Strategic Planning and Policy Committee Agenda

Council Chambers
Waipa District Council
101 Bank Street, Te Awamutu

Chairperson
SC O'Regan

Members
His Worship the Mayor JB Mylchreest, EM Andree-Wiltens, EH Barnes, AW Brown, LE Brown, PTJ Coles, RDB Gordon, ML Gower, MJ Pettit, EM Stolwyk, CS St Pierre, BS Thomas, GRP Webber and P Davies (Iwi representative).

01 September 2020 09:00 AM - 12:00 PM

STRATEGIC PLANNING AND POLICY COMMITTEE AGENDA

Waipa DISTRICT COUNCIL

APOLOGIES

STRATEGIC PLANNING AND POLICY COMMITTEE AGENDA

Waipa DISTRICT COUNCIL

DISCLOSURE OF MEMBERS' INTERESTS

Members are reminded to declare and stand aside from decision making when a conflict arises between their role as an elected member and any private or other external interest they may have.

STRATEGIC PLANNING AND POLICY COMMITTEE AGENDA

Waipa DISTRICT COUNCIL

LATE ITEMS

Items not on the agenda for the meeting require a resolution under section 46A of the Local Government Official Information and Meetings Act 1987 stating the reasons why the item was not on the agenda and why it cannot be dealt with at a subsequent meeting on the basis of a full agenda item. It is important to note that late items can only be dealt with when special circumstances exist and not as a means of avoiding or frustrating the requirements in the Act relating to notice, agendas, agenda format and content.

STRATEGIC PLANNING AND POLICY COMMITTEE AGENDA

Waipa DISTRICT COUNCIL

CONFIRMATION OF ORDER OF MEETING

Recommendation

That the order of the meeting be confirmed.

STRATEGIC PLANNING AND POLICY COMMITTEE REPORT

Waipā DISTRICT COUNCIL

To:	The Chairperson and Members of the Strategic Planning and Policy Committee
From:	Governance
Subject:	**CONFIRMATION OF MINUTES**
Meeting Date:	1 September 2020

1 EXECUTIVE SUMMARY

To confirm the minutes of the Strategic Planning and Policy Committee meeting held on 4 August 2020.

2 RECOMMENDATION

That the open minutes of the Strategic Planning and Policy Committee meeting held on 4 August 2020, having been circulated, be taken as read and confirmed as a true and correct record of that meeting.

3 ATTACHMENTS

Strategic Planning and Policy Minutes – 4 August 2020

STRATEGIC PLANNING AND POLICY COMMITTEE MINUTES

Time: 9.00am

Date: Tuesday, 4 August 2020

Meeting: Council Chambers, Waipa District Council, 101 Bank Street, Te Awamutu

PRESENT

Chairperson

SC O'Regan

Members

His Worship the Mayor JB Mylchreest, EM Andree-Wiltens, EH Barnes, AW Brown, LE Brown, PTJ Coles, RDB Gordon, ML Gower, MJ Pettit, EM Stolwyk, CS St Pierre, BS Thomas, GRP Webber and P Davies (Iwi representative).

In Attendance
E. Auton – CMD Consultants via Zoom [at 9.45am to 10.09am]

APOLOGIES

RESOLVED
02/20/41
That the apologies of Councillor Barnes for non-attendance be received.

Councillor St Pierre / Councillor Pettit

DISCLOSURE OF MEMBERS' INTERESTS

Councillor O'Regan declared an interest as a neighbouring property of the Waikato Hunt Club resource consent application in item 'District Growth Quarterly Report'.

LATE ITEMS

There were no late items.

STRATEGIC PLANNING AND POLICY COMMITTEE MINUTES

Waipa DISTRICT COUNCIL

CONFIRMATION OF ORDER OF MEETING

RESOLVED
02/20/42
That the order of the meeting be confirmed.

Councillor Thomas / Councillor St Pierre

MINUTES OF PREVIOUS MEETING

RESOLVED
02/20/43
That the open minutes of the Strategic Planning and Policy Committee meeting held on 7 July 2020 having been circulated, be taken as read and confirmed as a true and correct record of that meeting.

Councillor L. Brown / Councillor Pettit

TREE POLICY REVIEW

Community Facilities Team Lead, Brad Ward and Arborist Planner, Chris Brockelbank presented the report and answered questions of the Committee.

The Waipa District Council Tree Policy had been reviewed in conjunction with the recent District Plan Change 2 and was workshopped with elected members on 2 April 2019.

During the Tree Policy workshop, it was identified a contestable protected tree maintenance fund may be developed pending Council approval. It was proposed $50,000 be allocated each year to assist with protected tree maintenance costs.

Staff undertook a targeted feedback consultation process with protected tree owners which culminated in five verbal and one written submission being presented at the Strategic Planning and Policy Committee meeting on 3 July 2020. As a result of the feedback, changes were made to the proposed protected tree maintenance fund. However, there were still a small number of objectors to the process change from Council undertaking the maintenance to the tree owner, being the practice at other councils.

During the meeting on 3 July 2020, it was resolved that staff:

STRATEGIC PLANNING AND POLICY COMMITTEE MINUTES

Waipa DISTRICT COUNCIL

- Seek legal advice on alternative options, including individual agreements with land owners, and
- Report back on insurance and liability implications, and
- Investigate transitional provisions where protected tree status has been removed from a tree that was previously classified as protected.

Having investigated the matters raised by the Committee, staff's recommendation was that no further changes should be made and the Committee approve the Draft Tree Policy and protected tree fund criteria.

RESOLVED
02/20/44
That the Strategic Planning and Policy Committee:

a) ***RECEIVES*** *the report titled Tree Policy Review (document number 10433735) of Brad Ward, Community Facilities Team Leader;*

b) ***APPROVES*** *the draft Tree Policy as set out in Appendix 2 of this report (Document number 10128529);*

c) ***APPROVES*** *the proposed Protected Tree Fund Criteria as set out in Appendix 3 of this report (Document number 10421762) for inclusion as an appendix to the Tree Policy; and*

d) ***CONFIRMS*** *support for an ongoing budget, subject to 2021-2031 Long Term Plan deliberations.*

Councillor A. Brown / Councillor Coles

COMMUNITY SERVICES REPORT TO 30 JUNE 2020

The purpose of the report was to provide information on the activities pertaining to the Community Services Unit to 30 June 2020 (YTD). The report consisted of matters that are of a purely administrative nature or information that does not require a decision from Council. As such, the report does not address any matters that are significant in terms of Council's obligations as set out in the Local Government Act 2002.

RESOLVED
02/20/45
That

a) *The Community Services Report to 30 June 2020 (document number 10434009) of Sally Sheedy, Manager Community Services, be received.*

STRATEGIC PLANNING AND POLICY COMMITTEE MINUTES

Waipa DISTRICT COUNCIL

Councillor St Pierre / Councillor Pettit

QUARTERLY DISTRICT GROWTH REPORT

Group Manager District Growth & Regulatory - Wayne Allan, Manager District Plan & Growth - Tony Quickfall, Manager Strategy - Kirsty Downey and Emily Auton of GMD Consultants presented the report and answered questions of the Committee.

RESOLVED
02/20/46
That the Strategic Planning and Policy Committee receive the report titled 'Quarterly District Growth Report' (document number 10425160) of Wayne Allan, Group Manager District Growth and Regulatory Services.

Councillor A. Brown / Councillor Stolwyk

CIVIL DEFENCE EMERGENCY MANAGEMENT QUARTERLY REPORT

Civil Defence Emergency Manager – David Simes presented the report and answered questions of the Committee.

The purpose of this report was to provide the Committee with a quarterly update on matters relating to civil defence emergency management (CDEM) in the Waipā District.

This included matters arising at national, sub-regional, regional and district levels including emergency management activities under the shared service arrangement between Waipā, Ōtorohanga and Waitomo District Councils.

RESOLVED
02/20/47
*That the Strategic Planning and Policy Committee **RECEIVE** report 'Civil Defence Emergency Manager Quarterly Report' (document number 10431277) of David Simes, Emergency Management Operations Manager.*

Councillor L. Brown / Mayor Mylchreest

STRATEGIC PLANNING AND POLICY COMMITTEE MINUTES

Waipa DISTRICT COUNCIL

WAIPA DISTRICT COUNCIL COMMUNITY RECOVERY FUND

Waipa District Council has been considering how the organisation should best meet the needs of communities to assist the recovery from COVID-19. A range of government funding has been released to assist the nation's recovery. Local government needs to make decisions about how best to support this recovery at a local level, ensuring that central government funding is well utilised and then invest strategically in areas where there is less saturation of central government funding.

While Waipa is somewhat protected by its reliance on the primary sector, there is still expected to be an impact on GDP and unemployment is expected to rise. Māori will be disproportionately affected by this, with Māori unemployment within the region expected to rise significantly in the next 12 months.

Social services within the District are already stretched and data suggests that the wave of redundancies has yet to come. There are concerns amongst this sector about how they will manage, given the pressure on philanthropic funding sources and the potential increase in the need for their services.

Waipa District Council staff have considered the data on the impact of COVID-19 and information from a range of stakeholders have informed a position on recovery initiatives. Council has approved a $795,000 recovery package from the Arbitrage Fund.

Dr Bev Gatenby was contracted to develop a proposal for a contestable fund to support the District to recover from Covid-19 in collaboration with other philanthropic funders. As per her recommendations, this report proposes that $400,000 is allocated to the Waipa District Council Community Recovery Fund. It proposes these funds are administrated by a Working Group that reflects the makeup of our significant stakeholders in the Recovery space.

In addition to this, staff are looking at opportunities to work in partnership with iwi and others to maximise the use of central government funding for Waipa District.

RESOLVED

02/20/48

That

a) *The report titled 'Waipa District Council Community Recovery Fund' (document number) of Debbie Lascelles, Group Manager Strategy and Community Services, be received;*

b) *The Strategic Planning and Policy committee amends part (e) of Resolution*

STRATEGIC PLANNING AND POLICY COMMITTEE MINUTES

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E2/20/10 of the Strategic Planning and Policy Committee on 16 June 2020 by amending the quantum of the contestable COVID-19 Recovery Fund from $448,100 to $400,000 and approves the remaining $49,000 (out of the total $795,000 recovery fund) be allocated to support marketing of the District, with expenditure for marketing initiatives to be approved by the Group Manager, Strategy & Community Services in consultation with the Chair of Strategic Planning & Policy Committee and the Deputy Mayor;

c) Pursuant to Clause 30, schedule 7 of the Local Government Act (2002), the Strategic Planning and Policy Committee appoint a Waipa District Council Community Recovery Working Group;

(i) Membership of the Working Group shall consist of 2 Councillors (Chair of the Strategic Planning & Policy Committee and Deputy Mayor), Waipa District Council Iwi Liaison Advisor Shane Te Ruki, 1 Manager of a regional philanthropic fund, 2 community sector leaders and 2 iwi leaders.

d) Pursuant to Clause 32, schedule 7 of the Local Government Act 2002, the Strategic Planning and Policy committee delegate authority to;

(ii) the Mayor for final approval of the appointment of individuals, which are a manager of a regional philanthropic fund, 2 community sector leaders and 2 iwi leaders on the Waipā District Council Community Recovery Working Group;

(iii) the Waipa District Council Community Recovery Working Group to assess funding applications made to the Waipa District Council Community Recovery Fund and allocate funding as per the criteria set out in appendix 2.

Councillor Gordon / Councillor L. Brown

RESOLUTION TO EXCLUDE THE PUBLIC

(Section 48, Local Government Official Information and Meetings Act 1987)

RESOLVED

02/20/49

THAT the public be excluded from the following parts of the proceedings of this meeting.

The general subject of the matter to be considered while the public is excluded, the reason for passing this resolution in relation to each matter, and the specific grounds

STRATEGIC PLANNING AND POLICY COMMITTEE MINUTES

Waipa DISTRICT COUNCIL

under section 48(1) of the Local Government Official Information and Meetings Act 1987 for the passing of this resolution are as follows:

General subject of each matter to be considered	Reason for passing this resolution in relation to each matter	Ground(s) under section 48(1) for the passing of this resolution
1. Confirmation of Public Excluded Minutes	*Good reason to withhold exists under section 7 Local Government Official Information and Meetings Act 1987*	*Section 48(1)(a)*

This resolution is made in reliance on section 48(1)(a) of the Local Government Official Information and Meetings Act 1987 and the particular interest or interests protected by Section 6 or Section 7 of that Act, which would be prejudiced by the holding of the whole or relevant part of the proceedings of the meeting in public, are as follows:

Item No.	Section	Interest
1.	*Section 7(2)j)*	*To prevent the disclosure or use of official information for improper gain or advantage.*

Councillor St Pierre / Councillor Andree-Wiltens

There being no further business, the meeting closed at 11.08am.

CONFIRMED AS A TRUE AND CORRECT RECORD

CHAIRPERSON: ....

DATE: ....

STRATEGIC PLANNING AND POLICY COMMITTEE REPORT

Waipā DISTRICT COUNCIL

To:	The Chairperson and Members of the Strategic Planning and Policy Committee
From:	Manager Community Services
Subject:	**WAIPA COMMUNITY FACILITIES TRUST REPORT**
Meeting Date:	1 September 2020

1 EXECUTIVE SUMMARY

Waipa District Council has contracted Waipa Community Facilities Trust (the Trust) to operate the Te Awamutu Events Centre and Cambridge Swimming Pool Complex. A Services Agreement sets out roles and responsibilities for both parties. Under the Service Agreement in line with Schedule 6 S6/2, the Trust has obligations to provide Council with various reports and updates.

