REPORT

Tonkin+Taylor

Te Awamutu T6 and T11 Structure Plans

Transportation Assessment

Prepared for
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Executive summary

Growth Cells T6 and T11, both in the Te Awamutu area of Waipa District, were assessed for both the existing and potential future statuses of the transport network.

Considerations were as follows:

- Existing nature of the roads and other transport facilities around each growth area, including safety considerations.
- Crash history for the existing roads, including a comparison against NZTA Crash Prediction Modelling.
- Likely attractors for travel, and resulting travel patterns.
- Network assessment using the principles of 'Gravity Modelling' for those travel patterns in various scenarios from Existing to a predicted 2035 2% per annum increase plus High Development of the growth areas (anticipating future sub-division).
- Intersection modelling for key locations based on the assessed trip distribution.
- A comparison of the worst case future Crash Prediction Model with the existing situation.
- Consideration of a previous Feasibility Report by Opus (T11 only).

Taking all these factors, including results of modelling exercises, into account the following conclusions and recommendations were reached.

Growth Area T6 Conclusions and Recommendations:

This report found that there may be existing deficiencies in road width on several local roads and one local arterial (Golf Road) in the rural area, and that existing crash statistics on two of these roads (Herbert Street and Whitmore Street) are in excess of what would be expected using NZTA crash prediction modelling.

The traffic modelling also revealed that normal traffic growth to 2035, without including additional demand for growth area T6, could result in the following three intersections having unacceptable waiting times:

- State Highway 3 / St Leger Road / Golf Road intersection
- State Highway 3 / Herbert Street / Nixon Street intersection
- State Highway 3 / Whitmore Street intersection

The further demand placed on the network is estimated to be 2,400 additional vehicles per day in the proposed "Low Development" scenario, or 4,800 vehicles per day in the suggested conservative "High Development" scenario (assuming future sub-division of these lots).

These additional vehicles, whilst not helping existing issues if they go unaddressed, are otherwise able to be accommodated within the assessed network even with further baseline traffic growth.

In addition, there are also a lack of pedestrian and cyclist facilities around T6 which, whilst arguably not currently a known issue, the desire of Waipa District Council to incorporate these facilities in a growth area means there could be a lack of connectivity if not addressed in the existing network.

In line with these conclusions we have prepared some recommendations for work going forward to help address existing and future concerns:

1 Existing Local Roads:

  a The following council roads have higher than expected crash injury rates, and further investigation is required to determine why this is occurring:

i Herbert Street

ii Whitmore Street

b The following council roads are currently considered to have too narrow a seal width for their future purpose, and it is recommended investigation into widening and marking them is undertaken:

i St Leger Road (some sections of)

ii Brill Road

iii Haultain Street

iv McAndrew Street

v Golf Road (rural section)

vi McGhie Road (if desired to include as an alternative route east)

2 Pedestrian and Cyclist Facilities:

a Pedestrian and cyclist facilities around the growth area are lacking for connections to the anticipated facilities within the growth area. It is recommended that Waipa District Council review the existing facilities and programme in providing new infrastructure as the growth area is developed. The key connections to focus on for these facilities are anticipated to be:

i St Leger Road from Brill Road to State Highway 3

ii Ballance Street from the growth area connection to State Highway 3

iii Leslie Street from 'Access 3' to State Highway 3

b There are currently no dedicated or shared cyclist facilities along State Highway 3. It is recommended that NZTA look into providing these in some form.

c The only existing crossing facility along State Highway 3 is in Kihikihi town centre. It is recommended that NZTA look into additional provision for pedestrian (and possibly cyclist, depending on the solution) safe crossing facilities in the residential areas to the north and south of the town centre.

3 Intersection traffic issues:

a The State Highway 3 / Golf Road / St Leger Road intersection is recommended for an immediate investigation, for potential upgrade due to existing issues with vehicles trying to exit Golf Road. This intersection is designated as the junction of the proposed Western Arterial Road with SH3 in the Integrated Transport Strategy for WDC published in 2010.

b The State Highway 3 / Herbert Street / Nixon Street intersection is recommended for an upgrade investigation should growth area T6 be approved.

c The following intersections are recommended for an upgrade investigation before 2035 whether or not growth area T6 is approved for development:

i State Highway 3 / Whitmore Street

ii State Highway 3 / Herbert Street / Nixon Street

Growth Area T11 Conclusions and Recommendations:

This report found that the existing injury crash rate on Cambridge Road is higher than is predicted by NZTA modelling guidelines, which should be investigated further.

The traffic modelling around the State Highway 3 intersection with Cambridge Road and Arawata Street at a high level appears to be indicating that the intersection is near if not at capacity with current traffic flows.

The further demand placed on the network is estimated to be 1,510 additional vehicles per day in the proposed "Low Development" scenario, or 3,020 vehicles per day in the suggested conservative "High Development" scenario (assuming future sub-division of these lots).

These additional vehicles, whilst not helping existing issues, are able to be accommodated within the assessed network with no measureable detriment, even with further baseline traffic growth.

In addition, there is also a lack of dedicated cyclist facilities around T11 which, whilst arguably not currently a known issue, the desire of Waipa District Council to incorporate these facilities in the growth area means there could be a break in connectivity if not addressed in the existing network.

In line with these conclusions we have prepared some recommendations for work going forward to help address existing and future concerns:

1 Pedestrian and Cyclist Facilities:

   a Cyclist facilities down Cambridge Road are lacking for connections to the anticipated facilities within the growth area, although a shared path facility exists at the State Highway roundabout with Cambridge Road. It is recommended that Waipa District Council review the existing facilities and programme in providing / extending infrastructure as the growth area is developed.

   b The only existing crossing facility along Cambridge Road is at the State Highway roundabout where there is a refuge island at the intersection. It is recommended that Waipa District Council look at a more formal facility near the supermarket, or at least another refuge island, to enable pedestrian traffic to more safely access local amenities.

2 The arrangement of Access 2 with the service lane for the shopping complex is considered to be a safety issue, and it is recommended discussions are held with the owner of that service lane to form an arrangement which is less problematic.

   It is noted that Mitre 10 does not appear to have delivery doors/facilities to the rear, so there remains the possibility of combining the two into an intersection, and providing an access off the new road.

The following points are recommendations from the Opus Feasibility Report which we believe are still relevant:

1 Undertake a more detail assessment of speed management measures for Cambridge Road.

2 Undertake a review of pedestrian and cycling connectivity.

   – Recommendations have been made in this regard, however a specific detailed review of what facilities are warranted has not been undertaken and could be useful to Waipa District Council in targeting funds.

3 Detailed assessment of how to change the right of way at Cambridge Road Access 1 to be a public road.

1 Te Awamutu: T6

1.1 Structure Plan Area

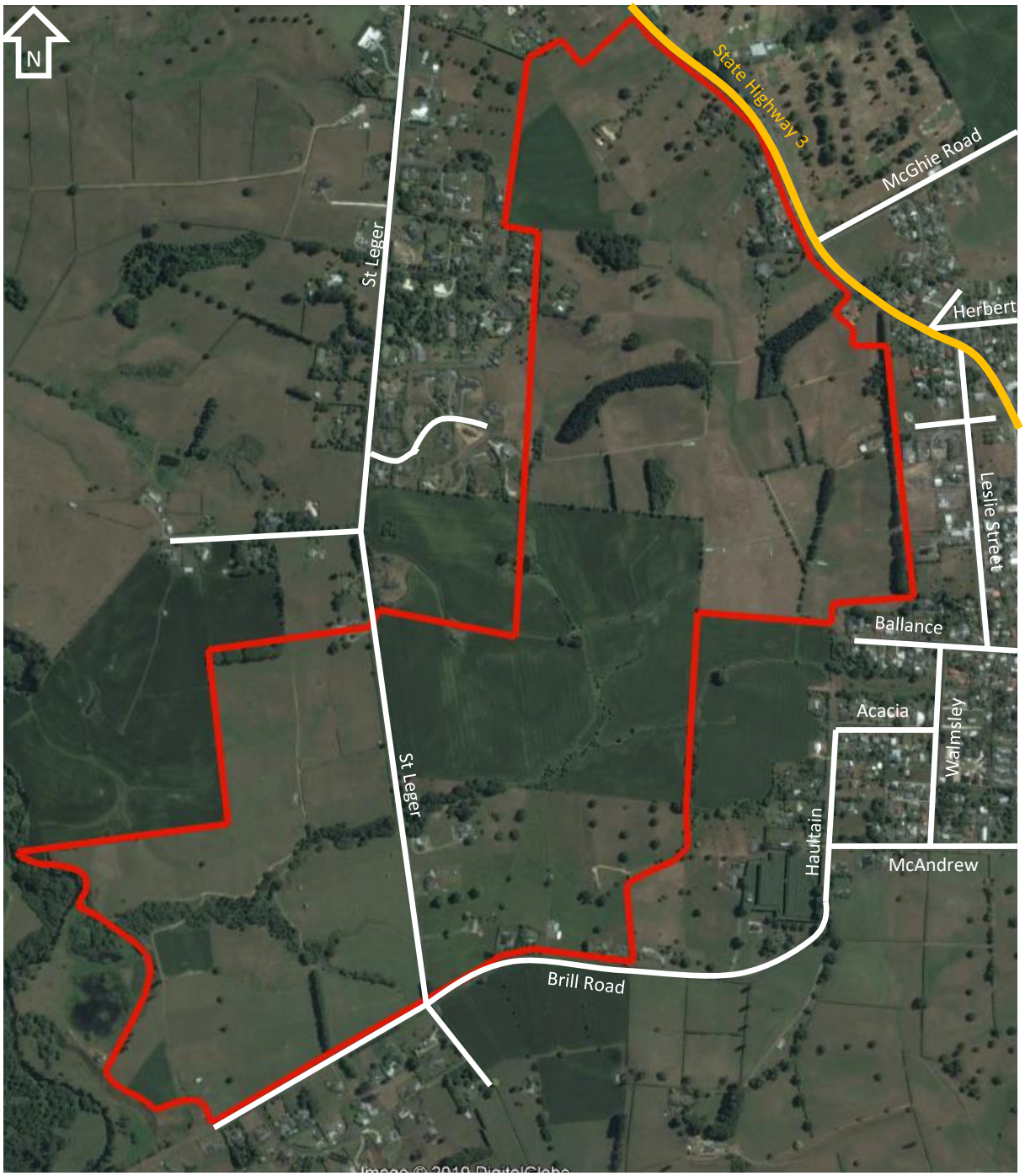

Figure 1.1: Approximate extents of T6 growth cell (image sourced from Google Earth)

The T6 growth cell lies between Kihikihi and Te Awamutu in a currently rural area zoned for future large-lot residential, immediately south of State Highway 3.

1.2 Existing Situation

1.2.1 Existing Transport Environment

With the exception of State Highway 3 to the north of the growth cell, all roads directly affected by T6 are classified as Local Roads.

There is a single narrow footpath on the northern / eastern side of the State Highway, otherwise there are no existing pedestrian or cyclist facilities on this major arterial.

Local roads surrounding the growth cell are generally consistent with a rural environment, with some residential on the Kihikihi (eastern) side.

Table 1.1: Road Details (Indicative Existing): Immediate Area

Road Name	Total Seal Width (m)	Lanes	Shoulder	Cycle Facilities	Footpaths	Posted Speed (km/hr)
St Leger Road	6.0 – 8.5	2 – Partially marked	Unmarked	None	None	80 – 100
Lawbrooke Lane	6.0	Unmarked (2 inferred)	Unmarked	None	None	80
Leger Grove	6.0	Unmarked (2 inferred)	Unmarked	None	None	80
Linehan Road	5.5	Unmarked (2 inferred)	Unmarked	None	None	80
Brill Road	5.5	2 – Partially marked	Unmarked	None	None	100
Haultain Street	4.5	2-way but effectively single lane	Unmarked	None	None	50
McAndrew Street	4.5 – 6.5	Unmarked (2 inferred)	Unmarked	None	None	50
Acacia Avenue	7.5	Unmarked (2 inferred)	Unmarked	None	1.5 m wide, northern side, full length	50
Walmsley Street	6.5 – 8.0	Unmarked (2 inferred)	Unmarked	None	1.5 m wide, western side, full length	50
Cameron Street	6.5	Unmarked (2 inferred)	Unmarked	None	None	50
Ballance Street	8.5	Unmarked (2 inferred)	Unmarked	None	1.5 m wide, northern side, full length	50
Havelock Street	4.5	2-way but effectively single lane	Unmarked	None	None	50
Leslie Street	7.5 – 8.5	Unmarked (2 inferred)	Unmarked	None	1.5 m wide, western side, 200 m long only from south	

Note: Measurements are approximate only using Google Earth.

In addition to the above the following roads, whilst not directly associated with the development (with the exception of the State Highway), will provide key links to the wider area:

Table 1.2: Road Details (Indicative Existing): Key Links

Road Name	Total Seal Width (m)	Lanes	Shoulder	Cycle Facilities	Footpaths	Posted Speed (km/hr)
State Highway 3 *Significant Road Corridor* *Major Arterial* *Regional Strategic*	15.5 – 16.5	2 + median	2, varies but generally at least 1.0 m wide	None	1.5 m wide, Northern / eastern side, full length	50 – 80
Golf Road *Major Arterial*	7.9 (town) 6.0 (rural)	2, fully marked with centreline and edgelines	1 on northern side to town boundary only, approximately 1.0 m wide	None	None	70 (town) 100 (rural)
McGhie Road *Local Road (connects SH3 to a Collector)*	4.5	2-way but effectively single lane	Unmarked	None	None	80
Herbert Street *Local Road (connects SH3 to a Collector)*	8.1	2 – Partially marked	Unmarked	None	1.5 m wide, northern side to Moule Street where it switches to southern side, ends at Oliver Street	50
Whitmore Street *Minor Arterial*	11.2 – 12.0	2, fully marked with centreline and edgelines	2, at least 2.0 m wide each	None	2 (both sides), 1.5 m wide each, full length within town	50
Church Street *Local Road (possible key link between Ballance and Whitmore)*	7.8	Unmarked (2 inferred)	Unmarked	None	1.5 m wide, southern side, full length	50

Note: Measurements are approximate only using Google Earth.

Herbert Street and, to a lesser extent, McGhie Road, provide key linkage through to Flat Road (a local Collector), and in turn feed into Golf Road, which also has its own connection to State Highway 3. Collectively these roads provide a key link to Cambridge and the rural businesses between the towns.

Whitmore Street (turning into Arapuni Road at the town boundary) provides a key link to the South Waikato towns of Putaruru and Tokoroa, as well as serving the rural areas around and to the south of Mount Maungatautari.

Church Street is a small section of road providing a second connection from State Highway 3 to Whitmore Street, however it lies directly opposite the Ballance Street intersection forming a crossroads, and would be the ideal route of many trying to travel from T6 out to the east.

These roads are not considered an exhaustive list, and there are many other local roads which provide "rat-runs" between the roads listed, however these are considered the primary, or most likely, routes for the majority of people, and certainly for those not familiar with urban Kihikihi.

1.2.2 Crash History

The NZTA Crash Analysis System (CAS) was interrogated for the period 2009 to 2018 (inclusive) to provide crash data for the roads in the immediate vicinity of the development and roads thought to be key in the distribution of traffic away from and back to the development, but only to the next major intersection or urban boundary. Full CAS outputs can be found in Appendix A.

State Highway 3 was assessed from the St Leger Road intersection to the McAndrew Street intersection (inclusive) only to account for the major intersections utilised by the new development.

While every effort was made to weed out any double-counting, it is possible that, where two roads in the assessment intersect, a crash may have been counted twice.

Table 1.3: Historical Crash Numbers with Injury by Road

Road Name	Number of Crashes	Non-injury	Minor Injury (M)	Death or Serious (DSI)	Crash Injury Rate	Years
State Highway 3	67	48	16	3	1.9	10x 2009 *(4x M; 2x DSI)* 4x 2010 *(M)* 1x 2011 *(1x M)* 4x 2012 *(1x M)* 2x 2013 *(1x M)* 3x 2014 11x 2015 *(3x M)* 14x 2016 *(1x M; 1x DSI)* 12x 2017 *(2x M)* 6x 2018 *(3x M)*
St Leger Road	3	1	1	1	0.2	1x 2010 1x 2012 1x 2015
Golf Road	12	11	1	0	0.1	2x 2009 2x 2010 2x 2011 *(1x M)* 1x 2012 3x 2015 1x 2017 1x 2018

Road Name	Number of Crashes	Non-injury	Minor Injury (M)	Death or Serious (DSI)	Crash Injury Rate	Years
McGhie Road	1	1	0	0	0	2011
Herbert Street	12	9	3	0	0.3	2x 2009 1x 2010 2x 2011 *(1x M)* 3x 2012 2x 2016 2x 2017 *(M)*
Whitmore Street	21	15	5	1	0.6	1x 2009 1x 2010 *(DSI)* 2x 2011 3x 2012 1x 2013 *(M)* 3x 2014 3x 2016 *(1x M)* 4x 2017 *(1x M)* 3x 2018 *(2x M)*
Leslie Street	3	3	0	0	0	1x 2009 1x 2012 1x 2015
Ballance Street	4	4	0	0	0	1x 2010 1x 2014 1x 2015
McAndrew Street	2	2	0	0	0	1x 2009 1x 2016
Walmsley Street	0	0	0	0	0	n/a
Acacia Street	0	0	0	0	0	n/a
Haultain Street	1	1	0	0	0.1	2009
Brill Road	0	0	0	0	0	n/a

As would be expected being a major arterial, State Highway 3 has by far the most crashes for the period, closely followed by Whitmore Street, Herbert Street and Golf Road. While this number seems high, it is less than would be expected by modelling (refer Section 1.2.3 below). This road is also noted as being a medium risk road on NZTA's KiwiRAP (Kiwi Roads Assessment Programme) report in 2012 (the most recent report) and therefore on NZTA's radar of roads that require attention.

Golf Road is a defined as a Major Arterial and Whitmore Street a Minor Arterial, therefore the crash rates on these roads appear consistent with their status.

Herbert Street is considered to be a Local Road, however the accident data suggests that it carries more traffic than normally expected or this classification and may be acting more like a collector road used as a defacto bypass of central Te Awamutu and/or as an alternative route to Cambridge and rural businesses.

If this is the case, it will have significant impact on the use of Herbert Street and its intersection with State Highway 3, over what may have been designed for, and improvement of the intersection and road corridor may be required.

1.2.3 Crash Prediction Modelling

A high-level Crash Prediction Model was assessed for the existing situation using the methods and formulae found in NZTA's Crash Estimation Compendium (2016, Updated June 2018).

For the State Highway 3 analysis, specifically the section of the State Highway from the St Leger Road / Golf Road intersection to the McAndrew Street intersection (both inclusive), the following sections were modelled independently from one another and combined in a final summation as per section 2.1.1: Methodology by site and crash type, of the Crash Estimation Compendium:

- State Highway 3 'rural' zone (i.e.: 80 km/hr) mid-block model
- State Highway 3 'urban' zone (i.e.: 50 km/hr) mid-block model
- St Leger Road / Golf Road intersection model
- Herbert Street intersection model
- Leslie Street intersection model
- Whitmore Street intersection model
- Ballance Street / Church Street intersection model
- McAndrew Street intersection model

Those Waipa District Council roads considered to be the main thoroughfares and/or distributors both currently and in the future were assessed as mid-block only as the major intersections were accounted for in the State Highway assessment, and the mid-block modelling can be said to account for minor intersections and private accesses.

Table 1.4: Crash Model Results (Existing)

Road Name	**Predicted Injury Crash Rate** (existing)	**Actual Injury Crash Rate**	**Differential: Predicted to Actual**	**Differential Rate**
State Highway 3 (includes intersections)	3.10	1.90	-1.20	-38.7%
St Leger Road	0.30	0.20	-0.10	-33.3%
Golf Road	0.10	0.10	0.00	0%
Herbert Street	0.12	0.30	+0.18	+50%
Leslie Street	0.06	0.00	-0.06	-100%
Whitmore Street	0.06	0.60	+0.54	+900%
Ballance Street	0.02	0.00	-0.02	-100%
McAndrew Street	0.02	0.00	-0.02	-100%

Most of the road corridors, including State Highway 3, are currently experiencing lower injury crash rates than the assessed prediction model estimates, with notable exceptions for Herbert Street and Whitmore Street.

The assumption regarding Herbert Street's collector road status also seems to be supported by the data, and Whitmore Street has a higher crash rate than would normally be expected, which could indicate it is in need of further detailed analysis to understand why this may be occurring.

It is important to note that, being high-level, no detailed analysis of individual crashes was undertaken; as such, it is possible that the actual injury crashes may have been assigned incorrectly.

1.2.4 Road Safety

The existing road network is that of a rural town, some is urbanised in facilities such as footpaths etc., and other areas have no footpaths or kerb and channel. Generally the local road network has some provision for pedestrians, as indicated in Table 1.1, however on the roads to the western side of State Highway 3 which will connect directly to this growth area the facilities are spotty, with some roads having partially complete paths on at least one side, and others having nothing. Dedicated cyclist facilities are none existent.

The State Highway, whilst having standard-width footpaths on both sides for most of the study length, is also lacking in dedicated cyclist facilities.

Crossing facilities beyond a drop-kerb in the footpath appear to be confined to the immediate town centre, and then a single Zebra-type crossing facility across the State Highway is the only formal arrangement.

In the crash data (refer Appendix A) there are three accidents which involve pedestrians, all associated with the State Highway; two of these resulted in vehicle to vehicle conflict due to attempts to avoid or slow down for the pedestrians in question. There are no accidents stated to involve cyclists.

One accident involved hitting a pedestrian, resulting in a minor injury, and was caused by the vehicle swerving to avoid 'another party.'

It's also important to note that these accidents were spread quite evenly over the study period, with only one non-injury crash involving a pedestrian in the last five years (in 2015).

This indicates the relative risk for pedestrians and cyclists in Kihikihi appears to be low, however it should be noted that the reason for this is unknown, for example it may be that there are very few pedestrians at all.

1.2.5 Travel Patterns

No traffic survey has been undertaken, however using best-practise and existing data from the Road Assessment and Maintenance Management database (RAMM) we can infer likely peak travel patterns.

This data was extracted from Mobileroad.org, which is populated using Road Controlling Authority (RCA) RAMM data. This data is maintained by the RCA (in this case NZTA for State Highway 3, and Waipa District Council for all other roads) for tracking and forecasting maintenance activities on their respective networks; it was noted that while the State Highway traffic data appeared to be based on recent counts, the Waipa District Council roads were all identified as estimates from 2016 and so we are unsure as to the accuracy of the data for that part of the network.

The key RAMM data used in this assessment can be found in Table 1.5 below.

Table 1.5: RAMM Data

Road Name	Average Daily Traffic (ADT) (veh/day)	Date of Count / Estimate	Heavy Vehicles (%)
Acacia Avenue	155	1/12/2016	Unknown
Ballance Street	600	1/12/2016	Unknown
Brill Road	230	1/12/2016	Unknown
Brill Road Stub	162	1/12/2016	Unknown
Church Street	1,160	1/12/2016	Unknown
Golf Road	1,580	1/12/2016	Unknown
Haultain Street	80	1/12/2016	Unknown
Havelock Street	30	1/12/2016	Unknown
Herbert Street	1,020	1/12/2016	Unknown
Leslie Street	610	1/12/2016	Unknown
McAndrew Street	250	1/12/2016	Unknown
McGhie Road	220	1/12/2016	Unknown
SH3 (Kihikihi Road) North of St Leger/Golf Int.	12,030	25/12/2017	8%
SH3 (Kihikihi Road) South of St Leger/Golf Int.	11,861	25/12/2017	11%
SH3 (Lyon Street) Herbert to Whitmore	11,861	25/12/2017	11%
SH3 (Lyon Street) Whitmore South	8,670	25/12/2017	19%
St Leger Road Brill Road to Bruce Road	355	1/12/2016	Unknown
St Leger Road Bruce Road to Linehan Road	410	1/12/2016	Unknown
St Leger Road Lawbrooke to SH3 / Golf	1,110	1/12/2016	Unknown
St Leger Road Leger Grove to Lawbrooke	920	1/12/2016	Unknown
St Leger Road Linehan Road to Leger Grove	545	1/12/2016	Unknown
St Leger Road Stub	57	1/12/2016	Unknown
Walmsley Street	130	1/12/2016	Unknown
Whitmore Street SH3 to Church	2,350	1/12/2016	Unknown
Whitmore Street East of Church	2,740	1/12/2016	Unknown

Note: All data obtained from MobileRoad.org, all 2-way traffic.

The attractors for determining travel patterns are considered to be as follows:

Table 1.6: Attractors and Type

Attractor Name	Approximate Distance from T6	Attractor Type	Attractions
Kihikihi Centre	700 m	Local Primary Attractor	• Local shops (food, postal services, etc.)
Hamilton	32 km	Primary Attractor	• Largest population centre within 0.5hrs travel • Large employment area • Large retail bases, including niche shops and large supermarkets • Recreational facilities
Te Awamutu	3 km	Secondary Attractor	• Closest large shopping area, including Supermarkets • Employment
Cambridge	23 km	Secondary Attractor	• Large shopping area, including Supermarkets • Employment
Local Rural Areas	3 km plus	Secondary Attractor	• Employment • Outdoor Recreation
Otorohanga (and South)	25 km plus	Tertiary Attractor	• Employment • Recreation

From these assumptions we can reasonably determine that the majority of traffic will travel east (Kihikihi Centre, Cambridge, and some rural areas) and north (Hamilton, Te Awamutu, and methods for getting to rural areas north, east and west), with the rest travelling south; and return from those same directions in similar proportions.

Westbound traffic moving away from this area are forced to head either north or south first as no method of direct connection in that direction exists.

1.2.6 Public Transport

State Highway 3 is currently serviced by the number 24 “Te Awamutu” bus connecting Te Awamutu and Kihikihi with Ohaupo and Hamilton City according to the “Busit.co.nz” website, and only to Kihikihi on Tuesdays and Thursdays.

No other public transport options are currently available for this area. Engagement with Waikato Regional Council is recommended to look at future public transport options in the lead up to the next LTP development in 2021.

1.2.7 Other Modes

For local trips to Kihikihi centre, and possibly Te Awamutu, it is likely cycling and walking will be used by children, the elderly, those with no access to a private vehicle, and those of a health or environmentally friendly mind-set; some of these same groups will use the bus to Te Awamutu and further to Hamilton.

Realistically, however, the majority of trips in this area are still likely to be private vehicle based regardless of the distance to travel.

1.3 Proposed Situation

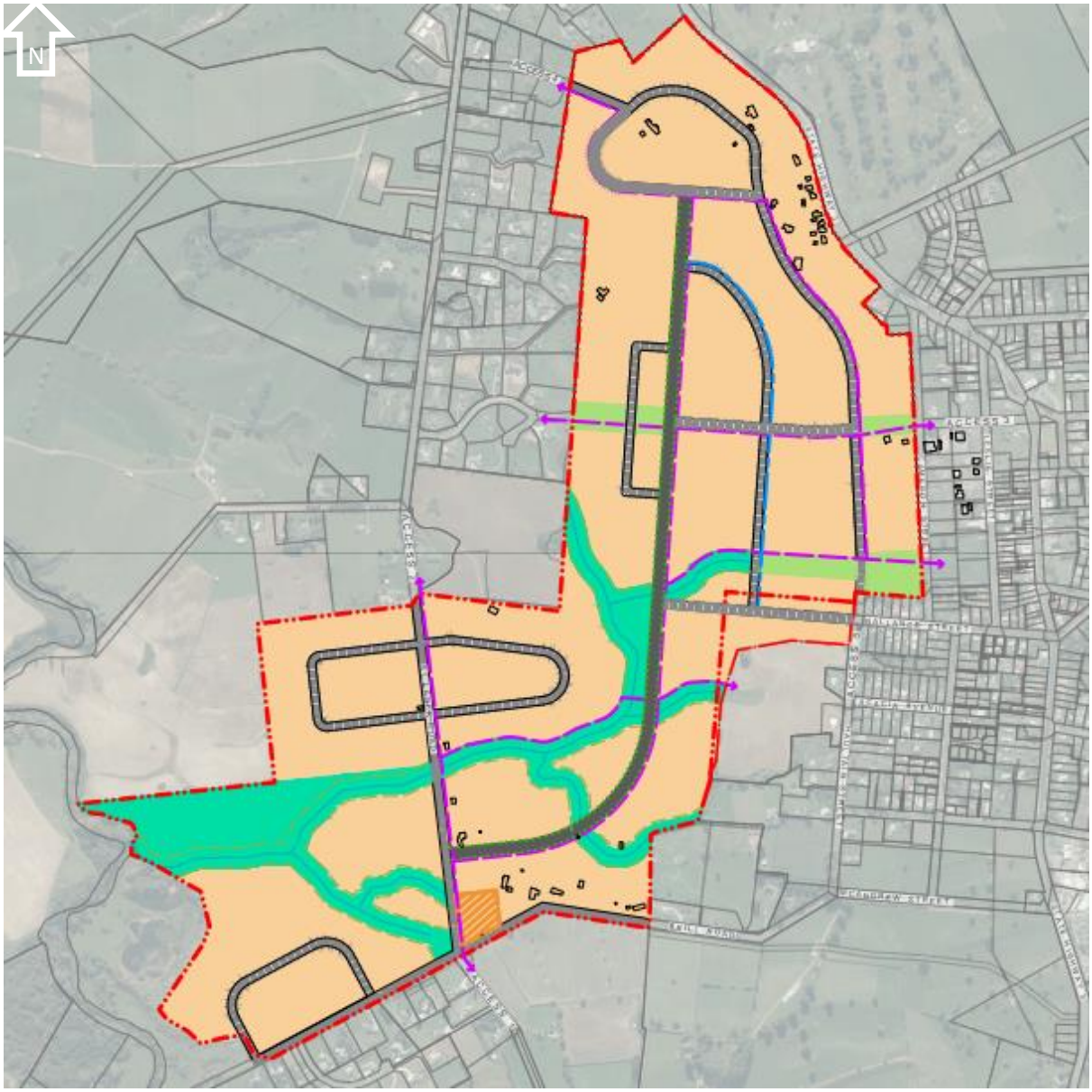

Figure 1.2: Proposed T6 Structure Plan road network

The proposed development area is intended to be a mixture of various lot sizes of residential and compact residential, ranging from 1,000 m^2, to 5,000 m^2 and over.

Based on the current Structure Plan at the time of writing, this results in an estimated lot yield of around 250-300.

1.3.1 Proposed Road Network

1.3.1.1 Overview

The proposed road network is designed to provide good connectivity both to and within the land parcel, providing good traffic amenity as well as retaining the potential for future in-fill subdivision from low density to medium density without the need for additional public roading infrastructure.

The links to the existing road network occur at two points on St Leger Road (including the intersection with Brill Road to the south), given it runs through the proposed plan area, and Ballance Street.

St Leger Road provides a good primary connection to State Highway 3 to the north for those living in the south, and parts of the central, plan area, as well as providing a reasonable local road link to State Highway 3 to the south via Brill Road and McAndrew Street.

Belle Amie Drive, leading out to St Leger Road in the northern part of the growth cell is a recently constructed road that appears to be of sufficient standard to join on to the 20 m collector road shown on the Structure Plan. It is likely that this will form the main point of entry for vehicles accessing from the north.

Ballance Street provides a good link from the centre of the plan area to Kihikihi town centre, providing an alternative link to State Highway 3 for those in the northern and central part of the plan area, saving a (comparatively) lengthy travel south.

It is anticipated that vehicles will use the Ballance Street intersection with State Highway 3 sparingly, unless they intend to use Whitmore Street to head out into the rural area, with Leslie and Walmsley Streets providing the primary north and southbound connections to the State Highway respectively.

1.3.1.2 Road Upgrades

The following roads, critical to the growth area, are currently estimated to be deficient (based on the desktop exercise) when assessed against the Waipa District Council standards (Regional Infrastructure Technical Specifications, Appendix T4: Criteria for Public and Private Roads) and may require upgrading to meet these standards:

- St Leger Road (some sections of)
- Brill Road
- Haultain Street
- McAndrew Street
- Golf Road (rural section)
- McGhie Road (if desired to include as an alternative route east)

Predominantly this relates to total seal widths, which may be exacerbated by a lack of markings, leading to drivers taking a more central position than they otherwise would do.

Upgrading the intersection of St Leger Road and Brill Road could provide a significant enhancement to safety and efficiency as the current crossroads alignment is narrow with highly constrained sight distance which is considered to be a considerable risk now, which will deteriorate in the future should traffic flows increase, although the medium term estimate is that this is unlikely given the increased ease of connectivity along other roads within the development.

We consider it necessary to undertake a review of these roads prior to the growth area coming online, in conjunction with any hierarchy changes (see below).

1.3.1.3 Road Hierarchy Changes

As part of this development, it is expected that certain local roads function, and therefore where it sits in the regional hierarchy, will change.

The table below indicates which roads are expected to change hierarchy as the development in the T6 growth area increases:

Table 1.7: Predicted Road Hierarchy Changes

Road Name	Current Zone / Hierarchy	Predicted Zone / Hierarchy
St Leger Road	Rural & Large Lot Residential / Local	Large Lot Residential / Collector
Herbert Street	Residential / Local	Residential / Collector
Ballance Street	Residential / Local	Residential / Collector
Church Street	Residential / Local	Residential / Collector

These predictions are based on a combination of function and traffic numbers, and even if T6 does not support the numbers based in this report, the roads listed are likely to function on this basis as a minimum.

If this prediction follows, then it is likely these roads will require some level of upgrade, as per the District Plan minimum standards, to function in this manner safely and efficiently. District Plan Road widths are reproduced in the table below.

Table 1.8: District Plan Residential Zone Road Widths

Class	Road Reserve Width (m)	Carriageway Width (m)	Lane Width (m)	Cycleway Width (m)	Footpath Width (m)
Collector	25	15	2 @ 3.5	Both sides @ 1.5	2 @ 1.5
Local	11	11	2 @ 3	Shared environment	2 @ 1.5

1.3.2 Proposed Alternative Mode Links

Shared pedestrian / cycle facilities have been proposed in the Structure Plan (the pink lines in Figure 1.2) which follow most of the proposed road links to the existing network, as well as providing some amenity linkage through proposed green spaces.

The majority of the roads connecting to these facilities currently have little to no pedestrian and cyclist facilities provided, and what is there is generally considered to be poorly inter-connected. We recommend that WDC consider addressing this in the next LTP by reviewing Kihikihi active mode transport facilities against the Waipa District Cycling Trails Strategic Framework to proposing projects, such as:

- Provision of shared cycle/footway path links to key destinations away from roads.
- Traffic Calming on local roads to reduce vehicle speeds and make a safer environment.
- Localised widening especially on corners to improve visibility and provide safe passing of cyclists.
- Construction of footpaths and berms wherever possible.

1.4 Modelling Assessments

1.4.1 Trip Distribution

Trip distribution has been assessed at a conceptual level using a simplified form of gravity modelling, a high-level method of determining likely travel patterns based on existing known data.

Using the attractors as a guide, at any one intersection the traffic flow in any direction currently on that road is proportionally split based on the most popular routes and likely destinations, informing the flows between, and therefore at, intersections through to the end of the study area.

The flows undergo a "balancing" exercise where the proportions turning in any one direction are gradually amended until the approximate ADT for each direction and road are arrived at.

This method is a cost effective way of estimating traffic patterns and turning flows without reliance on turning counts and origin destination surveys. The results are used to inform the indicative intersection models and give an indication as to whether intersections are currently functioning as intended, and whether they will continue to do so if more vehicles are added.

1.4.1.1 Base Year

The gravity modelling for the existing situation is based on the assumed travel patterns and traffic data identified in section 1.2.3 above.

The ADT data was pro-rated to a Base Year of 2018 using a 2% per annum average, and also to a Projected Year of 2035 using the same average; 2035 was chosen as this is the latest year this growth area is expected to be fully developed by.

These numbers were then placed into a spreadsheet-based "Wireframe Model" designed to look at the daily peaks using the following further assumptions:

- The average daily peaks will be 10% of the ADT.
- The flows on any one road are split 70/30 for direction based on the time of day and direction of attractors (i.e.: 70% AM towards attractors, 70% PM away from attractors).
- Where Heavy Traffic is 'Unknown' it will be assumed to be 1%

Turning estimates, by percentage of vehicles, were then used to try and balance the vehicles flowing into the study area with the vehicles flowing from the study area along key routes.

Using these turning estimates as a starting point, the 2035 base model was then also created.

1.4.1.2 Model Limitations

It is important to note that, no counts or observation verification was conducted at any of the key intersections and the model is entirely derived from the "most likely" routing based on the assumptions used for trip distribution.

Another issue with using ADT data over such a long section of State Highway is the "stepping" which occurs in the data between two count locations, which is difficult to reconcile within the assumptions and method mentioned above.

1.4.1.3 Development Figures

The future development of T6 has been assumed to be additional to the standard 2% traffic growth in this area; this is not strictly correct, as the traffic has to come from somewhere and this type of residential growth tends to be what supports it, however retaining this assumption does provide for a conservative model.

Two development scenarios over and above a standard 2% growth were considered:

1 Low Development: A scenario whereby the lot yield as presented in the Structure Plan was used to determine additional traffic flow.

2 High Development: A scenario whereby the lot yield was doubled when compared to that in the structure plan, to account for a worst case scenario of smaller lot types and future in-fill development.

The daily traffic per lot was assumed to be 10veh/day, with all other traffic assumptions matching that for the base models. This results in the following additional traffic figures:

1 Low Development = 2,400 veh/day

2 High Development = 4,800 veh/day

1.4.2 Intersection Modelling

The following intersections were modelled in Sidra Intersection 8.0 for levels of service, all based on the Gravity Model calculated flows and turning percentages:

- State Highway 3 / Golf Road / St Leger Road
- State Highway 3 / Herbert Street / Leslie Street / Nixon Street
- State Highway 3 / Whitmore Street / Church Street / Ballance Street
- State Highway 3 / McAndrew Street

These intersections were considered high priority intersections as they are collector roads or higher and/or currently manage or are expected to manage a significant amount of the traffic from both the existing developed areas of Kihikihi and the T6 growth area.

The Level of Service for any lane is directly related to the average delay anticipated for a vehicle in that lane, as follows:

Table 1.9: Level of Service (LoS): Sidra 8 Sign Control

Level of Service (LoS) for v/c≤1.0 (v/c>1.0 = LoS F)	**Average Delay per Vehicle** in seconds (d)
A	d ≤ 10
B	10 < d ≤ 15
C	15 < d ≤ 25
D	25 < d ≤ 35
E	35 < d ≤ 50
F	50 < d

The following assumptions, in addition to those mentioned for the Gravity Model, were used:

- No gradients are known, so all gradients for all approaches were set at 0%.
- All measurements possible were taken from aerial views on Google Earth.
- If a median was present it was assumed to act as a Right Turn Bay in lieu of an actual Right Turn Bay.
- If present, shoulders were considered ‘full’ (of parked vehicles, for example) and so not considered as additional seal width.

1.4.2.1 State Highway 3 / Golf Road / St Leger Road

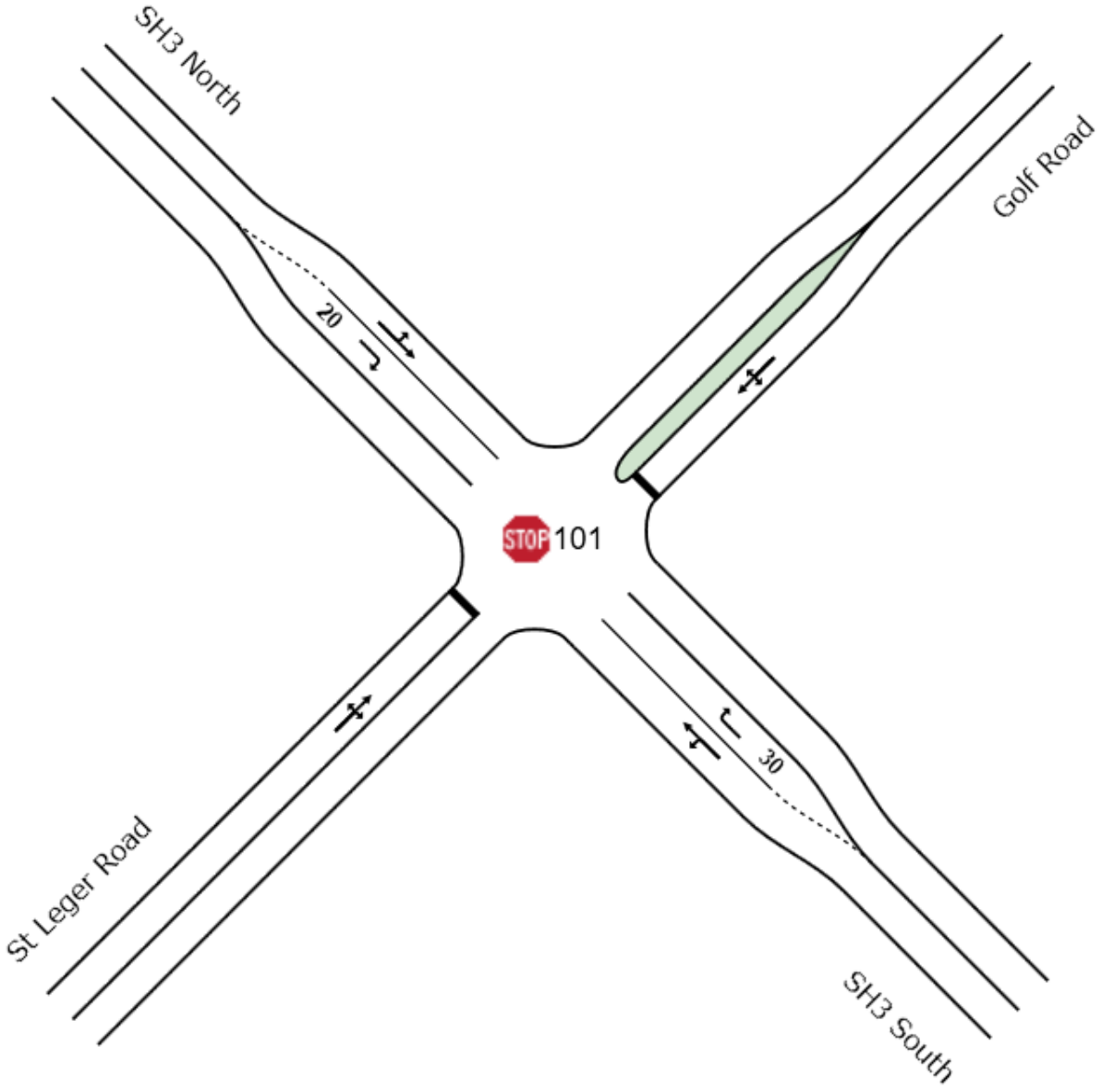

Figure 1.3: Sidra Intersection Diagram – State Highway 3 / Golf Road / St Leger Road

This intersection was modelled for the following situations:

- 2018 base year AM and PM peaks
- 2018 plus Low Development (LD) AM and PM peaks
- 2018 plus High Development (HD) AM and PM peaks
- 2035 assumed natural growth of 2%pa only, AM and PM peaks
- 2035 2% growth plus Low Development (LD), AM and PM peaks
- 2035 2% growth plus High Development (HD), AM and PM peaks

The following tables summarise the LoS findings for each leg / lane by scenario for quick reference. Summaries of the modelling reports can be found in Appendix B.

Table 1.10: AM Peaks

Scenario	SH3 North		SH3 South		Golf Road	St Leger Road
	Through Lane	Right Turn Bay	Through Lane	Right Turn Bay		
2018	A	B	A	A	F	C
2018 + LD	A	B	A	A	F	C
2018 + HD	A	B	A	A	F	C
2035	A	B	A	A	F	F
2035 + LD	A	B	A	A	F	F
2035 + HD	A	B	A	A	F	F

Table 1.11: PM Peaks

Scenario	SH3 North		SH3 South		Golf Road	St Leger Road
	Through Lane	Right Turn Bay	Through Lane	Right Turn Bay		
2018	A	A	A	B	F	C
2018 + LD	A	A	A	B	F	C
2018 + HD	A	A	A	B	F	C
2035	A	A	A	C	F	F
2035 + LD	A	A	A	C	F	F
2035 + HD	A	A	A	C	F	F

These results indicate that, for both AM and PM peaks, the existing intersection requires an upgrade with current traffic levels.

It is likely that, given Golf Road's other connections to the east, the intersection will very rarely see these levels of delay as users will re-direct to Park or Cambridge Roads to bypass any issues; however by 2035, without the added development as additional demand, St Leger Road will also be experiencing delay outside of the desired Levels of Service, with the only option for users to travel south and join the State Highway 3 traffic heading north, therefore adding to the issues with exiting a side road at this intersection, and also potentially causing problems with those within Kihikihi.

1.4.2.2 State Highway 3 / Herbert Street / Leslie Street

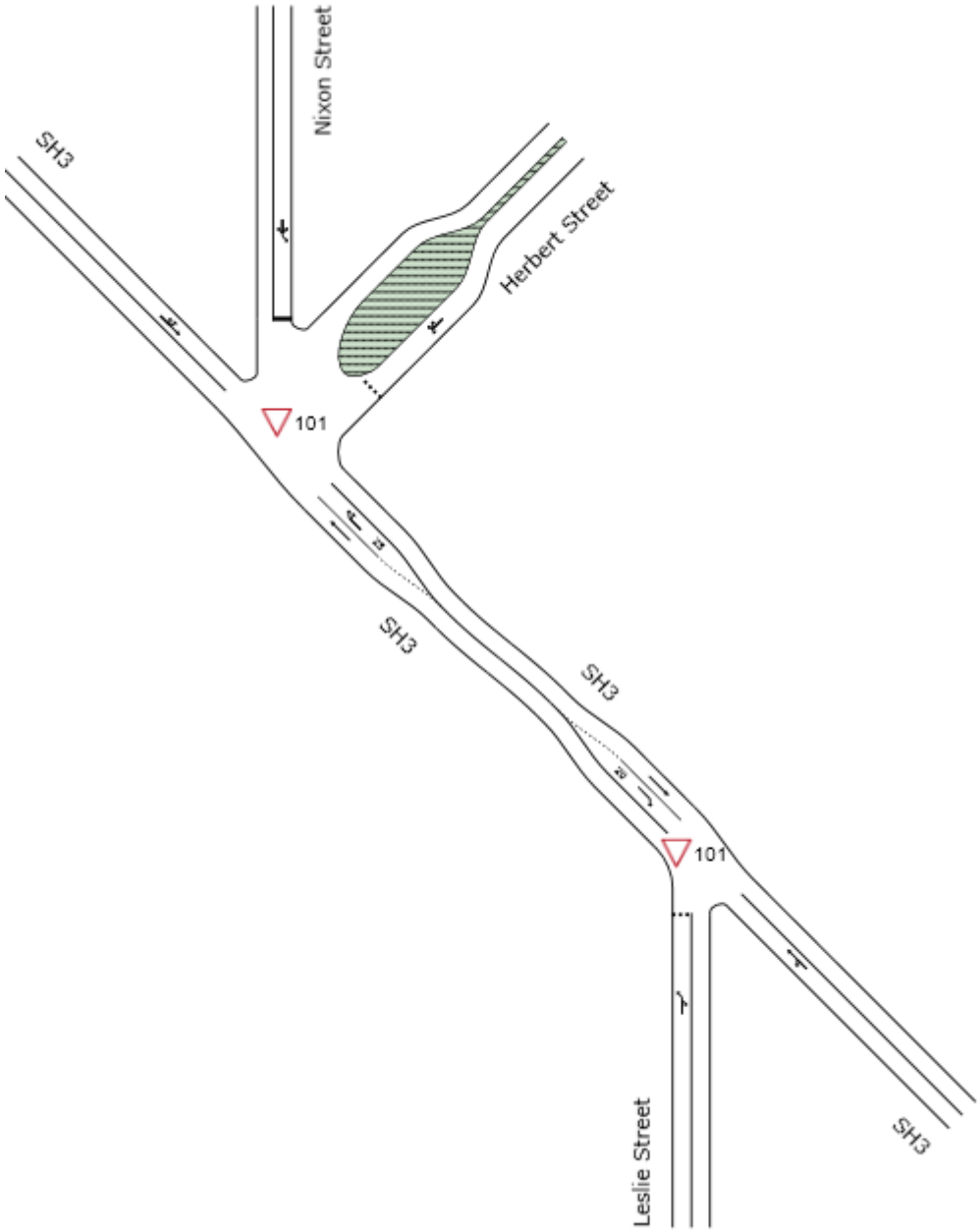

Figure 1.4: Sidra Intersection Diagram – State Highway 3 / Herbert Street / Leslie Street

This intersection was modelled for the following situations:

- 2018 base year AM and PM peaks
- 2018 plus Low Development (LD) AM and PM peaks
- 2018 plus High Development (HD) AM and PM peaks
- 2035 assumed natural growth of 2%pa only, AM and PM peaks
- 2035 2% growth plus Low Development (LD), AM and PM peaks
- 2035 2% growth plus High Development (HD), AM and PM peaks

It is important to note that this intersection is staggered, and as such has been summarised as two separate intersections, however it was analysed as one model for the purposes of this report.

The following tables summarise the LoS findings for each leg / lane by scenario for quick reference. Summaries of the modelling reports can be found in Appendix B.

Table 1.12: AM Peaks – Herbert Street

Scenario	SH3 North	SH3 South		Herbert Street	Nixon Street
		Through Lane	Right Turn Bay		
2018	A	A	A	D	C
2018 + LD	A	A	A	D	C
2018 + HD	A	A	A	E	C
2035	A	A	A	F	F
2035 + LD	A	A	A	F	F
2035 + HD	A	A	A	F	F

Table 1.13: AM Peaks – Leslie Street

Scenario	SH3 North		SH3 South	Leslie Street
	Through Lane	Right Turn Bay		
2018	A	A	A	B
2018 + LD	A	A	A	B
2018 + HD	A	A	A	B
2035	A	B	A	C
2035 + LD	A	B	A	C
2035 + HD	A	B	A	C

Table 1.14: PM Peaks – Herbert Street

Scenario	SH3 North	SH3 South		Herbert Street	Nixon Street
		Through Lane	Right Turn Bay		
2018	A	A	A	E	C
2018 + LD	A	A	A	F	D
2018 + HD	A	A	A	F	D
2035	A	A	C	F	F
2035 + LD	A	A	C	F	F
2035 + HD	A	A	C	F	F

Table 1.15: PM Peaks – Leslie Street

Scenario	SH3 North		SH3 South	Leslie Street
	Through Lane	Right Turn Bay		
2018	A	A	A	A
2018 + LD	A	A	A	A
2018 + HD	A	A	A	A
2035	A	A	A	B
2035 + LD	A	A	A	A
2035 + HD	A	A	A	A

These results indicate that the peak traffic is not currently a problem at either end of this staggered crossroads, however the PM peak becomes problematic with even low development of the T6 growth cell, and both AM and PM peaks are an issue by 2035 under a normal growth scenario.

It is likely that, given Herbert Street's other connections to the east, the intersection will rarely see these levels of delay as users will re-direct to Park or Cambridge Roads to bypass any issues, and users of Nixon Street will turn left and follow the same bypass routes if as those on Herbert; however this of course is potentially passing the problem on to other high-use intersections along the State Highway 3 corridor, which would be undesirable.

1.4.2.3 State Highway 3 / Whitmore Street / Church Street / Ballance Street

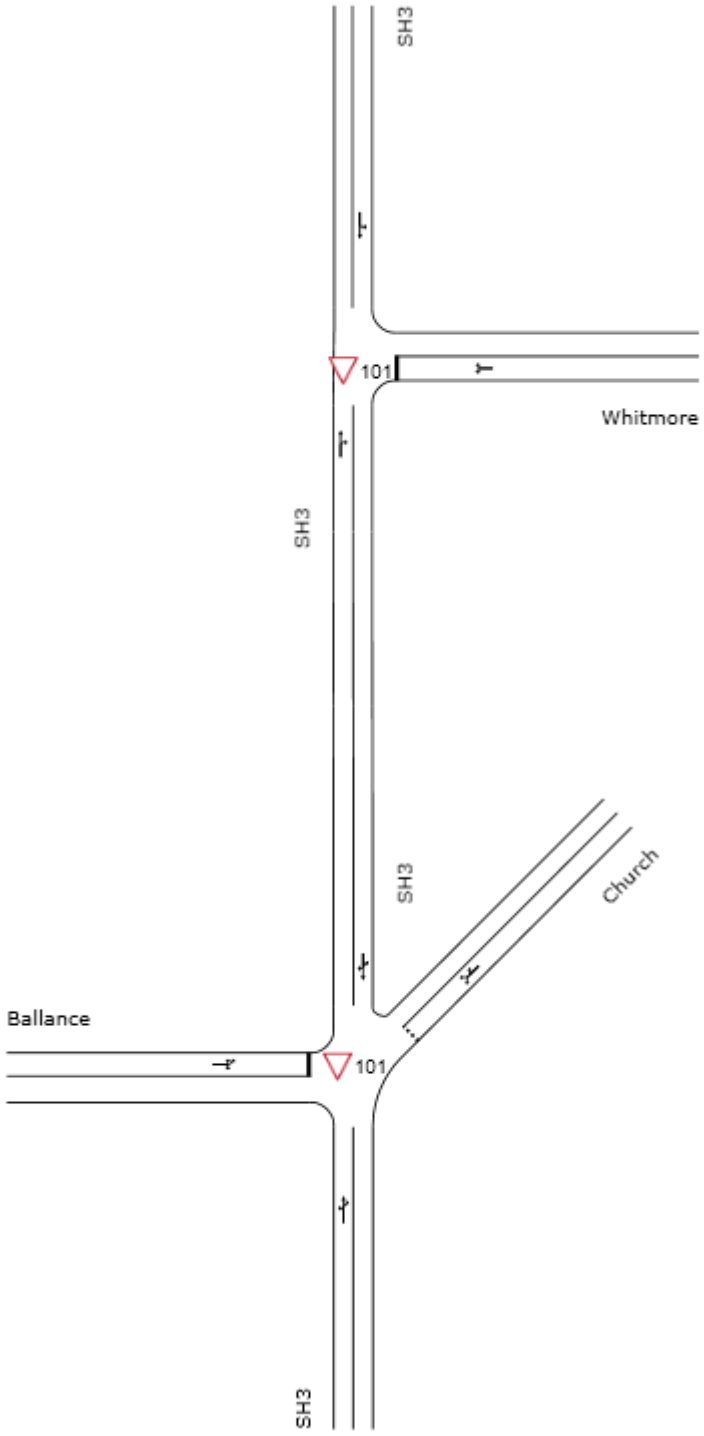

Figure 1.5: Sidra Intersection Diagram – State Highway 3 / Whitmore Street / Church Street / Ballance Street

This intersection was modelled for the following situations:

- 2018 base year AM and PM peaks
- 2018 plus Low Development (LD) AM and PM peaks
- 2018 plus High Development (HD) AM and PM peaks
- 2035 assumed natural growth of 2%pa only, AM and PM peaks

- 2035 2% growth plus Low Development (LD), AM and PM peaks
- 2035 2% growth plus High Development (HD), AM and PM peaks

It is important to note that this assessment is two intersections being treated as one due to proximity. It has been summarised as two separate intersections for clarity, however it was analysed as one model for the purposes of this report.

The following tables summarise the LoS findings for each leg / lane by scenario for quick reference. Summaries of the modelling reports can be found in Appendix B.

Table 1.16: AM Peaks – Whitmore Street

Scenario	SH3 North	SH3 South	Whitmore Street
2018	A	A	D
2018 + LD	A	A	D
2018 + HD	A	A	D
2035	A	A	F
2035 + LD	A	A	F
2035 + HD	A	A	F

Table 1.17: AM Peaks – Ballance Street

Scenario	SH3 North	SH3 South	Church Street	Ballance Street
2018	A	A	A	B
2018 + LD	A	A	A	B
2018 + HD	A	A	A	B
2035	A	A	B	B
2035 + LD	A	A	B	C
2035 + HD	A	A	B	C

Table 1.18: PM Peaks – Whitmore Street

Scenario	SH3 North	SH3 South	Whitmore Street
2018	A	A	C
2018 + LD	A	A	C
2018 + HD	A	A	D
2035	A	B	F
2035 + LD	A	B	F
2035 + HD	A	B	F

Table 1.19: PM Peaks – Ballance Street

Scenario	SH3 North	SH3 South	Church Street	Ballance Street
2018	A	A	B	B
2018 + LD	A	A	B	B
2018 + HD	A	A	B	B
2035	A	A	C	B
2035 + LD	A	A	C	B
2035 + HD	A	A	C	B

These results indicate that the peak traffic at the two intersections analysed is currently not a problem, and would still be meeting the required Levels of Service under both T6 growth scenarios.

However, by 2035 under normal a normal growth scenario, without the added development as additional demand, the Whitmore Street intersection falls below the minimum Level of Service and so may require upgrading.

1.4.2.4 State Highway 3 / McAndrew Street

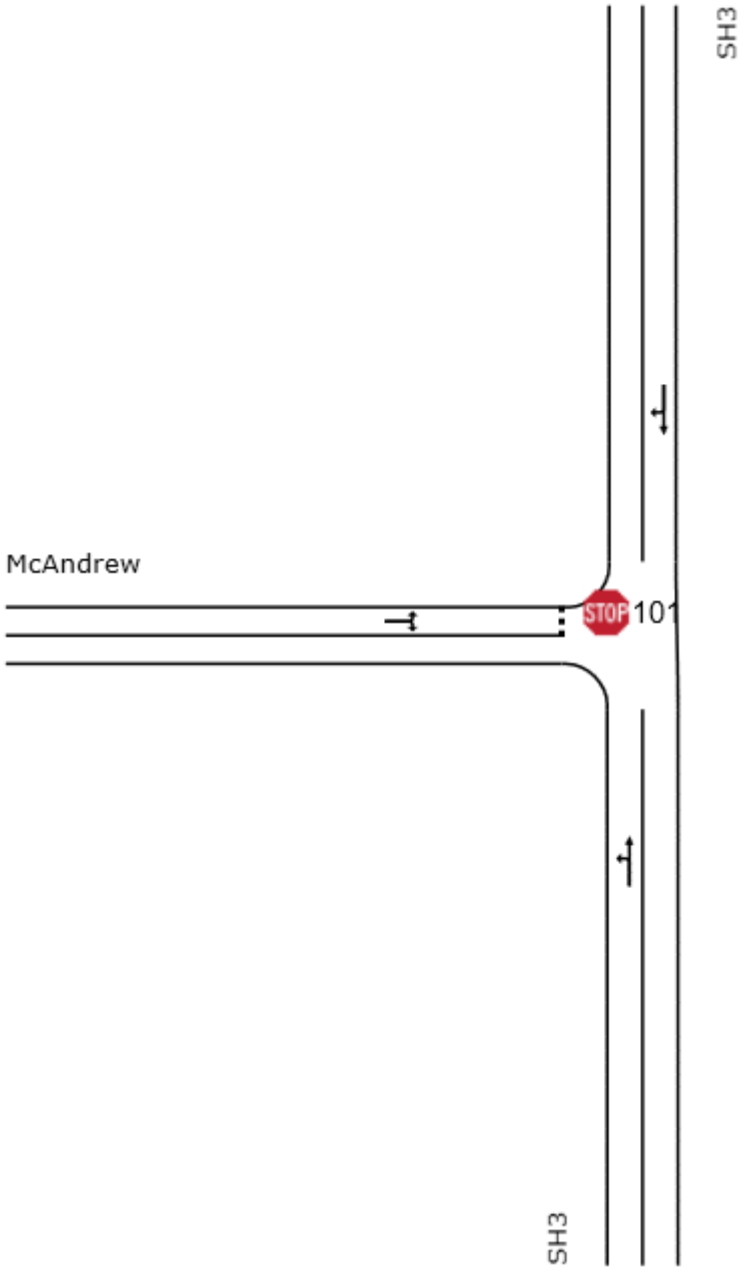

Figure 1.6: Sidra Intersection Diagram – State Highway 3 / McAndrew Street

This intersection was modelled for the following situations:

- 2018 base year AM and PM peaks
- 2018 plus Low Development (LD) AM and PM peaks
- 2018 plus High Development (HD) AM and PM peaks
- 2035 assumed natural growth of 2%pa only, AM and PM peaks
- 2035 2% growth plus Low Development (LD), AM and PM peaks
- 2035 2% growth plus High Development (HD), AM and PM peaks

The following tables summarise the LoS findings for each leg / lane by scenario for quick reference. Summaries of the modelling reports can be found in Appendix B.

Table 1.20: AM Peaks

Scenario	SH3 North	SH3 South	McAndrew Street
2018	A	A	B
2018 + LD	A	A	B
2018 + HD	A	A	B
2035	A	A	C
2035 + LD	A	A	C
2035 + HD	A	A	C

Table 1.21: PM Peaks

Scenario	SH3 North	SH3 South	McAndrew Street
2018	A	A	A
2018 + LD	A	A	A
2018 + HD	A	A	A
2035	A	A	B
2035 + LD	A	A	B
2035 + HD	A	A	B

These results indicate that the McAndrew Street intersection is both currently operating well within the Levels of Service, and continues to do so with development now and to 2035.

1.4.3 Access 4 – Belle Amie Drive

Belle Amie Drive, being positioned in the north-western section of the proposed growth area, potentially significantly alters the flow of traffic within this area as the assumptions currently assume most users want to travel north, and most of those users from the northern part of the development will therefore use the Ballance Street exit.

Access 4 would therefore draw traffic away from Ballance Street and place more traffic on the St Leger Road intersection with State Highway 3.

This would not significantly affect the modelling results, as the St Leger Road intersection is need of a more detailed investigation and more traffic would not change this, and Ballance Street (and the other assessed connections to the State Highway in this area) are expected to operate without significant problems up to the extreme case of 2035 traffic plus higher development in the growth area, which would only improve with traffic diverting away.

The connection of Access 4 to St Leger Road, therefore, is not considered a problem and could in fact reduce traffic in Kihikihi town centre if an upgrade to the State Highway 3 / St Leger Road / Golf Road intersection is implemented and works efficiently.

1.4.4 Crash Prediction Modelling

Using the additional vehicles assumed to be using the road corridors in a 2035 plus High Development worst-case scenario, as assigned in the Gravity Modelling above, the Crash Prediction Modelling was updated assuming the road corridors were not otherwise altered by the developments.

Table 1.22: Crash Model Results (Combined)

Road Name	**Predicted Injury Crash Rate** (existing)	**Predicted Injury Crash Rate** (2035 + HD)
State Highway 3 (includes intersections)	3.10	4.36
St Leger Road	0.30	0.49
Golf Road	0.10	0.13
Herbert Street	0.12	0.15
Leslie Street	0.06	0.10
Whitmore Street	0.06	0.08
Ballance Street	0.02	0.04
McAndrew Street	0.02	0.04

If the differential from Table 1.4 Crash Model Results (Existing) were applied to Herbert and Whitmore Streets, therefore assuming their current unexpected crash trends continued, they would produce a prediction of 0.23 and 0.72 crashes per year respectively.

This shows an increase in expected crashes as development increases, which is not unexpected, however with further investigation and option assessments for upgrading the various roads and intersections so they are better able to cope with expected traffic growth could help keep this increase to a minimum.

1.5 Indicative Costs

Given that the majority of road construction costs will be borne by developers, only a high-level cost estimate has been produced for the structure plan area, and only includes the following:

- Existing road sections which require upgrade to become Collectors or higher (including parts of St Leger Road and Ballance Road).
- New road infrastructure designated Collector or higher, which Waipa DC may wish to implement ahead of developer involvement.

This cost estimate is on the following basis:

- The typical cross section used was based on a “Rural and Large Lot Zone” Collector type road from the Waipa District Plan, with an allowance for a separate pedestrian and cycle shared path.
- No attempt to assess mass-balance of the structure plan area has been made, as a result a nominal earthworks quantity was assumed based on the road following existing contours with no undercutting for poor ground conditions considered.
- No Land Costs have been considered.

