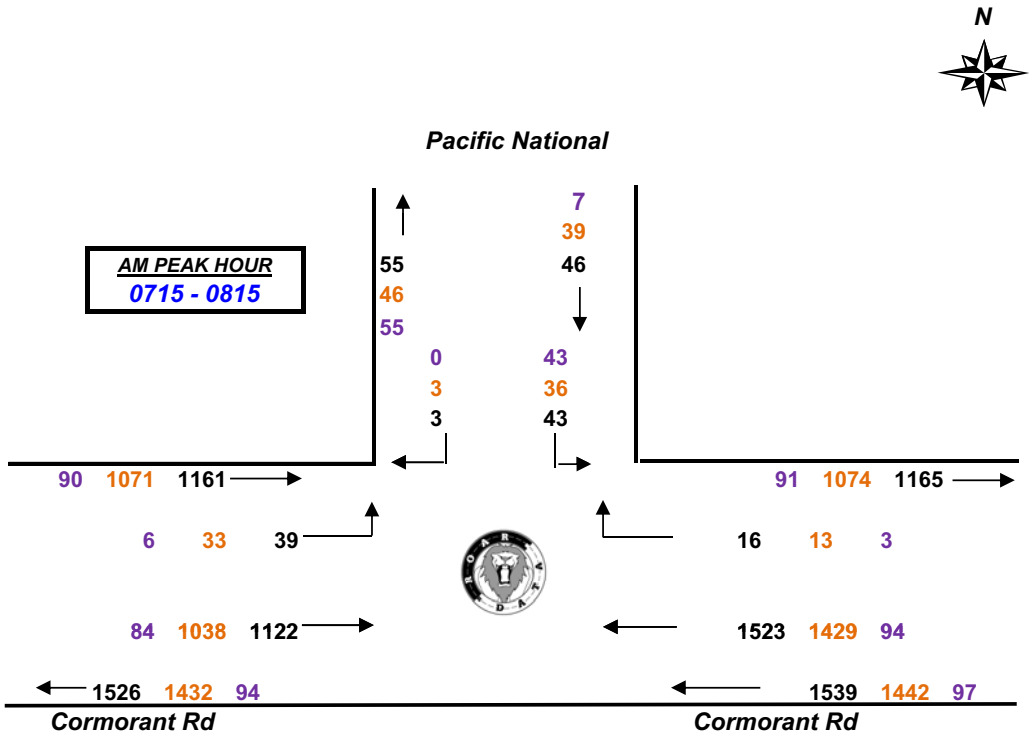
	WEST		NORTH		EAST		
	Cormorant		*Pacific*		*Cormorant*		
Peak Per	T	L	R	L	R	T	TOT
0500 - 0600	38	1	0	3	0	28	**70**
0515 - 0615	43	0	0	3	0	25	**71**
0530 - 0630	58	0	0	2	0	26	**86**
0545 - 0645	64	1	0	3	0	32	**100**
0600 - 0700	81	3	0	2	0	40	**126**
0615 - 0715	84	4	0	2	0	47	**137**
0630 - 0730	81	4	0	1	0	50	**136**
0645 - 0745	84	5	0	2	0	57	**148**
0700 - 0800	71	6	0	6	2	71	**156**
0715 - 0815	84	6	0	7	3	94	**194**
0730 - 0830	78	6	0	10	4	104	**202**
0745 - 0845	75	5	0	8	4	105	**197**
0800 - 0900	83	3	0	6	2	101	**195**
PEAK HR	**84**	**6**	**0**	**7**	**3**	**94**	**194**

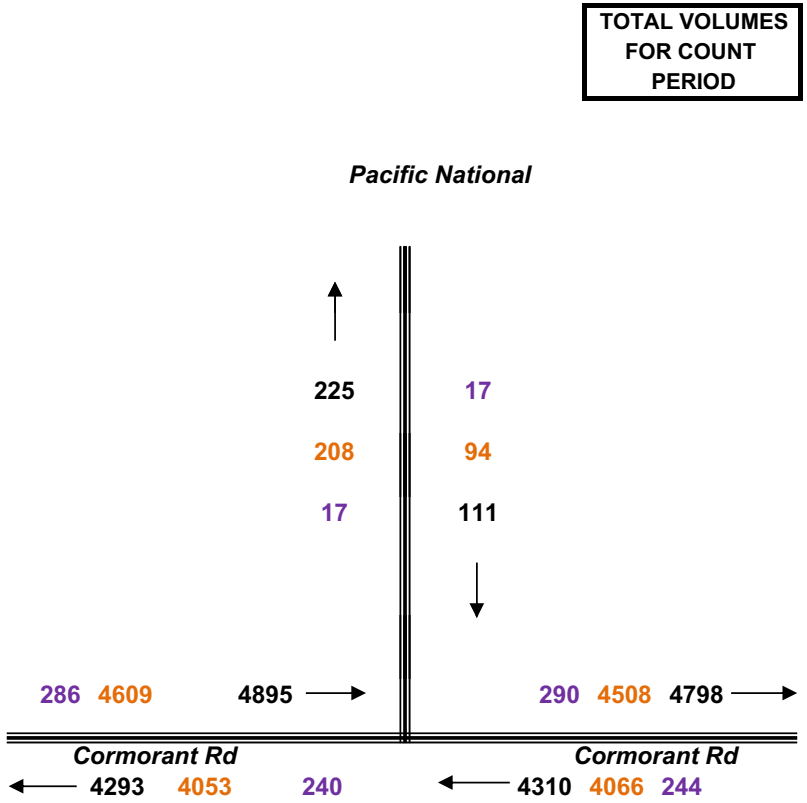
Combined

	WEST		NORTH		EAST		
	Cormorant		*Pacific*		*Cormorant*		
Peak Per	T	L	R	L	R	T	TOT
0500 - 0600	954	30	4	8	0	422	**1418**
0515 - 0615	1261	58	4	10	0	518	**1851**
0530 - 0630	1498	74	3	11	1	648	**2235**
0545 - 0645	1634	74	1	14	1	817	**2541**
0600 - 0700	1649	90	1	14	1	882	**2637**
0615 - 0715	1560	74	0	20	1	1013	**2668**
0630 - 0730	1515	60	1	28	2	1122	**2728**
0645 - 0745	1382	62	1	40	9	1222	**2716**
0700 - 0800	1197	46	2	45	13	1410	**2713**
0715 - 0815	1122	39	3	43	16	1523	**2746**
0730 - 0830	1003	38	2	41	17	1613	**2714**
0745 - 0845	913	33	2	31	14	1606	**2599**
0800 - 0900	895	34	1	36	11	1571	**2548**
PEAK HR	**1122**	**39**	**3**	**43**	**16**	**1523**	**2746**

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

Client : EMGA
Job no/Name : 3826 KOORAGANG ISLAND Traffic Counts
Day/Date : Tuesday 25th October 2011





R.O.A.R. DATA

Reliable, Original & Authentic Results

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

Client : EMGA
Job no/Name : 3826 KOORAGANG ISLAND Traffic Counts
Day/Date : Tuesday 25th October 2011

Lights

	WEST		NORTH		EAST		
	Cormorant		*Pacific*		*Cormorant*		
Time Per	T	L	R	L	R	T	TOT
1500 - 1515		5	0	13	6		**24**
1515 - 1530		7	0	14	7		**28**
1530 - 1545		5	0	7	11		**23**
1545 - 1600		2	2	17	9		**30**
1600 - 1615		2	0	25	9		**36**
1615 - 1630		13	0	26	3		**42**
1630 - 1645		0	0	21	10		**31**
1645 - 1700		3	0	9	4		**16**
1700 - 1715		1	0	12	7		**20**
1715 - 1730		0	0	5	4		**9**
1730 - 1745		3	0	5	2		**10**
1745 - 1800		2	0	7	5		**14**
1800 - 1815		1	0	2	4		**7**
1815 - 1830		2	0	3	1		**6**
1830 - 1845		4	0	5	0		**9**
1845 - 1900		2	0	1	2		**5**
Per End	**0**	**52**	**2**	**172**	**84**	**0**	**310**

Heavies

	WEST		NORTH		EAST		
	Cormorant		*Pacific*		*Cormorant*		
Time Per	T	L	R	L	R	T	TOT
1500 - 1515		0	0	0	1		**1**
1515 - 1530		0	0	6	3		**9**
1530 - 1545		0	0	1	1		**2**
1545 - 1600		1	0	2	4		**7**
1600 - 1615		1	0	3	1		**5**
1615 - 1630		0	0	2	1		**3**
1630 - 1645		0	0	0	1		**1**
1645 - 1700		0	0	0	0		**0**
1700 - 1715		0	0	0	0		**0**
1715 - 1730		0	0	0	0		**0**
1730 - 1745		0	0	0	0		**0**
1745 - 1800		0	0	0	0		**0**
1800 - 1815		0	0	0	0		**0**
1815 - 1830		0	0	0	0		**0**
1830 - 1845		0	0	0	0		**0**
1845 - 1900		0	0	0	0		**0**
Per End	**0**	**2**	**0**	**14**	**12**	**0**	**28**

Combined

	WEST		NORTH		EAST		
	Cormorant		*Pacific*		*Cormorant*		
Time Per	T	L	R	L	R	T	TOT
1500 - 1515	0	5	0	13	7	0	**25**
1515 - 1530	0	7	0	20	10	0	**37**
1530 - 1545	0	5	0	8	12	0	**25**
1545 - 1600	0	3	2	19	13	0	**37**
1600 - 1615	0	3	0	28	10	0	**41**
1615 - 1630	0	13	0	28	4	0	**45**
1630 - 1645	0	0	0	21	11	0	**32**
1645 - 1700	0	3	0	9	4	0	**16**
1700 - 1715	0	1	0	12	7	0	**20**
1715 - 1730	0	0	0	5	4	0	**9**
1730 - 1745	0	3	0	5	2	0	**10**
1745 - 1800	0	2	0	7	5	0	**14**
1800 - 1815	0	1	0	2	4	0	**7**
1815 - 1830	0	2	0	3	1	0	**6**
1830 - 1845	0	4	0	5	0	0	**9**
1845 - 1900	0	2	0	1	2	0	**5**
Per End	**0**	**54**	**2**	**186**	**96**	**0**	**338**

Lights

	WEST		NORTH		EAST		
	Cormorant		*Pacific*		*Cormorant*		
Peak Per	T	L	R	L	R	T	TOT
1500 - 1600	0	19	2	51	33	0	**105**
1515 - 1615	0	16	2	63	36	0	**117**
1530 - 1630	0	22	2	75	32	0	**131**
1545 - 1645	0	17	2	89	31	0	**139**
1600 - 1700	0	18	0	81	26	0	**125**
1615 - 1715	0	17	0	68	24	0	**109**
1630 - 1730	0	4	0	47	25	0	**76**
1645 - 1745	0	7	0	31	17	0	**55**
1700 - 1800	0	6	0	29	18	0	**53**
1715 - 1815	0	6	0	19	15	0	**40**
1730 - 1830	0	8	0	17	12	0	**37**
1745 - 1845	0	9	0	17	10	0	**36**
1800 - 1900	0	9	0	11	7	0	**27**

Heavies

	WEST		NORTH		EAST		
	Cormorant		*Pacific*		*Cormorant*		
Peak Per	T	L	R	L	R	T	TOT
1500 - 1600	0	1	0	9	9	0	**19**
1515 - 1615	0	2	0	12	9	0	**23**
1530 - 1630	0	2	0	8	7	0	**17**
1545 - 1645	0	2	0	7	7	0	**16**
1600 - 1700	0	1	0	5	3	0	**9**
1615 - 1715	0	0	0	2	2	0	**4**
1630 - 1730	0	0	0	0	1	0	**1**
1645 - 1745	0	0	0	0	0	0	**0**
1700 - 1800	0	0	0	0	0	0	**0**
1715 - 1815	0	0	0	0	0	0	**0**
1730 - 1830	0	0	0	0	0	0	**0**
1745 - 1845	0	0	0	0	0	0	**0**
1800 - 1900	0	0	0	0	0	0	**0**

Combined

	WEST		NORTH		EAST		
	Cormorant		*Pacific*		*Cormorant*		
Peak Per	T	L	R	L	R	T	TOT
1500 - 1600	0	20	2	60	42	0	**124**
1515 - 1615	0	18	2	75	45	0	**140**
1530 - 1630	0	24	2	83	39	0	**148**
1545 - 1645	0	19	2	96	38	0	**155**
1600 - 1700	0	19	0	86	29	0	**134**
1615 - 1715	0	17	0	70	26	0	**113**
1630 - 1730	0	4	0	47	26	0	**77**
1645 - 1745	0	7	0	31	17	0	**55**
1700 - 1800	0	6	0	29	18	0	**53**
1715 - 1815	0	6	0	19	15	0	**40**
1730 - 1830	0	8	0	17	12	0	**37**
1745 - 1845	0	9	0	17	10	0	**36**
1800 - 1900	0	9	0	11	7	0	**27**

PEAK HR	0	17	2	89	31	0	139

PEAK HR	0	2	0	7	7	0	16

PEAK HR	0	19	2	96	38	0	155

R.O.A.R. DATA

Reliable, Original & Authentic Results

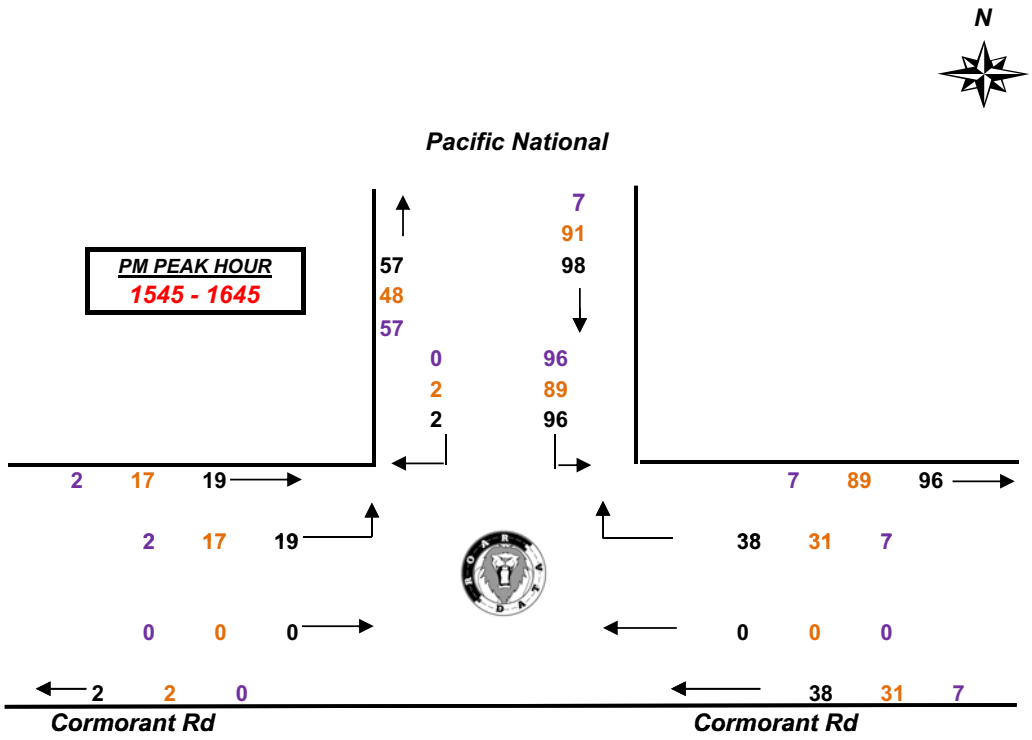
Ph.88196847, Fax 88196849, Mob.0418-239019

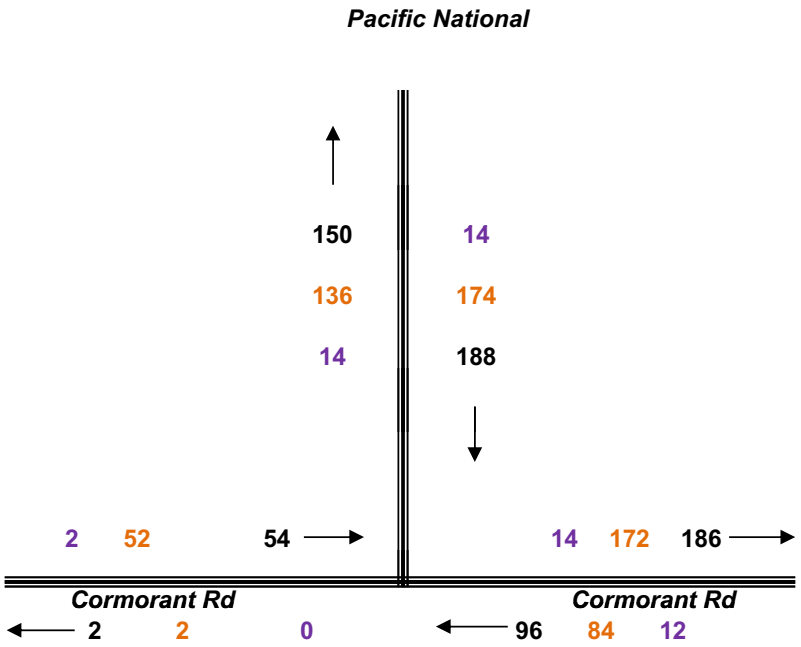
Client : EMGA

Job no/Name : 3826 KOORAGANG ISLAND Traffic Counts

Day/Date : Tuesday 25th October 2011

TOTAL VOLUMES FOR COUNT PERIOD





Curtis Traffic Surveys

Turning movement count

Job:

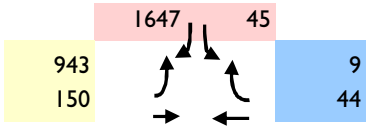
Day, date: Tue 29 Mar 11

Location: Cormorant Rd & Teal St

Weather: Fine

Client: Better Transport Futures

Peak Hour Volumes



Time Period	From Cormorant Rd east: Through Light vehicles	From Cormorant Rd east: Through Heavy vehicles	From Cormorant Rd east: Right Light vehicles	From Cormorant Rd east: Right Heavy vehicles	From Teal St: Left Light vehicles	From Teal St: Left Heavy vehicles	From Teal St: Right Light vehicles	From Teal St: Right Heavy vehicles	From Cormorant Rd west: Left Light vehicles	From Cormorant Rd west: Left Heavy vehicles	From Cormorant Rd west: Through Light vehicles	From Cormorant Rd west: Through Heavy vehicles	Total	
06:30 to 06:45	4	0	1	2	10	0	212	6	231	7	31	6	510	
06:45 to 07:00	8	0	1	4	18	1	242	8	274	14	48	12	630	
07:00 to 07:15	14	4	1	2	3	3	258	10	268	16	21	14	614	
07:15 to 07:30	5	6	1	1	16	1	308	21	321	19	20	15	734	
07:30 to 07:45	3	4	0	1	12	1	421	20	231	22	32	13	760	peak
07:45 to 08:00	6	6	0	2	8	1	394	24	143	16	24	16	640	
08:00 to 08:15	7	7	1	3	4	2	436	23	169	22	13	17	704	
08:15 to 08:30	11	9	0	2	1	2	429	12	176	18	16	15	691	
08:30 to 08:45	11	14	3	2	4	1	413	10	129	20	9	18	634	
08:45 to 09:00	12	4	1	1	3	3	245	21	106	15	15	12	438	
09:00 to 09:15	9	4	1	3	3	1	204	16	112	14	18	12	397	
09:15 to 09:30	11	5	3	2	5	1	237	9	108	15	13	18	427	
Total	101	63	13	25	87	17	3799	180	2268	198	260	168		

Hourly summary

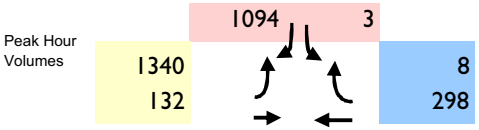
06:30 to 07:30	31	10	4	9	47	5	1020	45	1094	56	120	47	2488	
06:45 to 07:45	30	14	3	8	49	6	1229	59	1094	71	121	54	2738	
07:00 to 08:00	28	20	2	6	39	6	1381	75	963	73	97	58	2748	
07:15 to 08:15	21	23	2	7	40	5	1559	88	864	79	89	61	2838	peak hour
07:30 to 08:30	27	26	1	8	25	6	1680	79	719	78	85	61	2795	
07:45 to 08:45	35	36	4	9	17	6	1672	69	617	76	62	66	2669	
08:00 to 09:00	41	34	5	8	12	8	1523	66	580	75	53	62	2467	
08:15 to 09:15	43	31	5	8	11	7	1291	59	523	67	58	57	2160	
08:30 to 09:30	43	27	8	8	15	6	1099	56	455	64	55	60	1896	

Curtis Traffic Surveys

Turning movement count

Job: 110303bt
Day, date: Tue 29 Mar 11
Location: Cormorant Rd & Teal St
Weather: Fine
Client: Better Transport Futures

Peak Hour Volumes



Time Period	From Cormorant Rd east: Through Light vehicles	Through vehicles	Right Light vehicles	Right vehicles	From Teal St: Left Light vehicles	Left vehicles	Right Light vehicles	Right vehicles	From Cormorant Rd west: Left Light vehicles	Left vehicles	Through Light vehicles	Through vehicles	Total
14:30 to 14:45	19	15	1	1	5	2	289	29	272	17	26	31	707
14:45 to 15:00	17	5	0	2	3	2	266	15	226	12	22	22	592
15:00 to 15:15	25	6	0	1	1	0	278	12	222	11	29	18	603
15:15 to 15:30	39	16	1	0	2	2	198	16	214	14	24	14	540
15:30 to 15:45	46	7	0	0	1	0	183	13	251	13	21	12	547
15:45 to 16:00	26	6	0	2	0	0	236	13	268	11	26	21	609
16:00 to 16:15	35	6	0	2	2	1	266	20	236	8	18	14	608
16:15 to 16:30	26	7	1	1	0	2	242	10	291	11	10	8	609
16:30 to 16:45	34	4	2	1	0	0	312	8	296	6	11	5	679
16:45 to 17:00	141	4	0	0	1	0	289	10	341	5	41	11	843 peak
17:00 to 17:15	94	3	0	0	2	0	271	4	316	5	34	4	733
17:15 to 17:30	15	3	2	3	0	0	196	4	362	9	17	9	620
17:30 to 17:45	31	2	0	1	3	0	214	1	284	5	45	10	596
17:45 to 18:00	11	3	0	0	0	0	145	5	242	3	12	6	427
18:00 to 18:15	9	0	0	0	0	0	156	5	221	1	20	2	414
18:15 to 18:30	9	2	0	0	0	1	122	3	194	1	6	9	347
Total	577	89	7	14	20	10	3663	168	4236	132	362	196	

Hourly summary

14:30 to 15:30	100	42	2	4	11	6	1031	72	934	54	101	85	2442
14:45 to 15:45	127	34	1	3	7	4	925	56	913	50	96	66	2282
15:00 to 16:00	136	35	1	3	4	2	895	54	955	49	100	65	2299
15:15 to 16:15	146	35	1	4	5	3	883	62	969	46	89	61	2304
15:30 to 16:30	133	26	1	5	3	3	927	56	1046	43	75	55	2373
15:45 to 16:45	121	23	3	6	2	3	1056	51	1091	36	65	48	2505
16:00 to 17:00	236	21	3	4	3	3	1109	48	1164	30	80	38	2739
16:15 to 17:15	295	18	3	2	3	2	1114	32	1244	27	96	28	2864
16:30 to 17:30	284	14	4	4	3	0	1068	26	1315	25	103	29	2875 peak hour
16:45 to 17:45	281	12	2	4	6	0	970	19	1303	24	137	34	2792
17:00 to 18:00	151	11	2	4	5	0	826	14	1204	22	108	29	2376
17:15 to 18:15	66	8	2	4	3	0	711	15	1109	18	94	27	2057
17:30 to 18:30	60	7	0	1	3	1	637	14	941	10	83	27	1784

Curtis Traffic Surveys

Turning movement count

Job:

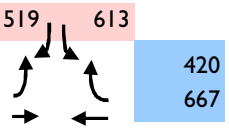
Day, date: Tue 29 Mar 11

Location: Industrial Drive & Tourle St

Weather: Fine

Client: Better Transport Futures

Peak Hour Volumes



	From Industrial Dr east				From Tourle St				From Industrial Dr west				
	Through		Right		Left		Right		Left		Through		
Time Period	Light vehicles	Heavy vehicles	Light vehicles	Heavy vehicles	Light vehicles	Heavy vehicles	Light vehicles	Heavy vehicles	Light vehicles	Heavy vehicles	Light vehicles	Heavy vehicles	Total
06:30 to 06:45	42	3	157	21	59	10	92	21	166	45	186	34	836
06:45 to 07:00	48	12	171	21	105	22	98	15	161	20	173	33	879
07:00 to 07:15	46	7	135	17	78	20	101	10	174	16	181	32	817
07:15 to 07:30	84	8	170	16	87	13	145	20	131	25	169	25	893
07:30 to 07:45	65	13	93	14	59	19	155	23	110	22	198	23	794
07:45 to 08:00	115	17	132	18	119	28	102	15	99	24	297	32	998
08:00 to 08:15	134	21	112	15	118	21	97	17	89	21	245	27	917
08:15 to 08:30	162	32	97	9	130	14	116	20	94	15	247	24	960
08:30 to 08:45	106	32	66	20	115	15	132	18	75	10	262	24	875
08:45 to 09:00	152	28	81	20	180	20	97	22	83	28	340	30	1081 peak
09:00 to 09:15	111	24	63	13	108	11	70	15	77	22	146	18	678
09:15 to 09:30	129	29	61	10	71	13	52	10	115	33	141	15	679
Total	1194	226	1338	194	1229	206	1257	206	1374	281	2585	317	
Hourly summary													
06:30 to 07:30	220	30	633	75	329	65	436	66	632	106	709	124	3425
06:45 to 07:45	243	40	569	68	329	74	499	68	576	83	721	113	3383
07:00 to 08:00	310	45	530	65	343	80	503	68	514	87	845	112	3502
07:15 to 08:15	398	59	507	63	383	81	499	75	429	92	909	107	3602
07:30 to 08:30	476	83	434	56	426	82	470	75	392	82	987	106	3669
07:45 to 08:45	517	102	407	62	482	78	447	70	357	70	1051	107	3750
08:00 to 09:00	554	113	356	64	543	70	442	77	341	74	1094	105	3833 peak hour
08:15 to 09:15	531	116	307	62	533	60	415	75	329	75	995	96	3594
08:30 to 09:30	498	113	271	63	474	59	351	65	350	93	889	87	3313

Curtis Traffic Surveys

Turning movement count

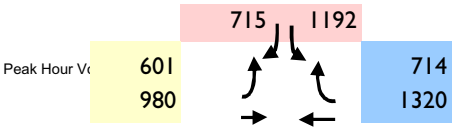
Job: 110303bt

Day, date: Tue 29 Mar 11

Location: Industrial Drive & Tourle St

Weather: Fine

Client: Better Transport Futures



Time Period	From Industrial Dr east				From Tourle St				From Industrial Dr west				Total	
	Through		Right		Left		Right		Left		Through			
	Light vehicles	Heavy vehicles	Light vehicles	Heavy vehicles	Light vehicles	Heavy vehicles	Light vehicles	Heavy vehicles	Light vehicles	Heavy vehicles	Light vehicles	Heavy vehicles		
14:30 to 14:45	199	26	141	11	85	10	84	25	119	11	141	21	873	
14:45 to 15:00	173	24	69	7	82	9	114	20	93	17	127	19	754	
15:00 to 15:15	265	26	125	13	100	5	165	18	81	12	139	19	968	
15:15 to 15:30	239	24	137	11	131	13	150	20	83	16	142	21	987	
15:30 to 15:45	261	24	139	11	102	8	197	22	121	23	183	22	1113	
15:45 to 16:00	133	14	99	10	50	3	134	18	96	14	273	19	863	
16:00 to 16:15	247	16	151	6	150	8	182	20	158	13	222	16	1189	
16:15 to 16:30	351	15	224	16	322	11	188	23	152	16	236	18	1572	peak
16:30 to 16:45	297	11	156	7	256	1	187	16	158	4	230	17	1340	
16:45 to 17:00	305	20	115	2	311	14	136	10	121	3	249	7	1293	
17:00 to 17:15	298	23	189	5	271	6	153	2	145	2	210	13	1317	
17:15 to 17:30	325	24	211	7	285	7	185	8	147	11	256	10	1476	
17:30 to 17:45	318	27	215	9	304	9	149	6	133	6	229	9	1414	
17:45 to 18:00	152	8	133	4	205	7	105	8	97	4	229	7	959	
18:00 to 18:15	231	16	86	4	74	1	115	3	89	4	273	2	898	
18:15 to 18:30	198	3	84	7	66	4	87	6	79	6	158	6	704	
Total	3992	301	2274	130	2794	116	2331	225	1872	162	3297	226		
Hourly summary														
14:30 to 15:30	876	100	472	42	398	37	513	83	376	56	549	80	3582	
14:45 to 15:45	938	98	470	42	415	35	626	80	378	68	591	81	3822	
15:00 to 16:00	898	88	500	45	383	29	646	78	381	65	737	81	3931	
15:15 to 16:15	880	78	526	38	433	32	663	80	458	66	820	78	4152	
15:30 to 16:30	992	69	613	43	624	30	701	83	527	66	914	75	4737	
15:45 to 16:45	1028	56	630	39	778	23	691	77	564	47	961	70	4964	
16:00 to 17:00	1200	62	646	31	1039	34	693	69	589	36	937	58	5394	
16:15 to 17:15	1251	69	684	30	1160	32	664	51	576	25	925	55	5522	peak hour
16:30 to 17:30	1225	78	671	21	1123	28	661	36	571	20	945	47	5426	
16:45 to 17:45	1246	94	730	23	1171	36	623	26	546	22	944	39	5500	
17:00 to 18:00	1093	82	748	25	1065	29	592	24	522	23	924	39	5166	
17:15 to 18:15	1026	75	645	24	868	24	554	25	466	25	987	28	4747	
17:30 to 18:30	899	54	518	24	649	21	456	23	398	20	889	24	3975	

R.O.A.R. DATA

Reliable, Original & Authentic Results

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

Client : EMGA
Job No/Name : 3826 KOORAGANG ISLAND Traffic Counts
Day/Date : Tuesday 25th October 2011

Lights

	NORTH			WEST			SOUTH			EAST			
	Woodstock St			*Industrial Dr*			*Woodstock St*			*Industrial Dr*			
Time Period	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**TOT**
0500 - 0515	0	0	4	1	31	5	6	0	0	0	71	0	**118**
0515 - 0530	0	0	1	4	67	9	21	0	0	0	115	2	**219**
0530 - 0545	0	0	2	7	124	10	22	0	0	0	197	3	**365**
0545 - 0600	2	0	1	14	166	13	45	0	0	0	236	3	**480**
0600 - 0615	1	0	1	12	134	15	46	0	0	0	274	3	**486**
0615 - 0630	1	0	2	12	226	11	38	0	0	0	264	6	**560**
0630 - 0645	5	0	4	10	324	19	31	0	0	0	299	2	**694**
0645 - 0700	2	0	1	12	291	15	22	0	0	1	247	7	**598**
0700 - 0715	6	0	3	9	289	24	27	0	0	0	316	6	**680**
0715 - 0730	3	0	0	6	345	24	27	0	0	1	323	9	**738**
0730 - 0745	3	0	0	9	463	17	18	0	1	0	322	4	**837**
0745 - 0800	6	0	1	12	502	29	32	0	0	0	295	5	**882**
0800 - 0815	5	0	1	9	456	20	30	0	0	0	365	11	**897**
0815 - 0830	2	0	0	17	527	29	30	0	0	0	297	7	**909**
0830 - 0845	4	0	0	9	469	30	27	0	0	1	314	6	**860**
0845 - 0900	7	0	2	5	415	28	20	1	0	0	245	9	**732**
Period End	**47**	**0**	**23**	**148**	**4829**	**298**	**442**	**1**	**1**	**3**	**4180**	**83**	**####**

Lights

	NORTH			WEST			SOUTH			EAST			
	Woodstock St			*Industrial Dr*			*Woodstock St*			*Industrial Dr*			
Peak Period	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**TOT**
0500 - 0600	2	0	8	26	388	37	94	0	0	0	619	8	**1182**
0515 - 0615	3	0	5	37	491	47	134	0	0	0	822	11	**1550**
0530 - 0630	4	0	6	45	650	49	151	0	0	0	971	15	**1891**
0545 - 0645	9	0	8	48	850	58	160	0	0	0	1073	14	**2220**
0600 - 0700	9	0	8	46	975	60	137	0	0	1	1084	18	**2338**
0615 - 0715	14	0	10	43	1130	69	118	0	0	1	1126	21	**2532**
0630 - 0730	16	0	8	37	1249	82	107	0	0	2	1185	24	**2710**
0645 - 0745	14	0	4	36	1388	80	94	0	1	2	1208	26	**2853**
0700 - 0800	18	0	4	36	1599	94	104	0	1	1	1256	24	**3137**
0715 - 0815	17	0	2	36	1766	90	107	0	1	1	1305	29	**3354**
0730 - 0830	16	0	2	47	1948	95	110	0	1	0	1279	27	**3525**
0745 - 0845	17	0	2	47	1954	108	119	0	0	1	1271	29	**3548**
0800 - 0900	18	0	3	40	1867	107	107	1	0	1	1221	33	**3398**
PEAK HOUR	**17**	**0**	**2**	**47**	**1954**	**108**	**119**	**0**	**0**	**1**	**1271**	**29**	**3548**