The following appendix accompanies this report as information for the Committee:

- Appendix 1 - Waipa Community Facilities Trust – Monthly Non-Financial Report June 2020 (Document number 10453898)

Matt Horne, Chief Executive and members of the Trust will be present at the 1 September 2020 Strategic Planning and Policy Committee to provide an update.

2 RECOMMENDATION

That

a) *The report titled Waipa Community Facilities Trust Report (document number ECM 10453907) of Sally Sheedy, Manager Community Services be* ***RECEIVED****;*

b) *The Waipa Community Facilities Trust Waipa Community Facilities Trust – Monthly Non-Financial Report June 2020 (Document Number* 10453898*), of Matt Horne, Chief Executive of Waipa Community Facilities Trust be* ***RECEIVED****.*

Sally Sheedy
MANAGER COMMUNITY SERVICES

Debbie Lascelles
GROUP MANAGER STRATEGY AND COMMUNITY SERVICES

SUPPORTING INFORMATION: ASSESSMENT OF PROPOSAL

1 Statutory and policy requirements

Legal and regulatory considerations

Local Government Act 2002
s.10 Purpose of Local Government
The decision to contract out the operation of the Trust Waikato The Awamutu Events Centre and Cambridge Swimming Pool Complex meets current and future needs of communities for good-quality local public services in a way that is most cost effective for households and business.

Consultation and Engagement
There are no Significance and Engagement Policy implications in approving the draft Statement of Intent.

2 Background to proposal/issue *(optional)*

The Services Agreement between Waipa District Council and Waipa Community Trust, dated 3 April 2018 (document number 7389161), sets out the roles and responsibilities of each party. This includes the Trust's reporting and Statement of Intent obligations.

Appendix 1

Waipa Community Facilities Trust - Monthly Non-Financial Report June 2020 Document number 10453898

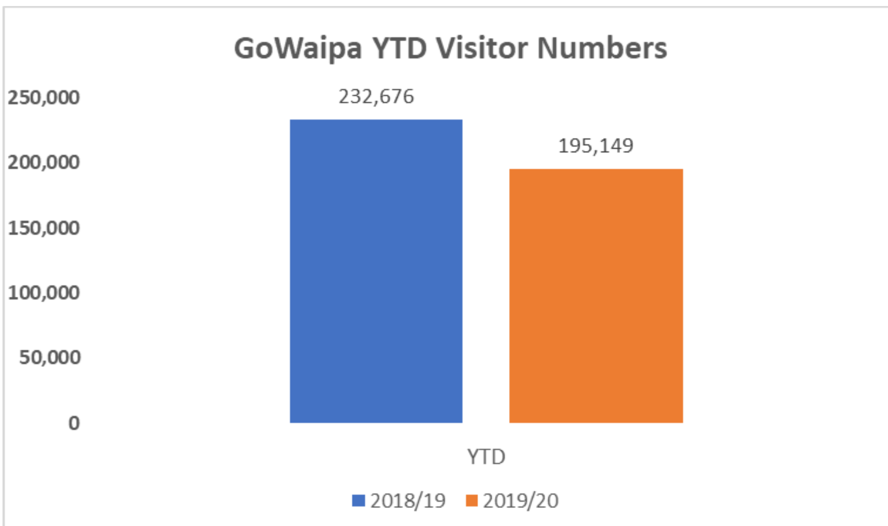
Waipa Community Facilities Trust
Monthly Non-Financial Report

June 2020

1. SUMMARY

New Zealand transitioned from COVID-19 Alert Level 2 to Alert Level 1 allowing the facility to open fully to the public with caution and heightened facility / physical hygiene. While it is back to business as usual, visitors are still cautious, and this is reflected in the attendance numbers.

GoWaipa YTD 2019-2020 overall attendance is down -37,527 visits or -16% compared with the same period previously in 2018* and 2019**

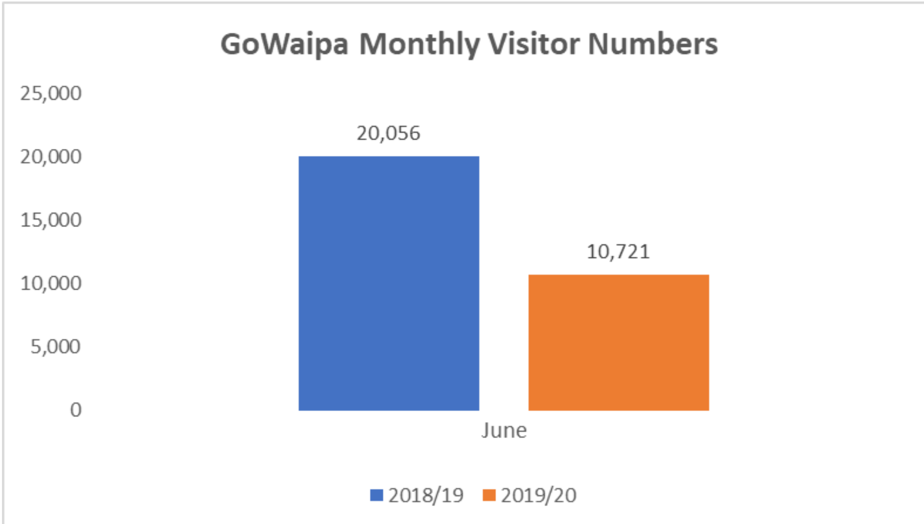


2019/2020	195,149** (**COVID-19 Mar-June)
2018/2019	232,676* (*Livingstone Aquatics closed in July)
2017/2018	252,085

Monthly attendance was down -9,335 or -46.5%

As stated, COVID-19 has had a major impact on all services, attendance, and financials. Prior to COVID-19 impacting services, overall visitor numbers we were tracking 9% higher than the previous year. If we able to maintain this tracking, our forecast projection was over 253,000 visits approximately 20,940 additional visits.

COVID-19 caused 268 bookings to cancel as of 30 June 2020 and 128 bookings so far in the 2020-2021 financial year. This equates to approximately $11,700 in lost revenue.



2020 June 10,721
2019 June 20,056

2. OPERATIONS

Annual maintenance was completed with all pools having their expansions and silicone joints removed and repaired. Significant work on the hydroslide tubing was also completed which has been long overdue.

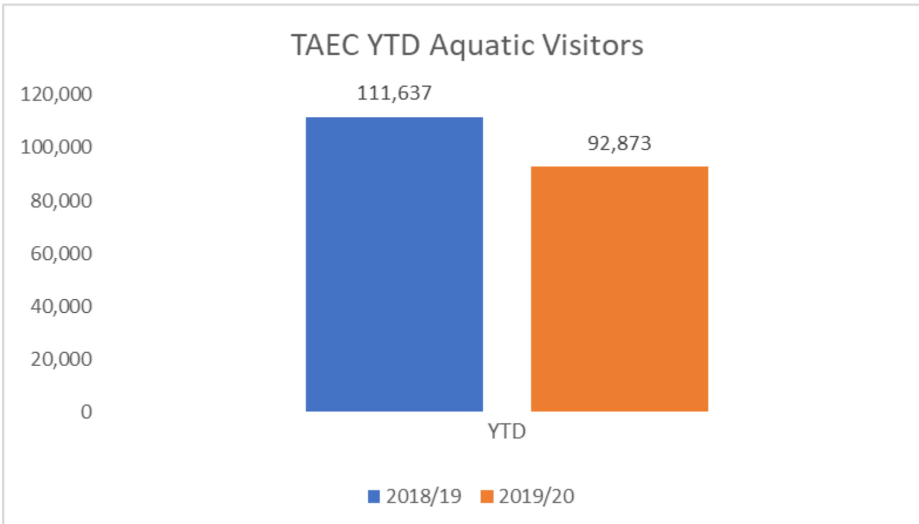
2.1. VISITOR NUMBERS – WCFT SUMMARY

TAEC June Visitor Numbers 2020 – 10,721

	TE AWAMUTU EVENT CENTRE								
LIVINGSTONE AQUATICS	SWIM WAIPA				CLUB WAIPA AQUATIC	SWIMMING SUB TOTAL	ASB STADIUM	CLUB WAIPA	TAEC TOTAL
	LTS	CLUB	SWIM 4 LIFE	HP					
4,460	416	84	0	0	23	4,983	1155	4,583	10,721

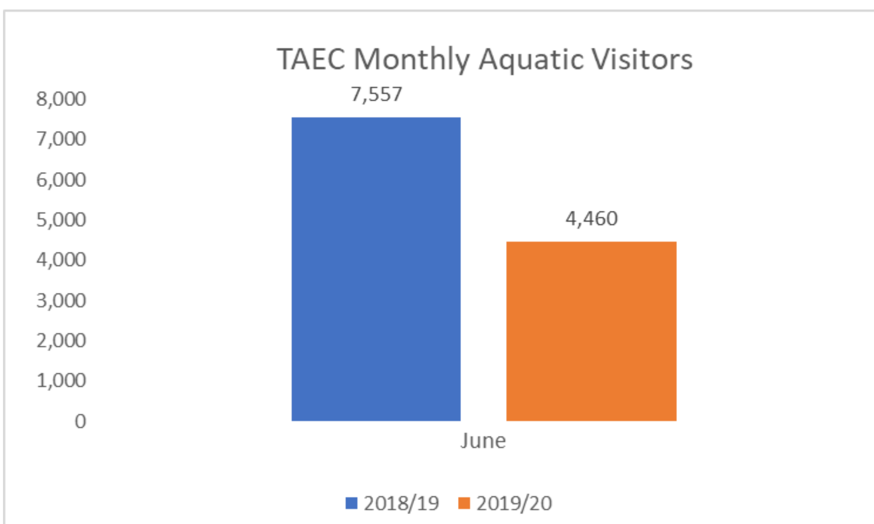
2.2. VISITOR NUMBERS –TAEC AQUATIC

Like all other departments aquatic attendance has been heavily affected by COVID-19. Annual attendance is down -18,764 visits or -17%. Priory to March we were ahead of previous last year's tracking by 2.5% so in the space of 4 months there has been a significant lost



2020 YTD 92,873**
2019 YTD 111,637

** COVID-19

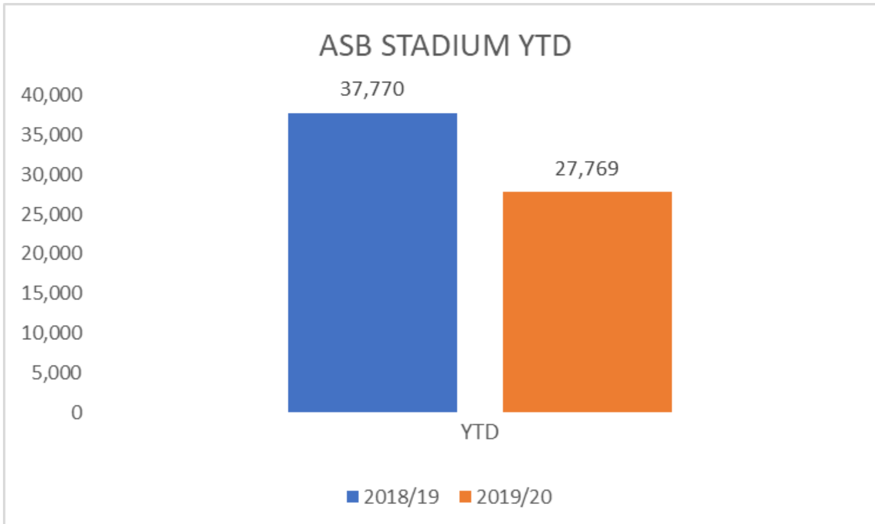


2020 June 4,460
2019 June 7,557

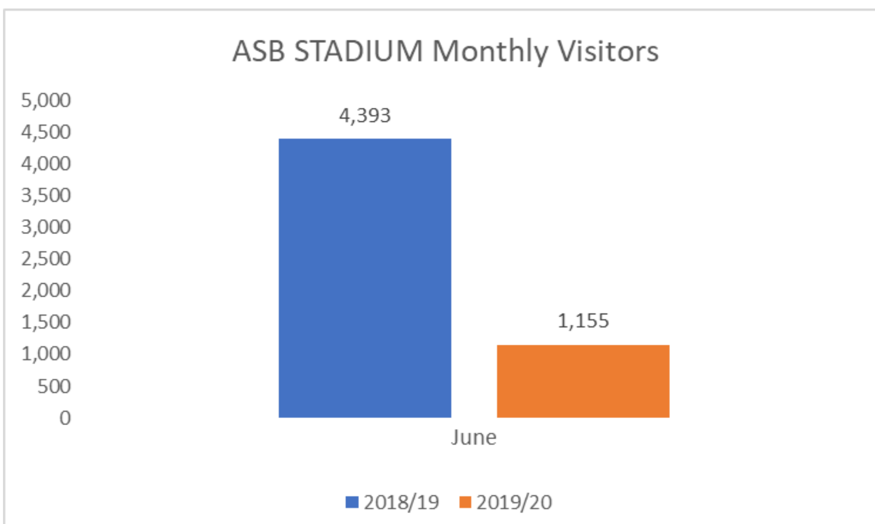
2.3. VISITOR NUMBERS – YTD – ASB STADIUM

ASB Stadium also heavily affected by COVID-19. All bookings had to stop due to social distancing rules and most indoor codes have adjusted their schedules and to restart in the 3rd Term.

