Appendix 1

Dowes Quarry Transport Route Intersection Analysis prepared by Constructive Solutions

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R.W. Corkery & Co Pty Ltd

Darryl McCarthy Constructions Pty Ltd Dowe's Quarry Transport Route Intersection Analysis

December 2014



Realising potential

Report prepared by:



Realising potential

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1. Introduction

This additional information report has been prepared for R.W. Corkery & Co. Pty Ltd on behalf of Darryl McCarthy Constructions Pty Ltd to consider the traffic impacts of the proposed continuation (and extension) of Dowe's Quarry (the Proposal). This document provides details of a SIDRA intersection traffic analysis for the following four way intersections located on the transport routes associated with Dowe's Quarry:-

- New England Highway (Rouse Street) and Naas Street intersection;
- Naas Street, Logan Street and Robert Brush Drive intersection;
- Mount Lindesay Road, Old Ballandeen Road and Boundary Road intersection; and
- New England Highway, Bruxner Highway and Old Ballandeen Road intersection.

2. Development Traffic

Information from the Transport Assessment, included in the Environmental Impact Statement (EIS) for the Proposal, stated that at maximum quarry production rates (100,000 tonne per annum) truck movements (HV) are anticipated to be 20 laden trips or 40 movements per day (two way) with light vehicle movements (LV) anticipated to be 8 per day (two way).

It was further established that these vehicle movements would be split 50:50 as provided in Table 1.

Table 1 – Development Traffic (Daily)

		rry Traffic Levels r day)
Road	LV	HV
Mount Lindesay Road from the quarry to Old Ballendeen Road and through to the New England Highway.	4	20
Mount Lindesay from the quarry to Naas Street and through to the New England Highway.	4	20
Total	8	40

Source: Dowe's Quarry EIS - Transport Assessment (July 2014)

For the purposes of the SIDRA analyses, it was assumed that the peak hour volumes for the traffic generated would be 20% of the total daily traffic volumes as provided in Table 2.

Table 2 – Development Traffic (Peak Hour)

		rry Traffic Levels ur Volumes
Road	LV	HV
Mount Lindesay Road from the quarry to Old Ballandeen Road and through to the New England Highway.	1	4
Mount Lindesay from the quarry to Naas Street and through to the New England Highway.	1	4
Total	2	8

3. Traffic Data

Traffic data for the analysis was provided by Darryl McCarthy Constructions Pty Ltd and consisted of traffic counts taken at 15 minute intervals at each of the intersections. The traffic counts were undertaken as follows to establish morning and afternoon peak flows and included a breakdown of light vehicles (LV) and heavy vehicles (HV):-

- 18 November 2014 7:00am to 10:00am and 3:00pm to 6:00pm
- 24 November 2014 7:00am to 10:00am and 3:00pm to 6:00pm.

Traffic data used for the analysis is provided in **Appendix A**.

4. SIDRA Intersection Software

4.1 Performance Parameters

The ability for the intersections to cater for future traffic forecasts was investigated using the SIDRA intersection software package. This package provides several indicators in order to determine the level of intersection performance. This report has used three typical performance parameters as listed and described below: -

- Level of service (LoS);
- Degree of saturation (DoS); and
- Average intersection delay.

4.1.1 Level of Service (LoS)

LoS is a basic performance parameter used to describe the operation of an intersection. Levels of Service range from A (indicating good intersection operation) to F (indicating over saturated conditions with long delays and queues). At priority controlled (give-way and stop controlled) intersections, the LoS is based on the modelled delay (seconds per vehicle) for the most delayed movement as shown in Table 3.

Level of Service	Average Delay per Vehicle (secs/veh)	Give Way & Stop Signs
А	< 14	Good operation
В	15 to 28	Acceptable delays & spare capacity
С	29 to 42	Satisfactory, but accident study required
D	43 to 56	Near capacity & accident study required
E	57 to 70	At capacity, requires other control mode

Table 3 – RMS Level of Service Criteria for Intersections

Source: RTA Guide to Traffic Generating Developments (2002)

4.1.2 Degree of Saturation (DoS)

DoS is the ratio of demand flow to capacity. As it approaches 1.0, extensive queues and delays can be experienced at an intersection. It is desirable for the DoS to be less than the nominated practical degree of saturation. The intersection DoS is based on the movement with the highest value.

For SIDRA analyses, a DoS of 0.9 represents an intersection at capacity.

4.1.3 Average Delay

Delay is the difference between interrupted and uninterrupted travel times through the intersection and is measured in seconds per vehicle. At priority controlled intersections, the average delay for the most delayed movement is reported.

4.2 Software Input Parameters

SIDRA relies on numerous input parameters to enable an accurate assessment to be undertaken. The parameters used for this analysis included:-

- Peak hour traffic data for each leg of the intersection including LV and HV volumes;
- Movement definitions;
- Lane geometry;
- Lane traffic data;
- Road Priority;
- Gap acceptance data;
- Vehicle movement data;

To cater for future traffic demands and to assess the traffic impacts of the additional traffic at each intersection for the for the life of the Proposal, an average annual growth estimate of 1.5% over a 30 year period has been used.

5. Intersection Performance

Intersection performance analysed in SIDRA based on the performance parameters discussed in Section 4.1 are provided in Table 4 including demand flows consisting of total vehicles per hour and percentage of heavy vehicles.

Analysis for each intersection included the following scenarios: -

- Background traffic (existing traffic);
- Background traffic plus development traffic; and
- 30 year traffic @ 1.5% annual growth plus development traffic.

Table 4 – Intersection Performance

	Peak Hour											
T = 26° -	Demand	l Flows		Degree of	Average							
Traffic	Total vph	% HV	LOS	Saturation	Delay (sec/veh)							
New England Hw	vy (Rouse St)	and Naas S	t intersection	on								
Background	448	12.3	LOS A	0.114	4.4							
Background + Development	458	13.8	LOS A	0.115	4.6							
30 year @ 1.5% + Development	742	13.9	LOS A	0.267	6.1							
Naas St, Logan S	t and Robert	Brush Drive	e intersectio	n								
Background	134	11	LOS A	0.038	3.3							
Background + Development	144	16.1	LOS A	0.047	3.4							
30 year @ 1.5% + Development	231	16.1	LOS A	0.08	3.6							
Mount Lindesay	Rd, Old Balla	ndeen Rd ar	nd Boundary	Rd intersect	ion							
Background	74	17.1	LOS A	0.02	3.2							
Background + Development	95	31.1	LOS A	0.029	3.4							
30 year @ 1.5% + Development	137	31.1	LOS A	0.042	3.4							
New England Hw	vy, Bruxner H	wy and Old	Ballandeen	Rd intersecti	on							
Background	256	16.9	LOS A	0.06	2.1							
Background + Development	266	19.4	LOS A	0.06	2.5							
30 year @ 1.5% + Development	386	19.4	LOS A	0.088	2.9							

SIDRA reports for each of the intersections and scenarios are provided in **Appendix B**, **C**, **D** & **E**.

A sensitivity analysis was also undertaken using the maximum daily quarry traffic volumes as detailed in Section 3. These figures were substituted for the peak hour volumes. In all cases, acceptable levels of delay and LoS A were achieved for all scenarios.

6. Conclusion

Based on the results of the SIDRA analysis, all four intersections operate with acceptable delays and good LoS for existing conditions and with the addition of maximum daily development traffic for the 30 year life of quarry operation.

As a result, intersection performance is not considered an issue and the need for intersection upgrades is not warranted from a traffic volume perspective however, minor improvements may be desirable for safety reasons.

APPENDIX A

Traffic Data

New England Highway (NEH) and Naas Street Intersection

Morning																																
Date:					H from the no								Naas Street from I							NEH from the South						Naa	as Street fro			1		
18/11/2014		H - heading sout HV DM HV			urn into Naas			turn into Naas Street HV DM HV H	(/A=+) 1)/		ght Across		Right turn into N		11/	Left turn into NEH HV DM HV HV (Art)		ading north		ht turn into Naas Str HV DM HV			to Naas Street DMcC HV (Art)	LV	Straight Across HV DM HV HV (Ar	-+> 1)/	Right tur				turn into NEH V DM HV	
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7:30am to												-																				
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-	NE	EH - heading sout	:h		urn into Naas		Left 1	turn into Naas Street		Straig	ght Across		Right turn into N			Left turn into NEH	NEH - he	ading north		ht turn into Naas Str		Left turn in	to Naas Street		Straight Across	1400	Right tur			Left	turn into NEH	1
24/11/2014 7:00am	LV	HV DM HV	HV (Art)	LV	HV DM I	HV HV (Art)	LV	HV DM HV H	/ (Art) LV	HV	DM HV HV (A	rt) LV	HV DM H	V HV (Art)	LV	HV DM HV HV (Art)	LV HV	DM HV HV (Art) LV	HV DM HV H	V (Art) LV	HV	DMcC HV (Art)	LV	HV DM HV HV (Ar	rt) LV	HV	DM HV	HV (Art)	LV H	V DM HV	HV (Art)
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New England Highway (NEH) and Naas Street Intersection

Afternoon

Date:						NEH fro	m the north									Naas Street from	NEH					_		_		NEH from t	the South		_					Ν	laas Stree	t from Loga	n Street	_		
		NEH - hea	ding south	1	R	ight turn i	into Naas Street	1	left turn int	to Naas Str	eet		Straight Acro	oss		Right turn into I	NEH		Left turn in	to NEH		NE	H - heading no	orth	Righ	ht turn into	Naas Stre	et	Left turn	nto Naas Street		Straigh	nt Across			turn into N		I	Left turn int	o NEH
18/11/2014	LV	HV	DM HV	HV (Art)	LV	HV	DM HV HV (Art)	LV	HV	DM HV	HV (Art)	LV	HV DN	HV HV (Art) LV	HV DM	HV HV (Art)	LV	HV I	DM HV	HV (Art)	LV	HV DM H	V HV (Art	:) LV	HV	DM HV H	V (Art) L'	/ н\	DMcC HV (A	t) LV	HV	DM HV HV	/(Art) L	V H	V DM H	/ HV (Art)	LV	HV D	M HV HV (Art)
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6:00pm	28	1		1				2				1			9							22		3	11			5			3			2	2			3		
Peak Hour:	404	42		14											10			0							22						40			0 1						
3pm to 4pm	101	12	0	14	1	0	0 0	11	0	0	0	8	0	0	40	0 0	0	0	0	0	0	111	9 0	9	32	0	0	0 3	4 U	0 0	10	2	0	0 1	0 2	2	0	18	2	0 0
Date:						NEL fro	m the north									Naas Street from	NEL									NEH from t	he Couth							•	laas Stree	t from Loga	. Ctroot			
Date.		NEH - hea	ding south	1	Ri		into Naas Street	1 1	left turn int	to Naas Str	eet		Straight Acro	oss	1	Right turn into I			Left turn in	to NEH		NE	H - heading no	orth		ht turn into		et	Left turn	into Naas Street		Straigh	nt Across			turn into N		1	Left turn int	NEH
24/11/2014	LV		DM HV			HV		LV	HV	DM HV		LV		HV HV (Art) LV	HV DM		LV	HV I		HV (Art)		HV DM H				DM HV H			DMcC HV (A	t) LV		DM HV H	(Art) L						M HV HV (Art)
3:00pm to																	,			-																	,,			
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3:30pm to																																								

Date:				_	1	NEH from	the north		-								-	Naas Stree	t from NEH	l i	_							_	NEH fron	n the South	_							_	Naas Street	from Logan	Street				
		NEH - head	ling south		Righ	ht turn inte	o Naas Str	eet	Le	eft turn into	o Naas Stre	et			t Across				n into NEH			Left turn	into NEH		Z	EH - heading r	north	Rig	ght turn in	nto Naas Street		Left turn i	nto Naas St	reet		Straight A				urn into NE			Left turn ir	nto NEH	
24/11/2014	LV	HV	DM HV	HV (Art)	LV	HV	DM HV	HV (Art)	LV	HV	DM HV	HV (Art)	LV	HV	DM HV	HV (Art)	LV	HV	DM HV	HV (Art)	LV	HV	DM HV	HV (Art)	LV	HV DM	HV HV (Art	t) LV	HV	DM HV HV	Art) LV	HV	DMcC	HV (Art)	LV	HV D	DM HV H	IV (Art)	LV HV	DM HV	HV (Art)	LV	HV	DM HV HV	Art)
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Peak Hour:																																													
3pm to 4pm	126	8	0	9	5	0	0	0	6	2	0	1	16	0	0	0	32	1	0	0	4	0	0	0	111	12 0	1	36	3	0	1 25	2	0	0	11	1	0	0	12 1	2	0	22	3	0	
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Afternoon																																													
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spm to 4pm	114	10	0	12	3	U	0	U	9	1	0	1	12	U	0	U	36	1	0	U	2	U	0	U	111	11 0	5	34	2		L 30	1	0	U	11	2	0	0	11 2	2	U	20	3		-
	114	1	22		3		U		9	1	2		12	1	U		36	1	1		2		U		111	16	0	34	1	3	30		1		11		2		11	4		20		4	

Use Peak Afternoon for SIDRA

Mount Lindesay Rd (MLR) & Old Ballandeen Rd (OBR) Intersection	

M	orn	ing

Date:					om NEH									MLR fro	m Naas Street								Bound	idary Road	from Saleyards								MLR fro	n Quarry			
		R across to Boundary Rd			n into MLR			o MLR (Qua			MLR Straight	t to Quarry		Right turn	into Boundary R			Left turn into OB			ry Rd across to OBI				MLR (Quarry)			VILR (to Naas St)		ALR to Naas S				n into OBR			nto Boundary Road
18/11/2014	LV	HV DM HV HV (A	art) LV	HV	DM HV HV (Art	t) LV	HV	DM HV	HV (Art)) LV	HV	DM HV	HV (Art)	LV HV	DM HV	HV (Art)	LV	HV DM HV	HV (Art)	LV	IV DM HV H	HV (Art)	LV	HV	DM HV HV (Art)	LV	HV	DM HV HV (Art)	LV	HV DN	HV HV (A	Art) LV	HV	DM HV	HV (Art)	LV HV	DM HV HV (A
7:00am to7:15am			2			1				3							1									2			2		1	1				1	
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7:45am to										5	1						-			-	±					5			-								
8:00am	1		1							1	1			3						2			1			4			3	3							
8:00am to 8:15am			2							2																			-	1							
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Date:				OBR fr	rom NEH									MLR fro	m Naas Street								Bound	dary Road	from Saleyards								MLR fro	n Quarry			
		R across to Boundary Rd		Right tur	n into MLR			o MLR (Qua		N	MLR Straight	t to Quarry		Right turn	into Boundary R	td		Left turn into OB			ry Rd across to OBF		Rig	ight turn into	MLR (Quarry)			MLR (to Naas St)		ALR to Naas S				into OBR			nto Boundary Road
24/11/2014 7:00am	LV	HV DM HV HV (art) LV	HV	DM HV HV (Art	t) LV	HV	DM HV	HV (Art)) LV	HV	DM HV	HV (Art)	LV HV	DM HV	HV (Art)	LV	HV DM HV	HV (Art)	LV		HV (Art)	LV	HV	DM HV HV (Art)	LV	HV	DM HV HV (Art)	LV	HV DN	HV HV (/	Art) LV	HV	DM HV	HV (Art)	LV HV	DM HV HV (A
to7:15am										1							1				1					1			1			1					
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Peak Hour: 7:45am to																																					
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Average Morning Peak																																					
Hour: 7:45am																																					
to 8:45am	1	0 0 1	3	0	0 0	2	1	2	0	7	1	0	0	5 0	0	0	1	1 0	0	4	0 0	0	1	0	0 0	6	1	0 0	22 22	3	2 0	5	0	0	0	0 0	0 0
			3			2				7										4						6											

Mount Lindesay Rd (MLR) & Old Ballandeen Rd (OBR) Intersection Afternoon

Deter						000 (D (Danna	dame David for																	
Date:	000		Boundary F			OBR fro	n into MLR			eft turn into	MID (Our			ALD Churchele				<mark>R from Na</mark> turn into E				1.44.4	rn into OBR		Davi	ndary Rd ad				dary Road fro					<i>(</i>) () ()			ALR to Naas S				r <mark>om Quarr</mark> urn into Ol			A	Design des ma D	
18/11/2014			DM HV		11/					HV				ALR Straight						HV (Art)	11/		DM HV			HV HV				turn into M HV [urn into MLR HV E				HV DN		(0+)			ык V HV (Art			Boundary Ro DM HV	
3:00pm to	LV	ΠV		HV (AIL)	LV	ΠV		nv (Art)	LV	ΠV		HV (AIL)	LV	ΠV		HV (AIL)	LV	ΠV		HV (Art)	LV	ΠV		HV (Art)	LV	ΠV		HV (Art)	LV			HV (Art)	LV			HV (AIL)	LV			(Art)				.) LV	ΠV		HV (AIL)
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3:15pm to					2				-		1		5				1																				-	2	-							++	
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Peak Hour:																				0			_								0				0												
4pm to 5pm	2	0	0	1	3	0	0	0	3	0	0	0	15	2	0	0	6	0	0	0	3	0	0	0	1	1	0	0	0	0	0	0	2	0	0	0	13	0	2 2	2	0 0	0	0	0	0	0	0

Date:					OBR	R from NEH										MLR from N	laas Street									Boundary Ro	ad from Sa	ileyards										from Quarry					
			s to Boundary Rd			turn into MLR				MLR (Quarry				nt to Quarry		ht turn into	Boundary	Rd		Left turn into				Rd across to Ol			into MLR (Qu			eft turn into MLR				MLR to Naas				turn into OBI				undary Road	
24/11/2014	LV	HV	DM HV HV (Art) LV	HV	DM HV	HV (Art)	LV	HV	DM HV	HV (Art)	LV	HV	DM HV HV (Art)	LV	HV	DM HV	HV (Art)	LV	HV DM	HV HV (Art) LV	HV	DM HV	HV (Art)	LV HV	DM H	V HV (Art)	LV	HV C	M HV H	IV (Art)	LV	HV D	M HV HV (A	rt) LV	HV	DM HV	HV (Art)	LV	HV	OM HV HV	(Art)
3:00pm to 3:15pm	1	1		1				1				4			1			1											5				4	1	1	1							
3:15pm to 3:30pm	1	1										3			1	1		1		1		1	1						2					1		1							
3:30pm to	1	1										5			-	1		1		1		-	-						2					1		-			+				
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5:00pm to 5:15pm	1							1				3							1				1						2				2							1			
5:15pm to 5:30pm	1			1								4							1										3	1		1								1			
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5:45pm to 6:00pm												2	1		2			1														1	5										
Peak Hour: 4pm to 5pm	2	2	0 0	1	0	0	0	3	0	1	0	18	3	0 0	9	1	0	3	0	0 0	0	3	2	0	1	0 0	0	0	6	0	0	2	6	3	2 0	0	1	0	0	2	0	0	0
Average Afternoon Peak Hour:																																											
4pm to5pm		1	0 1	2	0	0	0	3	0	1	0	17	3	0 0	8	1	0	2	2	0 (0	2	2	0	1	0 0	0	0	4	0	0	1	10	2	2 1	0	1	0	0	1	0	0	0
	2	I	2	2		0		3		1		17		3	8		3		2	()	2		3		0	0		4		1		10		5	0		1		1		0	

Use Peak Morning for SIDRA

New England Highway (NEH) & Old Ballandeen Rd (OBR) Intersection Morning

Date: Bruxner Highway to Quarry
 NEH to Brisbane
 Right turn into OBR
 Left turn into Bruxner

 LV
 HV
 DM HV
 HV (Art)
 LV
 HV
 DM HV
 HV (Art)

 NEH to Tenterfield
 Right turn into Bruxner
 Left turn into OBR
 Bruxner across to OBR
 Right turn into NH
 Left turn into NEH

 LV
 HV
 DM HV
 HV (Art)
 OBR across to Bruxner 18/11/2014 7:00am to 7:15am 7:15am to 7:30am 7:30am to 7:45am 7:45am to 8:00am 8:00am to 8:15am 8:15am to 8:30am 8:30am to 8:45am 8:45am to 9:00am 9:00am to 9:15am 9:15am to 9:30am 9:30am to 9:45am 9:45am to
 NEt
 NEt from Tenterfield
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 11 1 8:00am 8:00am to 8:15am 8:15am to 8:30am 8:30am to 8:45am 8:45am to 9:00am 9:00am to 9:15am 9:15am to з 14 1 13 2 1 9:30am 9:30am to 9:45am 9:45am to 0:00am Peak Hour am to m to

		OBR fror	n Quarry					
HV (Art)	LV	HV	DM HV	HV (Art)	LV	HV	DM HV	HV (Art)
	2							
	4					1		
	1	1						
	1							
	1							
	1							
	2							
1								
	2							
				1				
0	2	0	0	1	0	0	0	0
	HV (Art)	2 4 1 1 1 2 1 2 1 2 2 1 2 2 1 2	Night turn HV (Art) LV HV 2 4 - 1 1 - 1 1 - 1 1 - 1 1 - 1 1 - 1 1 - 1 1 - 1 1 - 1 1 - 1 2 - 1 - - 2 - - 1 - - 2 - - 1 - - 2 - - 1 - - 2 - - 3 - - 4 - - 5 - - 6 - - 6 - -	Right urm INDM IV IV IV DM HV I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I	IDENTIFY IVA IV IV <th>IPU Fight UPU IND IND IPU (AT) IPU (AT)</th> <th>IDENTIFICATION INTERPOSATION INTEGRATION INTEGRATINA INTEGRATINA INTEGRATION INTEGRATION INTEGRATION INTEGRATION I</th> <th>IDENTIFY INFORMATION INTEGRATION INTEGRATI</th>	IPU Fight UPU IND IND IPU (AT) IPU (AT)	IDENTIFICATION INTERPOSATION INTEGRATION INTEGRATINA INTEGRATINA INTEGRATION INTEGRATION INTEGRATION INTEGRATION I	IDENTIFY INFORMATION INTEGRATION INTEGRATI

		OBR from	n Quarry					
			into NEH				into NEH	
HV (Art)	LV	HV	DM HV	HV (Art)	LV	HV	DM HV	HV (Art)
	1							
	2				1			
	1					1		
	1							
	2							
	1							
0	3	0	0	0	0	0	0	0
0	3	0	0	1	0	0	0	0
	3		1		0		0	

New England Highway (NEH) & Old Ballandeen Rd (OBR) Intersection Afternoon

Date:					NEH from Te	nterfield								NEH from Brisbane	2							B	uxner High	way to Quarr	/								OBR	from Quarry			
			Brisbane		Right turn i	nto OBR			into Bruxner		NEH to Te			Right turn into Brux	ner		Left turn into OE			ruxner across			Right turn	n into NEH			Left turn in			OBR across to				t turn into NEH			Left turn into NEH
18/11/2014	LV	HV	DM HV	HV (Art)	LV HV	DM HV HV	(Art) LV	HV	DM HV HV (A	rt) LV	HV	DM HV HV (Art)	LV	HV DM HV	HV (Art)	LV	HV DM H	V HV (Art)	LV	HV D	VIHV HV (Ar	t) LV	HV	DM HV	IV (Art)	LV	HV	DM HV HV (Art)	LV	HV C	M HV HV (A	Art) LV	/ нv	DM HV	HV (Art)	LV	HV DM HV HV
3:00pm to 3:15pm	19		1	3			1			23	2	4				1	1		1			1	2		1							1	. 1			1 17	
3:15pm to 3:30pm	27	3		4			3	1		18		3				3																				1 17	
3:30pm to 3:45pm	16	1					2			12	2	4																				2					
3:45pm to		1	1	1			2				2					1	2					2	1										,				
4:00pm 4:00pm to	16			1	1		2			19		1	1			2	1		1			2														 	
4:15pm 4:15pm to	21	1		4	1		1			11	2											2															
4:30pm 4:30pm to	18	1	1	1						18	1	3				5			1			1				1										2	
4:45pm	20		2	3			2			16		2				1			1				2		1				2			1	. 2				
4:45pm to 5:00pm	12	1	1	1			3	1		24	1	12							2		1	1														1	
5:00pm to 5:15pm	17	1		з			3			15	1	4				1	1		1			5	1		1							1					
5:15pm to 5:30pm	18	3			1		,			11		4				1							1														
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Use Peak Afternoon for SIDRA

Logan St & Naas St Intersection Morning

Date:				Loga	in Street from Qu	arry								Naast Str	et from NEH						Rot	bert Brush Dr	rive (RB Drive)								Naas	s Street			
	Stra	ight across to RB	Drive	Right	turn into Naas S	treet	Left t	urn into Naas S	Street		Stra	aight Across		Right turr	into RB Drive	Left turn i	nto Logan Street		Straight acros	to Logan St	1	Right turn into	Naas Street		Left turn into Naas Si			Straight across to	NEH		Right turn in	nto Logan Stree	et	Left	turn into RB Drive
18/11/2014	LV	HV DM HV	/ HV (Art)	LV	HV DM HV	/ HV (Art)	LV LV	HV DM HV	IV HV (A	Art) L	V HV	DM H	/ HV (Art)	LV HV	DM HV HV (Art) LV HV	DM HV HV (A	rt) LV	HV	DM HV HV (Art)	LV	HV	DM HV HV (Art)	LV	HV DM H	IV HV (Art)	LV	HV DM	HV HV (A	Art) LV	HV	DM HV	HV (Art)	LV H	V DM HV HV (Art
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7:45am to																																			
8:45am	3	0 0	0	40	2 2	0	0	0 0	0) 5	5 0	0	0	3 0	0 0	11 1	0 0	3	0	0 0	1	1	0 0	1	0 0	0	8	1 (0 0	0	0	0	0	0	1 0 0
Date:				Loga	In Street from Qu	arry								Naast Str	et from NEH						Rot	bert Brush Dr	ive (RB Drive)								Naas	s Street			
	Stra	ight across to RB					1									1								1										4-1	
	5000	light across to RD	Drive	Right	turn into Naas S	treet	Left t	urn into Naas S	street		Stra	aight Across		Right turr	into RB Drive	Left turn i	nto Logan Street		Straight acros	to Logan St		Right turn into	Naas Street		Left turn into Naas Si	reet		Straight across to	NEH		Right turn in	nto Logan Stree	el	Leit	turn into RB Drive
	LV	HV DM HV	/ HV (Art)	Right LV	turn into Naas S HV DM HV	treet / HV (Art)	Left t	urn into Naas S HV DM HV	street IV HV (A	(Art) LV	Strai	DM H	/ HV (Art)	Right turr LV HV	Into RB Drive DM HV HV (Art	Left turn i) LV HV	nto Logan Street DM HV HV (A	rt) LV	Straight acros HV	to Logan St DM HV HV (Art)	LV	Right turn into HV	Naas Street DM HV HV (Art)	LV	Left turn into Naas Si HV DM H	IV HV (Art)	LV	Straight across to HV DM	NEH HV HV (A	Art) LV	Right turn in HV	DM HV	HV (Art)	LV H	turn into RB Drive IV DM HV HV (Art
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Logan St & Naas St Intersection

Afternoon

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Use Peak Afternoon for SIDRA

APPENDIX B

New England Hwy & Naas St -SIDRA Results

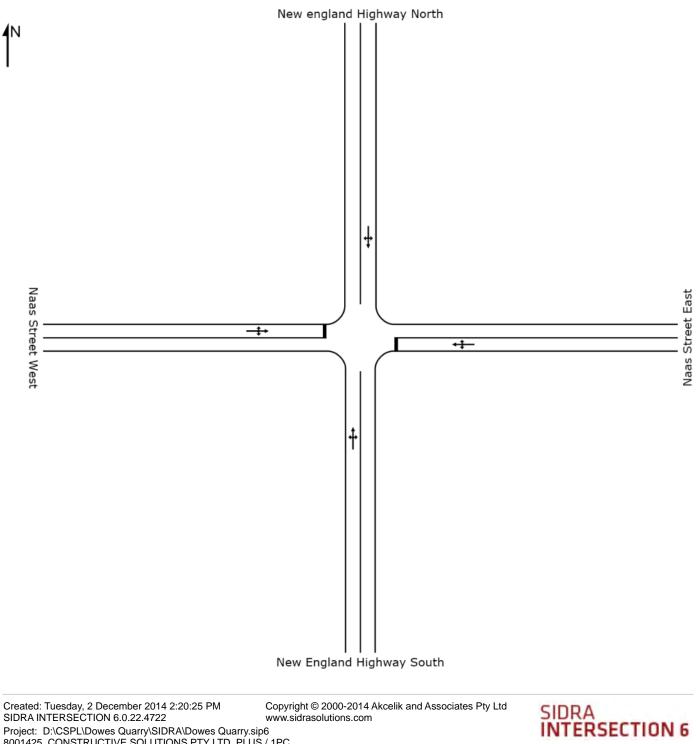
APPENDIX B1

Background

SITE LAYOUT

Site: New England Highway & Naas Street - No Development 8am - 9am Peak

New Site Stop (Two-Way)



Project: D:\CSPL\Dowes Quarry\SIDRA\Dowes Quarry.sip6 8001425, CONSTRUCTIVE SOLUTIONS PTY LTD, PLUS / 1PC

INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: New England Highway & Naas Street - No Development 8am - 9am Peak

New Site Stop (Two-Way)

Volume Display Method: Separate

Volumes are shown for Movement Class(es): Light Vehicles and Heavy Vehicles

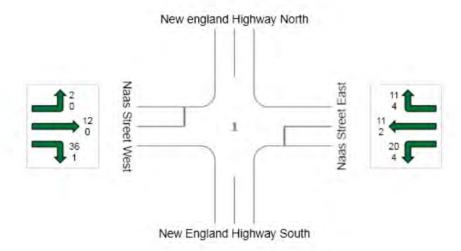
Total Intersection Volumes (veh)

All Movement Classes: 448

Light Vehicles (LV): 393

Heavy Vehicles (HV): 55





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MOVEMENT SUMMARY

5 Site: New England Highway & Naas Street - No Development 8am - 9am Peak

New Site Stop (Two-Way)

Move	ment Perfo	ormance - \	Vehicles								
Mov	OD	Demano		Deg.	Average	Level of	95% Back		Prop.	Effective	Average
ID	Mov	Total	HV	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
South	New Engla	veh/h	% South	V/C	Sec		veh	m		per veh	km/h
1	L2	127	12.6	0.114	5.3	LOS A	0.6	4.8	0.29	0.35	46.2
	T1	31	-	0.114		LOSA	0.6				46.8
2		• •	3.2	-	0.6			4.8	0.29	0.35	
3	R2	37	8.1	0.114	5.3	LOS A	0.6	4.8	0.29	0.35	45.9
Appro	ach	195	10.3	0.114	4.6	NA	0.6	4.8	0.29	0.35	46.3
East:	Vaas Street	East									
4	L2	24	16.7	0.063	9.6	LOS A	0.2	2.0	0.34	0.92	44.2
5	T1	13	15.4	0.063	9.4	LOS A	0.2	2.0	0.34	0.92	44.2
6	R2	15	26.7	0.063	9.4	LOS A	0.2	2.0	0.34	0.92	43.8
Appro	ach	52	19.2	0.063	9.5	LOS A	0.2	2.0	0.34	0.92	44.0
North:	New englan	d Highway N	North								
7	L2	11	18.2	0.085	5.3	LOS A	0.5	3.6	0.28	0.04	48.3
8	T1	136	16.2	0.085	0.5	LOS A	0.5	3.6	0.28	0.04	48.9
9	R2	3	0.0	0.085	5.1	LOS A	0.5	3.6	0.28	0.04	48.0
Appro	ach	150	16.0	0.085	1.0	NA	0.5	3.6	0.28	0.04	48.8
West:	Naas Street	West									
10	L2	2	0.0	0.068	9.4	LOS A	0.2	1.7	0.33	0.93	44.5
11	T1	12	0.0	0.068	9.1	LOS A	0.2	1.7	0.33	0.93	44.3
12	R2	37	2.7	0.068	9.0	LOS A	0.2	1.7	0.33	0.93	44.0
Appro	ach	51	2.0	0.068	9.0	LOS A	0.2	1.7	0.33	0.93	44.1
All Vel	nicles	448	12.3	0.114	4.4	NA	0.6	4.8	0.30	0.38	46.5

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 is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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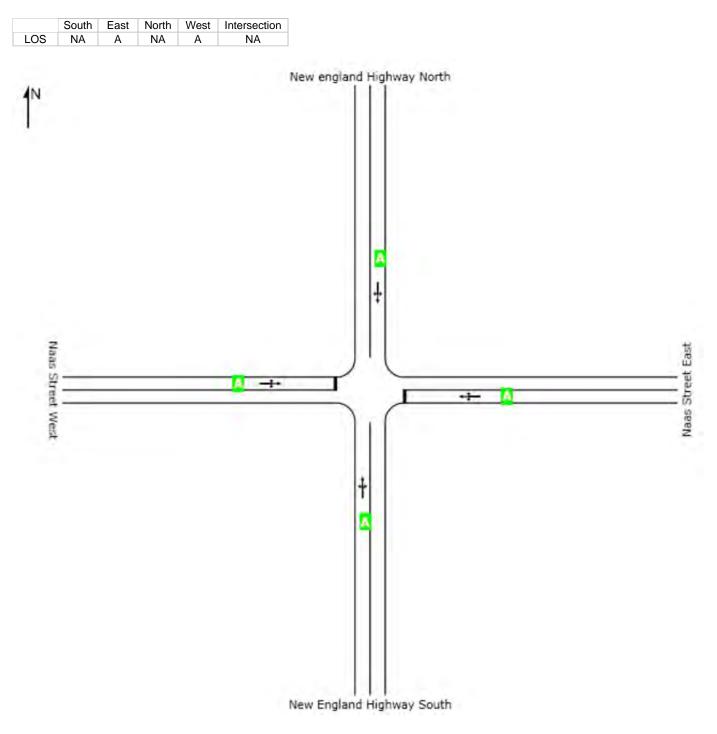
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LEVEL OF SERVICE

1 Site: New England Highway & Naas Street - No Development 8am - 9am Peak

New Site Stop (Two-Way)

All Movement Classes



Level of Service (LOS) Method: Delay (RTA NSW).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

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 lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.



DEGREE OF SATURATION

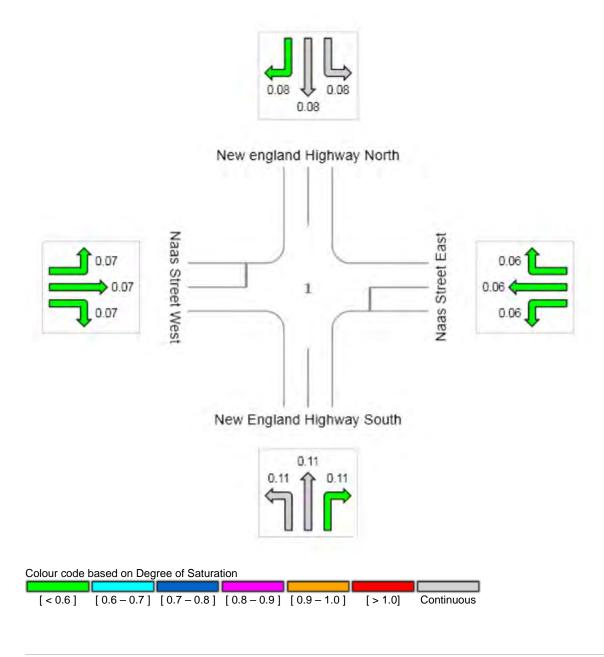
Ratio of Demand Volume to Capacity (v/c ratio)

W Site: New England Highway & Naas Street - No Development 8am - 9am Peak

New Site Stop (Two-Way)

All Movement Classes

	South	East	North	West	Intersection
Degree of Saturation	0.11	0.06	0.08	0.07	0.11



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DELAY (CONTROL)

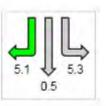
Average control delay per vehicle, or average pedestrian delay (seconds)

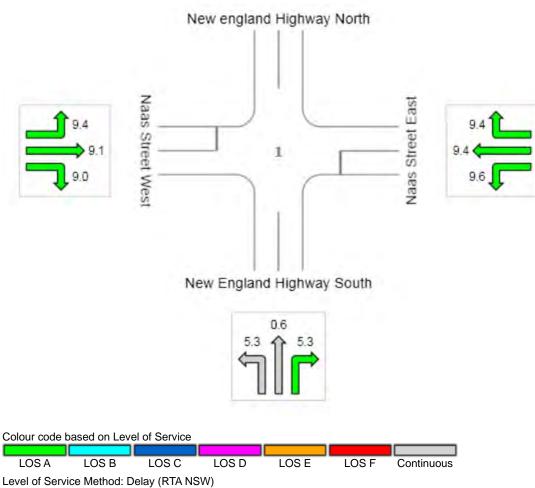
W Site: New England Highway & Naas Street - No Development 8am - 9am Peak

New Site Stop (Two-Way)

All Movement Classes

	South	East	North	West	Intersection
Delay (Control)	4.6	9.5	1.0	9.0	4.4
LOS	NA	А	NA	А	NA





SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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INPUT REPORT

Site: New England Highway & Naas Street - No Development 8am - 9am Peak

New Site Stop (Two-Way)

Intersection - Site Data	
Site Name	New England Highway & Naas Street - No Development 8am - 9am Peak
Site ID	1
Site Title	New Site

Site (Intersection) TypeStop (Two-Way)Model NameNew South WalesBase ModelNADrive RuleLeft-hand side of the roadHCM VersionNoUnitsMetricFirst CreatedDate2/12/2014 1:48:21 PMCreated ByDave	Intersection - Site Properties	
Base ModelNADrive RuleLeft-hand side of the roadHCM VersionNoUnitsMetricFirst CreatedDate2/12/2014 1:48:21 PM	Site (Intersection) Type	Stop (Two-Way)
Drive RuleLeft-hand side of the roadHCM VersionNoUnitsMetricFirst CreatedDate2/12/2014 1:48:21 PM	Model Name	New South Wales
HCM Version No Units Metric First Created	Base Model	NA
Units Metric First Created	Drive Rule	Left-hand side of the road
First Created	HCM Version	No
Date 2/12/2014 1:48:21 PM	Units	Metric
	First Created	
Created By Dave	Date	2/12/2014 1:48:21 PM
	Created By	Dave
Organisation CONSTRUCTIVE SOLUTIONS PTY LTD	Organisation	
Version 6.0.22.4722	Version	6.0.22.4722
Last Modified	Last Modified	
Date 2/12/2014 2:19:50 PM	Date	2/12/2014 2:19:50 PM
Modified By Dave	Modified By	Dave
Organisation CONSTRUCTIVE SOLUTIONS PTY LTD	Organisation	
Version 6.0.22.4722	Version	6.0.22.4722

Intersect	tion - Approach Data							
Location	Name	Туре	No. of App. Lanes	No. of Exit Lanes	Approach Distance		Approach Control	Area Type Factor
					m	%		
South	New England Highway South	Two-way	1	1	500.0	0	Major Road	-
East	Naas Street East	Two-way	1	1	500.0	0	Stop	_
North	New england Highway North	Two-way	1	1	500.0	0	Major Road	-
West	Naas Street West	Two-way	1	1	500.0	0	Stop	_

Movement Definitions - Inclue	ded Movement Classes		
Name	ID	Model Designation	Туре
Light Vehicles	LV	Light Vehicle	Standard
Heavy Vehicles	HV	Heavy Vehicle	Standard

Movement I	Definitions - C	Drigin-Destina	tion Moveme	nts
To Approach	OD Movement	t Turn Designation	OD Mov ID	LTR Mov ID
From: South	New En	gland Highway	South	
West	L2	L	1	1
North	T1	Т	2	2
East	R2	R	3	3
From: East	Naas S	treet East		
South	L2	L	4	4
West	T1	Т	5	5
North	R2	R	6	6

From: North		New england Highwa	y North	
East	L2	L	7	7
South	T1	т	8	8
West	R2	R	9	9
From: West		Naas Street West		
North	L2	L	10	10
East	T1	т	11	11
South	R2	R	12	12

Lane Geon	netry - Lane Con	figurati	on									
Logitom	Configuration	Tupo	Control	Slip/	Longth	Width	Grade	Full Lane		Island		
Leg Item	Configuration	Туре	Control	Bypass Control	Length	vviduri	Graue	[ID Colour]	[Front Width	Back Fil Width		For Peo Staging]
					m	m	%		m	m		
South	New England High	nway Sou	uth									
App. Lane 1	Full-Length	Normal	Continu ous	-	500	3.5	-3		-	-	-	-
Exit Lane 1	Full-Length	-	-	-	500	3.5	3		-	-	-	-
East	Naas Street East											
	Full-Length Full-Length	Normal –	Stop –	_ _	500 500	3 3	3 -3		-	_	_	_
North	New england High	way Nor	th									
App. Lane 1	Full-Length	Normal	Continu ous	-	500	3.5	0		-	-	-	-
Exit Lane 1	Full-Length	-	_	-	500	3.5	0		-	-	-	-
West	Naas Street West											
App. Lane 1 Exit Lane 1	Full-Length Full-Length	Normal	Stop –	_	500 500	3 3	0 0		_	_	_	_

Lanes are numbered from left to right in the direction of travel.

To Approach	OD Movement	Free Queue Distance m	Movement Class(es)
From: South	App. Lane 1		
West North East	L2 T1 R2	0 0 0	LV, HV LV, HV LV, HV
From: East	App. Lane 1		
South West North	L2 T1 R2	0 0 0	LV, HV LV, HV LV, HV
From: North	App. Lane 1		
East South West	L2 T1 R2	0 0 0	LV, HV LV, HV LV, HV
From: West	App. Lane 1		
North East South	L2 T1 R2	0 0 0	LV, HV LV, HV LV, HV

Lane	Data -	Lane	Data
			- Andrew Street and St

Lane Data - Lane D	ata				
Approach Lane	Basic Satn Flow	Utilisation Ratio	Saturation Speed	Capacity Adjustment	Use Given Cap Adj in Network Analysis
	tcu/h	%	km/h	%	
South New Eng	land Highway South				
App. Lane 1	1950	-	-	0.0	No
East Naas Str	eet East				
App. Lane 1	1950	_	_	0.0	No
North New eng	land Highway North				
App. Lane 1	1950	_	_	0.0	No

West	Naas Street West					
App. Lane	1	1950	-	-	0.0	No

Lane Data - Fic	ow Proportions			
Exit Lane	South %	To Exit Le East %	eg North %	West %
Light Vehicles (LV	V)			
From: South Exit Lane 1	App. Lane 1 –	100	100	100
From: East Exit Lane 1	App. Lane 1 100	-	100	100
From: North Exit Lane 1	App. Lane 1 100	100	_	100
From: West Exit Lane 1	App. Lane 1 100	100	100	-
Heavy Vehicles (HV)			
From: South Exit Lane 1	App. Lane 1 –	100	100	100
From: East Exit Lane 1	App. Lane 1 100	-	100	100
From: North Exit Lane 1	App. Lane 1 100	100	_	100
From: West Exit Lane 1	App. Lane 1 100	100	100	_

Lane Data - Lan	ne Blockage				
		To Exit Leg			
Exit Lane	South	East	North	West	
From: South	App. Lane 1				
Exit Lane 1	_	Yes	Yes	Yes	
From: East	App. Lane 1				
Exit Lane 1	Yes	-	Yes	Yes	
From: North	App. Lane 1				
Exit Lane 1	Yes	Yes	-	Yes	
From: West	App. Lane 1				
Exit Lane 1	Yes	Yes	Yes	_	

Pedestrians - Pedestrian Mov Unit Time for Volumes: 60 minutes Peak Flow Period: 60 minutes				
Main Crossing/ Slip/Bypass Lane Crossing	Volume	Peak Flow	Flow Scale	Growth Rate
Crossing	ped	%	%	%

Main Crossing/	Mov. ID	Crossing Distance	Oppng Ped.Fac.	P.Deg. Satn	Walking Speed	App. Trav. Distance	Downst. Distance	Queue Space
Slip/Bypass Lane Crossing		Distance	1 eu.1 ac.	Jain	opeeu	Distance	Distance	Opace
		m			m/sec	m	m	m

Unit Time for Volumes: 60 minutes Peak Flow Period: 60 minutes

Volume Data Meth	nod: Separate				
Movement Class	South veh	To Exit Leg East veh) North veh	West veh	
From: South	New Engla	nd Highway So	buth		
Total (veh) LV (veh) HV (veh)	-	37 34 3	31 30 1	127 111 16	
From: East	Naas Stree	t East			
Total (veh) LV (veh)	24 20	-	15 11	13 11	
HV (veh)	4	-	4	2	
From: North	New englar	nd Highway No	orth		
Total (veh) LV (veh) HV (veh)	136 114 22	11 9 2	- - -	3 3 0	
From: West	Naas Stree	t West			
Total (veh) LV (veh)	37 36	12 12 0	2 2 0	-	
HV (veh)	1	0	0	-	

Volumes - Volume FactorsToPeak FlowFlowApproachFactorScale%%%Light Vehicles (LV)Kew England Highway SouthWest-100.00North-100.00East-100.00	Growth Rate %/year 1.50 1.50 1.50
ApproachFactor %Scale %Light Vehicles (LV)From: SouthWest-100.00North-100.00	Rate %/year 1.50 1.50
%%Light Vehicles (LV)From: SouthNew England Highway SouthWest-100.00North-100.00	%/year 1.50 1.50
Light Vehicles (LV) From: South New England Highway South West – 100.00 North – 100.00	1.50 1.50
From: SouthNew England Highway SouthWest-100.00North-100.00	1.50
West – 100.00 North – 100.00	1.50
North – 100.00	1.50
From: East Naas Street East	
South – 100.00	1.50
West – 100.00	21.50
North – 100.00	1.50
From: North New england Highway North	
East – 100.00	1.50
South – 100.00	1.50
West – 100.00	1.50
From: West Naas Street West	
North – 100.00	1.50
East – 100.00	1.50
South – 100.00	1.50
Heavy Vehicles (HV)	
From: South New England Highway South	
West – 100.00	1.50
North – 100.00	1.50
East – 100.00	1.50
From: East Naas Street East	
South – 100.00	1.50
West – 100.00	21.50
North – 100.00	1.50
From: North New england Highway North	
East – 100.00	1.50
South – 100.00	1.50
West – 100.00	1.50
From: West Naas Street West	/ ==
North – 100.00	1.50
East – 100.00 South – 100.00	1.50 1.50
- 100.00	1.50

Priorities Opposed Movement

Opposing Movements East North

South	New England	d Highway S	South			
L2	-	-	-	-		
T1	-	_	_	_		
R2	-	-	T1,L2	-		
East	Naas Street	East				
L2	_	-	T1	_		
T1	R2,T1,L2	-	T1,R2	_		
R2	R2,T1	-	T1,R2	T1,L2		
North	New england	Highway N	lorth			
L2	-	-	_	_		
T1	-	_	_	_		
R2	T1,L2	-	-	-		
West	Naas Street	West				
L2	T1	-	_	_		
T1	R2,T1	-	T1,L2,R2	_		
R2	R2,T1	L2,T1	T1,R2	_		
	,	,	,			

Opposed	Apply TWSC	Critical	Follow-up	Minimum	Exiting	% Opp. By	Opng. Peds	Staged	
Movement	Calibration	Gap	Headway	Departures	Flow Effect	Nearest	(UnSig)	Crossing	
	Calloration	e «p		2000		Lane	(0	e	
		sec	sec	veh/min	%	%			
South	New England H	lighway Sou	uth						
R2	Yes	4.500	2.500	0.10	0	0.00	Pr (Flow)	None	
East	Naas Street East								
L2	Yes	5.000	3.000	0.10	50	100.00	Pr (Flow)	None	
T1	Yes	6.500	3.500	0.10	50	0.00	Pr (Flow)	None	
R2	Yes	7.000	4.000	0.10	50	0.00	Pr (Flow)	None	
North	New england H	ighway Nor	th						
R2	Yes	4.500	2.500	0.10	0	0.00	Pr (Flow)	None	
West	Naas Street We	est							
L2	Yes	5.000	3.000	0.10	50	100.00	Pr (Flow)	None	
T1	Yes	6.500	3.500	0.10	50	0.00	Pr (Flow)	None	
R2	Yes	7.000	4.000	0.10	50	0.00	Pr (Flow)	None	

Gap Acceptance - Two-Way Sign Control Calib	bration
Level of Reduction with Opposing Flow Rate	None
Major Road Turning Flow Factor	1

Gap Acceptance - Two-Way Sign Control Parameter Adjs for Major Rd Number of Lanes											
Criti	ical Gap A	djustment	Follow-up Headway Adjustment								
2-lane	3-lane	5-lane 6-	lane or	2-lane	3-lane	5-lane	6-lane				
			more				or more				
sec	sec	sec	sec	sec	sec	sec	sec				
-0.5	-0.5	0.0	0.0	-0.5	-0.5	0.0	0.0				
-1.5	-0.5	0.5	1.0	-0.5	-0.3	0.5	1.0				
-1.5	-0.5	0.5	1.0	-0.5	-0.3	0.5	1.0				
-0.5	-0.5	0.0	1.0	-0.5	-0.5	0.0	1.0				
	Crit 2-lane sec -0.5 -1.5 -1.5	Critical Gap A 2-lane 3-lane <u>sec sec</u> -0.5 -0.5 -1.5 -0.5 -1.5 -0.5	Critical Gap Adjustment 2-lane 3-lane 5-lane 6- sec sec	Critical Gap Adjustment 2-lane 3-lane 5-lane 6-lane or more sec sec sec sec -0.5 -0.5 0.0 0.0 -1.5 -0.5 0.5 1.0 -1.5 -0.5 0.5 1.0	Critical Gap Adjustment Follow-t 2-lane 3-lane 5-lane 6-lane or more 2-lane sec sec </td <td>Critical Gap Adjustment Follow-up Headw 2-lane 3-lane 5-lane 6-lane or more 2-lane 3-lane sec sec</td> <td>Critical Gap Adjustment Follow-up Headway Adjust 2-lane 3-lane 5-lane 6-lane or more 2-lane 3-lane 5-lane sec sec</td>	Critical Gap Adjustment Follow-up Headw 2-lane 3-lane 5-lane 6-lane or more 2-lane 3-lane sec sec	Critical Gap Adjustment Follow-up Headway Adjust 2-lane 3-lane 5-lane 6-lane or more 2-lane 3-lane 5-lane sec sec				

Gap Acceptance - Two-Way Sign Control Parameter Adjs for Geometry and Control

	Critical Gap Adjustment	Follow-up Headway Adjustment
	sec	sec
Give-Way / Yield Sign Control	-0.5	-0.3
One-Way Major Road	-0.5	-0.3
T Intersection (Minor Road Turn)	-0.7	-0.4
Entry Road Grade (for each per cent grade)	0.1	0.0
Staged Crossing - Stage 1	-1.0	-0.6
Staged Crossing - Stage 2	-1.0	-0.6
U Turn (Major Road)	1.5	0.9

0.0

Gap Acceptance - Settings Gap Acceptance Capacity: SIDRA Standard (Akçelik M3D)