Heavies

	NORTH			WEST			SOUTH			EAST			
	Woodstock St			*Industrial Dr*			*Woodstock St*			*Industrial Dr*			
Time Period	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**TOT**
0500 - 0515	0	0	0	1	4	0	0	0	0	0	6	0	**11**
0515 - 0530	0	0	1	1	9	0	0	0	0	0	5	0	**16**
0530 - 0545	0	0	0	0	6	0	0	0	0	0	11	0	**17**
0545 - 0600	0	0	0	0	10	0	0	0	0	0	9	0	**19**
0600 - 0615	0	0	0	0	15	0	0	0	0	0	11	0	**26**
0615 - 0630	0	0	2	1	20	0	0	0	0	0	15	0	**38**
0630 - 0645	0	0	0	1	12	0	0	0	0	0	19	0	**32**
0645 - 0700	0	0	1	2	15	0	0	0	0	0	16	0	**34**
0700 - 0715	0	0	0	0	24	0	0	0	0	0	19	0	**43**
0715 - 0730	0	0	0	0	16	0	0	0	0	0	22	0	**38**
0730 - 0745	0	0	0	0	20	0	0	0	0	0	25	0	**45**
0745 - 0800	0	0	0	1	20	1	0	0	0	0	23	0	**45**
0800 - 0815	0	0	0	0	28	4	0	0	0	1	24	0	**57**
0815 - 0830	0	0	0	0	18	0	0	0	0	0	22	0	**40**
0830 - 0845	0	0	0	1	19	0	0	0	0	1	25	0	**46**
0845 - 0900	0	0	1	0	27	0	1	0	0	0	28	0	**57**
Period End	**0**	**0**	**5**	**8**	**263**	**5**	**1**	**0**	**0**	**2**	**280**	**0**	**564**

Heavies

	NORTH			WEST			SOUTH			EAST			
	Woodstock St			*Industrial Dr*			*Woodstock St*			*Industrial Dr*			
Peak Period	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**TOT**
0500 - 0600	0	0	1	2	29	0	0	0	0	0	31	0	**63**
0515 - 0615	0	0	1	1	40	0	0	0	0	0	36	0	**78**
0530 - 0630	0	0	2	1	51	0	0	0	0	0	46	0	**100**
0545 - 0645	0	0	2	2	57	0	0	0	0	0	54	0	**115**
0600 - 0700	0	0	3	4	62	0	0	0	0	0	61	0	**130**
0615 - 0715	0	0	3	4	71	0	0	0	0	0	69	0	**147**
0630 - 0730	0	0	1	3	67	0	0	0	0	0	76	0	**147**
0645 - 0745	0	0	1	2	75	0	0	0	0	0	82	0	**160**
0700 - 0800	0	0	0	1	80	1	0	0	0	0	89	0	**171**
0715 - 0815	0	0	0	1	84	5	0	0	0	1	94	0	**185**
0730 - 0830	0	0	0	1	86	5	0	0	0	1	94	0	**187**
0745 - 0845	0	0	0	2	85	5	0	0	0	2	94	0	**188**
0800 - 0900	0	0	1	1	92	4	1	0	0	2	99	0	**200**
PEAK HOUR	**0**	**0**	**0**	**2**	**85**	**5**	**0**	**0**	**0**	**2**	**94**	**0**	**188**

R.O.A.R. DATA

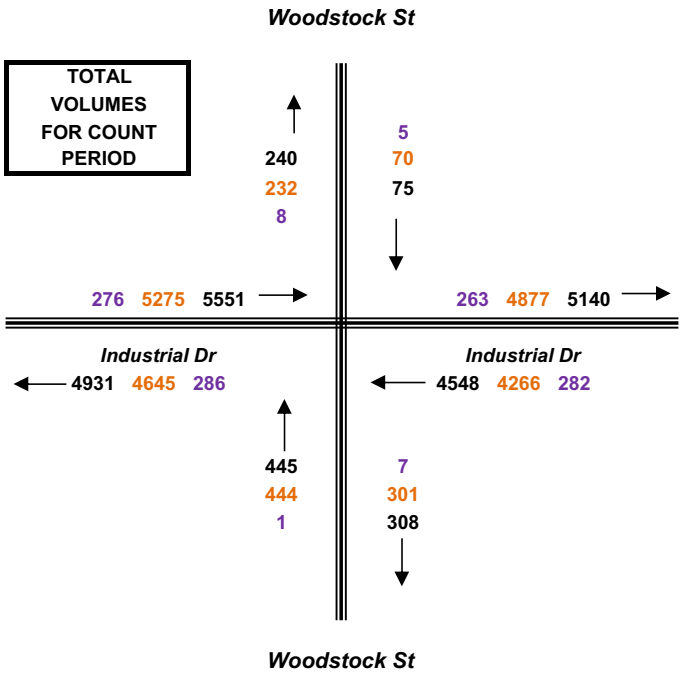
Reliable, Original & Authentic Results

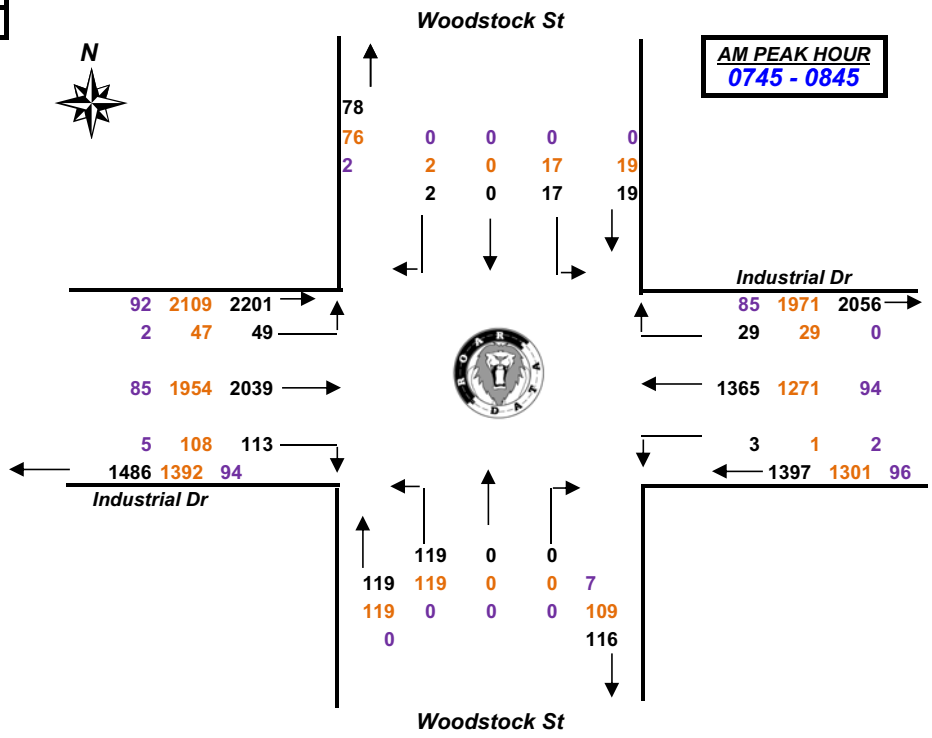
Ph.88196847, Fax 88196849, Mob.0418-239019

Client : EMGA
Job No/Name : 3826 KOORAGANG ISLAND Traffic Counts
Day/Date : Tuesday 25th October 2011

COMBINED	NORTH Woodstock St			WEST Industrial Dr			SOUTH Woodstock St			EAST Industrial Dr			
Time Period	L	T	R	L	T	R	L	T	R	L	T	R	TOT
0500 - 0515	0	0	4	2	35	5	6	0	0	0	77	0	129
0515 - 0530	0	0	2	5	76	9	21	0	0	0	120	2	235
0530 - 0545	0	0	2	7	130	10	22	0	0	0	208	3	382
0545 - 0600	2	0	1	14	176	13	45	0	0	0	245	3	499
0600 - 0615	1	0	1	12	149	15	46	0	0	0	285	3	512
0615 - 0630	1	0	4	13	246	11	38	0	0	0	279	6	598
0630 - 0645	5	0	4	11	336	19	31	0	0	0	318	2	726
0645 - 0700	2	0	2	14	306	15	22	0	0	1	263	7	632
0700 - 0715	6	0	3	9	313	24	27	0	0	0	335	6	723
0715 - 0730	3	0	0	6	361	24	27	0	0	1	345	9	776
0730 - 0745	3	0	0	9	483	17	18	0	1	0	347	4	882
0745 - 0800	6	0	1	13	522	30	32	0	0	0	318	5	927
0800 - 0815	5	0	1	9	484	24	30	0	0	1	389	11	954
0815 - 0830	2	0	0	17	545	29	30	0	0	0	319	7	949
0830 - 0845	4	0	0	10	488	30	27	0	0	2	339	6	906
0845 - 0900	7	0	3	5	442	28	21	1	0	0	273	9	789
Period End	**47**	**0**	**28**	**156**	**5092**	**303**	**443**	**1**	**1**	**5**	**4460**	**83**	**####**

COMBINED	NORTH Woodstock St			WEST Industrial Dr			SOUTH Woodstock St			EAST Industrial Dr			
Peak Period	L	T	R	L	T	R	L	T	R	L	T	R	TOT
0500 - 0600	2	0	9	28	417	37	94	0	0	0	650	8	1245
0515 - 0615	3	0	6	38	531	47	134	0	0	0	858	11	1628
0530 - 0630	4	0	8	46	701	49	151	0	0	0	1017	15	1991
0545 - 0645	9	0	10	50	907	58	160	0	0	0	1127	14	2335
0600 - 0700	9	0	11	50	1037	60	137	0	0	1	1145	18	2468
0615 - 0715	14	0	13	47	1201	69	118	0	0	1	1195	21	2679
0630 - 0730	16	0	9	40	1316	82	107	0	0	2	1261	24	2857
0645 - 0745	14	0	5	38	1463	80	94	0	1	2	1290	26	3013
0700 - 0800	18	0	4	37	1679	95	104	0	1	1	1345	24	3308
0715 - 0815	17	0	2	37	1850	95	107	0	1	2	1399	29	3539
0730 - 0830	16	0	2	48	2034	100	110	0	1	1	1373	27	3712
0745 - 0845	17	0	2	49	2039	113	119	0	0	3	1365	29	3736
0800 - 0900	18	0	4	41	1959	111	108	1	0	3	1320	33	3598
PEAK HOUR	**17**	**0**	**2**	**49**	**2039**	**113**	**119**	**0**	**0**	**3**	**1365**	**29**	**3736**





R.O.A.R. DATA

Reliable, Original & Authentic Results

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

Client : EMGA
Job No/Name : 3826 KOORAGANG ISLAND Traffic Counts
Day/Date : Tuesday 25th October 2011

Lights

	NORTH			WEST			SOUTH			EAST			
	Woodstock St			*Industrial Dr*			*Woodstock St*			*Industrial Dr*			
Time Period	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**TOT**
1500 - 1515	13	0	11	11	294	28	19	0	0	3	362	4	**745**
1515 - 1530	10	0	4	4	294	26	22	0	0	2	330	2	**694**
1530 - 1545	10	0	6	6	305	20	30	0	0	0	460	2	**839**
1545 - 1600	5	0	2	2	312	28	24	1	0	1	358	2	**735**
1600 - 1615	26	0	3	3	337	32	26	0	0	0	432	3	**862**
1615 - 1630	10	0	0	0	346	44	29	0	0	0	447	2	**878**
1630 - 1645	9	0	2	2	343	39	28	0	0	0	490	2	**915**
1645 - 1700	20	0	0	0	324	38	29	0	1	0	442	0	**854**
1700 - 1715	15	0	0	0	384	33	31	1	1	1	414	0	**880**
1715 - 1730	15	0	1	1	399	11	29	0	0	0	347	2	**805**
1730 - 1745	11	0	0	0	378	23	34	0	0	5	288	1	**740**
1745 - 1800	3	0	0	0	366	11	24	0	0	1	349	1	**755**
1800 - 1815	6	0	0	0	289	10	21	1	0	1	288	0	**616**
1815 - 1830	5	2	1	1	304	15	5	1	0	2	204	1	**541**
1830 - 1845	1	1	1	1	196	11	7	0	0	1	159	0	**378**
1845 - 1900	2	0	3	3	151	6	7	0	1	0	130	0	**303**
Period End	**161**	**3**	**34**	**34**	**5022**	**375**	**365**	**4**	**3**	**17**	**5500**	**22**	**####**

Lights

	NORTH			WEST			SOUTH			EAST			
	Woodstock St			*Industrial Dr*			*Woodstock St*			*Industrial Dr*			
Peak Period	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**TOT**
1500 - 1600	38	0	23	23	1205	102	95	1	0	6	1510	10	**3013**
1515 - 1615	51	0	15	15	1248	106	102	1	0	3	1580	9	**3130**
1530 - 1630	51	0	11	11	1300	124	109	1	0	1	1697	9	**3314**
1545 - 1645	50	0	7	7	1338	143	107	1	0	1	1727	9	**3390**
1600 - 1700	65	0	5	5	1350	153	112	0	1	0	1811	7	**3509**
1615 - 1715	54	0	2	2	1397	154	117	1	2	1	1793	4	**3527**
1630 - 1730	59	0	3	3	1450	121	117	1	2	1	1693	4	**3454**
1645 - 1745	61	0	1	1	1485	105	123	1	2	6	1491	3	**3279**
1700 - 1800	44	0	1	1	1527	78	118	1	1	7	1398	4	**3180**
1715 - 1815	35	0	1	1	1432	55	108	1	0	7	1272	4	**2916**
1730 - 1830	25	2	1	1	1337	59	84	2	0	9	1129	3	**2652**
1745 - 1845	15	3	2	2	1155	47	57	2	0	5	1000	2	**2290**
1800 - 1900	14	3	5	5	940	42	40	2	1	4	781	1	**1838**
PEAK HOUR	**65**	**0**	**5**	**5**	**1350**	**153**	**112**	**0**	**1**	**0**	**1811**	**7**	**3509**

Heavies

	NORTH			WEST			SOUTH			EAST			
	Woodstock St			*Industrial Dr*			*Woodstock St*			*Industrial Dr*			
Time Period	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**TOT**
1500 - 1515	0	0	1	1	14	0	1	0	0	0	31	0	**48**
1515 - 1530	1	0	0	0	14	0	0	0	0	0	23	0	**38**
1530 - 1545	0	0	0	0	15	0	0	0	0	0	22	0	**37**
1545 - 1600	0	0	0	0	18	0	0	0	0	0	12	0	**30**
1600 - 1615	0	0	0	0	13	0	0	0	0	0	22	0	**35**
1615 - 1630	0	0	0	0	13	0	1	0	0	0	7	0	**21**
1630 - 1645	0	0	0	0	8	0	0	0	0	0	9	0	**17**
1645 - 1700	0	0	0	0	5	0	1	0	0	0	9	0	**15**
1700 - 1715	0	0	0	0	7	0	0	0	0	0	6	0	**13**
1715 - 1730	1	0	0	0	5	0	0	0	0	0	4	0	**10**
1730 - 1745	0	0	0	0	6	0	0	0	0	0	9	0	**15**
1745 - 1800	0	0	0	0	5	0	0	0	0	0	6	0	**11**
1800 - 1815	1	0	0	0	10	0	0	0	0	0	10	0	**21**
1815 - 1830	0	0	0	0	6	0	0	0	0	0	6	0	**12**
1830 - 1845	0	0	0	0	1	0	0	0	0	0	5	0	**6**
1845 - 1900	0	0	0	0	6	0	0	0	0	0	3	0	**9**
Period End	**3**	**0**	**1**	**1**	**146**	**0**	**3**	**0**	**0**	**0**	**184**	**0**	**338**

Heavies

	NORTH			WEST			SOUTH			EAST			
	Woodstock St			*Industrial Dr*			*Woodstock St*			*Industrial Dr*			
Peak Period	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**TOT**
1500 - 1600	1	0	1	1	61	0	1	0	0	0	88	0	**153**
1515 - 1615	1	0	0	0	60	0	0	0	0	0	79	0	**140**
1530 - 1630	0	0	0	0	59	0	1	0	0	0	63	0	**123**
1545 - 1645	0	0	0	0	52	0	1	0	0	0	50	0	**103**
1600 - 1700	0	0	0	0	39	0	2	0	0	0	47	0	**88**
1615 - 1715	0	0	0	0	33	0	2	0	0	0	31	0	**66**
1630 - 1730	1	0	0	0	25	0	1	0	0	0	28	0	**55**
1645 - 1745	1	0	0	0	23	0	1	0	0	0	28	0	**53**
1700 - 1800	1	0	0	0	23	0	0	0	0	0	25	0	**49**
1715 - 1815	2	0	0	0	26	0	0	0	0	0	29	0	**57**
1730 - 1830	1	0	0	0	27	0	0	0	0	0	31	0	**59**
1745 - 1845	1	0	0	0	22	0	0	0	0	0	27	0	**50**
1800 - 1900	1	0	0	0	23	0	0	0	0	0	24	0	**48**
PEAK HOUR	**0**	**0**	**0**	**0**	**39**	**0**	**2**	**0**	**0**	**0**	**47**	**0**	**88**

R.O.A.R. DATA

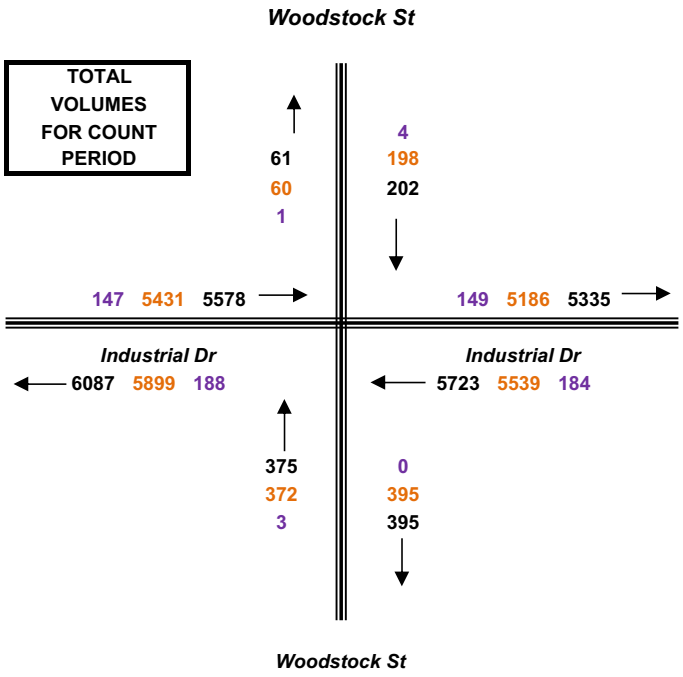
Reliable, Original & Authentic Results

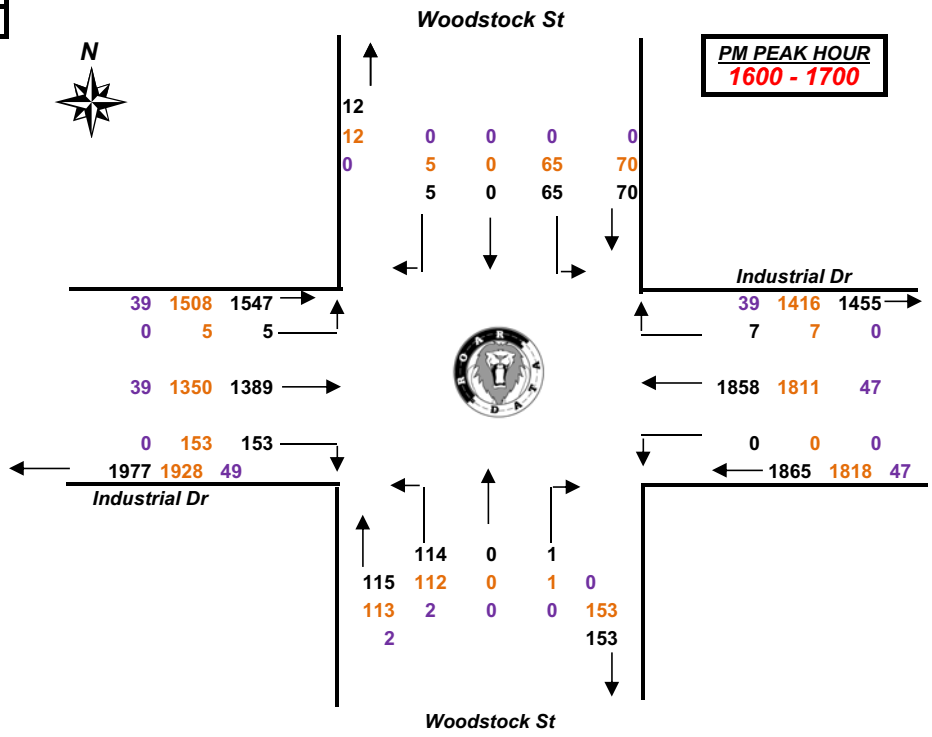
Ph.88196847, Fax 88196849, Mob.0418-239019

Client : EMGA
Job No/Name : 3826 KOORAGANG ISLAND Traffic Counts
Day/Date : Tuesday 25th October 2011

COMBINED	NORTH Woodstock St			WEST Industrial Dr			SOUTH Woodstock St			EAST Industrial Dr			
Time Period	L	T	R	L	T	R	L	T	R	L	T	R	TOT
1500 - 1515	13	0	12	12	308	28	20	0	0	3	393	4	**793**
1515 - 1530	11	0	4	4	308	26	22	0	0	2	353	2	**732**
1530 - 1545	10	0	6	6	320	20	30	0	0	0	482	2	**876**
1545 - 1600	5	0	2	2	330	28	24	1	0	1	370	2	**765**
1600 - 1615	26	0	3	3	350	32	26	0	0	0	454	3	**897**
1615 - 1630	10	0	0	0	359	44	30	0	0	0	454	2	**899**
1630 - 1645	9	0	2	2	351	39	28	0	0	0	499	2	**932**
1645 - 1700	20	0	0	0	329	38	30	0	1	0	451	0	**869**
1700 - 1715	15	0	0	0	391	33	31	1	1	1	420	0	**893**
1715 - 1730	16	0	1	1	404	11	29	0	0	0	351	2	**815**
1730 - 1745	11	0	0	0	384	23	34	0	0	5	297	1	**755**
1745 - 1800	3	0	0	0	371	11	24	0	0	1	355	1	**766**
1800 - 1815	7	0	0	0	299	10	21	1	0	1	298	0	**637**
1815 - 1830	5	2	1	1	310	15	5	1	0	2	210	1	**553**
1830 - 1845	1	1	1	1	197	11	7	0	0	1	164	0	**384**
1845 - 1900	2	0	3	3	157	6	7	0	1	0	133	0	**312**
Period End	**164**	**3**	**35**	**35**	**5168**	**375**	**368**	**4**	**3**	**17**	**5684**	**22**	**####**

COMBINED	NORTH Woodstock St			WEST Industrial Dr			SOUTH Woodstock St			EAST Industrial Dr			
Peak Period	L	T	R	L	T	R	L	T	R	L	T	R	TOT
1500 - 1600	39	0	24	24	1266	102	96	1	0	6	1598	10	**3166**
1515 - 1615	52	0	15	15	1308	106	102	1	0	3	1659	9	**3270**
1530 - 1630	51	0	11	11	1359	124	110	1	0	1	1760	9	**3437**
1545 - 1645	50	0	7	7	1390	143	108	1	0	1	1777	9	**3493**
1600 - 1700	65	0	5	5	1389	153	114	0	1	0	1858	7	**3597**
1615 - 1715	54	0	2	2	1430	154	119	1	2	1	1824	4	**3593**
1630 - 1730	60	0	3	3	1475	121	118	1	2	1	1721	4	**3509**
1645 - 1745	62	0	1	1	1508	105	124	1	2	6	1519	3	**3332**
1700 - 1800	45	0	1	1	1550	78	118	1	1	7	1423	4	**3229**
1715 - 1815	37	0	1	1	1458	55	108	1	0	7	1301	4	**2973**
1730 - 1830	26	2	1	1	1364	59	84	2	0	9	1160	3	**2711**
1745 - 1845	16	3	2	2	1177	47	57	2	0	5	1027	2	**2340**
1800 - 1900	15	3	5	5	963	42	40	2	1	4	805	1	**1886**
PEAK HOUR	**65**	**0**	**5**	**5**	**1389**	**153**	**114**	**0**	**1**	**0**	**1858**	**7**	**3597**





R.O.A.R. DATA

Reliable, Original & Authentic Results

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

Client : EMGA
Job no/Name : 3826 KOORAGANG ISLAND Traffic Counts
Day/Date : Tuesday 25th October 2011

Lights

	NORTH		WEST		SOUTH		
	Teal St		*Raven St*		*Teal St*		
Time Per	T	R	L	R	L	T	TOT
0500 - 0515	56	0	1	0	2	49	**108**
0515 - 0530	94	0	0	0	9	93	**196**
0530 - 0545	137	0	0	0	13	118	**268**
0545 - 0600	179	0	2	0	31	156	**368**
0600 - 0615	233	0	4	0	51	125	**413**
0615 - 0630	240	0	3	0	42	179	**464**
0630 - 0645	293	0	4	0	16	257	**570**
0645 - 0700	243	0	2	0	26	242	**513**
0700 - 0715	269	0	6	0	10	247	**532**
0715 - 0730	282	0	2	0	13	245	**542**
0730 - 0745	375	0	5	0	13	201	**594**
0745 - 0800	391	0	2	0	9	164	**566**
0800 - 0815	384	0	3	0	5	143	**535**
0815 - 0830	357	0	2	0	15	191	**565**
0830 - 0845	324	0	4	0	13	154	**495**
0845 - 0900	327	0	10	0	12	161	**510**
Per End	**4184**	**0**	**50**	**0**	**280**	**2725**	**7239**

Heavies

	NORTH		WEST		SOUTH		
	Teal St		*Raven St*		*Teal St*		
Time Per	T	R	L	R	L	T	TOT
0500 - 0515	2	0	0	0	0	5	**7**
0515 - 0530	8	0	0	0	0	6	**14**
0530 - 0545	4	0	0	0	0	8	**12**
0545 - 0600	5	0	1	0	2	7	**15**
0600 - 0615	3	0	0	0	0	9	**12**
0615 - 0630	8	0	0	0	3	8	**19**
0630 - 0645	8	0	1	0	1	7	**17**
0645 - 0700	8	0	2	0	2	10	**22**
0700 - 0715	9	0	1	0	2	5	**17**
0715 - 0730	16	0	0	0	8	6	**30**
0730 - 0745	17	0	4	0	11	10	**42**
0745 - 0800	22	0	6	0	4	8	**40**
0800 - 0815	19	0	5	0	9	10	**43**
0815 - 0830	17	0	4	0	8	9	**38**
0830 - 0845	16	0	8	0	7	8	**39**
0845 - 0900	10	0	3	0	3	11	**27**
Per End	**172**	**0**	**35**	**0**	**60**	**127**	**394**

Combined

	NORTH		WEST		SOUTH		
	Teal St		*Raven St*		*Teal St*		
Time Per	T	R	L	R	L	T	TOT
0500 - 0515	58	0	1	0	2	54	**115**
0515 - 0530	102	0	0	0	9	99	**210**
0530 - 0545	141	0	0	0	13	126	**280**
0545 - 0600	184	0	3	0	33	163	**383**
0600 - 0615	236	0	4	0	51	134	**425**
0615 - 0630	248	0	3	0	45	187	**483**
0630 - 0645	301	0	5	0	17	264	**587**
0645 - 0700	251	0	4	0	28	252	**535**
0700 - 0715	278	0	7	0	12	252	**549**
0715 - 0730	298	0	2	0	21	251	**572**
0730 - 0745	392	0	9	0	24	211	**636**
0745 - 0800	413	0	8	0	13	172	**606**
0800 - 0815	403	0	8	0	14	153	**578**
0815 - 0830	374	0	6	0	23	200	**603**
0830 - 0845	340	0	12	0	20	162	**534**
0845 - 0900	337	0	13	0	15	172	**537**
Per End	**4356**	**0**	**85**	**0**	**340**	**2852**	**7633**

Lights

	NORTH		WEST		SOUTH		
	Teal St		*Raven St*		*Teal St*		
Peak Per	T	R	L	R	L	T	TOT
0500 - 0600	466	0	3	0	55	416	**940**
0515 - 0615	643	0	6	0	104	492	**1245**
0530 - 0630	789	0	9	0	137	578	**1513**
0545 - 0645	945	0	13	0	140	717	**1815**
0600 - 0700	1009	0	13	0	135	803	**1960**
0615 - 0715	1045	0	15	0	94	925	**2079**
0630 - 0730	1087	0	14	0	65	991	**2157**
0645 - 0745	1169	0	15	0	62	935	**2181**
0700 - 0800	1317	0	15	0	45	857	**2234**
0715 - 0815	1432	0	12	0	40	753	**2237**
0730 - 0830	1507	0	12	0	42	699	**2260**
0745 - 0845	1456	0	11	0	42	652	**2161**
0800 - 0900	1392	0	19	0	45	649	**2105**
PEAK HR	**1507**	**0**	**12**	**0**	**42**	**699**	**2260**

Heavies

	NORTH		WEST		SOUTH		
	Teal St		*Raven St*		*Teal St*		
Peak Per	T	R	L	R	L	T	TOT
0500 - 0600	19	0	1	0	2	26	**48**
0515 - 0615	20	0	1	0	2	30	**53**
0530 - 0630	20	0	1	0	5	32	**58**
0545 - 0645	24	0	2	0	6	31	**63**
0600 - 0700	27	0	3	0	6	34	**70**
0615 - 0715	33	0	4	0	8	30	**75**
0630 - 0730	41	0	4	0	13	28	**86**
0645 - 0745	50	0	7	0	23	31	**111**
0700 - 0800	64	0	11	0	25	29	**129**
0715 - 0815	74	0	15	0	32	34	**155**
0730 - 0830	75	0	19	0	32	37	**163**
0745 - 0845	74	0	23	0	28	35	**160**
0800 - 0900	62	0	20	0	27	38	**147**
PEAK HR	**75**	**0**	**19**	**0**	**32**	**37**	**163**

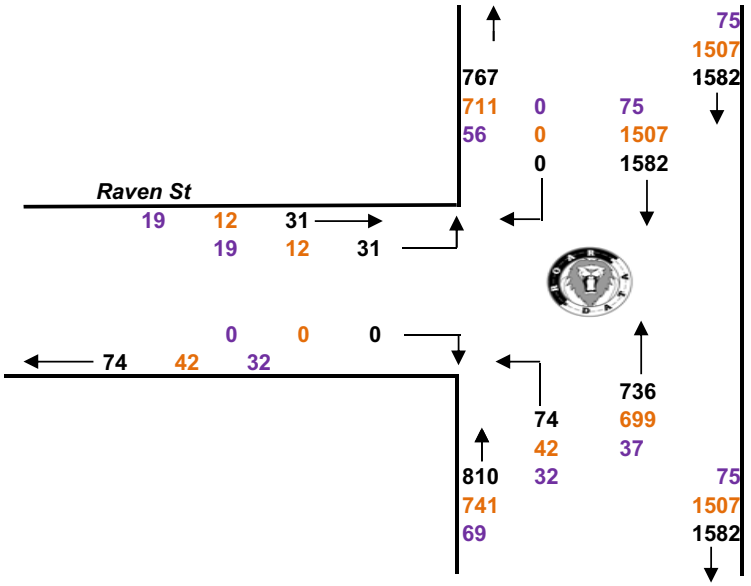
Combined

	NORTH		WEST		SOUTH		
	Teal St		*Raven St*		*Teal St*		
Peak Per	T	R	L	R	L	T	TOT
0500 - 0600	485	0	4	0	57	442	**988**
0515 - 0615	663	0	7	0	106	522	**1298**
0530 - 0630	809	0	10	0	142	610	**1571**
0545 - 0645	969	0	15	0	146	748	**1878**
0600 - 0700	1036	0	16	0	141	837	**2030**
0615 - 0715	1078	0	19	0	102	955	**2154**
0630 - 0730	1128	0	18	0	78	1019	**2243**
0645 - 0745	1219	0	22	0	85	966	**2292**
0700 - 0800	1381	0	26	0	70	886	**2363**
0715 - 0815	1506	0	27	0	72	787	**2392**
0730 - 0830	1582	0	31	0	74	736	**2423**
0745 - 0845	1530	0	34	0	70	687	**2321**
0800 - 0900	1454	0	39	0	72	687	**2252**
PEAK HR	**1582**	**0**	**31**	**0**	**74**	**736**	**2423**

