TRAFFIC IMPACT ASSESSMENT

IN SUPPORT PLANNING PROPOSAL

PROPOSAL TO AMEND THE ORANGE LOCAL ENVIRONMENTAL PLAN 2011 IN RESPECT OF LAND AT LEEDS PARADE, CLERGATE

PREPARED FOR:

ROSEDALE GARDENS ESTATE PTY LTD

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The preparation of this report has been in accordance with the project brief provided by the client and has relied upon the information, data and results provided or collected from the sources and under the conditions outlined in the report.

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Introduction

1.1 BACKGROUND AND PROPOSED DEVELOPMENT

Rosedale Gardens Estate Pty Ltd intends to develop a staged large lot residential subdivision on land consisting of the former Orange abattoir at the northern end of Leeds Parade, Orange.

In order to facilitate the subdivision an amendment to the Orange Local Environmental Plan 2011 is required to rezone the subject land from RU1 – Primary Production and IN1 – General Industrial to R5 – Large Lot Residential and E4 – Environmental Living.

The subject land is described in **Section 1.2** and has an overall area of approximately 290 hectares.

The subject land would be developed with internal local roads and these would be accessed from Leeds Parade in the south. At this time no further connections to existing roads are proposed however it anticipated that development of adjacent land in the future would facilitate an alternate access to Ophir Road. This does not however form part of this assessment. Additionally, an access to Pearce Lane has been considered but discounted at this time due to the costs associated with upgrading Pearce Lane and the Pearce Lane/Clergate Road and Clergate Road/Northern Distributor Road intersections.

A master plan for the site has been developed generating approximately 450 lots with a minimum size of 4,000 square metres.

A staging plan is predicated on the development commencing at the Leeds Parade intersection (south) and the release of 10-20 lots per year, to account for demand requirements, without over saturation.

This assessment is conducted on the development at completion, that is, the impact of vehicles generated by all 450 lots on the operation of the local road system.

1.2 SUBJECT SITE

The subject site is formed of:

- Lot 15 DP6694, 390 Clergate Road, Orange
- Lot 3 DP255983, 440 Clergate Road, Orange
- Lot 2 DP255983, 440 Clergate Road, Orange
- Lot 14 DP6694, 440 Clergate Road, Orange
- Lot 25 DP6694, 440 Clergate Road, Orange

The site is located approximately 5 kilometres north of Orange central business district (CBD) and 1.8 kilometres (3.5 kilometres by road) from the North Orange shopping centre. The site has an area of approximately 290 hectares and is bounded to the north by Pearce Lane, to the west by the Main Western Railway Line and to the south and east by private late. The southern portion of the site (Lot 15) is currently zoned IN1 – General Industrial with the remainder of the currently zoned RU1 – Primary Production.

The site is depicted in **Figure 1**.





Figure 1: The subject site (Source: Six Maps)



1.3 **METHODOLOGY**

By reference to clause 104 of the *State Environmental Planning Policy (Infrastructure) 2007* (ISEPP), the resulting proposed subdivision would be classified as a Schedule 1 traffic generating development in the basis that it proposes 300 or more lots. The matter is therefore referrable to the Roads and Maritime Services and a Traffic Impact Assessment (TIA) has been prepared to assist the development assessment process.

The proposal to rezone the land would result in the potential for the development of a large lot residential subdivision. This eventual subdivision would generate an increase in the volume of traffic movements onto the surrounding road network. The provision of safe and efficient means of access to the development will be necessary to ensure the satisfactory operation of the development.

This Traffic Impact Assessment (TIA) investigates the impact of the development on the surrounding road network. The TIA will determine if additional traffic management facilities are required to safely and efficiently control the movement of all vehicular traffic to and from the site.

This TIA will address the following specific issues:

- The potential levels of traffic generation as a result of the proposed rezoning;
- The capacity of the affected roads to accommodate additional traffic;
- Impact on safety and amenity of the surrounding road network; and
- Operation of specific affected intersections.

The methodology for preparing the TIA is outlined below:

- i. Review of existing traffic volume data held by Council and available from external sources for roads surrounding the development site.
- ii. Determination of the traffic generating potential of the rural residential subdivision development and calculation of the peak hour and peak daily traffic volumes to be added to the existing traffic volumes on the roads surrounding the development site.
- iii. Determination/collation of traffic generation data for surrounding traffic generating developments (notably, the Bunnings hardware store and highway service centre both currently under development on Leeds Parade);
- iv. Assessment of the impact of the additional traffic generated by the subdivision development on the surrounding road network through the use of SIDRA modelling, including the impacts associated with traffic generated by development in the surrounding area. The impact assessment will be carried out in terms of:
- Road capacity; and
- Level of Service.

In summary, this Traffic Impact Assessment will assess:

- the existing traffic movements on the existing road network, including Northern Distributor Road (both east and west of Leeds Parade) and Leeds Parade (both north and south of Northern Distributor Road);
- the expected traffic volumes generated by the proposed subdivision;
- the effect of the generated traffic on the surrounding roads; and
- review of the operation and design of existing intersections to determine whether anticipated volumes can be accommodated.



Existing Traffic Conditions

2.1 INTRODUCTION

Primary access to the site is from Leeds Parade in the south, with Leeds Parade transitioning into the sealed driveway that formerly provided heavy vehicle access to the abattoir buildings.

Historically abattoir staff are understood to have accessed the abattoir via a single lane bridge over the Main Western Railway Line, which staff used to walk over after parking on the land on the western side of the rail line. The bridge is accessed from private land owned by the applicant but not forming part of this application.

The site also currently benefits from a single lane rail crossing from Clergate Road and a number of gateway accesses to Pearce Lane in the north.

Figure 2 shows the south-western corner of the site and the three current (known) accesses into the property in this area.



Figure 2: Existing site accesses in the southern extent

The connectivity provided by the alignment of Leeds Parade to Northern Distributor Road affords excellent links to the Orange CBD via Leeds Parade South, Bathurst and Sydney via Northern Distributor Road east and the North Orange Shopping Centre and onwards to Wellington, Dubbo, Parkes, Forbes and Cowra (and south to Melbourne) via Northern Distributor Road west.



As outlined in **Section 1.1** the design intention is to utilise Leeds Parade for all traffic into and out of the subdivision. Access to the site will be via an extension of Leeds Parade with a suitable gateway treatment to indicate the entry to the proposed subdivision. To assess the impact of the proposed subdivision on the surrounding road network the following roads and intersections will be studied:

- Leeds Parade north of Northern Distributor Road;
- Leeds Parade south of Northern Distributor Road;
- Northern Distributor Road east of Leeds Parade.
- Northern Distributor Road west of Leeds Parade.
- The Northern Distributor Road/Leeds Parade Intersection
- The University Access Intersection

2.2 ROAD NETWORK HIERARCHY

The Roads and Traffic Authority (2008) proposes four basic road classes as the basis for the functional hierarchy of a road network.

Functional classifications take into account the relative balance of the traffic mobility function and amenity/access functions of streets and roads and defines the purpose of a road within the context of an urban area.

The four road classes are motorways, arterial, sub-arterial and local roads and are defined below.

Motorways

This is the highest form of arterial road and is considered separately due primarily to traffic function and strict access control via grade separate interchanges. These roads provide for major inter-regional traffic movements in a safe and operationally efficient manner.

Arterial Roads

Roads whose main function is to carry through traffic from one region to another forming the principal means of communication for major traffic movements. Access to land should be limited.

Sub-Arterial Roads

Those roads which supplement the arterial roads in providing for through traffic movement to an individually determined limit that is sensitive to both roadway characteristics and adjoining land uses.

Local Roads

Roads that distribute traffic between the arterial roads and the local street system and provide access to adjoining property.

Based on the existing road network the functional classification of Leeds Parade and Northern Distributor Road (in the vicinity of the subject site) are:

Leeds Parade - south of NDR and from NDR to the University access:	Sub-Arterial Road.
Leeds Parade - north of the University access: Sub-Arterial Road:	Local Road.
Northern Distributor Road:	Sub-Arterial Road.



2.3 EXISTING ROADWAY CONDITIONS

2.3.1 LEEDS PARADE

Leeds Parade is a two way two lane bitumen sealed road with no kerb and guttering.

From the subject site to the University entrance Leeds Parade is approximately 6-6.5m wide with no line markings. The post speed limit is 50 km/hr

From the University Entrance to Northern Distributor Road, Leeds Parade is approximately 6.5–7.5m wide with line marked lanes approximately 3.2 m wide. The posted speed limit is 80 km/hr from Northern Distributor Road to approximately 200m south of the University Entrance where the posted speed limit drops down to 50 km/hr.

South of Northern Distributor Road, Leeds Parade is a two lane, two way road with line marking and a speed limit of 80km/hr for a distance of approximately 650 metres south of the Northern Distributor Road intersection, at which point the speed limit reduces to 50km/hr as it approaches residential and industrial areas of Orange.

There is a bicycle/pedestrian pathway running along the western side of Leeds Parade starting at the University entrance and running south to link into a path on Northern Distributor Road and then continuing south to link into the residential areas of Orange.

2.3.2 NORTHERN DISTRIBUTOR ROAD.

Northern Distributor Road is a two way, two lane bitumen sealed road. Northern Distributor Road has full line marking with average lane widths of 3.7m and sealed shoulders of variable widths

East of Leeds Parade the posted speed limit on Northern Distributor Road is 80 km/hr whilst the remainder has a posted speed limit of 70 km/hr.

There is a bicycle/pedestrian pathway on the southern side of Northern Distributor Road (west of Leeds Parade) that links up to the bicycle/pedestrian pathway in Leeds Parade and into the general urban bicycle/pedestrian pathway network to the west.

Northern Distributor Road acts as a distributor for traffic looking to access the areas of West Orange and North Orange, including the North Orange shopping centre, and the areas of East Orange, including homemaker centre, and onwards to Bathurst and Sydney.

2.4 EXISTING ROAD CAPACITY

Roads have varying capacities dependent on the function they are performing. The United States Highway Capacity Manual defines capacity as follows:

...the maximum hourly rate at which persons or vehicles can reasonably be expected to traverse a point or uniform section of a lane or roadway during a given time period under the prevailing roadway, traffic and control conditions.

The physical characteristics of a roadway such as lane width, alignment, frequency of intersections etc. make up the prevailing roadway conditions.

Based upon its capacity and a driver's expectations of the operational characteristics of a traffic stream is a qualitative measure denoted as the level of service of a road.

Level of service definitions combine such factors as speed, travel time, safety, convenience and traffic interruptions and fall into six levels of service categories ranging from A down to F.



The AUSTROADS Guide to Traffic Management, Part 3 – Traffic Studies and Analysis describes Level of Service A as:

A condition of free flow in which individual drivers are virtually unaffected by the presence of others in the traffic stream. Freedom to select desired speeds and to manoeuvre within the traffic stream is extremely high, and the general level of comfort and convenience provided is excellent.

The categories are graduated from Level of Service A down through six levels to Level of Service F, being a zone of forced flow. The amount of traffic approaching the point under consideration exceeds that which can pass it. Flow breakdowns occur and queuing and delays result.

The AUSTROADS Guide to Traffic Management, Part 3 – Traffic Studies and Analysis sets out typical mid-block capacities for various types of urban road with interrupted flow. Based on the physical configuration of Leeds Parade and Northern Distributor Road together with the rates given in the Guide the capacity of the surrounding roads can be determined as:

- Leeds Parade Capacity of 900 vehicles per hour per lane;
- Northern Distributor Road Capacity of 1,200 vehicles per hour per lane.

2.5 EXISTING TRAFFIC

Site specific traffic data was not collected on individual roads surrounding the subdivision site for the preparation of this TIA. However, Geolyse has been able to access traffic data from the Traffic Impact Assessment prepared by Transport and Traffic Planning Associates (T&TPA) for the approved Orange Bunnings development, located on the corner of Leeds Parade and Northern Distributor Road. This report provides traffic data for both existing and post development conditions following the development of the proposed Bunnings development. A copy of this report is included in **Appendix A**.

Based on the report by T&TPA, heavy vehicles account for approximately 5% of traffic on Leeds Parade and Northern Distributor Road. These figures are used for modelling purposes across all traffic movements with the exception of Hanrahan Place (Hanrahan Place is a newly constructed fifth leg off the Northern Distributor Road/Leeds Parade roundabout that provides access to the Finemore Depot and for the purposes of the existing traffic scenario it has been assumed that 100% of vehicles on this leg are heavy).

2.5.1 ANNUAL AVERAGE DAILY TRAFFIC

Annual Average Daily Traffic (AADT) is defined as the total volume of traffic passing a roadside observation point over a period of a year divided by the number of days in a year.

AADT data on Leeds Parade north is not available, however it has been predicted based on the peak hour figures provided within the T&TPA report. Assuming the peak hour traffic (PHT) volume represents 10% of the annual average daily traffic (AADT) (based on the ratio of PHT to AADT for surrounding roads), the peak hour traffic can be calculated as:

Annual Average Daily Traffic = 111/10%

= 1,110 vehicles/day

Existing AADT for Northern Distributor Road and Leeds Parade south was obtained from the T&TPA report and **Table 2.1** contains a summary of the AADT on the roads surrounding the subject site.



Table 2.1 – Existing Annual Average Daily Traffic (AADT)

Road Location	AADT (vehicles/day)
Northern Distributor Road	8,400
Leeds Parade (south of Northern Distributor Road)	3,500
Leeds Parade (north of Northern Distributor Road)	1,110

Source: T&TPA Report – Refer Appendix A

2.5.2 PEAK HOUR TRAFFIC

The T&TPA report contains existing peak hour traffic for both the weekday PM and the weekend midday peaks based on traffic counts undertaken at the roundabout at the intersection of Leeds Parade and Northern Distributor Road. The weekday PM peak occurred at 16:15 to 17:15 and was greater than the weekend midday peak and hence will be adopted as the critical time period for peak hour traffic assessment for the roundabout and surrounding roads.

A summary of the peak hour traffic on the roads surrounding the subject site is contained in Table 2.2.

Table 2.2 – Existing Peak Hour Traffic

Road Location	Lane	Weekday PM Peak Hour Traffic (vehicles/hour)
Northern Distributor Road	Eastbound	241
(east of Leeds Parade)	Westbound	321
TOTAL		562
Northern Distributor Road	Eastbound	362
(west of Leeds Parade)	Westbound	580
TOTAL		942
Leeds Parade	Northbound	28
(north of Northern Distributor Road)	Southbound	83
TOTAL		111
Leeds Parade	Northbound	322
(south of Northern Distributor Road)	Southbound	242
TOTAL		564

Source: T&TPA Report – Refer Appendix A

2.6 EXISTING INTERSECTION CONDITIONS

2.6.1 INTRODUCTION

Intersections are critical points which often control the capacity of the road network. This is due to the need for conflicting traffic movements to share the same road space at these locations. The operation of the intersections in the vicinity of the site have been analysed using SIDRA Intersection. SIDRA Intersection is a computerised traffic evaluation tool which is used in the assessment and design of intersection treatments in terms of capacity and operation. The program provides outputs which include delays, queue lengths, total capacities, travel times, and average speeds. SIDRA Intersection is the preferred intersection analysis tool of Roads and Maritime and many Local Government Authorities.



As part of the intersection analysis, the SIDRA Intersection model provides an "Average Control Delay" for each approach of the intersection. This control delay is the average delay per vehicle over the peak hour as a result of the intersection and is grouped into six bands labelled A through to F (with 'A' being best and 'F' being over capacity), termed Level of Service (LOS). The overall LOS for a 'Give Way' intersection is the LOS result for the worst case turning movement.

2.6.2 LEEDS PARADE AND NORTHERN DISTRIBUTOR ROAD

The intersection of Leeds Parade and Northern Distributor Road features a two lane roundabout for all directions with a 36 metre diameter island.

An assessment of the Leeds Parade/Northern Distributor Road intersection under existing weekday PM peak hour conditions was undertaken using SIDRA.

The following assumptions were included in the SIDRA analysis:

- Intersection traffic and turning movements: refer Figure 3
- Heavy Vehicle percentage refer **Figure 3**
- Control type: Give Way all legs
- Lane widths assumed: 3.7m all lanes
- Approach lengths on Northern Distributor Road
 - 500m westbound through (120m inside lane)
 - 500m eastbound through (60m inside lane + 20m left turn slip lane)
- Approach lengths on Leeds Parade
 - 500m southbound through (100m inside lane)
 - 500m northbound through (60m inside lane)
- Approach lengths on Hanrahan Place 190m
- Approach and exit cruise speeds:
 - Northern Distributor Road east 70 kph
 - Northern Distributor Road west 80 kph
 - Leeds Parade (north and south) 80 kph
 - Hanrahan Place 50 kph

Based on the above assumptions, a SIDRA Intersection analysis was carried out for the intersection for the existing weekday PM peak. The movement summary output from the SIDRA assessment is shown in **Figure 4**. Full results of the SIDRA analysis are provided in **Appendix B**.



Figure 3: NDR/Leeds Prd Int – Existing weekday PM Peak hour traffic volumes



MOVEMENT SUMMARY

Site: WD PM (NDR/Leeds) - existing

New Site Roundabout

Mov	OD	Deman	d Flows	Deg.	Average	Level of	95% Back	of Queue	Prop.	Effective	Average
ID	Mov	Total	HV	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
South	Leeds Para	veh/h	%	v/c	sec		veh	m		per veh	km/t
1a	L1	271	5.0	0.217	9.8	LOSA	1.0	7.4	0.41	1.19	58.8
2	T1	13	5.0	0.072	22.3	LOS B	0.3	2.3	0.45	1.50	51.2
3a	R1	8	100.0	0.072	22.3	LOS B	0.3	2.3	0.45	1.50	51.2
3b	R3	30	5.0	0.072	22.3	LOS B	0.3	2.3	0.45	1.50	51.3
Approa	445	322	7.4	0.217	11.8	LOSA	1.0	7.4	0.43	0.62	57.2
e de la com				0.211	1.2	20011	3.6	111	0.12	0.02	
	East: Northe			0.000		100.0		1.0	0.00	4.00	50.0
21b	L3	52	5.0	0.032	15.1	LOSB	0.1	1.0	0.26	1.28	58.6
22	T1	267	5.0	0.093	9.7	LOSA	0.4	3.0	0.32	1.10	59.5
23a	R1	2	5.0	0.093	10.0	LOSA	0.4	2.9	0.33	1.12	59.3
23	R2	1	100.0	0.093	10.0	LOSA	0.4	2.9	0.33	1.12	59.3
Approach		322	5.3	0.093	10.5	LOSA	0.4	3.0	0.31	0.56	59.3
NorthE	ast: Hanrah	ian Pl									
24	L2	5	100.0	0.042	37.8	LOS C	0.2	2.0	0.50	1.48	49.3
24a	L1	7	100.0	0.042	37.8	LOS C	0.2	2.0	0.50	1.48	49.3
26	R2	11	100.0	0.042	37.8	LOS C	0.2	2.0	0.50	1.48	49.3
26b	R3	1	100.0	0.042	37.8	LOS C	0.2	2.0	0.50	1.48	49.3
Approa	ach	24	100.0	0.042	37.8	LOS C	0.2	2.0	0.50	0.74	49.1
North:	Leeds Para	de north									
7b	L3	1	100.0	0.037	12.8	LOSA	0.1	1.1	0.39	1.23	59.7
7a	L1	11	5.0	0.037	12.8	LOSA	0.1	1.1	0.39	1.23	59.7
8	T1	40	5.0	0.037	14.0	LOSA	0.1	1.1	0.40	1.27	58.
9b	R3	31	5.0	0.037	19.0	LOS B	0.1	1.1	0.41	1.46	52.2
Approa	ach	83	6.1	0.037	15.7	LOS B	0.1	1.1	0.40	0.67	56.0
NorthV	Vest: Northe	rn Distribute	or west								
27b	L3	13	5.0	0.128	11.0	LOSA	0.6	4.9	0.18	1.07	57.0
27	L2	11	100.0	0.128	11.0	LOSA	0.6	4.9	0.18	1.07	57.
28	T1	195	5.0	0.128	12.1	LOSA	0.6	4.9	0.18	1.12	56.0
29a	R1	143	5.0	0.128	17.5	LOS B	0.6	4.7	0.19	1.37	53.4
Approa	ach	362	7.9	0.128	14.1	LOS A	0.6	4.9	0.19	0.61	55.
	icles	1113	8.8	0.217	14.8	LOS B	1.0	7.4	0.31	0.60	56.3

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

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model 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.

Figure 4: NDR/Leeds Prd Int – Existing weekday PM Peak hour traffic movements

From the table in **Figure 4**, it can be seen that the current worst movement is for those vehicles exiting Hanrahan Place, with a LOS C and an average delay of 37.8 seconds. All other movements operate at a LOS A or B.

2.6.3 UNIVERSITY ENTRANCE

The intersection at the entrance to the University consists of a channelised right turn treatment with raised concrete medians.



An assessment of the Leeds Parade/University Entrance intersection under existing weekday PM peak hour conditions was undertaken using SIDRA. The following assumptions were included in the SIDRA analysis:

- Intersection traffic and turning movements: refer **Figures 5** (It was assumed only 1 vehicle per hour travelled past the University with all other traffic entering and leaving the University)
- Heavy Vehicle percentage refer Figure 5
- Control type: Give Way University to Leeds Parade
- Lane widths assumed: 3m all lanes
- Approach lengths on Leeds Parade
 - 500m northbound through (50m right turn lane)
- Approach length on University Entrance 140m
- Approach and exit cruise speeds:
 - 50kph all roads





Figure 5: University Ent Int – Existing weekday PM Peak hour traffic volumes

Based on the above assumptions, a SIDRA Intersection analysis was carried out for the intersection for the existing weekday PM peak. The movement summary output from the SIDRA assessment is shown in **Figure 6**. Full results of the SIDRA analysis are provided in **Appendix B**.



MOVEMENT SUMMARY

Site: Uni existing PM New Site

Giveway /	Yield	(Two-Way)

Move	ment Perfe	ormance - V	ehicles								
Mov	OD	Demand	Flows	Deg.	Average	Level of	95% Back	of Queue	Prop.	Effective	Average
ID	Mov	Total	HV	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
		veh/h	%	v/c	Sec		veh	m		per veh	km/h
South:	Leeds Para	ade									
2	T1	1	5.0	0.001	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
3	R2	27	5.0	0.015	8.0	LOS A	0.1	0.5	0.02	0.67	42.8
Approa	ach	28	5.0	0.015	7.7	NA	0.1	0.5	0.02	0.65	43.0
East: U	University										
4	L2	82	5.0	0.052	7.5	LOS A	0.2	1.6	0.01	0.63	43.1
6	R2	1	5.0	0.052	7.5	LOS A	0.2	1.6	0.01	0.63	43.1
Approa	ach	83	5.0	0.052	7.5	LOS A	0.2	1.6	0.01	0.63	43.1
North:	Leeds Para	de									
7	L2	1	5.0	0.001	3.7	LOS A	0.0	0.0	0.00	0.40	46.3
8	T1	1	5.0	0.001	3.7	LOS A	0.0	0.0	0.00	0.40	46.3
Approa	ach	2	5.0	0.001	3.7	NA	0.0	0.0	0.00	0.40	46.3
All Vel	nicles	113	5.0	0.052	7.5	NA	0.2	1.6	0.01	0.63	43.1

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

Vehicle movement LOS values are based on average delay per movement

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

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model 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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Figure 6: University Ent Int - Existing weekday PM Peak hour traffic movements

From the table in **Figure 6**, it can be seen that all movements operate at a LOS A, with the worst average delay of 8.0 seconds for the right turn movement off Leeds Parade into the University.

In assessing the performance of the University entrance intersection it is likely that the weekday AM peak hour will be the critical time period with more vehicles attempting the right turn into the University. The T&TPA report did not contain traffic data for the weekday AM peak. In the absence of AM peak data, the PM figures have been reversed to provide representative statistics as shown in **Figure 7**.





Figure 7: University Ent Int – Existing weekday AM Peak hour traffic volumes

Based on the above assumptions, a SIDRA Intersection analysis was carried out for the intersection for the existing weekday AM peak. The movement summary output from the SIDRA assessment is shown in **Figure 8**. Full results of the SIDRA analysis are provided in **Appendix B**.



MOVEMENT SUMMARY

Site: Uni existing AM

New Site

Giveway / Yield (Two-Way)

Mov	OD	Demand	Flows	Deg.	Average	Level of	95% Back	of Queue	Prop.	Effective	Average
ID	Mov	Total veh/h	HV %	Satn v/c	Delay sec	Service	Vehicles veh	Distance m	Queued	Stop Rate per veh	Speed km/h
South:	Leeds Para										
2	T1	1	5.0	0.001	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
3	R2	82	5.0	0.047	8.0	LOS A	0.2	1.6	0.02	0.67	42.7
Approa	ach	83	5.0	0.047	7.9	NA	0.2	1.6	0.02	0.66	42.8
East: L	University										
4	L2	27	5.0	0.018	7.5	LOS A	0.1	0.5	0.01	0.63	43.1
6	R2	1	5.0	0.018	7.5	LOS A	0.1	0.5	0.01	0.63	43.1
Approa	ach	28	5.0	0.018	7.5	LOS A	0.1	0.5	0.01	0.63	43.1
North:	Leeds Para	de									
7	L2	1	5.0	0.001	3.7	LOSA	0.0	0.0	0.00	0.40	46.3
8	T1	1	5.0	0.001	3.7	LOS A	0.0	0.0	0.00	0.40	46.3
Арргоа	ach	2	5.0	0.001	3.7	NA	0.0	0.0	0.00	0.40	46.3
All Veh	nicles	113	5.0	0.047	7.7	NA	0.2	1.6	0.02	0.65	43.0

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 (Akcelik M3D).

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

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Figure 8: University Ent Int - Existing weekday AM Peak hour traffic movements

From the table in **Figure 8**, it can be seen that all movements operate at a LOS A, with the worst average delay of 8.0 seconds for the right turn movement off Leeds Parade into the University.

Whilst this is unchanged from the PM peak the overall average delay for all legs increased slightly from the PM peak confirming the AM peak is the critical time period.



Traffic Generation and Impacts

3.1 SURROUNDING DEVELOPMENT

Construction work is currently underway to provide widening to Leeds Parade immediately to the north of Northern Distributor Road to support the new Bunnings development on the western side of the road and a highway service centre on the eastern side of the road. Primary ingress and egress to the Bunnings development will be via Leeds Parade whilst egress only for the highway service centre will be via Leeds Parade (access via Hanrahan Place).

Traffic generated by these two developments will be included in the assessment of the future traffic generation and impacts on the surrounding road network.

3.2 TRAFFIC DISTRIBUTION ASSUMPTIONS

As noted elsewhere, the subject development is only one traffic generator in the locality that will affect the movement and distribution of traffic. Therefore, the assumptions determining how traffic would be distributed is set down in the following sections for each traffic generator.

3.2.1 PROPOSED SUBDIVISION

For the purposes of further assessment, the following assumptions have been made about traffic distribution from the proposed subdivision development:

For peak periods:

- Leeds Parade (north)
 - AM Peaks: 75% Southbound and 25% Northbound
 - PM Peaks: 75% Northbound and 25% Southbound

Traffic exiting and leaving the subdivision would be expected to distribute from the Leeds Parade/Northern Distributor Road intersection on the following basis:

- 60% of traffic travelling to/from the subdivision would originate from/travel to Leeds Parade south;
- 30% of the traffic would originate from/travel to Northern Distributor Road (west);
- 10% of traffic would originate from/travel to Northern Distributor Road (east); and

5% of traffic entering and leaving the university would originate from/travel to the new subdivision.

3.2.2 BUNNINGS

The distribution of traffic generated by the Bunnings development will be as detailed in the T&TPA report included in **Appendix A**.

3.2.3 HIGHWAY SERVICE CENTRE

For the purposes of further assessment, the following assumptions have been made about traffic distribution from the new service centre currently under construction:

For additional traffic generated:

- 25% of the traffic would originate from/travel to Northern Distributor Road (west);
- 25% of traffic would originate from/travel to Northern Distributor Road (east);



- 25% of traffic would originate from/travel to Leeds Parade (north); and
- 25% of traffic would originate from/travel to Leeds Parade (south)

For passing traffic (linked trips):

- 25% of the traffic would originate from Northern Distributor Road (west);
- 25% of traffic would originate from Northern Distributor Road (east);
- 25% of traffic would originate from Leeds Parade (north); and
- 25% of traffic would originate from Leeds Parade (south)

3.3 TRAFFIC GENERATION

3.3.1 PROPOSED SUBDIVISION

The Roads and Traffic Authority's *Guide to Traffic Generating Developments* publishes data on the traffic generating potential of various development ranging from residential subdivisions, commercial premises, retail premises and industrial developments.

The RTA first published the *Guide to Traffic Generating Developments* in 1991, before its revision in 2001. It is currently being further revised and as interim measure the Roads and Maritime has published updated traffic survey data for a range of development types. Of relevance to this TIA is data provided in relation to low density residential dwellings. The summary figures are provided for the Sydney area and regional areas. A total of five regional sites were surveyed, including one in the Calare area of Orange. The figures for regional areas are relevant to this TIA and are reproduced in **Table 3.1**.

Rates	Regional Average (movements/dwelling)	Regional Range (movements/dwelling)		
Daily vehicle trips per dwelling	6.34	5.16-7.12*		
Peak- vehicle trips per dwelling	0.79	0.61-0.9		

Table 3.1 – Summary of land use traffic generation – low density residential

Source: RMS Guide to Traffic Generating Developments - updated traffic surveys August 2013

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* It is noted that the Orange (Calare) figures are the highest in the range at 7.12 but also that car occupancy for Orange was highest at 1.42 persons/vehicle (compared to average regional occupancy of 1.34) and also highest in the peak vehicle trips per dwelling at 0.9

To be conservative, the Orange figures of 7.12/day and 0.9/peak hour have been used for the purposes of this TIA.

Based on the stated traffic generation rates and the assumed average yield, the traffic generated by the development of the proposed subdivision is:

Daily Vehicle Trips:

450 lots x 7.12 trips per lot per day

Peak Hour Trips:

450 lots x 0.9 trips per lot per hour

405 vehicle trips per hour

3,204 vehicle trips per day

3.3.2 BUNNINGS

Figures for the generation of traffic associated with the development of the Bunnings site on the corner of Leeds Parade and Northern Distributor Road will be as detailed in the T&TPA report included in **Appendix A**.



3.3.3 HIGHWAY SERVICE CENTRE

Traffic figures for the approved highway service centre have been determined by reference to the 2002 RTA *Guide to Traffic Generating Development*. The Guide identifies that peak hour traffic generation associated with a service station is determined by the formula:

- 0.04 A(S) + 0.3 A(F), where
- A(S) = area of the site (m²) and
- A(F) = gross floor area of the convenience store

The area of the site is understood to be approximately $5,700m^2$ and the area of the approved convenience store is $200m^2$.

Therefore:

Peak Hour Trips (Service Station):

0.04*5700 + 0.3*200 = 288 vehicle trips per hour

The development also contains a drive in take away foot outlet. The Guide recommends adopting a figure of 100 vehicles for peak hour traffic generation for a KFC or equivalent. It is noted that MacDonalds has higher recommended rates however given the proximity of the North Orange MacDonalds, the likelihood that a MacDonalds would be developed here is low.

Therefore, the final traffic generation figure for the site becomes:

Peak Hour Trips (Service Centre Total):

288 + 100 = 388 vehicle trips per hour

The Guide notes the proportion of passing trade is typically 50%. Hence 194 vehicle trips per hour are new trips with the remaining 194 vehicle trips per hour coming from the existing traffic stream.

3.4 TRAFFIC IMPACTS

3.4.1 BASIS OF ASSESSMENT

The impact of the traffic generated by the development of the proposed subdivision on Leeds Parade and Northern Distributor Road will be assessed in terms of:

- i. Traffic volume; and
- ii. Intersection capacity.

The impact of the increased traffic on Leeds Parade and Northern Distributor Road will be assessed. The operational capacities of the roundabout at the intersection of Leeds Parade and Northern Distributor Road and the intersection on Leeds Parade at the University entrance will also be analysed and evaluated.

3.4.2 TRAFFIC VOLUME

The expected peak hour traffic volume generated from the subdivision will impact on the existing peak hour traffic volume on Leeds Parade and Northern Distributor Road. The increase in peak hour traffic volume on these two roads is summarised in **Table 3.2**.



Road Location	Lane	Weekday PM Peak Hou	ur Traffic (vehicles/hour)	Increase
		Existing	Post Development	
Northern Distributor	Eastbound	241	342	42%
Road (east of Leeds Parade)	Westbound	321	459	43%
TOTAL		562	801	43%
Northern Distributor	Eastbound	362	556	54%
Road (west of Leeds Parade)	Westbound	580	768	32%
TOTAL		942	1324	41%
Leeds Parade	Northbound	28	356	1,171%
(north of Northern Distributor Road)	Southbound	83	208	151%
TOTAL		111	564	408%
Leeds Parade	Northbound	322	652	102%
(south of Northern Distributor Road)	Southbound	242	405	67%
TOTAL		564	1057	87%

Table 3.2 – Comparison of Existing & Post Development Weekday PM Peak Hour Traffic Volumes

As expected, the greatest percentage increase in the weekday PM peak hour traffic following the full development of the proposed subdivision occurs on the northbound lane of Leeds Parade (north) with an increase in traffic volume of approximately 1,171%.

Whilst the percentage increase in traffic volume on Leeds Parade (north) appears extremely excessive it should be noted that this increase is from a very low existing traffic volume and the final post development traffic volume includes the traffic generated from the proposed Service Centre. Furthermore reference to **Section 2.4** of this report indicated that Leeds Parade has an existing capacity of 900 vehicles per hour per lane that is significantly more than the predicted post development peak traffic of 356 vehicles per hour.

Table 3.3 lists the peak hour traffic volume of the surrounding roads when compared against the existing capacity of the road.

Road Location	Lane	Weekday PM Peak Hou	ur Traffic (vehicles/hour)	Percentage
		Post Development	Capacity	of Capacity
Northern Distributor	Eastbound	342	1,200	29%
Road (east of Leeds Parade)	Westbound	459	1,200	38%
Northern Distributor	Eastbound	556	1,200	46%
Road (west of Leeds Parade)	Westbound	768	1,200	64%
Leeds Parade	Northbound	356	900	40%
(north of Northern Distributor Road)	Southbound	208	900	23%
Leeds Parade	Northbound	652	900	72%
(south of Northern Distributor Road)	Southbound	405	900	45%

 Table 3.3 – Comparison of Post Development Weekday PM Peak Hour Traffic Volumes to Capacity

It can be seen from **Table 3.3** that all roads are well below their capacity with the northbound lane of Leeds Parade (south) closest to capacity at 72%. Hence all roads are able to accommodate the increased additional peak hour traffic generated by the proposed development.



3.4.3 INTERSECTION ANALYSIS

3.4.3.1 Leeds Parade and Northern Distributor Road

Based on the assumptions outlined in **Section 2.6.2**, a SIDRA analysis was carried out for the Leeds Parade and Northern Distributor Road intersection under post development conditions during the weekday PM peak hour. The post development traffic and turning movements used in the SIDRA analysis is shown in **Figure 9**.



Figure 9: NDR/Leeds Prd Int – Post Development weekday PM Peak hour traffic volumes

Figure 10 illustrates the post development weekday PM peak hour Level of Service (LOS) for the Leeds Parade/Northern Distributor Road intersection and **Figure 11** provides the SIDRA movement summary. Full results of the SIDRA analysis are provided in **Appendix B**.



LEVEL OF SERVICE

Site: WD PM (NDR/Leeds) - proposed +bunnings + service centre

New Site Roundabout



Figure 10: NDR/Leeds Prd Int - Post Development weekday PM Peak LOS



MOVEMENT SUMMARY

Site: WD PM (NDR/Leeds) - proposed +bunnings + service centre

New Site Roundabout

Mov	OD	Deman	d Flows	Deg.	Average	Level of	95% Back	of Queue	Prop.	Effective	Average
ID	Mov	Total	HV	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
South	Leeds Para	veh/h	%	v/c	sec		veh	m	-	per veh	km/
1a	L1	299	5.0	0.330	6.6	LOS A	1.7	12.4	0.58	1.08	49.0
2	T1	259	5.0	0.330	9.5	LOSA	1.7	12.4	0.60	1.35	48.
3a	R1	56	19.0	0.330	10.4	LOSA	1.6	12.1	0.60	1.43	47.3
3b	R3	38	5.0	0.330	10.4	LOSA	1.6	12.1	0.60	1.43	47.3
Approach		652	6.2	0.330	8.3	LOSA	1.7	12.4	0.59	0.62	48.
SouthE	East: Northe	rn Distributo	or east								
21b	L3	57	5.0	0.037	8.0	LOS A	0.2	1.2	0.36	1.10	49.3
22	T1	286	5.0	0.163	7.0	LOSA	0.8	6.1	0.51	1.05	49.4
23a	R1	68	5.0	0.163	11.5	LOSA	0.8	5.7	0.53	1.43	46.7
23	R2	48	5.0	0.163	11.5	LOSA	0.8	5.7	0.53	1.43	46.1
Approach		459	5.0	0.163	8.3	LOS A	0.8	6.1	0.49	0.57	48.
NorthE	ast: Hanrah	an Pl									
24	L2	5	100.0	0.057	32.2	LOS C	0.2	2.7	0.62	1.50	42.3
24a	L1	7	100.0	0.057	32.2	LOS C	0.2	2.7	0.62	1.50	42.3
26	R2	11	100.0	0.057	32.2	LOS C	0.2	2.7	0.62	1.50	42.3
26b	R3	1	100.0	0.057	32.2	LOS C	0.2	2.7	0.62	1.50	42.3
Approach		24	100.0	0.057	32.2	LOS C	0.2	2.7	0.62	0.75	42.2
North:	Leeds Para	de north									
7b	L3	49	7.0	0.240	7.1	LOSA	1.2	8.5	0.56	1.13	49.4
7a	L1	76	5.0	0.240	7.1	LOSA	1.2	8.5	0.56	1.13	49.4
8	T1	177	5.0	0.240	8.9	LOSA	1.2	8.5	0.56	1.25	48.1
9b	R3	171	5.0	0.240	14.5	LOS A	1.1	8.2	0.58	1.60	45.0
Approa	ach	473	5.2	0.240	10.4	LOSA	1.2	8.5	0.57	0.67	47.3
NorthV	Vest: Northe	rn Distributo	or west								
27b	L3	111	5.0	0.271	8.6	LOS A	1.5	11.0	0.56	1.24	48.8
27	L2	59	23.0	0.271	8.6	LOSA	1.5	11.0	0.56	1.24	48.8
28	T1	222	5.0	0.271	9.7	LOS A	1.5	11.0	0.56	1.33	47.9
29a	R1	164	5.0	0.271	11.3	LOSA	1.4	10.3	0.57	1.46	46.9
Approa	ach	556	6.9	0.271	9.8	LOSA	1.5	11.0	0.56	0.67	47.9
		2164	7.0	0.330	9.4	LOSA	1.7	12.4	0.56	0.64	47.9

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

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

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

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

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

Figure 11: NDR/Leeds Prd Int – Post Development weekday PM Peak hour traffic movements

From the table in **Figure 11**, it can be seen that the worst movement remains as the movement for vehicles existing Hanrahan Place, with a LOS C and a slightly lower average delay of 32.2 seconds.