Vehicle Move	ement Data - Pa	th Data				
OD	Approach	Exit	Negotiation	Negotiation	Downstream	Negotiation
Movement	Cruise Speed C		Speed	Distance	Distance	Radius
	km/h	km/h	km/h	m	m	m
Light Vehicles	(LV)					
From: South	New Englar	nd Highway So	outh			
L2	50.0	50.0	-	-	-	-
T1	50.0	50.0	-	-	-	-
R2	50.0	50.0	-	-	-	-
From: East	Naas Street					
L2	50.0	50.0	-	-	-	-
T1	50.0	50.0	-	-	-	-
R2	50.0	50.0	-	-	-	-
From: North		d Highway No	rth			
L2	50.0	50.0	-	-	-	-
T1	50.0	50.0	-	-	-	-
R2	50.0	50.0	-	-	-	-
From: West	Naas Street					
L2	50.0	50.0	-	-	-	-
T1	50.0	50.0	-	-	-	-
R2	50.0	50.0	-	-	-	-
Heavy Vehicle	s (HV)					
From: South	New Englar	nd Highway So	outh			
L2	50.0	50.0	-	-	-	-
T1	50.0	50.0	-	-	-	-
R2	50.0	50.0	-	-	-	-
From: East	Naas Street	East				
L2	50.0	50.0	-	-	-	-
T1	50.0	50.0	-	-	-	-
R2	50.0	50.0	-	-	-	-
From: North		d Highway No	rth			
L2	50.0	50.0	-	-	-	-
T1	50.0	50.0	-	-	-	-
R2	50.0	50.0	-	-	-	-
From: West	Naas Street					
L2	50.0	50.0	_	-	-	_
T1	50.0	50.0	-	-	-	-
R2	50.0	50.0	-	-	-	-

Vehicle Moveme	ent Data - C	alibration						
OD Movement	Queue Space m	Vehicle Length m	Vehicle Occupancy pers/veh	Turn Veh [Factor	Effect Radius] m	Gap Accp Factor	Opng. Veh Factor	Prac. Deg. Of Satn.
Light Vehicles (LV)							
From: South	New Engl	and Highwa	y South					
L2 T1 R2	7.00 7.00 7.00	4.50 4.50 4.50	1.20 1.20 1.20	1.05 1 1.05	- - -	1 1 1	1 1 1	
From: East	Naas Stre	et East						
L2 T1 R2	7.00 7.00 7.00	4.50 4.50 4.50	1.20 1.20 1.20	1.05 1 1.05	_ _ _	1 1 1	1 1 1	
From: North	New engla	and Highway	/ North					
L2 T1 R2	7.00 7.00 7.00	4.50 4.50 4.50	1.20 1.20 1.20	1.05 1 1.05	- - -	1 1 1	1 1 1	- - -
From: West	Naas Stre	et West						
L2 T1 R2	7.00 7.00 7.00	4.50 4.50 4.50	1.20 1.20 1.20	1.05 1 1.05		1 1 1	1 1 1	

Heavy Vehicles (H)	/)							
From: South	New Engla	nd Highway Se	outh					
L2 T1 R2	13.00 13.00 13.00	10.00 10.00 10.00	1.20 1.20 1.20	1.09 1 1.09	_ _ _	1.5 1.5 1.5	1.5 1.5 1.5	_ _ _
From: East	Naas Stree	t East						
L2 T1 R2	13.00 13.00 13.00	10.00 10.00 10.00	1.20 1.20 1.20	1.09 1 1.09	- - -	1.5 1.5 1.5	1.5 1.5 1.5	- - -
From: North	New englar	nd Highway No	orth					
L2 T1 R2	13.00 13.00 13.00	10.00 10.00 10.00	1.20 1.20 1.20	1.09 1 1.09	- - -	1.5 1.5 1.5	1.5 1.5 1.5	- - -
From: West	Naas Stree	t West						
L2 T1 R2	13.00 13.00 13.00	10.00 10.00 10.00	1.20 1.20 1.20	1.09 1 1.09		1.5 1.5 1.5	1.5 1.5 1.5	

Demand & Sensitivity Analysis Method: None

Model Settings - Options	
General Options	
Level of Service Method	Delay (RTA NSW)
Level of Service Target	LOS C
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Include Short Lanes in determining Approach Queue Storage Ratio	No

Model Settings - Model Parameters	
Passenger Car Equivalents	
Light Vehicles (LV)	1.00 pcu/veh
Heavy Vehicles (HV)	1.65 pcu/veh
Queue Blockage	
Minimum Probability of Blockage	0
Delay and Queue	
Exclude Geometry Delay	No
HCM Delay Formula	No
HCM Queue Formula	No
Downstream Short Lane	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Cost Options							
Cost Unit	\$						
Vehicle Cost Parameters							
	Veh Operating Cost				Veh Time Cost		
Movement Class	Veh Cost Method	Pump Price of Fuel	Fuel Res. Cost Factor	Ratio of Running Cost to Fuel Cost	Avg. Income	Time Value Facto	
		\$/L			\$/h		
Light Vehicles (LV)	Operating Cost	1.450	0.500	3.00	38.00	0.600	
Heavy Vehicles (HV)	Operating Cost	1.450	0.500	3.00	38.00	0.600	

1 = h(1) + h(1		
Light Vehicles (LV) 1600. Heavy Vehicles (HV) 15000.	-	2.35 2.633

Model Settings - Fuel Consumption						
Movement Class	fi	А	В	Beta		
Light Vehicles (LV)	1200	16	0.004	0.1		
Heavy Vehicles (HV)	2300	200	0.009	0.075		

Model Settings - CO Emission						
Movement Class	fi	А	В	Beta		
Light Vehicles (LV)	1620	-138	0.0743	0.294		
Heavy Vehicles (HV)	25000	320	-0.06	0.04		

Model Settings - HC Emission						
Movement Class	fi	А	В	Beta		
Light Vehicles (LV)	340	-9	0.0031	0.029		
Heavy Vehicles (HV)	3000	1	-0.0016	0.0013		

Model Settings - NOx Emission						
fi	А	В	Beta			
300	-14	0.0068	0.166			
44000	2820	0.21	1.9			
	fi 300	fi A 300 -14	fi A B 300 -14 0.0068			

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SIDRA INTERSECTION 6

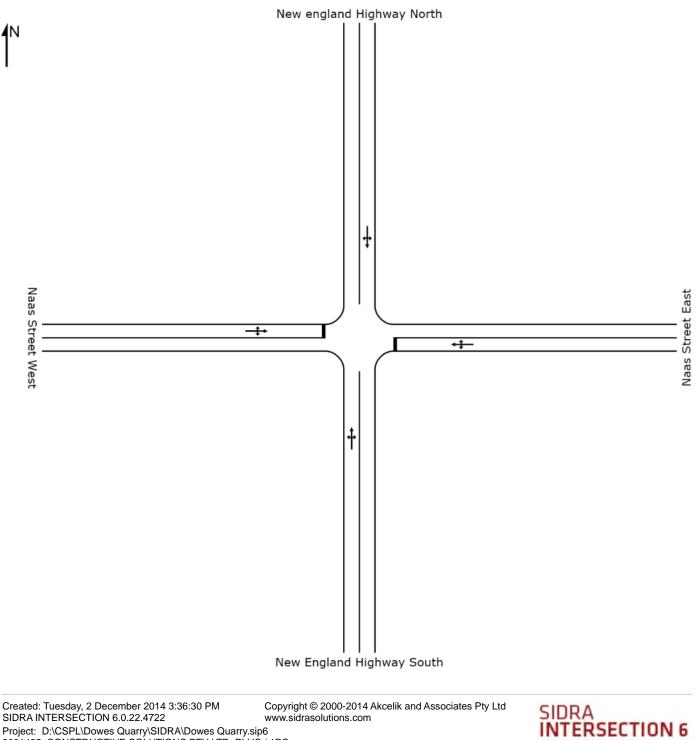
APPENDIX B2

Background + Development

SITE LAYOUT

Site: New England Highway & Naas Street - With Development 8am - 9am Peak

20% of Quarry Traffic Assumed within am Peak Stop (Two-Way)



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INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

1 Site: New England Highway & Naas Street - With Development 8am - 9am Peak

20% of Quarry Traffic Assumed within am Peak Stop (Two-Way)

Volume Display Method: Separate

Volumes are shown for Movement Class(es): Light Vehicles and Heavy Vehicles

Total Intersection Volumes (veh)

All Movement Classes: 458

Light Vehicles (LV): 395

Heavy Vehicles (HV): 63





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MOVEMENT SUMMARY

near Site: New England Highway & Naas Street - With Development 8am - 9am Peak

20% of Quarry Traffic Assumed within am Peak Stop (Two-Way)

Movement Performance - Vehicles Mov OD Mov Demand Flows Total Deg. HV Average Sath Level of Delay sec 95% Back of Queue Vehicles Prop. Distance Vehicles Prop. Distance 1 L2 127 12.6 0.115 5.3 LOS A 0.6 4.8 0.30 2 T1 31 3.2 0.115 5.3 LOS A 0.6 4.8 0.30 3 R2 37 8.1 0.115 5.3 LOS A 0.6 4.8 0.30 Approach 195 10.3 0.115 4.6 NA 0.6 4.8 0.30 East: Naas Street East	Effective Stop Rate per veh	Average Speed km/h
ID Mov Total veh/h HV % Sath v/c Delay sec Service Vehicles veh Distance m Queued m South: New England Highway South 1 L2 127 12.6 0.115 5.3 LOS A 0.6 4.8 0.30 2 T1 31 3.2 0.115 0.6 LOS A 0.6 4.8 0.30 3 R2 37 8.1 0.115 5.3 LOS A 0.6 4.8 0.30 Approach 195 10.3 0.115 4.6 NA 0.6 4.8 0.30 East: Naas Street East		Speed
South: New England Highway South: 1 L2 127 12.6 0.115 5.3 LOS A 0.6 4.8 0.30 2 T1 31 3.2 0.115 0.6 LOS A 0.6 4.8 0.30 3 R2 37 8.1 0.115 5.3 LOS A 0.6 4.8 0.30 Approach 195 10.3 0.115 5.3 LOS A 0.6 4.8 0.30 East: Nass 195 10.3 0.115 4.6 NA 0.6 4.8 0.30 5 T1 195 0.073 9.8 LOS A 0.3 2.4 0.35 6 R2 20 40.0 0.073 10.0 LOS A 0.3 2.4 0.35 Approach 57 24.6 0.073 9.8 LOS A 0.3 2.4 0.35	per veh	km/h
1 L2 127 12.6 0.115 5.3 LOS A 0.6 4.8 0.30 2 T1 31 3.2 0.115 0.6 LOS A 0.6 4.8 0.30 3 R2 37 8.1 0.115 5.3 LOS A 0.6 4.8 0.30 Approach 195 10.3 0.115 5.3 LOS A 0.6 4.8 0.30 Approach 195 10.3 0.115 4.6 NA 0.6 4.8 0.30 East: Naas East: Naas L2 24 16.7 0.073 9.8 LOS A 0.3 2.4 0.35 5 T1 13 15.4 0.073 9.6 LOS A 0.3 2.4 0.35 6 R2 20 40.0 0.073 10.0 LOS A 0.3 2.4 0.35 Approach 57 24.6 0.073 9.8 LOS A 0.3 2.4 0.35		
2 T1 31 3.2 0.115 0.6 LOS A 0.6 4.8 0.30 3 R2 37 8.1 0.115 5.3 LOS A 0.6 4.8 0.30 Approach 195 10.3 0.115 4.6 NA 0.6 4.8 0.30 East: Name 4 L2 24 16.7 0.073 9.8 LOS A 0.3 2.4 0.35 5 T1 13 15.4 0.073 9.6 LOS A 0.3 2.4 0.35 6 R2 20 40.0 0.073 10.0 LOS A 0.3 2.4 0.35 Approach 57 24.6 0.073 9.8 LOS A 0.3 2.4 0.35		
3 R2 37 8.1 0.115 5.3 LOS A 0.6 4.8 0.30 Approach 195 10.3 0.115 4.6 NA 0.6 4.8 0.30 East: Naas Street East 4 L2 24 16.7 0.073 9.8 LOS A 0.3 2.4 0.35 5 T1 13 15.4 0.073 9.6 LOS A 0.3 2.4 0.35 6 R2 20 40.0 0.073 9.8 LOS A 0.3 2.4 0.35 Approach 57 24.6 0.073 9.8 LOS A 0.3 2.4 0.35	0.35	46.2
Approach 195 10.3 0.115 4.6 NA 0.6 4.8 0.30 East: Naas Street East 4 L2 24 16.7 0.073 9.8 LOS A 0.3 2.4 0.35 5 T1 13 15.4 0.073 9.6 LOS A 0.3 2.4 0.35 6 R2 20 40.0 0.073 10.0 LOS A 0.3 2.4 0.35 Approach 57 24.6 0.073 9.8 LOS A 0.3 2.4 0.35	0.35	46.8
East: Naas Street East: 4 L2 24 16.7 0.073 9.8 LOS A 0.3 2.4 0.35 5 T1 13 15.4 0.073 9.6 LOS A 0.3 2.4 0.35 6 R2 20 40.0 0.073 10.0 LOS A 0.3 2.4 0.35 Approach 57 24.6 0.073 9.8 LOS A 0.3 2.4 0.35	0.35	45.9
4 L2 24 16.7 0.073 9.8 LOS A 0.3 2.4 0.35 5 T1 13 15.4 0.073 9.6 LOS A 0.3 2.4 0.35 6 R2 20 40.0 0.073 10.0 LOS A 0.3 2.4 0.35 Approach 57 24.6 0.073 9.8 LOS A 0.3 2.4 0.35	0.35	46.2
5 T1 13 15.4 0.073 9.6 LOS A 0.3 2.4 0.35 6 R2 20 40.0 0.073 10.0 LOS A 0.3 2.4 0.35 Approach 57 24.6 0.073 9.8 LOS A 0.3 2.4 0.35		
6 R2 20 40.0 0.073 10.0 LOS A 0.3 2.4 0.35 Approach 57 24.6 0.073 9.8 LOS A 0.3 2.4 0.35	0.93	44.1
Approach 57 24.6 0.073 9.8 LOS A 0.3 2.4 0.35	0.93	44.1
	0.93	43.5
North: New england Highway North	0.93	43.9
7 L2 16 37.5 0.089 5.4 LOS A 0.5 3.8 0.29	0.05	48.1
8 T1 136 16.2 0.089 0.5 LOSA 0.5 3.8 0.29	0.05	48.9
9 R2 3 0.0 0.089 5.1 LOS A 0.5 3.8 0.29	0.05	47.9
Approach 155 18.1 0.089 1.1 NA 0.5 3.8 0.29	0.05	48.8
West: Naas Street West		
10 L2 2 0.0 0.068 9.4 LOSA 0.2 1.7 0.33	0.93	44.5
11 T1 12 0.0 0.068 9.1 LOSA 0.2 1.7 0.33	0.93	44.3
12 R2 37 2.7 0.068 9.0 LOSA 0.2 1.7 0.33	0.93	44.0
Approach 51 2.0 0.068 9.0 LOS A 0.2 1.7 0.33	0.93	44.1
All Vehicles 458 13.8 0.115 4.6 NA 0.6 4.8 0.30	0.38	46.5

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 is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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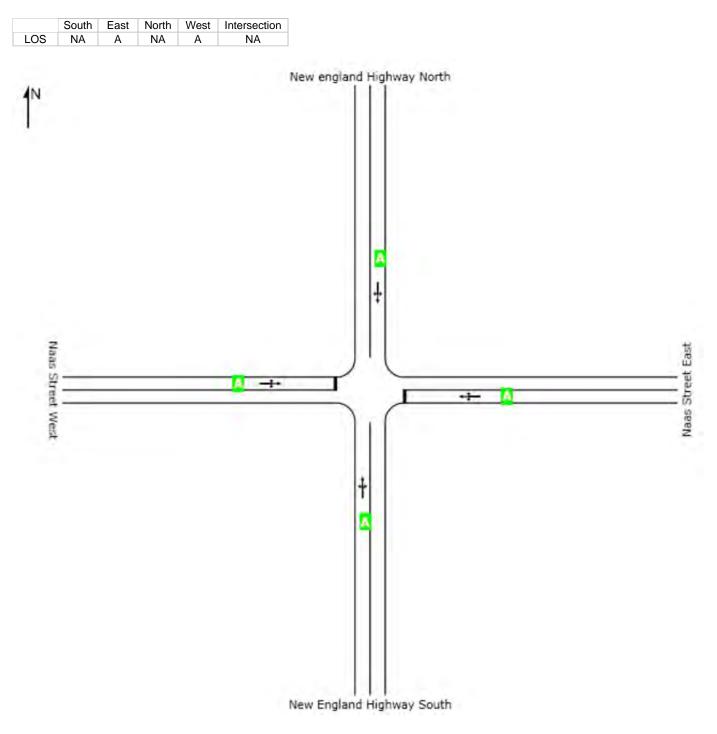
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LEVEL OF SERVICE

1 Site: New England Highway & Naas Street - With Development 8am - 9am Peak

20% of Quarry Traffic Assumed within am Peak Stop (Two-Way)

All Movement Classes



Level of Service (LOS) Method: Delay (RTA NSW).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

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 lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.



DEGREE OF SATURATION

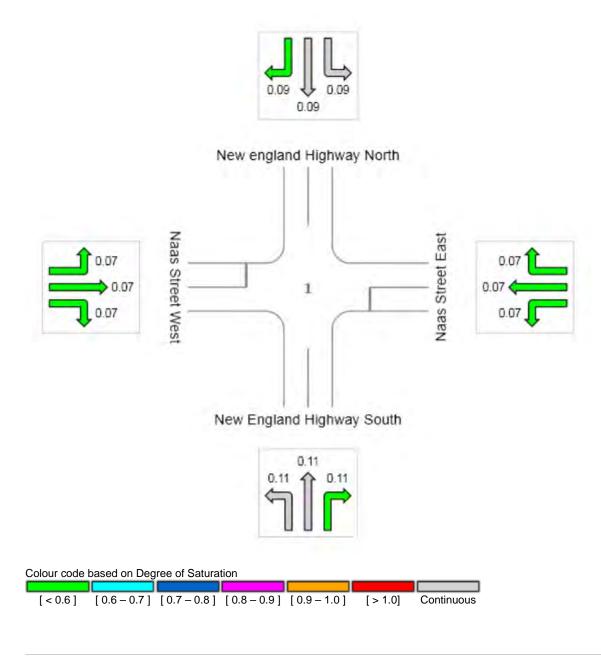
Ratio of Demand Volume to Capacity (v/c ratio)

1 Site: New England Highway & Naas Street - With Development 8am - 9am Peak

20% of Quarry Traffic Assumed within am Peak Stop (Two-Way)

All Movement Classes

	South	East	North	West	Intersection
Degree of Saturation	0.11	0.07	0.09	0.07	0.11



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DELAY (CONTROL)

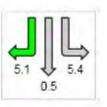
Average control delay per vehicle, or average pedestrian delay (seconds)

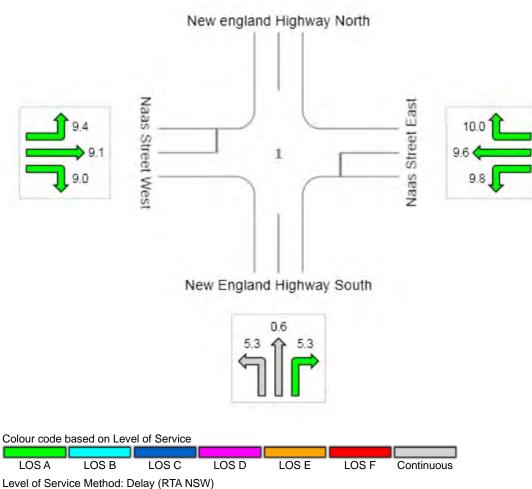
We Site: New England Highway & Naas Street - With Development 8am - 9am Peak

20% of Quarry Traffic Assumed within am Peak Stop (Two-Way)

All Movement Classes

	South	East	North	West	Intersection
Delay (Control)	4.6	9.8	1.1	9.0	4.6
LOS	NA	А	NA	Α	NA





SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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INPUT REPORT

Site: New England Highway & Naas Street - With Development 8am - 9am Peak

20% of Quarry Traffic Assumed within am Peak Stop (Two-Way)

Intersection - Site Data	
Site Name	New England Highway & Naas Street - With Development 8am - 9am Peak
Site ID	1
Site Title	20% of Quarry Traffic Assumed within am Peak

Intersection - Site Properties	
Site (Intersection) Type	Stop (Two-Way)
Model Name	New South Wales
Base Model	NA
Drive Rule	Left-hand side of the road
HCM Version	No
Units	Metric
First Created	
Date	2/12/2014 1:48:21 PM
Created By	Dave
Organisation	CONSTRUCTIVE SOLUTIONS PTY LTD
Version	6.0.22.4722
Last Modified	
Date	2/12/2014 3:36:00 PM
Modified By	Dave
Organisation	CONSTRUCTIVE SOLUTIONS PTY LTD
Version	6.0.22.4722

Location Name Type No. of App. No. of Exit Distance Bunching Control Lanes Exit Distance Bunching Control Exit Distance Bunching Control Lanes South New England Highway Two-way 1 1 500.0 0 Major Road	Area Type
South New England Highway Two-way 1 1 500.0 0 Major	Factor
South Road	-
East Naas Street East Two-way 1 1 500.0 0 Stop	-
North New england Highway Two-way 1 1 500.0 0 Major	-
North Road	
West Naas Street West Two-way 1 1 500.0 0 Stop	-

Movement Definitions - Included Movement Classes						
Name	ID	Model Designation	Туре			
Light Vehicles	LV	Light Vehicle	Standard			
Heavy Vehicles	HV	Heavy Vehicle	Standard			

Movement Definitions - Origin-Destination Movements							
To Approach	OD Mov	ement Turn Designatio	OD Mov n	ID LTR Mov	ID		
From: South	N	ew England Highv	vay South				
West	L2	L	1	1			
North	T1	Т	2	2			
East	R2	R	3	3			
From: East	N	aas Street East					
South	L2	L	4	4			
West	T1	Т	5	5			

North	R2	R	6	6
From: North		New england Highway	North	
East South West	L2 T1 R2	L T R	7 8 9	7 8 9
From: West		Naas Street West		
North East South	L2 T1 R2	L T R	10 11 12	10 11 12

Lane Geon	netry - Lane Con	figurati	on								
Leg Item	Configuration	Туре	Control	Slip/ Bypass Control	Length	Width	Grade	Full Lane [ID Colour]	[Front Width	Islanc Back Fil Width	l I Style For Ped Staging 1
					m	m	%		m	m	,
South	New England High	nway Sou	uth								
App. Lane 1	Full-Length	Normal	Continu ous	-	500	3.5	-3		-	-	
Exit Lane 1	Full-Length	-	_	-	500	3.5	3		-	-	
East	Naas Street East										
	Full-Length Full-Length	Normal –	Stop –	_	500 500	3 3	3 -3		_	_	
North	New england High	way Nor	th								
App. Lane 1	Full-Length	Normal	Continu ous	-	500	3.5	0		-	-	
Exit Lane 1	Full-Length	_	-	-	500	3.5	0		-	-	
West	Naas Street West										
	Full-Length	Normal	Stop	-	500	3	0		-	-	
Exit Lane 1	Full-Length	-	-	-	500	3	0		-	-	

Lanes are numbered from left to right in the direction of travel.

Lane Geometr	y - Lane Disciplin	es	
To Approach	OD Movement	Free Queue Distance m	Movement Class(es)
From: South	App. Lane 1		
West North East	L2 T1 R2	0 0 0	LV, HV LV, HV LV, HV
From: East	App. Lane 1		
South West North	L2 T1 R2	0 0 0	LV, HV LV, HV LV, HV
From: North	App. Lane 1		
East South West	L2 T1 R2	0 0 0	LV, HV LV, HV LV, HV
From: West	App. Lane 1		
North East South	L2 T1 R2	0 0 0	LV, HV LV, HV LV, HV

Lane Data - Lane Data	a				
Approach Lane	Basic Satn Flow	Utilisation Ratio	Saturation Speed	Capacity Adjustment	Use Given Cap Adj in Network Analysis
	tcu/h	%	km/h	%	
South New Englan	d Highway South				
App. Lane 1	1950	_	-	0.0	No
East Naas Street	East				
App. Lane 1	1950	-	-	0.0	No
North New englan	d Highway North				
App. Lane 1	1950	_	_	0.0	No

West	Naas Street West					
App. Lane	1	1950	-	-	0.0	No

Lane Data - Fic	ow Proportions			
Exit Lane	South %	To Exit Le East %	eg North %	West %
Light Vehicles (LV	V)			
From: South Exit Lane 1	App. Lane 1 –	100	100	100
From: East Exit Lane 1	App. Lane 1 100	-	100	100
From: North Exit Lane 1	App. Lane 1 100	100	_	100
From: West Exit Lane 1	App. Lane 1 100	100	100	-
Heavy Vehicles (HV)			
From: South Exit Lane 1	App. Lane 1 –	100	100	100
From: East Exit Lane 1	App. Lane 1 100	-	100	100
From: North Exit Lane 1	App. Lane 1 100	100	_	100
From: West Exit Lane 1	App. Lane 1 100	100	100	_

Lane Data - Lan	ne Blockage				
		To Exit Leg			
Exit Lane	South	East	North	West	
From: South	App. Lane 1				
Exit Lane 1	_	Yes	Yes	Yes	
From: East	App. Lane 1				
Exit Lane 1	Yes	-	Yes	Yes	
From: North	App. Lane 1				
Exit Lane 1	Yes	Yes	-	Yes	
From: West	App. Lane 1				
Exit Lane 1	Yes	Yes	Yes	_	

Unit Time for Volumes: 60 minute	es			
Peak Flow Period: 60 minutes				
Main Crossing/		Peak	Flow	Growth
Slip/Bypass Lane	Volume	Flow	Scale	Rate
Crossing				
	ped	%	%	%

Main Crossing/	Mov. ID	Crossing Distance	Oppng Ped.Fac.	P.Deg. Satn	Walking Speed	App. Trav. Distance	Downst. Distance	Queue Space
Slip/Bypass Lane Crossing		Distance	1 eu.1 ac.	Jain	opeeu	Distance	Distance	Opace
		m			m/sec	m	m	m

Unit Time for Volumes: 60 minutes Peak Flow Period: 60 minutes Volume Data Method: Separate

Volume Data Metho	od: Separate				
Movement Class	South veh	To Exit Leg East veh	North veh	West veh	
From: South	New Engla	nd Highway So	uth		
Total (veh) LV (veh) HV (veh)	=	37 34 3	31 30 1	127 111 16	
From: East	Naas Stree	t East			
Total (veh) LV (veh) HV (veh)	24 20 4		20 12 8	13 11 2	
From: North	New englar	nd Highway No	rth		
Total (veh) LV (veh) HV (veh)	136 114 22	16 10 6	_ _ _	3 3 0	
From: West	Naas Stree	t West			
Total (veh) LV (veh) HV (veh)	37 36 1	12 12 0	2 2 0	- - -	

Volumes - Volu To		Flow	Orouth
Approach	Peak Flow Factor	Scale	Growth Rate
, approuon	%	%	%/year
Light Vehicles (L	V)		
From: South	New England Highway	South	
West	-	100.00	1.50
North	-	100.00	1.50
East	-	100.00	1.50
From: East	Naas Street East		
South	_	100.00	1.50
West	—	100.00	21.50
North	-	100.00	1.50
From: North	New england Highway		
East	-	100.00	1.50
South	-	100.00	1.50
West	_	100.00	1.50
From: West	Naas Street West		
North	-	100.00	1.50
East South	-	100.00 100.00	1.50 1.50
		100.00	1.50
Heavy Vehicles (
From: South	New England Highway		
West	_	100.00	1.50
North East	_	100.00 100.00	1.50 1.50
		100.00	1.50
From: East	Naas Street East	400.00	4 50
South West	-	100.00 100.00	1.50 21.50
North		100.00	1.50
From: North	New england Highway		1.00
East		100.00	1.50
South	_	100.00	1.50
West	-	100.00	1.50
From: West	Naas Street West		
North	_	100.00	1.50
East	-	100.00	1.50
South	-	100.00	1.50

Priorities

Opposed Movement South Opposing Movements East North

South	New England	d Highway S	South			
L2	-	-	-	-		
T1	-	_	_	-		
R2	-	-	T1,L2	-		
East	Naas Street	East				
L2	_	-	T1	_		
T1	R2,T1,L2	-	T1,R2	_		
R2	R2,T1	-	T1,R2	T1,L2		
North	New england	Highway N	lorth			
L2	-	-	_	_		
T1	-	_	_	-		
R2	T1,L2	-	-	-		
West	Naas Street	West				
L2	T1	-	_	_		
T1	R2,T1	-	T1,L2,R2	_		
R2	R2,T1	L2,T1	T1,R2	_		
	,	,	,			

Opposed	Apply TWSC	Critical	Follow-up	Minimum	Exiting	% Opp. By	Opng. Peds	Staged
Movement	Calibration	Gap	Headway	Departures	Flow Effect	Nearest	(UnSig)	Crossing
						Lane		
		sec	sec	veh/min	%	%		
South	New England H	lighway Sou	uth					
R2	Yes	4.500	2.500	0.10	0	0.00	Pr (Flow)	None
East	Naas Street Ea	st						
L2	Yes	5.000	3.000	0.10	50	100.00	Pr (Flow)	None
T1	Yes	6.500	3.500	0.10	50	0.00	Pr (Flow)	None
R2	Yes	7.000	4.000	0.10	50	0.00	Pr (Flow)	None
North	New england H	lighway Nor	th					
R2	Yes	4.500	2.500	0.10	0	0.00	Pr (Flow)	None
West	Naas Street We	est						
L2	Yes	5.000	3.000	0.10	50	100.00	Pr (Flow)	None
T1	Yes	6.500	3.500	0.10	50	0.00	Pr (Flow)	None
R2	Yes	7.000	4.000	0.10	50	0.00	Pr (Flow)	None

Gap Acceptance - Two-Way Sign Control Calibration							
Level of Reduction with Opposing Flow Rate	None						
Major Road Turning Flow Factor	1						

Gap Acceptance - Two-Way Sign Control Parameter Adjs for Major Rd Number of Lanes											
Criti	ical Gap A	djustment	Follow-	up Headw	ay Adjust	ment					
2-lane	3-lane	5-lane 6-	lane or	2-lane	3-lane	5-lane	6-lane				
			more				or more				
sec	sec	sec	sec	sec	sec	sec	sec				
-0.5	-0.5	0.0	0.0	-0.5	-0.5	0.0	0.0				
-1.5	-0.5	0.5	1.0	-0.5	-0.3	0.5	1.0				
-1.5	-0.5	0.5	1.0	-0.5	-0.3	0.5	1.0				
-0.5	-0.5	0.0	1.0	-0.5	-0.5	0.0	1.0				
	Crit 2-lane sec -0.5 -1.5 -1.5	Critical Gap A 2-lane 3-lane <u>sec sec</u> -0.5 -0.5 -1.5 -0.5 -1.5 -0.5	Critical Gap Adjustment 2-lane 3-lane 5-lane 6- sec sec	Critical Gap Adjustment 2-lane 3-lane 5-lane 6-lane or more sec sec sec sec -0.5 -0.5 0.0 0.0 -1.5 -0.5 0.5 1.0 -1.5 -0.5 0.5 1.0	Critical Gap Adjustment Follow-t 2-lane 3-lane 5-lane 6-lane or more 2-lane sec sec </td <td>Critical Gap Adjustment Follow-up Headw 2-lane 3-lane 5-lane 6-lane or more 2-lane 3-lane sec sec</td> <td>Critical Gap Adjustment Follow-up Headway Adjust 2-lane 3-lane 5-lane 6-lane or more 2-lane 3-lane 5-lane sec sec</td>	Critical Gap Adjustment Follow-up Headw 2-lane 3-lane 5-lane 6-lane or more 2-lane 3-lane sec sec	Critical Gap Adjustment Follow-up Headway Adjust 2-lane 3-lane 5-lane 6-lane or more 2-lane 3-lane 5-lane sec sec				

Gap Acceptance - Two-Way Sign Control Parameter Adjs for Geometry and Control

	Critical Gap Adjustment	Follow-up Headway Adjustment
	sec	sec
Give-Way / Yield Sign Control	-0.5	-0.3
One-Way Major Road	-0.5	-0.3
T Intersection (Minor Road Turn)	-0.7	-0.4
Entry Road Grade (for each per cent grade)	0.1	0.0
Staged Crossing - Stage 1	-1.0	-0.6
Staged Crossing - Stage 2	-1.0	-0.6
U Turn (Major Road)	1.5	0.9

0.0

Gap Acceptance - Settings Gap Acceptance Capacity: SIDRA Standard (Akçelik M3D)

Vehicle Mov	ement Data - F	ath Da <u>ta</u>				
OD	Approach	Exit	Negotiation	Negotiation	Downstream	Negotiation
Movement		Cruise Speed	Speed	Distance	Distance	Radius
	km/h	km/h	km/h	m	m	m
Light Vehicles	(LV)					
From: South	New Engl	and Highway Sc	outh			
L2	50.0	50.0	-	-	-	-
T1	50.0	50.0	-	-	-	-
R2	50.0	50.0	-	-	-	-
From: East	Naas Stre	et East				
L2	50.0	50.0	-	-	-	-
T1	50.0	50.0	-	-	-	-
R2	50.0	50.0	-	-	-	-
From: North	New engl	and Highway No	orth			
L2	50.0	50.0	-	-	-	-
T1	50.0	50.0	-	-	-	-
R2	50.0	50.0	-	-	-	-
From: West	Naas Stre					
L2	50.0	50.0	-	-	-	-
T1	50.0	50.0	-	-	-	-
R2	50.0	50.0	_	-	-	-
Heavy Vehicle	es (HV)					
From: South	New Engl	and Highway Sc	outh			
L2	50.0	50.0	_	-	-	-
T1	50.0	50.0	-	-	-	-
R2	50.0	50.0	-	-	-	-
From: East	Naas Stre	et East				
L2	50.0	50.0	-	-	-	-
T1	50.0	50.0	-	-	-	-
R2	50.0	50.0	-	-	-	-
From: North		and Highway No	orth			
L2	50.0	50.0	-	-	-	-
T1	50.0	50.0	-	-	-	-
R2	50.0	50.0	_	-	-	-
From: West	Naas Stre	et West				
L2	50.0	50.0	_	_	_	_
T1	50.0	50.0	-	-	-	-
R2	50.0	50.0	-	-	-	-

Vehicle Movem	ent Data - C	alibration						
OD Movement	Queue Space m	Vehicle Length m	Vehicle Occupancy pers/veh	Turn Veh [Factor	Effect Radius] m	Gap Accp Factor	Opng. Veh Factor	Prac. Deg. Of Satn.
Light Vehicles (LV)							
From: South	New Engla	and Highway	y South					
L2 T1 R2	7.00 7.00 7.00	4.50 4.50 4.50	1.20 1.20 1.20	1.05 1 1.05	- - -	1 1 1	1 1 1	_ _ _
From: East	Naas Stre	et East						
L2 T1 R2	7.00 7.00 7.00	4.50 4.50 4.50	1.20 1.20 1.20	1.05 1 1.05	- - -	1 1 1	1 1 1	_ _ _
From: North	New engla	and Highway	/ North					
L2 T1 R2	7.00 7.00 7.00	4.50 4.50 4.50	1.20 1.20 1.20	1.05 1 1.05	- - -	1 1 1	1 1 1	_ _ _
From: West	Naas Stree	et West						
L2 T1 R2	7.00 7.00 7.00	4.50 4.50 4.50	1.20 1.20 1.20	1.05 1 1.05	- - -	1 1 1	1 1 1	_ _ _

Heavy Vehicles (H)	/)									
From: South	New Engla	New England Highway South								
L2 T1 R2	13.00 13.00 13.00	10.00 10.00 10.00	1.20 1.20 1.20	1.09 1 1.09	_ _ _	1.5 1.5 1.5	1.5 1.5 1.5	_ _ _		
From: East	Naas Stree	t East								
L2 T1 R2	13.00 13.00 13.00	10.00 10.00 10.00	1.20 1.20 1.20	1.09 1 1.09	- - -	1.5 1.5 1.5	1.5 1.5 1.5	- - -		
From: North	New englar	nd Highway No	orth							
L2 T1 R2	13.00 13.00 13.00	10.00 10.00 10.00	1.20 1.20 1.20	1.09 1 1.09	- - -	1.5 1.5 1.5	1.5 1.5 1.5	- - -		
From: West	Naas Stree	t West								
L2 T1 R2	13.00 13.00 13.00	10.00 10.00 10.00	1.20 1.20 1.20	1.09 1 1.09		1.5 1.5 1.5	1.5 1.5 1.5			

Demand & Sensitivity Analysis Method: None

Model Settings - Options	
General Options	
Level of Service Method	Delay (RTA NSW)
Level of Service Target	LOS C
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Include Short Lanes in determining Approach Queue Storage Ratio	No

Model Settings - Model Parameters	
Passenger Car Equivalents	
Light Vehicles (LV)	1.00 pcu/veh
Heavy Vehicles (HV)	1.65 pcu/veh
Queue Blockage	
Minimum Probability of Blockage	0
Delay and Queue	
Exclude Geometry Delay	No
HCM Delay Formula	No
HCM Queue Formula	No
Downstream Short Lane	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Cost Options							
Cost Unit	\$						
Vehicle Cost Parameters							
		Vel	n Operating Co	st	Veh Tim	Time Cost	
Movement Class	Veh Cost Method	Pump Price of Fuel	Fuel Res. Cost Factor	Ratio of Running Cost to Fuel Cost	Avg. Income	Time Value Facto	
		\$/L			\$/h		
Light Vehicles (LV)	Operating Cost	1.450	0.500	3.00	38.00	0.600	
Heavy Vehicles (HV)	Operating Cost	1.450	0.500	3.00	38.00	0.600	

Movement Class	Mass kg	Max Power kW	CO2 to Fuel Rate
Light Vehicles (LV)	1600.0	120	2.35
Heavy Vehicles (HV)	15000.0	170	2.633

Model Settings - Fuel Consumption									
fi	А	В	Beta						
1200	16	0.004	0.1						
2300	200	0.009	0.075						
	fi 1200	fi A 1200 16	fi A B 1200 16 0.004						

Model Settings - CO Emission									
Movement Class	fi	А	В	Beta					
Light Vehicles (LV)	1620	-138	0.0743	0.294					
Heavy Vehicles (HV)	25000	320	-0.06	0.04					

Model Settings - HC Emission									
Movement Class	fi	А	В	Beta					
Light Vehicles (LV)	340	-9	0.0031	0.029					
Heavy Vehicles (HV)	3000	1	-0.0016	0.0013					

Model Settings - NOx Emission									
fi	А	В	Beta						
300	-14	0.0068	0.166						
44000	2820	0.21	1.9						
	fi 300	fi A 300 -14	fi A B 300 -14 0.0068						

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SIDRA INTERSECTION 6

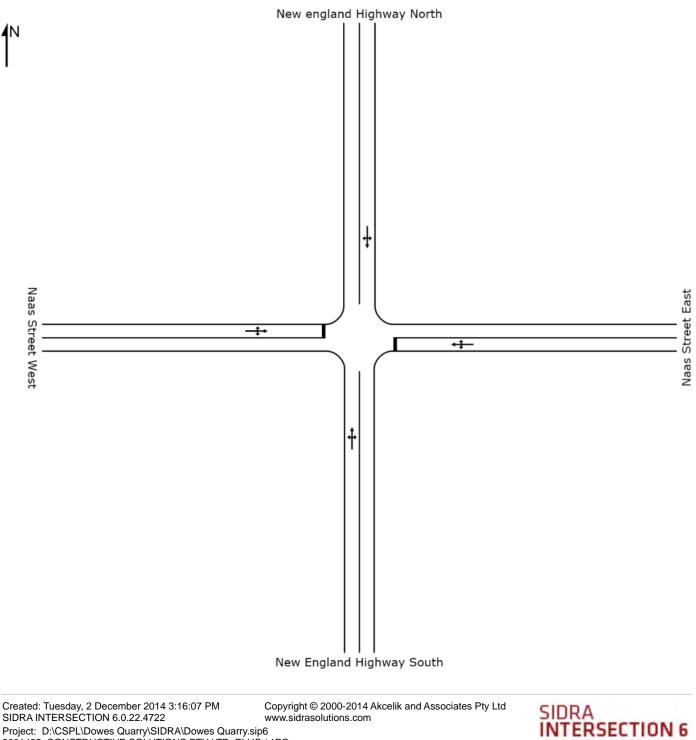
APPENDIX B3

30yr + Development

SITE LAYOUT

Site: New England Highway & Naas Street - With Development 8am - 9am Peak

20% of Quarry Traffic Assumed within am Peak Stop (Two-Way)



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INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

1 Site: New England Highway & Naas Street - With Development 8am - 9am Peak

20% of Quarry Traffic Assumed within am Peak Stop (Two-Way)

Volume Display Method: Separate

Volumes are shown for Movement Class(es): Light Vehicles and Heavy Vehicles

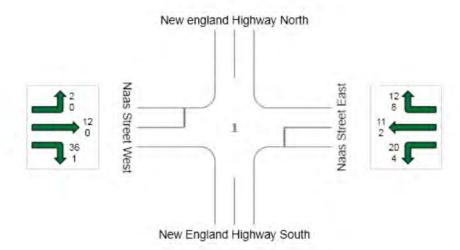
Total Intersection Volumes (veh)

All Movement Classes: 458

Light Vehicles (LV): 395

Heavy Vehicles (HV): 63







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MOVEMENT SUMMARY

🥶 Site: New England Highway & Naas Street - With Development 8am - 9am Peak

20% of Quarry Traffic Assumed within am Peak Stop (Two-Way) Design Life Analysis (Practical Capacity): Results for 30 years

Movement Performance - Vehicles											
Mov	OD	Demano	d Flows	Deg.	Average	Level of	95% Back		Prop.	Effective	Average
ID	Mov	Total veh/h	HV %	Satn v/c	Delay	Service	Vehicles veh	Distance	Queued	Stop Rate per veh	Speed
South	New Engl	and Highway		V/C	Sec	_	Ven	m	_	perven	km/h
1	L2	184	12.6	0.170	5.7	LOS A	1.0	7.8	0.39	0.32	46.0
2	T1	45	3.2	0.170	1.0	LOS A	1.0	7.8	0.39	0.32	46.6
3	R2	54	8.1	0.170	5.7	LOS A	1.0	7.8	0.39	0.32	45.6
Appro	ach	283	10.3	0.170	5.0	NA	1.0	7.8	0.39	0.32	46.0
East: I	Naas Stree	t East									
4	L2	35	16.7	0.267	12.4	LOS A	1.1	9.4	0.54	1.02	43.0
5	T1	97	15.4	0.267	12.2	LOS A	1.1	9.4	0.54	1.02	43.0
6	R2	29	40.0	0.267	12.6	LOS A	1.1	9.4	0.54	1.02	42.4
Appro	ach	161	20.1	0.267	12.3	LOS A	1.1	9.4	0.54	1.02	42.9
North:	New engla	nd Highway N	lorth								
7	L2	23	37.5	0.129	5.8	LOS A	0.7	6.0	0.37	0.05	47.8
8	T1	197	16.2	0.129	0.9	LOS A	0.7	6.0	0.37	0.05	48.7
9	R2	4	0.0	0.129	5.4	LOS A	0.7	6.0	0.37	0.05	47.7
Appro	ach	225	18.1	0.129	1.5	NA	0.7	6.0	0.37	0.05	48.6
West:	Naas Stree	et West									
10	L2	3	0.0	0.129	11.4	LOS A	0.4	3.2	0.44	0.98	43.5
11	T1	17	0.0	0.129	11.1	LOS A	0.4	3.2	0.44	0.98	43.3
12	R2	54	2.7	0.129	11.0	LOS A	0.4	3.2	0.44	0.98	43.1
Appro	ach	74	2.0	0.129	11.0	LOS A	0.4	3.2	0.44	0.98	43.1
All Vel	nicles	742	13.9	0.267	6.1	NA	1.1	9.4	0.42	0.46	45.7

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 is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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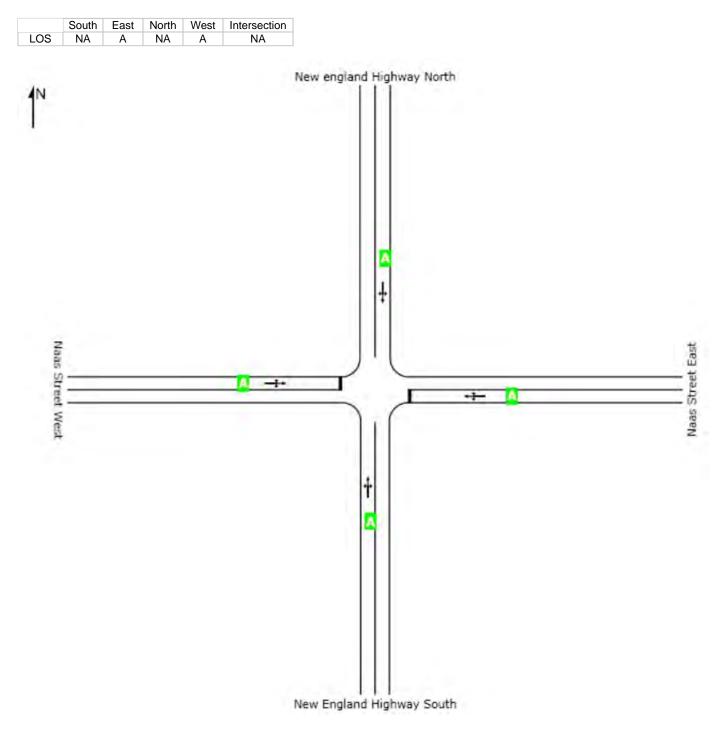
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LEVEL OF SERVICE

1 Site: New England Highway & Naas Street - With Development 8am - 9am Peak

20% of Quarry Traffic Assumed within am Peak Stop (Two-Way) Design Life Analysis (Practical Capacity): Results for 30 years

All Movement Classes



Level of Service (LOS) Method: Delay (RTA NSW).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

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 lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

DEGREE OF SATURATION

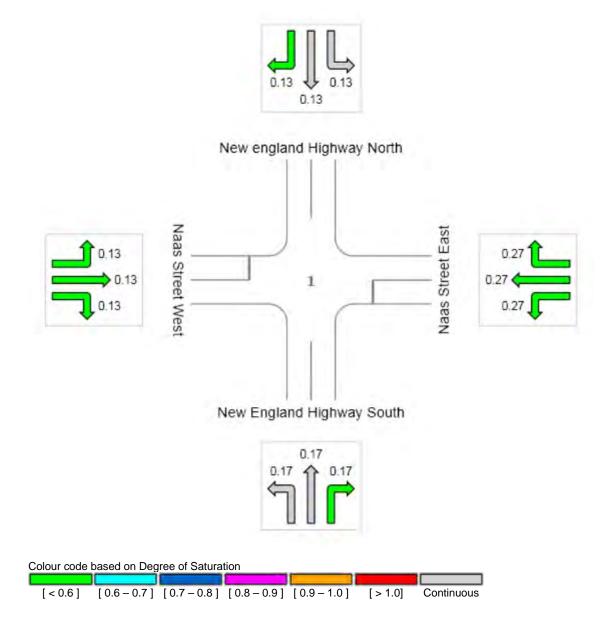
Ratio of Demand Volume to Capacity (v/c ratio)

1 Site: New England Highway & Naas Street - With Development 8am - 9am Peak

20% of Quarry Traffic Assumed within am Peak Stop (Two-Way) Design Life Analysis (Practical Capacity): Results for 30 years

All Movement Classes

	South	East	North	West	Intersection
Degree of Saturation	0.17	0.27	0.13	0.13	0.27



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DELAY (CONTROL)

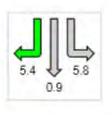
Average control delay per vehicle, or average pedestrian delay (seconds)

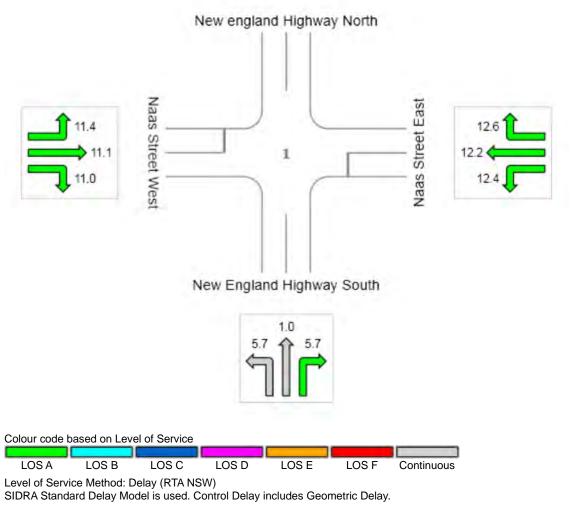
We Site: New England Highway & Naas Street - With Development 8am - 9am Peak

20% of Quarry Traffic Assumed within am Peak Stop (Two-Way) Design Life Analysis (Practical Capacity): Results for 30 years

All Movement Classes

	South	East	North	West	Intersection
Delay (Control)	5.0	12.3	1.5	11.0	6.1
LOS	NA	Α	NA	Α	NA





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INPUT REPORT

Site: New England Highway & Naas Street - With Development 8am - 9am Peak

20% of Quarry Traffic Assumed within am Peak Stop (Two-Way)

Intersection - Site Data							
Site Name	New England Highway & Naas Street - With Development 8am - 9am Peak						
Site ID	1						
Site Title	20% of Quarry Traffic Assumed within am Peak						

Intersection - Site Properties	
Site (Intersection) Type	Stop (Two-Way)
Model Name	New South Wales
Base Model	NA
Drive Rule	Left-hand side of the road
HCM Version	No
Units	Metric
First Created	
Date	2/12/2014 1:48:21 PM
Created By	Dave
Organisation	CONSTRUCTIVE SOLUTIONS PTY LTD
Version	6.0.22.4722
Last Modified	
Date	2/12/2014 3:15:26 PM
Modified By	Dave
Organisation	CONSTRUCTIVE SOLUTIONS PTY LTD
Version	6.0.22.4722

Intersection - Approach Data									
Location	Name	Туре	No. of App. Lanes	No. of Exit Lanes	Approach Distance		Approach Control	Area Type Factor	
					m	%			
South	New England Highway	Two-way	1	1	500.0	0	Major	-	
	South						Road		
East	Naas Street East	Two-way	1	1	500.0	0	Stop	_	
North	New england Highway	Two-way	1	1	500.0	0	Major	-	
	North						Road		
West	Naas Street West	Two-way	1	1	500.0	0	Stop	-	

Movement Definitions - Included Movement Classes							
Name	ID	Model Designation	Туре				
Light Vehicles	LV	Light Vehicle	Standard				
Heavy Vehicles	HV	Heavy Vehicle	Standard				

Movement Definitions - Origin-Destination Movements									
To Approach	OD Mo	ovement Turn Designation	OD Mov ID	LTR Mov ID					
From: South		New England Highway	South						
West	L2	L	1	1					
North	T1	Т	2	2					
East	R2	R	3	3					
From: East		Naas Street East							
South	L2	L	4	4					
West	T1	Т	5	5					

North	R2	R	6	6
From: North		New england Highway	North	
East South West	L2 T1 R2	L T R	7 8 9	7 8 9
From: West		Naas Street West		
North East South	L2 T1 R2	L T R	10 11 12	10 11 12

Lane Geometry - Lane Configuration											
Leg Item	Configuration	Туре	Control	Slip/ Bypass Control	Length	Width	Grade	Full Lane [ID Colour]	[Front Width	Islanc Back Fil Width	l I Style For Ped Staging 1
					m	m	%		m	m	,
South	New England High	nway Sou	uth								
App. Lane 1	Full-Length	Normal	Continu ous	-	500	3.5	-3		-	-	
Exit Lane 1	Full-Length	-	_	-	500	3.5	3		-	-	
East	Naas Street East										
	Full-Length Full-Length	Normal –	Stop –	_	500 500	3 3	3 -3		_	_	
North	New england High	way Nor	th								
App. Lane 1	Full-Length	Normal	Continu ous	-	500	3.5	0		-	-	
Exit Lane 1	Full-Length	_	-	-	500	3.5	0		-	-	
West	Naas Street West										
	Full-Length	Normal	Stop	-	500	3	0		-	-	
Exit Lane 1	Full-Length	-	-	-	500	3	0		-	-	

Lanes are numbered from left to right in the direction of travel.