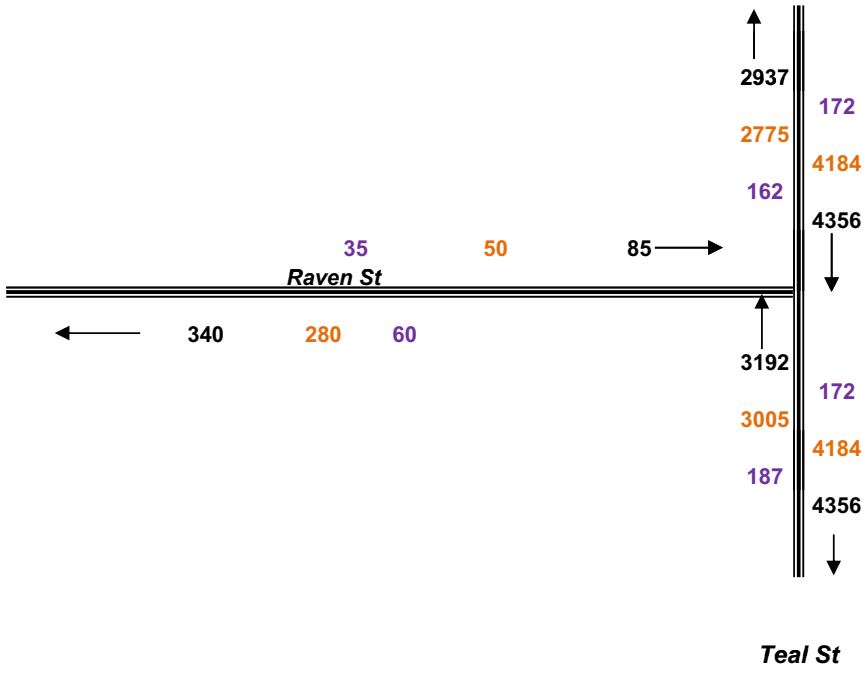
R.O.A.R. DATA
Reliable, Original & Authentic Results
Ph.88196847, Fax 88196849, Mob.0418-239019

Client : EMGA
Job no/Name : 3826 KOORAGANG ISLAND Traffic Counts
Day/Date : Tuesday 25th October 2011

AM PEAK HOUR
0730 - 0830



TOTAL VOLUMES FOR COUNT PERIOD



R.O.A.R. DATA

Reliable, Original & Authentic Results

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

Client : EMGA
Job no/Name : 3826 KOORAGANG ISLAND Traffic Counts
Day/Date : Tuesday 25th October 2011

Lights

	NORTH		WEST		SOUTH		
	Cormorant		*Raven St*		*Cormorant*		
Time Per	T	R	L	R	L	T	TOT
1500 - 1515		0	7	0	6		13
1515 - 1530		0	4	0	4		8
1530 - 1545		0	8	0	3		11
1545 - 1600		0	7	0	2		9
1600 - 1615		0	12	0	6		18
1615 - 1630		0	15	0	1		16
1630 - 1645		0	64	0	5		69
1645 - 1700		0	82	0	1		83
1700 - 1715		0	36	0	0		36
1715 - 1730		0	20	0	0		20
1730 - 1745		0	8	0	0		8
1745 - 1800		0	21	0	0		21
1800 - 1815		0	11	0	0		11
1815 - 1830		0	11	0	0		11
1830 - 1845		0	4	0	0		4
1845 - 1900		0	2	0	0		2
Per End	**0**	**0**	**312**	**0**	**28**	**0**	**340**

Heavies

	NORTH		WEST		SOUTH		
	Cormorant		*Raven St*		*Cormorant*		
Time Per	T	R	L	R	L	T	TOT
1500 - 1515		0	2	0	2		4
1515 - 1530		0	2	0	3		5
1530 - 1545		0	2	0	0		2
1545 - 1600		0	1	0	2		3
1600 - 1615		0	2	0	1		3
1615 - 1630		0	1	0	5		6
1630 - 1645		0	2	0	1		3
1645 - 1700		0	0	0	1		1
1700 - 1715		0	0	0	0		0
1715 - 1730		0	2	0	0		2
1730 - 1745		0	1	0	1		2
1745 - 1800		0	0	0	0		0
1800 - 1815		0	0	0	0		0
1815 - 1830		0	0	0	0		0
1830 - 1845		0	0	0	0		0
1845 - 1900		0	0	0	0		0
Per End	**0**	**0**	**15**	**0**	**16**	**0**	**31**

Combined

	NORTH		WEST		SOUTH		
	Cormorant		*Raven St*		*Cormorant*		
Time Per	T	R	L	R	L	T	TOT
1500 - 1515	0	0	9	0	8	0	17
1515 - 1530	0	0	6	0	7	0	13
1530 - 1545	0	0	10	0	3	0	13
1545 - 1600	0	0	8	0	4	0	12
1600 - 1615	0	0	14	0	7	0	21
1615 - 1630	0	0	16	0	6	0	22
1630 - 1645	0	0	66	0	6	0	72
1645 - 1700	0	0	82	0	2	0	84
1700 - 1715	0	0	36	0	0	0	36
1715 - 1730	0	0	22	0	0	0	22
1730 - 1745	0	0	9	0	1	0	10
1745 - 1800	0	0	21	0	0	0	21
1800 - 1815	0	0	11	0	0	0	11
1815 - 1830	0	0	11	0	0	0	11
1830 - 1845	0	0	4	0	0	0	4
1845 - 1900	0	0	2	0	0	0	2
Per End	**0**	**0**	**327**	**0**	**44**	**0**	**371**

Lights

	NORTH		WEST		SOUTH		
	Cormorant		*Raven St*		*Cormorant*		
Peak Per	T	R	L	R	L	T	TOT
1500 - 1600	0	0	26	0	15	0	41
1515 - 1615	0	0	31	0	15	0	46
1530 - 1630	0	0	42	0	12	0	54
1545 - 1645	0	0	98	0	14	0	112
1600 - 1700	0	0	173	0	13	0	186
1615 - 1715	0	0	197	0	7	0	204
1630 - 1730	0	0	202	0	6	0	208
1645 - 1745	0	0	146	0	1	0	147
1700 - 1800	0	0	85	0	0	0	85
1715 - 1815	0	0	60	0	0	0	60
1730 - 1830	0	0	51	0	0	0	51
1745 - 1845	0	0	47	0	0	0	47
1800 - 1900	0	0	28	0	0	0	28
PEAK HR	**0**	**0**	**197**	**0**	**7**	**0**	**204**

Heavies

	NORTH		WEST		SOUTH		
	Cormorant		*Raven St*		*Cormorant*		
Peak Per	T	R	L	R	L	T	TOT
1500 - 1600	0	0	7	0	7	0	14
1515 - 1615	0	0	7	0	6	0	13
1530 - 1630	0	0	6	0	8	0	14
1545 - 1645	0	0	6	0	9	0	15
1600 - 1700	0	0	5	0	8	0	13
1615 - 1715	0	0	3	0	7	0	10
1630 - 1730	0	0	4	0	2	0	6
1645 - 1745	0	0	3	0	2	0	5
1700 - 1800	0	0	3	0	1	0	4
1715 - 1815	0	0	3	0	1	0	4
1730 - 1830	0	0	1	0	1	0	2
1745 - 1845	0	0	0	0	0	0	0
1800 - 1900	0	0	0	0	0	0	0
PEAK HR	**0**	**0**	**3**	**0**	**7**	**0**	**10**

Combined

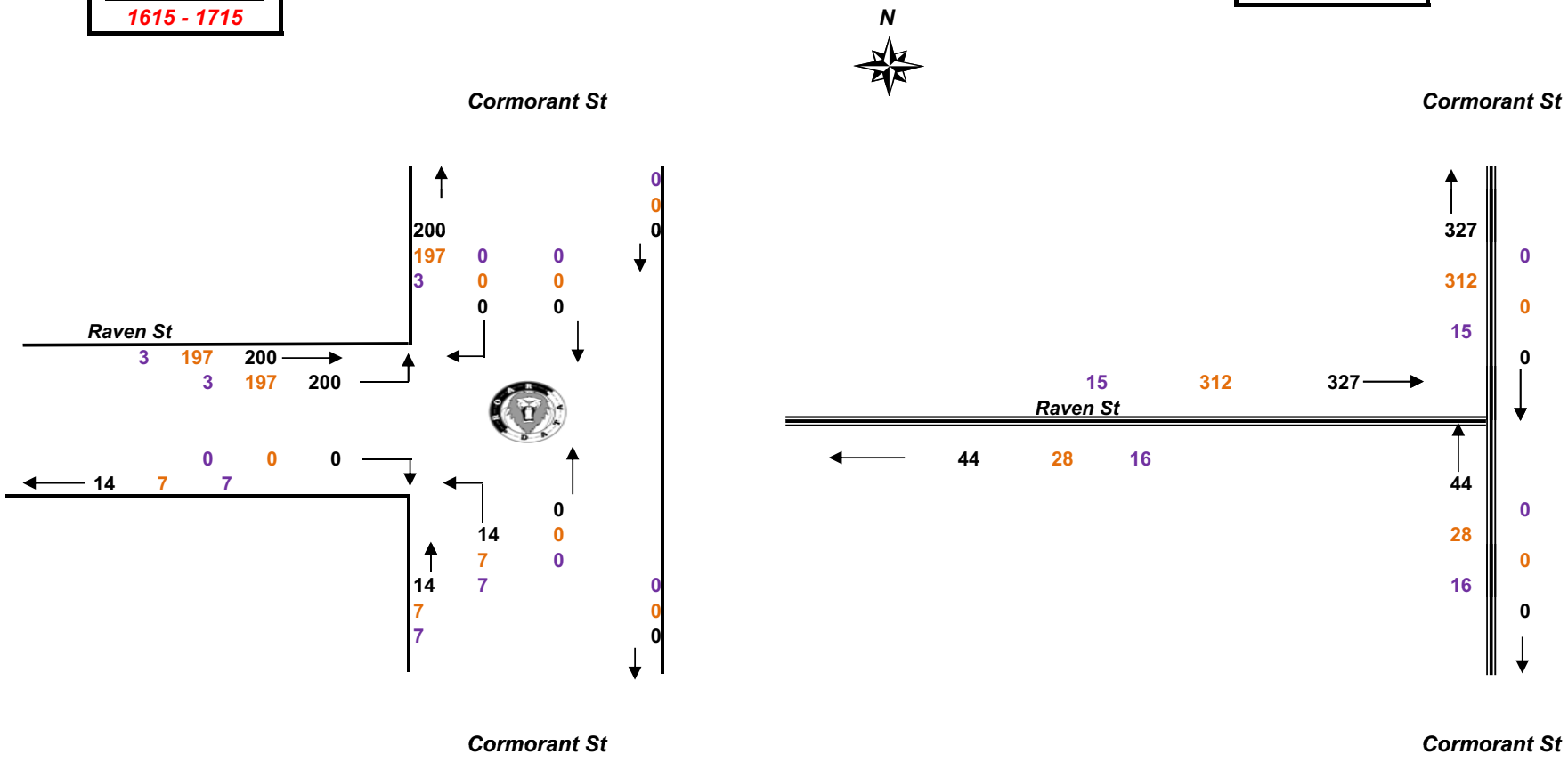
	NORTH		WEST		SOUTH		
	Cormorant		*Raven St*		*Cormorant*		
Peak Per	T	R	L	R	L	T	TOT
1500 - 1600	0	0	33	0	22	0	55
1515 - 1615	0	0	38	0	21	0	59
1530 - 1630	0	0	48	0	20	0	68
1545 - 1645	0	0	104	0	23	0	127
1600 - 1700	0	0	178	0	21	0	199
1615 - 1715	0	0	200	0	14	0	214
1630 - 1730	0	0	206	0	8	0	214
1645 - 1745	0	0	149	0	3	0	152
1700 - 1800	0	0	88	0	1	0	89
1715 - 1815	0	0	63	0	1	0	64
1730 - 1830	0	0	52	0	1	0	53
1745 - 1845	0	0	47	0	0	0	47
1800 - 1900	0	0	28	0	0	0	28
PEAK HR	**0**	**0**	**200**	**0**	**14**	**0**	**214**

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

Client : EMGA
Job no/Name : 3826 KOORAGANG ISLAND Traffic Counts
Day/Date : Tuesday 25th October 2011

PM PEAK HOUR
1615 - 1715

TOTAL VOLUMES FOR COUNT PERIOD



CfeIT bob.white@cfeit.com (02) 9740 8600

Traffic Count Summary Report

Count Number	**7386**	Ref : **BTF**	**Lat/Long : S32 52 37 85 / E151 44 1.09** **UBD 116 N-15**
Street	**TOURLE STREET, MAYFIELD WEST : From INDUSTRIAL DRIVE to CORMORANT ROAD : NORTH BOUND**		
Location	Adjacent Tourle Street Bridge, Northbound, at southern end of bridge		*Carriageway*

TOTAL COUNT MATRIX

Start Date	04-MAY-11
Start Time	100
Duration	7 DAYS
Interval	1 HOUR

Weekly 50th Percentile Speed	64
Weekly 85th Percentile Speed	76
Five Day AADT	16231
Seven Day AADT	14533

	MON *9TH*	TUE *10TH*	WED *4TH*	THU *5TH*	FRI *6TH*	SAT *7TH*	SUN *8TH*	5 Dav Total	5 Dav Average	7 Dav Total	7 Dav Average
Midnight - 1am	53	45	90	102	82	87	91	**372**	**74**	**550**	**79**
1am - 2am	21	39	55	72	65	61	75	**252**	**50**	**388**	**55**
2am - 3am	50	46	62	77	60	48	39	**295**	**59**	**382**	**55**
3am - 4am	39	51	78	91	73	50	45	**332**	**66**	**427**	**61**
4am - 5am	182	162	181	198	198	128	94	**921**	**184**	**1143**	**163**
5am - 6am	911	898	852	861	820	445	169	**4342**	**868**	**4956**	**708**
6am - 7am	**1663**	**1635**	**1715**	**1642**	**1668**	700	213	**8323**	**1665**	**9236**	**1319**
7am - 8am	1236	1271	1340	1311	1331	475	216	**6489**	**1298**	**7180**	**1026**
8am - 9am	846	853	871	908	875	585	284	**4353**	**871**	**5222**	**746**
9am - 10am	850	743	793	815	779	716	454	**3980**	**796**	**5150**	**736**
10am - 11am	704	699	731	692	753	777	748	**3579**	**716**	**5104**	**729**
11am - Midday	726	713	757	751	802	**850**	**1029**	**3749**	**750**	**5628**	**804**
Midday - 1pm	864	810	900	889	962	**890**	**934**	**4425**	**885**	**6249**	**893**
1pm - 2pm	833	890	896	888	1019	878	783	**4526**	**905**	**6187**	**884**
2pm - 3pm	1030	1005	1042	1066	1131	791	765	**5274**	**1055**	**6830**	**976**
3pm - 4pm	1274	1197	1271	1526	1324	742	879	**6592**	**1318**	**8213**	**1173**
4pm - 5pm	1264	**1346**	1289	**1629**	**1369**	769	816	**6897**	**1379**	**8482**	**1212**
5pm - 6pm	**1290**	1264	**1323**	1386	1244	727	609	**6507**	**1301**	**7843**	**1120**
6pm - 7pm	565	569	655	666	601	346	298	**3056**	**611**	**3700**	**529**
7pm - 8pm	324	349	405	431	363	270	222	**1872**	**374**	**2364**	**338**
8pm - 9pm	260	333	345	428	297	223	229	**1663**	**333**	**2115**	**302**
9pm - 10pm	244	272	313	474	300	236	188	**1603**	**321**	**2027**	**290**
10pm - 11pm	165	200	244	243	285	233	119	**1137**	**227**	**1489**	**213**
11pm - Midnight	101	87	141	139	146	173	80	**614**	**123**	**867**	**124**
Total	**15495**	**15477**	**16349**	**17285**	**16547**	**11200**	**9379**	**81153**	**16230**	**101732**	**14533**

CfeIT bob.white@cfeit.com (02) 9740 8600

Traffic Count Summary Report

Count Number	**7387**	Ref : **BTF**	**Lat/Long : S32 52 37 85 / E151 44 1.09** **UBD 116 N-15**
Street	**TOURLE STREET, MAYFIELD WEST : From INDUSTRIAL DRIVE to CORMORANT ROAD : SOUTH BOUND**		
Location	Adjacent Tourle Street Bridge, Southbound, at southern end of bridge		*Carriageway*

TOTAL COUNT MATRIX

Start Date	04-MAY-11
Start Time	100
Duration	7 DAYS
Interval	1 HOUR

Weekly 50th Percentile Speed	72
Weekly 85th Percentile Speed	79
Five Day AADT	15755
Seven Day AADT	14225

	MON *9TH*	TUE *10TH*	WED *4TH*	THU *5TH*	FRI *6TH*	SAT *7TH*	SUN *8TH*	5 Dav Total	5 Dav Average	7 Dav Total	7 Dav Average
Midnight - 1am	31	51	82	75	100	79	76	**339**	**68**	**494**	**71**
1am - 2am	24	62	84	103	52	53	47	**325**	**65**	**425**	**61**
2am - 3am	32	54	79	99	57	42	29	**321**	**64**	**392**	**56**
3am - 4am	61	69	74	82	67	48	47	**353**	**71**	**448**	**64**
4am - 5am	99	90	113	128	110	58	28	**540**	**108**	**626**	**89**
5am - 6am	430	392	423	410	414	211	152	**2069**	**414**	**2432**	**347**
6am - 7am	845	809	872	840	846	308	147	**4212**	**842**	**4667**	**667**
7am - 8am	1382	1257	1332	1312	1206	489	278	**6489**	**1298**	**7256**	**1037**
8am - 9am	**1507**	**1519**	**1443**	**1489**	**1509**	845	396	**7467**	**1493**	**8708**	**1244**
9am - 10am	948	950	1004	1005	1011	811	642	**4918**	**984**	**6371**	**910**
10am - 11am	933	848	814	901	976	952	**901**	**4472**	**894**	**6325**	**904**
11am - Midday	787	812	938	857	866	**957**	851	**4260**	**852**	**6068**	**867**
Midday - 1pm	759	750	789	796	1031	**917**	737	**4125**	**825**	**5779**	**826**
1pm - 2pm	854	795	873	809	1048	**917**	683	**4379**	**876**	**5979**	**854**
2pm - 3pm	1034	960	1098	1042	1413	902	849	**5547**	**1109**	**7298**	**1043**
3pm - 4pm	1278	1182	1275	1278	**1509**	713	**936**	**6522**	**1304**	**8171**	**1167**
4pm - 5pm	**1481**	**1529**	**1495**	1442	1101	688	902	**7048**	**1410**	**8638**	**1234**
5pm - 6pm	1244	1437	1444	**1534**	1042	674	762	**6701**	**1340**	**8137**	**1162**
6pm - 7pm	570	640	681	684	679	430	431	**3254**	**651**	**4115**	**588**
7pm - 8pm	242	269	292	326	317	218	207	**1446**	**289**	**1871**	**267**
8pm - 9pm	180	233	184	255	181	174	200	**1033**	**207**	**1407**	**201**
9pm - 10pm	231	237	292	343	244	263	239	**1347**	**269**	**1849**	**264**
10pm - 11pm	116	191	213	184	200	156	104	**904**	**181**	**1164**	**166**
11pm - Midnight	106	126	173	151	150	156	90	**706**	**141**	**952**	**136**
Total	**15174**	**15262**	**16067**	**16145**	**16129**	**11061**	**9734**	**78777**	**15755**	**99572**	**14224**

 CFE Information Technologies

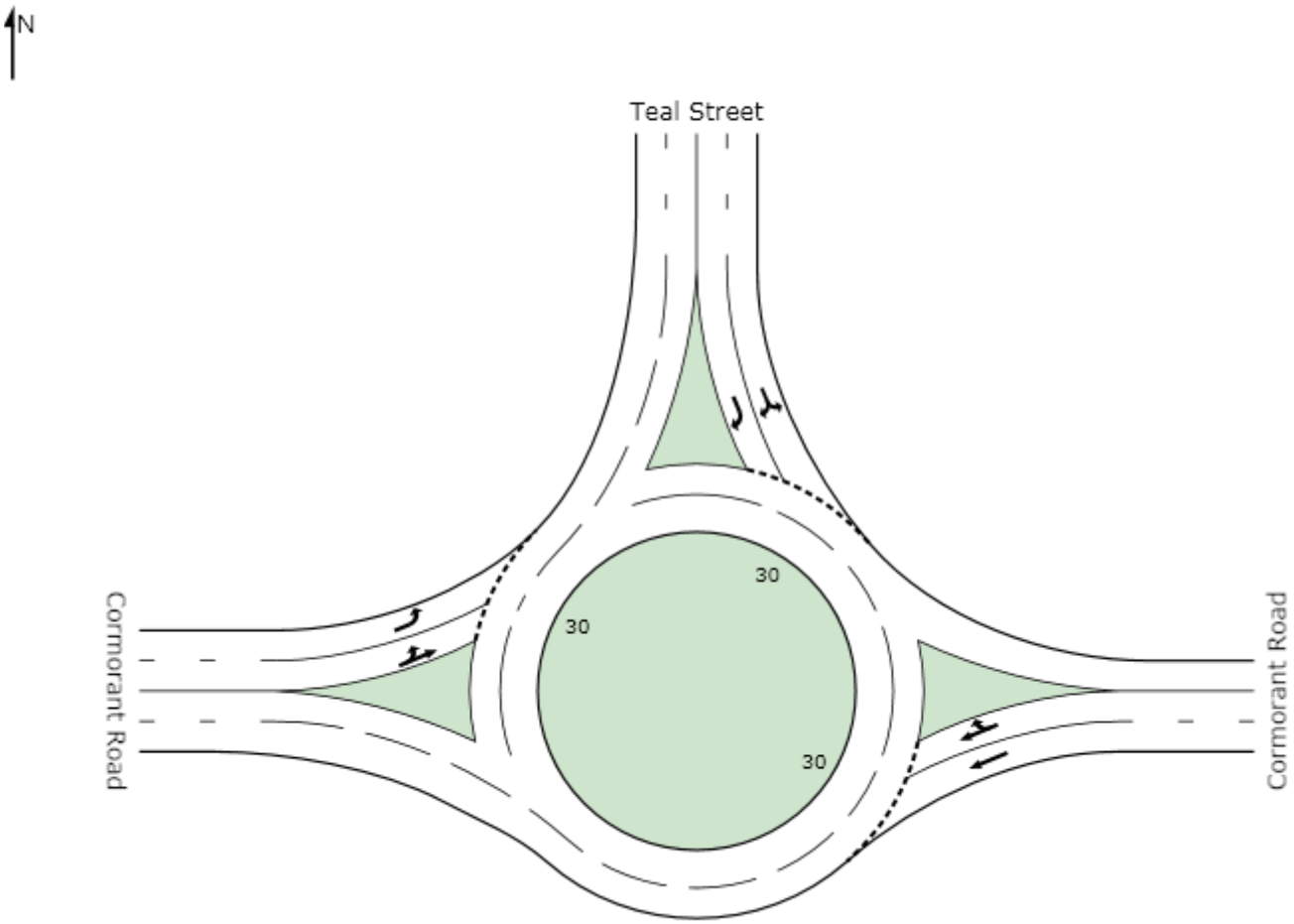
Data displayed has been compiled from pneumatic traffic count processes and is subject to the documented limitations

Appendix B

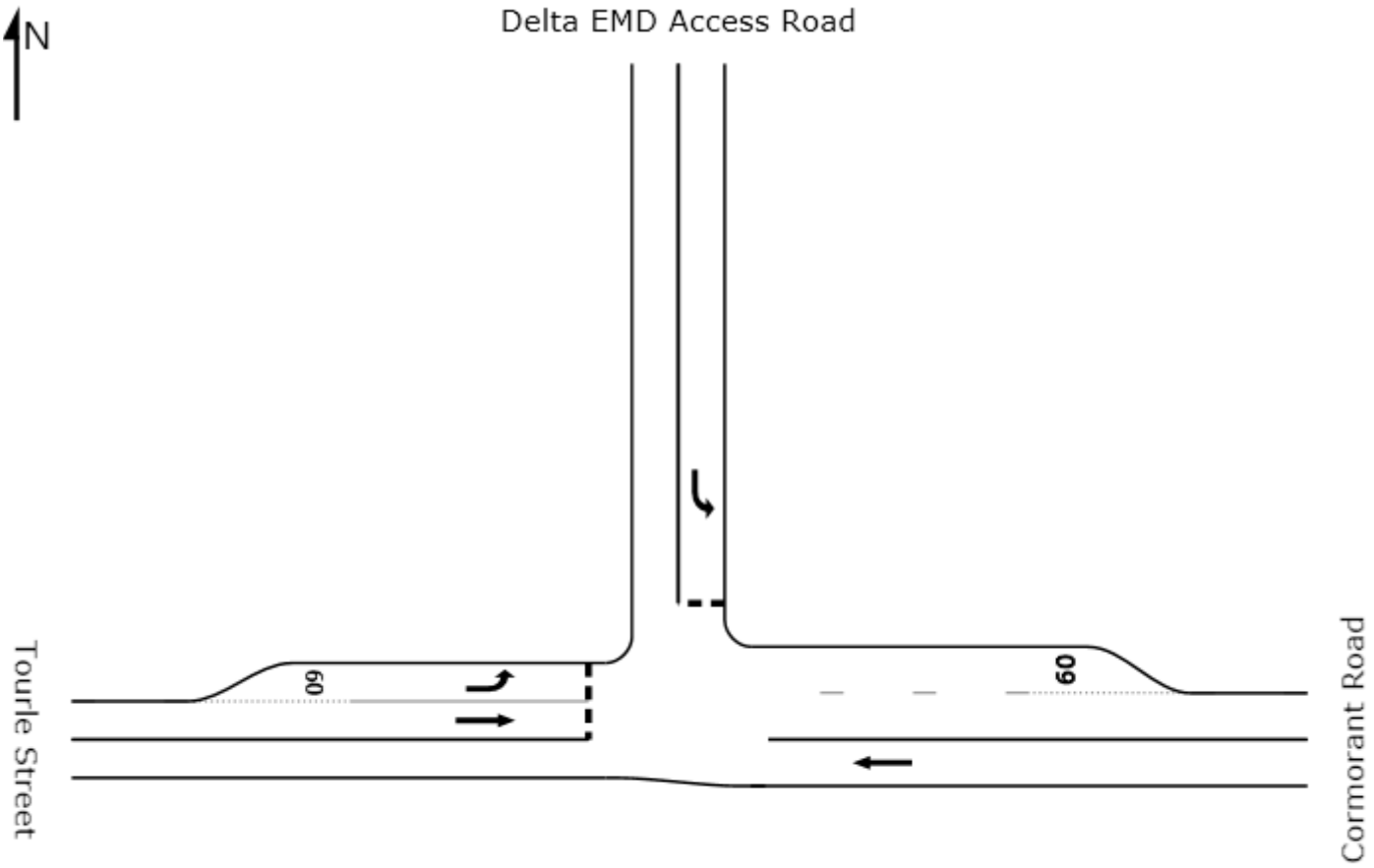
SIDRA intersection analysis results

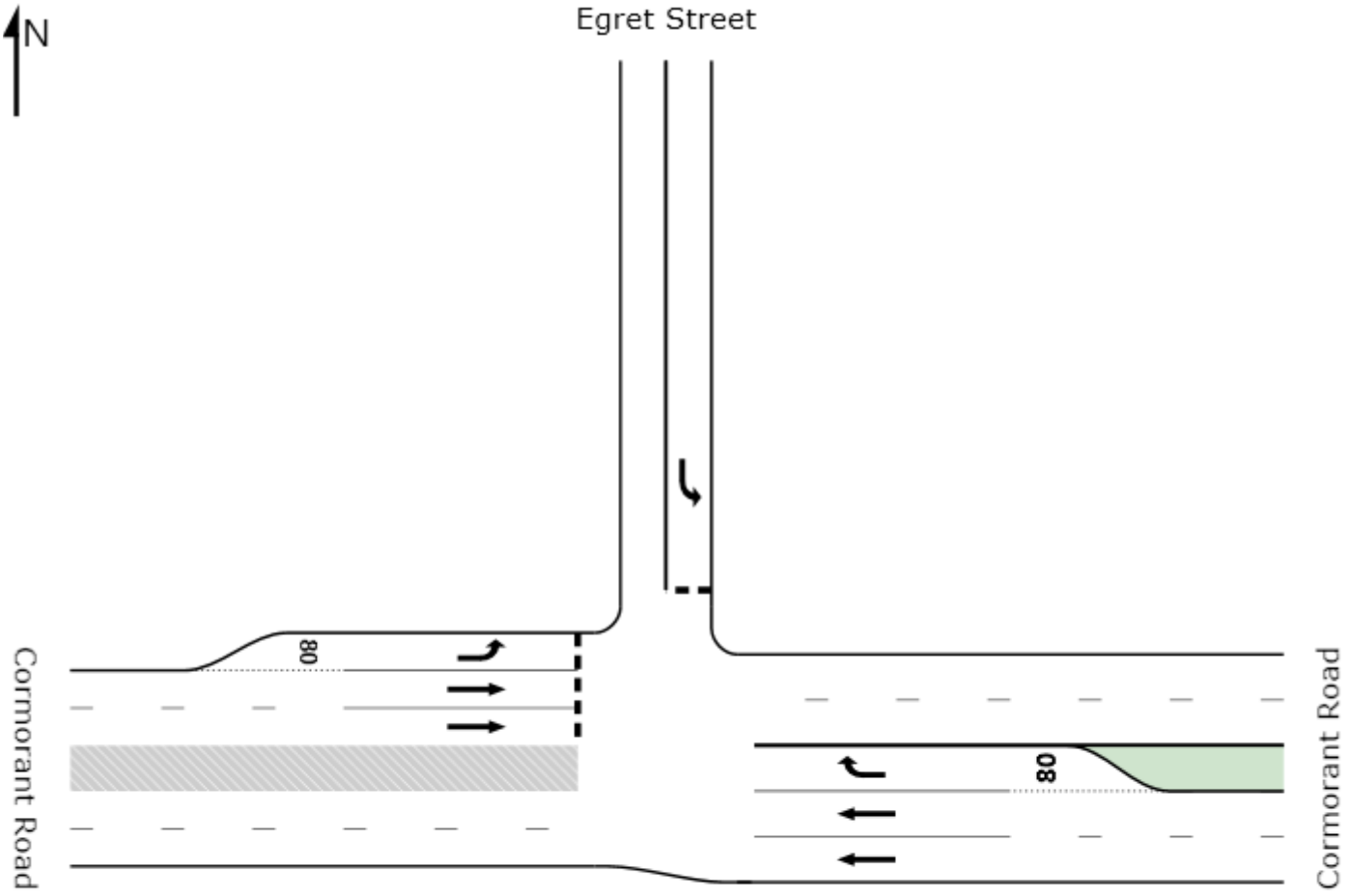
"This page has been intentionally left blank"