YTD visitor tracking is down by -10,001 or -26.5%



2020 YTD 27,769
2019 YTD 37,770



2020 June 1,155**
2019 June 4,393

BOOKINGS	HOURS OCCUPIED	TOTAL HOURS	OCCUPANCY RATE (%)
Court 1	29		6.94
Court 2	14.5		3.7
Stadium	56.5		13.52
Meeting Room	33.75		8.07
TOTAL	**133.75**	**418**	**32%**

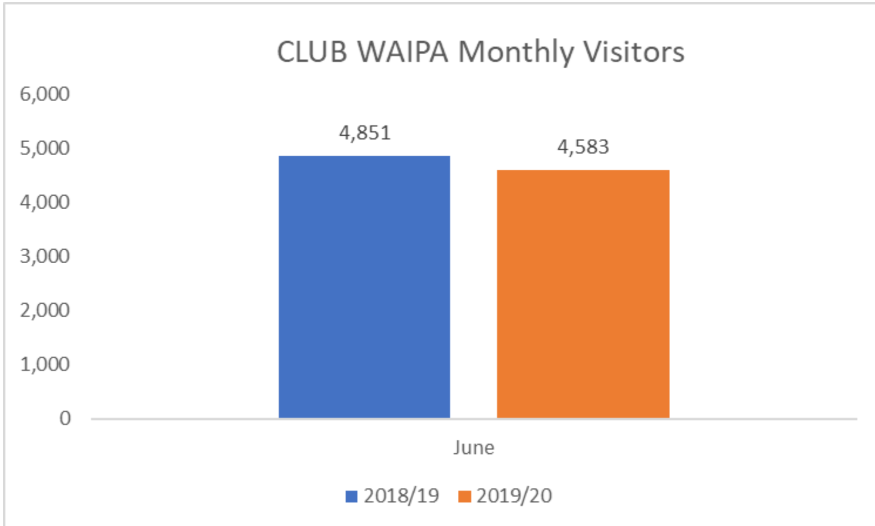
June 2020 32.00% Hours used – 133.75
June 2019 42.31% Hours used – 173.50

2.4. VISITOR NUMBERS – YTD – TAEC CLUB WAIPA

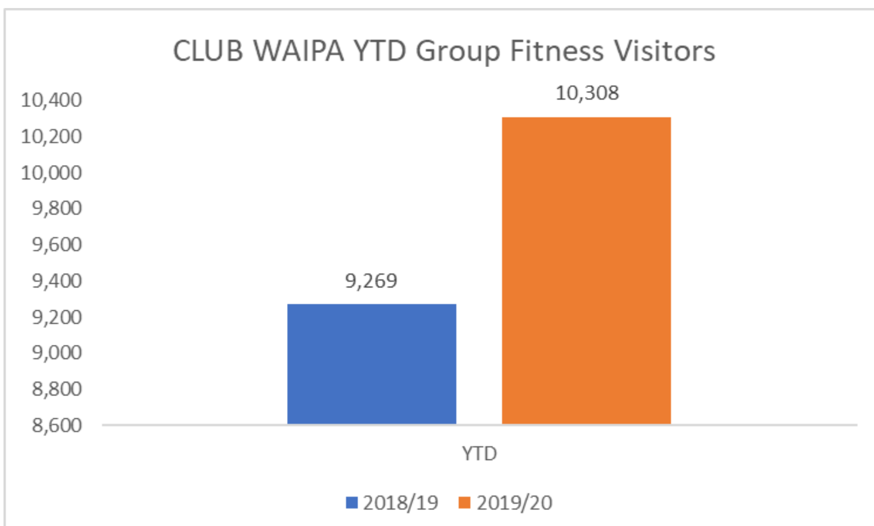
Memberships expired or were put suspended due to COVID-19. Overall membership has dropped from 887 to 780 with members not having the disposable income they previously had. The -107 members is a loss of -12%. We anticipate it will take a while to rebuild membership numbers to previous levels and the unknown financial impact this will have moving forward.

2020 YTD 49,965**
2019 YTD 51,887

Club Waipa monthly attendance was down -268** visits or -5.5%



2020 June 4,583
2019 June 4,851



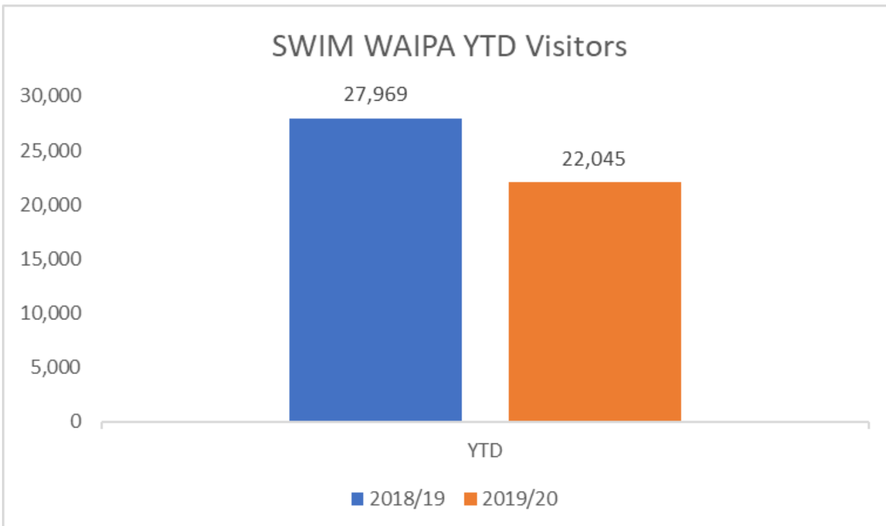
Group Fitness (GF)
2020 YTD 10,041** compared to 11,386 (2019) down -1,345 visits or -12%
2020 June 722** compared to 1,078 (2019) down -356 visits or -33%

2.5. VISITOR NUMBERS – YTD – CAMBRIDGE

Naylor Love have indicated that they are now making excellent progress working 6 days a week on site. GoWaipa is working with NL and Waipa District Council on an establishment plan to ensure transition meets all parties expectations.

2.6. VISITOR NUMBERS – YTD – TAEC SWIM WAIPA

The Swim Waipa Team worked through the outstanding credits due to COVID-19 to clear them before the start of Term 3. The effect of COVID-19 will not be known until the new term starts and bookings for lessons open.



YTD Swim Waipa attendance numbers are down -5,924 visits or -21% YTD over the same period last year.

2020 YTD**	22,045	15,709 SW	3,394 CB	2,410 SP	532 HP
2019 YTD*	27,969	21,417 SW	4,446 CB	1,676 SP	430 HP

*Livingstone Aquatics closed for maintenance July 2018
** COVID-19 March – May 2020

3. HEALTH & SAFETY – June

We had 0x Notifiable Events, 0x Ambulance, 3x Accidents, 2x Incidents, 4x Contaminations and 1x Near Misses and 0x Trespass

3.1 Notifiable Events (0)
Nil to report

3.2 Ambulance (0)
Nil to report

3.3 Accidents (3)
Bump/Cut/Graze/Trip (2)
1x child accidently bumped heads with another patron causing a bloody nose
1x toddler slipped in beach area banging head

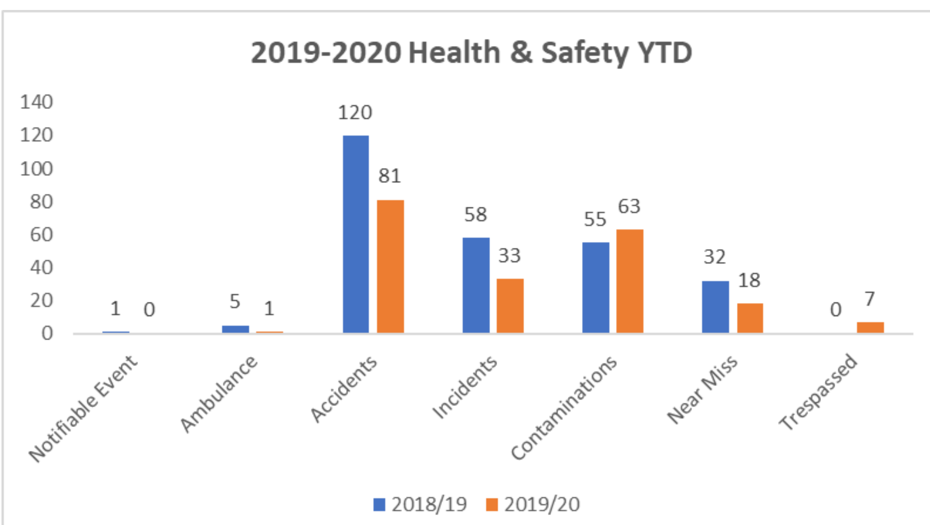
Hydroslide (1)
1x child hit head coming down slide

Staff provided first aid for all accidents and concourse areas cleaned where slips were indicated

3.4 Incidents (2)
1x dry rescue – child out of their depth and LG used flotation device to pull them to safety
1x security – exit door left unlocked but closed

3.5 Near Miss (1)
1x public rescue – young boy out of depth pulled to rescue by member of the public from direction of lifeguard

3.6 Trespass/Banned (0)
Nil to report



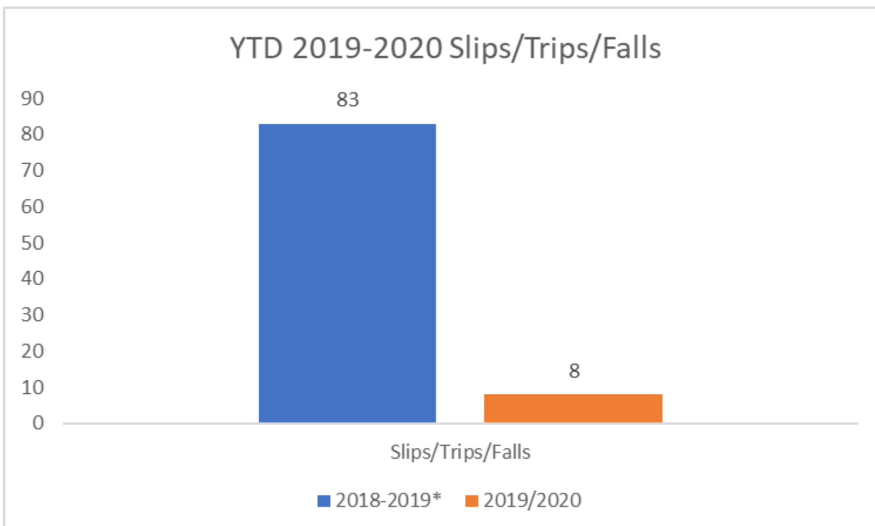
Health and Safety – 2019 - 2020 YTD Comparison (June)

	YTD 2018/19	YTD 2019/20	VARIANCE
Notifiable Event	1	0	-
Ambulance	5	1	-4
Accidents	120	81	-39
Incidents	58	33	-25
Contamination	55	63	8
Near Miss	32	18	-14
Trespassed/Banned	0	7	7

Concourse Slips Trips and Falls (0)

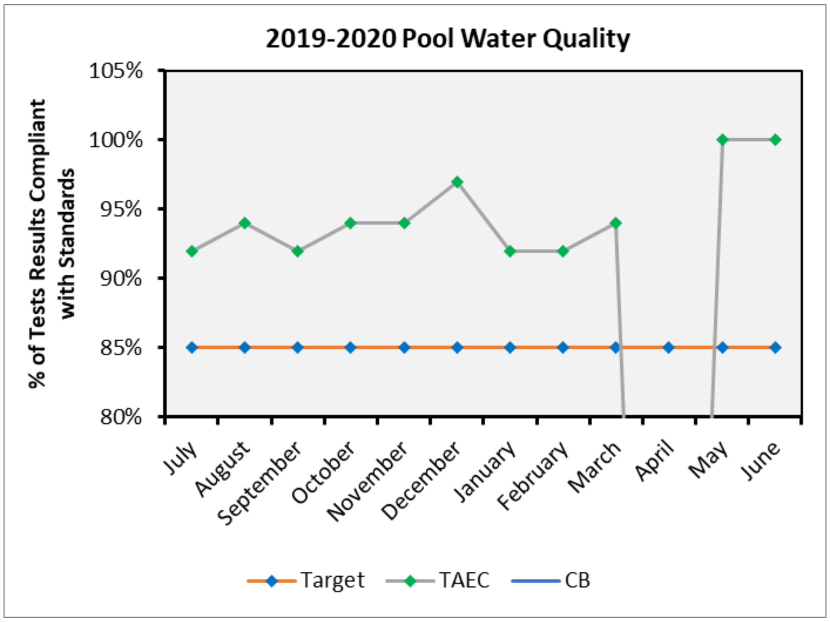
Nil to report

YTD we have 8 slips due to the concourse which is – 75 slips compared with the same period last year.