- No landscaping, beautification or other enhancement from the stated cross-section in the first point has been assumed (i.e.: grassed berms only).
- No minor roads are included for upgrade or construction.
- Priority intersections are standard (i.e.: no Roundabouts or Traffic Signals).
- No State Highway intersection upgrades have been included, as these are generally high cost bespoke design items, and in the case of the St Leger/Golf Road intersection is already overdue for an upgrade.
- Professional fees associated with the design, consenting and construction observation has not been included.
- Preliminary and General is assumed at 30%
- Escalation costs are not included.

The indicative estimate is $12,500,000, and is considered to be +/-50%.

1.6 Conclusion

There may be existing deficiencies in road width on several local roads including Golf Road (designated as arterial) in the rural area, and that existing crash statistics on Herbert Street and Whitmore Street are in excess of what would be expected using NZTA crash prediction modelling, suggesting that their usage is greater than current assumptions.

Modelling also suggests that normal traffic growth to 2035, without including additional demand for growth area T6, could result in the following three intersections having significant increase in delays:

- State Highway 3 / St Leger Road / Golf Road intersection
- State Highway 3 / Herbert Street / Nixon Street intersection
- State Highway 3 / Whitmore Street intersection

The additional demand placed on the network is estimated to be 2,400 vehicles per day in the proposed “Low Development” scenario, or 4,800 vehicles per day in the suggested conservative “High Development” scenario (assuming future sub-division of these lots).

These additional vehicles, whilst increasing pressure on the current network and compounding existing issues if they go unaddressed, are otherwise able to be accommodated within the assessed local roading network without significant detriment to safety and efficiency.

There is, however, insufficient pedestrian and cyclist facilities around T6 which. Whilst this is not currently a highlighted issue, the desire of Waipa District Council to incorporate these facilities in a growth area suggests there could be a lack of connectivity in the existing network.

In line with these conclusions we have made the following recommendations for work going forward to help address existing and future concerns.

1.7 Recommendations

We have prepared the below recommendations, based on the above analysis and discussion.

1 Existing Local Roads:

a The following council roads have higher than expected crash injury rates, and further investigation is required to determine why this is occurring:

i Herbert Street

ii Whitmore Street

b The following council roads are currently considered to have too narrow a seal width for their future purpose, and it is recommended investigation into widening and marking them is undertaken:
   i St Leger Road (some sections of)
   ii Brill Road
   iii Haultain Street
   iv McAndrew Street
   v Golf Road (rural section)
   vi McGhie Road (if desired to include as an alternative route east)

2 Pedestrian and Cyclist Facilities:
   a Pedestrian and cyclist facilities around the growth area are lacking for connections to the anticipated facilities within the growth area. It is recommended that Waipa District Council review the existing facilities and programme in providing new infrastructure as the growth area is developed. The key connections to focus on for these facilities are anticipated to be:
      i St Leger Road from Brill Road to State Highway 3
      ii Ballance Street from the growth area connection to State Highway 3
      iii Leslie Street from 'Access 3' to State Highway 3
   b There are currently no dedicated or shared cyclist facilities along State Highway 3. It is recommended that NZTA look into providing these in some form.
   c The only existing crossing facility along State Highway 3 is in Kihikihi town centre. It is recommended that NZTA look into additional provision for pedestrian (and possibly cyclist, depending on the solution) safe crossing facilities in the residential areas to the north and south of the town centre.

3 Intersection traffic issues:
   a The State Highway 3 / Golf Road / St Leger Road intersection is recommended for an immediate investigation for upgrading due to possible existing issues with vehicles trying to exit Golf Road.
   b The State Highway 3 / Herbert Street / Nixon Street intersection is recommended for an upgrade investigation should growth area T6 be approved.
   c The following intersections are recommended for an upgrade investigation before 2035 whether or not growth area T6 is approved for development:
      i State Highway 3 / Whitmore Street
      ii State Highway 3 / Herbert Street / Nixon Street

2 Te Awamutu: T11

2.1 Structure Plan Area

Figure 2.1: Approximate extents of T11 growth cell (image sourced from Google Earth).

The T11 growth cell lies south of Cambridge Road on the eastern extents of Te Awamutu, currently rural but zoned for future residential development.

2.2 Existing Situation

2.2.1 Existing Transport Environment

The only roads bordering growth cell T11 are Cambridge Road to the north, designated a Major Arterial in the Waipa District Plan; and Park Road to the south, designated a Collector.

There are no existing cycle facilities along this length of Cambridge Road, but there is a footpath on each side.

Cambridge Road is consistent with an urban environment.

Table 2.1: Road Details (Existing)

Road Name	Total Width (m)	Lanes	Shoulder	Cycle Facilities	Footpaths	Posted Speed (km/hr)
Cambridge Road	11.0	2 (+ median for right turn bay outside supermarket)	2, min. 1.0 m wide	None	1.5 m wide, both sides, full length	50 (70 to the east of Gleneagles Drive)
Park Road	8.0	2	2, approx. 1.0 m wide	None	1.5 m wide footpath extends from north-west to edge of T11	70

Note: Measurements are approximate only using Google Earth.

Park Road in the location of the structure plan area is consistent with a more rural environment, however there is no proposal at this stage to connect any roads through, and so has been disregarded for this assessment.

2.2.2 Crash History

The NZTA Crash Analysis System (CAS) was interrogated for the period 2009 to 2018 (inclusive) to provide crash data for the roads in the immediate vicinity of the development and roads thought to be key in the distribution of traffic away from and back to the development, but only to the next major intersection or urban boundary. Full CAS outputs can be found in Appendix C.

Table 2.2: Historical Crash Numbers

Road Name	Number of Crashes	Non-injury	Minor Injury (M)	Death or Serious (DSI)	Crash Injury Rate	Years
Cambridge Road	17	9	7	1	0.8	2x 2010 1x 2011 1x 2012 2x 2013 *(1x M)* 4x 2014 *(2x M, 1x DSI)* 1x 2016 *(M)* 3x 2017 *(1x M)* 3x 2018 *(2x M)*

2.2.3 Crash Prediction Modelling

A high-level Crash Prediction Model was put together for the existing situation on Cambridge Road using the methods and formulae found in NZTA's Crash Estimation Compendium (2016, Updated June 2018).

Cambridge Road was assessed under the mid-block only formula as this modelling can be said to account for minor intersections and private accesses, which is the most common type in front of growth cell T11.

Table 2.3: Crash Model Results (Existing)

Road Name	Predicted Injury Crash Rate (existing)	Actual Injury Crash Rate	Differential: Predicted to Actual	Differential Rate
Cambridge Road	0.18	0.80	+0.62	+344%

Cambridge Road is revealed to have a higher crash rate than would normally be expected, which could indicate it is in need of more detailed analysis to understand why this may be occurring.

2.2.4 Road Safety

The existing road network connecting to Cambridge Road is urban in nature. Generally the local road network has provision for pedestrians, however Cambridge Road only has one crossing facility, being a refuge island at the State Highway intersection some 700 m west.

2.2.5 Travel Patterns

No traffic survey has been undertaken, however using best-practise and existing data from the Road Assessment and Maintenance Management database (RAMM) we can infer likely peak travel patterns.

Although not intended to be assessed as part of this work due to the proximity and options for vehicles to re-direct prior, NZTA have requested that the effects on the State Highway 3 intersection some 730 m west be considered; because of this the data for each leg of this intersection has also been retrieved (highlighted blue).

This data was extracted from Mobileroad.org, which is populated using Road Controlling Authority (RCA) RAMM data. This data is maintained by the RCA (in this case NZTA for State Highway 3, and Waipa District Council for all other roads) for tracking and forecasting maintenance activities on their respective networks; it was noted that while the State Highway traffic data appeared to be based on recent counts, the Waipa District Council roads were all identified as estimates from 2016 and so we are unsure as to the accuracy of the data for that part of the network.

The key RAMM data used in this assessment is as follows:

Table 2.4: RAMM Data

Road Name	Average Daily Traffic (ADT) (veh/day)	Date of Count / Estimate	Heavy Vehicles (%)
Cambridge Road (outside T11)	4,240	1/12/2016	0%
Arawata Street	10,020	1/12/2016	0%
Cambridge Road (at intersection)	9,300	1/12/2016	Unknown
State Highway 3 North (Ohaupo Road)	12,623	25/12/2017	6%
State Highway 3 South (Albert Park Drive)	9,331	25/12/2017	6%

Note: All data obtained from MobileRoad.org, all 2-way traffic.

The attractors for determining travel patterns are considered to be as follows:

Table 2.5: Attractors and Type

Attractor Name	Approximate Distance from T11	Attractor Type	Attractions
Te Awamutu Centre	1.2 km	Local Primary Attractor	• Closest shopping centre outside immediate area • Employment
Hamilton	30 km	Primary Attractor	• Largest population centre within 0.5hrs travel • Large employment area • Large retail bases, including niche shops and large supermarkets • Recreational facilities
Cambridge	22 km	Secondary Attractor	• Large shopping area, including Supermarkets • Employment
Local Rural Areas		Secondary Attractor	• Employment • Outdoor Recreation
Otorohanga (and South)	30 km plus	Tertiary Attractor	• Employment • Recreation

From these assumptions we can reasonably determine that the majority of traffic will travel west towards the State Highway intersection, distributing from there to Te Awamutu town centre, Hamilton and rural areas to the north and west, with the rest travelling east towards Cambridge, eastern rural areas, and as a Te Awamutu bypass route for travelling south; returning from those same directions in similar proportions.

2.2.6 Public Transport

There are no bus routes, or other method of public transport, servicing the Cambridge Road or Park Road areas according to the “Busit.co.nz” website.

2.2.7 Other Modes

For local trips to the nearby supermarket, and possibly Te Awamutu, it is likely cycling and walking will be used by children, the elderly, those without access to a private vehicle, and those of a health or environmentally friendly mind-set; some of these same groups may also use these modes in conjunction with the bus to get to Hamilton.

Realistically, however, the majority of trips in this area are still likely to be private vehicle based regardless of the distance to travel.

2.3 Feasibility Report

The Opus Transport Project Feasibility Report prepared in June 2018 for this growth area is necessarily conceptual in nature, given the broad nature of the plans for T11 at that point. It is also worth noting that some of the comments and recommendations are linked with another growth area, T8, which is outside the scope of this assessment.

Generally the current Structure Plan was developed with this concept as a basis, with the notable amendment of the reduction in size of the planned area for building construction due to flooding issues to the rear of the large-format retail development.

We have the following differences in observation to those presented in the Opus report:

- The sight distances listed as deficient for Access 2 and Access 3 appear, in our estimation, to be adequate, or at least significantly less deficient than presented, possibly due to a change in speed environment.

The following recommendations from this report are addressed as follows (as they relate to T11 only):

- Reduce the number of accesses of growth cell T11 from three to two (i.e.: Remove Access 2)

  This is a possibility, given the reduction in lot numbers for this growth area, however has been left in for now due to the likelihood of the growth area just south of T11 (T14) being developed more quickly than planned, and the lack of inter-connectivity with Access 1 due to the flood-prone land not being developed; these two things combined may put pressure on a single access, dependent on other road connections made as part of this further development.

  It would be preferred if some agreement could be arrived at with the owners of the service access immediately adjacent to the proposed Access 2, as we agree with the Opus conclusion that this is an undesirable arrangement even with the relatively low expected vehicle movements from the service lane.
- Undertake traffic capacity assessment/ traffic modelling at the following intersections:
  - Cambridge Rd/Albert Park Dr/Arawata St/Ohaupo Rd
  - Park Rd/Albert Park Dr
  - Vaile St/Sloane St/Albert Park Dr

  The impact on the Cambridge Road-State Highway 3-Arawata Street intersection is discussed in the Modelling Assessment section below, the other two intersections appear to be more aligned with the T8 growth area and are not considered significantly affected by this proposal.
- Traffic modelling at each of the proposed access locations to assist with intersection layouts

  This has been conducted and is presented in the Modelling Assessment section below.
- Undertake more detail assessment of speed management measures for Cambridge Road

  This has not been considered as part of this assessment, and is considered to be future work to be conducted when the effects of all growth areas impacting Cambridge Road can be aggregated.
- Undertake a review of pedestrian and cycling connectivity

  Recommendations are made in this regard at the end of this assessment, however a specific detailed review of these facilities has not yet been undertaken.
- Undertake a more detail assessment of internal road network, including midblock cross sections and intersection form

  This work has been conducted in conjunction with Boffa Miskell and is presented elsewhere.
- Detail assessment how to change the right of way at Cambridge Access 1 to be a public road

  This is deemed to be a landowner negotiation and legal issue, not covered by this report.

2.4 Proposed Situation

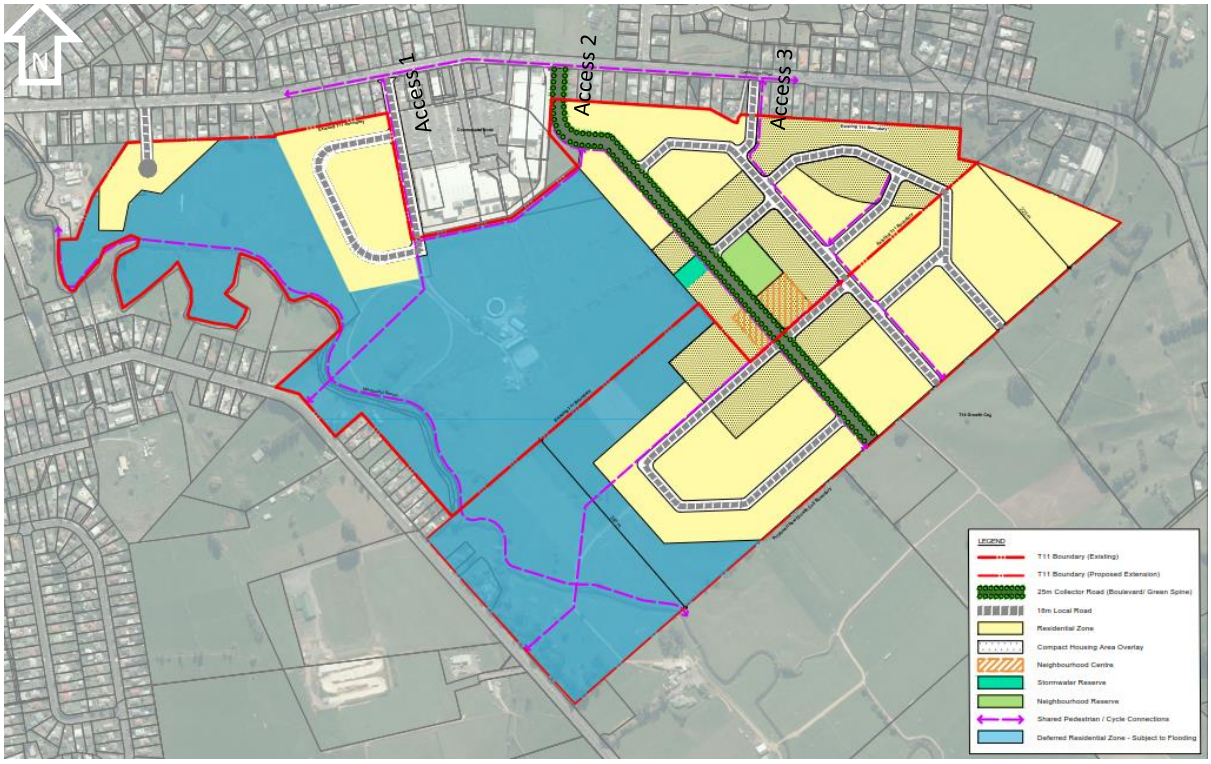

Figure 2.2: Proposed T11 Structure Plan road network

The proposed development area is intended to be a mixture of low and medium density urban residential.

Based on the current Structure Plan at the time of writing, which includes further land to the south-east, this results in an estimated lot yield of around 350. This was a late addition and so is not reflected in the modelling below, however experience suggests that this addition is not significant and the intersections will still be able to cope with this additional development area, though the models should be updated to be sure.

2.4.1 Proposed Road Network

The proposed road network is designed to provide good connectivity to Cambridge Road, as well as future connectivity to the T14 growth area, which also lies between Cambridge and Park road, but to the south of T11.

A significant section of this growth area has had to be left undeveloped due to potential flooding issues, which has also significantly affected how the roads will be laid out.

Because of this restriction, there is a small section to the west which is intended to have its own dedicated access to Cambridge Road down an existing access to the supermarket; the rest of the development, and eventually parts of T14, will share two further exit points to the east of the supermarket.

Once onto Cambridge Road, there are several local road options to help bypass the perceived main routes, however these all lead to either no exit roads or back to Cambridge Road to the east, so is considered to only really be useful for those with destinations along these roads rather than as true alternative or bypass routes that significant numbers will utilise.

2.4.2 Proposed Alternative Mode Links

Shared pedestrian / cycle facilities have been proposed in the Structure Plan which follow most of the proposed road links to the existing network, as well as providing some amenity linkage through proposed green spaces to Park Road.

Unfortunately, Cambridge and Park roads are both lacking in dedicated cyclist, or shared, facilities, and only Cambridge Road is fully serviced with pedestrian facilities in the immediate area of T11.

2.5 Modelling Assessments

2.5.1 Trip Distribution

Trip distribution has been assessed at a conceptual level using a simplified form of gravity modelling, a high-level method of determining likely travel patterns based on existing known data.

Using the attractors as a guide, at any one intersection the traffic flow in any direction currently on that road is proportionally split based on the most popular routes and likely destinations, informing the flows between, and therefore at, intersections through to the end of the study area.

The flows undergo a “balancing” exercise where the proportions turning in any one direction are gradually amended until the approximate ADT for each direction and road are arrived at.

This method is a cost effective way of estimating traffic patterns and turning flows without reliance on turning counts and origin destination surveys. The results are used to inform the indicative intersection models and give an indication as to whether intersections are currently functioning as intended, and whether they will continue to do so if more vehicles are added.

2.5.1.1 Modelling Basis

Given the relative simplicity of the internal road network and proposed connections, no specific gravity model has been produced for T11; the interaction with future growth cells will change this, and a holistic model of some kind will need to be considered prior to those areas coming on-line.

The following assumptions were used in calculating flows for intersection modelling:

- The ADT data was pro-rated to a Base Year of 2018 using a 2% per annum average.
- A Projected Year of 2035 using a 2% per annum average was also used; 2035 was chosen as this is the latest year this growth area is expected to be fully developed by.
- The average daily peaks will be 10% of the ADT.
- The flows on any one road are split 70/30 for direction based on the time of day and direction of attractors (i.e.: 70% AM towards attractors, 70% PM away from attractors).
- Where Heavy Traffic is ‘Unknown’ it will be assumed to be 1%.

2.5.1.2 Model Limitations

It is important to note that, due to cost constraints, no observation verification was conducted at any of the existing intersections and the model is entirely founded on the “most likely” routing based on attractor assumptions and anecdotal evidence.

2.5.1.3 Development Figures

The future development of T11 has been assumed to be additional to the standard 2% traffic growth in this area; this is not strictly correct, as the traffic has to come from somewhere and this type of residential growth tends to be what supports it, however retaining this assumption does provide for a conservative model.

Two development scenarios over and above a standard 2% growth were considered:

1 Low Development: A scenario whereby the lot yield as presented in the Structure Plan was used to determine additional traffic flow.

2 High Development: A scenario whereby the lot yield was doubled when compared to that in the structure plan, to account for a worst case scenario of smaller lot types and future in-fill development.

The daily traffic per lot was assumed to be 10veh/day, with all other traffic assumptions as per those in section 2.5.1.1 above.

2.5.2 Intersection Modelling

The following intersections were modelled in Sidra Intersection 8.0 for levels of service, all based on the logic stated in section 2.5.1 above:

- Access 1 / Cambridge Road
- Access 2 / Cambridge Road
- Access 3 / Cambridge Road
- Gleneagles Drive / Cambridge Road

The Level of Service for any lane is directly related to the average delay anticipated for a vehicle in that lane, as follows:

Table 2.6: Level of Service (LoS): Sidra 8 Sign Control

Level of Service (LoS) for v/c≤1.0 (v/c>1.0 = LoS F)	Average Delay per Vehicle in seconds (d)
A	d ≤ 10
B	10 < d ≤ 15
C	15 < d ≤ 25
D	25 < d ≤ 35
E	35 < d ≤ 50
F	50 < d

The following assumptions, in addition to those mentioned for the Gravity Model, were used:

- No gradients are known, so all gradients for all approaches were set at 0%.
- All measurements possible were taken from aerial views on Google Earth.
- If a median was present it was assumed to act as a Right Turn Bay in lieu of an actual Right Turn Bay.
- If present, shoulders were considered ‘full’ (of parked vehicles for example) and so not considered as additional seal width.

2.5.2.1 Access 1 / Cambridge Road

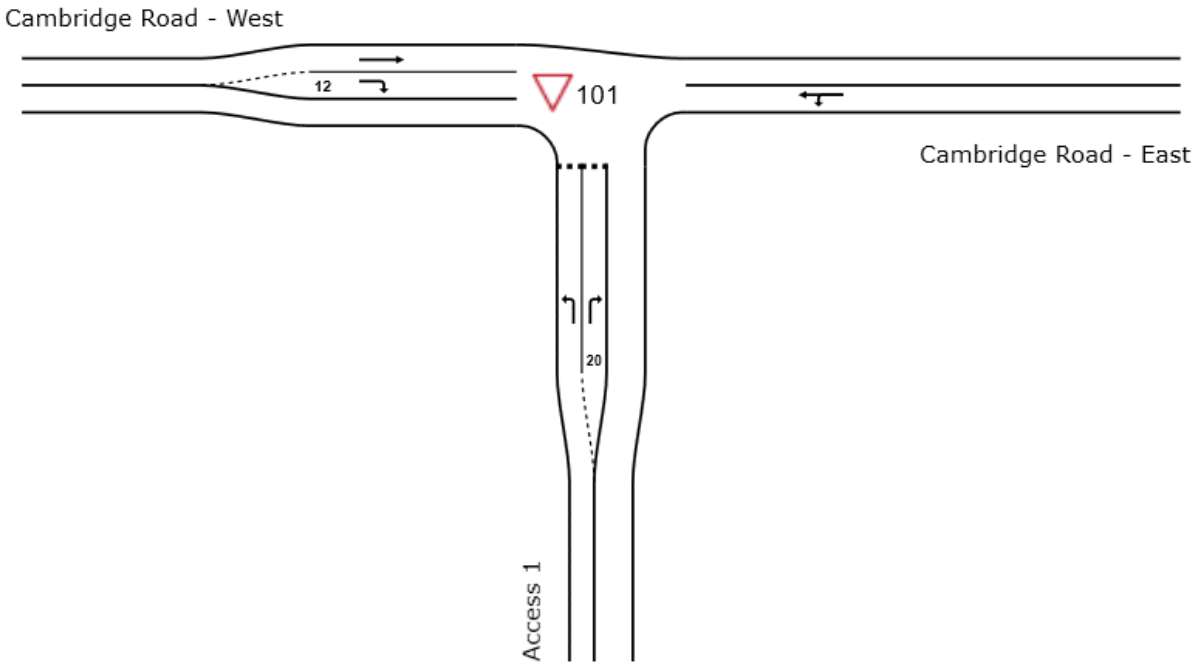

Figure 2.3: Sidra Intersection Diagram – Access 1

This intersection was modelled for the following situations:

- 2018 plus Low Development (LD) AM and PM peaks.
- 2035 2% growth plus High Development (HD), AM and PM peaks.

This intersections is too new to have existing traffic flow data as of the inception of this growth area, and existing traffic appears to be restricted to delivery traffic and a relatively small proportion of the carpark, so no base years for 2018 and 2035 were modelled. To account for the 'existing traffic' a peak movement of 10 vehicles (or 100 veh/day, equivalent to 10 houses) was added to the calculated figures for this part of the development.

Initially only the current proposed situation, and the forecast extreme situation indicated above were modelled to check the extreme ends of the development impact; given the results, no further modelling was deemed to be necessary.

The following tables summarise the LoS findings for each leg / lane by scenario for quick reference. Summaries of the modelling reports can be found in Appendix D.

Table 2.7: AM Peaks

Scenario	Cambridge Road West		Cambridge Road East	Access 1
	Through Lane	Right Turn Bay		
2018 + LD				
2035 + HD				

Table 2.8: PM Peaks

Scenario	Cambridge Road West		Cambridge Road East	Access 1
	Through Lane	Right Turn Bay		
2018 + LD				
2035 + HD				

The results indicate that the intersection should operate well during peak hours at all levels of development to 2035.

2.5.2.2 Access 2 / Cambridge Road

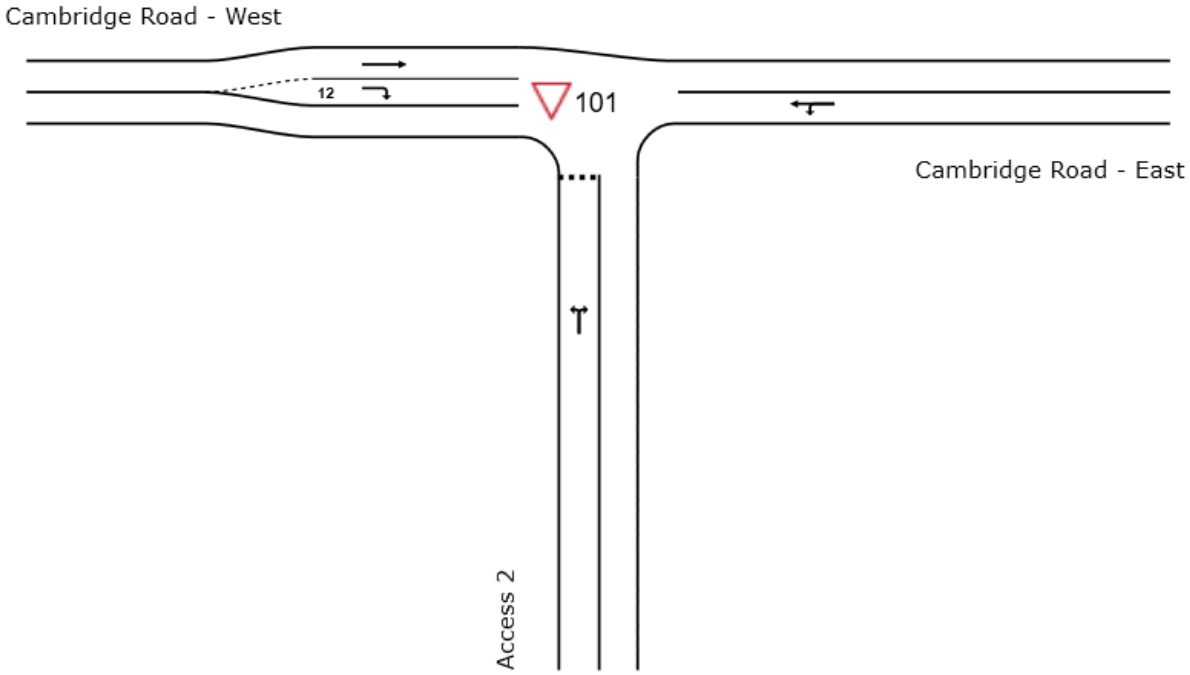

Figure 2.4: Sidra Intersection Diagram – Access 2

This intersection was modelled for the following situations:

- 2018 plus Low Development (LD) AM and PM peaks.
- 2035 2% growth plus High Development (HD), AM and PM peaks.

This intersection is brand new as of the inception of this growth area, so no base years for 2018 and 2035 were modelled.

Initially only the current proposed situation, and the forecast extreme situation indicated above were modelled to check the extreme ends of the development impact; given the results, no further modelling was deemed to be necessary.

The following tables summarise the LoS findings for each leg / lane by scenario for quick reference. Summaries of the modelling reports can be found in Appendix D.

Table 2.9: AM Peaks

Scenario	Cambridge Road West		Cambridge Road East	Access 2
	Through Lane	Right Turn Bay		
2018 + LD				
2035 + HD				

Table 2.10: PM Peaks

Scenario	Cambridge Road West		Cambridge Road East	Access 2
	Through Lane	Right Turn Bay		
2018 + LD				
2035 + HD				

The results indicate that the intersection should operate well during peak hours at all levels of development to 2035.

2.5.2.3 Access 3 / Cambridge Road

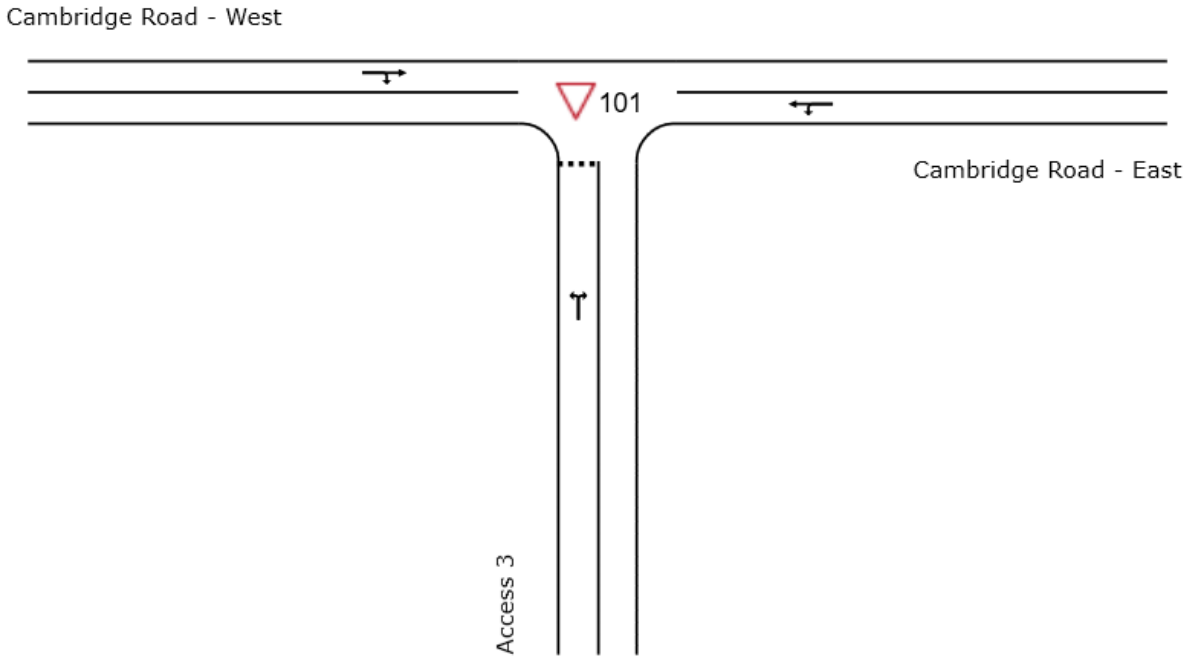

Figure 2.5: Sidra Intersection Diagram – Access 3

This intersection was modelled for the following situations:

- 2018 plus Low Development (LD) AM and PM peaks.
- 2035 2% growth plus High Development (HD), AM and PM peaks.

This intersection is brand new as of the inception of this growth area, so no base years for 2018 and 2035 were modelled.

Initially only the current proposed situation, and the forecast extreme situation indicated above were modelled to check the extreme ends of the development impact; given the results, no further modelling was deemed to be necessary.

The following tables summarise the LoS findings for each leg / lane by scenario for quick reference. Summaries of the modelling reports can be found in Appendix D.

Table 2.11: AM Peaks

Scenario	Cambridge Road West		Cambridge Road East	Access 3
	Through Lane	Right Turn Bay		
2018 + LD				
2035 + HD				

Table 2.12: PM Peaks

Scenario	Cambridge Road West		Cambridge Road East	Access 3
	Through Lane	Right Turn Bay		
2018 + LD				
2035 + HD				

The results indicate that the intersection should operate well during peak hours at all levels of development to 2035.

2.5.2.4 Gleneagles Drive / Cambridge Road

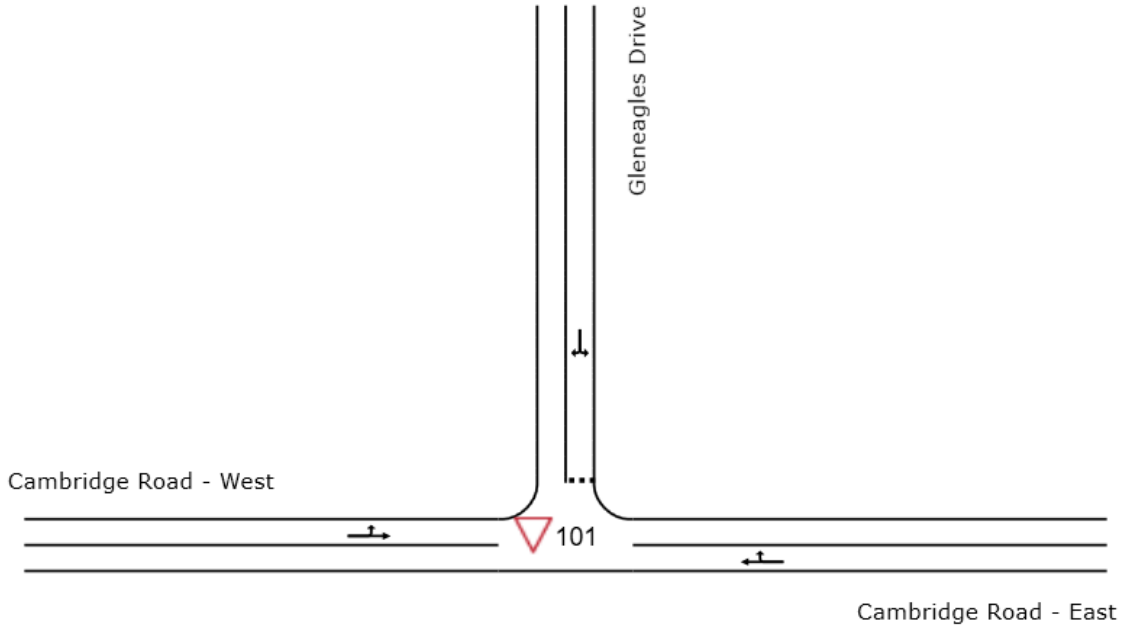

Figure 2.6: Sidra Intersection Diagram – Gleneagles Drive

This intersection was modelled for the following situations:

- 2018 plus Low Development (LD) AM and PM peaks.
- 2035 2% growth plus High Development (HD), AM and PM peaks.

This intersection was modelled for the same situations as the three Accesses so that a Network model (see next section) could be built to check that the close proximity of this and the three other intersections wasn't having a detrimental effect on the operation of Cambridge Road.

Initially only the current proposed situation and the forecast extreme situation indicated above were modelled to check the extreme ends of the development impact; given the results, no further modelling was deemed to be necessary.

The following tables summarise the LoS findings for each leg / lane by scenario for quick reference. Summaries of the modelling reports can be found in Appendix D.

Table 2.13: AM Peaks

Scenario	Cambridge Road West	Cambridge Road East		Gleneagles Drive
		Through Lane	Right Turn Bay	
2018 + LD				
2035 + HD				

Table 2.14: PM Peaks

Scenario	Cambridge Road West	Cambridge Road East		Gleneagles Drive
		Through Lane	Right Turn Bay	
2018 + LD				
2035 + HD				

The results indicate that the intersection should operate well during peak hours at all levels of development to 2035.

2.5.2.5 Network Assessment

These four intersections were then put together in network models to check the LoS "in-situ" as close as can be done.

The results were as per the individual intersection models with no obvious changes; below are the network diagrams for the 2035 2% growth plus High Development AM and PM:

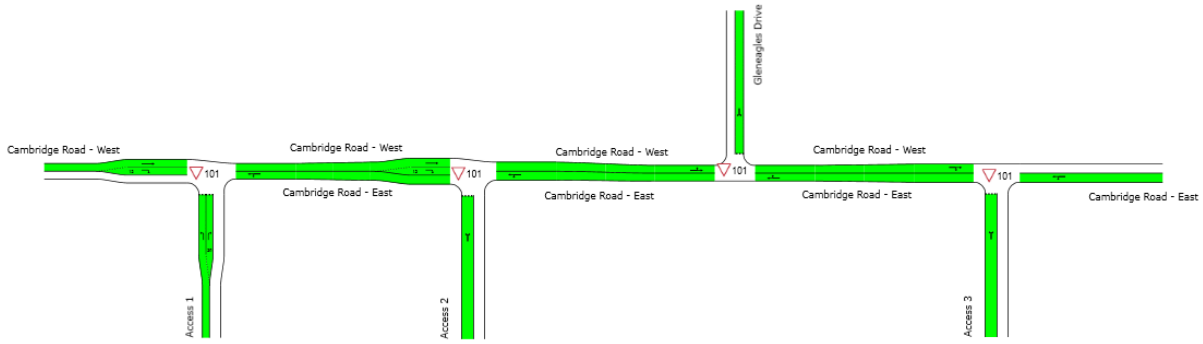

Figure 2.7: Cambridge Road Network Model – 2035 2% growth plus HD, AM

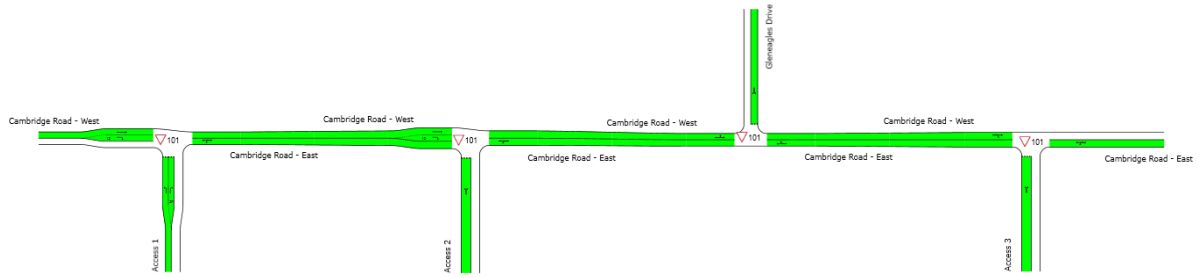

Figure 2.8: Cambridge Road Network Model – 2035 2% growth plus HD, PM

2.5.2.6 State Highway 3 Considerations

NZTA have requested the impacts on the State Highway 3 intersection with Cambridge Road and Arawata Street be considered as part of this assessment.

It is noted that this intersection is over 700 m to the west of the nearest exit from the proposed growth area, however the arrangement of the local roads are not conducive to traffic being able to bypass this intersection if they wish to travel to Te Awamutu town centre, or north to Hamilton.

The existing two-way traffic through the intersection was over 40,000 veh/day as at the last State Highway count; this growth area proposes to add some 1,510 veh/day (two-way), with the potential to increase to 3020 veh/day (two-way) if infill development is catered for.

This amounts to an increase of less than 4% initially, with the potential for an increase of up to 7.5% in the future, not accounting for other increases in State Highway traffic over that time.

A high-level assessment was conducted as to the capacity of the intersection based on the same assumptions used for the Gravity and Intersection modelling above, and it appears that the intersection may be close to capacity with existing traffic volumes at peak times, with very little change in waiting times once the additional flows are added. This is considered to be a small increase on the demands already placed on the intersection, however further investigation by NZTA may be warranted given the apparent existing issues with capacity. It is recommended that a full traffic survey and modelling exercise is undertaken to determine actual use and capacity thresholds at the roundabout.

CAS data was also retrieved on this intersection, and in the ten years to the end of 2018 there were 36 crashes associated with this intersection, with 3 injury crashes (two minor injury crashes and one severe).

This is an injury crash rate of 0.3, which is considered better than would be expected by the prediction models used by NZTA, and so the safety risks are considered minimal.

2.5.3 Crash Prediction Modelling

Using the additional vehicles assumed to be using the Cambridge Road corridor in a 2035 plus High Development worst-case scenario, as assigned in the Gravity Modelling above, the Crash Prediction Modelling was updated assuming the road corridor was not otherwise altered by the developments.

Table 2.15: Crash Model Results (Combined)

Road Name	**Predicted Injury Crash Rate** (existing)	**Predicted Injury Crash Rate** (2035 + HD)
Cambridge Road	0.18	0.35

This shows an increase in expected injury crashes as development increases, which is not unexpected given the additional volume of traffic on Cambridge Road in addition to the new flows from the development, however the movement is from approximately one injury crash every 5 years to approximately one injury crash every 3 years on average, which is still considered reasonable for a Major Arterial road.

However, if the injury crash differential rate from Table 2.3 is applied, therefore assuming the current unexpected crash trend continues, this would result in a new predicted injury crash rate of 1.19, or more than one per year on average, which could be considered less acceptable.

2.6 Indicative Costs

Given that the majority of road construction costs will be borne by developers, only a high-level cost estimate has been produced for the structure plan area, and only includes new road infrastructure designated Collector or higher, which Waipa DC may wish to implement ahead of developer involvement.

This cost estimate is on the following basis:

- The typical cross section used was based on a “Rural and Large Lot Zone” Collector type road from the Waipa District Plan, with an allowance for a separate pedestrian and cycle shared path.
- No attempt to assess mass-balance of the structure plan area has been made, as a result a nominal earthworks quantity was assumed based on the road following existing contours with no undercutting for poor ground conditions considered.
- No Land Costs have been considered.
- No landscaping, beautification or other enhancement from the stated cross-section in the first point has been assumed (i.e.: grassed berms only).
- No minor roads are included for upgrade or construction.
- Priority intersections are standard (i.e.: no Roundabouts or Traffic Signals).
- Professional fees associated with the design, consenting and construction observation has not been included.
- Preliminary and General is assumed at 30%
- Escalation costs are not included.

The indicative estimate is $3,200,000, and is considered to be +/-50%.

2.7 Conclusion

The existing injury crash rate on Cambridge Road is higher than is predicted by NZTA modelling guidelines, which should be investigated further.

The State Highway 3 intersection with Cambridge Road and Arawata Street high level assessment suggests the intersection is near or at capacity with current traffic flows.

The further demand placed on the network is estimated to be 1,510 additional vehicles per day in the proposed "Low Development" scenario, or 3,020 vehicles per day in the suggested conservative "High Development" scenario (assuming future sub-division of these lots).

These additional vehicles, are able to be accommodated within the assessed network with no measureable detriment to safety or efficiency, even with further baseline traffic growth.

Dedicated cyclist facilities around T11 appear to be insufficient which, whilst arguably not currently a known issue, the desire of Waipa District Council to incorporate these facilities in the growth area means there could be a break in connectivity if not addressed in the existing network.

In line with these conclusions we have prepared some recommendations for work going forward to help address existing and future concerns.

2.8 Recommendations

We have prepared recommendations, based on the above analysis and discussion.

1 Pedestrian and Cyclist Facilities:
   a Cyclist facilities down Cambridge Road are lacking for connections to the anticipated facilities within the growth area, although a shared path facility exists at the State Highway roundabout with Cambridge Road. It is recommended that Waipa District Council review the existing facilities and programme in providing / extending infrastructure as the growth area is developed.
   b The only existing crossing facility along Cambridge Road is at the State Highway roundabout where there is a refuge island at the intersection. It is recommended that Waipa District Council look at a more formal facility near the supermarket, or at least another refuge island, to enable pedestrian traffic to more safely access local amenities.

2 The arrangement of Access 2 with the service lane for the shopping complex is considered to be a safety issue, and it is recommended discussions are held with the owner of that service lane to form an arrangement which is less problematic.

   It is noted that there doesn't appear to be any delivery doors at the rear of the Mitre 10, so there remains the possibility of combining the two into an intersection, and providing an access off the new road.

3 The structure plan models should be updated to reflect the late change to the lot yield to ensure the intersections with Cambridge Road are not adversely affected, although experience suggest they will not be.

The following points are recommendations from the Opus Feasibility Report which we believe are still relevant:

1 Undertake a more detail assessment of speed management measures for Cambridge Road

2 Undertake a review of pedestrian and cycling connectivity
   – Recommendations have been made in this regard, however a specific detailed review of what facilities are warranted has not been undertaken and could be useful to Waipa District Council in targeting funds.

3 Detailed assessment of how to change the right of way at Cambridge Road Access 1 to be a public road.

3 Applicability

This report has been prepared by Tonkin & Taylor Limited (T+T) for Boffa Miskell Ltd pursuant to the terms of engagement (Contract) between T+T and Boffa Miskell Ltd in relation to the T6/T11 Structure Plan project. T+T agrees this report may also be used by Waipa District Council (WDC) for the purposes set out in, or able to be reasonably inferred from, the Contract, on the basis that the aggregate liability of T+T to Boffa Miskell Ltd and WDC in respect of any such use or reliance is subject to the limitations and exclusions of liability set out in the Contract. This report may not be relied upon in other contexts or for any other purpose, or by any person other than Boffa Miskell Ltd and WDC, without T+T's prior written agreement.

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Appendix A: T6 CAS Outputs

CAS outputs for the following roads included:

- **Ballance Street**
- **Golf Road**
- **Haultain Street**
- **Herbert Street**
- **Leslie Street**
- **McAndrew Street**
- **McGhie Road**
- **State Highway 3**
- **St Leger Road**
- **Walmsley Street**
- **Whitmore Street**

NZ TRANSPORT AGENCY WAKA KOTAHI CAS

Untitled query

Saved sites

Leslie Street

Crash year

2009 — 2019

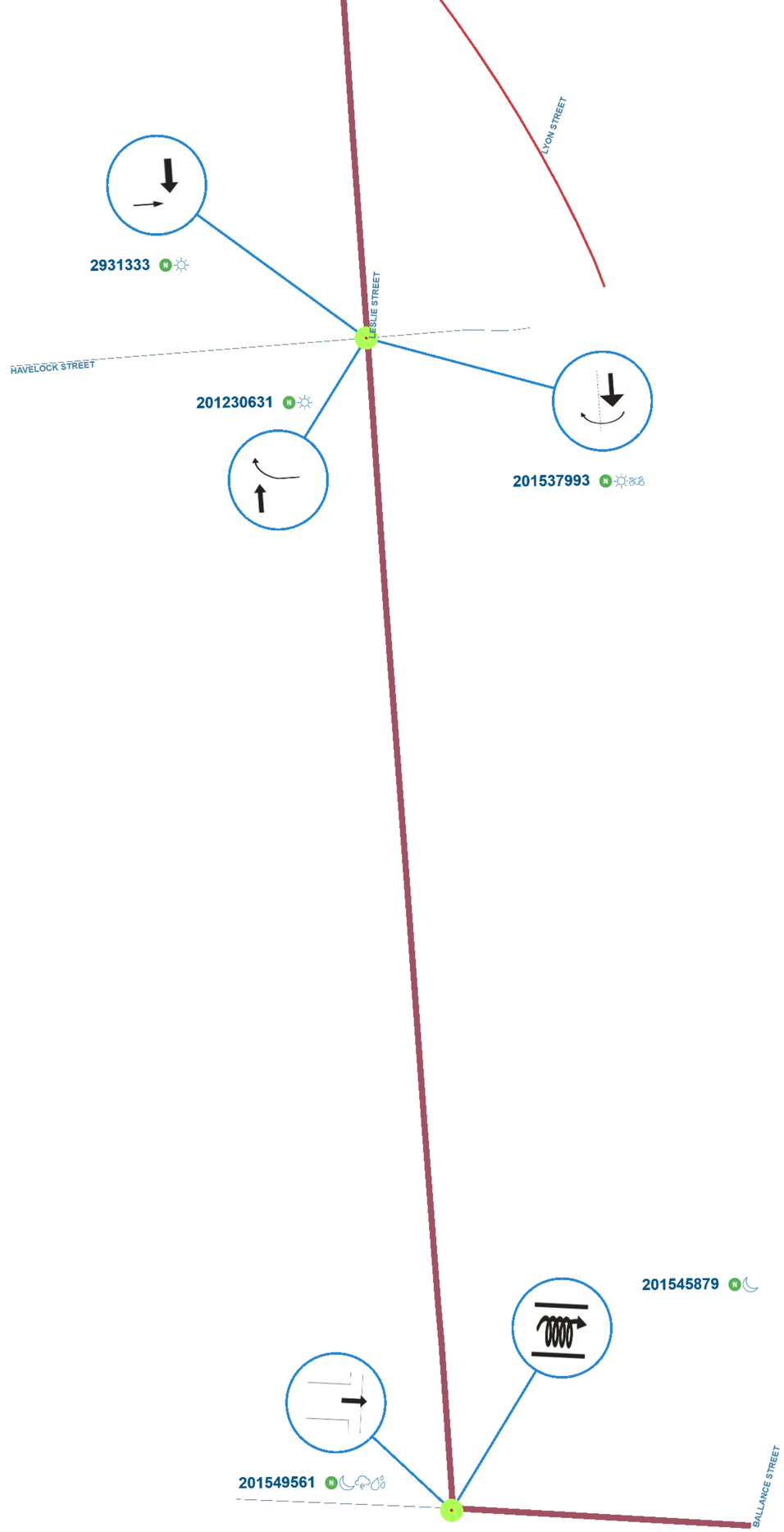
Plain English report

5 results from your query.

1-5 of 5

Crash road	Distance	Direction	Side road	ID	Date	Day of week	Time	Description of events	Crash factors	Surface condition	Natural light	Weather	Junction	Control	Crash count fatal	Crash count severe	Crash count minor
BALLANCE ST		I	LESLIE ST	201545879	18/09/2015	Fri	22:23	Car/Wagon1 EDB on BALLANCE ST lost control but did not leave the road, Car/Wagon1 hit fences	CAR/WAGON1, alcohol suspected, speed on straight	Dry	Dark	Fine	T Junction	Give way	0	0	0
BALLANCE ST		I	LESLIE ST	201549561	24/10/2015	Sat	03:00	Car/Wagon1 SDB on BALLANCE ST missed intersection or end of road, Car/Wagon1 hit fences	CAR/WAGON1, alcohol test above limit or test refused, lost control under braking, speed entering corner/curve, ENV: slippery road due to rain	Wet	Dark	Light rain	T Junction	Give way	0	0	0
LESLIE ST	0m			2931333	05/02/2009	Thu	12:10	Car/Wagon1 SDB on LESLIE ST hit Car/Wagon2 crossing at right angle from right, Car/Wagon1 hit kerbing	CAR/WAGON2, did not check/notice another party from other dirn	Dry	Bright sun	Fine	Crossroads	Nil	0	0	0
LESLIE ST	0m			201230631	20/03/2012	Tue		Car/Wagon1 NDB on LESLIE ST hit Car/Wagon2 merging from the right	CAR/WAGON2, other failed to give way	Dry	Bright sun	Fine	Crossroads	Nil	0	0	0
LESLIE ST	160m	S	SH 3	201537993	19/06/2015	Fri	14:48	Motorcycle1 SDB on LESLIE ST hit Car/Wagon2 U-turning from same direction of travel	CAR/WAGON2, did not check/notice another party behind	Dry	Bright sun	Fine	Nil (Default)	Nil	0	0	0

1-5 of 5



NZ TRANSPORT AGENCY WAKA KOTAHI CAS

Untitled query

Saved sites

McAndrew Street

Crash year

2009 — 2019

Plain English report

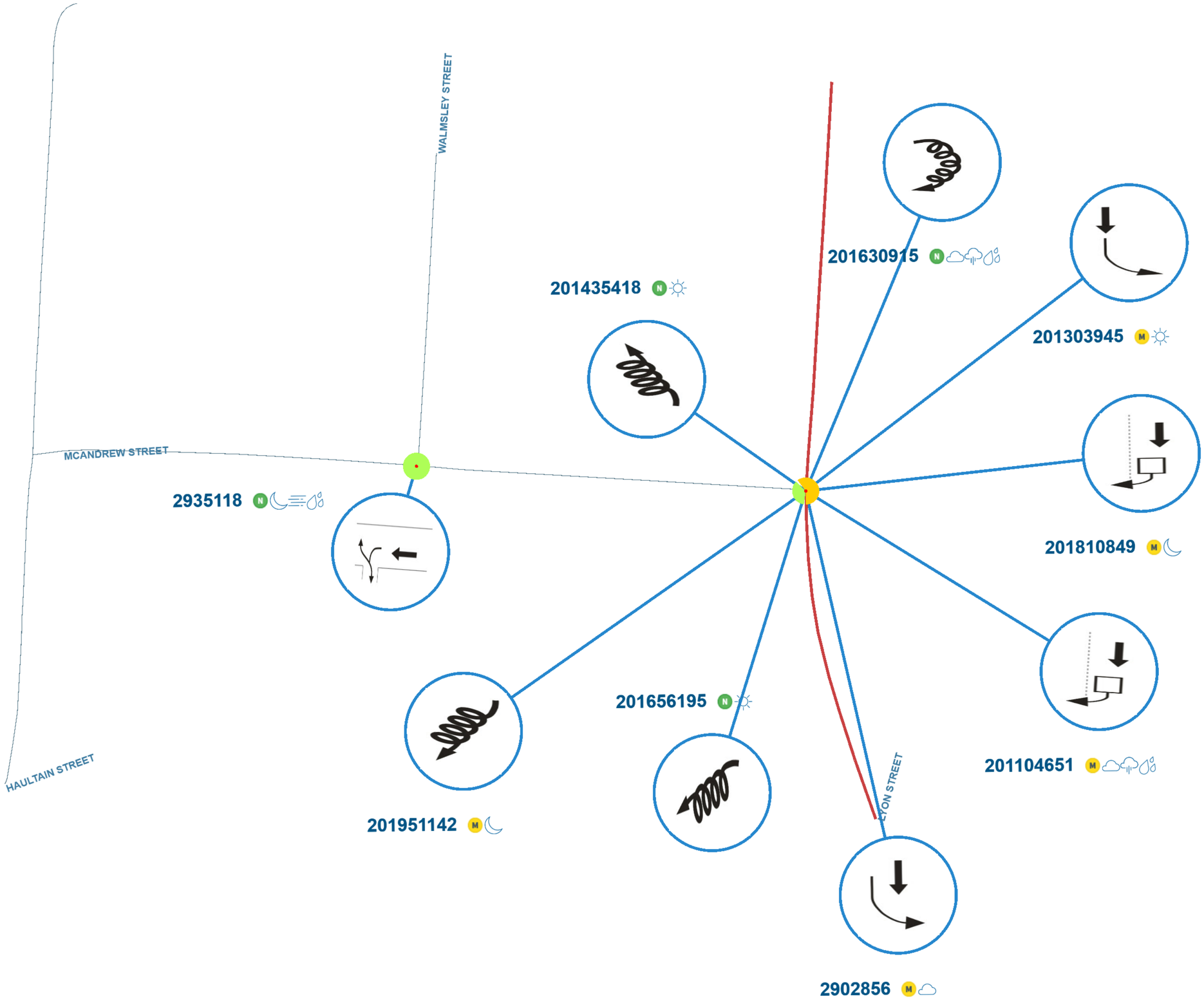
9 results from your query.

1-9 of 9

Crash road	Distance	Direction	Side road	ID	Date	Day of week	Time	Description of events	Crash factors	Surface condition	Natural light	Weather	Junction	Control	Crash count fatal	Crash count severe	Crash count minor
LYON STREET		I	MCANDREW STREET	201951142	17/02/2019	Sun	02:00	Car/Wagon1 SDB on LYON STREET, KIHIKIHI, WAIPA lost control; went off road to right	CAR/WAGON1, alcohol test above limit or test refused, interferred with driver, too far right	Dry	Dark	Fine	T Junction	Give way	0	0	1
MCANDREW ST	10m	S	SH 3	201656195	25/12/2016	Sun	19:46	Car/Wagon1 NDB on State Highway 3 lost control; went off road to left, Car/Wagon1 hit fences	CAR/WAGON1, alcohol test above limit or test refused, too far left	Dry	Bright sun	Fine	T Junction	Give way	0	0	0
MCANDREW ST	20m	W	WALMSLEY ST	2935118	22/05/2009	Fri	20:58	Car/Wagon1 WDB on MCANDREW ST hit SUV2 doing driveway manoeuvre	CAR/WAGON1, alcohol test above limit or test refused SUV2, failed to give way entering roadway from driveway, misjudged intentions of another party, ENV: entering or leaving private house / farm	Wet	Dark	Mist or Fog	Driveway	Nil	0	0	0
SH 3		I	MCANDREW ST	201435418	02/05/2014	Fri	13:05	Other1 NDB on SH 3 lost control; went off road to left, Other1 hit fences	OTHER1, too far left	Dry	Bright sun	Fine	T Junction	Give way	0	0	0
SH 3		I	MCANDREW ST	201630915	02/01/2016	Sat	11:35	Car/Wagon1 SDB on SH 3 lost control turning right, Car/Wagon1 hit fences	CAR/WAGON1, inappropriate speed for road conditions, lost control under braking, ENV: slippery road due to rain	Wet	Overcast	Light rain	T Junction	Nil	0	0	0
SH 3		I	MCANDREW ST	2902856	24/04/2009	Fri	14:25	Car/Wagon1 SDB on SH 3 sideswiped by Truck2 SDB on SH 3 turning left	CAR/WAGON1, failed to notice indication of vehicle in front, overtaking on left without due care, ENV: entering or leaving other commercial	Dry	Overcast	Fine	Driveway	Give way	0	0	1

Crash road	Distance	Direction	Side road	ID	Date	Day of week	Time	Description of events	Crash factors	Surface condition	Natural light	Weather	Junction	Control	Crash count fatal	Crash count severe	Crash count minor
SH 3		I	MCANDREW ST	201104651	06/11/2011	Sun	12:20	Car/Wagon1 SDB on SH 3 hit rear of Car/Wagon2 SDB on SH 3 turning right from centre line	CAR/WAGON1, attention diverted by passengers, failed to notice car slowing, stopping/stationary, ENV: slippery road due to rain	Wet	Overcast	Light rain	T Junction	Give way	0	0	2
SH 3	5m	S	MCANDREW ST	201303945	06/09/2013	Fri	15:20	Car/Wagon1 SDB on SH 3 hit rear of left turning Car/Wagon2 SDB on SH 3	CAR/WAGON1, attn diverted by scenery/persons outside vehicle, failed to notice indication of vehicle in front, ENV: entering or leaving private house / farm	Dry	Bright sun	Fine	Driveway	Give way	0	0	1
SH 3		I	MCANDREW ST	201810849	21/01/2018	Sun	21:05	Car/Wagon1 SDB on Lyon Street hit rear of Car/Wagon2 SDB on Lyon Street turning right from centre line	CAR/WAGON1, alcohol test below limit, misjudged another vehicle CAR/WAGON2, alcohol test below limit	Dry	Dark	Fine	T Junction	Give way	0	0	1

1-9 of 9



NZ TRANSPORT AGENCY WAKA KOTAHI CAS

Untitled query

Saved sites

McGhie Road

Crash year

2009 — 2019

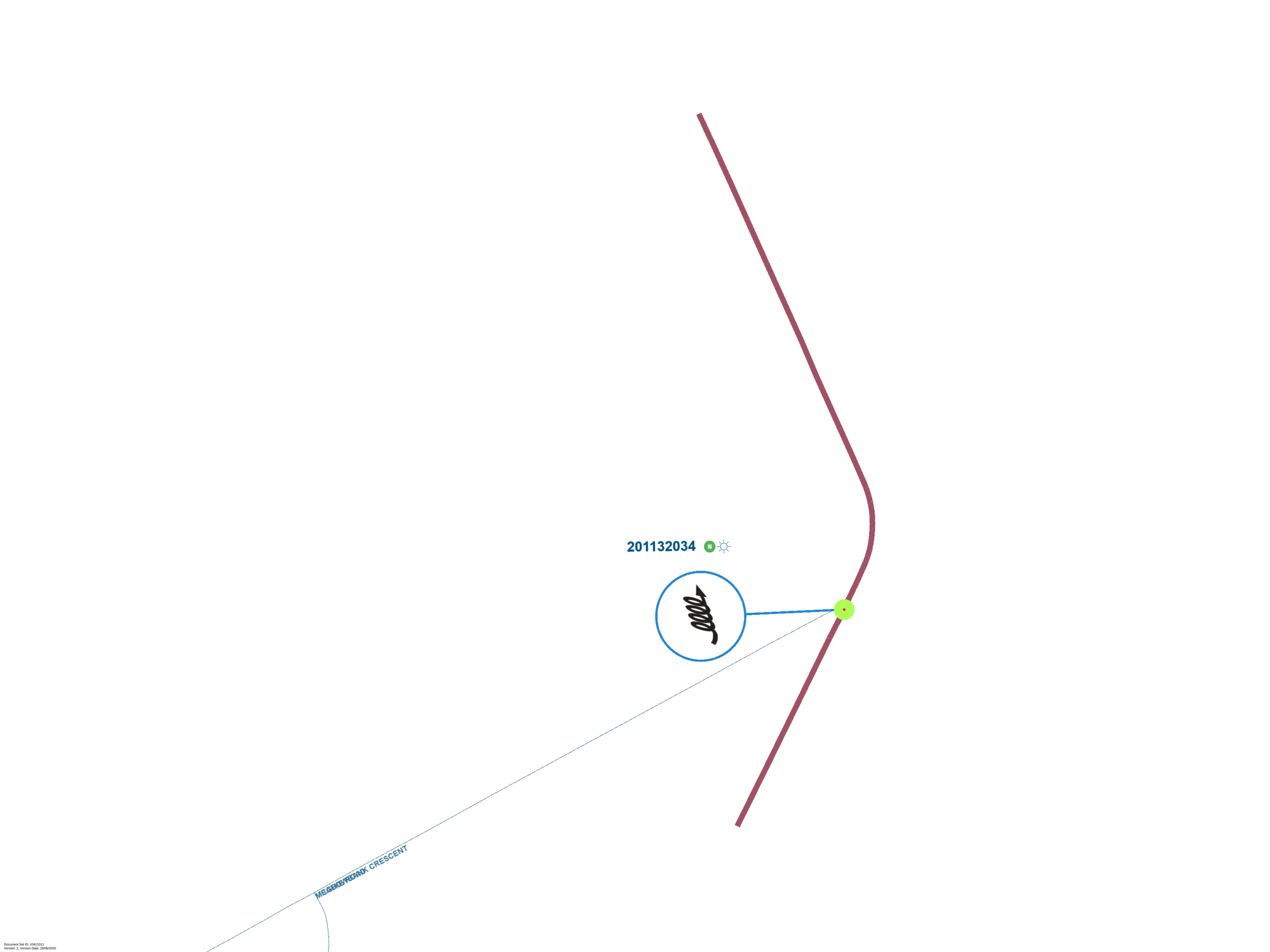
Plain English report

1 results from your query.

1-1 of 1

Crash road	Distance	Direction	Side road	ID	Date	Day of week	Time	Description of events	Crash factors	Surface condition	Natural light	Weather	Junction	Control	Crash count fatal	Crash count severe	Crash count minor
FLAT ROAD	20m	S	MCGHIE ROAD	201132034	19/03/2011	Sat	15:56	Car/Wagon1 NDB on FLAT ROAD lost control; went off road to left	CAR/WAGON1, attention diverted by food, cigarettes, beverages, speed at temporary speed limit, too far left	Dry	Bright sun	Fine	Nil (Default)	Unknown	0	0	0

1-1 of 1



Untitled query

Crash year

2009 — 2019

Saved sites

SH3 - St Leger to McAndrew

Plain English report

69 results from your query.

Showing 20 100 results at once.