Lane Geometr	y - Lane Disciplin	es	
To Approach	OD Movement	Free Queue Distance m	Movement Class(es)
From: South	App. Lane 1		
West North East	L2 T1 R2	0 0 0	LV, HV LV, HV LV, HV
From: East	App. Lane 1		
South West North	L2 T1 R2	0 0 0	LV, HV LV, HV LV, HV
From: North	App. Lane 1		
East South West	L2 T1 R2	0 0 0	LV, HV LV, HV LV, HV
From: West	App. Lane 1		
North East South	L2 T1 R2	0 0 0	LV, HV LV, HV LV, HV

Lane Data - Lane Data	a				
Approach Lane	Basic Satn Flow	Utilisation Ratio	Saturation Speed	Capacity Adjustment	Use Given Cap Adj in Network Analysis
	tcu/h	%	km/h	%	
South New Englan	d Highway South				
App. Lane 1	1950	_	-	0.0	No
East Naas Street	East				
App. Lane 1	1950	-	-	0.0	No
North New englan	d Highway North				
App. Lane 1	1950	_	_	0.0	No

West	Naas Street West					
App. Lane	1	1950	-	-	0.0	No

Lane Data - Fic	ow Proportions			
Exit Lane	South %	To Exit Le East %	eg North %	West %
Light Vehicles (LV	V)			
From: South Exit Lane 1	App. Lane 1 –	100	100	100
From: East Exit Lane 1	App. Lane 1 100	-	100	100
From: North Exit Lane 1	App. Lane 1 100	100	_	100
From: West Exit Lane 1	App. Lane 1 100	100	100	-
Heavy Vehicles (HV)			
From: South Exit Lane 1	App. Lane 1 –	100	100	100
From: East Exit Lane 1	App. Lane 1 100	-	100	100
From: North Exit Lane 1	App. Lane 1 100	100	_	100
From: West Exit Lane 1	App. Lane 1 100	100	100	_

Lane Data - Lan	ne Blockage				
		To Exit Leg			
Exit Lane	South	East	North	West	
From: South	App. Lane 1				
Exit Lane 1	_	Yes	Yes	Yes	
From: East	App. Lane 1				
Exit Lane 1	Yes	-	Yes	Yes	
From: North	App. Lane 1				
Exit Lane 1	Yes	Yes	-	Yes	
From: West	App. Lane 1				
Exit Lane 1	Yes	Yes	Yes	_	

Unit Time for Volumes: 60 minute	es			
Peak Flow Period: 60 minutes				
Main Crossing/		Peak	Flow	Growth
Slip/Bypass Lane	Volume	Flow	Scale	Rate
Crossing				
	ped	%	%	%

Main Crossing/	Mov. ID	Crossing Distance	Oppng Ped.Fac.	P.Deg. Satn	Walking Speed	App. Trav. Distance	Downst. Distance	Queue Space
Slip/Bypass Lane Crossing		Distance	1 eu.1 ac.	Jain	opeeu	Distance	Distance	Opace
		m			m/sec	m	m	m

Unit Time for Volumes: 60 minutes Peak Flow Period: 60 minutes Volume Data Method: Separate

Volume Data Metho	od: Separate				
Movement Class	South veh	To Exit Leg East veh	North veh	West veh	
From: South	New Engla	nd Highway So	uth		
Total (veh) LV (veh) HV (veh)	=	37 34 3	31 30 1	127 111 16	
From: East	Naas Stree	t East			
Total (veh) LV (veh) HV (veh)	24 20 4		20 12 8	13 11 2	
From: North	New englar	nd Highway No	rth		
Total (veh) LV (veh) HV (veh)	136 114 22	16 10 6	_ _ _	3 3 0	
From: West	Naas Stree	t West			
Total (veh) LV (veh) HV (veh)	37 36 1	12 12 0	2 2 0	- - -	

Volumes - Volu To		Flow	Orouth
Approach	Peak Flow Factor	Scale	Growth Rate
, approuon	%	%	%/year
Light Vehicles (L	V)		
From: South	New England Highway	South	
West	-	100.00	1.50
North	-	100.00	1.50
East	-	100.00	1.50
From: East	Naas Street East		
South	_	100.00	1.50
West	_	100.00	21.50
North	-	100.00	1.50
From: North	New england Highway		
East	-	100.00	1.50
South	-	100.00	1.50
West	_	100.00	1.50
From: West	Naas Street West		
North	-	100.00	1.50
East South	-	100.00 100.00	1.50 1.50
		100.00	1.50
Heavy Vehicles (
From: South	New England Highway		
West	_	100.00	1.50
North East	_	100.00 100.00	1.50 1.50
		100.00	1.50
From: East	Naas Street East	400.00	4 50
South West	-	100.00 100.00	1.50 21.50
North		100.00	1.50
From: North	New england Highway		1.00
East		100.00	1.50
South	_	100.00	1.50
West	-	100.00	1.50
From: West	Naas Street West		
North	_	100.00	1.50
East	-	100.00	1.50
South	-	100.00	1.50

Priorities

Opposed Movement South Opposing Movements East North

South	New England	d Highway S	South			
L2	-	-	-	-		
T1	-	_	_	_		
R2	-	-	T1,L2	-		
East	Naas Street	East				
L2	_	-	T1	_		
T1	R2,T1,L2	-	T1,R2	_		
R2	R2,T1	-	T1,R2	T1,L2		
North	New england	Highway N	lorth			
L2	-	-	_	_		
T1	-	_	_	_		
R2	T1,L2	-	-	-		
West	Naas Street	West				
L2	T1	-	_	_		
T1	R2,T1	-	T1,L2,R2	_		
R2	R2,T1	L2,T1	T1,R2	_		
	,	,	,			

Opposed	Apply TWSC	Critical	Follow-up	Minimum	Exiting	% Opp. By	Opng. Peds	Staged
Movement	Calibration	Gap	Headway	Departures	Flow Effect	Nearest	(UnSig)	Crossing
						Lane		
		sec	sec	veh/min	%	%		
South	New England H	lighway Sou	uth					
R2	Yes	4.500	2.500	0.10	0	0.00	Pr (Flow)	None
East	Naas Street Ea	st						
L2	Yes	5.000	3.000	0.10	50	100.00	Pr (Flow)	None
T1	Yes	6.500	3.500	0.10	50	0.00	Pr (Flow)	None
R2	Yes	7.000	4.000	0.10	50	0.00	Pr (Flow)	None
North	New england H	lighway Nor	th					
R2	Yes	4.500	2.500	0.10	0	0.00	Pr (Flow)	None
West	Naas Street We	est						
L2	Yes	5.000	3.000	0.10	50	100.00	Pr (Flow)	None
T1	Yes	6.500	3.500	0.10	50	0.00	Pr (Flow)	None
R2	Yes	7.000	4.000	0.10	50	0.00	Pr (Flow)	None

Gap Acceptance - Two-Way Sign Control Calibration						
Level of Reduction with Opposing Flow Rate	None					
Major Road Turning Flow Factor	1					

ay Sign C	ontrol P	arameter	Adjs fo	r Major R	d Numb	er of Lai	nes
Criti	Critical Gap Adjustment				up Headw	ay Adjust	ment
2-lane	3-lane	5-lane 6-	lane or	2-lane	3-lane	5-lane	6-lane
			more				or more
sec	sec	sec	sec	sec	sec	sec	sec
-0.5	-0.5	0.0	0.0	-0.5	-0.5	0.0	0.0
-1.5	-0.5	0.5	1.0	-0.5	-0.3	0.5	1.0
-1.5	-0.5	0.5	1.0	-0.5	-0.3	0.5	1.0
-0.5	-0.5	0.0	1.0	-0.5	-0.5	0.0	1.0
	Crit 2-lane sec -0.5 -1.5 -1.5	Critical Gap A 2-lane 3-lane <u>sec sec</u> -0.5 -0.5 -1.5 -0.5 -1.5 -0.5	Critical Gap Adjustment 2-lane 3-lane 5-lane 6- sec sec	Critical Gap Adjustment 2-lane 3-lane 5-lane 6-lane or more sec sec sec sec -0.5 -0.5 0.0 0.0 -1.5 -0.5 0.5 1.0 -1.5 -0.5 0.5 1.0	Critical Gap Adjustment Follow-t 2-lane 3-lane 5-lane 6-lane or more 2-lane sec sec </td <td>Critical Gap Adjustment Follow-up Headw 2-lane 3-lane 5-lane 6-lane or more 2-lane 3-lane sec sec</td> <td>2-lane 3-lane 5-lane 6-lane or more 2-lane 3-lane 5-lane sec <</td>	Critical Gap Adjustment Follow-up Headw 2-lane 3-lane 5-lane 6-lane or more 2-lane 3-lane sec sec	2-lane 3-lane 5-lane 6-lane or more 2-lane 3-lane 5-lane sec <

Gap Acceptance - Two-Way Sign Control Parameter Adjs for Geometry and Control

	Critical Gap Adjustment	Follow-up Headway Adjustment
	sec	sec
Give-Way / Yield Sign Control	-0.5	-0.3
One-Way Major Road	-0.5	-0.3
T Intersection (Minor Road Turn)	-0.7	-0.4
Entry Road Grade (for each per cent grade)	0.1	0.0
Staged Crossing - Stage 1	-1.0	-0.6
Staged Crossing - Stage 2	-1.0	-0.6
U Turn (Major Road)	1.5	0.9

0.0

Gap Acceptance - Settings Gap Acceptance Capacity: SIDRA Standard (Akçelik M3D)

Vehicle Mov	ement Data - F	ath Da <u>ta</u>								
OD	Approach	Exit	Negotiation	Negotiation	Downstream	Negotiation				
Movement		Cruise Speed	Speed	Distance	Distance	Radius				
	km/h	km/h	km/h	m	m	m				
Light Vehicles	(LV)									
From: South	New Engl	New England Highway South								
L2	50.0	50.0	-	-	-	-				
T1	50.0	50.0	-	-	-	-				
R2	50.0	50.0	-	-	-	-				
From: East	Naas Stre	et East								
L2	50.0	50.0	-	-	-	-				
T1	50.0	50.0	-	-	-	-				
R2	50.0	50.0	-	-	-	-				
From: North	New engl	and Highway No	orth							
L2	50.0	50.0	-	-	-	-				
T1	50.0	50.0	-	-	-	-				
R2	50.0	50.0	-	-	-	-				
From: West	Naas Stre									
L2	50.0	50.0	-	-	-	-				
T1	50.0	50.0	-	-	-	-				
R2	50.0	50.0	_	-	-	-				
Heavy Vehicle	es (HV)									
From: South	New Engl	and Highway Sc	outh							
L2	50.0	50.0	_	-	-	-				
T1	50.0	50.0	-	-	-	-				
R2	50.0	50.0	-	-	-	-				
From: East	Naas Stre	et East								
L2	50.0	50.0	-	-	-	-				
T1	50.0	50.0	-	-	-	-				
R2	50.0	50.0	-	-	-	-				
From: North		and Highway No	orth							
L2	50.0	50.0	-	-	-	-				
T1	50.0	50.0	-	-	-	-				
R2	50.0	50.0	_	-	-	-				
From: West	Naas Stre	et West								
L2	50.0	50.0	_	_	_	_				
T1	50.0	50.0	-	-	-	-				
R2	50.0	50.0	-	-	-	-				

Vehicle Movement Data - Calibration								
OD Movement	Queue Space m	Vehicle Length m	Vehicle Occupancy pers/veh	Turn Veh [Factor	Effect Radius] m	Gap Accp Factor	Opng. Veh Factor	Prac. Deg. Of Satn.
Light Vehicles (LV)							
From: South	New Engla	and Highway	y South					
L2 T1 R2	7.00 7.00 7.00	4.50 4.50 4.50	1.20 1.20 1.20	1.05 1 1.05	- - -	1 1 1	1 1 1	_ _ _
From: East	Naas Stre	et East						
L2 T1 R2	7.00 7.00 7.00	4.50 4.50 4.50	1.20 1.20 1.20	1.05 1 1.05	- - -	1 1 1	1 1 1	_ _ _
From: North	New engla	and Highway	/ North					
L2 T1 R2	7.00 7.00 7.00	4.50 4.50 4.50	1.20 1.20 1.20	1.05 1 1.05	- - -	1 1 1	1 1 1	_ _ _
From: West	Naas Stree	et West						
L2 T1 R2	7.00 7.00 7.00	4.50 4.50 4.50	1.20 1.20 1.20	1.05 1 1.05	_ _ _	1 1 1	1 1 1	_ _ _

Heavy Vehicles (H	V)							
From: South	New Engla	nd Highway So	outh					
L2	13.00	10.00	1.20	1.09	_	1.5	1.5	-
T1	13.00	10.00	1.20	1	-	1.5	1.5	-
R2	13.00	10.00	1.20	1.09	-	1.5	1.5	-
From: East	Naas Stree	et East						
L2	13.00	10.00	1.20	1.09	-	1.5	1.5	-
T1	13.00	10.00	1.20	1	-	1.5	1.5	-
R2	13.00	10.00	1.20	1.09	—	1.5	1.5	-
From: North	New engla	nd Highway No	orth					
L2	13.00	10.00	1.20	1.09	-	1.5	1.5	-
T1	13.00	10.00	1.20	1	-	1.5	1.5	-
R2	13.00	10.00	1.20	1.09	-	1.5	1.5	-
From: West	Naas Stree	et West						
L2	13.00	10.00	1.20	1.09	_	1.5	1.5	-
T1	13.00	10.00	1.20	1	-	1.5	1.5	-
R2	13.00	10.00	1.20	1.09	-	1.5	1.5	-

Demand & Sensitivity				
Analysis Method: Design Life				
Design Life Analysis Objective	Practical Capacity (v/c ratio = xp)			
Growth Model	Uniform			
Number of Years	30			
Const. No. of Years	-			
Result For	Intersection - Vehicles			

Model Settings - Options	
General Options	
Level of Service Method	Delay (RTA NSW)
Level of Service Target	LOS C
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Include Short Lanes in determining	No
Approach Queue Storage Ratio	

Model Settings - Model Parameters	
Passenger Car Equivalents	
Light Vehicles (LV)	1.00 pcu/veh
Heavy Vehicles (HV)	1.65 pcu/veh
Queue Blockage	
Minimum Probability of Blockage	0
Delay and Queue	
Exclude Geometry Delay	No
HCM Delay Formula	No
HCM Queue Formula	No
Downstream Short Lane	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Cost						
Cost Options						
Cost Unit	\$					
Vehicle Cost Parameters						
		Vel	Veh Time Cost			
Movement Class	Veh Cost Method	Pump Price of Fuel	Fuel Res. Cost Factor	Ratio of Running Cost to Fuel Cost	Avg. Income	Time Value Factor
		\$/L			\$/h	
Light Vehicles (LV)	Operating Cost	1.450	0.500	3.00	38.00	0.600

Model Settings - Vehicle Paramete	ers		
Movement Class	Mass	Max Power	CO2 to
	kg	kW	Fuel Rate
Light Vehicles (LV)	1600.0	120	2.35
Heavy Vehicles (HV)	15000.0	170	2.633

Model Settings - Fuel Consumption							
fi	А	В	Beta				
1200	16	0.004	0.1				
2300	200	0.009	0.075				
	fi 1200	fi A 1200 16	fi A B 1200 16 0.004				

Model Settings - CO Emission							
Movement Class	fi	А	В	Beta			
Light Vehicles (LV)	1620	-138	0.0743	0.294			
Heavy Vehicles (HV)	25000	320	-0.06	0.04			

Model Settings - HC Emission							
Movement Class	fi	А	В	Beta			
Light Vehicles (LV)	340	-9	0.0031	0.029			
Heavy Vehicles (HV)	3000	1	-0.0016	0.0013			

Model Settings - NOx Emission							
Movement Class	fi	А	В	Beta			
Light Vehicles (LV)	300	-14	0.0068	0.166			
Heavy Vehicles (HV)	44000	2820	0.21	1.9			

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APPENDIX C

Logan St & Naas St -SIDRA Results

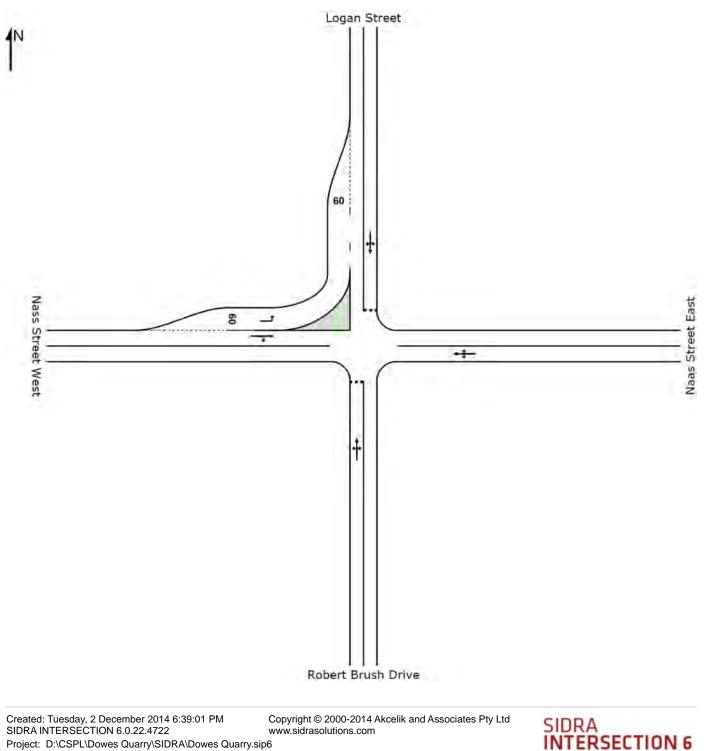
APPENDIX C1

Background

SITE LAYOUT

abla Site: Logan Street & Naas Street No Development 8am - 9am Peak

New Site Giveway / Yield (Two-Way)



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INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

V Site: Logan Street & Naas Street No Development 8am - 9am Peak

New Site Giveway / Yield (Two-Way)

Volume Display Method: Separate

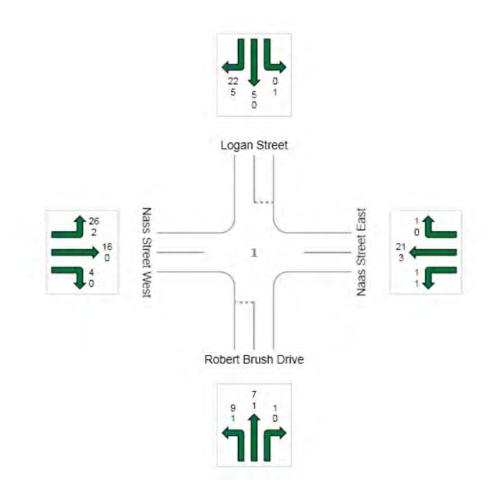
Volumes are shown for Movement Class(es): Light Vehicles and Heavy Vehicles

Total Intersection Volumes (veh)

All Movement Classes: 127

Light Vehicles (LV): 113

Heavy Vehicles (HV): 14



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MOVEMENT SUMMARY

abla Site: Logan Street & Naas Street No Development 8am - 9am Peak

New Site Giveway / Yield (Two-Way)

Move	ment Perfo	ormance -	Vehicle <u>s</u>								
Mov ID	OD Mov	Deman Total	Demand Flows Total HV		Average Delay	Level of Service	95% Back of Queue Vehicles Distance		Prop. Queued	Effective Stop Rate	Average Speed
	1010 0	veh/h	%	Satn v/c	sec	OCIVICO	veh	m	Queucu	per veh	km/h
South	Robert Brus	sh Drive									
1	L2	11	10.0	0.016	4.9	LOS A	0.1	0.5	0.11	0.47	46.5
2	T1	8	12.5	0.016	3.9	LOS A	0.1	0.5	0.11	0.47	46.8
3	R2	1	0.0	0.016	4.8	LOS A	0.1	0.5	0.11	0.47	46.2
Approach		20	10.5	0.016	4.5	LOS A	0.1	0.5	0.11	0.47	46.6
East: I	Naas Street	East									
4	L2	2	50.0	0.016	5.3	LOS A	0.1	0.6	0.07	0.06	48.2
5	T1	25	12.5	0.016	0.0	LOS A	0.1	0.6	0.07	0.06	49.5
6	R2	1	0.0	0.016	4.6	LOS A	0.1	0.6	0.07	0.06	48.7
Approach		28	14.8	0.016	0.6	NA	0.1	0.6	0.07	0.06	49.4
North:	Logan Stree	et									
7	L2	1	100.0	0.038	5.6	LOS A	0.2	1.2	0.20	0.48	44.9
8	T1	5	0.0	0.038	4.1	LOS A	0.2	1.2	0.20	0.48	46.5
9	R2	28	18.5	0.038	5.3	LOS A	0.2	1.2	0.20	0.48	46.4
Approach		35	18.2	0.038	5.1	LOS A	0.2	1.2	0.20	0.48	46.4
West:	Nass Street	West									
10	L2	29	7.1	0.016	4.4	LOS A	0.0	0.0	0.00	0.46	47.8
11	T1	17	0.0	0.011	0.1	LOS A	0.1	0.4	0.10	0.11	49.1
12	R2	4	0.0	0.011	4.6	LOS A	0.1	0.4	0.10	0.11	48.2
Approach		51	4.2	0.016	3.0	NA	0.1	0.4	0.04	0.31	48.2
All Vehicles		134	11.0	0.038	3.3	NA	0.2	1.2	0.10	0.33	47.7

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 is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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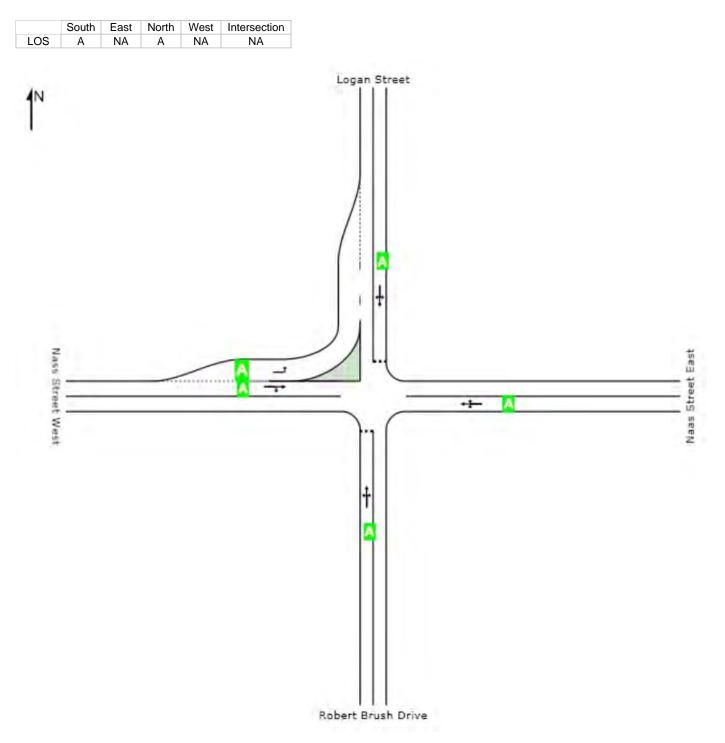


LEVEL OF SERVICE

abla Site: Logan Street & Naas Street No Development 8am - 9am Peak

New Site Giveway / Yield (Two-Way)

All Movement Classes



Level of Service (LOS) Method: Delay (RTA NSW).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

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 lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.



DEGREE OF SATURATION

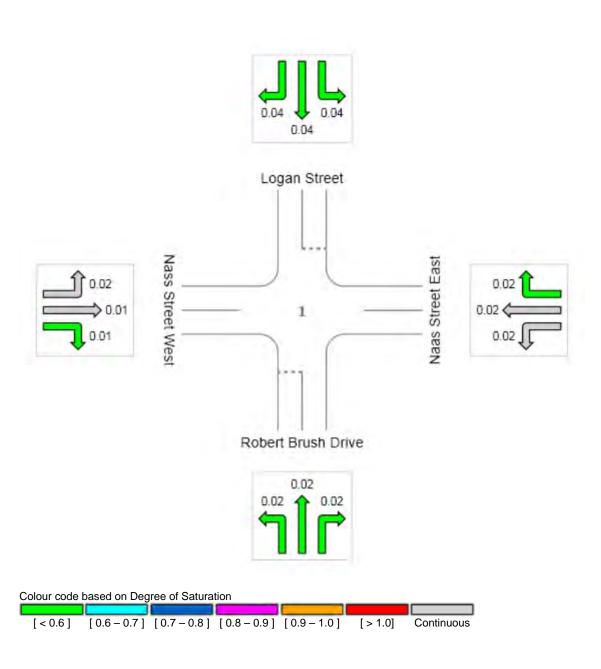
Ratio of Demand Volume to Capacity (v/c ratio)

igvee Site: Logan Street & Naas Street No Development 8am - 9am Peak

New Site Giveway / Yield (Two-Way)

All Movement Classes





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DELAY (CONTROL)

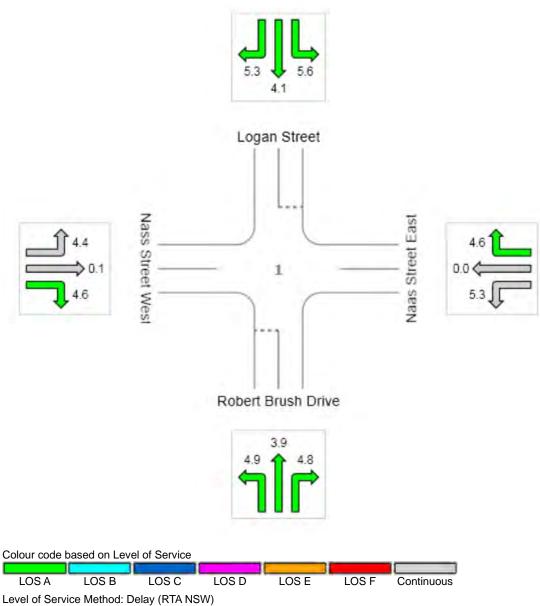
Average control delay per vehicle, or average pedestrian delay (seconds)

∇ Site: Logan Street & Naas Street No Development 8am - 9am Peak

New Site Giveway / Yield (Two-Way)

All Movement Classes

	South	East	North	West	Intersection
Delay (Control)	4.5	0.6	5.1	3.0	3.3
LOS	A	NA	Α	NA	NA



SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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INPUT REPORT

∇ Site: Logan Street & Naas Street No Development 8am - 9am Peak

New Site Giveway / Yield (Two-Way)

Intersection - Site Data	
Site Name	Logan Street & Naas Street No Development 8am - 9am Peak
Site ID	1
Site Title	New Site

Intersection - Site Properties	
Site (Intersection) Type	Giveway / Yield (Two-Way)
Model Name	New South Wales
Base Model	NA
Drive Rule	Left-hand side of the road
HCM Version	No
Units	Metric
First Created	
Date	2/12/2014 6:22:47 PM
Created By	Dave
Organisation	CONSTRUCTIVE SOLUTIONS PTY LTD
Version	6.0.22.4722
Last Modified	
Date	2/12/2014 6:38:24 PM
Modified By	Dave
Organisation	CONSTRUCTIVE SOLUTIONS PTY LTD
Version	6.0.22.4722

Intersect	tion - Approach Data							
Location	Name	Туре	No. of App. Lanes	No. of Exit Lanes	Approach Distance		Approach Control	Area Type Factor
			Lanes	Lanes	m	%		I actor
South	Robert Brush Drive	Two-way	1	1	500.0	0	Give-way Yield	-
East	Naas Street East	Two-way	1	1	500.0	0	Major Road	-
North	Logan Street	Two-way	1	2	500.0	0	Give-way Yield	-
West	Nass Street West	Two-way	2	1	500.0	0	Major Road	-

Movement Definitions - Included Movement Classes							
Name	ID	Model Designation	Туре				
Light Vehicles	LV	Light Vehicle	Standard				
Heavy Vehicles	HV	Heavy Vehicle	Standard				

Movement Definitions - Origin-Destination Movements								
To Approach	ODN	Novement Turn Designation	OD Mov ID	LTR Mov ID				
From: South		Robert Brush Drive						
West	L2	L	1	1				
North	T1	Т	2	2				
East	R2	R	3	3				
From: East		Naas Street East						
South	L2	L	4	4				

West	T1	T	5	5	
North	R2	R	6	6	
From: North		Logan Street			
East	L2	L	7	7	
South	T1	T	8	8	
West	R2	R	9	9	
From: West		Nass Street West			
North	L2	L	10	10	
East	T1	T	11	11	
South	R2	R	12	12	

Lane Geon	netry - Lane Con	figurati	on								
Leg Item	Configuration	Туре	Control	Slip/ Bypass Control	Length	Width	Grade	Full Lane [ID Colour] [Front Width	Island Back Fill Width	Style For Pec Staging]
					m	m	%		m	m	
South	Robert Brush Driv	е									
App. Lane 1	Full-Length	Normal	Giveway /Yield	-	500	3	0		-	-	
Exit Lane 1	Full-Length	-	-	-	500	3	0		-	-	
East	Naas Street East										
App. Lane 1	Full-Length	Normal	Continu ous	-	500	3.5	-3		-	-	
Exit Lane 1	Full-Length	_	-	-	500	3.5	3			-	
North	Logan Street										
App. Lane 1	Full-Length	Normal	Giveway /Yield	-	500	3	0		-	-	
	Full-Length	_	-	-	500	3	0			-	
Exit Lane 1	Short Lane	-	-	-	-	5	0		-	-	
West	Nass Street West										
App. Lane 1	Short Lane	Slip/ Bypass (Low Angle)	Continu (ous	Continuou s	-	5	3		-	-	
App. Lane 2	Full-Length		Continu ous	-	500	3.5	3		-	-	
Exit Lane 1	Full-Length	-	_	-	500	3.5	-3		-	-	

Lanes are numbered from left to right in the direction of travel.

Lane Geor	Lane Geometry - Lane Configuration - Short Lanes and Two-Segment Lanes										
1 1/			Short Lane /	Segment 1		Segment 2					
Leg Item	Configuration	[Length	Overflow/ Merge Dir	ID	Colour]	[Length	ID	Colour]			
		m				m					
North	Logan Street										
Exit Lane 1	Short Lane	60	Right			-	-	-			
West	Nass Street West										
App. Lane 1	Short Lane	60	Right			_	-	-			

Lane Geometi	ry - Lane Disciplin	ies	
To Approach	OD Movement	Free Queue Distance m	Movement Class(es)
From: South	App. Lane 1		
West	L2	0	LV, HV
North	T1	0	LV, HV
East	R2	0	LV, HV
From: East	App. Lane 1		
South	L2	0	LV, HV
West	T1	0	LV, HV
North	R2	0	LV, HV
From: North	App. Lane 1		
East	L2	0	LV, HV
South	T1	0	LV, HV

West	R2	0	LV, HV
From: West	App. Lane 1		
North	L2	0	LV, HV
From: West	App. Lane 2		
East	T1	0	LV, HV
South	R2	0	LV, HV

Lane Data - Lane Data										
Approach Lane		Basic tn Flow	Utilisation Ratio	Saturation Speed		Use Given Cap Adj in Network Analysis				
		tcu/h	%	km/h	%					
South	Robert Brush Drive									
App. Lane 1		1950	-	-	0.0	No				
East	Naas Street East									
App. Lane 1		1950	-	-	0.0	No				
North	Logan Street									
App. Lane 1		1950	-	-	0.0	No				
West	Nass Street West									
App. Lane 1		1950	-	-	0.0	No				
App. Lane 2		1950	-	-	0.0	No				

Lane Data - Flov	v Proportions				
Exit Lane	South	To Exit Le East	g North	West	
	%	%	%	%	
Light Vehicles (LV)	1				
From: South	App. Lane 1				
Exit Lane 1 Exit Lane 2		100	0 100	100	
From: East	App. Lane 1				
Exit Lane 1 Exit Lane 2	100	_	0 100	100	
From: North	App. Lane 1				
Exit Lane 1	100	100	-	100	
From: West	App. Lane 1				
Exit Lane 1 Exit Lane 2	_	_	100 0	_	
From: West	App. Lane 2				
Exit Lane 1	100	100	-	-	
Heavy Vehicles (H	V)				
From: South	App. Lane 1				
Exit Lane 1 Exit Lane 2	-	100	0 100	100	
From: East	App. Lane 1				
Exit Lane 1	100	-	0	100	
Exit Lane 2	_	-	100	-	
From: North	App. Lane 1				
Exit Lane 1	100	100	-	100	
From: West	App. Lane 1				
Exit Lane 1 Exit Lane 2	_	_	100 0	_	
From: West	App. Lane 2				
Exit Lane 1	100	100	-	-	

Lane Data - Lane Blockage						
Exit Lane	South	To Exit Leg	North	West		
	South	East	Νοπη	West		
From: South	App. Lane 1					
Exit Lane 1	-	Yes	Yes	Yes		
Exit Lane 2	-	-	Yes	-		

From: Foot	App Lope 1				
From: East	App. Lane 1				
Exit Lane 1	Yes	-	Yes	Yes	
Exit Lane 2	-	-	Yes	-	
From: North	App. Lane 1				
Exit Lane 1	Yes	Yes	-	Yes	
From: West	App. Lane 1				
Exit Lane 1	-	_	Yes	_	
Exit Lane 2	-	-	Yes	-	
From: West	App. Lane 2				
Exit Lane 1	Yes	Yes	-	-	

Pedestrians - Pedestrian	Movements			
Unit Time for Volumes: 60 mi	nutes			
Peak Flow Period: 30 minute	S			
Main Crossing/		Peak	Flow	Growth
Slip/Bypass Lane	Volume	Flow	Scale	Rate
Crossing				
0	ped	%	%	%
No Ped Movements				
No r eu movements				

Pedestrians	s - Pedestri	an Movement	Data					
Main Crossing/ Slip/Bypass Lane Crossing	Mov. ID	Crossing Distance	Oppng Ped.Fac.	P.Deg. Satn	Walking Speed	App. Trav. Distance	Downst. Distance	Queue Space
		m			m/sec	m	m	m
No Ped Move	ements							

Volumes Vahia	le Velumee				
Volumes - Vehic Unit Time for Volum Peak Flow Period: Volume Data Meth	nes: 60 minute 30 minutes	es			
		To Exit Le			
Movement Class	South veh	East veh	North veh	West veh	
From: South	Robert Brus	sh Drive			
Total (veh) LV (veh) HV (veh)	- - -	1 1 0	8 7 1	10 9 1	
From: East	Naas Street	East			
Total (veh) LV (veh) HV (veh)	2 1 1		1 1 0	24 21 3	
From: North	Logan Stree	et			
Total (veh) LV (veh) HV (veh)	5 5 0	1 0 1	-	27 22 5	
From: West	Nass Street	West			
Total (veh) LV (veh) HV (veh)	4 4 0	16 16 0	28 26 2		

Volumes - Volume Factors								
То	Peak Flow	Flow	Growth					
Approach	Factor	Scale	Rate					
	%	%	%/year					
Light Vehicles (L'	V)							
From: South	Robert Brush Drive							
West	95.0	100.00	2.00					
North	95.0	100.00	2.00					
East	95.0	100.00	2.00					

North 95.0 100.00 2.0 From: North Logan Street 2.0 East 95.0 100.00 2.0 South 95.0 100.00 2.0 West 95.0 100.00 2.0 From: West Nass Street West 2.0 North 95.0 100.00 2.0 From: West Nass Street West 2.0 North 95.0 100.00 2.0 South 95.0 100.00 2.0 South 95.0 100.00 2.0 From: South Robert Brush Drive 2.0 West 95.0 100.00 2.0 North 95.0 100.00 2.0 From: South Robert Brush Drive 2.0 West 95.0 100.00 2.0 From: East Naas Street East 2.0 South 95.0 100.00 2.0 North 95.0 100.00 2.0				
West 95.0 100.00 2.0 North 95.0 100.00 2.0 From: North Logan Street 2.0 East 95.0 100.00 2.0 South 95.0 100.00 2.0 West 95.0 100.00 2.0 West 95.0 100.00 2.0 From: West Nass Street West 2.0 North 95.0 100.00 2.0 East 95.0 100.00 2.0 South 95.0 100.00 2.0 East 95.0 100.00 2.0 South 95.0 100.00 2.0 Heavy Vehicles (HV) East 95.0 100.00 2.0 West 95.0 100.00 2.0 2.0 North 95.0 100.00 2.0 2.0 From: South 95.0 100.00 2.0 2.0 From: East Naas Street East 95.0 100.0			100.00	2.00
From: North Logan Street East 95.0 100.00 2.0 South 95.0 100.00 2.0 West 95.0 100.00 2.0 West 95.0 100.00 2.0 From: West Nass Street West 95.0 100.00 2.0 From: West Nass Street West 95.0 100.00 2.0 South 95.0 100.00 2.0 2.0 Bast 95.0 100.00 2.0 South 95.0 100.00 2.0 Heavy Vehicles (HV) 95.0 100.00 2.0 West 95.0 100.00 2.0 North 95.0 100.00 2.0 From: South Robert Brush Drive 95.0 100.00 2.0 From: East Naas Street East 95.0 100.00 2.0 From: East 95.0 100.00 2.0 0 North 95.0 100.00 2.0 0				2.00
East 95.0 100.00 2.0 South 95.0 100.00 2.0 West 95.0 100.00 2.0 From: West Nass Street West 2.0 North 95.0 100.00 2.0 East 95.0 100.00 2.0 North 95.0 100.00 2.0 East 95.0 100.00 2.0 South 95.0 100.00 2.0 Heavy Vehicles (HV) 95.0 100.00 2.0 West 95.0 100.00 2.0 North 95.0 100.00 2.0 North 95.0 100.00 2.0 From: South Robert Brush Drive 2.0 West 95.0 100.00 2.0 From: East Naas Street East 2.0 South 95.0 100.00 2.0 West 95.0 100.00 2.0 North 95.0 100.00 2.0	North	95.0	100.00	2.00
South 95.0 100.00 2.0 West 95.0 100.00 2.0 From: West Nass Street West 2.0 North 95.0 100.00 2.0 East 95.0 100.00 2.0 South 95.0 100.00 2.0 South 95.0 100.00 2.0 South 95.0 100.00 2.0 Heavy Vehicles (HV) From: South Robert Brush Drive 2.0 West 95.0 100.00 2.0 North 95.0 100.00 2.0 North 95.0 100.00 2.0 From: South Robert Brush Drive 2.0 West 95.0 100.00 2.0 From: East Naas Street East 2.0 South 95.0 100.00 2.0 West 95.0 100.00 2.0 North 95.0 100.00 2.0 North 95.0 100.00	From: North	Logan Street		
West 95.0 100.00 2.0 From: West Nass Street West 2.0 North 95.0 100.00 2.0 East 95.0 100.00 2.0 South 95.0 100.00 2.0 Heavy Vehicles (HV) 95.0 100.00 2.0 Heavy Vehicles (HV) 95.0 100.00 2.0 West 95.0 100.00 2.0 North 95.0 100.00 2.0 North 95.0 100.00 2.0 From: South Robert Brush Drive 2.0 North 95.0 100.00 2.0 From: East Naas Street East 2.0 South 95.0 100.00 2.0 West 95.0 100.00 2.0 North 95.0 100.00 2.0 West 95.0 100.00 2.0 North 95.0 100.00 2.0 From: North Logan Street <				2.00
From: West Nass Street West Intervention Interventin				
North 95.0 100.00 2.0 East 95.0 100.00 2.0 South 95.0 100.00 2.0 Heavy Vehicles (HV) 95.0 100.00 2.0 West 95.0 100.00 2.0 North 95.0 100.00 2.0 North 95.0 100.00 2.0 West 95.0 100.00 2.0 North 95.0 100.00 2.0 From: East Naas Street East 95.0 100.00 2.0 West 95.0 100.00 2.0 0 North 95.0 100.00 2.0 From: North Logan Street East 95.0 100.00 2.0			100.00	2.00
East 95.0 100.00 2.0 South 95.0 100.00 2.0 Heavy Vehicles (HV)			100.00	2.00
South 95.0 100.00 2.0 Heavy Vehicles (HV) 2.0 From: South Robert Brush Drive 2.0 West 95.0 100.00 2.0 North 95.0 100.00 2.0 East 95.0 100.00 2.0 From: East Naas Street East 2.0 South 95.0 100.00 2.0 West 95.0 100.00 2.0 North 95.0 100.00 2.0 West 95.0 100.00 2.0 North 95.0 100.00 2.0 From: North Logan Street 2.0 East 95.0 100.00 2.0				2.00
From: South Robert Brush Drive West 95.0 100.00 2.0 North 95.0 100.00 2.0 East 95.0 100.00 2.0 From: East Naas Street East 95.0 100.00 2.0 South 95.0 100.00 2.0 West 95.0 100.00 2.0 North 95.0 100.00 2.0 From: North Logan Street 2.0 East 95.0 100.00 2.0				2.00
West 95.0 100.00 2.0 North 95.0 100.00 2.0 East 95.0 100.00 2.0 From: East Naas Street East 2.0 South 95.0 100.00 2.0 West 95.0 100.00 2.0 North 95.0 100.00 2.0 North 95.0 100.00 2.0 From: North Logan Street 2.0 2.0 East 95.0 100.00 2.0	Heavy Vehicles (HV))		
North 95.0 100.00 2.0 East 95.0 100.00 2.0 From: East Naas Street East 2.0 South 95.0 100.00 2.0 West 95.0 100.00 2.0 North 95.0 100.00 2.0 North 95.0 100.00 2.0 From: North Logan Street 2.0 East 95.0 100.00 2.0	From: South	Robert Brush Drive	•	
East 95.0 100.00 2.0 From: East Naas Street East 2.0 South 95.0 100.00 2.0 West 95.0 100.00 2.0 North 95.0 100.00 2.0 From: North Logan Street 2.0 East 95.0 100.00 2.0				2.00
From: East Naas Street East 100.00 2.0 South 95.0 100.00 2.0 West 95.0 100.00 2.0 North 95.0 100.00 2.0 From: North Logan Street 2.0 East 95.0 100.00 2.0				2.00
South 95.0 100.00 2.0 West 95.0 100.00 2.0 North 95.0 100.00 2.0 From: North Logan Street 2.0 East 95.0 100.00 2.0		••••	100.00	2.00
West North 95.0 95.0 100.00 100.00 2.0 2.0 From: North Logan Street East 95.0 100.00 2.0				
North 95.0 100.00 2.0 From: North Logan Street East 95.0 100.00 2.0				2.00
From: North Logan Street East 95.0 100.00 2.0				
East 95.0 100.00 2.0			100.00	2.00
		0	100.00	2.00
50.0 100.00 Z.0				2.00
West 95.0 100.00 2.0				2.00
From: West Nass Street West	From: West	Nass Street West		
North 95.0 100.00 2.0	North	95.0	100.00	2.00
				2.00
South 95.0 100.00 2.0	South	95.0	100.00	2.00

Priorities Opposed Movement	South	Opposing N East	lovements North	West
South	Robert Brus	sh Drive		
L2 T1 R2		T1 R2,T1 R2,T1	_ _ T1,L2	– R2,T1,L2 R2,T1
East	Naas Stree	t East		
L2 T1 R2	_ _ _	- - -	- - -	- - T1
North	Logan Stree	et		
L2 T1 R2	_ _ T1,L2	– L2,R2,T1 R2,T1	- - -	T1 R2,T1 R2,T1
West	Nass Stree	t West		
L2 T1 R2		– – L2,T1		- -

Gap Acce	ptance - Gap A	cceptance	e Data					
Opposed Movement	Apply TWSC Calibration	Critical Gap	Follow-up Headway	Minimum Departures	Exiting Flow Effect	% Opp. By Nearest Lane	Opng. Peds (UnSig)	Staged Crossing
		sec	sec	veh/min	%	%		
South	Robert Brush D	rive						
L2 T1 R2	Yes Yes Yes	5.000 6.500 7.000	3.000 3.500 4.000	0.10 0.10 0.10	50 50 50	100.00 0.00 0.00	Pr (Flow) Pr (Flow) Pr (Flow)	None None None
East	Naas Street Ea	st						
R2	Yes	4.500	2.500	0.10	0	0.00	Pr (Flow)	None
North	Logan Street							
L2 T1 R2	Yes Yes Yes	5.000 6.500 7.000	3.000 3.500 4.000	0.10 0.10 0.10	50 50 50	100.00 0.00 0.00	Pr (Flow) Pr (Flow) Pr (Flow)	None None None

West	Nass Street W	/est					
R2	Yes	4.500	2.500	0.10	0	0.00 Pr (Flow)	None

Gap Acceptance - Two-Way Sign Control Calibration							
None							
1							

Gap Acceptance - Two-W	ay Sign C	ontrol P	arameter	Adjs fo	r Major F	d Numb	er of La	nes
	Crit	ical Gap A	djustment		Follow-	up Headw	ay Adjust	ment
Major Road Number of	2-lane	3-lane	5-lane 6	-lane or	2-lane	3-lane	5-lane	6-lane
Lanes:				more				or more
	sec	sec	sec	sec	sec	sec	sec	sec
Minor Road Left Turn	-0.5	-0.5	0.0	0.0	-0.5	-0.5	0.0	0.0
Minor Road Through	-1.5	-0.5	0.5	1.0	-0.5	-0.3	0.5	1.0
Minor Road Right Turn	-1.5	-0.5	0.5	1.0	-0.5	-0.3	0.5	1.0
Major Road Turn (Right or Left)	-0.5	-0.5	0.0	1.0	-0.5	-0.5	0.0	1.0

Gap Acceptance - Two-Way Sign Control Parameter Adjs for Geometry and Control

	Critical Gap	Follow-up
	Adjustment	Headway
		Adjustment
	sec	sec
Give-Way / Yield Sign Control	-0.5	-0.3
One-Way Major Road	-0.5	-0.3
T Intersection (Minor Road Turn)	-0.7	-0.4
Entry Road Grade (for each per cent grade)	0.1	0.0
Staged Crossing - Stage 1	-1.0	-0.6
Staged Crossing - Stage 2	-1.0	-0.6
U Turn (Major Road)	1.5	0.9
User Adjustment	0.0	0.0

Gap Acceptance - Settings Gap Acceptance Capacity: SIDRA Standard (Akçelik M3D)

Vehicle Move	ement Data - Pa	ith Data				
OD Movement	Approach Cruise Speed km/h	Exit Cruise Speed km/h	Negotiation Speed km/h	Negotiation Distance m	Downstream Distance m	Negotiation Radius m
Light Vehicles	(LV)					
From: South	Robert Bru	sh Drive				
L2 T1 R2	50.0 50.0 50.0	50.0 50.0 50.0	- - -	- - -	_ _ _	_ _ _
From: East	Naas Stree	et East				
L2 T1 R2	50.0 50.0 50.0	50.0 50.0 50.0	- - -		- - -	_ _ _
From: North	Logan Stre	et				
L2 T1 R2	50.0 50.0 50.0	50.0 50.0 50.0	- - -	- - -	- - -	- - -
From: West	Nass Stree	t West				
L2 T1 R2	50.0 50.0 50.0	50.0 50.0 50.0	- - -			_ _ _
Heavy Vehicles	s (HV)					
From: South L2 T1	Robert Bru: 50.0 50.0	sh Drive 50.0 50.0				

R2	50.0	50.0	_	-	-	-
From: East	Naas Street Ea	ist				
L2	50.0	50.0	-	_	-	-
T1	50.0	50.0	-	-	-	-
R2	50.0	50.0	-	-	-	-
From: North	Logan Street					
L2	50.0	50.0	-	-	-	-
T1	50.0	50.0	-	-	-	-
R2	50.0	50.0	-	_	-	-
From: West	Nass Street We	est				
L2	50.0	50.0	-	_	-	-
T1	50.0	50.0	-	-	-	-
R2	50.0	50.0	-	-	-	-

Vehicle Moveme	ent Data - C	Calibration						
OD Movement	Queue Space m	Vehicle Length m	Vehicle Occupancy pers/veh	Turn Veh [Factor	Effect Radius] m	Gap Accp Factor	Opng. Veh Factor	Prac. Deg. Of Satn.
Light Vehicles (LV))							
From: South	Robert Br	ush Drive						
L2 T1 R2	7.00 7.00 7.00	4.50 4.50 4.50	1.20 1.20 1.20	1.05 1 1.05	- - -	1 1 1	1 1 1	
From: East	Naas Stre	eet East						
L2 T1 R2	7.00 7.00 7.00	4.50 4.50 4.50	1.20 1.20 1.20	1.05 1 1.05		1 1 1	1 1 1	
From: North	Logan Str							
L2 T1 R2	7.00 7.00 7.00	4.50 4.50 4.50	1.20 1.20 1.20	1.05 1 1.05	_ _ _	1 1 1	1 1 1	- - -
From: West	Nass Stre	et West						
L2 T1 R2	7.00 7.00 7.00	4.50 4.50 4.50	1.20 1.20 1.20	1.05 1 1.05	- - -	1 1 1	1 1 1	- - -
Heavy Vehicles (H	IV)							
From: South	Robert Br	ush Drive						
L2 T1 R2	13.00 13.00 13.00	10.00 10.00 10.00	1.20 1.20 1.20	1.09 1 1.09	_ _ _	1.5 1.5 1.5	1.5 1.5 1.5	- - -
From: East	Naas Stre							
L2 T1 R2	13.00 13.00 13.00	10.00 10.00 10.00	1.20 1.20 1.20	1.09 1 1.09		1.5 1.5 1.5	1.5 1.5 1.5	- - -
From: North	Logan Str							
L2 T1 R2	13.00 13.00 13.00	10.00 10.00 10.00	1.20 1.20 1.20	1.09 1 1.09		1.5 1.5 1.5	1.5 1.5 1.5	- - -
From: West	Nass Stre							
L2 T1 R2	13.00 13.00 13.00	10.00 10.00 10.00	1.20 1.20 1.20	1.09 1 1.09		1.5 1.5 1.5	1.5 1.5 1.5	