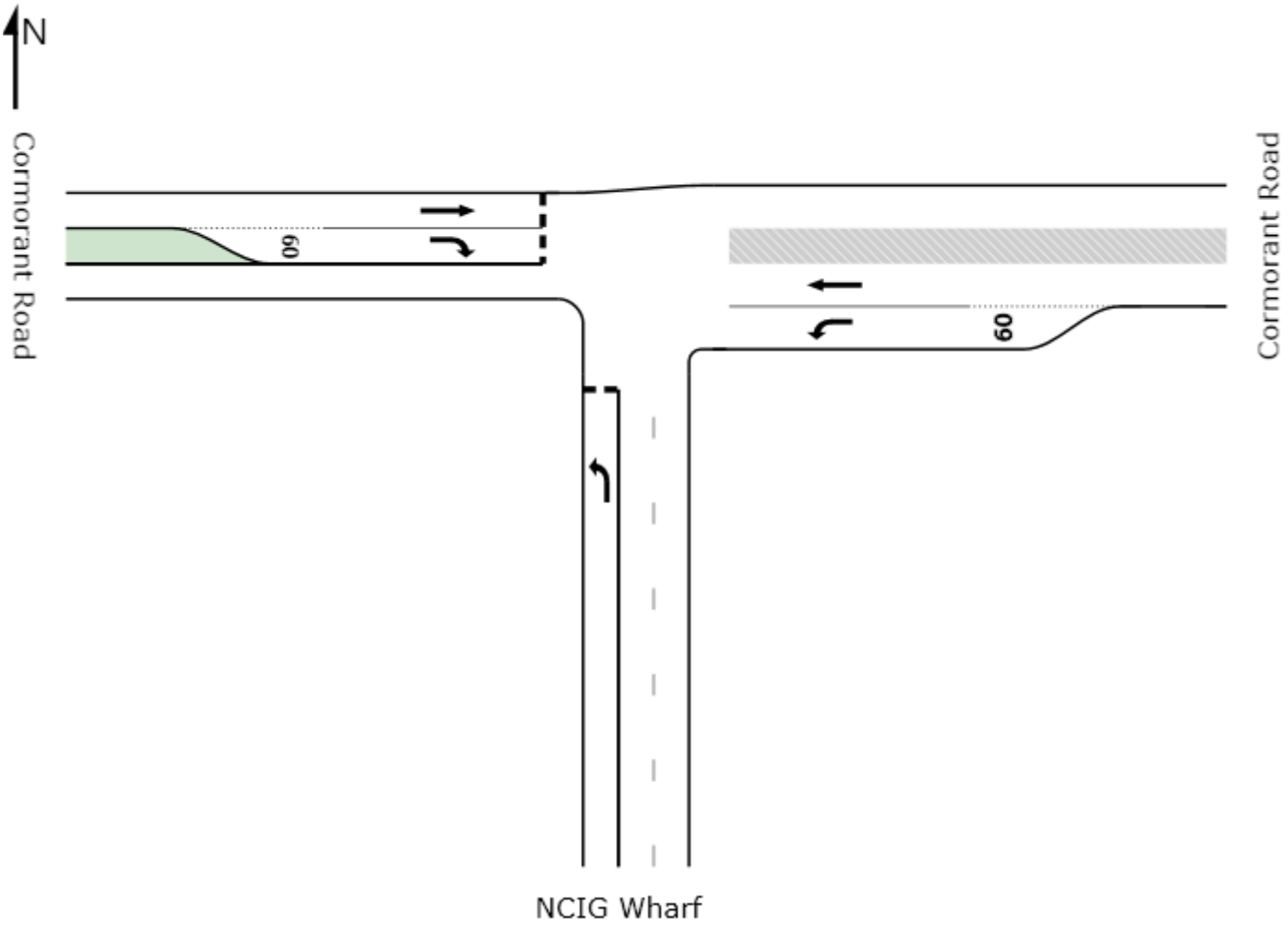
B1 - Intersection Layouts

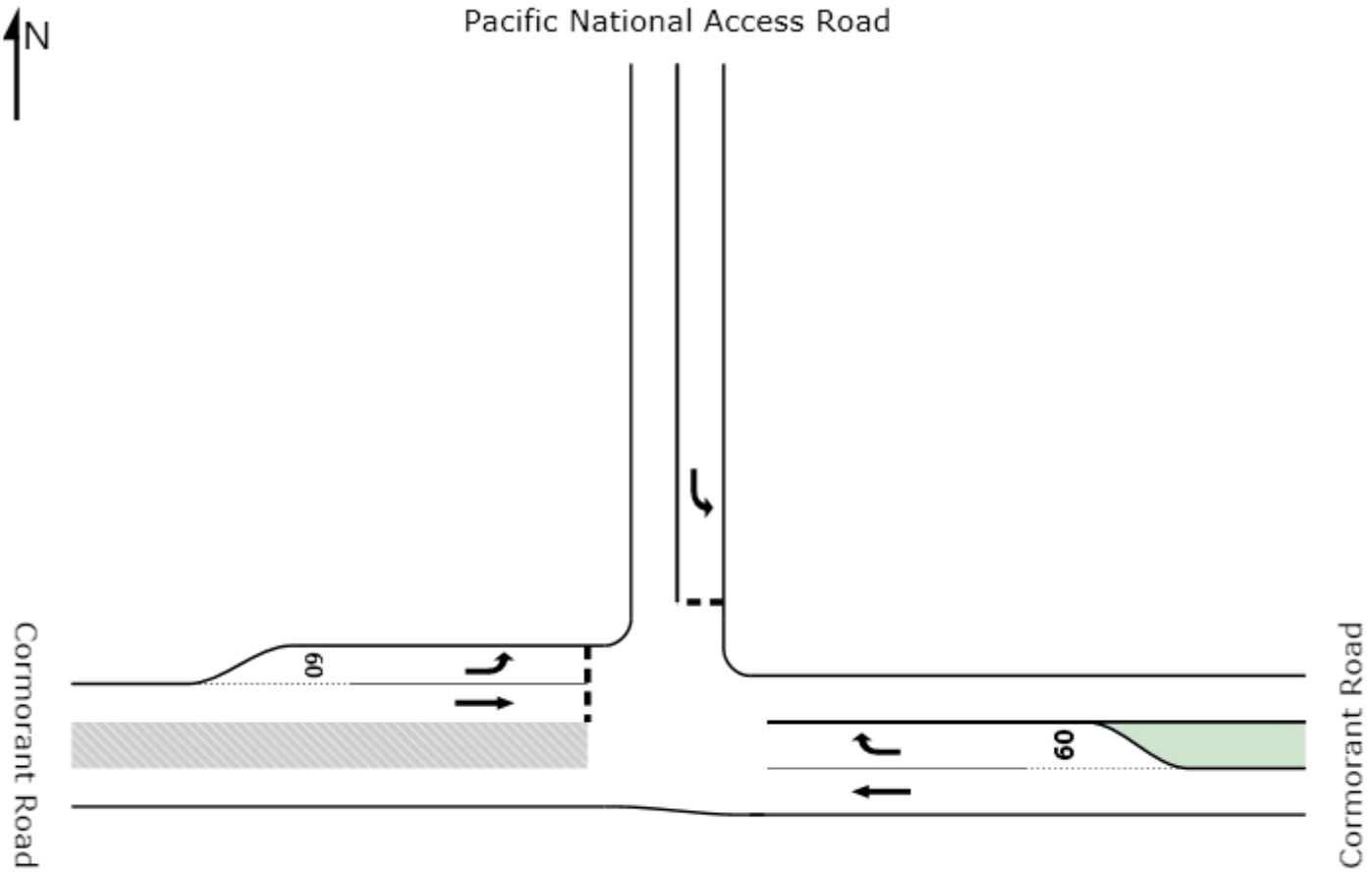

N
Teal Street
Cormorant Road
Cormorant Road
30
30
30

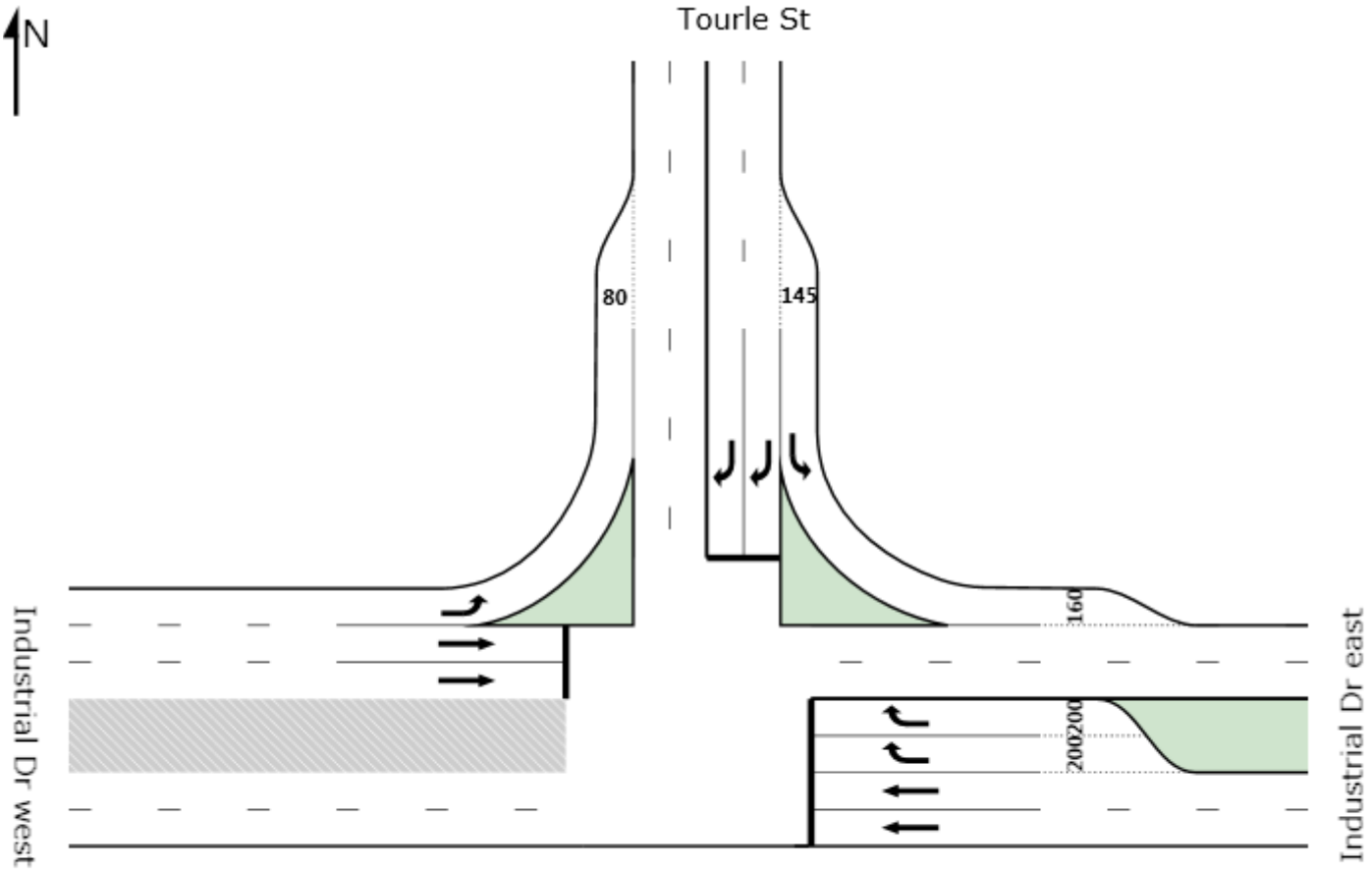
N
Cormorant Road
30
Curlew Street
30
30
Cormorant Road

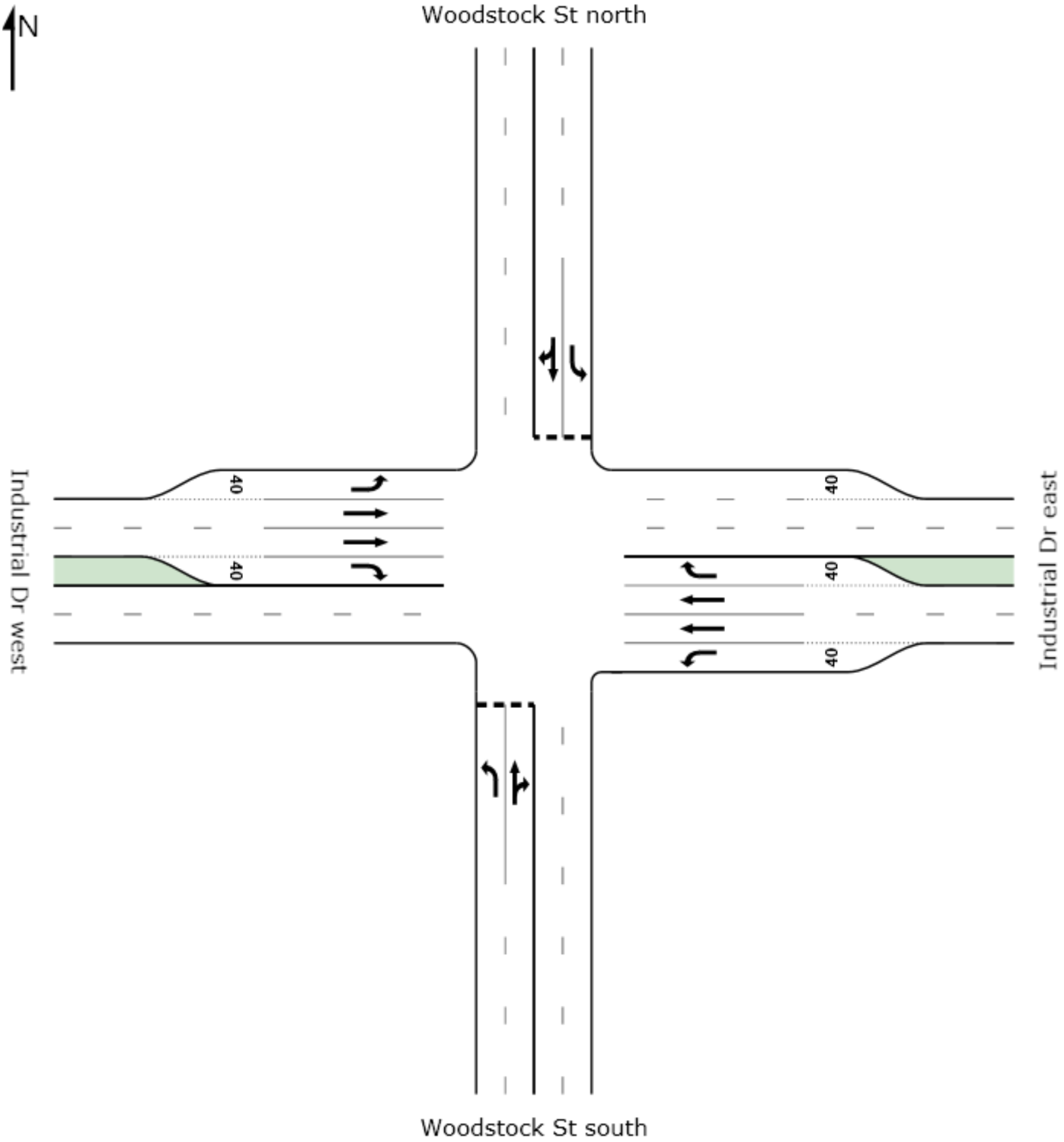

N
Delta EMD Access Road
Tourle Street
60
60
Cormorant Road

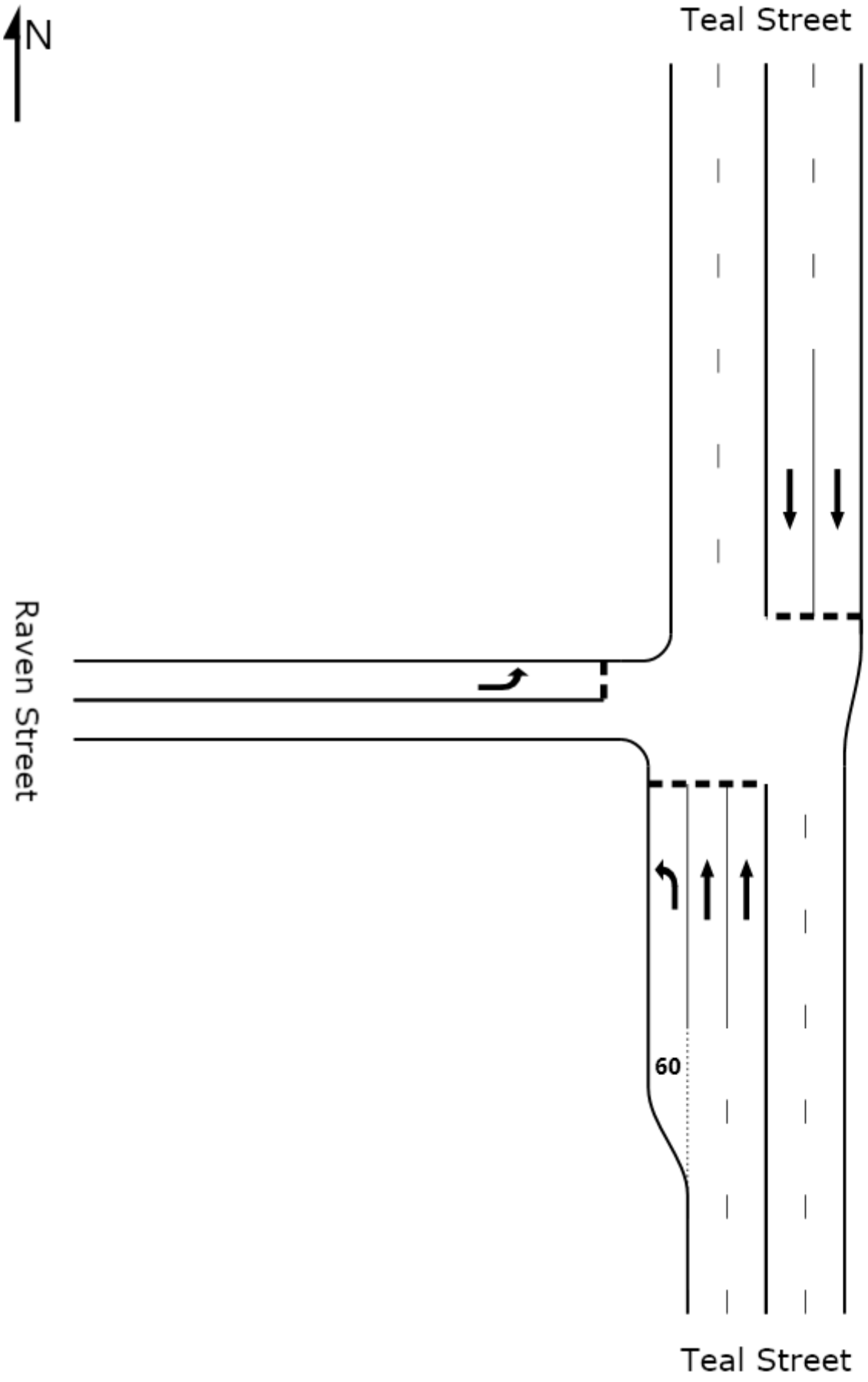

N
Egret Street
Cormorant Road
80
80
Cormorant Road

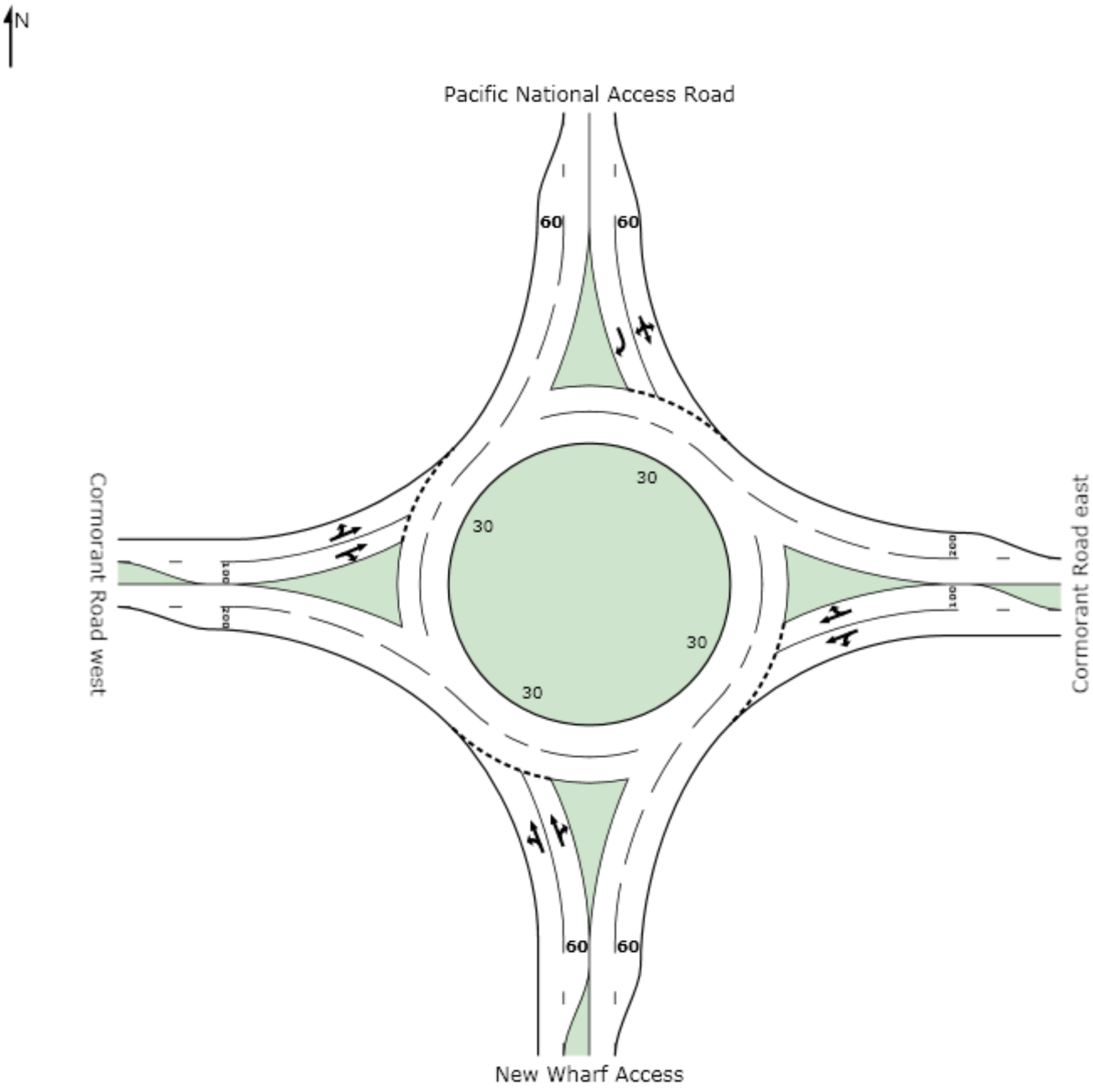

N
Cormorant Road
60
60
Cormorant Road
NCIG Wharf

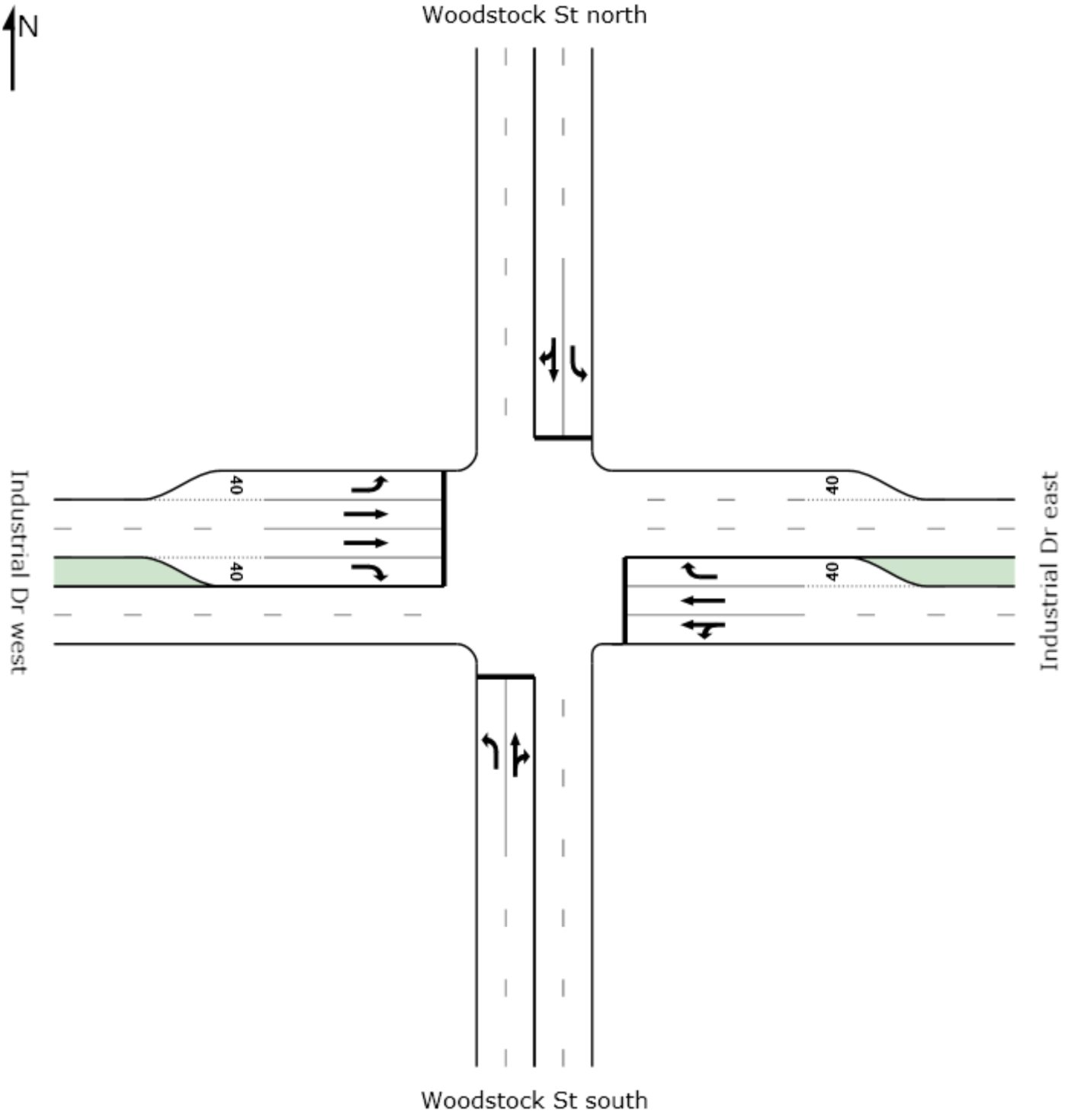

N
Pacific National Access Road
Cormorant Road
60
60
Cormorant Road

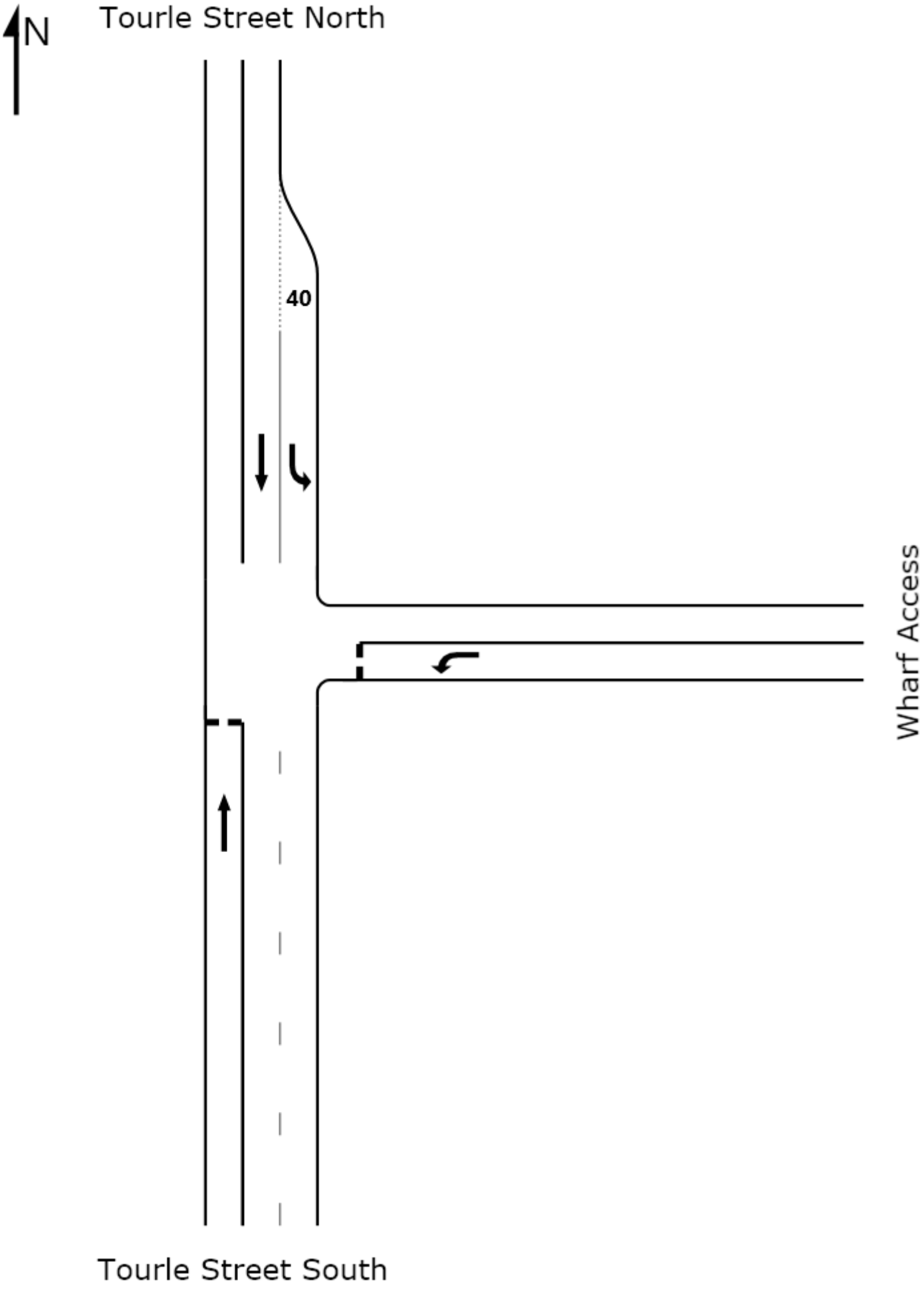

N
Tourle St
80
145
160
200
200
Industrial Dr west
Industrial Dr east


N
Woodstock St north
Industrial Dr west
Industrial Dr east
Woodstock St south
40
40
40
40
40


N
Teal Street
Raven Street
60
Teal Street


N
Pacific National Access Road
60
60
30
30
30
30
Cormorant Road west
Cormorant Road east
New Wharf Access
60
60


N
Woodstock St north
Industrial Dr west
Industrial Dr east
Woodstock St south
40
40
40


N
Tourle Street North
40
Wharf Access
Tourle Street South

B2 – 2011 Base Traffic for Stage 1 Access

MOVEMENT SUMMARY

Site: AM-Cormorant Rd - Curlew Street 2011 base 6-7 am

Cormorant Road with Curlew Street
2011 base flows
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: Cormorant Road											
1	L	49	6.4	0.028	8.4	LOS A	0.0	0.0	0.00	0.67	49.0
2	T	55	9.6	0.030	7.2	LOS A	0.0	0.0	0.00	0.59	50.4
Approach		104	8.1	0.030	7.8	LOS A	0.0	0.0	0.00	0.63	49.7
North: Cormorant Road											
8	T	11	40.0	0.007	8.1	LOS A	0.0	0.0	0.00	0.59	50.4
9	R	2	100.0	0.009	14.6	LOS B	0.0	0.3	0.37	0.61	44.5
Approach		13	50.0	0.009	9.2	LOS A	0.0	0.3	0.06	0.59	49.1
West: Curlew Street											
10	L	5	80.0	0.013	11.6	LOS A	0.0	0.4	0.24	0.60	47.8
12	R	47	13.3	0.067	9.8	LOS A	0.3	2.0	0.27	0.64	47.6
Approach		53	20.0	0.067	10.0	LOS A	0.3	2.0	0.27	0.64	47.7
All Vehicles		169	14.9	0.067	8.6	NA	0.3	2.0	0.09	0.63	49.0

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: AM-Cormorant Rd - Curlew Street 2011 base 7.30-8.30 am actual peak

Cormorant Road with Curlew Street
2011 base flows
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: Cormorant Road											
1	L	37	14.3	0.022	8.6	LOS A	0.0	0.0	0.00	0.67	49.0
2	T	48	19.6	0.028	7.5	LOS A	0.0	0.0	0.00	0.59	50.4
Approach		85	17.3	0.028	8.0	LOS A	0.0	0.0	0.00	0.62	49.7
North: Cormorant Road											
8	T	29	50.0	0.020	8.4	LOS A	0.0	0.0	0.00	0.58	50.4
9	R	4	75.0	0.014	12.8	LOS A	0.0	0.4	0.34	0.61	46.3
Approach		34	53.1	0.020	8.9	LOS A	0.0	0.4	0.04	0.59	49.8
West: Curlew Street											
10	L	9	88.9	0.024	11.8	LOS A	0.1	0.7	0.24	0.61	47.8
12	R	101	26.0	0.169	11.1	LOS A	0.7	6.1	0.35	0.67	46.7
Approach		111	31.4	0.169	11.1	LOS A	0.7	6.1	0.34	0.67	46.8
All Vehicles		229	29.4	0.169	9.6	NA	0.7	6.1	0.17	0.64	48.3

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: PM-Cormorant Rd - Curlew Street 2011 base 4.00-5.00 pm actual peak

Cormorant Road with Curlew Street
2011 base flows
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: Cormorant Road											
1	L	46	4.5	0.026	8.3	LOS A	0.0	0.0	0.00	0.67	49.0
2	T	9	22.2	0.006	7.6	LOS A	0.0	0.0	0.00	0.59	50.4
Approach		56	7.5	0.026	8.2	LOS A	0.0	0.0	0.00	0.65	49.2
North: Cormorant Road											
8	T	53	14.0	0.029	7.3	LOS A	0.0	0.0	0.00	0.59	50.4
9	R	15	21.4	0.028	9.4	LOS A	0.1	0.7	0.20	0.60	48.1
Approach		67	15.6	0.029	7.8	LOS A	0.1	0.7	0.04	0.59	49.9
West: Curlew Street											
10	L	3	33.3	0.005	9.4	LOS A	0.0	0.1	0.12	0.61	48.4
12	R	237	9.3	0.323	10.1	LOS A	1.6	12.2	0.35	0.66	47.2
Approach		240	9.6	0.323	10.1	LOS A	1.6	12.2	0.35	0.66	47.2
All Vehicles		363	10.4	0.323	9.4	NA	1.6	12.2	0.24	0.65	48.0

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: PM-Cormorant Rd - Curlew Street 2011 base 5-6 pm

Cormorant Road with Curlew Street
2011 base flows
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: Cormorant Road											
1	L	20	15.8	0.012	8.6	LOS A	0.0	0.0	0.00	0.66	49.0
2	T	26	12.0	0.015	7.3	LOS A	0.0	0.0	0.00	0.59	50.4
Approach		46	13.6	0.015	7.9	LOS A	0.0	0.0	0.00	0.62	49.7
North: Cormorant Road											
8	T	49	6.4	0.026	7.1	LOS A	0.0	0.0	0.00	0.59	50.4
9	R	12	0.0	0.018	8.5	LOS A	0.1	0.4	0.17	0.61	48.3
Approach		61	5.2	0.026	7.4	LOS A	0.1	0.4	0.03	0.59	49.9
West: Curlew Street											
10	L	1	0.0	0.001	8.3	LOS A	0.0	0.0	0.11	0.62	48.5
12	R	127	4.1	0.163	9.5	LOS A	0.7	5.1	0.28	0.65	47.6
Approach		128	4.1	0.163	9.5	LOS A	0.7	5.1	0.28	0.65	47.6
All Vehicles		236	6.3	0.163	8.6	NA	0.7	5.1	0.16	0.63	48.6

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: AM-Cormorant Rd - Delta EMD 2011 base 6-7 am

Cormorant Road with Delta EMD Access
2011 base flows
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
East: Cormorant Road											
5	T	904	4.4	0.477	0.0	LOS A	0.0	0.0	0.00	0.00	80.0
Approach		904	4.4	0.477	0.0	NA	0.0	0.0	0.00	0.00	80.0
North: Delta EMD Access Road											
7	L	1	0.0	0.017	59.7	LOS E	0.0	0.3	0.95	0.98	24.8
Approach		1	0.0	0.017	59.7	LOS E	0.0	0.3	0.95	0.98	24.8
West: Tourle Street											
10	L	14	0.0	0.007	10.1	LOS A	0.0	0.0	0.00	0.71	57.1
11	T	1757	4.9	0.930	10.4	LOS A	0.0	0.0	0.00	0.68	59.9
Approach		1771	4.9	0.930	10.4	LOS A	0.0	0.0	0.00	0.68	59.9
All Vehicles		2676	4.7	0.930	6.9	NA	0.0	0.3	0.00	0.45	65.5

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: AM-Cormorant Rd - Delta EMD 2011 base 7.15-8.15 am actual peak

Cormorant Road with Delta EMD Access
2011 base flows
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
East: Cormorant Road											
5	T	1542	6.5	0.824	0.0	LOS A	0.0	0.0	0.00	0.00	80.0
Approach		1542	6.5	0.824	0.0	NA	0.0	0.0	0.00	0.00	80.0
North: Delta EMD Access Road											
7	L	11	40.0	0.139	56.3	LOS D	0.4	3.7	0.93	0.98	26.1
Approach		11	40.0	0.139	56.3	LOS D	0.4	3.7	0.93	0.98	26.1
West: Tourle Street											
10	L	12	27.3	0.007	11.1	LOS A	0.0	0.0	0.00	0.71	57.1
11	T	1226	7.6	0.660	10.5	LOS A	0.0	0.0	0.00	0.68	59.9
Approach		1238	7.7	0.660	10.5	LOS A	0.0	0.0	0.00	0.68	59.9
All Vehicles		2791	7.2	0.824	4.9	NA	0.4	3.7	0.00	0.30	69.3

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: PM-Cormorant Rd - Delta EMD 2011 base 4.00-5.00 pm actual peak

Cormorant Road with Delta EMD Access
2011 base flows
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
East: Cormorant Road											
5	T	1752	3.0	0.916	0.0	LOS A	0.0	0.0	0.00	0.00	80.0
Approach		1752	3.0	0.916	0.0	NA	0.0	0.0	0.00	0.00	80.0
North: Delta EMD Access Road											
7	L	21	20.0	0.811	282.5	LOS F	2.5	20.6	1.00	1.10	7.6
Approach		21	20.0	0.811	282.5	LOS F	2.5	20.6	1.00	1.10	7.6
West: Tourle Street											
10	L	3	66.7	0.003	12.5	LOS A	0.0	0.0	0.00	0.70	57.1
11	T	1846	1.7	0.957	10.2	LOS A	0.0	0.0	0.00	0.68	59.9
Approach		1849	1.8	0.957	10.2	LOS A	0.0	0.0	0.00	0.68	59.9
All Vehicles		3622	2.5	0.957	6.9	NA	2.5	20.6	0.01	0.35	65.4

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.

