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PROPOSED RESIDENTIAL DEVELOPMENT
39 RIFLE RANGE ROAD
MUDGEE NSW 2850

TRAFFIC ASSESSMENT REPORT

05 JUNE 2024
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1 INTRODUCTION

Triaxial have been engaged by Arcstone Developments to prepare a traffic assessment report. The purpose of this report is to assess the traffic implications of the proposed residential subdivision located at 39 Rifle Range Road, Mudgee.

This report is to be included as supplementary information in the development application lodged with Mid-Western Regional Council.

Figure 1: Existing Site at 39 Rifle Range Road, Mudgee.

2 PROPOSAL

2.1 DEVELOPMENT SITE

The site located at 39 Rifle Range Road is proposed to be developed into a 17 lot subdivision as documented on the Development Application plans produced by Triaxial Consulting and ORyan Geospatial surveyors.

The site is zoned R2. The development referred to in this report relates to the R2 portion of the land within Lot 68, DP735127.

The existing site was previously used as the Mudgee Rifle Range by the Mudgee Gun Club who no longer actively use the site and have relocated after the sale of the land.

The lot fronts Rifle Range Road and it is proposed that a new road running perpendicular to Rifle Range Road is constructed as part of this development.

The speed limit along Rifle Range Road is 50km/hr. The site is not located within a school zone.

3 EXISTING TRAFFIC CONDITIONS

3.1 ROAD HIERARCHY – SURROUNDING ROAD NETWORK

The site is surrounded by the following roads:

- **Rifle Range Road** is a local sealed road, running East – West along the site frontage and is managed by Mid-Western Regional Council.
- **Henry Bayly Drive** is a local sealed road, running North – South approximately 330m to the East of the site, managed by Mid-Western Regional Council.
- **Albens Lane** is a local partially sealed road, running North – South approximately 300m to the West of the site, managed by Mid-Western Regional Council. Parts of Albens Lane to the North are unsealed.

Site access is proposed from the Rifle Range Road frontage of the site as documented on Triaxial plans TX17644.00-C8.0(A).