Demand & Sensitivity Analysis Method: None

Model Settings - Options	
General Options	
Level of Service Method	Delay (RTA NSW)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Include Short Lanes in determining	No
Approach Queue Storage Ratio	

Model Settings - Model Parameters	
Passenger Car Equivalents	
Light Vehicles (LV)	1.00 pcu/veh
Heavy Vehicles (HV)	1.65 pcu/veh
Queue Blockage	
Minimum Probability of Blockage	0
Delay and Queue	
Exclude Geometry Delay	No
HCM Delay Formula	No
HCM Queue Formula	No
Downstream Short Lane	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Cost Cost Options Cost Unit

Cost Unit	\$						
Vehicle Cost Parameters							
		Veh	n Operating Co	st	Veh Time Cost		
Movement Class	Veh Cost Method	Pump Price of Fuel	Fuel Res. Cost Factor	Ratio of Running Cost to Fuel Cost	Avg. Income	Time Value Factor	
		\$/L			\$/h		
Light Vehicles (LV)	Operating Cost	1.450	0.500	3.00	38.00	0.600	
Heavy Vehicles (HV)	Operating Cost	1.450	0.500	3.00	38.00	0.600	

Model Settings - Vehicle Parameters							
Movement Class	Mass	Max Power	CO2 to				
	kg	kW	Fuel Rate				
Light Vehicles (LV)	1600.0	120	2.35				
Heavy Vehicles (HV)	15000.0	170	2.633				

Model Settings - Fuel Consumption								
Movement Class	fi	А	В	Beta				
Light Vehicles (LV)	1200	16	0.004	0.1				
Heavy Vehicles (HV)	2300	200	0.009	0.075				

Model Settings - CO Emission							
Movement Class	fi	А	В	Beta			
Light Vehicles (LV) Heavy Vehicles (HV)	1620 25000	-138 320	0.0743 -0.06	0.294 0.04			

Model Settings - HC Emission							
Movement Class	fi	А	В	Beta			
Light Vehicles (LV)	340	-9	0.0031	0.029			
Heavy Vehicles (HV)	3000	1	-0.0016	0.0013			

Model Settings - NOx E	mission			
Movement Class	fi	А	В	Beta
Light Vehicles (LV)	300	-14	0.0068	0.166
Heavy Vehicles (HV)	44000	2820	0.21	1.9

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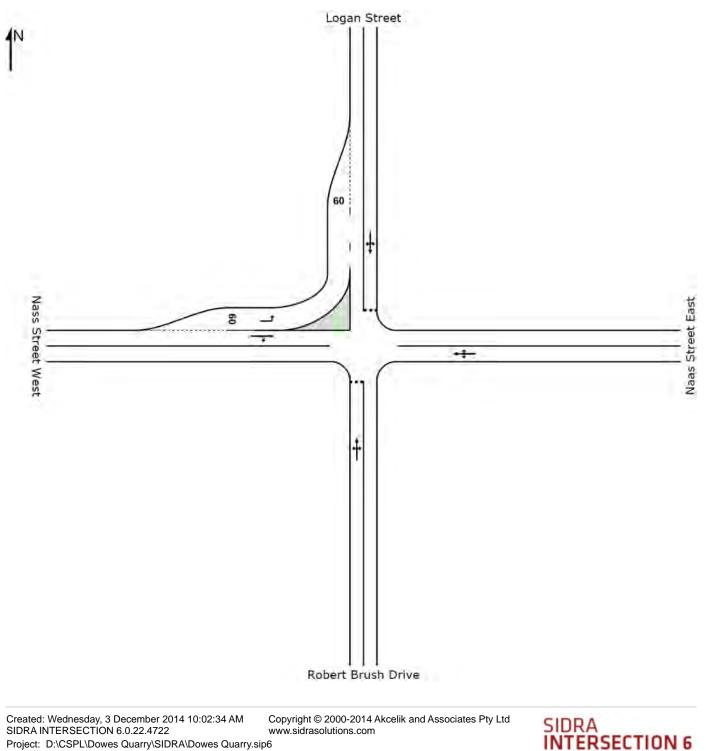
APPENDIX C2

Background + Development

SITE LAYOUT

abla Site: Logan Street & Naas Street No Development 8am - 9am Peak + Quarry

New Site Giveway / Yield (Two-Way)



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INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

V Site: Logan Street & Naas Street No Development 8am - 9am Peak + Quarry

New Site Giveway / Yield (Two-Way)

Volume Display Method: Separate

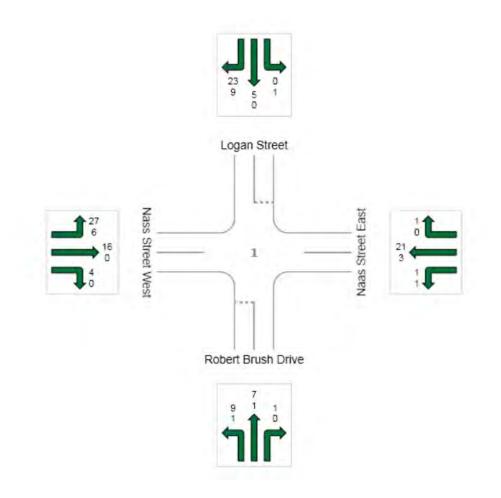
Volumes are shown for Movement Class(es): Light Vehicles and Heavy Vehicles

Total Intersection Volumes (veh)

All Movement Classes: 137

Light Vehicles (LV): 115

Heavy Vehicles (HV): 22



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MOVEMENT SUMMARY

$\overline{ abla}$ Site: Logan Street & Naas Street No Development 8am - 9am Peak + Quarry

New Site Giveway / Yield (Two-Way)

Move	ment Perfo	ormance -	Vehicles								
Mov	OD	Deman	d Flows	Deg.	Average	Level of	95% Back		Prop.	Effective	Average
ID	Mov	Total	HV	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
Osuth	Dahart Duv	veh/h	%	v/c	Sec		veh	m		per veh	km/h
	: Robert Brus										
1	L2	11	10.0	0.016	4.9	LOS A	0.1	0.5	0.11	0.47	46.5
2	T1	8	12.5	0.016	3.9	LOS A	0.1	0.5	0.11	0.47	46.8
3	R2	1	0.0	0.016	4.8	LOS A	0.1	0.5	0.11	0.47	46.2
Appro	ach	20	10.5	0.016	4.5	LOS A	0.1	0.5	0.11	0.47	46.6
East:	Naas Street	East									
4	L2	2	50.0	0.016	5.3	LOS A	0.1	0.6	0.07	0.06	48.2
5	T1	25	12.5	0.016	0.0	LOS A	0.1	0.6	0.07	0.06	49.5
6	R2	1	0.0	0.016	4.6	LOS A	0.1	0.6	0.07	0.06	48.7
Appro	ach	28	14.8	0.016	0.6	NA	0.1	0.6	0.07	0.06	49.4
North:	Logan Stree	et									
7	L2	1	100.0	0.047	5.7	LOS A	0.2	1.6	0.21	0.48	44.9
8	T1	5	0.0	0.047	4.2	LOS A	0.2	1.6	0.21	0.48	46.5
9	R2	34	28.1	0.047	5.5	LOS A	0.2	1.6	0.21	0.48	46.3
Appro	ach	40	26.3	0.047	5.3	LOS A	0.2	1.6	0.21	0.48	46.3
West:	Nass Street	West									
10	L2	35	18.2	0.020	4.5	LOS A	0.0	0.0	0.00	0.46	47.7
11	T1	17	0.0	0.011	0.1	LOS A	0.1	0.4	0.10	0.11	49.1
12	R2	4	0.0	0.011	4.6	LOS A	0.1	0.4	0.10	0.11	48.2
Appro	ach	56	11.3	0.020	3.1	NA	0.1	0.4	0.04	0.32	48.1
All Vel	hicles	144	16.1	0.047	3.4	NA	0.2	1.6	0.10	0.34	47.6

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 is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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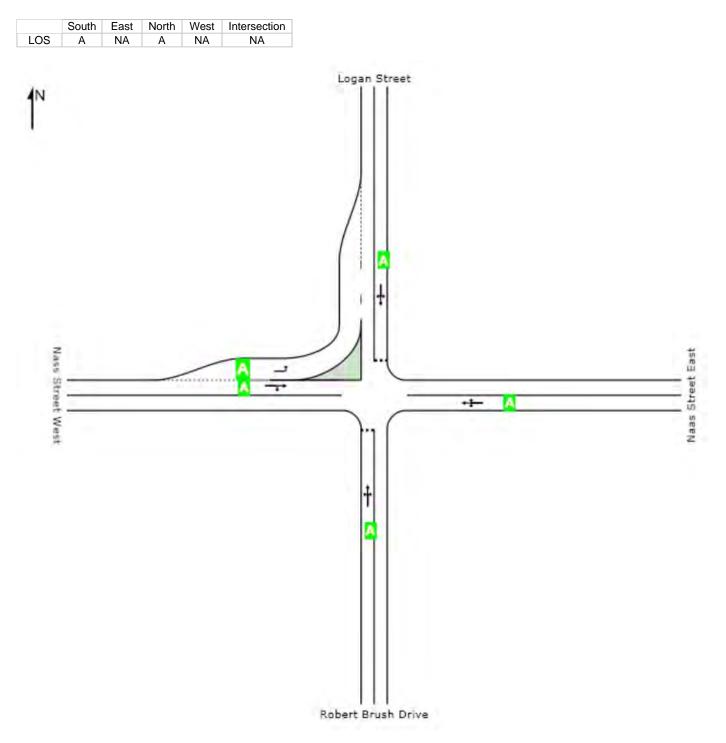


LEVEL OF SERVICE

$\overline{ abla}$ Site: Logan Street & Naas Street No Development 8am - 9am Peak + Quarry

New Site Giveway / Yield (Two-Way)

All Movement Classes



Level of Service (LOS) Method: Delay (RTA NSW).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

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 lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.



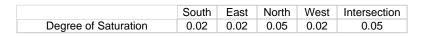
DEGREE OF SATURATION

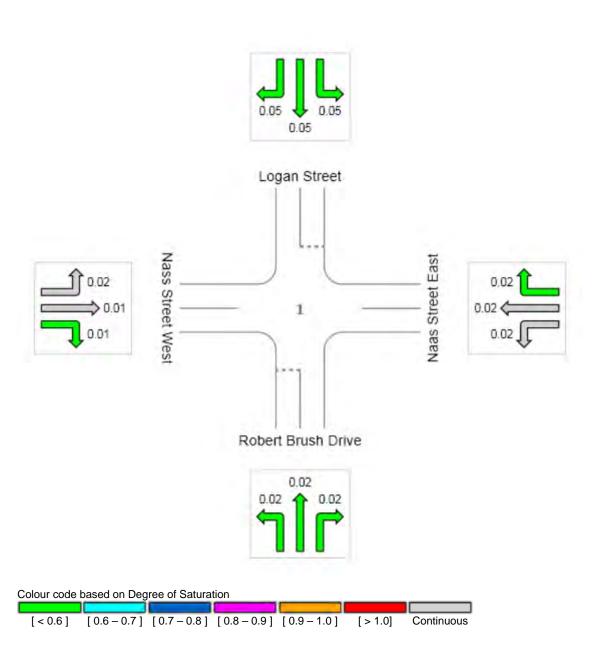
Ratio of Demand Volume to Capacity (v/c ratio)

$\overline{ abla}$ Site: Logan Street & Naas Street No Development 8am - 9am Peak + Quarry

New Site Giveway / Yield (Two-Way)

All Movement Classes





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DELAY (CONTROL)

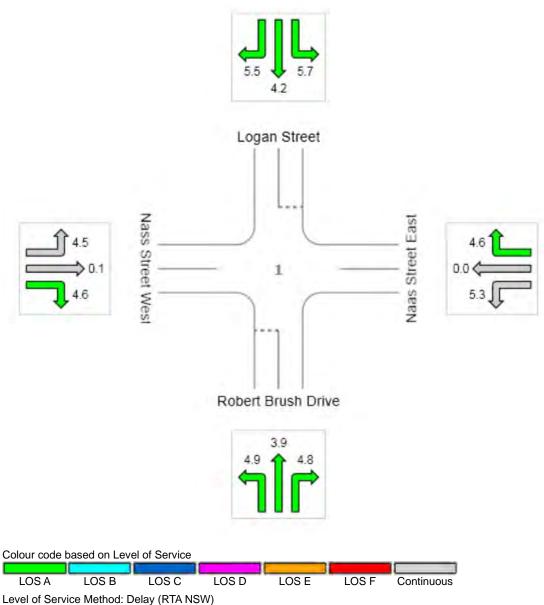
Average control delay per vehicle, or average pedestrian delay (seconds)

V Site: Logan Street & Naas Street No Development 8am - 9am Peak + Quarry

New Site Giveway / Yield (Two-Way)

All Movement Classes

	South	East	North	West	Intersection
Delay (Control)	4.5	0.6	5.3	3.1	3.4
LOS	Α	NA	Α	NA	NA



SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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INPUT REPORT

∇ Site: Logan Street & Naas Street No Development 8am - 9am Peak + Quarry

New Site Giveway / Yield (Two-Way)

Intersection - Site Data	
Site Name	Logan Street & Naas Street No Development 8am - 9am Peak + Quarry
Site ID	1
Site Title	New Site

Intersection - Site Properties	
Site (Intersection) Type	Giveway / Yield (Two-Way)
Model Name	New South Wales
Base Model	NA
Drive Rule	Left-hand side of the road
HCM Version	No
Units	Metric
First Created	
Date	2/12/2014 6:22:47 PM
Created By	Dave
Organisation	CONSTRUCTIVE SOLUTIONS PTY LTD
Version	6.0.22.4722
Last Modified	
Date	3/12/2014 9:11:46 AM
Modified By	Dave
Organisation	CONSTRUCTIVE SOLUTIONS PTY LTD
Version	6.0.22.4722

Intersect	ion - Approach Data							
Location	Name	Туре	No. of App. Lanes	No. of Exit Lanes	Approach Distance		Approach Control	Area Type Factor
					m	%		
South	Robert Brush Drive	Two-way	1	1	500.0	0	Give-way Yield	-
East	Naas Street East	Two-way	1	1	500.0	0	Major Road	-
North	Logan Street	Two-way	1	2	500.0	0	Give-way Yield	-
West	Nass Street West	Two-way	2	1	500.0	0	Major Road	-

Movement Definitions - Included Movement Classes						
Name	ID	Model Designation	Туре			
Light Vehicles	LV	Light Vehicle	Standard			
Heavy Vehicles	HV	Heavy Vehicle	Standard			

Movement Definitions - Origin-Destination Movements						
To Approach	OD N	lovement Turn Designation	OD Mov ID	LTR Mov ID		
From: South		Robert Brush Drive				
West	L2	L	1	1		
North	T1	Т	2	2		
East	R2	R	3	3		
From: East		Naas Street East				

South	L2	L	4	4	
West	T1	T	5	5	
North	R2	R	6	6	
From: North		Logan Street			
East	L2	L	7	7	
South	T1	T	8	8	
West	R2	R	9	9	
From: West		Nass Street West			
North	L2	L	10	10	
East	T1	T	11	11	
South	R2	R	12	12	

Lane Geon	netry - Lane Con	figurati	on										
Leg Item	Configuration	Туре	Control	Slip/ Bypass Control	Length	Width	Grade	Full [ID	Lane Colour]	[Front Width	Islan BackFi Width		e For Ped Staging 1
					m	m	%			m	m		
South	Robert Brush Driv	е											
App. Lane 1	Full-Length	Normal	Giveway /Yield	-	500	3	0			-	-	-	-
Exit Lane 1	Full-Length	-	-	-	500	3	0			-	-	-	-
East	Naas Street East												
App. Lane 1	Full-Length	Normal	Continu ous	-	500	3.5	-3			-	-	-	-
Exit Lane 1	Full-Length	_	-	-	500	3.5	3			-	-	-	-
North	Logan Street												
App. Lane 1	Full-Length	Normal	Giveway /Yield	-	500	3	0			-	-	-	-
	Full-Length	_	-	-	500	3	0			-	-	-	-
Exit Lane 1	Short Lane	-	-	-	-	5	0	-	-	-	-	-	-
West	Nass Street West												
App. Lane 1	Short Lane	Slip/ Bypass (Low Angle)	Continu (ous	Continuou s	_	5	3	-	_	-	-	_	-
App. Lane 2	Full-Length		Continu ous	-	500	3.5	3			-	-	-	-
Exit Lane 1	Full-Length	-	_	_	500	3.5	-3			-	-	-	-

Lanes are numbered from left to right in the direction of travel.

Lane Geon	netry - Lane Configuratior	n - Short Lanes a	Ind Two-Se	gment Lan	es				
			Short Lane /	Segment 1		S	Segment 2		
Leg Item	Configuration	[Length	Overflow/ Merge Dir	ID	Colour]	[Length	ID	Colour]	
		m				m			
North	Logan Street								
Exit Lane 1	Short Lane	60	Right			-	-	-	
West	Nass Street West								
App. Lane 1	Short Lane	60	Right			-	-	_	

Lane Geometr	ry - Lane Disciplin	es	
To Approach	OD Movement	Free Queue Distance m	Movement Class(es)
From: South	App. Lane 1		
West	L2	0	LV, HV
North	T1	0	LV, HV
East	R2	0	LV, HV
From: East	App. Lane 1		
South	L2	0	LV, HV
West	T1	0	LV, HV
North	R2	0	LV, HV
From: North	App. Lane 1		
East	L2	0	LV, HV

South West	T1 R2	0 0	LV, HV LV, HV	
From: West North	App. Lane 1 L2	0	LV, HV	
From: West East South	App. Lane 2 T1 R2	0	LV, HV LV, HV	

Lane Data -	Lane Data					
Approach Lane		Basic tn Flow	Utilisation Ratio	Saturation Speed		Jse Given Cap Adj in Network Analysis
		tcu/h	%	km/h	%	
South F	Robert Brush Drive					
App. Lane 1		1950	_	-	0.0	No
East N	Vaas Street East					
App. Lane 1		1950	_	-	0.0	No
North L	_ogan Street					
App. Lane 1		1950	-	-	0.0	No
West N	Vass Street West					
App. Lane 1		1950	-	-	0.0	No
App. Lane 2		1950	-	-	0.0	No

Lane Data - Flow	Proportions			
		To Exit Le		
Exit Lane	South	East	North	West
	%	%	%	%
Light Vehicles (LV)				
From: South	App. Lane 1			
Exit Lane 1	-	100	0	100
Exit Lane 2	-	-	100	-
From: East	App. Lane 1			
Exit Lane 1	100	-	0	100
Exit Lane 2	-	-	100	-
From: North	App. Lane 1			
Exit Lane 1	100	100	_	100
From: West	App. Lane 1			
Exit Lane 1		-	100	-
Exit Lane 2	-	-	0	-
From: West	App. Lane 2			
Exit Lane 1	100	100	-	-
Heavy Vehicles (H\	/)			
From: South	App. Lane 1			
Exit Lane 1		100	0	100
Exit Lane 2	-	_	100	-
From: East	App. Lane 1			
Exit Lane 1	100	_	0	100
Exit Lane 2	_	_	100	-
From: North	App. Lane 1			
Exit Lane 1	100	100	_	100
From: West				
Exit Lane 1	App. Lane 1		100	
Exit Lane 2	_	_	0	_
	A		Ū	
From: West Exit Lane 1	App. Lane 2 100	100		
	100	100	_	_

Lane Data - La	Lane Data - Lane Blockage							
Exit Lane	South	To Exit Leg East	l North	West				
From: South	App. Lane 1							
Exit Lane 1	-	Yes	Yes	Yes				

Exit Lane 2	-	-	Yes	-	
From: East	App. Lane 1				
Exit Lane 1 Exit Lane 2	Yes -	_	Yes Yes	Yes –	
From: North	App. Lane 1				
Exit Lane 1	Yes	Yes	-	Yes	
From: West	App. Lane 1				
Exit Lane 1	-	-	Yes	-	
Exit Lane 2	-	-	Yes	-	
From: West	App. Lane 2				
Exit Lane 1	Yes	Yes	_	-	

Pedestrians - Pedestrian Movements										
Unit Time for Volumes: 60 m Peak Flow Period: 30 minute										
Main Crossing/		Peak	Flow	Growth						
Slip/Bypass Lane	Volume	Flow	Scale	Rate						
Crossing										
	ped	%	%	%						
No Ped Movements										

Pedestrians	Pedestrians - Pedestrian Movement Data										
Main Crossing/ Slip/Bypass Lane Crossing	Mov. ID	Crossing Distance	Oppng Ped.Fac.	P.Deg. Satn	Walking Speed	App. Trav. Distance	Downst. Distance	Queue Space			
		m			m/sec	m	m	m			
No Ped Move	ements										

Volumes - Vehi	iclo Volumes				
Unit Time for Volu Peak Flow Period Volume Data Met	umes: 60 minute d: 30 minutes	es			
Movement	South	To Exit Le East	g North	West	
Class	veh	veh	veh	veh	
From: South	Robert Brus	sh Drive			
Total (veh)	-	1	8 7	10	
LV (veh) HV (veh)	_	0	7 1	9 1	
From: East	Naas Street	East			
Total (veh)	2	-	1	24	
LV (veh) HV (veh)	1	-	1 0	21 3	
From: North	Logan Stree	et			
Total (veh)	5	1	_	32	
LV (veh) HV (veh)	5 0	0 1	_	23 9	
From: West	Nass Street	West			
Total (veh)	4	16	33	-	
LV (veh) HV (veh)	4 0	16 0	27 6	_	
	Ũ	Ŭ	Ŭ		

Volumes - Volume Factors										
То	Peak Flow	Flow	Growth							
Approach	Factor	Scale	Rate							
	%	%	%/year							
Light Vehicles (L'	V)									
From: South	Robert Brush Drive									
West	95.0	100.00	2.00							
North	95.0	100.00	2.00							

East		95.0	100.00	2.00
From: East South West North	Naas Stree	t East 95.0 95.0 95.0	100.00 100.00 100.00	2.00 2.00 2.00
From: North East South West	Logan Stre	et 95.0 95.0 95.0	100.00 100.00 100.00	2.00 2.00 2.00
From: West North East South	Nass Stree	t West 95.0 95.0 95.0	100.00 100.00 100.00	2.00 2.00 2.00
Heavy Vehicles (H	V)			
From: South West North	Robert Bru	95.0 95.0	100.00 100.00	2.00 2.00
East		95.0	100.00	2.00
From: East South West North	Naas Stree	t East 95.0 95.0 95.0	100.00 100.00 100.00	2.00 2.00 2.00
From: North	Logan Stre			
East South West		95.0 95.0 95.0	100.00 100.00 100.00	2.00 2.00 2.00
From: West North East South	Nass Stree	t West 95.0 95.0 95.0	100.00 100.00 100.00	2.00 2.00 2.00

Priorities				
Opposed Movement	South	Opposing N East	lovements North	West
South	Robert Brus	sh Drive		
L2 T1 R2	_ _ _	T1 R2,T1 R2,T1	_ _ T1,L2	– R2,T1,L2 R2,T1
East	Naas Stree	t East		
L2 T1 R2	_ _ _	- - -	- - -	- - T1
North	Logan Stree	et		
L2 T1 R2	_ _ T1,L2	– L2,R2,T1 R2,T1	- - -	T1 R2,T1 R2,T1
West	Nass Street	t West		
L2 T1	_	_	_	_
R2	_	L2,T1	_	_

Gap Acce	Gap Acceptance - Gap Acceptance Data									
Opposed Movement	Apply TWSC Calibration	Critical Gap	Follow-up Headway	Minimum Departures	Exiting Flow Effect	% Opp. By Nearest Lane	Opng. Peds (UnSig)	Staged Crossing		
		sec	sec	veh/min	%	%				
South	Robert Brush D	rive								
L2 T1 R2	Yes Yes Yes	5.000 6.500 7.000	3.000 3.500 4.000	0.10 0.10 0.10	50 50 50	100.00 0.00 0.00	Pr (Flow) Pr (Flow) Pr (Flow)	None None None		
East R2	Naas Street Eas Yes	st 4.500	2.500	0.10	0	0.00	Pr (Flow)	None		
North	Logan Street						()			
L2 T1 R2	Yes Yes Yes	5.000 6.500 7.000	3.000 3.500 4.000	0.10 0.10 0.10	50 50 50	100.00 0.00 0.00	Pr (Flow) Pr (Flow) Pr (Flow)	None None None		

West	Nass Street W	/est					
R2	Yes	4.500	2.500	0.10	0	0.00 Pr (Flow)	None

Gap Acceptance - Two-Way Sign Control Calibration					
None					
1					

Gap Acceptance - Two-W	ay Sign C	ontrol P	arameter	Adjs fo	r Major F	d Numb	er of La	nes
	Crit	ical Gap A	djustment		Follow-	up Headw	ay Adjust	ment
Major Road Number of	2-lane	3-lane	5-lane 6	-lane or	2-lane	3-lane	5-lane	6-lane
Lanes:				more				or more
	sec	sec	sec	sec	sec	sec	sec	sec
Minor Road Left Turn	-0.5	-0.5	0.0	0.0	-0.5	-0.5	0.0	0.0
Minor Road Through	-1.5	-0.5	0.5	1.0	-0.5	-0.3	0.5	1.0
Minor Road Right Turn	-1.5	-0.5	0.5	1.0	-0.5	-0.3	0.5	1.0
Major Road Turn (Right or Left)	-0.5	-0.5	0.0	1.0	-0.5	-0.5	0.0	1.0

Gap Acceptance - Two-Way Sign Control Parameter Adjs for Geometry and Control

	Critical Gap	Follow-up
	Adjustment	Headway
		Adjustment
	sec	sec
Give-Way / Yield Sign Control	-0.5	-0.3
One-Way Major Road	-0.5	-0.3
T Intersection (Minor Road Turn)	-0.7	-0.4
Entry Road Grade (for each per cent grade)	0.1	0.0
Staged Crossing - Stage 1	-1.0	-0.6
Staged Crossing - Stage 2	-1.0	-0.6
U Turn (Major Road)	1.5	0.9
User Adjustment	0.0	0.0

Gap Acceptance - Settings Gap Acceptance Capacity: SIDRA Standard (Akçelik M3D)

Vehicle Move	ement Data - Pa	ith Data				
OD Movement	Approach Cruise Speed km/h	Exit Cruise Speed km/h	Negotiation Speed km/h	Negotiation Distance m	Downstream Distance m	Negotiation Radius m
Light Vehicles	(LV)					
From: South	Robert Bru	sh Drive				
L2 T1 R2	50.0 50.0 50.0	50.0 50.0 50.0	- - -	- - -	_ _ _	_ _ _
From: East	Naas Stree	et East				
L2 T1 R2	50.0 50.0 50.0	50.0 50.0 50.0	- - -		- - -	_ _ _
From: North	Logan Stre	et				
L2 T1 R2	50.0 50.0 50.0	50.0 50.0 50.0	- - -	- - -		- - -
From: West	Nass Stree	t West				
L2 T1 R2	50.0 50.0 50.0	50.0 50.0 50.0	- - -			_ _ _
Heavy Vehicles	s (HV)					
From: South L2 T1	Robert Bru: 50.0 50.0	sh Drive 50.0 50.0				

R2	50.0	50.0	-	-	-	-
From: East	Naas Street Ea	ist				
L2	50.0	50.0	-	_	-	-
T1	50.0	50.0	-	-	-	-
R2	50.0	50.0	-	-	-	-
From: North	Logan Street					
L2	50.0	50.0	-	-	-	-
T1	50.0	50.0	-	-	-	-
R2	50.0	50.0	-	_	-	-
From: West	Nass Street We	est				
L2	50.0	50.0	-	_	-	-
T1	50.0	50.0	-	-	-	-
R2	50.0	50.0	-	-	-	-

Vehicle Moveme	ent Data - C	Calibration						
OD Movement	Queue Space m	Vehicle Length m	Vehicle Occupancy pers/veh	Turn Veh [Factor	Effect Radius] m	Gap Accp Factor	Opng. Veh Factor	Prac. Deg. Of Satn.
Light Vehicles (LV))							
From: South	Robert Br	ush Drive						
L2 T1 R2	7.00 7.00 7.00	4.50 4.50 4.50	1.20 1.20 1.20	1.05 1 1.05	- - -	1 1 1	1 1 1	
From: East	Naas Stre	eet East						
L2 T1 R2	7.00 7.00 7.00	4.50 4.50 4.50	1.20 1.20 1.20	1.05 1 1.05		1 1 1	1 1 1	
From: North	Logan Str							
L2 T1 R2	7.00 7.00 7.00	4.50 4.50 4.50	1.20 1.20 1.20	1.05 1 1.05	_ _ _	1 1 1	1 1 1	- - -
From: West	Nass Stre	et West						
L2 T1 R2	7.00 7.00 7.00	4.50 4.50 4.50	1.20 1.20 1.20	1.05 1 1.05	- - -	1 1 1	1 1 1	- - -
Heavy Vehicles (H	IV)							
From: South	Robert Br	ush Drive						
L2 T1 R2	13.00 13.00 13.00	10.00 10.00 10.00	1.20 1.20 1.20	1.09 1 1.09	_ _ _	1.5 1.5 1.5	1.5 1.5 1.5	- - -
From: East	Naas Stre							
L2 T1 R2	13.00 13.00 13.00	10.00 10.00 10.00	1.20 1.20 1.20	1.09 1 1.09		1.5 1.5 1.5	1.5 1.5 1.5	- - -
From: North	Logan Str							
L2 T1 R2	13.00 13.00 13.00	10.00 10.00 10.00	1.20 1.20 1.20	1.09 1 1.09		1.5 1.5 1.5	1.5 1.5 1.5	- - -
From: West	Nass Stre							
L2 T1 R2	13.00 13.00 13.00	10.00 10.00 10.00	1.20 1.20 1.20	1.09 1 1.09		1.5 1.5 1.5	1.5 1.5 1.5	

Demand & Sensitivity Analysis Method: None

Model Settings - Options	
General Options	
Level of Service Method	Delay (RTA NSW)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Include Short Lanes in determining	No
Approach Queue Storage Ratio	

Model Settings - Model Parameters	
Passenger Car Equivalents	
Light Vehicles (LV)	1.00 pcu/veh
Heavy Vehicles (HV)	1.65 pcu/veh
Queue Blockage	
Minimum Probability of Blockage	0
Delay and Queue	
Exclude Geometry Delay	No
HCM Delay Formula	No
HCM Queue Formula	No
Downstream Short Lane	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Cost Cost Options

Cost Unit	\$					
Vehicle Cost Parameters						
		Veł	n Operating Co	st	Veh Tim	e Cost
Movement Class	Veh Cost Method	Pump Price of Fuel	Fuel Res. Cost Factor	Ratio of Running Cost to Fuel Cost	Avg. Income	Time Value Factor
		\$/L			\$/h	
Light Vehicles (LV)	Operating Cost	1.450	0.500	3.00	38.00	0.600
Heavy Vehicles (HV)	Operating Cost	1.450	0.500	3.00	38.00	0.600

Model Settings - Vehicle Parameters							
Movement Class	Mass	Max Power	CO2 to				
	kg	kW	Fuel Rate				
Light Vehicles (LV)	1600.0	120	2.35				
Heavy Vehicles (HV)	15000.0	170	2.633				

Model Settings - Fuel Consumption								
Movement Class	fi	А	В	Beta				
Light Vehicles (LV)	1200	16	0.004	0.1				
Heavy Vehicles (HV)	2300	200	0.009	0.075				

Model Settings - CO Emission							
Movement Class	fi	А	В	Beta			
Light Vehicles (LV)	1620	-138	0.0743	0.294			
Heavy Vehicles (HV)	25000	320	-0.06	0.04			

Model Settings - HC Emission							
Movement Class	fi	А	В	Beta			
Light Vehicles (LV)	340	-9	0.0031	0.029			
Heavy Vehicles (HV)	3000	1	-0.0016	0.0013			

Model Settings - NOx Emission							
Movement Class	fi	А	В	Beta			
Light Vehicles (LV)	300	-14	0.0068	0.166			
Heavy Vehicles (HV)	44000	2820	0.21	1.9			

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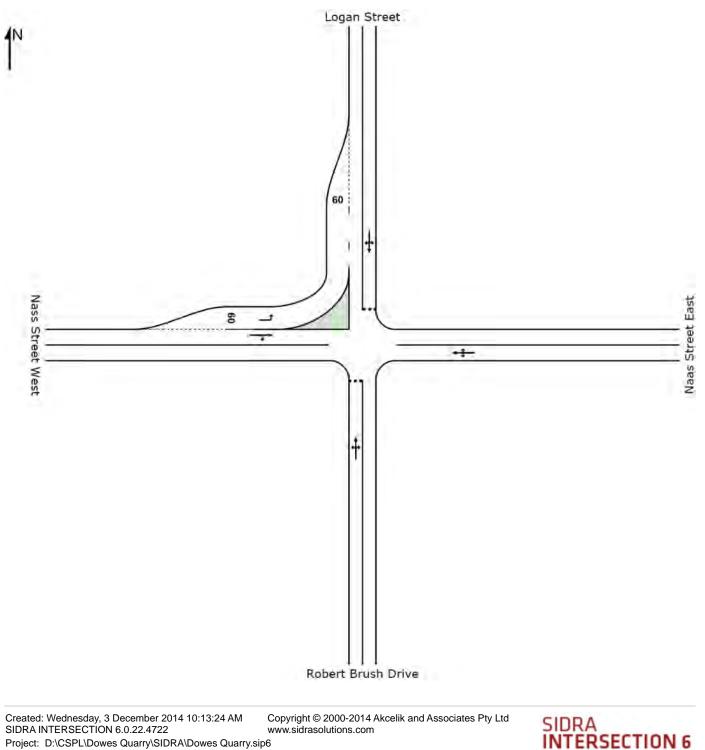
APPENDIX C3

30yr + Development

SITE LAYOUT

∇ Site: Logan Street & Naas Street No Development 8am - 9am Peak + Quarry 30yr

New Site Giveway / Yield (Two-Way)



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INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

V Site: Logan Street & Naas Street No Development 8am - 9am Peak + Quarry 30yr

New Site Giveway / Yield (Two-Way)

Volume Display Method: Separate

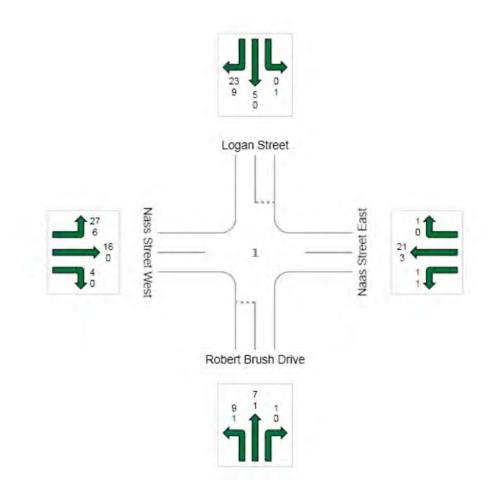
Volumes are shown for Movement Class(es): Light Vehicles and Heavy Vehicles

Total Intersection Volumes (veh)

All Movement Classes: 137

Light Vehicles (LV): 115

Heavy Vehicles (HV): 22



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MOVEMENT SUMMARY

abla Site: Logan Street & Naas Street No Development 8am - 9am Peak + Quarry 30yr

New Site Giveway / Yield (Two-Way)

Design Life Analysis (Practical Capacity): Results for 30 years

Move	ment P <u>erf</u>	ormance -	Vehicles								
Mov	OD		d Flows	Deg.	Average	Level of	95% Back		Prop.	Effective	Average
ID	Mov	Total	HV	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
South	: Robert Bru	veh/h	%	v/c	Sec		veh	m		per veh	km/h
	L2	17 Inve	10.0	0.027	5.1	LOS A	0.1	0.8	0.15	0.48	46.4
1					-		-				-
2	T1	13	12.5	0.027	4.1	LOS A	0.1	0.8	0.15	0.48	46.7
3	R2	2	0.0	0.027	5.0	LOS A	0.1	0.8	0.15	0.48	46.1
Appro	ach	32	10.5	0.027	4.7	LOS A	0.1	0.8	0.15	0.48	46.5
East: I	Naas Street	East									
4	L2	3	50.0	0.026	5.3	LOS A	0.1	0.9	0.09	0.06	48.2
5	T1	40	12.5	0.026	0.1	LOS A	0.1	0.9	0.09	0.06	49.5
6	R2	2	0.0	0.026	4.6	LOS A	0.1	0.9	0.09	0.06	48.6
Appro	ach	45	14.8	0.026	0.6	NA	0.1	0.9	0.09	0.06	49.3
North:	Logan Stre	et									
7	L2	2	100.0	0.080	6.2	LOS A	0.3	2.8	0.28	0.51	44.7
8	T1	8	0.0	0.080	4.7	LOS A	0.3	2.8	0.28	0.51	46.3
9	R2	54	28.1	0.080	5.9	LOS A	0.3	2.8	0.28	0.51	46.1
Appro	ach	64	26.3	0.080	5.8	LOS A	0.3	2.8	0.28	0.51	46.1
West:	Nass Stree	t West									
10	L2	56	18.2	0.032	4.5	LOS A	0.0	0.0	0.00	0.46	47.7
11	T1	27	0.0	0.018	0.1	LOS A	0.1	0.6	0.13	0.11	49.0
12	R2	7	0.0	0.018	4.7	LOS A	0.1	0.6	0.13	0.11	48.1
Appro	ach	89	11.3	0.032	3.2	NA	0.1	0.6	0.05	0.32	48.1
All Vel	nicles	231	16.1	0.080	3.6	NA	0.3	2.8	0.14	0.34	47.5

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 is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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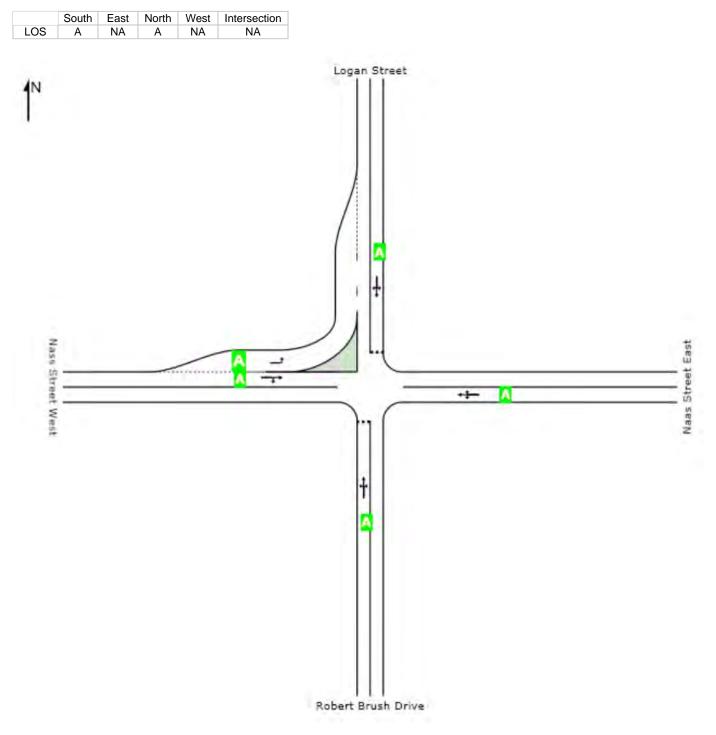


LEVEL OF SERVICE

\overline{V} Site: Logan Street & Naas Street No Development 8am - 9am Peak + Quarry 30yr

New Site Giveway / Yield (Two-Way) Design Life Analysis (Practical Capacity): Results for 30 years

All Movement Classes



Level of Service (LOS) Method: Delay (RTA NSW).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

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 lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

DEGREE OF SATURATION

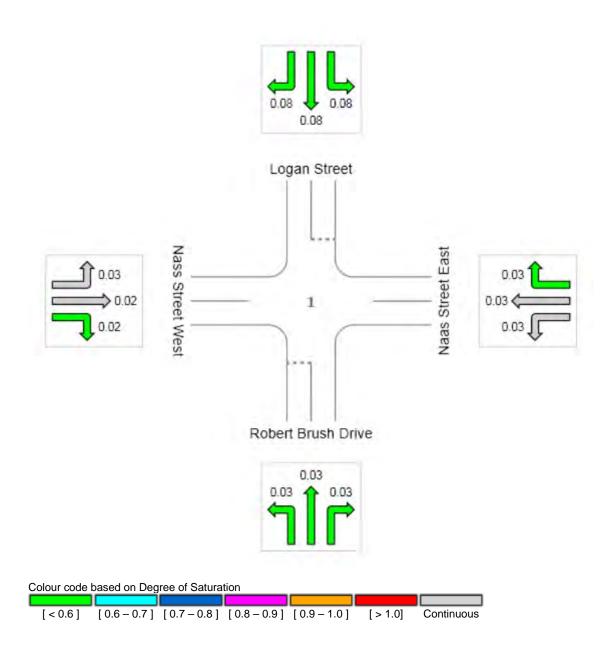
Ratio of Demand Volume to Capacity (v/c ratio)

V Site: Logan Street & Naas Street No Development 8am - 9am Peak + Quarry 30yr

New Site Giveway / Yield (Two-Way) Design Life Analysis (Practical Capacity): Results for 30 years

All Movement Classes

	South	East	North	West	Intersection
Degree of Saturation	0.03	0.03	0.08	0.03	0.08



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DELAY (CONTROL)

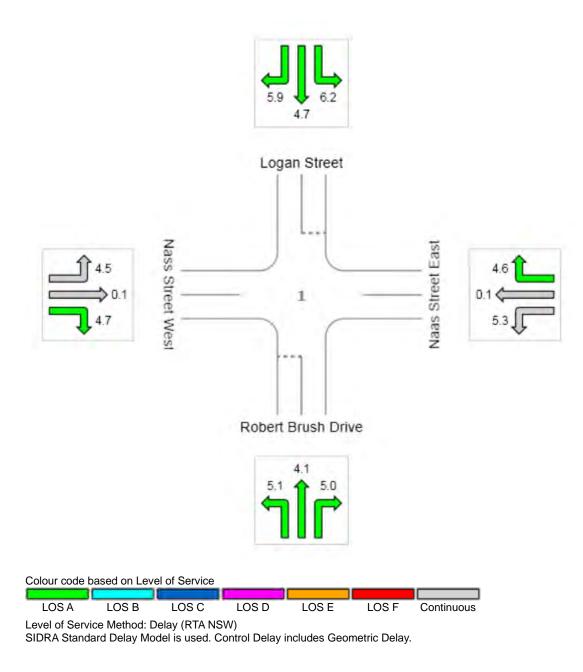
Average control delay per vehicle, or average pedestrian delay (seconds)

V Site: Logan Street & Naas Street No Development 8am - 9am Peak + Quarry 30yr

New Site Giveway / Yield (Two-Way) Design Life Analysis (Practical Capacity): Results for 30 years

All Movement Classes

	South	East	North	West	Intersection
Delay (Control)	4.7	0.6	5.8	3.2	3.6
LOS	Α	NA	Α	NA	NA



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INPUT REPORT

∇ Site: Logan Street & Naas Street No Development 8am - 9am Peak + Quarry 30yr

New Site Giveway / Yield (Two-Way)

Intersection - Site Data	
Site Name	Logan Street & Naas Street No Development 8am - 9am Peak + Quarry 30yr
Site ID	1
Site Title	New Site

Intersection - Site Properties	
Site (Intersection) Type	Giveway / Yield (Two-Way)
Model Name	New South Wales
Base Model	NA
Drive Rule	Left-hand side of the road
HCM Version	No
Units	Metric
First Created	
Date	2/12/2014 6:22:47 PM
Created By	Dave
Organisation	CONSTRUCTIVE SOLUTIONS PTY LTD
Version	6.0.22.4722
Last Modified	
Date	3/12/2014 9:11:46 AM
Modified By	Dave
Organisation	CONSTRUCTIVE SOLUTIONS PTY LTD
Version	6.0.22.4722

Intersect	tion - Approach Data							
Location	Name	Туре	No. of App. Lanes	No. of Exit Lanes	Approach Distance		Approach Control	Area Type Factor
					m	%		
South	Robert Brush Drive	Two-way	1	1	500.0	0	Give-way Yield	-
East	Naas Street East	Two-way	1	1	500.0	0	Major Road	-
North	Logan Street	Two-way	1	2	500.0	0	Give-way Yield	-
West	Nass Street West	Two-way	2	1	500.0	0	Major Road	-

Movement Definitions - Included Movement Classes					
Name	ID	Model Designation	Туре		
Light Vehicles	LV	Light Vehicle	Standard		
Heavy Vehicles	HV	Heavy Vehicle	Standard		

Movement Definitions - Origin-Destination Movements					
To Approach	OD N	lovement Turn Designation	OD Mov ID	LTR Mov ID	
From: South		Robert Brush Drive			
West North	L2 T1	L T	1 2	1 2	
East	R2	R	3	3	
From: East		Naas Street East			

South	L2	L	4	4	
West	T1	T	5	5	
North	R2	R	6	6	
From: North		Logan Street			
East	L2	L	7	7	
South	T1	T	8	8	
West	R2	R	9	9	
From: West		Nass Street West			
North	L2	L	10	10	
East	T1	T	11	11	
South	R2	R	12	12	

Lane Geon	netry - Lane Con	figurati	on										
Leg Item	Configuration	Туре	Control	Slip/ Bypass Control	Length	Width	Grade	Full [ID	Lane Colour]	[Front Width	Islan BackFi Width		e For Ped Staging 1
					m	m	%			m	m		
South	Robert Brush Driv	е											
App. Lane 1	Full-Length	Normal	Giveway /Yield	-	500	3	0			-	-	-	-
Exit Lane 1	Full-Length	-	-	-	500	3	0			-	-	-	-
East	Naas Street East												
App. Lane 1	Full-Length	Normal	Continu ous	-	500	3.5	-3			-	-	-	-
Exit Lane 1	Full-Length	_	-	-	500	3.5	3			-	-	-	-
North	Logan Street												
App. Lane 1	Full-Length	Normal	Giveway /Yield	-	500	3	0			-	-	-	-
	Full-Length	_	-	-	500	3	0			-	-	-	-
Exit Lane 1	Short Lane	-	-	-	-	5	0	-	-	-	-	-	-
West	Nass Street West												
App. Lane 1	Short Lane	Slip/ Bypass (Low Angle)	Continu (ous	Continuou s	_	5	3	-	_	-	-	_	-
App. Lane 2	Full-Length		Continu ous	-	500	3.5	3			-	-	-	-
Exit Lane 1	Full-Length	-	_	_	500	3.5	-3			-	-	-	-

Lanes are numbered from left to right in the direction of travel.