1-69 of 69

Crash road	Distance	Direction	Side road	ID	Date	Day of week	Time	Description of events	Crash factors	Surface condition	Natural light	Weather	Junction	Control	Crash count fatal	Crash count severe	Crash count minor
LYON STREET		I	MCANDREW STREET	201951142	17/02/2019	Sun	02:00	Car/Wagon1 SDB on LYON STREET, KIHIKIHI, WAIPA lost control; went off road to right	CAR/WAGON1, alcohol test above limit or test refused, interferred with driver, too far right	Dry	Dark	Fine	T Junction	Give way	0	0	1
003-0016		I	SHEEHAN ST	201950632	30/01/2019	Wed	23:45	Car/Wagon1 SDB on Lyon Street, Kihikihi lost control turning left; went off road to left, Car/Wagon1 hit cliffs	CAR/WAGON1, alcohol suspected, lost control when turning, speed entering corner/curve	Dry	Dark	Fine	T Junction	Nil	0	0	1
GOLF ROAD		I	SH 3	2931945	13/03/2009	Fri	14:30	Truck1 NDB on GOLF ROAD lost control turning right	TRUCK1, lost control when turning, speed entering corner/curve	Dry	Overcast	Fine	Crossroads	Stop	0	0	0
HERBERT ST		I	SH 3	2939001	05/08/2009	Wed	17:17	Car/Wagon1 SDB on HERBERT ST lost control turning left, Car/Wagon1 hit fences	CAR/WAGON1, speed entering corner/curve	Dry	Bright sun	Fine	T Junction	Give way	0	0	0
MCANDREW ST	10m	S	SH 3	201656195	25/12/2016	Sun	19:46	Car/Wagon1 NDB on State Highway 3 lost control; went off road to left, Car/Wagon1 hit fences	CAR/WAGON1, alcohol test above limit or test refused, too far left	Dry	Bright sun	Fine	T Junction	Give way	0	0	0
SH 3	40m	S	BALLANCE ST	201653711	17/11/2016	Thu	15:10	Car/Wagon1 SDB on State highway changing lanes/overtaking to right hit SUV2	CAR/WAGON1, did not check/notice another party from other dirn	Dry	Overcast	Fine	Nil (Default)	Unknown	0	0	0
SH 3		I	BALLANCE ST	201744193	05/07/2017	Wed	13:50	Van1 NDB on SH 3 hit rear of Van2 NDB on SH 3 turning right from centre line	VAN1, swerved to avoid pedestrian	Dry	Bright sun	Null	T Junction	Give way	0	0	0
SH 3		I	BALLANCE ST	201530499	26/01/2015	Mon	21:25	Car/Wagon1 NDB on SH 3 lost control turning left, Car/Wagon1 hit fences	CAR/WAGON1, speed entering corner/curve, wrong pedal/foot slipped	Dry	Dark	Fine	T Junction	Stop	0	0	0

Crash road	Distance	Direction	Side road	ID	Date	Day of week	Time	Description of events	Crash factors	Surface condition	Natural light	Weather	Junction	Control	Crash count fatal	Crash count severe	Crash count minor
SH 3	60m	S	CHURCH ST	201005983	21/12/2010	Tue	08:24	Car/Wagon1 SDB on SH 3 hit rear of Car/Wagon2 SDB on SH 3 turning right from centre line	CAR/WAGON1, failed to notice car slowing, stopping/stationary, ENV: entering or leaving other commercial	Dry	Overcast	Fine	Driveway	Nil	0	0	1
SH 3	100m	S	CHURCH ST	201752046	05/10/2017	Thu	17:30	Truck1 NDB on Sh 3 kihikihi hit obstruction, Truck1 hit poles	TRUCK1, misjudged own vehicle	Dry	Bright sun	Fine	Nil (Default)	Unknown	0	0	0
SH 3	15m	S	CHURCH ST	201040752	02/10/2010	Sat	15:00	Car/Wagon1 SDB on SH 3 hit Van2 U-turning from same direction of travel	VAN2, did not check/notice another party behind	Dry	Bright sun	Fine	Nil (Default)	Unknown	0	0	0
SH 3	70m	N	GALLOWAY ST	201235953	03/08/2012	Fri	16:00	Car/Wagon1 SDB on SH 3 lost control; went off road to left, Car/Wagon1 hit fences, kerbing	CAR/WAGON1, medical illness (not sudden)	Dry	Bright sun	Fine	Nil (Default)	Unknown	0	0	0
SH 3	10m	S	GALLOWAY ST	201516715	26/08/2015	Wed	17:00	Car/Wagon1 SDB on SH 3 hit Pedestrian2 (Age 35)	CAR/WAGON1, lost control avoiding another party, swerved to avoid vehicle	Dry	Twilight	Fine	T Junction	Give way	0	0	1
SH 3	20m	S	GALLOWAY ST	201655874	22/11/2016	Tue	09:30	Car/Wagon1 NDB on Lyon street hit turning Car/Wagon2	CAR/WAGON2, did not check/notice another party from other dirn, failed to give way entering roadway from driveway	Dry	Bright sun	Fine	Driveway	Nil	0	0	0
SH 3		I	GALLOWAY ST	201549085	11/10/2015	Sun	15:30	Car/Wagon1 SDB on SH 3 lost control; went off road to right	CAR/WAGON1, fatigue due to lack of sleep, medical illness (not sudden), too far left	Dry	Bright sun	Fine	T Junction	Give way	0	0	0
SH 3	50m	S	GALLOWAY ST	2931485	04/03/2009	Wed	10:40	Car/Wagon1 NDB on SH 3 hit rear end of Car/Wagon2 stop/slow for PEDESTRIAN	CAR/WAGON1, failed to notice car slowing, stopping/stationary, other attention diverted	Dry	Bright sun	Fine	Nil (Default)	Unknown	0	0	0
SH 3		I	GALLOWAY ST	201752686	13/10/2017	Fri	15:35	Car/Wagon1 NDB on Lyon st hit Van2 merging from the right	VAN2, did not check/notice another party from other dirn, failed to give way at priority traffic control	Dry	Overcast	Fine	T Junction	Give way	0	0	0
SH 3	50m	S	GALLOWAY ST	201203965	24/08/2012	Fri	08:30	Car/Wagon1 NDB on SH 3 hit rear end of Car/Wagon2 stop/slow for PEDESTRIAN	CAR/WAGON1, attention diverted by passengers, failed to notice car slowing, stopping/stationary	Dry	Bright sun	Fine	Nil (Default)	Unknown	0	0	1
SH 3	120m	N	GALLOWAY ST	201657073	29/12/2016	Thu	18:44	Truck1 NDB on Lyon street hit Car/Wagon2 manoeuvring	CAR/WAGON2, emotionally upset/road rage, too far right	Dry	Bright sun	Fine	Nil (Default)	Unknown	0	0	0
SH 3	90m	S	GALLOWAY ST	201646597	02/08/2016	Tue	19:40	parked Van1 NDB on SH 3 ran away, Van1 hit parked vehicle	VAN1, parking brake failed/defective	Dry	Dark	Fine	Nil (Default)	Unknown	0	0	0
SH 3	60m	N	GALLOWAY ST	201737274	20/04/2017	Thu	16:00	parked Truck1 NDB on Lyon street ran away, Truck1 hit fences	TRUCK1, other brakes	Dry	Bright sun	Fine	Nil (Default)	Unknown	0	0	0
SH 3		I	GOLF ROAD	201513311	15/05/2015	Fri	09:30	Van1 NDB on SH 3 hit Car/Wagon2 turning right onto AXROAD from the left	CAR/WAGON2, did not check/notice another party from other dirn, failed to give way at priority traffic control	Wet	Overcast	Heavy rain	Crossroads	Stop	0	0	1

Crash road	Distance	Direction	Side road	ID	Date	Day of week	Time	Description of events	Crash factors	Surface condition	Natural light	Weather	Junction	Control	Crash count fatal	Crash count severe	Crash count minor
SH 3	400m	S	GOLF ROAD	201530244	21/01/2015	Wed	11:07	Car/Wagon1 NDB on SH 3 hit Car/Wagon2 U-turning from same direction of travel	CAR/WAGON2, attention diverted fiding intersection, house, etc, did not check/notice another party behind	Dry	Bright sun	Fine	Nil (Default)	Unknown	0	0	0
SH 3		I	GOLF ROAD	201031270	10/03/2010	Wed	15:08	Other2 turning right hit by oncoming Van1 SDB on SH 3	OTHER2, didnt look/notice other party - visibility obstruc, failed to give way turning to non-turning traffic, overseas/migrant driver fail to adjust to nz roads	Dry	Bright sun	Fine	Crossroads	Stop	0	0	0
SH 3		I	GOLF ROAD	201533807	04/04/2015	Sat	13:00	Car/Wagon1 WDB on SH 3 hit rear end of Car/Wagon2 stop/slow for cross traffic	CAR/WAGON1, following too closely	Dry	Bright sun	Fine	Crossroads	Stop	0	0	0
SH 3	250m	S	GOLF ROAD	201543677	18/07/2015	Sat	14:45	SUV1 SDB on SH 3 lost control turning right, SUV1 hit trees	SUV1, lost control when turning, other attention diverted	Wet	Overcast	Fine	Nil (Default)	Unknown	0	0	0
SH 3		I	GOLF ROAD	201632838	28/01/2016	Thu	09:40	Car/Wagon2 turning right hit by oncoming Van1 SDB on SH 3	CAR/WAGON2, did not check/notice another party from other dirn, failed to give way turning to non-turning traffic	Dry	Bright sun	Fine	Crossroads	Stop	0	0	0
SH 3	330m	S	GOLF ROAD	201652407	12/11/2016	Sat	03:15	Car/Wagon1 SDB on SH 3 swinging wide hit Truck2 head on, Car/Wagon1 hit ditches	CAR/WAGON1, wrong way in one way street, motorway or roundabou TRUCK2, swerved to avoid vehicle, ENV: heavy rain	Wet	Dark	Heavy rain	Nil (Default)	Unknown	0	0	0
SH 3	90m	S	GOLF ROAD	201710582	03/02/2017	Fri	03:58	Car/Wagon1 SDB on Sh 3 otorohanga lost control turning left, Car/Wagon1 hit embankments	CAR/WAGON1, lost control when turning	Wet	Dark	Light rain	Nil (Default)	Unknown	0	0	1
SH 3		I	GOLF ROAD	201740606	02/06/2017	Fri	14:50	SUV1 EDB on Kihikihi Road hit Car/Wagon2 merging from the left	CAR/WAGON2, failed to give way at priority traffic control, other inexperience	Dry	Overcast	Fine	Crossroads	Stop	0	0	0
SH 3	200m	S	GOLF ROAD	201611805	01/03/2016	Tue	03:30	SUV1 NDB on SH 3 lost control; went off road to right	SUV1, fatige due to long day (working/recreation), fatigue due to lack of sleep	Wet	Dark	Light rain	Nil (Default)	Unknown	0	1	0
SH 3		I	GOLF ROAD	201748709	07/09/2017	Thu	14:45	Car/Wagon1 EDB on State highway 3 hit Van2 turning right onto AXROAD from the left	VAN2, did not check/notice another party from other dirn, failed to give way at priority traffic control	Dry	Overcast	Fine	Crossroads	Stop	0	0	0
SH 3	50m	N	HAVELOCK ST	201445661	01/10/2014	Wed	21:50	Car/Wagon1 SDB on SH 3 lost control turning right, Car/Wagon1 hit other	CAR/WAGON1, other fatigue	Dry	Dark	Fine	Nil (Default)	Unknown	0	0	0
SH 3	5m	S	HAVELOCK ST	2901756	02/02/2009	Mon	14:48	Car/Wagon1 NDB on SH 3 swinging wide hit Truck2 head on	CAR/WAGON1, lost control when turning	Dry	Bright sun	Fine	T Junction	Give way	0	1	0
SH 3	30m	S	HAVELOCK ST	201831252	13/01/2018	Sat	22:15	Car/Wagon1 NDB on Lyon st hit obstruction, Car/Wagon1 hit animals	CAR/WAGON1, alcohol test below limit, ENV: household pet rushed out or playing	Dry	Dark	Fine	Nil (Default)	Unknown	0	0	0

Crash road	Distance	Direction	Side road	ID	Date	Day of week	Time	Description of events	Crash factors	Surface condition	Natural light	Weather	Junction	Control	Crash count fatal	Crash count severe	Crash count minor
SH 3		I	HERBERT ST	201542699	12/07/2015	Sun	22:00	Car/Wagon1 SDB on SH 3 lost control turning right, Car/Wagon1 hit other	CAR/WAGON1, fatigue due to lack of sleep, lost control when turning	Dry	Dark	Fine	T Junction	Give way	0	0	0
SH 3		I	HERBERT ST	201241235	28/12/2012	Fri	13:41	Car/Wagon1 NDB on SH 3 hit rear of Car/Wagon2 NDB on SH 3 turning right from centre line	CAR/WAGON1, failed to notice indication of vehicle in front, other attention diverted, ENV: fog or mist	Wet	Overcast	Mist or Fog	T Junction	Give way	0	0	0
SH 3	50m	S	HERBERT ST	201336670	06/08/2013	Tue	15:02	Car/Wagon1 SDB on SH 3 hit Car/Wagon2 U-turning from same direction of travel	CAR/WAGON2, did not check/notice another party behind	Dry	Bright sun	Fine	Nil (Default)	Unknown	0	0	0
SH 3		I	LESLIE ST	201646455	12/08/2016	Fri	08:30	SUV1 EDB on SH 3 hit rear of Car/Wagon2 EDB on SH 3 turning right from centre line	SUV1, failed to notice car slowing, stopping/stationary	Null	Unknown	Null	T Junction	Give way	0	0	0
SH 3	20m	W	LESLIE ST	201839628	11/05/2018	Fri	17:45	SUV1 SDB on LYON STREET, KIHIKIHI, WAIPA hit rear end of Car/Wagon2 stop/slow for queue	SUV1, alcohol test below limit, failed to notice car slowing, stopping/stationary VAN3, alcohol test below limit	Wet	Dark	Light rain	T Junction	Give way	0	0	0
SH 3		I	LESLIE ST	201632343	17/01/2016	Sun	22:47	SUV1 EDB on SH 3 lost control turning right, SUV1 hit trees	SUV1, fatige due to long day (working/recreation), new driver/under instruction, too far left	Dry	Dark	Fine	T Junction	Nil	0	0	0
SH 3	100m	E	LESLIE ST	201735845	07/04/2017	Fri	08:26	Car/Wagon1 SDB on Lyon St hit rear of left turning Van2 SDB on Lyon St , Van2 hit houses	CAR/WAGON1, failed to notice car slowing, stopping/stationary, other attention diverted	Dry	Bright sun	Fine	Driveway	Nil	0	0	0
SH 3		I	LESLIE ST	201813985	14/05/2018	Mon	10:16	Van1 EDB on LYON STREET, KIHIKIHI, WAIPA hit rear of Car/Wagon2 EDB on LYON STREET, KIHIKIHI, WAIPA turning right from centre line	CAR/WAGON2, alcohol test below limit VAN1, alcohol test below limit, failed to notice car slowing, stopping/stationary	Dry	Bright sun	Fine	T Junction	Give way	0	0	1
SH 3	50m	S	LESLIE ST	2901711	20/02/2009	Fri	00:15	Car/Wagon1 SDB on SH 3 lost control turning right, Car/Wagon1 hit street furniture, other	CAR/WAGON1, other fatigue	Dry	Dark	Fine	Nil (Default)	Unknown	0	0	1
SH 3	10m	N	LESLIE ST	2931323	30/01/2009	Fri	16:30	SUV1 SDB on SH 3 lost control on curve and hit Truck2 head on	SUV1, lost control when turning, other fatigue	Dry	Bright sun	Fine	T Junction	Nil	0	0	0
SH 3	30m	S	LESLIE ST	201033073	13/03/2010	Sat	07:36	SUV1 SDB on SH 3 lost control; went off road to right, SUV1 hit trees	SUV1, sudden illness	Dry	Bright sun	Fine	Nil (Default)	Unknown	0	0	0
SH 3	30m	S	MCANDREW ST	201610570	01/01/2016	Fri	17:08	Car/Wagon1 NDB on SH 3 lost control turning right, Car/Wagon1 hit fences	CAR/WAGON1, fatigue due to lack of sleep, too far left	Wet	Overcast	Light rain	Nil (Default)	Unknown	0	0	1
SH 3		I	MCANDREW ST	201435418	02/05/2014	Fri	13:05	Other1 NDB on SH 3 lost control; went off road to left, Other1 hit fences	OTHER1, too far left	Dry	Bright sun	Fine	T Junction	Give way	0	0	0

Crash road	Distance	Direction	Side road	ID	Date	Day of week	Time	Description of events	Crash factors	Surface condition	Natural light	Weather	Junction	Control	Crash count fatal	Crash count severe	Crash count minor
SH 3		I	MCANDREW ST	201630915	02/01/2016	Sat	11:35	Car/Wagon1 SDB on SH 3 lost control turning right, Car/Wagon1 hit fences	CAR/WAGON1, inappropriate speed for road conditions, lost control under braking, ENV: slippery road due to rain	Wet	Overcast	Light rain	T Junction	Nil	0	0	0
SH 3		I	MCANDREW ST	201104651	06/11/2011	Sun	12:20	Car/Wagon1 SDB on SH 3 hit rear of Car/Wagon2 SDB on SH 3 turning right from centre line	CAR/WAGON1, attention diverted by passengers, failed to notice car slowing, stopping/stationary, ENV: slippery road due to rain	Wet	Overcast	Light rain	T Junction	Give way	0	0	2
SH 3		I	MCANDREW ST	2902856	24/04/2009	Fri	14:25	Car/Wagon1 SDB on SH 3 sideswiped by Truck2 SDB on SH 3 turning left	CAR/WAGON1, failed to notice indication of vehicle in front, overtaking on left without due care, ENV: entering or leaving other commercial	Dry	Overcast	Fine	Driveway	Give way	0	0	1
SH 3	20m	S	MCANDREW ST	201516710	21/09/2015	Mon	12:39	Van1 NDB on SH 3 lost control; went off road to left	VAN1, other fatigue, too far left	Dry	Overcast	Fine	T Junction	Give way	0	0	1
SH 3	90m	N	MCANDREW ST	201551169	18/11/2015	Wed	10:22	Truck1 SDB on SH 3 sideswiped by Car/Wagon2 SDB on SH 3 turning left	TRUCK1, misjudged intentions of another party CAR/WAGON2, attention diverted by passengers, failed to signal in time	Dry	Overcast	Fine	Driveway	Nil	0	0	0
SH 3	5m	S	MCANDREW ST	201303945	06/09/2013	Fri	15:20	Car/Wagon1 SDB on SH 3 hit rear of left turning Car/Wagon2 SDB on SH 3	CAR/WAGON1, attn diverted by scenery/persons outside vehicle, failed to notice indication of vehicle in front, ENV: entering or leaving private house / farm	Dry	Bright sun	Fine	Driveway	Give way	0	0	1
SH 3		I	MCANDREW ST	201810849	21/01/2018	Sun	21:05	Car/Wagon1 SDB on Lyon Street hit rear of Car/Wagon2 SDB on Lyon Street turning right from centre line	CAR/WAGON1, alcohol test below limit, misjudged another vehicle CAR/WAGON2, alcohol test below limit	Dry	Dark	Fine	T Junction	Give way	0	0	1
SH 3	60m	S	MCANDREW ST	201812253	24/03/2018	Sat	15:30	Car/Wagon1 NDB on Lyon street lost control; went off road to left, Car/Wagon1 hit poles	CAR/WAGON1, alcohol test below limit, lost control - road conditions, ENV: heavy rain	Wet	Overcast	Heavy rain	Nil (Default)	Unknown	0	0	1
SH 3	410m	N	MCGHIE ROAD	201439807	30/06/2014	Mon	14:56	load or trailer from Van1 NDB on SH 3 hit VEHB, Van1 hit kerbing	VAN1, inadequate tow coupling, load not well secured or load moved, lost control when turning, ENV: heavy rain	Wet	Overcast	Heavy rain	Nil (Default)	Unknown	0	0	0
SH 3	280m	N	MCGHIE ROAD	2901266	09/01/2009	Fri	22:27	Car/Wagon1 SDB on SH 3 lost control turning right, Car/Wagon1 hit fences, trees	CAR/WAGON1, alcohol test above limit or test refused, lost control when turning	Dry	Dark	Fine	Nil (Default)	Unknown	0	1	2
SH 3	60m	S	MCGHIE ROAD	2905082	14/11/2009	Sat	22:00	Car/Wagon1 SDB on SH 3 changing lanes/overtaking to right hit Car/Wagon2	CAR/WAGON1, did not check/notice another party behind	Dry	Dark	Fine	Nil (Default)	Nil	0	0	1
SH 3	30m	W	NIXON ST	201632922	09/02/2016	Tue	19:00	Car/Wagon1 WDB on SH 3 hit Van2 headon on straight	VAN2, alcohol test below limit CAR/WAGON1, alcohol test below limit, fatigue due to lack of sleep, too far right	Dry	Bright sun	Fine	Nil (Default)	Unknown	0	0	0

Crash road	Distance	Direction	Side road	ID	Date	Day of week	Time	Description of events	Crash factors	Surface condition	Natural light	Weather	Junction	Control	Crash count fatal	Crash count severe	Crash count minor
SH 3	130m	W	NIXON ST	201747606	08/08/2017	Tue	10:50	Car/Wagon1 NDB on Kihikihi road hit rear end of Van2 stop/slow for queue	CAR/WAGON1, failed to notice car slowing, stopping/stationary	Wet	Overcast	Fine	Nil (Default)	Unknown	0	0	0
SH 3	50m	E	NIXON ST	201745930	18/07/2017	Tue	13:06	Car/Wagon1 EDB on Herbert st lost control; went off road to right, Car/Wagon1 hit fences, poles	CAR/WAGON1, lost control when turning	Wet	Overcast	Light rain	Nil (Default)	Unknown	0	0	0
SH 3	60m	S	SHEEHAN ST	201847529	31/08/2018	Fri	00:29	Van1 SDB on LYON STREET, KIHIKIHI, WAIPA lost control while overtaking	VAN1, drugs suspected, other lost control, overtaking in the face of oncoming traffic, speed on straight	Wet	Dark	Light rain	Nil (Default)	Unknown	0	0	0
SH 3	15m	N	ST LEGER ROAD	2933430	08/04/2009	Wed	18:30	Car/Wagon1 NDB on SH 3 hit rear end of Car/Wagon2 stopped/moving slowly	CAR/WAGON1, other visibility limited CAR/WAGON2, following too closely, suddenly braked CAR/WAGON3, attention diverted fiding intersection, house, etc, ENV: visibility limited by crest or dip	Wet	Dark	Fine	Nil (Default)	Unknown	0	0	0
SH 3	40m	N	WHITMORE ST	201232618	22/05/2012	Tue	07:55	Truck1 SDB on SH 3 hit Car/Wagon2 manoeuvring, Truck1 hit parked vehicle	TRUCK1, misjudged own vehicle	Dry	Bright sun	Fine	Nil (Default)	Unknown	0	0	0
SH 3		I	WHITMORE ST	201552292	19/10/2015	Mon	19:06	Car/Wagon1 SDB on SH 3 lost control turning left, Car/Wagon1 hit fences	CAR/WAGON1, lost control when turning, new driver/under instruction, speed entering corner/curve	Dry	Bright sun	Fine	T Junction	Stop	0	0	0
SH 3		I	WHITMORE ST	201713430	02/05/2017	Tue	14:45	Car/Wagon1 SDB on Lyon hit rear of left turning Car/Wagon2 SDB on Lyon	CAR/WAGON1, wrong pedal/foot slipped	Dry	Bright sun	Fine	T Junction	Stop	0	0	2
SH 3		I	WHITMORE ST	201738969	19/04/2017	Wed	19:30	Car/Wagon1 NDB on Statehighway Three hit Car/Wagon2 merging from the right	CAR/WAGON2, did not stop at stop sign	Dry	Dark	Fine	T Junction	Stop	0	0	0
SH 3		I	WHITMORE ST	201633688	26/02/2016	Fri	15:30	Van1 SDB on SH 3 hit SUV2 turning right onto AXROAD from the left	SUV2, did not check/notice another party from other dirn, failed to give way at priority traffic control	Dry	Bright sun	Fine	T Junction	Stop	0	0	0

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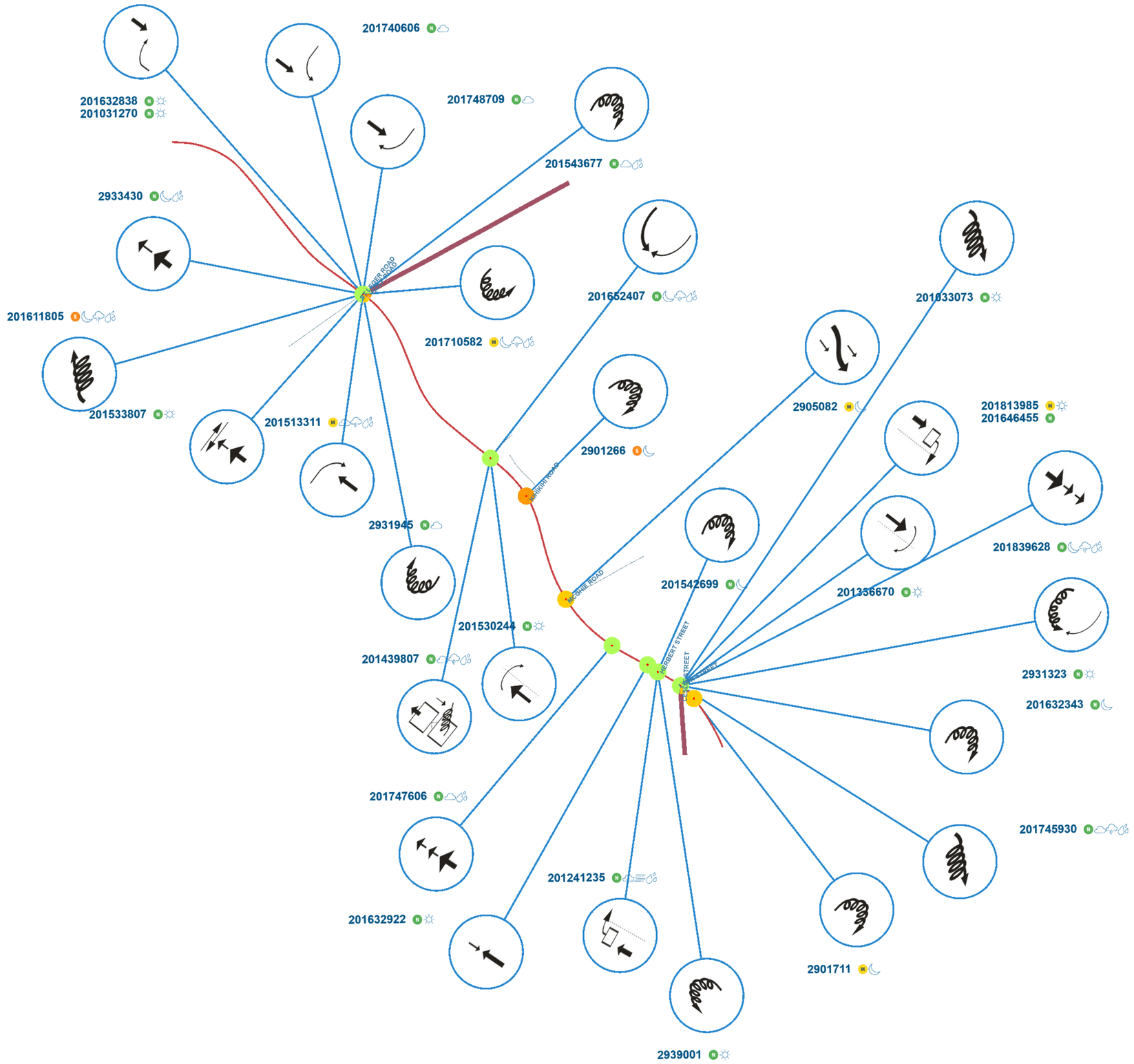
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201241235
201632922
2901711
2939001
MCGHIE ROAD
HERBERT STREET

Untitled query

Saved sites

St Leger Road

Crash year

2009 — 2019

Plain English report

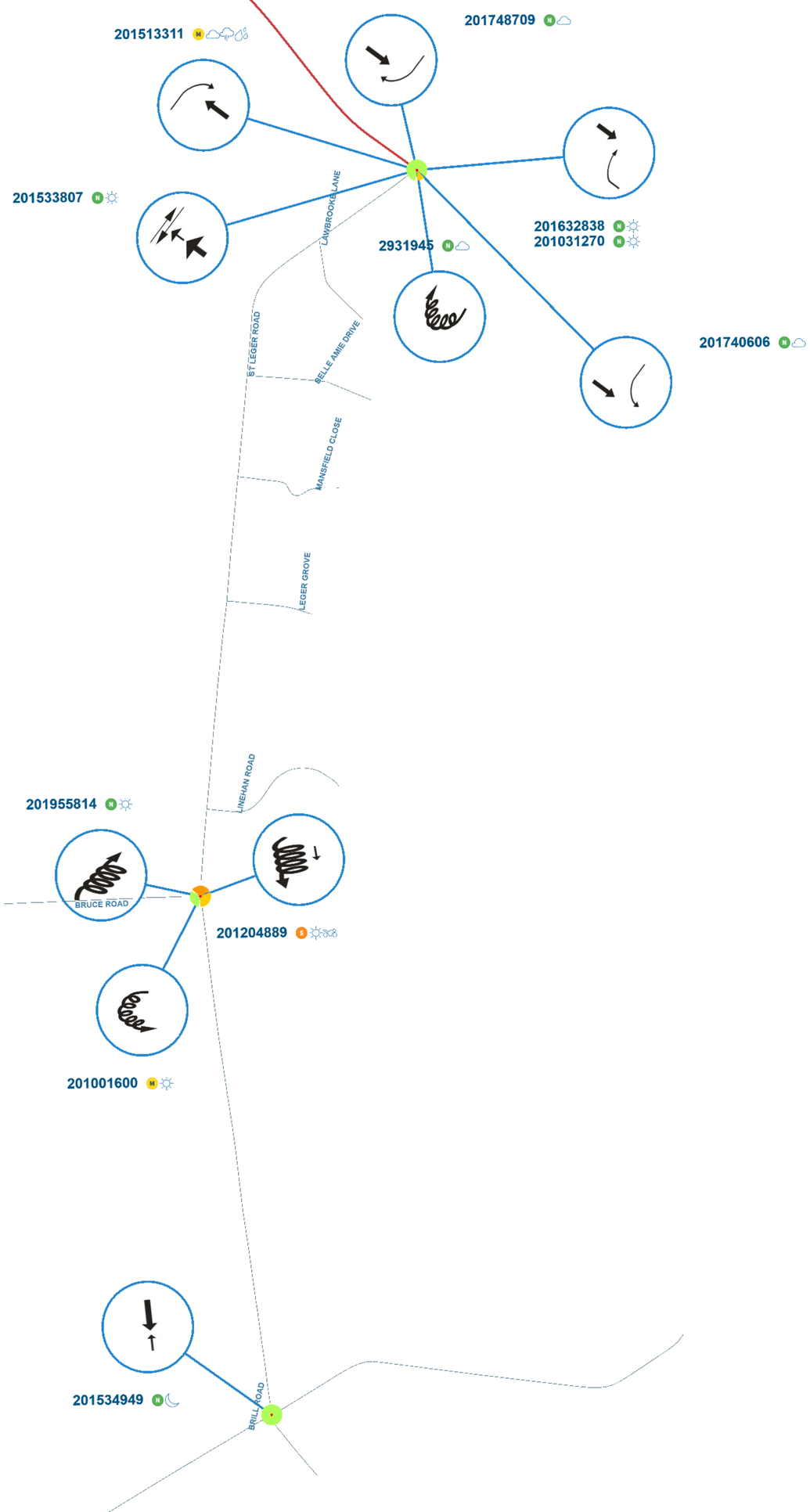
11 results from your query.

1-11 of 11

Crash road	Distance	Direction	Side road	ID	Date	Day of week	Time	Description of events	Crash factors	Surface condition	Natural light	Weather	Junction	Control	Crash count fatal	Crash count severe	Crash count minor
GOLF ROAD		I	SH 3	2931945	13/03/2009	Fri	14:30	Truck1 NDB on GOLF ROAD lost control turning right	TRUCK1, lost control when turning, speed entering corner/curve	Dry	Overcast	Fine	Crossroads	Stop	0	0	0
SH 3		I	GOLF ROAD	201748709	07/09/2017	Thu	14:45	Car/Wagon1 EDB on State highway 3 hit Van2 turning right onto AXROAD from the left	VAN2, did not check/notice another party from other dirn, failed to give way at priority traffic control	Dry	Overcast	Fine	Crossroads	Stop	0	0	0
SH 3		I	GOLF ROAD	201740606	02/06/2017	Fri	14:50	SUV1 EDB on Kihikihi Road hit Car/Wagon2 merging from the left	CAR/WAGON2, failed to give way at priority traffic control, other inexperience	Dry	Overcast	Fine	Crossroads	Stop	0	0	0
SH 3		I	GOLF ROAD	201513311	15/05/2015	Fri	09:30	Van1 NDB on SH 3 hit Car/Wagon2 turning right onto AXROAD from the left	CAR/WAGON2, did not check/notice another party from other dirn, failed to give way at priority traffic control	Wet	Overcast	Heavy rain	Crossroads	Stop	0	0	1
SH 3		I	GOLF ROAD	201031270	10/03/2010	Wed	15:08	Other2 turning right hit by oncoming Van1 SDB on SH 3	OTHER2, didnt look/notice other party - visibility obstruc, failed to give way turning to non-turning traffic, overseas/migrant driver fail to adjust to nz roads	Dry	Bright sun	Fine	Crossroads	Stop	0	0	0
SH 3		I	GOLF ROAD	201533807	04/04/2015	Sat	13:00	Car/Wagon1 WDB on SH 3 hit rear end of Car/Wagon2 stop/slow for cross traffic	CAR/WAGON1, following too closely	Dry	Bright sun	Fine	Crossroads	Stop	0	0	0
SH 3		I	GOLF ROAD	201632838	28/01/2016	Thu	09:40	Car/Wagon2 turning right hit by oncoming Van1 SDB on SH 3	CAR/WAGON2, did not check/notice another party from other dirn, failed to give way turning to non-turning traffic	Dry	Bright sun	Fine	Crossroads	Stop	0	0	0

Crash road	Distance	Direction	Side road	ID	Date	Day of week	Time	Description of events	Crash factors	Surface condition	Natural light	Weather	Junction	Control	Crash count fatal	Crash count severe	Crash count minor
ST LEGER RD	70m	N	BRUCE ROAD	201955814	09/02/2019	Sat	19:57	Car/Wagon1 NDB on ST LEGER ROAD lost control; went off road to right, Car/Wagon1 hit cliffs	CAR/WAGON1, alcohol test below limit, lost control avoiding another party, swerved to avoid animal, ENV: loose material on seal	Dry	Bright sun	Fine	Nil (Default)	Unknown	0	0	0
ST LEGER ROAD	100m	N	BRILL ROAD	201534949	22/02/2015	Sun	00:05	Car/Wagon1 SDB on ST LEGER ROAD hit Car/Wagon2 headon on straight	CAR/WAGON1, headlights fail suddenly, inadequate/no headlights, too far left	Dry	Dark	Fine	Nil (Default)	Nil	0	0	0
ST LEGER ROAD	90m	S	BRUCE ROAD	201204889	16/11/2012	Fri	18:07	Motorcycle1 SDB on ST LEGER ROAD lost control while overtaking	MOTORCYCLE1, lost control - road conditions, ENV: loose material on seal	Dry	Bright sun	Fine	Nil (Default)	Unknown	0	1	0
ST LEGER ROAD	150m	S	BRUCE ROAD	201001600	05/02/2010	Fri	20:00	Car/Wagon1 SDB on ST LEGER ROAD lost control turning left, Car/Wagon1 hit cliffs	CAR/WAGON1, alcohol test above limit or test refused, attention diverted by passengers, lost control when turning	Dry	Bright sun	Fine	Nil (Default)	Nil	0	0	1

1-11 of 11



Untitled query

Saved sites

Walmsley Street

Crash year

2009 — 2019

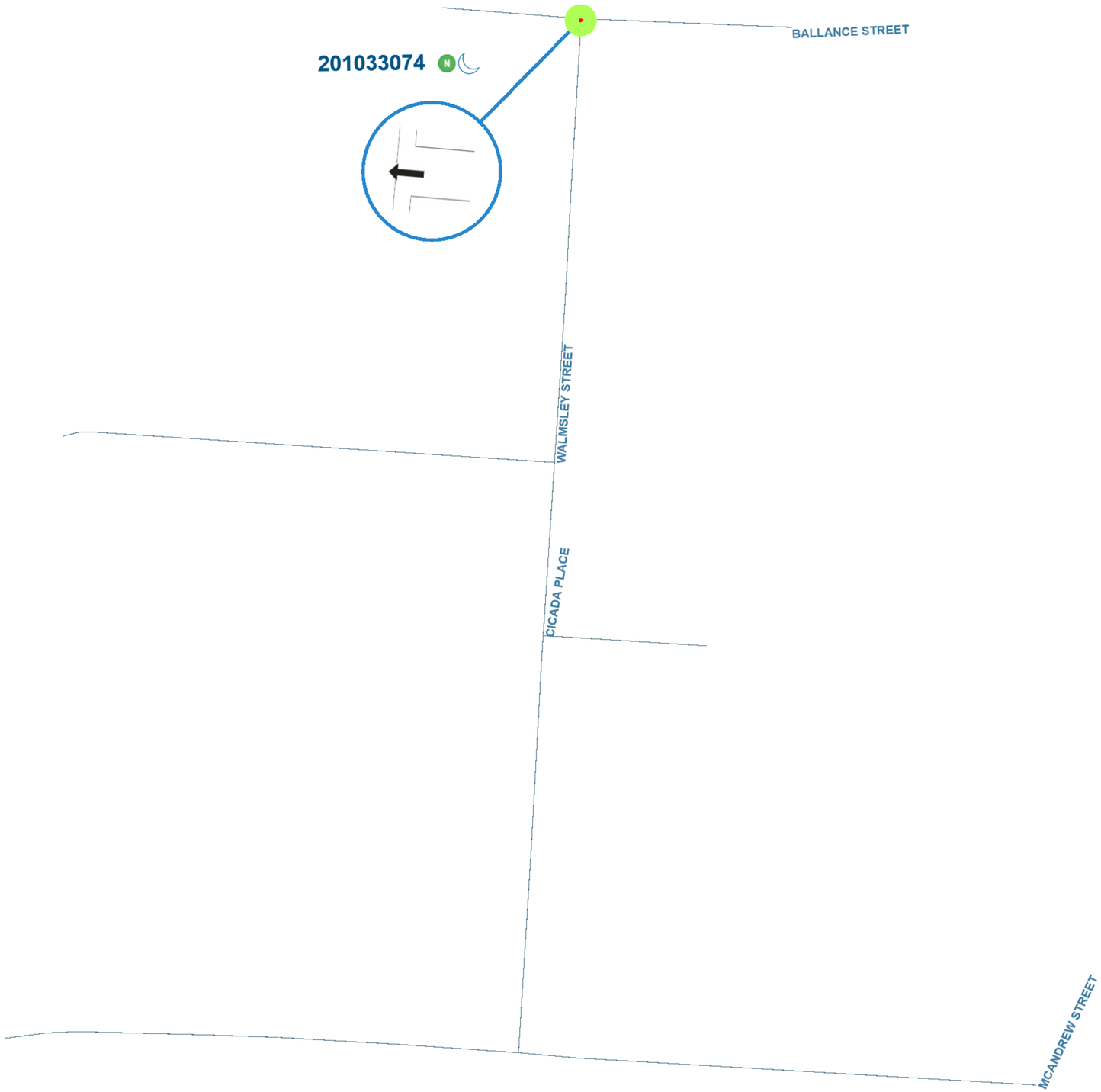
Plain English report

1 results from your query.

1-1 of 1

Crash road	Distance	Direction	Side road	ID	Date	Day of week	Time	Description of events	Crash factors	Surface condition	Natural light	Weather	Junction	Control	Crash count fatal	Crash count severe	Crash count minor
BALLANCE ST		I	WALMSLEY ST	201033074	13/03/2010	Sat	03:55	Car/Wagon1 NDB on BALLANCE ST missed intersection or end of road, Car/Wagon1 hit houses	CAR/WAGON1, alcohol test above limit or test refused, other fatigue	Dry	Dark	Fine	T Junction	Give way	0	0	0

1-1 of 1



Untitled query

Crash year

2009 — 2019

Saved sites

Whitmore Street

Plain English report

25 results from your query.

Showing 20 100 results at once.

1-25 of 25

Crash road	Distance	Direction	Side road	ID	Date	Day of week	Time	Description of events	Crash factors	Surface condition	Natural light	Weather	Junction	Control	Crash count fatal	Crash count severe	Crash count minor
ARAPUNI ROAD	160m	W	KIMBERLEY ROAD	201742178	19/06/2017	Mon	02:45	Car/Wagon1 EDB on Arapuni Rd lost control turning right, Car/Wagon1 hit fences, ditches	CAR/WAGON1, alcohol test below limit, other fatigue, other lost control	Dry	Dark	Fine	Nil (Default)	Unknown	0	0	0
ARAPUNI ROAD	170m	W	KIMBERLEY ROAD	201810980	31/01/2018	Wed	18:36	Van1 WDB on Arapuni road lost control turning right, Van1 hit trees	VAN1, alcohol test below limit, drugs suspected, fatigue due to lack of sleep, too far left	Dry	Bright sun	Fine	Nil (Default)	Unknown	0	0	1
ARAPUNI ROAD	320m	E	WHITMORE ST	201043693	26/11/2010	Fri	18:54	Car/Wagon1 WDB on ARAPUNI ROAD lost control turning right, Car/Wagon1 hit ditches	CAR/WAGON1, lost control under braking	Wet	Overcast	Heavy rain	Nil (Default)	Nil	0	0	0
CHURCH ST		I	WHITMORE ST	201818251	06/10/2018	Sat	09:00	Car/Wagon1 NDB on CHURCH STREET, KIHIKIHI, WAIPA hit Van2 crossing at right angle from right	VAN2, alcohol test below limit CAR/WAGON1, alcohol test below limit, failed to give way at priority traffic control, overseas/migrant driver fail to adjust to nz roads	Dry	Bright sun	Fine	Crossroads	Give way	0	0	3
MOULE ST		I	WHITMORE ST	201239395	06/10/2012	Sat		Car/Wagon1 EDB on MOULE ST lost control turning left, Car/Wagon1 hit parked vehicle, traffic sign	CAR/WAGON1, alcohol test above limit or test refused, lost control when turning, speed entering corner/curve	Wet	Overcast	Light rain	T Junction	Give way	0	0	0
ROLLESTON ST		I	WHITMORE ST	201000109	31/07/2010	Sat	19:02	Car/Wagon1 WDB on ROLLESTON ST hit Car/Wagon2 crossing at right angle from right, Car/Wagon1 hit fences	CAR/WAGON2, alcohol test above limit or test refused, failed to give way at priority traffic control, failed to notice control, speed approaching a traffic control	Dry	Dark	Fine	Crossroads	Give way	2	3	1
ROLLESTON ST		I	WHITMORE ST	201614399	25/05/2016	Wed	11:42	SUV1 WDB on ROLLESTON ST hit Car/Wagon2 crossing at right angle from right	CAR/WAGON2, failed to give way at priority traffic control, overseas/migrant driver fail to adjust to nz roads	Wet	Overcast	Light rain	Crossroads	Give way	0	0	1

Crash road	Distance	Direction	Side road	ID	Date	Day of week	Time	Description of events	Crash factors	Surface condition	Natural light	Weather	Junction	Control	Crash count fatal	Crash count severe	Crash count minor
WHITMORE ST	40m	W	CAREY ST	201648246	05/09/2016	Mon	17:10	parked Car/Wagon1 EDB on Whitmore street, kihikihi ran away, Car/Wagon1 hit poles	CAR/WAGON1, parking brake not fully applied	Wet	Overcast	Fine	Nil (Default)	Unknown	0	0	0
WHITMORE ST	50m	E	CAREY ST	201734936	31/01/2017	Tue	16:59	Car/Wagon1 EDB on Whitmore st sideswiped by Van2 EDB on Whitmore st turning left	CAR/WAGON1, misjudged intentions of another party	Dry	Bright sun	Fine	Driveway	Nil	0	0	0
WHITMORE ST		I	CHURCH ST	2930474	15/01/2009	Thu	15:53	Car/Wagon1 NDB on WHITMORE ST hit SUV2 crossing at right angle from right	CAR/WAGON1, didnt look/notice other party - visibility obstruc, failed to give way at priority traffic control, ENV: visibility limited by parked vehicle	Dry	Bright sun	Fine	Crossroads	Give way	0	0	0
WHITMORE ST		I	CHURCH ST	201230037	16/01/2012	Mon	14:20	Car/Wagon1 WDB on WHITMORE ST hit Motorcycle2 turning right onto AXROAD from the left	MOTORCYCLE2, did not check/notice another party from other dirn, failed to give way at priority traffic control, failed to notice control	Dry	Bright sun	Fine	Crossroads	Give way	0	0	0
WHITMORE ST		I	CHURCH ST	201845827	03/08/2018	Fri	18:00	Van1 EDB on WHITMORE STREET, KIHIKIHI, WAIPA hit Car/Wagon2 merging from the right	CAR/WAGON2, alcohol test below limit, did not check/notice another party from other dirn, failed to give way turning to non-turning traffic VAN1, alcohol test below limit	Dry	Dark	Fine	Crossroads	Give way	0	0	0
WHITMORE ST		I	CHURCH ST	201437937	17/06/2014	Tue	14:40	SUV1 EDB on WHITMORE ST hit Car/Wagon2 crossing at right angle from right	CAR/WAGON2, failed to give way at priority traffic control, other attention diverted, other inattentive	Dry	Overcast	Fine	Crossroads	Give way	0	0	0
WHITMORE ST		I	CHURCH ST	201136569	18/07/2011	Mon	09:00	Van1 EDB on WHITMORE ST hit Car/Wagon2 merging from the right	CAR/WAGON2, failed to give way at priority traffic control, ENV: dazzling sun	Dry	Bright sun	Fine	Crossroads	Give way	0	0	0
WHITMORE ST	50m	W	CHURCH ST	201954029	13/01/2019	Sun	17:15	Car/Wagon1 EDB on WHITMORE STREET, KIHIKIHI, WAIPA lost control; went off road to right, Car/Wagon1 hit fences	CAR/WAGON1, alcohol test below limit, other lost control	Wet	Overcast	Fine	Nil (Default)	Unknown	0	0	0
WHITMORE ST	90m	W	DICK ST	201436016	31/03/2014	Mon	09:47	Bus1 EDB on WHITMORE ST hit Truck2 U-turning from same direction of travel	TRUCK2, did not check/notice another party behind	Dry	Bright sun	Fine	Nil (Default)	Nil	0	0	0
WHITMORE ST	50m	S	OLIVER ST	201638078	14/05/2016	Sat	05:53	Car/Wagon1 SDB on WHITMORE ST lost control; went off road to left, Car/Wagon1 hit poles	CAR/WAGON1, fatigue due to lack of sleep	Wet	Dark	Light rain	Nil (Default)	Unknown	0	0	0
WHITMORE ST		I	OLIVER ST	201744665	28/04/2017	Fri	16:30	Car/Wagon2 turning right hit by oncoming Car/Wagon1 WDB on Arapuni rd, Car/Wagon1 hit traffic sign	CAR/WAGON2, attention diverted by cell phone, attention diverted by passengers, emotionally upset/road rage	Dry	Bright sun	Fine	Crossroads	Give way	0	0	0

Crash road	Distance	Direction	Side road	ID	Date	Day of week	Time	Description of events	Crash factors	Surface condition	Natural light	Weather	Junction	Control	Crash count fatal	Crash count severe	Crash count minor
WHITMORE ST	150m	E	OLIVER ST	201430721	15/01/2014	Wed	18:00	Car/Wagon1 EDB on WHITMORE ST hit Car/Wagon2 headon on straight	CAR/WAGON1, too far right	Dry	Bright sun	Fine	Nil (Default)	Nil	0	0	0
WHITMORE ST		I	ROLLESTON ST	201138254	21/10/2011	Fri	19:10	Van1 WDB on WHITMORE ST hit Car/Wagon2 crossing at right angle from right	CAR/WAGON2, alcohol test above limit or test refused, did not check/notice another party from other dirn, failed to give way at priority traffic control	Dry	Twilight	Fine	Crossroads	Give way	0	0	0
WHITMORE ST		I	ROLLESTON ST	201711676	14/03/2017	Tue	14:13	Car/Wagon1 EDB on Whitmore hit Car/Wagon2 crossing at right angle from right	CAR/WAGON2, failed to give way at priority traffic control, overseas/migrant driver fail to adjust to nz roads	Dry	Bright sun	Fine	Crossroads	Give way	0	0	2
WHITMORE ST		I	ROLLESTON ST	201742808	17/04/2017	Mon	14:15	Van1 EDB on Whitmore street hit Car/Wagon2 turning right onto AXROAD from the left	CAR/WAGON2, did not check/notice another party from other dirn	Dry	Overcast	Fine	Crossroads	Give way	0	0	0
WHITMORE ST		I	ROLLESTON ST	201818956	14/10/2018	Sun	12:39	Van1 EDB on WHITMORE STREET, KIHIKIHI, WAIPA hit Car/Wagon2 crossing at right angle from right	VAN1, alcohol test below limit CAR/WAGON2, alcohol test below limit, did not check/notice another party from other dirn, failed to give way at priority traffic control CAR/WAGON3, alcohol test below limit	Dry	Bright sun	Fine	Crossroads	Give way	0	0	1
WHITMORE ST	15m	E	SH 3 LYON	201304411	07/09/2013	Sat	12:10	Van1 EDB on WHITMORE ST hit obstruction, Van1 hit stationary vehicle	VAN1, emotionally upset/road rage, intentional collision CAR/WAGON2, emotionally upset/road rage	Dry	Bright sun	Fine	Nil (Default)	Unknown	0	0	2
WHITMORE ST	10m	S	WHITAKER ST	201230962	12/04/2012	Thu	12:45	Car/Wagon1 WDB on WHITMORE ST lost control; went off road to right, Car/Wagon1 hit poles	CAR/WAGON1, sudden illness, ENV: heavy rain	Wet	Overcast	Heavy rain	Crossroads	Give way	0	0	0

1-25 of 25

Untitled query

Saved sites

Ballance Street

Crash year

2009 — 2019

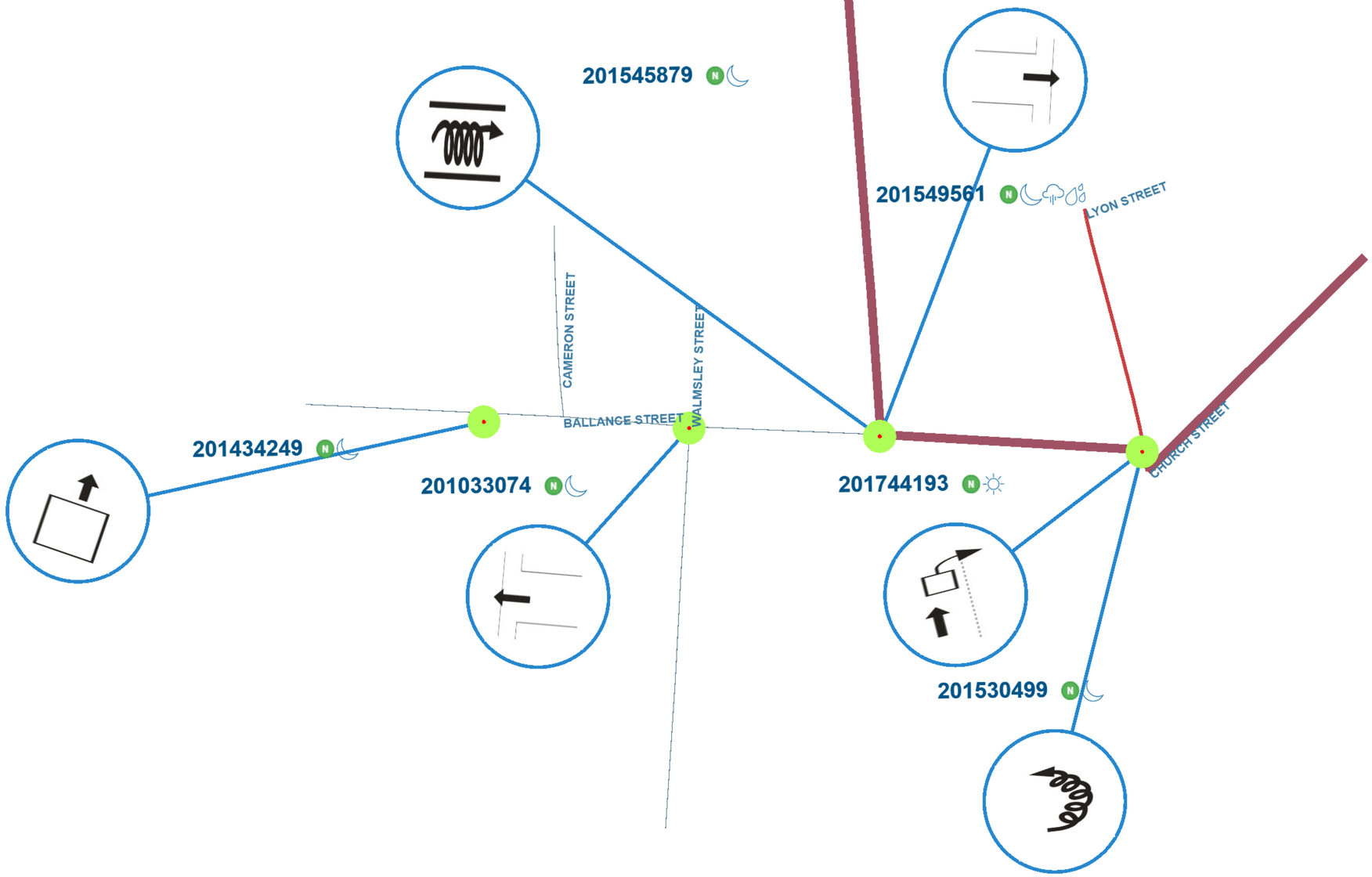
Plain English report

6 results from your query.

1-6 of 6

Crash road	Distance	Direction	Side road	ID	Date	Day of week	Time	Description of events	Crash factors	Surface condition	Natural light	Weather	Junction	Control	Crash count fatal	Crash count severe	Crash count minor
BALLANCE ST		I	LESLIE ST	201545879	18/09/2015	Fri	22:23	Car/Wagon1 EDB on BALLANCE ST lost control but did not leave the road, Car/Wagon1 hit fences	CAR/WAGON1, alcohol suspected, speed on straight	Dry	Dark	Fine	T Junction	Give way	0	0	0
BALLANCE ST		I	LESLIE ST	201549561	24/10/2015	Sat	03:00	Car/Wagon1 SDB on BALLANCE ST missed intersection or end of road, Car/Wagon1 hit fences	CAR/WAGON1, alcohol test above limit or test refused, lost control under braking, speed entering corner/curve, ENV: slippery road due to rain	Wet	Dark	Light rain	T Junction	Give way	0	0	0
BALLANCE ST		I	WALMSLEY ST	201033074	13/03/2010	Sat	03:55	Car/Wagon1 NDB on BALLANCE ST missed intersection or end of road, Car/Wagon1 hit houses	CAR/WAGON1, alcohol test above limit or test refused, other fatigue	Dry	Dark	Fine	T Junction	Give way	0	0	0
BALLANCE ST	100m	W	WALMSLEY ST	201434249	04/02/2014	Tue	22:43	parked Car/Wagon1 EDB on BALLANCE ST ran away, Car/Wagon1 hit houses	CAR/WAGON1, other attention diverted, parking brake not fully applied, ENV: entering or leaving private house / farm	Dry	Dark	Fine	Driveway	Unknown	0	0	0
SH 3		I	BALLANCE ST	201744193	05/07/2017	Wed	13:50	Van1 NDB on SH 3 hit rear of Van2 NDB on SH 3 turning right from centre line	VAN1, swerved to avoid pedestrian	Dry	Bright sun	Null	T Junction	Give way	0	0	0
SH 3		I	BALLANCE ST	201530499	26/01/2015	Mon	21:25	Car/Wagon1 NDB on SH 3 lost control turning left, Car/Wagon1 hit fences	CAR/WAGON1, speed entering corner/curve, wrong pedal/foot slipped	Dry	Dark	Fine	T Junction	Stop	0	0	0

1-6 of 6



Untitled query

Saved sites

Golf Road

Crash year

2009 — 2019

Plain English report

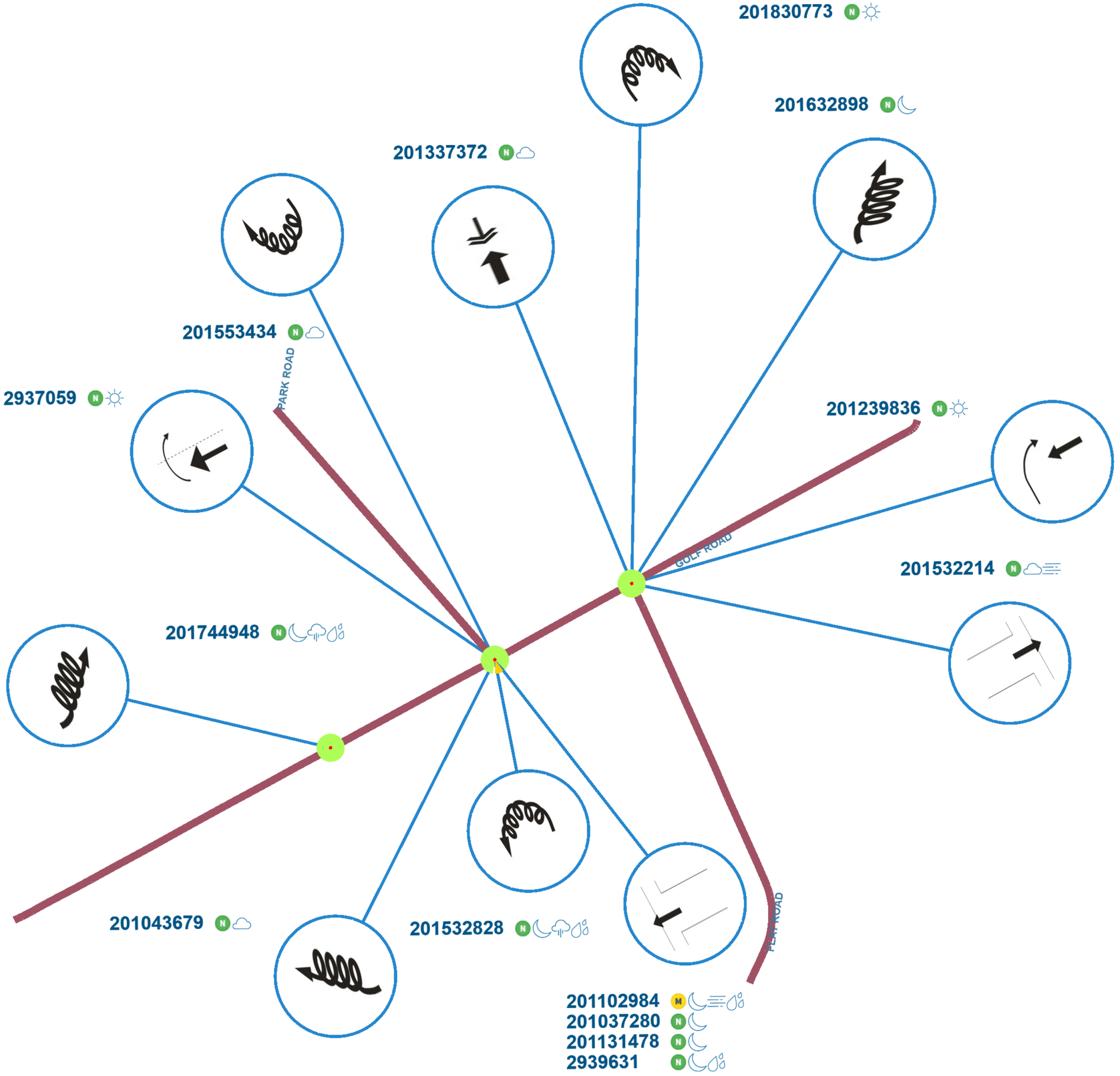
14 results from your query.