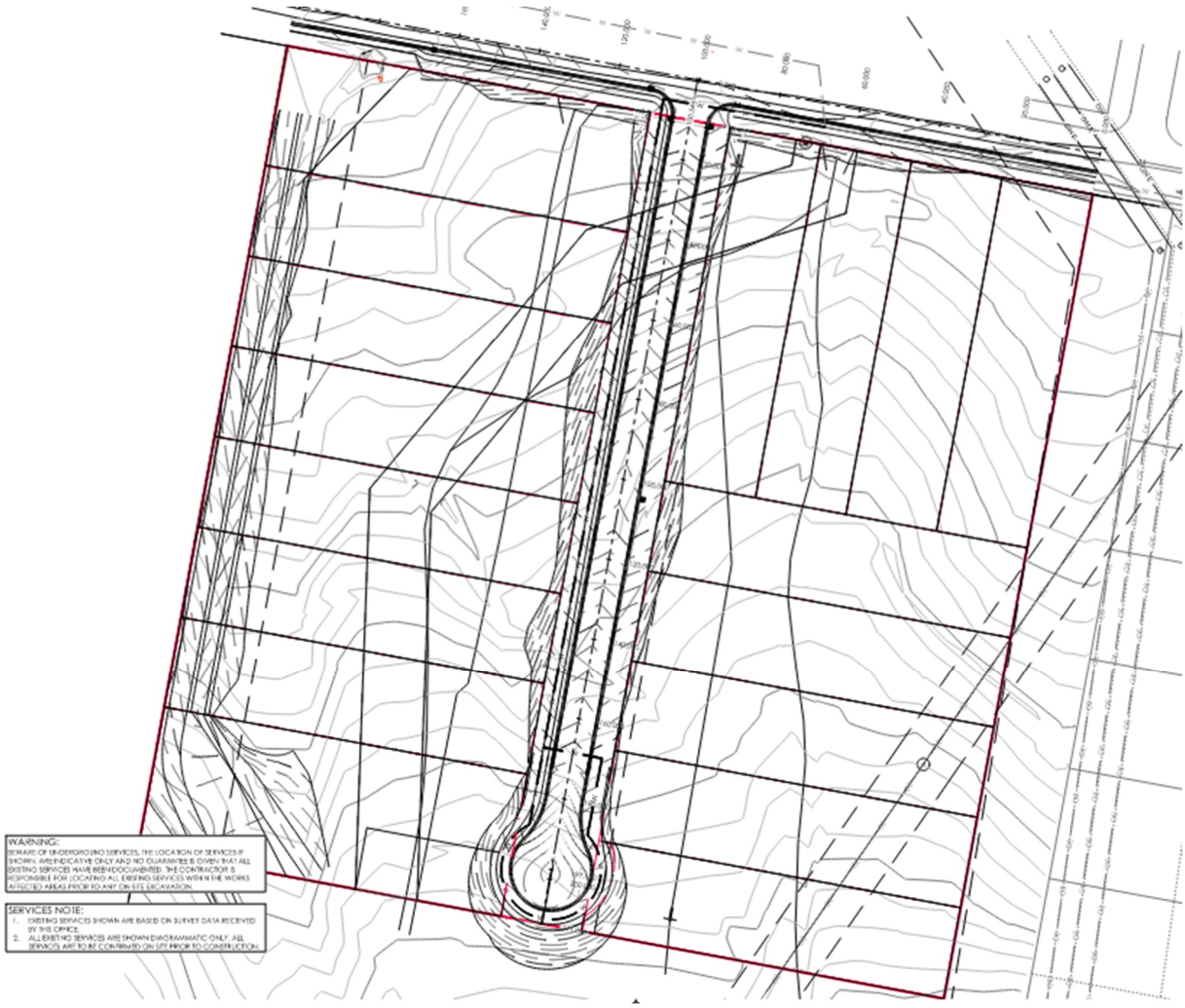

Figure 2: Site Access at Rifle Range Road and proposed new road and culdesac

It is proposed to construct the new road and culdesac to match the existing fall of the property and no major excavation work is proposed to allow the road to be constructed. The site falls to the North at generally between 3-4% grade.

Road construction including pavement depth, road width, road reserve width and inclusion of kerb and guttering and drainage systems will be included with the development. All inclusions are in accordance with Mid-Western Regional Council Development Control Plan requirements.

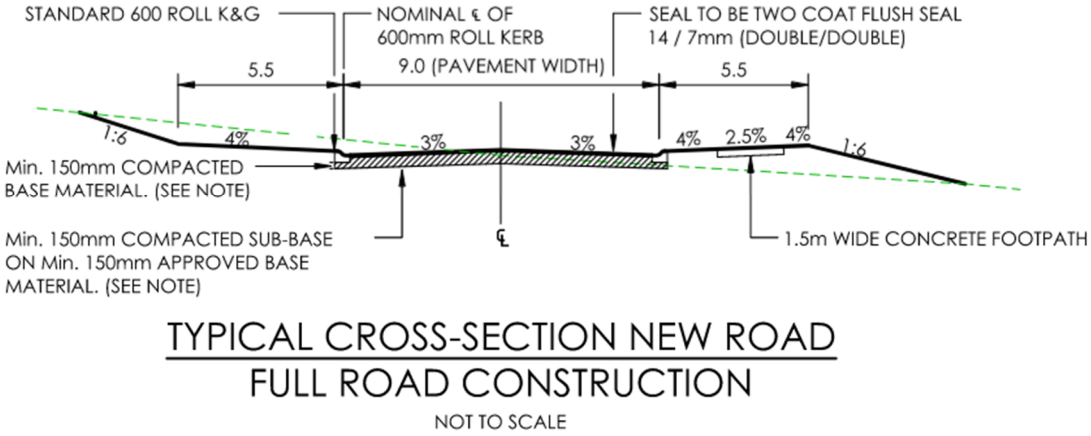

Figure 3: Cross section showing proposed new road widths and inclusions within the road reserve.