The increase in traffic from the proposed development provides for a more even distribution of traffic entering and leaving the roundabout that in turn results in an increase in the LOS on some legs with no decrease in the LOS on any legs. The overall average delay at the roundabout decreases from 14.8 seconds under existing conditions to 9.5 seconds under post development conditions.



3.4.3.2 Leeds Parade and University Access

Based on the assumptions outlined in **Section 2.6.3**, a SIDRA analysis was carried out for the Leeds Parade/University Entrance intersection under post development conditions during the weekday PM peak hour. The post development traffic and turning movements used in the SIDRA analysis is shown in **Figure 12**.



Figure 12: University Ent Int. – Post Development weekday PM Peak hour traffic volumes

Figure 13 illustrates the post development weekday PM peak hour Level of Service (LOS) for the Leeds Parade/University Entrance intersection and **Figure 14** provides the SIDRA movement summary. Full results of the SIDRA analysis are provided in **Appendix B**.



LEVEL OF SERVICE

Site: Uni post PM

New Site Giveway / Yield (Two-Way)



Figure 13: University Ent Int – Post Development weekday PM Peak LOS



MOVEMENT SUMMARY

Site: Uni post PM

New Site Giveway / Yield (Two-Way)

Mov	OD	Demand	Flows	Deg.	Average	Level of	95% Back	of Queue	Prop.	Effective	Average
ID	Mov	Total veh/h	HV %	Satn v/c	Delay sec	Service	Vehicles veh	Distance m	Queued	Stop Rate per veh	Speed km/h
South:	Leeds Para	de									
2	T1	301	5.0	0.159	0.0	LOSA	0.0	0.0	0.00	0.00	50.0
3	R2	26	5.0	0.016	8.3	LOSA	0.1	0.5	0.21	0.61	42.2
Approa	ach	327	5.0	0.159	0.7	NA	0.1	0.5	0.02	0.05	49.2
East: (Jniversity										
4	L2	78	5.0	0.061	8.0	LOSA	0.2	1.8	0.20	0.60	42.5
6	R2	5	5.0	0.061	8.0	LOSA	0.2	1.8	0.20	0.60	42.5
Appro:	ach	83	5.0	0.061	8.0	LOSA	0.2	1.8	0.20	0.60	42.5
North:	Leeds Para	de									
7	L2	2	5.0	0.055	0.2	LOSA	0.0	0.0	0.00	0.02	49.8
8	T1	101	5.0	0.055	0.2	LOSA	0.0	0.0	0.00	0.02	49.8
Approa	ach	103	5.0	0.055	0.2	NA	0.0	0.0	0.00	0.02	49.8
All Veł	nicles	513	5.0	0.159	1.8	NA	0.2	1.8	0.04	0.13	48.1

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

Vehicle movement LOS values are based on average delay per movement

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

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

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Figure 14: University Ent Int – Post Development weekday PM Peak hour traffic movements

From the table in **Figure 14**, it can be seen that all movements still operate at a LOS A, with the worst average delay of 8.3 seconds for the right turn movement off Leeds Parade into the University. The 95% back of vehicles is less than 1 vehicle indicating the existing right turn lane length is adequate.

As stated in **Section 2.6.3** it is expected that the weekday AM peak hour movements will be the critical time period with more vehicles attempting the right turn into the University. Based on the assumptions outlined in **Section 2.6.3**, a SIDRA analysis was carried out for the Leeds Parade/University Entrance intersection under post development conditions during the weekday AM peak hour. The post development traffic and turning movements used in the SIDRA analysis is shown in **Figure 15**.





Figure 15: University Ent Int. – Post development weekday AM Peak hour traffic volumes

Figure 16 illustrates the post development weekday AM peak hour Level of Service (LOS) for the Leeds Parade/University Entrance intersection and **Figure 17** provides the SIDRA movement summary. Full results of the SIDRA analysis are provided in **Appendix B**.



LEVEL OF SERVICE

Site: Uni post AM

Giveway / Yield (Two-Way)



University Ent Int - Post Development weekday AM Peak LOS Figure 16:

NA

South East North Intersection

А

NA

Leeds Parade

LOS NA



MOVEMENT SUMMARY

Site: Uni post AM

New Site Giveway / Yield (Two-Way)

Mov	OD	Demand	Flows	Deg.	Average	Level of	95% Back	of Queue	Prop.	Effective	Average
ID	Mov	Total veh/h	HV %	Satn v/c	Delay	Service	Vehicles veh	Distance m	Queued	Stop Rate per veh	Speed km/h
South	Leeds Para	de								100	
2	T1	101	5.0	0.053	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
3	R2	78	5.0	0.060	9.1	LOS A	0.3	1.9	0.40	0.66	41.6
Аррго	ach	179	5.0	0.060	4.0	NA	0.3	1.9	0.17	0.29	45.9
East:	University										
4	L2	26	5.0	0.025	8.7	LOSA	0.1	0.7	0.38	0.63	41.8
6	R2	2	5.0	0.025	8.7	LOSA	0.1	0.7	0.38	0.63	41.8
Appro	ach	28	5.0	0.025	8.7	LOS A	0.1	0.7	0.38	0.63	41.8
North:	Leeds Para	de									
7	L2	5	5.0	0.162	0.1	LOSA	0.0	0.0	0.00	0.02	49.8
8	T1	301	5.0	0.162	0.1	LOS A	0.0	0.0	0.00	0.02	49.8
Аррго	ach	306	5.0	0.162	0.1	NA	0.0	0.0	0.00	0.02	49.8
All Vel	hicles	513	5.0	0.162	1.9	NA	0.3	1.9	0.08	0.15	47.9

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

Vehicle movement LOS values are based on average delay per movement

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

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

Processed: 1 February 2016 12:50:46 PM Copyright © 2000-2013 Ak SIDRA INTERSECTION 6.0.1.3703 www.sidrasolutions.com Project: O:\Synergy\Projects\215\215322\Out\Reports\Traffic\215322_university.sip8 8000782, GEOLYSE PTY LTD, PLUS / 1PC

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SIDRA INTERSECTION 6

Figure 17: University Ent Int – Post Development weekday AM Peak hour traffic movements

From the table in **Figure 17**, it can be seen that all movements still operate at a LOS A, with the worst average delay of 9.1 seconds for the right turn movement off Leeds Parade into the University. The 95% back of vehicles is less than 1 vehicle indicating the existing right turn lane length is adequate.



3.4.4 IMPACT SUMMARY

The assessment of the impact of the traffic generated by the development of the proposed subdivision on the surrounding road network has determined that the impact on:

- i. Traffic Volume; and
- ii. Intersection Capacity

The greatest increase in the weekday PM peak hour traffic following the development of the proposed subdivision occurred on the northbound lane of Leeds Parade (south) with an increase in traffic volume of approximately 1,171%.

Whilst the percentage increase in traffic volume on the northbound lane of Leeds Parade (north) appears extremely excessive, the total peak traffic volume of 356 vehicles per hour is significantly less than the existing capacity of 900 vehicles per hour per lane.

All roads assessed are well below their capacity with the northbound lane of Leeds Parade (south) closest to capacity at 72%. Hence all roads are able to accommodate the increased additional peak hour traffic generated by the proposed development.

The increase in traffic from the proposed development provides for a more even distribution of traffic entering and leaving the roundabout at the intersection of Leeds Parade and Northern Distributor Road. SIDRA analysis of the roundabout showed that this resulted in an increase in the LOS on some legs with no decrease in the LOS on any legs. The overall average delay at the roundabout decreased from 14.8 seconds under existing conditions to 9.5 seconds under post development conditions.

SIDRA analysis of the intersection on Leeds Parade at the University entrance showed that that all movements at the intersection operate at a LOS A under post development conditions, with the worst average delay of 9.1 seconds for the right turn movement off Leeds Parade into the University during the weekday AM peak hour. The 95% back of vehicles for this movement is less than 1 vehicle indicating the existing right turn lane length is adequate.

Whilst the expected increases in traffic volume are significant, the capacity of the existing surrounding roads and intersections analysed are sufficient to cater for the post development traffic volumes and to disperse such traffic into the surrounding road network.



Recommendations

This Traffic Impact Assessment has evaluated the traffic generating potential of a proposed 450 lot rural residential subdivision in North Orange and has assessed the impact of the additional traffic generated on the surrounding roads and intersections.

The TIA has found that whilst the expected increases in traffic volume are significant, the capacity of the existing surrounding roads and intersections analysed are sufficient to cater for the post development traffic volumes and to disperse such traffic into the surrounding road network.

In completing the assessment of the impact of the traffic generated by the proposed development, the following recommendations are made:

- The design of all internal roads within the proposed subdivision shall be carried out to appropriate standards and the requirements of Orange City Council;
- The design of the subdivision should include a threshold entry treatment on Leeds Parade to clearly indicate the beginning of the large lot residential subdivision;
- The existing bicycle/pedestrian path on Leeds Parade should be extended to and into the proposed subdivision;
- Consideration should be given to widening Leeds Parade to provide full line marking and sealed shoulders to improve road safety and minimise future maintenance costs.



References

AUSTROADS (2009) Guide to Road Design Part 4A. Unsignalised and Signalised Intersections

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Roads and Maritime Services (2013) Guide to Traffic Generating Developments

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

Transport and Traffic Planning Associates (2013) Proposed Bunnings Warehouse - Assessment of Traffic and Parking Implications

Appendix A T&TPA TRAFFIC REPORT
PROPOSED BUNNINGS WAREHOUSE CNR NORTHERN DISTRIBUTOR ROAD AND LEEDS PARADE, ORANGE

Assessment of Traffic and Parking Implications

May 2013

Reference 12084

TRANSPORT AND TRAFFIC PLANNING ASSOCIATES Transportation, Traffic and Design Consultants Suite 502, Level 5 282 Victoria Avenue CHATSWOOD 2067 Telephone (02) 9411 5660 Facsimile (02) 9904 6622 Email: ttpa@ttpa.com.au

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APPENDIX C	SIDRA RESULTS
APPENDIX D	TURNING PATH ASSESSMENT

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FIGURE 1	LOCATION

- FIGURE 2 SITE
- FIGURE 3 ROAD NETWORK FIGURE 4 TRAFFIC CONTROLS

1. INTRODUCTION

This report has been prepared to accompany a Development Application to Orange City Council for a proposed new Bunnings Warehouse on a site with frontages to Northern Distributor Road and Leeds Parade at Orange (Figure 1).

The recent completion of the Northern Distributor Road providing a bypass to the Orange Town Centre has enabled upgraded vehicle access for urban development in the area to the north of the Town Centre.

The Bunnings development site is grassed farmland and the proposed scheme will enable replacement of the small existing Bunnings store which is located to the southeast of the Town Centre.

The proposed development will be a contemporary Bunnings warehouse comprising:

Warehouse	9,490 m ²
Trade Area	4,780 m ²
Nursery and bagged goods	3,020 m ²
Total Retail Area	17,290 m ²
Carparking	330 spaces

The purpose of this report is to:

- * describe the site and the proposed development scheme
- * describe the existing road network and traffic conditions
- * assess the adequacy of the proposed parking provision
- * assess the traffic potential implications of the development
- * assess the proposed access, internal circulation and servicing arrangements.



2. PROPOSED DEVELOPMENT SCHEME

2.1 SITE, CONTEXT AND EXISTING USE

The development site (Figure 2) is part of a consolidation of lots being an irregular shaped area of some 44,798m² within a total lot area of 8.58 ha. The site has a frontage to the northern side of Northern Distributor Road and to the western side of Leeds Parade and is located some 2.5 kms to the north of the City Centre.

The site, which is grassed farm land with a residence and out buildings, is bounded to the west by the Main Western Railway Line.

The surrounding uses comprise:

- * the industrial site just to the west and bus depot just to the east
- * the Orange Marketplace Centre further to the west
- * the new residential development to the west extending along both sides of NDR
- * the farmland extending to the north
- * the Orange Grove Homemakers Centre to the southeast

2.2 PROPOSED DEVELOPMENT

The development scheme involves some cut and fill of the site to provide level platforms for building and hardstand areas. The new Bunnings warehouse building will occupy the central and northern part of the site with the nursery located on the western side and carparking along the southern frontage area.

The proposed development scheme will comprise a single warehouse level with at grade carparking as follows:

Total Retail Area:	17,290m ²	
Nursery and bagged goods	-	3,020m ²
Trade area	-	4,780m ²
Warehouse	-	9,490m ²



TRANSPORT AND TRAFFIC PLANNING ASSOCIATES

A total of 330 parking spaces will be provided with vehicle access comprising:

- * ingress and egress for the carpark on Northern Distributor (left turn IN/OUT only)
- * ingress and egress for the carpark on Leeds Parade towards the centre of the site
- ingress and egress for service vehicles on Leeds Parade in the northern part of the frontage

Details of the proposed development scheme are provided on the plans prepared by John R Brogan and Associates which accompany the Development Application and are reproduced in part overleaf.



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PROPOSED BOU

ROOF TO YARD AREA

D

RAILWAY TBC WITH SITE LEVELS

AKEA ANALYSIS PROPOSED BUNNINGS ORANGE	Ш
WAREHOUSE	
Warehouse	9 100 m2
Mezzanine	300 m2
Main Entry	90 m2
TOTAL WAREHOUSE AREA	9 490 m2
Timber Trade Sales	2660 m2
Landscape & Building Materials Yard	930 m2
Bulk Trade Area	1190 m2
TOTAL TRADE AREA	4780 m2
Outdoor Nursery	1390 m2
Bagged Goods Canopy	1630 m2
TOTAL NURSERY AREA	3 020 m2
TOTAL BUNNINGS AREA	17 290 m2
Bunnings Parking Provided	330 CARS
Carparking Ratio	1/52 m2
Land Size - APPROX. FIGURES TBC (m2)	
MAIN LOT - SOUTH	37 750 m2
CONSOLIDATE CORNER LOT	8 050m2
Proposed BUNNINGS Lot	45 800 m2
SURPLUS LOT - NORTH (INCL DAM)	38 000 m2
TOTAL LAND	85 800m2

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РКОРОЗЕД ВИИИІИGS WAREHOUSE ОRANGE NSW 1311- PLOTTED 13/05/2013 А CAD REF : Microstation V81 S1



3. ROAD NETWORK AND TRAFFIC CONTROLS

3.1 ROAD NETWORK

- Mitchell Highway a principal State Highway route extending northwest from Bathurst through Orange
- Northern Distributor Road a new major collector road linking between the Mitchell Highway and providing a bypass around the Orange City Centre
- William Street/Leeds Parade a collector road route connecting northwards from the Orange Centre
- Burrendong Way, Escourt Way, Cargo Road and Forest Road major collector routes radiating from Orange Centre
- * Hill Street and Phillip Street etc collector roads serving the north Orange area

3.2 TRAFFIC CONTROLS

The few traffic controls which have been applied to the road system (Figure 4) in the vicinity of the site comprise:

- the large roundabout at the Northern Distributor Road and Leeds Parade intersection
- the large roundabout at the Mitchell Highway and Northern Distributor Road intersection
- * the 70 kmph speed limit on NDR and 50 kmph the local and collector roads
- * the marked footcrossing on Hibberson Street west of Gribble Street
- * the approved B Double Route along Mitchell Highway and NDR





3.3 TRAFFIC CONDITIONS

An indication of the traffic conditions on the road system in the vicinity of the site is contained in the results of traffic surveys undertaken by Council which are provided in Appendix A and surveys undertaken during the weekday afternoon and weekend midday periods. The Council data is summarised in the following for total (2-way) traffic follows:

North Distributor Road

8,400 vph
670 vph
920 vph
640 vph

Leeds Parade (south of NDR)

AWT	3,500 vpd
AM peak	360 vph
PM peak	380 vph
SATMD	280 vph

The results of the traffic surveys undertaken at the intersection are provided in Appendix B and summarised in the following:

		WDPM	WEMD
Northern Distributor Road	EB	195	137
	RT	143	145
	LT	13	3
	WB	267	113
	RT	2	1
	LT	52	11

Leeds Parade	NB	13	9
	RT	30	16
	LT	271	190
	SB	40	10
	RT	31	2
	LT	11	2

There is also an access road for a bus depot which connects into the roundabout however the traffic movements on this access are only minor.

Traffic conditions on the road network in the area during the peak periods, including the weekend, are quite free flowing and satisfactory with no congestion or delay. The site benefits, in traffic terms, from:

- the roundabout controlled access available through the Northern Distributor
 Road and Leeds Parade intersection
- * the absence of any major traffic generator in the near vicinity

4. ACCESS

The proposed vehicle access arrangements comprise:

- separate adjacent ingress and egress connections for the carpark located on the Northern Distributor Road frontage. There will be a central median island provided in Northern Distributor Road to restrict access movements to left turn IN/OUT with a deceleration lane for the ingress movement
- a combined ingress/egress connection for the carpark located on the Leeds
 Parade frontage with left turn deceleration lane
- a combined ingress/egress connection for service/delivery vehicles located on the Leeds Parade frontage to the north of the building

Minor road works will be undertaken to enable the provision of these proposed accesses and they will be located where there will be good sight distances available and sufficiently away from the intersection.

5. TRAFFIC

Bunnings stores have somewhat unique traffic generation characteristics (compared to other retail type uses) and the circumstances in Country Regional stores are also quite different to those in Capital City Metropolitan Area stores. In order to establish the country regional characteristics TTPA undertook surveys and research at existing Bunnings stores at Tamworth, Bathurst and Coffs Harbour.

The results of this survey data in relation to the peak traffic generation circumstances are and summarised in the following:

	١	Neekday	,	:	Saturday	y
		4-5pm			Midday	
	IN	OUT	Total	IN	OUT	Total
Tamworth	124	165	289	186	201	387
Bathurst	74	88	162	111	107	218
Coffs Harbour	108	104	212*	202	180	382*

* The existing Coffs Harbour store has a total GFA of $8,523m^2$ indicating PM peak – 2.5 vtph/100 m^2 WE peak – 4.5 vtph/100 m^2

RMS are in the process of updating their Guide for Traffic Generating Development and engaged consultants to undertake studies of Large Format Hardware stores. The results of that study for the single large <u>non-metropolitan</u> site (9,948m²) are as follows:

TRAFFIC GENERATION PER 100 M² GFA

AM Peak Hour	1.09 vtph
PM Peak Hour	1.99 vtph
Weekend Peak Hour	4.28 vtph

A very pertinent traffic generation characteristic of "large format Hardware" uses is that the larger the floor area the lower the traffic generation rate per 100 m² GFA and of the $17,290m^2$ proposed some $5,000m^2$ will be for building materials storage, landscape yard and trade area.

The assessed potential traffic generation rates for the proposed development having particular regard for the large floor area (ie twice that of the surveyed Bunnings Coffs Harbour and the site surveyed for RMS) are:

WD PM	1.8 vtph per 100 m ²
WE MD	3.5 vtph per 100 m ²

Application of these rates to the proposed development would indicate the following peak traffic generation:

	PM			WEMD)
IN	OUT	TOTAL	IN	OUT	TOTAL
130	180	310	300	300	600

As is normal for significant retail developments there will be a "passing trade" element (ie. vehicles already travelling along the Northern Distributor Road) particularly vehicles travelling to/from the existing Bunnings store to the south. The passing trade will not be as significant as that for a Metropolitan area site (ie. 20 to 30%), however, it is assessed that some 15% will be passing trade on weekdays and some 10% on weekends.

Passing Trade	PMWD	44 vtph
	WEMD	60 vtph

The projected directional distribution will be:

East	20%
West	40%
South	40%

In order to take account of future traffic growth (10 years) 10% will be added to the existing major vehicle movements. The projected future peak vehicle movements with the completed development are as follows:

		WDPM	WEMD
Northern Distributor Road	EB	209	141
	RT	153	150
	LT	13	3
	WB	288	105
	RT	40	77
	LT	57	11
Leeds Parade	NB	82	141
	RT	30	16
	LT	295	189
	SB	87	142
	RT	84	134
	LT	39	78

The operational performance of the intersection with these projected future volumes has been modelled using SIDRA and the results indicating a satisfactory performance are provided in Appendix C and summarised in the following:

	WDPM	WEMD
Level of Service	А	Α
Av. Vehicle Delay	9.1	9.5

6. PARKING

Orange City Council's Parking Code specifies a parking provision in relation to the proposed development of 1 space per 50m² GFA.

Survey and research of 6 existing Bunnings warehouse stores provides a comprehensive indication of the intrinsic parking demands for Bunnings outlets. The peak demands occur on weekends and it is apparent (as with traffic generation) that the parking demand per 100m² generally decreases as the floorspace increases. The established peak parking demand characteristics are summarised in the following:

Thomastown	10,625m ²	1.37 spaces per 100m ²
Minchinbury	11,932m ²	2.0 spaces per 100m ²
Penrith	13,500m ²	1.17 spaces per 100m ²
Hoopers Crossing	11,169m ²	1.74 spaces per 100m ²
Mornington	10,599m ²	2.39 spaces per 100m ²
Box Hill	13,762m ²	1.41 spaces per 100m ²

The recent RMS sponsored study of Non Metropolitan Area Large Format Hardware outlets reveals a maximum parking demand of 1.53 spaces per 100m² (ie 1 space per 65m²)

The proposed new Orange store of some 17,290m² will have 330 parking spaces which equates to 1 space per 52.4m². It is apparent that this provision will be quite adequate, particularly given the significant areas used for storage, and is generally compliant with Council's code. The proposed provision includes 10 suitable and designated spaces for disabled drivers while cars with trailers will be able to park in tandem spaces.

7. INTERNAL CIRCULATION AND SERVICING

Internal Circulation

The circulation and carpark areas are designed to accord to the design requirements of AS 2890.1 and AS 2890.6 with generous parking bay and aisle provisions. A flexible circulation arrangement will be available throughout the carpark with ability for vehicles to travel to/from either of the external access points.

<u>Servicing</u>

The Bunnings delivery and service vehicles will ingress on Leeds Parade and travel along the northern side of the building to turn and egress. The Bunnings deliveries will involve semi-trailer and potentially B Double vehicles with some vans and MRV's and the very extensive queuing length available will ensure that there is no possibility on waiting trucks affecting the movement of cars to/from the carpark. Similarly, the provisions in the goods pick-up area will be more than adequate to accommodate demands even at peak seasonal times. Details of the turning path implications of the movements of the largest articulated vehicles are provided in Appendix D indicating a satisfactory provision for access and circulation.

The frequency of delivery vehicle movements for Bunnings will vary from day to day with the projected maximum daily visitation of 1-2 articulated trucks and 2-4 smaller vehicles (HRV and MRV).

8. CONCLUSION

The proposed Bunnings warehouse development at Orange (replacing the existing store) will utilise the relatively large site which has convenient access to the arterial road system. This assessment has concluded that the design of the development in terms of vehicle access, circulation, parking and servicing is appropriate and that there will not be any adverse traffic impacts on the road system serving the site.

Appendix A

AUTOMATIC TRAFFIC SURVEYS

MetroCount Traffic Executive Vehicle Counts

VehicleCount-385 -- English (ENA)

Datasets:	
Site:	[35/08] Leeds Parade north of Honeyman Drive
Direction:	7 - North bound A>B, South bound B>A. Lane: 0
Survey Duration:	8:32 Tuesday, 9 September 2008 => 11:09 Wednesday, 8 October 2008
Zone:	
File:	0808Oct2008.EC0 (Plus)
Identifier:	M333VRCW MC56-6 [MC55] (c)Microcom 02/03/01
Algorithm:	Factory default (v3.21 - 15275)
Data type:	Axle sensors - Paired (Class/Speed/Count)
Profile:	
Filter time:	8:33 Tuesday, 9 September 2008 => 11:09 Wednesday, 8 October 2008
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Speed range:	10 - 160 km/h.
Direction:	North, East, South, West (bound)
Separation:	All - (Headway)
Name:	Default Profile
Scheme:	Vehicle classification (ARX)
Units:	Metric (meter, kilometer, m/s, km/h, kg, tonne)
In profile:	Vehicles = 91165 / 91207 (99.95%)

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1 M Pea Thu 0000	orsday	y, 18 0200 4 3 0 0	0300	0400	0500 41 3 9	118	204 52 51	35	5 270 8 86 7 57	245 47 70	210 60 51	225 56 62	5 74 5 53 5 58	76 73 67	68 81 76	96 99 5 81	84 84 84	62 39 46	34 23 28	15 12 11	19 16 9	8 8 7	17 7 3 3 4	22

* Friday, 19 Septen	nber 2008 - Tot	al=3712, 15 ı	minute dr	ops												
0000 0100 0200 0300 9 6 7 6 3 0 1 0 2 1 2 0 3 3 3 3 3 1 2 1 0 AM Peak 0800 - 0900 (360	11 39 12 3 4 2 1 8 2 3 7 2 4 20 5	7 225 360 1 36 71 5 55 95 5 71 93 5 63 101	250 226 65 51 48 59 66 66 71 50	254 232 68 41 64 58 58 52 64 81	1300 274 63 77 64 70	1400 265 56 80 58 71	1500 334 78 74 95 87	1600 353 92 81 94 86	1700 280 71 78 73 58	1800 191 65 44 47 35	1900 87 29 21 18 19	2000 : 60 15 12 22 11	2100 58 11 14 21 12	45 15 12 9 9	15 6 3 3 3	8 7 2 4
* Saturday, 20 Sept 0000 0100 0200 0300 21 10 6 0 8 4 2 0 7 4 1 2 2 2 1 2 4 0 2 2 AM Peak 1000 - 1100 (251	0400 0500 0600 5 21 44 1 2 6 2 6 10 2 5 12 0 8 20	0 0700 0800 0 3 102 165 16 5 16 32 39 2 29 37 3 34 57	900 1000 214 251 50 58 51 64 47 57 66 72	1100 1200 234 215 48 49 65 53 63 58 58 55	1300 204 54 46 50 54	1400 203 46 53 51 53	1500 179 44 53 42 40	1600 153 39 39 35 40	1700 162 37 52 32 41	1800 101 37 22 26 16	1900 91 25 24 18 24	2000 55 13 18 11 13	2100 47 12 10 12 13	2200 48 11 10 12 15	2300 15 6 3 4 2	3 4 3 4
* Sunday, 21 Septe 0000 0100 0200 0300 14 8 8 5 3 6 4 2 4 0 1 2 3 2 1 1 4 0 2 0 AM Peak 1145 - 1245 (249	0400 0500 0600 1 5 25 0 2 6 0 2 6 0 0 2 6 1 1 5	0 0700 0800 0 6 47 102 5 10 24 6 8 27 11 27 9 17 24	900 1000 159 203 38 41 32 42 42 53 47 67	1100 1200 207 260 58 61 44 64 48 67 57 68	1300 235 47 54 58 76	1400 222 59 52 49 62	1500 239 68 60 59 52	1600 238 69 61 57 51	1700 187 55 41 52 39	1800 130 43 36 33 18	1900 74 20 30 16 8	2000 3 64 13 18 18 18 15	2100 31 10 5 11 5	2200 22 11 4 3 4	2300 11 2 3 3 3 3	1 1 0 1
* Monday, 22 Septe 0000 0100 0200 0300 3 3 6 3 1 1 4 0 1 0 1 0 0 1 0 0 1 1 1 2 AM Peak 0815 - 0915 (396	0400 0500 0600 5 39 133 2 5 26 1 8 23 2 10 28 0 16 58	0 0700 0800 0 3 220 364 33 64 3 43 97 361 95 3 61 95 33 108	900 1000 277 197 96 45 66 44 63 50 52 58	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1300 193 49 42 53 49	1400 209 44 38 59 68	1500 294 53 70 86 85	1600 309 85 82 77 65	1700 274 85 57 73 59	1800 133 50 29 29 25	1900 65 25 18 10 12	2000 32 13 10 4 5	2100 30 8 5 7 10	2200 24 6 8 4 6	$\frac{2300}{11}$ 4 3 1 3	2 2 0 1
* Tuesday, 23 Sept 0000 0100 0200 0300 5 5 4 100 2 3 0 0 2 0 3 66 0 1 0 2 1 1 1 2 AM Peak 0815 - 0915 (361	0400 0500 0600 5 49 132 1 7 21 0 13 20 3 13 37 1 16 54	0700 0800 0 175 350 350 38 68 33 82 40 96 64 104	900 1000 253 222 79 52 68 54 52 49 54 67	1100 1200 214 214 52 42 42 62 62 54 58 56	1300 207 51 43 56 57	1400 227 51 43 65 68	1500 314 84 72 93 65	1600 329 92 80 89 68	1700 287 84 82 61 60	1800 149 45 54 29 21	1900 87 32 22 18 15	2000 3 49 16 13 14 6	2100 42 12 8 12 10	2200 23 9 4 4 6	2300 12 6 2 3 1	2 1 3 1
* Wednesday, 24 So 0000 0100 0200 7 5 6 7 2 2 0 00 1 0 3 1 3 2 1 3 1 1 2 3 AM Peak 0800 - 0900 (315	0400 0500 0600 8 54 120 2 5 17 0 13 17 3 11 26 3 25 60	0700 0800 0 236 315 315 48 63 63 53 78 62 85 73 89 89 85	900 1000 249 204 61 50 61 38 59 58 68 58	1100 1200 228 238 45 64 56 69 56 47 71 58	1300 240 79 53 52 56	1400 250 64 63 63 60	1500 315 82 70 93 70	1600 352 94 80 90 88	1700 327 81 93 69 84	1800 170 59 53 38 20	1900 106 36 28 29 13	2000 79 25 18 22 14	2100 52 13 13 13 11 15	2200 35 10 12 6 7	2300 11 5 4 1 1	2 1 0 3
* Thursday, 25 Sep 0000 0100 0200 0300 <u>6 3 5 55</u> <u>2 1 2 22</u> <u>1 0 0 1</u> 0 1 3 <u>1</u> 3 1 0 1 AM Peak 0815 - 0915 (395	0400 0500 0600 7 49 122 2 6 15 0 9 22 2 10 20 3 24 65	0 0700 0800 0 2 193 379 5 44 69 2 52 98 40 100 5 57 112	900 1000 254 203 85 48 60 53 53 45 56 57	1100 1200 195 204 48 44 58 67 51 48 38 45	225 60 54 66	1400 230 57 59 51 63	1500 334 70 88 98 78	1600 342 93 81 86 82	1700 302 101 68 66 67	1800 182 68 39 42 33	1900 117 37 33 30 17	2000 79 26 18 18 18 17	2100 29 8 8 9 4	2200 29 9 8 5 7	2300 12 5 5 1 1	4 5 0
* Friday, 26 Septem 0000 0100 0200 0300 9 8 3 5 4 2 1 3 5 4 0 0 0 1 0 1 0 1 2 1 AM Peak 0815 - 0915 (355	0400 0500 0600 6 47 136 0 3 25 2 12 22 1 8 30 3 24 61	0 0700 0800 0 237 352 46 69 51 91 59 98 81 94	900 1000 288 264 72 59 78 64 72 60 66 81	1100 1200 249 227 60 55 62 50 59 62 68 60	275 76 50 67	1400 265 56 70 73 66	1500 340 90 87 85 78	1600 316 101 82 68 65	1700 275 79 67 62 67	1800 186 63 56 35 32	1900 115 28 28 32 27	2000 97 27 17 31 22	2100 42 8 17 10 7	2200 46 10 6 18 12	2300 25 6 5 4 10	7 5 5 1
* Saturday, 27 Sept 0000 0100 0200 0300 18 12 8 10 7 2 0 4 5 5 1 3 5 3 2 22 1 2 5 1 AM Peak 1000 - 1100 (265	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	0 0700 0800 0 2 99 153 153 7 23 30 30 4 20 29 14 30 54 54 14 7 26 .40 14	900 1000 186 265 44 72 50 60 46 65 46 68	1100 1200 252 239 55 65 71 56 55 63 71 55	184 54 40 44	1400 188 38 48 52 50	1500 175 45 43 41 46	1600 187 57 42 44 44	1700 158 36 44 39 39	1800 130 37 31 30 32	1900 74 29 15 15 15	2000 42 12 8 11 11	2100 50 8 17 14 11	2200 43 13 12 11 7	2300 30 7 9 8 6	7 2 5 0
* Sunday, 28 Septe 0000 0100 0200 0300 14 11 1 6 7 5 0 3 2 3 1 1 5 2 0 0 0 1 0 2	mber 2008 - To 0400 0500 0600 7 8 25 3 1 0 3 1 0 1 3 8	tal=2193, 15 0 0700 0800 0 5 54 94 6 16 5 5 22 8 21 32 0 22 24	minute (900 1000 137 164 35 34 24 47 31 37 47 46	1100 1200 227 199 64 55 59 53 51 49 53 42	194 39 49 55	1400 209 54 38 58 59	1500 199 56 56 39 48	1600 189 54 49 48 38	1700 159 37 45 34 43	1800 119 44 35 22 18	1900 77 24 17 20 16	2000 31 9 6 14 2	2100 35 11 9 7 8	2200 18 6 8 2 2	2300 16 5 3 2	1 1 1 0

0 1 0 2 0 3 10 22 24 47 46 53 42 AM Peak 1100 - 1200 (227), AM PHF=0.89 PM Peak 1430 - 1530 (229), PM PHF=0.97

VehicleCount-385 Page 4

* Monday, 29 September 2008 - Total=3290, 15 minute drops. 0000 0100 0200 0300 0400 0500 0600 0700 0800 0900 1000 1200 1300 1400 1500 1600 1700 1800 1900 2000 2100 2200 2300 3 6 3 7 5 54 118 238 289 237 213 218 249 255 315 262 148 74 48 37 16 13 1 2 1 0 1 3 21 52 63 57 51 58 59 59 73 74 46 28 11 13 8 2 1 1 2 1 2 0 8 19 51 79 61 63 61 44 62 65 59 89 71 16 12 13 4 5 1 1 0 0 2 1 14 20 63 74 59 77 63 47	
* Tuesday, 30 September 2008 - Total=3533, 15 minute drops 0000 0100 0200 0300 0400 0500 0600 0700 0800 0900 1000 1200 1300 1400 1500 1600 1700 1800 1900 2000 2100 2200 2300 4 5 4 6 9 48 149 209 310 253 250 243 230 215 266 293 316 306 185 103 51 49 21 8 1 2 1 2 0 2 19 47 76 75 65 56 51 63 73 70 89 55 27 16 6 100 2 1 1 1 0 0 3 12 29 57 79 70 75 65 56 51 63 73 70 89 55 27 16 6 100 2 1 1 1 3 2 9 27 52<	
* Wednesday, 1 October 2008 - Total=3425, 15 minute drops 0000 0100 0200 0300 0400 0500 0600 0700 0800 0900 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000 210 2200 2300 5 3 11 5 7 49 125 218 271 253 205 206 237 262 216 280 331 297 200 89 62 46 29 18 2 1 2 1 3 4 14 46 70 85 45 67 71 50 65 77 100 73 22 20 13 10 5 1 0 2 0 0 8 23 58 68 63 57 58 53 93 84 70 46 16 13 9 4 5 0 1 0 2 0 8 23 58 68 57 58 <td></td>	
* Thursday, 2 October 2008 - Total=3575, 15 minute drops 0100 0100 0200 0300 0400 0500 0600 0700 0800 0900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000 2100 2200 2300 5 5 8 5 9 53 129 224 286 248 245 235 264 258 273 294 325 276 170 106 54 52 31 20 3 1 2 0 1 4 18 56 58 66 71 67 53 70 73 75 45 31 12 15 4 6 2 0 2 3 1 3 10 13 54 75 71 62 57 67 67 53 70 73 75 45 31 12 15 4 6 2 1 1 1 4 3 24 64 65 83 54 59 71 62 64 88 78 98 52 33 23 10 16 9 5 3 1 1 1 4 3 24 64 65 83 54 59 71 62 64 88 78 98 52 33 23 15 11 6 4 2 AM Peak 0815 - 0915 (295), AM PHF=0.89 PM Peak 1630 - 1730 (334), PM PHF=0.85	
* Friday, 3 October 2008 - Total=3436, 15 minute drops $\begin{array}{c ccccccccccccccccccccccccccccccccccc$	
* Saturday, 4 October 2008 - Total=2339, 15 minute drops 0000 0100 0200 0300 0400 0500 0600 0700 0800 0900 1000 1100 1200 1300 1400 1500 160 170 1800 1900 2000 2100 2200 2300 16 8 13 4 8 15 41 83 165 209 216 230 196 179 165 174 159 143 96 74 46 46 28 25 16 2 5 1 2 3 7 13 27 43 65 52 52 36 37 46 41 35 24 27 15 8 10 11 6 2 5 1 2 3 7 13 27 43 65 52 52 36 37 46 41 35 24 27 15 8 10 11 6 2 5 1 2 3 7 13 27 43 65 52 52 36 37 46 41 35 24 27 15 8 10 11 7 1 3 0 1 4 8 12 38 46 44 58 60 49 36 52 36 30 27 12 11 13 8 6 6 7 1 3 0 1 4 8 12 38 45 57 64 42 36 46 36 40 41 15 16 13 18 5 4 7 1 1 2 3 0 5 13 35 57 66 50 56 42 58 46 40 42 37 30 19 7 7 5 4 AM Peak 0945 - 1045 (232), AM PHF=0.88 PM Peak 1200 - 1300 (196), PM PHF=0.82	
* Sunday, 5 October 2008 - Total=1693, 15 minute drops $\begin{array}{c ccccccccccccccccccccccccccccccccccc$	
* Monday, 6 October 2008 - Total=2149, 15 minute drops * Monday, 6 October 2008 - Total=2149, 15 minute drops 0000 0100 0200 0300 0400 0500 0600 0700 0800 0900 1000 1100 1200 1300 1400 1500 1600 1700 1800 190 2000 2100 2200 2300 <u>6 3 4 3 20 20 21 48 88 176 204 210 218 194 186 190 193 125 88 59 42 28 18 5</u> <u>6 3 4 3 20 20 21 48 88 176 204 210 218 194 186 190 193 125 88 59 42 28 18 5</u> <u>7 1 1 1 3 3 6 5 21 38 48 51 57 44 54 59 57 28 31 24 13 8 11 0 1</u> <u>1 1 1 0 4 1 7 9 18 37 43 53 70 51 45 46 47 27 22 13 12 6 6 2 2</u> <u>1 1 1 1 0 4 1 7 9 18 37 43 53 70 51 45 46 38 20 8 10 7 1 2 2</u> <u>2 0 0 1 8 10 4 17 20 44 60 54 42 56 38 43 46 38 20 8 10 7 1 2 2</u> <u>1 1 2 1 5 6 4 17 29 57 53 52 49 43 49 42 43 32 15 14 7 7 0 1 0</u> AM Peak 1130 - 1230 (233), AM PHF=0.83 PM Peak 1200 - 1300 (218), PM PHF=0.78	
* Tuesday, 7 October 2008 - Total=3625, 15 minute drops 0000 0100 0200 0300 0400 0500 0600 0700 0800 0900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000 2100 2200 2300 5 6 3 8 42 101 220 268 222 279 270 285 237 299 290 333 185 114 75 54 26 20 12 5 6 3 8 42 101 220 268 222 279 270 285 237 299 290 333 185 114 75 54 26 20 12 1 0 1 2 6 20 46 55 56 63 61 71 83 54 75 82 108 63 38 21 17 7 6 5 2 2 1 1 7 19 50 66 58 53 60 79 72 52 66 63 76 46 37 11 13 9 6 2 0 2 1 0 2 9 20 36 73 81 57 84 79 70 61 60 80 64 64 37 21 17 9 6 3 2 1 2 1 0 2 9 26 51 66 51 79 70 <td< td=""><td>2033</td></td<>	2033
* Wednesday, 8 October 2008 - Total=904 (Incomplete), 15 minute drops $\begin{array}{c ccccccccccccccccccccccccccccccccccc$	