1-14 of 14

Crash road	Distance	Direction	Side road	ID	Date	Day of week	Time	Description of events	Crash factors	Surface condition	Natural light	Weather	Junction	Control	Crash count fatal	Crash count severe	Crash count minor
FLAT ROAD		I	GOLF ROAD	201632898	03/02/2016	Wed	21:51	Car/Wagon1 NDB on FLAT ROAD lost control; went off road to right, Car/Wagon1 hit fences, traffic islands	CAR/WAGON1, alcohol test above limit or test refused, other lost control, too far right	Dry	Dark	Fine	T Junction	Give way	0	0	0
FLAT ROAD		I	GOLF ROAD	201337372	27/08/2013	Tue	15:00	Van1 NDB on FLAT ROAD hit Car/Wagon2 reversing along road	CAR/WAGON2, did not check/notice another party behind	Dry	Overcast	Fine	T Junction	Give way	0	0	0
GOLF ROAD		I	FLAT ROAD	201239836	03/10/2012	Wed	17:30	Car/Wagon1 WDB on GOLF ROAD hit Car/Wagon2 turning right onto AXROAD from the left	CAR/WAGON2, did not check/notice another party from other dirn, failed to give way at priority traffic control	Dry	Bright sun	Fine	T Junction	Give way	0	0	0
GOLF ROAD		I	FLAT ROAD	201830773	05/01/2018	Fri	18:00	Car/Wagon1 EDB on Golf rd lost control turning right, Car/Wagon1 hit guide/guard rails	CAR/WAGON1, alcohol test below limit, lost control when turning, too far left, ENV: loose material on seal	Dry	Bright sun	Fine	T Junction	Give way	0	0	0
GOLF ROAD		I	FLAT ROAD	201532214	18/02/2015	Wed	06:32	Car/Wagon1 NDB on GOLF ROAD missed intersection or end of road, Car/Wagon1 hit fences, poles, traffic sign	CAR/WAGON1, failed to notice control, other lost control, speed on straight, ENV: fog or mist	Dry	Overcast	Mist or Fog	T Junction	Stop	0	0	0
GOLF ROAD		I	PARK ROAD	201131478	14/03/2011	Mon	22:40	SUV1 SDB on GOLF ROAD missed intersection or end of road, SUV1 hit fences, traffic sign, ditches, other	SUV1, lost control under braking, speed on straight	Dry	Dark	Fine	T Junction	Give way	0	0	0
GOLF ROAD		I	PARK ROAD	201037280	18/07/2010	Sun	03:45	SUV1 SDB on GOLF ROAD missed intersection or end of road	SUV1, alcohol test above limit or test refused	Dry	Dark	Fine	T Junction	Give way	0	0	0
GOLF ROAD	50m	W	PARK ROAD	201043679	13/12/2010	Mon	19:18	Car/Wagon1 WDB on GOLF ROAD lost control; went off road to right, Car/Wagon1 hit ditches	CAR/WAGON1, lost control - road conditions, ENV: loose material on seal	Dry	Overcast	Fine	Nil (Default)	Nil	0	0	0

Crash road	Distance	Direction	Side road	ID	Date	Day of week	Time	Description of events	Crash factors	Surface condition	Natural light	Weather	Junction	Control	Crash count fatal	Crash count severe	Crash count minor
GOLF ROAD	440m	W	PARK ROAD	201744948	20/07/2017	Thu	19:40	Car/Wagon1 EDB on Golf lost control; went off road to left, Car/Wagon1 hit ditches	CAR/WAGON1, alcohol test below limit, new driver/under instruction, too far left	Wet	Dark	Heavy rain	Nil (Default)	Unknown	0	0	0
GOLF ROAD		I	PARK ROAD	2939631	11/07/2009	Sat	19:10	Car/Wagon1 SDB on GOLF ROAD missed intersection or end of road, Car/Wagon1 hit fences	CAR/WAGON1, alcohol test above limit or test refused, failed to notice control	Wet	Dark	Fine	T Junction	Give way	0	0	0
GOLF ROAD	50m	W	PARK ROAD	2937059	01/06/2009	Mon	13:15	Car/Wagon1 WDB on GOLF ROAD hit SUV2 U-turning from same direction of travel, Car/Wagon1 hit fences	SUV2, did not check/notice another party behind	Dry	Bright sun	Fine	Nil (Default)	Unknown	0	0	0
GOLF ROAD		I	PARK ROAD	201532828	07/03/2015	Sat	20:39	Car/Wagon1 SDB on GOLF ROAD lost control turning left, Car/Wagon1 hit street furniture, ditches	CAR/WAGON1, lost control when turning, new driver/under instruction, wheelspins/wheelies/doughnuts/drifting	Wet	Dark	Heavy rain	T Junction	Give way	0	0	0
PARK ROAD		I	GOLF ROAD	201102984	06/06/2011	Mon	21:54	Car/Wagon1 SDB on PARK ROAD missed intersection or end of road, Car/Wagon1 hit fences, traffic islands, traffic sign, trees	CAR/WAGON1, attention diverted by cell phone, failed to notice control, worn tread on tyre, ENV: fog or mist	Wet	Dark	Mist or Fog	T Junction	Give way	0	0	1
PARK ROAD		I	GOLF ROAD	201553434	24/12/2015	Thu	11:13	Car/Wagon1 SDB on PARK ROAD lost control turning right	CAR/WAGON1, load interferes with driver, towed vehicle or trailer too heavy or incompatible	Dry	Overcast	Fine	T Junction	Give way	0	0	0

1-14 of 14



Untitled query

Saved sites

Haultain Street

Crash year

2009 — 2019

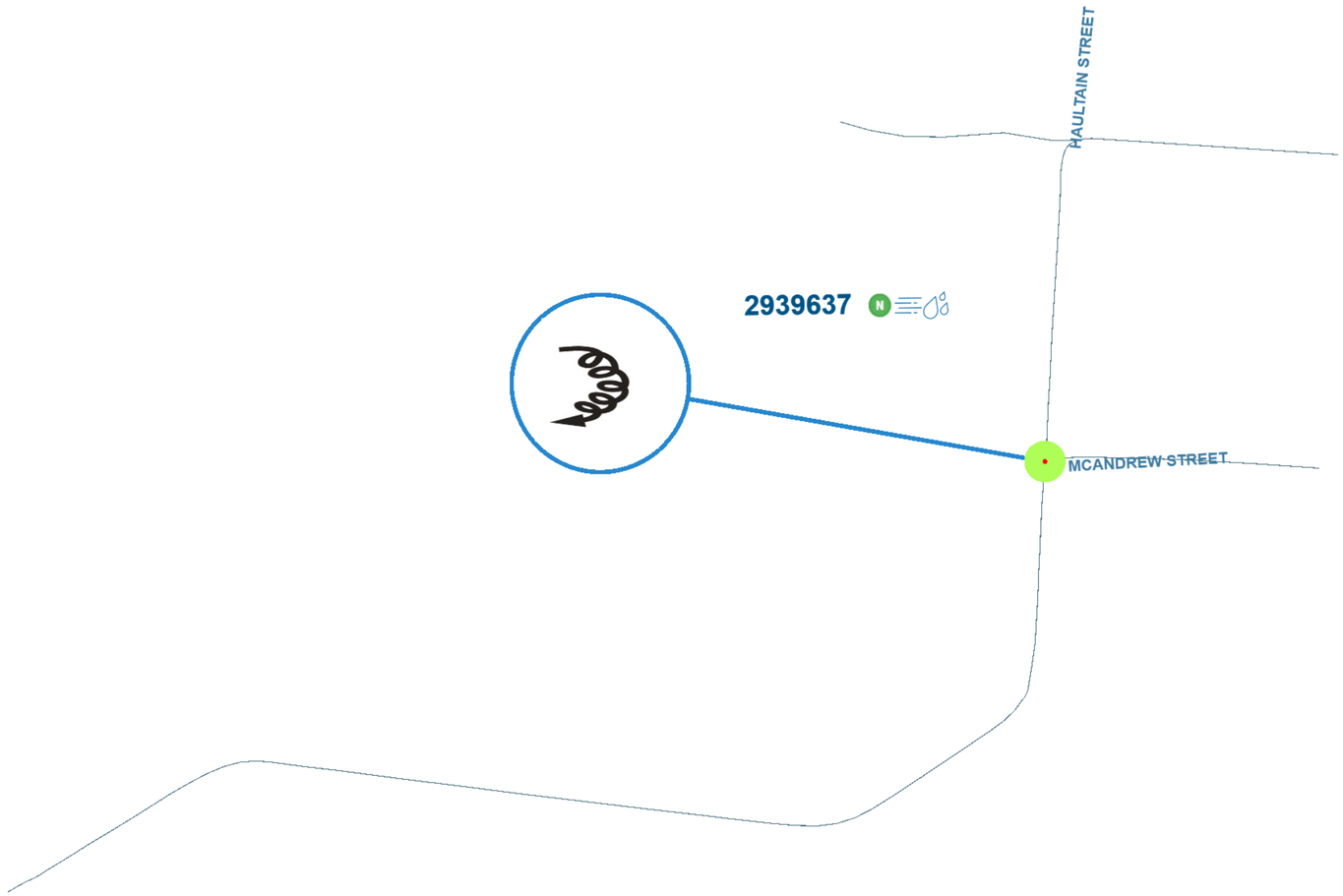
Plain English report

1 results from your query.

1-1 of 1

Crash road	Distance	Direction	Side road	ID	Date	Day of week	Time	Description of events	Crash factors	Surface condition	Natural light	Weather	Junction	Control	Crash count fatal	Crash count severe	Crash count minor
HAULTAIN ST		I	MCANDREW ST	2939637	30/07/2009	Thu	19:00	Car/Wagon1 WDB on HAULTAIN ST lost control turning right, Car/Wagon1 hit fences	CAR/WAGON1, lost control when turning, new driver/under instruction, speed entering corner/curve	Wet	Twilight	Mist or Fog	T Junction	Nil	0	0	0

1-1 of 1



Untitled query

Saved sites

Herbert Street

Crash year

2009 — 2019

Plain English report

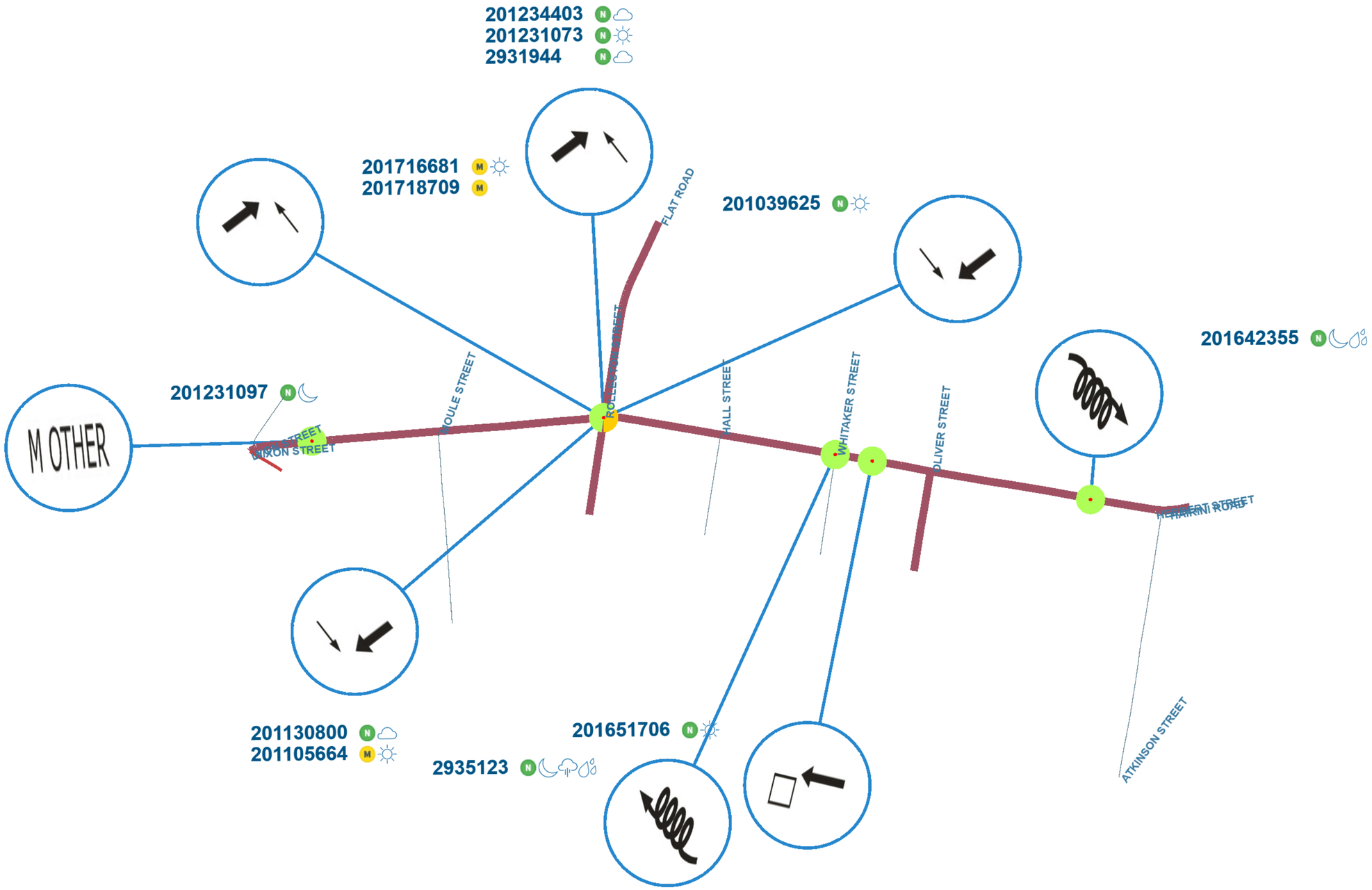
12 results from your query.

1-12 of 12

Crash road	Distance	Direction	Side road	ID	Date	Day of week	Time	Description of events	Crash factors	Surface condition	Natural light	Weather	Junction	Control	Crash count fatal	Crash count severe	Crash count minor
FLAT ROAD		I	HERBERT ST	2931944	14/03/2009	Sat	18:10	Truck1 NDB on FLAT ROAD hit Car/Wagon2 crossing at right angle from right	TRUCK1, did not check/notice another party from other dirn, failed to give way at priority traffic control	Dry	Overcast	Fine	Crossroads	Stop	0	0	0
FLAT ROAD		I	HERBERT ST	201105664	23/12/2011	Fri	12:27	Car/Wagon1 SDB on FLAT ROAD hit Car/Wagon2 crossing at right angle from right	CAR/WAGON2, did not check/notice another party from other dirn, failed to give way at priority traffic control	Dry	Bright sun	Fine	Crossroads	Stop	0	0	1
FLAT ROAD		I	HERBERT ST	201716681	24/07/2017	Mon	12:56	Car/Wagon1 EDB on Rolleston road hit Car/Wagon2 crossing at right angle from right	CAR/WAGON1, did not check/notice another party from other dirn, failed to give way at priority traffic control	Dry	Bright sun	Fine	Crossroads	Stop	0	0	1
HERBERT ST	140m	W	ATKINSON ST	201642355	22/06/2016	Wed	17:45	Car/Wagon1 EDB on HERBERT ST lost control; went off road to right, Car/Wagon1 hit poles	CAR/WAGON1, other lost control, other vehicle controls	Wet	Dark	Fine	Nil (Default)	Unknown	0	0	0
HERBERT ST		I	FLAT ROAD	201130800	03/02/2011	Thu	07:55	Car/Wagon1 SDB on HERBERT ST hit Car/Wagon2 crossing at right angle from right , Car/Wagon2 hit stationary vehicle	CAR/WAGON1, did not check/notice another party from other dirn, failed to give way at priority traffic control	Dry	Overcast	Fine	Crossroads	Stop	0	0	0
HERBERT ST		I	ROLLESTON ST	201231073	26/04/2012	Thu	15:50	Car/Wagon1 NDB on HERBERT ST hit Car/Wagon2 crossing at right angle from right	CAR/WAGON2, did not check/notice another party from other dirn, failed to give way at priority traffic control	Dry	Bright sun	Fine	Crossroads	Stop	0	0	0
HERBERT ST	120m	W	SH 3	201231097	03/04/2012	Tue	01:36	Car/Wagon1 EDB on HERBERT ST hit Car/Wagon2 manoeuvring, Car/Wagon1 hit stationary vehicle	CAR/WAGON1, evading enforcement, intentional collision	Dry	Dark	Fine	Nil (Default)	Unknown	0	0	0

Crash road	Distance	Direction	Side road	ID	Date	Day of week	Time	Description of events	Crash factors	Surface condition	Natural light	Weather	Junction	Control	Crash count fatal	Crash count severe	Crash count minor
HERBERT ST	25m	W	WHITAKER ST	2935123	14/05/2009	Thu	19:30	Car/Wagon1 WDB on HERBERT ST lost control; went off road to right, Car/Wagon1 hit fences	CAR/WAGON1, alcohol test above limit or test refused	Wet	Dark	Light rain	Nil (Default)	Nil	0	0	0
HERBERT ST	70m	E	WHITAKER ST	201651706	04/11/2016	Fri	12:55	Car/Wagon1 WDB on Herbert Road hit parked veh, Car/Wagon1 hit parked vehicle	CAR/WAGON1, too far left, wrong pedal/foot slipped	Dry	Bright sun	Fine	Nil (Default)	Unknown	0	0	0
ROLLESTON ST		I	HERBERT ST	201039625	01/09/2010	Wed	17:00	SUV1 WDB on ROLLESTON ST hit Car/Wagon2 crossing at right angle from right	CAR/WAGON2, attention diverted by passengers, failed to give way at priority traffic control, other visibility limited, ENV: other visibility limited	Dry	Bright sun	Fine	Crossroads	Stop	0	0	0
ROLLESTON ST		I	HERBERT ST	201234403	12/07/2012	Thu	08:00	Car/Wagon1 NDB on ROLLESTON ST hit Car/Wagon2 crossing at right angle from right	CAR/WAGON2, did not check/notice another party from other dirn, failed to give way at priority traffic control	Dry	Overcast	Fine	Crossroads	Stop	0	0	0
ROLLESTON ST		I	HERBERT ST	201718709	21/10/2017	Sat	07:32	Car/Wagon1 EDB on Herbert street, kihikihi hit Car/Wagon2 crossing at right angle from right	CAR/WAGON1, did not stop at stop sign, failed to give way at priority traffic control, speed entering corner/curve	Dry	Twilight	Fine	Crossroads	Stop	0	0	1

1-12 of 12



Appendix B: T6 Modelling Reports

Modelling outputs for the following intersections included:

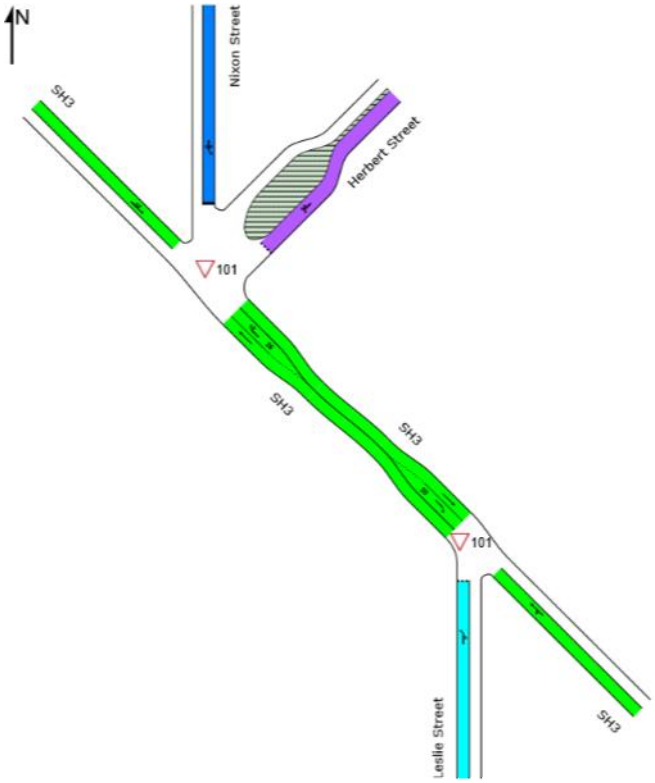
- **State Highway 3 / Golf Road / St Leger Road**
- **State Highway 3 / Herbert Street / Leslie Street / Nixon Street**
- **State Highway 3 / Whitmore Street / Church Street / Ballance Street**
- **State Highway 3 / McAndrew Street**

LANE LEVEL OF SERVICE

Lane Level of Service for Network Sites

Network: N101 [2018_Existing_AM]

New Network
Network Category: (None)



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F

Delay model settings are specified for individual Sites forming the Network.

Organisation: TONKIN & TAYLOR | Processed: Tuesday, 4 June 2019 10:17:24 AM
Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\T6_Herbert SH3 Int & Leslie SH3 Int.sip8

NETWORK SUMMARY

Network: N101 [2018_Existing_AM]

New Network
Network Category: (None)

Network Performance - Hourly Values						
Performance Measure	**Vehicles**		**Per Unit Distance**		**Persons**	
Network Level of Service (LOS)	LOS B					
Travel Time Index	8.67					
Speed Efficiency	0.88					
Congestion Coefficient	1.14					
Travel Speed (Average)	52.8	km/h			52.8	km/h
Travel Distance (Total)	1330.2	veh-km/h			1596.3	pers-km/h
Travel Time (Total)	25.2	veh-h/h			30.2	pers-h/h
Desired Speed	60.0	km/h				
Demand Flows (Total for all Sites)	2452	veh/h			2942	pers/h
Arrival Flows (Total for all Sites)	2452	veh/h			2942	pers/h
Demand Flows (Entry Total)	1259	veh/h				
Midblock Inflows (Total)	7	veh/h				
Midblock Outflows (Total)	-1	veh/h				
Percent Heavy Vehicles (Demand)	10.2	%				
Percent Heavy Vehicles (Arrival)	10.2	%				
Degree of Saturation	0.433					
Control Delay (Total)	0.66	veh-h/h			0.80	pers-h/h
Control Delay (Average)	1.0	sec			1.0	sec
Control Delay (Worst Lane)	32.2	sec				
Control Delay (Worst Movement)	46.1	sec			46.1	sec
Geometric Delay (Average)	0.4	sec				
Stop-Line Delay (Average)	0.6	sec				
Queue Storage Ratio (Worst Lane)	0.00					
Total Effective Stops	146	veh/h			175	pers/h
Effective Stop Rate	0.06		0.11	per km	0.06	
Proportion Queued	0.04				0.04	
Performance Index	29.0				29.0	
Cost (Total)	628.37	$/h	0.47	$/km	628.37	$/h
Fuel Consumption (Total)	115.6	L/h	86.9	mL/km		
Fuel Economy	8.7	L/100km				
Carbon Dioxide (Total)	278.8	kg/h	209.6	g/km		
Hydrocarbons (Total)	0.019	kg/h	0.015	g/km		
Carbon Monoxide (Total)	0.262	kg/h	0.197	g/km		
NOx (Total)	0.724	kg/h	0.545	g/km		

Network Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.0% 0.0% 0.0%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: Standard Left.

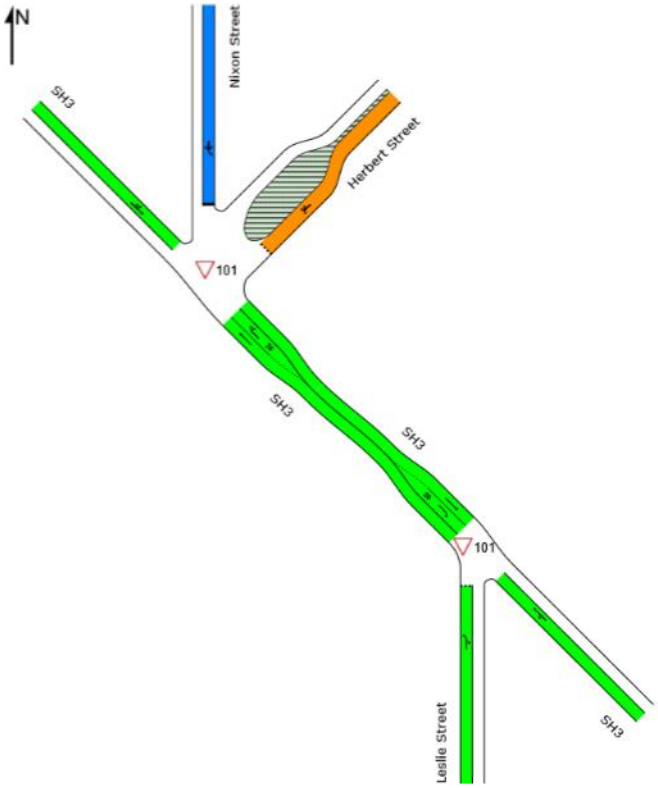
Network Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total for all Sites)	1,176,758	veh/y	1,412,110	pers/y
Delay	319	veh-h/y	383	pers-h/y
Effective Stops	69,844	veh/y	83,813	pers/y
Travel Distance	638,505	veh-km/y	766,206	pers-km/y
Travel Time	12,091	veh-h/y	14,509	pers-h/y
Cost	301,617	$/y	301,617	$/y
Fuel Consumption	55,503	L/y		
Carbon Dioxide	133,811	kg/y		
Hydrocarbons	9	kg/y		
Carbon Monoxide	126	kg/y		
NOx	348	kg/y		

LANE LEVEL OF SERVICE

Lane Level of Service for Network Sites

Network: N101 [2018_Existing_PM]

New Network
Network Category: (None)



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F

Delay model settings are specified for individual Sites forming the Network.

Organisation: TONKIN & TAYLOR | Processed: Tuesday, 4 June 2019 10:17:27 AM
Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\T6_Herbert SH3 Int & Leslie SH3 Int.sip8

NETWORK SUMMARY

Network: N101 [2018_Existing_PM]

New Network
Network Category: (None)

Network Performance - Hourly Values						
Performance Measure	**Vehicles**		**Per Unit Distance**		**Persons**	
Network Level of Service (LOS)	LOS B					
Travel Time Index	8.47					
Speed Efficiency	0.86					
Congestion Coefficient	1.16					
Travel Speed (Average)	51.8	km/h			51.8	km/h
Travel Distance (Total)	1350.9	veh-km/h			1621.1	pers-km/h
Travel Time (Total)	26.1	veh-h/h			31.3	pers-h/h
Desired Speed	60.0	km/h				
Demand Flows (Total for all Sites)	2445	veh/h			2934	pers/h
Arrival Flows (Total for all Sites)	2445	veh/h			2934	pers/h
Demand Flows (Entry Total)	1284	veh/h				
Midblock Inflows (Total)	1	veh/h				
Midblock Outflows (Total)	-2	veh/h				
Percent Heavy Vehicles (Demand)	10.3	%				
Percent Heavy Vehicles (Arrival)	10.3	%				
Degree of Saturation	0.561					
Control Delay (Total)	1.18	veh-h/h			1.42	pers-h/h
Control Delay (Average)	1.7	sec			1.7	sec
Control Delay (Worst Lane)	46.8	sec				
Control Delay (Worst Movement)	51.6	sec			51.6	sec
Geometric Delay (Average)	0.3	sec				
Stop-Line Delay (Average)	1.4	sec				
Queue Storage Ratio (Worst Lane)	0.01					
Total Effective Stops	140	veh/h			168	pers/h
Effective Stop Rate	0.06		0.10	per km	0.06	
Proportion Queued	0.04				0.04	
Performance Index	32.5				32.5	
Cost (Total)	685.94	$/h	0.51	$/km	685.94	$/h
Fuel Consumption (Total)	118.8	L/h	88.0	mL/km		
Fuel Economy	8.8	L/100km				
Carbon Dioxide (Total)	286.3	kg/h	211.9	g/km		
Hydrocarbons (Total)	0.020	kg/h	0.015	g/km		
Carbon Monoxide (Total)	0.270	kg/h	0.200	g/km		
NOx (Total)	0.740	kg/h	0.548	g/km		

Network Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.0% 0.0% 0.0%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: Standard Left.

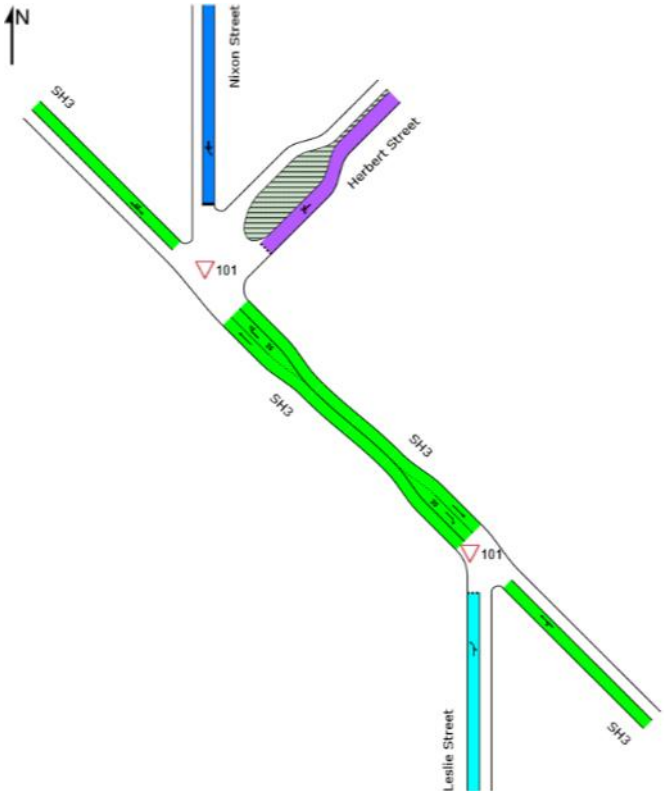
Network Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total for all Sites)	1,173,726	veh/y	1,408,472	pers/y
Delay	568	veh-h/y	682	pers-h/y
Effective Stops	67,213	veh/y	80,655	pers/y
Travel Distance	648,445	veh-km/y	778,134	pers-km/y
Travel Time	12,528	veh-h/y	15,034	pers-h/y
Cost	329,252	$/y	329,252	$/y
Fuel Consumption	57,032	L/y		
Carbon Dioxide	137,430	kg/y		
Hydrocarbons	10	kg/y		
Carbon Monoxide	130	kg/y		
NOx	355	kg/y		

LANE LEVEL OF SERVICE

Lane Level of Service for Network Sites

Network: N101 [2018_Low Dev_AM]

New Network
Network Category: (None)



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F

Delay model settings are specified for individual Sites forming the Network.

Organisation: TONKIN & TAYLOR | Processed: Tuesday, 4 June 2019 10:17:29 AM
Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\T6_Herbert SH3 Int & Leslie SH3 Int.sip8

NETWORK SUMMARY

Network: N101 [2018_Low Dev_AM]

New Network
Network Category: (None)

Network Performance - Hourly Values						
Performance Measure	**Vehicles**		**Per Unit Distance**		**Persons**	
Network Level of Service (LOS)	LOS B					
Travel Time Index	8.65					
Speed Efficiency	0.88					
Congestion Coefficient	1.14					
Travel Speed (Average)	52.7	km/h			52.7	km/h
Travel Distance (Total)	1370.0	veh-km/h			1644.0	pers-km/h
Travel Time (Total)	26.0	veh-h/h			31.2	pers-h/h
Desired Speed	60.0	km/h				
Demand Flows (Total for all Sites)	2525	veh/h			3030	pers/h
Arrival Flows (Total for all Sites)	2525	veh/h			3030	pers/h
Demand Flows (Entry Total)	1289	veh/h				
Midblock Inflows (Total)	20	veh/h				
Midblock Outflows (Total)	0	veh/h				
Percent Heavy Vehicles (Demand)	10.2	%				
Percent Heavy Vehicles (Arrival)	10.2	%				
Degree of Saturation	0.441					
Control Delay (Total)	0.74	veh-h/h			0.88	pers-h/h
Control Delay (Average)	1.0	sec			1.0	sec
Control Delay (Worst Lane)	34.4	sec				
Control Delay (Worst Movement)	49.8	sec			49.8	sec
Geometric Delay (Average)	0.4	sec				
Stop-Line Delay (Average)	0.7	sec				
Queue Storage Ratio (Worst Lane)	0.00					
Total Effective Stops	158	veh/h			190	pers/h
Effective Stop Rate	0.06		0.12	per km	0.06	
Proportion Queued	0.04				0.04	
Performance Index	30.1				30.1	
Cost (Total)	647.16	$/h	0.47	$/km	647.16	$/h
Fuel Consumption (Total)	119.2	L/h	87.0	mL/km		
Fuel Economy	8.7	L/100km				
Carbon Dioxide (Total)	287.3	kg/h	209.7	g/km		
Hydrocarbons (Total)	0.020	kg/h	0.015	g/km		
Carbon Monoxide (Total)	0.270	kg/h	0.197	g/km		
NOx (Total)	0.745	kg/h	0.543	g/km		

Network Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.0% 0.0% 0.0%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: Standard Left.

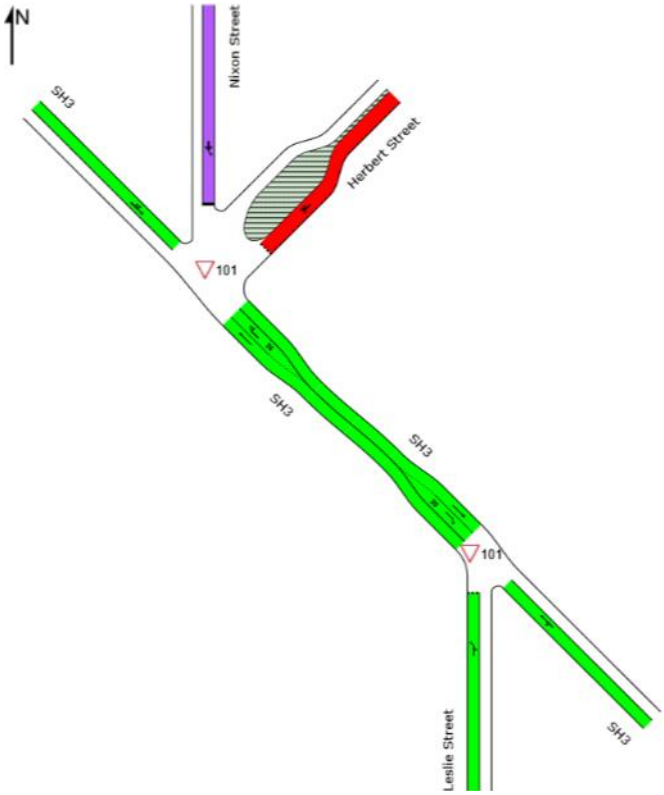
Network Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total for all Sites)	1,212,126	veh/y	1,454,552	pers/y
Delay	353	veh-h/y	424	pers-h/y
Effective Stops	75,808	veh/y	90,969	pers/y
Travel Distance	657,587	veh-km/y	789,105	pers-km/y
Travel Time	12,473	veh-h/y	14,968	pers-h/y
Cost	310,636	$/y	310,636	$/y
Fuel Consumption	57,197	L/y		
Carbon Dioxide	137,897	kg/y		
Hydrocarbons	10	kg/y		
Carbon Monoxide	130	kg/y		
NOx	357	kg/y		

LANE LEVEL OF SERVICE

Lane Level of Service for Network Sites

Network: N101 [2018_Low Dev_PM]

New Network
Network Category: (None)



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F

Delay model settings are specified for individual Sites forming the Network.

Organisation: TONKIN & TAYLOR | Processed: Tuesday, 4 June 2019 10:17:31 AM
Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\T6_Herbert SH3 Int & Leslie SH3 Int.sip8

NETWORK SUMMARY

Network: N101 [2018_Low Dev_PM]

New Network
Network Category: (None)

Network Performance - Hourly Values						
Performance Measure	**Vehicles**		**Per Unit Distance**		**Persons**	
Network Level of Service (LOS)	LOS B					
Travel Time Index	8.36					
Speed Efficiency	0.85					
Congestion Coefficient	1.17					
Travel Speed (Average)	51.2	km/h			51.2	km/h
Travel Distance (Total)	1393.7	veh-km/h			1672.4	pers-km/h
Travel Time (Total)	27.2	veh-h/h			32.7	pers-h/h
Desired Speed	60.0	km/h				
Demand Flows (Total for all Sites)	2520	veh/h			3024	pers/h
Arrival Flows (Total for all Sites)	2520	veh/h			3024	pers/h
Demand Flows (Entry Total)	1322	veh/h				
Midblock Inflows (Total)	7	veh/h				
Midblock Outflows (Total)	-2	veh/h				
Percent Heavy Vehicles (Demand)	10.3	%				
Percent Heavy Vehicles (Arrival)	10.3	%				
Degree of Saturation	0.661					
Control Delay (Total)	1.53	veh-h/h			1.84	pers-h/h
Control Delay (Average)	2.2	sec			2.2	sec
Control Delay (Worst Lane)	56.4	sec				
Control Delay (Worst Movement)	62.7	sec			62.7	sec
Geometric Delay (Average)	0.4	sec				
Stop-Line Delay (Average)	1.8	sec				
Queue Storage Ratio (Worst Lane)	0.02					
Total Effective Stops	158	veh/h			189	pers/h
Effective Stop Rate	0.06		0.11	per km	0.06	
Proportion Queued	0.04				0.04	
Performance Index	35.2				35.2	
Cost (Total)	717.83	$/h	0.52	$/km	717.83	$/h
Fuel Consumption (Total)	122.9	L/h	88.2	mL/km		
Fuel Economy	8.8	L/100km				
Carbon Dioxide (Total)	296.2	kg/h	212.5	g/km		
Hydrocarbons (Total)	0.021	kg/h	0.015	g/km		
Carbon Monoxide (Total)	0.279	kg/h	0.200	g/km		
NOx (Total)	0.761	kg/h	0.546	g/km		

Network Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.0% 0.0% 0.0%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: Standard Left.

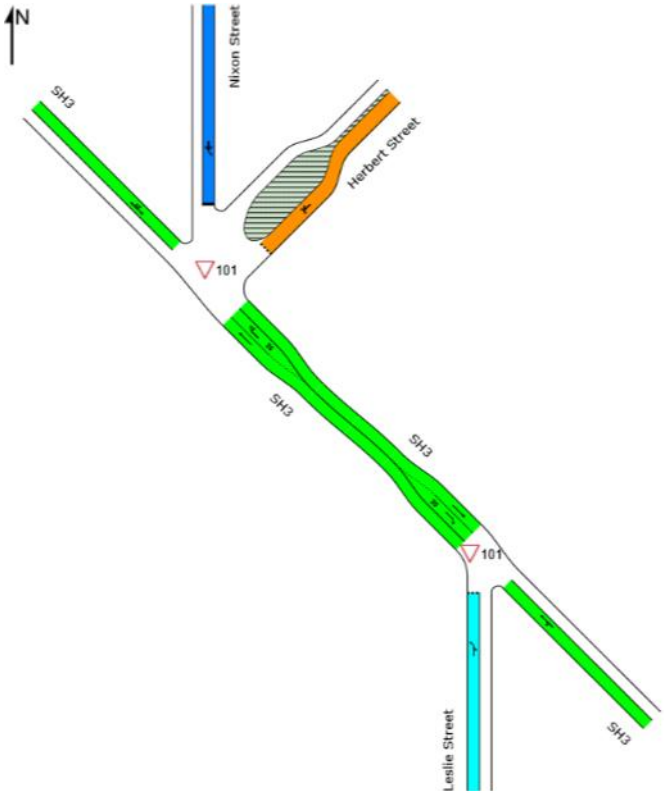
Network Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total for all Sites)	1,209,600	veh/y	1,451,520	pers/y
Delay	734	veh-h/y	881	pers-h/y
Effective Stops	75,636	veh/y	90,763	pers/y
Travel Distance	668,970	veh-km/y	802,764	pers-km/y
Travel Time	13,078	veh-h/y	15,693	pers-h/y
Cost	344,559	$/y	344,559	$/y
Fuel Consumption	59,006	L/y		
Carbon Dioxide	142,170	kg/y		
Hydrocarbons	10	kg/y		
Carbon Monoxide	134	kg/y		
NOx	365	kg/y		

LANE LEVEL OF SERVICE

Lane Level of Service for Network Sites

Network: N101 [2018_Hi Dev_AM]

New Network
Network Category: (None)



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F

Delay model settings are specified for individual Sites forming the Network.

Organisation: TONKIN & TAYLOR | Processed: Tuesday, 4 June 2019 10:17:33 AM
Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\T6_Herbert SH3 Int & Leslie SH3 Int.sip8

NETWORK SUMMARY

Network: N101 [2018_Hi Dev_AM]

New Network
Network Category: (None)

Network Performance - Hourly Values						
Performance Measure	**Vehicles**		**Per Unit Distance**		**Persons**	
Network Level of Service (LOS)	LOS B					
Travel Time Index	8.61					
Speed Efficiency	0.88					
Congestion Coefficient	1.14					
Travel Speed (Average)	52.5	km/h			52.5	km/h
Travel Distance (Total)	1390.1	veh-km/h			1668.1	pers-km/h
Travel Time (Total)	26.5	veh-h/h			31.8	pers-h/h
Desired Speed	60.0	km/h				
Demand Flows (Total for all Sites)	2562	veh/h			3075	pers/h
Arrival Flows (Total for all Sites)	2562	veh/h			3075	pers/h
Demand Flows (Entry Total)	1307	veh/h				
Midblock Inflows (Total)	24	veh/h				
Midblock Outflows (Total)	-2	veh/h				
Percent Heavy Vehicles (Demand)	10.1	%				
Percent Heavy Vehicles (Arrival)	10.1	%				
Degree of Saturation	0.447					
Control Delay (Total)	0.81	veh-h/h			0.98	pers-h/h
Control Delay (Average)	1.1	sec			1.1	sec
Control Delay (Worst Lane)	38.9	sec				
Control Delay (Worst Movement)	55.2	sec			55.2	sec
Geometric Delay (Average)	0.4	sec				
Stop-Line Delay (Average)	0.8	sec				
Queue Storage Ratio (Worst Lane)	0.01					
Total Effective Stops	167	veh/h			200	pers/h
Effective Stop Rate	0.07		0.12	per km	0.07	
Proportion Queued	0.05				0.05	
Performance Index	31.0				31.0	
Cost (Total)	659.12	$/h	0.47	$/km	659.12	$/h
Fuel Consumption (Total)	121.0	L/h	87.0	mL/km		
Fuel Economy	8.7	L/100km				
Carbon Dioxide (Total)	291.6	kg/h	209.8	g/km		
Hydrocarbons (Total)	0.020	kg/h	0.015	g/km		
Carbon Monoxide (Total)	0.274	kg/h	0.197	g/km		
NOx (Total)	0.754	kg/h	0.542	g/km		

Network Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.0% 0.0% 0.0%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: Standard Left.

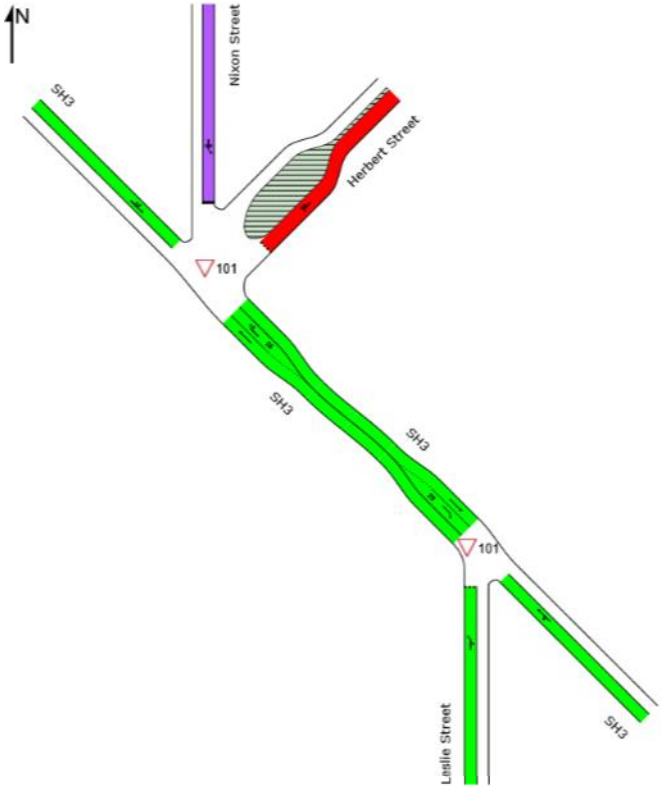
Network Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total for all Sites)	1,229,811	veh/y	1,475,773	pers/y
Delay	391	veh-h/y	469	pers-h/y
Effective Stops	80,086	veh/y	96,104	pers/y
Travel Distance	667,257	veh-km/y	800,708	pers-km/y
Travel Time	12,708	veh-h/y	15,250	pers-h/y
Cost	316,376	$/y	316,376	$/y
Fuel Consumption	58,060	L/y		
Carbon Dioxide	139,976	kg/y		
Hydrocarbons	10	kg/y		
Carbon Monoxide	131	kg/y		
NOx	362	kg/y		

LANE LEVEL OF SERVICE

Lane Level of Service for Network Sites

Network: N101 [2018_Hi Dev_PM]

New Network
Network Category: (None)



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F

Delay model settings are specified for individual Sites forming the Network.

Organisation: TONKIN & TAYLOR | Processed: Tuesday, 4 June 2019 10:17:36 AM
Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\T6_Herbert SH3 Int & Leslie SH3 Int.sip8

NETWORK SUMMARY

Network: N101 [2018_Hi Dev_PM]

New Network
Network Category: (None)

Network Performance - Hourly Values						
Performance Measure	**Vehicles**		**Per Unit Distance**		**Persons**	
Network Level of Service (LOS)	LOS B					
Travel Time Index	8.30					
Speed Efficiency	0.85					
Congestion Coefficient	1.18					
Travel Speed (Average)	50.8	km/h			50.8	km/h
Travel Distance (Total)	1422.1	veh-km/h			1706.5	pers-km/h
Travel Time (Total)	28.0	veh-h/h			33.6	pers-h/h
Desired Speed	60.0	km/h				
Demand Flows (Total for all Sites)	2573	veh/h			3087	pers/h
Arrival Flows (Total for all Sites)	2573	veh/h			3087	pers/h
Demand Flows (Entry Total)	1348	veh/h				
Midblock Inflows (Total)	9	veh/h				
Midblock Outflows (Total)	-3	veh/h				
Percent Heavy Vehicles (Demand)	10.3	%				
Percent Heavy Vehicles (Arrival)	10.3	%				
Degree of Saturation	0.711					
Control Delay (Total)	1.75	veh-h/h			2.10	pers-h/h
Control Delay (Average)	2.5	sec			2.5	sec
Control Delay (Worst Lane)	65.4	sec				
Control Delay (Worst Movement)	72.3	sec			72.3	sec
Geometric Delay (Average)	0.4	sec				
Stop-Line Delay (Average)	2.1	sec				
Queue Storage Ratio (Worst Lane)	0.02					
Total Effective Stops	163	veh/h			196	pers/h
Effective Stop Rate	0.06		0.11	per km	0.06	
Proportion Queued	0.04				0.04	
Performance Index	36.7				36.7	
Cost (Total)	738.53	$/h	0.52	$/km	738.53	$/h
Fuel Consumption (Total)	125.6	L/h	88.4	mL/km		
Fuel Economy	8.8	L/100km				
Carbon Dioxide (Total)	302.7	kg/h	212.9	g/km		
Hydrocarbons (Total)	0.021	kg/h	0.015	g/km		
Carbon Monoxide (Total)	0.285	kg/h	0.200	g/km		
NOx (Total)	0.777	kg/h	0.546	g/km		

Network Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.0% 0.0% 0.0%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: Standard Left.

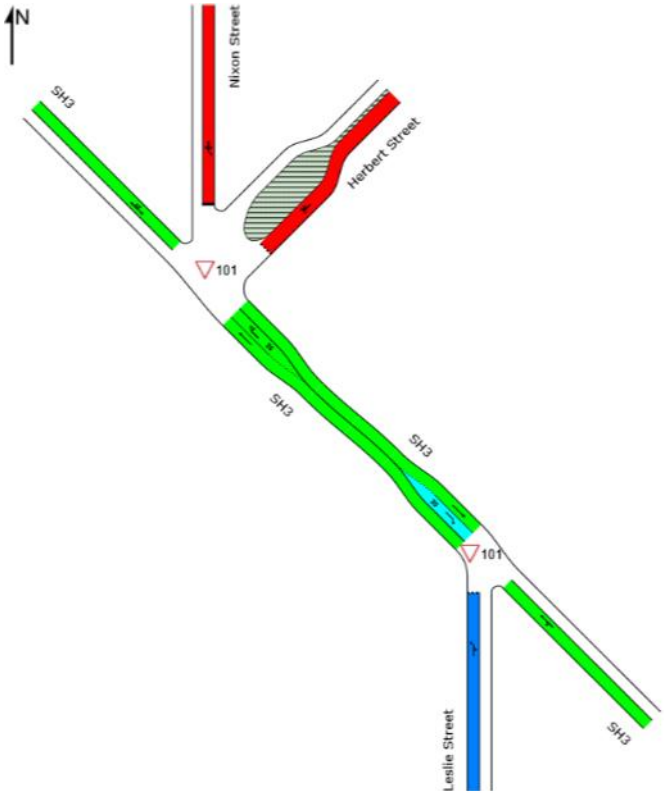
Network Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total for all Sites)	1,234,863	veh/y	1,481,836	pers/y
Delay	840	veh-h/y	1,008	pers-h/y
Effective Stops	78,208	veh/y	93,850	pers/y
Travel Distance	682,611	veh-km/y	819,134	pers-km/y
Travel Time	13,437	veh-h/y	16,124	pers-h/y
Cost	354,496	$/y	354,496	$/y
Fuel Consumption	60,310	L/y		
Carbon Dioxide	145,311	kg/y		
Hydrocarbons	10	kg/y		
Carbon Monoxide	137	kg/y		
NOx	373	kg/y		

LANE LEVEL OF SERVICE

Lane Level of Service for Network Sites

Network: N101 [2035_No Dev_AM]

New Network
Network Category: (None)



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F

Delay model settings are specified for individual Sites forming the Network.

Organisation: TONKIN & TAYLOR | Processed: Tuesday, 4 June 2019 10:17:38 AM
Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\T6_Herbert SH3 Int & Leslie SH3 Int.sip8

NETWORK SUMMARY

Network: N101 [2035_No Dev_AM]

New Network
Network Category: (None)

Network Performance - Hourly Values						
Performance Measure	**Vehicles**		**Per Unit Distance**		**Persons**	
Network Level of Service (LOS)	LOS C					
Travel Time Index	7.70					
Speed Efficiency	0.79					
Congestion Coefficient	1.26					
Travel Speed (Average)	47.6	km/h			47.6	km/h
Travel Distance (Total)	1792.2	veh-km/h			2150.7	pers-km/h
Travel Time (Total)	37.7	veh-h/h			45.2	pers-h/h
Desired Speed	60.0	km/h				
Demand Flows (Total for all Sites)	3304	veh/h			3965	pers/h
Arrival Flows (Total for all Sites)	3304	veh/h			3965	pers/h
Demand Flows (Entry Total)	1684	veh/h				
Midblock Inflows (Total)	31	veh/h				
Midblock Outflows (Total)	-1	veh/h				
Percent Heavy Vehicles (Demand)	10.2	%				
Percent Heavy Vehicles (Arrival)	10.2	%				
Degree of Saturation	1.052					
Control Delay (Total)	4.57	veh-h/h			5.48	pers-h/h
Control Delay (Average)	5.0	sec			5.0	sec
Control Delay (Worst Lane)	301.0	sec				
Control Delay (Worst Movement)	318.4	sec			318.4	sec
Geometric Delay (Average)	0.3	sec				
Stop-Line Delay (Average)	4.6	sec				
Queue Storage Ratio (Worst Lane)	0.04					
Total Effective Stops	231	veh/h			277	pers/h
Effective Stop Rate	0.07		0.13	per km	0.07	
Proportion Queued	0.05				0.05	
Performance Index	56.7				56.7	
Cost (Total)	970.62	$/h	0.54	$/km	970.62	$/h
Fuel Consumption (Total)	160.4	L/h	89.5	mL/km		
Fuel Economy	9.0	L/100km				
Carbon Dioxide (Total)	386.6	kg/h	215.7	g/km		
Hydrocarbons (Total)	0.028	kg/h	0.015	g/km		
Carbon Monoxide (Total)	0.360	kg/h	0.201	g/km		
NOx (Total)	0.982	kg/h	0.548	g/km		

Network Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.0% 0.0% 0.0%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: Standard Left.

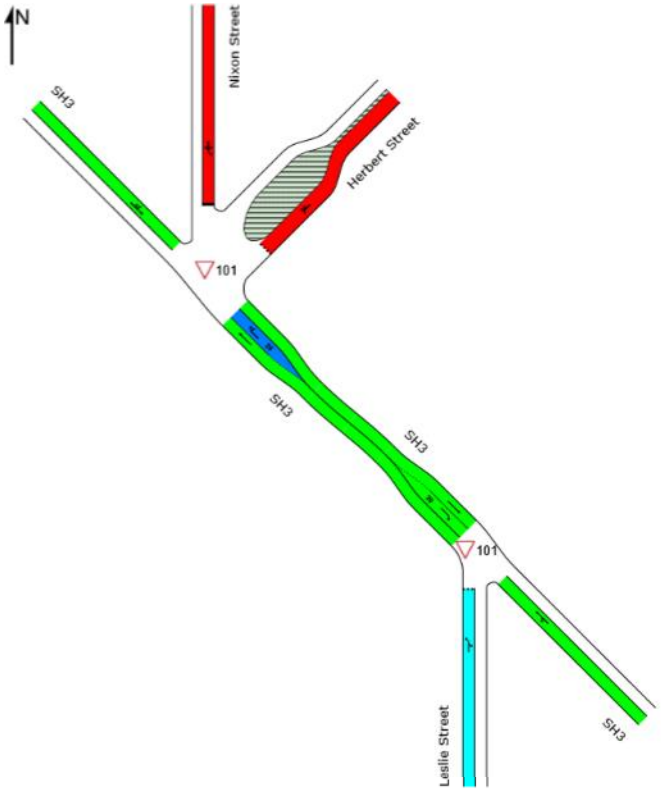
Network Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total for all Sites)	1,586,021	veh/y	1,903,225	pers/y
Delay	2,194	veh-h/y	2,633	pers-h/y
Effective Stops	110,813	veh/y	132,975	pers/y
Travel Distance	860,279	veh-km/y	1,032,335	pers-km/y
Travel Time	18,078	veh-h/y	21,693	pers-h/y
Cost	465,897	$/y	465,897	$/y
Fuel Consumption	77,014	L/y		
Carbon Dioxide	185,571	kg/y		
Hydrocarbons	13	kg/y		
Carbon Monoxide	173	kg/y		
NOx	471	kg/y		

LANE LEVEL OF SERVICE

Lane Level of Service for Network Sites

Network: N101 [2035_No Dev_PM]

New Network
Network Category: (None)



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F

Delay model settings are specified for individual Sites forming the Network.

Organisation: TONKIN & TAYLOR | Processed: Tuesday, 4 June 2019 10:17:40 AM
Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\T6_Herbert SH3 Int & Leslie SH3 Int.sip8

NETWORK SUMMARY

Network: N101 [2035_No Dev_PM]

New Network
Network Category: (None)

Network Performance - Hourly Values						
Performance Measure	**Vehicles**		**Per Unit Distance**		**Persons**	
Network Level of Service (LOS)	LOS E					
Travel Time Index	2.72					
Speed Efficiency	0.35					
Congestion Coefficient	2.90					
Travel Speed (Average)	20.7	km/h			20.7	km/h
Travel Distance (Total)	1818.7	veh-km/h			2182.5	pers-km/h
Travel Time (Total)	87.8	veh-h/h			105.4	pers-h/h
Desired Speed	60.0	km/h				
Demand Flows (Total for all Sites)	3297	veh/h			3956	pers/h
Arrival Flows (Total for all Sites)	3287	veh/h			3944	pers/h
Demand Flows (Entry Total)	1722	veh/h				
Midblock Inflows (Total)	20	veh/h				
Midblock Outflows (Total)	0	veh/h				
Percent Heavy Vehicles (Demand)	10.3	%				
Percent Heavy Vehicles (Arrival)	10.3	%				
Degree of Saturation	2.862					
Control Delay (Total)	52.40	veh-h/h			62.88	pers-h/h
Control Delay (Average)	57.4	sec			57.4	sec
Control Delay (Worst Lane)	1760.3	sec				
Control Delay (Worst Movement)	1765.9	sec			1765.9	sec
Geometric Delay (Average)	0.3	sec				
Stop-Line Delay (Average)	57.1	sec				
Queue Storage Ratio (Worst Lane)	0.29					
Total Effective Stops	369	veh/h			443	pers/h
Effective Stop Rate	0.11		0.20	per km	0.11	
Proportion Queued	0.04				0.04	
Performance Index	212.8				212.8	
Cost (Total)	2718.08	$/h	1.49	$/km	2718.08	$/h
Fuel Consumption (Total)	224.3	L/h	123.3	mL/km		
Fuel Economy	12.3	L/100km				
Carbon Dioxide (Total)	536.8	kg/h	295.1	g/km		
Hydrocarbons (Total)	0.046	kg/h	0.026	g/km		
Carbon Monoxide (Total)	0.461	kg/h	0.253	g/km		
NOx (Total)	1.039	kg/h	0.572	g/km		

Network Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.0% 0.0% 0.0%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: Standard Left.

Network Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total for all Sites)	1,582,484	veh/y	1,898,981	pers/y
Delay	25,152	veh-h/y	30,182	pers-h/y
Effective Stops	177,350	veh/y	212,820	pers/y
Travel Distance	872,996	veh-km/y	1,047,596	pers-km/y
Travel Time	42,163	veh-h/y	50,595	pers-h/y
Cost	1,304,680	$/y	1,304,680	$/y
Fuel Consumption	107,643	L/y		
Carbon Dioxide	257,663	kg/y		
Hydrocarbons	22	kg/y		
Carbon Monoxide	221	kg/y		
NOx	499	kg/y		

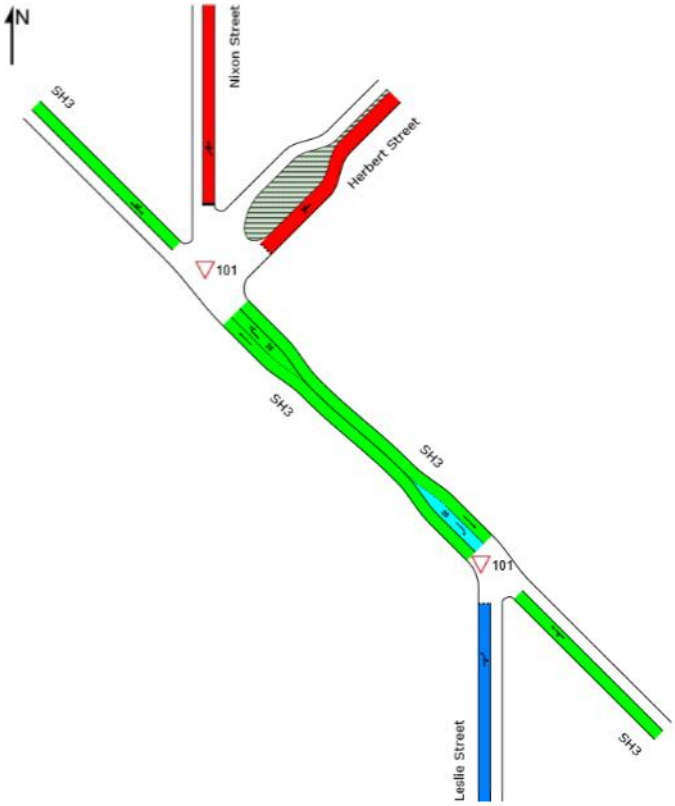
Organisation: TONKIN & TAYLOR | Processed: Tuesday, 4 June 2019 10:17:40 AM
Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\T6_Herbert SH3 Int & Leslie SH3 Int.sip8

LANE LEVEL OF SERVICE

Lane Level of Service for Network Sites

Network: N101 [2035_Low Dev_AM]

New Network
Network Category: (None)



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F

Delay model settings are specified for individual Sites forming the Network.

Organisation: TONKIN & TAYLOR | Processed: Tuesday, 4 June 2019 10:17:42 AM
Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\T6_Herbert SH3 Int & Leslie SH3 Int.sip8

NETWORK SUMMARY

Network: N101 [2035_Low Dev_AM]

New Network
Network Category: (None)

Network Performance - Hourly Values						
Performance Measure	**Vehicles**		**Per Unit Distance**		**Persons**	
Network Level of Service (LOS)	LOS C					
Travel Time Index	7.39					
Speed Efficiency	0.76					
Congestion Coefficient	1.31					
Travel Speed (Average)	45.9	km/h			45.9	km/h
Travel Distance (Total)	1806.5	veh-km/h			2167.8	pers-km/h
Travel Time (Total)	39.4	veh-h/h			47.2	pers-h/h
Desired Speed	60.0	km/h				
Demand Flows (Total for all Sites)	3331	veh/h			3997	pers/h
Arrival Flows (Total for all Sites)	3329	veh/h			3995	pers/h
Demand Flows (Entry Total)	1708	veh/h				
Midblock Inflows (Total)	12	veh/h				
Midblock Outflows (Total)	-3	veh/h				
Percent Heavy Vehicles (Demand)	10.2	%				
Percent Heavy Vehicles (Arrival)	10.2	%				
Degree of Saturation	1.179					
Control Delay (Total)	5.84	veh-h/h			7.00	pers-h/h
Control Delay (Average)	6.3	sec			6.3	sec
Control Delay (Worst Lane)	392.5	sec				
Control Delay (Worst Movement)	409.7	sec			409.7	sec
Geometric Delay (Average)	0.4	sec				
Stop-Line Delay (Average)	5.9	sec				
Queue Storage Ratio (Worst Lane)	0.05					
Total Effective Stops	251	veh/h			301	pers/h
Effective Stop Rate	0.08		0.14	per km	0.08	
Proportion Queued	0.05				0.05	
Performance Index	64.7				64.7	
Cost (Total)	1028.07	$/h	0.57	$/km	1028.07	$/h
Fuel Consumption (Total)	163.3	L/h	90.4	mL/km		
Fuel Economy	9.0	L/100km				
Carbon Dioxide (Total)	393.4	kg/h	217.7	g/km		
Hydrocarbons (Total)	0.028	kg/h	0.016	g/km		
Carbon Monoxide (Total)	0.365	kg/h	0.202	g/km		
NOx (Total)	0.988	kg/h	0.547	g/km		

Network Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.0% 0.0% 0.0%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: Standard Left.

Network Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total for all Sites)	1,598,653	veh/y	1,918,383	pers/y
Delay	2,802	veh-h/y	3,362	pers-h/y
Effective Stops	120,599	veh/y	144,718	pers/y
Travel Distance	867,138	veh-km/y	1,040,566	pers-km/y
Travel Time	18,894	veh-h/y	22,672	pers-h/y
Cost	493,474	$/y	493,474	$/y
Fuel Consumption	78,386	L/y		
Carbon Dioxide	188,808	kg/y		
Hydrocarbons	14	kg/y		
Carbon Monoxide	175	kg/y		
NOx	474	kg/y		

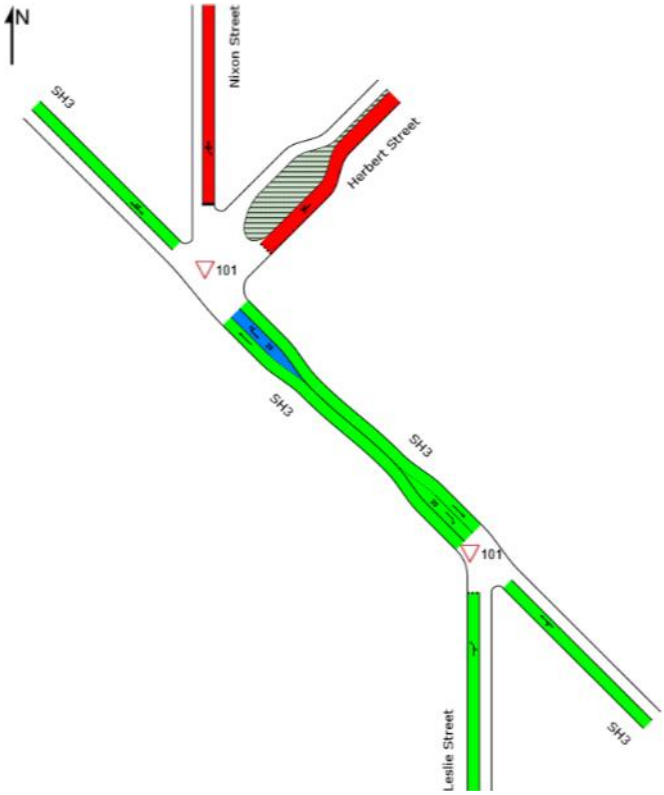
Organisation: TONKIN & TAYLOR | Processed: Tuesday, 4 June 2019 10:17:42 AM
Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\T6_Herbert SH3 Int & Leslie SH3 Int.sip8

LANE LEVEL OF SERVICE

Lane Level of Service for Network Sites

Network: N101 [2035_Low Dev_PM]

New Network
Network Category: (None)



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F

Delay model settings are specified for individual Sites forming the Network.

Organisation: TONKIN & TAYLOR | Processed: Tuesday, 4 June 2019 10:17:45 AM
Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\T6_Herbert SH3 Int & Leslie SH3 Int.sip8

NETWORK SUMMARY

Network: N101 [2035_Low Dev_PM]

New Network
Network Category: (None)

Network Performance - Hourly Values						
Performance Measure	**Vehicles**		**Per Unit Distance**		**Persons**	
Network Level of Service (LOS)	LOS F					
Travel Time Index	2.16					
Speed Efficiency	0.29					
Congestion Coefficient	3.40					
Travel Speed (Average)	17.6	km/h			17.6	km/h
Travel Distance (Total)	1857.0	veh-km/h			2228.5	pers-km/h
Travel Time (Total)	105.3	veh-h/h			126.3	pers-h/h
Desired Speed	60.0	km/h				
Demand Flows (Total for all Sites)	3368	veh/h			4042	pers/h
Arrival Flows (Total for all Sites)	3357	veh/h			4029	pers/h
Demand Flows (Entry Total)	1765	veh/h				
Midblock Inflows (Total)	11	veh/h				
Midblock Outflows (Total)	-3	veh/h				
Percent Heavy Vehicles (Demand)	10.3	%				
Percent Heavy Vehicles (Arrival)	10.3	%				
Degree of Saturation	3.464					
Control Delay (Total)	68.54	veh-h/h			82.24	pers-h/h
Control Delay (Average)	73.5	sec			73.5	sec
Control Delay (Worst Lane)	2305.2	sec				
Control Delay (Worst Movement)	2310.6	sec			2310.6	sec
Geometric Delay (Average)	0.3	sec				
Stop-Line Delay (Average)	73.2	sec				
Queue Storage Ratio (Worst Lane)	0.32					
Total Effective Stops	357	veh/h			429	pers/h
Effective Stop Rate	0.11		0.19	per km	0.11	
Proportion Queued	0.04				0.04	
Performance Index	242.8				242.8	
Cost (Total)	3306.27	$/h	1.78	$/km	3306.27	$/h
Fuel Consumption (Total)	247.7	L/h	133.4	mL/km		
Fuel Economy	13.3	L/100km				
Carbon Dioxide (Total)	592.2	kg/h	318.9	g/km		
Hydrocarbons (Total)	0.053	kg/h	0.029	g/km		
Carbon Monoxide (Total)	0.499	kg/h	0.269	g/km		
NOx (Total)	1.073	kg/h	0.578	g/km		

Network Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.0% 0.0% 0.0%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: Standard Left.