3.2 PEDESTRIAN AND CYCLIST FACILITIES

Currently there are no cyclist facilities (bike lanes on or off road), or designated bike routes listed along Rifle Range Road at the property address.

There is an existing concrete footpath located on the Northern side of Rifle Range Road to the East of the site, however this finishes before reaching Henry Bayly Drive.

3.3 EXISTING CRASH DATA

A review of the available crash data from the 5-year period 2016 – 2021 using the centre for road safety website shows that there were two vehicle crashes during this period. Neither of these crashes were close to the proposed development, with the closest being located approximately 800m from the site. No crashes were recorded at the intersection of Henry Bayly Drive and Rifle Range Road. The location of these crashes is shown in Figure 3 below.

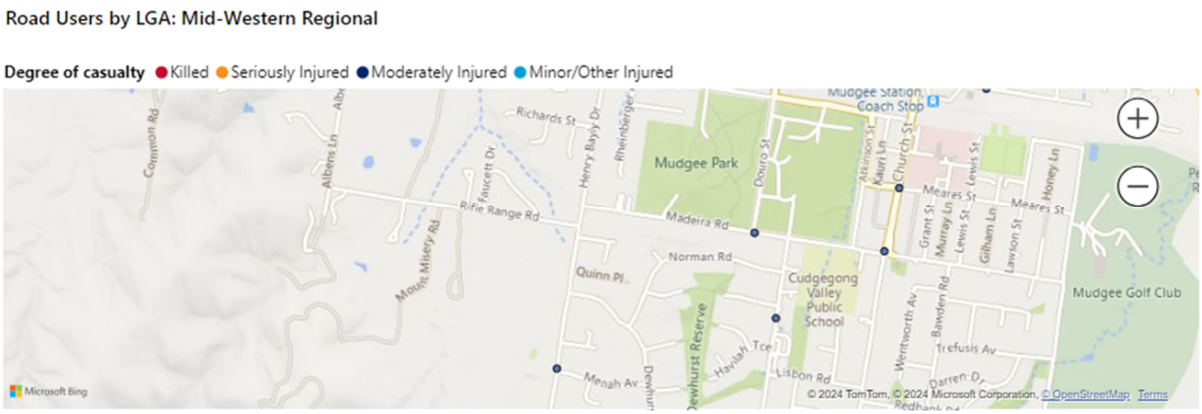

Figure 4: Crash data near the site showing crashes from 2018-2022. Total crashes listed in table yearly for Mid Western Regional Council area (Source: NSW Centre for Road Safety) Dots indicate crash location.

3.4 EXISTING TRAFFIC DATA

As no existing traffic data was available from any authority that was relevant to this development, a series of traffic counts was undertaken to develop a baseline existing traffic estimate for Rifle Range Road and the closest intersection to the development, the intersection with Henry Bayly Drive.

Traffic counts were conducted by Triaxial Consulting on six separate occasions, with two weekday AM and PM counts undertaken, as well as a weekend AM and PM peak hour count.

A summary of the existing traffic volume data with the highest traffic count over the six sessions is shown in the table below:

Street	AM Peak (hourly volume)	PM Peak (hourly volume)
Rifle Range Road Eastwards	16	9
Rifle Range Road Westwards	4	12
Henry Bayly Drive Northwards	20	16
Henry Bayly Drive Southwards	14	23

Table 1: Traffic data observed at the intersection of Henry Bayly Drive and Rifle Range Road

4 EXPECTED TRAFFIC GENERATION

It is proposed that the vehicles listed below will access the site during the following stages of the project:

4.1 CONSTRUCTION PHASE

Vehicles accessing the site during construction will consist of:

- Semi-trailer trucks for material and equipment delivery as per typical construction practices.
- Light vehicles for specific trades.