Lane Geon	Lane Geometry - Lane Configuration - Short Lanes and Two-Segment Lanes									
			Short Lane / Segment 1 Segme					ent 2		
Leg Item	Configuration	[Length	Overflow/ Merge Dir	ID	Colour]	[Length	ID	Colour]		
		m				m				
North	Logan Street									
Exit Lane 1	Short Lane	60	Right			-	-	-		
West	Nass Street West									
App. Lane 1	Short Lane	60	Right			-	-	_		

Lane Geometr	ry - Lane Disciplin	es	
To Approach	OD Movement	Free Queue Distance m	Movement Class(es)
From: South	App. Lane 1		
West	L2	0	LV, HV
North	T1	0	LV, HV
East	R2	0	LV, HV
From: East	App. Lane 1		
South	L2	0	LV, HV
West	T1	0	LV, HV
North	R2	0	LV, HV
From: North	App. Lane 1		
East	L2	0	LV, HV

South West	T1 R2	0 0	LV, HV LV, HV	
From: West North	App. Lane 1 L2	0	LV, HV	
From: West East South	App. Lane 2 T1 R2	0	LV, HV LV, HV	

Lane Data -	Lane Data					
Approach Lar		Basic tn Flow	Utilisation Ratio	Saturation Speed		Jse Given Cap Adj in Network Analysis
		tcu/h	%	km/h	%	
South F	Robert Brush Drive					
App. Lane 1		1950	_	-	0.0	No
East N	Vaas Street East					
App. Lane 1		1950	_	-	0.0	No
North L	_ogan Street					
App. Lane 1		1950	-	-	0.0	No
West N	Vass Street West					
App. Lane 1		1950	-	-	0.0	No
App. Lane 2		1950	-	-	0.0	No

Lane Data - Flow	Proportions			
		To Exit Le		
Exit Lane	South	East	North	West
	%	%	%	%
Light Vehicles (LV)				
From: South	App. Lane 1			
Exit Lane 1	-	100	0	100
Exit Lane 2	-	-	100	-
From: East	App. Lane 1			
Exit Lane 1	100	-	0	100
Exit Lane 2	-	-	100	-
From: North	App. Lane 1			
Exit Lane 1	100	100	_	100
From: West	App. Lane 1			
Exit Lane 1		-	100	-
Exit Lane 2	-	-	0	-
From: West	App. Lane 2			
Exit Lane 1	100	100	-	-
Heavy Vehicles (H\	/)			
From: South	App. Lane 1			
Exit Lane 1		100	0	100
Exit Lane 2	-	_	100	-
From: East	App. Lane 1			
Exit Lane 1	100	_	0	100
Exit Lane 2	_	_	100	-
From: North	App. Lane 1			
Exit Lane 1	100	100	_	100
From: West				
Exit Lane 1	App. Lane 1		100	
Exit Lane 2	_	_	0	_
	A		Ū	
From: West Exit Lane 1	App. Lane 2 100	100		
	100	100	_	_

Lane Data - La	Lane Data - Lane Blockage						
Exit Lane	South	To Exit Leg East	l North	West			
From: South	App. Lane 1						
Exit Lane 1	-	Yes	Yes	Yes			

Exit Lane 2	-	-	Yes	-	
From: East	App. Lane 1				
Exit Lane 1 Exit Lane 2	Yes -	_	Yes Yes	Yes –	
From: North	App. Lane 1				
Exit Lane 1	Yes	Yes	-	Yes	
From: West	App. Lane 1				
Exit Lane 1	-	-	Yes	-	
Exit Lane 2	-	-	Yes	-	
From: West	App. Lane 2				
Exit Lane 1	Yes	Yes	_	-	

Pedestrians - Pedestrian	Pedestrians - Pedestrian Movements								
Unit Time for Volumes: 60 minutes Peak Flow Period: 30 minutes									
Main Crossing/		Peak	Flow	Growth					
Slip/Bypass Lane	Volume	Flow	Scale	Rate					
Crossing									
	ped	%	%	%					
No Ped Movements									

Pedestrians	Pedestrians - Pedestrian Movement Data									
Main Crossing/ Slip/Bypass Lane Crossing	Mov. ID	Crossing Distance	Oppng Ped.Fac.	P.Deg. Satn	Walking Speed	App. Trav. Distance	Downst. Distance	Queue Space		
		m			m/sec	m	m	m		
No Ped Move	ements									

Volumes - Vehi	iclo Volumes						
Unit Time for Volu Peak Flow Period Volume Data Met	umes: 60 minute d: 30 minutes	es					
Movement	South	To Exit Le East	g North	West			
Class	veh	veh	veh	veh			
From: South	Robert Brus	sh Drive					
Total (veh)	-	1	8 7	10			
LV (veh) HV (veh)	_	0	7 1	9 1			
From: East	Naas Street	East					
Total (veh)	2	-	1	24			
LV (veh) HV (veh)	1	-	1 0	21 3			
From: North	Logan Stree	et					
Total (veh)	5	1	_	32			
LV (veh) HV (veh)	5 0	0 1	_	23 9			
From: West	Nass Street	Nass Street West					
Total (veh)	4	16	33	-			
LV (veh) HV (veh)	4 0	16 0	27 6	_			
	Ũ	Ŭ	Ŭ				

Volumes - Volume Factors								
То	Peak Flow	Flow	Growth					
Approach	Factor	Scale	Rate					
	%	%	%/year					
Light Vehicles (L'	V)							
From: South	Robert Brush Drive							
West	95.0	100.00	2.00					
North	95.0	100.00	2.00					

East		95.0	100.00	2.00
From: East South West North	Naas Stree	t East 95.0 95.0 95.0	100.00 100.00 100.00	2.00 2.00 2.00
From: North East South West	Logan Stre	et 95.0 95.0 95.0	100.00 100.00 100.00	2.00 2.00 2.00
From: West North East South	Nass Stree	t West 95.0 95.0 95.0	100.00 100.00 100.00	2.00 2.00 2.00
Heavy Vehicles (H	V)			
From: South West North	Robert Bru	95.0 95.0	100.00 100.00	2.00 2.00
East		95.0	100.00	2.00
From: East South West North	Naas Stree	t East 95.0 95.0 95.0	100.00 100.00 100.00	2.00 2.00 2.00
From: North	Logan Stre			
East South West		95.0 95.0 95.0	100.00 100.00 100.00	2.00 2.00 2.00
From: West North East South	Nass Stree	t West 95.0 95.0 95.0	100.00 100.00 100.00	2.00 2.00 2.00

Priorities				
Opposed Movement	South	Opposing N East	lovements North	West
South	Robert Brus	sh Drive		
L2 T1 R2	_ _ _	T1 R2,T1 R2,T1	_ _ T1,L2	– R2,T1,L2 R2,T1
East	Naas Stree	t East		
L2 T1 R2	_ _ _	- - -	- - -	- - T1
North	Logan Stree	et		
L2 T1 R2	_ _ T1,L2	– L2,R2,T1 R2,T1	- - -	T1 R2,T1 R2,T1
West	Nass Street	t West		
L2 T1	_	_	_	_
R2	_	L2,T1	_	_

Gap Acce	ptance - Gap A	cceptance	e Data					
Opposed Movement	Apply TWSC Calibration	Critical Gap	Follow-up Headway	Minimum Departures	Exiting Flow Effect	% Opp. By Nearest Lane	Opng. Peds (UnSig)	Staged Crossing
		sec	sec	veh/min	%	%		
South	Robert Brush D	rive						
L2 T1 R2	Yes Yes Yes	5.000 6.500 7.000	3.000 3.500 4.000	0.10 0.10 0.10	50 50 50	100.00 0.00 0.00	Pr (Flow) Pr (Flow) Pr (Flow)	None None None
East R2	Naas Street Eas Yes	st 4.500	2.500	0.10	0	0.00	Pr (Flow)	None
North	Logan Street						()	
L2 T1 R2	Yes Yes Yes	5.000 6.500 7.000	3.000 3.500 4.000	0.10 0.10 0.10	50 50 50	100.00 0.00 0.00	Pr (Flow) Pr (Flow) Pr (Flow)	None None None

West	Nass Street W	/est					
R2	Yes	4.500	2.500	0.10	0	0.00 Pr (Flow)	None

Gap Acceptance - Two-Way Sign Control Calibration						
None						
1						

Gap Acceptance - Two-W	ay Sign C	ontrol P	arameter	Adjs fo	r Major F	d Numb	er of La	nes
	Crit	ical Gap A	djustment		Follow-	up Headw	ay Adjust	ment
Major Road Number of	2-lane	3-lane	5-lane 6	-lane or	2-lane	3-lane	5-lane	6-lane
Lanes:				more				or more
	sec	sec	sec	sec	sec	sec	sec	sec
Minor Road Left Turn	-0.5	-0.5	0.0	0.0	-0.5	-0.5	0.0	0.0
Minor Road Through	-1.5	-0.5	0.5	1.0	-0.5	-0.3	0.5	1.0
Minor Road Right Turn	-1.5	-0.5	0.5	1.0	-0.5	-0.3	0.5	1.0
Major Road Turn (Right or Left)	-0.5	-0.5	0.0	1.0	-0.5	-0.5	0.0	1.0

Gap Acceptance - Two-Way Sign Control Parameter Adjs for Geometry and Control

	Critical Gap	Follow-up
	Adjustment	Headway
		Adjustment
	sec	sec
Give-Way / Yield Sign Control	-0.5	-0.3
One-Way Major Road	-0.5	-0.3
T Intersection (Minor Road Turn)	-0.7	-0.4
Entry Road Grade (for each per cent grade)	0.1	0.0
Staged Crossing - Stage 1	-1.0	-0.6
Staged Crossing - Stage 2	-1.0	-0.6
U Turn (Major Road)	1.5	0.9
User Adjustment	0.0	0.0

Gap Acceptance - Settings Gap Acceptance Capacity: SIDRA Standard (Akçelik M3D)

Vehicle Move	ement Data - Pa	ith Data				
OD Movement	Approach Cruise Speed km/h	Exit Cruise Speed km/h	Negotiation Speed km/h	Negotiation Distance m	Downstream Distance m	Negotiation Radius m
Light Vehicles	(LV)					
From: South	Robert Bru	sh Drive				
L2 T1 R2	50.0 50.0 50.0	50.0 50.0 50.0	- - -	- - -	_ _ _	_ _ _
From: East	Naas Stree	et East				
L2 T1 R2	50.0 50.0 50.0	50.0 50.0 50.0	- - -		- - -	_ _ _
From: North	Logan Stre	et				
L2 T1 R2	50.0 50.0 50.0	50.0 50.0 50.0	- - -	_ _ _	- - -	- - -
From: West	Nass Stree	t West				
L2 T1 R2	50.0 50.0 50.0	50.0 50.0 50.0	- - -			_ _ _
Heavy Vehicles	s (HV)					
From: South L2 T1	Robert Bru: 50.0 50.0	sh Drive 50.0 50.0				

R2	50.0	50.0	_	-	-	-
From: East	Naas Street Ea	ist				
L2	50.0	50.0	_	-	-	-
T1	50.0	50.0	_	-	-	-
R2	50.0	50.0	-	-	-	-
From: North	Logan Street					
L2	50.0	50.0	_	-	-	-
T1	50.0	50.0	-	-	-	-
R2	50.0	50.0	-	-	-	-
From: West	Nass Street We	est				
L2	50.0	50.0	_	-	-	-
T1	50.0	50.0	-	-	-	-
R2	50.0	50.0	_	-	-	-

Vehicle Movem	ent Data - (Calibration						
OD Movement	Queue Space m	Vehicle Length m	Vehicle Occupancy pers/veh	Turn Veh [Factor	e Effect Radius] m	Gap Accp Factor	Opng. Veh Factor	Prac. Deg. Of Satn.
Light Vehicles (LV	/)							
From: South	Robert B	rush Drive						
L2	7.00	4.50	1.20	1.05	-	1	1	-
T1 R2	7.00 7.00	4.50 4.50	1.20 1.20	1 1.05	_	1 1	1	
From: East	Naas Stre	eet East						
L2	7.00	4.50	1.20	1.05	-	1	1	-
T1	7.00	4.50	1.20	1	-	1	1	-
R2	7.00	4.50	1.20	1.05	-	1	1	-
From: North	Logan St							
L2 T1	7.00 7.00	4.50 4.50	1.20 1.20	1.05 1	—	1 1	1 1	_
R2	7.00	4.50	1.20	1.05	_	1	1	_
From: West	Nass Stre	eet West						
L2	7.00	4.50	1.20	1.05	_	1	1	-
T1 R2	7.00 7.00	4.50 4.50	1.20 1.20	1 1.05	-	1 1	1	-
Heavy Vehicles (H		4.50	1.20	1.05	-	1	1	_
	,							
From: South		rush Drive	1.00	1.00		4 5	4.5	
L2 T1	13.00 13.00	10.00 10.00	1.20 1.20	1.09 1	_	1.5 1.5	1.5 1.5	_
R2	13.00	10.00	1.20	1.09	-	1.5	1.5	-
From: East	Naas Stre	eet East						
L2	13.00	10.00	1.20	1.09	_	1.5	1.5	-
T1 R2	13.00 13.00	10.00 10.00	1.20 1.20	1 1.09	_	1.5 1.5	1.5 1.5	_
From: North			1.20	1.09	_	1.5	1.5	_
L2	Logan St 13.00	10.00	1.20	1.09	_	1.5	1.5	-
T1	13.00	10.00	1.20	1	_	1.5	1.5	_
R2	13.00	10.00	1.20	1.09	-	1.5	1.5	-
From: West	Nass Stre							
L2	13.00	10.00	1.20	1.09	-	1.5	1.5	-
T1 R2	13.00 13.00	10.00 10.00	1.20 1.20	1 1.09	-	1.5 1.5	1.5 1.5	-
	10.00	10.00	1.20	1.00		1.5	1.5	

 Demand & Sensitivity

 Analysis Method:
 Design Life

 Design Life Analysis Objective
 Practical Capacity (v/c ratio = xp)

 Growth Model
 Uniform

 Number of Years
 30

 Const. No. of Years
 –

 Result For
 Intersection - Vehicles

Model Settings - Options	
General Options	
Level of Service Method	Delay (RTA NSW)
Level of Service Target	LOS D
Performance Measure	Delay

Percentile Queue	95 %
Hours per Year	480 h
Include Short Lanes in determining	No
Approach Queue Storage Ratio	

Model Settings - Model Parameters	
Passenger Car Equivalents	
Light Vehicles (LV)	1.00 pcu/veh
Heavy Vehicles (HV)	1.65 pcu/veh
Queue Blockage	
Minimum Probability of Blockage	0
Delay and Queue	
Exclude Geometry Delay	No
HCM Delay Formula	No
HCM Queue Formula	No
Downstream Short Lane	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Cost						
Cost Options						
Cost Unit	\$					
Vehicle Cost Parameters						
		Vel	n Operating Co	st	Veh Tim	e Cost
Movement Class	Veh Cost Method	Pump Price of Fuel	Fuel Res. Cost Factor	Ratio of Running Cost to Fuel Cost	Avg. Income	Time Value Factor
		\$/L			\$/h	
Light Vehicles (LV)	Operating Cost	1.450	0.500	3.00	38.00	0.600
Heavy Vehicles (HV)	Operating Cost	1.450	0.500	3.00	38.00	0.600

Mass	Max Power	CO2 to
kg	kW	Fuel Rate
1600.0	120	2.35
15000.0	170	2.633
	kg 1600.0	kg kW 1600.0 120

Model Settings - Fuel Consumption							
Movement Class	fi	А	В	Beta			
Light Vehicles (LV)	1200	16	0.004	0.1			
Heavy Vehicles (HV)	2300	200	0.009	0.075			

Model Settings - CO Emission							
Movement Class	fi	А	В	Beta			
Light Vehicles (LV)	1620	-138	0.0743	0.294			
Heavy Vehicles (HV)	25000	320	-0.06	0.04			

Model Settings - HC Emission							
Movement Class	fi	А	В	Beta			
Light Vehicles (LV)	340	-9	0.0031	0.029			
Heavy Vehicles (HV)	3000	1	-0.0016	0.0013			

Model Settings - NOx E	mission			
Movement Class	fi	А	В	Beta
Light Vehicles (LV)	300	-14	0.0068	0.166

Heavy Vehicles (HV)	44000	2820	0.21	1.9
---------------------	-------	------	------	-----

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APPENDIX D

Mount Lindesay Rd & Old Ballandeen Rd - SIDRA Results

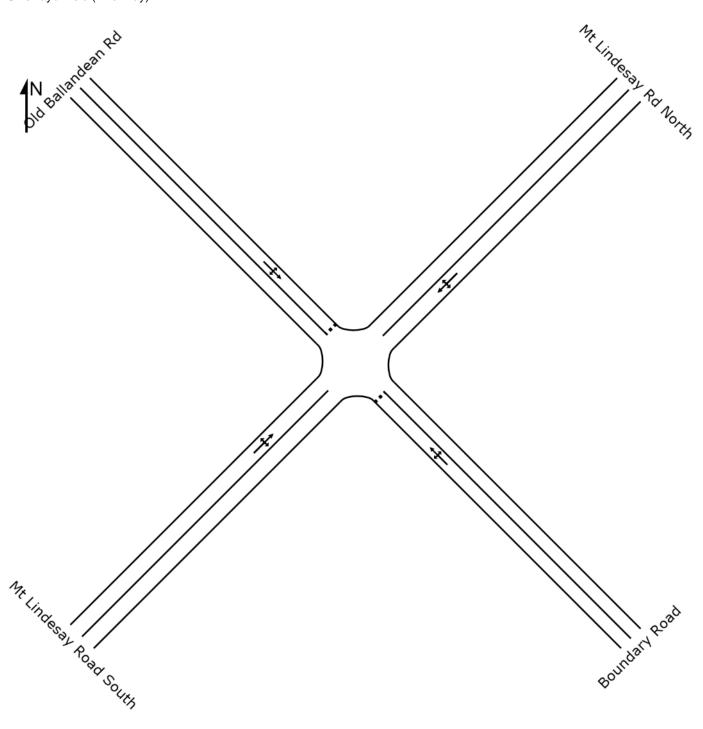
APPENDIX D1

Background

SITE LAYOUT

$\overline{ abla}$ Site: Mt Lindesay & Old Ballandean Rd - No Development 8am - 9am Peak

New Site Giveway / Yield (Two-Way)



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INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

✓ Site: Mt Lindesay & Old Ballandean Rd - No Development 8am - 9am Peak

New Site Giveway / Yield (Two-Way)

Volume Display Method: Separate

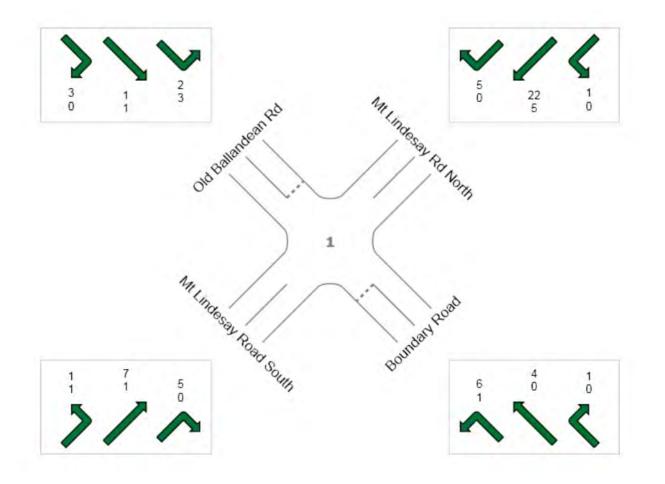
Volumes are shown for Movement Class(es): Light Vehicles and Heavy Vehicles

Total Intersection Volumes (veh)

All Movement Classes: 70

Light Vehicles (LV): 58

Heavy Vehicles (HV): 12



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MOVEMENT SUMMARY

abla Site: Mt Lindesay & Old Ballandean Rd - No Development 8am - 9am Peak

New Site Giveway / Yield (Two-Way)

Move	ment Perfo	ormance - \	/ehicle <u>s</u>								
Mov	OD	Demano		Deg.	Average	Level of	95% Back	of Queue	Prop.	Effective	Average
ID	Mov	Total	ΗV	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
Osuth	Talati, David	veh/h	%	v/c	sec		veh	m		per veh	km/h
	East: Bound	,									
4	L2	7	14.3	0.009	6.9	LOS A	0.0	0.2	0.08	0.57	55.9
5	T1	4	0.0	0.009	5.1	LOS A	0.0	0.2	0.08	0.57	60.2
6	R2	1	0.0	0.009	6.3	LOS A	0.0	0.2	0.08	0.57	59.3
Appro	ach	13	8.3	0.009	6.3	LOS A	0.0	0.2	0.08	0.57	57.5
NorthE	East: Mt Lind	lesay Rd No	th								
7	L2	1	0.0	0.020	6.4	LOS A	0.1	0.7	0.06	0.12	64.8
8	T1	28	18.5	0.020	0.0	LOS A	0.1	0.7	0.06	0.12	67.9
9	R2	5	0.0	0.020	6.2	LOS A	0.1	0.7	0.06	0.12	64.1
Appro	ach	35	15.2	0.020	1.2	NA	0.1	0.7	0.06	0.12	67.2
North	Vest: Old Ba	llandean Rd									
10	L2	5	60.0	0.009	6.9	LOS A	0.0	0.4	0.06	0.59	45.8
11	T1	2	50.0	0.009	5.4	LOS A	0.0	0.4	0.06	0.59	48.4
12	R2	3	0.0	0.009	6.4	LOS A	0.0	0.4	0.06	0.59	59.2
Appro	ach	11	40.0	0.009	6.5	LOS A	0.0	0.4	0.06	0.59	49.7
South	Nest: Mt Lin	desay Road	South								
1	L2	2	50.0	0.009	7.2	LOS A	0.0	0.3	0.10	0.28	60.5
2	T1	8	12.5	0.009	0.1	LOS A	0.0	0.3	0.10	0.28	65.8
3	R2	5	0.0	0.009	6.3	LOS A	0.0	0.3	0.10	0.28	62.2
Approa	ach	16	13.3	0.009	3.1	NA	0.0	0.3	0.10	0.28	63.8
All Veł	nicles	74	17.1	0.020	3.2	NA	0.1	0.7	0.07	0.30	61.6

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 is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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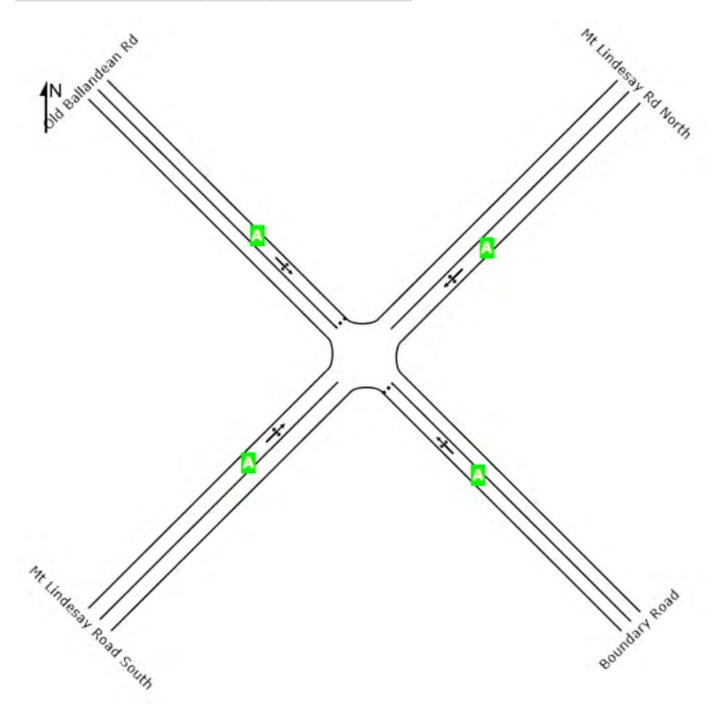
LEVEL OF SERVICE

igvee Site: Mt Lindesay & Old Ballandean Rd - No Development 8am - 9am Peak

New Site Giveway / Yield (Two-Way)

All Movement Classes

	Southeast	Northeast	Northwest	Southwest	Intersection
LOS	A	NA	А	NA	NA



Level of Service (LOS) Method: Delay (RTA NSW).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

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 lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

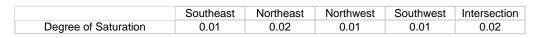
DEGREE OF SATURATION

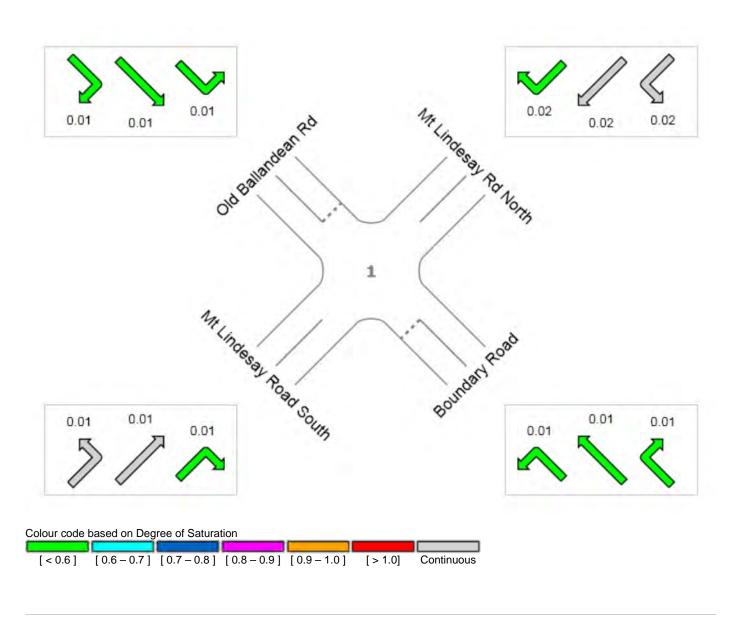
Ratio of Demand Volume to Capacity (v/c ratio)

\overline{igvee} Site: Mt Lindesay & Old Ballandean Rd - No Development 8am - 9am Peak

New Site Giveway / Yield (Two-Way)

All Movement Classes





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DELAY (CONTROL)

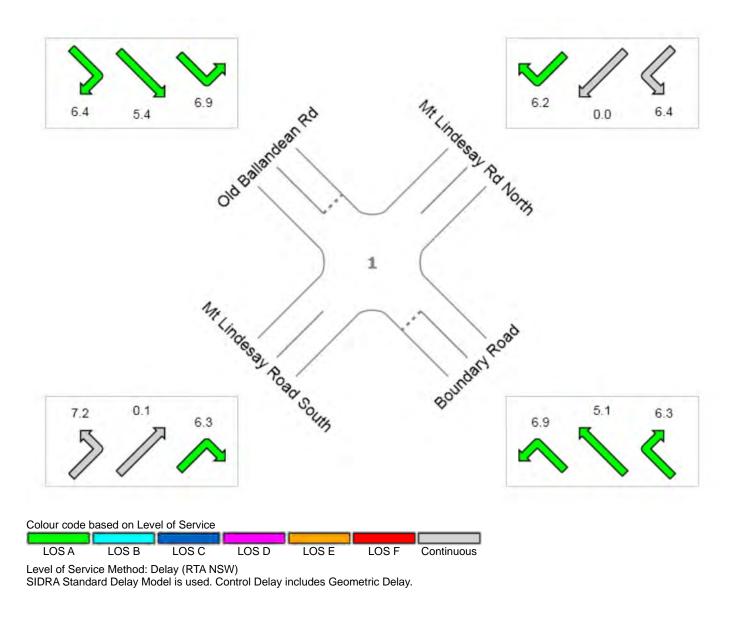
Average control delay per vehicle, or average pedestrian delay (seconds)

V Site: Mt Lindesay & Old Ballandean Rd - No Development 8am - 9am Peak

New Site Giveway / Yield (Two-Way)

All Movement Classes

	Southeast	Northeast	Northwest	Southwest	Intersection
Delay (Control)	6.3	1.2	6.5	3.1	3.2
LOS	A	NA	A	NA	NA



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INPUT REPORT

∇ Site: Mt Lindesay & Old Ballandean Rd - No Development 8am - 9am Peak

New Site Giveway / Yield (Two-Way)

Intersection - Site Data	
Site Name	Mt Lindesay & Old Ballandean Rd - No Development 8am - 9am Peak
Site ID	1
Site Title	New Site

Intersection - Site Properties	
Site (Intersection) Type	Giveway / Yield (Two-Way)
Model Name	New South Wales
Base Model	NA
Drive Rule	Left-hand side of the road
HCM Version	No
Units	Metric
First Created	
Date	2/12/2014 3:52:40 PM
Created By	Dave
Organisation	CONSTRUCTIVE SOLUTIONS PTY LTD
Version	6.0.22.4722
Last Modified	
Date	2/12/2014 4:16:42 PM
Modified By	Dave
Organisation	CONSTRUCTIVE SOLUTIONS PTY LTD
Version	6.0.22.4722

Intersectio	n - Approach Data							
Location	Name	Туре	No. of App. Lanes	No. of Exit Lanes		Extra Bunching	Approach Control	Area Type Factor
					m	%		
SouthEast E	Boundary Road	Two-way	1	1	500.0	0	Give-way Yield	-
NorthEast N	Mt Lindesay Rd North	Two-way	1	1	500.0	0	Major Road	-
NorthWest 0	Old Ballandean Rd	Two-way	1	1	500.0	0	Give-way Yield	-
SouthWest N	At Lindesay Road South	Two-way	1	1	500.0	0	Major Road	-

Movement Definitions - Inclue	ded Movement Classes		
Name	ID	Model Designation	Туре
Light Vehicles	LV	Light Vehicle	Standard
Heavy Vehicles	HV	Heavy Vehicle	Standard

Movement	Defin	itions - Origin-Destina	ation Movem	ents
To Approach	OD	Novement Turn Designation	OD Mov ID	LTR Mov ID
From: South	East	Boundary Road		
SouthWest	L2	Ĺ	4	4
NorthWest	T1	Т	5	5
NorthEast	R2	R	6	6
From: Northl	East	Mt Lindesay Rd North		
SouthEast	L2	L	7	7

From: NorthWestOld Ballandean RdNorthEastL2L10SouthEastT1T11		T1 R2	T R	8 9	8 9
	From: NorthW	est Old Ball	andean Rd		
SouthWest R2 R 12 12	SouthEast	 T1	L T R	11	11
From: SouthWest Mt Lindesay Road South	From: SouthW	Vest Mt Linde	esay Road Sout	h	
NorthWest L2 L 1 1 NorthEast T1 T 2 2 SouthEast R2 R 3 3	NorthEast	T1	L T R	1 2 3	-

Lane Geon	netry - Lane Co	onfigurati	ion									
Leg Item	Configuration	Туре	Control	Slip/ Bypass Control	Length	Width	Grade	Full Lane [ID Colour]	[Front Width	Island Back Fil Width		For Pec Staging 1
					m	m	%		m	m		-
SouthEast	Boundary Road											
App. Lane 1	Full-Length	Normal	Giveway /Yield	-	500	2.5	-6		-	-	-	-
Exit Lane 1	Full-Length	-	_	-	500	2.5	6		-	-	-	-
NorthEast	Mt Lindesay Rd I	North										
App. Lane 1	Full-Length	Normal	Continu ous	-	500	3	-2		-	-	-	-
Exit Lane 1	Full-Length	-	_	-	500	3	2		-	-	-	-
NorthWest	Old Ballandean F	٦d										
App. Lane 1	Full-Length	Normal	Giveway /Yield	-	500	2.5	4		-	-	-	-
Exit Lane 1	Full-Length	-	_	-	500	2.5	-4		-	-	-	-
SouthWest	Mt Lindesay Roa	d South										
App. Lane 1	Full-Length	Normal	Continu ous	-	500	3	0		-	-	-	-
Exit Lane 1	Full-Length	-	-	-	500	3	0		-	-	-	-

Lanes are numbered from left to right in the direction of travel.

Lane Geometry	- Lane Disciplin	es	
To Approach	OD Movement	Free Queue Distance m	Movement Class(es)
From: SouthEast	App. Lane 1		
SouthWest NorthWest NorthEast	L2 T1 R2	0 0 0	LV, HV LV, HV LV, HV
From: NorthEast	App. Lane 1		
SouthEast SouthWest NorthWest	L2 T1 R2	0 0 0	LV, HV LV, HV LV, HV
From: NorthWest	App. Lane 1		
NorthEast SouthEast SouthWest	L2 T1 R2	0 0 0	LV, HV LV, HV LV, HV
From: SouthWest	App. Lane 1		
NorthWest NorthEast SouthEast	L2 T1 R2	0 0 0	LV, HV LV, HV LV, HV

Lane Data - Lane Dat	а				
Approach Lane	Basic Satn Flow	Utilisation Ratio	Saturation Speed	Capacity Adjustment	Use Given Cap Adj in Network Analysis
	tcu/h	%	km/h	%	
SouthEast Boundary R	load				
App. Lane 1	1950	-	_	0.0	No
NorthEast Mt Lindesay	/ Rd North				

App. Lane 1	1950	-	-	0.0	No
NorthWest Old Ballandean Rd					
App. Lane 1	1950	-	-	0.0	No
SouthWest Mt Lindesay Road So	outh				
App. Lane 1	1950	-	-	0.0	No

Lane Data - Fl	ow Proportio	ns		
		To Exit	Leg	
Exit Lane		NorthEast	NorthWest	SouthWest
	%	%	%	%
Light Vehicles (L	_V)			
From: SouthEas	t App. Lane	1		
Exit Lane 1	-	100	100	100
From: NorthEast	t App. Lane	1		
Exit Lane 1	100	-	100	100
From: NorthWes	t App. Lane	1		
Exit Lane 1	100	100	-	100
From: SouthWes	st App. Lane	1		
Exit Lane 1	100	100	100	-
Heavy Vehicles	(HV)			
From: SouthEas	t App. Lane	1		
Exit Lane 1	-	. 100	100	100
From: NorthEast	t App. Lane	1		
Exit Lane 1	100	-	100	100
From: NorthWes	t App. Lane	1		
Exit Lane 1	100	. 100	_	100
From: SouthWes	st App. Lane	1		
Exit Lane 1	100	. 100	100	-

Lane Data - Lane Blockage
Lane Data - Lane Blockage

	and Breenag	~		
		To Exit	Leg	
Exit Lane	SouthEast	NorthEast	NorthWest	SouthWest
From: SouthEast	st App. Lan	e 1		
Exit Lane 1	_	Yes	Yes	Yes
From: NorthEas	t App. Lan	e 1		
Exit Lane 1	Yes	-	Yes	Yes
From: NorthWes	st App. Lan	e 1		
Exit Lane 1	Yes	Yes	-	Yes
From: SouthWe	st App. Lan	e 1		
Exit Lane 1	Yes	Yes	Yes	_

Pedestrians - Pedestrian	Movements			
Unit Time for Volumes: 60 mir Peak Flow Period: 30 minutes				
Main Crossing/ Slip/Bypass Lane Crossing	Volume	Peak Flow	Flow Scale	Growth Rate
	ped	%	%	%
No Ped Movements				

Pedestrians	Pedestrians - Pedestrian Movement Data											
Main Crossing/ Slip/Bypass Lane Crossing	Mov. ID	Crossing Distance	Oppng Ped.Fac.	P.Deg. Satn	Walking Speed	App. Trav. Distance	Downst. Distance	Queue Space				
		m			m/sec	m	m	m				
No Ped Move	ments											

Volumes - Vehicle Volumes

Unit Time for Volumes: 60 minutes Peak Flow Period: 30 minutes Volume Data Method: Separate

Volume Data Me	thod: Separat	te			
		To Exit	Leg		
Movement	SouthEast	NorthEast	NorthWest	SouthWest	
Class	veh	veh	veh	veh	
From: SouthEas	t Boundar	y Road			
Total (veh)	_	1	4	7	
LV (veh)	-	1	4	6	
HV (veh)	-	0	0	1	
From: NorthEast	t Mt Linde	say Rd North			
Total (veh)	1	-	5	27	
LV (veh)	1	-	5	22	
HV (veh)	0	-	0	5	
From: NorthWes	t Old Balla	ndean Rd			
Total (veh)	2	5	-	3	
LV (veh)	1	2	-	3	
HV (veh)	1	3	-	0	
From: SouthWes	st Mt Linde	say Road Sou	uth		
Total (veh)	5	8	2	_	
LV (veh)	5	7	1	-	
HV (veh)	0	1	1	_	

Volumes - Volum	e Factors		
To Approach	Peak Flow Factor %	Flow Scale %	Growth Rate %/year
Light Vehicles (LV)			
From: SouthEast	Boundary Road		
SouthWest NorthWest NorthEast	95.0 95.0 95.0	100.00 100.00 100.00	1.50 1.50 1.50
From: NorthEast	Mt Lindesay Rd North		
SouthEast SouthWest NorthWest	95.0 95.0 95.0	100.00 100.00 100.00	1.50 1.50 1.50
From: NorthWest	Old Ballandean Rd		
NorthEast SouthEast SouthWest	95.0 95.0 95.0	100.00 100.00 100.00	1.50 1.50 1.50
From: SouthWest	Mt Lindesay Road South		
NorthWest NorthEast SouthEast	95.0 95.0 95.0	100.00 100.00 100.00	1.50 1.50 1.50
Heavy Vehicles (HW	()		
From: SouthEast	Boundary Road		
SouthWest NorthWest NorthEast	95.0 95.0 95.0	100.00 100.00 100.00	1.50 1.50 1.50
From: NorthEast	Mt Lindesay Rd North		
SouthEast SouthWest NorthWest	95.0 95.0 95.0	100.00 100.00 100.00	1.50 1.50 1.50
From: NorthWest	Old Ballandean Rd		
NorthEast SouthEast SouthWest	95.0 95.0 95.0	100.00 100.00 100.00	1.50 1.50 1.50
From: SouthWest	Mt Lindesay Road South		
NorthWest NorthEast SouthEast	95.0 95.0 95.0	100.00 100.00 100.00	1.50 1.50 1.50

Priorities Opposed

Opposing Movements

Movement	SouthEast	NorthEast	NorthWest	SouthWest	
SouthEast	Boundary R	oad			
L2 T1 R2	- - -	T1 T1,R2 T1,R2	_ _ T1,L2	– R2,T1,L2 R2,T1	
NorthEast	Mt Lindesay	Rd North			
L2 T1 R2	- - -	- - -	- - -	_ _ T1,L2	
NorthWest	Old Ballande	ean Rd			
L2 T1 R2	_ _ L2,T1	– T1,L2,R2 T1,R2	-	T1 R2,T1 R2,T1	
SouthWest	Mt Lindesay	Road South			
L2 T1 R2		– – T1,L2		- - -	

Gap Acce	ptance - Gap Ac	ceptance	e Data					
Opposed Movement	Apply TWSC Calibration	Critical Gap	Follow-up Headway	Minimum Departures	Exiting Flow Effect	Nearest Lane	Opng. Peds (UnSig)	Staged Crossing
		sec	sec	veh/min	%	%		
SouthEast	Boundary Road							
L2 T1	Yes Yes	5.000 6.500	3.000 3.500	0.10 0.10	50 50	100.00	Pr (Flow) Pr (Flow) Pr (Flow)	None None
R2	Yes	7.000	4.000	0.10	50	0.00	Pr (Flow)	None
NorthEast	Mt Lindesay Rd I	North						
R2	Yes	4.500	2.500	0.10	0	0.00	Pr (Flow)	None
NorthWest	Old Ballandean F	٦d						
L2 T1	Yes Yes	5.000 6.500	3.000 3.500	0.10 0.10	50 50	100.00 0.00	Pr (Flow) Pr (Flow)	None None
R2	Yes	7.000	4.000	0.10	50	0.00	Pr (Flow)	None
SouthWest	Mt Lindesay Roa	d South						
R2	Yes	4.500	2.500	0.10	0	0.00	Pr (Flow)	None

Gap Acceptance - Two-W	ay Sign C	ontrol P	arameter	Adjs fo	r Major R	d Numb	er of Lai	nes
	Crit	ical Gap A	djustment		Follow-	up Headw	ay Adjust	ment
Major Road Number of	2-lane	3-lane	5-lane 6-	lane or	2-lane	3-lane	5-lane	6-lane
Lanes:				more				or more
	sec	sec	sec	sec	sec	sec	sec	sec
Minor Road Left Turn	-0.5	-0.5	0.0	0.0	-0.5	-0.5	0.0	0.0
Minor Road Through	-1.5	-0.5	0.5	1.0	-0.5	-0.3	0.5	1.0
Minor Road Right Turn	-1.5	-0.5	0.5	1.0	-0.5	-0.3	0.5	1.0
Major Road Turn (Right or Left)	-0.5	-0.5	0.0	1.0	-0.5	-0.5	0.0	1.0

Gap Acceptance - Two-Way Sign Control Parameter Adjs for Geometry and Control

	Critical Gap	Follow-up
	Adjustment	Headway Adjustment
	sec	sec
Give-Way / Yield Sign Control	-0.5	-0.3
One-Way Major Road	-0.5	-0.3
T Intersection (Minor Road Turn)	-0.7	-0.4
Entry Road Grade (for each per cent grade)	0.1	0.0
Staged Crossing - Stage 1	-1.0	-0.6
Staged Crossing - Stage 2	-1.0	-0.6

Gap Acceptance - Settings Gap Acceptance Capacity : SIDRA Standard (Akçelik M3D)

Vehicle Movem	ent Data - <u>Pa</u> t	th Data				
OD	Approach	Exit	Negotiation	Negotiation	Downstream	Negotiation
Movement C	ruise Speed C	ruise Speed	Speed	Distance	Distance	Radius
	km/h	km/h	km/h	m	m	m
Light Vehicles (LV)					
From: SouthEast	Boundary R	oad				
L2	70.0	70.0	-	-	_	-
T1	70.0	70.0	-	-	-	-
R2	70.0	70.0	-	-	-	-
From: NorthEast	Mt Lindesay	Rd North				
L2	70.0	70.0	-	-	-	-
T1	70.0	70.0	-	-	-	-
R2	70.0	70.0	-	-	-	-
From: NorthWest	Old Balland					
L2	70.0	70.0	-	-	-	-
T1	70.0	70.0	-	-	-	-
R2	70.0	70.0	-	-	-	-
From: SouthWest		Road South				
L2	70.0	70.0	-	-	-	-
T1	70.0	70.0	-	-	-	-
R2	70.0	70.0	-	-	-	-
Heavy Vehicles (H	HV)					
From: SouthEast	Boundary R					
L2	70.0	70.0	-	-	-	-
T1	70.0	70.0	-	-	-	-
R2	70.0	70.0	-	-	-	-
From: NorthEast	Mt Lindesay					
L2	70.0	70.0	-	-	-	-
T1	70.0	70.0	-	-	-	-
R2	70.0	70.0	-	-	-	_
From: NorthWest	Old Balland					
L2	70.0	70.0	-	-	-	-
T1	70.0	70.0	-	-	-	-
R2	70.0	70.0	_		_	
From: SouthWest		Road South				
L2	70.0	70.0	-	-	-	-
T1	70.0	70.0	-	-	-	-
R2	70.0	70.0	-	-	-	-

Vehicle Moveme	nt Data - C	alibration						
OD Movement	Queue Space	Vehicle Length	Vehicle Occupancy	Turn Veh [Factor	Effect Radius]	Gap Accp Factor	Opng. Veh Factor	Prac. Deg. Of Satn.
	m	m	pers/veh		m			
Light Vehicles (LV)								
From: SouthEast	Boundary	Road						
L2	7.00	4.50	1.20	1.05	-	1	1	-
T1	7.00	4.50	1.20	1	-	1	1	-
R2	7.00	4.50	1.20	1.05	-	1	1	-
From: NorthEast	Mt Lindes	ay Rd North						
L2	7.00	4.50	1.20	1.05	-	1	1	-
T1	7.00	4.50	1.20	1	-	1	1	-
R2	7.00	4.50	1.20	1.05	-	1	1	-
From: NorthWest	Old Ballar	ndean Rd						
L2	7.00	4.50	1.20	1.05	_	1	1	-
T1	7.00	4.50	1.20	1	_	1	1	-
R2	7.00	4.50	1.20	1.05	-	1	1	-
From: SouthWest	Mt Lindes	ay Road So	uth					
L2	7.00	4.50	1.20	1.05	_	1	1	_
T1	7.00	4.50	1.20	1	-	1	1	-

R2	7.00	4.50	1.20	1.05	-	1	1	-
Heavy Vehicles (HV	/)							
From: SouthEast	Boundary I	Road						
L2 T1	13.00 13.00	10.00 10.00	1.20 1.20	1.09 1	_	1.5 1.5	1.5 1.5	_
R2	13.00	10.00	1.20	1.09	-	1.5	1.5	-
From: NorthEast	Mt Lindesa	y Rd North						
L2 T1 R2	13.00 13.00 13.00	10.00 10.00 10.00	1.20 1.20 1.20	1.09 1 1.09	- - -	1.5 1.5 1.5	1.5 1.5 1.5	- - -
From: NorthWest	Old Balland	dean Rd						
L2 T1 R2	13.00 13.00 13.00	10.00 10.00 10.00	1.20 1.20 1.20	1.09 1 1.09		1.5 1.5 1.5	1.5 1.5 1.5	
From: SouthWest	Mt Lindesa	y Road South						
L2 T1 R2	13.00 13.00 13.00	10.00 10.00 10.00	1.20 1.20 1.20	1.09 1 1.09	- - -	1.5 1.5 1.5	1.5 1.5 1.5	

Demand & Sensiti	vity	
Analysis Method:	None	

Model Settings - Options	
General Options	
Level of Service Method	Delay (RTA NSW)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Include Short Lanes in determining	No
Approach Queue Storage Ratio	

Model Settings - Model Parameters	
Passenger Car Equivalents	
Light Vehicles (LV)	1.00 pcu/veh
Heavy Vehicles (HV)	1.65 pcu/veh
Queue Blockage	
Minimum Probability of Blockage	0
Delay and Queue	
Exclude Geometry Delay	No
HCM Delay Formula	No
HCM Queue Formula	No
Downstream Short Lane	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Cost

Model Settings - Cost						
Cost Options						
Cost Unit	\$					
Vehicle Cost Parameters						
		Vel	n Operating Co	st	Veh Tim	e Cost
Movement Class	Veh Cost Method	Pump Price of Fuel	Fuel Res. Cost Factor	Ratio of Running Cost to Fuel Cost	Avg. Income	Time Value Factor
		\$/L			\$/h	
Light Vehicles (LV)	Operating Cost	1.450	0.500	3.00	38.00	0.600
Heavy Vehicles (HV)	Operating Cost	1.450	0.500	3.00	38.00	0.600

Model Settings - Vehicle Parameters			
Movement Class	Mass	Max Power	CO2 to
	kg	kW	Fuel Rate
Light Vehicles (LV)	1600.0	120	2.35
Heavy Vehicles (HV)	15000.0	170	2.633

Model Settings - Fuel Consumption							
Movement Class	fi	А	В	Beta			
Light Vehicles (LV)	1200	16	0.004	0.1			
Heavy Vehicles (HV)	2300	200	0.009	0.075			

Model Settings - CO Emission								
Movement Class	fi	А	В	Beta				
Light Vehicles (LV) Heavy Vehicles (HV)	1620 25000	-138 320	0.0743 -0.06	0.294 0.04				

Model Settings - HC Emission								
Movement Class	fi	А	В	Beta				
Light Vehicles (LV)	340	-9	0.0031	0.029				
Heavy Vehicles (HV)	3000	1	-0.0016	0.0013				

Model Settings - NOx Emission							
Movement Class	fi	А	В	Beta			
Light Vehicles (LV)	300	-14	0.0068	0.166			
Heavy Vehicles (HV)	44000	2820	0.21	1.9			

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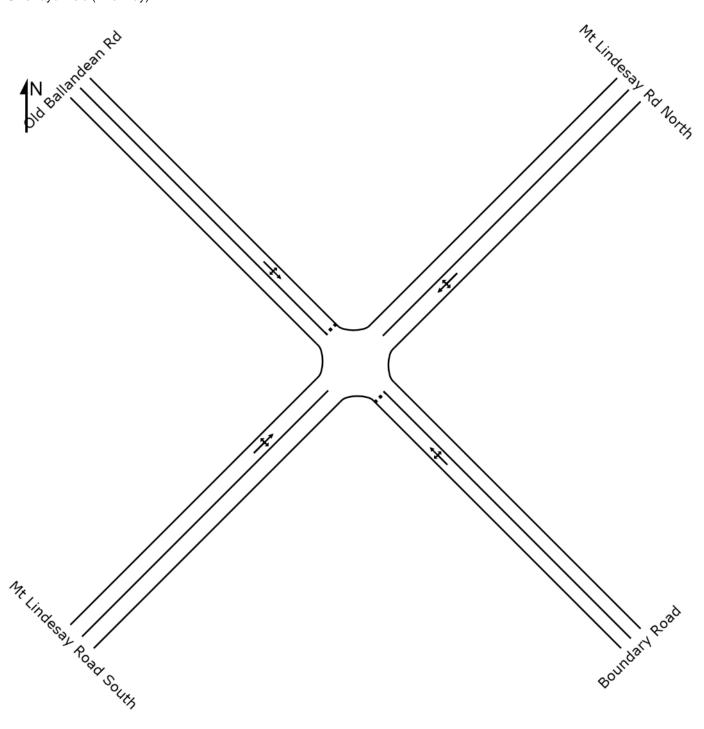
APPENDIX D2

Background + Development

SITE LAYOUT

$\overline{ abla}$ Site: Mt Lindesay & Old Ballandean Rd - With Development 8am - 9am Peak

New Site Giveway / Yield (Two-Way)



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INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

V Site: Mt Lindesay & Old Ballandean Rd - With Development 8am - 9am Peak

New Site Giveway / Yield (Two-Way)

Volume Display Method: Separate

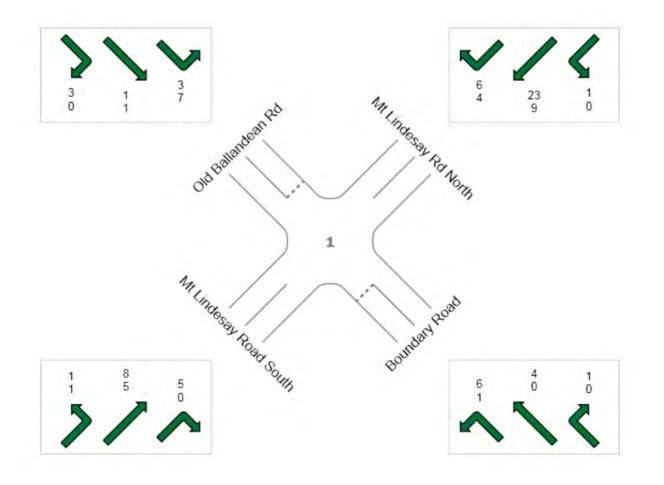
Volumes are shown for Movement Class(es): Light Vehicles and Heavy Vehicles

Total Intersection Volumes (veh)

All Movement Classes: 90

Light Vehicles (LV): 62

Heavy Vehicles (HV): 28



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MOVEMENT SUMMARY

\overline{igvee} Site: Mt Lindesay & Old Ballandean Rd - With Development 8am - 9am Peak

New Site Giveway / Yield (Two-Way)

	ment Perfo			Dee			OF0/ Deals	of O	Dress	Effective	A
Mov ID	OD Mov	Demano Total	HOWS HV	Deg. Satn	Average Delay	Level of Service	95% Back Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
	IVIOV	veh/h	%	V/C	Sec	OCIVICE	venicies	m	Queueu	per veh	km/h
South	East: Bound		/0								
4	L2	7	14.3	0.009	7.0	LOS A	0.0	0.2	0.09	0.57	55.8
5	T1	4	0.0	0.009	5.1	LOS A	0.0	0.2	0.09	0.57	60.1
6	R2	1	0.0	0.009	6.4	LOS A	0.0	0.2	0.09	0.57	59.3
Approa	ach	13	8.3	0.009	6.3	LOS A	0.0	0.2	0.09	0.57	57.5
NorthE	East: Mt Lind	lesay Rd No	rth								
7	L2	1	0.0	0.029	6.4	LOS A	0.1	1.2	0.08	0.16	64.5
8	T1	34	28.1	0.029	0.1	LOS A	0.1	1.2	0.08	0.16	67.6
9	R2	11	40.0	0.029	7.2	LOS A	0.1	1.2	0.08	0.16	61.6
Approa	ach	45	30.2	0.029	1.9	NA	0.1	1.2	0.08	0.16	66.1
NorthV	Vest: Old Ba	llandean Rd									
10	L2	11	70.0	0.014	7.0	LOS A	0.1	0.6	0.08	0.58	44.0
11	T1	2	50.0	0.014	5.5	LOS A	0.1	0.6	0.08	0.58	48.3
12	R2	3	0.0	0.014	6.4	LOS A	0.1	0.6	0.08	0.58	59.1
Approa	ach	16	53.3	0.014	6.7	LOS A	0.1	0.6	0.08	0.58	47.0
South\	West: Mt Lin	desay Road	South								
1	L2	2	50.0	0.013	7.2	LOS A	0.1	0.5	0.11	0.21	60.7
2	T1	14	38.5	0.013	0.1	LOS A	0.1	0.5	0.11	0.21	66.0
3	R2	5	0.0	0.013	6.3	LOS A	0.1	0.5	0.11	0.21	62.3
Approa	ach	21	30.0	0.013	2.4	NA	0.1	0.5	0.11	0.21	64.5
All Veł	nicles	95	31.1	0.029	3.4	NA	0.1	1.2	0.09	0.30	60.4

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 is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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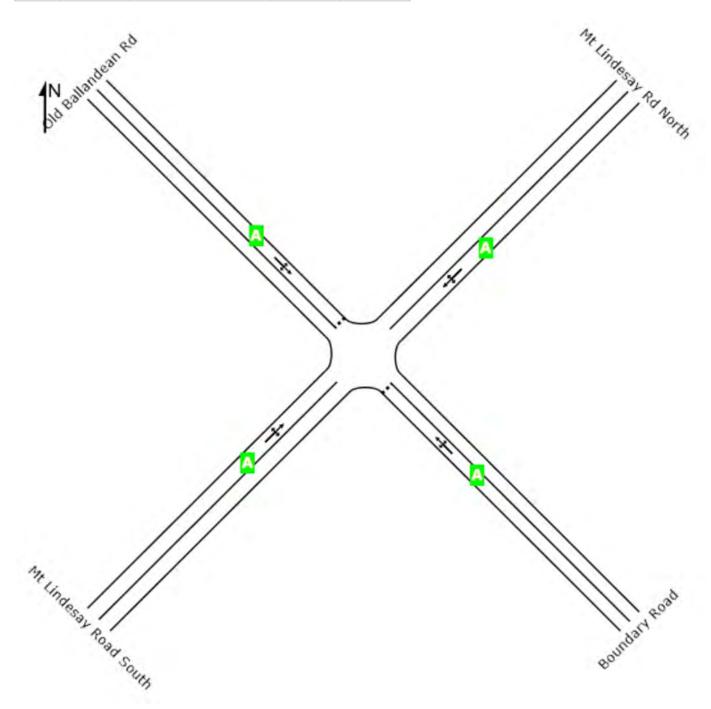
LEVEL OF SERVICE

abla Site: Mt Lindesay & Old Ballandean Rd - With Development 8am - 9am Peak

New Site Giveway / Yield (Two-Way)