Network Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total for all Sites)	1,616,842	veh/y	1,940,211	pers/y
Delay	32,898	veh-h/y	39,478	pers-h/y
Effective Stops	171,544	veh/y	205,852	pers/y
Travel Distance	891,380	veh-km/y	1,069,656	pers-km/y
Travel Time	50,526	veh-h/y	60,631	pers-h/y
Cost	1,587,009	$/y	1,587,009	$/y
Fuel Consumption	118,901	L/y		
Carbon Dioxide	284,235	kg/y		
Hydrocarbons	25	kg/y		
Carbon Monoxide	239	kg/y		
NOx	515	kg/y		

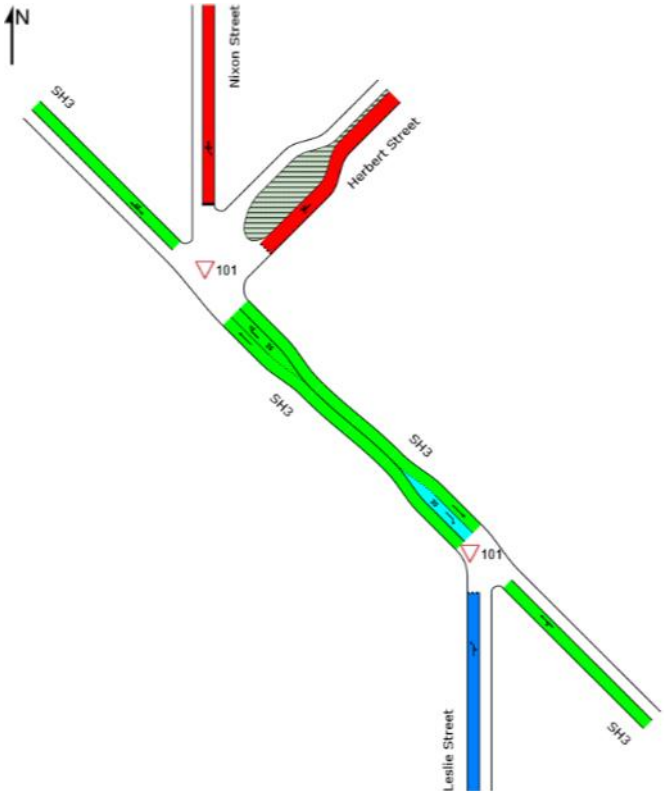
Organisation: TONKIN & TAYLOR | Processed: Tuesday, 4 June 2019 10:17:45 AM
Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\T6_Herbert SH3 Int & Leslie SH3 Int.sip8

LANE LEVEL OF SERVICE

Lane Level of Service for Network Sites

Network: N101 [2035_Hi Dev_AM]

New Network
Network Category: (None)



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F

Delay model settings are specified for individual Sites forming the Network.

Organisation: TONKIN & TAYLOR | Processed: Tuesday, 4 June 2019 10:17:47 AM
Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\T6_Herbert SH3 Int & Leslie SH3 Int.sip8

NETWORK SUMMARY

Network: N101 [2035_Hi Dev_AM]

New Network
Network Category: (None)

Network Performance - Hourly Values						
Performance Measure	**Vehicles**		**Per Unit Distance**		**Persons**	
Network Level of Service (LOS)	LOS C					
Travel Time Index	7.02					
Speed Efficiency	0.73					
Congestion Coefficient	1.37					
Travel Speed (Average)	43.9	km/h			43.9	km/h
Travel Distance (Total)	1837.5	veh-km/h			2205.0	pers-km/h
Travel Time (Total)	41.9	veh-h/h			50.2	pers-h/h
Desired Speed	60.0	km/h				
Demand Flows (Total for all Sites)	3388	veh/h			4066	pers/h
Arrival Flows (Total for all Sites)	3387	veh/h			4064	pers/h
Demand Flows (Entry Total)	1733	veh/h				
Midblock Inflows (Total)	23	veh/h				
Midblock Outflows (Total)	-3	veh/h				
Percent Heavy Vehicles (Demand)	10.2	%				
Percent Heavy Vehicles (Arrival)	10.2	%				
Degree of Saturation	1.342					
Control Delay (Total)	7.60	veh-h/h			9.12	pers-h/h
Control Delay (Average)	8.1	sec			8.1	sec
Control Delay (Worst Lane)	523.3	sec				
Control Delay (Worst Movement)	540.2	sec			540.2	sec
Geometric Delay (Average)	0.4	sec				
Stop-Line Delay (Average)	7.7	sec				
Queue Storage Ratio (Worst Lane)	0.07					
Total Effective Stops	270	veh/h			325	pers/h
Effective Stop Rate	0.08		0.15	per km	0.08	
Proportion Queued	0.05				0.05	
Performance Index	74.4				74.4	
Cost (Total)	1106.60	$/h	0.60	$/km	1106.60	$/h
Fuel Consumption (Total)	168.3	L/h	91.6	mL/km		
Fuel Economy	9.2	L/100km				
Carbon Dioxide (Total)	405.4	kg/h	220.6	g/km		
Hydrocarbons (Total)	0.029	kg/h	0.016	g/km		
Carbon Monoxide (Total)	0.375	kg/h	0.204	g/km		
NOx (Total)	1.005	kg/h	0.547	g/km		

Network Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.0% 0.0% 0.0%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: Standard Left.

Network Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total for all Sites)	1,626,442	veh/y	1,951,731	pers/y
Delay	3,648	veh-h/y	4,378	pers-h/y
Effective Stops	129,835	veh/y	155,803	pers/y
Travel Distance	882,016	veh-km/y	1,058,419	pers-km/y
Travel Time	20,097	veh-h/y	24,116	pers-h/y
Cost	531,166	$/y	531,166	$/y
Fuel Consumption	80,800	L/y		
Carbon Dioxide	194,571	kg/y		
Hydrocarbons	14	kg/y		
Carbon Monoxide	180	kg/y		
NOx	482	kg/y		

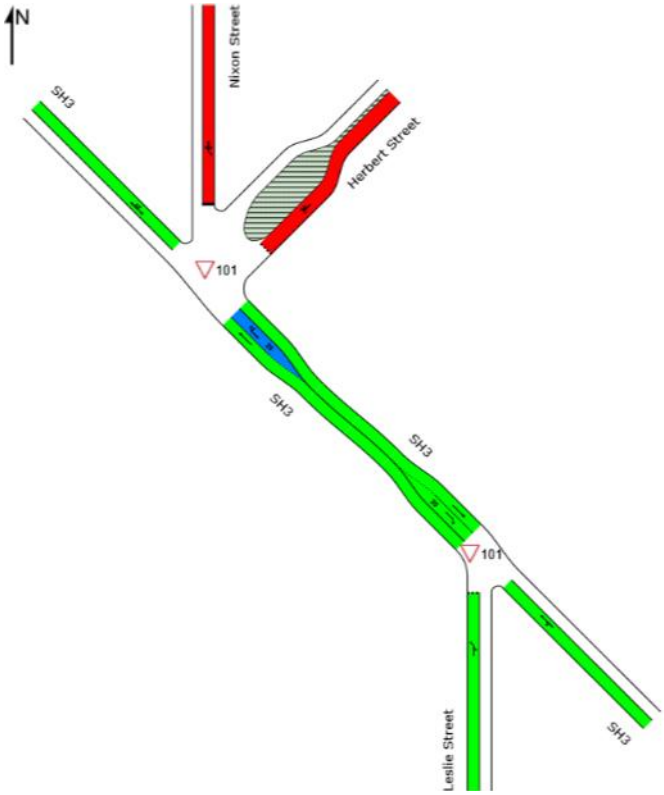
Organisation: TONKIN & TAYLOR | Processed: Tuesday, 4 June 2019 10:17:47 AM
Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\T6_Herbert SH3 Int & Leslie SH3 Int.sip8

LANE LEVEL OF SERVICE

Lane Level of Service for Network Sites

Network: N101 [2035_Hi Dev_PM]

New Network
Network Category: (None)



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F

Delay model settings are specified for individual Sites forming the Network.

Organisation: TONKIN & TAYLOR | Processed: Tuesday, 4 June 2019 10:17:49 AM
Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\T6_Herbert SH3 Int & Leslie SH3 Int.sip8

NETWORK SUMMARY

Network: N101 [2035_Hi Dev_PM]

New Network
Network Category: (None)

Network Performance - Hourly Values						
Performance Measure	**Vehicles**		**Per Unit Distance**		**Persons**	
Network Level of Service (LOS)	LOS F					
Travel Time Index	2.03					
Speed Efficiency	0.28					
Congestion Coefficient	3.54					
Travel Speed (Average)	16.9	km/h			16.9	km/h
Travel Distance (Total)	1875.2	veh-km/h			2250.3	pers-km/h
Travel Time (Total)	110.7	veh-h/h			132.9	pers-h/h
Desired Speed	60.0	km/h				
Demand Flows (Total for all Sites)	3402	veh/h			4083	pers/h
Arrival Flows (Total for all Sites)	3391	veh/h			4069	pers/h
Demand Flows (Entry Total)	1783	veh/h				
Midblock Inflows (Total)	9	veh/h				
Midblock Outflows (Total)	-2	veh/h				
Percent Heavy Vehicles (Demand)	10.3	%				
Percent Heavy Vehicles (Arrival)	10.3	%				
Degree of Saturation	3.649					
Control Delay (Total)	73.49	veh-h/h			88.19	pers-h/h
Control Delay (Average)	78.0	sec			78.0	sec
Control Delay (Worst Lane)	2471.9	sec				
Control Delay (Worst Movement)	2477.4	sec			2477.4	sec
Geometric Delay (Average)	0.3	sec				
Stop-Line Delay (Average)	77.7	sec				
Queue Storage Ratio (Worst Lane)	0.33					
Total Effective Stops	358	veh/h			429	pers/h
Effective Stop Rate	0.11		0.19	per km	0.11	
Proportion Queued	0.04				0.04	
Performance Index	251.5				251.5	
Cost (Total)	3489.16	$/h	1.86	$/km	3489.16	$/h
Fuel Consumption (Total)	255.5	L/h	136.2	mL/km		
Fuel Economy	13.6	L/100km				
Carbon Dioxide (Total)	610.5	kg/h	325.5	g/km		
Hydrocarbons (Total)	0.055	kg/h	0.029	g/km		
Carbon Monoxide (Total)	0.512	kg/h	0.273	g/km		
NOx (Total)	1.085	kg/h	0.579	g/km		

Network Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.0% 0.0% 0.0%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: Standard Left.

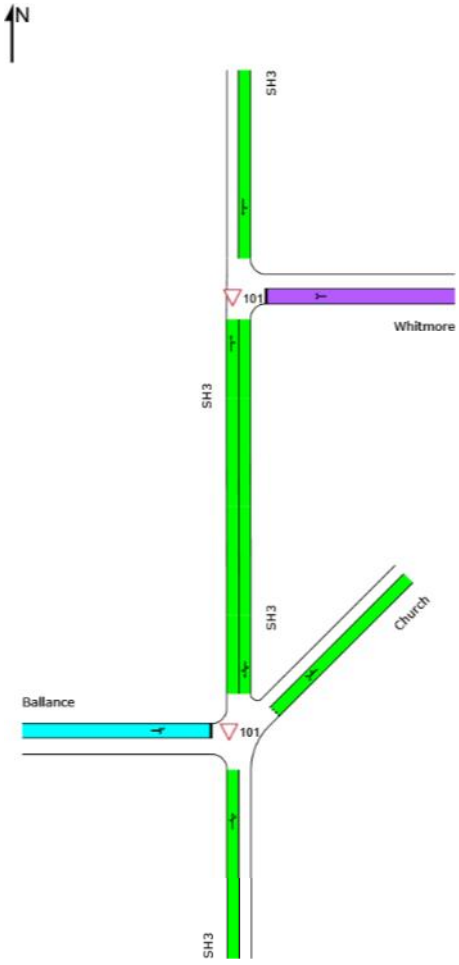
Network Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total for all Sites)	1,633,011	veh/y	1,959,613	pers/y
Delay	35,275	veh-h/y	42,330	pers-h/y
Effective Stops	171,678	veh/y	206,014	pers/y
Travel Distance	900,115	veh-km/y	1,080,138	pers-km/y
Travel Time	53,144	veh-h/y	63,773	pers-h/y
Cost	1,674,799	$/y	1,674,799	$/y
Fuel Consumption	122,619	L/y		
Carbon Dioxide	293,023	kg/y		
Hydrocarbons	27	kg/y		
Carbon Monoxide	246	kg/y		
NOx	521	kg/y		

LANE LEVEL OF SERVICE

Lane Level of Service for Network Sites

Network: N101 [2018_Existing_AM]

New Network
Network Category: (None)



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F

Delay model settings are specified for individual Sites forming the Network.

Organisation: TONKIN & TAYLOR | Processed: Friday, 24 May 2019 11:42:53 AM
Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\T6_Ballance SH3 Church Int & Whitmore SH3 Int.sip8

NETWORK SUMMARY

Network: N101 [2018_Existing_AM]

New Network
Network Category: (None)

Network Performance - Hourly Values						
Performance Measure	**Vehicles**		**Per Unit Distance**		**Persons**	
Network Level of Service (LOS)	LOS A[3]					
Travel Time Index	11.02					
Speed Efficiency	1.09					
Congestion Coefficient	0.92					
Travel Speed (Average)	54.6	km/h			54.6	km/h
Travel Distance (Total)	1282.4	veh-km/h			1538.9	pers-km/h
Travel Time (Total)	23.5	veh-h/h			28.2	pers-h/h
Desired Speed	50.0	km/h				
Demand Flows (Total for all Sites)	2295	veh/h			2754	pers/h
Arrival Flows (Total for all Sites)	2295	veh/h			2754	pers/h
Demand Flows (Entry Total)	1292	veh/h				
Midblock Inflows (Total)	5	veh/h				
Midblock Outflows (Total)	-4	veh/h				
Percent Heavy Vehicles (Demand)	9.1	%				
Percent Heavy Vehicles (Arrival)	9.1	%				
Degree of Saturation	0.611					
Control Delay (Total)	1.95	veh-h/h			2.34	pers-h/h
Control Delay (Average)	3.1	sec			3.1	sec
Control Delay (Worst Lane)	26.2	sec				
Control Delay (Worst Movement)	26.3	sec			26.3	sec
Geometric Delay (Average)	1.2	sec				
Stop-Line Delay (Average)	1.8	sec				
Queue Storage Ratio (Worst Lane)	0.06					
Total Effective Stops	375	veh/h			450	pers/h
Effective Stop Rate	0.16		0.29	per km	0.16	
Proportion Queued	0.15				0.15	
Performance Index	33.7				33.7	
Cost (Total)	660.43	$/h	0.52	$/km	660.43	$/h
Fuel Consumption (Total)	119.5	L/h	93.2	mL/km		
Fuel Economy	9.3	L/100km				
Carbon Dioxide (Total)	286.8	kg/h	223.7	g/km		
Hydrocarbons (Total)	0.022	kg/h	0.017	g/km		
Carbon Monoxide (Total)	0.307	kg/h	0.239	g/km		
NOx (Total)	0.704	kg/h	0.549	g/km		

Network Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.0% 0.0% 0.0%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: New Zealand.

3 Calculated Average Speed exceeds the specified Desired Speed.

Network Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total for all Sites)	1,101,474	veh/y	1,321,768	pers/y
Delay	937	veh-h/y	1,124	pers-h/y
Effective Stops	179,885	veh/y	215,863	pers/y
Travel Distance	615,543	veh-km/y	738,652	pers-km/y
Travel Time	11,275	veh-h/y	13,530	pers-h/y
Cost	317,008	$/y	317,008	$/y
Fuel Consumption	57,353	L/y		
Carbon Dioxide	137,678	kg/y		
Hydrocarbons	11	kg/y		
Carbon Monoxide	147	kg/y		

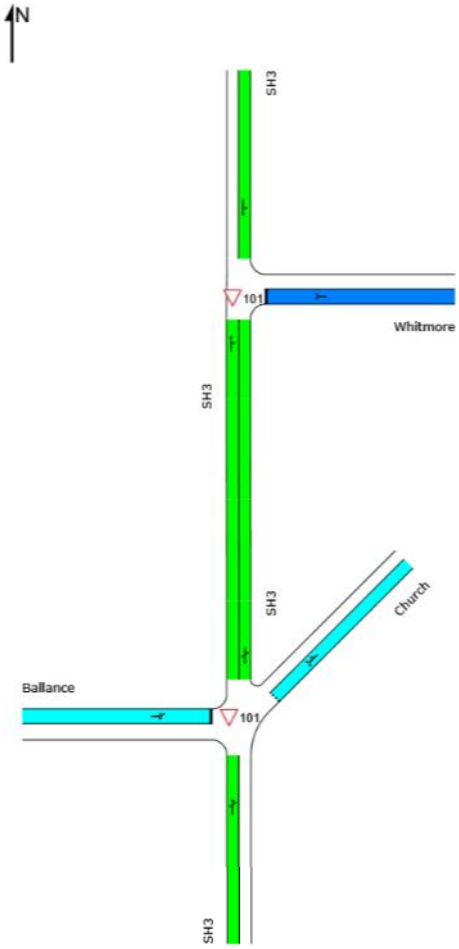
NOx	338 kg/y

LANE LEVEL OF SERVICE

Lane Level of Service for Network Sites

Network: N101 [2018_Existing_PM]

New Network
Network Category: (None)



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F

Delay model settings are specified for individual Sites forming the Network.

Organisation: TONKIN & TAYLOR | Processed: Friday, 24 May 2019 11:42:56 AM
Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\T6_Ballance SH3 Church Int & Whitmore SH3 Int.sip8

NETWORK SUMMARY

Network: N101 [2018_Existing_PM]

New Network
Network Category: (None)

Network Performance - Hourly Values						
Performance Measure	**Vehicles**		**Per Unit Distance**		**Persons**	
Network Level of Service (LOS)	LOS A[3]					
Travel Time Index	11.20					
Speed Efficiency	1.11					
Congestion Coefficient	0.90					
Travel Speed (Average)	55.4	km/h			55.4	km/h
Travel Distance (Total)	1291.2	veh-km/h			1549.4	pers-km/h
Travel Time (Total)	23.3	veh-h/h			28.0	pers-h/h
Desired Speed	50.0	km/h				
Demand Flows (Total for all Sites)	2302	veh/h			2763	pers/h
Arrival Flows (Total for all Sites)	2302	veh/h			2763	pers/h
Demand Flows (Entry Total)	1301	veh/h				
Midblock Inflows (Total)	9	veh/h				
Midblock Outflows (Total)	-9	veh/h				
Percent Heavy Vehicles (Demand)	9.1	%				
Percent Heavy Vehicles (Arrival)	9.1	%				
Degree of Saturation	0.466					
Control Delay (Total)	1.54	veh-h/h			1.85	pers-h/h
Control Delay (Average)	2.4	sec			2.4	sec
Control Delay (Worst Lane)	23.4	sec				
Control Delay (Worst Movement)	23.5	sec			23.5	sec
Geometric Delay (Average)	1.2	sec				
Stop-Line Delay (Average)	1.3	sec				
Queue Storage Ratio (Worst Lane)	0.03					
Total Effective Stops	328	veh/h			394	pers/h
Effective Stop Rate	0.14		0.25	per km	0.14	
Proportion Queued	0.13				0.13	
Performance Index	31.1				31.1	
Cost (Total)	669.99	$/h	0.52	$/km	669.99	$/h
Fuel Consumption (Total)	120.4	L/h	93.2	mL/km		
Fuel Economy	9.3	L/100km				
Carbon Dioxide (Total)	288.9	kg/h	223.8	g/km		
Hydrocarbons (Total)	0.022	kg/h	0.017	g/km		
Carbon Monoxide (Total)	0.309	kg/h	0.239	g/km		
NOx (Total)	0.717	kg/h	0.555	g/km		

Network Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.0% 0.0% 0.0%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: New Zealand.

3 Calculated Average Speed exceeds the specified Desired Speed.

Network Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total for all Sites)	1,105,011	veh/y	1,326,013	pers/y
Delay	740	veh-h/y	888	pers-h/y
Effective Stops	157,557	veh/y	189,069	pers/y
Travel Distance	619,760	veh-km/y	743,712	pers-km/y
Travel Time	11,187	veh-h/y	13,424	pers-h/y
Cost	321,596	$/y	321,596	$/y
Fuel Consumption	57,781	L/y		
Carbon Dioxide	138,676	kg/y		
Hydrocarbons	11	kg/y		
Carbon Monoxide	148	kg/y		

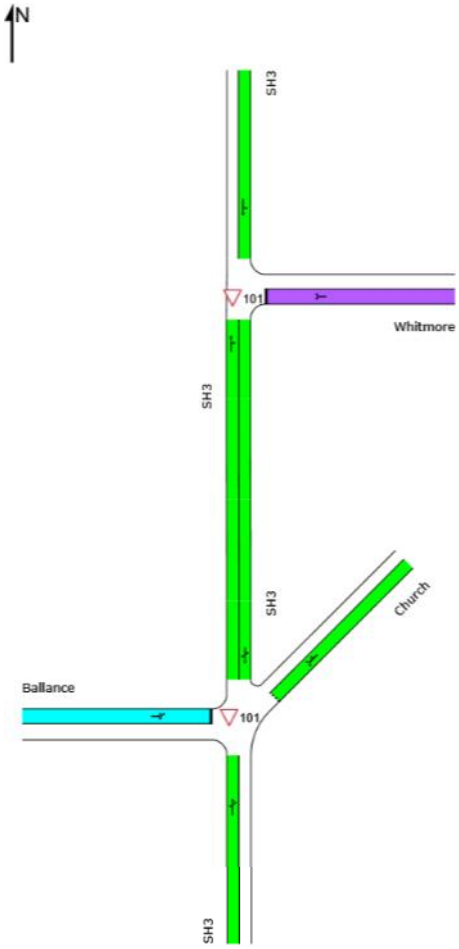
NOx	344 kg/y

LANE LEVEL OF SERVICE

Lane Level of Service for Network Sites

Network: N101 [2018_Low Dev_AM]

New Network
Network Category: (None)



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F

Delay model settings are specified for individual Sites forming the Network.

Organisation: TONKIN & TAYLOR | Processed: Friday, 24 May 2019 11:42:58 AM
Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\T6_Ballance SH3 Church Int & Whitmore SH3 Int.sip8

NETWORK SUMMARY

Network: N101 [2018_Low Dev_AM]

New Network
Network Category: (None)

Network Performance - Hourly Values						
Performance Measure	**Vehicles**		**Per Unit Distance**		**Persons**	
Network Level of Service (LOS)	LOS A[3]					
Travel Time Index	11.00					
Speed Efficiency	1.09					
Congestion Coefficient	0.92					
Travel Speed (Average)	54.5	km/h			54.5	km/h
Travel Distance (Total)	1300.2	veh-km/h			1560.2	pers-km/h
Travel Time (Total)	23.9	veh-h/h			28.6	pers-h/h
Desired Speed	50.0	km/h				
Demand Flows (Total for all Sites)	2325	veh/h			2790	pers/h
Arrival Flows (Total for all Sites)	2325	veh/h			2790	pers/h
Demand Flows (Entry Total)	1307	veh/h				
Midblock Inflows (Total)	6	veh/h				
Midblock Outflows (Total)	-4	veh/h				
Percent Heavy Vehicles (Demand)	9.1	%				
Percent Heavy Vehicles (Arrival)	9.1	%				
Degree of Saturation	0.629					
Control Delay (Total)	2.03	veh-h/h			2.44	pers-h/h
Control Delay (Average)	3.1	sec			3.1	sec
Control Delay (Worst Lane)	27.3	sec				
Control Delay (Worst Movement)	27.4	sec			27.4	sec
Geometric Delay (Average)	1.2	sec				
Stop-Line Delay (Average)	1.9	sec				
Queue Storage Ratio (Worst Lane)	0.07					
Total Effective Stops	381	veh/h			457	pers/h
Effective Stop Rate	0.16		0.29	per km	0.16	
Proportion Queued	0.16				0.16	
Performance Index	34.4				34.4	
Cost (Total)	671.47	$/h	0.52	$/km	671.47	$/h
Fuel Consumption (Total)	121.2	L/h	93.2	mL/km		
Fuel Economy	9.3	L/100km				
Carbon Dioxide (Total)	291.0	kg/h	223.8	g/km		
Hydrocarbons (Total)	0.022	kg/h	0.017	g/km		
Carbon Monoxide (Total)	0.311	kg/h	0.239	g/km		
NOx (Total)	0.714	kg/h	0.549	g/km		

Network Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.0% 0.0% 0.0%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: New Zealand.

3 Calculated Average Speed exceeds the specified Desired Speed.

Network Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total for all Sites)	1,116,126	veh/y	1,339,352	pers/y
Delay	976	veh-h/y	1,171	pers-h/y
Effective Stops	182,730	veh/y	219,276	pers/y
Travel Distance	624,079	veh-km/y	748,894	pers-km/y
Travel Time	11,455	veh-h/y	13,745	pers-h/y
Cost	322,304	$/y	322,304	$/y
Fuel Consumption	58,194	L/y		
Carbon Dioxide	139,699	kg/y		
Hydrocarbons	11	kg/y		
Carbon Monoxide	149	kg/y		

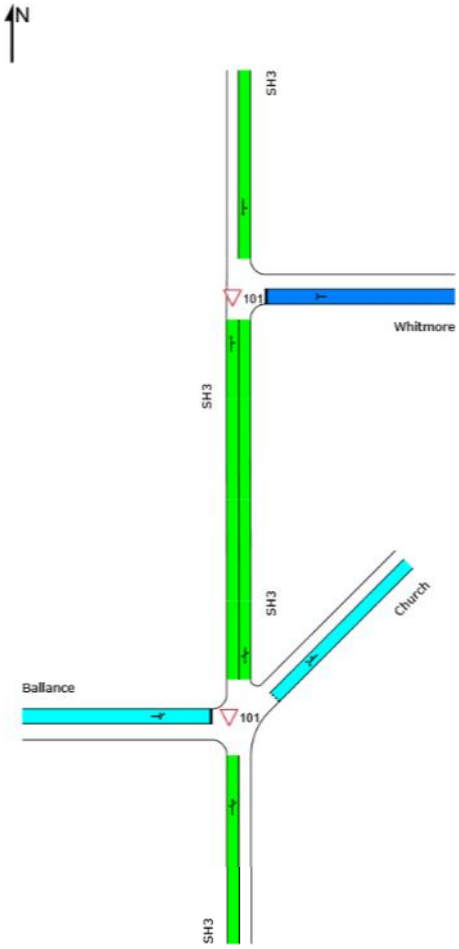
NOx	343 kg/y

LANE LEVEL OF SERVICE

Lane Level of Service for Network Sites

Network: N101 [2018_Low Dev_PM]

New Network
Network Category: (None)



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F

Delay model settings are specified for individual Sites forming the Network.

Organisation: TONKIN & TAYLOR | Processed: Friday, 24 May 2019 11:43:00 AM
Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\T6_Ballance SH3 Church Int & Whitmore SH3 Int.sip8

NETWORK SUMMARY

Network: N101 [2018_Low Dev_PM]

New Network
Network Category: (None)

Network Performance - Hourly Values						
Performance Measure	**Vehicles**		**Per Unit Distance**		**Persons**	
Network Level of Service (LOS)	LOS A[3]					
Travel Time Index	11.18					
Speed Efficiency	1.11					
Congestion Coefficient	0.90					
Travel Speed (Average)	55.3	km/h			55.3	km/h
Travel Distance (Total)	1317.9	veh-km/h			1581.5	pers-km/h
Travel Time (Total)	23.8	veh-h/h			28.6	pers-h/h
Desired Speed	50.0	km/h				
Demand Flows (Total for all Sites)	2351	veh/h			2821	pers/h
Arrival Flows (Total for all Sites)	2351	veh/h			2821	pers/h
Demand Flows (Entry Total)	1327	veh/h				
Midblock Inflows (Total)	6	veh/h				
Midblock Outflows (Total)	-9	veh/h				
Percent Heavy Vehicles (Demand)	9.1	%				
Percent Heavy Vehicles (Arrival)	9.1	%				
Degree of Saturation	0.476					
Control Delay (Total)	1.61	veh-h/h			1.94	pers-h/h
Control Delay (Average)	2.5	sec			2.5	sec
Control Delay (Worst Lane)	24.6	sec				
Control Delay (Worst Movement)	24.8	sec			24.8	sec
Geometric Delay (Average)	1.1	sec				
Stop-Line Delay (Average)	1.3	sec				
Queue Storage Ratio (Worst Lane)	0.03					
Total Effective Stops	332	veh/h			399	pers/h
Effective Stop Rate	0.14		0.25	per km	0.14	
Proportion Queued	0.13				0.13	
Performance Index	32.0				32.0	
Cost (Total)	685.98	$/h	0.52	$/km	685.98	$/h
Fuel Consumption (Total)	123.0	L/h	93.4	mL/km		
Fuel Economy	9.3	L/100km				
Carbon Dioxide (Total)	295.3	kg/h	224.1	g/km		
Hydrocarbons (Total)	0.023	kg/h	0.017	g/km		
Carbon Monoxide (Total)	0.315	kg/h	0.239	g/km		
NOx (Total)	0.736	kg/h	0.558	g/km		

Network Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.0% 0.0% 0.0%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: New Zealand.

3 Calculated Average Speed exceeds the specified Desired Speed.

Network Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total for all Sites)	1,128,253	veh/y	1,353,903	pers/y
Delay	774	veh-h/y	929	pers-h/y
Effective Stops	159,483	veh/y	191,380	pers/y
Travel Distance	632,602	veh-km/y	759,122	pers-km/y
Travel Time	11,435	veh-h/y	13,722	pers-h/y
Cost	329,268	$/y	329,268	$/y
Fuel Consumption	59,063	L/y		
Carbon Dioxide	141,760	kg/y		
Hydrocarbons	11	kg/y		
Carbon Monoxide	151	kg/y		

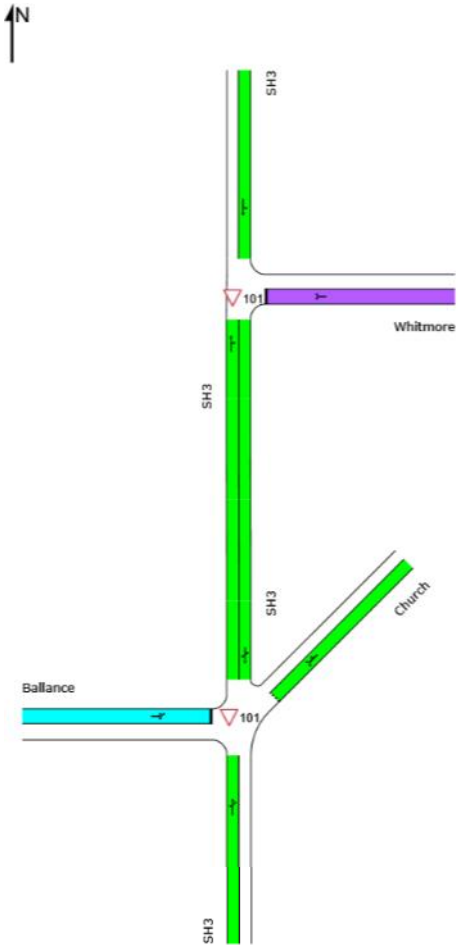
NOx	353 kg/y

LANE LEVEL OF SERVICE

Lane Level of Service for Network Sites

Network: N101 [2018_Hi Dev_AM]

New Network
Network Category: (None)



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F

Delay model settings are specified for individual Sites forming the Network.

Organisation: TONKIN & TAYLOR | Processed: Friday, 24 May 2019 11:43:02 AM
Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\T6_Ballance SH3 Church Int & Whitmore SH3 Int.sip8

NETWORK SUMMARY

Network: N101 [2018_Hi Dev_AM]

New Network
Network Category: (None)

Network Performance - Hourly Values						
Performance Measure	**Vehicles**		**Per Unit Distance**		**Persons**	
Network Level of Service (LOS)	LOS A[3]					
Travel Time Index	10.96					
Speed Efficiency	1.09					
Congestion Coefficient	0.92					
Travel Speed (Average)	54.3	km/h			54.3	km/h
Travel Distance (Total)	1319.0	veh-km/h			1582.8	pers-km/h
Travel Time (Total)	24.3	veh-h/h			29.1	pers-h/h
Desired Speed	50.0	km/h				
Demand Flows (Total for all Sites)	2357	veh/h			2828	pers/h
Arrival Flows (Total for all Sites)	2357	veh/h			2828	pers/h
Demand Flows (Entry Total)	1323	veh/h				
Midblock Inflows (Total)	15	veh/h				
Midblock Outflows (Total)	-4	veh/h				
Percent Heavy Vehicles (Demand)	9.1	%				
Percent Heavy Vehicles (Arrival)	9.1	%				
Degree of Saturation	0.649					
Control Delay (Total)	2.14	veh-h/h			2.57	pers-h/h
Control Delay (Average)	3.3	sec			3.3	sec
Control Delay (Worst Lane)	28.5	sec				
Control Delay (Worst Movement)	28.7	sec			28.7	sec
Geometric Delay (Average)	1.3	sec				
Stop-Line Delay (Average)	2.0	sec				
Queue Storage Ratio (Worst Lane)	0.07					
Total Effective Stops	392	veh/h			470	pers/h
Effective Stop Rate	0.17		0.30	per km	0.17	
Proportion Queued	0.16				0.16	
Performance Index	35.4				35.4	
Cost (Total)	684.91	$/h	0.52	$/km	684.91	$/h
Fuel Consumption (Total)	123.3	L/h	93.5	mL/km		
Fuel Economy	9.3	L/100km				
Carbon Dioxide (Total)	296.0	kg/h	224.4	g/km		
Hydrocarbons (Total)	0.023	kg/h	0.017	g/km		
Carbon Monoxide (Total)	0.316	kg/h	0.240	g/km		
NOx (Total)	0.726	kg/h	0.550	g/km		

Network Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.0% 0.0% 0.0%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: New Zealand.

3 Calculated Average Speed exceeds the specified Desired Speed.

Network Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total for all Sites)	1,131,284	veh/y	1,357,541	pers/y
Delay	1,030	veh-h/y	1,235	pers-h/y
Effective Stops	188,048	veh/y	225,658	pers/y
Travel Distance	633,113	veh-km/y	759,736	pers-km/y
Travel Time	11,659	veh-h/y	13,990	pers-h/y
Cost	328,755	$/y	328,755	$/y
Fuel Consumption	59,190	L/y		
Carbon Dioxide	142,081	kg/y		
Hydrocarbons	11	kg/y		
Carbon Monoxide	152	kg/y		

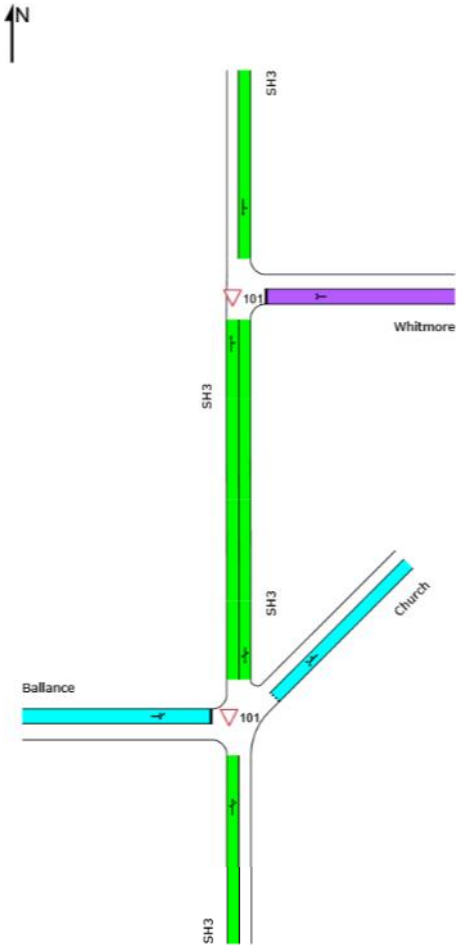
NOx	348 kg/y

LANE LEVEL OF SERVICE

Lane Level of Service for Network Sites

Network: N101 [2018_Hi Dev_PM]

New Network
Network Category: (None)



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F

Delay model settings are specified for individual Sites forming the Network.

Organisation: TONKIN & TAYLOR | Processed: Friday, 24 May 2019 11:43:05 AM
Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\T6_Ballance SH3 Church Int & Whitmore SH3 Int.sip8

NETWORK SUMMARY

Network: N101 [2018_Hi Dev_PM]

New Network
Network Category: (None)

Network Performance - Hourly Values						
Performance Measure	**Vehicles**		**Per Unit Distance**		**Persons**	
Network Level of Service (LOS)	LOS A[3]					
Travel Time Index	11.17					
Speed Efficiency	1.11					
Congestion Coefficient	0.90					
Travel Speed (Average)	55.3	km/h			55.3	km/h
Travel Distance (Total)	1345.5	veh-km/h			1614.5	pers-km/h
Travel Time (Total)	24.3	veh-h/h			29.2	pers-h/h
Desired Speed	50.0	km/h				
Demand Flows (Total for all Sites)	2398	veh/h			2877	pers/h
Arrival Flows (Total for all Sites)	2398	veh/h			2877	pers/h
Demand Flows (Entry Total)	1353	veh/h				
Midblock Inflows (Total)	5	veh/h				
Midblock Outflows (Total)	-9	veh/h				
Percent Heavy Vehicles (Demand)	9.2	%				
Percent Heavy Vehicles (Arrival)	9.2	%				
Degree of Saturation	0.487					
Control Delay (Total)	1.68	veh-h/h			2.01	pers-h/h
Control Delay (Average)	2.5	sec			2.5	sec
Control Delay (Worst Lane)	26.0	sec				
Control Delay (Worst Movement)	26.1	sec			26.1	sec
Geometric Delay (Average)	1.1	sec				
Stop-Line Delay (Average)	1.4	sec				
Queue Storage Ratio (Worst Lane)	0.03					
Total Effective Stops	335	veh/h			402	pers/h
Effective Stop Rate	0.14		0.25	per km	0.14	
Proportion Queued	0.13				0.13	
Performance Index	32.9				32.9	
Cost (Total)	700.41	$/h	0.52	$/km	700.41	$/h
Fuel Consumption (Total)	125.6	L/h	93.3	mL/km		
Fuel Economy	9.3	L/100km				
Carbon Dioxide (Total)	301.4	kg/h	224.0	g/km		
Hydrocarbons (Total)	0.023	kg/h	0.017	g/km		
Carbon Monoxide (Total)	0.322	kg/h	0.239	g/km		
NOx (Total)	0.752	kg/h	0.559	g/km		

Network Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.0% 0.0% 0.0%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: New Zealand.

3 Calculated Average Speed exceeds the specified Desired Speed.

Network Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total for all Sites)	1,150,990	veh/y	1,381,187	pers/y
Delay	805	veh-h/y	966	pers-h/y
Effective Stops	160,996	veh/y	193,195	pers/y
Travel Distance	645,816	veh-km/y	774,980	pers-km/y
Travel Time	11,685	veh-h/y	14,022	pers-h/y
Cost	336,195	$/y	336,195	$/y
Fuel Consumption	60,267	L/y		
Carbon Dioxide	144,661	kg/y		
Hydrocarbons	11	kg/y		
Carbon Monoxide	155	kg/y		

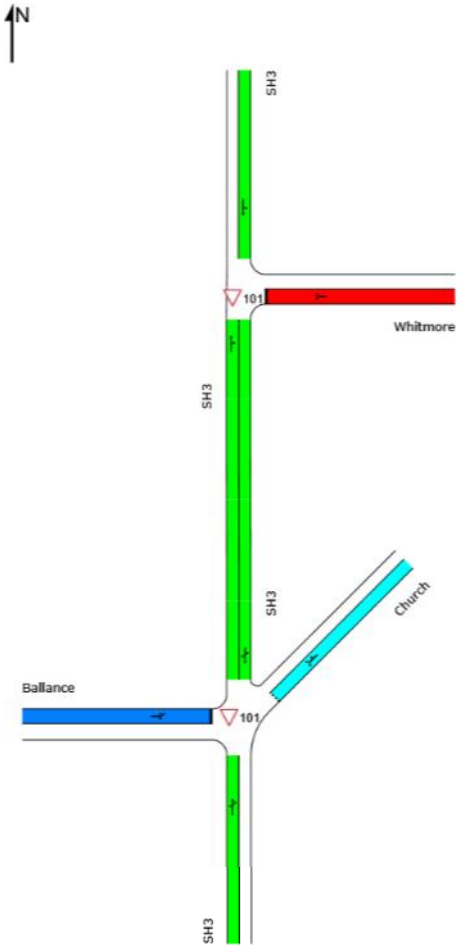
NOx	361 kg/y

LANE LEVEL OF SERVICE

Lane Level of Service for Network Sites

Network: N101 [2035_No Dev_AM]

New Network
Network Category: (None)



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F

Delay model settings are specified for individual Sites forming the Network.

Organisation: TONKIN & TAYLOR | Processed: Friday, 24 May 2019 11:43:07 AM
Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\T6_Ballance SH3 Church Int & Whitmore SH3 Int.sip8

NETWORK SUMMARY

Network: N101 [2035_No Dev_AM]

New Network
Network Category: (None)

Network Performance - Hourly Values						
Performance Measure	**Vehicles**		**Per Unit Distance**		**Persons**	
Network Level of Service (LOS)	LOS E					
Travel Time Index	3.71					
Speed Efficiency	0.43					
Congestion Coefficient	2.30					
Travel Speed (Average)	21.7	km/h			21.7	km/h
Travel Distance (Total)	1716.6	veh-km/h			2059.9	pers-km/h
Travel Time (Total)	79.1	veh-h/h			94.9	pers-h/h
Desired Speed	50.0	km/h				
Demand Flows (Total for all Sites)	3074	veh/h			3688	pers/h
Arrival Flows (Total for all Sites)	3073	veh/h			3687	pers/h
Demand Flows (Entry Total)	1729	veh/h				
Midblock Inflows (Total)	7	veh/h				
Midblock Outflows (Total)	-6	veh/h				
Percent Heavy Vehicles (Demand)	9.1	%				
Percent Heavy Vehicles (Arrival)	9.1	%				
Degree of Saturation	1.782					
Control Delay (Total)	49.51	veh-h/h			59.41	pers-h/h
Control Delay (Average)	58.0	sec			58.0	sec
Control Delay (Worst Lane)	742.4	sec				
Control Delay (Worst Movement)	742.5	sec			742.5	sec
Geometric Delay (Average)	1.2	sec				
Stop-Line Delay (Average)	56.8	sec				
Queue Storage Ratio (Worst Lane)	1.59					
Total Effective Stops	1260	veh/h			1512	pers/h
Effective Stop Rate	0.41		0.73	per km	0.41	
Proportion Queued	0.20				0.20	
Performance Index	206.5				206.5	
Cost (Total)	2533.61	$/h	1.48	$/km	2533.61	$/h
Fuel Consumption (Total)	223.4	L/h	130.1	mL/km		
Fuel Economy	13.0	L/100km				
Carbon Dioxide (Total)	533.3	kg/h	310.7	g/km		
Hydrocarbons (Total)	0.048	kg/h	0.028	g/km		
Carbon Monoxide (Total)	0.509	kg/h	0.297	g/km		
NOx (Total)	1.030	kg/h	0.600	g/km		

Network Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.0% 0.0% 0.0%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: New Zealand.

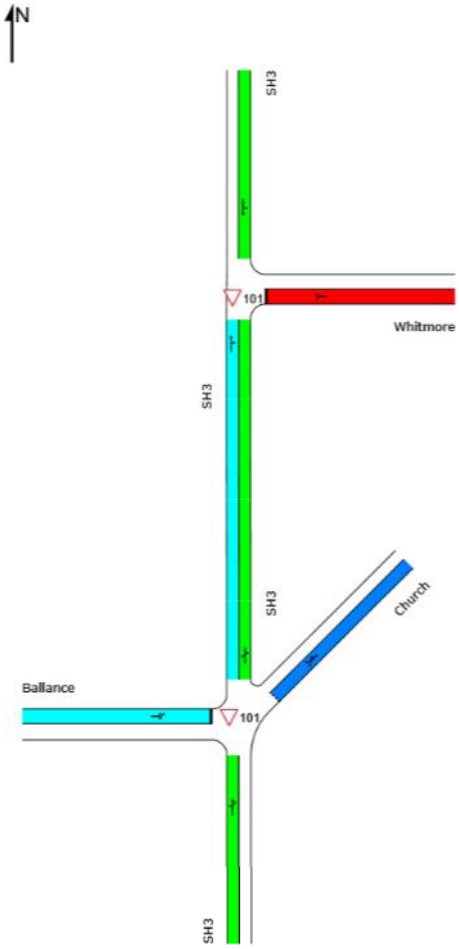
Network Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total for all Sites)	1,475,369	veh/y	1,770,442	pers/y
Delay	23,765	veh-h/y	28,518	pers-h/y
Effective Stops	604,869	veh/y	725,842	pers/y
Travel Distance	823,948	veh-km/y	988,737	pers-km/y
Travel Time	37,979	veh-h/y	45,575	pers-h/y
Cost	1,216,134	$/y	1,216,134	$/y
Fuel Consumption	107,227	L/y		
Carbon Dioxide	256,004	kg/y		
Hydrocarbons	23	kg/y		
Carbon Monoxide	244	kg/y		
NOx	494	kg/y		

LANE LEVEL OF SERVICE

Lane Level of Service for Network Sites

Network: N101 [2035_No Dev_PM]

New Network
Network Category: (None)



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F

Delay model settings are specified for individual Sites forming the Network.

Organisation: TONKIN & TAYLOR | Processed: Friday, 24 May 2019 11:43:10 AM
Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\T6_Ballance SH3 Church Int & Whitmore SH3 Int.sip8

NETWORK SUMMARY

Network: N101 [2035_No Dev_PM]

New Network
Network Category: (None)

Network Performance - Hourly Values						
Performance Measure	**Vehicles**		**Per Unit Distance**		**Persons**	
Network Level of Service (LOS)	LOS A					
Travel Time Index	8.97					
Speed Efficiency	0.91					
Congestion Coefficient	1.10					
Travel Speed (Average)	45.3	km/h			45.3	km/h
Travel Distance (Total)	1729.5	veh-km/h			2075.5	pers-km/h
Travel Time (Total)	38.1	veh-h/h			45.8	pers-h/h
Desired Speed	50.0	km/h				
Demand Flows (Total for all Sites)	3084	veh/h			3701	pers/h
Arrival Flows (Total for all Sites)	3084	veh/h			3701	pers/h
Demand Flows (Entry Total)	1743	veh/h				
Midblock Inflows (Total)	11	veh/h				
Midblock Outflows (Total)	-12	veh/h				
Percent Heavy Vehicles (Demand)	9.1	%				
Percent Heavy Vehicles (Arrival)	9.1	%				
Degree of Saturation	1.121					
Control Delay (Total)	8.90	veh-h/h			10.68	pers-h/h
Control Delay (Average)	10.4	sec			10.4	sec
Control Delay (Worst Lane)	214.2	sec				
Control Delay (Worst Movement)	214.4	sec			214.4	sec
Geometric Delay (Average)	1.2	sec				
Stop-Line Delay (Average)	9.2	sec				
Queue Storage Ratio (Worst Lane)	0.28					
Total Effective Stops	552	veh/h			662	pers/h
Effective Stop Rate	0.18		0.32	per km	0.18	
Proportion Queued	0.19				0.19	
Performance Index	73.5				73.5	
Cost (Total)	1160.57	$/h	0.67	$/km	1160.57	$/h
Fuel Consumption (Total)	175.7	L/h	101.6	mL/km		
Fuel Economy	10.2	L/100km				
Carbon Dioxide (Total)	421.2	kg/h	243.6	g/km		
Hydrocarbons (Total)	0.034	kg/h	0.019	g/km		
Carbon Monoxide (Total)	0.439	kg/h	0.254	g/km		
NOx (Total)	1.041	kg/h	0.602	g/km		

Network Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.0% 0.0% 0.0%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: New Zealand.

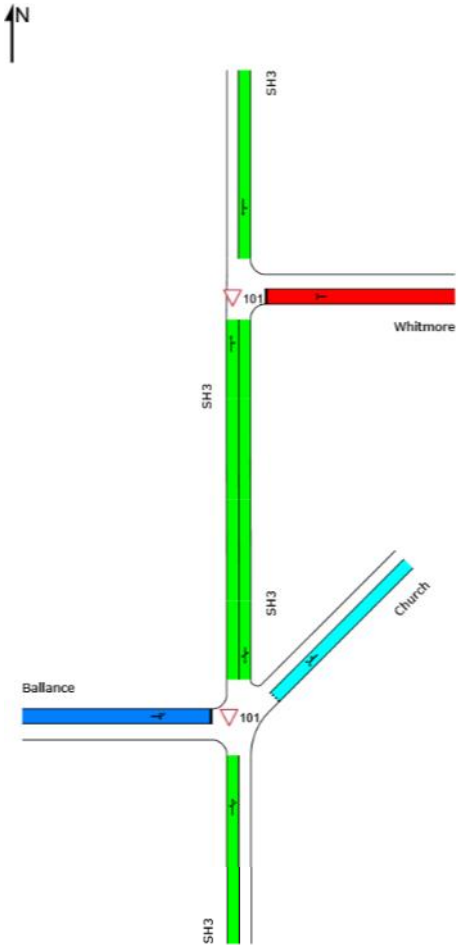
Network Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total for all Sites)	1,480,421	veh/y	1,776,505	pers/y
Delay	4,272	veh-h/y	5,127	pers-h/y
Effective Stops	264,730	veh/y	317,675	pers/y
Travel Distance	830,180	veh-km/y	996,216	pers-km/y
Travel Time	18,307	veh-h/y	21,968	pers-h/y
Cost	557,074	$/y	557,074	$/y
Fuel Consumption	84,349	L/y		
Carbon Dioxide	202,194	kg/y		
Hydrocarbons	16	kg/y		
Carbon Monoxide	211	kg/y		
NOx	499	kg/y		

LANE LEVEL OF SERVICE

Lane Level of Service for Network Sites

Network: N101 [2035_Low Dev_AM]

New Network
Network Category: (None)



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F

Delay model settings are specified for individual Sites forming the Network.

Organisation: TONKIN & TAYLOR | Processed: Friday, 24 May 2019 11:43:12 AM
Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\T6_Ballance SH3 Church Int & Whitmore SH3 Int.sip8

NETWORK SUMMARY

Network: N101 [2035_Low Dev_AM]

New Network
Network Category: (None)

Network Performance - Hourly Values						
Performance Measure	**Vehicles**		**Per Unit Distance**		**Persons**	
Network Level of Service (LOS)	LOS E					
Travel Time Index	3.50					
Speed Efficiency	0.41					
Congestion Coefficient	2.41					
Travel Speed (Average)	20.7	km/h			20.7	km/h
Travel Distance (Total)	1733.4	veh-km/h			2080.1	pers-km/h
Travel Time (Total)	83.6	veh-h/h			100.3	pers-h/h
Desired Speed	50.0	km/h				
Demand Flows (Total for all Sites)	3104	veh/h			3725	pers/h
Arrival Flows (Total for all Sites)	3103	veh/h			3724	pers/h
Demand Flows (Entry Total)	1745	veh/h				
Midblock Inflows (Total)	7	veh/h				
Midblock Outflows (Total)	-6	veh/h				
Percent Heavy Vehicles (Demand)	9.1	%				
Percent Heavy Vehicles (Arrival)	9.1	%				
Degree of Saturation	1.852					
Control Delay (Total)	53.64	veh-h/h			64.37	pers-h/h
Control Delay (Average)	62.2	sec			62.2	sec
Control Delay (Worst Lane)	805.3	sec				
Control Delay (Worst Movement)	805.4	sec			805.4	sec
Geometric Delay (Average)	1.2	sec				
Stop-Line Delay (Average)	61.0	sec				
Queue Storage Ratio (Worst Lane)	1.67					
Total Effective Stops	1274	veh/h			1528	pers/h
Effective Stop Rate	0.41		0.73	per km	0.41	
Proportion Queued	0.20				0.20	
Performance Index	216.4				216.4	
Cost (Total)	2685.57	$/h	1.55	$/km	2685.57	$/h
Fuel Consumption (Total)	230.2	L/h	132.8	mL/km		
Fuel Economy	13.3	L/100km				
Carbon Dioxide (Total)	549.5	kg/h	317.0	g/km		
Hydrocarbons (Total)	0.050	kg/h	0.029	g/km		
Carbon Monoxide (Total)	0.521	kg/h	0.301	g/km		
NOx (Total)	1.045	kg/h	0.603	g/km		

Network Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.0% 0.0% 0.0%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: New Zealand.

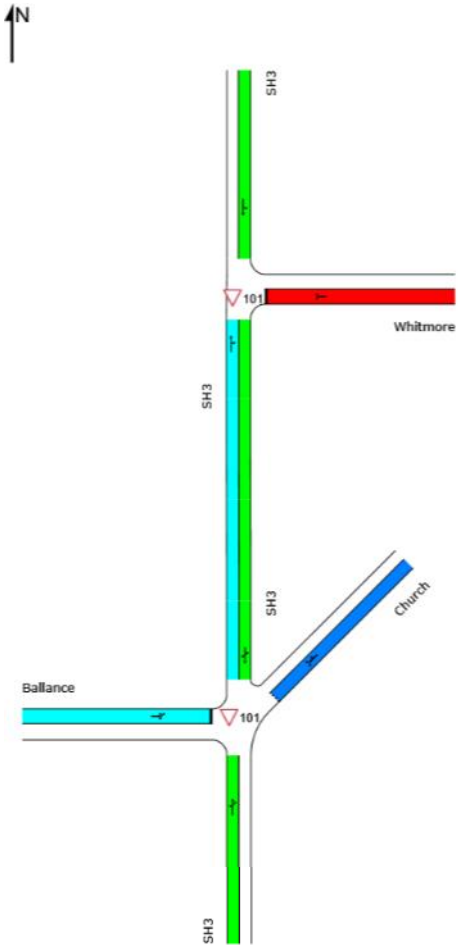
Network Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total for all Sites)	1,490,021	veh/y	1,788,025	pers/y
Delay	25,746	veh-h/y	30,896	pers-h/y
Effective Stops	611,349	veh/y	733,619	pers/y
Travel Distance	832,031	veh-km/y	998,438	pers-km/y
Travel Time	40,129	veh-h/y	48,155	pers-h/y
Cost	1,289,075	$/y	1,289,075	$/y
Fuel Consumption	110,508	L/y		
Carbon Dioxide	263,764	kg/y		
Hydrocarbons	24	kg/y		
Carbon Monoxide	250	kg/y		
NOx	501	kg/y		

LANE LEVEL OF SERVICE

Lane Level of Service for Network Sites

Network: N101 [2035_Low Dev_PM]

New Network
Network Category: (None)



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F

Delay model settings are specified for individual Sites forming the Network.

Organisation: TONKIN & TAYLOR | Processed: Friday, 24 May 2019 11:43:14 AM
Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\T6_Ballance SH3 Church Int & Whitmore SH3 Int.sip8

NETWORK SUMMARY

Network: N101 [2035_Low Dev_PM]

New Network
Network Category: (None)

Network Performance - Hourly Values						
Performance Measure	**Vehicles**		**Per Unit Distance**		**Persons**	
Network Level of Service (LOS)	LOS B					
Travel Time Index	8.42					
Speed Efficiency	0.86					
Congestion Coefficient	1.17					
Travel Speed (Average)	42.9	km/h			42.9	km/h
Travel Distance (Total)	1757.4	veh-km/h			2108.9	pers-km/h
Travel Time (Total)	41.0	veh-h/h			49.1	pers-h/h
Desired Speed	50.0	km/h				
Demand Flows (Total for all Sites)	3134	veh/h			3760	pers/h
Arrival Flows (Total for all Sites)	3134	veh/h			3760	pers/h
Demand Flows (Entry Total)	1769	veh/h				
Midblock Inflows (Total)	10	veh/h				
Midblock Outflows (Total)	-12	veh/h				
Percent Heavy Vehicles (Demand)	9.1	%				
Percent Heavy Vehicles (Arrival)	9.1	%				
Degree of Saturation	1.211					
Control Delay (Total)	11.16	veh-h/h			13.39	pers-h/h
Control Delay (Average)	12.8	sec			12.8	sec
Control Delay (Worst Lane)	283.7	sec				
Control Delay (Worst Movement)	283.9	sec			283.9	sec
Geometric Delay (Average)	1.1	sec				
Stop-Line Delay (Average)	11.7	sec				
Queue Storage Ratio (Worst Lane)	0.37					
Total Effective Stops	581	veh/h			697	pers/h
Effective Stop Rate	0.19		0.33	per km	0.19	
Proportion Queued	0.19				0.19	
Performance Index	83.8				83.8	
Cost (Total)	1256.28	$/h	0.71	$/km	1256.28	$/h
Fuel Consumption (Total)	181.7	L/h	103.4	mL/km		
Fuel Economy	10.3	L/100km				
Carbon Dioxide (Total)	435.4	kg/h	247.7	g/km		
Hydrocarbons (Total)	0.035	kg/h	0.020	g/km		
Carbon Monoxide (Total)	0.452	kg/h	0.257	g/km		
NOx (Total)	1.066	kg/h	0.606	g/km		

Network Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.0% 0.0% 0.0%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: New Zealand.

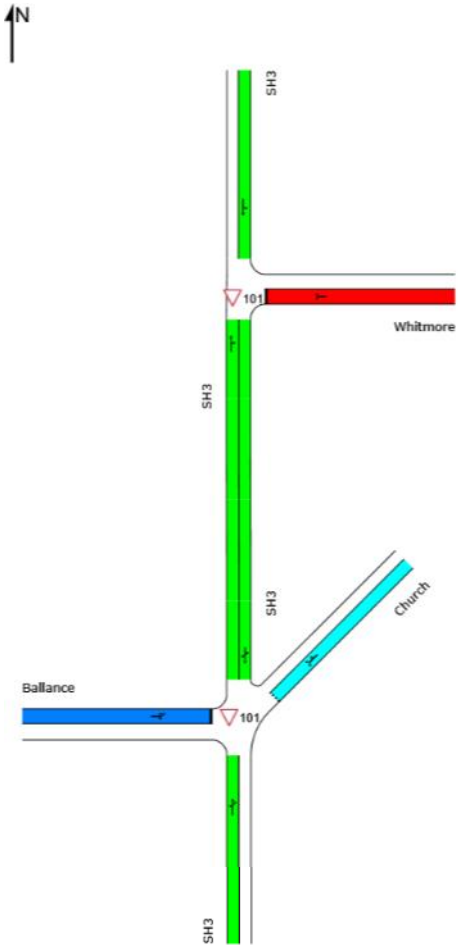
Network Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total for all Sites)	1,504,169	veh/y	1,805,002	pers/y
Delay	5,356	veh-h/y	6,427	pers-h/y
Effective Stops	278,724	veh/y	334,469	pers/y
Travel Distance	843,568	veh-km/y	1,012,281	pers-km/y
Travel Time	19,658	veh-h/y	23,590	pers-h/y
Cost	603,016	$/y	603,016	$/y
Fuel Consumption	87,205	L/y		
Carbon Dioxide	208,989	kg/y		
Hydrocarbons	17	kg/y		
Carbon Monoxide	217	kg/y		
NOx	511	kg/y		

LANE LEVEL OF SERVICE

Lane Level of Service for Network Sites

Network: N101 [2035_Hi Dev_AM]

New Network
Network Category: (None)



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F

Delay model settings are specified for individual Sites forming the Network.

Organisation: TONKIN & TAYLOR | Processed: Friday, 24 May 2019 11:43:16 AM
Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\T6_Ballance SH3 Church Int & Whitmore SH3 Int.sip8

NETWORK SUMMARY

Network: N101 [2035_Hi Dev_AM]

New Network
Network Category: (None)

Network Performance - Hourly Values						
Performance Measure	**Vehicles**		**Per Unit Distance**		**Persons**	
Network Level of Service (LOS)	LOS E					
Travel Time Index	3.25					
Speed Efficiency	0.39					
Congestion Coefficient	2.54					
Travel Speed (Average)	19.6	km/h			19.6	km/h
Travel Distance (Total)	1752.6	veh-km/h			2103.2	pers-km/h
Travel Time (Total)	89.2	veh-h/h			107.0	pers-h/h
Desired Speed	50.0	km/h				
Demand Flows (Total for all Sites)	3139	veh/h			3767	pers/h
Arrival Flows (Total for all Sites)	3138	veh/h			3766	pers/h
Demand Flows (Entry Total)	1764	veh/h				
Midblock Inflows (Total)	6	veh/h				
Midblock Outflows (Total)	-6	veh/h				
Percent Heavy Vehicles (Demand)	9.1	%				
Percent Heavy Vehicles (Arrival)	9.1	%				
Degree of Saturation	1.940					
Control Delay (Total)	58.83	veh-h/h			70.60	pers-h/h
Control Delay (Average)	67.5	sec			67.5	sec
Control Delay (Worst Lane)	884.2	sec				
Control Delay (Worst Movement)	884.4	sec			884.4	sec
Geometric Delay (Average)	1.3	sec				
Stop-Line Delay (Average)	66.2	sec				
Queue Storage Ratio (Worst Lane)	1.75					
Total Effective Stops	1288	veh/h			1546	pers/h
Effective Stop Rate	0.41		0.74	per km	0.41	
Proportion Queued	0.20				0.20	
Performance Index	228.5				228.5	
Cost (Total)	2877.36	$/h	1.64	$/km	2877.36	$/h
Fuel Consumption (Total)	238.9	L/h	136.3	mL/km		
Fuel Economy	13.6	L/100km				
Carbon Dioxide (Total)	570.0	kg/h	325.2	g/km		
Hydrocarbons (Total)	0.053	kg/h	0.030	g/km		
Carbon Monoxide (Total)	0.537	kg/h	0.306	g/km		
NOx (Total)	1.064	kg/h	0.607	g/km		

Network Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.0% 0.0% 0.0%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: New Zealand.

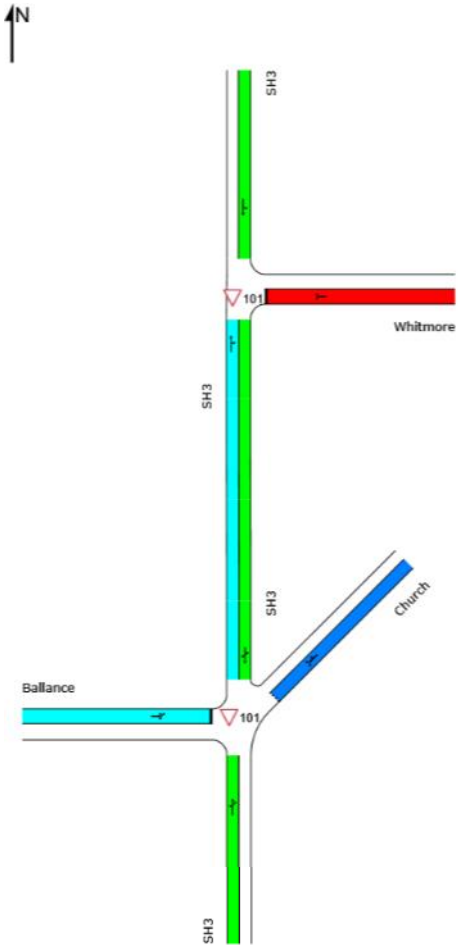
Network Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total for all Sites)	1,506,695	veh/y	1,808,034	pers/y
Delay	28,240	veh-h/y	33,888	pers-h/y
Effective Stops	618,479	veh/y	742,175	pers/y
Travel Distance	841,266	veh-km/y	1,009,519	pers-km/y
Travel Time	42,820	veh-h/y	51,383	pers-h/y
Cost	1,381,131	$/y	1,381,131	$/y
Fuel Consumption	114,667	L/y		
Carbon Dioxide	273,593	kg/y		
Hydrocarbons	25	kg/y		
Carbon Monoxide	258	kg/y		
NOx	511	kg/y		

LANE LEVEL OF SERVICE

Lane Level of Service for Network Sites

Network: N101 [2035_Hi Dev_PM]

New Network
Network Category: (None)



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F

Delay model settings are specified for individual Sites forming the Network.