MOVEMENT SUMMARY

Site: PM-Cormorant Rd - Delta EMD 2011 base 5-6 pm

Cormorant Road with Delta EMD Access
2011 base flows
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
East: Cormorant Road											
5	T	1417	2.2	0.737	0.0	LOS A	0.0	0.0	0.00	0.00	80.0
Approach		1417	2.2	0.737	0.0	NA	0.0	0.0	0.00	0.00	80.0
North: Delta EMD Access Road											
7	L	1	100.0	0.305	1091.5	LOS F	0.7	9.1	1.00	1.01	2.8
Approach		1	100.0	0.305	1091.5	LOS F	0.7	9.1	1.00	1.01	2.8
West: Tourle Street											
10	L	1	0.0	0.001	10.1	LOS A	0.0	0.0	0.00	0.71	57.1
11	T	1591	1.1	0.822	10.2	LOS A	0.0	0.0	0.00	0.68	59.9
Approach		1592	1.1	0.822	10.2	LOS A	0.0	0.0	0.00	0.68	59.9
All Vehicles		3009	1.7	0.822	5.8	NA	0.7	9.1	0.00	0.36	67.4

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.

MOVEMENT SUMMARY

Site: AM-Cormorant Rd - Egret Street 2011 base 6-7 am

Cormorant Road with Egret Street
2011 base flows
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
East: Cormorant Road											
5	T	913	4.6	0.241	0.0	LOS A	0.0	0.0	0.00	0.00	80.0
6	R	7	28.6	0.063	41.3	LOS C	0.2	1.7	0.91	0.97	31.9
Approach		920	4.8	0.241	0.3	NA	0.2	1.7	0.01	0.01	79.2
North: Egret Street											
7	L	22	47.6	0.293	64.9	LOS E	0.9	8.9	0.93	1.01	24.0
Approach		22	47.6	0.293	64.9	LOS E	0.9	8.9	0.93	1.01	24.0
West: Cormorant Road											
10	L	459	4.4	0.255	10.2	LOS A	0.0	0.0	0.00	0.71	57.1
11	T	1079	5.4	0.286	10.4	LOS A	0.0	0.0	0.00	0.68	59.9
Approach		1538	5.1	0.286	10.3	LOS A	0.0	0.0	0.00	0.69	59.1
All Vehicles		2480	5.3	0.293	7.1	NA	0.9	8.9	0.01	0.44	64.5

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: AM-Cormorant Rd - Egret Street 2011 base 7.30-8.30 am actual peak

Cormorant Road with Egret Street
2011 base flows
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
East: Cormorant Road											
5	T	1658	6.7	0.444	0.0	LOS A	0.0	0.0	0.00	0.00	80.0
6	R	9	55.6	0.061	34.4	LOS C	0.2	2.0	0.85	0.95	36.0
Approach		1667	6.9	0.444	0.2	NA	0.2	2.0	0.00	0.01	79.5
North: Egret Street											
7	L	27	61.5	0.229	43.3	LOS D	0.7	7.9	0.88	0.98	30.7
Approach		27	61.5	0.229	43.3	LOS D	0.7	7.9	0.88	0.98	30.7
West: Cormorant Road											
10	L	173	17.1	0.104	10.7	LOS A	0.0	0.0	0.00	0.71	57.1
11	T	871	6.4	0.233	10.4	LOS A	0.0	0.0	0.00	0.68	59.9
Approach		1043	8.2	0.233	10.5	LOS A	0.0	0.0	0.00	0.68	59.4
All Vehicles		2738	8.0	0.444	4.5	NA	0.7	7.9	0.01	0.27	69.7

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: PM-Cormorant Rd - Egret Street 2011 base 4.30-5.30 pm actual peak

Cormorant Road with Egret Street
2011 base flows
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
East: Cormorant Road											
5	T	1666	3.2	0.436	0.0	LOS A	0.0	0.0	0.00	0.00	80.0
6	R	1	0.0	0.008	34.6	LOS C	0.0	0.2	0.91	0.95	34.7
Approach		1667	3.2	0.436	0.0	NA	0.0	0.2	0.00	0.00	79.9
North: Egret Street											
7	L	166	3.8	1.785	782.5	LOS F	51.7	373.5	1.00	3.43	3.0
Approach		166	3.8	1.785	782.5	LOS F	51.7	373.5	1.00	3.43	3.0
West: Cormorant Road											
10	L	40	26.3	0.026	11.0	LOS A	0.0	0.0	0.00	0.71	57.1
11	T	1822	1.4	0.471	10.2	LOS A	0.0	0.0	0.00	0.68	59.9
Approach		1862	1.9	0.471	10.2	LOS A	0.0	0.0	0.00	0.68	59.8
All Vehicles		3696	2.6	1.785	40.4	NA	51.7	373.5	0.05	0.50	34.4

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.

MOVEMENT SUMMARY

Site: PM-Cormorant Rd - Egret Street 2011 base 5-6 pm

Cormorant Road with Egret Street
2011 base flows
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
East: Cormorant Road											
5	T	1361	2.2	0.354	0.0	LOS A	0.0	0.0	0.00	0.00	80.0
6	R	1	0.0	0.005	25.1	LOS B	0.0	0.1	0.85	0.86	40.9
Approach		1362	2.2	0.354	0.0	NA	0.0	0.1	0.00	0.00	79.9
North: Egret Street											
7	L	66	4.8	0.426	39.0	LOS C	1.5	10.8	0.92	1.04	31.5
Approach		66	4.8	0.426	39.0	LOS C	1.5	10.8	0.92	1.04	31.5
West: Cormorant Road											
10	L	39	13.5	0.023	10.6	LOS A	0.0	0.0	0.00	0.71	57.1
11	T	1533	0.9	0.395	10.2	LOS A	0.0	0.0	0.00	0.68	59.9
Approach		1572	1.2	0.395	10.2	LOS A	0.0	0.0	0.00	0.68	59.8
All Vehicles		3000	1.7	0.426	6.2	NA	1.5	10.8	0.02	0.38	66.2

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

MOVEMENT SUMMARY

Site: AM-Cormorant Rd - NCIG Wharf 2011 base 6-7 am

Cormorant Road with NCIG Wharf Access
2011 base flows
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: NCIG Wharf											
1	L	9	22.2	0.037	22.4	LOS B	0.1	1.0	0.76	0.93	40.6
Approach		9	22.2	0.037	22.4	LOS B	0.1	1.0	0.76	0.93	40.6
East: Cormorant Road											
4	L	22	0.0	0.012	10.1	LOS A	0.0	0.0	0.00	0.71	57.1
5	T	919	4.4	0.485	0.0	LOS A	0.0	0.0	0.00	0.00	80.0
Approach		941	4.3	0.485	0.2	NA	0.0	0.0	0.00	0.02	79.3
West: Cormorant Road											
11	T	1655	5.0	0.876	10.4	LOS A	0.0	0.0	0.00	0.68	59.9
12	R	96	4.4	0.529	39.9	LOS C	2.4	17.1	0.89	1.06	32.0
Approach		1751	5.0	0.876	12.0	LOS A	2.4	17.1	0.05	0.70	57.4
All Vehicles		2701	4.8	0.876	7.9	NA	2.4	17.1	0.03	0.46	63.6

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: AM-Cormorant Rd - NCIG Wharf 2011 base 7.15-8.15 am actual peak

Cormorant Road with NCIG Wharf Access
2011 base flows
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: NCIG Wharf											
1	L	45	9.3	0.535	70.1	LOS E	1.7	13.1	0.96	1.06	22.5
Approach		45	9.3	0.535	70.1	LOS E	1.7	13.1	0.96	1.06	22.5
East: Cormorant Road											
4	L	14	7.7	0.008	10.3	LOS A	0.0	0.0	0.00	0.71	57.1
5	T	1564	6.3	0.835	0.0	LOS A	0.0	0.0	0.00	0.00	80.0
Approach		1578	6.3	0.835	0.1	NA	0.0	0.0	0.00	0.01	79.8
West: Cormorant Road											
11	T	1182	7.6	0.636	10.5	LOS A	0.0	0.0	0.00	0.68	59.9
12	R	44	14.3	1.000[3]	246.2	LOS F	5.1	39.8	1.00	1.27	7.9
Approach		1226	7.8	1.000	19.0	LOS B	5.1	39.8	0.04	0.70	49.4
All Vehicles		2849	7.0	1.000	9.3	NA	5.1	39.8	0.03	0.32	61.4

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.

3 x = 1.00 due to short lane. Refer to the Lane Summary report for information about excess flow and related conditions.

MOVEMENT SUMMARY

Site: PM-Cormorant Rd - NCIG Wharf 2011 base 4.00-5.00 pm actual peak

Cormorant Road with NCIG Wharf Access
2011 base flows
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: NCIG Wharf											
1	L	118	4.5	1.432	485.2	LOS F	27.3	198.2	1.00	2.58	4.7
Approach		118	4.5	1.432	485.2	LOS F	27.3	198.2	1.00	2.58	4.7
East: Cormorant Road											
4	L	4	50.0	0.003	11.9	LOS A	0.0	0.0	0.00	0.71	57.1
5	T	1664	3.0	0.870	0.0	LOS A	0.0	0.0	0.00	0.00	80.0
Approach		1668	3.2	0.870	0.0	NA	0.0	0.0	0.00	0.00	79.9
West: Cormorant Road											
11	T	1862	1.9	0.967	10.2	LOS A	0.0	0.0	0.00	0.68	59.9
12	R	76	4.2	1.263	368.4	LOS F	14.3	103.7	1.00	1.73	5.5
Approach		1938	2.0	1.263	24.3	LOS B	14.3	103.7	0.04	0.72	44.4
All Vehicles		3724	2.6	1.432	28.0	NA	27.3	198.2	0.05	0.46	41.6

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: PM-Cormorant Rd - NCIG Wharf 2011 base 5-6 pm

Cormorant Road with NCIG Wharf Access
2011 base flows
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: NCIG Wharf											
1	L	74	2.9	0.442	37.2	LOS C	1.6	11.2	0.92	1.04	32.2
Approach		74	2.9	0.442	37.2	LOS C	1.6	11.2	0.92	1.04	32.2
East: Cormorant Road											
4	L	1	0.0	0.001	10.1	LOS A	0.0	0.0	0.00	0.71	57.1
5	T	1362	2.2	0.708	0.0	LOS A	0.0	0.0	0.00	0.00	80.0
Approach		1363	2.2	0.708	0.0	NA	0.0	0.0	0.00	0.00	80.0
West: Cormorant Road											
11	T	1572	1.2	0.812	10.2	LOS A	0.0	0.0	0.00	0.68	59.9
12	R	44	0.0	0.651	102.0	LOS F	2.4	16.7	0.97	1.08	16.7
Approach		1616	1.2	0.812	12.7	LOS A	2.4	16.7	0.03	0.69	56.3
All Vehicles		3053	1.7	0.812	7.6	NA	2.4	16.7	0.04	0.39	63.7

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: AM-Cormorant Rd - Pacific National 2011 base 6-7 am

Cormorant Road with Pacific National Access
2011 base flows
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
East: Cormorant Road											
5	T	928	4.5	0.490	0.0	LOS A	0.0	0.0	0.00	0.00	80.0
6	R	1	0.0	0.012	48.8	LOS D	0.0	0.2	0.94	0.98	28.3
Approach		929	4.5	0.490	0.1	NA	0.0	0.2	0.00	0.00	79.9
North: Pacific National Access Road											
7	L	15	14.3	0.366	114.6	LOS F	1.0	7.9	0.98	1.02	16.0
Approach		15	14.3	0.366	114.6	LOS F	1.0	7.9	0.98	1.02	16.0
West: Cormorant Road											
10	L	95	3.3	0.052	10.2	LOS A	0.0	0.0	0.00	0.71	57.1
11	T	1736	4.9	0.919	10.4	LOS A	0.0	0.0	0.00	0.68	59.9
Approach		1831	4.8	0.919	10.4	LOS A	0.0	0.0	0.00	0.68	59.8
All Vehicles		2775	4.8	0.919	7.5	NA	1.0	7.9	0.01	0.45	64.4

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.

MOVEMENT SUMMARY

Site: AM-Cormorant Rd - Pacific National 2011 base 7.15-8.15 am actual peak

Cormorant Road with Pacific National Access
2011 base flows
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
East: Cormorant Road											
5	T	1603	6.2	0.855	0.0	LOS A	0.0	0.0	0.00	0.00	80.0
6	R	17	18.8	0.083	28.2	LOS B	0.3	2.2	0.85	0.96	39.1
Approach		1620	6.3	0.855	0.3	NA	0.3	2.2	0.01	0.01	79.3
North: Pacific National Access Road											
7	L	45	16.3	0.288	35.3	LOS C	0.9	7.6	0.89	1.00	33.3
Approach		45	16.3	0.288	35.3	LOS C	0.9	7.6	0.89	1.00	33.3
West: Cormorant Road											
10	L	41	15.4	0.025	10.6	LOS A	0.0	0.0	0.00	0.71	57.1
11	T	1181	7.5	0.635	10.5	LOS A	0.0	0.0	0.00	0.68	59.9
Approach		1222	7.8	0.635	10.5	LOS A	0.0	0.0	0.00	0.68	59.8
All Vehicles		2887	7.1	0.855	5.2	NA	0.9	7.6	0.02	0.31	68.5

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: PM-Cormorant Rd - Pacific National 2011 base 4.00-5.00 pm actual peak

Cormorant Road with Pacific National Access
2011 base flows
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
East: Cormorant Road											
5	T	1752	3.0	0.916	0.0	LOS A	0.0	0.0	0.00	0.00	80.0
6	R	31	10.3	0.483	90.2	LOS F	1.5	11.2	0.98	1.03	18.4
Approach		1782	3.1	0.916	1.5	NA	1.5	11.2	0.02	0.02	76.2
North: Pacific National Access Road											
7	L	91	5.8	1.509	574.1	LOS F	23.7	174.2	1.00	2.33	4.0
Approach		91	5.8	1.509	574.1	LOS F	23.7	174.2	1.00	2.33	4.0
West: Cormorant Road											
10	L	20	5.3	0.011	10.3	LOS A	0.0	0.0	0.00	0.71	57.1
11	T	1847	1.8	0.959	10.2	LOS A	0.0	0.0	0.00	0.68	59.9
Approach		1867	1.9	0.959	10.2	LOS A	0.0	0.0	0.00	0.68	59.9
All Vehicles		3740	2.6	1.509	19.7	NA	23.7	174.2	0.03	0.40	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: PM-Cormorant Rd - Pacific National 2011 base 5-6 pm

Cormorant Road with Pacific National Access
2011 base flows
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
East: Cormorant Road											
5	T	1417	2.2	0.737	0.0	LOS A	0.0	0.0	0.00	0.00	80.0
6	R	19	0.0	0.125	33.5	LOS C	0.4	2.6	0.91	0.97	35.3
Approach		1436	2.2	0.737	0.4	NA	0.4	2.6	0.01	0.01	78.9
North: Pacific National Access Road											
7	L	31	0.0	0.304	49.5	LOS D	0.9	6.4	0.94	1.01	27.7
Approach		31	0.0	0.304	49.5	LOS D	0.9	6.4	0.94	1.01	27.7
West: Cormorant Road											
10	L	6	0.0	0.003	10.1	LOS A	0.0	0.0	0.00	0.71	57.1
11	T	1585	1.2	0.819	10.2	LOS A	0.0	0.0	0.00	0.68	59.9
Approach		1592	1.2	0.819	10.2	LOS A	0.0	0.0	0.00	0.68	59.9
All Vehicles		3058	1.7	0.819	6.0	NA	0.9	6.4	0.02	0.37	66.8

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: AM-Teal St roundabout 2011 base 6-7 am

Teal Street roundaboput with Cormorant Road
2011 base flows
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
East: Cormorant Road											
5	T	25	0.0	0.026	6.1	LOS A	0.1	0.7	0.56	0.56	49.2
6	R	17	75.0	0.054	20.1	LOS B	0.2	2.1	0.66	0.88	40.7
Approach		42	30.0	0.054	11.7	LOS A	0.2	2.1	0.60	0.69	45.2
North: Teal Street											
7	L	61	3.4	0.407	6.6	LOS A	2.4	17.0	0.41	0.54	48.7
9	R	985	3.0	0.407	12.3	LOS A	2.4	17.0	0.42	0.69	45.0
Approach		1046	3.0	0.407	12.0	LOS A	2.4	17.0	0.42	0.68	45.2
West: Cormorant Road											
10	L	1107	4.0	0.427	5.8	LOS A	3.1	22.6	0.16	0.46	50.9
11	T	204	18.6	0.427	4.8	LOS A	3.0	22.6	0.17	0.36	52.0
Approach		1312	6.3	0.427	5.6	LOS A	3.1	22.6	0.16	0.45	51.1
All Vehicles		2400	5.3	0.427	8.5	LOS A	3.1	22.6	0.28	0.55	48.1

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: AM-Teal St roundabout 2011 base 7.15-8.15 am actual peak

Teal Street roundaboput with Cormorant Road
2011 base flows
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
East: Cormorant Road											
5	T	46	52.3	0.100	13.2	LOS A	0.4	4.2	0.78	0.86	44.7
6	R	9	77.8	0.100	24.8	LOS B	0.4	3.9	0.82	0.96	38.3
Approach		56	56.6	0.100	15.2	LOS B	0.4	4.2	0.79	0.88	43.4
North: Teal Street											
7	L	47	11.1	0.677	7.2	LOS A	5.6	41.3	0.56	0.58	47.7
9	R	1734	5.3	0.677	12.9	LOS A	5.8	42.7	0.57	0.70	44.3
Approach		1781	5.5	0.677	12.8	LOS A	5.8	42.7	0.57	0.70	44.4
West: Cormorant Road											
10	L	993	8.4	0.388	5.8	LOS A	2.8	21.8	0.12	0.46	51.2
11	T	158	40.7	0.388	5.1	LOS A	2.7	21.8	0.13	0.34	52.4
Approach		1151	12.8	0.388	5.7	LOS A	2.8	21.8	0.12	0.45	51.4
All Vehicles		2987	9.3	0.677	10.1	LOS A	5.8	42.7	0.40	0.60	46.7

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: PM-Teal St roundabout 2011 base 4.30-5.30 pm actual peak

Teal Street roundabout with Cormorant Road
2011 base flows
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
East: Cormorant Road											
5	T	314	4.7	0.201	7.4	LOS A	0.9	6.6	0.64	0.66	48.6
6	R	8	50.0	0.201	15.7	LOS B	0.8	6.2	0.65	0.98	44.9
Approach		322	5.9	0.201	7.6	LOS A	0.9	6.6	0.64	0.67	48.5
North: Teal Street											
7	L	3	0.0	0.423	6.3	LOS A	2.5	17.6	0.34	0.50	49.2
9	R	1152	2.4	0.423	12.0	LOS A	2.5	17.6	0.35	0.66	45.2
Approach		1155	2.4	0.423	12.0	LOS A	2.5	17.6	0.35	0.66	45.2
West: Cormorant Road											
10	L	1411	1.9	0.482	5.7	LOS A	3.8	27.5	0.10	0.46	51.3
11	T	139	22.0	0.482	4.8	LOS A	3.7	27.5	0.11	0.34	52.6
Approach		1549	3.7	0.482	5.6	LOS A	3.8	27.5	0.11	0.45	51.4
All Vehicles		3026	3.4	0.482	8.2	LOS A	3.8	27.5	0.26	0.56	48.4

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: PM-Teal St roundabout 2011 base 5-6 pm

Teal Street roundabout with Cormorant Road
2011 base flows
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
East: Cormorant Road											
5	T	171	6.8	0.102	6.7	LOS A	0.4	3.1	0.55	0.60	49.2
6	R	6	66.7	0.102	15.2	LOS B	0.4	3.0	0.57	0.97	45.3
Approach		177	8.9	0.102	7.0	LOS A	0.4	3.1	0.56	0.61	49.0
North: Teal Street											
7	L	5	0.0	0.329	6.2	LOS A	1.7	12.2	0.32	0.49	49.5
9	R	884	1.7	0.329	11.9	LOS A	1.7	12.2	0.32	0.66	45.3
Approach		889	1.7	0.329	11.9	LOS A	1.7	12.2	0.32	0.66	45.4
West: Cormorant Road											
10	L	1291	1.8	0.445	5.7	LOS A	3.2	23.4	0.09	0.47	51.4
11	T	144	21.2	0.445	4.8	LOS A	3.2	23.4	0.09	0.34	52.7
Approach		1435	3.7	0.445	5.6	LOS A	3.2	23.4	0.09	0.46	51.6
All Vehicles		2501	3.4	0.445	7.9	LOS A	3.2	23.4	0.20	0.54	48.9

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: AM-Industrial Dr - Tourle St
2011 base 6-7 am

Industrial Dr-Tourle St
2011 Base
Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

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
East: Industrial Dr east											
5	T	221	14.3	0.090	5.4	LOS A	1.7	13.7	0.35	0.29	65.3
6	R	779	11.4	0.756	47.0	LOS D	18.1	139.1	0.97	0.88	29.3
Approach		1000	12.0	0.756	37.8	LOS C	18.1	139.1	0.83	0.75	33.8
North: Tourle St											
7	L	413	16.3	0.248	8.1	X	X	X	X	0.59	49.7
9	R	476	15.9	0.751	55.0	LOS D	11.8	93.9	1.00	0.89	26.3
Approach		888	16.1	0.751	33.2	LOS C	11.8	93.9	0.54	0.75	33.2
West: Industrial Dr west											
10	L	825	16.6	0.497	12.1	X	X	X	X	0.68	58.7
11	T	897	15.7	0.768	34.7	LOS C	20.7	164.0	0.96	0.88	35.4
Approach		1722	16.1	0.768	23.9	LOS B	20.7	164.0	0.50	0.78	43.6
All Vehicles		3611	15.0	0.768	30.0	LOS C	20.7	164.0	0.60	0.77	37.9

X: Not applicable for Continuous movement.

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.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: AM-Industrial Dr - Tourle St 2011 base 8.00-9.00 am actual peak

Industrial Dr-Tourle St
2011 Base
Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

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
East: Industrial Dr east											
5	T	702	16.9	0.298	7.2	LOS A	7.0	55.7	0.44	0.39	61.6
6	R	442	15.2	0.776	58.3	LOS E	11.3	89.2	1.00	0.89	25.5
Approach		1144	16.3	0.776	26.9	LOS B	11.3	89.2	0.66	0.58	41.0
North: Tourle St											
7	L	645	11.4	0.376	8.0	X	X	X	X	0.60	49.7
9	R	546	14.8	0.775	54.4	LOS D	13.6	107.6	1.00	0.90	26.5
Approach		1192	13.0	0.775	29.3	LOS C	13.6	107.6	0.46	0.74	34.9
West: Industrial Dr west											
10	L	437	17.8	0.265	12.1	X	X	X	X	0.68	58.8
11	T	1262	8.8	0.777	26.8	LOS B	26.9	202.4	0.92	0.84	40.0
Approach		1699	11.1	0.777	23.1	LOS B	26.9	202.4	0.68	0.80	43.5
All Vehicles		4035	13.1	0.777	26.0	LOS B	26.9	202.4	0.61	0.72	40.0

X: Not applicable for Continuous movement.

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.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: PM-Industrial Dr - Tourle St 2011 base 4.15-5.15 pm actual peak

Industrial Dr-Tourle St
2011 Base
Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

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
East: Industrial Dr east											
5	T	1389	5.2	0.585	11.5	LOS A	19.6	143.4	0.63	0.58	54.6
6	R	752	4.2	0.834	55.1	LOS D	19.5	141.2	1.00	0.93	26.3
Approach		2141	4.9	0.834	26.8	LOS B	19.6	143.4	0.76	0.70	40.5
North: Tourle St											
7	L	1255	2.7	0.689	7.8	X	X	X	X	0.60	49.6
9	R	753	7.1	0.852	56.4	LOS D	20.0	148.8	1.00	0.96	25.8
Approach		2007	4.4	0.852	26.1	LOS B	20.0	148.8	0.37	0.73	36.3
West: Industrial Dr west											
10	L	633	4.2	0.351	11.3	X	X	X	X	0.69	58.8
11	T	1032	5.6	0.857	42.2	LOS C	26.9	197.1	1.00	0.98	31.9
Approach		1664	5.1	0.857	30.4	LOS C	26.9	197.1	0.62	0.87	38.6
All Vehicles		5813	4.7	0.857	27.6	LOS B	26.9	197.1	0.59	0.76	38.4

X: Not applicable for Continuous movement.

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.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: PM-Industrial Dr - Tourle St
2011 base 5-6 pm

Industrial Dr-Tourle St
2011 Base
Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

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
East: Industrial Dr east											
5	T	1237	7.0	0.502	9.2	LOS A	15.1	112.3	0.55	0.50	58.1
6	R	814	3.2	0.830	53.3	LOS D	20.8	149.7	1.00	0.92	26.9
Approach		2051	5.5	0.830	26.7	LOS B	20.8	149.7	0.73	0.67	40.7
North: Tourle St											
7	L	1152	2.7	0.632	7.8	X	X	X	X	0.60	49.6
9	R	648	3.9	0.816	55.0	LOS D	16.6	120.2	1.00	0.93	26.1
Approach		1800	3.1	0.816	24.8	LOS B	16.6	120.2	0.36	0.72	36.9
West: Industrial Dr west											
10	L	574	4.2	0.318	11.3	X	X	X	X	0.69	58.8
11	T	1014	4.0	0.808	36.9	LOS C	24.3	176.3	0.98	0.92	34.3
Approach		1587	4.1	0.808	27.6	LOS B	24.3	176.3	0.63	0.83	40.3
All Vehicles		5438	4.3	0.830	26.3	LOS B	24.3	176.3	0.58	0.73	39.3

X: Not applicable for Continuous movement.

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.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: AM-Industrial Dr - Woodstock St 2011 base 6-7 am

Industrial Dr-Woodstock St
2011 Base
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: Woodstock St south											
1	L	144	0.0	0.533	27.2	LOS B	2.3	16.4	0.88	1.08	34.3
2	T	1	0.0	0.439	930.1	LOS F	1.0	7.3	1.00	1.01	2.3
3	R	1	0.0	0.439	930.5	LOS F	1.0	7.3	1.00	1.01	2.3
Approach		146	0.0	0.533	40.2	LOS C	2.3	16.4	0.88	1.07	28.5
East: Industrial Dr east											
4	L	1	0.0	0.001	10.1	LOS A	0.0	0.0	0.00	0.71	57.1
5	T	1205	5.3	0.320	0.0	LOS A	0.0	0.0	0.00	0.00	80.0
6	R	19	0.0	0.047	18.1	LOS B	0.2	1.1	0.73	0.92	47.2
Approach		1225	5.2	0.320	0.3	NA	0.2	1.1	0.01	0.01	79.2
North: Woodstock St north											
7	L	9	0.0	0.031	19.3	LOS B	0.1	0.7	0.75	0.92	42.2
8	T	1	0.0	1.000[4]	583.3	LOS F	3.3	28.1	1.00	1.13	3.5
9	R	12	27.3	1.000[4]	586.4	LOS F	3.3	28.1	1.00	1.12	3.9
Approach		22	14.3	1.000	343.2	LOS F	3.3	28.1	0.89	1.04	6.4
West: Industrial Dr west											
10	L	53	8.0	0.030	10.5	LOS A	0.0	0.0	0.00	0.71	57.1
11	T	1092	6.0	0.291	0.0	LOS A	0.0	0.0	0.00	0.00	80.0
12	R	63	0.0	0.170	19.5	LOS B	0.6	4.2	0.78	0.94	45.8
Approach		1207	5.8	0.291	1.5	NA	0.6	4.2	0.04	0.08	76.2
All Vehicles		2601	5.3	1.000	6.0	NA	3.3	28.1	0.08	0.11	65.8

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.