In line with typical construction practices, these vehicles will be arriving to the site out of AM and PM peak hours. All vehicles used in construction works will be parked on the subject site, not within the Rifle Range Road reserve.

4.2 POST – CONSTRUCTION (TYPICAL) TRAFFIC GENERATION RATES

Once completed the site will generate light vehicle traffic due to the newly created residential lots.

Traffic generation rates for light vehicles during the PM peak hour were obtained from the "RTA *NSW Guide to Traffic Generating Developments 2002".*

- Trip generation = 17 lots x 9 vehicle trips per day (average), 0.9 trips per dwelling peak hour.
    - = 153 trips total (daily)
    - = 16 trips peak hour (peak hour)

No reduction rates due to internal trips, or pedestrian trips have been assumed.

We note that in addition to this development, a residential subdivision on Rifle Range Road to the East of the site has been recently constructed. This development contains seven new residential lots. For the purposes of the intersection analysis, these lots have been included in the post-developed modelling at the following rates:

- Trip generation = 7 lots x 9 vehicle trips per day (average), 0.9 trips per dwelling peak hour.
    - = 63 trips total (daily)
    - = 7 trips peak hour (peak hour)

Total traffic assumed post development was an additional **216** daily trips and an additional **23** peak hour trips.

4.3 SUBDIVISION ACCESS

All lots withing the development will be accessed via one new internal road to be constructed off Rifle Range Road, with the exception of 5 lots (lots 1, 5,6,7,8) which are provided with access from Rifle Range Road.

It is proposed that the new internal road will provide one point of access to the development from Rifle Range Road. It is proposed that a new turning head be constructed at the Southern end of the new road to allow service vehicles to manoeuvre in a single turn (proposed road radius 10.0m) before exiting along Rifle Range Road.

The number of lots serviced is in accordance with the maximum recommended (culdesac lot serviced maximum 12, length maximum 150m) in the Mid Western Council DCP. There are 12 lots that will be accessed from the new road.

The length of the culdesac is approximately 200m. A contributing factor to the longer culdesac length is the larger lot frontages required for the 2000m² blocks, which generally have larger lot frontages, much larger than in typical residential construction.

Although longer than recommended the culdesac will be managed by ensuring the road construction is at a standard that will be able to convey the expected volume of traffic to be generated (approximately 12 vehicle trips in peak hour). As can be seen from Triaxial plans TX17644.01-C5.00(B), the proposed carriageway width is 9.0m which is sufficient for a far greater volume of traffic than expected. The proposed new road will be constructed with an 18m wide road reserve and a 9m wide carriageway in line with Mid Western Regional Council DCP requirements for servicing between 31-120 residential lots.

It is also important to note that the provision has been made to extend the culdesac through land to the South in the future. Should this land ever be developed there will be the possibility of extending this road and connecting it in a looped road system in the future.

5 TRAFFIC ANALYSIS

The existing state and the proposed state post-development were both modelled using SIDRA traffic software to accurately determine the impact on the surrounding road network.

For the purposes of this report, it was conservatively assumed that all traffic generated by the new developments along Rifle Range Road would travel East and use the intersection with Henry Bayly Drive instead of travelling West towards Albens Lane (due to the unsealed section of road further to the North and general direction to Mudgee CBD Eastwards).

5.1 INTERSECTION ANALYSIS

A SIDRA analysis of the closest intersection was undertaken with the following traffic data.

Street	AM Peak	PM Peak	Traffic Volume Modelled in SIDRA (post development)
Rifle Range Rd Eastwards	16	9	39
Rifle Range Rd Westwards	4	12	35
Henry Bayly Rd Northwards	20	16	43
Henry Bayly Rd Southwards	14	23	46

Table 2: Traffic data input into SIDRA for intersection analysis

The SIDRA analysis was conducted, and the results are shown below. A pre-developed (existing) site was input (Site A) and then a post-developed site (Site B).