Organisation: TONKIN & TAYLOR | Processed: Friday, 24 May 2019 11:43:18 AM
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NETWORK SUMMARY

Network: N101 [2035_Hi Dev_PM]

New Network
Network Category: (None)

Network Performance - Hourly Values						
Performance Measure	**Vehicles**		**Per Unit Distance**		**Persons**	
Network Level of Service (LOS)	LOS C					
Travel Time Index	7.70					
Speed Efficiency	0.79					
Congestion Coefficient	1.26					
Travel Speed (Average)	39.6	km/h			39.6	km/h
Travel Distance (Total)	1786.3	veh-km/h			2143.6	pers-km/h
Travel Time (Total)	45.1	veh-h/h			54.1	pers-h/h
Desired Speed	50.0	km/h				
Demand Flows (Total for all Sites)	3186	veh/h			3824	pers/h
Arrival Flows (Total for all Sites)	3186	veh/h			3823	pers/h
Demand Flows (Entry Total)	1801	veh/h				
Midblock Inflows (Total)	3	veh/h				
Midblock Outflows (Total)	-13	veh/h				
Percent Heavy Vehicles (Demand)	9.1	%				
Percent Heavy Vehicles (Arrival)	9.1	%				
Degree of Saturation	1.342					
Control Delay (Total)	14.67	veh-h/h			17.60	pers-h/h
Control Delay (Average)	16.6	sec			16.6	sec
Control Delay (Worst Lane)	393.2	sec				
Control Delay (Worst Movement)	393.5	sec			393.5	sec
Geometric Delay (Average)	1.1	sec				
Stop-Line Delay (Average)	15.4	sec				
Queue Storage Ratio (Worst Lane)	0.49					
Total Effective Stops	620	veh/h			744	pers/h
Effective Stop Rate	0.19		0.35	per km	0.19	
Proportion Queued	0.24				0.24	
Performance Index	100.8				100.8	
Cost (Total)	1420.00	$/h	0.79	$/km	1420.00	$/h
Fuel Consumption (Total)	194.3	L/h	108.8	mL/km		
Fuel Economy	10.9	L/100km				
Carbon Dioxide (Total)	465.5	kg/h	260.6	g/km		
Hydrocarbons (Total)	0.038	kg/h	0.021	g/km		
Carbon Monoxide (Total)	0.476	kg/h	0.266	g/km		
NOx (Total)	1.156	kg/h	0.647	g/km		

Network Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.0% 0.0% 0.0%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: New Zealand.

Network Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total for all Sites)	1,529,432	veh/y	1,835,318	pers/y
Delay	7,041	veh-h/y	8,449	pers-h/y
Effective Stops	297,633	veh/y	357,160	pers/y
Travel Distance	857,434	veh-km/y	1,028,921	pers-km/y
Travel Time	21,637	veh-h/y	25,964	pers-h/y
Cost	681,599	$/y	681,599	$/y
Fuel Consumption	93,283	L/y		
Carbon Dioxide	223,421	kg/y		
Hydrocarbons	18	kg/y		
Carbon Monoxide	229	kg/y		
NOx	555	kg/y		

INTERSECTION SUMMARY

Site: 101 [2018_Existing_AM]

New Site
Site Category: (None)
Stop (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	59.6	km/h	59.6	km/h
Travel Distance (Total)	1019.7	veh-km/h	1223.6	pers-km/h
Travel Time (Total)	17.1	veh-h/h	20.5	pers-h/h
Demand Flows (Total)	1009	veh/h	1211	pers/h
Percent Heavy Vehicles (Demand)	10.7	%		
Degree of Saturation	0.354			
Practical Spare Capacity	176.6	%		
Effective Intersection Capacity	2849	veh/h		
Control Delay (Total)	0.10	veh-h/h	0.12	pers-h/h
Control Delay (Average)	0.3	sec	0.3	sec
Control Delay (Worst Lane)	10.6	sec		
Control Delay (Worst Movement)	12.8	sec	12.8	sec
Geometric Delay (Average)	0.2	sec		
Stop-Line Delay (Average)	0.2	sec		
Idling Time (Average)	0.1	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	0.1	veh		
95% Back of Queue - Distance (Worst Lane)	1.0	m		
Queue Storage Ratio (Worst Lane)	0.00			
Total Effective Stops	22	veh/h	27	pers/h
Effective Stop Rate	0.02		0.02	
Proportion Queued	0.02		0.02	
Performance Index	17.5		17.5	
Cost (Total)	396.54	$/h	396.54	$/h
Fuel Consumption (Total)	84.1	L/h		
Carbon Dioxide (Total)	203.3	kg/h		
Hydrocarbons (Total)	0.014	kg/h		
Carbon Monoxide (Total)	0.219	kg/h		
NOx (Total)	0.549	kg/h		

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection 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.
Site Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 3 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 70.4% 1.1% 0.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	484,547	veh/y	581,457	pers/y
Delay	46	veh-h/y	56	pers-h/y
Effective Stops	10,789	veh/y	12,947	pers/y
Travel Distance	489,437	veh-km/y	587,325	pers-km/y
Travel Time	8,216	veh-h/y	9,860	pers-h/y
Cost	190,338	$/y	190,338	$/y
Fuel Consumption	40,365	L/y		
Carbon Dioxide	97,596	kg/y		
Hydrocarbons	7	kg/y		
Carbon Monoxide	105	kg/y		
NOx	263	kg/y		

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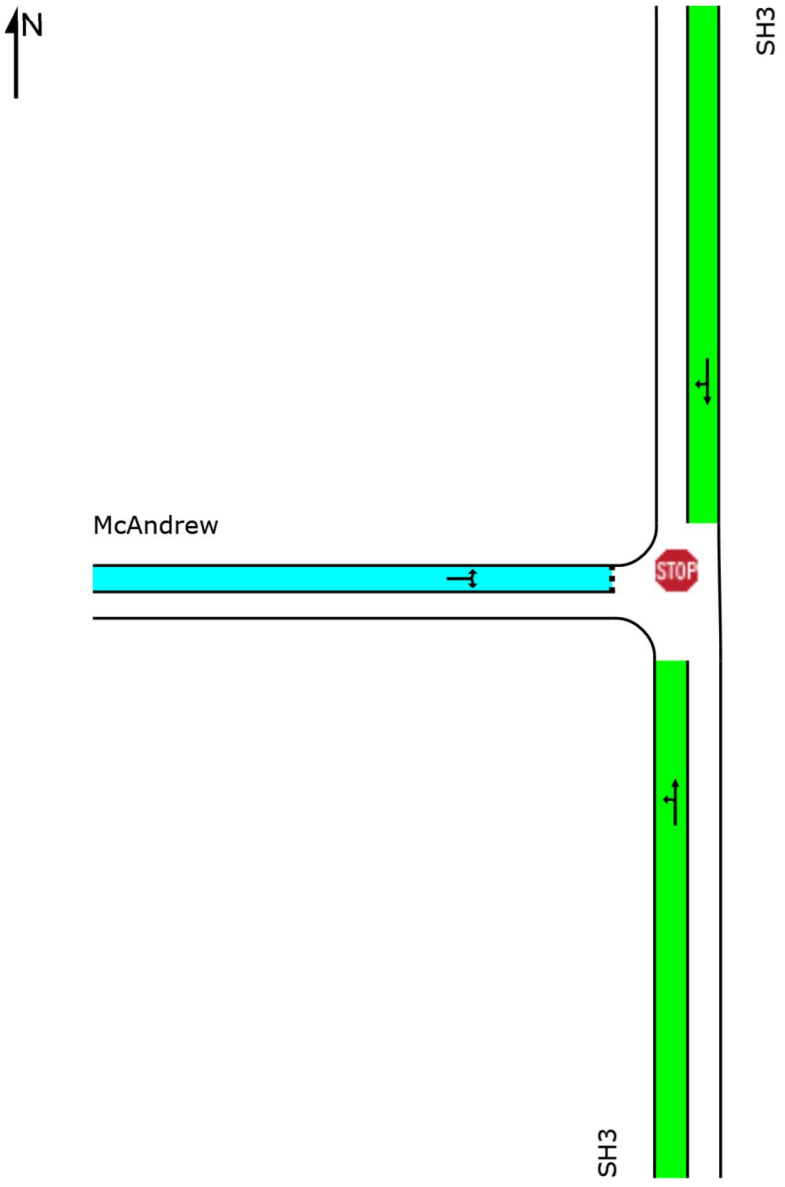
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2018_Existing_AM]

New Site
Site Category: (None)
Stop (Two-Way)

	Approaches			Intersection
	South	North	West	
LOS	NA	NA	B	NA



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

INTERSECTION SUMMARY

Site: 101 [2018_Existing_PM]

New Site
Site Category: (None)
Stop (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	59.5	km/h	59.5	km/h
Travel Distance (Total)	1013.3	veh-km/h	1215.9	pers-km/h
Travel Time (Total)	17.0	veh-h/h	20.4	pers-h/h
Demand Flows (Total)	1003	veh/h	1204	pers/h
Percent Heavy Vehicles (Demand)	10.6	%		
Degree of Saturation	0.400			
Practical Spare Capacity	145.1	%		
Effective Intersection Capacity	2509	veh/h		
Control Delay (Total)	0.09	veh-h/h	0.11	pers-h/h
Control Delay (Average)	0.3	sec	0.3	sec
Control Delay (Worst Lane)	9.6	sec		
Control Delay (Worst Movement)	12.8	sec	12.8	sec
Geometric Delay (Average)	0.2	sec		
Stop-Line Delay (Average)	0.1	sec		
Idling Time (Average)	0.0	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	0.3	veh		
95% Back of Queue - Distance (Worst Lane)	2.2	m		
Queue Storage Ratio (Worst Lane)	0.00			
Total Effective Stops	23	veh/h	28	pers/h
Effective Stop Rate	0.02		0.02	
Proportion Queued	0.03		0.03	
Performance Index	17.6		17.6	
Cost (Total)	399.56	$/h	399.56	$/h
Fuel Consumption (Total)	84.6	L/h		
Carbon Dioxide (Total)	204.5	kg/h		
Hydrocarbons (Total)	0.015	kg/h		
Carbon Monoxide (Total)	0.220	kg/h		
NOx (Total)	0.556	kg/h		

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection 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.
Site Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 3 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 68.0% 1.1% 0.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	481,516	veh/y	577,819	pers/y
Delay	43	veh-h/y	52	pers-h/y
Effective Stops	11,062	veh/y	13,275	pers/y
Travel Distance	486,366	veh-km/y	583,639	pers-km/y
Travel Time	8,168	veh-h/y	9,802	pers-h/y
Cost	191,790	$/y	191,790	$/y
Fuel Consumption	40,618	L/y		
Carbon Dioxide	98,175	kg/y		
Hydrocarbons	7	kg/y		
Carbon Monoxide	106	kg/y		
NOx	267	kg/y		

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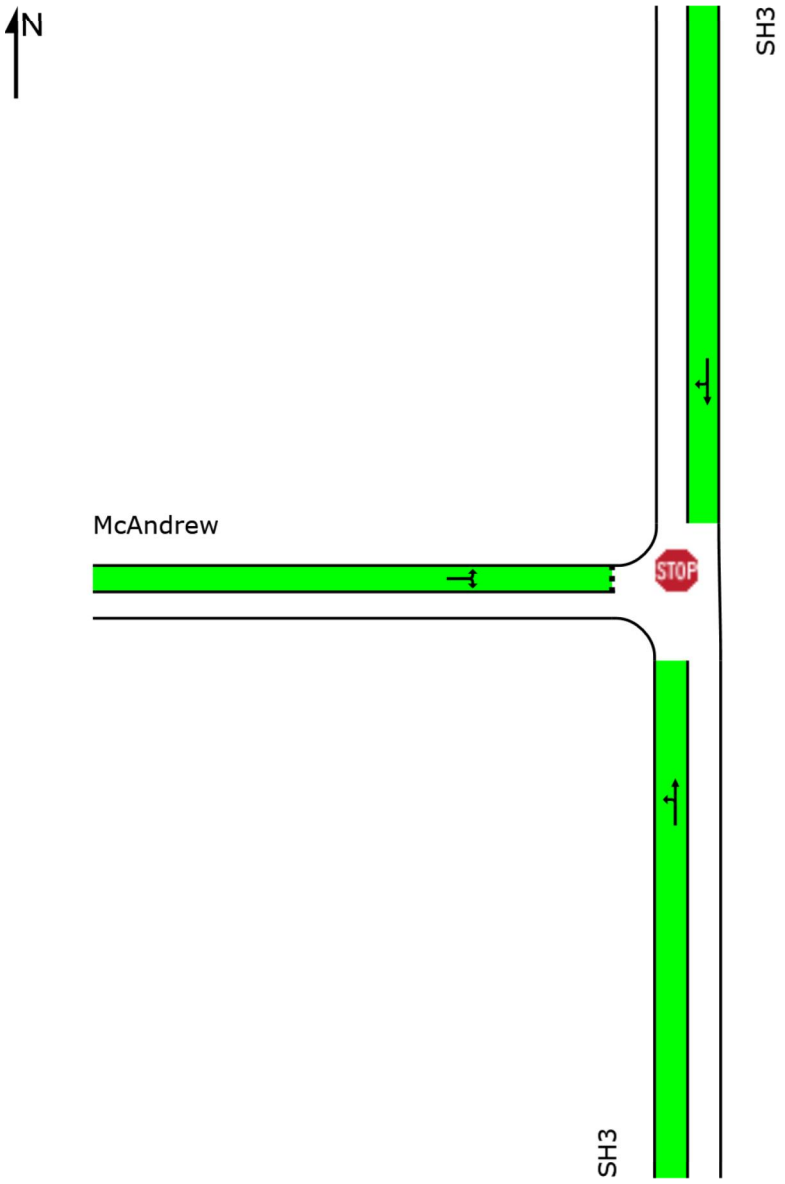
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2018_Existing_PM]

New Site
Site Category: (None)
Stop (Two-Way)

	Approaches			Intersection
	South	North	West	
LOS	NA	NA	A	NA



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

INTERSECTION SUMMARY

Site: 101 [2018_Low Dev_AM]

New Site
Site Category: (None)
Stop (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	59.5	km/h	59.5	km/h
Travel Distance (Total)	1032.4	veh-km/h	1238.9	pers-km/h
Travel Time (Total)	17.3	veh-h/h	20.8	pers-h/h
Demand Flows (Total)	1022	veh/h	1227	pers/h
Percent Heavy Vehicles (Demand)	10.7	%		
Degree of Saturation	0.355			
Practical Spare Capacity	175.7	%		
Effective Intersection Capacity	2875	veh/h		
Control Delay (Total)	0.11	veh-h/h	0.13	pers-h/h
Control Delay (Average)	0.4	sec	0.4	sec
Control Delay (Worst Lane)	10.5	sec		
Control Delay (Worst Movement)	13.0	sec	13.0	sec
Geometric Delay (Average)	0.2	sec		
Stop-Line Delay (Average)	0.2	sec		
Idling Time (Average)	0.1	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	0.2	veh		
95% Back of Queue - Distance (Worst Lane)	1.2	m		
Queue Storage Ratio (Worst Lane)	0.00			
Total Effective Stops	26	veh/h	31	pers/h
Effective Stop Rate	0.03		0.03	
Proportion Queued	0.02		0.02	
Performance Index	17.8		17.8	
Cost (Total)	402.28	$/h	402.28	$/h
Fuel Consumption (Total)	85.2	L/h		
Carbon Dioxide (Total)	205.9	kg/h		
Hydrocarbons (Total)	0.015	kg/h		
Carbon Monoxide (Total)	0.222	kg/h		
NOx (Total)	0.554	kg/h		

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection 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.
Site Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 3 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 70.0% 1.1% 0.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	490,611	veh/y	588,733	pers/y
Delay	52	veh-h/y	63	pers-h/y
Effective Stops	12,441	veh/y	14,930	pers/y
Travel Distance	495,570	veh-km/y	594,683	pers-km/y
Travel Time	8,326	veh-h/y	9,991	pers-h/y
Cost	193,096	$/y	193,096	$/y
Fuel Consumption	40,880	L/y		
Carbon Dioxide	98,831	kg/y		
Hydrocarbons	7	kg/y		
Carbon Monoxide	106	kg/y		
NOx	266	kg/y		

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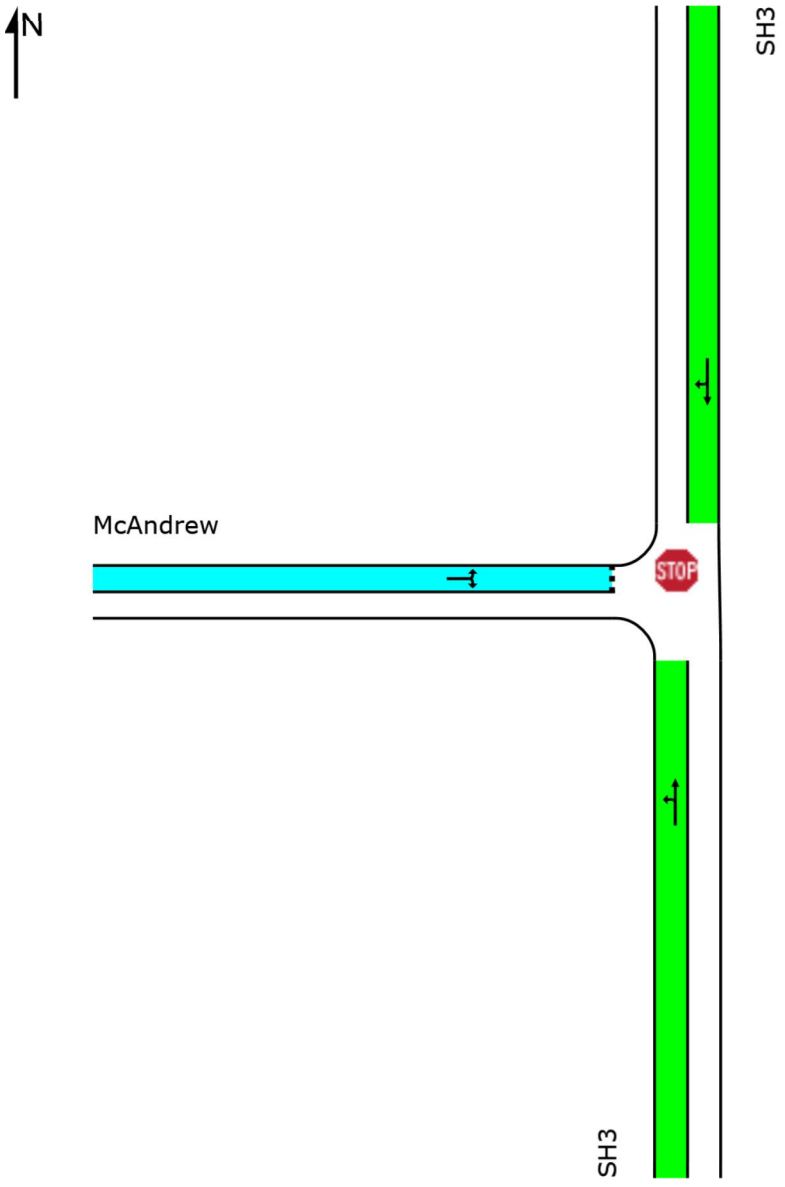
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2018_Low Dev_AM]

New Site
Site Category: (None)
Stop (Two-Way)

	Approaches			Intersection
	South	North	West	
LOS	NA	NA	B	NA



Colour code based on Level of Service

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

INTERSECTION SUMMARY

Site: 101 [2018_Low Dev_PM]

New Site
Site Category: (None)
Stop (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	59.5	km/h	59.5	km/h
Travel Distance (Total)	1034.6	veh-km/h	1241.5	pers-km/h
Travel Time (Total)	17.4	veh-h/h	20.9	pers-h/h
Demand Flows (Total)	1024	veh/h	1229	pers/h
Percent Heavy Vehicles (Demand)	10.6	%		
Degree of Saturation	0.408			
Practical Spare Capacity	140.2	%		
Effective Intersection Capacity	2511	veh/h		
Control Delay (Total)	0.10	veh-h/h	0.12	pers-h/h
Control Delay (Average)	0.4	sec	0.4	sec
Control Delay (Worst Lane)	8.7	sec		
Control Delay (Worst Movement)	13.2	sec	13.2	sec
Geometric Delay (Average)	0.2	sec		
Stop-Line Delay (Average)	0.1	sec		
Idling Time (Average)	0.0	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	0.3	veh		
95% Back of Queue - Distance (Worst Lane)	2.3	m		
Queue Storage Ratio (Worst Lane)	0.00			
Total Effective Stops	26	veh/h	31	pers/h
Effective Stop Rate	0.03		0.03	
Proportion Queued	0.03		0.03	
Performance Index	18.0		18.0	
Cost (Total)	408.65	$/h	408.65	$/h
Fuel Consumption (Total)	86.4	L/h		
Carbon Dioxide (Total)	208.8	kg/h		
Hydrocarbons (Total)	0.015	kg/h		
Carbon Monoxide (Total)	0.225	kg/h		
NOx (Total)	0.565	kg/h		

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection 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.
Site Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 3 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 61.8% 1.1% 0.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	491,621	veh/y	589,945	pers/y
Delay	48	veh-h/y	58	pers-h/y
Effective Stops	12,541	veh/y	15,049	pers/y
Travel Distance	496,587	veh-km/y	595,905	pers-km/y
Travel Time	8,345	veh-h/y	10,014	pers-h/y
Cost	196,150	$/y	196,150	$/y
Fuel Consumption	41,476	L/y		
Carbon Dioxide	100,239	kg/y		
Hydrocarbons	7	kg/y		
Carbon Monoxide	108	kg/y		
NOx	271	kg/y		

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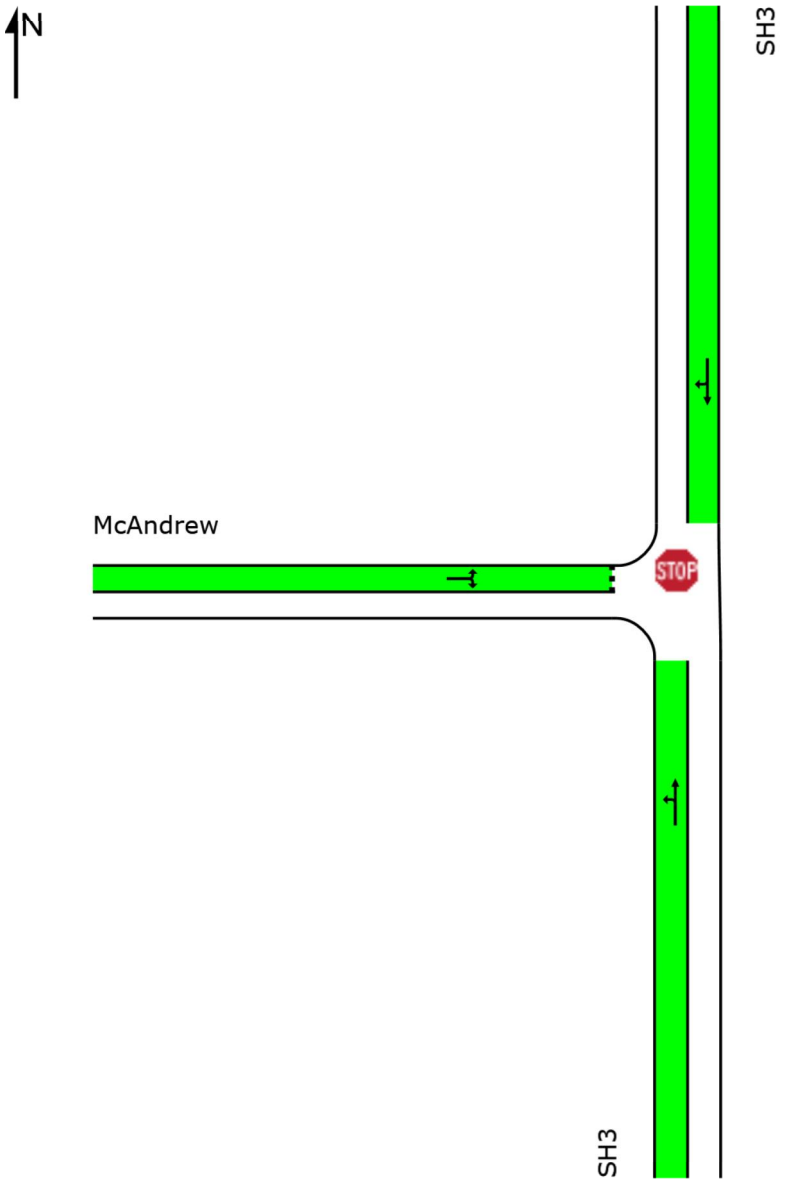
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2018_Low Dev_PM]

New Site
Site Category: (None)
Stop (Two-Way)

	Approaches			Intersection
	South	North	West	
LOS	NA	NA	A	NA



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

INTERSECTION SUMMARY

Site: 101 [2018_Hi Dev_AM]

New Site
Site Category: (None)
Stop (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	59.5	km/h	59.5	km/h
Travel Distance (Total)	1044.1	veh-km/h	1253.0	pers-km/h
Travel Time (Total)	17.6	veh-h/h	21.1	pers-h/h
Demand Flows (Total)	1034	veh/h	1240	pers/h
Percent Heavy Vehicles (Demand)	10.6	%		
Degree of Saturation	0.356			
Practical Spare Capacity	175.2	%		
Effective Intersection Capacity	2903	veh/h		
Control Delay (Total)	0.13	veh-h/h	0.15	pers-h/h
Control Delay (Average)	0.4	sec	0.4	sec
Control Delay (Worst Lane)	10.7	sec		
Control Delay (Worst Movement)	13.1	sec	13.1	sec
Geometric Delay (Average)	0.2	sec		
Stop-Line Delay (Average)	0.2	sec		
Idling Time (Average)	0.1	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	0.2	veh		
95% Back of Queue - Distance (Worst Lane)	1.4	m		
Queue Storage Ratio (Worst Lane)	0.00			
Total Effective Stops	30	veh/h	36	pers/h
Effective Stop Rate	0.03		0.03	
Proportion Queued	0.03		0.03	
Performance Index	18.1		18.1	
Cost (Total)	408.35	$/h	408.35	$/h
Fuel Consumption (Total)	86.3	L/h		
Carbon Dioxide (Total)	208.5	kg/h		
Hydrocarbons (Total)	0.015	kg/h		
Carbon Monoxide (Total)	0.224	kg/h		
NOx (Total)	0.560	kg/h		

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection 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.
Site Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 3 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 70.5% 1.4% 0.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	496,168	veh/y	595,402	pers/y
Delay	61	veh-h/y	74	pers-h/y
Effective Stops	14,518	veh/y	17,422	pers/y
Travel Distance	501,189	veh-km/y	601,426	pers-km/y
Travel Time	8,430	veh-h/y	10,116	pers-h/y
Cost	196,009	$/y	196,009	$/y
Fuel Consumption	41,401	L/y		
Carbon Dioxide	100,077	kg/y		
Hydrocarbons	7	kg/y		
Carbon Monoxide	108	kg/y		
NOx	269	kg/y		

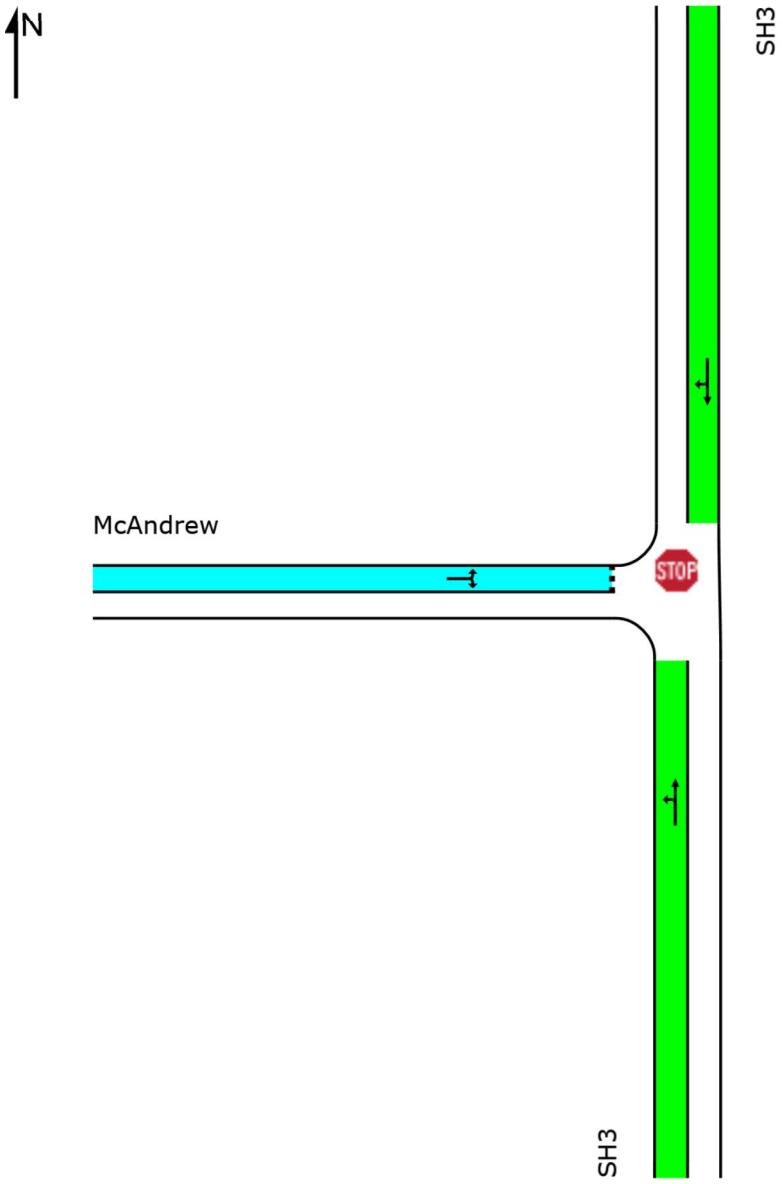
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2018_Hi Dev_AM]

New Site
Site Category: (None)
Stop (Two-Way)

	Approaches			Intersection
	South	North	West	
LOS	NA	NA	B	NA



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

INTERSECTION SUMMARY

Site: 101 [2018_Hi Dev_PM]

New Site
Site Category: (None)
Stop (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	59.5	km/h	59.5	km/h
Travel Distance (Total)	1056.9	veh-km/h	1268.3	pers-km/h
Travel Time (Total)	17.8	veh-h/h	21.3	pers-h/h
Demand Flows (Total)	1046	veh/h	1256	pers/h
Percent Heavy Vehicles (Demand)	10.6	%		
Degree of Saturation	0.417			
Practical Spare Capacity	135.1	%		
Effective Intersection Capacity	2510	veh/h		
Control Delay (Total)	0.11	veh-h/h	0.14	pers-h/h
Control Delay (Average)	0.4	sec	0.4	sec
Control Delay (Worst Lane)	9.1	sec		
Control Delay (Worst Movement)	13.6	sec	13.6	sec
Geometric Delay (Average)	0.2	sec		
Stop-Line Delay (Average)	0.1	sec		
Idling Time (Average)	0.0	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	0.3	veh		
95% Back of Queue - Distance (Worst Lane)	2.5	m		
Queue Storage Ratio (Worst Lane)	0.00			
Total Effective Stops	29	veh/h	35	pers/h
Effective Stop Rate	0.03		0.03	
Proportion Queued	0.04		0.04	
Performance Index	18.5		18.5	
Cost (Total)	418.40	$/h	418.40	$/h
Fuel Consumption (Total)	88.4	L/h		
Carbon Dioxide (Total)	213.5	kg/h		
Hydrocarbons (Total)	0.015	kg/h		
Carbon Monoxide (Total)	0.230	kg/h		
NOx (Total)	0.577	kg/h		

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection 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.
Site Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 3 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 64.7% 1.1% 0.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	502,232	veh/y	602,678	pers/y
Delay	54	veh-h/y	65	pers-h/y
Effective Stops	13,886	veh/y	16,663	pers/y
Travel Distance	507,310	veh-km/y	608,772	pers-km/y
Travel Time	8,531	veh-h/y	10,237	pers-h/y
Cost	200,834	$/y	200,834	$/y
Fuel Consumption	42,409	L/y		
Carbon Dioxide	102,483	kg/y		
Hydrocarbons	7	kg/y		
Carbon Monoxide	110	kg/y		
NOx	277	kg/y		

Organisation: TONKIN & TAYLOR | Processed: Friday, 24 May 2019 4:43:48 PM
Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\T6_McAndrew SH3 Int.sip8

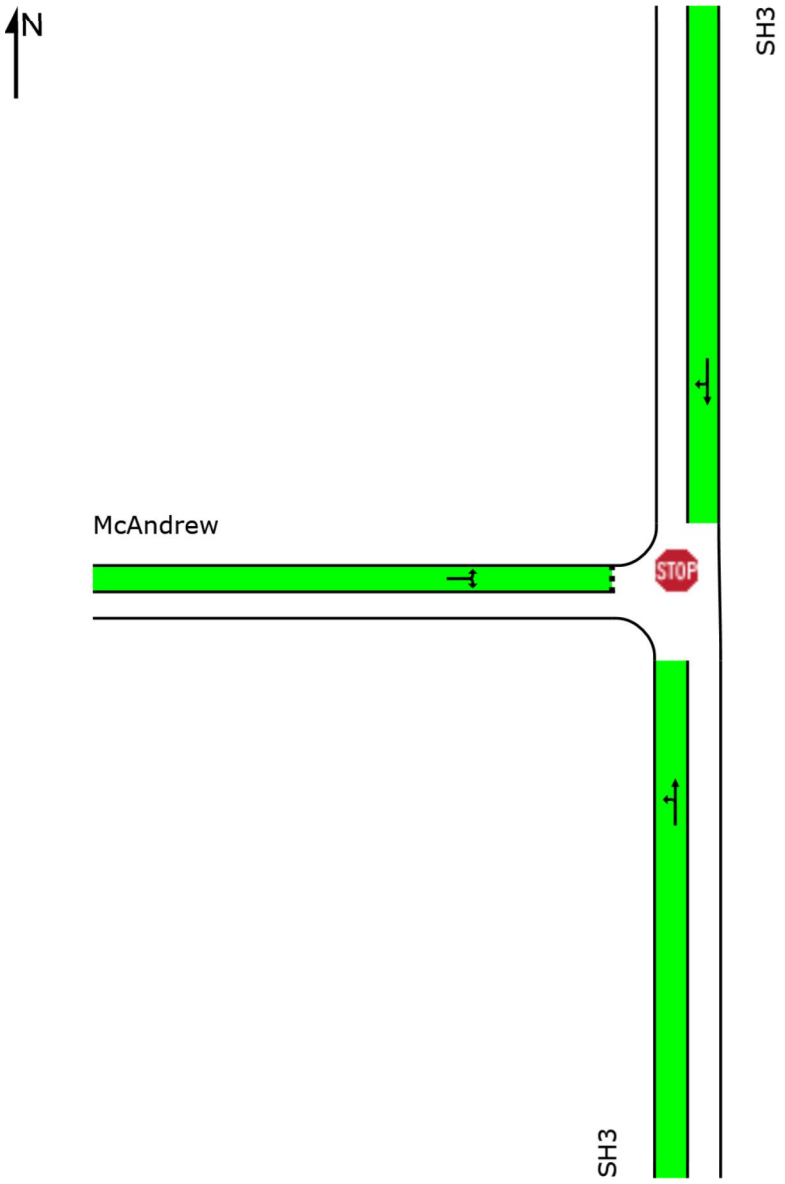
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2018_Hi Dev_PM]

New Site
Site Category: (None)
Stop (Two-Way)

	Approaches			Intersection
	South	North	West	
LOS	NA	NA	A	NA



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

INTERSECTION SUMMARY

Site: 101 [2035_No Dev_AM]

New Site
Site Category: (None)
Stop (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	59.4	km/h	59.4	km/h
Travel Distance (Total)	1365.2	veh-km/h	1638.3	pers-km/h
Travel Time (Total)	23.0	veh-h/h	27.6	pers-h/h
Demand Flows (Total)	1352	veh/h	1622	pers/h
Percent Heavy Vehicles (Demand)	10.7	%		
Degree of Saturation	0.475			
Practical Spare Capacity	106.3	%		
Effective Intersection Capacity	2845	veh/h		
Control Delay (Total)	0.20	veh-h/h	0.24	pers-h/h
Control Delay (Average)	0.5	sec	0.5	sec
Control Delay (Worst Lane)	15.9	sec		
Control Delay (Worst Movement)	21.5	sec	21.5	sec
Geometric Delay (Average)	0.2	sec		
Stop-Line Delay (Average)	0.4	sec		
Idling Time (Average)	0.2	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	0.3	veh		
95% Back of Queue - Distance (Worst Lane)	2.1	m		
Queue Storage Ratio (Worst Lane)	0.00			
Total Effective Stops	33	veh/h	40	pers/h
Effective Stop Rate	0.02		0.02	
Proportion Queued	0.03		0.03	
Performance Index	23.8		23.8	
Cost (Total)	534.40	$/h	534.40	$/h
Fuel Consumption (Total)	112.9	L/h		
Carbon Dioxide (Total)	273.0	kg/h		
Hydrocarbons (Total)	0.019	kg/h		
Carbon Monoxide (Total)	0.293	kg/h		
NOx (Total)	0.738	kg/h		

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection 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.
Site Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 3 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 83.0% 2.1% 0.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	648,758	veh/y	778,510	pers/y
Delay	96	veh-h/y	116	pers-h/y
Effective Stops	15,901	veh/y	19,081	pers/y
Travel Distance	655,304	veh-km/y	786,365	pers-km/y
Travel Time	11,039	veh-h/y	13,246	pers-h/y
Cost	256,514	$/y	256,514	$/y
Fuel Consumption	54,198	L/y		
Carbon Dioxide	131,037	kg/y		
Hydrocarbons	9	kg/y		
Carbon Monoxide	141	kg/y		
NOx	354	kg/y		

Organisation: TONKIN & TAYLOR | Processed: Monday, 13 May 2019 4:44:59 PM
Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\T6_McAndrew SH3 Int.sip8

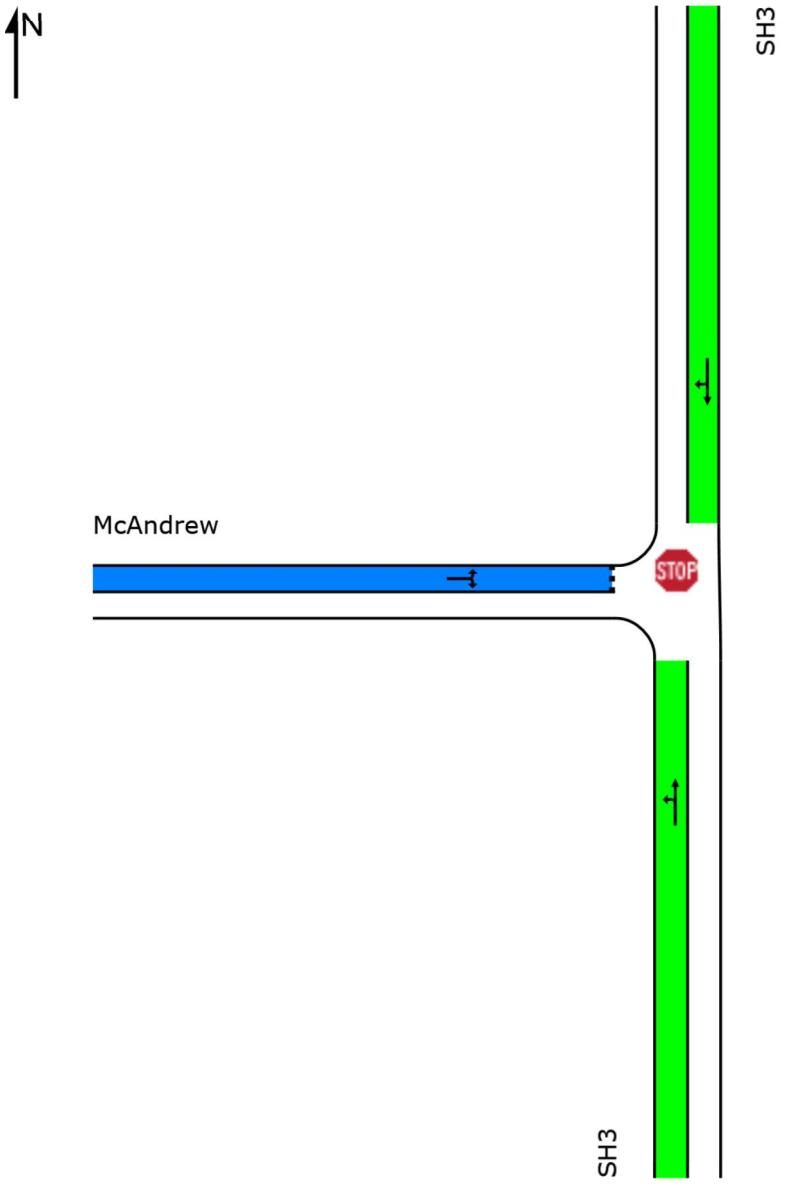
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2035_No Dev_AM]

New Site
Site Category: (None)
Stop (Two-Way)

	Approaches			Intersection
	South	North	West	
LOS	NA	NA	C	NA



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

INTERSECTION SUMMARY

Site: 101 [2035_No Dev_PM]

New Site
Site Category: (None)
Stop (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	59.4	km/h	59.4	km/h
Travel Distance (Total)	1359.9	veh-km/h	1631.9	pers-km/h
Travel Time (Total)	22.9	veh-h/h	27.5	pers-h/h
Demand Flows (Total)	1346	veh/h	1616	pers/h
Percent Heavy Vehicles (Demand)	10.6	%		
Degree of Saturation	0.538			
Practical Spare Capacity	82.0	%		
Effective Intersection Capacity	2500	veh/h		
Control Delay (Total)	0.18	veh-h/h	0.22	pers-h/h
Control Delay (Average)	0.5	sec	0.5	sec
Control Delay (Worst Lane)	11.9	sec		
Control Delay (Worst Movement)	22.2	sec	22.2	sec
Geometric Delay (Average)	0.2	sec		
Stop-Line Delay (Average)	0.3	sec		
Idling Time (Average)	0.0	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	0.7	veh		
95% Back of Queue - Distance (Worst Lane)	5.2	m		
Queue Storage Ratio (Worst Lane)	0.00			
Total Effective Stops	34	veh/h	41	pers/h
Effective Stop Rate	0.03		0.03	
Proportion Queued	0.05		0.05	
Performance Index	24.2		24.2	
Cost (Total)	541.83	$/h	541.83	$/h
Fuel Consumption (Total)	114.4	L/h		
Carbon Dioxide (Total)	276.5	kg/h		
Hydrocarbons (Total)	0.020	kg/h		
Carbon Monoxide (Total)	0.297	kg/h		
NOx (Total)	0.754	kg/h		

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection 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.
Site Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 3 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 76.7% 1.5% 0.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	646,232	veh/y	775,478	pers/y
Delay	87	veh-h/y	104	pers-h/y
Effective Stops	16,485	veh/y	19,781	pers/y
Travel Distance	652,757	veh-km/y	783,308	pers-km/y
Travel Time	10,987	veh-h/y	13,184	pers-h/y
Cost	260,080	$/y	260,080	$/y
Fuel Consumption	54,924	L/y		
Carbon Dioxide	132,728	kg/y		
Hydrocarbons	10	kg/y		
Carbon Monoxide	143	kg/y		
NOx	362	kg/y		

Organisation: TONKIN & TAYLOR | Processed: Monday, 13 May 2019 4:44:59 PM
Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\T6_McAndrew SH3 Int.sip8

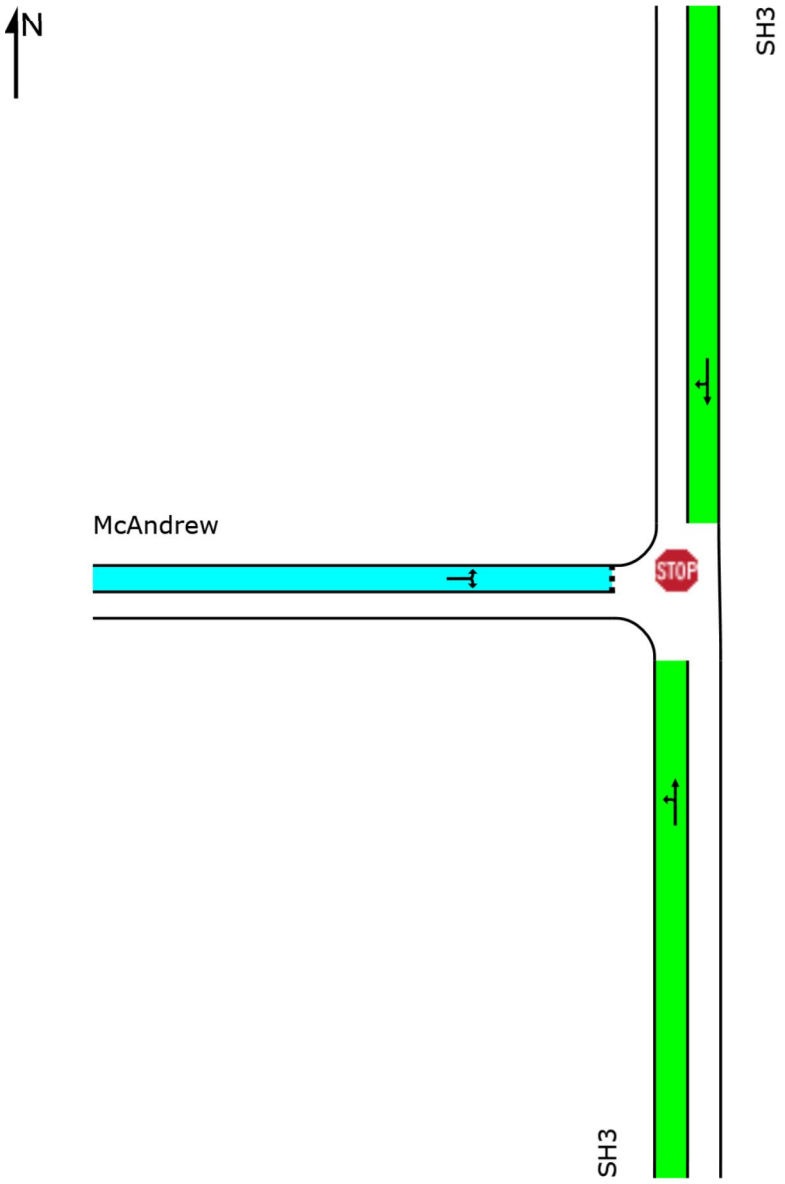
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2035_No Dev_PM]

New Site
Site Category: (None)
Stop (Two-Way)

	Approaches			Intersection
	South	North	West	
LOS	NA	NA	B	NA



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

INTERSECTION SUMMARY

Site: 101 [2035_Low Dev_AM]

New Site
Site Category: (None)
Stop (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	59.3	km/h	59.3	km/h
Travel Distance (Total)	1378.0	veh-km/h	1653.6	pers-km/h
Travel Time (Total)	23.2	veh-h/h	27.9	pers-h/h
Demand Flows (Total)	1364	veh/h	1637	pers/h
Percent Heavy Vehicles (Demand)	10.7	%		
Degree of Saturation	0.476			
Practical Spare Capacity	106.0	%		
Effective Intersection Capacity	2868	veh/h		
Control Delay (Total)	0.22	veh-h/h	0.27	pers-h/h
Control Delay (Average)	0.6	sec	0.6	sec
Control Delay (Worst Lane)	16.2	sec		
Control Delay (Worst Movement)	21.9	sec	21.9	sec
Geometric Delay (Average)	0.2	sec		
Stop-Line Delay (Average)	0.4	sec		
Idling Time (Average)	0.2	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	0.3	veh		
95% Back of Queue - Distance (Worst Lane)	2.5	m		
Queue Storage Ratio (Worst Lane)	0.00			
Total Effective Stops	37	veh/h	44	pers/h
Effective Stop Rate	0.03		0.03	
Proportion Queued	0.03		0.03	
Performance Index	24.2		24.2	
Cost (Total)	540.49	$/h	540.49	$/h
Fuel Consumption (Total)	114.0	L/h		
Carbon Dioxide (Total)	275.6	kg/h		
Hydrocarbons (Total)	0.020	kg/h		
Carbon Monoxide (Total)	0.296	kg/h		
NOx (Total)	0.744	kg/h		

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection 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.
Site Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 3 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 83.3% 2.1% 0.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	654,821	veh/y	785,785	pers/y
Delay	107	veh-h/y	128	pers-h/y
Effective Stops	17,787	veh/y	21,345	pers/y
Travel Distance	661,434	veh-km/y	793,721	pers-km/y
Travel Time	11,152	veh-h/y	13,383	pers-h/y
Cost	259,433	$/y	259,433	$/y
Fuel Consumption	54,721	L/y		
Carbon Dioxide	132,291	kg/y		
Hydrocarbons	9	kg/y		
Carbon Monoxide	142	kg/y		
NOx	357	kg/y		

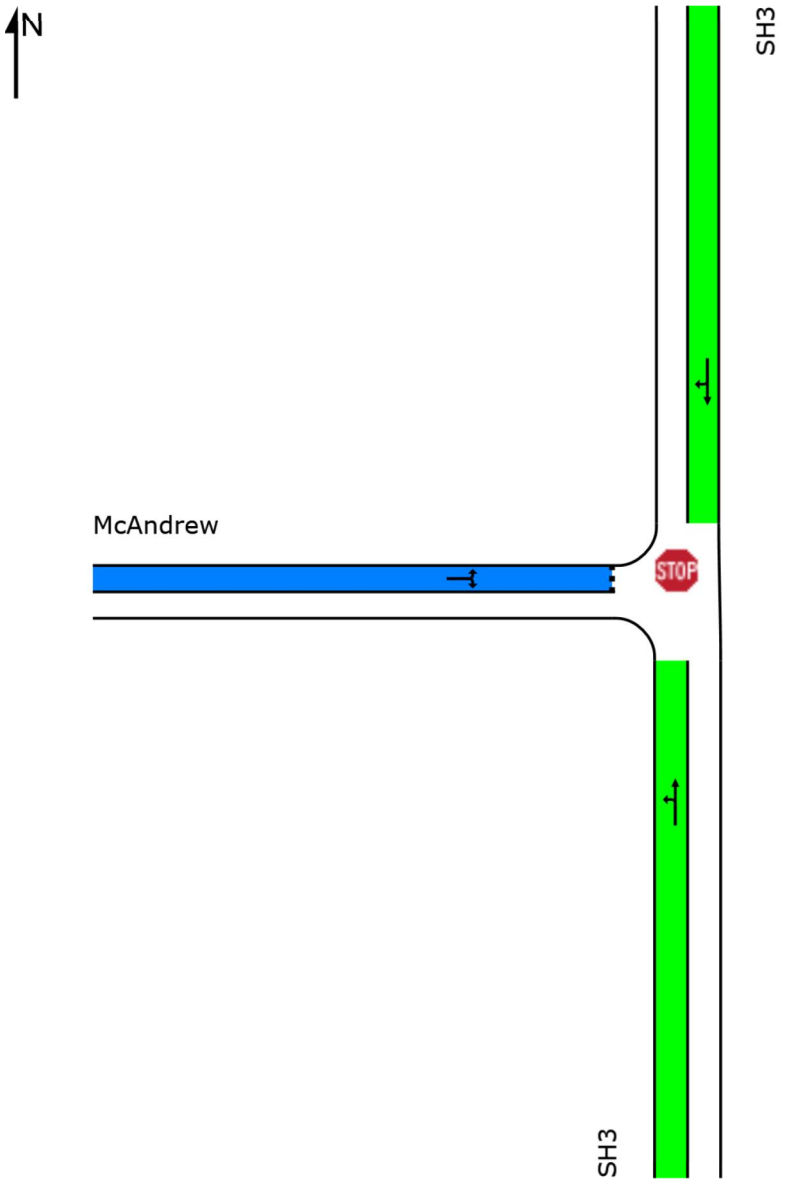
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2035_Low Dev_AM]

New Site
Site Category: (None)
Stop (Two-Way)

	Approaches			Intersection
	South	North	West	
LOS	NA	NA	C	NA



Colour code based on Level of Service

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

INTERSECTION SUMMARY

Site: 101 [2035_Low Dev_PM]

New Site
Site Category: (None)
Stop (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	59.4	km/h	59.4	km/h
Travel Distance (Total)	1380.1	veh-km/h	1656.1	pers-km/h
Travel Time (Total)	23.2	veh-h/h	27.9	pers-h/h
Demand Flows (Total)	1366	veh/h	1640	pers/h
Percent Heavy Vehicles (Demand)	10.6	%		
Degree of Saturation	0.547			
Practical Spare Capacity	79.3	%		
Effective Intersection Capacity	2499	veh/h		
Control Delay (Total)	0.19	veh-h/h	0.23	pers-h/h
Control Delay (Average)	0.5	sec	0.5	sec
Control Delay (Worst Lane)	13.0	sec		
Control Delay (Worst Movement)	23.2	sec	23.2	sec
Geometric Delay (Average)	0.2	sec		
Stop-Line Delay (Average)	0.3	sec		
Idling Time (Average)	0.1	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	0.7	veh		
95% Back of Queue - Distance (Worst Lane)	5.3	m		
Queue Storage Ratio (Worst Lane)	0.00			
Total Effective Stops	35	veh/h	42	pers/h
Effective Stop Rate	0.03		0.03	
Proportion Queued	0.05		0.05	
Performance Index	24.6		24.6	
Cost (Total)	550.26	$/h	550.26	$/h
Fuel Consumption (Total)	116.1	L/h		
Carbon Dioxide (Total)	280.7	kg/h		
Hydrocarbons (Total)	0.020	kg/h		
Carbon Monoxide (Total)	0.301	kg/h		
NOx (Total)	0.765	kg/h		

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection 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.
Site Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 3 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 79.2% 1.5% 0.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	655,832	veh/y	786,998	pers/y
Delay	92	veh-h/y	110	pers-h/y
Effective Stops	16,975	veh/y	20,370	pers/y
Travel Distance	662,452	veh-km/y	794,943	pers-km/y
Travel Time	11,154	veh-h/y	13,385	pers-h/y
Cost	264,123	$/y	264,123	$/y
Fuel Consumption	55,752	L/y		
Carbon Dioxide	134,728	kg/y		
Hydrocarbons	10	kg/y		
Carbon Monoxide	145	kg/y		
NOx	367	kg/y		

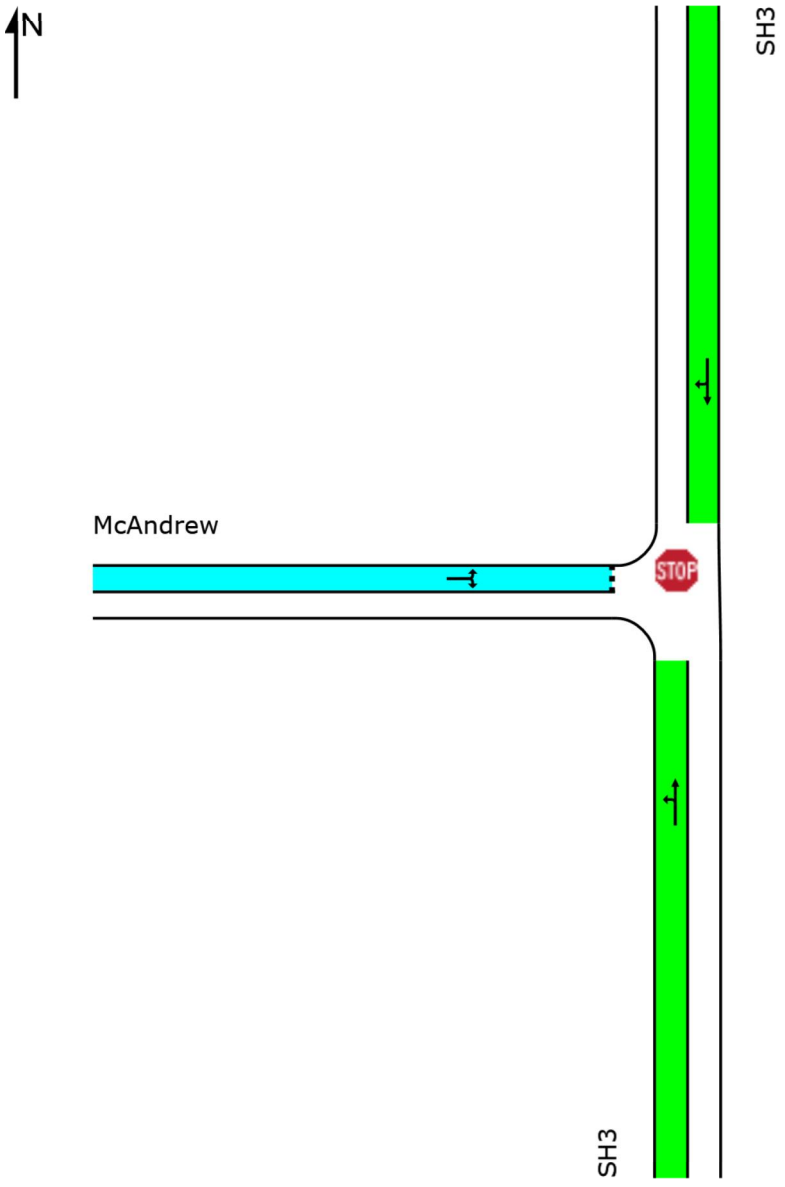
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2035_Low Dev_PM]

New Site
Site Category: (None)
Stop (Two-Way)

	Approaches			Intersection
	South	North	West	
LOS	NA	NA	B	NA



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

INTERSECTION SUMMARY

Site: 101 [2035_Hi Dev_AM]

New Site
Site Category: (None)
Stop (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	59.2	km/h	59.2	km/h
Travel Distance (Total)	1390.8	veh-km/h	1668.9	pers-km/h
Travel Time (Total)	23.5	veh-h/h	28.2	pers-h/h
Demand Flows (Total)	1377	veh/h	1652	pers/h
Percent Heavy Vehicles (Demand)	10.6	%		
Degree of Saturation	0.477			
Practical Spare Capacity	105.5	%		
Effective Intersection Capacity	2888	veh/h		
Control Delay (Total)	0.25	veh-h/h	0.30	pers-h/h
Control Delay (Average)	0.7	sec	0.7	sec
Control Delay (Worst Lane)	16.1	sec		
Control Delay (Worst Movement)	22.3	sec	22.3	sec
Geometric Delay (Average)	0.2	sec		
Stop-Line Delay (Average)	0.5	sec		
Idling Time (Average)	0.3	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	0.4	veh		
95% Back of Queue - Distance (Worst Lane)	2.7	m		
Queue Storage Ratio (Worst Lane)	0.00			
Total Effective Stops	42	veh/h	50	pers/h
Effective Stop Rate	0.03		0.03	
Proportion Queued	0.03		0.03	
Performance Index	24.6		24.6	
Cost (Total)	547.62	$/h	547.62	$/h
Fuel Consumption (Total)	115.3	L/h		
Carbon Dioxide (Total)	278.6	kg/h		
Hydrocarbons (Total)	0.020	kg/h		
Carbon Monoxide (Total)	0.299	kg/h		
NOx (Total)	0.750	kg/h		

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection 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.
Site Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 3 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 83.2% 2.6% 0.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	660,884	veh/y	793,061	pers/y
Delay	121	veh-h/y	145	pers-h/y
Effective Stops	19,980	veh/y	23,976	pers/y
Travel Distance	667,566	veh-km/y	801,080	pers-km/y
Travel Time	11,270	veh-h/y	13,524	pers-h/y
Cost	262,857	$/y	262,857	$/y
Fuel Consumption	55,321	L/y		
Carbon Dioxide	133,726	kg/y		
Hydrocarbons	10	kg/y		
Carbon Monoxide	144	kg/y		
NOx	360	kg/y		

Organisation: TONKIN & TAYLOR | Processed: Friday, 24 May 2019 4:47:34 PM
Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\T6_McAndrew SH3 Int.sip8

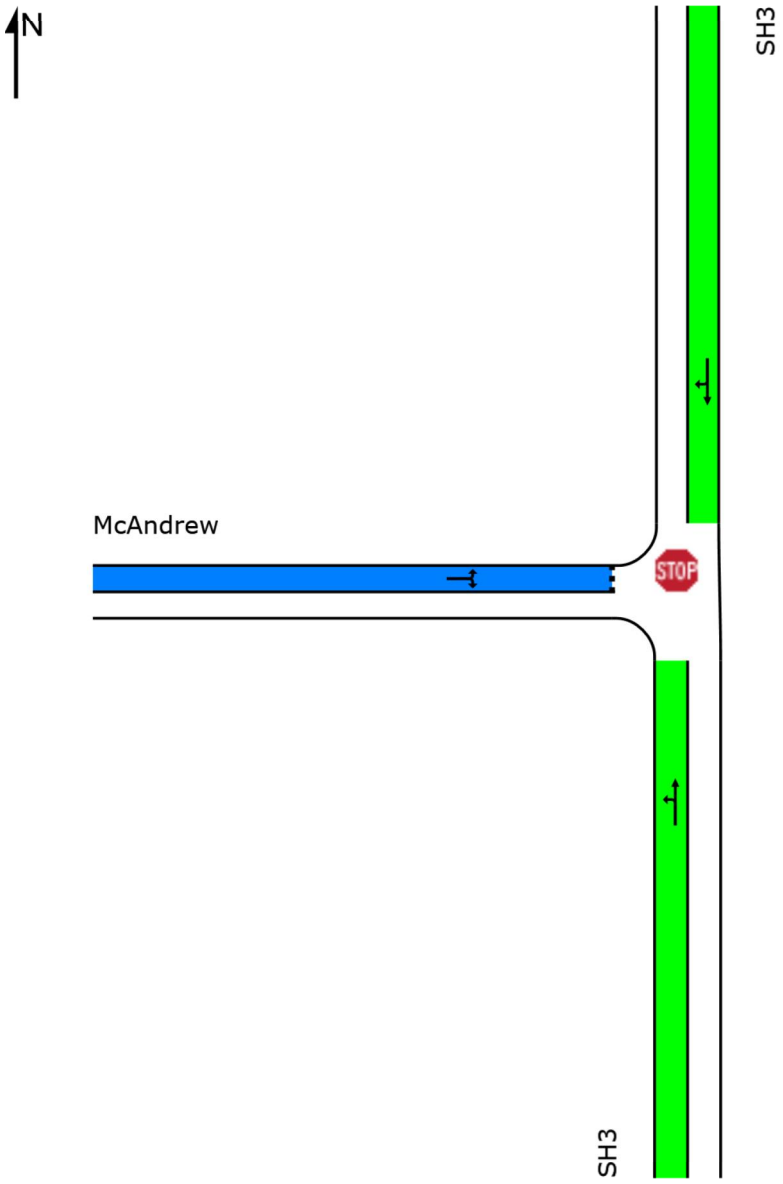
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2035_Hi Dev_AM]

New Site
Site Category: (None)
Stop (Two-Way)

	Approaches			Intersection
	South	North	West	
LOS	NA	NA	C	NA



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

INTERSECTION SUMMARY

Site: 101 [2035_Hi Dev_PM]

New Site
Site Category: (None)
Stop (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	59.3	km/h	59.3	km/h
Travel Distance (Total)	1400.3	veh-km/h	1680.4	pers-km/h
Travel Time (Total)	23.6	veh-h/h	28.3	pers-h/h
Demand Flows (Total)	1386	veh/h	1664	pers/h
Percent Heavy Vehicles (Demand)	10.6	%		
Degree of Saturation	0.555			
Practical Spare Capacity	76.5	%		
Effective Intersection Capacity	2497	veh/h		
Control Delay (Total)	0.21	veh-h/h	0.25	pers-h/h
Control Delay (Average)	0.5	sec	0.5	sec
Control Delay (Worst Lane)	14.5	sec		
Control Delay (Worst Movement)	24.1	sec	24.1	sec
Geometric Delay (Average)	0.2	sec		
Stop-Line Delay (Average)	0.3	sec		
Idling Time (Average)	0.1	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	0.7	veh		
95% Back of Queue - Distance (Worst Lane)	5.7	m		
Queue Storage Ratio (Worst Lane)	0.00			
Total Effective Stops	38	veh/h	46	pers/h
Effective Stop Rate	0.03		0.03	
Proportion Queued	0.05		0.05	
Performance Index	25.1		25.1	
Cost (Total)	559.70	$/h	559.70	$/h
Fuel Consumption (Total)	118.0	L/h		
Carbon Dioxide (Total)	285.1	kg/h		
Hydrocarbons (Total)	0.020	kg/h		
Carbon Monoxide (Total)	0.306	kg/h		
NOx (Total)	0.776	kg/h		

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection 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.
Site Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 3 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 82.2% 1.6% 0.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	665,432	veh/y	798,518	pers/y
Delay	101	veh-h/y	122	pers-h/y
Effective Stops	18,443	veh/y	22,132	pers/y
Travel Distance	672,155	veh-km/y	806,585	pers-km/y
Travel Time	11,326	veh-h/y	13,591	pers-h/y
Cost	268,655	$/y	268,655	$/y
Fuel Consumption	56,631	L/y		
Carbon Dioxide	136,842	kg/y		
Hydrocarbons	10	kg/y		
Carbon Monoxide	147	kg/y		
NOx	373	kg/y		

Organisation: TONKIN & TAYLOR | Processed: Friday, 24 May 2019 4:48:55 PM
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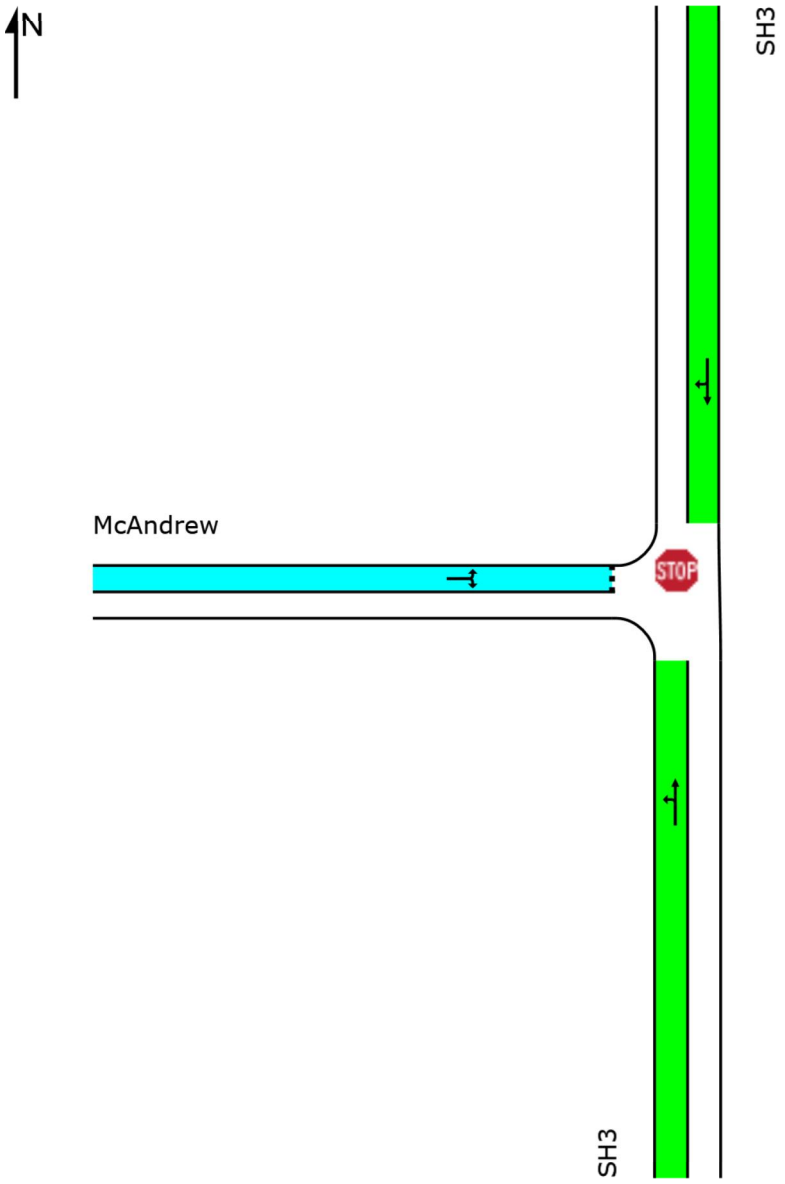
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2035_Hi Dev_PM]

New Site
Site Category: (None)
Stop (Two-Way)

	Approaches			Intersection
	South	North	West	
LOS	NA	NA	B	NA



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Appendix C: T11 CAS Outputs

CAS outputs for the following roads included:

- **Cambridge Road**

Also included as reference for the high-level assessment of State Highway 3:

- **State Highway 3 / Cambridge Road / Arawata Street intersection**

Untitled query

Saved sites

Cambridge Road

Crash year

2009 — 2019

Plain English report

17 results from your query.