4 x = 1.00 due to minimum capacity

MOVEMENT SUMMARY

Site: AM-Industrial Dr - Woodstock St 2011 base 7.45-8.45 am actual peak

Industrial Dr-Woodstock St
2011 Base
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: Woodstock St south											
1	L	125	0.0	0.693	44.3	LOS D	3.1	21.8	0.95	1.16	27.0
2	T	1	0.0	1.000[4]	3756.4	LOS F	4.1	28.6	1.00	1.02	0.6
3	R	1	0.0	1.000[4]	3756.8	LOS F	4.1	28.6	1.00	1.02	0.6
Approach		127	0.0	1.000	105.7	LOS F	4.1	28.6	0.95	1.16	15.3
East: Industrial Dr east											
4	L	3	66.7	0.003	13.6	LOS A	0.0	0.0	0.00	0.71	57.1
5	T	1437	6.9	0.385	0.0	LOS A	0.0	0.0	0.00	0.00	80.0
6	R	31	0.0	0.408	73.0	LOS F	1.3	8.8	0.97	1.02	21.6
Approach		1471	6.9	0.408	1.5	NA	1.3	8.8	0.02	0.02	76.2
North: Woodstock St north											
7	L	18	0.0	0.372	98.6	LOS F	1.0	7.3	0.97	1.02	17.8
8	T	1	0.0	1.000[4]	2611.3	LOS F	4.2	29.1	1.00	1.03	0.8
9	R	2	0.0	1.000[4]	2612.9	LOS F	4.2	29.1	1.00	1.03	0.9
Approach		21	0.0	1.000	475.7	LOS F	4.2	29.1	0.98	1.02	4.7
West: Industrial Dr west											
10	L	52	4.1	0.029	10.3	LOS A	0.0	0.0	0.00	0.71	57.1
11	T	2146	4.2	0.565	0.0	LOS A	0.0	0.0	0.00	0.00	80.0
12	R	119	4.4	0.465	30.1	LOS C	1.9	14.0	0.90	1.04	37.6
Approach		2317	4.2	0.565	1.8	NA	1.9	14.0	0.05	0.07	75.5
All Vehicles		3936	5.0	1.000	7.6	NA	4.2	29.1	0.07	0.09	63.6

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.

4 x = 1.00 due to minimum capacity

MOVEMENT SUMMARY

Site: PM-Industrial Dr - Woodstock St 2011 base 4.00-5.00 pm actual peak

Industrial Dr-Woodstock St
2011 Base
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: Woodstock St south											
1	L	120	1.8	1.601	637.3	LOS F	33.5	237.7	1.00	2.73	3.2
2	T	1	0.0	1.000[4]	3842.8	LOS F	4.2	29.3	1.00	1.02	0.6
3	R	1	0.0	1.000[4]	3843.2	LOS F	4.2	29.3	1.00	1.02	0.6
Approach		122	1.7	1.601	692.5	LOS F	33.5	237.7	1.00	2.70	3.0
East: Industrial Dr east											
4	L	1	0.0	0.001	10.1	LOS A	0.0	0.0	0.00	0.71	57.1
5	T	1956	2.5	0.510	0.0	LOS A	0.0	0.0	0.00	0.00	80.0
6	R	7	0.0	0.029	23.1	LOS B	0.1	0.6	0.83	0.95	42.5
Approach		1964	2.5	0.510	0.1	NA	0.1	0.6	0.00	0.00	79.8
North: Woodstock St north											
7	L	68	0.0	0.377	33.3	LOS C	1.3	9.3	0.90	1.02	33.9
8	T	1	0.0	1.000[4]	1468.9	LOS F	4.5	31.4	1.00	1.05	1.5
9	R	5	0.0	1.000[4]	1470.5	LOS F	4.5	31.4	1.00	1.05	1.6
Approach		75	0.0	1.000	154.8	LOS F	4.5	31.4	0.91	1.02	12.6
West: Industrial Dr west											
10	L	5	0.0	0.003	10.1	LOS A	0.0	0.0	0.00	0.71	57.1
11	T	1493	2.8	0.390	0.0	LOS A	0.0	0.0	0.00	0.00	80.0
12	R	130	0.0	1.110	211.2	LOS F	14.2	99.2	1.00	1.78	9.1
Approach		1628	2.5	1.110	16.9	NA	14.2	99.2	0.08	0.14	51.6
All Vehicles		3789	2.4	1.601	32.7	NA	33.5	237.7	0.09	0.17	38.6

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.

4 x = 1.00 due to minimum capacity

MOVEMENT SUMMARY

Site: PM-Industrial Dr - Woodstock St 2011 base 5-6 pm

Industrial Dr-Woodstock St
2011 Base
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: Woodstock St south											
1	L	124	0.0	0.727	48.9	LOS D	3.3	23.4	0.96	1.18	25.5
2	T	1	0.0	1.000[4]	4022.2	LOS F	4.4	30.6	1.00	1.02	0.5
3	R	1	0.0	1.000[4]	4022.5	LOS F	4.4	30.6	1.00	1.02	0.5
Approach		126	0.0	1.000	115.1	LOS F	4.4	30.6	0.96	1.18	14.4
East: Industrial Dr east											
4	L	7	0.0	0.004	10.1	LOS A	0.0	0.0	0.00	0.71	57.1
5	T	1498	1.8	0.388	0.0	LOS A	0.0	0.0	0.00	0.00	80.0
6	R	4	0.0	0.021	27.1	LOS B	0.1	0.5	0.86	0.96	39.5
Approach		1509	1.7	0.388	0.1	NA	0.1	0.5	0.00	0.01	79.7
North: Woodstock St north											
7	L	47	2.2	0.347	40.6	LOS C	1.1	8.1	0.92	1.01	30.8
8	T	1	0.0	1.000[4]	4002.1	LOS F	4.3	30.4	1.00	1.02	0.5
9	R	1	0.0	1.000[4]	4003.7	LOS F	4.3	30.4	1.00	1.02	0.6
Approach		49	2.1	1.000	209.2	LOS F	4.3	30.4	0.93	1.01	9.8
West: Industrial Dr west											
10	L	1	0.0	0.001	10.1	LOS A	0.0	0.0	0.00	0.71	57.1
11	T	1632	1.5	0.422	0.0	LOS A	0.0	0.0	0.00	0.00	80.0
12	R	82	0.0	0.337	28.2	LOS B	1.3	8.8	0.88	1.00	38.7
Approach		1715	1.4	0.422	1.4	NA	1.3	8.8	0.04	0.05	76.5
All Vehicles		3400	1.5	1.000	8.1	NA	4.4	30.6	0.07	0.09	62.7

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.

4 x = 1.00 due to minimum capacity

MOVEMENT SUMMARY

Site: AM-Teal St - Raven Street
2011 base 6-7 am

Teal Street with Raven Street
2011 base flows
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: Teal Street											
1	L	148	4.3	0.082	10.2	LOS A	0.0	0.0	0.00	0.71	57.1
2	T	881	4.1	0.232	10.3	LOS A	0.0	0.0	0.00	0.68	59.9
Approach		1029	4.1	0.232	10.3	LOS A	0.0	0.0	0.00	0.68	59.5
North: Teal Street											
8	T	1091	2.6	0.284	10.3	LOS A	0.0	0.0	0.00	0.68	59.9
Approach		1091	2.6	0.284	10.3	LOS A	0.0	0.0	0.00	0.68	59.9
West: Raven Street											
10	L	17	18.8	0.058	20.5	LOS B	0.2	1.5	0.73	0.92	41.8
Approach		17	18.8	0.058	20.5	LOS B	0.2	1.5	0.73	0.92	41.8
All Vehicles		2137	3.4	0.284	10.4	NA	0.2	1.5	0.01	0.68	59.5

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: AM-Teal St - Raven Street 2011 base 7.30-8.30 am actual peak

Teal Street with Raven Street
2011 base flows
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: Teal Street											
1	L	78	43.2	0.055	11.6	LOS A	0.0	0.0	0.00	0.71	57.1
2	T	775	5.0	0.205	10.4	LOS A	0.0	0.0	0.00	0.68	59.9
Approach		853	8.5	0.205	10.5	LOS A	0.0	0.0	0.00	0.68	59.6
North: Teal Street											
8	T	1665	4.7	0.440	10.4	LOS A	0.0	0.0	0.00	0.68	59.9
Approach		1665	4.7	0.440	10.4	LOS A	0.0	0.0	0.00	0.68	59.9
West: Raven Street											
10	L	33	61.3	0.195	32.7	LOS C	0.6	6.9	0.82	0.95	35.4
Approach		33	61.3	0.195	32.7	LOS C	0.6	6.9	0.82	0.95	35.4
All Vehicles		2551	6.7	0.440	10.7	NA	0.6	6.9	0.01	0.68	59.3

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: PM-Teal St - Raven Street 2011 base 4.30-5.30 am actual peak

Teal Street with Raven Street
2011 base flows
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: Teal Street											
1	L	8	25.0	0.005	11.0	LOS A	0.0	0.0	0.00	0.71	57.1
2	T	1411	2.0	0.366	10.2	LOS A	0.0	0.0	0.00	0.68	59.9
Approach		1419	2.2	0.366	10.3	LOS A	0.0	0.0	0.00	0.68	59.9
North: Teal Street											
8	T	1155	2.4	0.301	10.3	LOS A	0.0	0.0	0.00	0.68	59.9
Approach		1155	2.4	0.301	10.3	LOS A	0.0	0.0	0.00	0.68	59.9
West: Raven Street											
10	L	217	1.9	1.100	162.7	LOS F	20.5	146.0	1.00	2.44	12.1
Approach		217	1.9	1.100	162.7	LOS F	20.5	146.0	1.00	2.44	12.1
All Vehicles		2791	2.2	1.100	22.1	NA	20.5	146.0	0.08	0.82	45.8

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: PM-Teal St - Raven Street
2011 base 5-6 pm

Teal Street with Raven Street
2011 base flows
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: Teal Street											
1	L	1	100.0	0.001	13.7	LOS A	0.0	0.0	0.00	0.70	53.2
2	T	1296	2.0	0.337	10.3	LOS A	0.0	0.0	0.00	0.68	59.9
Approach		1297	2.1	0.337	10.3	LOS A	0.0	0.0	0.00	0.68	59.9
North: Teal Street											
8	T	889	1.7	0.231	10.2	LOS A	0.0	0.0	0.00	0.68	59.9
Approach		889	1.7	0.231	10.2	LOS A	0.0	0.0	0.00	0.68	59.9
West: Raven Street											
10	L	93	3.4	0.390	27.8	LOS B	1.5	10.6	0.87	1.02	36.8
Approach		93	3.4	0.390	27.8	LOS B	1.5	10.6	0.87	1.02	36.8
All Vehicles		2279	2.0	0.390	11.0	NA	1.5	10.6	0.04	0.69	58.4

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.

B3 – 2015 Stage 1 Construction Traffic

MOVEMENT SUMMARY

Site: AM-Cormorant Rd - Curlew Street 2015 Stage 1 construction 6-7 am

Cormorant Road with Curlew Street
2015 Stage 1 Construction
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: Cormorant Road											
1	L	28	11.1	0.017	8.5	LOS A	0.0	0.0	0.00	0.67	49.0
2	T	33	16.1	0.018	7.4	LOS A	0.0	0.0	0.00	0.59	50.4
Approach		61	13.8	0.018	7.9	LOS A	0.0	0.0	0.00	0.62	49.7
North: Cormorant Road											
8	T	11	40.0	0.007	8.1	LOS A	0.0	0.0	0.00	0.59	50.4
9	R	2	100.0	0.008	13.1	LOS A	0.0	0.3	0.29	0.59	45.7
Approach		13	50.0	0.008	8.9	LOS A	0.0	0.3	0.05	0.59	49.4
West: Curlew Street											
10	L	5	80.0	0.012	11.1	LOS A	0.0	0.3	0.18	0.60	48.1
12	R	47	13.3	0.063	9.4	LOS A	0.2	1.9	0.22	0.63	47.9
Approach		53	20.0	0.063	9.6	LOS A	0.2	1.9	0.21	0.63	47.9
All Vehicles		126	20.0	0.063	8.7	NA	0.2	1.9	0.09	0.62	48.9

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: PM-Cormorant Rd - Curlew Street 2015 Stage 1 construction 5-6 pm

Cormorant Road with Curlew Street
2015 Stage 1 Construction
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: Cormorant Road											
1	L	20	15.8	0.012	8.6	LOS A	0.0	0.0	0.00	0.66	49.0
2	T	26	12.0	0.015	7.3	LOS A	0.0	0.0	0.00	0.59	50.4
Approach		46	13.6	0.015	7.9	LOS A	0.0	0.0	0.00	0.62	49.7
North: Cormorant Road											
8	T	25	12.5	0.014	7.3	LOS A	0.0	0.0	0.00	0.59	50.4
9	R	12	0.0	0.018	8.5	LOS A	0.1	0.4	0.17	0.61	48.3
Approach		37	8.6	0.018	7.7	LOS A	0.1	0.4	0.05	0.59	49.7
West: Curlew Street											
10	L	1	0.0	0.001	8.3	LOS A	0.0	0.0	0.11	0.62	48.5
12	R	62	8.5	0.080	9.3	LOS A	0.3	2.4	0.23	0.63	47.8
Approach		63	8.3	0.080	9.3	LOS A	0.3	2.4	0.23	0.63	47.9
All Vehicles		146	10.1	0.080	8.4	NA	0.3	2.4	0.11	0.62	48.9

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: AM-Cormorant Rd - Delta EMD 2015 Stage 1 construction 6-7 am

Cormorant Road with Delta EMD Access
2015 Stage 1 Construction
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
East: Cormorant Road											
5	T	957	4.2	0.504	0.0	LOS A	0.0	0.0	0.00	0.00	80.0
Approach		957	4.2	0.504	0.0	NA	0.0	0.0	0.00	0.00	80.0
North: Delta EMD Access Road											
7	L	1	0.0	0.019	65.5	LOS E	0.0	0.3	0.95	0.99	23.4
Approach		1	0.0	0.019	65.5	LOS E	0.0	0.3	0.95	0.99	23.4
West: Tourle Street											
10	L	14	0.0	0.007	10.1	LOS A	0.0	0.0	0.00	0.71	57.1
11	T	1798	4.8	0.951	10.4	LOS A	0.0	0.0	0.00	0.68	59.9
Approach		1812	4.8	0.951	10.4	LOS A	0.0	0.0	0.00	0.68	59.9
All Vehicles		2769	4.6	0.951	6.8	NA	0.0	0.3	0.00	0.44	65.7

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: PM-Cormorant Rd - Delta EMD 2015 Stage 1 construction 5-6 pm

Cormorant Road with Delta EMD Access
2015 Stage 1 Construction
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
East: Cormorant Road											
5	T	1699	1.9	0.882	0.0	LOS A	0.0	0.0	0.00	0.00	80.0
Approach		1699	1.9	0.882	0.0	NA	0.0	0.0	0.00	0.00	80.0
North: Delta EMD Access Road											
7	L	18	5.9	0.222	55.6	LOS D	0.6	4.6	0.95	1.00	25.9
Approach		18	5.9	0.222	55.6	LOS D	0.6	4.6	0.95	1.00	25.9
West: Tourle Street											
10	L	1	0.0	0.001	10.1	LOS A	0.0	0.0	0.00	0.71	57.1
11	T	1661	1.1	0.858	10.2	LOS A	0.0	0.0	0.00	0.68	59.9
Approach		1662	1.1	0.858	10.2	LOS A	0.0	0.0	0.00	0.68	59.9
All Vehicles		3379	1.5	0.882	5.3	NA	0.6	4.6	0.01	0.34	68.2

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

MOVEMENT SUMMARY

Site: AM-Cormorant Rd - Egret Street 2015 Stage 1 construction 6-7 am

Cormorant Road with Egret Street
2015 Stage 1 Construction
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
East: Cormorant Road											
5	T	1005	4.2	0.265	0.0	LOS A	0.0	0.0	0.00	0.00	80.0
6	R	7	28.6	0.042	30.9	LOS C	0.1	1.2	0.86	0.96	37.5
Approach		1013	4.4	0.265	0.2	NA	0.1	1.2	0.01	0.01	79.4
North: Egret Street											
7	L	22	47.6	0.222	49.2	LOS D	0.7	6.8	0.91	0.99	28.4
Approach		22	47.6	0.222	49.2	LOS D	0.7	6.8	0.91	0.99	28.4
West: Cormorant Road											
10	L	260	7.7	0.148	10.3	LOS A	0.0	0.0	0.00	0.71	57.1
11	T	1053	5.5	0.280	10.4	LOS A	0.0	0.0	0.00	0.68	59.9
Approach		1313	5.9	0.280	10.4	LOS A	0.0	0.0	0.00	0.68	59.4
All Vehicles		2347	5.7	0.280	6.4	NA	0.7	6.8	0.01	0.40	66.1

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: PM-Cormorant Rd - Egret Street 2015 Stage 1 construction 5-6 pm

Cormorant Road with Egret Street
2015 Stage 1 Construction
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
East: Cormorant Road											
5	T	1255	2.3	0.327	0.0	LOS A	0.0	0.0	0.00	0.00	80.0
6	R	1	0.0	0.006	28.7	LOS C	0.0	0.1	0.88	0.90	38.4
Approach		1256	2.3	0.327	0.0	NA	0.0	0.1	0.00	0.00	79.9
North: Egret Street											
7	L	32	10.0	0.298	48.1	LOS D	0.9	7.0	0.93	1.01	28.3
Approach		32	10.0	0.298	48.1	LOS D	0.9	7.0	0.93	1.01	28.3
West: Cormorant Road											
10	L	39	13.5	0.023	10.6	LOS A	0.0	0.0	0.00	0.71	57.1
11	T	1660	0.8	0.428	10.2	LOS A	0.0	0.0	0.00	0.68	59.9
Approach		1699	1.1	0.428	10.2	LOS A	0.0	0.0	0.00	0.68	59.8
All Vehicles		2986	1.7	0.428	6.3	NA	0.9	7.0	0.01	0.40	66.2

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

MOVEMENT SUMMARY

Site: AM-Cormorant Rd - New Roundabout 2015 Stage 1 construction 6-7 am

Cormorant Road with New Four Way Roundabout
2015 Stage 1 Construction Traffic
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: New Wharf Access											
1	L	7	14.3	0.008	9.5	LOS A	0.0	0.3	0.55	0.64	50.1
2	T	1	0.0	0.003	7.5	LOS A	0.0	0.1	0.57	0.55	48.4
3	R	1	0.0	0.003	16.4	LOS B	0.0	0.1	0.57	0.76	46.3
Approach		9	11.1	0.008	10.0	LOS A	0.0	0.3	0.55	0.64	49.5
East: Cormorant Road east											
4	L	22	0.0	0.367	8.2	LOS A	2.2	15.7	0.27	0.59	58.5
5	T	971	4.1	0.367	8.6	LOS A	2.2	15.7	0.27	0.53	60.6
6	R	41	0.0	0.367	13.8	LOS A	2.1	14.8	0.28	0.85	53.0
Approach		1034	3.9	0.367	8.8	LOS A	2.2	15.7	0.27	0.55	60.2
North: Pacific National Access Road											
7	L	4	50.0	0.014	12.8	LOS A	0.1	0.5	0.69	0.76	48.8
8	T	1	0.0	0.014	8.7	LOS A	0.1	0.5	0.69	0.64	47.2
9	R	12	0.0	0.014	17.5	LOS B	0.1	0.5	0.68	0.79	45.0
Approach		17	12.5	0.014	15.7	LOS B	0.1	0.5	0.68	0.78	46.0
West: Cormorant Road west											
10	L	361	0.9	0.632	8.1	LOS A	6.4	46.6	0.27	0.54	58.4
11	T	1425	5.7	0.632	8.7	LOS A	6.4	46.6	0.36	0.48	59.7
12	R	85	4.9	0.632	14.1	LOS A	5.5	40.4	0.43	0.72	52.9
Approach		1872	4.7	0.632	8.9	LOS A	6.4	46.6	0.34	0.50	59.1
All Vehicles		2932	4.5	0.632	8.9	LOS A	6.4	46.6	0.32	0.52	59.3

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: PM-Cormorant Rd - New Roundabout 2015 Stage 1 construction 5-6 pm

Cormorant Road with New Four Way Roundabout
2015 Stage 1 Construction Traffic
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: New Wharf Access											
1	L	106	2.0	0.144	10.4	LOS A	0.7	5.0	0.74	0.81	49.0
2	T	1	0.0	0.036	9.1	LOS A	0.2	1.1	0.71	0.76	46.4
3	R	17	0.0	0.036	18.0	LOS B	0.2	1.1	0.71	0.88	44.6
Approach		124	1.7	0.144	11.4	LOS A	0.7	5.0	0.74	0.82	48.3
East: Cormorant Road east											
4	L	1	0.0	0.547	9.7	LOS A	3.8	27.3	0.63	0.72	56.0
5	T	1204	2.4	0.547	10.2	LOS A	3.8	27.3	0.64	0.70	57.2
6	R	8	0.0	0.547	15.6	LOS B	3.8	27.0	0.65	0.93	52.2
Approach		1214	2.4	0.547	10.2	LOS A	3.8	27.3	0.64	0.70	57.2
North: Pacific National Access Road											
7	L	55	0.0	0.321	11.5	LOS A	1.7	11.7	0.77	0.89	48.2
8	T	1	0.0	0.321	8.9	LOS A	1.7	11.7	0.77	0.81	46.0
9	R	372	0.0	0.321	18.7	LOS B	1.7	11.7	0.77	0.95	44.1
Approach		427	0.0	0.321	17.8	LOS B	1.7	11.7	0.77	0.94	44.5
West: Cormorant Road west											
10	L	15	0.0	0.551	8.0	LOS A	5.2	37.1	0.19	0.56	59.2
11	T	1627	1.2	0.551	8.4	LOS A	5.2	37.1	0.28	0.48	60.5
12	R	26	0.0	0.551	13.8	LOS A	4.4	31.0	0.40	0.72	53.0
Approach		1668	1.1	0.551	8.5	LOS A	5.2	37.1	0.28	0.49	60.3
All Vehicles		3434	1.5	0.551	10.3	LOS A	5.2	37.1	0.49	0.63	56.1

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: AM-Teal St roundabout 2015
Stage 1 construction 6-7 am

Teal Street roundaboput with Cormorant Road
2015 Stage 1 Construction
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
East: Cormorant Road											
5	T	25	0.0	0.027	6.3	LOS A	0.1	0.8	0.59	0.58	49.0
6	R	17	75.0	0.058	20.8	LOS B	0.2	2.2	0.69	0.89	40.2
Approach		42	30.0	0.058	12.1	LOS A	0.2	2.2	0.63	0.70	44.9
North: Teal Street											
7	L	21	10.0	0.426	6.8	LOS A	2.5	18.2	0.42	0.54	48.7
9	R	1078	2.7	0.426	12.3	LOS A	2.5	18.2	0.43	0.69	44.9
Approach		1099	2.9	0.426	12.2	LOS A	2.5	18.2	0.43	0.69	45.0
West: Cormorant Road											
10	L	1084	4.1	0.419	5.8	LOS A	3.0	22.1	0.16	0.46	50.9
11	T	201	18.8	0.419	4.8	LOS A	2.9	22.1	0.17	0.36	52.1
Approach		1285	6.4	0.419	5.6	LOS A	3.0	22.1	0.16	0.45	51.1
All Vehicles		2426	5.2	0.426	8.7	LOS A	3.0	22.1	0.29	0.56	47.9

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: PM-Teal St roundabout 2015
Stage 1 construction 5-6 pm

Teal Street roundaboput with Cormorant Road
2015 Stage 1 Construction
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
East: Cormorant Road											
5	T	81	14.3	0.058	7.2	LOS A	0.2	1.7	0.55	0.62	49.2
6	R	6	66.7	0.058	15.9	LOS B	0.2	1.7	0.57	0.96	44.7
Approach		87	18.1	0.058	7.8	LOS A	0.2	1.7	0.55	0.64	48.8
North: Teal Street											
7	L	5	0.0	0.326	6.1	LOS A	1.7	12.0	0.28	0.47	49.7
9	R	902	1.6	0.326	11.8	LOS A	1.7	12.0	0.29	0.65	45.5
Approach		907	1.6	0.326	11.7	LOS A	1.7	12.0	0.29	0.65	45.5
West: Cormorant Road											
10	L	1418	1.6	0.474	5.7	LOS A	3.6	26.0	0.09	0.47	51.4
11	T	109	27.9	0.474	4.9	LOS A	3.5	26.0	0.10	0.34	52.7
Approach		1527	3.5	0.474	5.6	LOS A	3.6	26.0	0.09	0.46	51.5
All Vehicles		2522	3.3	0.474	7.9	LOS A	3.6	26.0	0.18	0.53	49.0

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: AM-Industrial Dr - Tourle St
2015 Stage 1 construction 6-7 am

Industrial Dr-Tourle St
2015 Stage 1 Construction
Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

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
East: Industrial Dr east											
5	T	234	14.4	0.095	5.4	LOS A	1.8	14.5	0.35	0.29	65.2
6	R	800	11.1	0.801	50.4	LOS D	19.7	150.8	0.99	0.91	28.0
Approach		1034	11.8	0.801	40.3	LOS C	19.7	150.8	0.84	0.77	32.6
North: Tourle St											
7	L	439	15.3	0.262	8.1	X	X	X	X	0.59	49.7
9	R	502	15.1	0.788	56.7	LOS E	12.8	101.1	1.00	0.91	25.9
Approach		941	15.2	0.788	34.0	LOS C	12.8	101.1	0.53	0.76	32.8
West: Industrial Dr west											
10	L	845	16.2	0.508	12.1	X	X	X	X	0.68	58.7
11	T	947	15.8	0.788	35.2	LOS C	22.2	176.5	0.97	0.90	35.2
Approach		1793	16.0	0.788	24.3	LOS B	22.2	176.5	0.51	0.80	43.3
All Vehicles		3767	14.6	0.801	31.1	LOS C	22.2	176.5	0.61	0.78	37.2

X: Not applicable for Continuous movement.

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.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: PM-Industrial Dr - Tourle St
2015 Stage 1 construction 5-6 pm

Industrial Dr-Tourle St
2015 Stage 1 Construction
Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

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
East: Industrial Dr east											
5	T	1306	7.0	0.539	10.0	LOS A	16.9	125.7	0.58	0.53	56.8
6	R	856	3.1	0.872	57.8	LOS E	23.3	167.5	1.00	0.95	25.5
Approach		2162	5.5	0.872	28.9	LOS C	23.3	167.5	0.75	0.70	39.2
North: Tourle St											
7	L	1329	2.3	0.728	7.8	X	X	X	X	0.60	49.5
9	R	752	3.4	0.901	63.9	LOS E	21.7	156.3	1.00	1.01	23.9
Approach		2081	2.7	0.901	28.1	LOS B	21.7	156.3	0.36	0.75	35.0
West: Industrial Dr west											
10	L	602	4.0	0.334	11.3	X	X	X	X	0.69	58.8
11	T	1071	4.0	0.880	45.2	LOS D	29.1	210.7	1.00	1.01	30.7
Approach		1673	4.0	0.880	33.0	LOS C	29.1	210.7	0.64	0.90	37.1
All Vehicles		5916	4.1	0.901	29.8	LOS C	29.1	210.7	0.58	0.77	37.1

X: Not applicable for Continuous movement.

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.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: AM-Industrial Dr - Woodstock St 2015 Stage 1 construction 6-7 am

Industrial Dr-Woodstock St
2015 Stage 1 Construction
Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

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: Woodstock St south											
1	L	144	0.0	0.457	50.4	LOS D	6.5	45.5	0.95	0.80	27.4
2	T	1	0.0	0.007	37.0	LOS C	0.1	0.6	0.85	0.53	27.9
3	R	1	0.0	0.007	46.2	LOS D	0.1	0.6	0.85	0.65	29.3
Approach		146	0.0	0.457	50.3	LOS D	6.5	45.5	0.95	0.80	27.4
East: Industrial Dr east											
4	L	1	0.0	0.463	16.7	LOS B	12.9	94.1	0.47	1.36	53.0
5	T	1239	5.4	0.463	6.6	LOS A	12.9	94.2	0.47	0.42	62.3
6	R	19	0.0	0.083	20.2	LOS B	0.4	2.9	0.46	0.73	45.1
Approach		1259	5.3	0.463	6.8	LOS A	12.9	94.2	0.47	0.43	62.0
North: Woodstock St north											
7	L	9	0.0	0.030	46.5	LOS D	0.4	2.7	0.86	0.69	28.6
8	T	1	0.0	0.092	44.3	LOS D	0.6	4.9	0.92	0.65	25.0
9	R	12	27.3	0.092	55.0	LOS D	0.6	4.9	0.92	0.70	26.6
Approach		22	14.3	0.092	50.9	LOS D	0.6	4.9	0.89	0.69	27.4
West: Industrial Dr west											
10	L	53	8.0	0.113	15.0	LOS B	0.7	5.6	0.31	0.73	51.0
11	T	1168	6.3	0.439	6.5	LOS A	11.8	87.2	0.45	0.41	62.7
12	R	63	0.0	0.302	22.4	LOS B	1.6	11.5	0.54	0.78	43.1
Approach		1284	6.1	0.439	7.6	LOS A	11.8	87.2	0.45	0.44	61.0
All Vehicles		2712	5.4	0.463	9.9	LOS A	12.9	94.2	0.49	0.46	57.1

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.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: PM-Industrial Dr - Woodstock St 2015 Stage 1 construction 5-6 pm

Industrial Dr-Woodstock St
2015 Stage 1 Construction
Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

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: Woodstock St south											
1	L	124	0.0	0.608	56.3	LOS D	6.1	42.6	1.00	0.80	23.5
2	T	1	0.0	0.012	44.4	LOS D	0.1	0.7	0.92	0.57	25.4
3	R	1	0.0	0.012	52.4	LOS D	0.1	0.7	0.92	0.64	25.1
Approach		126	0.0	0.608	56.2	LOS D	6.1	42.6	1.00	0.80	23.5
East: Industrial Dr east											
4	L	7	0.0	0.545	14.9	LOS B	15.4	109.3	0.43	1.37	55.0
5	T	1609	2.0	0.545	4.8	LOS A	15.4	109.4	0.43	0.40	65.5
6	R	4	0.0	0.028	21.1	LOS B	0.1	0.7	0.46	0.71	44.3
Approach		1621	1.9	0.545	4.9	LOS A	15.4	109.4	0.43	0.40	65.4
North: Woodstock St north											
7	L	47	2.2	0.236	54.7	LOS D	2.2	15.6	0.95	0.75	26.2
8	T	1	0.0	0.018	48.2	LOS D	0.1	0.7	0.95	0.59	24.3
9	R	1	0.0	0.018	57.3	LOS E	0.1	0.7	0.95	0.63	25.9
Approach		49	2.1	0.236	54.6	LOS D	2.2	15.6	0.95	0.74	26.1
West: Industrial Dr west											
10	L	1	0.0	0.002	12.8	LOS A	0.0	0.1	0.24	0.69	53.3
11	T	1864	1.4	0.626	5.4	LOS A	19.9	140.7	0.48	0.45	64.2
12	R	82	0.0	0.513	23.0	LOS B	2.5	17.3	0.60	0.80	42.6
Approach		1947	1.4	0.626	6.2	LOS A	19.9	140.7	0.49	0.46	63.0
All Vehicles		3744	1.6	0.626	7.9	LOS A	19.9	140.7	0.49	0.45	59.9

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.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: AM-Teal St - Raven Street
2015 Stage 1 construction 6-7 am

Teal Street with Raven Street
2015 Stage 1 Construction
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: Teal Street											
1	L	84	7.5	0.048	10.3	LOS A	0.0	0.0	0.00	0.71	57.1
2	T	922	3.9	0.242	10.3	LOS A	0.0	0.0	0.00	0.68	59.9
Approach		1006	4.2	0.242	10.3	LOS A	0.0	0.0	0.00	0.68	59.7
North: Teal Street											
8	T	1143	2.5	0.298	10.3	LOS A	0.0	0.0	0.00	0.68	59.9
Approach		1143	2.5	0.298	10.3	LOS A	0.0	0.0	0.00	0.68	59.9
West: Raven Street											
10	L	17	18.8	0.058	20.7	LOS B	0.2	1.5	0.74	0.92	41.7
Approach		17	18.8	0.058	20.7	LOS B	0.2	1.5	0.74	0.92	41.7
All Vehicles		2166	3.4	0.298	10.4	NA	0.2	1.5	0.01	0.68	59.6

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: PM-Teal St - Raven Street
2015 Stage 1 construction 5-6 pm

Teal Street with Raven Street
2015 Stage 1 Construction
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: Teal Street											
1	L	1	100.0	0.001	13.7	LOS A	0.0	0.0	0.00	0.70	53.2
2	T	1423	1.8	0.369	10.2	LOS A	0.0	0.0	0.00	0.68	59.9
Approach		1424	1.9	0.369	10.2	LOS A	0.0	0.0	0.00	0.68	59.9
North: Teal Street											
8	T	907	1.6	0.235	10.2	LOS A	0.0	0.0	0.00	0.68	59.9
Approach		907	1.6	0.235	10.2	LOS A	0.0	0.0	0.00	0.68	59.9
West: Raven Street											
10	L	45	7.0	0.248	30.5	LOS C	0.8	6.0	0.88	0.99	35.4
Approach		45	7.0	0.248	30.5	LOS C	0.8	6.0	0.88	0.99	35.4
All Vehicles		2377	1.9	0.369	10.6	NA	0.8	6.0	0.02	0.68	59.1

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.