All Movement Classes

	Southeast	Northeast	Northwest	Southwest	Intersection
LOS	A	NA	A	NA	NA



Level of Service (LOS) Method: Delay (RTA NSW).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

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 lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

DEGREE OF SATURATION

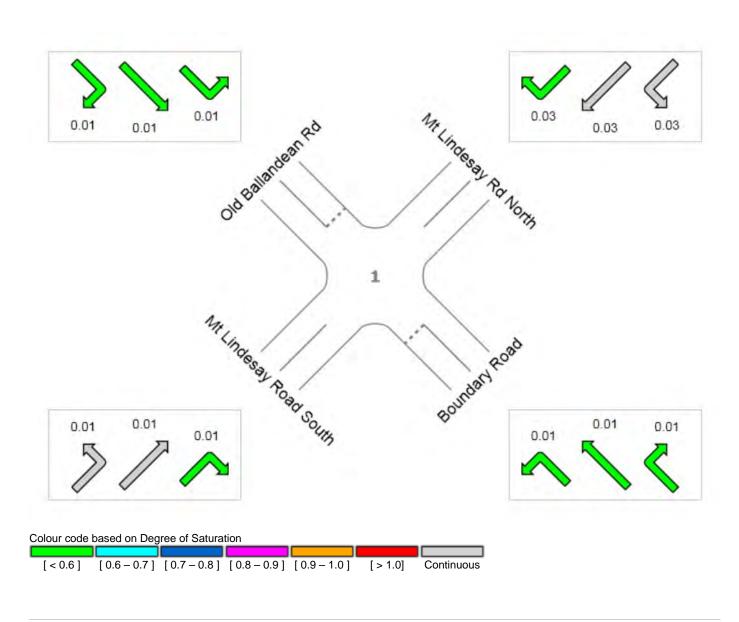
Ratio of Demand Volume to Capacity (v/c ratio)

\overline{igvee} Site: Mt Lindesay & Old Ballandean Rd - With Development 8am - 9am Peak

New Site Giveway / Yield (Two-Way)

All Movement Classes





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DELAY (CONTROL)

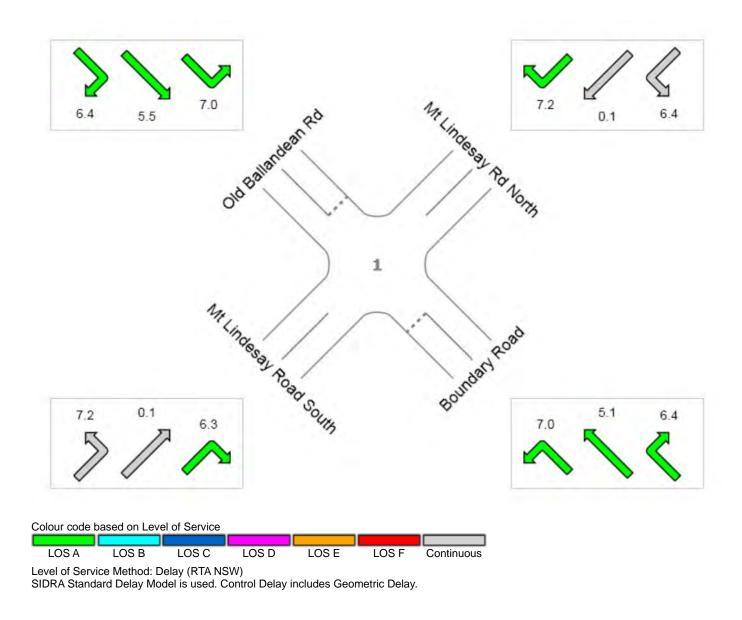
Average control delay per vehicle, or average pedestrian delay (seconds)

\overline{igvee} Site: Mt Lindesay & Old Ballandean Rd - With Development 8am - 9am Peak

New Site Giveway / Yield (Two-Way)

All Movement Classes

	Southeast	Northeast	Northwest	Southwest	Intersection
Delay (Control)	6.3	1.9	6.7	2.4	3.4
LOS	A	NA	A	NA	NA



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INPUT REPORT

∇ Site: Mt Lindesay & Old Ballandean Rd - With Development 8am - 9am Peak

New Site Giveway / Yield (Two-Way)

Intersection - Site Data	
Site Name	Mt Lindesay & Old Ballandean Rd - With Development 8am - 9am Peak
Site ID	1
Site Title	New Site

Intersection - Site Properties	
Site (Intersection) Type	Giveway / Yield (Two-Way)
Model Name	New South Wales
Base Model	NA
Drive Rule	Left-hand side of the road
HCM Version	No
Units	Metric
First Created	
Date	2/12/2014 3:52:40 PM
Created By	Dave
Organisation	CONSTRUCTIVE SOLUTIONS PTY LTD
Version	6.0.22.4722
Last Modified	
Date	3/12/2014 9:11:46 AM
Modified By	Dave
Organisation	CONSTRUCTIVE SOLUTIONS PTY LTD
Version	6.0.22.4722

Intersection	n - Approach Data							
Location	Name	Туре	No. of App. Lanes	No. of Exit Lanes		Extra A Bunching	Approach Control	Area Type Factor
					m	%		
SouthEast B	oundary Road	Two-way	1	1	500.0	0 0	Give-way Yield	-
NorthEast M	It Lindesay Rd North	Two-way	1	1	500.0	0	Major Road	-
NorthWest C	ld Ballandean Rd	Two-way	1	1	500.0	0 (Give-way Yield	-
SouthWest M	It Lindesay Road South	Two-way	1	1	500.0	0	Major Road	-

Movement Definitions - Included Movement Classes				
Name	ID	Model Designation	Туре	
Light Vehicles	LV	Light Vehicle	Standard	
Heavy Vehicles	HV	Heavy Vehicle	Standard	

Movement Definitions - Origin-Destination Movements						
To Approach	OD	Novement Turn Designation	OD Mov ID	LTR Mov ID		
From: South	East	Boundary Road				
SouthWest	L2	Ĺ	4	4		
NorthWest	T1	Т	5	5		
NorthEast	R2	R	6	6		
From: Northl	East	Mt Lindesay Rd North				
SouthEast	L2	L	7	7		

From: NorthWestOld Ballandean RdNorthEastL2L10SouthEastT1T11		T1 R2	T R	8 9	8 9
	From: NorthW	est Old Ball	andean Rd		
SouthWest R2 R 12 12	SouthEast	 T1	L T R	11	11
From: SouthWest Mt Lindesay Road South	From: SouthW	Vest Mt Linde	esay Road Sout	h	
NorthWest L2 L 1 1 NorthEast T1 T 2 2 SouthEast R2 R 3 3	NorthEast	T1	L T R	1 2 3	-

Lane Geometry - Lane Configuration												
Leg Item	Configuration	Туре	Control	Slip/ Bypass Control	Length	Width	Grade	Full Lane [ID Colour]	[Front Width	Island Back Fil Width		For Pec Staging 1
					m	m	%		m	m		-
SouthEast	Boundary Road											
App. Lane 1	Full-Length	Normal	Giveway /Yield	-	500	2.5	-6		-	-	-	-
Exit Lane 1	Full-Length	-	_	-	500	2.5	6		-	-	-	-
NorthEast	Mt Lindesay Rd I	North										
App. Lane 1	Full-Length	Normal	Continu ous	-	500	3	-2		-	-	-	-
Exit Lane 1	Full-Length	-	_	-	500	3	2		-	-	-	-
NorthWest	Old Ballandean F	٦d										
App. Lane 1	Full-Length	Normal	Giveway /Yield	-	500	2.5	4		-	-	-	-
Exit Lane 1	Full-Length	-	_	-	500	2.5	-4		-	-	-	-
SouthWest	Mt Lindesay Roa	d South										
App. Lane 1	Full-Length	Normal	Continu ous	-	500	3	0		-	-	-	-
Exit Lane 1	Full-Length	-	-	-	500	3	0		-	-	-	-

Lanes are numbered from left to right in the direction of travel.

Lane Geometry	- Lane Disciplin	es	
To Approach	OD Movement	Free Queue Distance m	Movement Class(es)
From: SouthEast	App. Lane 1		
SouthWest NorthWest NorthEast	L2 T1 R2	0 0 0	LV, HV LV, HV LV, HV
From: NorthEast	App. Lane 1		
SouthEast SouthWest NorthWest	L2 T1 R2	0 0 0	LV, HV LV, HV LV, HV
From: NorthWest	App. Lane 1		
NorthEast SouthEast SouthWest	L2 T1 R2	0 0 0	LV, HV LV, HV LV, HV
From: SouthWest	App. Lane 1		
NorthWest NorthEast SouthEast	L2 T1 R2	0 0 0	LV, HV LV, HV LV, HV

Lane Data - Lane Dat	а				
Approach Lane	Basic Satn Flow	Utilisation Ratio	Saturation Speed	Capacity Adjustment	Use Given Cap Adj in Network Analysis
	tcu/h	%	km/h	%	
SouthEast Boundary R	load				
App. Lane 1	1950	-	_	0.0	No
NorthEast Mt Lindesay	/ Rd North				

App. Lane 1	1950	-	-	0.0	No
NorthWest Old Ballandean Rd					
App. Lane 1	1950	-	-	0.0	No
SouthWest Mt Lindesay Road So	outh				
App. Lane 1	1950	-	-	0.0	No

Lane Data - Fl	ow Proportio	ns		
		To Exit	Leg	
Exit Lane		NorthEast	NorthWest	SouthWest
	%	%	%	%
Light Vehicles (L	_V)			
From: SouthEas	t App. Lane	1		
Exit Lane 1	-	100	100	100
From: NorthEast	t App. Lane	1		
Exit Lane 1	100	-	100	100
From: NorthWes	t App. Lane	1		
Exit Lane 1	100	100	-	100
From: SouthWes	st App. Lane	1		
Exit Lane 1	100	100	100	-
Heavy Vehicles	(HV)			
From: SouthEas	t App. Lane	1		
Exit Lane 1	-	. 100	100	100
From: NorthEast	t App. Lane	1		
Exit Lane 1	100	-	100	100
From: NorthWes	t App. Lane	1		
Exit Lane 1	100	. 100	_	100
From: SouthWes	st App. Lane	1		
Exit Lane 1	100	. 100	100	-

Lane Data - Lane Blockage
Lane Data - Lane Blockage

	and Breenag	~		
		To Exit	Leg	
Exit Lane	SouthEast	NorthEast	NorthWest	SouthWest
From: SouthEast	st App. Lan	e 1		
Exit Lane 1	_	Yes	Yes	Yes
From: NorthEas	t App. Lan	e 1		
Exit Lane 1	Yes	-	Yes	Yes
From: NorthWes	st App. Lan	e 1		
Exit Lane 1	Yes	Yes	-	Yes
From: SouthWe	st App. Lan	e 1		
Exit Lane 1	Yes	Yes	Yes	_

Pedestrians - Pedestrian	Movements			
Unit Time for Volumes: 60 mir Peak Flow Period: 30 minutes				
Main Crossing/ Slip/Bypass Lane Crossing	Volume	Peak Flow	Flow Scale	Growth Rate
	ped	%	%	%
No Ped Movements				

Pedestrians	- Pedestri	an Movement	Data					
Main Crossing/ Slip/Bypass Lane Crossing	Mov. ID	Crossing Distance	Oppng Ped.Fac.	P.Deg. Satn	Walking Speed	App. Trav. Distance	Downst. Distance	Queue Space
		m			m/sec	m	m	m
No Ped Move	ments							

Volumes - Vehicle Volumes

Unit Time for Volumes: 60 minutes Peak Flow Period: 30 minutes Volume Data Method: Separate

Volume Data Me						
		To Exit	Leg			
Movement Class	SouthEast veh	NorthEast veh	NorthWest veh	SouthWest veh		
From: SouthEas	t Boundar	y Road				
Total (veh)	_	1	4	7		
LV (veh)	-	1	4	6		
HV (veh)	-	0	0	1		
From: NorthEas	t Mt Linde	say Rd North				
Total (veh)	1	-	10	32		
LV (veh)	1	-	6	23		
HV (veh)	0	-	4	9		
From: NorthWes	st Old Balla	ndean Rd				
Total (veh)	2	10	-	3		
LV (veh)	1	3	-	3		
HV (veh)	1	7	-	0		
From: SouthWe	st Mt Linde	say Road Sou	uth			
Total (veh)	5	13	2	-		
LV (veh)	5	8	1	-		
HV (veh)	0	5	1	-		

Approach Factor Scale H % % Light Vehicles (LV)	rowth Rate ‰/year
% % % Light Vehicles (LV)	
Light Vehicles (LV)	o/year
From: SouthEast Boundary Road	
SouthWest 95.0 100.00	1.50
NorthWest 95.0 100.00	1.50
NorthEast 95.0 100.00	1.50
From: NorthEast Mt Lindesay Rd North	
SouthEast 95.0 100.00	1.50
SouthWest 95.0 100.00	1.50
NorthWest 95.0 100.00	1.50
From: NorthWest Old Ballandean Rd	
NorthEast 95.0 100.00	1.50
SouthEast 95.0 100.00 SouthWest 95.0 100.00	1.50 1.50
	1.50
From: SouthWest Mt Lindesay Road South	
NorthWest 95.0 100.00	1.50
NorthEast 95.0 100.00 SouthEast 95.0 100.00	1.50 1.50
Heavy Vehicles (HV)	1.50
From: SouthEast Boundary Road	
SouthWest 95.0 100.00	1.50
NorthWest 95.0 100.00 NorthEast 95.0 100.00	1.50 1.50
	1.50
From: NorthEast Mt Lindesay Rd North	4 50
SouthEast 95.0 100.00 SouthWest 95.0 100.00	1.50 1.50
NorthWest 95.0 100.00	1.50
From: NorthWest Old Ballandean Rd	1.00
NorthEast 95.0 100.00	1.50
SouthEast 95.0 100.00	1.50
SouthWest 95.0 100.00	1.50
From: SouthWest Mt Lindesay Road South	
NorthWest 95.0 100.00	1.50
NorthEast 95.0 100.00	1.50
SouthEast 95.0 100.00	1.50

Priorities Opposed

Opposing Movements

Movement	SouthEast	NorthEast	NorthWest	SouthWest	
SouthEast	Boundary R	oad			
L2 T1 R2	- - -	T1 T1,R2 T1,R2	_ _ T1,L2	– R2,T1,L2 R2,T1	
NorthEast	Mt Lindesay	Rd North			
L2 T1 R2	- - -	- - -	- - -	_ _ T1,L2	
NorthWest	Old Ballande	ean Rd			
L2 T1 R2	_ _ L2,T1	– T1,L2,R2 T1,R2	-	T1 R2,T1 R2,T1	
SouthWest	Mt Lindesay	Road South			
L2 T1 R2		– – T1,L2		- - -	

Gap Acce	ptance - Gap Ac	ceptance	e Data					
Opposed Movement	Apply TWSC Calibration	Critical Gap	Follow-up Headway	Minimum Departures	Exiting Flow Effect	Nearest Lane	Opng. Peds (UnSig)	Staged Crossing
		sec	sec	veh/min	%	%		
SouthEast	Boundary Road							
L2 T1	Yes Yes	5.000 6.500	3.000 3.500	0.10 0.10	50 50	100.00	Pr (Flow) Pr (Flow) Pr (Flow)	None None
R2	Yes	7.000	4.000	0.10	50	0.00	Pr (Flow)	None
NorthEast	Mt Lindesay Rd I	North						
R2	Yes	4.500	2.500	0.10	0	0.00	Pr (Flow)	None
NorthWest	Old Ballandean F	٦d						
L2 T1	Yes Yes	5.000 6.500	3.000 3.500	0.10 0.10	50 50	100.00 0.00	Pr (Flow) Pr (Flow)	None None
R2	Yes	7.000	4.000	0.10	50	0.00	Pr (Flow)	None
SouthWest	Mt Lindesay Roa	d South						
R2	Yes	4.500	2.500	0.10	0	0.00	Pr (Flow)	None

Gap Acceptance - Two-W	ay Sign C	ontrol P	arameter	Adjs fo	r Major R	d Numb	er of Lai	nes	
	Crit	ical Gap A	djustment		Follow-	Follow-up Headway Adjustment			
Major Road Number of	2-lane	3-lane	5-lane 6-	lane or	2-lane	3-lane	5-lane	6-lane	
Lanes:				more				or more	
	sec	sec	sec	sec	sec	sec	sec	sec	
Minor Road Left Turn	-0.5	-0.5	0.0	0.0	-0.5	-0.5	0.0	0.0	
Minor Road Through	-1.5	-0.5	0.5	1.0	-0.5	-0.3	0.5	1.0	
Minor Road Right Turn	-1.5	-0.5	0.5	1.0	-0.5	-0.3	0.5	1.0	
Major Road Turn (Right or Left)	-0.5	-0.5	0.0	1.0	-0.5	-0.5	0.0	1.0	

Gap Acceptance - Two-Way Sign Control Parameter Adjs for Geometry and Control

	Critical Gap	Follow-up
	Adjustment	Headway Adjustment
	sec	sec
Give-Way / Yield Sign Control	-0.5	-0.3
One-Way Major Road	-0.5	-0.3
T Intersection (Minor Road Turn)	-0.7	-0.4
Entry Road Grade (for each per cent grade)	0.1	0.0
Staged Crossing - Stage 1	-1.0	-0.6
Staged Crossing - Stage 2	-1.0	-0.6

Gap Acceptance - Settings Gap Acceptance Capacity : SIDRA Standard (Akçelik M3D)

Vehicle Movem	ent Data - <u>Pa</u> t	th Data				
OD	Approach	Exit	Negotiation	Negotiation	Downstream	Negotiation
Movement C	ruise Speed C	ruise Speed	Speed	Distance	Distance	Radius
	km/h	km/h	km/h	m	m	m
Light Vehicles (LV)					
From: SouthEast	Boundary R	oad				
L2	70.0	70.0	-	-	_	-
T1	70.0	70.0	-	-	-	-
R2	70.0	70.0	-	-	-	-
From: NorthEast	Mt Lindesay	Rd North				
L2	70.0	70.0	-	-	-	-
T1	70.0	70.0	-	-	-	-
R2	70.0	70.0	-	-	-	-
From: NorthWest	Old Balland					
L2	70.0	70.0	-	-	-	-
T1	70.0	70.0	-	-	-	-
R2	70.0	70.0	-	-	-	-
From: SouthWest		Road South				
L2	70.0	70.0	-	-	-	-
T1	70.0	70.0	-	-	-	-
R2	70.0	70.0	-	-	-	-
Heavy Vehicles (H	HV)					
From: SouthEast	Boundary R					
L2	70.0	70.0	-	-	-	-
T1	70.0	70.0	-	-	-	-
R2	70.0	70.0	-	-	-	-
From: NorthEast	Mt Lindesay					
L2	70.0	70.0	-	-	-	-
T1	70.0	70.0	-	-	-	-
R2	70.0	70.0	-	-	-	_
From: NorthWest	Old Balland					
L2	70.0	70.0	-	-	-	-
T1	70.0	70.0	-	-	-	-
R2	70.0	70.0	_		_	
From: SouthWest		Road South				
L2	70.0	70.0	-	-	-	-
T1	70.0	70.0	-	-	-	-
R2	70.0	70.0	-	-	-	-

Vehicle Moveme	nt Data - C	alibration						
OD Movement	Queue Space	Vehicle Length	Vehicle Occupancy	Turn Veh [Factor	Effect Radius]	Gap Accp Factor	Opng. Veh Factor	Prac. Deg. Of Satn.
	m	m	pers/veh		m			
Light Vehicles (LV)								
From: SouthEast	Boundary	Road						
L2	7.00	4.50	1.20	1.05	-	1	1	-
T1	7.00	4.50	1.20	1	-	1	1	-
R2	7.00	4.50	1.20	1.05	-	1	1	-
From: NorthEast	Mt Lindes	ay Rd North						
L2	7.00	4.50	1.20	1.05	-	1	1	-
T1	7.00	4.50	1.20	1	-	1	1	-
R2	7.00	4.50	1.20	1.05	-	1	1	-
From: NorthWest	Old Ballar	ndean Rd						
L2	7.00	4.50	1.20	1.05	_	1	1	-
T1	7.00	4.50	1.20	1	_	1	1	-
R2	7.00	4.50	1.20	1.05	-	1	1	-
From: SouthWest	Mt Lindes	ay Road So	uth					
L2	7.00	4.50	1.20	1.05	_	1	1	_
T1	7.00	4.50	1.20	1	-	1	1	-

Heavy Vehicles (HV) From: SouthEast Boundary Road L2 13.00 10.00 1.20 1.09 - 1.5 1.5 - T1 13.00 10.00 1.20 1 - 1.5 1.5 - R2 13.00 10.00 1.20 1.09 - 1.5 1.5 - R2 13.00 10.00 1.20 1.09 - 1.5 1.5 - From: NorthEast Mt Lindesay Rd North - 1.5 1.5 - - L2 13.00 10.00 1.20 1.09 - 1.5 1.5 - R2 13.00 10.00 1.20 1.09 - 1.5 1.5 - From: NorthWest Old Ballandean Rd - 1.5 1.5 - - L2 13.00 10.00 1.20 1.09 - 1.5 1.5 - R2 13.00 10.00<	R2	7.00	4.50	1.20	1.05	-	1	1	-
L2 13.00 10.00 1.20 1.09 - 1.5 1.5 - T1 13.00 10.00 1.20 1 - 1.5 1.5 - R2 13.00 10.00 1.20 1.09 - 1.5 1.5 - From: NorthEast Mt Lindesay Rd North - 1.5 1.5 - - L2 13.00 10.00 1.20 1.09 - 1.5 1.5 - T1 13.00 10.00 1.20 1.09 - 1.5 1.5 - T2 13.00 10.00 1.20 1.09 - 1.5 1.5 - R2 13.00 10.00 1.20 1.09 - 1.5 1.5 - R2 13.00 10.00 1.20 1.09 - 1.5 1.5 - From: NorthWest Old Ballandean Rd - - 1.5 1.5 - R2 13.00 10.00 1.20 1.09 - 1.5 1.5 <td>Heavy Vehicles (H)</td> <td>/)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	Heavy Vehicles (H)	/)							
T1 13.00 10.00 1.20 1 - 1.5 1.5 - R2 13.00 10.00 1.20 1.09 - 1.5 1.5 - From: NorthEast Mt Lindesay Rd North L2 13.00 10.00 1.20 1.09 - 1.5 1.5 - T1 13.00 10.00 1.20 1.09 - 1.5 1.5 - T1 13.00 10.00 1.20 1.09 - 1.5 1.5 - R2 13.00 10.00 1.20 1.09 - 1.5 1.5 - R2 13.00 10.00 1.20 1.09 - 1.5 1.5 - From: NorthWest Old Ballandean Rd U <thu< th=""> <thu< th=""></thu<></thu<>	From: SouthEast	Boundary	Road						
From: NorthEast Mt Lindesay Rd North L2 13.00 10.00 1.20 1.09 - 1.5 1.5 - T1 13.00 10.00 1.20 1 - 1.5 1.5 - R2 13.00 10.00 1.20 1.09 - 1.5 1.5 - From: NorthWest Old Ballandean Rd L2 13.00 10.00 1.20 1.09 - 1.5 1.5 - T1 13.00 10.00 1.20 1.09 - 1.5 1.5 - T2 13.00 10.00 1.20 1.09 - 1.5 1.5 - T1 13.00 10.00 1.20 1.09 - 1.5 1.5 - R2 13.00 10.00 1.20 1.09 - 1.5 1.5 - R2 13.00 10.00 1.20 1.09 - 1.5 1.5 -	T1	13.00	10.00	1.20	1	-	1.5	1.5	_
L2 13.00 10.00 1.20 1.09 - 1.5 1.5 - T1 13.00 10.00 1.20 1 - 1.5 1.5 - R2 13.00 10.00 1.20 1.09 - 1.5 1.5 - From: NorthWest Old Ballandean Rd - 1.5 1.5 - - L2 13.00 10.00 1.20 1.09 - 1.5 1.5 - T1 13.00 10.00 1.20 1.09 - 1.5 1.5 - R2 13.00 10.00 1.20 1.09 - 1.5 1.5 - R2 13.00 10.00 1.20 1.09 - 1.5 1.5 - R2 13.00 10.00 1.20 1.09 - 1.5 1.5 - From: SouthWest Mt Lindesay Road South - 1.5 1.5 - -				1.20	1.03		1.0	1.5	_
L2 13.00 10.00 1.20 1.09 - 1.5 1.5 - T1 13.00 10.00 1.20 1 - 1.5 1.5 - R2 13.00 10.00 1.20 1.09 - 1.5 1.5 - From: SouthWest Mt Lindesay Road South - 1.5 1.5 -	T1	13.00 13.00	10.00 10.00	1.20	1	- - -	1.5	1.5	
T1 13.00 10.00 1.20 1 - 1.5 1.5 - R2 13.00 10.00 1.20 1.09 - 1.5 1.5 - From: SouthWest Mt Lindesay Road South - 1.5 1.5 -	From: NorthWest	Old Ballan	dean Rd						
	T1	13.00	10.00	1.20	1	- - -	1.5	1.5	-
L2 13.00 10.00 1.20 1.09 - 1.5 1.5 -	From: SouthWest	Mt Lindesa	ay Road South						
T113.0010.001.201-1.51.5-R213.0010.001.201.09-1.51.5-	T1	13.00	10.00	1.20	1		1.5	1.5	

Demand & Sensiti		
Analysis Method:	None	

Model Settings - Options	
General Options	
Level of Service Method	Delay (RTA NSW)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Include Short Lanes in determining	No
Approach Queue Storage Ratio	

Model Settings - Model Parameters	
Passenger Car Equivalents	
Light Vehicles (LV)	1.00 pcu/veh
Heavy Vehicles (HV)	1.65 pcu/veh
Queue Blockage	
Minimum Probability of Blockage	0
Delay and Queue	
Exclude Geometry Delay	No
HCM Delay Formula	No
HCM Queue Formula	No
Downstream Short Lane	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Cost

Model Settings - Cost						
Cost Options						
Cost Unit	\$					
Vehicle Cost Parameters						
		Vel	n Operating Co	st	Veh Tim	e Cost
Movement Class	Veh Cost Method	Pump Price of Fuel	Fuel Res. Cost Factor	Ratio of Running Cost to Fuel Cost	Avg. Income	Time Value Factor
		\$/L			\$/h	
Light Vehicles (LV)	Operating Cost	1.450	0.500	3.00	38.00	0.600
Heavy Vehicles (HV)	Operating Cost	1.450	0.500	3.00	38.00	0.600

Model Settings - Vehicle Parameters			
Movement Class	Mass	Max Power	CO2 to
	kg	kW	Fuel Rate
Light Vehicles (LV)	1600.0	120	2.35
Heavy Vehicles (HV)	15000.0	170	2.633

Model Settings - Fuel Consumption							
Movement Class	fi	А	В	Beta			
Light Vehicles (LV)	1200	16	0.004	0.1			
Heavy Vehicles (HV)	2300	200	0.009	0.075			

Model Settings - CO Emission							
Movement Class	fi	А	В	Beta			
Light Vehicles (LV) Heavy Vehicles (HV)	1620 25000	-138 320	0.0743 -0.06	0.294 0.04			

Model Settings - HC Emission							
Movement Class	fi	А	В	Beta			
Light Vehicles (LV)	340	-9	0.0031	0.029			
Heavy Vehicles (HV)	3000	1	-0.0016	0.0013			

Model Settings - NOx Emission						
Movement Class	fi	А	В	Beta		
Light Vehicles (LV)	300	-14	0.0068	0.166		
Heavy Vehicles (HV)	44000	2820	0.21	1.9		

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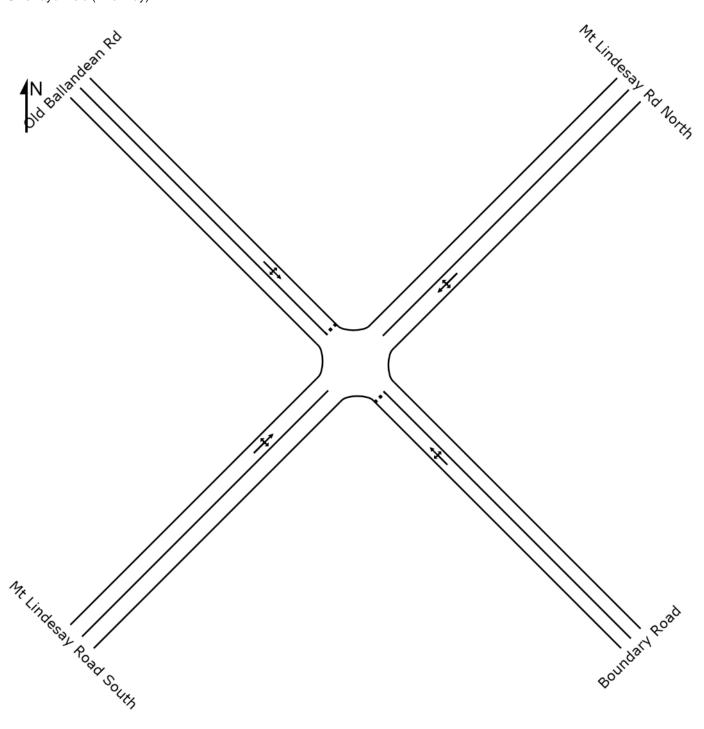
APPENDIX D3

30yr + Development

SITE LAYOUT

$\overline{ abla}$ Site: Mt Lindesay & Old Ballandean Rd - With Development 8am - 9am Peak

New Site Giveway / Yield (Two-Way)



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SIDRA INTERSECTION 6

INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

V Site: Mt Lindesay & Old Ballandean Rd - With Development 8am - 9am Peak

New Site Giveway / Yield (Two-Way)

Volume Display Method: Separate

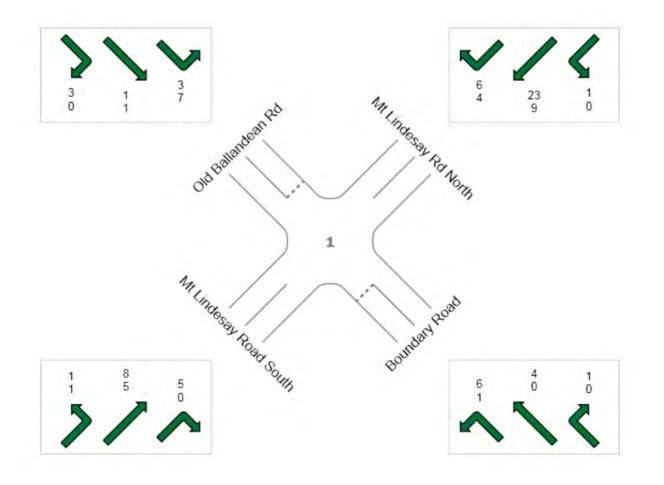
Volumes are shown for Movement Class(es): Light Vehicles and Heavy Vehicles

Total Intersection Volumes (veh)

All Movement Classes: 90

Light Vehicles (LV): 62

Heavy Vehicles (HV): 28



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MOVEMENT SUMMARY

abla Site: Mt Lindesay & Old Ballandean Rd - With Development 8am - 9am Peak

New Site Giveway / Yield (Two-Way)

Design Life Analysis (Practical Capacity): Results for 30 years

Move	ment Perf	ormance - \	/ehicles								
Mov	OD	Demano		Deg.	Average	Level of	95% Back		Prop.	Effective	Average
ID	Mov	Total veh/h	HV	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
South	East: Bound		%	v/c	sec	_	veh	m	_	per veh	km/h
4	L2	11	14.3	0.014	7.0	LOS A	0.0	0.3	0.12	0.57	55.7
5	 T1	6	0.0	0.014	5.2	LOSA	0.0	0.3	0.12	0.57	60.0
6	R2	2	0.0	0.014	6.4	LOS A	0.0	0.3	0.12	0.57	59.2
Approa		18	8.3	0.014	6.4	LOSA	0.0	0.3	0.12	0.57	57.4
									•···-		
		desay Rd Noi									
7	L2	2	0.0	0.042	6.5	LOS A	0.2	1.8	0.11	0.16	64.4
8	T1	49	28.1	0.042	0.1	LOS A	0.2	1.8	0.11	0.16	67.5
9	R2	15	40.0	0.042	7.2	LOS A	0.2	1.8	0.11	0.16	61.5
Approa	ach	66	30.2	0.042	1.9	NA	0.2	1.8	0.11	0.16	65.9
North\	Vest: Old B	allandean Rd									
10	L2	15	70.0	0.021	7.1	LOS A	0.1	0.9	0.10	0.58	44.0
11	T1	3	50.0	0.021	5.6	LOS A	0.1	0.9	0.10	0.58	48.3
12	R2	5	0.0	0.021	6.5	LOS A	0.1	0.9	0.10	0.58	59.0
Approa	ach	23	53.3	0.021	6.8	LOS A	0.1	0.9	0.10	0.58	46.9
South	West: Mt Li	ndesay Road	South								
1	L2	3	50.0	0.019	7.2	LOS A	0.1	0.7	0.14	0.21	60.5
2	T1	20	38.5	0.019	0.2	LOS A	0.1	0.7	0.14	0.21	65.9
3	R2	8	0.0	0.019	6.4	LOS A	0.1	0.7	0.14	0.21	62.2
Approa	ach	31	30.0	0.019	2.4	NA	0.1	0.7	0.14	0.21	64.4
All Vel	nicles	137	31.1	0.042	3.4	NA	0.2	1.8	0.11	0.29	60.3

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 is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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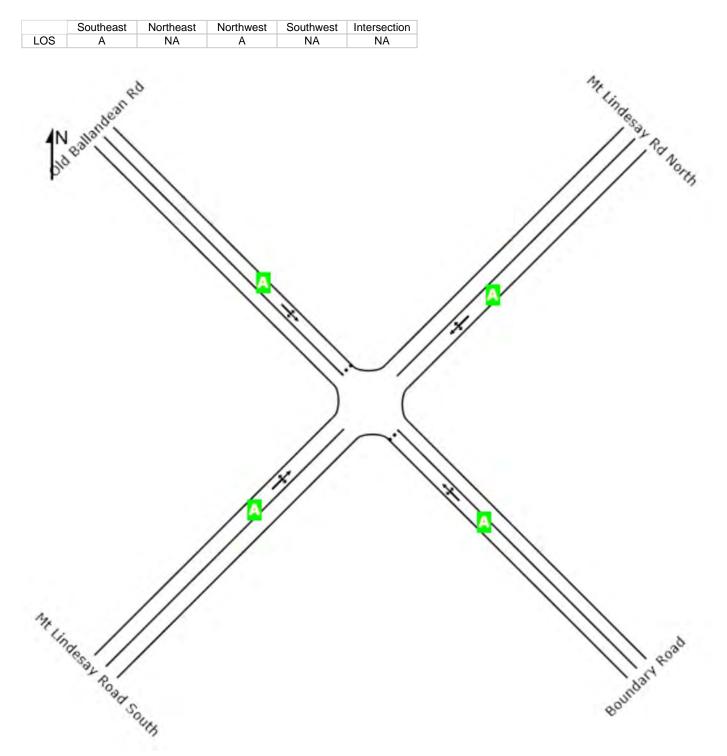


LEVEL OF SERVICE

igvee Site: Mt Lindesay & Old Ballandean Rd - With Development 8am - 9am Peak

New Site Giveway / Yield (Two-Way) Design Life Analysis (Practical Capacity): Results for 30 years

All Movement Classes



Level of Service (LOS) Method: Delay (RTA NSW).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

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 lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

DEGREE OF SATURATION

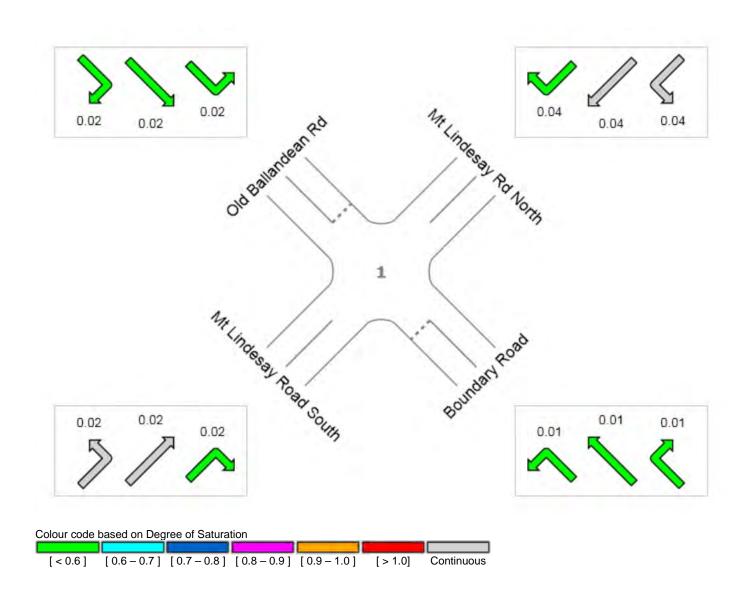
Ratio of Demand Volume to Capacity (v/c ratio)

\overline{V} Site: Mt Lindesay & Old Ballandean Rd - With Development 8am - 9am Peak

New Site Giveway / Yield (Two-Way) Design Life Analysis (Practical Capacity): Results for 30 years

All Movement Classes

	Southeast	Northeast	Northwest	Southwest	Intersection
Degree of Saturation	0.01	0.04	0.02	0.02	0.04



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SIDRA INTERSECTION 6

DELAY (CONTROL)

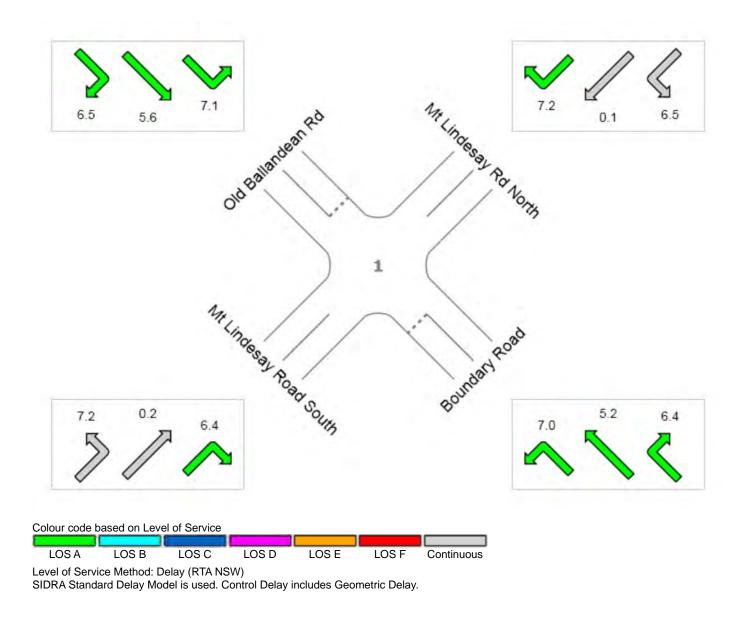
Average control delay per vehicle, or average pedestrian delay (seconds)

∇ Site: Mt Lindesay & Old Ballandean Rd - With Development 8am - 9am Peak

New Site Giveway / Yield (Two-Way) Design Life Analysis (Practical Capacity): Results for 30 years

All Movement Classes

	Southeast	Northeast	Northwest	Southwest	Intersection
Delay (Control)	6.4	1.9	6.8	2.4	3.4
LOS	A	NA	A	NA	NA



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INPUT REPORT

∇ Site: Mt Lindesay & Old Ballandean Rd - With Development 8am - 9am Peak

New Site Giveway / Yield (Two-Way)

Intersection - Site Data	
Site Name	Mt Lindesay & Old Ballandean Rd - With Development 8am - 9am Peak
Site ID	1
Site Title	New Site

Intersection - Site Properties	
Site (Intersection) Type	Giveway / Yield (Two-Way)
Model Name	New South Wales
Base Model	NA
Drive Rule	Left-hand side of the road
HCM Version	No
Units	Metric
First Created	
Date	2/12/2014 3:52:40 PM
Created By	Dave
Organisation	CONSTRUCTIVE SOLUTIONS PTY LTD
Version	6.0.22.4722
Last Modified	
Date	3/12/2014 9:11:46 AM
Modified By	Dave
Organisation	CONSTRUCTIVE SOLUTIONS PTY LTD
Version	6.0.22.4722

Intersection	n - Approach Data							
Location	Name	Туре	No. of App. Lanes	No. of Exit Lanes		Extra A Bunching	Approach Control	Area Type Factor
					m	%		
SouthEast B	oundary Road	Two-way	1	1	500.0	0 0	Give-way Yield	-
NorthEast M	It Lindesay Rd North	Two-way	1	1	500.0	0	Major Road	-
NorthWest C	ld Ballandean Rd	Two-way	1	1	500.0	0 0	Give-way Yield	-
SouthWest M	It Lindesay Road South	Two-way	1	1	500.0	0	Major Road	-

Movement Definitions - Inclue	Movement Definitions - Included Movement Classes								
Name	ID	Model Designation	Туре						
Light Vehicles	LV	Light Vehicle	Standard						
Heavy Vehicles	HV	Heavy Vehicle	Standard						

Movement Definitions - Origin-Destination Movements									
To Approach	OD	Novement Turn Designation	OD Mov ID	LTR Mov ID					
From: South	East	Boundary Road							
SouthWest	L2	Ĺ	4	4					
NorthWest	T1	Т	5	5					
NorthEast	R2	R	6	6					
From: Northl	East	Mt Lindesay Rd North							
SouthEast	L2	L	7	7					

From: NorthWestOld Ballandean RdNorthEastL2L10SouthEastT1T11		T1 R2	T R	8 9	8 9
	From: NorthW	est Old Ball	andean Rd		
SouthWest R2 R 12 12	SouthEast	 T1	L T R	11	11
From: SouthWest Mt Lindesay Road South	From: SouthW	Vest Mt Linde	esay Road Sout	h	
NorthWest L2 L 1 1 NorthEast T1 T 2 2 SouthEast R2 R 3 3	NorthEast	T1	L T R	1 2 3	-

Lane Geon	netry - Lane Co	onfigurati	ion									
Leg Item	Configuration	Туре	Control	Slip/ Bypass Control	Length	Width	Grade	Full Lane [ID Colour]	[Front Width	Island Back Fil Width		For Pec Staging 1
					m	m	%		m	m		-
SouthEast	Boundary Road											
App. Lane 1	Full-Length	Normal	Giveway /Yield	-	500	2.5	-6		-	-	-	-
Exit Lane 1	Full-Length	-	_	-	500	2.5	6		-	-	-	-
NorthEast	Mt Lindesay Rd I	North										
App. Lane 1	Full-Length	Normal	Continu ous	-	500	3	-2		-	-	-	-
Exit Lane 1	Full-Length	-	_	-	500	3	2		-	-	-	-
NorthWest	Old Ballandean F	٦d										
App. Lane 1	Full-Length	Normal	Giveway /Yield	-	500	2.5	4		-	-	-	-
Exit Lane 1	Full-Length	-	_	-	500	2.5	-4		-	-	-	-
SouthWest	Mt Lindesay Roa	d South										
App. Lane 1	Full-Length	Normal	Continu ous	-	500	3	0		-	-	-	-
Exit Lane 1	Full-Length	-	-	-	500	3	0		-	-	-	-

Lanes are numbered from left to right in the direction of travel.