June monthly tracking we had 0 slips compared to 1 last year.

3.7 POOL WATER QUALITY



The Operational Team has maintained YTD pool water quality average at 94% tracking above the recommended minimum Pool Water Quality Standard of 85%. Water quality will not be tested until June when the pools are reopened.

3.8 WATER QUALITY – YEARLY AVERAGE (TARGET: 85%)

Water Quality Results 2019/2020

Month	TAEC	Cambridge
July	92%	
August	94%	
September	92%	
October	94%	
November	94%	
December	97%	
January	92%	
February	92%	
March	94%	
April	Closed	
May	Closed	
June	100%	

3.9 POOL TEMPERATURES

Pool Temperatures	LTS/Hydrotherapy 31-33˚c	25m Pool 25-28˚c	Toddlers Pool 30-33˚c	Spa Pool 38-40˚c
July	32.5	28.0	33.1	38.6
August	32.5	28.0	33.5	38.5
September	32.7	28.0	33.7	38.5
October	32.6	28.0	33.8	38.5
November	32.3	28.2	33.4	38.6
December	32.2	28.0	32.7	38.5
January	32.7	27.9	32.7	38.2
February	31.8	26.9	31.8	38.5
March	32.5	27.1	31.9	38.1
April	-	-	-	-
May	-	-	-	-
June	32.6	27.9	31.6	38.2
Total Average	**32.4**	**27.8**	**32.8**	**38.4**

4. CUSTOMER FEEDBACK

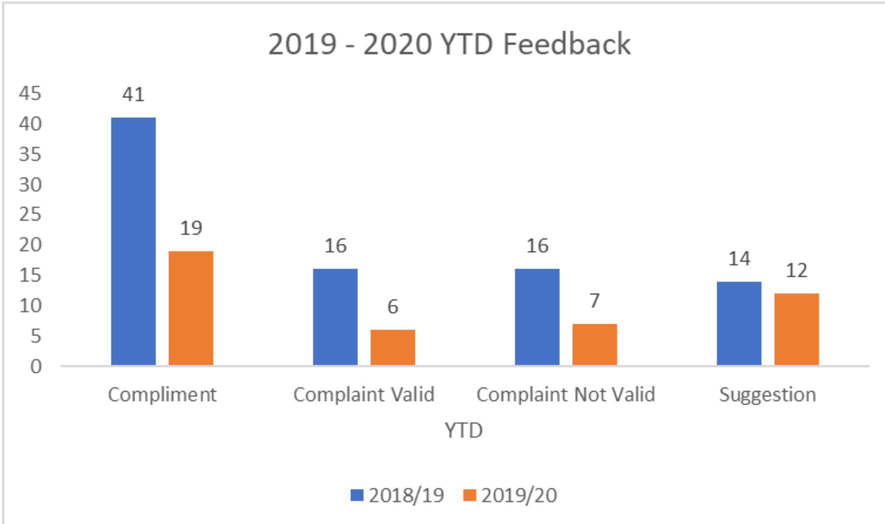
For June we had 1x Compliments, 0x Valid Complaints, 0x Non-valid Complaint and 1x Suggestions

4.1 Compliments (1)
Delighted the pool is open again, everything is spotless, a credit to the staff and maintenance team. I felt really comfortable being back.

4.2 Complaints Valid (0)
Nil to report

4.3 Complaint Not Valid (0)
Nil to report

4.4 Suggestions (1)
Please update water fountain in pool area. Current fountain is insufficient for drinking and refilling water bottles.



YTD Feedback Comparison

	2018/19	2019/20	Variance
Compliment	41	19	-22
Complaint Valid	16	6	-10
Complaint Not Valid	16	7	-9
Suggestion	14	12	-2

5. CAPITAL NEW AND RENEWAL ASSET MANAGEMENT PROJECTS

- Gas Tube Heaters ($20,000) – Completed
- Retractable Seating ($50,000) – Completed
- Stadium Tables and Chairs ($10,000) – Completed
- Pump Replacement ($12,000) – Completed
- Sauna Refurbishment ($25,000) – Completed
- TAEC Lane Ropes ($7,220)– Completed
- TAEC Reception desk – Completed
- Heat Pump Office space – Completed

6. GENERAL BUSINESS

June

Upcoming Key Dates/Bookings

July
COVID-19 closed

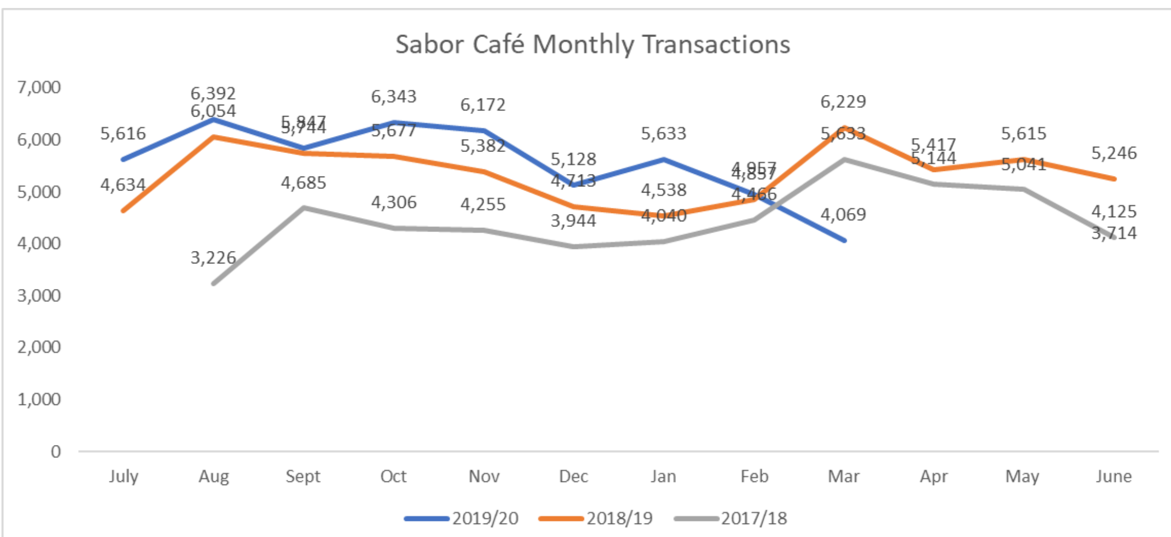
7. SABOR CAFÉ

June Sabor report.

Sabor was also affected during the COVID -19 lockdown and did not open until the alert level 1 was introduced and at reduced hours. They have continued to operate at reduced hours informing us they will continue this until the start of Term 3.

The information provided for June is hard to determine whether the low result is based on COVID-19, the reduction of hours or a combination of both.

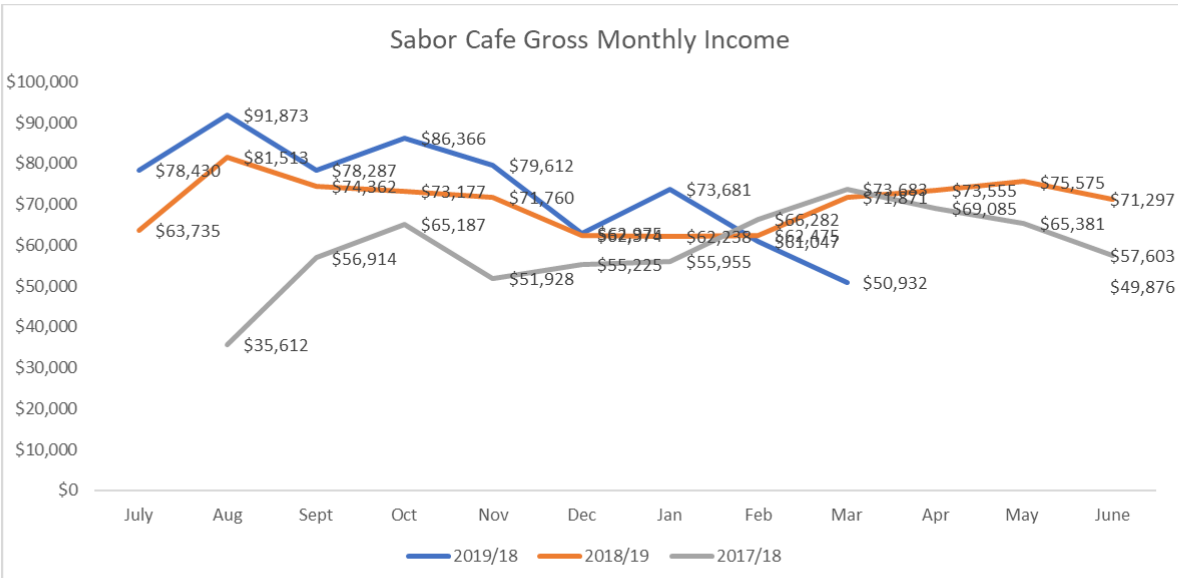
YTD June
2020 53,871
2019 64,106



2020 June 3,714**
2019 June 5,246

YTD turnover is $713,079 which is a decrease over the same period measured by -$130,863 or -15.5%

2020 YTD $713,079
2019 YTD $843,942



2020 June $49,876**
2019 June $71,297

8. Appendices

8.1. Visitor Numbers – Monthly & YTD Breakdown

2019/20	GOWAIPA YTD VISITS												
		Swim Waipa											
Month	Livingstone Aquatics	Swim Waipa Learn to Swim	Swim Waipa Club	Swim Waipa Schools Programme	Holiday Programme	Swim Waipa Total	Club Waipa - Aquatic	Swimming Sub-Total	ASB Stadium	Club Waipa Non-Aquatic	TAEC Total	Cambridge Aquatic	Grand Total
July	8786	834	408	0	90	1332	358	10476	2978	5099	18553		18553
August	7693	1766	563	0	0	2329	353	10375	5695	5567	21637		21637
September	7718	1784	466	0	18	2268	362	10348	2641	5376	18365		18365
October	11630	1195	393	0	142	1730	302	13662	3910	5417	22989		22989
November	10632	2713	483	297	0	3493	355	14480	5093	5035	24608		24608
December	10521	2396	227	266	0	2889	210	13620	1441	4281	19342		19342
January	12989	0	100	0	282	382	114	13485	351	4852	18688		18688
February	10800	2704	385	1269	0	4358	301	15539	2078	5027	22644		22644
March	7654	1901	285	578	0	2764	119	10447	2313	3299	16059		16059
April	-	-	-	-	-	-	-	-	-	-	-		-
May	-	-	-	-	-	-	-	-	114	1429	1543		1543
June	4460	416	84	-	-	500	23	4983	1155	4583	10721		10721
YTD Totals	**92,873**	**15,709**	**3,394**	**2,410**	**532**	**22,045**	**2,497**	**117,415**	**27,769**	**49,965**	**195,149**	**0**	**195,149**

STRATEGIC PLANNING AND POLICY COMMITTEE REPORT

Waipā DISTRICT COUNCIL

To:	The Chairperson and Members of the Strategic Planning and Policy Committee
From:	Group Manager Strategy & Community Services
Subject:	**WAIKATO ARTS NAVIGATOR REPORT TO WAIPA DISTRICT COUNCIL**
Meeting Date:	1 September 2020

1 EXECUTIVE SUMMARY

This report presents *Waikato Arts Navigator - Report to Waipa District Council – WAN Stage 2, An arts approach to post-crisis recovery.* This will be presented by Des Ratima from Creative Waikato.

The following appendix accompanies the report:

- Appendix 1 – Waikato Arts Navigator – Report to Waipā District Council – WAN Stage 2 Report.

2 RECOMMENDATION

That

*a) The report titled 'Waikato Arts Navigator Report to Waipa District Council' (document number 10454545) of Debbie Lascelles, Group Manager Strategy & Community Services be **RECEIVED**.*

3 Background

Council agreed to fund Creative Waikato $6,000 in year one of the 2018-28 Long Term Plan to complete stage one of the Waikato Arts Navigator (WAN).

WAN is a framework developed by Creative Waikato and available to all Councils in the Waikato region. Its goal is to build a collective vision for arts and creative outcomes for communities in the Waikato Region.

Stage one aimed to capture a clear understanding of the current state of arts within each district. Stage two, which has not commenced yet, proposes to focus on the way arts can contribute to recovery from Covid-19 and presents a framework to support that.

Debbie Lascelles
GROUP MANAGER STRATEGY AND COMMUNITY SERVICES

Appendix 1

Waikato Arts Navigator – Report to Waipā District Council – WAN Stage 2 Report

Waikato Arts Navigator

Report to Waipā District Council

Stage 2

An arts approach to post-crisis recovery

Creative Waikato
Toi Waikato

Waikato arts NAVIGATOR

Table of Contents

Introduction

The Waikato Arts Navigator (WAN) is a framework developed by Creative Waikato available to all Councils in the wider Waikato region. Its goal is to build a collective vision for arts and creative outcomes for all our communities.