Appendix B

INTERSECTION SURVEYS

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R.O.A.R. DATA Reliable, Original & Authentic Results

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

: T.T.P.A. Job No/Name Client

: 4578 ORANGE Leeds Pde

: Friday 5th April 2013

Day/Date

		NORTH	КТН			NORTHEAST	IEAST			EAST	ST			SOUTH	TH			WEST	ST		
		Leeds Pde	s Pde			Bus Depot	epot		Noi	thern D	Northern Distributor	or		Leeds Pde	Pde		Noi	rthern D	Northern Distributor	or	
Time Per	ш	T	L	ΗL	用	ы	н	L	뛰	ы	Т	L	用	ш	ы	L	ы	ы	L	비	тот
1500 - 1515	2	7	4	0	0	1	1	0	0	1	39	5	14	5	9	25	23	32	0	0	165
1515 - 1530	5	6	2	1	0	1	0	1	0	1	48	15	7	0	8	47	35	45	0	1	226
1530 - 1545	5	7	4	0	0	0	1	0	1	0	55	10	6	0	5	60	50	38	1	0	246
1545 - 1600	5	6	7	0	0	1	1	0	0	٢	23	8	12	3	9	77	32	41	1	7	234
1600 - 1615	6	8	2	0	0	۲	0	0	0	1	50	6	8	3	3	78	50	55	5	5	287
1615 - 1630	7	10	2	0	0	2	1	1	0	2	50	10	8	0	3	55	45	32	5	3	236
1630 - 1645	5	7	2	1	0	2	1	1	0	0	50	10	11	0	2	57	32	57	2	з	243
1645 - 1700	5	6	0	0	0	2	3	1	0	0	73	6	6	5	7	77	36	61	2	5	301
1700 - 1715	14	17	7	0	0	5	2	2	0	0	94	23	2	с	-	82	30	45	2	2	331
1715 - 1730	5	10	З	0	0	3	2	1	0	0	43	7	1	0	0	65	41	39	2	0	222
1730 - 1745	7	2	1	0	0	3	5	0	0	0	53	5	3	1	5	64	25	27	2	0	203
1745 - 1800	5	7	٢	0	0	2	0	0	1	0	47	3	6	5	3	41	28	47	0	1	197
Period End	74	66	35	2	0	23	17	7	2	9	625	114	06	25	49	728	427	519	22	27	2891
				ana 1																	
		N	NORTH			NORTI	NORTHEAST			EAST	ST			SOUTH	ТН			WEST	ST		
								ſ											And a lot of the second se		

		тот	871	993	1003	1000	1067	1111	1097	1057	953	1111
	or	뀌	8	13	15	18	16	13	10	7	3	13
ST	istribute	L	2	7	12	13	14	11	8	8	9	11
WEST	Northern Distributor	Ц	156	179	166	185	205	195	202	172	158	195
	No	щ	140	167	177	159	163	143	139	132	124	143
		L	209	262	270	267	267	271	281	288	252	271
SOUTH	Leeds Pde	Ы	25	22	17	14	15	13	10	13	6	13
SOI	Leed	с	8	9	9	9	80	8	8	6	6	80
		用	42	36	37	39	36	30	23	15	12	30
	tor		38	42	37	37	38	52	49	44	38	52
EAST	Distribut	ы	165	176	178	173	223	267	260	263	237	267
EA	Northern Distributor	с	з	ŝ	4	4	в	2	0	0	0	2
	Ne	뛰	١	٢	٢	0	0	0	0	0	1	0
			٢	-	-	2	в	5	5	4	3	5
NORTHEAST	Bus Depot	н	3	2	3	e	5	7	80	12	6	2
NORT	Bus	ш	3	ю	4	9	7	11	12	13	13	11
		뛰	0	0	0	0	0	0	0	0	0	0
		뵈	1	1	0	-	٢	1	٢	0	0	۲
NORTH	Leeds Pde	L	17	15	15	13	9	11	12	11	12	11
NO	Leeo	н	32	33	34	34	31	40	40	35	36	40
		ш	17	24	26	26	26	31	29	31	31	R 31
		Peak Time	1500 - 1600	1515 - 1615	1530 - 1630	1545 - 1645	1600 - 1700	1615 - 1715	1630 - 1730	1645 - 1745	1700 - 1800	PEAK HOUR



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

: T.T.P.A. Job No/Name Client

: 4578 ORANGE Leeds Pde : Saturday 6th April 2013

Day/Date

		тот	148	146	132	133	172	175	164	134	158	149	168	160	1839
	or	Щ	3	1	0	0	2	1	0	0	2	0	3	2	14
ST	istribut	L	1	0	2	0	0	2	0	0	2	0	1	1	6
WEST	Northern Distributor	н	31	34	29	24	42	41	34	20	28	29	37	30	379
	No	œ١	33	33	25	18	45	30	32	38	29	27	32	30	372
		Г	33	36	41	46	36	55	53	46	51	36	55	34	522
ТН	Pde	ц	2	2	1	0	3	4	0	2	2	3	2	1	22
SOUTH	Leeds	۲	0	2	0	0	1	0	0	0	2	1	0	3	6
		뛰	3	-	4	5	8	5	1	2	2	5	0	4	40
	or	الـ	4	ю	0	3	3	3	з	2	3	3	3	4	34
sт	istribut	н	28	26	20	32	30	32	33	18	30	35	30	48	362
EAST	Northern Distributor	ш	0	-	0	0	0	0	0	1	0	0	0	0	2
	Noi	用	0	0	1	0	0	0	0	0	0	0	0	0	1
		L	-	2	2	0	0	0	0	0	0	1	1	0	7
IEAST	epot	ы	0	0	0	0	0	0	2	0	3	1	0	0	9
NORTHEAST	Bus Depot	ш	1	-	1	2	0	0	0	1	1	2	1	0	10
		붜	0	0	0	0	0	0	0	0	0.	0	0	0	0
		비	0	0	0	0	0	0	0	0	0	0	0	0	0
RTH	s Pde	-	0	0	0	0	1	0	1	0	1	0	0	0	3
NORTH	Leeds Pde	н	5	2	4	2	1	2	4	3	1	3	3	3	33
		ш	ю	7	2	1	0	0	1	1	1	з	0	0	14
		Time Per	1100 - 1115	1115 - 1130	1130 - 1145	1145 - 1200	1200 - 1215	1215 - 1230	1230 - 1245	1245 - 1300	1300 - 1315	1315 - 1330	1330 - 1345	1345 - 1400	Period End

		тот	559	583	612	644	645	631	605	609	635	645
	r	비	4	3	3	3	3	3	2	5	7	e
ST	Northern Distributor	L	3	2	4	2	2	4	2	3	4	2
WEST	thern D	Ц	118	129	136	141	137	123	111	114	124	137
	Noi	ш	109	121	118	125	145	129	126	126	118	145
一日の		L	156	159	178	190	190	205	186	188	176	190
TH	s Pde	I	5	9	8	7	9	8	7	6	8	თ
SOUTH	Leeds Pde	щ	2	3	1	1	1	2	3	3	9	~
		用	13	18	22	19	16	10	10	6	11	16
	or	L	10	6	9	12	11	11	11	11	13	11
ST	Northern Distributor	н	106	108	114	127	113	113	116	113	143	113
EAST	rthern [ш	1	1	0	0	1	1	٢	1	0	1
	No	Ħ	1	1	1	0	0	0	0	0	0	0
		L	5	4	2	0	0	0	1	2	2	0
NORTHEAST	Bus Depot	I	0	0	0	2	2	5	9	4	4	2
NORT	Bus I	ш	5	4	с	2	1	2	4	5	4	1
		뛴	0	0	0	0	0	0	0	0	0	0
		비	0	0	0	0	0	0	0	0	0	0
NORTH	Leeds Pde	L	0	٢	1	2	2	2	2	1	1	2
ION	Leed	н	13	თ	ი	ი	10	10	11	10	10	10
		ы	8	5	S	2	2	ю	9	5	4	2
		Peak Time	1100 - 1200	1115 - 1215	1130 - 1230	1145 - 1245	1200 - 1300	1215 - 1315	1230 - 1330	1245 - 1345	1300 - 1400	PEAK HOUR



Appendix C

SIDRA RESULTS

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MOVEMENT SUMMARY

Roundabout

Г

Moven	nent Per	formance -	Vehicles					· · · · · · · · · · · · · · · · · · ·		· · · · · ·	
(HADACO)	2014201-00-0	Demand		Deg Sath	Average	Level of 4	95% Back o		Prop.		Average
Mov ID	Ium	Flow veh/h	HV %	Sath v/c	Delay sec	Service	Vehicles	Distance	Queued	Stop Rate per veh	Speed
South:	Leeds Pde			н — 23 ж.//м. 2	SIGE		yen.			oet and	
1	L	311	5.0	0.256	7.3	LOS A	1.3	9.2	0.49	0.56	55.0
2	т	86	5.0	0.152	8.1	LOS A	0.6	4.9	0.49	0.61	54.4
3	R	40	25.0	0.152	17.3	LOS B	0.6	4.9	0.49	0.90	48.7
Approa	ch	437	6.8	0.256	8.3	LOS A	1.3	9.2	0.49	0.60	54.2
South E	ast: North	nern Dist									
21	L	60	5.0	0.049	8.0	LOS A	0.2	1.1	0.30	0.54	54.9
22	т	303	5.0	0.157	6.9	LOS A	0.8	5.6	0.40	0.53	55.5
23	R	42	5.0	0.157	13.1	LOS A	0.8	5.6	0.40	0.81	51.5
Approa	ch	405	5.0	0.157	7.7	LOS A	0.8	5.6	0.39	0.56	55.0
North E	ast: Bus [Depot									
24	Ł	13	100.0	0.072	16.8	LOS B	0.2	3.2	0.59	0.77	48.1
26	R	12	100.0	0.072	24.2	LOS B	0.2	3.2	0.59	0.92	45.1
Approa	ch	24	100.0	0.072	20.4	LOS B	0.2	3.2	0.59	0.84	46.6
North: L	eeds Pde	•									
7	L	29	8.4	0.063	7.9	LOS A	0.2	1.8	0.45	0.60	55.3
8	т	81	5.0	0.119	7.3	LOS A	0.5	3.6	0.44	0.55	54.8
9	R	88	5.0	0.119	16.2	LOS B	0.5	3.6	0.43	0.81	48.9
Арргоас	ch	199	5.5	0.119	1 1.3	LOS A	0.5	3.6	0.44	0.67	51.9
North W	/est: North	nern Dist									
27	L	25	48.5	0.154	10.2	LOS A	0.7	5.2	0.33	0.64	54.9
28	Т	233	5.0	0.195	6.7	LOS A	1.0	7.0	0.32	0.48	56.1
29	R	172	5.0	0.195	12.8	LOS A	1.0	7.0	0.31	0.72	51.0
Approad	ch	429	7.6	0.195	9.3	LOS A	1.0	7.0	0.32	0.58	53.8
All Vehi	cles	1495	7.9	0.256	9.1	LOS A	1.3	9.2	0.41	0.60	53.8

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

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model used.

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8000272, TRANSPORT & TRAFFIC PLANNING ASSOC	IATES, SINGLE	

MOVEMENT SUMMARY

Roundabout

Г

Moven	nent Per	formance -	Vehicles								
Mov ID	Turn	Demand Flow	HV	Deg Sath	Average Delay	Level of Service	95% Back of Vehicles	f Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
South: I	Leeds Pd	veh/h	%	v/c	sed.	3.00	veh	m i		per veh	km/h
1	L	199	5.0	0.155	6.9	LOS A	0.7	5.1	0.39	0.53	55.8
2	Т	148	5.0	0.149	7.1	LOS A	0.7	4.8	0.41	0.55	55.5
3	R	18	10.6	0.149	16.2	LOS B	0.7	4.8	0.41	0.90	49.6
Approa	ch	365	5.3	0.155	7.4	LOS A	0.7	5.1	0.40	0.56	55.3
South E	ast: North	nern Dist									
21	L	12	5.0	0.009	8.1	LOS A	0.0	0.2	0.33	0.53	54.7
22	Т	111	5.0	0.091	7.2	LOS A	0.4	3.2	0.44	0.54	54.9
23	R	81	5.0	0.091	13.3	LOS A	0.4	3.2	0.44	0.74	50.7
Approac	ch	203	5.0	0.091	9.6	LOS A	0.4	3.2	0.43	0.62	53.1
North E	ast: Bus [Depot									
24	L	2	100.0	0.010	16.3	LOS B	0.0	0.4	0.59	0.66	48.7
26	R	1	100.0	0.010	24.4	LOS B	0.0	0.4	0.59	0.85	45.4
Approac	ch	3	100.0	0.010	19.0	LOS B	0.0	0.4	0.59	0.73	47.5
North: L	eeds Pde	÷									
7	L	51	5.0	0.101	7.4	LOS A	0.4	2.9	0.43	0.57	55.5
8	Т	139	5.0	0.189	7.1	LOS A	0.8	6.2	0.43	0.54	54.9
9	R	141	5.0	0.189	16.1	LOS B	0.8	6.2	0.42	0.81	49.0
Approac	ch	331	5.0	0.189	11.0	LOS A	0.8	6.2	0.43	0.66	52.1
North W	lest: North	nern Dist									
27	L	5	43.0	0.134	10.2	LOS A	0.6	4.4	0.37	0.67	54.8
28	Т	180	5.0	0.169	6.9	LOS A	0.8	5.9	0.36	0.51	55.8
29	R	189	5.0	0.169	13.1	LOS A	0.8	5.9	0.36	0.70	50.5
Approac	h	375	5.5	0.169	10.1	LOS A	0.8	5.9	0.36	0.61	52.9
All Vehic	cles	1277	5.5	0.189	9.5	LOS A	0.8	6.2	0.40	0.61	53.3

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

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model used.

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Appendix D

TURNING PATH ASSESSMENT










DETAILED OUTPUT

Site: WD PM (NDR/Leeds) - proposed +bunnings + service centre

New Site Roundabout

OUTPUT TABL	E LINKS
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 Roundabouts Roundabout Basic Parameters Roundabout Circulating / Exiting Stream Parameters Roundabout Gap Acceptance Parameters Roundabout Flow Rates
Movements Intersection Negotiation Data Movement Capacity and Performance Parameters Fuel Consumption, Emissions and Cost
Lanes Lane Performance and Capacity Information Lane Delays Lane Queues Lane Queue Percentiles Lane Stops
Flow Rates Origin-Destination Flow Rates (Total) Origin-Destination Flow Rates by Movement Class Lane Flow Rates
Conter Model Settings Summary Diagnostics

Roundabouts

Roundabout Basic Parameters Site:WD PM (NDR/Leeds) - proposed +bunnings + service centre Intersection ID: 1

Roundabo	ut	. 1					
Island Diam M	Width m	Insc Diam. m	Entry Radius M	Entry Angle deg	Circ Lanes	Entry Lanes	Av.Entry Lane Width m
South: L 36.0	eeds Pa 10.0	rade so 56.0		30.0	2	2	3.70
SouthEas 36.0	t: Nort 10.0	hern Di 56.0		r east 30.0	2	3	3.70
NorthEas 36.0	t: Hanr 10.0	ahan Pl 56.0		30.0	2	1	3.70
North: L 36.0	eeds Pa 10.0	rade no 56.0		30.0	2	2	3.70
NorthWes 36.0	t: Nort 10.0	hern Di 56.0		r west 30.0	2	2	
			Model: S				



Roundabout Circulating / Exiting Stream Parameters Site:WD PM (NDR/Leeds) - proposed +bunnings + service centre

Intersection ID: 1 Roundabout Dest Turn Lane Lane Opng HVE Adj. %Near %Exit Cap. O-D Aver In-Bunch Prop. No. Type Flow pcu/ Flow Lane Flow Const. Factor Speed Headway Bunched veh/h veh pcu/h Only Incl. Effect km/h sec

South: Leeds Parade south

NW	L1	_	Dominant		1.03	605	0.0	0.0	N	0.947	34.4	1.16	0.349
N	Т1	_	Dominant	585	1.03	605	0.0	0.0	N	0.947	34.4	1.16	0.349
N	Т1			585	1.03	605	0.0	0.0	N	0.947	34.4		0.349
NE	R1				1.03	605	0.0	0.0	N	0.947			0.349
SE	R3	2	Subdominant	585	1.03	605	0.0	0.0	N	0.947	34.4	1.16	0.349
South	East:	No	orthern Distri	butor	east								
S	L3	1	Excl. Slip	348	1.03	360	0.0	0.0	N	0.975	35.0	1.14	0.220
NW	т1		Dominant		1.04	553	0.0	0.0	N	0.950	32.3	1.36	0.368
NW	т1	3	Subdominant	531	1.04	553	0.0	0.0	N	0.950	32.3	1.36	0.368
N	R1	3	Subdominant	531	1.04	553	0.0	0.0	N	0.950	32.3	1.36	0.368
NE	R2	3	Subdominant	531	1.04	553	0.0	0.0	Ν	0.950	32.3	1.36	0.368
North	East:	Ha	anrahan Pl										
SE	L2	1	Dominant	848	1.02	869	0.0	0.0	N	0.937	35.4	1.16	0.460
S	L1	1	Dominant	848	1.02	869	0.0	0.0	N	0.937	35.4	1.16	0.460
NW	R2	1	Dominant	848	1.02	869	0.0	0.0	N	0.937	35.4	1.16	0.460
Ν	R3	1	Dominant	848	1.02	869	0.0	0.0	Ν	0.937	35.4	1.16	0.460
North	: Lee	ds	Parade north										
NE	L3	1	Dominant	587	1.04	611	0.0	0.0	N	0.936	33.5	1.10	0.335
SE	L1	1	Dominant	587	1.04	611	0.0	0.0	N	0.936	33.5	1.10	0.335
S	т1	1	Dominant	587	1.04	611	0.0	0.0	N	0.936	33.5	1.10	0.335
S	т1	2	Subdominant	587	1.04	611	0.0	0.0	N	0.936	33.5	1.10	0.335
NW	R3	2	Subdominant	587	1.04	611	0.0	0.0	Ν	0.936	33.5	1.10	0.335
North	West:	No.	orthern Distri	 butor	west								
	L3	1	Dominant	470	1.03	486	0.0	0.0	N	0.948	35.3	1.54	0.365
N			Dominant	470	1.03	486	0.0	0.0	N	0.948	35.3	1.54	0.365
N NE	L2	1	Dominanc					0 0		0.040	35.3	1 5 4	0 265
					1.03	486	0.0	0.0	N	0.948	35.3	1.54	0.365
NE	L2	1	Dominant	470	1.03 1.03	486 486	0.0	0.0	N N	0.948	35.3	1.54	0.365

Roundabout Gap Acceptance Parameters Site:WD PM (NDR/Leeds) - proposed +bunnings + service centre

Intersection ID: 1 Roundabout

Dest	Turn	Lane	Lane			Critica		
		No.			Priority Sharing			-
 South	: Leed	s Para	de south					
			r: 1.00					
Entry	/Circ.	Flow A	Adjustment	: Medium				
NW	L1	1 Doi	minant	1.16	N	3.38	32.3	2.13
N	т1	1 Doi	minant	1.16	N	3.38	32.3	2.13
N	т1		bdominant	1.16	N	3.89	37.1	2.45
NE	R1	2 Sul	bdominant	1.16	N	4.15	39.6	2.61
SE	R3		bdominant	1.16	N	3.89	37.1	2.45
South	East:	Northe:	rn Distrib	utor east				
Envir	onment	Facto	r: 1.00					
Entry	/Circ.	Flow A	Adjustment	: Medium				
S	L3	1 Ex(cl. Slip	1.14	N	3.06	29.7	1.84
NW	т1	2 Doi	minant	1.36	Y	2.84	25.4	1.77
NW	т1	3 Sul	bdominant	1.36	Y	3.56	31.9	2.22
N	R1	3 Sul	bdominant	1.36	Y	3.56	31.9	2.22
NE	R2	3 Sul	bdominant	1.36	Y	3.56	31.9	2.22
North	East:	Hanrah	an Pl					
Envir	onment	Facto	r: 1.00					
			Adjustment	: Medium				
SE	L2	1 Doi	minant	1.16	N	5.38	52.9	3.52
S	L1	1 Doi	minant	1.16	N	5.38	52.9	3.52
NW	R2	1 Doi	minant	1.16	N	5.38	52.9	3.52
N	R3	1 Doi	minant	1.16	N	5.38	52.9	3.52
North	: Leed	s Para	de north					
			r: 1.00					
Entry	/Circ.	Flow A	Adjustment	: Medium				
NE	L3	1 Doi	minant	1.10	N	3.41	31.8	2.15
SE		1 Doi	minant	1.10	N	3.38	31.4	2.13
S			minant	1.10	N	3.38	31.4	
S			bdominant		N	3.87	36.1	
NW	R3	2 Sul	bdominant	1.10	N	3.87	36.1	2.44
North	West:	Northe:	rn Distrib	utor west				
Envir	onment	Facto	r: 1.00					
			Adjustment	: Medium				
N	L3	1 Doi	minant	1.54	Y	3.52	34.5	2.17
				1 5 4	Y	3.83	37.6	2.37
NE	L2	T Doi	minant	1.54 1.54	ĩ	3.03	57.0	2.57

SE S			dominant dominant			39.0 39.0		
Pri	ority s	haring	ity Model: means Foll he Critical	ow-up He	s Intra-bu	nch Headv	vay	
Dis	t (Dist	ance):	Spacing, i successive or exiting	vehicle				
Go to Ta	able Links	(Top)						

Roundabout Flow Rates Site:WD PM (NDR/Leeds) - proposed +bunnings + service centre

Intersection ID: 1 Roundabout

CIRCULATING LANE FLOW RATES

Lane No.		lating Fl pcu/h	ow Rates Percent
South:	Leeds Parad	le south	
1	230	236	39.0%
2	355		61.0%
Total	585	606	
SouthEa	ast: Norther	n Distri	butor east
1	133	137	24.7%
2	398	417	75.3%
Total	531	554	
NorthEa	ast: Hanraha	an Pl	
1	336	344	39.6%
2	512	525	60.4%
Total	848	869	
North:	Leeds Parad	le north	
1	328	345	56.5%
2	259	266	43.5%
Total	587	611	
NorthWe	est: Norther	n Distri	butor west
1	61	62	12.8%
2	409	424	87.2%
Total	470	486	

APPROACH LANE FLOW RATES

Lane No.	Approac Out To		(veh/h) Total
South: Lee	de Darade		
1	299	61	360
2		292	292
Total	299	353	652
SouthEast:	Northern	Distri	butor east
1	57	0	57
2		230	230
3	0	172	172
Total	57	402	459
NorthEast:	Hanrahan	Pl	
1	5	19	24
Total	5	19	24
North: Lee	ds Parade	north	
1	49	209	258
2	0	215	215
Total	49	424	473
NorthWest:	Northern	Distri	butor west
1	111	186	297
2	0	259	259
Total	111	445	556
EXITING LANE	FLOW RAT	ES	
Lane	Exiting	Flow R	lates

No.	veh/h	pcu/h	Percent
SouthEast	North	ern Dist	ributor east
1	140	147	40.9%
2	208	213	59.1%
Total	348	360	

Movements

Intersection Negotiation Data Site:WD PM (NDR/Leeds) - proposed +bunnings + service centre

Intersection ID: 1 Roundabout

INTERSECTION NEGOTIATION DATA

From	То				Negn Dist.	Appr. Dist.	Downstrear	n Distance
Approach		Turn	m	km/h	m	m	m	User Spec?
South: Le	eds Parade	south						
No	rthWest	L1	68.6	41.9	39.9	500	177	No
	North	T1	68.6	41.9	53.2	500	197	No
	rthEast		22.0	27.2	69.1	500	303	No
So	uthEast	R3	22.0	27.2	103.7	500	234	No
SouthEast	: Northern	Distri	butor ea	ast				
	South	L3	33.0	31.7	11.0	500	181	No
No	rthWest	T1	68.6	41.9	53.2	500	213	No
	North	Rl	22.0	27.2	69.1	500	216	No
No	rthEast	R2	22.0	27.2	86.4	500	232	No
NorthEast	: Hanrahan	. Pl						
So	uthEast	L2	46.6	36.2	21.6	500	1088	No
	South	L1	68.6	41.9	39.9	500	1209	No
No	rthWest	R2	22.0	27.2	86.4	500	972	No
	North	R3	22.0	27.2	103.7	500	989	No
North: Le	eds Parade	north						
No	rthEast	L3	30.6	30.8	11.0	500	168	No
So	uthEast	L1	68.6	41.9	39.9	500	185	No
	South		68.6	41.9	53.2	500	217	No
No	rthWest	R3	22.0	27.2	103.7	500	254	No
NorthWest	· Northern	Distri	butor we	est				
	North	L3	30.6	30.8	11.0	500	165	No
No	rthEast	L2	42.9	35.0	21.7	500	335	No
So	uthEast	т1	68.6	41.9	53.2	500	211	No
	South	R1	22.0	27.2	69.1	500	214	No

Maximum Negotiation (Design) Speed = 50.0 km/h

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

MOVEMENT SPEEDS AND GEOMETRIC DELAY

						Queue 1	Move-up			
		App. Sp	eeds	Exit	Speeds			Av. Sect	ion Spd	Geom
Mov	Turn					1st	2nd			Delay
ID			5					Running		
Sou		eds Para								
1a	L1	60.0	41.9	41.9	60.0	20.8		49.6	49.6	4.7
2	т1	60.0	41.9	41.9	60.0	20.0		48.3	48.1	4.7
3a	R1	60.0	27.2	27.2	60.0	19.7		47.9	47.7	14.7
3b	R3	60.0	27.2	27.2	60.0	19.7		47.9	47.7	14.2
Sou	thEast	: Northe	rn Dist	 ributo	 r east					
21b		60.0				27.1		49.3	49.3	7.3
		60.0				23.2		49.4		
23a	R1	60.0	27.2	27.2	60.0	21.4		46.7	46.7	11.7
23	R2	60.0	27.2	27.2	60.0	21.4		46.7	46.7	12.9
Nor	thEast	: Hanrah	an Pl							
24	L2	60.0	36.2	36.2	60.0	20.1		42.2	42.2	23.4
24a	L1	60.0	41.9	41.9	60.0	20.1		42.2	42.2	18.2

26	R2	60.0	27.2	27.2	60.0	20.1	42.2	42.2	32.2
26b	R3	60.0	27.2	27.2	60.0	20.1	42.2	42.2	33.4
Nor	th: Le	eds Para	de nort	th					
7b	L3	60.0	30.8	30.8	60.0	20.7	49.4	49.4	8.0
7a	L1	60.0	41.9	41.9	60.0	20.7	49.4	49.4	4.7
8	т1	60.0	41.9	41.9	60.0	20.4	48.1	48.1	4.7
9b	R3	60.0	27.2	27.2	60.0	19.5	45.0	45.0	14.2
Nor	thWest	: Northe	rn Dist	tributo	r west				
27b	LЗ	60.0	30.8	30.8	60.0	23.0	48.8	48.8	7.5
27	L2	60.0	35.0	35.0	60.0	23.0	48.8	48.8	9.9
28	т1	60.0	41.9	41.9	60.0	22.4	47.9	47.9	4.7
29a	R1	60.0	27.2	27.2	60.0	21.7	46.9	46.9	11.7

Movement Capacity and Performance Parameters Site:WD PM (NDR/Leeds) - proposed +bunnings + service centre

Intersection ID: 1 Roundabout

MOVEMENT CAPACITY PARAMETERS

Mov	Turn	Mov		Opng M	lovement	: Total	Prac.	Prac. Spare Cap.	Deg.		
ID		Cl.	Arv	_	Adjust	c. Cap.	Deg.	Spare	Satn		
			Flow Woh/h	Flow Wob/b	Flow	rroh /h	Satn	Cap. %	х		
				ven/n		ven/n	xp	°	X		
Sout	h: Le	eds P	arade s	outh							
1a	L1	#	299	585	605	907	0.85	158	0.330*		
∠ 3a	-1-1 R1	# #	259	585	605	/85 170	0.85	158	0.330*	, ,	
3b	R3	#	38	585	605	115	0.85	158 158 158 158	0.330*	r -	
) istribu						-	
21b	L3	#	57	348	360	1541	0.85	2198	0.037		
22	т1	#	286	1062	1107	1758	0.85	2198 422 422 422	0.163		
23a	R1	#	68	531	553	418	0.85	422	0.163		
23	R2	# 	48	531	553	295	0.85	422	0.163	_	
24	L2	LV	0	0	0	0.000	0.000	0	0.85	**** 1403 **** 1403 **** 1403 **** 1403	0.000
24	L2 1.1	HV	5	88	0	0.000	0.000	88	0.85	1403 ****	0.057
24a	L1	HV	7	124	0	0.000	0.000	124	0.85	1403	0.057
26	R2	LV	0	0	0	0.000	0.000	0	0.85	* * * *	0.000
26	R2	HV	11	194	0	0.000	0.000	194	0.85	1403	0.057
26b 26b	R3	LV	0	19	0	0.000	0.000	19	0.85	1/02	0.000
											0.057
Nort	h: Le	eds P	arade n	orth	<i></i>		0.05	05.4			
7b 7a	ЦЗ Т.1	# #	49	587	611 611	204	0.85	254	0.240		
8	T1	#	177	1174	1222	738	0.85	254	0.240		
9b	R3	#	171	587	611	713	0.85	254 254 254 254	0.240		
Nort	hWest	: Nor	thern T	istribu	tor wes	2+				-	
27b	L3	#	111	470	486	410	0.85	214	0.271		
27	L2	#	59	470	486	218	0.85	214	0.271		
28	T1 D1	#	222	940	972	820	0.85	214 214 214 214	0.271		
29a 				470	400			214			
				f satur							
#	Combi	ned M	ovement	Capaci	ty para	ameters	are sho	wn for a	all Mov	rement Cl	asses.
MOVE	MENT	PERFO	RMANCE								
Mov	Turn	Tota	l To	tal A	ver. E	Eff. To	tal Pe	rf. Tot	.Trav.	Tot.Trav Time	. Aver.
ID		Dela	y De	lay D	elay S	Stop St	ops In	dex Dis	tance	Time	Speed
	•	veh-h 	/h)(per 	s-h/h)(sec) F	late 		(ve)	h-km/h) 	(veh-h/h	(km/h)
Sout	h: Lo	ada D	arado e	outh							
1a	L1	0.0	30.	03	6.6 1	.08 3	24.3 11	.92	378.1	7.6	49.6
2	T1 D1	0.0	30. E0	03	9.5 1	L.35 3	50.4 11	20	335.9	7.0	48.1
3b	R3	0.0	5 0. 1 0.	01 1	0.4 1	L.43	54.5 4	.09	49.7	7.6 7.0 1.5 1.0	47.7
Sout	hEast	: Nor	thern I	istribu	tor eas	st 10	62 0 0	07	72 5	1 5	40 2
2.2	т]	0.0	- U. 2 0	03	7.0 1	L.05 2	99.2 10	.05	366.8	7.4	49.4
23a	R1	0.0	1 0.	02 1	1.5 1	1.43	97.1 3	.82	91.4	1.5 7.4 2.0 1.4	46.7
23	R2	0.0	1 0.	01 1	1.5 1	.43	68.5 3	.10	64.5	1.4	46.7

Nort	hEast:	Hanrah	an Pl							
24	L2	0.04	0.05	32.2	1.50	7.5	0.55	15.4	0.4	42.2
24a	ь1	0.05	0.06	32.2	1.50	10.5	0.68	21.6	0.5	42.2
26	R2	0.12	0.14	32.2	1.50	16.5	1.06	34.0	0.8	42.2
26b	R3	0.01	0.01	32.2	1.50	1.5	0.25	3.1	0.1	42.2
Nort	h: Lee	ds Para	de north							
7b	L3	0.01	0.01	7.1	1.13	55.6	3.48	62.1	1.3	49.4
7a	L1	0.01	0.01	7.1	1.13	86.2	4.23	96.3	2.0	49.4
8	т1	0.02	0.02	8.9	1.25	221.3	7.57	230.2	4.8	48.1
9b	R3	0.04	0.05	14.5	1.60	274.3	8.88	239.6	5.3	45.0
Nort	hWest:	Northe	rn Distr	ibutor v	west					
27b	L3	0.01	0.02	8.6	1.24	137.9	6.05	141.0	2.9	48.8
27	L2	0.04	0.05	8.6	1.24	73.3	4.39	74.9	1.5	48.8
28	Т1	0.02	0.02	9.7	1.33	296.2	9.58	287.7	6.0	47.9
29a	R1	0.03	0.04	11.3	1.46	238.9	8.50	218.1	4.7	46.9

Fuel Consumption, Emissions and Cost Site:WD PM (NDR/Leeds) - proposed +bunnings + service centre

Intersection ID: 1 Roundabout

FUEL CONSUMPTION, EMISSIONS AND COST (TOTAL)

Turn 	Cost Total	Fuel	CO2	CO	HC	NOX
Leed		Total	Total		Total	Total
Leed		T /h	locar ka/h	kg/h		kg/h
Leed	\$/h 		kg/h			
	s Parade sou					
1		13.0	30.8	0.09		
1	137.57	13.5 3.1	32.1 7.3	0.09	0.010	
21	30.64	3.1	7.3	0.09	0.002	
23				0.01		
	332.24	31.7	75.1	0.21	0.024	
	Northern Dis	tributor	east			
-3	27.57	2.5	5.9	0.02	0.002	0.017
1	138.80	12.6	29.7	0.09	0.010	0.085
22	25.41	2.2	5.3	0.02	0.002	0.015
	227.78	20.4	48.3	0.14	0.016	0.137
ast:						
2	9.33	2.0	5.2	0.01	0.001	0.030
.1	13.06	2.7	7.2	0.01	0.001	0.042
2	20.52		11.4	0.02	0.001	0.066
.3		0.4	1.0	0.00	0.000	
			24.8			0.143
T ood						
			5 2	0 01	0 002	0 016
	25.00	2.2	9 1	0.01	0.002	
			10.1	0.02	0.005	0.024
	96.80	83	19 5	0.05	0.000	0.053
			52.1	0.15	0.018	0.149
	59.73	6.3	15.0	0.04	0.004	0.057
	31.75	3.4	8.0	0.02	0.002	0.030
		11.6	27.5	0.07	0.008	
21		7.5	17.8	0.05	0.006	0.050
	295.37	28.8	68.3		0.021	
SECTI			268.4	0.71	0.082	
	ast: 3 1 1 2 ast: 2 1 2 3 Leed 3 1 1 3 2 1 1 3 1 1 3 1 1 2 1 2 1 1 	332.24 ast: Northern Dis 3 27.57 1 138.80 1 36.00 2 25.41 227.78 ast: Hanrahan Pl 2 9.33 1 13.06 2 20.52 3 1.87 44.78 Leeds Parade nor 3 23.86 1 37.01 1 89.65 3 96.80 247.32 est: Northern Dis 3 59.73 2 31.75 1 118.06 1 85.83 295.37	3 20.79 2.1 	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$

	R1 R3			99.7 99.7			
		0.40	3.8	89.8		0.028	0.289
Sout	hEast: N	Jorthern Distr	ibutor	east			
	L3	0.38	3.5	81.6	0.23	0.027	
22	Т1	0.38	3.4	80.9	0.23	0.027	
23a	Rl			81.4			0.225
23	R2	0.39	3.4	81.4	0.24	0.029	0.225
		0.38	3.4	81.1	0.23	0.028	0.231
Nort	hEast: H	Ianrahan Pl					
24	L2	0.60	12.7	335.0	0.45	0.036	1.930
24a	L1	0.60	12.7	335.0	0.45	0.036	1.930
26	R2	0.60	12.7	335.0	0.45	0.036	1.930
26b	R3	0.60	12.7	335.0	0.45	0.036	1.930
		0.60	12.7	335.0	0.45	0.036	1.930
Nort	h: Leeds	Parade north					
7b	L3	0.38	3.6	84.1	0.24	0.028	0.253
	L1	0.38					
8	т1	0.39					0.244
9b	R3	0.40	3.5	81.6	0.24	0.029	0.220
		0.39	3.5	82.9	0.24	0.028	0.237
Nort		Jorthern Distr					
27b	L3	0.42	4.5	106.6	0.27	0.030	0.403
27	L2	0.42	4.5	106.6	0.27	0.030	0.403
28	Т1	0.41	4.0	95.6	0.25	0.029	0.326
29a	Rl	0.39	3.5	81.6	0.24	0.028	0.227
		0.41	4.0	94.7	0.25	0.029	0.319
INT	ERSECTIO	DN: 0.66	6.6	156.6	0.42	0.048	0.526

Lanes

Lane Performance and Capacity Information Site:WD PM (NDR/Leeds) - proposed +bunnings + service centre

Intersection ID: 1 Roundabout

LANE PERFORMANCE

Lane					Eff.	Que 95%1	Back	Lane Length
No.	veh/h	veh/ł	ı x	sec	Rate	veh	m	m
South:	Leeds P							
	360 292	887	0.330	10.4	0.72		12.1	500.0
SouthEa	ast: Nor							
	57							
	230							
3	172					8.0		
NorthEa	ast: Han							
1	24	424	0.057			0.2		
North:	Leeds Pa	arade	north					
	258							
2	215	895	0.240	14.5	0.80	1.1	8.2	500.0
NorthWe	est: Nor		Distri	 butor w	est.			
1	297	1097	0.271	8.6	0.62	1.5	11.0	60.0
2	259	958	0.271	11.3	0.73	1.4	10.3	500.0
LANE FLC	OW AND C.	APACIJ	TY INFO	RMATION				

Lane	Total	Min	Tot	Deg.	Lane
No.	Arv Flow	Cap	Cap	Satn	Util
	(veh/h)	veh/h	veh/h	х	\$

```
South: Leeds Parade south
     360 150 1091 0.330 100
292 150 887 0.330 100
 1
 2
_____
 SouthEast: Northern Distributor east

        1
        57
        57
        1541
        0.037
        100

        2
        230
        150
        1414
        0.163
        100

        3
        172
        150
        1057
        0.163
        100

 NorthEast: Hanrahan Pl
1 24 24 424 0.057 100
 North: Leeds Parade north

        1
        258
        150
        1076
        0.240
        100

        2
        215
        150
        895
        0.240
        100

              _____
_____
 NorthWest: Northern Distributor west
1 297 150 1097 0.271 100
2 259 150 958 0.271 100
```

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle effects. Saturation flow scale applies if specified.