B4 – 2011 Base Traffic for Stage 2 & 3 Access

MOVEMENT SUMMARY

Site: AM-Industrial Dr - Tourle St
2011 Base 5-6 am

Industrial Dr-Tourle St
2018 Stage 2 Construction
Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

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
East: Industrial Dr east											
5	T	262	4.0	0.099	5.1	LOS A	2.0	14.6	0.34	0.28	65.9
6	R	531	4.4	0.351	31.3	LOS C	8.8	63.7	0.72	0.81	36.9
Approach		793	4.2	0.351	22.6	LOS B	8.8	63.7	0.60	0.63	43.8
North: Tourle St											
7	L	224	7.0	0.127	7.8	X	X	X	X	0.60	49.8
9	R	223	6.6	0.350	49.1	LOS D	4.9	36.1	0.92	0.79	28.0
Approach		447	6.8	0.350	28.4	LOS B	4.9	36.1	0.46	0.69	35.3
West: Industrial Dr west											
10	L	529	4.2	0.294	11.3	X	X	X	X	0.69	58.8
11	T	283	5.9	0.343	35.9	LOS C	5.9	43.5	0.89	0.72	35.0
Approach		813	4.8	0.343	19.9	LOS B	5.9	43.5	0.31	0.70	47.5
All Vehicles		2053	5.0	0.351	22.8	LOS B	8.8	63.7	0.45	0.67	43.0

X: Not applicable for Continuous movement.

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.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: AM-Industrial Dr - Tourle St
2011 Base 6-7 am

Industrial Dr-Tourle St
2018 Stage 2 Construction
Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

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
East: Industrial Dr east											
5	T	221	14.3	0.090	5.4	LOS A	1.7	13.7	0.35	0.29	65.3
6	R	779	11.4	0.756	47.0	LOS D	18.1	139.1	0.97	0.88	29.3
Approach		1000	12.0	0.756	37.8	LOS C	18.1	139.1	0.83	0.75	33.8
North: Tourle St											
7	L	413	16.3	0.248	8.1	X	X	X	X	0.59	49.7
9	R	476	15.9	0.751	55.0	LOS D	11.8	93.9	1.00	0.89	26.3
Approach		888	16.1	0.751	33.2	LOS C	11.8	93.9	0.54	0.75	33.2
West: Industrial Dr west											
10	L	825	16.6	0.497	12.1	X	X	X	X	0.68	58.7
11	T	897	15.7	0.768	34.7	LOS C	20.7	164.0	0.96	0.88	35.4
Approach		1722	16.1	0.768	23.9	LOS B	20.7	164.0	0.50	0.78	43.6
All Vehicles		3611	15.0	0.768	30.0	LOS C	20.7	164.0	0.60	0.77	37.9

X: Not applicable for Continuous movement.

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.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: AM-Industrial Dr - Tourle St
2011 Base 8-9 am

Industrial Dr-Tourle St
2018 Stage 2 Construction
Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

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
East: Industrial Dr east											
5	T	702	16.9	0.298	7.2	LOS A	7.0	55.7	0.44	0.39	61.6
6	R	442	15.2	0.776	58.3	LOS E	11.3	89.2	1.00	0.89	25.5
Approach		1144	16.3	0.776	26.9	LOS B	11.3	89.2	0.66	0.58	41.0
North: Tourle St											
7	L	645	11.4	0.376	8.0	X	X	X	X	0.60	49.7
9	R	546	14.8	0.775	54.4	LOS D	13.6	107.6	1.00	0.90	26.5
Approach		1192	13.0	0.775	29.3	LOS C	13.6	107.6	0.46	0.74	34.9
West: Industrial Dr west											
10	L	437	17.8	0.265	12.1	X	X	X	X	0.68	58.8
11	T	1262	8.8	0.777	26.8	LOS B	26.9	202.4	0.92	0.84	40.0
Approach		1699	11.1	0.777	23.1	LOS B	26.9	202.4	0.68	0.80	43.5
All Vehicles		4035	13.1	0.777	26.0	LOS B	26.9	202.4	0.61	0.72	40.0

X: Not applicable for Continuous movement.

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.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: PM-Industrial Dr - Tourle St
2011 Base 4-5 pm

Industrial Dr-Tourle St
2018 Stage 2 Construction
Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

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
East: Industrial Dr east											
5	T	1389	5.2	0.585	11.5	LOS A	19.6	143.4	0.63	0.58	54.6
6	R	752	4.2	0.834	55.1	LOS D	19.5	141.2	1.00	0.93	26.3
Approach		2141	4.9	0.834	26.8	LOS B	19.6	143.4	0.76	0.70	40.5
North: Tourle St											
7	L	1255	2.7	0.689	7.8	X	X	X	X	0.60	49.6
9	R	753	7.1	0.852	56.4	LOS D	20.0	148.8	1.00	0.96	25.8
Approach		2007	4.4	0.852	26.1	LOS B	20.0	148.8	0.37	0.73	36.3
West: Industrial Dr west											
10	L	633	4.2	0.351	11.3	X	X	X	X	0.69	58.8
11	T	1032	5.6	0.857	42.2	LOS C	26.9	197.1	1.00	0.98	31.9
Approach		1664	5.1	0.857	30.4	LOS C	26.9	197.1	0.62	0.87	38.6
All Vehicles		5813	4.7	0.857	27.6	LOS B	26.9	197.1	0.59	0.76	38.4

X: Not applicable for Continuous movement.

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.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: PM-Industrial Dr - Tourle St
2011 Base 5-6 pm

Industrial Dr-Tourle St
2018 Stage 2 Construction
Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

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
East: Industrial Dr east											
5	T	1237	7.0	0.502	9.2	LOS A	15.1	112.3	0.55	0.50	58.1
6	R	814	3.2	0.830	53.3	LOS D	20.8	149.7	1.00	0.92	26.9
Approach		2051	5.5	0.830	26.7	LOS B	20.8	149.7	0.73	0.67	40.7
North: Tourle St											
7	L	1152	2.7	0.632	7.8	X	X	X	X	0.60	49.6
9	R	648	3.9	0.816	55.0	LOS D	16.6	120.2	1.00	0.93	26.1
Approach		1800	3.1	0.816	24.8	LOS B	16.6	120.2	0.36	0.72	36.9
West: Industrial Dr west											
10	L	574	4.2	0.318	11.3	X	X	X	X	0.69	58.8
11	T	1014	4.0	0.808	36.9	LOS C	24.3	176.3	0.98	0.92	34.3
Approach		1587	4.1	0.808	27.6	LOS B	24.3	176.3	0.63	0.83	40.3
All Vehicles		5438	4.3	0.830	26.3	LOS B	24.3	176.3	0.58	0.73	39.3

X: Not applicable for Continuous movement.

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.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: AM-Industrial Dr - Woodstock St 2011 Base 5-6 am

Industrial Dr-Woodstock St
2018 Stage 2 Construction
Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

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: Woodstock St south											
1	L	99	0.0	0.266	46.1	LOS D	4.1	29.0	0.89	0.78	28.8
2	T	1	0.0	0.006	34.2	LOS C	0.1	0.6	0.82	0.52	29.0
3	R	1	0.0	0.006	43.4	LOS D	0.1	0.6	0.82	0.66	30.3
Approach		101	0.0	0.266	45.9	LOS D	4.1	29.0	0.89	0.78	28.8
East: Industrial Dr east											
4	L	1	0.0	0.266	16.7	LOS B	6.4	46.7	0.42	1.38	52.5
5	T	684	4.8	0.266	6.6	LOS A	6.4	46.7	0.42	0.37	62.7
6	R	8	0.0	0.024	17.0	LOS B	0.1	1.0	0.38	0.70	48.4
Approach		694	4.7	0.266	6.7	LOS A	6.4	46.7	0.42	0.37	62.5
North: Woodstock St north											
7	L	2	0.0	0.006	43.2	LOS D	0.1	0.6	0.82	0.64	29.8
8	T	1	0.0	0.046	38.1	LOS C	0.4	3.3	0.86	0.60	27.1
9	R	9	11.1	0.046	47.9	LOS D	0.4	3.3	0.86	0.70	28.5
Approach		13	8.3	0.046	46.3	LOS D	0.4	3.3	0.86	0.68	28.6
West: Industrial Dr west											
10	L	29	7.1	0.068	15.9	LOS B	0.5	3.4	0.34	0.72	49.9
11	T	439	7.0	0.173	6.1	LOS A	3.8	28.2	0.39	0.33	63.7
12	R	39	0.0	0.131	18.7	LOS B	0.8	5.5	0.43	0.74	46.5
Approach		507	6.4	0.173	7.7	LOS A	3.8	28.2	0.39	0.38	61.3
All Vehicles		1315	5.0	0.266	10.5	LOS A	6.4	46.7	0.45	0.41	56.5

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.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: AM-Industrial Dr - Woodstock St 2011 Base 6-7 am

Industrial Dr-Woodstock St
2018 Stage 2 Construction
Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

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: Woodstock St south											
1	L	144	0.0	0.457	50.4	LOS D	6.5	45.5	0.95	0.80	27.4
2	T	1	0.0	0.007	37.0	LOS C	0.1	0.6	0.85	0.53	27.9
3	R	1	0.0	0.007	46.2	LOS D	0.1	0.6	0.85	0.65	29.3
Approach		146	0.0	0.457	50.3	LOS D	6.5	45.5	0.95	0.80	27.4
East: Industrial Dr east											
4	L	1	0.0	0.451	16.6	LOS B	12.3	90.3	0.46	1.36	53.1
5	T	1205	5.3	0.451	6.5	LOS A	12.3	90.4	0.46	0.42	62.5
6	R	19	0.0	0.079	19.2	LOS B	0.4	2.8	0.43	0.73	46.1
Approach		1225	5.2	0.451	6.7	LOS A	12.3	90.4	0.46	0.42	62.2
North: Woodstock St north											
7	L	9	0.0	0.030	46.5	LOS D	0.4	2.7	0.86	0.69	28.6
8	T	1	0.0	0.092	44.3	LOS D	0.6	4.9	0.92	0.65	25.0
9	R	12	27.3	0.092	55.0	LOS D	0.6	4.9	0.92	0.70	26.6
Approach		22	14.3	0.092	50.9	LOS D	0.6	4.9	0.89	0.69	27.4
West: Industrial Dr west											
10	L	53	8.0	0.113	15.0	LOS B	0.7	5.6	0.31	0.73	51.0
11	T	1092	6.0	0.410	6.3	LOS A	10.7	78.8	0.44	0.40	63.1
12	R	63	0.0	0.294	21.7	LOS B	1.6	11.1	0.52	0.77	43.7
Approach		1207	5.8	0.410	7.5	LOS A	10.7	78.8	0.44	0.43	61.3
All Vehicles		2601	5.3	0.457	9.9	LOS A	12.3	90.4	0.48	0.45	57.2

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.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: AM-Industrial Dr - Woodstock St 2011 Base 8-9 am

Industrial Dr-Woodstock St
2018 Stage 2 Construction
Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

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: Woodstock St south											
1	L	125	0.0	0.674	59.3	LOS E	6.3	44.2	1.00	0.83	24.9
2	T	1	0.0	0.013	44.5	LOS D	0.1	0.7	0.92	0.57	25.3
3	R	1	0.0	0.013	53.6	LOS D	0.1	0.7	0.92	0.64	26.9
Approach		127	0.0	0.674	59.2	LOS E	6.3	44.2	1.00	0.83	24.9
East: Industrial Dr east											
4	L	3	66.7	0.495	17.8	LOS B	12.4	91.8	0.39	2.63	55.5
5	T	1437	6.9	0.495	4.2	LOS A	12.4	91.8	0.39	0.36	67.1
6	R	31	0.0	0.269	27.1	LOS B	0.9	6.6	0.61	0.77	39.5
Approach		1471	6.9	0.495	4.7	LOS A	12.4	91.8	0.39	0.37	66.2
North: Woodstock St north											
7	L	18	0.0	0.096	54.6	LOS D	0.8	5.7	0.94	0.70	26.2
8	T	1	0.0	0.034	51.1	LOS D	0.2	1.1	0.97	0.61	23.3
9	R	2	0.0	0.034	60.3	LOS E	0.2	1.1	0.97	0.63	24.9
Approach		21	0.0	0.096	55.0	LOS D	0.8	5.7	0.94	0.69	25.9
West: Industrial Dr west											
10	L	52	4.1	0.088	12.9	LOS A	0.6	4.0	0.24	0.72	53.4
11	T	2146	4.2	0.725	5.9	LOS A	26.1	189.0	0.55	0.52	62.8
12	R	119	4.4	0.609	23.7	LOS B	3.8	27.7	0.62	0.83	42.2
Approach		2317	4.2	0.725	7.0	LOS A	26.1	189.0	0.55	0.54	61.3
All Vehicles		3936	5.0	0.725	8.1	LOS A	26.1	189.0	0.51	0.48	59.7

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.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: PM-Industrial Dr - Woodstock St 2011 Base 4-5 pm

Industrial Dr-Woodstock St
2018 Stage 2 Construction
Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

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: Woodstock St south											
1	L	120	1.8	0.935	75.6	LOS F	7.2	51.3	1.00	1.06	19.5
2	T	1	0.0	0.022	49.9	LOS D	0.1	0.7	0.96	0.59	23.8
3	R	1	0.0	0.022	57.9	LOS E	0.1	0.7	0.96	0.62	23.6
Approach		122	1.7	0.935	75.2	LOS F	7.2	51.3	1.00	1.05	19.5
East: Industrial Dr east											
4	L	1	0.0	0.630	14.0	LOS A	18.2	130.0	0.42	1.40	56.3
5	T	1956	2.5	0.630	3.9	LOS A	18.2	130.0	0.42	0.39	66.8
6	R	7	0.0	0.033	15.1	LOS B	0.1	0.8	0.32	0.71	50.5
Approach		1964	2.5	0.630	3.9	LOS A	18.2	130.0	0.42	0.40	66.7
North: Woodstock St north											
7	L	68	0.0	0.526	60.9	LOS E	3.5	24.2	1.00	0.76	24.5
8	T	1	0.0	0.079	53.2	LOS D	0.3	2.2	0.99	0.64	22.6
9	R	5	0.0	0.079	62.4	LOS E	0.3	2.2	0.99	0.65	24.3
Approach		75	0.0	0.526	60.9	LOS E	3.5	24.2	1.00	0.75	24.5
West: Industrial Dr west											
10	L	5	0.0	0.008	11.9	LOS A	0.0	0.3	0.20	0.70	54.4
11	T	1462	2.8	0.471	3.1	LOS A	10.7	77.0	0.33	0.31	69.2
12	R	161	0.0	0.931	47.9	LOS D	9.3	65.3	0.96	0.97	28.7
Approach		1628	2.5	0.931	7.5	LOS A	10.7	77.0	0.40	0.37	61.6
All Vehicles		3789	2.4	0.935	8.9	LOS A	18.2	130.0	0.44	0.41	58.6

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.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: PM-Industrial Dr - Woodstock St 2011 Base 5-6 pm

Industrial Dr-Woodstock St
2018 Stage 2 Construction
Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

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: Woodstock St south											
1	L	124	0.0	0.557	54.8	LOS D	6.0	41.7	0.99	0.79	23.9
2	T	1	0.0	0.011	43.2	LOS D	0.1	0.6	0.91	0.57	25.7
3	R	1	0.0	0.011	51.3	LOS D	0.1	0.6	0.91	0.64	25.4
Approach		126	0.0	0.557	54.6	LOS D	6.0	41.7	0.99	0.79	23.9
East: Industrial Dr east											
4	L	7	0.0	0.514	15.1	LOS B	14.2	100.9	0.43	1.37	54.7
5	T	1498	1.8	0.514	5.0	LOS A	14.2	100.9	0.43	0.39	65.3
6	R	4	0.0	0.022	19.5	LOS B	0.1	0.6	0.43	0.71	45.8
Approach		1509	1.7	0.514	5.1	LOS A	14.2	100.9	0.43	0.40	65.2
North: Woodstock St north											
7	L	47	2.2	0.216	53.5	LOS D	2.2	15.4	0.94	0.75	26.5
8	T	1	0.0	0.016	46.9	LOS D	0.1	0.7	0.94	0.58	24.6
9	R	1	0.0	0.016	56.0	LOS D	0.1	0.7	0.94	0.63	26.2
Approach		49	2.1	0.216	53.4	LOS D	2.2	15.4	0.94	0.74	26.5
West: Industrial Dr west											
10	L	1	0.0	0.002	13.0	LOS A	0.0	0.1	0.25	0.69	53.0
11	T	1632	1.5	0.556	5.3	LOS A	16.2	115.2	0.45	0.42	64.6
12	R	82	0.0	0.452	22.2	LOS B	2.3	16.2	0.57	0.80	43.3
Approach		1715	1.4	0.556	6.1	LOS A	16.2	115.2	0.46	0.43	63.3
All Vehicles		3400	1.5	0.557	8.1	LOS A	16.2	115.2	0.47	0.43	59.7

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.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: AM- Tourle St Left Turn Access 2011 Base 5-6 am

Tourle St Left Turn Access
2018 Stage 2 Construction
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: Tourle Street South											
2	T	1060	4.3	0.559	7.1	LOS A	0.0	0.0	0.00	0.59	50.4
Approach		1060	4.3	0.559	7.1	LOS A	0.0	0.0	0.00	0.59	50.4
East: Wharf Access											
4	L	1	0.0	0.001	10.5	LOS A	0.0	0.0	0.45	0.62	46.5
Approach		1	0.0	0.001	10.5	LOS A	0.0	0.0	0.45	0.62	46.5
North: Tourle Street North											
7	L	1	0.0	0.001	9.2	LOS A	0.0	0.0	0.00	0.69	51.1
8	T	447	6.8	0.240	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		448	6.8	0.240	0.0	NA	0.0	0.0	0.00	0.00	60.0
All Vehicles		1509	5.0	0.559	5.0	NA	0.0	0.0	0.00	0.42	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: AM- Tourle St Left Turn Access 2011 Base 6-7 am

Tourle St Left Turn Access
2018 Stage 2 Construction
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: Tourle Street South											
2	T	1771	4.9	0.937	7.1	LOS A	0.0	0.0	0.00	0.59	50.4
Approach		1771	4.9	0.937	7.1	LOS A	0.0	0.0	0.00	0.59	50.4
East: Wharf Access											
4	L	1	0.0	0.003	15.3	LOS B	0.0	0.1	0.68	0.73	42.2
Approach		1	0.0	0.003	15.3	LOS B	0.0	0.1	0.68	0.73	42.2
North: Tourle Street North											
7	L	1	0.0	0.001	9.2	LOS A	0.0	0.0	0.00	0.69	51.1
8	T	904	4.4	0.477	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		905	4.4	0.477	0.0	NA	0.0	0.0	0.00	0.00	60.0
All Vehicles		2677	4.7	0.937	4.7	NA	0.0	0.1	0.00	0.39	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: AM- Tourle St Left Turn Access 2011 Base 8-9 am

Tourle St Left Turn Access
2018 Stage 2 Construction
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: Tourle Street South											
2	T	1238	7.7	0.667	7.3	LOS A	0.0	0.0	0.00	0.59	50.4
Approach		1238	7.7	0.667	7.3	LOS A	0.0	0.0	0.00	0.59	50.4
East: Wharf Access											
4	L	1	0.0	0.010	38.7	LOS C	0.0	0.2	0.91	0.97	29.0
Approach		1	0.0	0.010	38.7	LOS C	0.0	0.2	0.91	0.97	29.0
North: Tourle Street North											
7	L	1	0.0	0.001	9.2	LOS A	0.0	0.0	0.00	0.69	51.1
8	T	1542	6.5	0.824	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		1543	6.5	0.824	0.0	NA	0.0	0.0	0.00	0.00	60.0
All Vehicles		2782	7.0	0.824	3.3	NA	0.0	0.2	0.00	0.26	55.3

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: PM- Tourle St Left Turn Access 2011 Base 4-5 pm

Tourle St Left Turn Access
2018 Stage 2 Construction
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: Tourle Street South											
2	T	1849	1.8	0.959	7.0	LOS A	0.0	0.0	0.00	0.59	50.4
Approach		1849	1.8	0.959	7.0	LOS A	0.0	0.0	0.00	0.59	50.4
East: Wharf Access											
4	L	1	0.0	0.016	56.7	LOS E	0.0	0.3	0.95	0.98	23.4
Approach		1	0.0	0.016	56.7	LOS E	0.0	0.3	0.95	0.98	23.4
North: Tourle Street North											
7	L	1	0.0	0.001	9.2	LOS A	0.0	0.0	0.00	0.69	51.1
8	T	1752	3.0	0.916	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		1753	3.0	0.916	0.0	NA	0.0	0.0	0.00	0.00	60.0
All Vehicles		3603	2.4	0.959	3.6	NA	0.0	0.3	0.00	0.30	54.6

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: PM- Tourle St Left Turn Access 2011 Base 5-6 pm

Tourle St Left Turn Access
2018 Stage 2 Construction
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: Tourle Street South											
2	T	1591	1.1	0.822	7.0	LOS A	0.0	0.0	0.00	0.59	50.4
Approach		1591	1.1	0.822	7.0	LOS A	0.0	0.0	0.00	0.59	50.4
East: Wharf Access											
4	L	1	0.0	0.007	29.8	LOS C	0.0	0.1	0.88	0.93	32.9
Approach		1	0.0	0.007	29.8	LOS C	0.0	0.1	0.88	0.93	32.9
North: Tourle Street North											
7	L	1	0.0	0.001	9.2	LOS A	0.0	0.0	0.00	0.69	51.1
8	T	1417	2.2	0.737	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		1418	2.2	0.737	0.0	NA	0.0	0.0	0.00	0.00	60.0
All Vehicles		3009	1.6	0.822	3.7	NA	0.0	0.1	0.00	0.31	54.5

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.

B5 – 2018 Stage 2 Construction Traffic

MOVEMENT SUMMARY

Site: AM-Industrial Dr - Tourle St
2018 Stage 2 construction 5-6 am

Industrial Dr-Tourle St
2018 Stage 2 Construction
Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

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
East: Industrial Dr east											
5	T	286	4.0	0.108	5.1	LOS A	2.2	16.0	0.34	0.28	65.8
6	R	480	4.8	0.343	33.3	LOS C	8.2	60.0	0.75	0.81	35.7
Approach		766	4.5	0.343	22.8	LOS B	8.2	60.0	0.60	0.61	43.8
North: Tourle St											
7	L	214	7.4	0.121	7.8	X	X	X	X	0.60	49.8
9	R	221	6.7	0.346	49.0	LOS D	4.8	35.7	0.92	0.79	28.0
Approach		435	7.0	0.346	28.8	LOS C	4.8	35.7	0.47	0.69	35.2
West: Industrial Dr west											
10	L	474	4.7	0.264	11.4	X	X	X	X	0.69	58.8
11	T	323	5.5	0.343	33.4	LOS C	6.5	47.9	0.87	0.71	36.3
Approach		797	5.0	0.343	20.3	LOS B	6.5	47.9	0.35	0.70	46.9
All Vehicles		1998	5.3	0.346	23.1	LOS B	8.2	60.0	0.47	0.66	42.7

X: Not applicable for Continuous movement.

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.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: AM-Industrial Dr - Tourle St
2018 Stage 2 construction 6-7 am

Industrial Dr-Tourle St
2018 Stage 2 Construction
Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

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
East: Industrial Dr east											
5	T	241	14.4	0.099	5.8	LOS A	2.0	15.5	0.36	0.30	64.5
6	R	680	13.2	0.770	50.9	LOS D	16.5	128.2	0.99	0.89	27.8
Approach		921	13.5	0.770	39.1	LOS C	16.5	128.2	0.82	0.74	33.3
North: Tourle St											
7	L	464	14.5	0.276	8.1	X	X	X	X	0.59	49.7
9	R	528	14.5	0.785	55.7	LOS D	13.4	105.2	1.00	0.91	26.1
Approach		993	14.5	0.785	33.4	LOS C	13.4	105.2	0.53	0.76	33.1
West: Industrial Dr west											
10	L	724	18.9	0.443	12.2	X	X	X	X	0.68	58.8
11	T	1009	15.3	0.791	33.9	LOS C	23.4	185.7	0.96	0.89	35.8
Approach		1734	16.8	0.791	24.8	LOS B	23.4	185.7	0.56	0.81	42.7
All Vehicles		3647	15.4	0.791	30.8	LOS C	23.4	185.7	0.62	0.78	37.3

X: Not applicable for Continuous movement.

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.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: AM-Industrial Dr - Tourle St
2018 Stage 2 construction 8-9 am

Industrial Dr-Tourle St
2018 Stage 2 Construction
Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

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
East: Industrial Dr east											
5	T	765	16.9	0.325	7.4	LOS A	7.8	62.2	0.45	0.40	61.3
6	R	481	14.0	0.838	61.9	LOS E	12.9	101.2	1.00	0.93	24.5
Approach		1246	15.8	0.838	28.4	LOS B	12.9	101.2	0.66	0.60	39.9
North: Tourle St											
7	L	702	10.5	0.406	8.0	X	X	X	X	0.60	49.7
9	R	606	13.7	0.853	60.0	LOS E	16.4	128.3	1.00	0.96	25.0
Approach		1308	12.0	0.853	32.1	LOS C	16.4	128.3	0.46	0.77	33.5
West: Industrial Dr west											
10	L	475	16.4	0.286	12.0	X	X	X	X	0.68	58.8
11	T	1381	8.8	0.851	33.4	LOS C	33.8	254.6	0.97	0.95	36.1
Approach		1856	10.8	0.851	27.9	LOS B	33.8	254.6	0.72	0.88	40.0
All Vehicles		4411	12.6	0.853	29.3	LOS C	33.8	254.6	0.63	0.77	37.9

X: Not applicable for Continuous movement.

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.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: PM-Industrial Dr - Tourle St
2018 Stage 2 construction 4-5 pm

Industrial Dr-Tourle St
2018 Stage 2 Construction
Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

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
East: Industrial Dr east											
5	T	1516	5.2	0.600	9.7	LOS A	20.1	147.1	0.60	0.55	57.1
6	R	782	4.0	0.833	54.4	LOS D	20.2	146.1	1.00	0.93	26.5
Approach		2298	4.8	0.833	24.9	LOS B	20.2	147.1	0.73	0.68	42.0
North: Tourle St											
7	L	1109	3.0	0.610	7.8	X	X	X	X	0.60	49.6
9	R	624	8.8	0.850	59.1	LOS E	16.8	126.2	1.00	0.96	25.1
Approach		1734	5.1	0.850	26.3	LOS B	16.8	126.2	0.36	0.73	36.1
West: Industrial Dr west											
10	L	657	4.0	0.364	11.3	X	X	X	X	0.69	58.8
11	T	1137	5.6	0.863	41.0	LOS C	29.7	217.6	1.00	0.99	32.4
Approach		1794	5.0	0.863	30.1	LOS C	29.7	217.6	0.63	0.88	38.7
All Vehicles		5825	5.0	0.863	26.9	LOS B	29.7	217.6	0.59	0.75	39.1

X: Not applicable for Continuous movement.

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.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: PM-Industrial Dr - Tourle St
2018 Stage 2 construction 5-6 pm

Industrial Dr-Tourle St
2018 Stage 2 Construction
Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

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
East: Industrial Dr east											
5	T	1348	6.9	0.539	9.0	LOS A	16.8	124.3	0.56	0.51	58.2
6	R	898	2.9	0.881	58.5	LOS E	24.8	178.2	1.00	0.96	25.3
Approach		2246	5.3	0.881	28.8	LOS C	24.8	178.2	0.74	0.69	39.3
North: Tourle St											
7	L	1137	2.7	0.624	7.8	X	X	X	X	0.60	49.6
9	R	674	3.9	0.888	63.0	LOS E	19.0	137.7	1.00	1.00	24.1
Approach		1811	3.1	0.888	28.3	LOS B	19.0	137.7	0.37	0.75	35.0
West: Industrial Dr west											
10	L	644	3.8	0.356	11.3	X	X	X	X	0.69	58.8
11	T	1107	4.2	0.884	45.1	LOS D	30.2	219.3	1.00	1.02	30.8
Approach		1752	4.0	0.884	32.7	LOS C	30.2	219.3	0.63	0.90	37.2
All Vehicles		5808	4.3	0.888	29.8	LOS C	30.2	219.3	0.59	0.77	37.3

X: Not applicable for Continuous movement.