Lane Geometry	- Lane Disciplin	es	
To Approach	OD Movement	Free Queue Distance m	Movement Class(es)
From: SouthEast	App. Lane 1		
SouthWest NorthWest NorthEast	L2 T1 R2	0 0 0	LV, HV LV, HV LV, HV
From: NorthEast	App. Lane 1		
SouthEast SouthWest NorthWest	L2 T1 R2	0 0 0	LV, HV LV, HV LV, HV
From: NorthWest	App. Lane 1		
NorthEast SouthEast SouthWest	L2 T1 R2	0 0 0	LV, HV LV, HV LV, HV
From: SouthWest	App. Lane 1		
NorthWest NorthEast SouthEast	L2 T1 R2	0 0 0	LV, HV LV, HV LV, HV

Lane Data - Lane Dat	а				
Approach Lane	Basic Satn Flow	Utilisation Ratio	Saturation Speed	Capacity Adjustment	Use Given Cap Adj in Network Analysis
	tcu/h	%	km/h	%	
SouthEast Boundary R	load				
App. Lane 1	1950	-	_	0.0	No
NorthEast Mt Lindesay	/ Rd North				

App. Lane 1	1950	-	-	0.0	No			
NorthWest Old Ballandean Rd								
App. Lane 1	1950	-	-	0.0	No			
SouthWest Mt Lindesay Road South								
App. Lane 1	1950	-	-	0.0	No			

Lane Data - Fl	ow Proportio	ns		
		To Exit	Leg	
Exit Lane		NorthEast	NorthWest	SouthWest
	%	%	%	%
Light Vehicles (L	_V)			
From: SouthEas	t App. Lane	1		
Exit Lane 1	-	100	100	100
From: NorthEast	t App. Lane	1		
Exit Lane 1	100	-	100	100
From: NorthWes	t App. Lane	1		
Exit Lane 1	100	100	-	100
From: SouthWes	st App. Lane	1		
Exit Lane 1	100	100	100	-
Heavy Vehicles	(HV)			
From: SouthEas	t App. Lane	1		
Exit Lane 1	-	. 100	100	100
From: NorthEast	t App. Lane	1		
Exit Lane 1	100	-	100	100
From: NorthWes	t App. Lane	1		
Exit Lane 1	100	. 100	_	100
From: SouthWes	st App. Lane	1		
Exit Lane 1	100	. 100	100	-

Lane Data - Lane Blockage
Lane Data - Lane Blockage

	and Breenag	~		
		To Exit	Leg	
Exit Lane	SouthEast	NorthEast	NorthWest	SouthWest
From: SouthEast	st App. Lan	e 1		
Exit Lane 1	_	Yes	Yes	Yes
From: NorthEas	t App. Lan	e 1		
Exit Lane 1	Yes	-	Yes	Yes
From: NorthWes	st App. Lan	e 1		
Exit Lane 1	Yes	Yes	-	Yes
From: SouthWe	st App. Lan	e 1		
Exit Lane 1	Yes	Yes	Yes	_

Pedestrians - Pedestrian Movements									
Unit Time for Volumes: 60 mir Peak Flow Period: 30 minutes									
Main Crossing/ Slip/Bypass Lane Crossing	Volume	Peak Flow	Flow Scale	Growth Rate					
	ped	%	%	%					
No Ped Movements									

Pedestrians - Pedestrian Movement Data										
Main Crossing/ Slip/Bypass Lane Crossing	Mov. ID	Crossing Distance	Oppng Ped.Fac.	P.Deg. Satn	Walking Speed	App. Trav. Distance	Downst. Distance	Queue Space		
		m			m/sec	m	m	m		
No Ped Move	ments									

Volumes - Vehicle Volumes

Unit Time for Volumes: 60 minutes Peak Flow Period: 30 minutes Volume Data Method: Separate

Volume Data Me						
		To Exit	Leg			
Movement Class	SouthEast veh	NorthEast veh	NorthWest veh	SouthWest veh		
From: SouthEas	t Boundar	y Road				
Total (veh)	_	1	4	7		
LV (veh)	-	1	4	6		
HV (veh)	-	0	0	1		
From: NorthEas	t Mt Linde	say Rd North				
Total (veh)	1	-	10	32		
LV (veh)	1	-	6	23		
HV (veh)	0	-	4	9		
From: NorthWes	st Old Balla	ndean Rd				
Total (veh)	2	10	-	3		
LV (veh)	1	3	-	3		
HV (veh)	1	7	-	0		
From: SouthWe	st Mt Linde	say Road Sou	uth			
Total (veh)	5	13	2	-		
LV (veh)	5	8	1	-		
HV (veh)	0	5	1	-		

Approach Factor Scale H % % Light Vehicles (LV)	rowth Rate ‰/year
% % % Light Vehicles (LV)	
Light Vehicles (LV)	o/year
From: SouthEast Boundary Road	
SouthWest 95.0 100.00	1.50
NorthWest 95.0 100.00	1.50
NorthEast 95.0 100.00	1.50
From: NorthEast Mt Lindesay Rd North	
SouthEast 95.0 100.00	1.50
SouthWest 95.0 100.00	1.50
NorthWest 95.0 100.00	1.50
From: NorthWest Old Ballandean Rd	
NorthEast 95.0 100.00	1.50
SouthEast 95.0 100.00 SouthWest 95.0 100.00	1.50 1.50
	1.50
From: SouthWest Mt Lindesay Road South	
NorthWest 95.0 100.00	1.50
NorthEast 95.0 100.00 SouthEast 95.0 100.00	1.50 1.50
Heavy Vehicles (HV)	1.50
From: SouthEast Boundary Road	
SouthWest 95.0 100.00	1.50
NorthWest 95.0 100.00 NorthEast 95.0 100.00	1.50 1.50
	1.50
From: NorthEast Mt Lindesay Rd North	4 50
SouthEast 95.0 100.00 SouthWest 95.0 100.00	1.50 1.50
NorthWest 95.0 100.00	1.50
From: NorthWest Old Ballandean Rd	1.00
NorthEast 95.0 100.00	1.50
SouthEast 95.0 100.00	1.50
SouthWest 95.0 100.00	1.50
From: SouthWest Mt Lindesay Road South	
NorthWest 95.0 100.00	1.50
NorthEast 95.0 100.00	1.50
SouthEast 95.0 100.00	1.50

Priorities Opposed

Opposing Movements

Movement	SouthEast	NorthEast	NorthWest	SouthWest	
SouthEast	Boundary R	oad			
L2 T1 R2	- - -	T1 T1,R2 T1,R2	_ _ T1,L2	– R2,T1,L2 R2,T1	
NorthEast	Mt Lindesay	Rd North			
L2 T1 R2	- - -	- - -	- - -	_ _ T1,L2	
NorthWest	Old Ballande	ean Rd			
L2 T1 R2	_ _ L2,T1	– T1,L2,R2 T1,R2	-	T1 R2,T1 R2,T1	
SouthWest	Mt Lindesay	Road South			
L2 T1 R2		– – T1,L2		- - -	

Gap Acce	ptance - Gap Ac	ceptance	e Data					
Opposed Movement	Apply TWSC Calibration	Critical Gap	Follow-up Headway	Minimum Departures	Exiting Flow Effect	Nearest Lane	Opng. Peds (UnSig)	Staged Crossing
		sec	sec	veh/min	%	%		
SouthEast	Boundary Road							
L2 T1	Yes Yes	5.000 6.500	3.000 3.500	0.10 0.10	50 50	100.00	Pr (Flow) Pr (Flow) Pr (Flow)	None None
R2	Yes	7.000	4.000	0.10	50	0.00	Pr (Flow)	None
NorthEast	Mt Lindesay Rd I	North						
R2	Yes	4.500	2.500	0.10	0	0.00	Pr (Flow)	None
NorthWest	Old Ballandean F	٦d						
L2 T1	Yes Yes	5.000 6.500	3.000 3.500	0.10 0.10	50 50	100.00 0.00	Pr (Flow) Pr (Flow)	None None
R2	Yes	7.000	4.000	0.10	50	0.00	Pr (Flow)	None
SouthWest	Mt Lindesay Roa	d South						
R2	Yes	4.500	2.500	0.10	0	0.00	Pr (Flow)	None

Gap Acceptance - Two-W	ay Sign C	ontrol P	arameter	Adjs fo	r Major R	d Numb	er of Lai	nes
	Crit	ical Gap A	djustment		Follow-	up Headw	ay Adjust	ment
Major Road Number of	2-lane	3-lane	5-lane 6-	lane or	2-lane	3-lane	5-lane	6-lane
Lanes:				more				or more
	sec	sec	sec	sec	sec	sec	sec	sec
Minor Road Left Turn	-0.5	-0.5	0.0	0.0	-0.5	-0.5	0.0	0.0
Minor Road Through	-1.5	-0.5	0.5	1.0	-0.5	-0.3	0.5	1.0
Minor Road Right Turn	-1.5	-0.5	0.5	1.0	-0.5	-0.3	0.5	1.0
Major Road Turn (Right or Left)	-0.5	-0.5	0.0	1.0	-0.5	-0.5	0.0	1.0

Gap Acceptance - Two-Way Sign Control Parameter Adjs for Geometry and Control

	Critical Gap	Follow-up
	Adjustment	Headway Adjustment
	sec	sec
Give-Way / Yield Sign Control	-0.5	-0.3
One-Way Major Road	-0.5	-0.3
T Intersection (Minor Road Turn)	-0.7	-0.4
Entry Road Grade (for each per cent grade)	0.1	0.0
Staged Crossing - Stage 1	-1.0	-0.6
Staged Crossing - Stage 2	-1.0	-0.6

Gap Acceptance - Settings Gap Acceptance Capacity : SIDRA Standard (Akçelik M3D)

Vehicle Movem	ent Data - <u>Pa</u> t	th Data				
OD	Approach	Exit	Negotiation	Negotiation	Downstream	Negotiation
Movement C	ruise Speed C	ruise Speed	Speed	Distance	Distance	Radius
	km/h	km/h	km/h	m	m	m
Light Vehicles (LV)					
From: SouthEast	Boundary R	oad				
L2	70.0	70.0	-	-	_	-
T1	70.0	70.0	-	-	-	-
R2	70.0	70.0	-	-	-	-
From: NorthEast	Mt Lindesay	Rd North				
L2	70.0	70.0	-	-	-	-
T1	70.0	70.0	-	-	-	-
R2	70.0	70.0	-	-	-	-
From: NorthWest	Old Balland					
L2	70.0	70.0	-	-	-	-
T1	70.0	70.0	-	-	-	-
R2	70.0	70.0	-	-	-	-
From: SouthWest		Road South				
L2	70.0	70.0	-	-	-	-
T1	70.0	70.0	-	-	-	-
R2	70.0	70.0	-	-	-	-
Heavy Vehicles (H	HV)					
From: SouthEast	Boundary R					
L2	70.0	70.0	-	-	-	-
T1	70.0	70.0	-	-	-	-
R2	70.0	70.0	-	-	-	-
From: NorthEast	Mt Lindesay					
L2	70.0	70.0	-	-	-	-
T1	70.0	70.0	-	-	-	-
R2	70.0	70.0	-	-	-	_
From: NorthWest	Old Balland					
L2	70.0	70.0	-	-	-	-
T1	70.0	70.0	-	-	-	-
R2	70.0	70.0	_		_	
From: SouthWest		Road South				
L2	70.0	70.0	-	-	-	-
T1	70.0	70.0	-	-	-	-
R2	70.0	70.0	-	-	-	-

Vehicle Moveme	nt Data - C	alibration						
OD Movement	Queue Space	Vehicle Length	Vehicle Occupancy	Turn Veh [Factor	Effect Radius]	Gap Accp Factor	Opng. Veh Factor	Prac. Deg. Of Satn.
	m	m	pers/veh		m			
Light Vehicles (LV)								
From: SouthEast	Boundary	Road						
L2	7.00	4.50	1.20	1.05	-	1	1	-
T1	7.00	4.50	1.20	1	-	1	1	-
R2	7.00	4.50	1.20	1.05	-	1	1	-
From: NorthEast	Mt Lindes	ay Rd North						
L2	7.00	4.50	1.20	1.05	-	1	1	-
T1	7.00	4.50	1.20	1	-	1	1	-
R2	7.00	4.50	1.20	1.05	-	1	1	-
From: NorthWest	Old Ballar	ndean Rd						
L2	7.00	4.50	1.20	1.05	_	1	1	-
T1	7.00	4.50	1.20	1	_	1	1	-
R2	7.00	4.50	1.20	1.05	-	1	1	-
From: SouthWest	Mt Lindes	ay Road So	uth					
L2	7.00	4.50	1.20	1.05	_	1	1	_
T1	7.00	4.50	1.20	1	-	1	1	-

R2	7.00	4.50	1.20	1.05	-	1	1	-
Heavy Vehicles (H)	√)							
From: SouthEast	Boundary	Road						
L2	13.00	10.00	1.20	1.09	-	1.5	1.5	-
T1	13.00	10.00	1.20	1	-	1.5	1.5	-
R2	13.00	10.00	1.20	1.09	-	1.5	1.5	-
From: NorthEast	Mt Lindesa	y Rd North						
L2	13.00	10.00	1.20	1.09	-	1.5	1.5	-
T1	13.00	10.00	1.20	1	-	1.5	1.5	-
R2	13.00	10.00	1.20	1.09	-	1.5	1.5	-
From: NorthWest	Old Ballan	dean Rd						
L2	13.00	10.00	1.20	1.09	-	1.5	1.5	-
T1	13.00	10.00	1.20	1	-	1.5	1.5	-
R2	13.00	10.00	1.20	1.09	-	1.5	1.5	-
From: SouthWest	Mt Lindesa	y Road South						
L2	13.00	10.00	1.20	1.09	_	1.5	1.5	-
T1	13.00	10.00	1.20	1	-	1.5	1.5	-
R2	13.00	10.00	1.20	1.09	-	1.5	1.5	-

Demand & Sensitivity					
Analysis Method: Design Life					
Design Life Analysis Objective	Practical Capacity (v/c ratio = xp)				
Growth Model	Uniform				
Number of Years	30				
Const. No. of Years	-				
Result For	Intersection - Vehicles				

Model Settings - Options	
General Options	
Level of Service Method	Delay (RTA NSW)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Include Short Lanes in determining Approach Queue Storage Ratio	No

Model Settings - Model Parameters	
Passenger Car Equivalents	
Light Vehicles (LV)	1.00 pcu/veh
Heavy Vehicles (HV)	1.65 pcu/veh
Queue Blockage	
Minimum Probability of Blockage	0
Delay and Queue	
Exclude Geometry Delay	No
HCM Delay Formula	No
HCM Queue Formula	No
Downstream Short Lane	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Cost							
Cost Options							
Cost Unit	\$						
Vehicle Cost Parameters							
		Vel	n Operating Co	st	Veh Time Cost		
Movement Class	Veh Cost Method	Pump Price of Fuel	Fuel Res. Cost Factor	Ratio of Running Cost to Fuel Cost	Avg. Income	Time Value Factor	
		\$/L			\$/h		
Light Vehicles (LV)	Operating	1.450	0.500	3.00	38.00	0.600	

	Cost					
Heavy Vehicles (HV)	Operating Cost	1.450	0.500	3.00	38.00	0.600

Model Settings - Vehicle Parameters						
Movement Class	Mass	Max Power	CO2 to			
	kg	kW	Fuel Rate			
Light Vehicles (LV)	1600.0	120	2.35			
Heavy Vehicles (HV)	15000.0	170	2.633			

Model Settings - Fuel Consumption						
Movement Class	fi	А	В	Beta		
Light Vehicles (LV)	1200	16	0.004	0.1		
Heavy Vehicles (HV)	2300	200	0.009	0.075		

Model Settings - CO Emission						
Movement Class	fi	А	В	Beta		
Light Vehicles (LV) Heavy Vehicles (HV)	1620 25000	-138 320	0.0743 -0.06	0.294 0.04		

Model Settings - HC Emission										
Movement Class	fi	А	В	Beta						
Light Vehicles (LV)	340	-9	0.0031	0.029						
Heavy Vehicles (HV)	3000	1	-0.0016	0.0013						

Model Settings - NOx Emission										
Movement Class	fi	А	В	Beta						
Light Vehicles (LV)	300	-14	0.0068	0.166						
Heavy Vehicles (HV)	44000	2820	0.21	1.9						

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APPENDIX E

New England Hwy, Bruxner Hwy & Old Ballandeen Rd -SIDRA Results

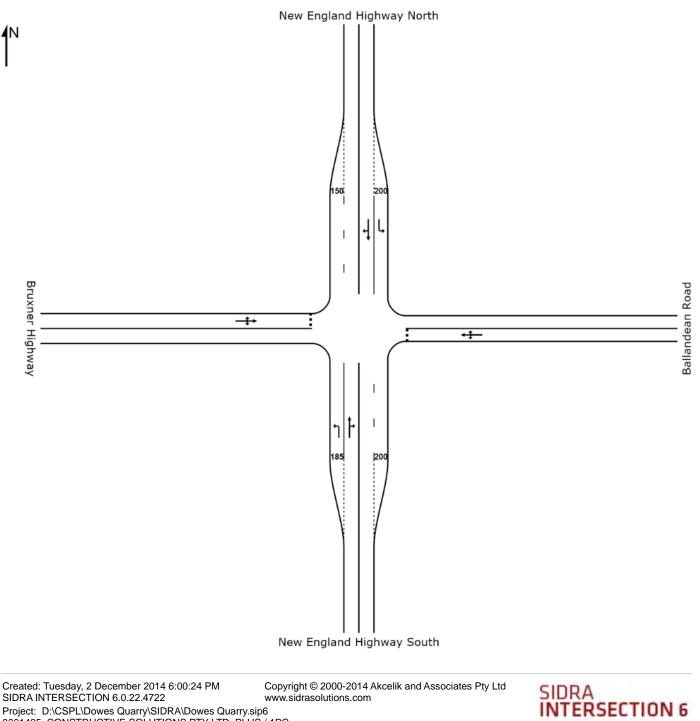
APPENDIX E1

Background

SITE LAYOUT

abla Site: New England Highway & Old Ballandean Rd No Development 8am - 9am Peak

New Site Giveway / Yield (Two-Way)



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INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

\overline{igvee} Site: New England Highway & Old Ballandean Rd No Development 8am - 9am Peak

New Site Giveway / Yield (Two-Way)

Volume Display Method: Separate

Volumes are shown for Movement Class(es): Light Vehicles and Heavy Vehicles

Total Intersection Volumes (veh)

All Movement Classes: 243

Light Vehicles (LV): 202

Heavy Vehicles (HV): 41





New England Highway South



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MOVEMENT SUMMARY

abla Site: New England Highway & Old Ballandean Rd No Development 8am - 9am Peak

New Site Giveway / Yield (Two-Way)

Move	ment Perf	ormance - \	Vehicles								
Mov ID	OD Mov	Demano Total	d Flows HV	Deg. Satn	Average Delav	Level of Service	95% Back Vehicles	of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
U	IVIOV	veh/h	пv %	v/c	Sec	Service	venicies veh	Distance	Queuea	per veh	speed km/h
South	New Engla	nd Highway									
1	L2	14	15.4	0.008	8.0	LOS A	0.0	0.0	0.00	0.66	69.1
2	T1	101	13.5	0.059	0.5	LOS A	0.3	2.5	0.24	0.01	96.2
3	R2	2	0.0	0.059	8.1	LOS A	0.3	2.5	0.24	0.01	83.1
Appro	ach	117	13.5	0.059	1.5	NA	0.3	2.5	0.21	0.09	91.7
East:	Ballandean	Road									
4	L2	1	0.0	0.010	8.9	LOS A	0.0	0.3	0.34	0.60	63.4
5	T1	2	50.0	0.010	9.7	LOS A	0.0	0.3	0.34	0.60	51.4
6	R2	3	33.3	0.010	9.8	LOS A	0.0	0.3	0.34	0.60	53.8
Appro	ach	6	33.3	0.010	9.6	LOS A	0.0	0.3	0.34	0.60	54.3
North:	New Engla	nd Highway I	North								
7	L2	12	36.4	0.008	9.6	LOS A	0.0	0.0	0.00	0.67	63.0
8	T1	106	15.8	0.060	0.5	LOS A	0.3	2.7	0.23	0.01	96.5
9	R2	1	0.0	0.060	8.1	LOS A	0.3	2.7	0.23	0.01	85.7
Appro	ach	119	17.7	0.060	1.4	NA	0.3	2.7	0.21	0.07	91.6
West:	Bruxner Hig	hway									
10	L2	1	0.0	0.022	9.4	LOS A	0.1	0.7	0.39	0.63	62.8
11	T1	2	50.0	0.022	9.6	LOS A	0.1	0.7	0.39	0.63	51.0
12	R2	11	30.0	0.022	9.9	LOS A	0.1	0.7	0.39	0.63	60.9
Appro	ach	14	30.8	0.022	9.8	LOS A	0.1	0.7	0.39	0.63	59.3
All Vel	nicles	256	16.9	0.060	2.1	NA	0.3	2.7	0.22	0.12	87.6

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 is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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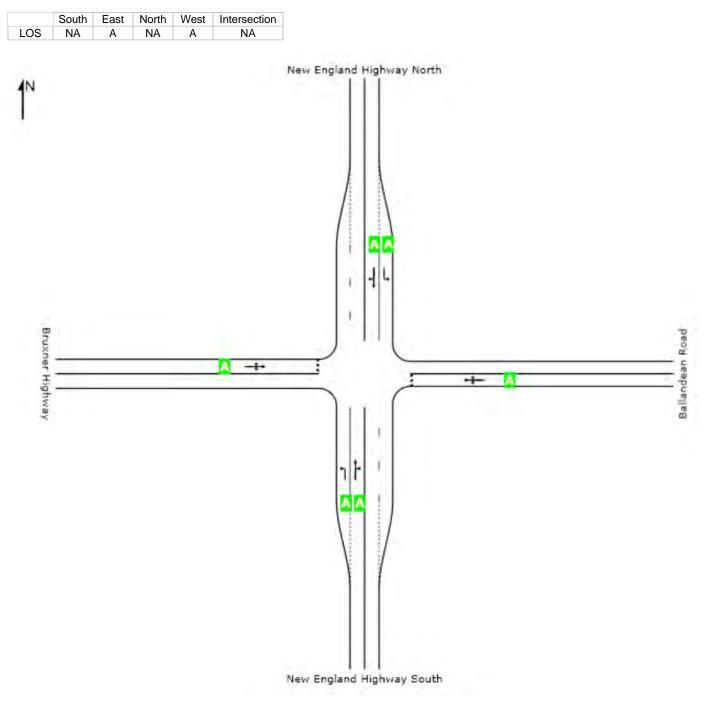


LEVEL OF SERVICE

\overline{igvee} Site: New England Highway & Old Ballandean Rd No Development 8am - 9am Peak

New Site Giveway / Yield (Two-Way)

All Movement Classes



Level of Service (LOS) Method: Delay (RTA NSW).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

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 lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.



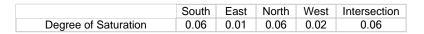
DEGREE OF SATURATION

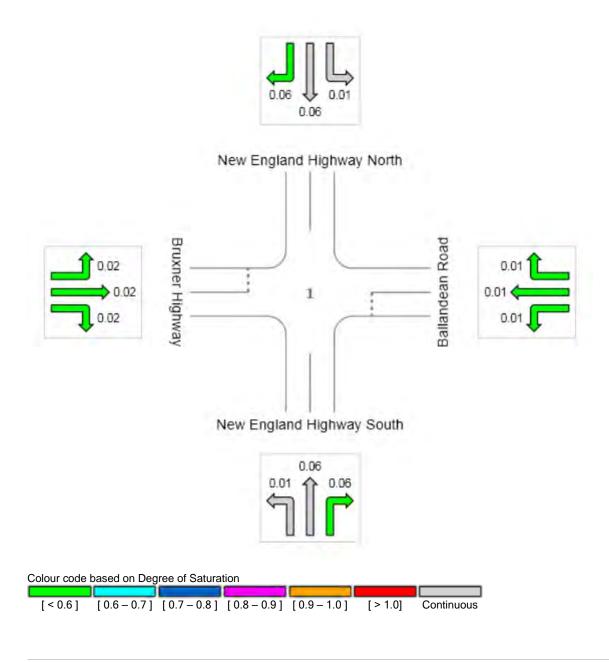
Ratio of Demand Volume to Capacity (v/c ratio)

\overline{V} Site: New England Highway & Old Ballandean Rd No Development 8am - 9am Peak

New Site Giveway / Yield (Two-Way)

All Movement Classes





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DELAY (CONTROL)

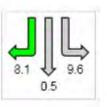
Average control delay per vehicle, or average pedestrian delay (seconds)

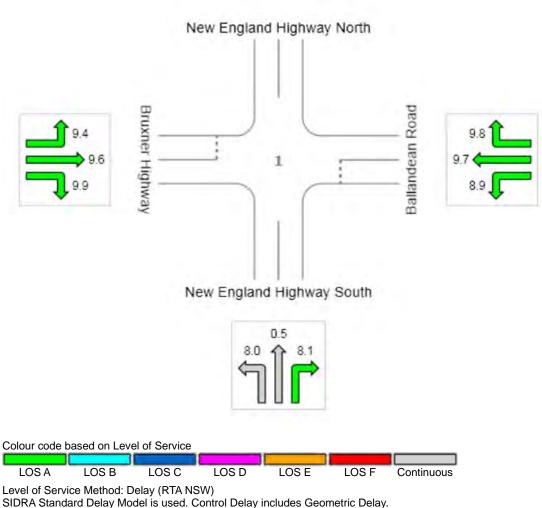
\overline{V} Site: New England Highway & Old Ballandean Rd No Development 8am - 9am Peak

New Site Giveway / Yield (Two-Way)

All Movement Classes

	South	East	North	West	Intersection
Delay (Control)	1.5	9.6	1.4	9.8	2.1
LOS	NA	А	NA	А	NA





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INPUT REPORT

∇ Site: New England Highway & Old Ballandean Rd No Development 8am - 9am Peak

New Site Giveway / Yield (Two-Way)

Intersection - Site Data	
Site Name	New England Highway & Old Ballandean Rd No Development 8am - 9am Peak
Site ID	1
Site Title	New Site

Intersection - Site Properties	
Site (Intersection) Type Giveway	/ / Yield (Two-Way)
Model Name New So	uth Wales
Base Model NA	
Drive Rule Left-han	d side of the road
HCM Version No	
Units Metric	
First Created	
Date 2/12/201	14 5:05:46 PM
Created By Dave	
Organisation CONST	RUCTIVE SOLUTIONS PTY
Version 6.0.22.4	722
Last Modified	
Date 2/12/201	14 5:56:42 PM
Modified By Dave	
Organisation CONST	RUCTIVE SOLUTIONS PTY
Version 6.0.22.4	722

Intersection - Approach Data										
Location	Name	Туре	No. of App. Lanes	No. of Exit Lanes	Approach Distance		Approach Control	Area Type Factor		
					m	%				
South	New England Highway South	Two-way	2	2	500.0	0	Major Road	-		
East	Ballandean Road	Two-way	1	1	500.0	0	Give-way Yield	-		
North	New England Highway North	Two-way	2	2	500.0	0	Major Road	-		
West	Bruxner Highway	Two-way	1	1	500.0	0	Give-way Yield	-		

Movement Definitions - Included Movement Classes								
Name	ID	Model Designation	Туре					
Light Vehicles	LV	Light Vehicle	Standard					
Heavy Vehicles	HV	Heavy Vehicle	Standard					

Movement Definitions - Origin-Destination Movements								
To Approach	OD N	lovement	Turn Designat	OD Mov ion	ID LTR	Mov ID		
From: South		New Eng	land Higl	hway South				
West	L2	_	L	1	1			
North	T1		Т	2	2			
East	R2		R	3	3			
From: East		Ballande	an Road					

South	L2	L	4	4
West	T1	T	5	5
North	R2	R	6	6
From: North		New England Highway	/ North	
East	L2	L	7	7
South	T1	T	8	8
West	R2	R	9	9
From: West		Bruxner Highway		
North	L2	L	10	10
East	T1	T	11	11
South	R2	R	12	12

Lane Geon	netry - Lane Cor	nfigurati	on										
Leg Item	Configuration	Туре	Control	Slip/ Bypass Control	Length	Width	Grade	Full [ID	l Lane Colour]	[Front Width	Islan BackFi Width		For Ped Staging 1
					m	m	%			m	m		
South	New England High	hway So	uth										
App. Lane 1	Short Lane	Normal	Continu ous	-	_	3.25	6	-	-	-	-	-	-
App. Lane 2	Full-Length	Normal	Continu ous	-	500	3.5	6			-	-	-	-
Exit Lane 2 Exit Lane 1	Full-Length Short Lane	_	_	_	500 _	3.5 3.25	-6 -6	_	_		_	_	_
East	Ballandean Road												
App. Lane 1	Full-Length	Normal	Giveway /Yield	-	500	3	-4			-	-	-	-
Exit Lane 1	Full-Length	-	-	-	500	3	4			-	-	-	-
North	New England High	hway No	rth										
App. Lane 1	Short Lane	Normal	Continu ous	-	_	3.25	-6	-	-	_	_	-	-
App. Lane 2	Full-Length	Normal	Continu ous	-	500	3.5	-6			-	-	-	-
	Full-Length	-	-	-	500	3.5	6			-	-	-	-
Exit Lane 1	Short Lane	-	-	-	-	3.25	6	-	-	-	-	-	-
West	Bruxner Highway												
App. Lane 1	Full-Length	Normal	Giveway /Yield	-	500	3.5	0			_	_	-	_
Exit Lane 1	Full-Length	-	-	-	500	3.5	0			-	-	-	-

Lanes are numbered from left to right in the direction of travel.

Leg Item Configuration Short Lane / Segment 1 Overflow/ Merge Dir Colour] Segment 2 ID Colour] South New England Highway South m m m m South New England Highway South 10 Colour] m m App. Lane 1 Short Lane 185 Right - - - North New England Highway North 200 Right - - - North New England Highway North - - - - North New England Highway North - - - - App. Lane 1 Short Lane 200 Right - - - North New England Highway North - - - - - App. Lane 1 Short Lane 200 Right - - -	Lane Geometry - Lane Configuration - Short Lanes and Two-Segment Lanes									
South New England Highway South 185 Right - - - App. Lane 1 Short Lane 185 Right - - - North New England Highway North App. Lane 1 Short Lane 200 Right - - - North New England Highway North - - - -				Short Lane /	Segment 1		S	egment 2	l	
South New England Highway South App. Lane 1 Short Lane 1 Short Lane 200 Right	Leg Item	Configuration	[Length		ID	Colour]	[Length	ID	Colour]	
App. Lane 1Short Lane185RightExit Lane 1Short Lane200RightNorthNew England Highway NorthApp. Lane 1Short Lane200Right			m				m			
Exit Lane 1 Short Lane 200 Right - - - - North New England Highway North - <td>South</td> <td>New England Highway South</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	South	New England Highway South								
North New England Highway North App. Lane 1 Short Lane 200 Right - - -	App. Lane 1	Short Lane	185	Right			_	-	_	
App. Lane 1 Short Lane 200 Right	Exit Lane 1	Short Lane	200	Right			-	-	-	
	North	New England Highway North								
Exit Lane 1 Short Lane 150 Right	App. Lane 1	Short Lane	200	Right			_	-	_	
	Exit Lane 1	Short Lane	150	Right			-	-	-	

Lane Geometr	ry - Lane Disciplin	es		
To Approach	OD Movement	Free Queue Distance m	Movement Class(es)	
From: South	App. Lane 1			
West	L2	0	LV, HV	
From: South	App. Lane 2			
North	T1	0	LV, HV	
East	R2	0	LV, HV	
From: East	App. Lane 1			
South	L2	0	LV, HV	

West North	T1 R2	0 0	LV, HV LV, HV
From: North	App. Lane 1		
East	L2	0	LV, HV
From: North	App. Lane 2		
South	T1	0	LV, HV
West	R2	0	LV, HV
From: West	App. Lane 1		
North	L2	0	LV, HV
East	T1	0	LV, HV
South	R2	0	LV, HV

Lane Data	- Lane Data					
Approach L	ane	Basic Satn Flow	Utilisation Ratio	Saturation Speed	Capacity Adjustment	Use Given Cap Adj in Network Analysis
		tcu/h	%	km/h	%	
South	New England High	way South				
App. Lane 1 App. Lane 2		1950 1950			0.0 0.0	No No
East	Ballandean Road					
App. Lane 1	l	1950	-	-	0.0	No
North	New England High	way North				
App. Lane 1 App. Lane 2		1950 1950			0.0 0.0	No No
West	Bruxner Highway					
App. Lane 1		1950	_	-	0.0	No

Lane Data - Flow	v Proportions			
Exit Lane	South %	To Exit Leg East %	North %	West %
Light Vehicles (LV))			
From: South Exit Lane 1	App. Lane 1 –	-	-	100
From: South Exit Lane 1 Exit Lane 2	App. Lane 2 – –	100	100 0	-
From: East Exit Lane 1 Exit Lane 2	App. Lane 1 100 0	-	0 100	100
From: North Exit Lane 1	App. Lane 1 –	100	-	-
From: North Exit Lane 1 Exit Lane 2	App. Lane 2 100 0	-	Ξ	100
From: West Exit Lane 1 Exit Lane 2	App. Lane 1 0 100	100	100 0	-
Heavy Vehicles (H	V)			
From: South Exit Lane 1	App. Lane 1 –	-	-	100
From: South Exit Lane 1 Exit Lane 2	App. Lane 2 _ _	100	100 0	-
From: East Exit Lane 1 Exit Lane 2	App. Lane 1 100 0	- -	0 100	100
From: North Exit Lane 1	App. Lane 1 –	100	-	-
From: North Exit Lane 1 Exit Lane 2	App. Lane 2 100 0	-	-	100 _

From: West	App. Lane 1				
Exit Lane 1	0	100	100	-	
Exit Lane 2	100	_	0	-	

Lane Data - Lan	ne Blockage			
Exit Lane	South	To Exit Leg East	North	West
From: South	App. Lane 1			
Exit Lane 1	-	-	-	Yes
From: South	App. Lane 2			
Exit Lane 1	-	Yes	Yes	-
Exit Lane 2	-	-	Yes	_
From: East	App. Lane 1			
Exit Lane 1	Yes	-	Yes	Yes
Exit Lane 2	Yes	-	Yes	-
From: North	App. Lane 1			
Exit Lane 1	-	Yes	-	-
From: North	App. Lane 2			
Exit Lane 1	Yes	-	-	Yes
Exit Lane 2	Yes	_	-	-
From: West	App. Lane 1			
Exit Lane 1	Yes	Yes	Yes	-
Exit Lane 2	Yes	-	Yes	-

Pedestrians - Pedestrian	Movements			
Unit Time for Volumes: 60 mi Peak Flow Period: 30 minute				
Main Crossing/ Slip/Bypass Lane Crossing	Volume	Peak Flow	Flow Scale	Growth Rate
	ped	%	%	%
No Ped Movements				

Pedestrians	s - Pedestri	an Movement	Data					
Main Crossing/ Slip/Bypass Lane Crossing	Mov. ID	Crossing Distance	Oppng Ped.Fac.	P.Deg. Satn	Walking Speed	App. Trav. Distance	Downst. Distance	Queue Space
		m			m/sec	m	m	m
No Ped Move	ements							

Volumes - Veh	icle Volumes			
Unit Time for Vol Peak Flow Period Volume Data Me	umes: 60 minute d: 30 minutes			
Movement Class	South veh	To Exit Leo East veh) North veh	West veh
From: South	New Englan	d Highway So		
Total (veh) LV (veh) HV (veh)	- - -	2 2 0	96 83 13	13 11 2
From: East	Ballandean	Road		
Total (veh) LV (veh) HV (veh)	1 1 0		3 2 1	2 1 1
From: North	New Englan	d Highway N	orth	
Total (veh) LV (veh) HV (veh)	101 85 16	11 7 4		1 1 0
From: West	Bruxner Hig	hway		

Total (veh)	10	2	1	_
LV (veh)	7	1	1	-
HV (veh)	3	1	0	-

Volumes - Volu	ume Factors		
То	Peak Flow	Flow	Growth
Approach	Factor	Scale	Rate
	%	%	%/year
Light Vehicles (L	V)		
From: South	New England Highway	South	
West	95.0	100.00	1.50
North	95.0	100.00	1.50
East	95.0	100.00	1.50
From: East	Ballandean Road		
South	95.0	100.00	1.50
West	95.0	100.00	1.50
North	95.0	100.00	1.50
From: North	New England Highway	North	
East	95.0	100.00	1.50
South	95.0	100.00	1.50
West	95.0	100.00	1.50
From: West	Bruxner Highway		
North	95.0	100.00	1.50
East	95.0	100.00	1.50
South	95.0	100.00	1.50
Heavy Vehicles	(HV)		
From: South	New England Highway	South	
West	95.0	100.00	1.50
North	95.0	100.00	1.50
East	95.0	100.00	1.50
From: East	Ballandean Road		
South	95.0	100.00	1.50
West	95.0	100.00	1.50
North	95.0	100.00	1.50
From: North	New England Highway	North	
East	95.0	100.00	1.50
South	95.0	100.00	1.50
West	95.0	100.00	1.50
From: West	Bruxner Highway		
North	95.0	100.00	1.50
East	95.0	100.00	1.50
South	95.0	100.00	1.50

Priorities				
Opposed Movement	South	Opposing East	Movements North	West
South	New Englan	d Highway S	South	
L2	_	-	_	-
T1 R2	-	-	_ T1 2	-
	-	-	T1,L2	-
East	Ballandean	Road		
L2		-	T1	-
T1 R2	R2,T1,L2 R2,T1		T1,R2 T1,R2	_ T1,L2
				11,52
North	New Englan	id Highway I	North	
L2 T1	-	-	-	-
R2	_ T1,L2	_	_	_
West	Bruxner Hig	hway		
L2	T1	_		-
T1 R2	R2,T1 R2,T1	_ L2,T1	T1,L2,R2 T1,R2	-
112	172,11	∟∠, Г Г	11,62	-

Gap Acce	ptance - Gap A	cceptance	e Data					
Opposed Movement	Apply TWSC Calibration	Critical Gap	Follow-up Headway	Minimum Departures	Exiting Flow Effect	% Opp. By Nearest Lane	Opng. Peds (UnSig)	Staged Crossing
		sec	sec	veh/min	%	%		
South	New England H	lighway Sou	ıth					
R2	Yes	4.500	2.500	0.10	0	0.00	Pr (Flow)	None
East	Ballandean Ro	ad						
L2	Yes	5.000	3.000	0.10	50	100.00	Pr (Flow)	None
T1 R2	Yes Yes	6.500 7.000	3.500 4.000	0.10 0.10	50 50	0.00 0.00	Pr (Flow) Pr (Flow)	None None
North	New England H	lighway Nor	th					
R2	Yes	4.500	2.500	0.10	0	0.00	Pr (Flow)	None
West	Bruxner Highwa	ay						
L2	Yes	5.000	3.000	0.10	50	100.00	Pr (Flow)	None
T1	Yes	6.500	3.500	0.10	50	0.00	Pr (Flow)	None
R2	Yes	7.000	4.000	0.10	50	0.00	Pr (Flow)	None

Gap Acceptance - Two-Way Sign Control Calibration					
Level of Reduction with Opposing Flow Rate	None				
Major Road Turning Flow Factor	1				

Gap Acceptance - Two-W	/ay Sign C	ontrol P	arameter	Adjs fo	r Major R	d Numb	er of Lar	nes
Critical Gap Adjustment						up Headwa	ay Adjust	ment
Major Road Number of	2-lane	3-lane	5-lane 6-	lane or	2-lane	3-lane	5-lane	6-lane
Lanes:				more				or more
	sec	sec	sec	sec	sec	sec	sec	sec
Minor Road Left Turn	-0.5	-0.5	0.0	0.0	-0.5	-0.5	0.0	0.0
Minor Road Through	-1.5	-0.5	0.5	1.0	-0.5	-0.3	0.5	1.0
Minor Road Right Turn	-1.5	-0.5	0.5	1.0	-0.5	-0.3	0.5	1.0
Major Road Turn (Right or Left)	-0.5	-0.5	0.0	1.0	-0.5	-0.5	0.0	1.0

Gap Acceptance - Two-Way Sign Control Parameter Adjs for Geometry and Control

	Critical Gap Adjustment	Follow-up Headway Adjustment
	sec	sec
Give-Way / Yield Sign Control	-0.5	-0.3
One-Way Major Road	-0.5	-0.3
T Intersection (Minor Road Turn)	-0.7	-0.4
Entry Road Grade (for each per cent grade)	0.1	0.0
Staged Crossing - Stage 1	-1.0	-0.6
Staged Crossing - Stage 2	-1.0	-0.6
U Turn (Major Road)	1.5	0.9
User Adjustment	0.0	0.0
·		

Gap Acceptance - Settings Gap Acceptance Capacity : SIDRA Standard (Akçelik M3D)

Vehicle Movement Data - Path Data									
OD	Approach	Exit	Negotiation	Negotiation	Downstream	Negotiation			
Movement		Cruise Speed	Speed	Distance	Distance	Radius			
	km/h	km/h	km/h	m	m	m			
Light Vehicles	(LV)								
From: South	New Engl	and Highway So	outh						
L2	100.0	100.0	_	-	-	_			
T1	100.0	100.0	-	-	-	-			
R2	100.0	100.0	-	-	-	-			

From: East	Ballandean R					
L2	80.0	80.0	-	-	-	
T1	80.0	80.0	-	-	-	
R2	80.0	80.0	-	-	-	
From: North	New England	Highway North				
L2	100.0	100.0	-	-	-	
T1	100.0	100.0	-	-	-	
R2	100.0	100.0	-	-	-	
From: West	Bruxner High	way				
L2	80.0	80.0	-	-	_	
T1	80.0	80.0	-	-	_	
R2	80.0	80.0	-	-	_	
Heavy Vehicles (HV)					
From: South	New England	Highway South				
L2	100.0	100.0	-	-	-	
T1	100.0	100.0	-	-	-	
R2	100.0	100.0	-	-	-	
From: East	Ballandean R	oad				
L2	80.0	80.0	-	-	-	
T1	80.0	80.0	-	-	-	
R2	80.0	80.0	-	-	-	
From: North	New England	Highway North				
L2	100.0	100.0	-	-	-	
T1	100.0	100.0	-	_	_	
R2	100.0	100.0	-	-	_	
From: West	Bruxner High	way				
L2	80.0	80.0	_	_	-	
T1	80.0	80.0	-	-	_	
R2	80.0	80.0				

Vehicle Movem	ent Data - C	alibration						
OD	Queue	Vehicle	Vehicle	Turn Veh		Gap Accp	Opng. Veh	Prac. Deg.
Movement	Space	Length	Occupancy	[Factor	Radius]	Factor	Factor	Of Satn.
	m	m	pers/veh		m			
Light Vehicles (LV	()							
From: South		and Highwa						
L2	7.00	4.50	1.20	1.05	-	1	1	-
T1 R2	7.00	4.50 4.50	1.20	1 1.05	-	1	1	-
	7.00		1.20	1.05	-	1	1	-
From: East	Ballandea							
L2	7.00	4.50	1.20	1.05	-	1	1	-
T1 R2	7.00 7.00	4.50	1.20	1	-	1	1	-
		4.50	1.20	1.05	-	1	1	-
From: North		and Highwa						
L2	7.00	4.50	1.20	1.05	-	1	1	-
T1 R2	7.00	4.50	1.20 1.20	1 1.05	-	1	1	-
	7.00	4.50	1.20	1.05	_	1	1	_
From: West	Bruxner H							
L2	7.00	4.50	1.20	1.05	-	1	1	-
T1 R2	7.00 7.00	4.50 4.50	1.20 1.20	1 1.05	-	1	1	-
		4.50	1.20	1.05	-	1	1	_
Heavy Vehicles (H	HV)							
From: South	New Engl	and Highwa	y South					
L2	13.00	10.00	1.20	1.09	-	1.5	1.5	-
T1	13.00	10.00	1.20	1	-	1.5	1.5	-
R2	13.00	10.00	1.20	1.09	-	1.5	1.5	-
From: East	Ballandea							
L2	13.00	10.00	1.20	1.09	-	1.5	1.5	-
T1	13.00	10.00	1.20	1	-	1.5	1.5	-
R2	13.00	10.00	1.20	1.09	_	1.5	1.5	_
From: North		and Highwa						
L2	13.00	10.00	1.20	1.09	-	1.5	1.5	-
T1	13.00	10.00	1.20	1	-	1.5	1.5	-
R2	13.00	10.00	1.20	1.09	-	1.5	1.5	-
From: West	Bruxner H							
L2	13.00	10.00	1.20	1.09	-	1.5	1.5	-
T1	13.00	10.00	1.20	1	-	1.5	1.5	-
R2	13.00	10.00	1.20	1.09	-	1.5	1.5	-

Demand & Sensitivity Analysis Method: None

Model Settings - Options	
General Options	
Level of Service Method	Delay (RTA NSW)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Include Short Lanes in determining	No
Approach Queue Storage Ratio	

Model Settings - Model Parameters	
Passenger Car Equivalents	
Light Vehicles (LV)	1.00 pcu/veh
Heavy Vehicles (HV)	1.65 pcu/veh
Queue Blockage	
Minimum Probability of Blockage	0
Delay and Queue	
Exclude Geometry Delay	No
HCM Delay Formula	No
HCM Queue Formula	No
Downstream Short Lane	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Cost						
Cost Options						
Cost Unit	\$					
Vehicle Cost Parameters						
		Vel	n Operating Co	st	Veh Tim	e Cost
Movement Class	Veh Cost Method	Pump Price of Fuel	Fuel Res. Cost Factor	Ratio of Running Cost to Fuel Cost	Avg. Income	Time Value Factor
		\$/L			\$/h	
Light Vehicles (LV)	Operating Cost	1.450	0.500	3.00	38.00	0.600
Heavy Vehicles (HV)	Operating Cost	1.450	0.500	3.00	38.00	0.600

kg kW Fuel R Light Vehicles (LV) 1600.0 120 2	Model Settings - Vehicle Paramet	ers		
kg kW Fuel R Light Vehicles (LV) 1600.0 120 2	Movement Class	Mass	Max Power	CO2 to
		kg	kW	Fuel Rate
	Light Vehicles (LV)	1600.0	120	2.35
Heavy Vehicles (HV) 15000.0 170 2.6	Heavy Vehicles (HV)	15000.0	170	2.633

Model Settings - Fuel Consumption								
Movement Class	fi	А	В	Beta				
Light Vehicles (LV)	1200	16	0.004	0.1				
Heavy Vehicles (HV)	2300	200	0.009	0.075				

Model Settings - CO Emission							
Movement Class	fi	А	В	Beta			
Light Vehicles (LV)	1620	-138	0.0743	0.294			
Heavy Vehicles (HV)	25000	320	-0.06	0.04			

Model Settings - HC Emission							
fi	А	В	Beta				
340	-9	0.0031	0.029				
3000	1	-0.0016	0.0013				
	fi 340	fi A 340 -9	fi A B 340 -9 0.0031				

Model Settings - NOx Emission							
fi	А	В	Beta				
300	-14	0.0068	0.166				
44000	2820	0.21	1.9				
	fi 300	fi A 300 -14	fi A B 300 -14 0.0068				

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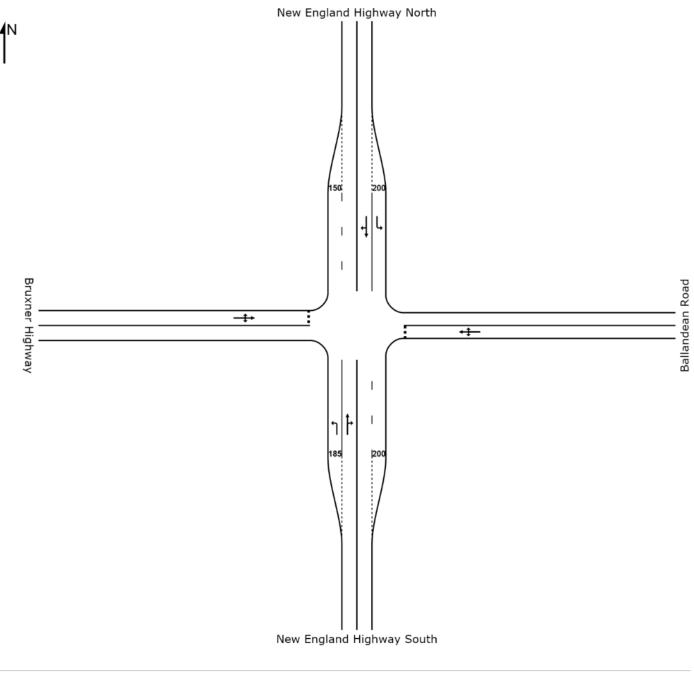
APPENDIX E2

Background + Development

SITE LAYOUT

abla Site: New England Highway & Old Ballandean Rd with Development 8am - 9am Peak - Copy

New Site Giveway / Yield (Two-Way)



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SIDRA INTERSECTION 6

INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

\overline{igvee} Site: New England Highway & Old Ballandean Rd with Development 8am - 9am Peak - Copy

New Site Giveway / Yield (Two-Way)

Volume Display Method: Separate

Volumes are shown for Movement Class(es): Light Vehicles and Heavy Vehicles

Total Intersection Volumes (veh)

All Movement Classes: 253

Light Vehicles (LV): 204

Heavy Vehicles (HV): 49





New England Highway South

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MOVEMENT SUMMARY

\overline{igvee} Site: New England Highway & Old Ballandean Rd with Development 8am - 9am Peak - Copy

New Site Giveway / Yield (Two-Way)

Move	ment Perfo	ormance - \	/ehicle <u>s</u>								
Mov	OD	Demano		Deg.	Average	Level of	95% Back	of Queue	Prop.	Effective	Average
ID	Mov	Total	ΗV	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
Ocutha	New Freder	veh/h	%	v/c	Sec		veh	m		per veh	km/h
	0	nd Highway									
1	L2	14	15.4	0.008	8.0	LOS A	0.0	0.0	0.00	0.66	69.1
2	T1	101	13.5	0.059	0.5	LOS A	0.3	2.6	0.24	0.01	96.1
3	R2	2	0.0	0.059	8.1	LOS A	0.3	2.6	0.24	0.01	83.0
Approa	ach	117	13.5	0.059	1.5	NA	0.3	2.6	0.22	0.09	91.6
East: E	Ballandean F	Road									
4	L2	1	0.0	0.021	9.7	LOS A	0.1	0.8	0.38	0.63	62.6
5	T1	2	50.0	0.021	10.5	LOS A	0.1	0.8	0.38	0.63	50.9
6	R2	8	62.5	0.021	11.5	LOS A	0.1	0.8	0.38	0.63	47.2
Approa	ach	12	54.5	0.021	11.1	LOS A	0.1	0.8	0.38	0.63	48.9
North:	New Englar	nd Highway I	North								
7	L2	17	50.0	0.012	10.3	LOS A	0.0	0.0	0.00	0.67	59.9
8	T1	106	15.8	0.060	0.5	LOS A	0.3	2.7	0.23	0.01	96.5
9	R2	1	0.0	0.060	8.1	LOS A	0.3	2.7	0.23	0.01	85.7
Approach		124	20.3	0.060	1.9	NA	0.3	2.7	0.20	0.10	89.0
West:	Bruxner Hig	hway									
10	L2	1	0.0	0.023	9.4	LOS A	0.1	0.7	0.39	0.63	62.8
11	T1	2	50.0	0.023	9.6	LOS A	0.1	0.7	0.39	0.63	51.0
12	R2	11	30.0	0.023	9.9	LOS A	0.1	0.7	0.39	0.63	60.9
Approa	ach	14	30.8	0.023	9.8	LOS A	0.1	0.7	0.39	0.63	59.3
All Ver	nicles	266	19.4	0.060	2.5	NA	0.3	2.7	0.22	0.14	84.8

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 is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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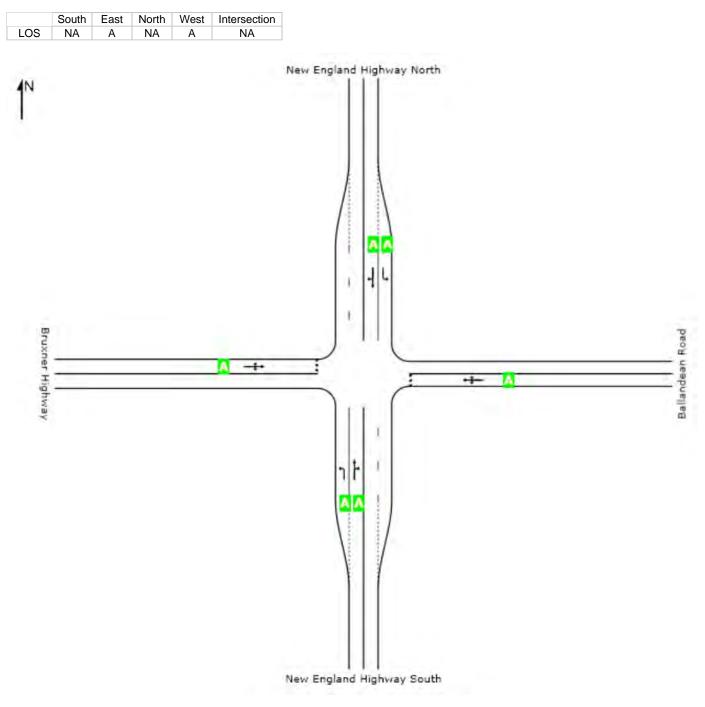


LEVEL OF SERVICE

\overline{igvee} Site: New England Highway & Old Ballandean Rd with Development 8am - 9am Peak - Copy

New Site Giveway / Yield (Two-Way)

All Movement Classes



Level of Service (LOS) Method: Delay (RTA NSW).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

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 lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.



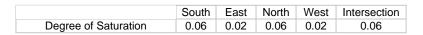
DEGREE OF SATURATION

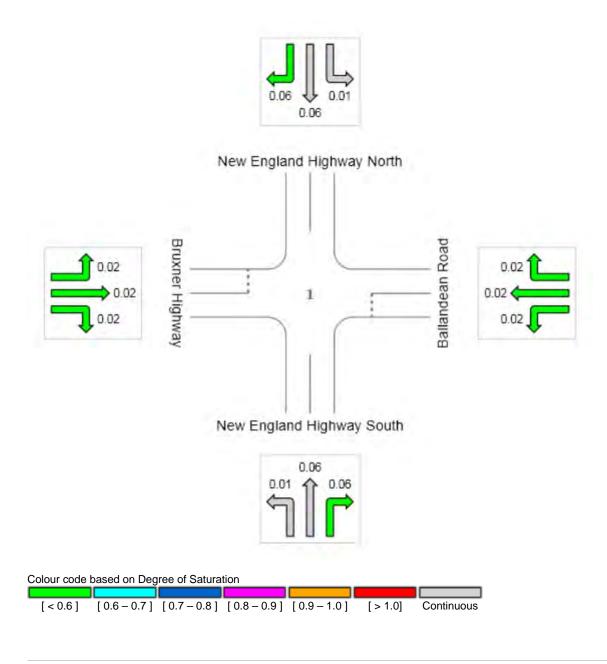
Ratio of Demand Volume to Capacity (v/c ratio)

\overline{igvee} Site: New England Highway & Old Ballandean Rd with Development 8am - 9am Peak - Copy

New Site Giveway / Yield (Two-Way)

All Movement Classes





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DELAY (CONTROL)

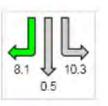
Average control delay per vehicle, or average pedestrian delay (seconds)

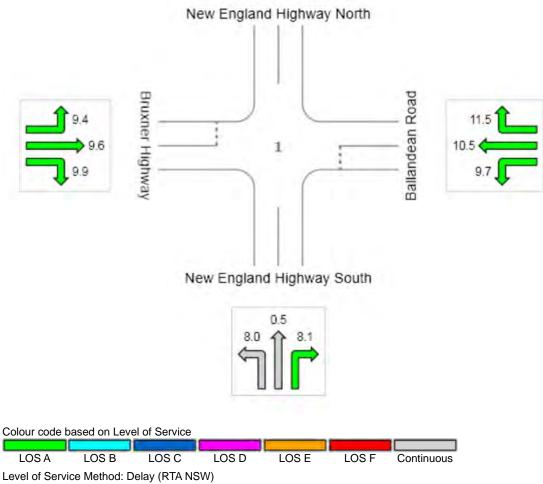
\overline{igvee} Site: New England Highway & Old Ballandean Rd with Development 8am - 9am Peak - Copy

New Site Giveway / Yield (Two-Way)

All Movement Classes

	South	East	North	West	Intersection
Delay (Control)	1.5	11.1	1.9	9.8	2.5
LOS	NA	А	NA	Α	NA





SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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INPUT REPORT

∇ Site: New England Highway & Old Ballandean Rd with Development 8am - 9am Peak - Copy

New Site Giveway / Yield (Two-Way)

Intersection - Site Data	
Site Name	New England Highway & Old Ballandean Rd with Development 8am - 9am Peak - Copy
Site ID	1
Site Title	New Site

Intersection - Site Properties	
Site (Intersection) Type	Giveway / Yield (Two-Way)
Model Name	New South Wales
Base Model	NA
Drive Rule	Left-hand side of the road
HCM Version	No
Units	Metric
First Created	
Date	2/12/2014 5:05:46 PM
Created By	Dave
Organisation	CONSTRUCTIVE SOLUTIONS PTY LTD
Version	6.0.22.4722
Last Modified	
Date	3/12/2014 9:11:46 AM
Modified By	Dave
Organisation	CONSTRUCTIVE SOLUTIONS PTY LTD
Version	6.0.22.4722

Intersection - Approach Data											
Location	Name	Туре	No. of App. Lanes	No. of Exit Lanes	Approach Distance		Approach Control	Area Type Factor			
					m	%					
South	New England Highway South	Two-way	2	2	500.0	0	Major Road	-			
East	Ballandean Road	Two-way	1	1	500.0	0	Give-way Yield	-			
North	New England Highway North	Two-way	2	2	500.0	0	Major Road	-			
West	Bruxner Highway	Two-way	1	1	500.0	0	Give-way Yield	-			

Movement Definitions - Included Movement Classes									
Name	ID	Model Designation	Туре						
Light Vehicles	LV	Light Vehicle	Standard						
Heavy Vehicles	HV	Heavy Vehicle	Standard						

Movement I	Movement Definitions - Origin-Destination Movements										
To Approach	OD N	lovement Turn Designation	OD Mov ID	LTR Mov ID							
From: South		New England Highway	South								
West	L2	L	1	1							
North	T1	Т	2	2							
East	R2	R	3	3							
From: East		Ballandean Road									

South	L2	L	4	4
West	T1	T	5	5
North	R2	R	6	6
From: North		New England Highway	/ North	
East	L2	L	7	7
South	T1	T	8	8
West	R2	R	9	9
From: West		Bruxner Highway		
North	L2	L	10	10
East	T1	T	11	11
South	R2	R	12	12

Lane Geon	Lane Geometry - Lane Configuration												
Leg Item	Configuration	Туре	Control	Slip/ Bypass Control	Length	Width	Grade	Full [ID	l Lane Colour]	[Front Width	Islan BackFi Width		For Ped Staging 1
					m	m	%			m	m		
South	New England High	hway So	uth										
App. Lane 1	Short Lane	Normal	Continu ous	-	_	3.25	6	-	-	-	-	-	-
App. Lane 2	Full-Length	Normal	Continu ous	-	500	3.5	6			-	-	-	-
Exit Lane 2 Exit Lane 1	Full-Length Short Lane	_	_	_	500 _	3.5 3.25	-6 -6	_	_		_	_	_
East	Ballandean Road												
App. Lane 1	Full-Length	Normal	Giveway /Yield	-	500	3	-4			-	-	-	-
Exit Lane 1	Full-Length	-	-	-	500	3	4			-	-	-	-
North	New England High	hway No	rth										
App. Lane 1	Short Lane	Normal	Continu ous	-	_	3.25	-6	-	-	_	_	-	-
App. Lane 2	Full-Length	Normal	Continu ous	-	500	3.5	-6			-	-	-	-
	Full-Length	-	-	-	500	3.5	6			-	-	-	-
Exit Lane 1	Short Lane	-	-	-	-	3.25	6	-	-	-	-	-	-
West	Bruxner Highway												
App. Lane 1	Full-Length	Normal	Giveway /Yield	-	500	3.5	0			_	_	-	-
Exit Lane 1	Full-Length	-	-	-	500	3.5	0			-	-	-	-

Lanes are numbered from left to right in the direction of travel.