Go to Table Links (Top)

Lane Delays Site:WD PM (NDR/Leeds) - proposed +bunnings + service centre

Intersection ID: 1 Roundabout

LANE DELAYS

No.	Satn x	Prog. Factor	Stop- 1st d1	-line 2nd d2	Delay Total dSL	Acc. Dec. dn	Queu Total dq	ing MvUp dqm	(Idle) di	Geom	
South:	Leeds	Parade so	outh								
1 2	0.330 0.330	1.000 1.000	1.9 2.5	0.0	1.9 2.5	4.0 3.5	0.0 0.2	0.0	0.0 0.2	4.7 7.9	6.6 10.4
		1.000				2.1	0.0	0.0	0.0	7.3	8.0
2 3	0.163	1.000 1.000	$1.2 \\ 1.7$	0.0	$1.2 \\ 1.7$	3.5 2.6	0.0	0.0	0.0	4.7 9.8	5.9 11.5
		nrahan P									
1	0.057	1.000	5.9		5.9	12.3	0.0	0.0	0.0	26.3	32.2
		Parade no									
		1.000							0.0		
		rthern D: 1.000				3.5	0.0	0.0	0.0	6.8	8.6
	0.271	1.000	2.1	0.0	2.1	2.9	0.0	0.0	0.0	9.2	11.3
and G dSL: d dn: A dq: Q dq: Q dqm: 0 di: S dig: 0	eometri Stop-li verage ueuing topped Queue m topped	c Delay. ne delay stop-sta: delay (t) delay and ove-up de delay (s) ric delay	(=d1+c rt dela ne part d queue elay	12) ay for t of t e move	all v the sto -up de	ehicle: p-line lay)	s queu delay	ed and that	d unque includ	ued	pp-line De
LANE DE	LAY PER	CENTILES									
						Dolor					
Lane											
	x	50%					* 9 	8% 	100% 		
		Parade so 6.6		7 5	7 0	0	1 0	4	0 6		

 SouthEast:
 Northern
 Distributor
 east

 1
 0.037
 8.0
 8.1
 8.3
 8.4
 8.5
 8.6
 8.6

 2
 0.163
 5.9
 6.1
 6.5
 6.6
 6.8
 7.0
 7.1

 3
 0.163
 11.5
 11.8
 12.4
 12.6
 12.9
 13.2
 13.3

 NorthEast:
 Hanrahan Pl

 1
 0.057
 32.2
 33.3
 35.0
 35.9
 36.9
 37.7
 38.3

 North:
 Leeds Parade north
 I
 0.240
 7.1
 7.4
 7.9
 8.2
 8.5
 8.7
 8.9

 2
 0.240
 14.5
 14.9
 15.6
 15.9
 16.3
 16.6
 16.8

 NorthWest:
 Northern Distributor west

 1
 0.271
 8.6
 8.9
 9.4
 9.7
 10.0
 10.2
 10.4

 2
 0.271
 11.3
 11.7
 12.3
 12.6
 13.0
 13.2
 13.5

Go to Table Links (Top)

Lane Queues Site:WD PM (NDR/Leeds) - proposed +bunnings + service centre

Intersection ID: 1 Roundabout

LANE QUEUES (VEHICLES)

Lane	Deg. Satn		Ovrfl. Oueue								Cyc-Av	
No.	x		No	Nbl	Nb2	Nb	95%	Ratio	8	00		95%
		Parade										
1	0.330	1.000	0.0	0.7	0.0	0.7	1.7	0.08	0.0	100.0	0.2	0.3
			0.0								0.2	
			Distribu									
1	0.037	1.000	0.0	0.1	0.0	0.1	0.2	0.02	0.0	100.0	0.0	0.0
2	0.163	1.000	0.0	0.3	0.0	0.3	0.8	0.02	0.0	100.0	0.1	0.1
3	0.163	1.000	0.0	0.3	0.0	0.3	0.8	0.00	0.0	100.0	0.1	0.2
North	nEast: H	anrahan	Pl									
			0.0									
		Parade										
1	0.240	1.000	0.0	0.5	0.0	0.5	1.2	0.03	0.0	100.0	0.1	0.2
2	0.240	1.000	0.0	0.5							0.1	
North	Nwest: N	orthern	Distribu									
1	0.271	1.000	0.0	0.6	0.0	0.6	1.5	0.07	0.0	100.0	0.1	0.3
2	0.271	1.000	0.0	0.6	0.0	0.6	1.4	0.01	0.0	100.0	0.2	0.3

LANE QUEUES (DISTANCE)

Lane	-	Prog. Factor								P'ile Block	-	. Queue
	x	FACLOI			Nb2						NC	
Soutl	n: Leeds	Parade	south									
1	0.330	1.000	0.0	5.0	0.0	5.0	12.4	0.08	0.0	100.0	1.4	2.5
2	0.330	1.000	0.0	4.9	0.0	4.9	12.1	0.01	0.0	100.0	1.5	2.8
Soutl	nEast: N	orthern	Distribu	tor eas	 t							
1	0.037	1.000	0.0	0.5	0.0	0.5	1.2	0.02	0.0	100.0	0.1	0.1
2	0.163	1.000	0.0	2.4	0.0	2.4	6.1	0.02	0.0	100.0	0.6	1.0
3	0.163	1.000	0.0	2.3	0.0	2.3	5.7	0.00	0.0	100.0	0.6	1.1
North	nEast: H	anrahan	Pl									
			0.0		0.0	1.1	2.7	0.01	0.0	100.0	0.5	0.9
		Parade	north									
1	0.240	1.000	0.0	3.4	0.0	3.4	8.5	0.03	0.0	100.0	0.9	1.7
2	0.240	1.000	0.0	3.3	0.0	3.3	8.2	0.01	0.0	100.0	1.0	1.8
North	nWest: N	orthern	Distribu	tor wes	 t							
1			0.0			4.4	11.0	0.07	0.0	100.0	1.1	2.0
2	0.271	1.000	0.0	4.2	0.0	4.2	10.3	0.01	0.0	100.0	1.1	2.0

Go to Table Links (Top)

Lane Queue Percentiles

Site:WD PM (NDR/Leeds) - proposed +bunnings + service centre

Intersection ID: 1 Roundabout LANE QUEUE PERCENTILES (VEHICLES)

Tano	Deg. Satn		Perce					
No.	х	50%	70%	85%	90%	95%		100
		Parade						
1	0.330	0.7	0.9	1.2	1.4	1.7	1.9	2.
2	0.330		0.8	1.2	1.4	1.6	1.8	1.
South	East: N	orthern	Distrib	utor e	ast			
1	0.037	0.1	0.1	0.1	0.1	0.2	0.2 0.9 0.9	Ο.
2	0.163	0.3	0.4	0.6	0.7	0.8	0.9	1.
3	0.163	0.3	0.4	0.6	0.7	0.8	0.9	0.
North	East: H	anrahan	Pl					
1	0.057	0.1	0.1	0.2	0.2	0.2	0.2	0.
		Parade						
1	0.240	0.5	0.6	0.9	1.0	1.2	1.3	1.
2	0.240	0.4	0.6	0.8	1.0	1.1	1.2	1.
			Distrib					
						1.5	1.6 1.6	1.
2	0.271	0.6	0.7	1.0	1.2	1.4	1.6	1.
	UEUE PE		ES (DIST					
ANE Q	UEUE PE Deg.	RCENTILI	ES (DIST	ANCE)	Back of	Queue	(metres)	
ANE Q Lane	UEUE PE Deg. Satn	RCENTILI	ES (DIST Perce	ANCE)	Back of	Queue	(metres)	
ANE Q Lane No. 	UEUE PE Deg. Satn x	RCENTILI	ES (DIST Perce 70%	ANCE)	Back of	Queue	(metres)	
ANE Q Lane No. South	UEUE PE Deg. Satn x : Leeds	RCENTILI 50% Parade	ES (DIST Perce 70% south	ANCE) entile : 85%	Back of 90% 	Queue 95%	(metres) 98%	100
ANE Q Lane No. South 1 2	UEUE PE Deg. Satn x : Leeds 0.330 0.330	RCENTILI 50% Parade 5.0 4.9	ES (DIST Perce 70% south 6.4 6.3	PANCE) entile: 85% 9.1 8.9	Back of 90% 10.5 10.3	Queue 95% 12.4 12.1	(metres) 98% 13.7 13.4	100 14. 14.
ANE Q Lane No. South 1 2 South	UEUE PE: Deg. Satn x : Leeds 0.330 0.330 East: N	RCENTILI 50% Parade 5.0 4.9 orthern	ES (DIST Perce 70% south 6.4 6.3 Distrik	ANCE) 	Back of 90% 10.5 10.3 	Queue 95% 12.4 12.1	(metres) 98% 13.7 13.4	100 14. 14.
ANE Q Lane No. South 1 2 South	UEUE PE: Deg. Satn x : Leeds 0.330 0.330 East: N	RCENTILI 50% Parade 5.0 4.9 orthern	ES (DIST Perce 70% south 6.4 6.3 Distrik	ANCE) 	Back of 90% 10.5 10.3 	Queue 95% 12.4 12.1	(metres) 98% 13.7 13.4	100 14. 14.
ANE Q Lane No. South 1 2 South 1 2 South 1 2	UEUE PE Deg. Satn x : Leeds 0.330 0.330 East: N 0.037 0.163	Parade 5.0 4.9 orthern 0.5 2.4	ES (DIST Perce 70% south 6.4 6.3 Distrik 0.6 3.2	2ANCE) entile : 85% 9.1 8.9 outor e. 0.9 4.5	Back of 90% 10.5 10.3 ast 1.0 5.2	Queue 95% 12.4 12.1 1.2 6.1	(metres) 98% 13.7 13.4 1.3 6.8	100 14. 14.
ANE Q Lane No. South 1 2 South 1 2 3	UEUE PE Deg. Satn x Leeds 0.330 East: N. 0.037 0.163	RCENTILI 50% Parade 5.0 4.9 orthern 0.5 2.4 2.3	ES (DIST Perce 70% south 6.4 6.3 Distrik 0.6 3.2 2.9	2ANCE) 	Back of 90% 10.5 10.3 ast 1.0 5.2 4.8	Queue 95% 12.4 12.1 1.2 6.1 5.7	(metres) 98% 13.7 13.4 1.3 6.8 6.3	100 14. 14. 14. 1. 7.
ANE Q Lane No. South 1 2 South 1 2 3 	UEUE PE Deg. Satn x : Leeds 0.330 0.330 East: N 0.037 0.163 0.163	RCENTILI 50% Parade 5.0 4.9 orthern 0.5 2.4 2.3	ES (DIST Perce 70% south 6.4 6.3 Distrik 0.6 3.2 2.9	2ANCE) 	Back of 90% 10.5 10.3 ast 1.0 5.2 4.8	Queue 95% 12.4 12.1 1.2 6.1 5.7	(metres) 98% 13.7 13.4 1.3 6.8 6.3	100 14. 14. 14.
ANE Q No South 1 2 South 1 2 3 North 1	UEUE PE Deg. Satn X : Leeds 0.330 0.330 East: N 0.037 0.163 0.163 East: H: 0.057	RCENTILI 50% Parade 5.0 4.9 0rthern 0.5 2.4 2.3 anrahan 1.1	ES (DIST Perce 70% south 6.4 6.3 Distrik 0.6 3.2 2.9 Pl 1.4	PANCE) mtile : 85% 9.1 8.9 0.9 4.5 4.2 2.0	Back of 90% 10.5 10.3 ast 1.0 5.2 4.8 	Queue 95% 12.4 12.1 1.2 6.1 5.7 2.7	(metres) 98% 13.7 13.4 1.3 6.8 6.3 3.0	100 14. 14. 14. 7. 6.
ANE Q Lane No. South 1 2 South 1 2 3 North 1 North	UEUE PE Deg. Satn x : Leeds 0.330 0.330 East: N 0.037 0.163 0.163 East: H 0.057 : Leeds	RCENTILJ 50% Parade 5.0 4.9 orthern 0.5 2.4 2.3 anrahan 1.1 Parade	ES (DIST Perce 70% south 6.4 6.3 Distrik 0.6 3.2 2.9 Pl 1.4 north	PANCE) mtile : 85% 9.1 8.9 putor e. 0.9 4.5 4.2 2.0	Back of 90% 10.5 10.3 ast 1.0 5.2 4.8 2.3	Queue 95% 12.4 12.1 1.2 6.1 5.7 2.7	(metres) 98% 13.7 13.4 1.3 6.8 6.3 3.0	100 14. 14. 1. 7. 6. 3.
ANE Q Lane No. South 1 2 South 1 2 3 North 1 North	UEUE PE Deg. Satn x : Leeds 0.330 0.330 East: N 0.037 0.163 0.163 East: H 0.057 : Leeds	RCENTILJ 50% Parade 5.0 4.9 orthern 0.5 2.4 2.3 anrahan 1.1 Parade	ES (DIST Perce 70% south 6.4 6.3 Distrik 0.6 3.2 2.9 Pl 1.4 north	PANCE) mtile : 85% 9.1 8.9 putor e. 0.9 4.5 4.2 2.0	Back of 90% 10.5 10.3 ast 1.0 5.2 4.8 2.3	Queue 95% 12.4 12.1 1.2 6.1 5.7 2.7	(metres) 98% 13.7 13.4 1.3 6.8 6.3 3.0	100 14. 14. 1. 7. 6. 3.
ANE Q Lane No. South 1 2 South 1 2 3 North 1 North 1	UEUE PE Deg. Satn x : Leeds 0.330 0.330 East: N 0.037 0.163 0.163 East: H 0.057 : Leeds	RCENTILI 50% Parade 5.0 4.9 Orthern 0.5 2.4 2.3 anrahan 1.1 Parade 3.4	ES (DIST Perce 70% south 6.4 6.3 Distrik 0.6 3.2 2.9 Pl 1.4 north	PANCE) mtile : 85% 9.1 8.9 wtor e. 0.9 4.5 4.2 2.0 6.3	Back of 90% 10.5 10.3 ast 1.0 5.2 4.8 2.3 7.2	Queue 95% 12.4 12.1 1.2 6.1 5.7 2.7 8.5	(metres) 98% 13.7 13.4 1.3 6.8 6.3 3.0 9.5	100 14. 14. 14. 7. 6. 3. 10.
ANE Q South 1 2 South 1 2 3 North 1 2 North 1 2 	UEUE PE Deg. Satn x : Leeds 0.330 0.330 East: N: 0.037 0.163 0.163 0.163 East: H: 0.057 : Leeds 0.240 0.240	RCENTILI 50% Parade 5.0 4.9 orthern 0.5 2.4 2.3 anrahan 1.1 Parade 3.4 3.3	ES (DIST Perce 70% South 6.4 6.3 Distrik 0.6 3.2 2.9 Pl 1.4 north 4.4	PANCE) mtile : 85% 9.1 8.9 0.9 4.5 4.2 2.0 6.3 6.0	Back of 90% 10.5 10.3 ast 1.0 5.2 4.8 2.3 7.2 6.9	Queue 95% 12.4 12.1 1.2 6.1 5.7 2.7 8.5	(metres) 98% 13.7 13.4 1.3 6.8 6.3 3.0 9.5	100 14. 14. 14. 7. 6. 3. 10.
ANE Q Lane No. South 1 2 South 1 2 3 North 1 2 North 1 2 North 1 2 North	UEUE PE Deg. Satn x : Leeds 0.330 0.330 East: N 0.037 0.163 0.163 0.163 0.163 0.163 0.163 0.163 0.1640	RCENTILI 50% Parade 5.0 4.9 orthern 0.5 2.4 2.3 anrahan 1.1 Parade 3.4 3.3 orthern	ES (DIST Perce 70% south 6.4 6.3 Distrik 0.6 3.2 2.9 Pl 1.4 north 4.4 4.3 Distrik	PANCE) minile : 85% 9.1 8.9 putor en 0.9 4.5 4.2 2.0 6.3 6.0 putor without and the second secon	Back of 90% 10.5 10.3 ast 1.0 5.2 4.8 2.3 7.2 6.9 est	Queue 95% 12.4 12.1 1.2 6.1 5.7 2.7 8.5 8.2	(metres) 98% 13.7 13.4 1.3 6.8 6.3 3.0 9.5	100 14. 14. 1. 7. 6. 3. 3. 10. 9.

Go to Table Links (Top)

Lane Stops Site:WD PM (NDR/Leeds) - proposed +bunnings + service centre

Inters Rounda	ection bout	ID: 1								
							Queue	Total		
	Deg.	Prog.	Ef	fectiv	e Stop	Rate	Total	Move-up	Queue	Prop.
Lane	Satn	Factor			Geom.	Overall	Stops	Rate M	love-ups	Queued
No.	х		hel	he2	hig	h	Н	hqm	Hqm	pq
South	: Leeds	Parade	south							
1	0.330	1.000	0.39	0.00	0.15	0.54	195.1	0.00	0.0	0.58
2	0.330	1.000	0.50	0.00	0.22	0.72	209.7	0.00	0.0	0.60
South	East: N	orthern	Distri	butor	east					
1	0.037	1.000	0.21	0.00	0.34	0.55	31.5	0.00	0.0	0.36
2	0.163	1.000	0.29	0.00	0.18	0.48	109.6	0.00	0.0	0.50
3	0.163	1.000	0.41	0.00	0.30	0.71	122.8	0.00	0.0	0.53
North	East: H	anrahan	Pl							
1	0.057	1.000	0.50	0.00	0.25	0.75	17.9	0.00	0.0	0.62
North	: Leeds	Parade	north							
1	0.240	1.000	0.38	0.00	0.19	0.57	146.5	0.00	0.0	0.56
2	0.240	1.000	0.51	0.00	0.29	0.80	172.2	0.00	0.0	0.58

NorthWest: Northern Distributor west

1		1.000					184.3	0.00		0.56
2	0.271	1.000	0.46	0.00	0.27	0.73	188.9	0.00	0.0	0.57
hi	g is the	average	value	for al	l move	ments in	a shared	lane		
hq	m is aveı	age que	le move	-up ra	te for	all veh	icles que	ued and u	unqueuec	l

Flow Rates

Origin-Destination Flow Rates (Total) Site:WD PM (NDR/Leeds) - proposed +bunnings + service centre

Intersection ID: 1 Roundabout

TOTAL FLOW RATES (ALL MOVEMENT CLASSES)

From SOUTH To:	NW	N	NE	SE	
Turn:	L1	т1	Rl	R3	TOT
Flow Rate	299.0	259.0	56.0	38.0	652.0
%HV (all designations)	5.0		19.0	5.0	6.2
From SOUTHEAST To:	S		 N	NE	
Turn:	L3	т1	R1	R2	TOT
Flow Rate	57.0	286.0	68.0	48.0	459.0
%HV (all designations)	5.0				
From NORTHEAST To:		s	NW		
Turn:	L2	Ll	R2	R3	TOT
Flow Rate	5.0	7.0	11.0	1.0	24.0
%HV (all designations)	100.0	100.0	100.0	100.0	100.0
From NORTH To:	NE	SE	s	NW	
Turn:	L3	L1	т1	R3	TOT
Flow Rate	49.0	76.0	177.0	171.0	473.0
%HV (all designations)	7.0	5.0	5.0	5.0	5.2
From NORTHWEST To:	N	NE	SE	s	
Turn:	L3	L2	Т1	R1	TOT
Flow Rate	111.0	59.0	222.0	164.0	556.0
%HV (all designations)	5.0	23.0	5.0	5.0	6.9

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Origin-Destination Flow Rates by Movement Class Site:WD PM (NDR/Leeds) - proposed +bunnings + service centre

Intersection ID: 1 Roundabout

FLOW RATES FOR Light Vehicles

From SOUTH To: Turn:		N Tl			TOT
Flow Rate - Veh Mov Class % Flow Scale - Fixed Flow Scale - Var Peak Flow Factor	95.0 1.00 1.00 1.00	95.0 1.00 1.00	81.0 1.00 1.00 1.00	95.0 1.00 1.00 1.00	
From SOUTHEAST To: Turn:	S		N	NE	тот
Flow Rate - Veh Mov Class % Flow Scale - Fixed Flow Scale - Var Peak Flow Factor	95.0 1.00 1.00 1.00	95.0 1.00 1.00	95.0 1.00 1.00 1.00	95.0 1.00 1.00 1.00	95.0
From NORTHEAST To: Turn:	SE		NW	Ν	
Flow Rate - Veh Mov Class % Flow Scale - Fixed Flow Scale - Var Peak Flow Factor	0.0 1.00 1.00	0.0 1.00 1.00	0.0 1.00 1.00	0.0 1.00 1.00	
From NORTH To: Turn:	NE L3	SE L1		NW R3	тот

Flow Rate - Veh	45.6	72.2	168.1	162.4	448.4
Mov Class %	93.0	95.0	95.0	95.0	94.8
Flow Scale - Fixed	1.00	1.00	1.00	1.00	
Flow Scale - Var	1.00	1.00	1.00	1.00	
Peak Flow Factor	1.00	1.00	1.00	1.00	
From NORTHWEST To: Turn:	N L3	NE L2	SE T1	S R1	TOT
Flow Rate - Veh	105.4	45.4	210.9	155.8	517.6
Mov Class %	95.0	77.0	95.0	95.0	93.1
Flow Scale - Fixed	1.00	1.00	1.00	1.00	
Flow Scale - Var	1.00	1.00	1.00	1.00	
Peak Flow Factor	1.00	1.00	1.00	1.00	
LOW RATES FOR Heavy	Vehicle	es			
From SOUTH To:	NW	N	NE	SE	
Turn: 	L1	T1	R1	R3	тот
Flow Rate - Veh	14.9	12.9	10.6	1.9	40.4
Mov Class %	5.0	5.0	19.0	5.0	6.2
Flow Scale - Fixed	1.00	1.00	1.00	1.00	
Flow Scale - Var	1.00	1.00	1.00	1.00	
Peak Flow Factor	1.00	1.00	1.00	1.00	
From SOUTHEAST To:	S	NW	N	NE	
Turn:	L3	Т1	R1	R2	TOT
 Flow Rate - Veh	2.8	14.3	3.4	2.4	23.0
Mov Class %	2.8 5.0	5.0	3.4	2.4	∠3.0 5.0
Flow Scale - Fixed	1.00	1.00	1.00	1.00	5.0
Flow Scale - Var	1.00	1.00	1.00	1.00	
Peak Flow Factor	1.00	1.00	1.00	1.00	
From NORTHEAST To:	SE	S	NW	N	
Turn:	L2	L1	R2	R3	TOT
Flow Rate - Veh	5.0	7.0	11.0	1.0	24.0
Mov Class %	100.0	100.0	100.0	100.0	100.0
Flow Scale - Fixed	1.00	1.00	1.00	1.00	
Flow Scale - Var	1.00	1.00	1.00	1.00	
Peak Flow Factor	1.00	1.00	1.00	1.00	
From NORTH To:	NE	SE	s	 NW	
Turn:	L3	L1	Т1	R3	TOT
 Flow Rate - Veh	3.4	3.8	8.9	8.6	24.6
Mov Class %	7.0	5.0	5.0	5.0	5.2
Flow Scale - Fixed	1.00	1.00	1.00	1.00	
Flow Scale - Var	1.00	1.00	1.00	1.00	
	1.00	1.00	1.00	1.00	
Peak Flow Factor		NE	SE	s	
	N			т 1	TOT
From NORTHWEST To:	N L3	L2	Т1	R1	
From NORTHWEST To: Turn:	L3	L2			
From NORTHWEST To: Turn: Flow Rate - Veh	L3 		11.1 5 0	8.2	
From NORTHWEST To: Turn: Flow Rate - Veh Mov Class %	L3 5.6 5.0	L2 13.6 23.0	11.1 5 0	8.2	
Peak Flow Factor From NORTHWEST To: Turn: Flow Rate - Veh Mov Class % Flow Scale - Fixed Flow Scale - Var	L3 5.6 5.0	L2 13.6	11.1 5.0	8.2	38.4 6.9

Lane Flow Rates Site:WD PM (NDR/Leeds) - proposed +bunnings + service centre

Intersection ID: 1 Roundabout

LANE FLOW RATES AT STOP LINE

From SOUTH To:	NW	N	NE	SE	
Turn:	L1	т1	Rl	R3	TOT
 Lane 1					
LV	284.0	57.6	*	*	341.7
HV	14.9	3.0	*	*	18.0
Total	299.0	60.6	*	*	359.6
Lane 2					
LV	*	188.4	45.4	36.1	269.9
HV	*	9.9	10.6	1.9	22.5
Total	*	198.4	56.0	38.0	292.4

Approach	299.0	259.0	56.0	38.0	652.0
From SOUTHEAST Turn:	To: S	NW		NE	
Lane 1					
LV	54.2	*	*	*	54.2
HV	2.8	*	*	*	2.8
Total	57.0	*	*	*	57.0
Lane 2 LV	*	218.5	*	*	218.5
HV	*	11.5	*	*	11.5
Total	*	230.1	*	*	230.1
Lane 3					
LV	*	53.2	64.6	45.6	163.4
HV	*	2.8	3.4	2.4	8.6
Total	*	55.9	3.4 68.0	48.0	171.9
Approach	57.0	286.0	68.0	48.0	459.0
From NORTHEAST		S	NW	N	
Turn:	L2		R2		TOT
Lane 1 HV	F 0	7 0	11 0	1 0	24 0
HV Total	5.0	7.0	11.0 11.0	1.0	24.0
				±.0	24.0
Approach	5.0	7.0	11.0	1.0	24.0
From NORTH To:	NE	SE	S	NW	
Turn:	L3	Ll	Т1	R3	TOT
Lane 1 LV	45 6	72 2	126 6	*	244.4
HV	45.0	38	120.0	*	13.9
Total	49.0	76.0	126.6 6.7 133.3	*	258.3
Lane 2					
LV	*	*	41.5	162.4	204.0
HV	*	*	2.2 43.7	8.6 171.0	10.7
Total	*			171.0	214.7
Approach					
From NORTHWEST		NE	SE	s	
Turn:	L3	L2	T1	R1	TOT
Lane 1					
LV HV			120.4 6.3		271.3
HV Total	5.0 111 0	13.0 59.0	6.3 126.7	*	25.5 296.7
Lane 2	TTT.0	0.00	120./		220.1
LV	*	*	90.5	155.8	246.3
HV	*	*	4.8 95.3	8.2	13.0
Total	*	*	95.3	164.0	259.3
	111.0		222.0		556.0
* Movement n	ot allocate	d + o + b			

* Movement not allocated to the lane

EXIT LANE FLOW RATES

	nt Class:		
Exit:	SOUTH 1 2		16.5 10.4
Exit: Lane: Lane: Total	2	192.6 126.6 319.2	6.7
Lane: Total	NORTHEAST 1	182.0	30.0
	NORTH 1 2	163.1 253.0 416.1	8.6 14.3
Exit: Lane: Lane: Total	2	502.6 215.6 718.2	22.3
* Mo	ovement not	allocated	to the

DOWNSTREAM LANE FLOW RATES FOR EXIT ROADS _____ Movement Class: LV HV _____ Exit: SOUTH Lane: 1 180.8 16.5 Lane: 2 197.3 10.4 Total 378.1 26.9 Exit: SOUTHEAST Lane: 1 192.6 15.1 Lane: 2 126.6 6.7 319.2 21.8 _____ Exit: NORTHEAST Lane: 1 182.0 Total 182.0 30.0 30.0 ------Exit: NORTH Lane: 1 163.1 8.6 Lane: 2 253.0 14.3 Total 416.1 22.9 Exit: NORTHWEST Lane: 1 502.6 Lane: 2 215.6 Total 718.2 26.5 22.3 48.8 * Movement not allocated to the lane Unit Time for Volumes = 60 minutes Peak Flow Period = 30 minutes Flow Rates include effects of Flow Scale and Peak Flow Factor

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Other

```
Model Settings Summary
Site:WD PM (NDR/Leeds) - proposed +bunnings + service centre
```

Intersection ID: 1 Roundabout

* Basic Parameters: Intersection Type: Roundabout Driving on the left-hand side of the road Input data specified in Metric units Model Defaults: New South Wales Peak Flow Period (for performance): 30 minutes Unit time (for volumes): 60 minutes. SIDRA Standard Delay model used SIDRA Standard Queue model used Level of Service based on: Delay (RTA NSW) Queue percentile: 95%

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Diagnostics Site:WD PM (NDR/Leeds) - proposed +bunnings + service centre

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Processed: 2 February 2016 1:43:51 PM SIDRA INTERSECTION 6.0.1.3703

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DETAILED OUTPUT

Site: WD PM (NDR/Leeds) - existing

New Site Roundabout

OUTPUT TABLE LINKS

Ø	Roundabouts Roundabout Basic Parameters Roundabout Circulating / Exiting Stream Parameters Roundabout Gap Acceptance Parameters Roundabout Flow Rates
tîr	Movements Intersection Negotiation Data Movement Capacity and Performance Parameters Fuel Consumption, Emissions and Cost
4	Lanes Lane Performance and Capacity Information Lane Delays Lane Queues Lane Queue Percentiles Lane Stops
Îr	Flow Rates Origin-Destination Flow Rates (Total) Origin-Destination Flow Rates by Movement Class Lane Flow Rates
8	Other Model Settings Summary Diagnostics

Roundabouts

Roundabout Basic Parameters

Site:WD PM (NDR/Leeds) - existing										
Intersection ID: 1 Roundabout										
Island Diam	Width	Diam.	Entry Radius m	Angle			Av.Entry Lane Width m			
South: L 36.0			uth 20.0	30.0	2	2	3.70			
			stributo 20.0			3	3.70			
NorthEas 36.0			20.0	30.0	2	1	3.70			
North: L 36.0			rth 20.0	30.0	2	2	3.70			
	NorthWest: Northern Distributor west 36.0 10.0 56.0 20.0 30.0 2 2 3.70									
Rounda	bout Ca	pacity	Model: S	IDRA St	andard					

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Roundabout Circulating / Exiting Stream Parameters Site:WD PM (NDR/Leeds) - existing

Intersection ID: 1 Roundabout						
Dest Turn Lane Lane No. Type	Flow pcu/ F	Flow Lane	%Exit Cap. Flow Const. Incl. Effect	Factor Sp	er In-Bunch eed Headway m/h sec	Prop. Bunched
South: Leeds Parade south NW Ll 1 Dominant	313 1.04	327 0.0	0.0 N	0.979 3	9.7 1.04	0.187

N	т1	2 Subdominant	313	1.04	327	0.0	0.0	N	0.979	39.7	1.04	0.187
NE	R1	2 Subdominant	313	1.04	327	0.0	0.0	N	0.979	39.7	1.04	0.187
SE	R3	2 Subdominant	313	1.04	327	0.0	0.0	N	0.979	39.7	1.04	0.187
		Neuthern Diete										
South	L3	Northern Distr 1 Excl. Slip		east 1.04	198	0.0	0.0	N	0.993	30.8	1.40	0.155
NW	ЦЗ Т1	2 Dominant			248	0.0	0.0	N	0.993	30.8	1.40	0.155
NW	T1	3 Subdominant			248	0.0	0.0	N	0.993	30.2	1.53	0.205
N	R1	3 Subdominant	233		248	0.0	0.0	N	0.993	30.2		0.205
NE	R2	3 Subdominant	233	1.06	248	0.0	0.0	N	0.993	30.2	1.53	0.205
North	East:	Hanrahan Pl										
SE	L2	1 Dominant	450	1.03	461	0.0	0.0	N	0.985	35.2	1.06	0.257
S	L1	1 Dominant	450	1.03	461	0.0	0.0	N	0.985	35.2	1.06	0.257
NW	R2	1 Dominant	450	1.03	461	0.0	0.0	N	0.985	35.2	1.06	0.257
N	R3	1 Dominant	450	1.03	461	0.0	0.0	N	0.985	35.2	1.06	0.257
North		ds Parade north										
NE	L3	1 Dominant		1.05	407	0.0	0.0	N	0.985	34.8	1.09	0.237
SE	L1	1 Dominant	388	1.05	407	0.0	0.0	N	0.985	34.8	1.09	0.237
S	т1		388	1.05	407	0.0	0.0	N	0.985	34.8	1.09	0.237
S	т1	2 Subdominant		1.05	407	0.0	0.0	N	0.985	34.8	1.09	0.237
NW	R3	2 Subdominant	388	1.05	407	0.0	0.0	N	0.985	34.8	1.09	0.237
North	West:	Northern Distr	ibutor	west								
N	L3	1 Dominant		1.11	61	0.0	0.0	N	0.992	30.7	2.00	0.072
NE	L2	1 Dominant	55	1.11	61	0.0	0.0	N	0.992	30.7	2.00	0.072
SE	т1	1 Dominant		1.11	61	0.0	0.0	N	0.992	30.7	2.00	0.072
SE	т1	2 Subdominant		1.11	61	0.0	0.0	N	0.992	30.7		0.072
22	R1	2 Subdominant		1.11	61	0.0	0.0	N	0.992	30.7	2.00	0.072
S												

Roundabout Gap Acceptance Parameters Site:WD PM (NDR/Leeds) - existing

Intersection ID: 1 Roundabout _____ Dest Turn Lane Lane Critical Gap In-Bunch Priority Follow-up No. Type -----Headway Sharing Headway Dist Headway sec sec m sec _____ _____ South: Leeds Parade south Environment Factor: 1.00 Entry/Circ. Flow Adjustment: Medium NW L1 1.04 3.73 2.24 1 Dominant Ν 41.1 2 Subdominant т1 1.04 Ν 5.36 59.1 3.21 Ν NE R1 2 Subdominant 1.04 7.85 86.5 4.70 Ν SE R3 2 Subdominant 1.04 Ν 5.36 59.1 3.21 _____ _ _ _ _ _ _ _ _ --------SouthEast: Northern Distributor east Environment Factor: 1.00 Entry/Circ. Flow Adjustment: Medium L3 1 Excl. Slip 1.40 3.26 27.9 1.91 S Y NW т1 2 Dominant 1.53 Y 3.20 26.8 1.89 NW т1 3 Subdominant 1.53 Ν 3.89 32.6 2.30 3 Subdominant N R1 1.53 N 3.89 32.6 2.30 NE R2 3 Subdominant 1.53 N 5.69 47.7 3.36 ----NorthEast: Hanrahan Pl Environment Factor: 1.00 Entry/Circ. Flow Adjustment: Medium 59.7 59.7 1 Dominant 1 Dominant 1.06 3.75 SE L2 Ν 6.11 3.75 L1 1.06 S Ν 6.11 NW R2 1 Dominant 59.7 3.75 1.06 Ν 6.11 1 Dominant Ν R3 1.06 6.11 59.7 3.75 Ν -----North: Leeds Parade north Environment Factor: 1.00 Entry/Circ. Flow Adjustment: Medium 1 Dominant Ν 5.30 51.3 3.23 NE L3 1.09 SE 1 Dominant 1.09 L13.62 35.0 2.20 Ν т1 1 Dominant 1.09 3.62 35.0 2.20 S Ν S т1 2 Subdominant 1.09 Ν 4.07 39.3 2.47 NW R3 2 Subdominant 1.09 Ν 4.07 39.3 2.47 _____ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ NorthWest: Northern Distributor west Environment Factor: 1.00 Entry/Circ. Flow Adjustment: Medium 1 Dominant 2.00 Y 3.97 2.25 Ν L3 33.8 NE L2 1 Dominant 2.00 Ν 5.80 49.5 3.30 SE T1 1 Dominant 2.00 Y 3.97 33.8 2.25 2.00 37.3 SE т1 2 Subdominant Y 4.38 2.49 R1 2 Subdominant 2.00 Y 4.38 37.3 2.49 S

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Roundabout Capacity Model: SIDRA Standard Priority sharing means Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap.

Dist (Distance): Spacing, i.e. distance between the front ends of two successive vehicles across all lanes in the circulating or exiting stream

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Roundabout Flow Rates Site:WD PM (NDR/Leeds) - existing

Intersection ID: 1 Roundabout

CIRCULATING LANE FLOW RATES

Lane			ow Rates
No.	veh/h	pcu/h	Percent
South: Lee	ds Parade	south	
1	151	154	47.2%
2	162	173	52.8%
Total	313	327	
SouthEast:	Northerr	Distril	butor east
1	32	33	13.3%
2	201	215	86.7%
Total	233	248	
NorthEast:	Hanrahar	1 Pl	
1	207	212	46.0%
2	243	249	54.0%
Total	450	461	
North: Lee	ds Parade	north	
1	214	229	56.2%
2	174	179	43.8%
Total	388	408	
NorthWest:	Northerr	Distril	butor west
1	0	0	0.0%
2	55	61	100.0%
Total	55	61	

APPROACH LANE FLOW RATES

Lane	Approac		
No.	Out To	Downst	Total
South: Lee	ds Parade	south	
1	271	0	271
2	0	51	51
Total	271	51	322
SouthEast:	Northern	Distrik	outor east
1	52	0	52
2	0	151	151
3	0	119	119
Total	52	270	322
NorthEast:	Hanrahan	Pl	
1	5	19	24
Total	5	19	24
North: Lee	ds Parade	north	
1	1	43	44
2	0	39	39
Total	1	82	83
NorthWest:	Northern	Distrik	outor west
1	13	175	188
2	0	174	174
Total	13	349	362
EXITING LANE	FLOW RAT	ES	
Lane	Exiting	Flow Ra	ates
No.	veh/h pc	u/h Pe	ercent

SouthEast: Northern Distributor east

1	39	44	22.0%
2	151	155	78.0%
Total	190	199	

Movements

Intersection Negotiation Data Site:WD PM (NDR/Leeds) - existing

Intersection ID: 1 Roundabout

INTERSECTION NEGOTIATION DATA

	To Exit					Appr. Dist. m	Downstrear 	 stance Spec?
	eeds Parade		60 G	41 0	20.0	500	200	
NC	orthWest	L1			39.9		286	No
27.						500 500	479	No No
	orthEast outhEast				103.7			NO
SouthEast	: Northern South	L3			11.0	500	445	No
N			53.0 68.6		53.2		289	NO
INC	North	T1 D1					289 446	NO
27.	orthEast	R1			69.1 86.4			
NC	ortnEast	RZ 	22.0	27.2	86.4	500	331	 No
NorthEast	: Hanrahan	Pl						
Sc			46.6					No
	South					500		No
No	orthWest	R2	22.0	27.2	86.4	500	1711	No
	North	R3	22.0	27.2	103.7	500	2820	No
North: Le	eeds Parade	north						
No	orthEast	L3	30.6	30.8	11.0	500	363	No
Sc	outhEast	L1	68.6	41.9	39.9	500	441	No
	South	т1	68.6	41.9	53.2	500	481	No
No	orthWest	R3	22.0	27.2	103.7	500	364	No
NorthWest	: Northern	Distri	butor w	est				
	North	L3	30.6	30.8	11.0	500	412	No
No	orthEast	L2	42.9	35.0	21.7	500	446	No
Sc	outhEast	т1	68.6	41.9	53.2	500	482	No
	South	R1		27.2	69.1	500	485	No

Maximum Negotiation (Design) Speed = 50.0 km/h

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

MOVEMENT SPEEDS AND GEOMETRIC DELAY

						Queue N	Move-up			
		App. Sp	eeds	Exit	Speeds			Av. Sect	ion Spd	Geom
Mov	Turn					1st	2nd			Delay
								Running		
		eds Para								
la	L1	80.0	41.9	41.9	70.0	25.6		58.8	58.8	8.8
2	т1	80.0	41.9	41.9	80.0	22.5		51.5	51.2	11.6
3a	R1	80.0	27.2	27.2	50.0	22.5		51.5	51.2	95.5
3b	R3	80.0	27.2	27.2	80.0	22.5		51.5	51.2	22.9
		: Northe								
		80.0						58.6		14.7
		80.0						59.5	59.5	8.9
23a	R1	80.0	27.2	27.2	80.0	29.0			59.2	
23	R2	80.0	27.2	27.2	50.0	29.0		59.2	59.2	23.8
		: Hanrah								
		50.0			80.0			49.2		
		50.0			80.0			49.2		
		50.0						49.2		
26b	R3	50.0	27.2	27.2	80.0	23.9		49.2	49.2	47.4

Nor	th: L	eeds Para	de nor	th					
7b	L3	80.0	30.8	30.8	50.0	23.8	59.7	59.7	117.7
7a	L1	80.0	41.9	41.9	80.0	23.8	59.7	59.7	11.5
8	т1	80.0	41.9	41.9	80.0	23.6	58.1	58.1	11.6
9b	R3	80.0	27.2	27.2	70.0	22.5	52.2	52.2	19.3
Nor	thWes	t: Northe	rn Dis	tributo	r west				
27b	LЗ	70.0	30.8	30.8	80.0	40.7	57.6	57.6	13.7
27	L2	70.0	35.0	35.0	50.0	40.7	57.6	57.6	131.9
28	т1	70.0	41.9	41.9	80.0	39.0	56.8	56.8	10.3
29a	R1	70.0	27.2	27.2	80.0	29.8	53.4	53.4	18.8
"R	Runnin	g Speed"	is the	averag	e speed	d excluding	stopped perio	ds.	