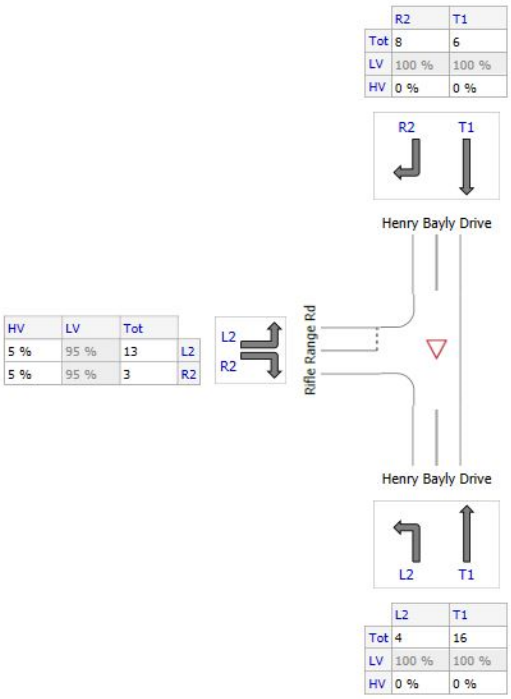

Figure 5: Site A – Pre Developed - Intersection data input into SIDRA model showing proposed peak hour traffic volumes analysed.

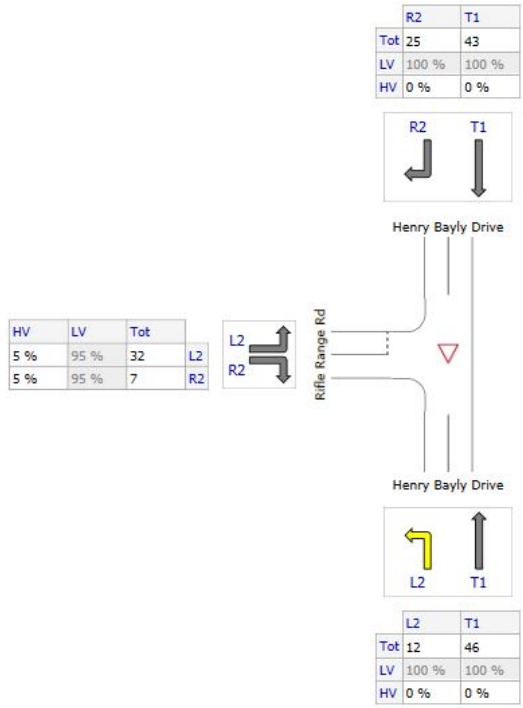

Figure 6: Site B – Post Developed - Intersection data input into SIDRA model showing proposed peak hour traffic volumes analysed.

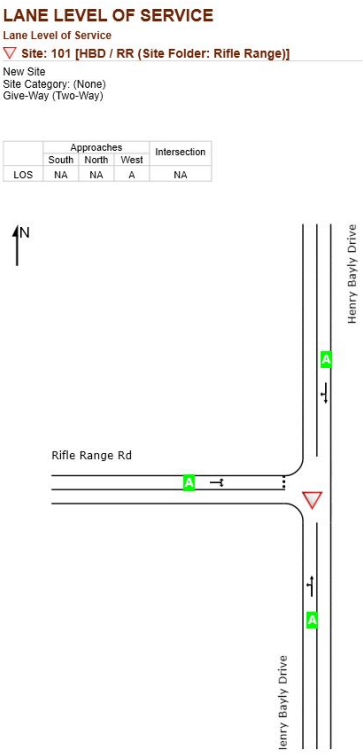

Figure 8: Site A – Pre Developed – Level of Service A (best available)