1-17 of 17

Crash road	Distance	Direction	Side road	ID	Date	Day of week	Time	Description of events	Crash factors	Surface condition	Natural light	Weather	Junction	Control	Crash count fatal	Crash count severe	Crash count minor
CAMBRIDGE ROAD	200m	E	GLENEAGLES DRIVE	201410731	22/03/2014	Sat	15:58	Car/Wagon1 WDB on CAMBRIDGE ROAD overtaking Motorcycle2	MOTORCYCLE2, misjudged another vehicle, other overtaking CAR/WAGON1, misjudged another vehicle, other overtaking	Dry	Bright sun	Fine	Nil (Default)	Nil	0	0	1
CAMBRIDGE ROAD	200m	W	GLENEAGLES DRIVE	201417293	04/11/2014	Tue	16:20	Car/Wagon1 entering/leaving driveway hit Wheeled pedestrian (wheelchairs, mobility scooters, etc)&CR;&LF;2 (Age 83) walking on footpath	CAR/WAGON1, did not check/notice another party behind, other visibility limited, WHEELED PEDESTRIAN (WHEELCHAIRS, MOBILITY SCOOTERS2, other did not see or look for other party, ENV: entering or leaving private house / farm, visibility limited by hedge or fence	Dry	Bright sun	Fine	Driveway	Unknown	0	0	1
CAMBRIDGE ROAD	210m	E	GLENEAGLES DRIVE	201848679	04/09/2018	Tue	17:42	Car/Wagon1 EDB on CAMBRIDGE ROAD changing lanes to left hit Car/Wagon2	CAR/WAGON1, alcohol suspected, cut in after overtaking, emotionally upset/road rage	Wet	Overcast	Light rain	Nil (Default)	Unknown	0	0	0
CAMBRIDGE ROAD	300m	W	GLENEAGLES DRIVE	201618865	17/12/2016	Sat	16:10	Car/Wagon1 WDB on Cambridge hit rear of left turning Car/Wagon2 WDB on Cambridge	CAR/WAGON1, following too closely	Dry	Bright sun	Fine	Driveway	Nil	0	0	1
CAMBRIDGE ROAD	400m	W	MCLARNON ROAD	201043676	14/12/2010	Tue	18:45	Car/Wagon1 NDB on CAMBRIDGE ROAD lost control turning right, Car/Wagon1 hit fences	CAR/WAGON1, lost control when turning, speed entering corner/curve, ENV: heavy rain, slippery road due to rain	Wet	Overcast	Heavy rain	Nil (Default)	Nil	0	0	0
CAMBRIDGE ROAD	140m	W	PEKERAU CRESCENT	201233052	01/06/2012	Fri	12:05	Car/Wagon1 EDB on CAMBRIDGE ROAD sideswiped by Car/Wagon2 EDB on CAMBRIDGE ROAD turning left	CAR/WAGON2, turned from incorrect position on road CAR/WAGON1, misjudged intentions of another party, ENV: entering or leaving private house / farm	Dry	Bright sun	Fine	Driveway	Unknown	0	0	0
CAMBRIDGE ROAD	220m	E	PEKERAU CRESCENT	201303100	13/06/2013	Thu	05:57	Car/Wagon2 turning right hit by oncoming Cycle1 WDB on CAMBRIDGE ROAD	CAR/WAGON2, did not check/notice another party from other dirn, failed to give way turning to non-turning traffic, ENV: entering or leaving shopping complex	Dry	Dark	Fine	Driveway	Unknown	0	0	2

Crash road	Distance	Direction	Side road	ID	Date	Day of week	Time	Description of events	Crash factors	Surface condition	Natural light	Weather	Junction	Control	Crash count fatal	Crash count severe	Crash count minor
CAMBRIDGE ROAD	90m	W	PEKERAU CRESCENT	201750817	30/09/2017	Sat	11:45	Van1 EDB on Cambridge Rd Te Awamutu hit Van2 U-turning from same direction of travel	VAN2, blind spot, did not check/notice another party behind	Dry	Bright sun	Fine	Nil (Default)	Unknown	0	0	0
CAMBRIDGE ROAD	120m	E	PEKERAU CRESCENT	201813695	19/04/2018	Thu	18:25	Car/Wagon1 EDB on Cambridge Rd hit Pedestrian2 (Age 65) crossing road from right side	CAR/WAGON1, alcohol test below limit, did not check/notice another party from other dirn, failed to see another party wearing dark clothing, ENV: street lighting inadequate	Dry	Dark	Fine	Nil (Default)	Unknown	0	0	1
CAMBRIDGE ROAD	25m	E	PEKERAU CRESCENT	201034521	02/05/2010	Sun	10:11	Car/Wagon1 WDB on CAMBRIDGE ROAD lost control but did not leave the road	CAR/WAGON1, puncture or blowout	Dry	Bright sun	Fine	Nil (Default)	Nil	0	0	0
CAMBRIDGE ROAD		I	PEKERAU CRESCENT	201139432	28/12/2011	Wed	15:20	Truck1 WDB on CAMBRIDGE ROAD lost control turning right, Truck1 hit kerbing, poles	TRUCK1, attention diverted by other traffic, lost control when turning	Dry	Overcast	Fine	T Junction	Stop	0	0	0
CAMBRIDGE ROAD	140m	W	PEKERAU CRESCENT	201717837	29/09/2017	Fri	16:20	Car/Wagon1 WDB on Cambridge rd hit rear of left turning Van2 WDB on Cambridge rd	CAR/WAGON1, following too closely, other attention diverted	Dry	Bright sun	Fine	Driveway	Nil	0	0	1
CAMBRIDGE ROAD	120m	E	PEKERAU CRESCENT	201754051	02/11/2017	Thu	12:15	SUV1 WDB on Cambridge hit parked veh, SUV1 hit parked vehicle	SUV1, attention diverted by food, cigarettes, beverages, too far left	Dry	Bright sun	Fine	Nil (Default)	Unknown	0	0	0
CAMBRIDGE ROAD	100m	E	PEKERAU CRESCENT	201814989	12/06/2018	Tue	14:30	Car/Wagon1 WDB on Cambridge Road hit parked veh, Car/Wagon1 hit parked vehicle	CAR/WAGON1, alcohol test below limit, too far left	Wet	Overcast	Light rain	Nil (Default)	Unknown	0	0	1
CAMBRIDGE ROAD	110m	W	PICQUET HILL ROAD	201418710	23/12/2014	Tue	07:42	Car/Wagon1 WDB on CAMBRIDGE ROAD lost control on straight and hit SUV2 head on, Car/Wagon1 hit fences	CAR/WAGON1, fatigue due to lack of sleep, other inattentive, other lost control	Dry	Bright sun	Fine	Nil (Default)	Unknown	0	1	1
CAMBRIDGE ROAD		I	THORNCOMBE ROAD	201358128	16/11/2013	Sat	17:35	Car/Wagon1 SDB on CAMBRIDGE ROAD lost control turning right, Car/Wagon1 hit parked vehicle	CAR/WAGON1, alcohol test above limit or test refused, wheelspins/wheelies/doughnuts/drifting	Dry	Bright sun	Fine	T Junction	Give way	0	0	0
CAMBRIDGE ROAD		I	THORNCOMBE ROAD	201443014	14/08/2014	Thu	15:14	Car/Wagon1 SDB on CAMBRIDGE ROAD missed intersection or end of road	CAR/WAGON1, alcohol test above limit or test refused, did not stop at stop sign, new driver/under instruction, other lost control	Dry	Bright sun	Fine	T Junction	Stop	0	0	0

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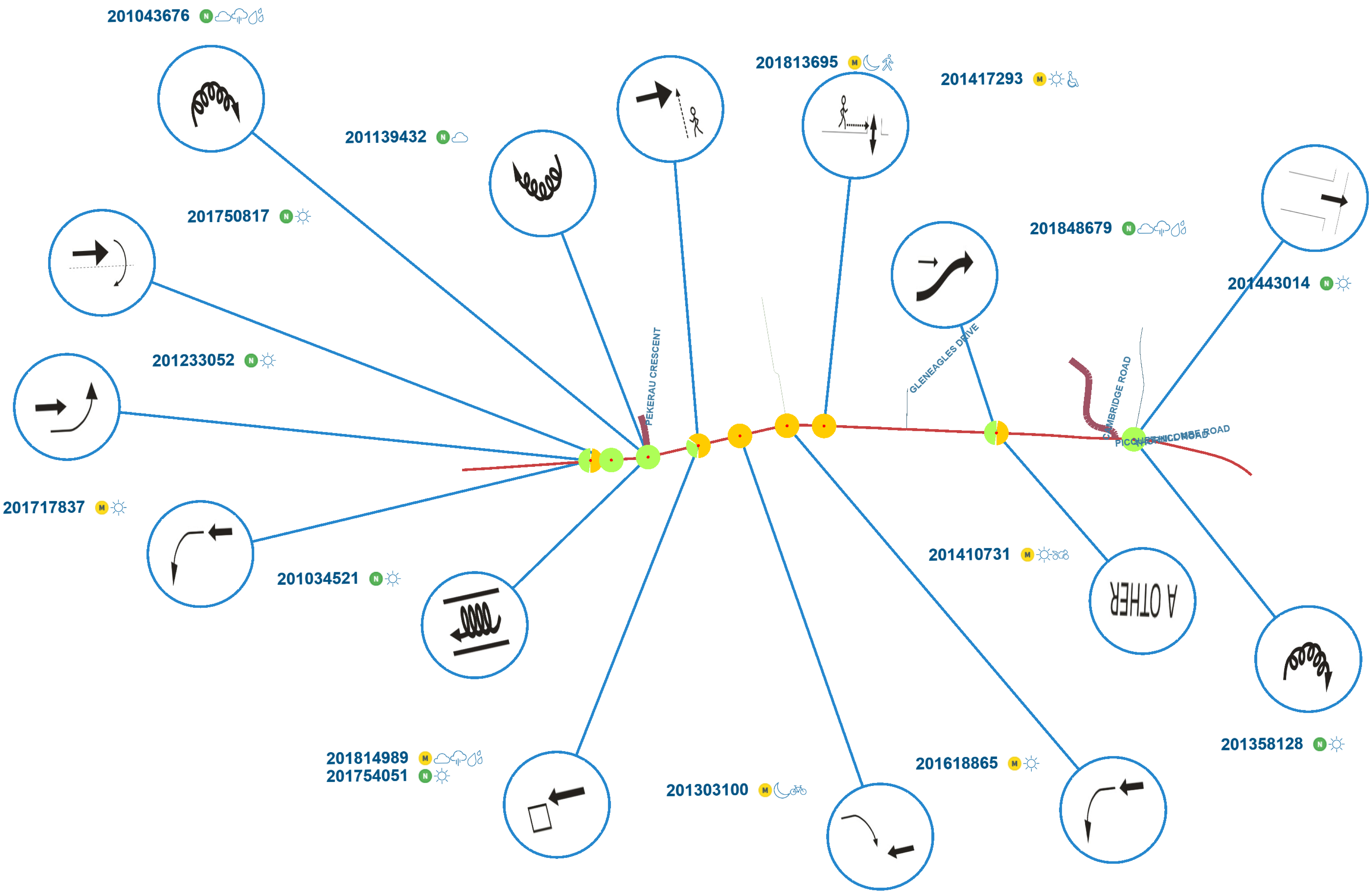

201043676
201139432
201813695
201417293
201750817
201848679
201443014
201233052
PEKERAU CRESCENT
GLENEAGLES DRIVE
CAMBRIDGE ROAD
201717837
201034521
201410731
A OTHER
201358128
201814989
201754051
201303100
201618865

Untitled query

Crash year

2009 — 2019

Saved sites

SH3 RAB Te Awamutu

Plain English report

38 results from your query.

Showing 20 100 results at once.

1-38 of 38

Crash road	Distance	Direction	Side road	ID	Date	Day of week	Time	Description of events	Crash factors	Surface condition	Natural light	Weather	Junction	Control	Crash count fatal	Crash count severe	Crash count minor
003-0016		I	ARAWATA ST	201897617	24/07/2018	Tue	16:10	Car/Wagon1 DIRN on 003-0016 sideswiped by Unknown2 DIRN on 003-0016 turning left	UNKNOWN2, turned right from incorrect lane	Dry	Bright sun	Fine	Roundabout	Give way	0	0	0
003-0016		I	CAMBRIDGE ROAD	201895902	22/11/2018	Thu	17:00	Car/Wagon1 NDB on 003-0016 overtaking SUV2	CAR/WAGON1, too far left	Dry	Overcast	Fine	Roundabout	Give way	0	0	0
ARAWATA ST		I	SH 3	201239396	19/10/2012	Fri	07:05	Van1 NDB on ARAWATA ST hit Van2 crossing at right angle from right	VAN1, did not check/notice another party from other dirn, failed to give way at priority traffic control, ENV: slippery road due to rain	Wet	Bright sun	Light rain	Roundabout	Give way	0	0	0
ARAWATA ST		I	SH 3	201736211	07/04/2017	Fri	07:00	Car/Wagon1 NDB on ARAWATA ST hit rear end of Car/Wagon2 stop/slow for cross traffic	CAR/WAGON1, following too closely CAR/WAGON2, suddenly braked	Dry	Twilight	Null	Roundabout	Give way	0	0	0
ARAWATA ST		I	SH 3	201138354	03/11/2011	Thu	15:30	Car/Wagon1 EDB on ARAWATA ST sideswiped by SUV2 EDB on ARAWATA ST turning left	SUV2, turned right from incorrect lane	Dry	Bright sun	Fine	Roundabout	Give way	0	0	0
ARAWATA ST		I	SH 3	201139354	28/12/2011	Wed	10:10	Van1 EDB on ARAWATA ST sideswiped by Car/Wagon2 EDB on ARAWATA ST turning left	CAR/WAGON2, turned right from incorrect lane	Dry	Overcast	Fine	Roundabout	Give way	0	0	0
ARAWATA ST		I	SH 3	201440078	04/07/2014	Fri	16:55	Car/Wagon1 NDB on ARAWATA ST hit Car/Wagon2 crossing at right angle from right	CAR/WAGON1, failed to give way at priority traffic control	Dry	Bright sun	Fine	Roundabout	Give way	0	0	0
ARAWATA ST		I	SH 3	201652520	15/09/2016	Thu	18:45	Car/Wagon1 NDB on ARAWATA ST hit Car/Wagon2 crossing at right angle from right	CAR/WAGON1, failed to give way at priority traffic control	Wet	Dark	Fine	Roundabout	Give way	0	0	0

Crash road	Distance	Direction	Side road	ID	Date	Day of week	Time	Description of events	Crash factors	Surface condition	Natural light	Weather	Junction	Control	Crash count fatal	Crash count severe	Crash count minor
BOND ROAD		I	OHAUPO ROAD	201637035	28/04/2016	Thu	11:00	Truck1 and Truck2 both SDB on BOND ROAD and turning; collided	TRUCK1, alcohol test below limit, too far left TRUCK2, alcohol test below limit	Dry	Bright sun	Fine	T Junction	Give way	0	0	0
BOND ROAD		I	SH 3	201837764	07/04/2018	Sat	12:30	Car/Wagon2 turning right hit by oncoming Car/Wagon1 SDB on Ohaupo	CAR/WAGON1, other wrong lane or position CAR/WAGON2, failed to give way when waved through by other dri	Dry	Bright sun	Fine	T Junction	Give way	0	0	0
BOND ROAD		I	SH 3	201233687	21/06/2012	Thu	16:30	Truck1 and Van2 both SDB on BOND ROAD and turning; collided	TRUCK1, blind spot VAN2, failed to notice indication of vehicle in front	Dry	Bright sun	Fine	T Junction	Give way	0	0	0
CAMBRIDGE ROAD		I	OHAUPO ROAD	201631734	21/01/2016	Thu	00:00	Car/Wagon1 EDB on CAMBRIDGE ROAD changing lanes to left hit Car/Wagon2	CAR/WAGON1, alcohol test below limit, did not check/notice another party from other dirn, other inattentive, overtaking on left without due care CAR/WAGON2, alcohol test below limit	Dry	Bright sun	Fine	Roundabout	Give way	0	0	0
CAMBRIDGE ROAD		I	SH 3	201836605	03/04/2018	Tue	18:15	Van1 SDB on CAMBRIDGE ROAD hit Car/Wagon2 merging from the left	CAR/WAGON2, failed to give way at priority traffic control	Dry	Bright sun	Fine	Roundabout	Give way	0	0	0
CAMBRIDGE ROAD		I	SH 3	201836607	27/02/2018	Tue	16:00	Car/Wagon1 SDB on CAMBRIDGE ROAD sideswiped by Van2 SDB on CAMBRIDGE ROAD turning left	VAN2, failed to give way at priority traffic control	Dry	Twilight	Fine	Roundabout	Give way	0	0	0
CAMBRIDGE ROAD		I	SH 3	201040618	24/09/2010	Fri	19:00	Car/Wagon1 SDB on CAMBRIDGE ROAD hit Car/Wagon2 merging from the left	CAR/WAGON2, alcohol suspected, failed to give way at priority traffic control	Dry	Dark	Fine	Roundabout	Give way	0	0	0
CAMBRIDGE ROAD		I	SH 3	201356469	01/11/2013	Fri	08:13	Car/Wagon1 NDB on CAMBRIDGE ROAD hit Motorcycle2 crossing at right angle from right	CAR/WAGON1, alcohol test above limit or test refused, did not check/notice another party from other dirn, failed to give way at priority traffic control	Dry	Overcast	Fine	Roundabout	Give way	0	0	0
CAMBRIDGE ROAD		I	SH 3	201435253	21/03/2014	Fri	16:06	Van1 SDB on CAMBRIDGE ROAD hit Car/Wagon2 merging from the right	CAR/WAGON2, failed to give way at priority traffic control	Dry	Bright sun	Fine	Roundabout	Give way	0	0	0
CAMBRIDGE ROAD		I	SH 3 ALBERT PARK	201138015	05/10/2011	Wed	21:15	Car/Wagon1 WDB on CAMBRIDGE ROAD hit Car/Wagon2 turning right onto AXROAD from the left	CAR/WAGON2, failed to give way at priority traffic control, misjudged intentions of another party	Wet	Dark	Fine	Roundabout	Give way	0	0	0
CAMBRIDGE ROAD		I	SH 3 ALBERT PARK DRIVE	201547700	24/09/2015	Thu	09:47	Car/Wagon1 WDB on CAMBRIDGE ROAD hit Car/Wagon2 crossing at right angle from right	CAR/WAGON2, attn diverted by scenery/persons outside vehicle	Dry	Overcast	Fine	Roundabout	Give way	0	0	0
ROGERS PLACE	50m	E	BOND ROAD	201640974	26/05/2016	Thu	14:36	Car/Wagon1 WDB on ROGERS PLACE hit Car/Wagon2 turning into angle park	CAR/WAGON2, did not check/notice another party behind	Dry	Bright sun	Null	Nil (Default)	Unknown	0	0	0

Crash road	Distance	Direction	Side road	ID	Date	Day of week	Time	Description of events	Crash factors	Surface condition	Natural light	Weather	Junction	Control	Crash count fatal	Crash count severe	Crash count minor
ROGERS PLACE	60m	W	TE RAHU ROAD	201746939	04/08/2017	Fri	11:30	Car/Wagon1 NDB on Rogers place hit VEHB manoeuvring, Car/Wagon1 hit houses	CAR/WAGON1, wrong pedal/foot slipped	Dry	Overcast	Fine	Nil (Default)	Unknown	0	0	0
SH 3		I	ARAWATA ST	201833163	02/02/2018	Fri	11:50	Car/Wagon1 SDB on SH 3 hit rear end of Car/Wagon2 stopped/moving slowly	CAR/WAGON1, following too closely	Dry	Bright sun	Fine	Roundabout	Give way	0	0	0
SH 3		I	ARAWATA ST	201302009	13/03/2013	Wed	20:19	Car/Wagon1 EDB on SH 3 lost control turning right, Car/Wagon1 hit traffic islands, parked vehicle, stationary vehicle	CAR/WAGON1, alcohol test above limit or test refused, driver over-reacted, lost control when turning, speed entering corner/curve	Dry	Dark	Fine	Roundabout	Give way	0	1	1
SH 3		I	ARAWATA ST	201339127	30/09/2013	Mon	18:20	Car/Wagon1 EDB on SH 3 hit SUV2 crossing at right angle from right	CAR/WAGON1, failed to give way at priority traffic control, failed to notice control	Wet	Overcast	Light rain	Roundabout	Give way	0	0	0
SH 3		I	ARAWATA ST	201642318	29/06/2016	Wed	11:52	Car/Wagon1 SDB on SH 3 hit Car/Wagon2 crossing at right angle from right	CAR/WAGON2, alcohol test below limit CAR/WAGON1, alcohol test below limit, did not check/notice another party from other dirn, failed to give way at priority traffic control	Wet	Overcast	Heavy rain	Roundabout	Give way	0	0	0
SH 3		I	ARAWATA ST	201752650	10/10/2017	Tue	13:15	Car/Wagon1 SDB on SH 3 changing lanes to left hit Car/Wagon2	CAR/WAGON1, following too closely	Dry	Bright sun	Fine	Roundabout	Give way	0	0	0
SH 3		I	ARAWATA ST	201440072	04/07/2014	Fri	14:00	Car/Wagon1 NDB on SH 3 hit rear of Car/Wagon2 NDB on SH 3 turning right from left side	CAR/WAGON1, travelled straight ahead from turning lane or flus	Dry	Bright sun	Fine	Roundabout	Give way	0	0	0
SH 3		I	ARAWATA ST	201039448	08/09/2010	Wed	08:00	Car/Wagon1 WDB on SH 3 overtaking hit Car/Wagon2 WDB on SH 3 turning right	CAR/WAGON2, turned right from incorrect lane	Dry	Overcast	Fine	Roundabout	Give way	0	0	0
SH 3		I	ARAWATA ST	201201043	19/01/2012	Thu	22:17	Motorcycle2 turning right hit by oncoming SUV1 NDB on SH 3	SUV1, failed to give way at priority traffic control, misjudged intentions of another party	Dry	Dark	Fine	Roundabout	Give way	0	0	1
SH 3		I	ARAWATA ST	201039388	03/09/2010	Fri	08:30	Car/Wagon1 SDB on SH 3 hit Car/Wagon2 merging from the left	CAR/WAGON1, failed to give way at priority traffic control	Dry	Overcast	Fine	Roundabout	Give way	0	0	0
SH 3		I	ARAWATA ST	201848911	25/09/2018	Tue	16:20	Car/Wagon1 NDB on ARAWATA STREET, TE AWAMUTU, WAIPA sideswiped by Van2 NDB on ARAWATA STREET, TE AWAMUTU, WAIPA turning left	VAN2, alcohol test below limit, other wrong lane or position CAR/WAGON1, alcohol test below limit	Dry	Bright sun	Fine	Roundabout	Give way	0	0	0
SH 3	5m	S	BOND ROAD	2936728	16/05/2009	Sat	09:34	SUV1 SDB on SH 3 hit rear end of Car/Wagon2 stop/slow for queue	SUV1, failed to notice car slowing, stopping/stationary, following too closely, ENV: slippery road due to rain	Wet	Overcast	Light rain	T Junction	Give way	0	0	0

Crash road	Distance	Direction	Side road	ID	Date	Day of week	Time	Description of events	Crash factors	Surface condition	Natural light	Weather	Junction	Control	Crash count fatal	Crash count severe	Crash count minor
SH 3		I	BOND ROAD	201519543	23/12/2015	Wed	14:40	Car/Wagon2 turning right hit by oncoming SUV1 SDB on SH 3	CAR/WAGON2, didnt look/notice other party - visibility obstruc, failed to give way turning to non-turning traffic SUV1, failed to give way when waved through by other dri	Dry	Bright sun	Null	T Junction	Give way	0	0	1
SH 3		I	CAMBRIDGE ROAD	201335938	08/08/2013	Thu	14:00	Car/Wagon1 SDB on SH 3 hit Car/Wagon2 merging from the left	CAR/WAGON1, failed to give way at priority traffic control, other inattentive	Dry	Overcast	Fine	Roundabout	Give way	0	0	0
SH 3		I	CAMBRIDGE ROAD	201530394	06/01/2015	Tue	08:00	Van1 EDB on SH 3 sideswiped by Car/Wagon2 EDB on SH 3 turning left	VAN1, other inattentive, turned right from incorrect lane	Dry	Bright sun	Fine	Roundabout	Give way	0	0	0
SH 3		I	CAMBRIDGE ROAD	201650354	26/09/2016	Mon	15:40	Car/Wagon1 SDB on SH 3 sideswiped by Car/Wagon2 SDB on SH 3 turning left	CAR/WAGON1, travelled straight ahead from turning lane or flus	Dry	Overcast	Fine	Roundabout	Give way	0	0	0
SH 3		I	CAMBRIDGE ROAD	201652816	18/11/2016	Fri	14:45	Van1 EDB on Ohaupo Road sideswiped by Car/Wagon2 EDB on Ohaupo Road turning left	CAR/WAGON2, turned right from incorrect lane	Dry	Bright sun	Fine	Roundabout	Nil	0	0	0
SH 3		I	SH 3	201739448	15/05/2017	Mon	14:50	Car/Wagon1 EDB on Ohaupo road sideswiped by Car/Wagon2 EDB on Ohaupo road turning left	CAR/WAGON2, did not check/notice another party behind, non-compliance with regulatory device with sign or, turned right from incorrect lane	Dry	Overcast	Fine	Roundabout	Give way	0	0	0

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Appendix D: T11 Modelling Reports

Modelling outputs for the following intersections included:

- **Proposed Access 1**
- **Proposed Access 2**
- **Proposed Access 3**
- **Gleneagles Road**

Also included as reference for the high-level assessment of State Highway 3:

- **State Highway 3 / Cambridge Road / Arawata Street intersectio**

INTERSECTION SUMMARY

Site: 101 [2018_Low Dev_Access 1_AM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	49.5	km/h	49.5	km/h
Travel Distance (Total)	521.7	veh-km/h	626.1	pers-km/h
Travel Time (Total)	10.5	veh-h/h	12.7	pers-h/h
Demand Flows (Total)	518	veh/h	621	pers/h
Percent Heavy Vehicles (Demand)	1.0	%		
Degree of Saturation	0.173			
Practical Spare Capacity	466.9	%		
Effective Intersection Capacity	2996	veh/h		
Control Delay (Total)	0.09	veh-h/h	0.11	pers-h/h
Control Delay (Average)	0.6	sec	0.6	sec
Control Delay (Worst Lane)	7.7	sec		
Control Delay (Worst Movement)	7.7	sec	7.7	sec
Geometric Delay (Average)	0.5	sec		
Stop-Line Delay (Average)	0.2	sec		
Idling Time (Average)	0.0	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	0.1	veh		
95% Back of Queue - Distance (Worst Lane)	0.6	m		
Queue Storage Ratio (Worst Lane)	0.00			
Total Effective Stops	31	veh/h	37	pers/h
Effective Stop Rate	0.06		0.06	
Proportion Queued	0.04		0.04	
Performance Index	10.8		10.8	
Cost (Total)	165.94	$/h	165.94	$/h
Fuel Consumption (Total)	32.3	L/h		
Carbon Dioxide (Total)	76.3	kg/h		
Hydrocarbons (Total)	0.005	kg/h		
Carbon Monoxide (Total)	0.059	kg/h		
NOx (Total)	0.040	kg/h		

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection 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.
Site Model Variability Index (Iterations 3 to N): 1.2 %
Number of Iterations: 4 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 28.0% 1.6% 0.8%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	248,590	veh/y	298,307	pers/y
Delay	44	veh-h/y	52	pers-h/y
Effective Stops	14,679	veh/y	17,614	pers/y
Travel Distance	250,434	veh-km/y	300,521	pers-km/y
Travel Time	5,062	veh-h/y	6,075	pers-h/y
Cost	79,650	$/y	79,650	$/y
Fuel Consumption	15,521	L/y		
Carbon Dioxide	36,617	kg/y		
Hydrocarbons	2	kg/y		
Carbon Monoxide	28	kg/y		
NOx	19	kg/y		

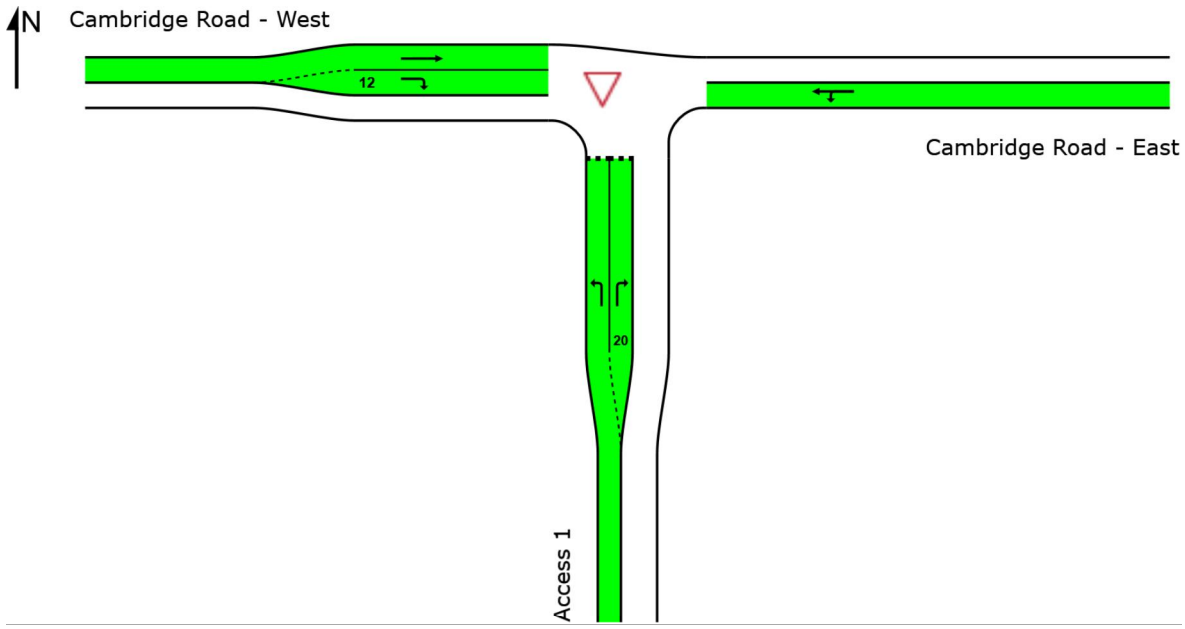
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2018_Low Dev_Access 1_AM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

	Approaches			Intersection
	South	East	West	
LOS	A	NA	NA	NA



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

INTERSECTION SUMMARY

Site: 101 [2018_Low Dev_Access 1_PM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	49.5	km/h	49.5	km/h
Travel Distance (Total)	521.7	veh-km/h	626.1	pers-km/h
Travel Time (Total)	10.5	veh-h/h	12.6	pers-h/h
Demand Flows (Total)	518	veh/h	621	pers/h
Percent Heavy Vehicles (Demand)	1.0	%		
Degree of Saturation	0.172			
Practical Spare Capacity	471.0	%		
Effective Intersection Capacity	3017	veh/h		
Control Delay (Total)	0.08	veh-h/h	0.09	pers-h/h
Control Delay (Average)	0.5	sec	0.5	sec
Control Delay (Worst Lane)	7.8	sec		
Control Delay (Worst Movement)	7.8	sec	7.8	sec
Geometric Delay (Average)	0.5	sec		
Stop-Line Delay (Average)	0.1	sec		
Idling Time (Average)	0.0	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	0.1	veh		
95% Back of Queue - Distance (Worst Lane)	0.5	m		
Queue Storage Ratio (Worst Lane)	0.00			
Total Effective Stops	28	veh/h	34	pers/h
Effective Stop Rate	0.05		0.05	
Proportion Queued	0.02		0.02	
Performance Index	10.8		10.8	
Cost (Total)	217.50	$/h	217.50	$/h
Fuel Consumption (Total)	32.3	L/h		
Carbon Dioxide (Total)	76.1	kg/h		
Hydrocarbons (Total)	0.005	kg/h		
Carbon Monoxide (Total)	0.059	kg/h		
NOx (Total)	0.040	kg/h		

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection 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.
Site Model Variability Index (Iterations 3 to N): 0.6 %
Number of Iterations: 3 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 63.7% 13.7% 0.6%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	248,590	veh/y	298,307	pers/y
Delay	38	veh-h/y	45	pers-h/y
Effective Stops	13,465	veh/y	16,158	pers/y
Travel Distance	250,428	veh-km/y	300,513	pers-km/y
Travel Time	5,057	veh-h/y	6,068	pers-h/y
Cost	104,400	$/y	104,400	$/y
Fuel Consumption	15,503	L/y		
Carbon Dioxide	36,544	kg/y		
Hydrocarbons	2	kg/y		
Carbon Monoxide	28	kg/y		
NOx	19	kg/y		

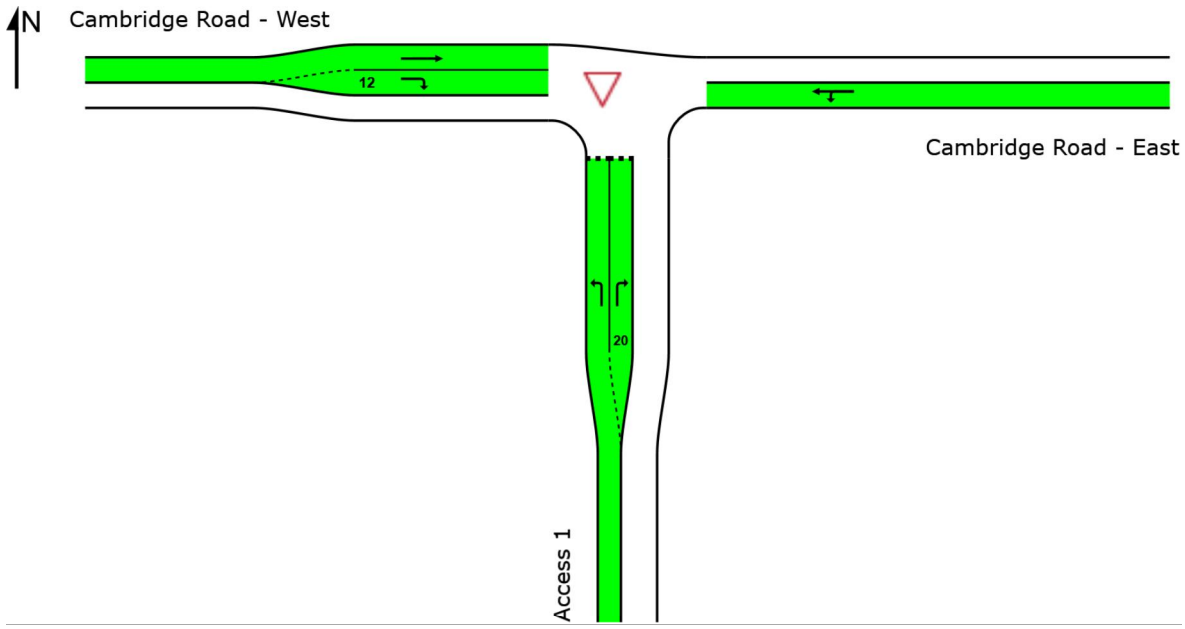
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2018_Low Dev_Access 1_PM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

	Approaches			Intersection
	South	East	West	
LOS	A	NA	NA	NA



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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INTERSECTION SUMMARY

Site: 101 [2035_Hi Dev_Access 1_AM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	49.3	km/h	49.3	km/h
Travel Distance (Total)	720.9	veh-km/h	865.1	pers-km/h
Travel Time (Total)	14.6	veh-h/h	17.6	pers-h/h
Demand Flows (Total)	719	veh/h	863	pers/h
Percent Heavy Vehicles (Demand)	1.0	%		
Degree of Saturation	0.233			
Practical Spare Capacity	320.4	%		
Effective Intersection Capacity	3084	veh/h		
Control Delay (Total)	0.18	veh-h/h	0.22	pers-h/h
Control Delay (Average)	0.9	sec	0.9	sec
Control Delay (Worst Lane)	9.6	sec		
Control Delay (Worst Movement)	9.6	sec	9.6	sec
Geometric Delay (Average)	0.6	sec		
Stop-Line Delay (Average)	0.3	sec		
Idling Time (Average)	0.1	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	0.2	veh		
95% Back of Queue - Distance (Worst Lane)	1.2	m		
Queue Storage Ratio (Worst Lane)	0.00			
Total Effective Stops	61	veh/h	73	pers/h
Effective Stop Rate	0.09		0.09	
Proportion Queued	0.06		0.06	
Performance Index	15.2		15.2	
Cost (Total)	233.25	$/h	233.25	$/h
Fuel Consumption (Total)	45.1	L/h		
Carbon Dioxide (Total)	106.5	kg/h		
Hydrocarbons (Total)	0.006	kg/h		
Carbon Monoxide (Total)	0.082	kg/h		
NOx (Total)	0.057	kg/h		

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection 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.
Site Model Variability Index (Iterations 3 to N): 1.7 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 3.0% 1.5% 0.7%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	345,095	veh/y	414,114	pers/y
Delay	88	veh-h/y	106	pers-h/y
Effective Stops	29,348	veh/y	35,217	pers/y
Travel Distance	346,050	veh-km/y	415,260	pers-km/y
Travel Time	7,025	veh-h/y	8,431	pers-h/y
Cost	111,961	$/y	111,961	$/y
Fuel Consumption	21,672	L/y		
Carbon Dioxide	51,126	kg/y		
Hydrocarbons	3	kg/y		
Carbon Monoxide	39	kg/y		
NOx	27	kg/y		

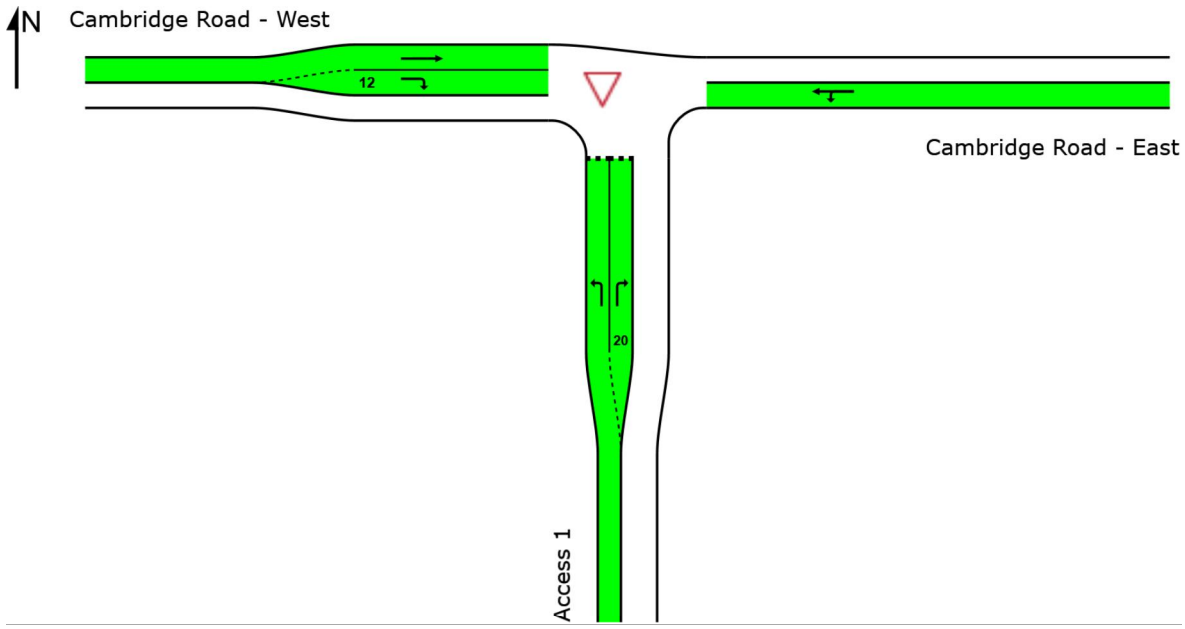
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2035_Hi Dev_Access 1_AM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

	Approaches			Intersection
	South	East	West	
LOS	A	NA	NA	NA



Colour code based on Level of Service

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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INTERSECTION SUMMARY

Site: 101 [2035_Hi Dev_Access 1_PM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	49.3	km/h	49.3	km/h
Travel Distance (Total)	720.9	veh-km/h	865.1	pers-km/h
Travel Time (Total)	14.6	veh-h/h	17.5	pers-h/h
Demand Flows (Total)	719	veh/h	863	pers/h
Percent Heavy Vehicles (Demand)	1.0	%		
Degree of Saturation	0.230			
Practical Spare Capacity	326.4	%		
Effective Intersection Capacity	3128	veh/h		
Control Delay (Total)	0.15	veh-h/h	0.18	pers-h/h
Control Delay (Average)	0.8	sec	0.8	sec
Control Delay (Worst Lane)	9.8	sec		
Control Delay (Worst Movement)	9.8	sec	9.8	sec
Geometric Delay (Average)	0.6	sec		
Stop-Line Delay (Average)	0.1	sec		
Idling Time (Average)	0.0	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	0.1	veh		
95% Back of Queue - Distance (Worst Lane)	1.0	m		
Queue Storage Ratio (Worst Lane)	0.00			
Total Effective Stops	53	veh/h	63	pers/h
Effective Stop Rate	0.07		0.07	
Proportion Queued	0.04		0.04	
Performance Index	15.1		15.1	
Cost (Total)	303.70	$/h	303.70	$/h
Fuel Consumption (Total)	45.1	L/h		
Carbon Dioxide (Total)	106.2	kg/h		
Hydrocarbons (Total)	0.006	kg/h		
Carbon Monoxide (Total)	0.082	kg/h		
NOx (Total)	0.056	kg/h		

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection 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.
Site Model Variability Index (Iterations 3 to N): 0.9 %
Number of Iterations: 4 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 18.2% 1.2% 0.6%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	345,095	veh/y	414,114	pers/y
Delay	73	veh-h/y	87	pers-h/y
Effective Stops	25,317	veh/y	30,380	pers/y
Travel Distance	346,036	veh-km/y	415,243	pers-km/y
Travel Time	7,012	veh-h/y	8,415	pers-h/y
Cost	145,777	$/y	145,777	$/y
Fuel Consumption	21,633	L/y		
Carbon Dioxide	50,993	kg/y		
Hydrocarbons	3	kg/y		
Carbon Monoxide	39	kg/y		
NOx	27	kg/y		

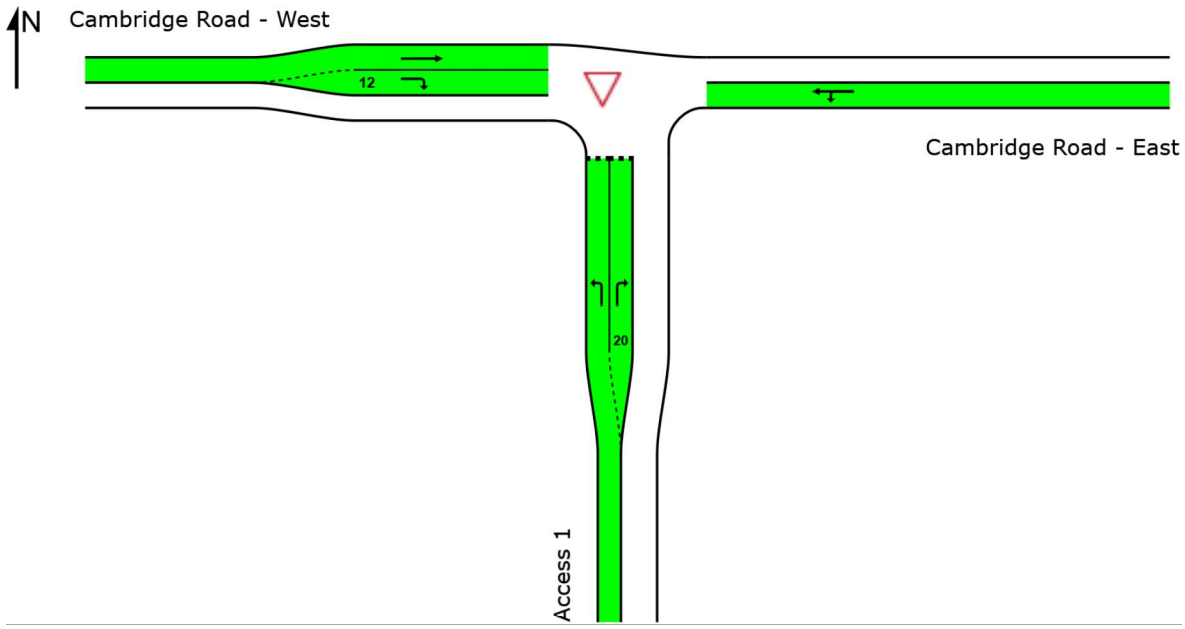
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2035_Hi Dev_Access 1_PM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

	Approaches			Intersection
	South	East	West	
LOS	A	NA	NA	NA



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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INTERSECTION SUMMARY

Site: 101 [2018_Low Dev_Access 2_AM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	49.3	km/h	49.3	km/h
Travel Distance (Total)	210.1	veh-km/h	252.2	pers-km/h
Travel Time (Total)	4.3	veh-h/h	5.1	pers-h/h
Demand Flows (Total)	496	veh/h	595	pers/h
Percent Heavy Vehicles (Demand)	1.0	%		
Degree of Saturation	0.168			
Practical Spare Capacity	483.8	%		
Effective Intersection Capacity	2954	veh/h		
Control Delay (Total)	0.05	veh-h/h	0.06	pers-h/h
Control Delay (Average)	0.4	sec	0.4	sec
Control Delay (Worst Lane)	6.2	sec		
Control Delay (Worst Movement)	7.7	sec	7.7	sec
Geometric Delay (Average)	0.3	sec		
Stop-Line Delay (Average)	0.1	sec		
Idling Time (Average)	0.0	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	0.1	veh		
95% Back of Queue - Distance (Worst Lane)	0.6	m		
Queue Storage Ratio (Worst Lane)	0.00			
Total Effective Stops	18	veh/h	21	pers/h
Effective Stop Rate	0.04		0.04	
Proportion Queued	0.02		0.02	
Performance Index	4.5		4.5	
Cost (Total)	71.45	$/h	71.45	$/h
Fuel Consumption (Total)	13.2	L/h		
Carbon Dioxide (Total)	31.2	kg/h		
Hydrocarbons (Total)	0.002	kg/h		
Carbon Monoxide (Total)	0.024	kg/h		
NOx (Total)	0.017	kg/h		

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection 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.
Site Model Variability Index (Iterations 3 to N): 0.9 %
Number of Iterations: 3 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 49.9% 27.9% 0.9%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	237,979	veh/y	285,575	pers/y
Delay	25	veh-h/y	30	pers-h/y
Effective Stops	8,569	veh/y	10,283	pers/y
Travel Distance	100,865	veh-km/y	121,037	pers-km/y
Travel Time	2,047	veh-h/y	2,457	pers-h/y
Cost	34,296	$/y	34,296	$/y
Fuel Consumption	6,341	L/y		
Carbon Dioxide	14,956	kg/y		
Hydrocarbons	1	kg/y		
Carbon Monoxide	12	kg/y		
NOx	8	kg/y		

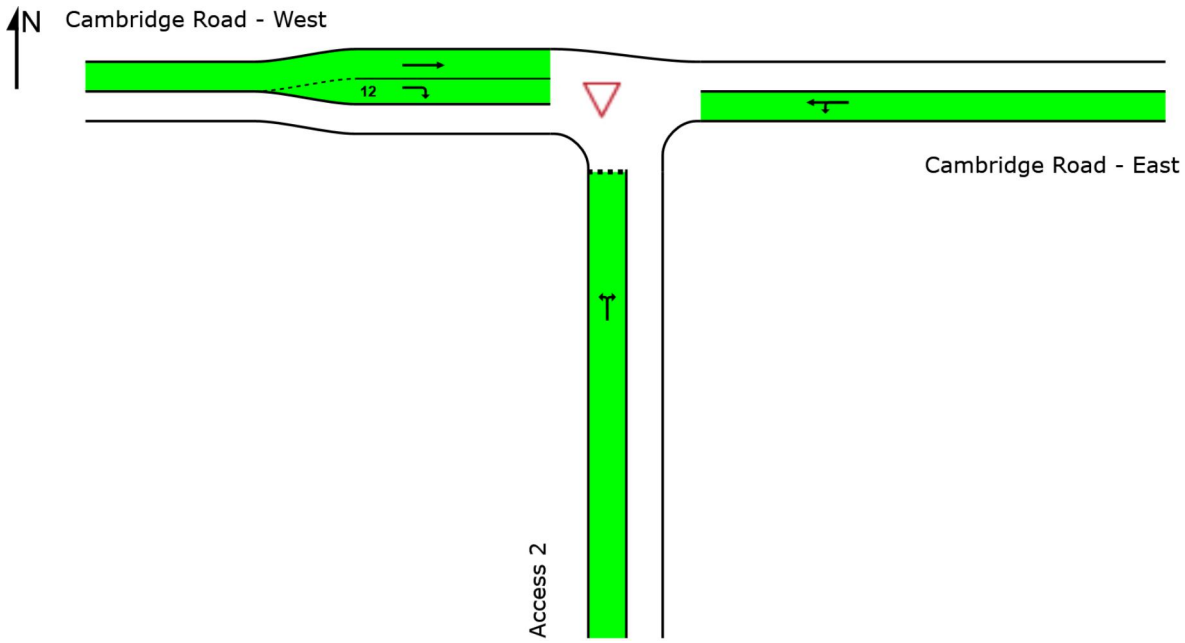
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2018_Low Dev_Access 2_AM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

	Approaches			Intersection
	South	East	West	
LOS	A	NA	NA	NA



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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INTERSECTION SUMMARY

Site: 101 [2018_Low Dev_Access 2_PM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	49.3	km/h	49.3	km/h
Travel Distance (Total)	210.1	veh-km/h	252.1	pers-km/h
Travel Time (Total)	4.3	veh-h/h	5.1	pers-h/h
Demand Flows (Total)	496	veh/h	595	pers/h
Percent Heavy Vehicles (Demand)	1.0	%		
Degree of Saturation	0.167			
Practical Spare Capacity	487.5	%		
Effective Intersection Capacity	2972	veh/h		
Control Delay (Total)	0.05	veh-h/h	0.06	pers-h/h
Control Delay (Average)	0.3	sec	0.3	sec
Control Delay (Worst Lane)	5.9	sec		
Control Delay (Worst Movement)	7.7	sec	7.7	sec
Geometric Delay (Average)	0.3	sec		
Stop-Line Delay (Average)	0.0	sec		
Idling Time (Average)	0.0	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	0.0	veh		
95% Back of Queue - Distance (Worst Lane)	0.3	m		
Queue Storage Ratio (Worst Lane)	0.00			
Total Effective Stops	16	veh/h	20	pers/h
Effective Stop Rate	0.03		0.03	
Proportion Queued	0.01		0.01	
Performance Index	4.4		4.4	
Cost (Total)	87.53	$/h	87.53	$/h
Fuel Consumption (Total)	13.2	L/h		
Carbon Dioxide (Total)	31.1	kg/h		
Hydrocarbons (Total)	0.002	kg/h		
Carbon Monoxide (Total)	0.024	kg/h		
NOx (Total)	0.017	kg/h		

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection 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.

Site Model Variability Index (Iterations 3 to N): 0.4 %

Number of Iterations: 3 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 47.1% 13.3% 0.4%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	237,979	veh/y	285,575	pers/y
Delay	22	veh-h/y	27	pers-h/y
Effective Stops	7,859	veh/y	9,430	pers/y
Travel Distance	100,855	veh-km/y	121,026	pers-km/y
Travel Time	2,045	veh-h/y	2,454	pers-h/y
Cost	42,012	$/y	42,012	$/y
Fuel Consumption	6,331	L/y		
Carbon Dioxide	14,924	kg/y		
Hydrocarbons	1	kg/y		
Carbon Monoxide	12	kg/y		
NOx	8	kg/y		

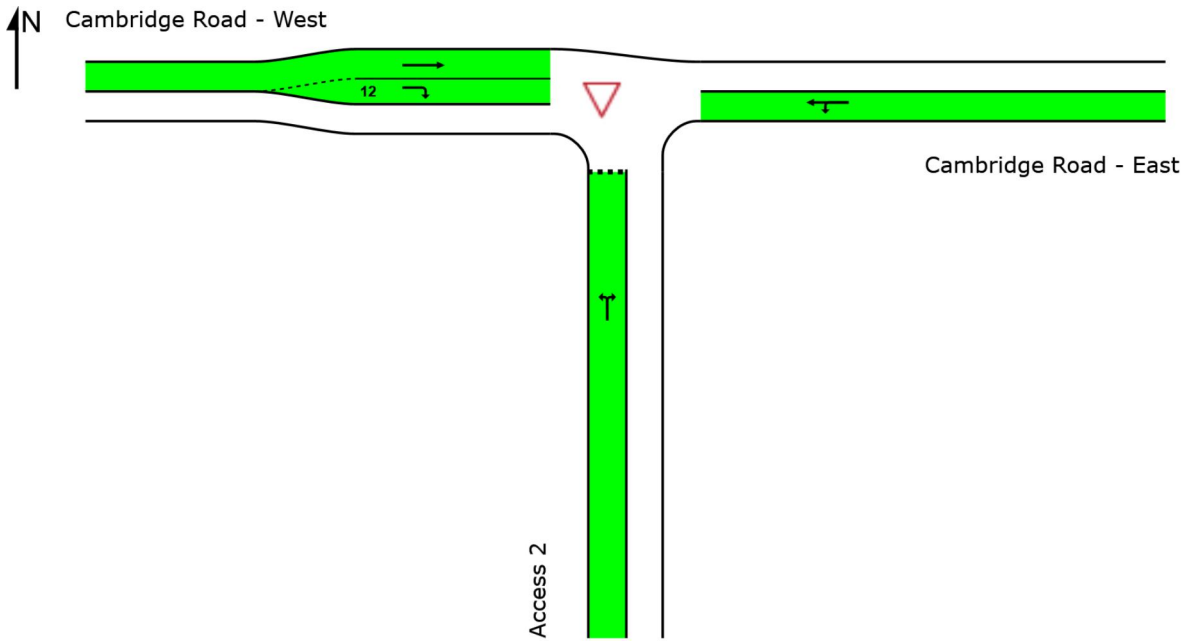
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2018_Low Dev_Access 2_PM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

	Approaches			Intersection
	South	East	West	
LOS	A	NA	NA	NA



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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INTERSECTION SUMMARY

Site: 101 [2035_Hi Dev_Access 2_AM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	48.8	km/h	48.8	km/h
Travel Distance (Total)	291.0	veh-km/h	349.2	pers-km/h
Travel Time (Total)	6.0	veh-h/h	7.2	pers-h/h
Demand Flows (Total)	685	veh/h	822	pers/h
Percent Heavy Vehicles (Demand)	1.0	%		
Degree of Saturation	0.225			
Practical Spare Capacity	334.7	%		
Effective Intersection Capacity	3040	veh/h		
Control Delay (Total)	0.12	veh-h/h	0.14	pers-h/h
Control Delay (Average)	0.6	sec	0.6	sec
Control Delay (Worst Lane)	7.3	sec		
Control Delay (Worst Movement)	9.7	sec	9.7	sec
Geometric Delay (Average)	0.4	sec		
Stop-Line Delay (Average)	0.2	sec		
Idling Time (Average)	0.0	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	0.2	veh		
95% Back of Queue - Distance (Worst Lane)	1.4	m		
Queue Storage Ratio (Worst Lane)	0.00			
Total Effective Stops	40	veh/h	48	pers/h
Effective Stop Rate	0.06		0.06	
Proportion Queued	0.04		0.04	
Performance Index	6.5		6.5	
Cost (Total)	102.47	$/h	102.47	$/h
Fuel Consumption (Total)	18.7	L/h		
Carbon Dioxide (Total)	44.1	kg/h		
Hydrocarbons (Total)	0.003	kg/h		
Carbon Monoxide (Total)	0.034	kg/h		
NOx (Total)	0.024	kg/h		

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection 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.
Site Model Variability Index (Iterations 3 to N): 1.2 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 2.1% 1.0% 0.5%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	328,926	veh/y	394,712	pers/y
Delay	58	veh-h/y	69	pers-h/y
Effective Stops	19,276	veh/y	23,132	pers/y
Travel Distance	139,664	veh-km/y	167,596	pers-km/y
Travel Time	2,860	veh-h/y	3,432	pers-h/y
Cost	49,185	$/y	49,185	$/y
Fuel Consumption	8,972	L/y		
Carbon Dioxide	21,161	kg/y		
Hydrocarbons	1	kg/y		
Carbon Monoxide	16	kg/y		
NOx	12	kg/y		

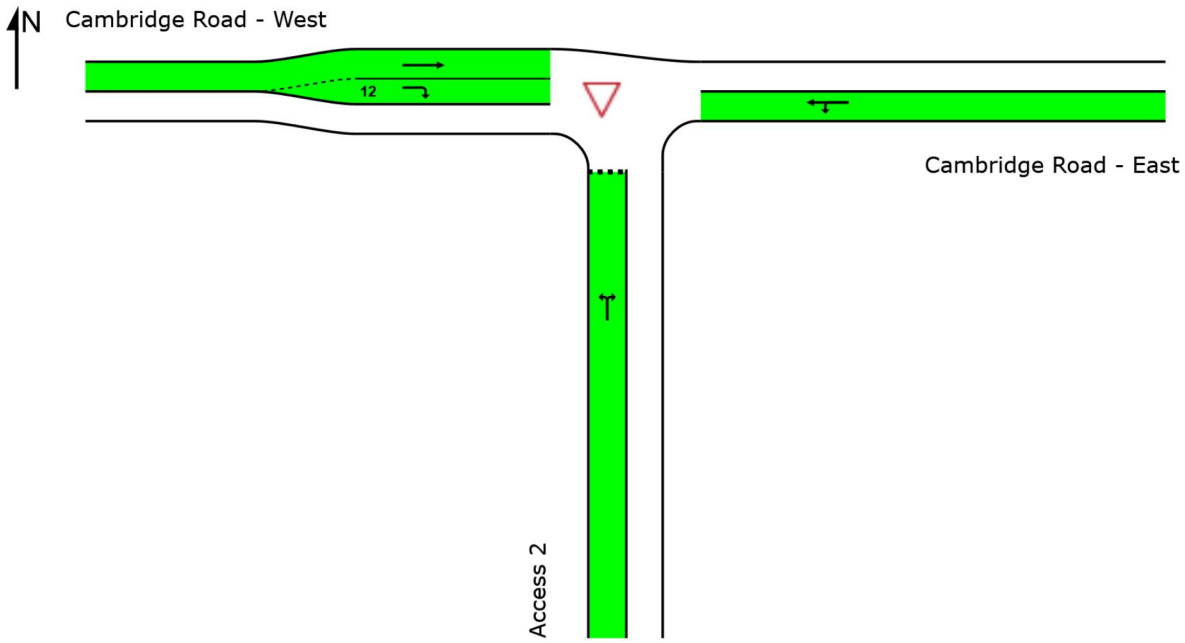
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2035_Hi Dev_Access 2_AM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

	Approaches			Intersection
	South	East	West	
LOS	A	NA	NA	NA



Colour code based on Level of Service

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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INTERSECTION SUMMARY

Site: 101 [2035_Hi Dev_Access 2_PM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	49.0	km/h	49.0	km/h
Travel Distance (Total)	290.9	veh-km/h	349.1	pers-km/h
Travel Time (Total)	5.9	veh-h/h	7.1	pers-h/h
Demand Flows (Total)	685	veh/h	822	pers/h
Percent Heavy Vehicles (Demand)	1.0	%		
Degree of Saturation	0.224			
Practical Spare Capacity	336.8	%		
Effective Intersection Capacity	3054	veh/h		
Control Delay (Total)	0.10	veh-h/h	0.12	pers-h/h
Control Delay (Average)	0.5	sec	0.5	sec
Control Delay (Worst Lane)	6.4	sec		
Control Delay (Worst Movement)	9.7	sec	9.7	sec
Geometric Delay (Average)	0.4	sec		
Stop-Line Delay (Average)	0.1	sec		
Idling Time (Average)	0.0	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	0.1	veh		
95% Back of Queue - Distance (Worst Lane)	0.6	m		
Queue Storage Ratio (Worst Lane)	0.00			
Total Effective Stops	34	veh/h	41	pers/h
Effective Stop Rate	0.05		0.05	
Proportion Queued	0.02		0.02	
Performance Index	6.3		6.3	
Cost (Total)	123.57	$/h	123.57	$/h
Fuel Consumption (Total)	18.6	L/h		
Carbon Dioxide (Total)	43.9	kg/h		
Hydrocarbons (Total)	0.003	kg/h		
Carbon Monoxide (Total)	0.034	kg/h		
NOx (Total)	0.024	kg/h		

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection 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.