Movement Capacity and Performance Parameters Site:WD PM (NDR/Leeds) - existing

Intersection ID: 1 Roundabout

MOVEMENT CAPACITY PARAMETERS

Mov ID	Turn	Mov Cl.	Arv Flow	Flow	Adjust Flow pcu/h	. Cap.	Satn	Spare	Deg. Satn x		
								·			
Sout			arade s								
	L1	#	271	313	327	1251	0.85	292	0.217*		
2	T1	#	13	313	327	181	0.85	1086	0.072		
3a	R1	LV	0	0	327 0 0	0.000	0.000	0	0.85	****	0.000
3a 21	RI	HV	20	37	227	0.000	0.000	1000	0.85	1086	0.072
					327						
					tor east						
21b	L3	#	52	190	198	1652	0.85	2600	0.031		
22	т1	#	267	466	496	2871	0.85	814	0.093		
23a	R1	#	2	233	496 248 0 0	22	0.85	814	0.093		
23	R2	LV	0	0	0	0.000	0.000	0	0.85	****	0.000
23	R2	HV	1	11	0	0.000	0.000	11	0.85	814	0.093
		Han	rahan P	1							
24	т.2	T.37	0	0	0	0.000	0.000	0	0.85	* * * *	0.000
24	L2	HV	5	118	0	0.000	0.000	118	0.85	1903	0.042
24a	L1	LV	0	0		0.000	0.000	0	0.85	* * * *	0.000
24a	L1	HV	7	165	0	0.000	0.000	165	0.85	1903	0.042
26	R2	LV	0	0	0	0.000	0.000	0	0.85	* * * *	0.000
26	R2	HV	11	259	0	0.000	0.000	259	0.85	1903	0.042
26b	R3	LV	0	0	0 0	0.000	0.000	0	0.85	****	
26D	R3	HV	1	24	0	0.000	0.000	24		1903	0.042
Nort	h: Lee	eds P	arade n	orth							
7b	L3	LV	0	0	0 0 407 814	0.000	0.000	0	0.85	* * * *	0.000
7b	L3	HV	1	27	0	0.000	0.000	27	0.85	2205	0.037
7a	L1	#	11	388	407	298	0.85	2205	0.037		
8	т1	#	40	776	814	1085	0.85	2205	0.037		
					407			2205	0.037		
Nort	hWest	Nor	thern D	istribu	tor west	t					
27b	L3	#	13	55	61	101	0.85	564	0.128		
27	L2	LV	0	0	0	0.000	0.000	0	0.85	* * * *	0.000
27	L2	HV	11	86	61 0 0 122	0.000	0.000	86	0.85	564	0.128
28	т1	#	195	110	122	1522	0.85	564	0.128		
29a	R1	#	143	55	61	1116	0.85	564	0.128		
*	Maxıı Combiı			f satur							

MOVEMENT PERFORMANCE

Mov ID		Delay	Total Delay pers-h/h	Aver. Delay)(sec)	Eff. Stop Rate	Total Stops		Tot.Trav. Distance (veh-km/h)	Tot.Trav. Time)(veh-h/h)	Aver. Speed (km/h)
Sout	h: Lee	ds Parad	e south							
1a	L1	0.04	0.04	9.8	1.19	321.6	9.69	383.6	6.5	58.8
2	т1	0.00	0.00	22.3	1.50	19.5	0.96	23.5	0.5	51.2
3a	R1	0.22	0.26	22.3	1.50	12.0	0.91	14.5	0.3	51.2
3b	R3	0.01	0.01	22.3	1.50	45.1	1.80	54.3	1.1	51.2
Sout	hEast:	Norther	n Distri	butor e	ast					
21b	L3	0.01	0.01	15.1	1.28	66.4	2.08	84.9	1.4	58.6
22	т1	0.04	0.04	9.7	1.10	292.4	8.45	380.3	6.4	59.5
23a	R1	0.00	0.00	10.0	1.12	2.2	0.72	2.9	0.0	59.2

								1.4		
		Hanrah								
24	L2	0.05	0.06	37.8	1.48	7.4	0.85	28.8	0.6	49.2
24a	L1	0.06	0.07	37.8	1.48	10.4	1.11	40.3	0.8	49.2
26	R2	0.13	0.15	37.8	1.48	16.3	1.74	63.3	1.3	49.2
	R3							5.8		
			de north							
7b	L3	0.03	0.04	12.8	1.23	1.2	0.21	1.6	0.0	59.7
7a	L1	0.00	0.00	12.8	1.23	13.5	0.61	18.0	0.3	59.7
8	т1	0.01	0.01	14.0	1.27	50.9	1.61	65.2	1.1	58.1
	R3		0.01					49.5		
			rn Distr							
27b	L3	0.00	0.00	11.0	1.07	13.9	1.53	21.5	0.4	57.6
27	L2	0.40	0.48	11.0	1.07	11.8	1.65	18.2	0.3	57.6
28	Т1	0.03	0.03	12.1	1.12	217.7	8.03	324.8	5.7	56.8
29a	R1	0.04	0.05	17.5	1.37	195.9	7.12	244.4	4.6	53.4

Fuel Consumption, Emissions and Cost Site:WD PM (NDR/Leeds) - existing

Intersection ID: 1 Roundabout

FUEL CONSUMPTION, EMISSIONS AND COST (TOTAL)

Mov ID	Turn	Cost Total	Fuel Total	CO2 Total	CO Total	HC Total	NOX Total
		\$/h	L/h	kg/h	kg/h	kg/h	kg/h
sout.	h: Leeds Pa	rade sout					
	L1		14.2	33.5	0.09	0.009	0.114
2	т1	10.06	1.4	3.3		0.001	0.015
3a	R1	6.19	1.4 0.8	3.3 2.0	0.00	0.000	0.009
3b	R3	23.22	3.1	7.5	0.02	0.002	0.035
		172.84	19.5	46.3	0.11	0.012	0.174
Sout	hEast: Nort	 hern Dist	ributor	east			
21b	L3	31.39	3.6		0.02	0.002	0.032
	T1	131.13		33.5	0.09	0.009	0.116
	R1	1.00		03	0 00		0.001
23		0.50	0.1	0.1	0.00	0.000	0.000
		164.02	17.9	42.4	0.11	0.011	0.150
	hEast: Hanr						
	L2	15.85	3.6	9.4	0.01	0.001	0.053
24a		22.20		13.1			
	R2	34.88	7.8	20.6	0.02	0.001	0.118
26b		3.17	0.7	1.9	0.00	0.002	0.011
		76.10	17.0	44.9	0.06	0.004	0.257
		76.10	17.0	44.9	0.06	0.004	0.257
	h: Leeds Pa	76.10 	17.0 				
7b	L3	76.10 rade nort 0.60	17.0 .h 0.1	0.2	0.00	0.000	0.001
7b 7a	L3 L1	76.10 rade nort 0.60 6.64	17.0 .h 0.1 0.8	0.2	0.00	0.000	0.001
7b 7a 8	L3 L1 T1	76.10 rade nort 0.60 6.64	17.0 .h 0.1 0.8	0.2	0.00	0.000 0.000 0.002	0.001 0.008 0.026
7b 7a	L3 L1 T1 R3	76.10 rade nort 0.60	17.0 h 0.1 0.8 2.8 1.9	0.2 1.9 6.7 4.4	0.00 0.00 0.02 0.01	0.000 0.000 0.002 0.001	0.001 0.008 0.026
7b 7a 8	L3 L1 T1 R3	76.10 rade nort 0.60 6.64 24.16 18.76	17.0 .h 0.1 0.8 2.8 1.9	0.2 1.9 6.7 4.4	0.00 0.00 0.02 0.01	0.000 0.000 0.002 0.001	0.001 0.008 0.026 0.015
7b 7a 8 9b	L3 L1 T1 R3	76.10 rade nort 0.60 6.64 24.16 18.76 50.16	17.0 .h 0.1 0.8 2.8 1.9 5.6	0.2 1.9 6.7 4.4 13.2	0.00 0.00 0.02 0.01	0.000 0.000 0.002 0.001	0.001 0.008 0.026 0.015
7b 7a 8 9b	L3 L1 T1 R3	76.10 rade nort 0.60 6.64 24.16 18.76 50.16 	17.0 h 0.1 0.8 2.8 1.9 5.6 ributor	0.2 1.9 6.7 4.4 13.2 west	0.00 0.00 0.02 0.01 0.03	0.000 0.000 0.002 0.001	0.001 0.008 0.026 0.015 0.049
7b 7a 9b Nort 27b	L3 L1 T1 R3 hWest: Nort	76.10 rade nort 0.60 6.64 24.16 18.76 50.16 	17.0 h 0.1 0.8 2.8 1.9 5.6 ributor	0.2 1.9 6.7 4.4 13.2 west	0.00 0.00 0.02 0.01	0.000 0.000 0.002 0.001	0.001 0.008 0.026 0.015 0.049
7b 7a 9b Nort 27b 27	L3 L1 T1 R3 hWest: Nort L3	76.10 rade nort 0.60 6.64 24.16 18.76 50.16 	17.0 .h 0.1 0.8 2.8 1.9 5.6 .ributor 1.0 0.9	0.2 1.9 6.7 4.4 13.2 west	0.00 0.02 0.01 0.03 0.01 0.01 0.00	0.000 0.000 0.002 0.001	0.001 0.008 0.026 0.015 0.049 0.049 0.011 0.009
7b 7a 9b 27b 27 28	L3 L1 T1 R3 	76.10 rade nort 0.60 6.64 24.16 18.76 50.16 hern Dist 8.24 6.97 124.61	17.0 .h 0.1 0.8 2.8 1.9 5.6 .ributor 1.0 0.9	0.2 1.9 6.7 4.4 13.2 west 2.5 2.1 36.7	0.00 0.02 0.01 0.03 0.01 0.01 0.00	0.000 0.002 0.001 0.003 0.003	0.001 0.008 0.026 0.015 0.049 0.011 0.009 0.153
7b 7a 9b Nort 27b 27	L3 L1 T1 R3 	76.10 rade nort 0.60 6.64 24.16 18.76 50.16 hern Dist 8.24 6.97 124.61 95.37 235.19	17.0 h 0.1 0.8 2.8 1.9 5.6 ributor 1.0 0.9 15.4 10.4 27.7	0.2 1.9 6.7 4.4 13.2 west 2.5 2.1 36.7 24.5 65.8	0.00 0.02 0.01 0.03 0.01 0.00 0.08 0.06 0.15	0.000 0.002 0.001 0.003 0.001 0.000 0.008 0.007 0.016	0.001 0.008 0.026 0.015 0.049 0.011 0.009 0.153 0.089 0.261
7b 7a	L3 L1	76.10 rade nort 0.60 6.64	17.0 .h 0.1 0.8	0.2	0.00	0.	.000
L3 L1 T1 R3 L2 L2 T1 R1	est: Nort	76.10 rade nort 0.60 6.64 24.16 18.76 50.16 hern Dist 8.24 6.97 124.61 95.37 235.19	17.0 h 0.1 0.8 2.8 1.9 5.6 ributor 1.0 0.9 15.4 10.4 27.7	0.2 1.9 6.7 4.4 13.2 west 2.5 2.1 36.7 24.5 65.8	0.00 0.02 0.01 0.03 0.01 0.00 0.08 0.06	0.000 0.002 0.001 0.003 0.001 0.000 0.008 0.007 0.016	0.153
7b 7a 89b ort 7b 27 28 9a INT	L3 L1 T1 R3 	76.10 rade nort 0.60 6.64 24.16 18.76 50.16 hern Dist 8.24 6.97 124.61 95.37 235.19 691.40	17.0 h 0.1 0.8 2.8 1.9 5.6 ributor 1.0 0.9 15.4 10.4 27.7 87.7	0.2 1.9 6.7 4.4 13.2 west 2.5 2.1 36.7 24.5 65.8 212.4	0.00 0.02 0.01 0.03 0.01 0.03 0.01 0.00 0.08 0.06 0.15 0.47	0.000 0.002 0.001 0.003 0.001 0.000 0.008 0.007 0.016	0.001 0.008 0.026 0.015 0.049 0.011 0.009 0.153 0.089 0.261
7b 7a 8 9b 27 28 29a 	L3 L1 T1 R3 hWest: Nort L3 L2 T1 R1 ERSECTION:	76.10 rade nort 0.60 6.64 24.16 18.76 50.16 hern Dist 8.24 6.97 124.61 95.37 235.19 691.40	17.0 h 0.1 0.8 2.8 1.9 5.6 ributor 1.0 0.9 15.4 10.4 27.7 87.7	0.2 1.9 6.7 4.4 13.2 west 2.5 2.1 36.7 24.5 65.8 212.4	0.00 0.02 0.01 0.03 0.01 0.03 0.01 0.00 0.08 0.06 0.15 0.47	0.000 0.002 0.001 0.003 0.001 0.000 0.008 0.007 0.016	0.001 0.008 0.026 0.015 0.049 0.049 0.011 0.009 0.153 0.089 0.261
7b 7a 8 9b 27b 27 28 29a INT 	L3 L1 T1 R3 hWest: Nort L3 L2 T1 R1 ERSECTION:	76.10 rade nort 0.60 6.64 24.16 18.76 50.16 hern Dist 8.24 6.97 124.61 95.37 235.19 691.40	17.0 h 0.1 0.8 2.8 1.9 5.6 ributor 1.0 0.9 15.4 10.4 27.7 87.7	0.2 1.9 6.7 4.4 13.2 west 2.5 2.1 36.7 24.5 65.8 212.4	0.00 0.02 0.01 0.03 0.01 0.03 0.01 0.00 0.08 0.06 0.15 0.47	0.000 0.002 0.001 0.003 0.001 0.000 0.008 0.007 0.016	0.001 0.008 0.026 0.015 0.049 0.049 0.011 0.009 0.153 0.089 0.261
7b 7a 8 9b 27 28 29a FUEL	L3 L1 T1 R3 hWest: Nort L3 L2 T1 R1 ERSECTION:	76.10 rade nort 0.60 6.64 24.16 18.76 50.16 hern Dist 8.24 6.97 124.61 95.37 235.19 691.40 N, EMISSI	17.0 h 0.1 0.8 2.8 1.9 5.6 ributor 1.0 0.9 15.4 10.4 27.7 87.7 CONS AND	0.2 1.9 6.7 4.4 13.2 west 2.5 2.1 36.7 24.5 65.8 212.4 COST (R)	0.00 0.02 0.01 0.03 0.01 0.00 0.08 0.06 0.15 0.47 ATE)	0.000 0.002 0.001 0.003 0.001 0.000 0.008 0.007 0.016 0.047	0.001 0.008 0.026 0.015 0.049 0.011 0.009 0.153 0.089 0.261

South: Leeds	Parade south					
la Ll	0.35	3.7	87.3	0.23	0.024	0.298

3a	T1 R1 R3	0.43	5.8	138.9 138.9 138.9	0.29	0.029	0.650 0.650 0.650
		0.36	4.1	97.3	0.24	0.025	0.366
Sout	hEast: Nort	 horn Digtr					
21b		0.37			0 25	0 025	0.379
22				88.1			
23a				89.8			
23	R2			89.8			
		0.35	3.8	90.3	0.23	0.024	0.319
Nort	hEast: Hanra	 ahan Pl					
24	L2	0.55	12.3	324.8	0.41	0.031	1.856
24a	L1	0.55	12.3	324.8 324.8	0.41	0.031	
26	R2	0.55	12.3	324.8	0.41	0.031	1.856
26b	R3	0.55	12.3	324.8	0.41	0.031	1.856
		0.55	12.3	324.8	0.41	0.031	1.856
Nort	h: Leeds Pa:	rade north					
7b	L3			105.7			
		0.37					
	T1	0.37	4.3	102.7	0.25	0.025	0.399
9b	R3	0.38	3.8	89.9	0.24	0.027	0.296
		0.37	4.2	98.4	0.24	0.026	0.365
Nort	hWest: Nort						
27b		0.38	4.8	115.4 115.4	0.26	0.026	0.490
27		0.38	4.8	115.4	0.26	0.026	
28				112.9			
29a	R1	0.39	4.2	100.4	0.25	0.027	0.366
		0.39	4.6	108.1	0.25	0.026	0.429
INT	ERSECTION:	0.63	8.0				

Lanes

Lane Performance and Capacity Information Site:WD PM (NDR/Leeds) - existing

Intersection ID: 1 Roundabout

LANE PERFORMANCE

Lane			Satn	Delay	Eff. Stop		ack 	Length
No.								
South: L								
				9.8	0.59	1.0	7.4	60.0
2		712	0.072	22.3	0.75	0.3	2.3	
SouthEas								
						0.1		
						0.4		
						0.4		500.0
NorthEas								
1								
North: L	eeds P	arade	north					
1	44	1199	0.037	12.8	0.61	0.1	1.1	100.0
						0.1		
NorthWes								
1	188	1466	0.128	11.0	0.53	0.6	4.9	60.0
						0.6		
LANE FLOW	AND C.	APACIT	Y INFO	RMATION				

Lane	Total	Min	Tot	Deg.	Lane
No.	Arv Flow	Cap	Cap	Satn	Util
	(veh/h)	veh/h	veh/h	x	8

Sou	uth: Leeds P	arade s	outh		
1	271	150	1251	0.217	100
2	51	51	712	0.072	33P
~ ~ .	uthEast: Nor				
	52				
	151				
3	119	119	1284	0.093	100
		T			
	rthEast: Han			0 040	100
	24				100
	rth: Leeds P				
	44			0.037	100
	39				
Noi	rthWest: Nor	thern D	istrib	outor we	st
	188				
2	174	150	1360	0.128	100
P	Lane under the value				-
	modified b				
	exclusive		-	-	
	CACIUSIVE	14110 110	DCCI	i iounu)	•

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle effects. Saturation flow scale applies if specified.

Go to Table Links (Top)

Lane Delays Site:WD PM (NDR/Leeds) - existing

Intersection ID: 1 Roundabout

LANE DELAYS

No.	Satn x	Factor	Stop	-line 2nd d2	Delay Total dSL	Acc. Dec. dn	Queu Total dq	ing MvUp dqm	Stopd (Idle) di	Geom dig	Control dic
South: 1 2	Leeds 0.217 0.072	Parade 1.000 1.000		0.0	1.0 2.2	2.9 2.8	0.0 0.3	0.0	0.0	8.8 20.1	9.8 22.3
SouthE 1 2 3	ast: No 0.031 0.093 0.093	orthern 1.000 1.000 1.000	Distrib 0.4 0.5 0.8	utor e 0.0 0.0 0.0	east 0.4 0.5 0.8	1.5 2.1 2.3	0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	14.7 8.9 9.2	15.1 9.4 10.0
1	0.042		Pl 3.4								
North: 1 2	Leeds 0.037 0.037	Parade 1.000 1.000		0.0	1.0 1.3	2.8 1.9	0.0	0.0	0.0	11.8 17.7	12.8 19.0
1 2	0.128 0.128	1.000 1.000	Distrib 0.2 0.2	0.0 0.0	0.2 0.2	0.9	0.0	0.0	0.0	17.3	17.5
SIDRA and G dSL: dn: A dq: Q s dqm: di: S dig:	Standa eometr: Stop-1: verage ueuing topped Queue r topped Geometr	ard Dela ic Delay ine dela stop-st delay (delay a nove-up	ay Model , ay (=d1+ , art del , the par and queu delay , stopped	is us d2) ay for t of t e move	aed. C all v the sto -up de	ontrol ehicles p-line lay)	Delay s queu delay	is tl ed and that	he sum d d unque includ	of Sto ued	op-line Del
LANE DE			S								
Lane	Deg. Satn			Perc	centile						
South: 1	Leeds 0.217	Parade	10.0	10.3	10.5	10.	 7 10	.8	100% 10.9 24.5		

Sout	SouthEast: Northern Distributor east											
1	0.031	15.1	15.1	15.2	15.3	15.4	15.4	15.5				
2	0.093	9.4	9.5	9.7	9.8	9.9	9.9	10.0				
3	0.093	10.0	10.1	10.3	10.5	10.6	10.7	10.8				
Nort	hEast: Ha	nrahan	Pl									
1	0.042	37.8	38.4	39.4	39.9	40.5	41.0	41.3				
Nort	h: Leeds	Parade	north									
1	0.037	12.8	13.0	13.3	13.4	13.6	13.8	13.9				
2	0.037	19.0	19.2	19.6	19.8	20.0	20.2	20.3				
Nort	hWest: No	orthern	Distri	butor we	est							
1	0.128	11.0	11.1	11.1	11.2	11.2	11.2	11.3				
2	0.128	17.5	17.5	17.6	17.6	17.7	17.7	17.7				

Lane Queues Site:WD PM (NDR/Leeds) - existing

Intersection ID: 1 Roundabout

LANE QUEUES (VEHICLES)

Lano	-	Prog. Factor	Ovrfl.								Cyc-Av	~
	х		No	Nb1	Nb2	Nb	95%	Ratio	8	90	Nc	95%
South		Parade										
1	0.217	1.000	0.0	0.4	0.0	0.4	1.0	0.05	0.0	100.0	0.1	0.1
2	0.072	1.000	0.0	0.1	0.0	0.1	0.3	0.00	0.0	100.0	0.0	0.1
South	nEast: N	orthern	Distribut	tor east	:							
1	0.031	1.000	0.0	0.1	0.0	0.1	0.1	0.02	0.0	100.0	0.0	0.0
2			0.0				0.4	0.01	0.0	100.0	0.0	0.0
3	0.093	1.000	0.0	0.2	0.0	0.2	0.4	0.00	0.0	100.0	0.0	0.0
North	nEast: H	anrahan	Pl									
			0.0				0.2	0.00	0.0	100.0	0.0	0.0
		Parade	north									
1	0.037	1.000	0.0	0.1	0.0	0.1	0.1	0.00	0.0	100.0	0.0	0.0
2	0.037	1.000	0.0	0.1	0.0	0.1	0.1	0.00	0.0	100.0	0.0	0.0
North	nWest: N	orthern	Distribut	tor west								
1	0.128	1.000	0.0	0.3	0.0	0.3	0.6	0.03	0.0	100.0	0.0	0.0
2	0.128	1.000	0.0	0.3	0.0	0.3	0.6	0.00	0.0	100.0	0.0	0.0

LANE QUEUES (DISTANCE)

Lane	Deg. Satn	5				eue (m)					Cyc-Av	~
No.				Nbl							Nc	
South	n: Leeds	Parade										
		1.000		3.0			7.4			100.0		
2	0.072	1.000	0.0	0.9	0.0	0.9	2.3	0.00	0.0	100.0	0.3	0.5
South	nEast: N	orthern	Distribu	tor eas	t							
1	0.031	1.000	0.0	0.4	0.0	0.4	1.0	0.02	0.0	100.0	0.0	0.1
			0.0			1.2	3.0	0.01		100.0		0.3
3			0.0		0.0	1.2	2.9	0.00	0.0	100.0	0.2	0.3
North	nEast: H	anrahan	Pl									
1	0.042	1.000	0.0	0.8	0.0	0.8	2.0	0.00	0.0	100.0	0.3	0.5
North	n: Leeds	Parade	north									
1	0.037	1.000	0.0	0.4	0.0	0.4	1.1	0.00	0.0	100.0	0.1	0.2
2	0.037	1.000	0.0	0.4	0.0	0.4	1.1	0.00	0.0	100.0	0.1	0.2
North	nWest: N	orthern	Distribu	tor wes	t							
1	0.128	1.000	0.0	2.0	0.0	2.0	4.9	0.03	0.0	100.0	0.1	0.1
2	0.128	1.000	0.0	1.9	0.0	1.9	4.7	0.00	0.0	100.0	0.1	0.1

Go to Table Links (Top)

Lane Queue Percentiles Site:WD PM (NDR/Leeds) - existing Intersection ID: 1 Roundabout

LANE QUEUE PERCENTILES (VEHICLES)

Lano	Deg. Satn				Back of			
	х	50%	70%	85%	90%	95%		
Sout	h: Leeds							
1	0.217	0.4	0.5	0.7	0.9	1.0	1.1	1.2
2	0.072						0.3	
Sout	hEast: No							
1	0.031	0.1	0.1	0.1	0.1	0.1	0.1	0.2
2	0.093	0.2	0.2	0.3	0.4	0.4	0.5	0.5
3	0.093	0.2	0.2	0.3	0.3	0.4	0.4	0.5
Nort	hEast: Ha	anrahan	Pl					
	0.042							
	h: Leeds							
1	0.037	0.1	0.1	0.1	0.1	0.1	0.2	0.2
2	0.037	0.1	0.1	0.1	0.1	0.1	0.2	0.2
Nort	hWest: No	orthern	Distrib	utor we	est			
1	0.128	0.3	0.3	0.5	0.6	0.6	0.7	0.8
2	0.128	0.3	0.3	0.5	0.5	0.6	0.7	0.8

LANE QUEUE PERCENTILES (DISTANCE)

							(metres)	
No.	x	50%	70%	85%	90%	95%	98%	100%
South 1 2	: Leeds 0.217 0.072	Parade 3.0 0.9	south 3.8 1.2	5.4 1.7	6.3 2.0	7.4 2.3	8.2 2.6	8.8 2.8
South 1 2 3	East: No 0.031 0.093 0.093	0.4 0.4 1.2 1.2	Distrib 0.5 1.6 1.5	outor ea 0.7 2.2 2.2	st 0.8 2.6 2.5	1.0 3.0 2.9	1.1 3.3 3.3	1.1 3.6 3.5
North 1	East: Ha 0.042	anrahan 0.8	Pl 1.1	1.5	1.7	2.0	2.2	2.4
North 1 2	: Leeds 0.037 0.037	Parade 0.4 0.4	north 0.6 0.5	0.8 0.8	0.9 0.9	1.1 1.1	1.2 1.2	1.3 1.3
North 1 2	West: No 0.128 0.128	orthern 2.0 1.9	Distrib 2.6 2.4	utor we 3.6 3.4	st 4.2 4.0	4.9 4.7	5.5 5.2	5.9 5.6

Go to Table Links (Top)

Intersection ID: 1

Lane Stops Site:WD PM (NDR/Leeds) - existing

Roundal	Roundabout											
							Queue	Total				
	Deg.	Prog.	Ef	fectiv	e Stop	Rate	Total	Move-up	Queue	Prop.		
Lane	Satn	Factor			Geom.	Overall	Stops	Rate N	love-ups	Queued		
	х				-			hqm	-			
		Parade										
								0.00				
2	0.072	1.000	0.33	0.00	0.42	0.75	38.3	0.00	0.0	0.45		
South	East: No	orthern	Distri		east							
1			0.12			0.64	33 2	0.00	0.0	0.26		
	0.093		0.12			0.54		0.00		0.31		
								0.00		0.31		
3	0.093	1.000	0.20	0.00	0.30	0.50	07.2	0.00	0.0	0.33		
North	NorthEast: Hanrahan Pl											
1	0.042	1.000	0.39	0.00	0.35	0.74	17.8	0.00	0.0	0.50		

1	h: Leeds: 0.037	1.000	0.25	0.00	0.37	0.61	27.1	0.00	0.0	0.39
2	0.037	1.000	0.27	0.00	0.46	0.73	28.3	0.00	0.0	0.41
Nort	hWest: N	lorthern	Distri	butor	west					
1	0.128	1.000	0.07	0.00	0.47	0.53	100.3	0.00	0.0	0.18
2	0.128	1.000	0.07	0.00	0.61	0.69	119.3	0.00	0.0	0.19
hig is the average value for all movements in a shared lane hqm is average queue move-up rate for all vehicles queued and unqueued										

Flow Rates

Origin-Destination Flow Rates (Total) Site:WD PM (NDR/Leeds) - existing

Intersection ID: 1 Roundabout

TOTAL FLOW RATES (ALL MOVEMENT CLASSES)

From SOUTH To: Turn: Flow Rate %HV (all designations)	271.0 5.0	13.0 5.0		30.0 5.0	322.0 7.4
From SOUTHEAST To: Turn: Flow Rate %HV (all designations)	S L3 52.0 5.0	NW T1 267.0 5.0	N R1 2.0 5.0	NE R2 1.0 100.0	TOT 322.0 5.3
From NORTHEAST To: Turn: Flow Rate %HV (all designations)	SE L2 5.0 100.0	S L1 7.0 100.0	NW R2 11.0	N R3 1.0 100.0	TOT 24.0 100.0
From NORTH To: Turn: Flow Rate %HV (all designations)	NE L3 1.0	SE L1 11.0	S T1 40.0	NW R3 31.0	TOT 83.0
From NORTHWEST To: Turn: Flow Rate %HV (all designations)	L3 13.0	L2 11.0	SE T1 195.0 5.0	R1 143.0	362.0

Go to Table Links (Top)

Origin-Destination Flow Rates by Movement Class Site:WD PM (NDR/Leeds) - existing

Intersection ID: 1 Roundabout

FLOW RATES FOR Light Vehicles

	L1	N Tl	R1		
Flow Rate - Veh Mov Class % Flow Scale - Fixed Flow Scale - Var Peak Flow Factor	257.5 95.0 1.00 1.00 1.00	12.4 95.0 1.00 1.00 1.00	0.0 0.0 1.00 1.00 1.00	28.5 95.0 1.00 1.00 1.00	298.3
From SOUTHEAST To: Turn:	S L3	NW T1	N Rl	NE R2	
Flow Rate - Veh Mov Class % Flow Scale - Fixed Flow Scale - Var Peak Flow Factor	49.4 95.0 1.00 1.00 1.00	253.6 95.0 1.00 1.00 1.00	1.9 95.0 1.00 1.00 1.00	0.0 0.0 1.00 1.00 1.00	304.9 94.7
From NORTHEAST To: Turn:	SE L2	S L1	NW R2	N R3	TOT
Flow Rate - Veh Mov Class % Flow Scale - Fixed	0.0	0.0	0.0	0.0	0.0

Flow Scale - Var Peak Flow Factor	1.00	1.00			
From NORTH To:	NE L3	SE L1	Т1	R3	
Flow Rate - Veh Mov Class % Flow Scale - Fixed Flow Scale - Var Peak Flow Factor	0.0 0.0 1.00 1.00 1.00	10.4 95.0 1.00 1.00 1.00	38.0 95.0 1.00 1.00 1.00	29.5 95.0 1.00 1.00 1.00	77.9 93.9
From NORTHWEST To: Turn:	N L3	NE L2	SE T1	S R1	TOT
Flow Rate - Veh Mov Class % Flow Scale - Fixed Flow Scale - Var Peak Flow Factor	12.4 95.0 1.00 1.00	0.0 0.0 1.00 1.00	185.2 95.0 1.00 1.00	135.9 95.0 1.00 1.00	333.4

FLOW RATES FOR Heavy Vehicles

From SOUTH To: Turn:	NW L1	N T1	NE R1	SE R3	тот
Flow Rate - Veh Mov Class % Flow Scale - Fixed Flow Scale - Var Peak Flow Factor		0.6 5.0 1.00 1.00 1.00	8.0 100.0 1.00 1.00 1.00	1.5 5.0 1.00 1.00 1.00	23.7 7.4
From SOUTHEAST To: Turn:	S L3	NW Tl	N R1	NE R2	TOT
Flow Rate - Veh Mov Class % Flow Scale - Fixed Flow Scale - Var Peak Flow Factor	2.6 5.0 1.00 1.00 1.00	13.4 5.0 1.00 1.00 1.00	0.1 5.0 1.00 1.00 1.00	1.0 100.0 1.00 1.00 1.00	17.1 5.3
From NORTHEAST To: Turn:	SE L2	S L1	NW R2	N R3	TOT
Flow Rate - Veh Mov Class % Flow Scale - Fixed Flow Scale - Var Peak Flow Factor	5.0 100.0 1.00 1.00 1.00	7.0 100.0 1.00 1.00 1.00	11.0 100.0 1.00 1.00 1.00	1.0 100.0 1.00 1.00 1.00	24.0 100.0
From NORTH To: Turn:	NE L3	SE L1	S Tl	NW R3	тот
Flow Rate - Veh Mov Class % Flow Scale - Fixed Flow Scale - Var Peak Flow Factor	1.0 100.0 1.00 1.00 1.00	0.6 5.0 1.00 1.00 1.00	2.0 5.0 1.00 1.00 1.00	1.5 5.0 1.00 1.00 1.00	5.1 6.1
From NORTHWEST To: Turn:	N L3	NE L2	SE T1	S R1	TOT
Flow Rate - Veh Mov Class % Flow Scale - Fixed Flow Scale - Var Peak Flow Factor	0.6 5.0 1.00 1.00 1.00	11.0 100.0 1.00 1.00 1.00	9.8 5.0 1.00 1.00 1.00	7.2 5.0 1.00 1.00 1.00	28.5 7.9

Go to Table Links (Top)

Lane Flow Rates Site:WD PM (NDR/Leeds) - existing

Intersection ID: 1 Roundabout

LANE FLOW RATES AT STOP LINE

From SOUTH To:	NW	N	NE	SE	
Turn:	L1	т1	R1	R3	TOT
Lane 1					
LV	257.5	*	*	*	257.5
HV	13.6	*	*	*	13.6
Total	271.0	*	*	*	271.0

Lane 2 LV HV Total	* *	12.4 0.6 13.0	* 8.0 8.0	28.5 1.5 30.0	40.8 10.1 51.0
Approach	271.0	13.0	8.0	30.0	322.0
From SOUTHEAST To Turn:		NW		NE R2	тот
Lane 1 LV HV Total	49.4 2.6 52.0	* * *	* * *	* * *	49.4 2.6 52.0
Lane 2 LV HV Total Lane 3	* *	143.0 7.5 150.6	* *	* *	143.0 7.5 150.6
LV HV Total	* *	110.6 5.8 116.4 267.0	1.9 0.1 2.0	* 1.0 1.0	112.5 6.9 119.4
Approach	52.0	20110	2.0	±.0	322.0
From NORTHEAST TO Turn:	SE SE	S L1	NW	N	TOT
Lane 1 HV Total	5.0 5.0	7.0 7.0	11.0 11.0	1.0 1.0	24.0 24.0
Approach	5.0	7.0	11.0	1.0	24.0
From NORTH To: Turn:		SE L1	S T1	NW R3	тот
Lane 1 LV HV Total Lane 2	*	10.4 0.6 11.0	30.6 1.6 32.2	* *	41.1 3.2 44.2
LV HV Total	* * *	* * *	7.4 0.4 7.8	29.5 1.5 31.0	36.8 1.9 38.8
Approach	1.0	11.0	40.0	31.0	83.0
From NORTHWEST TO Turn:	L3	NE L2	SE T1	S R1	TOT
Lane 1 LV HV Total Lane 2	12.4 0.6 13.0		155.6 8.2 163.8	* *	19.8 187.8
LV HV Total		* * *	29.6 1.6 31.2	135.9 7.2 143.0	165.5 8.7 174.2
Approach	13.0	11.0		143.0	362.0

* Movement not allocated to the lane

EXIT LANE FLOW RATES

Movemen	nt Class:	LV	HV
Exit: Lane: Lane: Total		80.0 143.2 223.3	7.5
Exit: Lane: Lane: Total			13.7 3.1 16.8
Exit: Lane: Total	northeast 1	*	21.0 21.0
Exit: Lane: Lane: Total		12.4 14.2 26.6	0.6 1.8 2.4
	NORTHWEST 1	400.5	21.1

Total	140.1 540.5	39.5
* Movement not	allocated	
DOWNSTREAM LANE FI	LOW RATES	FOR EXIT ROADS
Movement Class:	LV	HV
Exit: SOUTH Lane: 1 Lane: 2 Total	80.0 143.2 223.3	11.2 7.5 18.8
Exit: SOUTHEAST Lane: 1 Lane: 2 Total		13.7 3.1 16.8
Exit: NORTHEAST Lane: 1 Total	*	21.0 21.0
Exit: NORTH Lane: 1 Lane: 2	12.4 14.2 26.6	0.6 1.8 2.4
Exit: NORTHWEST Lane: 1 Lane: 2 Total	400.5 140.1 540.5	21.1
* Movement not Unit Time for Volu Peak Flow Period =	umes = 60	minutes

Peak Flow Period = 30 minutes Flow Rates include effects of Flow Scale and Peak Flow Factor

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Other

```
Model Settings Summary
Site:WD PM (NDR/Leeds) - existing
Intersection ID: 1
Roundabout
* Basic Parameters:
Intersection Type: Roundabout
Driving on the left-hand side of the road
Input data specified in Metric units
Model Defaults: New South Wales
Peak Flow Period (for performance): 30 minutes
Unit time (for volumes): 60 minutes.
SIDRA Standard Delay model used
SIDRA Standard Queue model used
Level of Service based on: Delay (RTA NSW)
Queue percentile: 95%
```

Diagnostics Site:WD PM (NDR/Leeds) - existing

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Processed: 2 February 2016 8:54:25 AM SIDRA INTERSECTION 6.0.1.3703

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Project: O:\Synergy\Projects\215\215322\Out\Reports\Traffic\215322.sip6 8000782, GEOLYSE PTY LTD, PLUS / 1PC

DETAILED OUTPUT

Site: Uni post PM

New Site Giveway / Yield (Two-Way)

OUTPUT TABLE LINKS

ŵ	Movements Intersection Negotiation Data Gap Acceptance Parameters Movement Capacity and Performance Parameters Fuel Consumption, Emissions and Cost
1	Lanes Lane Performance and Capacity Information Lane Delays Lane Queues Lane Queue Percentiles Lane Stops
îr	Flow Rates Origin-Destination Flow Rates (Total) Origin-Destination Flow Rates by Movement Class Lane Flow Rates
8=	Other Model Settings Summary Diagnostics