Leg Item Configuration Short Lane / Segment 1 Overflow/ Merge Dir Colour] Segment 2 ID Colour] South New England Highway South m m m m South New England Highway South 10 Colour] m m App. Lane 1 Short Lane 185 Right - - - North New England Highway North 200 Right - - - North New England Highway North - - - - North New England Highway North - - - - App. Lane 1 Short Lane 200 Right - - - North New England Highway North - - - - - App. Lane 1 Short Lane 200 Right - - -	Lane Geor	Lane Geometry - Lane Configuration - Short Lanes and Two-Segment Lanes											
South New England Highway South 185 Right - - - App. Lane 1 Short Lane 185 Right - - - North New England Highway North App. Lane 1 Short Lane 200 Right - - - North New England Highway North - - - -				Short Lane /	Segment 1		S	egment 2	l				
South New England Highway South App. Lane 1 Short Lane 1 Short Lane 200 Right	Leg Item	Configuration	[Length		ID	Colour]	[Length	ID	Colour]				
App. Lane 1Short Lane185RightExit Lane 1Short Lane200RightNorthNew England Highway NorthApp. Lane 1Short Lane200Right			m				m						
Exit Lane 1 Short Lane 200 Right - - - - North New England Highway North - <td>South</td> <td>New England Highway South</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	South	New England Highway South											
North New England Highway North App. Lane 1 Short Lane 200 Right - - -	App. Lane 1	Short Lane	185	Right			_	-	_				
App. Lane 1 Short Lane 200 Right	Exit Lane 1	Short Lane	200	Right			-	-	-				
	North	New England Highway North											
Exit Lane 1 Short Lane 150 Right	App. Lane 1	Short Lane	200	Right			_	_	-				
	Exit Lane 1	Short Lane	150	Right			-	-	-				

Lane Geometry - Lane Disciplines								
To Approach	OD Movement	Free Queue Distance m	Movement Class(es)					
From: South	App. Lane 1							
West	L2	0	LV, HV					
From: South	App. Lane 2							
North	T1	0	LV, HV					
East	R2	0	LV, HV					
From: East	App. Lane 1							
South	L2	0	LV, HV					

West North	T1 R2	0 0	LV, HV LV, HV
From: North	App. Lane 1		
East	L2	0	LV, HV
From: North	App. Lane 2		
South	T1	0	LV, HV
West	R2	0	LV, HV
From: West	App. Lane 1		
North	L2	0	LV, HV
East	T1	0	LV, HV
South	R2	0	LV, HV

Lane Data	- Lane Data					
Approach Lane		Basic Satn Flow	Utilisation Ratio	Saturation Speed	Capacity Adjustment	Use Given Cap Adj in Network Analysis
		tcu/h	%	km/h	%	
South	New England High	way South				
App. Lane 1 App. Lane 2		1950 1950			0.0 0.0	No No
East	Ballandean Road					
App. Lane 1	l	1950	-	-	0.0	No
North	New England High	way North				
App. Lane 1 App. Lane 2		1950 1950			0.0 0.0	No No
West	Bruxner Highway					
App. Lane 1		1950	_	-	0.0	No

Lane Data - Flow	v Proportions			
Exit Lane	South %	To Exit Leg East %	North %	West %
Light Vehicles (LV))			
From: South Exit Lane 1	App. Lane 1 –	-	-	100
From: South Exit Lane 1 Exit Lane 2	App. Lane 2 – –	100	100 0	-
From: East Exit Lane 1 Exit Lane 2	App. Lane 1 100 0	-	0 100	100
From: North Exit Lane 1	App. Lane 1 –	100	-	-
From: North Exit Lane 1 Exit Lane 2	App. Lane 2 100 0	-	Ξ	100
From: West Exit Lane 1 Exit Lane 2	App. Lane 1 0 100	100	100 0	-
Heavy Vehicles (H	V)			
From: South Exit Lane 1	App. Lane 1 –	-	-	100
From: South Exit Lane 1 Exit Lane 2	App. Lane 2 _ _	100	100 0	-
From: East Exit Lane 1 Exit Lane 2	App. Lane 1 100 0	- -	0 100	100
From: North Exit Lane 1	App. Lane 1 –	100	-	-
From: North Exit Lane 1 Exit Lane 2	App. Lane 2 100 0	-	-	100 _

From: West	App. Lane 1				
Exit Lane 1	0	100	100	-	
Exit Lane 2	100	_	0	-	

Lane Data - Lan	e Blockage			
Exit Lane	South	To Exit Leg East	North	West
From: South	App. Lane 1			
Exit Lane 1	-	-	-	Yes
From: South	App. Lane 2			
Exit Lane 1	-	Yes	Yes	-
Exit Lane 2	_	-	Yes	-
From: East	App. Lane 1			
Exit Lane 1	Yes	-	Yes	Yes
Exit Lane 2	Yes	_	Yes	-
From: North	App. Lane 1			
Exit Lane 1	-	Yes	-	-
From: North	App. Lane 2			
Exit Lane 1	Yes	_	_	Yes
Exit Lane 2	Yes	-	-	-
From: West	App. Lane 1			
Exit Lane 1	Yes	Yes	Yes	-
Exit Lane 2	Yes	-	Yes	-

Pedestrians - Pedestrian Movements								
Unit Time for Volumes: 60 mi Peak Flow Period: 30 minute								
Main Crossing/ Slip/Bypass Lane Crossing	Volume	Peak Flow	Flow Scale	Growth Rate				
	ped	%	%	%				
No Ped Movements								

Pedestrians - Pedestrian Movement Data										
Main Crossing/ Slip/Bypass Lane Crossing	Mov. ID	Crossing Distance	Oppng Ped.Fac.	P.Deg. Satn	Walking Speed	App. Trav. Distance	Downst. Distance	Queue Space		
		m			m/sec	m	m	m		
No Ped Move	ments									

Volumes - Veh	icle Volumes			
Unit Time for Volu Peak Flow Period Volume Data Meriod	umes: 60 minute d: 30 minutes			
Movement Class	South veh	To Exit Leo East veh) North veh	West veh
From: South	New Englan	d Highway So		
Total (veh) LV (veh) HV (veh)	- - -	2 2 0	96 83 13	13 11 2
From: East	Ballandean	Road		
Total (veh) LV (veh) HV (veh)	1 1 0	_ _ _	8 3 5	2 1 1
From: North	New Englan	d Highway N	orth	
Total (veh) LV (veh) HV (veh)	101 85 16	16 8 8		1 1 0
From: West	Bruxner Hig	hway		

Total (veh)	10	2	1	_
LV (veh)	7	1	1	-
HV (veh)	3	1	0	-

Volumes - Volu	ume Factors		
То	Peak Flow	Flow	Growth
Approach	Factor	Scale	Rate
	%	%	%/year
Light Vehicles (L	V)		
From: South	New England Highway	South	
West	95.0	100.00	1.50
North	95.0	100.00	1.50
East	95.0	100.00	1.50
From: East	Ballandean Road		
South	95.0	100.00	1.50
West	95.0	100.00	1.50
North	95.0	100.00	1.50
From: North	New England Highway	North	
East	95.0	100.00	1.50
South	95.0	100.00	1.50
West	95.0	100.00	1.50
From: West	Bruxner Highway		
North	95.0	100.00	1.50
East	95.0	100.00	1.50
South	95.0	100.00	1.50
Heavy Vehicles	(HV)		
From: South	New England Highway	South	
West	95.0	100.00	1.50
North	95.0	100.00	1.50
East	95.0	100.00	1.50
From: East	Ballandean Road		
South	95.0	100.00	1.50
West	95.0	100.00	1.50
North	95.0	100.00	1.50
From: North	New England Highway	North	
East	95.0	100.00	1.50
South	95.0	100.00	1.50
West	95.0	100.00	1.50
From: West	Bruxner Highway		
North	95.0	100.00	1.50
East	95.0	100.00	1.50
South	95.0	100.00	1.50

Priorities				
Opposed Movement	South	Opposing East	Movements North	West
South	New Englan	d Highway S	South	
L2	_	-	_	-
T1 R2	-	-	_ T1 2	-
	-	-	T1,L2	-
East	Ballandean	Road		
L2		-	T1	-
T1 R2	R2,T1,L2 R2,T1	-	T1,R2 T1,R2	_ T1,L2
				11,52
North	New Englan	id Highway I	North	
L2 T1	-	-	-	-
R2	_ T1,L2	_	_	_
West	Bruxner Hig	hway		
L2	T1	_		-
T1 R2	R2,T1 R2,T1	_ L2,T1	T1,L2,R2 T1,R2	-
112	172,11	∟∠, Г Г	11,62	-

Gap Acceptance - Gap Acceptance Data									
Opposed Movement	Apply TWSC Calibration	Critical Gap	Follow-up Headway	Minimum Departures	Exiting Flow Effect	% Opp. By Nearest Lane	Opng. Peds (UnSig)	Staged Crossing	
		sec	sec	veh/min	%	%			
South	New England H	lighway Sou	ıth						
R2	Yes	4.500	2.500	0.10	0	0.00	Pr (Flow)	None	
East	Ballandean Ro	ad							
L2	Yes	5.000	3.000	0.10	50	100.00	Pr (Flow)	None	
T1 R2	Yes Yes	6.500 7.000	3.500 4.000	0.10 0.10	50 50	0.00 0.00	Pr (Flow) Pr (Flow)	None None	
North	New England H	lighway Nor	th						
R2	Yes	4.500	2.500	0.10	0	0.00	Pr (Flow)	None	
West	Bruxner Highwa	ay							
L2	Yes	5.000	3.000	0.10	50	100.00	Pr (Flow)	None	
T1	Yes	6.500	3.500	0.10	50	0.00	Pr (Flow)	None	
R2	Yes	7.000	4.000	0.10	50	0.00	Pr (Flow)	None	

Gap Acceptance - Two-Way Sign Control Cal	ibration
Level of Reduction with Opposing Flow Rate	None
Major Road Turning Flow Factor	1

Gap Acceptance - Two-W	/ay Sign C	ontrol P	arameter	Adjs fo	r Major R	d Numb	er of Lar	nes
	Crit	ical Gap A	djustment		Follow-	up Headw	ay Adjust	ment
Major Road Number of	2-lane	3-lane	5-lane 6-	lane or	2-lane	3-lane	5-lane	6-lane
Lanes:				more				or more
	sec	sec	sec	sec	sec	sec	sec	sec
Minor Road Left Turn	-0.5	-0.5	0.0	0.0	-0.5	-0.5	0.0	0.0
Minor Road Through	-1.5	-0.5	0.5	1.0	-0.5	-0.3	0.5	1.0
Minor Road Right Turn	-1.5	-0.5	0.5	1.0	-0.5	-0.3	0.5	1.0
Major Road Turn (Right or Left)	-0.5	-0.5	0.0	1.0	-0.5	-0.5	0.0	1.0

Gap Acceptance - Two-Way Sign Control Parameter Adjs for Geometry and Control

	Critical Gap Adjustment	Follow-up Headway Adjustment
	sec	sec
Give-Way / Yield Sign Control	-0.5	-0.3
One-Way Major Road	-0.5	-0.3
T Intersection (Minor Road Turn)	-0.7	-0.4
Entry Road Grade (for each per cent grade)	0.1	0.0
Staged Crossing - Stage 1	-1.0	-0.6
Staged Crossing - Stage 2	-1.0	-0.6
U Turn (Major Road)	1.5	0.9
User Adjustment	0.0	0.0
·		

Gap Acceptance - Settings Gap Acceptance Capacity : SIDRA Standard (Akçelik M3D)

Vehicle Move	ement Data - F	Path Data				
OD	Approach	Exit	Negotiation	Negotiation	Downstream	Negotiation
Movement		Cruise Speed	Speed	Distance	Distance	Radius
	km/h	km/h	km/h	m	m	m
Light Vehicles	(LV)					
From: South	New Engl	and Highway So	outh			
L2	100.0	100.0	_	-	-	_
T1	100.0	100.0	-	-	-	-
R2	100.0	100.0	-	-	-	-

From: East	Ballandean R					
L2	80.0	80.0	-	-	-	
T1	80.0	80.0	-	-	-	
R2	80.0	80.0	-	-	-	
From: North	New England	Highway North				
L2	100.0	100.0	-	-	-	
T1	100.0	100.0	-	-	-	
R2	100.0	100.0	-	-	-	
From: West	Bruxner High	way				
L2	80.0	80.0	-	-	_	
T1	80.0	80.0	-	-	_	
R2	80.0	80.0	-	-	_	
Heavy Vehicles (HV)					
From: South	New England	Highway South				
L2	100.0	100.0	-	-	-	
T1	100.0	100.0	-	-	-	
R2	100.0	100.0	-	-	-	
From: East	Ballandean R	load				
L2	80.0	80.0	-	-	-	
T1	80.0	80.0	-	-	-	
R2	80.0	80.0	-	-	-	
From: North	New England	Highway North				
L2	100.0	100.0	-	-	-	
T1	100.0	100.0	-	_	_	
R2	100.0	100.0	-	-	_	
From: West	Bruxner High	way				
L2	80.0	80.0	_	_	-	
T1	80.0	80.0	-	-	_	
R2	80.0	80.0				

Vehicle Movem	ent Data - C	alibration						
OD	Queue	Vehicle	Vehicle	Turn Veh		Gap Accp	Opng. Veh	Prac. Deg.
Movement	Space	Length	Occupancy	[Factor	Radius]	Factor	Factor	Of Satn.
	m	m	pers/veh		m			
Light Vehicles (LV	()							
From: South		and Highwa						
L2	7.00	4.50	1.20	1.05	-	1	1	-
T1 R2	7.00	4.50 4.50	1.20	1 1.05	-	1	1	-
	7.00		1.20	1.05	-	1	1	-
From: East	Ballandea							
L2	7.00	4.50	1.20	1.05	-	1	1	-
T1 R2	7.00 7.00	4.50	1.20	1	-	1	1	-
		4.50	1.20	1.05	-	1	1	-
From: North		and Highwa						
L2	7.00	4.50	1.20	1.05	-	1	1	-
T1 R2	7.00	4.50	1.20 1.20	1 1.05	-	1	1	-
	7.00	4.50	1.20	1.05	_	1	1	_
From: West	Bruxner H							
L2	7.00	4.50	1.20	1.05	-	1	1	-
T1 R2	7.00 7.00	4.50 4.50	1.20 1.20	1 1.05	-	1	1	-
		4.50	1.20	1.05	-	1	1	_
Heavy Vehicles (H	HV)							
From: South	New Engl	and Highwa	y South					
L2	13.00	10.00	1.20	1.09	-	1.5	1.5	-
T1	13.00	10.00	1.20	1	-	1.5	1.5	-
R2	13.00	10.00	1.20	1.09	-	1.5	1.5	-
From: East	Ballandea							
L2	13.00	10.00	1.20	1.09	-	1.5	1.5	-
T1	13.00	10.00	1.20	1	-	1.5	1.5	-
R2	13.00	10.00	1.20	1.09	_	1.5	1.5	_
From: North		and Highwa						
L2	13.00	10.00	1.20	1.09	-	1.5	1.5	-
T1	13.00	10.00	1.20	1	-	1.5	1.5	-
R2	13.00	10.00	1.20	1.09	-	1.5	1.5	-
From: West	Bruxner H							
L2	13.00	10.00	1.20	1.09	-	1.5	1.5	-
T1	13.00	10.00	1.20	1	-	1.5	1.5	-
R2	13.00	10.00	1.20	1.09	-	1.5	1.5	-

Demand & Sensitivity Analysis Method: None

Model Settings - Options	
General Options	
Level of Service Method	Delay (RTA NSW)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Include Short Lanes in determining	No
Approach Queue Storage Ratio	

Model Settings - Model Parameters	
Passenger Car Equivalents	
Light Vehicles (LV)	1.00 pcu/veh
Heavy Vehicles (HV)	1.65 pcu/veh
Queue Blockage	
Minimum Probability of Blockage	0
Delay and Queue	
Exclude Geometry Delay	No
HCM Delay Formula	No
HCM Queue Formula	No
Downstream Short Lane	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Cost						
Cost Options						
Cost Unit	\$					
Vehicle Cost Parameters						
		Vel	n Operating Co	st	Veh Tim	e Cost
Movement Class	Veh Cost Method	Pump Price of Fuel	Fuel Res. Cost Factor	Ratio of Running Cost to Fuel Cost	Avg. Income	Time Value Factor
		\$/L			\$/h	
Light Vehicles (LV)	Operating Cost	1.450	0.500	3.00	38.00	0.600
Heavy Vehicles (HV)	Operating Cost	1.450	0.500	3.00	38.00	0.600

kg kW Fuel R Light Vehicles (LV) 1600.0 120 2	Model Settings - Vehicle Paramet	ers		
kg kW Fuel R Light Vehicles (LV) 1600.0 120 2	Movement Class	Mass	Max Power	CO2 to
		kg	kW	Fuel Rate
	Light Vehicles (LV)	1600.0	120	2.35
Heavy Vehicles (HV) 15000.0 170 2.6	Heavy Vehicles (HV)	15000.0	170	2.633

Model Settings - Fuel Consumption							
Movement Class	fi	А	В	Beta			
Light Vehicles (LV)	1200	16	0.004	0.1			
Heavy Vehicles (HV)	2300	200	0.009	0.075			

Model Settings - CO Emission						
Movement Class	fi	А	В	Beta		
Light Vehicles (LV)	1620	-138	0.0743	0.294		
Heavy Vehicles (HV)	25000	320	-0.06	0.04		

Model Settings - HC Emission						
Movement Class	fi	А	В	Beta		
Light Vehicles (LV)	340	-9	0.0031	0.029		
Heavy Vehicles (HV)	3000	1	-0.0016	0.0013		

Model Settings - NOx Emission						
Movement Class	fi	А	В	Beta		
Light Vehicles (LV)	300	-14	0.0068	0.166		
Heavy Vehicles (HV)	44000	2820	0.21	1.9		

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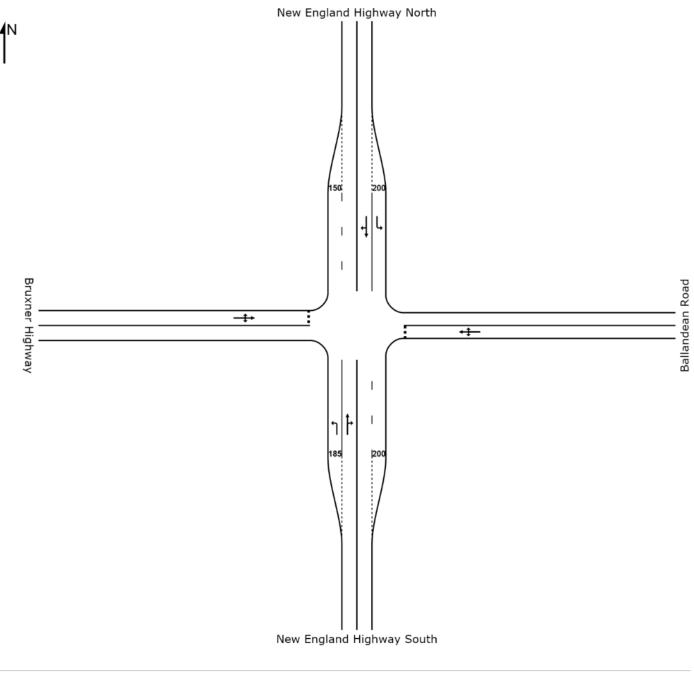
APPENDIX E3

30yr + Development

SITE LAYOUT

abla Site: New England Highway & Old Ballandean Rd with Development 8am - 9am Peak 30yr

New Site Giveway / Yield (Two-Way)



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SIDRA INTERSECTION 6

INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

\overline{igvee} Site: New England Highway & Old Ballandean Rd with Development 8am - 9am Peak 30yr

New Site Giveway / Yield (Two-Way)

Volume Display Method: Separate

Volumes are shown for Movement Class(es): Light Vehicles and Heavy Vehicles

Total Intersection Volumes (veh)

All Movement Classes: 253

Light Vehicles (LV): 204

Heavy Vehicles (HV): 49





New England Highway South



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MOVEMENT SUMMARY

abla Site: New England Highway & Old Ballandean Rd with Development 8am - 9am Peak 30yr

New Site

Giveway / Yield (Two-Way) Design Life Analysis (Practical Capacity): Results for 30 years

Move	ment P <u>er</u>	formance - \	/ehicles								
Mov	OD	Demano		Deg.	Average	Level of	95% Back		Prop.	Effective	Average
ID	Mov	Total	HV	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
South		veh/h and Highway \$	% South	v/c	Sec	_	veh	m	_	per veh	km/h
1	L2	20	15.4	0.012	8.0	LOS A	0.0	0.0	0.00	0.66	69.1
2	T1	147	13.5	0.086	0.8	LOSA	0.5	4.0	0.00	0.00	95.2
2	R2	3	0.0	0.086	8.4	LOSA	0.5	4.0	0.31	0.01	82.3
-											
Appro	acn	169	13.5	0.086	1.8	NA	0.5	4.0	0.27	0.09	90.9
East: E	Ballandean	Road									
4	L2	2	0.0	0.037	11.4	LOS A	0.1	1.3	0.47	0.69	60.7
5	T1	3	50.0	0.037	12.2	LOS A	0.1	1.3	0.47	0.69	49.6
6	R2	12	62.5	0.037	13.2	LOS A	0.1	1.3	0.47	0.69	46.1
Approa	ach	17	54.5	0.037	12.9	LOS A	0.1	1.3	0.47	0.69	47.8
North:	New Engla	and Highway N	North								
7	L2	24	50.0	0.018	10.3	LOS A	0.0	0.0	0.00	0.67	59.9
8	T1	154	15.8	0.088	0.7	LOS A	0.5	4.2	0.29	0.01	95.6
9	R2	2	0.0	0.088	8.4	LOS A	0.5	4.2	0.29	0.01	85.0
Approa	ach	180	20.3	0.088	2.1	NA	0.5	4.2	0.25	0.10	88.4
West:	Bruxner Hi	ghway									
10	L2	2	0.0	0.039	11.0	LOS A	0.1	1.3	0.48	0.69	61.1
11	T1	3	50.0	0.039	11.2	LOS A	0.1	1.3	0.48	0.69	49.9
12	R2	15	30.0	0.039	11.5	LOS A	0.1	1.3	0.48	0.69	59.3
Appro	ach	20	30.8	0.039	11.4	LOS A	0.1	1.3	0.48	0.69	57.8
All Vel	nicles	386	19.4	0.088	2.9	NA	0.5	4.2	0.28	0.15	84.0

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 is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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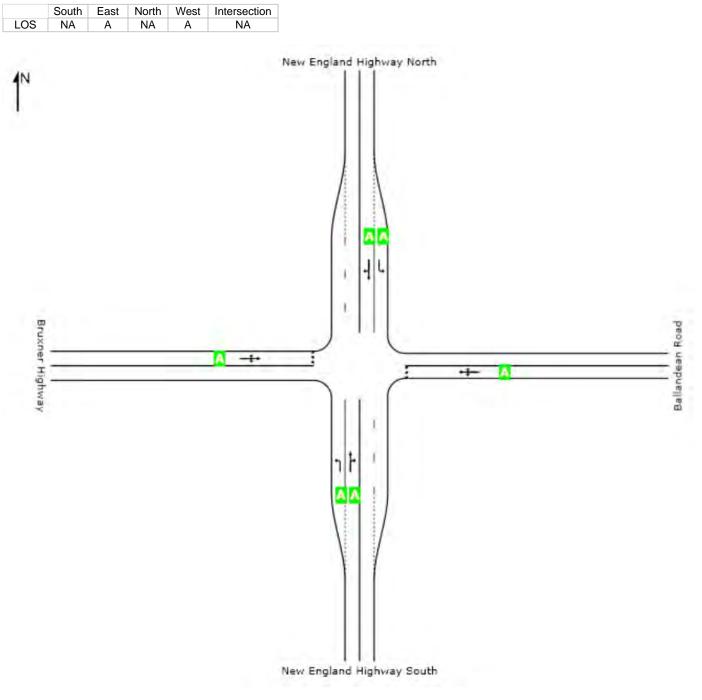


LEVEL OF SERVICE

\overline{igvee} Site: New England Highway & Old Ballandean Rd with Development 8am - 9am Peak 30yr

New Site Giveway / Yield (Two-Way) Design Life Analysis (Practical Capacity): Results for 30 years

All Movement Classes



Level of Service (LOS) Method: Delay (RTA NSW).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

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 lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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DEGREE OF SATURATION

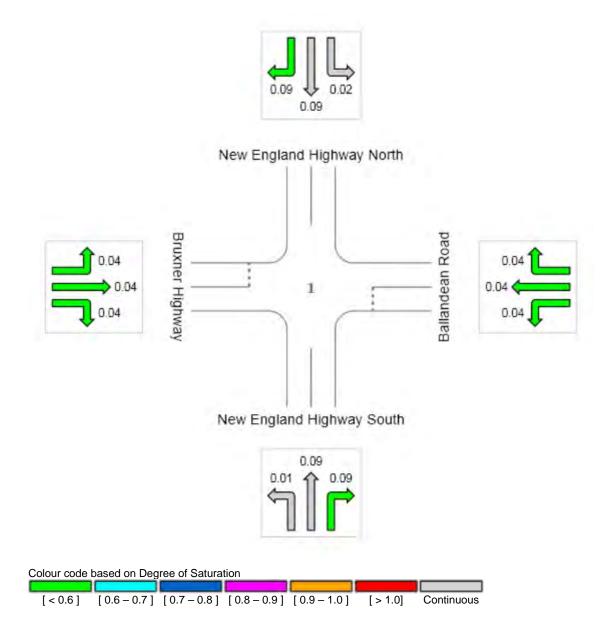
Ratio of Demand Volume to Capacity (v/c ratio)

\overline{V} Site: New England Highway & Old Ballandean Rd with Development 8am - 9am Peak 30yr

New Site Giveway / Yield (Two-Way) Design Life Analysis (Practical Capacity): Results for 30 years

All Movement Classes

	South	East	North	West	Intersection
Degree of Saturation	0.09	0.04	0.09	0.04	0.09



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DELAY (CONTROL)

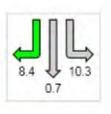
Average control delay per vehicle, or average pedestrian delay (seconds)

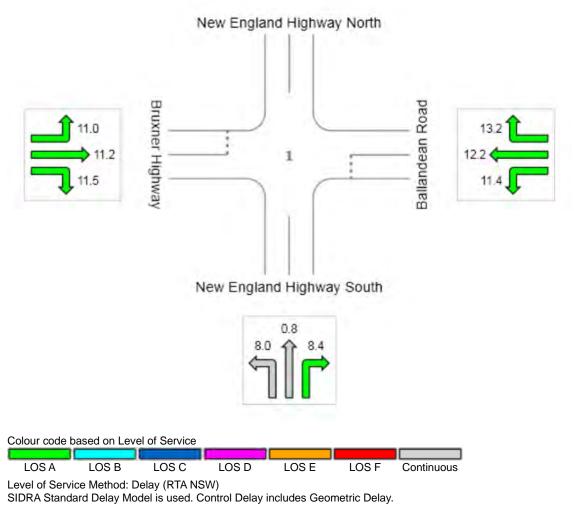
V Site: New England Highway & Old Ballandean Rd with Development 8am - 9am Peak 30yr

New Site Giveway / Yield (Two-Way) Design Life Analysis (Practical Capacity): Results for 30 years

All Movement Classes

	South	East	North	West	Intersection
Delay (Control)	1.8	12.9	2.1	11.4	2.9
LOS	NA	Α	NA	Α	NA





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INPUT REPORT

∇ Site: New England Highway & Old Ballandean Rd with Development 8am - 9am Peak 30yr

New Site Giveway / Yield (Two-Way)

Intersection - Site Data	
Site Name	New England Highway & Old Ballandean Rd with Development 8am - 9am Peak 30yr
Site ID	1
Site Title	New Site

Intersection - Site Properties	
Site (Intersection) Type	Giveway / Yield (Two-Way)
Model Name	New South Wales
Base Model	NA
Drive Rule	Left-hand side of the road
HCM Version	No
Units	Metric
First Created	
Date	2/12/2014 5:05:46 PM
Created By	Dave
Organisation	CONSTRUCTIVE SOLUTIONS PTY LTD
Version	6.0.22.4722
Last Modified	
Date	3/12/2014 9:11:46 AM
Modified By	Dave
Organisation	CONSTRUCTIVE SOLUTIONS PTY LTD
Version	6.0.22.4722

Intersect	tion - Approach Data							
Location	Name	Туре	No. of App. Lanes	No. of Exit Lanes	Approach Distance		Approach Control	Area Type Factor
					m	%		
South	New England Highway South	Two-way	2	2	500.0	0	Major Road	-
East	Ballandean Road	Two-way	1	1	500.0	0	Give-way Yield	-
North	New England Highway North	Two-way	2	2	500.0	0	Major Road	-
West	Bruxner Highway	Two-way	1	1	500.0	0	Give-way Yield	-

Movement Definitions - Inclu	ded Movement Classes		
Name	ID	Model Designation	Туре
Light Vehicles	LV	Light Vehicle	Standard
Heavy Vehicles	HV	Heavy Vehicle	Standard

Movement I	Movement Definitions - Origin-Destination Movements								
To Approach	OD N	lovement Turn Designation	OD Mov ID	LTR Mov ID					
From: South		New England Highway	South						
West	L2	L	1	1					
North	T1	Т	2	2					
East	R2	R	3	3					
From: East		Ballandean Road							

South	L2	L	4	4
West	T1	T	5	5
North	R2	R	6	6
From: North		New England Highway	/ North	
East	L2	L	7	7
South	T1	T	8	8
West	R2	R	9	9
From: West		Bruxner Highway		
North	L2	L	10	10
East	T1	T	11	11
South	R2	R	12	12

Lane Geon	netry - Lane Cor	nfigurati	on										
Leg Item	Configuration	Туре	Control	Slip/ Bypass Control	Length	Width	Grade	Full [ID	l Lane Colour]	[Front Width	Islan BackFi Width		For Ped Staging 1
					m	m	%			m	m		
South	New England High	hway So	uth										
App. Lane 1	Short Lane	Normal	Continu ous	-	_	3.25	6	-	-	-	-	-	-
App. Lane 2	Full-Length	Normal	Continu ous	-	500	3.5	6			-	-	-	-
Exit Lane 2 Exit Lane 1	Full-Length Short Lane	_	_	_	500 _	3.5 3.25	-6 -6	_	_		_	_	_
East	Ballandean Road												
App. Lane 1	Full-Length	Normal	Giveway /Yield	-	500	3	-4			-	-	-	-
Exit Lane 1	Full-Length	-	-	-	500	3	4			-	-	-	-
North	New England High	hway No	rth										
App. Lane 1	Short Lane	Normal	Continu ous	-	_	3.25	-6	-	-	_	_	-	-
App. Lane 2	Full-Length	Normal	Continu ous	-	500	3.5	-6			-	-	-	-
	Full-Length	-	-	-	500	3.5	6			-	-	-	-
Exit Lane 1	Short Lane	-	-	-	-	3.25	6	-	-	-	-	-	-
West	Bruxner Highway												
App. Lane 1	Full-Length	Normal	Giveway /Yield	-	500	3.5	0			_	_	-	_
Exit Lane 1	Full-Length	-	-	-	500	3.5	0			-	-	-	-

Lanes are numbered from left to right in the direction of travel.

Leg Item Configuration Short Lane / Segment 1 Overflow/ Merge Dir Colour] Segment 2 ID Colour] South New England Highway South m m m m South New England Highway South 10 Colour] m m App. Lane 1 Short Lane 185 Right - - - North New England Highway North 200 Right - - - North New England Highway North - - - - North New England Highway North - - - - App. Lane 1 Short Lane 200 Right - - - North New England Highway North - - - - - App. Lane 1 Short Lane 200 Right - - -	Lane Geor	Lane Geometry - Lane Configuration - Short Lanes and Two-Segment Lanes									
South New England Highway South 185 Right - - - App. Lane 1 Short Lane 185 Right - - - North New England Highway North App. Lane 1 Short Lane 200 Right - - - North New England Highway North - - - -				Short Lane /	Segment 1		S	Segment 2			
South New England Highway South App. Lane 1 Short Lane 1 Short Lane 200 Right	Leg Item	Configuration	[Length		ID	Colour]	[Length	ID	Colour]		
App. Lane 1Short Lane185RightExit Lane 1Short Lane200RightNorthNew England Highway NorthApp. Lane 1Short Lane200Right			m				m				
Exit Lane 1 Short Lane 200 Right - - - - North New England Highway North - <td>South</td> <td>New England Highway South</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	South	New England Highway South									
North New England Highway North App. Lane 1 Short Lane 200 Right - - -	App. Lane 1	Short Lane	185	Right			_	-	_		
App. Lane 1 Short Lane 200 Right	Exit Lane 1	Short Lane	200	Right			-	-	-		
	North	New England Highway North									
Exit Lane 1 Short Lane 150 Right	App. Lane 1	Short Lane	200	Right			_	_	-		
	Exit Lane 1	Short Lane	150	Right			-	-	-		

Lane Geometry - Lane Disciplines							
To Approach	OD Movement	Free Queue Distance m	Movement Class(es)				
From: South	App. Lane 1						
West	L2	0	LV, HV				
From: South	App. Lane 2						
North	T1	0	LV, HV				
East	R2	0	LV, HV				
From: East	App. Lane 1						
South	L2	0	LV, HV				

West North	T1 R2	0 0	LV, HV LV, HV
From: North	App. Lane 1		
East	L2	0	LV, HV
From: North	App. Lane 2		
South	T1	0	LV, HV
West	R2	0	LV, HV
From: West	App. Lane 1		
North	L2	0	LV, HV
East	T1	0	LV, HV
South	R2	0	LV, HV

Lane Data	- Lane Data					
Approach Lane		Basic Utilisation Satn Flow Ratio		Saturation Speed	Capacity Adjustment	Use Given Cap Adj in Network Analysis
		tcu/h	%	km/h	%	
South	New England High	way South				
App. Lane 1 App. Lane 2		1950 1950			0.0 0.0	No No
East	Ballandean Road					
App. Lane 1	l	1950	-	-	0.0	No
North	New England High	way North				
App. Lane 1 App. Lane 2		1950 1950			0.0 0.0	No No
West	Bruxner Highway					
App. Lane 1		1950	_	-	0.0	No

Lane Data - Flow	v Proportions			
Exit Lane	South %	To Exit Leg East %	North %	West %
Light Vehicles (LV))			
From: South Exit Lane 1	App. Lane 1 –	-	-	100
From: South Exit Lane 1 Exit Lane 2	App. Lane 2 – –	100	100 0	-
From: East Exit Lane 1 Exit Lane 2	App. Lane 1 100 0	-	0 100	100
From: North Exit Lane 1	App. Lane 1 –	100	-	-
From: North Exit Lane 1 Exit Lane 2	App. Lane 2 100 0	-	Ξ	100
From: West Exit Lane 1 Exit Lane 2	App. Lane 1 0 100	100	100 0	-
Heavy Vehicles (H	V)			
From: South Exit Lane 1	App. Lane 1 –	-	-	100
From: South Exit Lane 1 Exit Lane 2	App. Lane 2 _ _	100	100 0	-
From: East Exit Lane 1 Exit Lane 2	App. Lane 1 100 0	- -	0 100	100
From: North Exit Lane 1	App. Lane 1 –	100	-	-
From: North Exit Lane 1 Exit Lane 2	App. Lane 2 100 0	-	-	100 _

From: West	App. Lane 1				
Exit Lane 1	0	100	100	-	
Exit Lane 2	100	_	0	-	

Lane Data - Lan	e Blockage			
Exit Lane	South	To Exit Leg East	North	West
From: South	App. Lane 1			
Exit Lane 1	-	-	-	Yes
From: South	App. Lane 2			
Exit Lane 1	-	Yes	Yes	-
Exit Lane 2	_	-	Yes	-
From: East	App. Lane 1			
Exit Lane 1	Yes	-	Yes	Yes
Exit Lane 2	Yes	_	Yes	-
From: North	App. Lane 1			
Exit Lane 1	-	Yes	-	-
From: North	App. Lane 2			
Exit Lane 1	Yes	_	_	Yes
Exit Lane 2	Yes	-	-	-
From: West	App. Lane 1			
Exit Lane 1	Yes	Yes	Yes	-
Exit Lane 2	Yes	-	Yes	-

Pedestrians - Pedestrian Movements									
Unit Time for Volumes: 60 mi Peak Flow Period: 30 minute									
Main Crossing/ Slip/Bypass Lane Crossing	Volume	Peak Flow	Flow Scale	Growth Rate					
	ped	%	%	%					
No Ped Movements									

Pedestrians - Pedestrian Movement Data										
Main Crossing/ Slip/Bypass Lane Crossing	Mov. ID	Crossing Distance	Oppng Ped.Fac.	P.Deg. Satn	Walking Speed	App. Trav. Distance	Downst. Distance	Queue Space		
		m			m/sec	m	m	m		
No Ped Move	ments									

Volumes - Veh	icle Volumes			
Unit Time for Volu Peak Flow Period Volume Data Meriod	umes: 60 minute d: 30 minutes			
Movement Class	South veh	To Exit Leo East veh) North veh	West veh
From: South	New Englan	d Highway So		
Total (veh) LV (veh) HV (veh)	- - -	2 2 0	96 83 13	13 11 2
From: East	Ballandean	Road		
Total (veh) LV (veh) HV (veh)	1 1 0	_ _ _	8 3 5	2 1 1
From: North	New Englan	d Highway N	orth	
Total (veh) LV (veh) HV (veh)	101 85 16	16 8 8		1 1 0
From: West	Bruxner Hig	hway		

Total (veh)	10	2	1	_
LV (veh)	7	1	1	-
HV (veh)	3	1	0	-

Volumes - Volu	ume Factors		
То	Peak Flow	Flow	Growth
Approach	Factor	Scale	Rate
	%	%	%/year
Light Vehicles (L	V)		
From: South	New England Highway	South	
West	95.0	100.00	1.50
North	95.0	100.00	1.50
East	95.0	100.00	1.50
From: East	Ballandean Road		
South	95.0	100.00	1.50
West	95.0	100.00	1.50
North	95.0	100.00	1.50
From: North	New England Highway	North	
East	95.0	100.00	1.50
South	95.0	100.00	1.50
West	95.0	100.00	1.50
From: West	Bruxner Highway		
North	95.0	100.00	1.50
East	95.0	100.00	1.50
South	95.0	100.00	1.50
Heavy Vehicles	(HV)		
From: South	New England Highway	South	
West	95.0	100.00	1.50
North	95.0	100.00	1.50
East	95.0	100.00	1.50
From: East	Ballandean Road		
South	95.0	100.00	1.50
West	95.0	100.00	1.50
North	95.0	100.00	1.50
From: North	New England Highway	North	
East	95.0	100.00	1.50
South	95.0	100.00	1.50
West	95.0	100.00	1.50
From: West	Bruxner Highway		
North	95.0	100.00	1.50
East	95.0	100.00	1.50
South	95.0	100.00	1.50

Priorities				
Opposed Movement	South	Opposing East	Movements North	West
South	New Englan	d Highway S	South	
L2	_	-	_	-
T1 R2	-	-	- T1 2	-
	-	-	T1,L2	-
East	Ballandean	Road		
L2		-	T1	-
T1 R2	R2,T1,L2 R2,T1		T1,R2 T1,R2	_ T1,L2
				11,52
North	New Englan	id Highway I	North	
L2 T1	-	-	-	-
R2	_ T1,L2	_	_	_
West	Bruxner Hig	hway		
L2	T1	_		-
T1 R2	R2,T1 R2,T1	_ L2,T1	T1,L2,R2 T1,R2	-
112	172,11	∟∠, Г Г	11,62	-

Gap Acce	ptance - Gap A	cceptance	e Data					
Opposed Movement	Apply TWSC Calibration	Critical Gap	Follow-up Headway	Minimum Departures	Exiting Flow Effect	% Opp. By Nearest Lane	Opng. Peds (UnSig)	Staged Crossing
		sec	sec	veh/min	%	%		
South	New England H	lighway Sou	ıth					
R2	Yes	4.500	2.500	0.10	0	0.00	Pr (Flow)	None
East	Ballandean Ro	ad						
L2	Yes	5.000	3.000	0.10	50	100.00	Pr (Flow)	None
T1 R2	Yes Yes	6.500 7.000	3.500 4.000	0.10 0.10	50 50	0.00 0.00	Pr (Flow) Pr (Flow)	None None
North	New England H	lighway Nor	th					
R2	Yes	4.500	2.500	0.10	0	0.00	Pr (Flow)	None
West	Bruxner Highwa	ay						
L2	Yes	5.000	3.000	0.10	50	100.00	Pr (Flow)	None
T1	Yes	6.500	3.500	0.10	50	0.00	Pr (Flow)	None
R2	Yes	7.000	4.000	0.10	50	0.00	Pr (Flow)	None

Gap Acceptance - Two-Way Sign Control Calibration				
Level of Reduction with Opposing Flow Rate	None			
Major Road Turning Flow Factor	1			

Gap Acceptance - Two-W	/ay Sign C	ontrol P	arameter	Adjs fo	r Major R	d Numb	er of Lar	nes
	Crit	ical Gap A	djustment		Follow-up Headway Adjustment			ment
Major Road Number of	2-lane	3-lane	5-lane 6-	lane or	2-lane	3-lane	5-lane	6-lane
Lanes:				more				or more
	sec	sec	sec	sec	sec	sec	sec	sec
Minor Road Left Turn	-0.5	-0.5	0.0	0.0	-0.5	-0.5	0.0	0.0
Minor Road Through	-1.5	-0.5	0.5	1.0	-0.5	-0.3	0.5	1.0
Minor Road Right Turn	-1.5	-0.5	0.5	1.0	-0.5	-0.3	0.5	1.0
Major Road Turn (Right or Left)	-0.5	-0.5	0.0	1.0	-0.5	-0.5	0.0	1.0

Gap Acceptance - Two-Way Sign Control Parameter Adjs for Geometry and Control

	Critical Gap Adjustment	Follow-up Headway Adjustment
	sec	sec
Give-Way / Yield Sign Control	-0.5	-0.3
One-Way Major Road	-0.5	-0.3
T Intersection (Minor Road Turn)	-0.7	-0.4
Entry Road Grade (for each per cent grade)	0.1	0.0
Staged Crossing - Stage 1	-1.0	-0.6
Staged Crossing - Stage 2	-1.0	-0.6
U Turn (Major Road)	1.5	0.9
User Adjustment	0.0	0.0
·		

Gap Acceptance - Settings Gap Acceptance Capacity : SIDRA Standard (Akçelik M3D)

Vehicle Move	ement Data - F	Path Data				
OD Movement	Approach Cruise Speed km/h	Exit Cruise Speed km/h	Negotiation Speed km/h	Negotiation Distance m	Downstream Distance m	Negotiation Radius m
Light Vehicles	(LV)					
From: South	New Engl	and Highway So	outh			
L2	100.0	100.0	_	-	-	-
T1	100.0	100.0	-	-	-	-
R2	100.0	100.0	-	-	-	-

From: East	Ballandean R					
L2	80.0	80.0	-	-	-	
T1	80.0	80.0	-	-	-	
R2	80.0	80.0	-	-	-	
From: North	New England	Highway North				
L2	100.0	100.0	-	-	-	
T1	100.0	100.0	-	-	-	
R2	100.0	100.0	-	-	-	
From: West	Bruxner High	way				
L2	80.0	80.0	-	-	_	
T1	80.0	80.0	-	-	_	
R2	80.0	80.0	-	-	_	
Heavy Vehicles (HV)					
From: South	New England	Highway South				
L2	100.0	100.0	-	-	-	
T1	100.0	100.0	-	-	-	
R2	100.0	100.0	-	-	-	
From: East	Ballandean R	oad				
L2	80.0	80.0	-	-	-	
T1	80.0	80.0	-	-	-	
R2	80.0	80.0	-	-	-	
From: North	New England	Highway North				
L2	100.0	100.0	-	-	-	
T1	100.0	100.0	-	_	_	
R2	100.0	100.0	-	-	_	
From: West	Bruxner High	way				
L2	80.0	80.0	_	_	-	
T1	80.0	80.0	-	-	_	
R2	80.0	80.0				

Vehicle Movem	ent Data - C	alibration						
OD	Queue	Vehicle	Vehicle	Turn Veh		Gap Accp	Opng. Veh	Prac. Deg.
Movement	Space	Length	Occupancy	[Factor	Radius]	Factor	Factor	Of Satn.
	m	m	pers/veh		m			
Light Vehicles (LV	()							
From: South		and Highwa						
L2	7.00	4.50	1.20	1.05	-	1	1	-
T1 R2	7.00	4.50 4.50	1.20	1 1.05	-	1	1	-
	7.00		1.20	1.05	-	1	1	-
From: East	Ballandea							
L2	7.00	4.50	1.20	1.05	-	1	1	-
T1 R2	7.00 7.00	4.50	1.20	1	-	1	1	-
		4.50	1.20	1.05	-	1	1	-
From: North		and Highwa						
L2	7.00	4.50	1.20	1.05	-	1	1	-
T1 R2	7.00	4.50	1.20 1.20	1 1.05	-	1	1	-
	7.00	4.50	1.20	1.05	_	1	1	_
From: West	Bruxner H							
L2	7.00	4.50	1.20	1.05	-	1	1	-
T1 R2	7.00 7.00	4.50 4.50	1.20 1.20	1 1.05	-	1	1	-
		4.50	1.20	1.05	-	1	1	_
Heavy Vehicles (H	HV)							
From: South	New Engl	and Highwa	y South					
L2	13.00	10.00	1.20	1.09	-	1.5	1.5	-
T1	13.00	10.00	1.20	1	-	1.5	1.5	-
R2	13.00	10.00	1.20	1.09	-	1.5	1.5	-
From: East	Ballandea							
L2	13.00	10.00	1.20	1.09	-	1.5	1.5	-
T1	13.00	10.00	1.20	1	-	1.5	1.5	-
R2	13.00	10.00	1.20	1.09	_	1.5	1.5	_
From: North		and Highwa						
L2	13.00	10.00	1.20	1.09	-	1.5	1.5	-
T1	13.00	10.00	1.20	1	-	1.5	1.5	-
R2	13.00	10.00	1.20	1.09	-	1.5	1.5	-
From: West	Bruxner H							
L2	13.00	10.00	1.20	1.09	-	1.5	1.5	-
T1	13.00	10.00	1.20	1	-	1.5	1.5	-
R2	13.00	10.00	1.20	1.09	-	1.5	1.5	-

Demand & Sensitivity	
Analysis Method: Design Life	
Design Life Analysis Objective	Practical Capacity (v/c ratio = xp)
Growth Model	Uniform
Number of Years	30
Const. No. of Years	-
Result For	Intersection - Vehicles

Model Settings - Options	
General Options	
Level of Service Method	Delay (RTA NSW)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Include Short Lanes in determining	No
Approach Queue Storage Ratio	

Model Settings - Model Parameters	
Passenger Car Equivalents	
Light Vehicles (LV)	1.00 pcu/veh
Heavy Vehicles (HV)	1.65 pcu/veh
Queue Blockage	
Minimum Probability of Blockage	0
Delay and Queue	
Exclude Geometry Delay	No
HCM Delay Formula	No
HCM Queue Formula	No
Downstream Short Lane	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Cost

Cost Options						
Cost Unit	\$					
Vehicle Cost Parameters						
		Vel	n Operating Co	st	Veh Tim	e Cost
Movement Class	Veh Cost Method	Pump Price of Fuel	Fuel Res. Cost Factor	Ratio of Running Cost to Fuel Cost	Avg. Income	Time Value Factor
		\$/L			\$/h	
Light Vehicles (LV)	Operating Cost	1.450	0.500	3.00	38.00	0.600
Heavy Vehicles (HV)	Operating Cost	1.450	0.500	3.00	38.00	0.600

Model Settings - Vehicle Paramet	ers		
Movement Class	Mass	Max Power	CO2 to
	kg	kW	Fuel Rate
Light Vehicles (LV)	1600.0	120	2.35
Heavy Vehicles (HV)	15000.0	170	2.633

Model Settings - Fuel Consumption							
Movement Class	fi	А	В	Beta			
Light Vehicles (LV)	1200	16	0.004	0.1			
Heavy Vehicles (HV)	2300	200	0.009	0.075			

Model Settings - CO Emission							
Movement Class	fi	А	В	Beta			
Light Vehicles (LV)	1620	-138	0.0743	0.294			
Heavy Vehicles (HV)	25000	320	-0.06	0.04			

Model Settings - HC Emission							
Movement Class	fi	А	В	Beta			
Light Vehicles (LV)	340	-9	0.0031	0.029			
Heavy Vehicles (HV)	3000	1	-0.0016	0.0013			

Model Settings - NOx Emission							
fi	А	В	Beta				
300	-14	0.0068	0.166				
44000	2820	0.21	1.9				
	fi 300	fi A 300 -14	fi A B 300 -14 0.0068				

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