The ultimate objective of WAN is to have all Councils in the region making decisions for arts development with the following outcomes in mind:

- Creative Prosperity
- Creative Experiences
- Creative Wellbeing
- Creative Excellence

Framework

CREATIVE PROSPERITY	CREATIVE EXPERIENCES	CREATIVE WELLBEING	CREATIVE EXCELLENCE
Outcomes	Outcomes	Outcomes	Outcomes
Creative economies	Community participation	Mental & physical health	Build a national audience
Attract new residents	Community and cultural expression	Community engagement	Youth development
Retain youth	Recreation and interaction	Collective and individual identity	Culture of excellence & achievement
National perceptions	Local pride	Create, grow and strengthen communities	Creative export opportunities

The foundation principles of WAN are that it is:

- Strength based
- Borderless
- Inclusive
- Tangata whenua
- Regionally aligned

This is a simple way to have an effective arts strategy utilising existing knowledge of local communities' activities and working from its strengths. It is a simple tool to develop a practical solution to unifying Waikato districts activities and goals within a single arts plan.

Why is it important?

When arts and culture are strong and visible, so are our communities.

How does it work?

Councils and communities are able to –
- Clearly see their communities within the plan
- Agree with the priorities and understand how they can benefit their communities
- Identify elements within the plan that they can support or action, thus contributing to the realisation of the vision
- Recognise the importance of relationship between stakeholders and other communities in order for the vision to be realised

Purpose of this report

The purpose of this report is to –

- Outline the predicted challenges facing Council post-lockdown
- Provide examples of how the arts can assist with post-recovery
- Seek Council agreement and commitment toward Stage 2 approach

Background

Stages 1 and 2

In 2018, during the Long-Term Plan, Creative Waikato made submissions to all Councils in the Waikato region. The basis of this submission was that the Waikato Arts Navigator be endorsed and Creative Waikato work with Council staff to develop an arts action plan that aligns with WAN and funding to support and build focus within each district. Waipā District Council endorsed this strategy and agreed to fund $6,000 p/a (for three years).

The purpose of Stage 1 was to gain a clear, accurate and current understanding of the arts in each district.

The foundation of this was built from expert knowledge and insight from initial research, consultation with each community, building of a local arts profile (incl artist and art group clusters), undertaking a hard and soft infrastructure stocktake as well as funding and key arts events. Arts strengths were identified and an infographic showing areas of strength was developed. A report on Stage 1 was sent to Waipā District Council in December 2019.

The initial purpose of Stage 2 was to gain agreement on recommendations for areas of focus and development. This stage has not yet been commenced. The advent of COVID-19 has provided a challenge, but also an opportunity to ascertain how the arts can play a crucial role in post-recovery efforts. It is proposed that Stage 2 is now focused on providing arts solutions to post-recovery efforts.

COVID-19

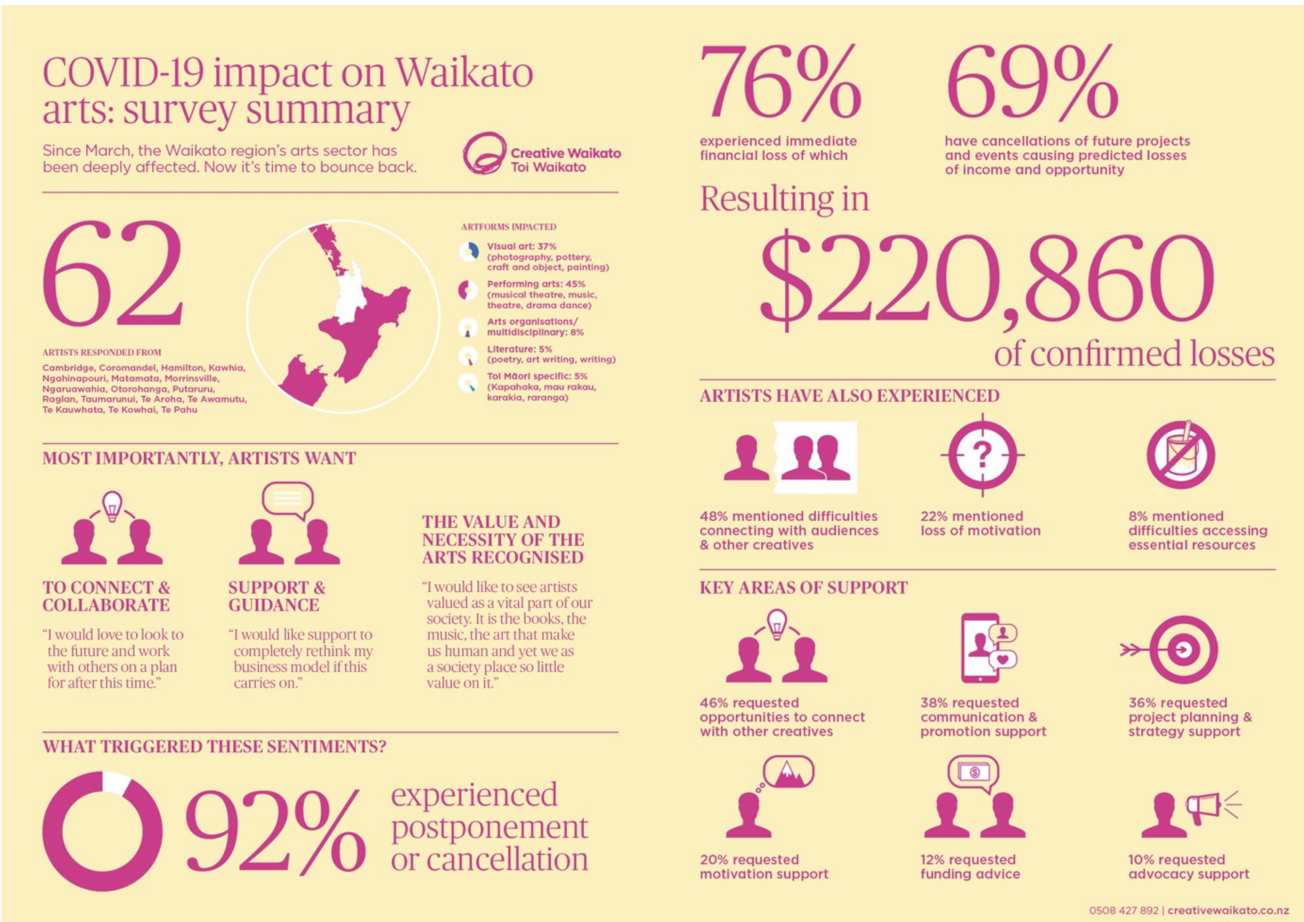
The arts sector used this time of uncertainty to take a moment to settle in and think creatively about how we will respond. We know that there will continue to be an arts sector after this crisis – it may be different for a while, but it will continue. There will always be a need for arts and creativity.

Global catastrophes change the world. The impact of COVID-19 has amplified challenges that already existed, such as social inequality, mental health and economic fragility.

Arts and cultural activities serve as a coping mechanism for humanity. They help us to adjust to new conditions. They help us find clarity around who we are and how we connect. Because of this, we saw creativity on a level never before seen in human history. An appetite for culture was shown around the world. Online concerts, virtual galleries and musical performances not only provided entertainment and cultural uplift, but served to remind us of our humanity. What is needed now is to translate this into a broader understanding of the concept of value for the arts in the wider community.

COVID-19 impact on Waikato arts: survey summary

Creative Waikato completed a survey of our wider sector to examine the impact of COVID-19, but it was also intended to get a clearer picture of the support people need at this time. This informed the support services that Creative Waikato has developed in terms of our approach, our development of resources, and our change of focus. We also gathered information via ongoing communications (email, calls and digital meetings) with key stakeholders. This helped us to better understand the issues faced, and support required to ensure our sector can thrive after this.



Artists are resilient. They are used to adapting, but it is important that there is an ongoing framework to support their work. Having access to a thriving arts sector makes for an exciting and engaging city/town/region – there is a great strategic impact of setting things in motion to make this sector sustainable and active as it has a substantial contribution to the broader Waikato region in many of the key measures – not only through the lens of cultural wellbeing.

5

Predicted challenges post-lockdown

The main challenges post-lockdown mirror those being experienced globally to a greater or lesser extent. A few of the main challenges have been explored below.

Economic recovery

Pre-COVID-19, the labour market was already undergoing a significant transformation, driven by automation but also other factors such as climate change[1]

When COVID-19 arrived on our shores, we experienced the same devastation experienced around the world - jobs were lost, small businesses closed, tourism came to a halt and planned projects and budgets were cut. All of this occurring against a backdrop of fear and anxiety as the country went into panic not knowing where this would all lead to.

The New Zealand Activity Index (NZAC) was launched[2] to provide a more granular and timely signal of movements in the New Zealand economy. It was constructed by staff at the Treasury, Stats NZ, and the Reserve Bank of New Zealand.

The NZAC index summarises changes in several monthly activity indicators. The first edition of the index shows that activity in April 2020 was 19 percent down on the same month last year and, even though activity bounced back in May, it still remained 6.5 percent down on May 2019.

While the NZAC is not an official statistic, it is a composite index that seeks to track New Zealand's economic activity each month.[3]

There has been some impetus shown from major Waikato companies to respond to Government's request for regions and groups to submit shovel ready infrastructure projects. This provides an integrated response and a focus on a plan for different activities.[4]

However, only time will tell what the real economic impact will be.

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[1] Culture Lab 2030 'Voices of the City', p 4 - https://en.unesco.org/creative-cities/sites/creative-cities/files/16_pages_villes_creatives_uk_bd.pdf
[2] Statistics New Zealand 'New index shows activity down in April and May' 1 July 2020 - https://www.stats.govt.nz/news/new-index-shows-activity-down-in-april-and-may
[3] Ibid
[4] 'How Waikato business leaders plan to revive regional economy' - https://www.stuff.co.nz/business/industries/121180802/coronavirus-how-waikato-business-leaders-plan-to-revive-regional-economy-postcovid19-lockdown

Physical and mental health

COVID-19 is having a significant impact on how we interact with others, go about our lives, our work, study and many other aspects of our lives. We know that a combination of stress and uncertainty can have significant and wide-reaching impacts on the [physical and] mental wellbeing of people in New Zealand.[5]

In general, we know at-risk groups for long-term mental health issues will be the healthcare workers who are on the frontline, young people under 30 and children, the elderly and those in precarious situations, for example, owing to mental illness, disability and poverty. All this should surprise no one; insights on the long-term damage of disasters have been accepted in the field of trauma psychology for decades.[6]

Spotlight on inequality

The disruption caused by COVID-19 brings out the strengths and weaknesses across all sectors – it acts as an amplifier. COVID-19 is an equaliser in so far as no one is immune but it exposes our inequalities across our communities, our sectors, our societies.[7]

COVID-19 has hit the most vulnerable the hardest, including the 1 billion residents of the world's densely populated informal settlements and slums, as well as other people lacking access to adequate, affordable and secure housing. 'Without a house, it is impossible to heed the call to stay at home. Without safe shelter and access to basic services, the order to shelter in place has no meaning'.[8]

Put simply, if you are poor, your life expectancy is lower than someone with wealth. If you are also Māori or of Pacific Island descent, you can expect to be sicker and die even sooner. There is an argument that our current social systems have moved away from the local, away from the intimacy that drives empathy and compels action. We know where the problems are and the supporting information and knowledge to define and understand these, however, implementing effective solutions and acting on these issues has been less successful.[9]

The inequalities that were prevalent prior to the COVID-19 pandemic have intensified already vulnerable communities and added more pressure. It seems perplexing that 'our

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[5] Ministry of Health 'Mental health and wellbeing resources' - https://www.health.govt.nz/our-work/diseases-and-conditions/covid-19-novel-coronavirus/covid-19-health-advice-general-public/covid-19-mental-health-and-wellbeing-resources)
[6] World Economic Forum 'This is the psychological side of the Covid-19 pandemic that we are ignoring' https://www.weforum.org/agenda/2020/04/this-is-the-psychological-side-of-the-covid-19-pandemic-that-were-ignoring/
[7] The Big Idea 'Are you ready for reinvention?' article on PAANZ Hui, 21 April 2020, Shona McCullagh - http://www.thebigidea.nz/stories/are-you-ready-for-reinvention/
[8] 'How life in our cities will look after the coronavirus pandemic' - https://foreignpolicy.com/202/05/01/future-of-cities-urban-life-after-corovirus-pandemic/
[9] Matheson, A – Ideas Room 'Covid019 lays inequality in NZ bare - https://www.newsroom.co.nz/ideasroom/2020/04/28/1143311/covid-19-lays-inequality-in-nz-bare

indigenous people have so much knowledge in regenerative practice and collective knowledge about health and wellbeing'[10] and yet our health and social systems fail to value and utilise this taonga not only for Māori but for the benefit of all New Zealanders.

The arts can be a powerful force to help create more equality in how we respond. It values human impact and an ecosystem that is adaptive, resilient and embraces the collective rather than competitive behavior.

Examples of post-recovery efforts

Artists as first responders

The power of art to restore some wholeness to psyches and souls shaken by disaster has emerged as a major theme in artist-led recovery efforts.[11] The following examples show how artists have been the first to respond to disasters and crises and how they galvanise efforts to connect communities in providing post-recovery solutions.

Community resilience and wellbeing

Artists and community groups are able to take initiative and create innovative forms of leadership and local governance to provide necessary services and amenities in their communities.[12]

Some of these examples suggest that in addition to natural disasters, some 'man-made' disasters including certain political decisions from recovery authorities – have hindered a smooth recovery process. The result is that many community-led initiatives significantly contributed to social connectedness and mental and physical wellbeing.