Movements

Intersection Negotiation Data Site:Uni post PM

Intersection ID: 1 Give-Way Sign Controlled Intersection

INTERSECTION NEGOTIATION DATA

From Approach	To Exit	Turn	-	Negn Speed km/h	Negn Dist. m	Appr. Dist. m	Downstre m	eam Distance User Spec?			
South: Le	South: Leeds Parade										
	North	T1	S	50.0	10.0	500	157	No			
	East	R2	6.6	17.2	10.4	500	105	No			
East: Uni	versity										
	South	L2	10.0	20.2	15.7	500	108	No			
	North	R2	6.6	17.2	10.4	500	103	No			
North: Leeds Parade											
	East	L2	10.0	20.2	15.7	500	72	No			
	South	Τ1	S	50.0	10.0	500	159	No			

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

MOVEMENT SPEEDS AND GEOMETRIC DELAY

						Queue M	love-up			
Mou	Turn	App. Sp			Speeds	 1st	2nd	Av. Sect	-	Geom Delav
TD	Turn	Cruise	Negn		Cruise	Grn	Grn	Running		sec
10		CIUISE	Negii	Negii	CIUISE	GIII	GIII	Kuiiiiiig	Overaii	560
Sou	th: Le	eds Para	ıde							
2	т1	50.0	50.0	50.0	50.0			50.0	50.0	0.0
3	R2	50.0	17.2	17.2	50.0	17.2		42.2	42.2	8.0
		versity								
4	L2	50.0	20.2	20.2	50.0	19.9		42.5	42.5	7.5
6	R2	50.0	17.2	17.2	50.0	19.9		42.5	42.5	8.0

North: Leeds Parade

					erage s								
to T	able Li	inks (To	<u>(qc</u>										
		otance ost PN	e Paran 1	neters									
		ion II Sign (led In	tersect	ion							
					Critica	l Gap				Intra			
0p La	d ne	Dest	Fl pc	ow u/h	Hdwy sec	Dist m	Headw sec	ay H Eq	V Juiv	Hdwy sec	Bnch	n d	
Sou	th: L 2	eeds 1 E	arade? 10	6	4.10	0.0	2.0	5 1	.03	1.80	0.01		
las	t: Un 1	ivers: S	ity 10	4+	4.10 5.43	0.0	2.2	5 1	.02	1.80	0.01	1	
					5.43 								
Va Us	lues e the	in th: Pede:	is tabl strians	e are and P	adjuste rioriti flow in	d for h es inpu	neavy v ut dial	ehicles ogs to	in th specif	e enti y oppo	ry stre	am.	n movement
to T	able Li	inks (To	(qq										
		ion II Sign (D: 1	led In	tersect		neters						
.ve)ve lov	-Way MENT Turn	ion II Sign (CAPAC: Mov Cl.	D: 1 Control ITY PAR Arv Flow	AMETER Opng Flow	S Movemen Adjus Flow	ion t Tota t. Cap	al Pra p. Deg Sat	. Spa n Cap	re Sa ••	tn			
VE Iov D	-Way MENT Turn	ion II Sign (CAPAC: Mov Cl.	D: 1 Control ITY PAR Arv Flow veh/h	AMETER Opng Flow veh/h	S Movemen Adjus	ion t Tota t. Cap veh/	al Pra p. Deg Sat /h xp	. Spa n Cap	re Sa	tn x			
Ve VE Iov D	-Way MENT Turn h: Le	ion II Sign (CAPAC: Mov Cl.	D: 1 Control ITY PAR Arv Flow veh/h arade	AMETER Opng Flow veh/h	S Movemen Adjus Flow pcu/h	ion t Tota t. Cap veh/	al Pra p. Deg Sat /h xp	. Spa n Cap *	re Sa	tn x 			
Ve VE lov D	-Way MENT Turn h: Le T1 R2 	ion II Sign (CAPAC: Mov Cl. eds Pa # #	D: 1 Control ITY PAR Arv Flow veh/h arade 301 26	AMETER Opng Flow veh/h 0 0	S Movemen Adjus Flow pcu/h	ion t Tota t. Cap veh/ 	al Pra p. Deg Sat /h xp 9 0.9 9 0.9	. Spa n Cap * 8 51 8 592	re Sa	tn x 59* 16			
Ve VE Iov D 2 3 	-Way MENT Turn Turn h: Le T1 R2 : Uni	ion II Sign (CAPAC: Mov Cl. eds Pa # # 	D: 1 Control ITY PAR Arv Flow veh/h 301 26	AMETER Opng Flow veh/h 0 0	S Movemen Adjus Flow pcu/h 0 0	ion t Tota t. Cag veh/ 1885 1599	al Pra p. Deg Sat /h xp 0.9 0.9	. Spa n Cap * 8 51 8 592 	re Sa 5 0.1 7 0.0	tn x 59* 16 			
VE IOVE 2 3 10v 2 3 10v 2 3 	-Way MENT Turn Turn h: Le T1 R2 : Uni L2 R2	ion II Sign (CAPAC: Mov Cl. eds Pa # # 	D: 1 Control ITY PAR Arv Flow veh/h arade 301 26 	AMETER Opng Flow veh/h 0 0 0	S Movemen Adjus Flow pcu/h 0 0	ion t Tota t. Cap veh/ 1885 1599 	al Pra p. Deg Sat /h xp 0.9 0.9 0.9 4 0.8 2 0.8	. Spa n Cap * 8 51 8 592 0 121 0 121	re Sa 5 0.1 7 0.0 7 0.0 7 0.0	tn x 59* 16 61 61			
	-Way MENT Turn Turn h: Ler T1 R2 R2 R2 R2 R2 h: Le	ion II Sign (CAPAC: Mov Cl. eds Pa # # versit # # eds Pa	D: 1 Control ITY PAR Arv Flow veh/h arade 301 26 57 78 5 5 arade	AMETER Opng Flow veh/h 0 0 0	S Movemen Adjus Flow pcu/h 0 0 0	ion t Tota t. Cap 1889 1599 1284 82	al Pra p. Deg Sat /h xp 0.9 0.9 0.9 4 0.8 2 0.8	. Spa n Cap * 8 51 8 592 0 121 0 121	re Sa	tn x 59* 16 61 61			
VE 0VE 10 10 10 10 10 10 10 10 10 10	-Way MENT Turn Turn h: Le T1 R2 : Uni: L2 R2 h: Le L2 T1	ion II Sign (CAPAC: Mov Cl. Cl. Cl. # # # wersit # # eds Pa # # #	D: 1 Control ITY PAR Flow veh/h 26 27 78 5 78 5 arade 2101	AMETER Opng Flow veh/h 0 0 0 0 0 0 0 0 0 0 0	S Movemen Adjus Flow pcu/h 0 0 0 0 0 0 0 0	ion t Tota t. Cag veh/ 1889 1599 1284 82 37 1850	al Pra p. Deg Sat /h xp 0.9 0.9 0.9 4 0.8 2 0.8 7 0.9 0 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9	. Span n Cap % 8 51 8 592 0 121 0 121 8 169 8 169	re Sa 	tn x 59* 16 61 61 61 55 55			
VE 0VE 10 2 3 2 3 4 6 7 8 *	-Way MENT Turn h: Le Tl R2 : Uni L2 R2 h: Le L2 Tl Maxin	ion II Sign (CAPAC: Mov Cl. Cl. eds Pa # # eds Pa # # # eds Pa # # # 	D: 1 Control ITY PAR Arv Flow veh/h arade 301 26 	AMETER Opng Flow veh/h 0 0 0 0 0 0 f satu	S Movemen Adjus Flow pcu/h 0 0 0	ion t Tota t. Cap 1885 1595 1284 82 37 1850	Al Pra Deg Sat /h xp 0.9 0.9 0.9 4 0.8 2 0.8 7 0.9 0 0.9	. Span n Cap % 8 51 8 592 	re Sa 5 0.1 7 0.0 7 0.0 7 0.0 5 0.0 5 0.0	tn 59* 16 61 55 55 	ent Clas	5565.	
VE 0VE 10 10 10 10 10 10 10 10 10 10	-Way MENT Turn Turn h: Le T1 R2 k: L2 R2 T1 L2 R2 h: Le L2 T1 Combi MENT	ion II Sign (CAPAC: Mov Cl. eds Pa # # versit # # = eds Pa # # mum da ned Ma	D: 1 Control ITY PAR Arv Flow veh/h arade 301 26 5 78 5 78 5 78 5 78 5 2 101 	AMETER Opng Flow veh/h 0 0 0 0 0 0 f satu Capac	S Movemen Adjus Flow pcu/h 0 0 0 0 0 0 0 ration ity par	ion t Tota t. Cap 1885 1599 1284 82 	al Pra p. Deg Sat /h xp 0.9 0.9 0.9 4 0.8 2 0.8 7 0.9 0 0.9 5 are s	. Spa n Cap % 8 51 8 592 0 121 0 121 0 121 8 169 8 169 8 169	re Sa 	tn x 61 61 55 55 Moveme			
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Ve 0VE 10 10 10 10 10 10 10 10 10 10	-Way MENT Turn Turn h: Le T1 R2 L2 R2 Maxin Combin MENT Turn () h: Le	ion II Sign (CAPAC: Mov Cl. Cl. Cl. eds Pa # # # # mum do ned Mo PERFOI Tota: Delay veh-h, eds Pa	D: 1 Control ITY PAR Arv Flow veh/h 26 301 26 78 5 78 5 arade 2 101 egree c povement RMANCE RMANCE	AMETER Opng Flow veh/h 0 0 0 0 0 0 f satu Capac tal lay s-h/h)	S Movemen Adjus Flow pcu/h 0 0 0 0 0 ration ity par Aver. Delay	ion t Tota t. Cag veh/ 1889 1599 1284 82 1850 ameters Eff. 1 Stop S Rate	al Pra p. Deg Sat (h xp 0.9 0.9 0.9 4 0.8 2 0.8 7 0.9 0 0.9 5 are s Total Stops	. Spa n Cap % 8 51 8 592 0 121 0 121	re Sa 5 0.1 7 0.0 7 0.0 7 0.0 5 0.0	tn x 59* 16 55 55 Woveme v. Tot e T /h)(ve	.Trav. Time eh-h/h)	Aver. Speed (km/h)	
VE 	-Way MENT Turn Turn h: Le Tl R2 : Uni L2 R2 h: Le L2 Tl Combi: Combi: Combi: Turn MENT Combi: L2 Tl L2 Tl R2 h: Le	ion II Sign (CAPAC: dot dot dot dot dot dot dot dot dot dot	D: 1 Control ITY PAR Arv Flow veh/h arade 301 26 78 5 78 5 78 5 2 101 	AMETER Opng Flow veh/h 0 0 6 0 f satu Capac tal lay s-h/h) 	S Movemen Adjus Flow 0 0 0 0 0 0 ration ity par Aver. Delay (sec) 0.0 8.3	ion t Tota t. Cap 1885 1599 1284 82 1850 1285 1286 82 1850 1286 82 1850 1286 82 1850 1286 82 1850 1286 82 1850 1286 82 1850 1850 1850 1850 1850 1850 1850 1850	al Pra p. Deg Sat /h xp 0.9 0.9 0.9 4 0.8 2 0.8 2 0.8 7 0.9 0 0.9 0 0.9 5 are s Total Stops 0.0 16.0	. Spa n Cap % 8 51 8 592 0 121 0 121 8 169 8 169 8 169 8 169 hown fc Perf. T Index E Index 5 (re Sa 5 0.1 7 0.0 7 0.0 7 0.0 5 0.0 5 0.0 5 0.0 5 0.0 r all ot.Tra istanc veh-km 173. 15.	tn x 61 61 55 55 Woveme v. Tote e T /h)(ve 9	2.Trav. Fime Ph-h/h) 3.5 0.4	Aver. Speed (km/h)	
VE 10 10 10 10 10 10 10 10 10 10	-Way MENT Turn Turn h: Let T1 R2 L2 R2 Maxin Combi: MENT Turn Turn turn Combi: Turn	ion II Sign (CAPAC: Mov Cl. Cl. Cl. eds Pa # # # eds Pa # # # mum do ned Mo PERFOI O.00 0.00 0.00 0.00	D: 1 Control ITY PAR Flow veh/h 26 301 26 5 78 5 arade 2 101 egree c by egree c by egree c by covement RMANCE	AMETER Opng Flow veh/h 0 0 0 0 0 0 0 1 5 satu Capac tal lay s-h/h) 00 00 	S Movemen Adjus Flow pcu/h 0 0 0 0 0 0 ration ity par Aver. Delay (sec) 0.0 8.3	ion t Tota t. Cag veh/ 1889 1599 1284 82 1284 82 37 1850 ameters Eff. 1 Stop S Rate 	al Pra p. Deg Sat (h xp p 0.9 0.9 4 0.8 2 0.8 7 0.9 0 0.9 3 are s Fotal Stops 0.0 16.0	. Spa n Cap % 8 51 8 592 0 121 0 121 0 121 0 121 8 169 8 169 8 169 hown fc Perf. T Index E (re Sa 	tn x 59* 16 61 61 55 55 Woveme v. Tot e T /h)(ve 9 1 	3.5 0.4	Aver. Speed (km/h) 50.0 42.2	
ive OVE Mov ID 3 4 6 * # OVE * # OVE * 4 0 * 4 0 * 4 0 - 4 0 - - - - - - - - - - -	-Way MENT Turn Turn h: Let T1 R2 k: Let L2 R2 Maxii Combi: MENT Turn (h: Let T1 Turn MENT : L2 R2 K L2 R2 R2 K L2 R2 R2 K L2 R2 R2 K Combi: L2 R2 R2 K L2 R2 R2 K K Combi: L2 R2 R2 R2 R2 K L2 R2 R2 R2 R2 R2 R2 R2 R2 R2 R2 R2 R2 R2	ion II Sign (CAPAC: Mov Cl. eds Pa # # wersif # # eds Pa ned Ma PERFOI Delag veh-h; o.00 0.00 0.00	D: 1 Control ITY PAR Arv Flow veh/h arade 301 26 78 5 78 5 arade 2 101 egree o ovement RMANCE L To y De (h) (per arade 0 0. 0 0.	AMETER Opng Flow veh/h 0 0 f satu Capac tal lay s-h/h) 00 00 00 0 0 0 0 0 0 0 0 0 0 0 0	S Movemen Adjus Flow .pcu/h .o 0 0 	ion t Tota t. Cag veh/ 1885 1595 1284 82 1286 82 1286 82 1286 82 1850 1286 82 1850 1286 82 1286 82 1850 1286 82 1850 1286 82 1850 1286 82 1850 1950 1850 1850 1950 1850 1950 1850 1950	al Pra p. Deg Sat /h xp 9 0.9 9 0.9 9 0.9 4 0.8 2 0.8 7 0.9 0 0.9 0 0.9 5 are s 5 are s 5 are s 0.0 16.0 16.0	. Spa n Cap % 8 51 8 592 0 121 0 121 8 169 8 169 8 169 hown fc Perf. T Index E (3.48 0.45 1.54 0.28	re Sa 5 0.1 7 0.0 7 0.0 7 0.0 5 0.0 5 0.0 5 0.0 5 0.0 r all ot.Tra istanc veh-km 173. 15. 45. 2.	tn x 61 61 55 55 Moveme v. Tott e T /h)(ve 9 1 5 9	2.Trav. Cime eh-h/h) 3.5 0.4 1.1 0.1	Aver. Speed (km/h) 50.0 42.2 42.5 42.5	
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Fuel Consumption, Emissions and Cost Site:Uni post PM

Intersection ID: 1 Give-Way Sign Controlled Intersection

FUEL CONSUMPTION, EMISSIONS AND COST (TOTAL)

Mov Turn ID	Total	Total	CO2 Total kg/h	Total	Total	Total						
South: Leeds Parade												
	122.34	10.6	25.0	0.08	0.009	0.061						
3 R2	12.52					0.006						
	134.86	11.6	27.4	0.08	0.010	0.067						
East: Universit												
4 L2		3 0	7.1	0 02	0 003	0 017						
6 R2	2.40											
0 112												
	39.86	3.2	7.6	0.02	0.003	0.018						
North: Leeds Pa	rade											
7 L2	0.82	0.1	0.2	0.00	0.000	0.000						
8 T1	41.18											
			8.6									
INTERSECTION:	216.71	18.4	43.6	0.13	0.016	0.106						

FUEL CONSUMPTION, EMISSIONS AND COST (RATE)

Mov Turn	Cost	Fuel	CO2	CO	HC	NOX
ID				Rate		
	\$/km	L/100km	g/km	g/km	g/km	g/km
South: Leeds Pa	rade					
2 T1	0.70	6.1	144.0	0.43	0.051	0.352
3 R2				0.49		
		6.1	145.1	0.44	0.052	0.354
East: Universit						
4 L2	0.82	6.6	156.4	0.48	0.061	0.377
6 R2	0.82	6.6	156.4	0.48	0.061	0.377
	0.82	6.6	156.4	0.48	0.061	0.377
North: Leeds Pa	rade					
7 L2	0.71	6.1	144.2	0.43	0.051	0.353
8 T1	0.71	6.1	144.2	0.43	0.051	0.353
	0.71	6.1	144.2	0.43	0.051	0.353
INTERSECTION:	0.61	5.2	122.3	0.37	0.045	0.298

Go to Table Links (Top)

Lanes

Lane Performance and Capacity Information Site:Uni post PM

Intersection ID: 1 Give-Way Sign Controlled Intersection

LANE PERFORMANCE

						Que	u e		
	Flow	Cap	Deg.	Aver.	Eff.	95% B	ack	Lane	
Lane			Satn	Delay	Stop			Length	
No.	veh/h	veh/h	х	sec	Rate	veh	m	m	
South: 3	Leeds Pa	arade							
1	301	1889	0.159	0.0	0.00			500.0	
2	26	1599	0.016	8.3	0.61	0.1	0.5	60.0T	

Page 3 of 8
_____ 1 83 1367 0.061 8.0 0.60 0.2 1.8 140.0 North: Leeds Parade 103 1887 0.055 0.2 0.02 1 500.0 ------T Short lane due to specification of Turn Bay LANE FLOW AND CAPACITY INFORMATION _____ Lane Total Min Tot Deg. Lane No. Arv Flow Cap Cap Satn Util (veh/h) veh/h veh/h x % South: Leeds Parade 1 301 301 1889 0.159 100 2 26 6 1599 0.016 100 East: University - 83 6 1367 0.061 100 - .. North: Leeds Parade 1 103 103 1887 0.055 100 The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle effects. Saturation flow scale applies if specified. Go to Table Links (Top) Lane Delays Site:Uni post PM Intersection ID: 1 Give-Way Sign Controlled Intersection LANE DELAYS _____ ----- Delay (seconds/veh) -----Deg. Prog. Stop-line Delay Acc. Queuing Stopd Lane Sath Factor 1st 2nd Total Dec. Total MvUp (Idle) Geom Control No. x dl d2 dSL dn dq dam di dia dia No. x d1 d2 dSL dn dq dqm di di South: Leeds Parade 1 0.159 0.0 0.0 0.0 0.0 2 0.016 1.000 0.3 0.0 0.3 0.7 0.0 0.0 0.0 8.0 8.3 ------East: University 0.061 1.000 0.5 0.0 0.5 0.8 0.0 0.0 0.0 7.5 8.0 1 _____ _____ North: Leeds Parade 0.1 0.2 -----_____ ____ SIDRA Standard Delay Model is used. Control Delay is the sum of Stop-line Delay and Geometric Delay. dSL: Stop-line delay (=d1+d2) dn: Average stop-start delay for all vehicles queued and unqueued dq: Queuing delay (the part of the stop-line delay that includes stopped delay and queue move-up delay) dqm: Queue move-up delay di: Stopped delay (stopped (idling) time at near-zero speed) dig: Geometric delay dic: Control delay LANE DELAY PERCENTILES _____ Percentile Delay Deg. Lane Satn -----_____ x 50% 70% 85% 90% 95% 98% 100% No. South: Leeds Parade 1 NA - Continuous Movement 2 0.016 8.3 8.3 8.4 8.5 8.5 8.5 0.0 1 0.061 8.0 8.1 8.3 8.3 8.4 8.5 8.5 North: Leeds Parade NA - Continuous Movement 1 _____ -----_____

Lane Queues Site:Uni post PM

Intersection ID: 1 Give-Way Sign Controlled Intersection

LANE QUEUES (VEHICLES)

5		Prog. Factor	Ovrfl. Oueue		~	eue (ve		~	Prob. Block		Cyc-Av	~
No.	x	FACCOL	No	Nbl	Nb2	Nb		Ratio	810CK	\$ BIOCK	NC	95%
		Parade 1.000	0.0	0.0		0.0	0 1	0.00		100.0	0.0	0.0
												0.0
	Univer: 0 061	-	0.0	0.1	0 0	0.1	02	0 01	0 0	100.0	0.0	0.0

LANE QUEUES (DISTANCE)

5		Prog.	Ovrfl. Oueue		~ ~	eue (m)		~	Prob. Block		Cyc-Av.	~
No.		No	Nbl	Nb2	Nb		Ratio			NC	95%	
		Parade 1.000	0.0	0.2	0.0	0.2	0.5	0.00	0.0	100.0	0.0	0.0
	Univer 0.061	-	0.0	0.7	0.0	0.7	1.8	0.01	0.0	100.0	0.1	0.1

Go to Table Links (Top)

Lane Queue Percentiles Site:Uni post PM

Intersection ID: 1 Give-Way Sign Controlled Intersection

LANE QUEUE PERCENTILES (VEHICLES)

x 50%			ack of (Queue	(veh)	
	70%	85%	90%	95%		
eeds Parade 016 0.0	0.0					
iversity 061 0.1	0.1					0.3
eeds Parade						
		ANCE /				
		ntile B				
atn x 50%	 70%	ntile B 	90%	 95%	 98%	 100%
atn x 50% eeds Parade 016 0.2	70% 	ntile E 85% 	90%	95% 	98% 	100% 0.6
atn x 50% eeds Parade 016 0.2 iversity	70% 0.3 0.9	ntile E 85% 0.4 	90% 0.4 1.5	95% 0.5 1.8	98% 0.6 2.0	 100% 0.6 2.1
atı x eec 010 	n 50% ds Parade 5 0.2 ersity	Perce 50% 70% ds Parade 6 0.2 0.3 ersity	Percentile E 50% 70% 85% ds Parade 5 0.2 0.3 0.4 ersity	Percentile Back of 0 50% 70% 85% 90% ds Parade 5 0.2 0.3 0.4 0.4 ersity	Percentile Back of Queue 50% 70% 85% 90% 95% ds Parade 5 0.2 0.3 0.4 0.4 0.5 ersity	5 0.2 0.3 0.4 0.4 0.5 0.6

Lane Sto	ops
Site:Uni	post PM

Intersection ID: 1 Give-Way Sign Controlled Intersection

No.	Satn x	Factor	he1	he2	Geom. hig	Rate Overall h	Total Stops H	Rate hqm	Move-ups Hqm	Queued pq
South 1	: Leeds 0.159	Parade 1.000			0.00	0.00 0.61	0.0			
	Univer 0.061	-	0.09	0.00	0.51	0.60	49.8	0.00	0.0	0.20
	: Leeds 0.055					0.02	2.2			
		average	value		l move	ments in all vehi			unqueue	

Go to Table Links (Top)

Flow Rates

Origin-Destination Flow Rates Site:Uni post PM	Origin-Destination Flow Rates (Total) Site:Uni post PM										
Intersection ID: 1 Give-Way Sign Controlled Intersection											
TOTAL FLOW RATES (ALL MOVEMENT CLASSES)											
From SOUTH To:	N	 Е									
Turn:		R2	TOT								
Flow Rate	301.0	26.0	327.0								
%HV (all designations)	5.0	5.0	5.0								
From EAST To:	S	N									
Turn:		R2									
Flow Rate		5.0									
%HV (all designations)	5.0	5.0	5.0								
From NORTH To:	Е	S									
Turn:	L2	т1	TOT								
Flow Rate	2.0	101.0	103.0								
%HV (all designations)	5.0	5.0	5.0								

Go to Table Links (Top)

Origin-Destination Flow Rates by Movement Class Site:Uni post PM

```
Intersection ID: 1
Give-Way Sign Controlled Intersection
```

FLOW RATES FOR Light Vehicles

From SOUTH To: Turn:	N Tl	e R2	TOT
Flow Rate - Veh Mov Class % Flow Scale - Fixed Flow Scale - Var Peak Flow Factor	95.0 1.00 1.00	95.0 1.00 1.00	310.7 95.0
From EAST To: Turn:	S L2	N R2	TOT
Flow Rate - Veh Mov Class % Flow Scale - Fixed Flow Scale - Var Peak Flow Factor	1.00	95.0 1.00 1.00	

From NORTH To: Turn:	E L2	S Tl	TOT							
Flow Rate - Veh Mov Class % Flow Scale - Fixed Flow Scale - Var Peak Flow Factor	1.9 95.0 1.00 1.00 1.00	95.9 95.0 1.00 1.00 1.00	97.8 95.0							
FLOW RATES FOR Heavy Vehicles										
From SOUTH To: Turn:	N T1	E R2	тот							
Flow Rate - Veh Mov Class % Flow Scale - Fixed Flow Scale - Var Peak Flow Factor		1.3 5.0 1.00 1.00 1.00	16.4 5.0							
From EAST To: Turn:	S L2	N R2	TOT							
Flow Rate - Veh Mov Class % Flow Scale - Fixed Flow Scale - Var Peak Flow Factor	3.9 5.0 1.00 1.00 1.00	0.2 5.0 1.00 1.00 1.00	4.2 5.0							
From NORTH To: Turn:	E L2	S Tl	тот							
Flow Rate - Veh Mov Class % Flow Scale - Fixed Flow Scale - Var Peak Flow Factor	0.1 5.0 1.00 1.00 1.00		5.2 5.0							

Lane Flow Rates Site:Uni post PM

Intersection ID: 1 Give-Way Sign Controlled Intersection

LANE FLOW RATES AT STOP LINE

From SOUTH To:	N	E	-
Turn:	T1	R2	тот
Lane 1	286.0	*	206.0
LV HV	286.0 15.1	*	286.0 15.1
Total	301.0	*	301.0
Lane 2			
LV	*	24.7	24.7
HV Total	*	1.3 26.0	1.3 26.0
10La1		20.0	20.0
Approach	301.0	26.0	327.0
From EAST To:	S	N	
Turn:	L2	R2	TOT
*			
Lane 1 LV	74 1	4.8	78 8
HV		0.2	
Total	78.0	5.0	83.0
Approach	78.0	5.0	83.0
From NORTH To:	 E	s	
Turn:	L2	т1	TOT
Lane 1 LV	1 0	95.9	07 0
HV		5.1	
Total		101.0	
Approach	2.0	101.0	103.0
* Movement not	allocate	ed to the	e lane

		LV				
EXIL.	SOUTH					
		170.0	9.0			
Total		170.0				
Exit:						
Lane:	1	26.6				
Total		26.6	1.4			
Exit:						
Lane:	1	290.7	15.3			
Total		290.7	15.3			
		FLOW RATES		lane T ROADS		
 Movemer	nt Class:		 HV			
Movemer Exit:	nt Class: SOUTH	LV	HV			
Movemer Exit: Lane:	nt Class:	LV 170.0	HV 9.0			
Movemer Exit: Lane: Total	nt Class: SOUTH	LV	HV 9.0 9.0			
Movemer Exit: Lane: Total Exit:	nt Class: SOUTH 1 EAST	LV 170.0 170.0	HV 9.0 9.0			
Movemer Exit: Lane: Total Exit: Lane:	nt Class: SOUTH 1	LV 170.0 170.0 26.6	HV 9.0 9.0			
Movemer Exit: Lane: Total Exit: Lane: Total	SOUTH 1 EAST 1	LV 170.0 170.0	HV 9.0 9.0			
Movemer Exit: Lane: Total Exit: Lane: Total Total Exit:	SOUTH 1 EAST 1 NORTH	LV 170.0 170.0 26.6 26.6	HV 9.0 9.0 1.4 1.4			
Movemer Exit: Lane: Total Exit: Lane: Total Total Exit:	SOUTH 1 EAST 1 NORTH 1	LV 170.0 170.0 26.6 26.6 290.7	HV 9.0 9.0 1.4 1.4 1.4			
Movemer Exit: Lane: Total Exit: Lane: Total Exit: Lane: Total	SOUTH 1 EAST 1 NORTH 1	LV 170.0 170.0 26.6 26.6	HV 9.0 9.0 1.4 1.4 1.4 1.5.3 15.3			

Other

Model Settings Summary Site:Uni post PM Intersection ID: 1 Give-Way Sign Controlled Intersection * Basic Parameters: Intersection Type: Unsignalised - Give Way Driving on the left-hand side of the road Input data specified in Metric units Model Defaults: New South Wales Peak Flow Period (for performance): 30 minutes Unit time (for volumes): 60 minutes. SIDRA Standard Delay model used SIDRA Standard Queue model used Level of Service based on: Delay (RTA NSW) Queue percentile: 95%

Diagnostics Site:Uni post PM

Go to Table Links (Top)

Processed: 2 February 2016 8:59:20 AM SIDRA INTERSECTION 6.0.1.3703

Project: O:\Synergy\Projects\215\215322\Out\Reports\Traffic\215322_university.sip6 8000782, GEOLYSE PTY LTD, PLUS / 1PC

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DETAILED OUTPUT

Site: Uni existing PM

New Site Giveway / Yield (Two-Way)

OUTPUT TABLE LINKS

fill Movements Intersection Negotiation Data Gap Acceptance Parameters Movement Capacity and Performance Parameters Fuel Consumption, Emissions and Cost 💙 Lanes Lane Performance and Capacity Information Lane Delays Lane Queues Lane Queue Percentiles Lane Stops IF Flow Rates Origin-Destination Flow Rates (Total) Origin-Destination Flow Rates by Movement Class Lane Flow Rates E Other Model Settings Summary Diagnostics

Movements

Intersection Negotiation Data Site:Uni existing PM

Intersection ID: 1 Give-Way Sign Controlled Intersection

INTERSECTION NEGOTIATION DATA

From			Negn Radius	Negn Speed	Negn Dist.		Downstrea	m Distance		
Approach	Exit	Turn	m	km/h	m	m	m	User Spec?		
South: Leeds Parade										
	North	т1	S	50.0	10.0	500	157	No		
	East	R2	6.6	17.2	10.4	500	105	No		
East: Uni	versity									
	South	L2	10.0	20.2	15.7	140	108	No		
	North	R2	6.6	17.2	10.4	140	102	No		
North: Le	eds Para	de								
	East	L2	10.0	20.2	15.7	500	95	No		
	South	т1	S		10.0	500	181	No		

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

MOVEMENT SPEEDS AND GEOMETRIC DELAY

						Queue M	love-up			
		App. Sp	eeds	Exit	Speeds			Av. Sect	-	Geom
Mov	Turn					1st	2nd			Delay
ID		Cruise	Negn	Negn	Cruise	Grn	Grn	Running	Overall	sec
Sou	th: Le	eds Para	de							
2	т1	50.0	50.0	50.0	50.0			50.0	50.0	0.0
3	R2	50.0	17.2	17.2	50.0	17.2		42.8	42.8	8.0
Eas	t: Uni	versity								
4	L2	50.0	20.2	20.2	50.0	20.1		35.3	35.3	7.5
6	R2	50.0	17.2	17.2	50.0	20.1		35.3	35.3	8.0