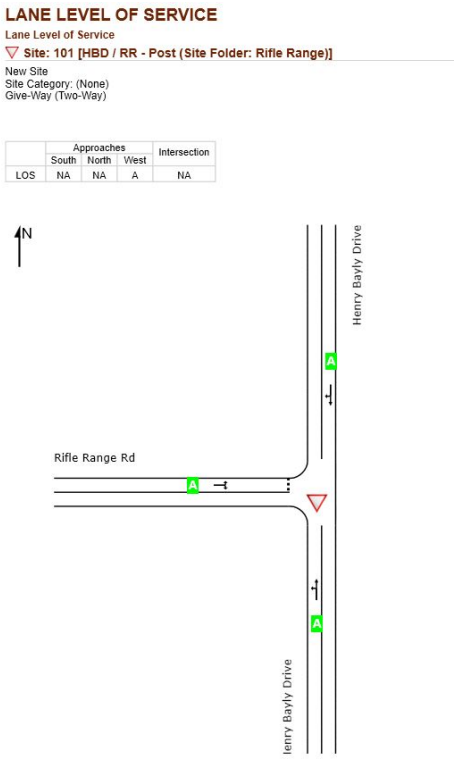

Figure 9: Site B – Post Developed – Level of Service A (best available)

5.2 MODEL RESULTS

The level of service of the road and intersection both pre and post development was modelled in SIDRA as a comparison.

Major results from the analysis are shown in the table below. A full report on the site differences is included in Appendix B.

Category	Site A – Pre Developed	Site B – Post Developed	Difference (Site A – Site B)
Degree of Saturation	0.011	0.039	+0.028
Control Delay Total (veh/hr)	0.04	0.11	0.07
Practical Spare Capacity (%)	6991	2410	-4580
95% Back of Queue Length (m)	0.3	1.0	0.7

Table 3: Major criteria differences pre/post site model

Whilst there are increases in performance criteria for the introduction of a higher number of vehicles accessing the intersection, this increase does not come close to triggering any

intersection upgrades or additional treatments. The intersection will continue to operate at a level of service A, the highest available. Intersection treatments or upgrades do not become necessary until the level of service drops to a C or D rating.

It can be seen that even with the conservative estimates of traffic using the intersection post-development, there is still 2410% practical spare capacity in the intersection function which will allow it to continue operating at an acceptable level into the future.

6 SUMMARY

In summary, the proposed construction of the residential subdivision will introduce approximately 23 new peak hour trips onto the surrounding road network, and approximately 216 new daily trips.

A SIDRA analysis of the impact of this increase in traffic has shown that the road network and closest intersection will both continue to operate at a level of service A, with no upgrade works required.