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.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: AM-Industrial Dr - Woodstock St 2018 Stage 2 construction 5-6 am

Industrial Dr-Woodstock St
2018 Stage 2 Construction
Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

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: Woodstock St south											
1	L	99	0.0	0.254	45.1	LOS D	4.1	28.6	0.88	0.78	29.1
2	T	1	0.0	0.006	33.3	LOS C	0.1	0.6	0.81	0.51	29.3
3	R	1	0.0	0.006	42.5	LOS C	0.1	0.6	0.81	0.66	30.6
Approach		101	0.0	0.254	45.0	LOS D	4.1	28.6	0.87	0.78	29.1
East: Industrial Dr east											
4	L	1	0.0	0.259	17.0	LOS B	6.3	45.8	0.43	1.37	52.2
5	T	654	5.2	0.259	7.0	LOS A	6.3	45.8	0.43	0.37	62.1
6	R	23	0.0	0.070	17.5	LOS B	0.4	3.0	0.40	0.72	47.8
Approach		678	5.0	0.259	7.3	LOS A	6.3	45.8	0.43	0.39	61.5
North: Woodstock St north											
7	L	11	0.0	0.027	42.8	LOS D	0.4	2.8	0.82	0.69	30.0
8	T	1	0.0	0.059	37.3	LOS C	0.6	4.5	0.86	0.61	27.3
9	R	14	7.7	0.059	46.9	LOS D	0.6	4.5	0.86	0.71	28.8
Approach		25	4.2	0.059	44.8	LOS D	0.6	4.5	0.84	0.70	29.2
West: Industrial Dr west											
10	L	44	4.8	0.102	16.2	LOS B	0.7	5.2	0.35	0.73	49.5
11	T	454	7.0	0.181	6.5	LOS A	4.1	30.2	0.40	0.34	63.0
12	R	39	0.0	0.130	18.7	LOS B	0.8	5.5	0.43	0.74	46.5
Approach		537	6.3	0.181	8.2	LOS A	4.1	30.2	0.40	0.40	60.4
All Vehicles		1341	5.1	0.259	11.2	LOS A	6.3	45.8	0.46	0.43	55.4

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.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: AM-Industrial Dr - Woodstock St 2018 Stage 2 construction 6-7 am

Industrial Dr-Woodstock St
2018 Stage 2 Construction
Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

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: Woodstock St south											
1	L	144	0.0	0.457	50.4	LOS D	6.5	45.5	0.95	0.80	27.4
2	T	1	0.0	0.008	37.0	LOS C	0.1	0.6	0.85	0.53	27.9
3	R	1	0.0	0.008	46.2	LOS D	0.1	0.6	0.85	0.65	29.3
Approach		146	0.0	0.457	50.3	LOS D	6.5	45.5	0.95	0.80	27.4
East: Industrial Dr east											
4	L	1	0.0	0.423	16.4	LOS B	11.2	82.4	0.45	1.37	53.2
5	T	1125	6.0	0.423	6.4	LOS A	11.2	82.4	0.45	0.40	62.9
6	R	51	2.1	0.238	21.9	LOS B	1.3	8.9	0.51	0.76	43.7
Approach		1177	5.8	0.423	7.0	LOS A	11.2	82.4	0.45	0.42	61.9
North: Woodstock St north											
7	L	11	10.0	0.036	47.4	LOS D	0.4	3.3	0.86	0.69	28.6
8	T	1	0.0	0.105	44.5	LOS D	0.6	5.6	0.92	0.65	24.9
9	R	13	33.3	0.105	55.6	LOS D	0.6	5.6	0.92	0.71	26.5
Approach		24	21.7	0.105	51.6	LOS D	0.6	5.6	0.89	0.70	27.3
West: Industrial Dr west											
10	L	84	6.2	0.179	15.0	LOS B	1.2	9.0	0.32	0.74	50.9
11	T	1224	6.4	0.460	6.6	LOS A	12.7	93.4	0.47	0.42	62.4
12	R	63	0.0	0.278	21.0	LOS B	1.5	10.7	0.50	0.77	44.4
Approach		1372	6.1	0.460	7.8	LOS A	12.7	93.4	0.46	0.46	60.6
All Vehicles		2719	5.8	0.460	10.1	LOS A	12.7	93.4	0.48	0.46	56.8

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.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: AM-Industrial Dr - Woodstock St 2018 Stage 2 construction 8-9 am

Industrial Dr-Woodstock St
2018 Stage 2 Construction
Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

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: Woodstock St south											
1	L	125	0.0	0.749	61.9	LOS E	6.5	45.7	1.00	0.87	24.3
2	T	1	0.0	0.014	45.6	LOS D	0.1	0.7	0.93	0.58	25.0
3	R	1	0.0	0.014	54.8	LOS D	0.1	0.7	0.93	0.63	26.6
Approach		127	0.0	0.749	61.7	LOS E	6.5	45.7	1.00	0.86	24.3
East: Industrial Dr east											
4	L	3	66.7	0.524	17.6	LOS B	13.2	98.4	0.39	2.64	55.8
5	T	1538	7.1	0.524	4.0	LOS A	13.2	98.4	0.39	0.36	67.4
6	R	34	3.1	0.332	30.8	LOS C	1.2	8.4	0.67	0.78	37.1
Approach		1575	7.2	0.524	4.6	LOS A	13.2	98.4	0.39	0.37	66.4
North: Woodstock St north											
7	L	21	5.0	0.130	56.5	LOS D	1.0	7.2	0.95	0.71	25.7
8	T	1	0.0	0.052	52.8	LOS D	0.2	1.5	0.98	0.62	22.8
9	R	3	0.0	0.052	62.0	LOS E	0.2	1.5	0.98	0.63	24.5
Approach		25	4.2	0.130	57.0	LOS E	1.0	7.2	0.96	0.70	25.5
West: Industrial Dr west											
10	L	55	5.8	0.092	12.7	LOS A	0.6	4.1	0.23	0.72	53.7
11	T	2319	4.3	0.774	6.0	LOS A	30.1	218.3	0.59	0.56	62.4
12	R	119	4.4	0.689	30.7	LOS C	4.7	34.3	0.68	0.89	37.2
Approach		2493	4.3	0.774	7.3	LOS A	30.1	218.3	0.59	0.57	60.5
All Vehicles		4220	5.3	0.774	8.2	LOS A	30.1	218.3	0.53	0.51	59.3

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.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: PM-Industrial Dr - Woodstock St 2018 Stage 2 construction 4-5 pm

Industrial Dr-Woodstock St
2018 Stage 2 Construction
Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

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: Woodstock St south											
1	L	120	1.8	0.935	75.6	LOS F	7.2	51.3	1.00	1.06	19.5
2	T	1	0.0	0.024	51.1	LOS D	0.1	0.7	0.97	0.59	23.4
3	R	1	0.0	0.024	59.2	LOS E	0.1	0.7	0.97	0.62	23.3
Approach		122	1.7	0.935	75.3	LOS F	7.2	51.3	1.00	1.05	19.5
East: Industrial Dr east											
4	L	1	0.0	0.679	14.3	LOS A	21.3	152.5	0.46	1.38	56.2
5	T	2106	2.6	0.679	4.2	LOS A	21.3	152.6	0.46	0.43	65.8
6	R	19	5.6	0.085	15.6	LOS B	0.3	2.2	0.33	0.73	50.2
Approach		2126	2.7	0.679	4.3	LOS A	21.3	152.6	0.46	0.43	65.7
North: Woodstock St north											
7	L	86	1.2	0.670	62.5	LOS E	4.5	31.6	1.00	0.82	24.1
8	T	1	0.0	0.160	53.9	LOS D	0.6	4.5	0.99	0.67	22.4
9	R	12	0.0	0.160	63.1	LOS E	0.6	4.5	0.99	0.68	24.1
Approach		99	1.1	0.670	62.5	LOS E	4.5	31.6	1.00	0.80	24.1
West: Industrial Dr west											
10	L	17	6.3	0.027	12.3	LOS A	0.2	1.1	0.20	0.71	54.4
11	T	1411	3.3	0.456	3.0	LOS A	10.2	73.2	0.33	0.30	69.4
12	R	161	0.0	0.962	47.1	LOS D	9.3	65.3	1.00	0.95	29.0
Approach		1588	3.0	0.962	7.6	LOS A	10.2	73.2	0.39	0.37	61.5
All Vehicles		3936	2.7	0.962	9.3	LOS A	21.3	152.6	0.46	0.44	57.9

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.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: PM-Industrial Dr - Woodstock St 2018 Stage 2 construction 5-6 pm

Industrial Dr-Woodstock St
2018 Stage 2 Construction
Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

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: Woodstock St south											
1	L	124	0.0	0.557	54.8	LOS D	6.0	41.7	0.99	0.79	23.9
2	T	1	0.0	0.013	44.5	LOS D	0.1	0.7	0.92	0.57	25.3
3	R	1	0.0	0.013	52.6	LOS D	0.1	0.7	0.92	0.64	25.0
Approach		126	0.0	0.557	54.7	LOS D	6.0	41.7	0.99	0.79	23.9
East: Industrial Dr east											
4	L	7	0.0	0.577	15.5	LOS B	17.3	123.2	0.46	1.35	54.5
5	T	1681	2.0	0.577	5.4	LOS A	17.3	123.2	0.46	0.43	64.2
6	R	5	20.0	0.042	21.9	LOS B	0.1	1.0	0.46	0.72	44.5
Approach		1694	2.1	0.577	5.5	LOS A	17.3	123.2	0.46	0.43	64.1
North: Woodstock St north											
7	L	87	2.4	0.399	54.8	LOS D	4.1	29.3	0.97	0.77	26.1
8	T	1	0.0	0.130	49.8	LOS D	0.7	5.0	0.97	0.67	23.4
9	R	14	0.0	0.130	58.9	LOS E	0.7	5.0	0.97	0.69	25.1
Approach		102	2.1	0.399	55.3	LOS D	4.1	29.3	0.97	0.76	26.0
West: Industrial Dr west											
10	L	2	50.0	0.005	15.7	LOS B	0.0	0.2	0.25	0.69	52.9
11	T	1709	1.7	0.583	5.5	LOS A	17.7	125.4	0.47	0.43	64.2
12	R	82	0.0	0.569	26.8	LOS B	2.8	19.9	0.67	0.83	39.7
Approach		1794	1.6	0.583	6.5	LOS A	17.7	125.4	0.48	0.45	62.6
All Vehicles		3716	1.8	0.583	9.0	LOS A	17.7	125.4	0.50	0.46	58.2

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.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: AM- Tourle St Left Turn Access 2018 Stage 2 construction 5-6 am

Tourle St Left Turn Access
2018 Stage 2 Construction
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: Tourle Street South											
2	T	949	4.8	0.502	7.1	LOS A	0.0	0.0	0.00	0.59	50.4
Approach		949	4.8	0.502	7.1	LOS A	0.0	0.0	0.00	0.59	50.4
East: Wharf Access											
4	L	8	0.0	0.011	10.5	LOS A	0.0	0.3	0.45	0.67	46.5
Approach		8	0.0	0.011	10.5	LOS A	0.0	0.3	0.45	0.67	46.5
North: Tourle Street North											
7	L	5	0.0	0.003	9.2	LOS A	0.0	0.0	0.00	0.69	51.1
8	T	426	7.2	0.229	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		432	7.1	0.229	0.1	NA	0.0	0.0	0.00	0.01	59.9
All Vehicles		1389	5.5	0.502	5.0	NA	0.0	0.3	0.00	0.41	53.0

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: AM- Tourle St Left Turn Access 2018 Stage 2 construction 6-7 am

Tourle St Left Turn Access
2018 Stage 2 Construction
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: Tourle Street South											
2	T	1571	5.6	0.835	7.2	LOS A	0.0	0.0	0.00	0.59	50.4
Approach		1571	5.6	0.835	7.2	LOS A	0.0	0.0	0.00	0.59	50.4
East: Wharf Access											
4	L	1	100.0	0.018	68.9	LOS E	0.1	0.7	0.91	0.97	23.9
Approach		1	100.0	0.018	68.9	LOS E	0.1	0.7	0.91	0.97	23.9
North: Tourle Street North											
7	L	9	11.1	0.006	9.9	LOS A	0.0	0.0	0.00	0.69	51.1
8	T	904	4.4	0.477	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		914	4.5	0.477	0.1	NA	0.0	0.0	0.00	0.01	59.9
All Vehicles		2485	5.2	0.835	4.6	NA	0.1	0.7	0.00	0.38	53.5

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: AM- Tourle St Left Turn Access 2018 Stage 2 construction 8-9 am

Tourle St Left Turn Access
2018 Stage 2 Construction
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: Tourle Street South											
2	T	1315	7.3	0.706	7.2	LOS A	0.0	0.0	0.00	0.59	50.4
Approach		1315	7.3	0.706	7.2	LOS A	0.0	0.0	0.00	0.59	50.4
East: Wharf Access											
4	L	3	33.3	0.117	129.5	LOS F	0.3	2.7	0.97	0.99	13.2
Approach		3	33.3	0.117	129.5	LOS F	0.3	2.7	0.97	0.99	13.2
North: Tourle Street North											
7	L	1	0.0	0.001	9.2	LOS A	0.0	0.0	0.00	0.69	51.1
8	T	1655	6.0	0.882	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		1656	6.0	0.882	0.0	NA	0.0	0.0	0.00	0.00	60.0
All Vehicles		2974	6.6	0.882	3.3	NA	0.3	2.7	0.00	0.26	55.1

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: PM- Tourle St Left Turn Access 2018 Stage 2 construction 4-5 pm

Tourle St Left Turn Access
2018 Stage 2 Construction
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: Tourle Street South											
2	T	1904	1.7	0.987	7.0	LOS A	0.0	0.0	0.00	0.59	50.4
Approach		1904	1.7	0.987	7.0	LOS A	0.0	0.0	0.00	0.59	50.4
East: Wharf Access											
4	L	18	5.9	0.138	35.0	LOS C	0.4	2.9	0.90	0.97	30.7
Approach		18	5.9	0.138	35.0	LOS C	0.4	2.9	0.90	0.97	30.7
North: Tourle Street North											
7	L	5	0.0	0.003	9.2	LOS A	0.0	0.0	0.00	0.69	51.1
8	T	1460	3.6	0.766	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		1465	3.6	0.766	0.0	NA	0.0	0.0	0.00	0.00	60.0
All Vehicles		3387	2.5	0.987	4.1	NA	0.4	2.9	0.00	0.34	53.9

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: PM- Tourle St Left Turn Access 2018 Stage 2 construction 5-6 pm

Tourle St Left Turn Access
2018 Stage 2 Construction
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: Tourle Street South											
2	T	1745	1.0	0.901	7.0	LOS A	0.0	0.0	0.00	0.59	50.4
Approach		1745	1.0	0.901	7.0	LOS A	0.0	0.0	0.00	0.59	50.4
East: Wharf Access											
4	L	40	2.6	0.253	32.8	LOS C	0.8	5.7	0.90	0.99	31.6
Approach		40	2.6	0.253	32.8	LOS C	0.8	5.7	0.90	0.99	31.6
North: Tourle Street North											
7	L	1	0.0	0.001	9.2	LOS A	0.0	0.0	0.00	0.69	51.1
8	T	1387	2.3	0.722	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		1388	2.3	0.722	0.0	NA	0.0	0.0	0.00	0.00	60.0
All Vehicles		3174	1.6	0.901	4.3	NA	0.8	5.7	0.01	0.34	53.7

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.

B6 – 2020 Stage 3 Construction Traffic

MOVEMENT SUMMARY

Site: AM-Industrial Dr - Tourle St
2020 Stage 3 construction 5-6 am

Industrial Dr-Tourle St
2020 Stage 3 Construction
Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

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
East: Industrial Dr east											
5	T	293	4.0	0.112	5.5	LOS A	2.3	16.9	0.36	0.30	65.1
6	R	485	4.8	0.356	34.1	LOS C	8.5	61.8	0.76	0.81	35.2
Approach		778	4.5	0.356	23.3	LOS B	8.5	61.8	0.61	0.62	43.3
North: Tourle St											
7	L	221	7.1	0.125	7.8	X	X	X	X	0.60	49.8
9	R	228	6.5	0.339	48.1	LOS D	4.9	36.4	0.91	0.79	28.3
Approach		449	6.8	0.339	28.3	LOS B	4.9	36.4	0.46	0.69	35.4
West: Industrial Dr west											
10	L	478	4.6	0.266	11.3	X	X	X	X	0.69	58.8
11	T	331	5.4	0.351	33.5	LOS C	6.7	49.0	0.87	0.71	36.3
Approach		808	4.9	0.351	20.4	LOS B	6.7	49.0	0.35	0.70	46.8
All Vehicles		2036	5.2	0.356	23.3	LOS B	8.5	61.8	0.48	0.67	42.6

X: Not applicable for Continuous movement.

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.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: AM-Industrial Dr - Tourle St
2020 Stage 3 construction 6-7 am

Industrial Dr-Tourle St
2020 Stage 3 Construction
Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

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
East: Industrial Dr east											
5	T	247	14.5	0.102	5.8	LOS A	2.0	16.0	0.36	0.30	64.5
6	R	692	12.9	0.782	51.6	LOS D	16.9	131.7	0.99	0.90	27.6
Approach		939	13.3	0.782	39.5	LOS C	16.9	131.7	0.82	0.74	33.1
North: Tourle St											
7	L	480	14.0	0.284	8.1	X	X	X	X	0.60	49.7
9	R	543	14.1	0.805	56.8	LOS E	14.0	109.7	1.00	0.92	25.8
Approach		1023	14.1	0.805	33.9	LOS C	14.0	109.7	0.53	0.77	32.8
West: Industrial Dr west											
10	L	736	18.6	0.449	12.2	X	X	X	X	0.68	58.8
11	T	1034	15.4	0.810	35.3	LOS C	24.7	195.6	0.97	0.92	35.1
Approach		1769	16.7	0.810	25.7	LOS B	24.7	195.6	0.57	0.82	42.1
All Vehicles		3732	15.1	0.810	31.4	LOS C	24.7	195.6	0.62	0.79	36.9

X: Not applicable for Continuous movement.

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.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: AM-Industrial Dr - Tourle St
2020 Stage 3 construction 8-9 am

Industrial Dr-Tourle St
2020 Stage 3 Construction
Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

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
East: Industrial Dr east											
5	T	784	16.9	0.333	7.4	LOS A	8.0	64.2	0.46	0.40	61.2
6	R	496	13.6	0.861	64.0	LOS E	13.6	106.7	1.00	0.95	23.9
Approach		1280	15.6	0.861	29.3	LOS C	13.6	106.7	0.67	0.61	39.3
North: Tourle St											
7	L	722	10.2	0.417	8.0	X	X	X	X	0.60	49.7
9	R	626	13.3	0.879	62.9	LOS E	17.6	137.0	1.00	0.99	24.2
Approach		1348	11.6	0.879	33.5	LOS C	17.6	137.0	0.46	0.78	32.8
West: Industrial Dr west											
10	L	488	15.9	0.293	12.0	X	X	X	X	0.68	58.8
11	T	1413	8.8	0.870	36.0	LOS C	36.2	272.2	0.98	0.98	34.7
Approach		1901	10.6	0.870	29.8	LOS C	36.2	272.2	0.73	0.91	38.8
All Vehicles		4529	12.3	0.879	30.8	LOS C	36.2	272.2	0.63	0.79	37.0

X: Not applicable for Continuous movement.

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.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: PM-Industrial Dr - Tourle St
2020 Stage 3 construction 4-5 pm

Industrial Dr-Tourle St
2020 Stage 3 Construction
Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

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
East: Industrial Dr east											
5	T	1552	5.2	0.614	9.8	LOS A	20.9	153.1	0.61	0.56	56.8
6	R	803	3.9	0.855	56.5	LOS E	21.4	154.5	1.00	0.94	25.9
Approach		2355	4.8	0.855	25.8	LOS B	21.4	154.5	0.74	0.69	41.4
North: Tourle St											
7	L	1125	3.0	0.619	7.8	X	X	X	X	0.60	49.6
9	R	640	8.6	0.871	61.3	LOS E	17.7	132.7	1.00	0.98	24.6
Approach		1765	5.0	0.871	27.2	LOS B	17.7	132.7	0.36	0.74	35.6
West: Industrial Dr west											
10	L	678	3.9	0.375	11.3	X	X	X	X	0.69	58.8
11	T	1163	5.6	0.883	43.8	LOS D	31.6	231.9	1.00	1.02	31.3
Approach		1841	5.0	0.883	31.9	LOS C	31.6	231.9	0.63	0.90	37.7
All Vehicles		5961	4.9	0.883	28.1	LOS B	31.6	231.9	0.60	0.77	38.4

X: Not applicable for Continuous movement.

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.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: PM-Industrial Dr - Tourle St
2020 Stage 3 construction 5-6 pm

Industrial Dr-Tourle St
2020 Stage 3 Construction
Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

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
East: Industrial Dr east											
5	T	1382	7.0	0.553	9.2	LOS A	17.4	129.4	0.57	0.52	57.9
6	R	919	2.9	0.902	62.0	LOS E	26.5	189.8	1.00	0.98	24.3
Approach		2301	5.4	0.902	30.3	LOS C	26.5	189.8	0.74	0.70	38.4
North: Tourle St											
7	L	1149	2.7	0.631	7.8	X	X	X	X	0.60	49.6
9	R	685	3.8	0.903	65.4	LOS E	19.9	143.7	1.00	1.02	23.5
Approach		1835	3.1	0.903	29.3	LOS C	19.9	143.7	0.37	0.76	34.5
West: Industrial Dr west											
10	L	664	3.6	0.367	11.3	X	X	X	X	0.69	58.8
11	T	1134	4.2	0.905	49.0	LOS D	32.5	235.4	1.00	1.05	29.4
Approach		1798	4.0	0.905	35.0	LOS C	32.5	235.4	0.63	0.92	36.0
All Vehicles		5934	4.2	0.905	31.4	LOS C	32.5	235.4	0.59	0.78	36.4

X: Not applicable for Continuous movement.

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.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: AM-Industrial Dr - Woodstock St 2020 Stage 3 construction 5-6 am

Industrial Dr-Woodstock St
2020 Stage 3 Construction
Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

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: Woodstock St south											
1	L	99	0.0	0.254	45.1	LOS D	4.1	28.6	0.88	0.78	29.1
2	T	1	0.0	0.006	33.3	LOS C	0.1	0.6	0.81	0.51	29.3
3	R	1	0.0	0.006	42.5	LOS C	0.1	0.6	0.81	0.66	30.6
Approach		101	0.0	0.254	45.0	LOS D	4.1	28.6	0.87	0.78	29.1
East: Industrial Dr east											
4	L	1	0.0	0.263	17.1	LOS B	6.4	46.7	0.43	1.37	52.2
5	T	665	5.1	0.263	7.0	LOS A	6.4	46.7	0.43	0.37	62.0
6	R	23	0.0	0.070	17.5	LOS B	0.4	3.0	0.40	0.72	47.8
Approach		689	4.9	0.263	7.4	LOS A	6.4	46.7	0.43	0.39	61.5
North: Woodstock St north											
7	L	11	0.0	0.027	42.8	LOS D	0.4	2.8	0.82	0.69	30.0
8	T	1	0.0	0.059	37.3	LOS C	0.6	4.5	0.86	0.61	27.3
9	R	14	7.7	0.059	46.9	LOS D	0.6	4.5	0.86	0.71	28.8
Approach		25	4.2	0.059	44.8	LOS D	0.6	4.5	0.84	0.70	29.2
West: Industrial Dr west											
10	L	44	4.8	0.102	16.2	LOS B	0.7	5.2	0.35	0.73	49.5
11	T	468	6.7	0.187	6.6	LOS A	4.2	31.3	0.40	0.34	62.9
12	R	39	0.0	0.132	19.2	LOS B	0.8	5.6	0.44	0.74	46.1
Approach		552	6.1	0.187	8.2	LOS A	4.2	31.3	0.40	0.40	60.3
All Vehicles		1367	5.0	0.263	11.2	LOS A	6.4	46.7	0.46	0.43	55.5

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.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: AM-Industrial Dr - Woodstock St 2020 Stage 3 construction 6-7 am

Industrial Dr-Woodstock St
2020 Stage 3 Construction
Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

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: Woodstock St south											
1	L	144	0.0	0.457	50.4	LOS D	6.5	45.5	0.95	0.80	27.4
2	T	1	0.0	0.008	37.0	LOS C	0.1	0.6	0.85	0.53	27.9
3	R	1	0.0	0.008	46.2	LOS D	0.1	0.6	0.85	0.65	29.3
Approach		146	0.0	0.457	50.3	LOS D	6.5	45.5	0.95	0.80	27.4
East: Industrial Dr east											
4	L	1	0.0	0.429	16.5	LOS B	11.5	84.3	0.45	1.37	53.2
5	T	1143	6.0	0.429	6.4	LOS A	11.5	84.3	0.45	0.41	62.8
6	R	51	2.1	0.245	22.0	LOS B	1.3	9.0	0.52	0.76	43.6
Approach		1195	5.8	0.429	7.1	LOS A	11.5	84.3	0.45	0.42	61.8
North: Woodstock St north											
7	L	11	10.0	0.036	47.4	LOS D	0.4	3.3	0.86	0.69	28.6
8	T	1	0.0	0.105	44.5	LOS D	0.6	5.6	0.92	0.65	24.9
9	R	13	33.3	0.105	55.6	LOS D	0.6	5.6	0.92	0.71	26.5
Approach		24	21.7	0.105	51.6	LOS D	0.6	5.6	0.89	0.70	27.3
West: Industrial Dr west											
10	L	84	6.2	0.179	15.0	LOS B	1.2	9.0	0.32	0.74	50.9
11	T	1264	6.5	0.476	6.7	LOS A	13.3	98.2	0.47	0.43	62.1
12	R	63	0.0	0.281	21.0	LOS B	1.5	10.7	0.50	0.77	44.3
Approach		1412	6.2	0.476	7.9	LOS A	13.3	98.2	0.47	0.46	60.5
All Vehicles		2777	5.8	0.476	10.1	LOS A	13.3	98.2	0.49	0.46	56.8

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.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: AM-Industrial Dr - Woodstock St 2020 Stage 3 construction 8-9 am

Industrial Dr-Woodstock St
2020 Stage 3 Construction
Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

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: Woodstock St south											
1	L	125	0.0	0.749	61.9	LOS E	6.5	45.7	1.00	0.87	24.3
2	T	1	0.0	0.014	45.6	LOS D	0.1	0.7	0.93	0.58	25.0
3	R	1	0.0	0.014	54.8	LOS D	0.1	0.7	0.93	0.63	26.6
Approach		127	0.0	0.749	61.7	LOS E	6.5	45.7	1.00	0.86	24.3
East: Industrial Dr east											
4	L	3	66.7	0.535	17.6	LOS B	13.7	102.2	0.40	2.62	55.7
5	T	1572	7.2	0.535	4.0	LOS A	13.7	102.2	0.40	0.36	67.2
6	R	34	3.1	0.343	31.6	LOS C	1.2	8.6	0.68	0.78	36.6
Approach		1608	7.2	0.535	4.6	LOS A	13.7	102.2	0.40	0.38	66.2
North: Woodstock St north											
7	L	21	5.0	0.130	56.5	LOS D	1.0	7.2	0.95	0.71	25.7
8	T	1	0.0	0.052	52.8	LOS D	0.2	1.5	0.98	0.62	22.8
9	R	3	0.0	0.052	62.0	LOS E	0.2	1.5	0.98	0.63	24.5
Approach		25	4.2	0.130	57.0	LOS E	1.0	7.2	0.96	0.70	25.5
West: Industrial Dr west											
10	L	55	5.8	0.092	12.7	LOS A	0.6	4.1	0.23	0.72	53.7
11	T	2371	4.3	0.791	6.2	LOS A	31.9	231.2	0.61	0.58	61.9
12	R	119	4.4	0.721	35.1	LOS C	5.2	37.9	0.72	0.91	34.6
Approach		2544	4.3	0.791	7.7	LOS A	31.9	231.2	0.61	0.60	59.8
All Vehicles		4305	5.3	0.791	8.5	LOS A	31.9	231.2	0.54	0.52	59.0

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.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: PM-Industrial Dr - Woodstock St 2020 Stage 3 construction 4-5 pm

Industrial Dr-Woodstock St
2020 Stage 3 Construction
Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

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: Woodstock St south											
1	L	120	1.8	0.935	75.6	LOS F	7.2	51.3	1.00	1.06	19.5
2	T	1	0.0	0.024	51.1	LOS D	0.1	0.7	0.97	0.59	23.4
3	R	1	0.0	0.024	59.2	LOS E	0.1	0.7	0.97	0.62	23.3
Approach		122	1.7	0.935	75.3	LOS F	7.2	51.3	1.00	1.05	19.5
East: Industrial Dr east											
4	L	1	0.0	0.697	14.4	LOS A	22.6	162.1	0.48	1.36	56.2
5	T	2163	2.7	0.697	4.4	LOS A	22.6	162.1	0.48	0.45	65.4
6	R	19	5.6	0.087	15.6	LOS B	0.3	2.2	0.33	0.73	50.2
Approach		2183	2.7	0.697	4.5	LOS A	22.6	162.1	0.47	0.45	65.3
North: Woodstock St north											
7	L	86	1.2	0.670	62.5	LOS E	4.5	31.6	1.00	0.82	24.1
8	T	1	0.0	0.160	53.9	LOS D	0.6	4.5	0.99	0.67	22.4
9	R	12	0.0	0.160	63.1	LOS E	0.6	4.5	0.99	0.68	24.1
Approach		99	1.1	0.670	62.5	LOS E	4.5	31.6	1.00	0.80	24.1
West: Industrial Dr west											
10	L	17	6.3	0.027	12.3	LOS A	0.2	1.1	0.20	0.71	54.4
11	T	1453	3.3	0.470	3.1	LOS A	10.7	76.7	0.33	0.30	69.3
12	R	161	0.0	0.980	46.1	LOS D	9.3	65.3	1.00	0.94	29.3
Approach		1631	3.0	0.980	7.4	LOS A	10.7	76.7	0.40	0.37	61.8
All Vehicles		4035	2.7	0.980	9.2	LOS A	22.6	162.1	0.47	0.44	57.9

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.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: PM-Industrial Dr - Woodstock St 2020 Stage 3 construction 5-6 pm

Industrial Dr-Woodstock St
2020 Stage 3 Construction
Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

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: Woodstock St south											
1	L	124	0.0	0.557	54.8	LOS D	6.0	41.7	0.99	0.79	23.9
2	T	1	0.0	0.013	44.5	LOS D	0.1	0.7	0.92	0.57	25.3
3	R	1	0.0	0.013	52.6	LOS D	0.1	0.7	0.92	0.64	25.0
Approach		126	0.0	0.557	54.7	LOS D	6.0	41.7	0.99	0.79	23.9
East: Industrial Dr east											
4	L	7	0.0	0.596	15.6	LOS B	18.3	130.7	0.48	1.34	54.5
5	T	1736	2.1	0.596	5.6	LOS A	18.4	130.8	0.48	0.44	63.9
6	R	5	20.0	0.043	21.9	LOS B	0.1	1.0	0.46	0.72	44.5
Approach		1748	2.2	0.596	5.7	LOS A	18.4	130.8	0.48	0.45	63.8
North: Woodstock St north											
7	L	87	2.4	0.399	54.8	LOS D	4.1	29.3	0.97	0.77	26.1
8	T	1	0.0	0.130	49.8	LOS D	0.7	5.0	0.97	0.67	23.4
9	R	14	0.0	0.130	58.9	LOS E	0.7	5.0	0.97	0.69	25.1
Approach		102	2.1	0.399	55.3	LOS D	4.1	29.3	0.97	0.76	26.0
West: Industrial Dr west											
10	L	2	50.0	0.005	15.7	LOS B	0.0	0.2	0.25	0.69	52.9
11	T	1748	1.7	0.596	5.6	LOS A	18.4	130.7	0.48	0.44	63.9
12	R	82	0.0	0.607	29.8	LOS C	3.1	21.8	0.70	0.85	37.6
Approach		1833	1.7	0.607	6.7	LOS A	18.4	130.7	0.49	0.46	62.2
All Vehicles		3809	1.9	0.607	9.1	LOS A	18.4	130.8	0.51	0.47	58.0

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.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: AM- Tourle St Left Turn Access 2020 Stage 3 construction 5-6 am

Tourle St Left Turn Access
2020 Stage 3 Construction
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: Tourle Street South											
2	T	959	4.7	0.507	7.1	LOS A	0.0	0.0	0.00	0.59	50.4
Approach		959	4.7	0.507	7.1	LOS A	0.0	0.0	0.00	0.59	50.4
East: Wharf Access											
4	L	8	0.0	0.012	10.6	LOS A	0.0	0.3	0.45	0.68	46.4
Approach		8	0.0	0.012	10.6	LOS A	0.0	0.3	0.45	0.68	46.4
North: Tourle Street North											
7	L	5	0.0	0.003	9.2	LOS A	0.0	0.0	0.00	0.69	51.1
8	T	441	6.9	0.236	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		446	6.8	0.236	0.1	NA	0.0	0.0	0.00	0.01	59.9
All Vehicles		1414	5.4	0.507	4.9	NA	0.0	0.3	0.00	0.41	53.0

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: AM- Tourle St Left Turn Access 2020 Stage 3 construction 6-7 am

Tourle St Left Turn Access
2020 Stage 3 Construction
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: Tourle Street South											
2	T	1594	5.5	0.846	7.2	LOS A	0.0	0.0	0.00	0.59	50.4
Approach		1594	5.5	0.846	7.2	LOS A	0.0	0.0	0.00	0.59	50.4
East: Wharf Access											
4	L	1	100.0	0.020	75.0	LOS F	0.1	0.7	0.92	0.97	22.6
Approach		1	100.0	0.020	75.0	LOS F	0.1	0.7	0.92	0.97	22.6
North: Tourle Street North											
7	L	9	11.1	0.006	9.9	LOS A	0.0	0.0	0.00	0.69	51.1
8	T	935	4.3	0.493	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		944	4.3	0.493	0.1	NA	0.0	0.0	0.00	0.01	59.9
All Vehicles		2539	5.1	0.846	4.6	NA	0.1	0.7	0.00	0.37	53.5

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: AM- Tourle St Left Turn Access 2020 Stage 3 construction 8-9 am

Tourle St Left Turn Access
2020 Stage 3 Construction
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: Tourle Street South											
2	T	1343	7.1	0.721	7.2	LOS A	0.0	0.0	0.00	0.59	50.4
Approach		1343	7.1	0.721	7.2	LOS A	0.0	0.0	0.00	0.59	50.4
East: Wharf Access											
4	L	3	33.3	0.134	146.4	LOS F	0.3	3.0	0.98	0.99	12.0
Approach		3	33.3	0.134	146.4	LOS F	0.3	3.0	0.98	0.99	12.0
North: Tourle Street North											
7	L	1	0.0	0.001	9.2	LOS A	0.0	0.0	0.00	0.69	51.1
8	T	1695	5.9	0.902	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		1696	5.9	0.902	0.0	NA	0.0	0.0	0.00	0.00	60.0
All Vehicles		3042	6.5	0.902	3.4	NA	0.3	3.0	0.00	0.26	55.1

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: PM- Tourle St Left Turn Access 2020 Stage 3 construction 4-5 pm

Tourle St Left Turn Access
2020 Stage 3 Construction
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: Tourle Street South											
2	T	1946	1.7	1.009	15.1	LOS B	12.1	86.0	1.00	0.00	42.4
Approach		1946	1.7	1.009	15.1	LOS B	12.1	86.0	1.00	0.00	42.4
East: Wharf Access											
4	L	18	5.9	0.148	37.1	LOS C	0.4	3.1	0.91	0.97	29.8
Approach		18	5.9	0.148	37.1	LOS C	0.4	3.1	0.91	0.97	29.8
North: Tourle Street North											
7	L	5	0.0	0.003	9.2	LOS A	0.0	0.0	0.00	0.69	51.1
8	T	1492	3.5	0.782	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		1497	3.5	0.782	0.0	NA	0.0	0.0	0.00	0.00	60.0
All Vehicles		3461	2.5	1.009	8.7	NA	12.1	86.0	0.57	0.01	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: PM- Tourle St Left Turn Access 2020 Stage 3 construction 5-6 pm

Tourle St Left Turn Access
2020 Stage 3 Construction
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: Tourle Street South											
2	T	1786	1.0	0.922	7.0	LOS A	0.0	0.0	0.00	0.59	50.4
Approach		1786	1.0	0.922	7.0	LOS A	0.0	0.0	0.00	0.59	50.4
East: Wharf Access											
4	L	40	2.6	0.267	34.4	LOS C	0.8	6.0	0.91	0.99	30.8
Approach		40	2.6	0.267	34.4	LOS C	0.8	6.0	0.91	0.99	30.8
North: Tourle Street North											
7	L	1	0.0	0.001	9.2	LOS A	0.0	0.0	0.00	0.69	51.1
8	T	1412	2.2	0.734	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		1413	2.2	0.734	0.0	NA	0.0	0.0	0.00	0.00	60.0
All Vehicles		3239	1.6	0.922	4.3	NA	0.8	6.0	0.01	0.34	53.7

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.

SYDNEY
Ground floor, Suite 01, 20 Chandos Street
St Leonards, New South Wales, 2065
T 02 9493 9500 F 02 9493 9599

NEWCASTLE
Level 1, 6 Bolton Street
Newcastle, New South Wales, 2300
T 02 4927 0506 F 02 4926 1312