Site Model Variability Index (Iterations 3 to N): 0.8 %

Number of Iterations: 3 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 52.1% 17.7% 0.8%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	328,926	veh/y	394,712	pers/y
Delay	46	veh-h/y	56	pers-h/y
Effective Stops	16,214	veh/y	19,457	pers/y
Travel Distance	139,651	veh-km/y	167,582	pers-km/y
Travel Time	2,850	veh-h/y	3,421	pers-h/y
Cost	59,315	$/y	59,315	$/y
Fuel Consumption	8,942	L/y		
Carbon Dioxide	21,080	kg/y		
Hydrocarbons	1	kg/y		
Carbon Monoxide	16	kg/y		
NOx	12	kg/y		

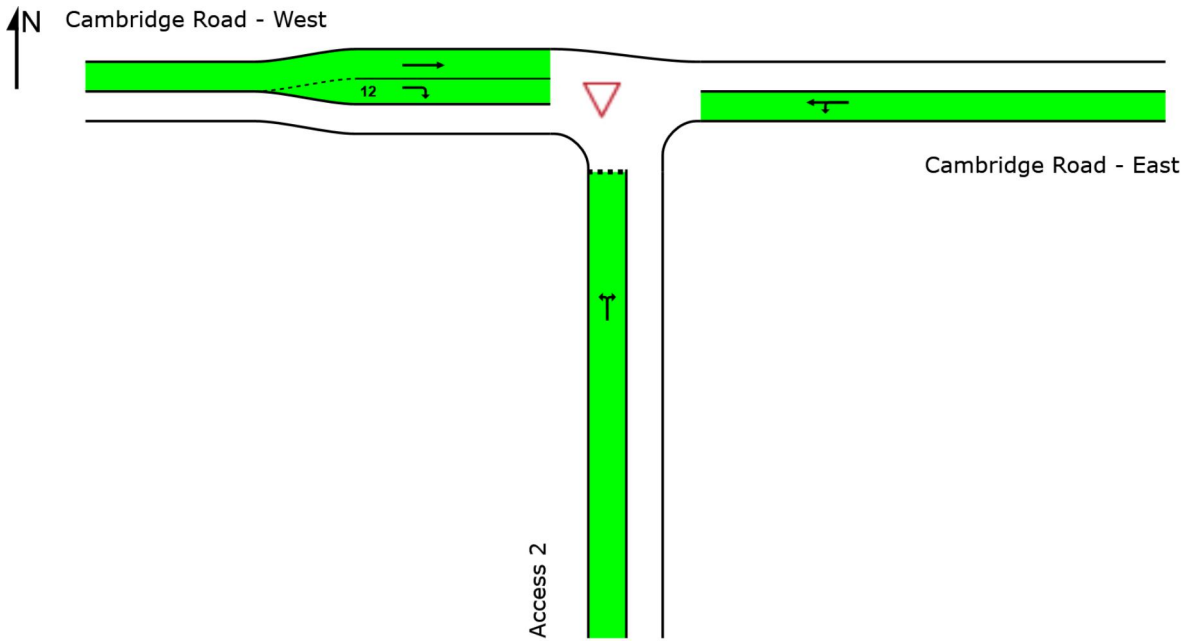
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2035_Hi Dev_Access 2_PM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

	Approaches			Intersection
	South	East	West	
LOS	A	NA	NA	NA



Colour code based on Level of Service

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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INTERSECTION SUMMARY

Site: 101 [2018_Low Dev_Access 3_AM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	48.3	km/h	48.3	km/h
Travel Distance (Total)	259.4	veh-km/h	311.3	pers-km/h
Travel Time (Total)	5.4	veh-h/h	6.4	pers-h/h
Demand Flows (Total)	548	veh/h	658	pers/h
Percent Heavy Vehicles (Demand)	1.0	%		
Degree of Saturation	0.170			
Practical Spare Capacity	476.1	%		
Effective Intersection Capacity	3224	veh/h		
Control Delay (Total)	0.15	veh-h/h	0.18	pers-h/h
Control Delay (Average)	1.0	sec	1.0	sec
Control Delay (Worst Lane)	6.0	sec		
Control Delay (Worst Movement)	6.7	sec	6.7	sec
Geometric Delay (Average)	0.7	sec		
Stop-Line Delay (Average)	0.3	sec		
Idling Time (Average)	0.0	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	0.2	veh		
95% Back of Queue - Distance (Worst Lane)	1.4	m		
Queue Storage Ratio (Worst Lane)	0.00			
Total Effective Stops	50	veh/h	60	pers/h
Effective Stop Rate	0.09		0.09	
Proportion Queued	0.08		0.08	
Performance Index	6.2		6.2	
Cost (Total)	113.30	$/h	113.30	$/h
Fuel Consumption (Total)	17.5	L/h		
Carbon Dioxide (Total)	41.2	kg/h		
Hydrocarbons (Total)	0.003	kg/h		
Carbon Monoxide (Total)	0.032	kg/h		
NOx (Total)	0.024	kg/h		

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection 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.
Site Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 3 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 46.5% 5.3% 0.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	263,242	veh/y	315,891	pers/y
Delay	70	veh-h/y	84	pers-h/y
Effective Stops	23,864	veh/y	28,637	pers/y
Travel Distance	124,532	veh-km/y	149,439	pers-km/y
Travel Time	2,576	veh-h/y	3,091	pers-h/y
Cost	54,385	$/y	54,385	$/y
Fuel Consumption	8,385	L/y		
Carbon Dioxide	19,765	kg/y		
Hydrocarbons	1	kg/y		
Carbon Monoxide	16	kg/y		
NOx	11	kg/y		

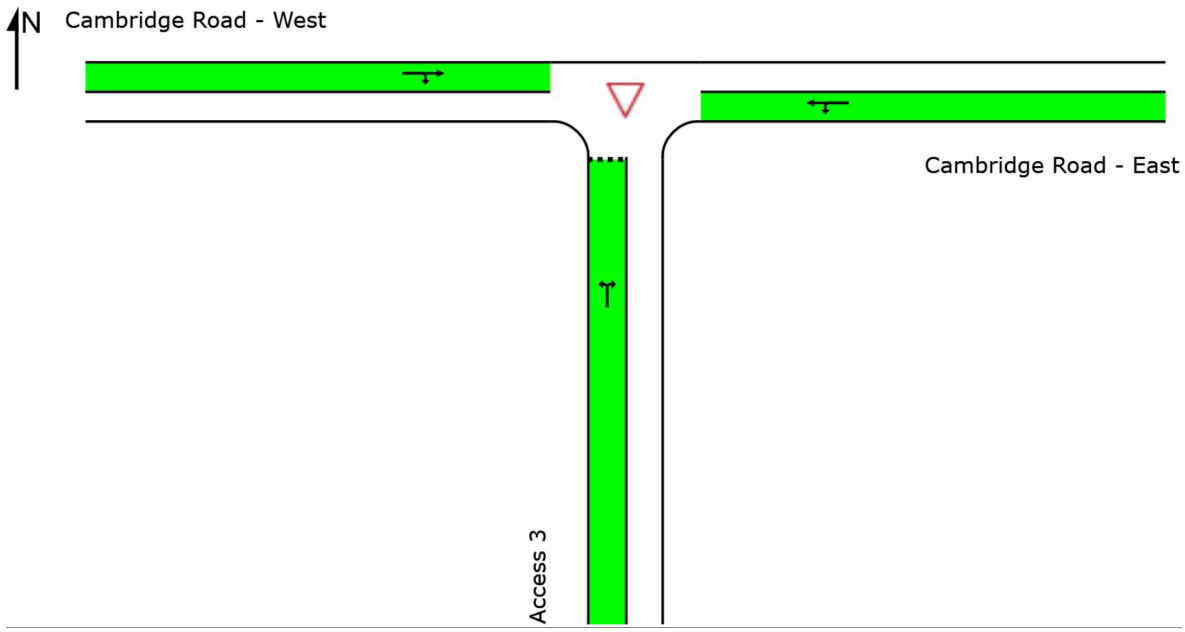
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2018_Low Dev_Access 3_AM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

	Approaches			Intersection
	South	East	West	
LOS	A	NA	NA	NA



Colour code based on Level of Service

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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INTERSECTION SUMMARY

Site: 101 [2018_Low Dev_Access 3_PM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	48.4	km/h	48.4	km/h
Travel Distance (Total)	259.4	veh-km/h	311.3	pers-km/h
Travel Time (Total)	5.4	veh-h/h	6.4	pers-h/h
Demand Flows (Total)	548	veh/h	658	pers/h
Percent Heavy Vehicles (Demand)	1.0	%		
Degree of Saturation	0.193			
Practical Spare Capacity	406.6	%		
Effective Intersection Capacity	2835	veh/h		
Control Delay (Total)	0.13	veh-h/h	0.16	pers-h/h
Control Delay (Average)	0.8	sec	0.8	sec
Control Delay (Worst Lane)	5.5	sec		
Control Delay (Worst Movement)	6.8	sec	6.8	sec
Geometric Delay (Average)	0.7	sec		
Stop-Line Delay (Average)	0.1	sec		
Idling Time (Average)	0.0	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	0.3	veh		
95% Back of Queue - Distance (Worst Lane)	2.2	m		
Queue Storage Ratio (Worst Lane)	0.01			
Total Effective Stops	46	veh/h	55	pers/h
Effective Stop Rate	0.08		0.08	
Proportion Queued	0.06		0.06	
Performance Index	6.2		6.2	
Cost (Total)	100.27	$/h	100.27	$/h
Fuel Consumption (Total)	17.6	L/h		
Carbon Dioxide (Total)	41.5	kg/h		
Hydrocarbons (Total)	0.003	kg/h		
Carbon Monoxide (Total)	0.033	kg/h		
NOx (Total)	0.024	kg/h		

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection 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.
Site Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 3 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 41.0% 2.7% 0.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	263,242	veh/y	315,891	pers/y
Delay	62	veh-h/y	74	pers-h/y
Effective Stops	22,104	veh/y	26,525	pers/y
Travel Distance	124,514	veh-km/y	149,417	pers-km/y
Travel Time	2,572	veh-h/y	3,087	pers-h/y
Cost	48,130	$/y	48,130	$/y
Fuel Consumption	8,443	L/y		
Carbon Dioxide	19,911	kg/y		
Hydrocarbons	1	kg/y		
Carbon Monoxide	16	kg/y		
NOx	12	kg/y		

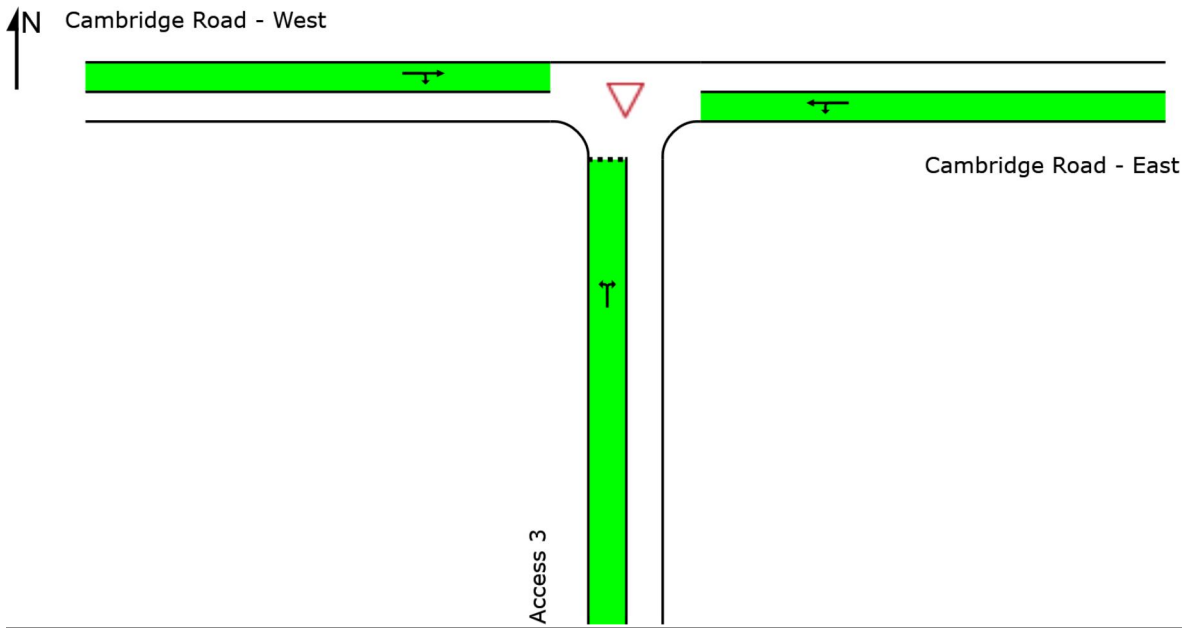
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2018_Low Dev_Access 3_PM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

	Approaches			Intersection
	South	East	West	
LOS	A	NA	NA	NA



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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INTERSECTION SUMMARY

Site: 101 [2035_Hi Dev_Access 3_AM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	47.5	km/h	47.5	km/h
Travel Distance (Total)	371.2	veh-km/h	445.5	pers-km/h
Travel Time (Total)	7.8	veh-h/h	9.4	pers-h/h
Demand Flows (Total)	791	veh/h	949	pers/h
Percent Heavy Vehicles (Demand)	1.0	%		
Degree of Saturation	0.231			
Practical Spare Capacity	325.1	%		
Effective Intersection Capacity	3429	veh/h		
Control Delay (Total)	0.34	veh-h/h	0.41	pers-h/h
Control Delay (Average)	1.5	sec	1.5	sec
Control Delay (Worst Lane)	6.9	sec		
Control Delay (Worst Movement)	8.2	sec	8.2	sec
Geometric Delay (Average)	1.0	sec		
Stop-Line Delay (Average)	0.6	sec		
Idling Time (Average)	0.1	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	0.5	veh		
95% Back of Queue - Distance (Worst Lane)	3.4	m		
Queue Storage Ratio (Worst Lane)	0.01			
Total Effective Stops	112	veh/h	134	pers/h
Effective Stop Rate	0.14		0.14	
Proportion Queued	0.13		0.13	
Performance Index	9.7		9.7	
Cost (Total)	171.05	$/h	171.05	$/h
Fuel Consumption (Total)	26.3	L/h		
Carbon Dioxide (Total)	61.9	kg/h		
Hydrocarbons (Total)	0.004	kg/h		
Carbon Monoxide (Total)	0.049	kg/h		
NOx (Total)	0.037	kg/h		

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection 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.
Site Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 3 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 54.4% 10.2% 0.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	379,453	veh/y	455,343	pers/y
Delay	162	veh-h/y	195	pers-h/y
Effective Stops	53,537	veh/y	64,245	pers/y
Travel Distance	178,181	veh-km/y	213,817	pers-km/y
Travel Time	3,750	veh-h/y	4,500	pers-h/y
Cost	82,103	$/y	82,103	$/y
Fuel Consumption	12,600	L/y		
Carbon Dioxide	29,699	kg/y		
Hydrocarbons	2	kg/y		
Carbon Monoxide	24	kg/y		
NOx	18	kg/y		

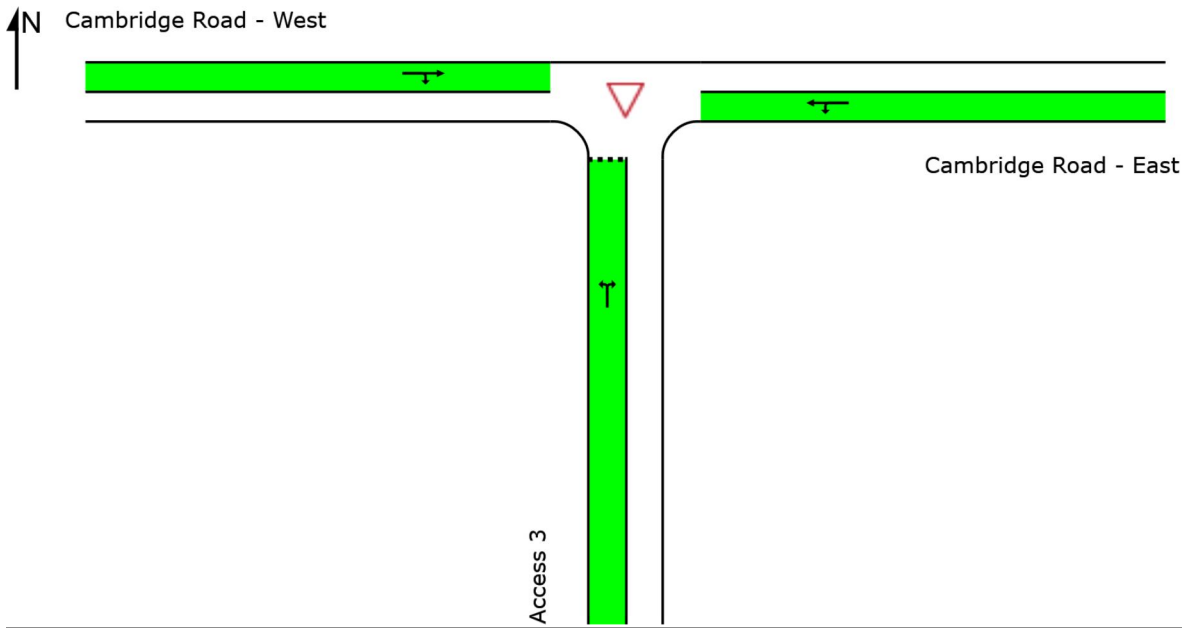
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2035_Hi Dev_Access 3_AM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

	Approaches			Intersection
	South	East	West	
LOS	A	NA	NA	NA



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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INTERSECTION SUMMARY

Site: 101 [2035_Hi Dev_Access 3_PM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	47.6	km/h	47.6	km/h
Travel Distance (Total)	371.1	veh-km/h	445.4	pers-km/h
Travel Time (Total)	7.8	veh-h/h	9.4	pers-h/h
Demand Flows (Total)	791	veh/h	949	pers/h
Percent Heavy Vehicles (Demand)	1.0	%		
Degree of Saturation	0.281			
Practical Spare Capacity	249.3	%		
Effective Intersection Capacity	2817	veh/h		
Control Delay (Total)	0.29	veh-h/h	0.34	pers-h/h
Control Delay (Average)	1.3	sec	1.3	sec
Control Delay (Worst Lane)	6.1	sec		
Control Delay (Worst Movement)	8.5	sec	8.5	sec
Geometric Delay (Average)	1.0	sec		
Stop-Line Delay (Average)	0.3	sec		
Idling Time (Average)	0.0	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	0.7	veh		
95% Back of Queue - Distance (Worst Lane)	5.1	m		
Queue Storage Ratio (Worst Lane)	0.01			
Total Effective Stops	95	veh/h	114	pers/h
Effective Stop Rate	0.12		0.12	
Proportion Queued	0.11		0.11	
Performance Index	9.7		9.7	
Cost (Total)	154.73	$/h	154.73	$/h
Fuel Consumption (Total)	26.6	L/h		
Carbon Dioxide (Total)	62.7	kg/h		
Hydrocarbons (Total)	0.004	kg/h		
Carbon Monoxide (Total)	0.050	kg/h		
NOx (Total)	0.039	kg/h		

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection 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.
Site Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 3 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 48.8% 5.0% 0.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	379,453	veh/y	455,343	pers/y
Delay	138	veh-h/y	166	pers-h/y
Effective Stops	45,569	veh/y	54,683	pers/y
Travel Distance	178,144	veh-km/y	213,772	pers-km/y
Travel Time	3,741	veh-h/y	4,489	pers-h/y
Cost	74,272	$/y	74,272	$/y
Fuel Consumption	12,771	L/y		
Carbon Dioxide	30,113	kg/y		
Hydrocarbons	2	kg/y		
Carbon Monoxide	24	kg/y		
NOx	19	kg/y		

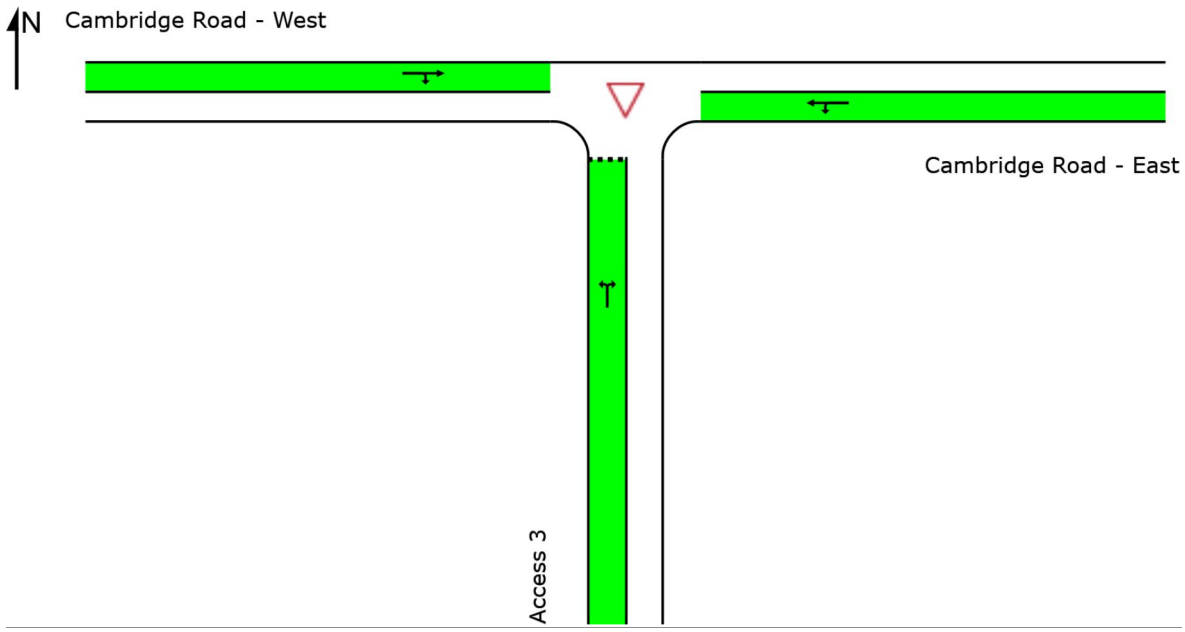
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2035_Hi Dev_Access 3_PM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

	Approaches			Intersection
	South	East	West	
LOS	A	NA	NA	NA



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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INTERSECTION SUMMARY

Site: 101 [2018_Low Dev_Gleneagles_AM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	49.0	km/h	49.0	km/h
Travel Distance (Total)	155.1	veh-km/h	186.1	pers-km/h
Travel Time (Total)	3.2	veh-h/h	3.8	pers-h/h
Demand Flows (Total)	496	veh/h	595	pers/h
Percent Heavy Vehicles (Demand)	0.9	%		
Degree of Saturation	0.173			
Practical Spare Capacity	467.7	%		
Effective Intersection Capacity	2872	veh/h		
Control Delay (Total)	0.05	veh-h/h	0.06	pers-h/h
Control Delay (Average)	0.4	sec	0.4	sec
Control Delay (Worst Lane)	6.1	sec		
Control Delay (Worst Movement)	6.5	sec	6.5	sec
Geometric Delay (Average)	0.3	sec		
Stop-Line Delay (Average)	0.1	sec		
Idling Time (Average)	0.0	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	0.1	veh		
95% Back of Queue - Distance (Worst Lane)	0.5	m		
Queue Storage Ratio (Worst Lane)	0.00			
Total Effective Stops	18	veh/h	22	pers/h
Effective Stop Rate	0.04		0.04	
Proportion Queued	0.02		0.02	
Performance Index	3.3		3.3	
Cost (Total)	62.41	$/h	62.41	$/h
Fuel Consumption (Total)	9.9	L/h		
Carbon Dioxide (Total)	23.3	kg/h		
Hydrocarbons (Total)	0.001	kg/h		
Carbon Monoxide (Total)	0.018	kg/h		
NOx (Total)	0.011	kg/h		

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection 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.
Site Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 2 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 0.0% 49.4% 0.2%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	237,979	veh/y	285,575	pers/y
Delay	24	veh-h/y	29	pers-h/y
Effective Stops	8,714	veh/y	10,456	pers/y
Travel Distance	74,445	veh-km/y	89,334	pers-km/y
Travel Time	1,519	veh-h/y	1,823	pers-h/y
Cost	29,958	$/y	29,958	$/y
Fuel Consumption	4,741	L/y		
Carbon Dioxide	11,176	kg/y		
Hydrocarbons	1	kg/y		
Carbon Monoxide	9	kg/y		
NOx	5	kg/y		

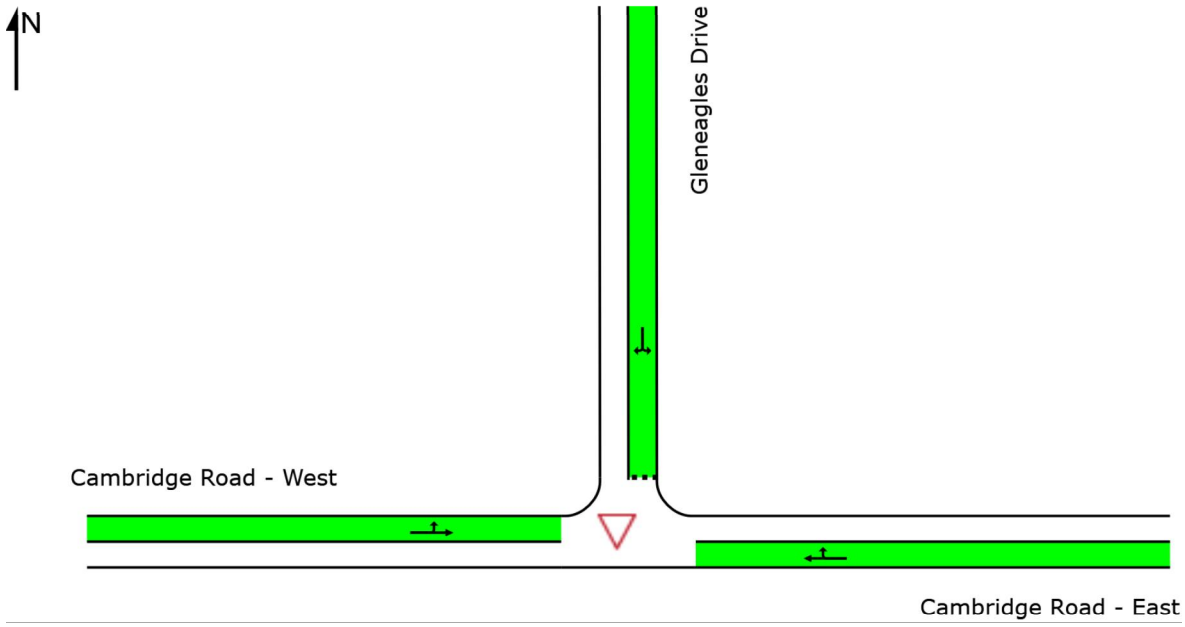
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2018_Low Dev_Gleneagles_AM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

	Approaches			Intersection
	East	North	West	
LOS	NA	A	NA	NA



Colour code based on Level of Service

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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INTERSECTION SUMMARY

Site: 101 [2018_Low Dev_Gleneagles_PM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	49.1	km/h	49.1	km/h
Travel Distance (Total)	155.1	veh-km/h	186.2	pers-km/h
Travel Time (Total)	3.2	veh-h/h	3.8	pers-h/h
Demand Flows (Total)	496	veh/h	595	pers/h
Percent Heavy Vehicles (Demand)	0.9	%		
Degree of Saturation	0.175			
Practical Spare Capacity	460.9	%		
Effective Intersection Capacity	2838	veh/h		
Control Delay (Total)	0.05	veh-h/h	0.06	pers-h/h
Control Delay (Average)	0.3	sec	0.3	sec
Control Delay (Worst Lane)	6.0	sec		
Control Delay (Worst Movement)	6.5	sec	6.5	sec
Geometric Delay (Average)	0.3	sec		
Stop-Line Delay (Average)	0.0	sec		
Idling Time (Average)	0.0	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	0.0	veh		
95% Back of Queue - Distance (Worst Lane)	0.3	m		
Queue Storage Ratio (Worst Lane)	0.00			
Total Effective Stops	18	veh/h	21	pers/h
Effective Stop Rate	0.04		0.04	
Proportion Queued	0.01		0.01	
Performance Index	3.3		3.3	
Cost (Total)	62.11	$/h	62.11	$/h
Fuel Consumption (Total)	9.9	L/h		
Carbon Dioxide (Total)	23.3	kg/h		
Hydrocarbons (Total)	0.001	kg/h		
Carbon Monoxide (Total)	0.018	kg/h		
NOx (Total)	0.011	kg/h		

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection 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.
Site Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 2 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 0.0% 48.5% 0.4%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	237,979	veh/y	285,575	pers/y
Delay	22	veh-h/y	27	pers-h/y
Effective Stops	8,431	veh/y	10,117	pers/y
Travel Distance	74,462	veh-km/y	89,355	pers-km/y
Travel Time	1,517	veh-h/y	1,821	pers-h/y
Cost	29,811	$/y	29,811	$/y
Fuel Consumption	4,754	L/y		
Carbon Dioxide	11,206	kg/y		
Hydrocarbons	1	kg/y		
Carbon Monoxide	9	kg/y		
NOx	6	kg/y		

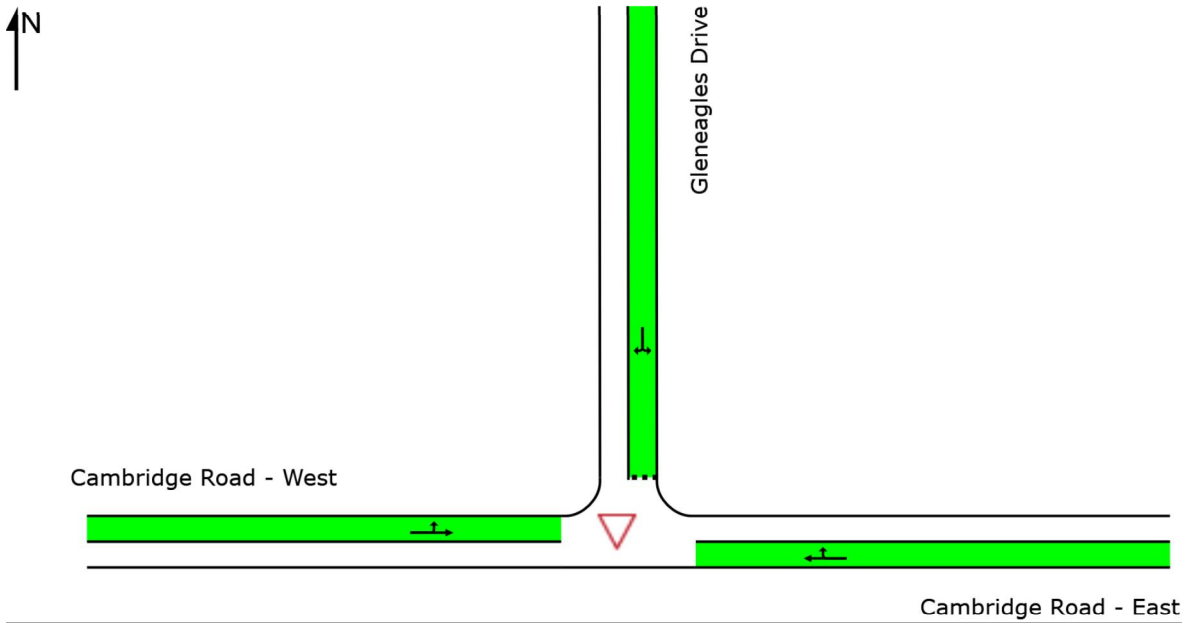
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2018_Low Dev_Gleneagles_PM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

	Approaches			Intersection
	East	North	West	
LOS	NA	A	NA	NA



Colour code based on Level of Service

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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INTERSECTION SUMMARY

Site: 101 [2035_Hi Dev_Gleneagles_AM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	48.9	km/h	48.9	km/h
Travel Distance (Total)	208.5	veh-km/h	250.2	pers-km/h
Travel Time (Total)	4.3	veh-h/h	5.1	pers-h/h
Demand Flows (Total)	666	veh/h	800	pers/h
Percent Heavy Vehicles (Demand)	0.9	%		
Degree of Saturation	0.231			
Practical Spare Capacity	323.5	%		
Effective Intersection Capacity	2880	veh/h		
Control Delay (Total)	0.08	veh-h/h	0.09	pers-h/h
Control Delay (Average)	0.4	sec	0.4	sec
Control Delay (Worst Lane)	6.8	sec		
Control Delay (Worst Movement)	7.6	sec	7.6	sec
Geometric Delay (Average)	0.3	sec		
Stop-Line Delay (Average)	0.1	sec		
Idling Time (Average)	0.0	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	0.1	veh		
95% Back of Queue - Distance (Worst Lane)	0.9	m		
Queue Storage Ratio (Worst Lane)	0.00			
Total Effective Stops	27	veh/h	32	pers/h
Effective Stop Rate	0.04		0.04	
Proportion Queued	0.02		0.02	
Performance Index	4.5		4.5	
Cost (Total)	84.41	$/h	84.41	$/h
Fuel Consumption (Total)	13.3	L/h		
Carbon Dioxide (Total)	31.4	kg/h		
Hydrocarbons (Total)	0.002	kg/h		
Carbon Monoxide (Total)	0.024	kg/h		
NOx (Total)	0.015	kg/h		

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection 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.
Site Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 2 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 0.0% 56.3% 0.3%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	319,832	veh/y	383,798	pers/y
Delay	37	veh-h/y	45	pers-h/y
Effective Stops	12,835	veh/y	15,402	pers/y
Travel Distance	100,099	veh-km/y	120,119	pers-km/y
Travel Time	2,047	veh-h/y	2,457	pers-h/y
Cost	40,519	$/y	40,519	$/y
Fuel Consumption	6,402	L/y		
Carbon Dioxide	15,089	kg/y		
Hydrocarbons	1	kg/y		
Carbon Monoxide	12	kg/y		
NOx	7	kg/y		

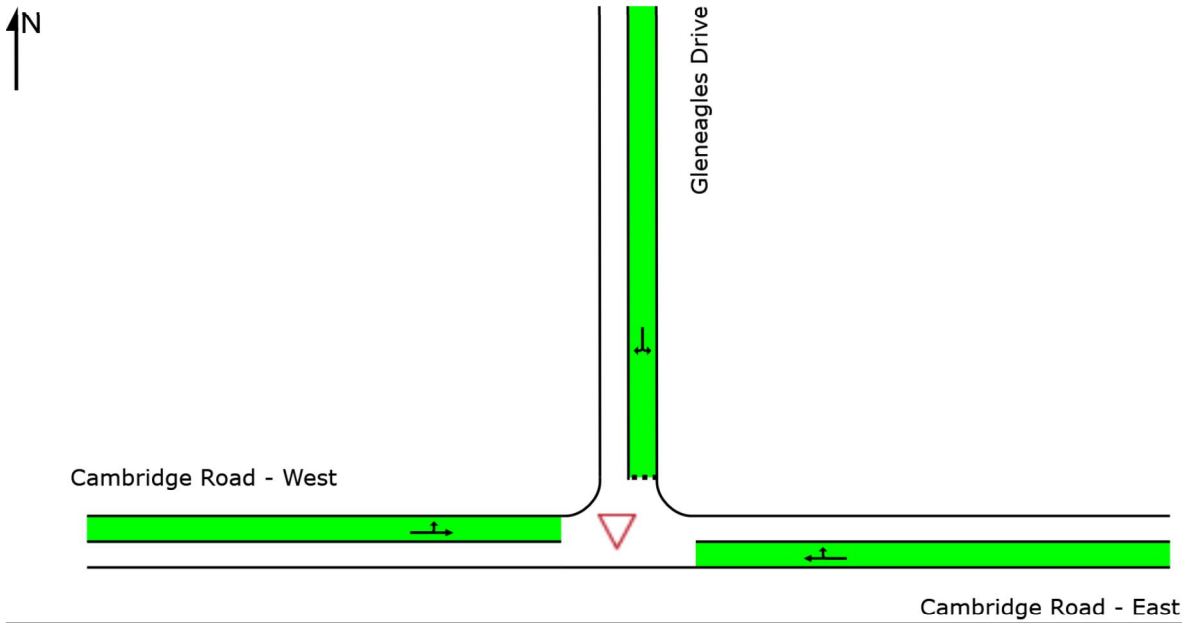
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2035_Hi Dev_Gleneagles_AM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

	Approaches			Intersection
	East	North	West	
LOS	NA	A	NA	NA



Colour code based on Level of Service

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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INTERSECTION SUMMARY

Site: 101 [2035_Hi Dev_Gleneagles_PM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	48.9	km/h	48.9	km/h
Travel Distance (Total)	208.6	veh-km/h	250.3	pers-km/h
Travel Time (Total)	4.3	veh-h/h	5.1	pers-h/h
Demand Flows (Total)	666	veh/h	800	pers/h
Percent Heavy Vehicles (Demand)	0.9	%		
Degree of Saturation	0.240			
Practical Spare Capacity	308.3	%		
Effective Intersection Capacity	2776	veh/h		
Control Delay (Total)	0.08	veh-h/h	0.10	pers-h/h
Control Delay (Average)	0.4	sec	0.4	sec
Control Delay (Worst Lane)	7.1	sec		
Control Delay (Worst Movement)	7.6	sec	7.6	sec
Geometric Delay (Average)	0.3	sec		
Stop-Line Delay (Average)	0.1	sec		
Idling Time (Average)	0.0	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	0.1	veh		
95% Back of Queue - Distance (Worst Lane)	0.7	m		
Queue Storage Ratio (Worst Lane)	0.00			
Total Effective Stops	26	veh/h	31	pers/h
Effective Stop Rate	0.04		0.04	
Proportion Queued	0.03		0.03	
Performance Index	4.6		4.6	
Cost (Total)	79.08	$/h	79.08	$/h
Fuel Consumption (Total)	13.5	L/h		
Carbon Dioxide (Total)	31.8	kg/h		
Hydrocarbons (Total)	0.002	kg/h		
Carbon Monoxide (Total)	0.025	kg/h		
NOx (Total)	0.016	kg/h		

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection 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.

Site Model Variability Index (Iterations 3 to N): 0.0 %

Number of Iterations: 3 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 59.0% 3.2% 0.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	319,832	veh/y	383,798	pers/y
Delay	38	veh-h/y	46	pers-h/y
Effective Stops	12,480	veh/y	14,976	pers/y
Travel Distance	100,117	veh-km/y	120,140	pers-km/y
Travel Time	2,048	veh-h/y	2,458	pers-h/y
Cost	37,961	$/y	37,961	$/y
Fuel Consumption	6,471	L/y		
Carbon Dioxide	15,255	kg/y		
Hydrocarbons	1	kg/y		
Carbon Monoxide	12	kg/y		
NOx	8	kg/y		

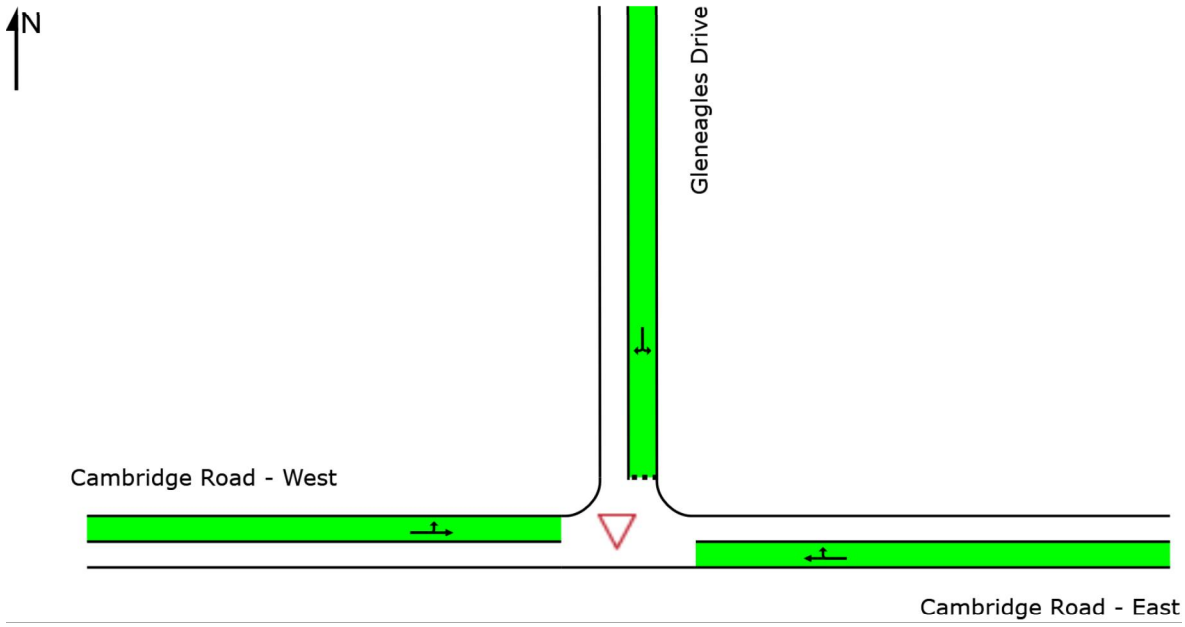
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2035_Hi Dev_Gleneagles_PM]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

	Approaches			Intersection
	East	North	West	
LOS	NA	A	NA	NA



Colour code based on Level of Service

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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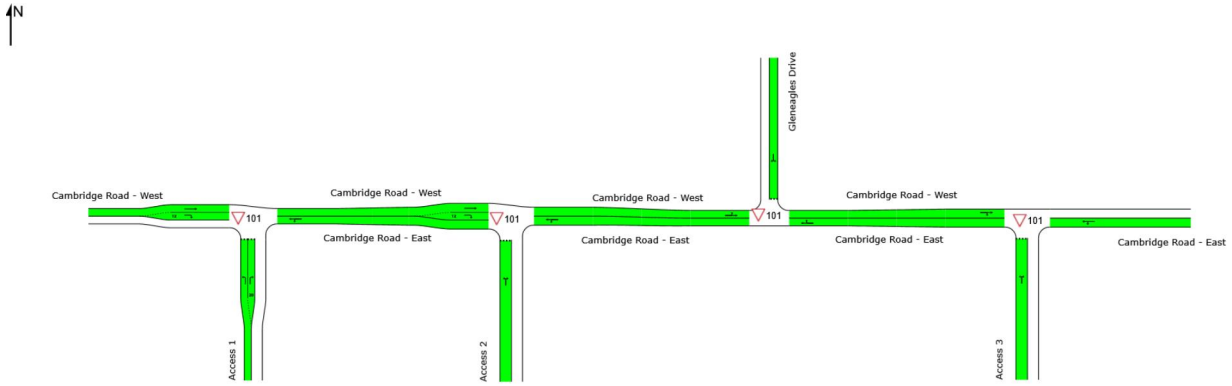
LANE LEVEL OF SERVICE

Lane Level of Service for Network Sites

Network: N101 [2018_Low Dev]

New Network
Network Category: (None)



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F

Delay model settings are specified for individual Sites forming the Network.

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NETWORK SUMMARY

Network: N101 [2018_Low Dev]

New Network
Network Category: (None)

Network Performance - Hourly Values						
Performance Measure	**Vehicles**		**Per Unit Distance**		**Persons**	
Network Level of Service (LOS)	LOS A					
Travel Time Index	9.64					
Speed Efficiency	0.97					
Congestion Coefficient	1.03					
Travel Speed (Average)	48.4	km/h			48.4	km/h
Travel Distance (Total)	1196.6	veh-km/h			1435.9	pers-km/h
Travel Time (Total)	24.7	veh-h/h			29.7	pers-h/h
Desired Speed	50.0	km/h				
Demand Flows (Total for all Sites)	2861	veh/h			3433	pers/h
Arrival Flows (Total for all Sites)	2861	veh/h			3433	pers/h
Demand Flows (Entry Total)	918	veh/h				
Midblock Inflows (Total)	26	veh/h				
Midblock Outflows (Total)	-126	veh/h				
Percent Heavy Vehicles (Demand)	1.0	%				
Percent Heavy Vehicles (Arrival)	1.0	%				
Degree of Saturation	0.233					
Control Delay (Total)	0.72	veh-h/h			0.86	pers-h/h
Control Delay (Average)	0.9	sec			0.9	sec
Control Delay (Worst Lane)	9.6	sec				
Control Delay (Worst Movement)	9.7	sec			9.7	sec
Geometric Delay (Average)	0.6	sec				
Stop-Line Delay (Average)	0.3	sec				
Queue Storage Ratio (Worst Lane)	0.01					
Total Effective Stops	240	veh/h			287	pers/h
Effective Stop Rate	0.08		0.20	per km	0.08	
Proportion Queued	0.07				0.07	
Performance Index	28.1				28.1	
Cost (Total)	566.08	$/h	0.47	$/km	566.08	$/h
Fuel Consumption (Total)	79.7	L/h	66.6	mL/km		
Fuel Economy	6.7	L/100km				
Carbon Dioxide (Total)	187.9	kg/h	157.0	g/km		
Hydrocarbons (Total)	0.012	kg/h	0.010	g/km		
Carbon Monoxide (Total)	0.147	kg/h	0.123	g/km		
NOx (Total)	0.106	kg/h	0.088	g/km		

Network Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.0% 0.0% 0.0%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: New Zealand.

Network Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total for all Sites)	1,373,305	veh/y	1,647,966	pers/y
Delay	346	veh-h/y	415	pers-h/y
Effective Stops	114,997	veh/y	137,996	pers/y
Travel Distance	574,369	veh-km/y	689,243	pers-km/y
Travel Time	11,867	veh-h/y	14,240	pers-h/y
Cost	271,717	$/y	271,717	$/y
Fuel Consumption	38,270	L/y		
Carbon Dioxide	90,184	kg/y		
Hydrocarbons	6	kg/y		
Carbon Monoxide	71	kg/y		
NOx	51	kg/y		

LANE LEVEL OF SERVICE

Lane Level of Service for Network Sites

Network: N102 [2035_Hi Dev]

New Network
Network Category: (None)

Colour code based on Level of Service

LOS A LOS B LOS C LOS D LOS E LOS F

Delay model settings are specified for individual Sites forming the Network.

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NETWORK SUMMARY

Network: N102 [2035_Hi Dev]

New Network
Network Category: (None)

Network Performance - Hourly Values						
Performance Measure	**Vehicles**		**Per Unit Distance**		**Persons**	
Network Level of Service (LOS)	LOS A					
Travel Time Index	9.67					
Speed Efficiency	0.97					
Congestion Coefficient	1.03					
Travel Speed (Average)	48.5	km/h			48.5	km/h
Travel Distance (Total)	1215.8	veh-km/h			1459.0	pers-km/h
Travel Time (Total)	25.1	veh-h/h			30.1	pers-h/h
Desired Speed	50.0	km/h				
Demand Flows (Total for all Sites)	2861	veh/h			3433	pers/h
Arrival Flows (Total for all Sites)	2861	veh/h			3433	pers/h
Demand Flows (Entry Total)	818	veh/h				
Midblock Inflows (Total)	126	veh/h				
Midblock Outflows (Total)	-26	veh/h				
Percent Heavy Vehicles (Demand)	1.0	%				
Percent Heavy Vehicles (Arrival)	1.0	%				
Degree of Saturation	0.281					
Control Delay (Total)	0.62	veh-h/h			0.74	pers-h/h
Control Delay (Average)	0.8	sec			0.8	sec
Control Delay (Worst Lane)	9.8	sec				
Control Delay (Worst Movement)	9.8	sec			9.8	sec
Geometric Delay (Average)	0.6	sec				
Stop-Line Delay (Average)	0.2	sec				
Queue Storage Ratio (Worst Lane)	0.01					
Total Effective Stops	207	veh/h			249	pers/h
Effective Stop Rate	0.07		0.17	per km	0.07	
Proportion Queued	0.05				0.05	
Performance Index	28.1				28.1	
Cost (Total)	637.21	$/h	0.52	$/km	637.21	$/h
Fuel Consumption (Total)	81.2	L/h	66.8	mL/km		
Fuel Economy	6.7	L/100km				
Carbon Dioxide (Total)	191.4	kg/h	157.4	g/km		
Hydrocarbons (Total)	0.012	kg/h	0.010	g/km		
Carbon Monoxide (Total)	0.150	kg/h	0.123	g/km		
NOx (Total)	0.108	kg/h	0.089	g/km		

Network Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation or Queue Storage Ratios for the last three Network Iterations: 0.0% 0.0% 0.0%
Network Level of Service (LOS) Method: SIDRA Speed Efficiency.
Software Setup used: New Zealand.

Network Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total for all Sites)	1,373,305	veh/y	1,647,966	pers/y
Delay	295	veh-h/y	354	pers-h/y
Effective Stops	99,580	veh/y	119,496	pers/y
Travel Distance	583,599	veh-km/y	700,319	pers-km/y
Travel Time	12,033	veh-h/y	14,440	pers-h/y
Cost	305,861	$/y	305,861	$/y
Fuel Consumption	38,995	L/y		
Carbon Dioxide	91,857	kg/y		
Hydrocarbons	6	kg/y		
Carbon Monoxide	72	kg/y		
NOx	52	kg/y		

INTERSECTION SUMMARY

Site: 101 [2018_No Dev_Hi-Lvl Peak]

New Site
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	13.3	km/h	13.3	km/h
Travel Distance (Total)	3725.0	veh-km/h	4470.0	pers-km/h
Travel Time (Total)	279.5	veh-h/h	335.3	pers-h/h
Demand Flows (Total)	4342	veh/h	5211	pers/h
Percent Heavy Vehicles (Demand)	6.8	%		
Degree of Saturation	1.325			
Practical Spare Capacity	-35.8	%		
Effective Intersection Capacity	3278	veh/h		
Control Delay (Total)	207.26	veh-h/h	248.71	pers-h/h
Control Delay (Average)	171.8	sec	171.8	sec
Control Delay (Worst Lane)	317.0	sec		
Control Delay (Worst Movement)	318.7	sec	318.7	sec
Geometric Delay (Average)	3.7	sec		
Stop-Line Delay (Average)	168.1	sec		
Idling Time (Average)	118.6	sec		
Intersection Level of Service (LOS)	LOS F			
95% Back of Queue - Vehicles (Worst Lane)	170.3	veh		
95% Back of Queue - Distance (Worst Lane)	1304.9	m		
Queue Storage Ratio (Worst Lane)	1.12			
Total Effective Stops	18868	veh/h	22642	pers/h
Effective Stop Rate	4.35		4.35	
Proportion Queued	0.98		0.98	
Performance Index	1072.3		1072.3	
Cost (Total)	8081.36	$/h	8081.36	$/h
Fuel Consumption (Total)	762.2	L/h		
Carbon Dioxide (Total)	1813.9	kg/h		
Hydrocarbons (Total)	0.206	kg/h		
Carbon Monoxide (Total)	1.661	kg/h		
NOx (Total)	4.169	kg/h		

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Site Model Variability Index (Iterations 3 to N): 4.7 %
Number of Iterations: 7 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 1.9% 1.0% 0.5%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	2,084,211	veh/y	2,501,053	pers/y
Delay	99,484	veh-h/y	119,381	pers-h/y
Effective Stops	9,056,741	veh/y	10,868,090	pers/y
Travel Distance	1,787,985	veh-km/y	2,145,582	pers-km/y
Travel Time	134,139	veh-h/y	160,967	pers-h/y
Cost	3,879,052	$/y	3,879,052	$/y
Fuel Consumption	365,868	L/y		
Carbon Dioxide	870,655	kg/y		
Hydrocarbons	99	kg/y		
Carbon Monoxide	798	kg/y		
NOx	2,001	kg/y		

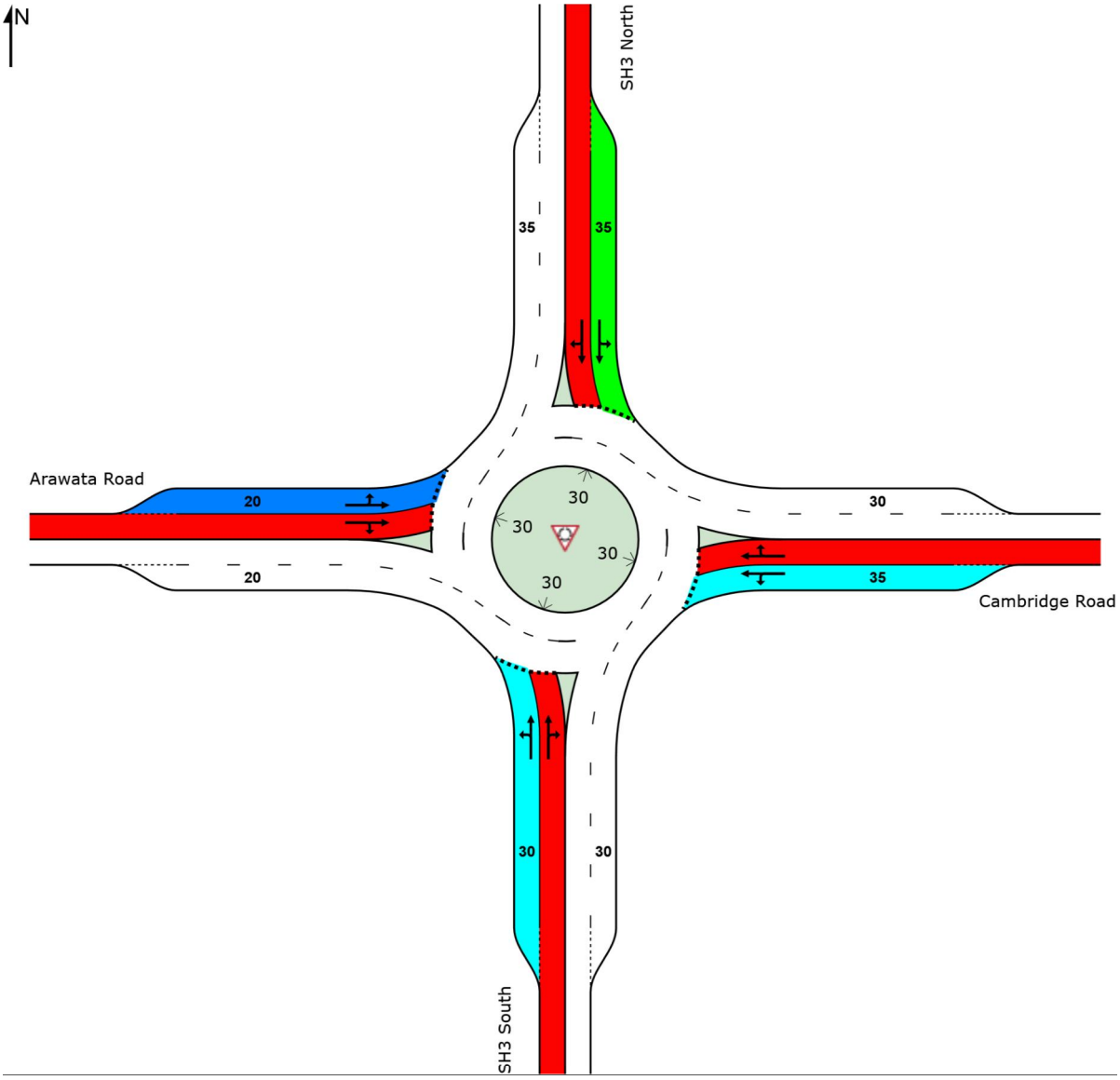
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2018_No Dev_Hi-Lvl Peak]

New Site
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	F	F	F	F	F



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Roundabout Level of Service Method: SIDRA Roundabout LOS
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

INTERSECTION SUMMARY

Site: 101 [2018_Low Dev_Hi-Lvl Peak]

New Site
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	11.2	km/h	11.2	km/h
Travel Distance (Total)	3888.4	veh-km/h	4666.1	pers-km/h
Travel Time (Total)	348.7	veh-h/h	418.5	pers-h/h
Demand Flows (Total)	4505	veh/h	5406	pers/h
Percent Heavy Vehicles (Demand)	6.6	%		
Degree of Saturation	1.558			
Practical Spare Capacity	-45.4	%		
Effective Intersection Capacity	2892	veh/h		
Control Delay (Total)	273.09	veh-h/h	327.71	pers-h/h
Control Delay (Average)	218.2	sec	218.2	sec
Control Delay (Worst Lane)	521.4	sec		
Control Delay (Worst Movement)	523.0	sec	523.0	sec
Geometric Delay (Average)	3.8	sec		
Stop-Line Delay (Average)	214.4	sec		
Idling Time (Average)	157.9	sec		
Intersection Level of Service (LOS)	LOS F			
95% Back of Queue - Vehicles (Worst Lane)	218.8	veh		
95% Back of Queue - Distance (Worst Lane)	1557.6	m		
Queue Storage Ratio (Worst Lane)	1.25			
Total Effective Stops	21908	veh/h	26290	pers/h
Effective Stop Rate	4.86		4.86	
Proportion Queued	0.98		0.98	
Performance Index	1301.6		1301.6	
Cost (Total)	9971.07	$/h	9971.07	$/h
Fuel Consumption (Total)	871.0	L/h		
Carbon Dioxide (Total)	2070.2	kg/h		
Hydrocarbons (Total)	0.238	kg/h		
Carbon Monoxide (Total)	1.851	kg/h		
NOx (Total)	4.339	kg/h		

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Site Model Variability Index (Iterations 3 to N): 3.9 %
Number of Iterations: 10 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 1.0% 1.1% 0.8%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	2,162,526	veh/y	2,595,032	pers/y
Delay	131,083	veh-h/y	157,300	pers-h/y
Effective Stops	10,516,060	veh/y	12,619,270	pers/y
Travel Distance	1,866,426	veh-km/y	2,239,711	pers-km/y
Travel Time	167,380	veh-h/y	200,856	pers-h/y
Cost	4,786,112	$/y	4,786,112	$/y
Fuel Consumption	418,100	L/y		
Carbon Dioxide	993,702	kg/y		
Hydrocarbons	114	kg/y		
Carbon Monoxide	889	kg/y		
NOx	2,082	kg/y		

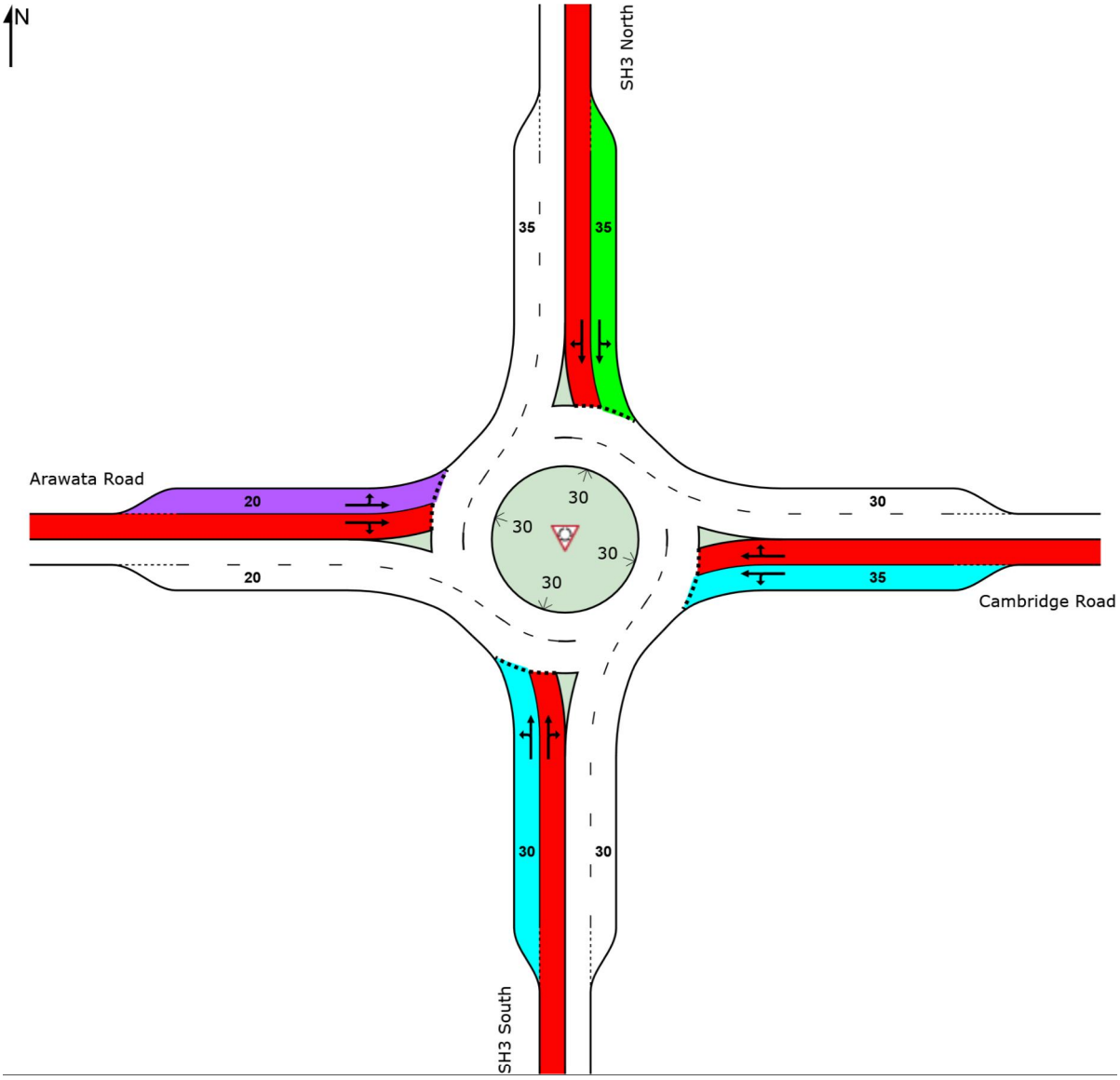
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2018_Low Dev_Hi-Lvl Peak]

New Site
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	F	F	F	F	F



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Roundabout Level of Service Method: SIDRA Roundabout LOS
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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