Arts as part of our community eco-system

The arts can be, and should be, embedded in all facets of our community. They feed into a broader understanding of the ecosystem of our community and place.[13] When we collectively utilise an understanding of arts-based methodologies there is a way to ensure that we can move forward in an inclusive and engaging way. We can see in the following examples how the arts have been part of recovery and strategies for re-imagining the way people thrive in their communities.

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[10] The Big Idea 'Are you ready for reinvention?' article on PAANZ Hui, 21 April 2020, Shona McCullagh - http://www.thebigidea.nz/stories/are-you-ready-for-reinvention/

[11] Forecast 'How artists help communities heal' - https://forecastpublicart.org/how-artists-help-communities-heal-after-disasters/

[12] 'Gauging the Impacts of Post-Disaster Arts and Culture Initiatives in Christchurch' - https://www.eqrecoverylearning.org/assets/downloads/2045-Gauging-the-Impacts-of-Post-Disaster-Arts-and-Culture-Initiatives-in-Christchurch-main-document.PDF

[13] See attached Waikato Arts Ecosystem map (Appendix)

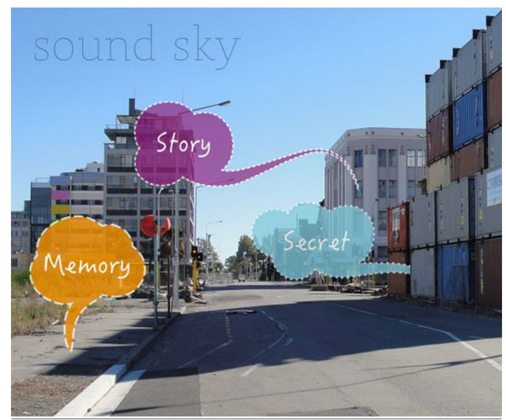
Location	Arts response and description	Impacts	Images	Link
New Orleans	**Transforma Project** • A five year artistic experimentation in New Orleans led by a group of artists and art professionals in response to the devastation of Hurricane Katrina. • Emerged out of community consultation • Co-ordinated by a 'diverse and fluid group of professionals, local and national, that provide the structural backbone of the initiative'.	HOME, New Orleans? • Moves local participation forward in strengthening, revitalising, and rebuilding community. Operation Paydirt/Fundred Bill project • Seeks to facilitate the complete transformation of New Orleans into a city with lead-safe soil through the delivery of a scientific solution to lead contamination while calling for action through a nationwide drawing project designed to engage young people. These projects support and raise psychological and emotional wellbeing may also improve physical health. In this respect, participation in the arts is receiving increasing attention for its health promoting potential.[14]	 	https://www.transformaprojects.org/pdfs/transformaPilotProjects.pdf

[14] Bidwell, S 'The arts in health' Evidence from International Literature' Population Health and Community Engagement, 2014, p 5 - https://www.pegasus.health.nz/wp-content/uploads/2018/05/Arts-in-Health-Susan-Bidwell.pdf

9

USA	**Sandy Storyline Project** • A community-generated narrative of the storm and its aftermath that sought to build a more just and sustainable future	• Amplify the voices of community members during the aftermath of Hurricane Sandy. • Examines the human impact into the national conversation about economic inequality, climate change, infrastructure development and the future of coastal cities in America.	 Sandy volunteers remember the storm and explain how they got involved  The Teachable Moment: Rockaway, Hurricane Sandy, and Social Media  Milan Taylor: A Window on Change  Terri Bennett: Respond and Rebuild	https://www.sandystoryline.com/about/ http://sandystory.wpengine.com/stories/
Japan	**Yappeshi Festival** • Engaged a creative network to spark new life amidst the loss and devastation in the city after the tsunami. • Participants hang up their handwritten hopes and wishes, receive massages, play games, fly paper lanterns and visit the "listening booth"	• Bring signs of hope into an everyday where daily necessities such as food, water and a warm place to sleep are no longer taken for granted. • Means "lets do it!" (*yappeshi*), emphasises the local nature of the event. • The loss of social memory, has serious detrimental effects to the wellbeing of communities. Arts and culture can be key tools in preserving, recovering and creating new social memory, with positive impacts on communities abilities to be resilient.	 	http://artasiapacific.com/Blog/YappeshiFestivalAtTohoku

10

Christchurch NZ	**GAPFILLER** • Globally acclaimed creative social enterprise that works with communities – and the public and private sectors – to design and deliver placemaking strategies and programmes that are the foundation for long-term community outcomes.[15] • Creates installations, events and processes to make places more memorable, fun, participatory, surprising, equitable and sociable	Dance-o-mat • A coin operated dance floor that anyone can use. A coin-operated ex-laundromat washing machine powers four speakers which surround a custom-made, sprung dance floor. • Thousands of people have used the Dance-O-Mat, even Prince Charles and Camilla in November 2012 on their Royal Jubilee tour. It had approximately 600 hours of use across the first 3 months. Sound Sky • A location-sensitive audio-visual artwork for Christchurch constructed from and inspired by spoken and recorded contributions from residents. • Allows people to listen to and share memories of the past, create playfulness in the present, and plant visions for the future. • By developing an infrastructure within which residents can create something together in public spaces, emphasises the creativity and knowledge of its people and places.[16]	  	https://gapfiller.org.nz/project/dance-o-mat/ http://soundsky.org/

[15] Gapfiller - https://gapfiller.org.nz/about/
[16] Ibid

11

Bringing residents and visitors back into cities and towns

The arts play an important role in attracting visitors, creating jobs and developing skills. Additionally, arts and culture activities can have spillover impacts into other sectors (such as tourism).[17]

There won't be a return to travel as it was in the past and the new normal will take some time to bed in. It is estimated that there will be a five year recovery for international travel. New Zealand will have much more focus on domestic travel and that's where the industry has turned to first.[18]

The fact that artists are proficient and experienced at trying new things, make them well positioned to think of new and innovative ways of enticing domestic consumers as well as residents to their towns and to reimagine their place anew.

Partnership between Arts and other industries:
Christchurch regeneration project, May 2017 to current

There is a need to embed arts-based strategies and frameworks into the broader ecosystem of the city. This is key to exploring arts as a community wellbeing methodology, rather than simply an output. One great example of this is the Placemaking At One Central project – which is a partnership between Gap Filler and Fletcher Living. It's the first time in New Zealand that a major developer is partnering with community and social innovators to run a programme of community-building activities at the pre-development stage.[19]

Gap Filler has been experimenting for a long time now with how temporary projects can have long-term community outcomes. Placemaking at One Central is a logical leap forward, growing community over the course of several years before, around and within a major residential development. A couple of Placemaking at One Central projects are shown below.

Giant Spray Cans

Detour Snake Run

[17] 'Gauging the Impacts of Post-Disaster Arts and Culture Initiatives in Christchurch' - https://www.eqrecoverylearning.org/assets/downloads/2045-Gauging-the-Impacts-of-Post-Disaster-Arts-and-Culture-Initiatives-in-Christchurch-main-document.PDF
[18] RNZ 'Tourism eyes post lockdown rebound - https://www.rnz.co.nz/news/national/412966/tourism-eyes-post-lockdown-rebound
[19] Gapfiller - https://gapfiller.org.nz/project/placemaking-at-one-central/

Waikato Arts solutions to post-recovery efforts

As the environment around us continues to change in often unpredictable ways, maintaining community access to and involvement in arts and culture is vital.[20] The arts provide the ability to think critically and solve problems creatively. The table below show the challenges districts may be facing, some arts responses that will aid in addressing these challenges and how these align with the Navigator outcomes.

Challenges	Arts response	WAN outcomes
Empty buildings and shops	• Temporary activations fostering long-term community outcomes	Creative economies Attract new residents Retain youth National perceptions Community participation Community and cultural expression Recreation and interaction Local pride Community engagement
Potential loss or reinvention of identity	• Arts as a tool to preserve, recover or recreate a new identity • Opportunity to increase the quality, livelihood and sustainability of the urban environment through playful experiences • Creatively moving into the future	Community participation Community and cultural expression Recreation and interaction Local pride Community engagement Collective and individual identity
Tourism downturn	• Making places more memorable, fun, participatory, surprising, equitable and social	Creative economies Attract new residents Retain youth

[20] Creative New Zealand *'Supporting your arts community through Covid-19 – He waka eke noa'* - A guide for territorial authorities, June 2020

Challenges	Arts response	WAN outcomes
	• Highlighting local businesses and telling their stories	National perceptions Community participation Local pride Create, grow and strengthen communities
Physical and mental health	• Engaging people in sharing their own experiences and visions • Telling peoples' stories from their perspective • Helping people to stay connected, express their identity and understand differences	Mental and physical health Community engagement Collective and individual identity Create, grow and strengthen communities
Inequalities between rich and poor are intensified	• Bring together diverse communities to create positive change • Create awareness and redress issues that were already embedded • Highlight the human impact into the national conversation about economic inequality, infrastructure development and the future of cities and towns	Community participation Community and cultural expression Mental and physical health Community engagement Collective and individual identity Create, grow and strengthen communities

Alignment with Council plan

Waipā District Council long-term plan 2018-28
The table below demonstrates how Waipa DC's community outcomes align with the Waikato Arts Navigator outcomes.

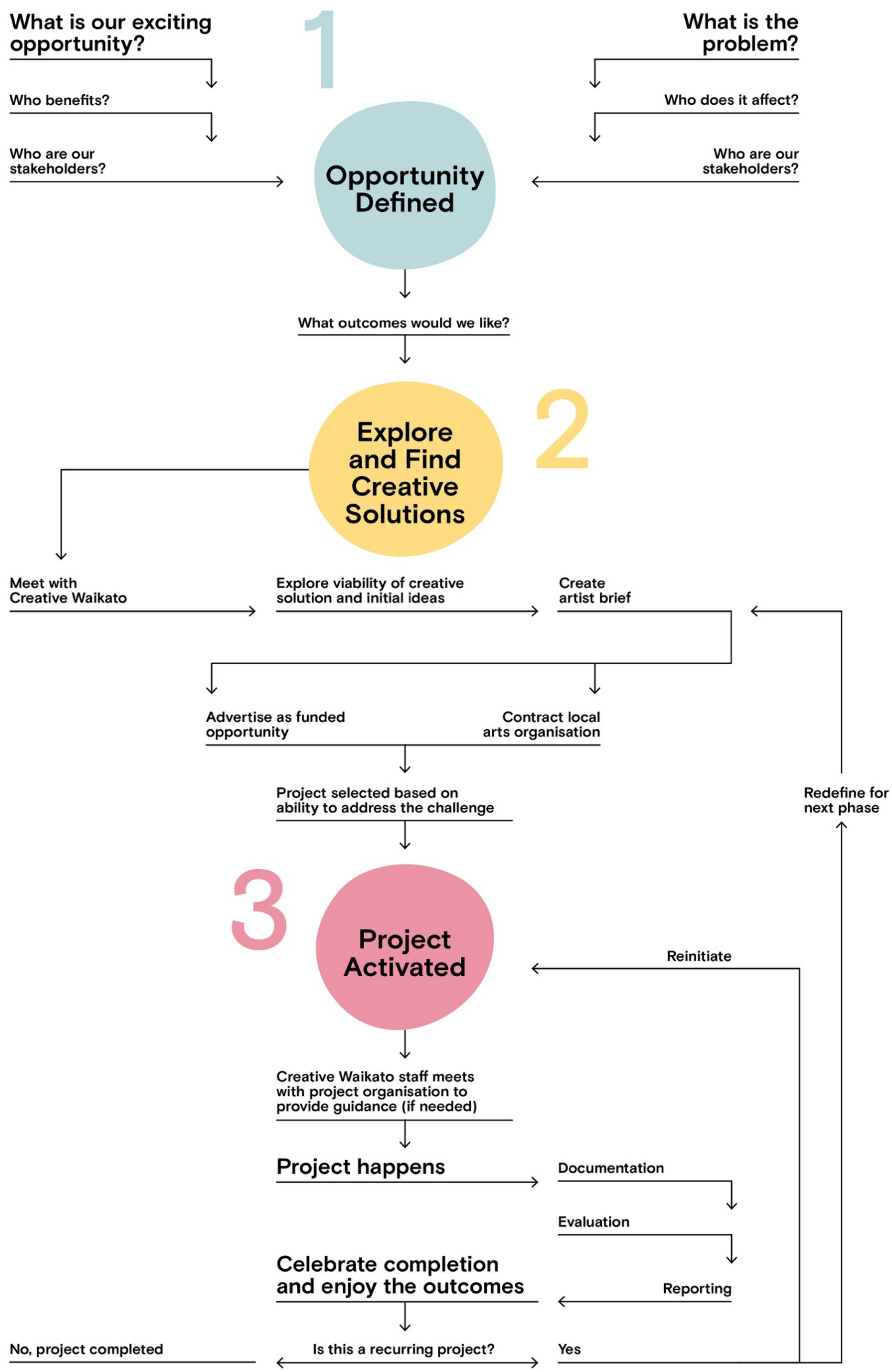
Waipā DC outcomes	**Waikato Arts Navigator outcomes**
Economically Progressive Continuing to build a sustainable thriving economy based upon the districts unique characteristics.	Creative economies Build a national audience Attract new residents Culture of excellence and achievement Local pride National perceptions (tourism) Create, grow and strengthen communities Creative export opportunities
Environmental and Cultural Champions Building a community that is proud of Waipā's physical and cultural environment	Community participation Mental & physical health Community and cultural expression Community engagement Recreation and interaction Collective and individual identity Create, grow and strengthen communities
Socially Responsible Utilising the knowledge and resources within Waipā for the benefit of the whole community	Creative economies Community participation Attract new residents Community and cultural expression Community engagement Youth development Recreation and interaction Collective and individual identity Culture of excellence and achievement Local pride Create, grow and strengthen communities
Connected with our Community Ensuring the Waipā community is actively involved in the decisions and actions that affect Waipā	Community participation Mental & physical health Community and cultural expression Community engagement Youth development Retain youth Recreation and interaction Collective and individual identity Local pride Create, grow and strengthen communities

A framework – using a creative lens

The following page shows a proposed framework for Stage 2. It is a framework that utilises creative thinking when considering a potential opportunity or problem. Once this is defined and outcomes are agreed, the second step is to explore and find creative solutions. Creative Waikato can assist in exploring the idea further and providing initial ideas. Depending on the solution, advertisements for funded opportunities for artists or arts organisations would commence, or a local arts organisation would be contracted to deliver a solution. The project would be selected based on its ability to deliver on the challenges which have been identified.