APPENDIX A - SITE PHOTOS

Photo 1
Proposed site entry location looking West along Rifle Range Road

Photo 2
Proposed site entry location looking East along Rifle Range Road

APPENDIX B – SIDRA COMPARISON

SITE OUTPUT COMPARISON

Comparison of Intersection Summary Statistics

▽ **Site A: 101 [HBD / RR (Site Folder: Rifle Range)]**

▽ **Site B: 101 [HBD / RR - Post (Site Folder: Rifle Range)]**

Intersection Performance (Vehicles Only) - Hourly Values					
Performance Measure	Units	Site A	Site B	Difference Site B - Site A	% Difference Diff / Site A
Travel Speed (Average)	km/h	47.8	48.1	0.3	0.6
Travel Distance (Total)	veh-km/h	53.3	175.7	122.4	229.9
Travel Time (Total)	veh-h/h	1.1	3.7	2.5	228.0
Demand Flows (Total)	veh/h	53	174	121	230.0
Percent Heavy Vehicles (Demand)	%	1.6	1.2	-0.4	-26.1
Degree of Saturation		0.011	0.039	0.028	246.0
Practical Spare Capacity	%	6991.1	2410.3	-4580.8	-65.5
Effective Intersection Capacity	veh/h	4665	4449	-216	-4.6
Control Delay (Total)	veh-h/h	0.04	0.11	0.07	180.2
Control Delay (Average)	sec	2.6	2.2	-0.4	-15.1
Control Delay (Worst Lane)	sec	4.7	4.8	0.1	2.9
Control Delay (Worst Movement)	sec	4.7	5.0	0.3	7.0
Geometric Delay (Average)	sec	2.6	2.1	-0.5	-17.8
Stop-Line Delay (Average)	sec	0.0	0.1	0.1	197.4
Idling Time (Average)	sec	0.0	0.0	0.0	0.0
Intersection Level of Service (LOS)		NA	NA	NA	NA
95% Back of Queue - Vehicles (Worst Lane)	veh	0.0	0.1	0.1	221.0
95% Back of Queue - Distance (Worst Lane)	m	0.3	1.0	0.6	207.8
Ave. Queue Storage Ratio (Worst Lane)		0.00	0.00	0.00	207.8
Total Effective Stops	veh/h	15	42	26	171.7
Effective Stop Rate		0.29	0.24	-0.05	-17.7
Proportion Queued		0.04	0.07	0.03	79.4
Performance Index		1.3	4.1	2.9	222.0
Cost (Total)	$/h	45.58	148.65	103.07	226.1
Fuel Consumption (Total)	L/h	3.9	12.3	8.4	217.9
Carbon Dioxide (Total)	kg/h	9.1	29.0	19.9	217.5
Hydrocarbons (Total)	kg/h	0.001	0.002	0.001	212.5
Carbon Monoxide (Total)	kg/h	0.007	0.023	0.016	215.7
NOx (Total)	kg/h	0.008	0.022	0.013	159.6

Intersection Performance (Vehicles Only) - Annual Values

Site A - Hours per Year: 480
Site B - Hours per Year: 480

Performance Measure	Units	Site A	Site B	Difference Site B - Site A	% Difference Diff / Site A
Demand Flows (Total)	veh/y	25,263	83,368	58,105	230.0
Delay	veh-h/y	18	51	33	180.2
Effective Stops	veh/y	7,398	20,098	12,700	171.7
Travel Distance	veh-km/y	25,567	84,335	58,768	229.9
Travel Time	veh-h/y	535	1,754	1,219	228.0
Cost	$/y	21,878	71,350	49,472	226.1
Fuel Consumption	L/y	1,854	5,894	4,040	217.9
Carbon Dioxide	kg/y	4,380	13,909	9,529	217.5
Hydrocarbons	kg/y	0	1	1	212.5
Carbon Monoxide	kg/y	3	11	7	215.7
NOx	kg/y	4	10	6	159.6

Intersection Performance (Persons Only) - Hourly Values

Performance Measure	Units	Site A	Site B	Difference Site B - Site A	% Difference Diff / Site A
Travel Speed (Average)	km/h	47.8	48.1	0.3	0.6
Travel Distance (Total)	pers-km/h	63.9	210.8	146.9	229.9
Travel Time (Total)	pers-h/h	1.3	4.4	3.0	228.0
Demand Flows (Total)	pers/h	63	208	145	230.0
Control Delay (Total)	pers-h/h	0.05	0.13	0.08	180.2
Control Delay (Average)	sec	2.6	2.2	-0.4	-15.1
Control Delay (Worst Movement)	sec	4.7	5.0	0.3	7.0
Total Effective Stops	pers/h	18	50	32	171.7
Effective Stop Rate		0.29	0.24	-0.05	-17.7
Proportion Queued		0.04	0.07	0.03	79.4
Performance Index		1.3	4.1	2.9	222.0
Cost (Total)	$/h	45.58	148.65	103.07	226.1

Intersection Performance (Persons Only) - Annual Values

Site A - Hours per Year: 480
Site B - Hours per Year: 480

Performance Measure	Units	Site A	Site B	Difference Site B - Site A	% Difference Diff / Site A
Demand Flows (Total)	pers/y	30,316	100,042	69,726	230.0
Delay	pers-h/y	22	61	39	180.2
Effective Stops	pers/y	8,878	24,118	15,240	171.7
Travel Distance	pers-km/y	30,680	101,202	70,522	229.9
Travel Time	pers-h/y	642	2,105	1,463	228.0
Cost	$/y	21,878	71,350	49,472	226.1