North: Leeds Parade

Running Specet is the average speed excluding stopped periods. to Table Likes (Top) ap Acceptance Parameters tel/Un existing PM storesortion ID : 1 ver-Way Sign Controlled Intersection The pour base is a second base in the second base is a second base i	8	L2 T1	50.	0 20.2) 50).0 50				46.3					
ap Acceptance Parameters truewesting PM trevection ID: 1 verway Sign Controlled Intersection Critical Gap Point Critical Gap Point Point <po< th=""><th>"Ru</th><th>nning</th><th>g Speed</th><th>l" is th</th><th>ne ave</th><th>erage s</th><th>speed ex</th><th>ccluding</th><th>g stoppe</th><th>ed peri</th><th>ods.</th><th></th><th></th><th></th><th></th></po<>	"Ru	nning	g Speed	l" is th	ne ave	erage s	speed ex	ccluding	g stoppe	ed peri	ods.				
tet:Uni existing PM tet:resction ID: 1 verway Sign Controlled Intersection Opd Dest Flow Hidw Dist Headway IW Hidwy Bondd Lanc pon/h sec m sec Reuiv sec Touth: Leade Parade 1.02 1.80 0.000 2 2 4.10 0.0 2.05 1.02 1.80 0.000 1 8 1+ 4.10 0.0 2.26 1.03 1.80 0.000 1 N 30+ 5.43 0.0 3.07 1.02 1.43 0.004 Touth: Leade Parade No 0.0 2.26 1.03 1.80 0.000 1 N 30+ 5.43 0.0 3.07 1.02 1.43 0.004 Touth: Leede Parade No 0.0 2.26 1.03 1.80 0.000 1 N 30+ 5.43 0.0 3.07 1.02 1.43 0.001 Touth: Leeds Parade No 0.90 sec restly whicle file 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00	to Ta	able Li	inks (Top	<u>))</u>											
Opend (peak plow) Critical Gap plow Foll-up Headway Entry	te:U	Jni ex	ion ID	PM : 1		tersect	tion								
Open Open Pallup Entry Bunch Propen Lane Plow Headway Back Bunch Propen Lane Pouth sec m Headway Bunch Propen Toth: Leeds Parade 2 2 4.10 0.0 2.05 1.02 1.80 0.000 iast: University 1 N 30+ 5.43 0.0 3.07 1.02 1.43 0.000 iast: University 1 N 30+ 5.43 0.0 3.07 1.02 1.43 0.004 iast: University 1.02 1.43 0.004 1.00 0.004 iorth: Leeds Parade Proversity 0.000 1.00 0.004 Values in this table are adjusted for heavy vehicles in the entry stream. 1.00 1.00 1.00 1.00 Values in this table are adjusted for heavy vehicles in the entry stream. 1.00 1.0															
Note: Liesds Parade 2 8 2 4.10 0.0 2.05 1.02 1.80 0.000 1 3 30* 5.43 0.0 3.07 1.02 1.43 0.000 1 8 30* 5.43 0.0 3.07 1.02 1.43 0.000 1 8 30* 5.43 0.0 3.07 1.02 1.43 0.000 1 8 30* 5.43 0.0 3.07 1.02 1.43 0.000 No oppoade movements on this approach.				Opno	y .			Foll-	up Ent	try E	Bunch	Propi	1		
South: Leeds Parade 4.10 0.0 2.05 1.02 1.80 0.000 1 N 34 4.10 0.0 2.26 1.03 1.80 0.000 1 N 36 5.43 0.0 2.26 1.03 1.80 0.000 1 N 36 5.43 0.0 2.26 1.03 1.80 0.000 1 N 36 5.43 0.0 2.26 1.03 1.80 0.000 1 N 36 5.43 0.0 2.26 1.03 1.80 0.000 torth: Leeds Parade	0pd Lan	l 1e	Dest	Flow pcu/	v I /h	Hdwy sec	Dist m	Headw sec	ay H Equ	V H uiv	Idwy sec	Bncho	1		
hast: University 1 S 1+ 4.10 0.0 2.26 1.03 1.80 0.000 1 N 30+ 5.43 0.0 3.07 1.02 1.43 0.004 No opposed movements on this approach. Values in this table are adjusted for heavy vehicles in the entry stream. Values in this table are adjusted for heavy vehicles in the entry stream. Values in this table are adjusted for heavy vehicles in the entry stream. Values in this table are adjusted for heavy vehicles in the entry stream. Values in this table are adjusted for heavy vehicles in the entry stream. Values in this table are adjusted for heavy vehicles in the entry stream. Values in this approach. Values in this approach. Values in this approach.	Sout	2 h	eeds Pa E	arade 2		4.10	0.0	2.0	5 1.	.02 1	.80	0.000)		
No opposed movements on this approach. Values in this table are adjusted for heavy vehicles in the entry stream. Use the Pedestrians and Priorities input dialogs to specify opposing pedestrian movements. + Percentage of exiting flow included in opposing vehicle flow to Table Links (Top) overment Capacity and Performance Parameters te:Uni existing PM itersection ID: 1 ver-May Sign Controlled Intersection VEMENT CAPACITY PRAMETERS for Turn Nov Oppng Movement Total Prac. Prac. Deg. veh/h veh/h peu/h veh/h xp % veh/h veh/h peu/h veh/h xp % veh/h veh/h peu/h veh/h xp % veh/i veh/h veh/h peu/h veh/h xp % veh/i veh/a veh/h peu/h veh/h xp % veh/i veh/h veh/h peu/h veh/h xp % veh/i veh/h veh/h peu/h veh/h xp % veh/i veh/i veh/h peu/h ve	last	: Un	iversi	_{zy}											
No opposed movements on this approach. Values in this table are adjusted for heavy vehicles in the entry stream. Use the Pedestrians and Priorities input dialogs to specify opposing pedestrian movements. * Percentage of exiting flow included in opposing vehicle flow to Table Links (Top) ovement Capacity and Performance Parameters te:Uni existing PM tiersection ID: 1 twe-Way Sign Controlled Intersection WEMENT CAPACITY PARAMETERS flow Turn Mov Oppg Movement Total Prac. Prac. Deg. () Arv Adjust. Cap. Deg. Spare Satn Flow Flow Flow Flow Satn Cap. veh/h veh/h pou/h veh/h xp & x vuch: Leeds Parade 2 Ti # 1 0 0 1889 0.98 **** 0.001 3 E2 # 27 0 0 1753 0.98 6263 0.015 ast: University 4 L2 # 82 0 0 1568 0.80 1430 0.052* orth: Leeds Parade 7 L2 # 1 0 0 0 19 0.80 1430 0.052* orth: Leeds Parade 7 L2 # 1 0 0 920 0.98 **** 0.001 * Maximum degree of saturation # Combined Movement Capacity parameters are shown for all Movement Classes. WUEMENT FERFORMANCE MAXIMUM degree of saturation # Combined Movement Capacity parameters are shown for all Movement Classes. WUEMENT FERFORMANCE Mov Turn Total Total Aver. Eff. Total Perf. Tot.Trav. Tot.Trav. Aver. Maximum degree of saturation # Combined Movement Capacity parameters are shown for all Movement Classes. WUEMENT FERFORMANCE Mov Turn Total Total Aver. Eff. Total Perf. Tot.Trav. Tot.Trav. Aver. Maximum degree of saturation # Combined Movement Capacity parameters are shown for all Movement Classes. WUEMENT FERFORMANCE		1 1	S N												
Values in this table are adjusted for heavy vehicles in the entry stream. Values in this table are adjusted for heavy vehicles in the entry stream. Use the Pedestrian and Priorities input dialogs to specify opposing pedestrian movements. + Percentage of exiting flow included in opposing vehicle flow to Table Links (Top) overment Capacity and Performance Parameters te:Uni existing PM ttersection ID: 1 verway Sign Controlled Intersection VEMENT CAPACITY PARAMETERS for Vurn Mov Oping Movement Total Prac. Prac. Deg. DC Cl. Arv Multit. Cap. Deg. veh/h veh/h pcu/h veh/h xp * x veh/h veh/h pcu/h veh/h xp															
overment Capacity and Performance Parameters te:Uni existing PM itersection ID: 1 itersection ID: 1 ive-Way Sign Controlled Intersection WEMENT CAPACITY PARAMETERS dow Turn Mov Opng Movement Total Prac. Prac. Deg. D. Cl. Arv Adjust. Cap. Deg. Spare Satn Flow Flow Flow Satn Cap. veh/h veh/h pcu/h veh/h xp % x outh: Leeds Parade 2 TI # 1 0 0 1753 3 R2 # 27 0 0 1753 0.98 st: University 4 4.2 8.2 0 1568 0.80 1430 0.052* orth: Leeds Parade 7 7.2 # 1 0 0 920 0.98 ***** 0.001 8 TI # 1 0 0 920 0.98 ***** 0.001 * Maximum degree of saturation # Combined Movement Classes. ****** 0.001 * Movinum Total Total Aver. Eff. Total Perf. Tot.Trav. Tot.Trav. Aver. ****** 0.001 to Delay Del	Use +	e the Perc	Pedest entage	trians a of exit	and Pr	riorit	ies inpu	ut dial	ogs to s	specify	v oppo			an movem	ents.
Duth: Leeds Parade 2 T1 # 1 0 0 1889 0.98 ***** 0.001 3 R2 # 27 0 0 1753 0.98 6263 0.015 stitution of the state of the sta	nter	sect	ion ID	: 1	ed Int			neters							
2 T1 # 1 0 0 1889 0.98 **** 0.001 3 R2 # 27 0 0 1753 0.98 6263 0.015 ast: University 4 L2 # 82 0 0 1568 0.80 1430 0.052* 6 R2 # 1 0 0 19 0.80 1430 0.052* T1 # 1 0 0 920 0.98 **** 0.001 8 T1 # 1 0 0 920 0.98 **** 0.001 8 T1 # 1 0 0 920 0.98 **** 0.001 * Maximum degree of saturation # Combined Movement Capacity parameters are shown for all Movement Classes. WEMENT PERFORMANCE Mov Turn Total Total Aver. Eff. Total Perf. Tot.Trav. Tot.Trav. Aver. CD Delay Delay Delay Stop Stops Index Distance Time Speed (veh-h/h)(pers-h/h)(sec) Rate (veh-km/h)(veh-h/h) (km/h) mouth: Leeds Parade 2 T1 0.00 0.00 0.0 0.00 0.0 0.01 0.6 0.0 50.0 3 R2 0.00 0.00 8.0 0.67 18.1 0.47 15.7 0.4 42.8 T1 University 4 L2 0.01 0.01 7.5 0.63 51.8 1.00 18.3 0.5 35.3 6 R2 0.00 0.00 7.5 0.63 0.6 0.18 0.2 0.0 35.3 Torth: Leeds Parade	nter Lve- DVEM	Turn	ion ID Sign Co CAPACI Mov Cl	: 1 ontrolle TY PARAN (Arv	METERS Dpng 1	tersect S Movemen Adju:	tion nt Tota st. Cap	al Pra	c. Prac . Spai	c. Deg re Sat					
Ast: University 4 L2 # 82 0 0 1568 0.80 1430 0.052* 6 R2 # 1 0 0 19 0.80 1430 0.052* orth: Leeds Parade 7 L2 # 1 0 0 920 0.98 **** 0.001 8 T1 # 1 0 0 920 0.98 **** 0.001 * Maximum degree of saturation # Combined Movement Capacity parameters are shown for all Movement Classes. WEMENT PERFORMANCE Mov Turn Total Total Aver. Eff. Total Perf. Tot.Trav. Tot.Trav. Aver. Delay Delay Delay Stop Stops Index Distance Time Speed (veh-h/h)(pers-h/h)(sec) Rate (veh-km/h)(veh-h/h) (km/h) puth: Leeds Parade 2 T1 0.00 0.00 0.0 0.00 0.0 0.01 0.6 0.0 50.0 3 R2 0.00 0.00 8.0 0.67 18.1 0.47 15.7 0.4 42.8 mast: University 4 L2 0.01 0.01 7.5 0.63 51.8 1.00 18.3 0.5 35.3 6 R2 0.00 0.00 7.5 0.63 0.6 0.18 0.2 0.0 35.3 Torth: Leeds Parade	NUTER NUTER NUTER NOVEM NOV NUTER NU	Esect Way MENT Turn	ion ID Sign Co CAPACI Mov Cl. 1	: 1 ontrolle TY PARAN C Arv Flow H veh/h t	AETERS Dpng 1 Flow Zeh/h	S Movemen Adjus Flow pcu/l	tion nt Tota st. Cap h veh,	al Pra p. Deg Sat /h xp	c. Prac . Spai n Cap	c. Deg re Sat	in K				
Orth: Leeds Parade 7 L2 # 1 0 0 920 0.98 **** 0.001 8 T1 # 1 0 0 920 0.98 **** 0.001 * Maximum degree of saturation # Combined Movement Capacity parameters are shown for all Movement Classes. DVEMENT PERFORMANCE Mov Turn Total Total Aver. Eff. Total Perf. Tot.Trav. Tot.Trav. Aver. DD Delay Delay Delay Stop Stops Index Distance Time Speed (veh-h/h) (pers-h/h) (sec) Rate (veh-km/h) (veh-h/h) (km/h) Outh: Leeds Parade 2 T1 0.00 0.00 0.0 0.00 0.0 0.01 0.6 0.0 50.0 3 R2 0.00 0.00 8.0 0.67 18.1 0.47 15.7 0.4 42.8 Maximum Structure Maximum Capacity 4 L2 0.01 0.01 7.5 0.63 51.8 1.00 18.3 0.5 35.3 6 R2 0.00 0.00 7.5 0.63 0.6 0.18 0.2 0.0 35.3 Outh: Leeds Parade 0.00 0.00 7.5 0.63 0.6 0.18 0.2 0.0 35.3	DVEM	Turn Turn Ti Lee T1 R2	ion ID Sign Co CAPACIT Mov Cl. i I I S Cl. i I I S Cl. i I I I I I I I I I I I I I I I I I I I	: 1 ontrolle TY PARAN CArv Flow F yeh/h v rade 1 27	METERS Dpng M ?low zeh/h 0 0	S Movemen Adju: Flow pcu/l	tion nt Tota st. Cay h veh, 1885 1753	al Pra p. Deg Sat /h xp 9 0.9 3 0.9	c. Prac . Spai n Cap 8 *** 8 6263	c. Deg re Sat	n 01 15				
7 L2 # 1 0 0 920 0.98 **** 0.001 8 T1 # 1 0 0 920 0.98 **** 0.001 * Maximum degree of saturation # Combined Movement Capacity parameters are shown for all Movement Classes. WEMENT PERFORMANCE Mov Turn Total Total Aver. Eff. Total Perf. Tot.Trav. Tot.Trav. Aver. TD Delay Delay Delay Stop Stops Index Distance Time Speed (veh-h/h)(pers-h/h)(sec) Rate (veh-km/h)(veh-h/h) (km/h) puth: Leeds Parade 2 T1 0.00 0.00 0.0 0.00 0.0 0.01 0.6 0.0 50.0 3 R2 0.00 0.00 8.0 0.67 18.1 0.47 15.7 0.4 42.8 mast: University 4 L2 0.01 0.01 7.5 0.63 51.8 1.00 18.3 0.5 35.3 6 R2 0.00 0.00 7.5 0.63 0.6 0.18 0.2 0.0 35.3 	Nter NVEM Mov ID 2 3 4	Turn Turn Ti Le Tl R2 Uni L2	ion ID Sign Co CAPACIT 	: 1 ontrolle TY PARAN CArv Flow F veh/h v crade 1 27 	METERS Dpng M Flow veh/h 0 0	S Movemen Adjus Flow pcu/l 0 0	tion nt Tota st. Cap h veh, 1885 1753	al Pra p. Deg Sat /h xp 3 0.9 3 0.9	c. Prac . Span n Cap % 	c. Deg re Sat * 0.00 3 0.01 	2 2 2 2 2 1 2 5 5 5 2 *				
<pre>* Maximum degree of saturation # Combined Movement Capacity parameters are shown for all Movement Classes. WEMENT PERFORMANCE for Turn Total Total Aver. Eff. Total Perf. Tot.Trav. Tot.Trav. Aver. Delay Delay Delay Stop Stops Index Distance Time Speed</pre>	NVEM NVEM LD 2 3 ast: 4 6	Turn Turn Ti Lea T1 R2 L2 R2 R2	ion ID Sign CC CAPACIT 	: 1 ontrolle FY PARAN CArv Flow H veh/h v rade 1 27 % 82 1	4ETER: Dpng M ?low reh/h 0 0 0	S Movemen Adjus Flow pcu/l 0 0 0	tion nt Tota st. Cay h veh, 1889 1753 1564	al Pra p. Deg Sat /h xp 3 0.9 3 0.9 3 0.8 8 0.8	c. Prac . Span n Cap * * 8 **** 8 6263 0 1430 0 1430	c. Deg re Sat * 0.00 3 0.01 0 0.05 0 0.05	2 2 2 2 2 1 2 5 2 4 5 2 * 5 2 *				
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Ast: University 4 L2 0.01 0.01 7.5 0.63 51.8 1.00 18.3 0.5 35.3 6 R2 0.00 0.00 7.5 0.63 0.6 0.18 0.2 0.0 35.3 	DVEM 10V 10 	MENT (MENT) Turn Turn L2 R2 Cuni: L2 T1 L2 T1 Combi: Combi: Turn (ion ID Sign Cd CAPACIT Mov Cl. i eds Par # # versity # # eds Par # # 	1 TY PARAM TY PARAM Ty PARAM Tow F Tow F Ty Physical Types of Types	METER: Dopng N Flow reh/h 0 0 0 0 0 0 0 0 0 0 0 0 0	Vovemei Adju: Flow pcu/l 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	tion nt Tota st. Cap h veh, 1888 175: 1566 192 920 920 920 rameters Eff. 5 Stop 5 Stop 5 Rate	al Pra p. Deg Sat /h xp 9 0.9 3 0.9 5 at 5 at 5 at 5 at 5 at 5 at 5 at 5 at	c. Prace . Span n Cap % 	c. Deg re Sat	:n ()1 55 ()1 52* ()2* ()1 10 (oveme) ()1 ()2*	.Trav. ime h-h/h)	Aver. Speed (km/h)		
orth: Leeds Parade	DVEM 2 	MENT (MENT) Turn Turn Turn R2 Cuni: Le R2 Cuni: Le R2 Maxin Combi: Combi: Combi: Cuni: Le R2 Turn Cuni: Cu	ion ID Sign Co CAPACIT eds Pan # eds Pan # # mum deg ned Mor PERFORI Delay veh-h/1 Delay veh-h/1 ds Pan 0.000	ry PARAM FY PARAM Plow F Plow F rade 1 27 rade 1 1 rade 1 1 rade 1 1 rade 1 1 rate 0 rate 0 rate 0 rate 0 rate 0 rate 0 rate 0 rate 0 rate 0 rate 0 rate 1 r rate 1 rate 1 r rate 1 r r r r r r r r r r r r r r r r r r	4ETER: 	Vovemes Adjus Flow pcu/l 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	tion nt Tota st. Cap h veh, 1888 1753 1566 19 920 920 920 rameters Eff. 5 Stop S Rate 0.00 0.67	al Pra p. Deg Sat /h xp 9 0.9 3 0.9 5 0.0 5 0.9 5 0.0 5	c. Praces Praces Praces Praces Praces Praces Provide Praces Provide Praces Prac	c. Deg re Sat * 0.00 3 0.01 0 0.05 0 0.05 * 0.00 * 0.00 * 0.00 r all M ot.Trax istance veh-km/ 0.6 15.7	:n)1 52* 01 01 foveme: 7. Tot Tot 	.Trav. ime h-h/h) 0.0 0.4	Aver. Speed (km/h) 50.0 42.8		
	11 ter 10 ven 10 ven 10 ven 10 ven 10 ven 10 ven 10 ven 11 ven 12 3 14 6 15 ven 16 ven 17 ven 18 ven 19 ven 19 ven 10	rsect Way MENT Turn Turn I L2 R2 I L2 T1 L2 T1 Maxin Combi: Combi: Turn (Turn I L2 T1 I L2 T1 I L2 T1 I L2 T1 I L2 T1 I I I L2 T1 I I I I I I I I I I I I I I I I I I	ion ID Sign Cd CAPACIT 	<pre>: 1 ontrolle IY PARAM</pre>	METER: 	Vovemen Adjus Flow pcu/l 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	tion nt Tota st. Cap h veh, 1889 1752 1566 1920 920 920 920 920 920 920 920	al Pra p. Deg Sat /h xp 9 0.9 3 0.9 5 0.9 5 are s Fotal Stops 0.0 18.1	c. Praces Praces Praces Praces Praces Praces Praces Praces Provided Praces Prac	c. Deg re Sat	n 2 2 2 2 2 2 2 2 2 2 2 2 2	.Trav. ime h-h/h) 0.0 0.4	Aver. Speed (km/h) 50.0 42.8		

Fuel Consumption, Emissions and Cost Site:Uni existing PM

Intersection ID: 1 Give-Way Sign Controlled Intersection

FUEL CONSUMPTION, EMISSIONS AND COST (TOTAL)

Mov Turn ID	Total	Total	Total	CO Total kg/h	Total	Total
South: Leeds Par	rade					
2 T1	0.41	0.0	0.1	0.00	0.000	0.000
3 R2				0.01		0.006
	13.25	1.1	2.5	0.01	0.001	0.006
East: University						
4 L2		1.7	3.9	0.01	0.001	0.012
6 R2	0.24	0.0	0.0	0.00	0.000	0.000
-	19.67	1.7	4.0	0.01	0.001	0.012
North: Leeds Par	rade					
7 L2	0.44	0.0	0.1	0.00	0.000	0.000
8 T1	0.44	0.0	0.1	0.00	0.000	0.000
	0.88	0.1	0.2	0.00	0.000	0.000
INTERSECTION:	33.80	2.8	6.7	0.02	0.003	0.019

FUEL CONSUMPTION, EMISSIONS AND COST (RATE)

Mov Turn	Cost	Fuel	C02	CO	HC	NOX
ID	Rate	Rate	Rate	Rate	Rate	Rate
	\$/km	L/100km	g/km	g/km	g/km	g/km
South: Leeds Par	ade					
2 T1	0.70	6.1	144.0	0.43	0.051	0.352
3 R2	0.82	6.6	156.5	0.48	0.061	0.381
				0.48		
East: University						
4 L2	1.06	9.0	213.5	0.60	0.079	0.669
6 R2	1.06	9.0	213.5	0.60	0.079	0.669
_	1.06	9.0	213.5	0.60	0.079	0.669
North: Leeds Par	ade					
7 L2	0.76	6.3	149.5	0.46	0.056	0.364
8 T1	0.76	6.3	149.5	0.46	0.056	0.364
-	0.76	6.3	149.5	0.46	0.056	0.364
INTERSECTION:	0.78	6.5	154.5	0.45	0.058	0.440

Go to Table Links (Top)

Lanes

Lane Performance and Capacity Information Site:Uni existing PM

Intersection ID: 1 Give-Way Sign Controlled Intersection

LANE PERFORMANCE

about:blank

						Que	u e	
	Flow	Cap	Deg.	Aver.	Eff.	95% B	ack	Lane
Lane			Satn	Delay	Stop			Length
No.	veh/h	veh/h	х	sec	Rate	veh	m	m
South: 1	Leeds Pa	arade						
1	1	1889	0.001	0.0	0.00			500.0
2	27	1753	0.015	8.0	0.67	0.1	0.5	60.0T

_____ 1 83 1587 0.052 7.5 0.63 0.2 1.6 140.0 North: Leeds Parade North: Leeds Parade 1 2 1840 0.001 3.7 0.40 50 500.0 T Short lane due to specification of Turn Bay LANE FLOW AND CAPACITY INFORMATION _____ Lane Total Min Tot Deg. Lane No. Arv Flow Cap Cap Satn Util (veh/h) veh/h veh/h x % South: Leeds Parade
 1
 1
 1
 1889
 0.001
 100

 2
 27
 6
 1753
 0.015
 100
 _____ East: University 1 83 6 1587 0.052 100 - ... North: Leeds Parade 1 2 2 1840 0.001 100 _____ The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle effects. Saturation flow scale applies if specified. Go to Table Links (Top) Lane Delays Site:Uni existing PM Intersection ID: 1 Give-Way Sign Controlled Intersection LANE DELAYS _____ ----- Delay (seconds/veh) -----Deg. Prog. Stop-line Delay Acc. Queuing Stopd Lane Sath Factor 1st 2nd Total Dec. Total MvUp (Idle) Geom Control No. x dl d2 dSL dn dq dam di dia dia dq dqm di di _____ South: Leeds Parade 1 0.001 0.0 0.0 0.0 0.0 0.0 2 0.015 1.000 0.0 0.0 0.0 0.1 0.0 0.0 0.0 8.0 8.0 ------East: University 0.052 1.000 0.0 0.0 0.0 0.0 0.0 0.0 0.0 7.5 7.5 1 _____ _____ North: Leeds Parade 3.7 3.7 -----_____ SIDRA Standard Delay Model is used. Control Delay is the sum of Stop-line Delay and Geometric Delay. dSL: Stop-line delay (=d1+d2) dn: Average stop-start delay for all vehicles queued and unqueued dq: Queuing delay (the part of the stop-line delay that includes stopped delay and queue move-up delay) dqm: Queue move-up delay di: Stopped delay (stopped (idling) time at near-zero speed) dig: Geometric delay dic: Control delay LANE DELAY PERCENTILES _____ Percentile Delay Deg. Lane Satn -----_____ x 50% 70% 85% 90% 95% 98% 100% No. South: Leeds Parade 1 0.052 7.5 7.5 7.5 7.5 7.5 7.5 7.5 North: Leeds Parade NA - Continuous Movement 1 _____

Lane Queues Site:Uni existing PM

Intersection ID: 1 Give-Way Sign Controlled Intersection

LANE QUEUES (VEHICLES)

Lane	Deg. Satn	Prog. Factor	Ovrfl. Oueue		~	eue (ve		~	Prob. Block		Cyc-Av	~
No.	x	FACCOL	No	Nbl	Nb2	Nb		Ratio	\$ BIOCK	\$ BIOCK	NC	95%
South:	Leeds	Parade										
2	0.015	1.000	0.0	0.0	0.0	0.0	0.1	0.00	0.0	100.0	0.0	0.0
East:	Univer	sity										
1	0.052	1.000	0.0	0.1	0.0	0.1	0.2	0.00	0.0	100.0	0.0	0.0

LANE QUEUES (DISTANCE)

Lane	Deg. Satn	Prog. Factor	Ovrfl. Oueue		~	eue (m)		~	Prob. Block		Cyc-Av.	~
No.	x		No	Nbl	Nb2	Nb	95%	Ratio	8	8	Nc	95%
South		Parade									0.0	0.0
East: 1	Univer 0.052	-	0.0	0.6	0.0	0.6	1.6	0.00	0.0	100.0	0.0	0.0
North	: Leeds	Parade										

Go to Table Links (Top)

Lane Queue Percentiles Site:Uni existing PM

Intersection ID: 1 Give-Way Sign Controlled Intersection

LANE QUEUE PERCENTILES (VEHICLES)

	Deg.		Perce	ntile B	ack of (Queue	(veh)	
No.	х	50%	70%	85%	90%	95%	98%	
2		Parade 0.0						
1		o.1						
North	: Leeds							
LANE OU	JEUE PER	CENTILES	(DIST	ANCE)				
					ack of (Dueue	(metres)	
 Lane	Deg. Satn	CENTILES	Perce	ntile B				
Lane No. South	Deg. Satn x : Leeds	50% Parade 0.2	Perce: 70%	ntile B 85% 	90%	95% 	98%	100%
Lane No. South 2 East: 1	Deg. Satn x : Leeds 0.015 Univers 0.052	50% Parade 0.2 Sity 0.6	Percei 70% 0.3 0.8	ntile E 85% 0.4 1.2	90% 0.4 1.3	95% 0.5 1.6	98% 0.6 1.7	100% 0.6 1.9
Lane No. South 2 East: 1 North	Deg. Satn x : Leeds 0.015 Univers 0.052 : Leeds	50% Parade 0.2 Sity 0.6	Perces 70% 0.3 0.8	ntile B 85% 0.4 1.2	90% 0.4 1.3	95% 0.5 1.6	98% 0.6 1.7	100% 0.6 1.9

Lane Stops Site:Uni existing PM

Intersection ID: 1 Give-Way Sign Controlled Intersection

No.	Satn x	Factor	hel	he2	Geom. hig	Rate Overall h	Total Stops H	Rate hqm	Move-ups Hqm	Queued pq
South 1	: Leeds 0.001	Parade 1.000			0.00	0.00 0.67	0.0			
	Univer 0.052	-	0.00	0.00	0.63	0.63	52.4	0.00	0.0	0.01
	Leeds 0.001					0.40	0.8			
		average	value	for al	l move	ments in all vehi			unqueue	

Go to Table Links (Top)

Flow Rates

Origin-Destination Flow Rates (Total) Site: Uni existing PM Intersection ID: 1 Give-Way Sign Controlled Intersection TOTAL FLOW RATES (ALL MOVEMENT CLASSES)

 From SOUTH To:
 N
 E

 Turn:
 T1
 R2
 TOT

 Flow Rate
 1.0
 27.0
 28.0

 %HV (all designations)
 5.0
 5.0
 5.0

 From EAST To:
 S
 N

 Turn:
 L2
 R2
 TOT

 Flow Rate
 82.0
 1.0
 83.0

 PUV (all designations)
 5.0
 5.0
 5.0

%HV (all designations)	5.0	5.0	5.0
From NORTH To: Turn: Flow Rate %HV (all designations)	E L2 1.0 5.0	S T1 1.0 5.0	TOT 2.0 5.0

Go to Table Links (Top)

Origin-Destination Flow Rates by Movement Class Site:Uni existing PM

```
Intersection ID: 1
Give-Way Sign Controlled Intersection
```

FLOW RATES FOR Light Vehicles

From SOUTH To:	N	Е	
Turn:	Т1	R2	TOT
Flow Rate - Veh	0.9	25.6	26.6
Mov Class %	95.0	95.0	95.0
Flow Scale - Fixed	1.00	1.00	
Flow Scale - Var	1.00	1.00	
Peak Flow Factor	1.00	1.00	
From EAST To:	 S	N	
From EAST To: Turn:	S L2	N R2	тот
			TOT
		R2	
Turn:	L2	R2	78.8
Turn: Flow Rate - Veh	L2 77.9 95.0	R2	78.8
Turn: Flow Rate - Veh Mov Class % Flow Scale - Fixed	L2 77.9 95.0	R2 0.9 95.0	78.8
Turn: Flow Rate - Veh Mov Class % Flow Scale - Fixed	L2 77.9 95.0 1.00 1.00	R2 0.9 95.0 1.00	78.8

From NORTH To: Turn:	E L2	S T1	TOT
Flow Rate - Veh Mov Class % Flow Scale - Fixed Flow Scale - Var Peak Flow Factor		0.9 95.0 1.00 1.00 1.00	1.9 95.0
FLOW RATES FOR Heavy	Vehicle	s	
From SOUTH To: Turn:	N T1	E R2	тот
Flow Rate - Veh Mov Class % Flow Scale - Fixed Flow Scale - Var Peak Flow Factor	0.1 5.0 1.00 1.00 1.00	1.4 5.0 1.00 1.00 1.00	1.4 5.0
From EAST To: Turn:	S L2	N R2	тот
Flow Rate - Veh Mov Class % Flow Scale - Fixed Flow Scale - Var Peak Flow Factor	4.1 5.0 1.00 1.00 1.00	0.1 5.0 1.00 1.00 1.00	4.2 5.0
From NORTH To: Turn:	E L2	S T1	TOT
Flow Rate - Veh Mov Class % Flow Scale - Fixed Flow Scale - Var Peak Flow Factor	0.1 5.0 1.00 1.00 1.00		0.1 5.0

Lane Flow Rates Site:Uni existing PM

Intersection ID: 1 Give-Way Sign Controlled Intersection

LANE FLOW RATES AT STOP LINE

From SOUTH To:	N	Е	
Turn:	T1	R2	TOT
Lane 1			
LV	0.9	*	0.9
HV	0.1	*	0.1
Total Lane 2	1.0	*	1.0
LV	*	25.6	25.6
HV	*	1.4	1.4
Total	*	27.0	27.0
Approach	1.0	27.0	28.0
From EAST To:	S	N	
Turn:	L2	R2	TOT
Lane 1			
LV	77.9		
HV	4.1	0.1	4.2
Total	82.0	1.0	83.0
Approach	82.0	1.0	83.0
From NORTH To:	E	s	
Turn:	L2	Т1	TOT
Lane 1			
LV	0.9	0.9	1.9
HV	0.1		
Total	1.0	1.0	2.0
Approach	1.0	1.0	2.0
* Movement not	allocated	to the	lane

		LV				
Exit: S						
Lane: 1		78.8	4.2			
Total		78.8				
Exit: E						
Lane: 1		26.6	1.4			
Total		26.6				
Exit: N						
Lane: 1		1.9	0.1			
Total		1.9				
DOWNSTRE	AM LANE F	allocated	FOR EXI			
DOWNSTRE	AM LANE F	LOW RATES	FOR EXI			
DOWNSTRE	AM LANE F. Class: DUTH	LOW RATES	FOR EXI HV			
DOWNSTRE Movement Exit: So Lane: 1	AM LANE F. Class: DUTH	LOW RATES 	FOR EXI HV 4.2			
DOWNSTRE Movement Exit: So Lane: 1 Total	AM LANE F. Class: DUTH	LOW RATES LV 78.8 78.8	FOR EXI HV 4.2			
DOWNSTRE	AM LANE F Class: DUTH	LOW RATES LV 78.8 78.8	FOR EX1			
DOWNSTRE Movement Exit: So Lane: 1 Total Exit: E Lane: 1	AM LANE F Class: DUTH	LOW RATES LV 78.8 78.8 26.6	FOR EXI HV 4.2 4.2 1.4			
DOWNSTREA Movement Exit: SG Lane: 1 Total Exit: EA Lane: 1 Total	AM LANE F. Class: DUTH	LOW RATES LV 78.8 78.8	FOR EXI HV 4.2 4.2 1.4			
DOWNSTRE	AM LANE F Class: DUTH AST	LOW RATES LV 78.8 78.8 26.6	FOR EXI HV 4.2 4.2 1.4			
DOWNSTREA Movement Exit: SG Lane: 1 Total Exit: E Lane: 1 Total	AM LANE F Class: OUTH AST	LOW RATES LV 78.8 78.8 26.6 26.6 26.6	FOR EXJ HV 4.2 4.2 1.4 1.4 0.1			
DOWNSTRE Exit: S(Lane: 1 Total Exit: E Lane: 1 Total Exit: N(AM LANE F. Class: DUTH AST	LOW RATES LV 78.8 78.8 26.6 26.6 26.6	FOR EXI HV 4.2 4.2 1.4 1.4 0.1 0.1			

Other

Model Settings Summary Site:Uni existing PM Intersection ID: 1 Give-Way Sign Controlled Intersection * Basic Parameters: Intersection Type: Unsignalised - Give Way Driving on the left-hand side of the road Input data specified in Metric units Model Defaults: New South Wales Peak Flow Period (for performance): 30 minutes Unit time (for volumes): 60 minutes. SIDRA Standard Delay model used SIDRA Standard Queue model used Level of Service based on: Delay (RTA NSW) Queue percentile: 95%

Diagnostics Site:Uni existing PM

Go to Table Links (Top)

Processed: 2 February 2016 8:59:19 AM SIDRA INTERSECTION 6.0.1.3703

Project: O:\Synergy\Projects\215\215322\Out\Reports\Traffic\215322_university.sip6 8000782, GEOLYSE PTY LTD, PLUS / 1PC

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DETAILED OUTPUT

Site: Uni post AM

New Site Giveway / Yield (Two-Way)

OUTPUT TABLE LINKS

fill Movements Intersection Negotiation Data Gap Acceptance Parameters Movement Capacity and Performance Parameters Fuel Consumption, Emissions and Cost 💙 Lanes Lane Performance and Capacity Information Lane Delays Lane Queues Lane Queue Percentiles Lane Stops IF Flow Rates Origin-Destination Flow Rates (Total) Origin-Destination Flow Rates by Movement Class Lane Flow Rates E Other Model Settings Summary Diagnostics

Movements

Intersection Negotiation Data Site:Uni post AM

Intersection ID: 1 Give-Way Sign Controlled Intersection

INTERSECTION NEGOTIATION DATA

From Approach	To Exit	Turn	Negn Radius M	Negn Speed km/h	Negn Dist. m	Appr. Dist. m	Downstre m	eam Distance User Spec?
South: Le	eds Para	de						
	North	Т1	S	50.0	10.0	500	157	No
	East	R2	6.6	17.2	10.4	500	105	No
East: Uni	versity							
	South	L2	10.0	20.2	15.7	500	108	No
	North	R2	6.6	17.2	10.4	500	103	No
North: Le	eds Para	de						
	East	L2	10.0	20.2	15.7	500	72	No
	South	Τ1	S	50.0	10.0	500	158	No

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

MOVEMENT SPEEDS AND GEOMETRIC DELAY

					Oueue M				
Mov Turn ID	App. Spe Cruise			Speeds Cruise	lst Grn	2nd Grn	Av. Sect Running		Geom Delay sec
South: Le	eds Parad	le							
2 T1	50.0	50.0	50.0	50.0			50.0	50.0	0.0
3 R2	50.0	17.2	17.2	50.0	17.2		41.6	41.6	8.0
East: Uni	versity								
4 L2	50.0	20.2	20.2	50.0	19.7		41.8	41.8	7.5
6 R2	50.0	17.2	17.2	50.0	19.7		41.8	41.8	8.0

North: Leeds Parade

	unning						luding s	stopped	period	5.		
to T	able L	inks (T	op)									
	A c = -	otor	o Da	ooto								
		ost Al	e Paran M	neters								
		ion I Sian		led In	tersecti	on						
	-	-										
			010	200	Critical	Gap	Toll up	Enter	Int	ah Dwore	n	
0po Lai	d ne	Dest	Fl pc	ow 1 u/h	Hdwy sec	Dist m	Headway sec	HV Equi	Hdw v se	y Bnch c	d	
Sout	th: L	eeds	Parade				2.05			0 0.03	6	
	1 1	S N	30 1 49	9+ 5+	5.43	0.0	3.07	1.03	2 0.9	0 0.03 8 0.04	5	
		eeds	Parade									
					his appr							
										ntry stre		
							dialogs n opposi				edestria	n movements
	1010	eneag	01 01	101119		Judica 1	III OPPODI		1010 11			
to T	able L	inks (T	op)									
ite:	rsect	ost Ál ion I	M D: 1			Parame	elers					
nte: Lve	rsect -Way	ion I Sign	M D: 1 Control	led In	tersecti		elers					
nte: Lve DVEI	rsect -Way MENT	ion I Sign CAPAC	M D: 1 Control TTY PAR	led In AMETER	tersecti S	lon		Prac	Deg			
nte: ive DVEI	rsect -Way MENT	ion I Sign CAPAC	M D: 1 Control CITY PAR Arv Flow	led In AMETER Opng I Flow	tersecti S Movement Adjust Flow	Lon Total	Prac. Deg. Satn	Cap.				
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nte: ive DVEI Mov ID 2 3	rsect -Way MENT Turn Turn h: Le T1 R2	DSt Al ion I Sign CAPAC Mov Cl. eds P #	M D: 1 Control TITY PAR Arv Flow veh/h arade 101 78	led In AMETER. Opng I Flow veh/h 0 0	tersecti S Movement Adjust Flow pcu/h 	ton Total Cap. veh/r 1889 1298	Prac. Deg. Satn 1 xp	Cap. % 1733 1530	x 0.053 0.060			
nte: ive DVEI Mov ID 2 3 	rsect -Way MENT Turn h: Le T1 R2	CAPAC CAPAC Mov C1. eds P # #	M D: 1 Control TTY PAR Arv Flow veh/h arade 101 78	led In AMETER. Opng I Flow veh/h 0 0	tersecti S Movement Adjust Flow pcu/h 0 0	Total Cap. veh/r 1889 1298	0.98 0.98	Cap. % 1733 1530	x 0.053 0.060			
DVEI	MENT Turn Turn Le T1 R2 L2 R2	DST AI ion I Sign CAPAC CAPAC Cl. Cl. eds P # # wersi #	M D: 1 Control CITY PAR Arv Flow veh/h varade 101 78 ty 26 2	led In AMETER. Opng I Flow veh/h 0 0 0	tersecti S Movement Adjust Flow pcu/h 0 0 0	Total Total Cap. veh/r 1889 1298 1046 80	Drac. Deg. Satn 1 xp 0.98 0.98	Cap. % 1733 1530 3118 3118	x 0.053 0.060 0.025 0.025			
DVEI DVEI 40v DUTI 2 3 4 6 	rsect -Way MENT Turn n: Le T1 R2 : Uni L2 R2 	OSTÂI ion I Sign CAPAC CAPAC Cl. Mov Cl. # # versi # # ueds P # eds P	M D: 1 Control TTY PAR Arv Flow veh/h varade 101 78 26 2 2 2 arade	led In AMETER Opng I Flow veh/h 0 0 0 0	tersecti S Movement Adjust Flow pcu/h 0 0 0	Total Total Cap. veh/r 1889 1298 1046 80	Prac. Deg. Satn xp 0.98 0.98 0.80 0.80	Cap. % 1733 1530 3118 3118	x 0.053 0.060 0.025 0.025			
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nte: ive OVEI ID 2 3 2 3 4 6 7 8 	MENT 	OST AI ion I Sign CAPAC C1. C1. C1.	M D: 1 Control CITY PAR Arv Flow veh/h arade 101 78 ty 26 2 2301	led In AMETER. Opng I Flow veh/h 0 0 0 0 0 0	tersecti S Movement Adjust Flow pcu/h 0 0 0 0	Total Total Cap. veh/r 1889 1298 1046 80 31 1856	Prac. Deg. Satn xp 0.98 0.98 0.80 0.80 0.80	Cap. % 1733 1530 3118 3118 3118 504 504	x 0.053 0.060 0.025 0.025 0.162* 0.162*			
nte: ive OVEI for 2 3 3 4 6 7 8 *	MENT 	Dost AI ion I Sign CAPAC CAPAC C1. Mov C1. # # wersi # # eds P # # # mum d	M D: 1 Control ITY PAR Arv Flow veh/h varade 101 78 20 2 2 2 301 varade 5 301	led In AMETER Opng D Flow veh/h 0 0 0 0 0 0 0 0 0 0 0	tersecti S Movement Adjust Flow pcu/h 0 0 0 0 0 0 0 0 0 0 0	Lon Total Cap. veh/r 1889 1298 1046 80 31 1856	Prac. Deg. Satn 1 xp 0.98 0.98 0.80 0.80 0.80 0.98 0.98	Cap. % 1733 1530 3118 3118 504 504	x 0.053 0.060 0.025 0.025 0.162* 0.162*	ement Cla	sses.	
DVEI 	MENT 	OST AI ion I Sign CAPAC CL. Cl. Cl. eds P # # eds P # # mum d M	M D: 1 Control TTY PAR Arv Flow veh/h 101 78 20 26 2 301 degree of tovement	led In AMETER Opng D Flow veh/h 0 0 0 0 0 0 0 0 0 0 0	tersecti S Movement Adjust Flow pcu/h 0 0 0 0 0 0 0 0 0 0 0	Lon Total Cap. veh/r 1889 1298 1046 80 31 1856	Prac. Deg. Satn 1 xp 0.98 0.98 0.80 0.80 0.80 0.98 0.98	Cap. % 1733 1530 3118 3118 504 504	x 0.053 0.060 0.025 0.025 0.162* 0.162*	ement Clas	sses.	
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nte: ive OVEI 2 3 2 3 3 6 7 8 6 7 8 4 6 7 8 4 6 7 8 8 7 8 9 0 VEI 2 3 7 8 9 0 VEI 2 3 	MENT Turn Turn Turn R2 R2 R2 R2 Maxi Combi MENT Turn MENT Maxi 	DST AI ion I Sign CAPAC C1. C1. C1. C1. eds P # # # eds P # # mum d ned M PERFO Tota Dela Veh-h 	M D: 1 Control PITY PAR Arv Flow veh/h 	led In AMETER. Opng I Flow veh/h 0 0 0 f satu: Capac tal lay 1 s-h/h) 	tersecti S Movement Adjust Flow pcu/h 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Total Total Cap. veh/r 1889 1298 1046 80 31 1856 ameters	Prac. Deg. Satn xp 0.98 0.98 0.80 0.80 0.98 0.98 are show	Cap. % 1733 1530 3118 3118 504 504 504 504 504 504 504 504	x 0.053 0.025 0.025 0.162* 0.162* all Mov .Trav.	Tot.Trav. Time (veh-h/h)	Aver. Speed (km/h)	
nte: ive OVEI 2 3 2 3 4 6 7 8 4 6 7 8 4 6 8 8 10 7 8 9 7 8 8 10 7 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	MENT 	Dest AI ion I Sign CAPAC CAPAC C1. C1. C1. C1. C1. C1. C1. C1. C1. C1	M D: 1 Control	led In AMETER Opng I Flow veh/h 0 0 0 0 0 0 0 f satu Capac tal 1ay s-h/h) 00 01	tersecti S Movement Adjust Flow pcu/h 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Ion Total Total Cap. veh/r 1889 1298 1046 80 31 1856 31 1856 ameters Stff. To Stop St Rate	Prac. Deg. Satn xp 0.98 0.98 0.80 0.80 0.98 0.98 are show otal Pen cops Inc 0.0 1. 51.7 1.	Cap. % 1733 1530 3118 3118 3118 504 504 504 504 504 504 504 504	x 0.053 0.060 0.025 0.162* 0.162* all Mov tance h-km/h) 58.4 45.2	 Tot.Trav. Time	Aver. Speed (km/h) 50.0 41.6	
nte: ive over mov ID 2 3 2 3 4 6 7 8 8 8 8 8 8 7 8 8 9 VEI 2 3 2 3 7 8 9 VEI 2 3 7 8 9 VEI 2 3 7 8 9 VEI 2 3 7 8 8 9 VEI 2 3 7 8 8 9 VEI 2 3 3 7 8 9 VEI 2 3 5 7 9 VEI 2 3 7 8 9 VEI 2 3 8 8 9 VEI 2 3 7 8 9 VEI 2 3 8 8 9 VEI 2 3 7 7 9 10 9 10 9 10 9 10 10 10 10 10 10 10 10 10 10 10 10 10	<pre></pre>	DST AI ion I Sign CAPAC CAPAC C1. C1. C1. C1. C1. C1. Wov C1. Wov C1. C1. C1. C1. C1. C1. C1. C1. C1. C1.	M D: 1 Control PITY PAR Arv Flow veh/h Carade 101 78 26 2 301 Varade 5 301 Varade 5 301 Varade 101 78 varade 101 70 varade 101 70 varade 101 70 varade 101 70 varade 10 varade 10 varade 10 	led In AMETER. Opng I Flow veh/h 0 0 0 0 0 0 flow Capac tal lay s-h/h) 00 0 lay	tersecti S Movement Adjust Flow pcu/h 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Total Total Cap. veh/H 1889 1298 1298 1298 1298 1298 1298 1298	Prac. Deg. Satn xp 0.98 0.98 0.80 0.80 0.98 0.98 0.98 are show otal Pen cops Inc 0.0 1. 51.7 1.	Cap. % 1733 1530 3118 3118 3118 504 504 504 504 504 504 504 504	x 0.053 0.025 0.025 0.162* 0.162* all Mov .Trav. tance h-km/h) 58.4 45.2	Tot.Trav. Time (veh-h/h) 1.2 1.1	Aver. Speed (km/h) 50.0 41.6	
nte: ive 0VEI 0utl 2 3 ast 4 6 7 8 6 1D 2 3 2 3 2 4 6 2 3 5 4 6 10 7 8 2 3 10 7 8 10 9 10 10 10 10 10 10 10 10 10 10 10 10 10	MENT Turn Turn Turn Turn 12 R2 12 R2 12 R2 Maxi Combi MENT Turn ((n: Le T1 Maxi Combi MENT Turn (L2 R2 R2 R2 R2 R2 R2 R2 R2 R2 R	DST AI ion I Sign CAPAC CAPAC CI. Mov Cl. # # # # wersi # # # # mum d ned M PERFO PERFO Dela Versi Dela Dela Versi 0.0 0.0 0.0	M D: 1 Control	led In AMETER: Opng I Flow veh/h 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 5 satu: Capac tal 1 1ay 1 5 s-h/h) 00 01 000 0 0 0 0 0 0 0 0 0 0 0	tersecti S Movement Adjust Flow pcu/h 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	lon Total Total Cap. veh/r 1889 1298 1046 80 31 1856 ameters Stff. To Stop St Rate 0.00 0.66 0.63 0.63	<pre>Prac. Deg. Satn xp 0.98 0.98 0.80 0.80 0.80 0.98 0.98 are show cops Inc 0.0 1. 51.7 1. 16.3 0. 1.3 0.</pre>	Cap. % 1733 1530 3118 3118 3118 504 504 504 504 	x 0.053 0.060 0.025 0.162* 0.162* 0.162* all Mov .Trav. tance h-km/h) 58.4 45.2 15.2 1.2	Tot.Trav. Time (veh-h/h) 1.2 1.1	Aver. Speed (km/h) 50.0 41.6 41.8 41.8	
nte: ive over Mov ID 2 3 ast 4 6 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 9 0 VEI 2 3 7 9 0 VEI 2 3 7 9 0 VEI 2 3 7 8 7 8 7 8 7 8 7 8 7 8 7 9 0 VEI 2 3 7 8 7 9 0 VEI 2 3 7 9 0 0 10 10 10 10 10 10 10 10 10 10 10 10	<pre>vrsect -Way MENT Turn</pre>	OST AI ion I Sign CAPAC CAPAC C1. C1. C1. C1. C1. C1. C1. C1. C1. C1	M D: 1 Control PITY PAR Arv Flow veh/h arade 101 78 26 2 301 ty 26 2 301 ty Parade 5 301 egree o lovement PRMANCE l To y De t/h)(per parade 0 0. 1 0. ty 0 0. 0 0. ty 0 0. 	led In AMETER. Opng I Flow veh/h 0 0 0 f satu: Capac tal iay s-h/h) 00 0 0 0 0 0 0 0 0 0 0 	tersecti S Movement Adjust Flow pcu/h 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Total Total Cap. veh/H 1889 1298 1046 80 31 1856 ameters Sff. To Stop St Rate 0.00 0.66 0.63 .63	Prac. Deg. Satn 1 xp 0.98 0.98 0.98 0.98 0.98 0.98 0.98 0.98	Cap. % 1733 1530 3118 3118 3118 504 504 504 504 	x 0.053 0.025 0.025 0.162* 0.162* 0.162* all Mov .Trav. tance h-km/h) 58.4 45.2 15.2 1.2	Tot.Trav. Time (veh-h/h) 1.2 1.1 0.4 0.0	Aver. Speed (km/h) 50.0 41.6 41.8 41.8	