The project is then activated. Reporting, evaluation and documentation would be undertaken for the project with Creative Waikato providing assistance and guidance if needed.

This framework has the potential to be utilised across other areas of Council i.e., Infrastructure; Economic Development; Environmental Sustainability; Culture and Heritage; Political engagement; Liveability and Community cohesion. It puts a creative lens on any opportunities and problems that may arise, thereby introducing creative thinking at the outset of the process.



1
What is our exciting opportunity?
Who benefits?
Who are our stakeholders?
What is the problem?
Who does it affect?
Who are our stakeholders?
Opportunity Defined
What outcomes would we like?
2
Explore and Find Creative Solutions
Meet with Creative Waikato
Explore viability of creative solution and initial ideas
Create artist brief
Advertise as funded opportunity
Contract local arts organisation
Project selected based on ability to address the challenge
Redefine for next phase
3
Project Activated
Reinitiate
Creative Waikato staff meets with project organisation to provide guidance (if needed)
Project happens
Documentation
Evaluation
Reporting
Celebrate completion and enjoy the outcomes
No, project completed
Is this a recurring project?
Yes

17

Project examples

Below are some examples of potential Stage 2 projects, how they align with the Navigator outcomes and indicative costs.

Creative project	Project examples	WAN outcome	Cost (est per town)
Telling peoples stories	A storytelling project about a community project focused on mental health	Mental and physical health Community engagement Collective and individual identity Create, grow and strengthen communities	< $5,000
Expression of identity	Series of community murals expressing the identity of different areas	Creative economies Attract new residents Retain youth National perceptions Community participation Local pride Create, grow and strengthen communities	Approx $2,500 for a small/medium wall. Or $5000 for a medium/large wall Flexible depending on demands.
Activation of empty spaces	Pop-up shop activation and exhibitions	Creative economies Attract new residents Retain youth National perceptions Community participation Community and cultural expression Recreation and interaction Local pride Community engagement	$15,000 to $30,000 May depend on size of shops, scope of work, and the potential to commission installations which would change scope.
Community celebration and connectedness	Festival in town centre focused on connecting people from different groups i.e., ethnic groups, older people or youth	Creative economies Attract new residents Retain youth National perceptions Community participation Community and cultural expression Recreation and interaction Local pride Community engagement	$20,000 to $50,000
Town centre regeneration	Project focused on town centre regeneration i.e., road/path treatments, shop activation, public art, murals, events/festivals etc.	Creative economies Attract new residents Retain youth National perceptions Community participation Community and cultural expression Recreation and interaction Local pride Community engagement	> $40,000

Long term

The Waikato Arts Navigator is an aspirational vision to see our region become a place with a vibrant arts and cultural sector that thrives with diverse and transformative creative activity. This means that there is the ongoing sustainable development of a wide range of artistic and cultural activities. The arts are valued and celebrated in our communities with robust and flourishing pathways from participation and audience engagement, to training and capability development through a range of practical activities and culminating in having a sector of creative professionals whose careers are able to live and thrive.

It is important to encourage local government, industry and sector leaders to see artists as a more embedded component within the rest of society. This encourages a collaborative space where the value of artists in society can be better recognised and utilised. As part of this, it would include a diverse but interconnected ecosystem of arts infrastructure (both hard and soft) that would provide clear pathways for artists and community members at any stage of the journey.

Moving forward

The Waikato region is well-placed to provide a meaningful arts response in that most districts have already agreed that the Waikato Arts Navigator is a framework they wish to implement. What is now required is a realisation of how this strategy can activate an arts response which is unique to each individual district. Local and international examples show what can be achieved if artists can engage with communities to create a response that not only embeds their sense of belonging, but also helps to shape what their towns and cities will look like.

While the impact of a major shift on skills, wages and the nature of our jobs is hard to estimate, creative skills are essential to evolving and adapting local provision in this new environment. The creative economy will likely become one of the leading sectors for job creation in the future, as a vehicle to facilitate economic transition. Culture can be the engine for recovery.[21]

Recovery also runs on social capital; the networks of relationships among people who live and work in a particular society, enabling that society to function effectively. There is no doubt that the recovery has to begin by helping those affected to restore their faith in the continuity of their lives. Social scientists use the concept of 'ontological security' to describe this sense of continuity, but it is similar to the Māori notion of Tūrangawaewae (having a physical home and the sense of belonging and continuity that being anchored in a place provides).

Successful recovery is about defining clearly, focusing locally, spending social capital and creative compelling narratives. It is first and foremost about people and places, not processes and policies.[22] The arts can serve as an antidote to times of chaos. It can be a

[21] Unesco ResiliArt Debate - http://svarcstream3a.unesco.org/ksastream/video/ResiliArt-Debate.mp4
[22] Lessons for the Covid-19 recovery - https://www.researchfirst.co.nz/blog/lessons-for-the-covid-19-recovery

route to clarity, and it can be a force of resistance and repair, providing new registers, new languages in which to think.[23] The arts can be the catalyst to effect such change.

[23] Laing, O 'Feeling overwhelmed? How art can help in an emergency' https://www.theguardian.com/books/2020/mar/21/feeling-overwhelmed-how-art-can-help-in-an-emergency-by-olivia-laing

APPENDIX 1

Waipā District Profile

Stage One

The foundation of this was built from expert knowledge and insight from the collective experience of Creative Waikato from the last 7 years.

The following is a summary of the work, which was undertaken for this phase;

1. Research (July 2018 – February 2019)
2. Consultation with community (March 2019 – June 2019)
3. Local arts profile review (July 2018 – June 2019)
    - Artist and art group clusters
    - Hard infrastructure (physical assets)
    - Soft infrastructure (people and services)
    - Funding
    - Key Arts events
4. Identified art strengths
5. Info-graphic
6. In development

<u>Research</u>

This phase included researching multiple documents both internal and external of Creative Waikato, which were consolidated to provide an accurate picture of the arts within each district. These included information collated from the following sources:

- Waikato Creative Infrastructure Plan data
- Creative New Zealand Atlas data
- 'New Zealanders and the Arts' – Waikato report
- Waikato Arts Mapping 2014
- Council Long Term Plans

Consultation with community

The main purpose from community consultation was two-fold.

1. Introduce local arts communities to Waikato Arts Navigator project and the framework within it.
2. Fill the gaps in our current knowledge of arts in the district and have a clear, current and accurate understanding of arts in the district.

Consultation took place in two main forms. Firstly, as an individual approach to local arts experts/champions we were familiar with and secondly, group sessions were held in major townships where arts groups and artists were invited to attend to share knowledge.

Group sessions took place in:
Cambridge – 10 April 2019
Te Awamutu – 14 May 2019

In attendance at these group sessions included individual artists, arts groups and local arts advocates. There was a broad representation of the arts including music, visual arts, craft and object, theatre and performance.

Local Arts profile review

The following is a summary of the information which was collated during the individual consultations and groups sessions within the Waipā district. These provide a local arts profile for the district and a good basis for building a picture of the arts in this district moving forward.

Arts Clusters

Visual Arts

- Cambridge is well serviced with galleries and studio galleries. These include The Garden Art Studio, Heritage Gallery, The Painting Place, Sinclair Barclay Gallery, and Di Tocker Studio.
- The Rosebank Art Group is based in Te Awamutu. The Cambridge Society of Arts is also active. Both societies have their own dedicated making spaces.
- Pirongia has both the Baffin Street Gallery and the Pirongia Village Craft Shop & Gallery.

Craft and Object

- Cambridge groups include Cambridge Creative Fibre, and QPO Patchwork Group. Te Awamutu groups include Te Awamutu Quilters, Te Awamutu Fibre Arts, Te Awamutu Embroidery Group, Te Awamutu Brass Band, Te Awamutu Country Music Club.

Performing Arts

- Both the the Gaslight Theatre in Cambridge and the Woolshed Theatre in Te Awamutu are active theatre spaces. Te Awamutu also has the Little Theatre, a 36 seat venue.
- Performing arts classes and tuition for both adults and youth are also available.

Toi Māori

- A Te Wananga o Aotearoa campus is based in Te Awamutu. This campus offers a diploma in indigenous art with a focus on whakairo (carving). They also teach Te Reo Māori classes.
- Te Awamutu Musuem often displays historical and contemporary toi Māori. They have the famous Uenuku on permanent display.

Music

- Music groups are active in both Cambridge and Te Awamutu, mosty in the more traditional music forms.
- Cambridge groups include Cambridge and Districts Pipe Band, Cambridge Brass Band, and Mosaic Choir. Te Awamutu groups include Rosetown Choristers, Rosetown Rock'n'Roll Club, and Te Awamutu Music Federation.

Hard infrastructure (physical assets)

Galleries	9
Studio Galleries	3
Theatres	3
Museums	2
Marae	6
Libraries	2
Venues	3

Soft infrastructure (people and services)

Groups and Clubs	20
Support Organisations	2
Workshops/classes	3

Funding

- Local funding for the arts includes Creative Community Schemes from Creative New Zealand, District Promotion Fund, Community Event Fund and Community Discretionary Fund from Waipā District Council.
- Other funding sources including regional and national are available for Waipā district residents, details of which can be found in the district profile.

Key Art Events

Type	Name of event	Town/suburb	Occurance	Month	Primary Artform
Festival	Cambridge Autumn Festival	Cambridge	Annual	April	Multi-artform
Open Studios	Cambridge Open Studios	Cambridge	Annual	April	Visual Arts
Fair	Saint Andrews Craft Fair	Cambridge	Twice per year	Labour Day, Ak Anniv Day	Craft
Festival	Pirongia Craft Day	Pirongia	Annual	September	Craft and Object
Festival	Pirongia Blues Festival	Pirongia	Annual	April	Music

Identified art strengths

Findings from the New Zealanders and the Arts 2018, show a 67% attendance to an arts event and a 45% participation in an arts event in the Waikato Region in the last 12 months. In Hauraki, art forms that stand out as strengths include Visual Arts, Toi Māori, and Performing arts across current infrastructure and audience engagement.