Fuel Consumption, Emissions and Cost Site:Uni post AM

Intersection ID: 1 Give-Way Sign Controlled Intersection

FUEL CONSUMPTION, EMISSIONS AND COST (TOTAL)

Mov Turn ID		Total	CO2 Total kg/h	Total	Total	Total
South: Leeds Pa	rade					
	41.05	3.6	8.4	0.03	0.003	0.021
3 R2			7.2			0.017
			15.6			
East: Universit	-					
4 L2			2.4			
6 R2	0.97		0.2			0.000
			2.6			
North: Leeds Pa:	rade					
7 L2	2.04	0.2	0.4	0.00	0.000	0.001
8 T1	122.67		25.1			0.061
			25.5			
INTERSECTION:	217.40	18.5	43.6	0.13	0.016	0.106

FUEL CONSUMPTION, EMISSIONS AND COST (RATE)

Mov Turn ID	Rate	Fuel Rate L/100km	Rate	Rate	Rate	Rate
 South: Leeds Pa	arade					
	0.70	6.1	144.0	0.43	0.051	0.352
3 R2	0.84	6.7	158.5	0.49	0.063	0.383
	0.76	6.4		0.46	0.056	0.366
East: Universi	 :y					
4 L2	0.83	6.7	157.5	0.49	0.062	0.379
6 R2	0.83	6.7	157.5	0.49	0.062	0.379
	0.83	6.7	157.5	0.49	0.062	0.379
North: Leeds Pa	arade					
	0.71					
8 T1	0.71	6.1	144.2	0.43	0.051	0.352
	0.71	6.1	144.2	0.43	0.051	0.352
INTERSECTION:	0.61	5.2	122.5	0.37	0.045	0.299

Go to Table Links (Top)

Lanes

Lane Performance and Capacity Information Site:Uni post AM

Intersection ID: 1 Give-Way Sign Controlled Intersection

LANE PERFORMANCE

						Que	u e	
	Flow	Cap	Deg.	Aver.	Eff.	95% B	ack	Lane
Lane			Satn	Delay	Stop			Length
No.	veh/h	veh/h	х	sec	Rate	veh	m	m
South: 3	Leeds Pa	arade						
1	101	1889	0.053	0.0	0.00			500.0
2	78	1298	0.060	9.1	0.66	0.3	1.9	60.0T

_____ 1 28 1126 0.025 8.7 0.63 0.1 0.7 140.0 North: Leeds Parade 306 1887 0.162 0.1 0.02 1 500.0 ------T Short lane due to specification of Turn Bay LANE FLOW AND CAPACITY INFORMATION _____ Lane Total Min Tot Deg. Lane No. Arv Flow Cap Cap Satn Util (veh/h) veh/h veh/h x % South: Leeds Parade 1 101 101 1889 0.053 100 2 78 6 1298 0.060 100 East: University 28 6 1126 0.025 100 - . North: Leeds Parade 1 306 306 1887 0.162 100 The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle effects. Saturation flow scale applies if specified. Go to Table Links (Top) Lane Delays Site:Uni post AM Intersection ID: 1 Give-Way Sign Controlled Intersection LANE DELAYS _____ ----- Delay (seconds/veh) -----Deg. Prog. Stop-line Delay Acc. Queuing Stopd Lane Sath Factor 1st 2nd Total Dec. Total MvUp (Idle) Geom Control No. x dl d2 dSL dn dq dam di dia dia dq dqm di di _____ South: Leeds Parade ------East: University 0.025 1.000 1.2 0.0 1.2 1.5 0.0 0.0 0.0 7.5 8.7 1 _____ _____ North: Leeds Parade 0.1 0.1 -----_____ ____ SIDRA Standard Delay Model is used. Control Delay is the sum of Stop-line Delay and Geometric Delay. dSL: Stop-line delay (=d1+d2) dn: Average stop-start delay for all vehicles queued and unqueued dq: Queuing delay (the part of the stop-line delay that includes stopped delay and queue move-up delay) dqm: Queue move-up delay di: Stopped delay (stopped (idling) time at near-zero speed) dig: Geometric delay dic: Control delay LANE DELAY PERCENTILES _____ Percentile Delay Deg. Lane Satn -----_____ x 50% 70% 85% 90% 95% 98% 100% No. South: Leeds Parade 1 NA - Continuous Movement 2 0.060 9.1 9.3 9.6 9.8 10.0 10.1 10.2 1 0.025 8.7 9.0 9.3 9.5 9.7 9.9 10.0 North: Leeds Parade NA - Continuous Movement 1 _____ -----_____

Lane Queues Site:Uni post AM

Intersection ID: 1 Give-Way Sign Controlled Intersection

LANE QUEUES (VEHICLES)

Lane	Deg. Satn	Prog. Factor	Ovrfl. Oueue		~	eue (ve		~			Cyc-Av.	~
No.	X	FACLOL	No	Nbl	Nb2	Nb		Ratio	BIOCK	Block %	NC	95%
		Parade										
2	0.060	1.000	0.0	0.1	0.0	0.1	0.3	0.01	0.0	100.0	0.0	0.0
East:	Univer	sity										
1	0.025	1.000	0.0	0.0	0.0	0.0	0.1	0.00	0.0	100.0	0.0	0.0

LANE QUEUES (DISTANCE)

Sati	Factor						Ctor	Block	Ploak		
х		Queue No	Nbl	Nb2	Nb		Ratio			NC	95%
		0.0	0.8	0.0	0.8	1.9	0.01	0.0	100.0	0.2	0.3
	-	0.0	0.3	0.0	0.3	0.7	0.00	0.0	100.0	0.1	0.1
r	.060 	niversity	.060 1.000 0.0 	.060 1.000 0.0 0.8 hiversity	.060 1.000 0.0 0.8 0.0 hiversity	060 1.000 0.0 0.8 0.0 0.8 hiversity	060 1.000 0.0 0.8 0.0 0.8 1.9	060 1.000 0.0 0.8 0.0 0.8 1.9 0.01	060 1.000 0.0 0.8 0.0 0.8 1.9 0.01 0.0 hiversity	.060 1.000 0.0 0.8 0.0 0.8 1.9 0.01 0.0 100.0 niversity	.060 1.000 0.0 0.8 0.0 0.8 1.9 0.01 0.0 100.0 0.2 niversity

Go to Table Links (Top)

Lane Queue Percentiles Site:Uni post AM

Intersection ID: 1 Give-Way Sign Controlled Intersection

LANE QUEUE PERCENTILES (VEHICLES)

Lane	Deg. Satn		Perce	ntile E	Back of	Queue (veh)	
No.	х	50%	70%	85%	90%	95%		
South 2	: Leeds 0.060		0.1	0.2	0.2	0.3	0.3	0.3
1		0.0			0.1			
North	: Leeds							
LANE QI	UEUE PER	CENTILES	G (DIST	ANCE)				
	Deg. Satn		Perce	ntile E	Back of	Queue (metres)	
Lane No.	Deg. Satn x	50%	Perce	ntile E 	Back of 90%	Queue (95%	metres) 98%	100%
Lane No. South	Deg. Satn x : Leeds	50% Parade 0.8	Perce 70%	ntile E 85% 	Back of 90%	Queue (95% 1.9	metres) 98% 	100%
Lane No. South 2 East: 1	Deg. Satn x : Leeds 0.060 Univers 0.025	50% Parade 0.8 Sity 0.3	Perce 70% 1.0	ntile E 85% 1.4 	Back of 90% 1.6 0.6	Queue (95% 1.9 0.7	metres) 98% 2.1 	100% 2.3 0.8
Lane No. South 2 East: 1 North	Deg. Satn x : Leeds 0.060 Univers 0.025 : Leeds	50% Parade 0.8 Sity 0.3	Perce 70% 1.0 0.4	ntile E 85% 1.4 0.5	Back of 90% 1.6 0.6	Queue (95% 1.9 0.7	metres) 98% 2.1 0.8	100% 2.3 0.8

Lane Stops Site:Uni post AM

Intersection ID: 1 Give-Way Sign Controlled Intersection

	Satn	Factor			Geom.	Rate Overall h	Total Stops	Rate	~ Move-ups	Queued
South	: Leeds	Parade								
-	0.053					0.00				
2	0.060	1.000	0.25	0.00	0.41	0.66	51.7	0.00	0.0	0.40
East:	Univer	sity								
1	0.025	1.000	0.23	0.00	0.40	0.63	17.6	0.00	0.0	0.38
	: Leeds 0.162					0.02	5.6			
		average	value	for al	l move	ments in all vehi			unqueue	

Go to Table Links (Top)

Flow Rates

Origin-Destination Flow Rates Site:Uni post AM	s (Total)		
Intersection ID: 1 Give-Way Sign Controlled Ir	itersectio	on	
TOTAL FLOW RATES (ALL MOVEN	IENT CLASS	SES)	
From SOUTH To:	N	Е	
Turn:	т1	R2	TOT
Flow Rate	101.0		
%HV (all designations)	5.0	5.0	5.0
From EAST To:	S	N	
Turn:		R2	
Flow Rate		2.0	
%HV (all designations)	5.0	5.0	5.0
From NORTH To:	Е	S	
Turn:	L2	Т1	TOT
Flow Rate	5.0	301.0	306.0
%HV (all designations)	5.0	5.0	5.0

Go to Table Links (Top)

Origin-Destination Flow Rates by Movement Class Site:Uni post AM

```
Intersection ID: 1
Give-Way Sign Controlled Intersection
```

FLOW RATES FOR Light Vehicles

From SOUTH To: Turn:	N Tl	E R2	тот
1urn.	11	KZ	101
Flow Rate - Veh Mov Class %	95.9 95.0	74.1	170.0 95.0
Flow Scale - Fixed		1.00	95.0
	1.00	1.00	
Peak Flow Factor	1.00	1.00	
From EAST To:	s	N	
From EAST To: Turn:	S L2	N R2	тот
Turn:	L2	R2	
Turn: Flow Rate - Veh	L2 24.7	R2 1.9	26.6
Turn: 	L2 24.7 95.0	R2 1.9 95.0	26.6
Turn: Flow Rate - Veh Mov Class % Flow Scale - Fixed	L2 24.7 95.0 1.00	R2 1.9 95.0 1.00	26.6
Turn: Flow Rate - Veh Mov Class % Flow Scale - Fixed	L2 24.7 95.0 1.00 1.00	R2 1.9 95.0	26.6

From NORTH To: Turn:	E L2	S Tl	TOT
Flow Rate - Veh Mov Class % Flow Scale - Fixed Flow Scale - Var Peak Flow Factor	95.0	286.0 95.0 1.00 1.00 1.00	
FLOW RATES FOR Heavy	Vehicle	es	
From SOUTH To: Turn:	N T1	E R2	TOT
Flow Rate - Veh Mov Class % Flow Scale - Fixed Flow Scale - Var Peak Flow Factor	1.00	3.9 5.0 1.00 1.00 1.00	9.0 5.0
From EAST To: Turn:	S L2	N R2	TOT
Flow Rate - Veh Mov Class % Flow Scale - Fixed Flow Scale - Var Peak Flow Factor	5.0	0.1 5.0 1.00 1.00 1.00	1.4 5.0
From NORTH To: Turn:	E L2	S T1	тот
Flow Rate - Veh Mov Class % Flow Scale - Fixed Flow Scale - Var Peak Flow Factor			15.3 5.0

Lane Flow Rates Site:Uni post AM

Intersection ID: 1 Give-Way Sign Controlled Intersection

LANE FLOW RATES AT STOP LINE

From SOUTH To: Turn:	N Tl	E R2	тот
Lane 1			
LV	95.9	*	95.9
HV	5.1	*	5.1
Total Lane 2	101.0	*	101.0
LV	*	74.1	74.1
HV	*	3.9	3.9
Total	*	78.0	78.0
Approach	101.0	78.0	179.0
From EAST To:	s	N	
Turn:	L2	R2	TOT
Lane 1			
LV		1.9	
HV		0.1	
Total	26.0	2.0	28.0
Approach	26.0	2.0	28.0
From NORTH To:	 Е	s	
Turn:	L2	Т1	TOT
Lane 1			
LV		286.0	
HV		15.1	
Total	5.0	301.0	306.0
Approach	5.0	301.0	306.0
* Movement not	allocate	d to the	e lane

Movement Class:					
Exit: SOUTH					
Lane: 1	310.7	16.4			
Total 	310.7				
Exit: EAST					
Lane: 1	78.8	4.2			
Total	78.8				
Exit: NORTH					
Lane: 1	97.8	5.2			
Total	97.8				
* Movement not DOWNSTREAM LANE F	allocate	d to the FOR EXI			
* Movement not DOWNSTREAM LANE F	LOW RATES	d to the FOR EXI HV			
* Movement not DOWNSTREAM LANE F Movement Class: Exit: SOUTH	LOW RATES	d to the FOR EXI HV			
* Movement not DOWNSTREAM LANE F 	allocate LOW RATES LV 310.7	d to the FOR EXI HV 16.4			
* Movement not DOWNSTREAM LANE F Movement Class: Exit: SOUTH Lane: 1 Total	allocate LOW RATES LV 310.7 310.7	d to the FOR EXI HV 16.4 16.4			
* Movement not DOWNSTREAM LANE F Movement Class: Exit: SOUTH	allocate LOW RATES LV 310.7 310.7	d to the FOR EXI HV 16.4 16.4			
* Movement not DOWNSTREAM LANE F Movement Class: Exit: SOUTH Lane: 1 Total Exit: EAST	allocate LOW RATES LV 310.7 310.7 78.8	d to the FOR EXI HV 16.4 16.4 4.2			
* Movement not DOWNSTREAM LANE F 	Allocate LOW RATES LV 310.7 310.7 78.8 78.8	d to the FOR EXI HV 16.4 16.4 16.4 4.2 4.2			
* Movement not DOWNSTREAM LANE F Movement Class: Exit: SOUTH Lane: 1 Total Exit: EAST Lane: 1	Allocate LOW RATES LV 310.7 310.7 78.8 78.8	d to the FOR EXI HV 16.4 16.4 16.4 4.2 4.2			
* Movement not DOWNSTREAM LANE F Movement Class: Exit: SOUTH Lane: 1 Total Exit: EAST Lane: 1 Total	Allocate LOW RATES LV 310.7 310.7 78.8 78.8	d to the FOR EXI HV 16.4 16.4 16.4 4.2 4.2			
* Movement not DOWNSTREAM LANE F Movement Class: Exit: SOUTH Lane: 1 Total Exit: EAST Lane: 1 Total Exit: NORTH	Allocate LOW RATES LV 310.7 310.7 78.8 78.8	d to the FOR EXI HV 16.4 16.4 16.4 .2 4.2 4.2 5.2			
* Movement not DOWNSTREAM LANE F Movement Class: Exit: SOUTH Lane: 1 Total Exit: EAST Lane: 1 Total Exit: NORTH Lane: 1	Allocate LOW RATES LV 310.7 310.7 78.8 78.8 78.8 78.8 97.8 97.8	d to the FOR EXI HV 16.4 16.4 16.4 .2 4.2 4.2 5.2 5.2	T ROADS		

Other

Model Settings Summary Site:Uni post AM Intersection ID: 1 Give-Way Sign Controlled Intersection * Basic Parameters: Intersection Type: Unsignalised - Give Way Driving on the left-hand side of the road Input data specified in Metric units Model Defaults: New South Wales Peak Flow Period (for performance): 30 minutes Unit time (for volumes): 60 minutes. SIDRA Standard Delay model used SIDRA Standard Queue model used Level of Service based on: Delay (RTA NSW) Queue percentile: 95%

Diagnostics Site:Uni post AM

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Processed: 2 February 2016 8:59:21 AM SIDRA INTERSECTION 6.0.1.3703

Project: O:\Synergy\Projects\215\215322\Out\Reports\Traffic\215322_university.sip6 8000782, GEOLYSE PTY LTD, PLUS / 1PC

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DETAILED OUTPUT

Site: Uni existing AM

New Site Giveway / Yield (Two-Way)

OUTPUT TABLE LINKS

fill Movements Intersection Negotiation Data Gap Acceptance Parameters Movement Capacity and Performance Parameters Fuel Consumption, Emissions and Cost 💙 Lanes Lane Performance and Capacity Information Lane Delays Lane Queues Lane Queue Percentiles Lane Stops IF Flow Rates Origin-Destination Flow Rates (Total) Origin-Destination Flow Rates by Movement Class Lane Flow Rates E Other Model Settings Summary Diagnostics

Movements

Intersection Negotiation Data Site:Uni existing AM

Intersection ID: 1 Give-Way Sign Controlled Intersection

INTERSECTION NEGOTIATION DATA

			Negn	Negn	Negn Dist.	Appr.	Downstrea	
From Approach	To Exit	Turn	Radius m	km/h	m	m	 m	User Spec?
South: Le	eds Parad	e						
	North	т1	S	50.0	10.0	500	157	No
	East	R2	6.6	17.2	10.4	500	105	No
East: Uni	versity							
	South	L2	10.0	20.2	15.7	500	108	No
	North	R2	6.6	17.2	10.4	500	102	No
North: Le	eds Parad	e						
	East	L2	10.0	20.2	15.7	500	95	No
	South	Τ1	S	50.0	10.0	500	181	No

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

MOVEMENT SPEEDS AND GEOMETRIC DELAY

					Queue M	love-up			
Mov Turn	App. Spe		Exit &	Speeds	 1st	2nd	Av. Sect	-	Geom Delay
ID	Cruise	Negn	Negn (Cruise	Grn	Grn	Running	Overall	sec
South: Le	eds Parad	e							
2 T1	50.0	50.0	50.0	50.0			50.0	50.0	0.0
3 R2	50.0	17.2	17.2	50.0	17.2		42.7	42.7	8.0
East: Uni	versity								
4 L2	50.0	20.2	20.2	50.0	20.1		43.1	43.1	7.5
6 R2	50.0	17.2	17.2	50.0	20.1		43.1	43.1	8.0

North: Leeds Parade

						speed or	cluding	stopped	period	s		
				the av	verage	speed es	keruariig	scopped	perioa	5.		
		<u>inks (To</u>	<u>, ((</u>									
				meters								
te:l	Jnie	xisting	AIVI									
		ion II		11.00 1								
Lve	-	-			ntersec							
						cal Gap			Int	 ra		
000	٩	Dest	O ד	png low		Diet	Foll-u Headwa	p Entr	y Bun Hdw	ch Prop	n A	
Lai	ie	Debe	P	cu/h	sec	m	sec	Equi	v se	y Bnch c	a	
Sout	h: L	leeds I	Parade									
	2	E		2	4.10	0.0	2.05	1.0	3 1.8	0 0.00	0	
Cast	: Un	ivers:	ity	1.+	4 10	0 0	2 25	1 (10 10	0 0 00	0	
	1	N		87+	5.43	0.0	3.07	1.0	1.5	0 0.00 7 0.01	2	
		eeds 1										
No	0000	apd m	11/emow	taon	thia ~~	proach.						
Va	lues	in th:	is tab	le are	adjust	ed for 1	heavy ve	hicles i	n the e	ntry stre	am.	
Use	e the	Pedea	strian	s and i	Priorit	ies inp	ut dialc	gs to sp	ecify o	pposing p		n movements.
+	Perc	entage	e of e	xiting	tlow 1	Included	in oppo	sing veh	ucle fl	OW		
to T	able L	inks (To	<u>(qc</u>									
nter	rsect	ion II	AM 5: 1			ce Parar	neters					
nte Lve	rsect -Way	ion II Sign (AM D: 1 Contro		ntersec		neters					
ite lve DVE	rsect -Way MENT	CAPAC	AM D: 1 Contro ITY PA	lled I RAMETE	ntersec RS	ction		. Prac.				
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Fuel Consumption, Emissions and Cost Site:Uni existing AM

Intersection ID: 1 Give-Way Sign Controlled Intersection

FUEL CONSUMPTION, EMISSIONS AND COST (TOTAL)

Mov Turn	Cost	Fuel	CO2	CO	HC	NOX
ID	Total	Total	Total	Total	Total	Total
	\$/h	L/h	kg/h	kg/h	kg/h	kg/h
South: Leeds Par						
	0.41	0.0	0.1	0.00	0.000	0.000
3 R2				0.02		
	39.42	3.2	7.5	0.02	0.003	0.018
East: University						
4 L2				0.01		0.006
6 R2	0.47	0.0	0.1	0.00	0.000	0.000
-	12 25	1 1	 2 5	0.01	0 001	0.006
	13.25	±.±	2.J			
North: Leeds Par	rade					
7 L2	0.44	0.0	0.1	0.00	0.000	0.000
8 T1	0.44	0.0	0.1	0.00	0.000	0.000
	0.88	0.1	0.2	0.00	0.000	0.000
INTERSECTION:	53.55	·	10.2	0.03	0.004	0.025
INTERSECTION	53.55	4.3	10.2	0.03	0.004	0.025

FUEL CONSUMPTION, EMISSIONS AND COST (RATE)

Mov Turn	Cost	Fuel	C02	CO	HC	NOX
ID	Rate	Rate	Rate	Rate	Rate	Rate
	\$/km	L/100km	g/km	g/km	g/km	g/km
South: Leeds Par	ade					
2 T1	0.70	6.1	144.0	0.43	0.051	0.352
3 R2	0.82	6.6	156.5	0.48	0.061	0.381
-				0.48		
East: University						
4 L2	0.81	6.6	155.1	0.48	0.060	0.375
6 R2	0.81	6.6	155.1	0.48	0.060	0.375
-	0.81	6.6		0.48	0.060	0.375
North: Leeds Par	ade					
7 L2	0.76	6.3	149.5	0.46	0.056	0.364
8 T1	0.76	6.3	149.5	0.46	0.056	0.364
-	0.76	6.3	149.5	0.46	0.056	0.364
INTERSECTION:	0.68	5.5	129.9	0.40	0.050	0.316

Go to Table Links (Top)

Lanes

Lane Performance and Capacity Information Site:Uni existing AM

Intersection ID: 1 Give-Way Sign Controlled Intersection

LANE PERFORMANCE

about:blank

						Que	ue	
	Flow	Cap	Deg.	Aver.	Eff.	95% B	ack	Lane
Lane			Satn	Delay	Stop			Length
No.	veh/h	veh/h	x	sec	Rate	veh	m	m
South: 1	Leeds Pa	arade						
1	1	1889	0.001	0.0	0.00			500.0
2	82	1753	0.047	8.0	0.67	0.2	1.6	60.0T

_____ 1 28 1567 0.018 7.5 0.63 0.1 0.5 140.0 North: Leeds Parade North: Leeds Parade 1 2 1840 0.001 3.7 0.40 50 500.0 T Short lane due to specification of Turn Bay LANE FLOW AND CAPACITY INFORMATION _____ Lane Total Min Tot Deg. Lane No. Arv Flow Cap Cap Satn Util (veh/h) veh/h veh/h x % South: Leeds Parade
 1
 1
 1
 1889
 0.001
 100

 2
 82
 6
 1753
 0.047
 100
 _____ East: University 1 28 6 1567 0.018 100 - . North: Leeds Parade 1 2 2 1840 0.001 100 _____ The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle effects. Saturation flow scale applies if specified. Go to Table Links (Top) Lane Delays Site:Uni existing AM Intersection ID: 1 Give-Way Sign Controlled Intersection LANE DELAYS _____ ----- Delay (seconds/veh) -----Deg. Prog. Stop-line Delay Acc. Queuing Stopd Lane Sath Factor 1st 2nd Total Dec. Total MvUp (Idle) Geom Control No. x dl d2 dSL dn dq dam di dia dia dq dqm di di _____ South: Leeds Parade 1 0.001 0.0 0.0 0.0 0.0 0.0 2 0.047 1.000 0.0 0.0 0.0 0.1 0.0 0.0 0.0 8.0 8.0 ------East: University 0.018 1.000 0.0 0.0 0.0 0.0 0.0 0.0 0.0 7.5 7.5 1 _____ -----North: Leeds Parade 3.7 3.7 -----_____ SIDRA Standard Delay Model is used. Control Delay is the sum of Stop-line Delay and Geometric Delay. dSL: Stop-line delay (=d1+d2) dn: Average stop-start delay for all vehicles queued and unqueued dq: Queuing delay (the part of the stop-line delay that includes stopped delay and queue move-up delay) dqm: Queue move-up delay di: Stopped delay (stopped (idling) time at near-zero speed) dig: Geometric delay dic: Control delay LANE DELAY PERCENTILES _____ Percentile Delay Deg. Lane Satn -----_____ x 50% 70% 85% 90% 95% 98% 100% No. South: Leeds Parade
 NA - Continuous Movement

 2
 0.047
 8.0
 8.0
 8.0
 8.0
 8.0
 8.0
 East: University 1 0.018 7.5 7.5 7.5 7.5 7.5 7.6 7.6 North: Leeds Parade NA - Continuous Movement 1 _____ -----

Lane Queues Site:Uni existing AM

Intersection ID: 1 Give-Way Sign Controlled Intersection

LANE QUEUES (VEHICLES)

Lane	Deg. Satn	Prog. Factor	Ovrfl. Oueue		k of Qu			~	Prob. Block	P'ile Block	Cyc-Av	~
No.	x	FACCOL	No	Nbl	Nb2	Nb		Ratio	\$ BIOCK	\$ BIOCK	NC	95%
South:	Leeds	Parade										
2	0.047	1.000	0.0	0.1	0.0	0.1	0.2	0.01	0.0	100.0	0.0	0.0
East:	Univer	sity										
1	0.018	1.000	0.0	0.0	0.0	0.0	0.1	0.00	0.0	100.0	0.0	0.0

LANE QUEUES (DISTANCE)

Factor s Parade	Queue No	Nb1		Nb			Block %	\$	NC	95%
s Parade										
1.000	0.0	0.6	0.0	0.6	1.6	0.01	0.0	100.0	0.0	0.0
rsity 1.000	0.0	0.2	0.0	0.2	0.5	0.00	0.0	100.0	0.0	0.0
	-	1.000 0.0	1.000 0.0 0.2	1.000 0.0 0.2 0.0	1.000 0.0 0.2 0.0 0.2	1.000 0.0 0.2 0.0 0.2 0.5	1.000 0.0 0.2 0.0 0.2 0.5 0.00	1.000 0.0 0.2 0.0 0.2 0.5 0.00 0.0	1.000 0.0 0.2 0.0 0.2 0.5 0.00 0.0 100.0	1.000 0.0 0.2 0.0 0.2 0.5 0.00 0.0 100.0 0.0

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Lane Queue Percentiles Site:Uni existing AM

Intersection ID: 1 Give-Way Sign Controlled Intersection

LANE QUEUE PERCENTILES (VEHICLES)

Lane	Deg. Satn		Perce	ntile B	Back of	Queue	veh)	
No.	х	50%	70%	85%	90%	95%		
2		Parade 0.1						
1		o.0						
North:	Leeds							
ANE QU	JEUE PER	CENTILES	(DIST	ANCE)				
	Deg.		Perce	ntile B	 Back of			
Lane No.	Deg. Satn x		Perce 70%	ntile E 	90%	95%	98%	 100%
Lane No. South:	Deg. Satn x Leeds 0.047	50% Parade 0.6	Perce: 70%	ntile E 85% 	90% 	95% 	98% 	100%
Lane No. South: 2 East: 1	Deg. Satn x Leeds 0.047 Univers 0.018	50% Parade 0.6	Perce: 70% 0.8 0.3	ntile E 85% 1.2 0.4	90% 1.4 0.4	95% 1.6 0.5	98% 1.8 0.6	 100% 1.9

Lane Sto	ops	
Site:Uni	existing	AM

Intersection ID: 1 Give-Way Sign Controlled Intersection

No.	Satn x	Factor	he1	he2	Geom. hig	Rate Overall h	Total Stops H	Rate 1 hqm	Move-ups Hqm	Queued pq
South 1	Leeds	Parade 1.000			0.00	0.00 0.67	0.0			
	Univer 0.018	-	0.00	0.00	0.63	0.63	17.8	0.00	0.0	0.01
	: Leeds 0.001	Parade 1.000			0.40	0.40	0.8			
-		-				ments in all vehi			unqueue	

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Flow Rates

Site:Uni existing AM		
Intersection ID: 1 Give-Way Sign Controlled Intersection		
TOTAL FLOW RATES (ALL MOVEMENT CLASSES)		
From SOUTH TO: N E		
Turn: T1 R2	тот	
Flow Rate 1.0 82.0	83.0	

Turn: Flow Rate %HV (all designations)	T1 1.0 5.0	R2 82.0 5.0	TOT 83.0 5.0
From EAST To: Turn: Flow Rate %HV (all designations)	S L2 27.0 5.0	N R2 1.0 5.0	TOT 28.0 5.0
From NORTH To: Turn: Flow Rate %HV (all designations)	E L2 1.0 5.0	S T1 1.0 5.0	TOT 2.0 5.0

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Origin-Destination Flow Rates by Movement Class Site:Uni existing AM

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Intersection ID: 1
Give-Way Sign Controlled Intersection
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FLOW RATES FOR Light Vehicles

From SOUTH To: Turn:	N T1	E R2	тот
			101
Flow Rate - Veh	0.9	77.9	78.8
Mov Class %	95.0	95.0	95.0
Flow Scale - Fixed	1.00	1.00	
Flow Scale - Var	1.00	1.00	
Peak Flow Factor	1.00	1.00	
From EAST To:	S	N	
From EAST To: Turn:	S L2	N R2	TOT
	-	11	TOT
	-	R2	
Turn:	L2	R2	26.6
Turn: 	L2 25.6 95.0	R2 0.9	26.6
Turn: Flow Rate - Veh Mov Class % Flow Scale - Fixed	L2 25.6 95.0	R2 0.9 95.0	26.6
Turn: Flow Rate - Veh Mov Class % Flow Scale - Fixed	L2 25.6 95.0 1.00 1.00	R2 0.9 95.0 1.00	26.6
Turn: Flow Rate - Veh Mov Class % Flow Scale - Fixed Flow Scale - Var	L2 25.6 95.0 1.00 1.00	R2 0.9 95.0 1.00 1.00	26.6

From NORTH To: Turn:	E L2	S T1	TOT
Flow Rate - Veh Mov Class % Flow Scale - Fixed Flow Scale - Var Peak Flow Factor		0.9 95.0 1.00 1.00 1.00	1.9 95.0
FLOW RATES FOR Heavy	Vehicle	s	
From SOUTH To: Turn:	N T1	E R2	тот
Flow Rate - Veh Mov Class % Flow Scale - Fixed Flow Scale - Var Peak Flow Factor	0.1 5.0 1.00 1.00 1.00	4.1 5.0 1.00 1.00 1.00	4.2 5.0
From EAST To: Turn:	S L2	N R2	TOT
Flow Rate - Veh Mov Class % Flow Scale - Fixed Flow Scale - Var Peak Flow Factor	1.4 5.0 1.00 1.00 1.00	0.1 5.0 1.00 1.00 1.00	1.4 5.0
From NORTH To: Turn:	E L2	S T1	TOT
Flow Rate - Veh Mov Class % Flow Scale - Fixed Flow Scale - Var Peak Flow Factor	5.0	0.1 5.0 1.00 1.00 1.00	0.1 5.0

Lane Flow Rates Site:Uni existing AM

Intersection ID: 1 Give-Way Sign Controlled Intersection

LANE FLOW RATES AT STOP LINE

From SOUTH To:	N	Е	
Turn:	T1	R2	тот
Lane 1			
LV	0.9	*	0.9
HV	0.1 1.0	*	0.1
Total Lane 2	1.0	^	1.0
LV	*	77.9	77.9
HV	*	4.1	4.1
Total	*	82.0	82.0
Approach	1.0	82.0	
From EAST To:	S	 N	
Turn:	L2	R2	TOT
Lane 1			
LV	25.6	0.9	26.6
HV	1.4		
Total	27.0	1.0	28.0
Approach	27.0	1.0	28.0
From NORTH To:	 E	s	
Turn:	L2	Т1	TOT
Lane 1			
LV	0.9	0.9	1.9
HV	0.1		0.1
Total	1.0	1.0	2.0
Approach	1.0	1.0	2.0
* Movement not	allocated	to the	lane

		LV				
Exit: S						
Lane: 1		26.6				
Total		26.6				
Exit: E						
Lane: 1		78.8	4.2			
Total		78.8	4.2			
Exit: N						
Lane: 1		1.9	0.1			
Total		1.9	0.1			
DOWNSTRE	AM LANE F	allocated	FOR EXI	ł		
DOWNSTRE	AM LANE F	LOW RATES	FOR EXI	ł		
DOWNSTRE	AM LANE F: Class: DUTH	LOW RATES	FOR EX1	1		
DOWNSTRE Movement Exit: So Lane: 1	AM LANE F: Class: DUTH	LOW RATES 	FOR EXI HV	1		
DOWNSTRE Movement Exit: So Lane: 1 Total	AM LANE F Class: DUTH	LOW RATES	FOR EXI HV 1.4 1.4	1		
DOWNSTRE	AM LANE F. Class: DUTH	LOW RATES LV 26.6 26.6	FOR EXI HV 1.4 1.4	l		
DOWNSTRE Movement Exit: So Lane: 1 Total Exit: E Lane: 1	AM LANE F. Class: DUTH	LOW RATES LV 26.6 26.6 78.8	FOR EXI HV 1.4 1.4 4.2	1		
DOWNSTREA Movement Exit: SG Lane: 1 Total Exit: EA Lane: 1 Total	AM LANE F: Class: DUTH	LOW RATES LV 26.6 26.6	FOR EXI HV 1.4 1.4 4.2	1		
DOWNSTRE	AM LANE F: Class: DUTH AST	LOW RATES LV 26.6 26.6 78.8	FOR EXI HV 1.4 1.4 4.2	1		
DOWNSTREA Movement Exit: SG Lane: 1 Total Exit: E Lane: 1 Total	AM LANE F. Class: DUTH AST	LOW RATES LV 26.6 26.6 78.8 78.8 78.8 1.9	FOR EXJ HV 1.4 1.4 4.2 4.2 4.2	1		
DOWNSTRE Exit: S(Lane: 1 Total Exit: E Lane: 1 Total Exit: N(AM LANE F: Class: DUTH AST	LOW RATES LV 26.6 26.6 78.8 78.8 78.8 1.9	FOR EXI HV 1.4 1.4 4.2 4.2 0.1 0.1			

Other

Model Settings Summary Site:Uni existing AM Intersection ID: 1 Give-Way Sign Controlled Intersection * Basic Parameters: Intersection Type: Unsignalised - Give Way Driving on the left-hand side of the road Input data specified in Metric units Model Defaults: New South Wales Peak Flow Period (for performance): 30 minutes Unit time (for volumes): 60 minutes. SIDRA Standard Delay model used SIDRA Standard Queue model used Level of Service based on: Delay (RTA NSW) Queue percentile: 95%

Diagnostics Site:Uni existing AM

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Processed: 2 February 2016 8:59:22 AM SIDRA INTERSECTION 6.0.1.3703

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