Some of the current local strengths are;

Ignite Arts Academy
Gaslight Theatre
Woolshed Theatre
Te Awamutu Theatre

Financials

Budget 2018/2019

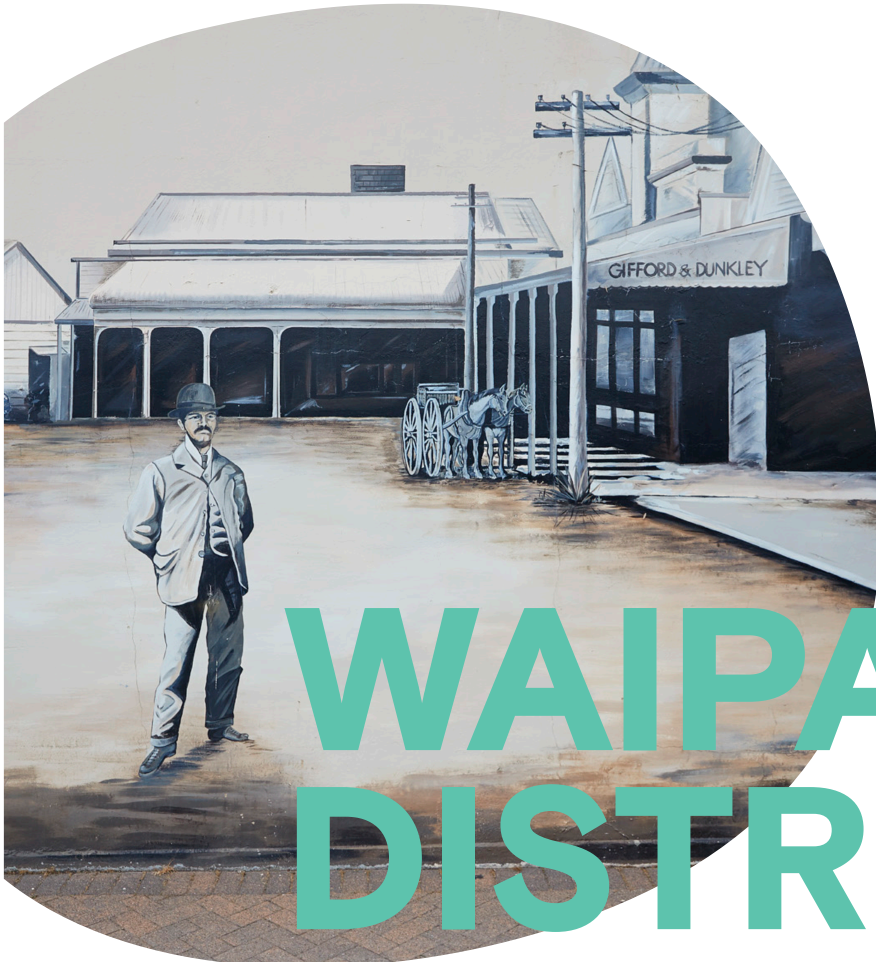
INCOME		
Item	**Description**	**Amount**
WDC	Grant for Stage 1	6000
TOTAL		**$6,000.00**
EXPENDITURE		
Item	**Description**	**Amount**
Personel		
Research	consolidating of exisiitng research documents	2530
Desktop	capture and recording of data - all reviews	2530
Consultation		
Venue	booking fees for venue hire	85
Catering	food and tea and coffee	200
Travel	distance travelled for consultations	418.88
Labour	Facilitation of consultaions	1620
Design		
Concept brief	development of design brief	510
Designer	Area Design design fee for 4 info-graphics	1250
TOTAL		**$9,143.88**
SURPLUS		**-$3,143.88**
Creative Waikato	Absorbed in annual budgeting	**$3,143.88**

APPENDIX 2

Infographic map – Waipā District

The infographic is a visualisation of the arts in your district. It represents in a more digestible and visual way the data gathered from the district, making clear where the strengths are and what arts and culture are in your district. It acts as both a directory of arts infrastructure and events as well as creating a picture of what is unique about your arts in the your district.

Waikato arts NAVIGATOR



WAIPA DISTRICT PROFILE

Creative Waikato
Toi Waikato

Waipa District Profile

Waikato arts NAVIGATOR

Main centres

Cambridge
Te Awamutu
Kihikihi
Pirongia
Ōhaupō
Leamington

Tangata Whenua

Tainui Waikato
Maniapoto
Raukawa

District Population

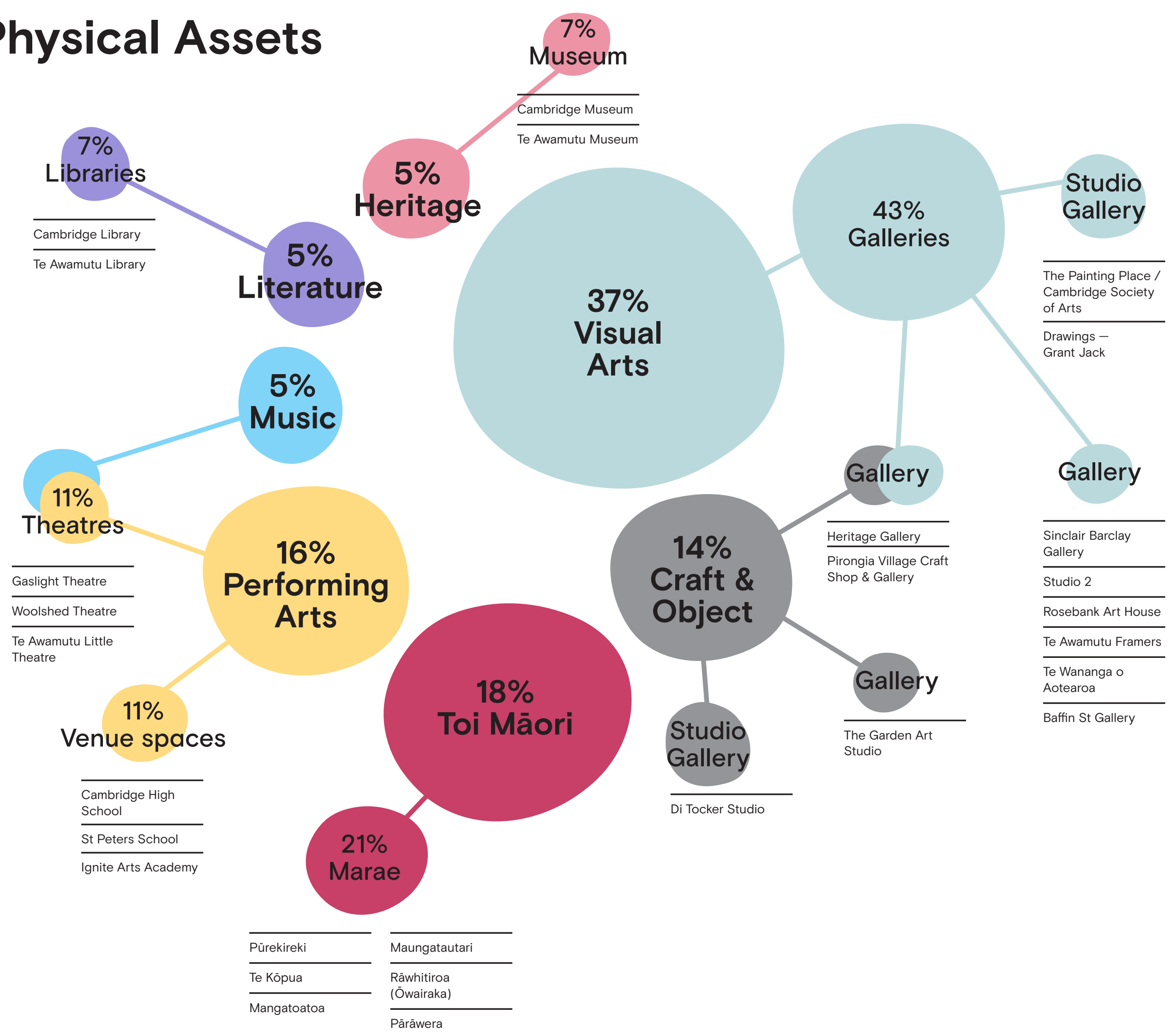
46,668

Arts engagement
CNZ New Zealanders and the Arts, 2018

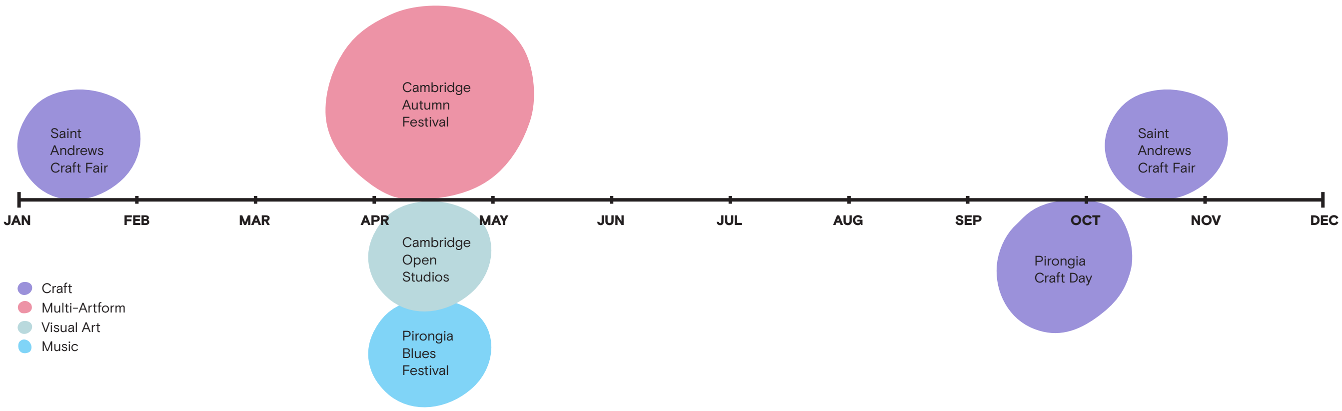
Total engagement

78%

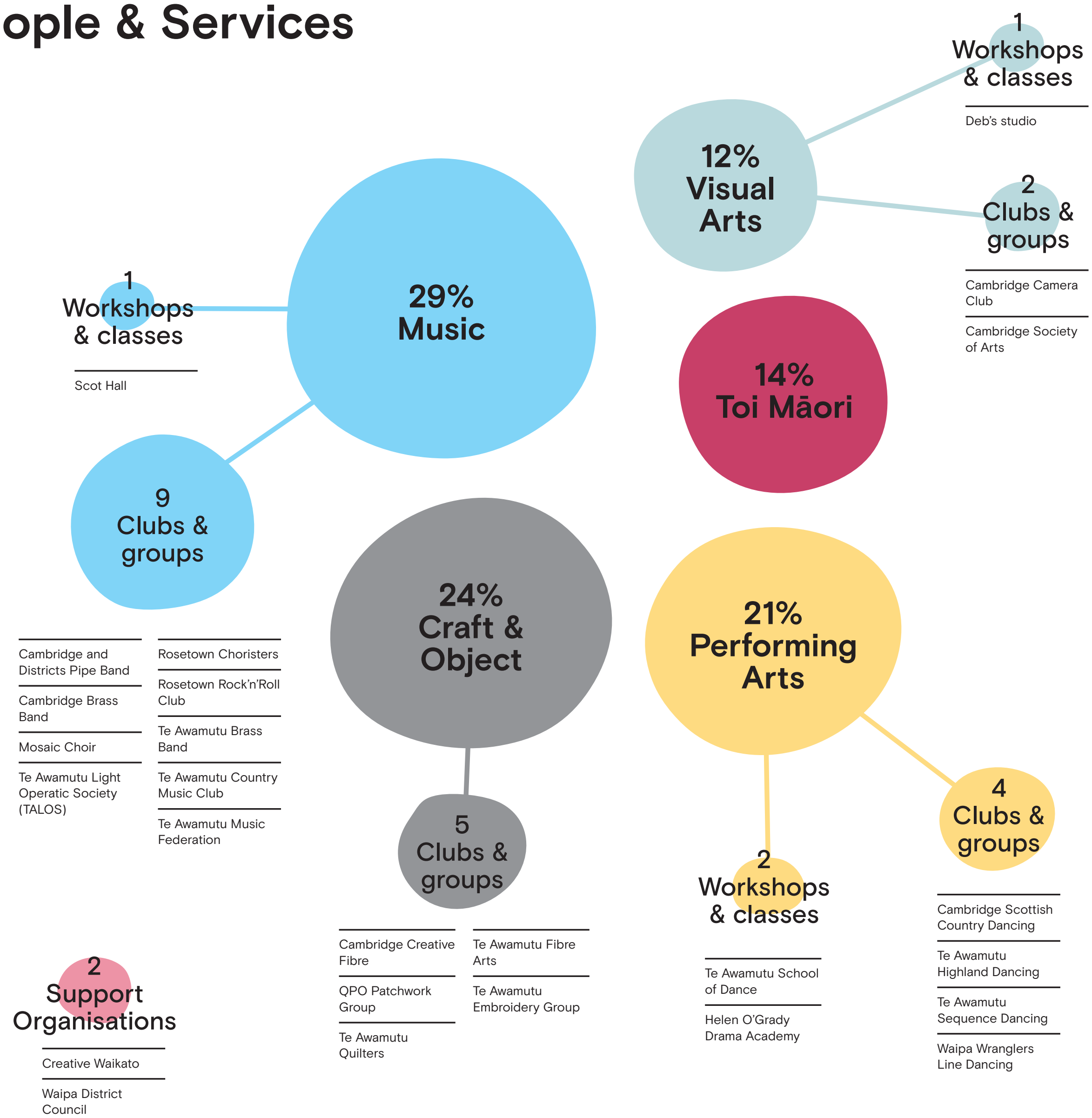
Physical Assets



Key Art Events



People & Services



Waipa District Profile

FOCUS

The following is a summary of the information which was collated during the individual consultations and group sessions within the Waipa district. These provide a local arts profile for the district and a good basis for building a picture of the arts in this district moving forward.

Arts engagement

CNZ New Zealanders and the Arts, 2018

Attendance

67%

Participation

47%

Performing Arts | **Visual Arts** | **Music**

Literature | **Toi Māori** | **Craft & Object** | **Heritage**

Visual Arts

Attendance	Participation
35%	25%

Arts Clusters

Craft/Object

Cambridge groups include Cambridge Creative Fibre, and QPO Patchwork Group. Te Awamutu groups include Te Awamutu Quilters, Te Awamutu Fibre Arts, Te Awamutu Embroidery Group, Te Awamutu Brass Band, Te Awamutu Country Music Club.

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Toi Māori

A Te Wananga o Aotearoa campus is based in Te Awamutu. This campus offers a diploma in indigenous art with a focus on whakairo (carving). They also teach Te Reo Māori classes.

Te Awamutu Musuem often displays historical and contemporary toi Māori. They have the famous Uenuku on permanent display.

APPENDIX 3

Waikato Arts Ecosystem Map

ARTS AND CULTURAL ECOSYSTEM IN THE WAIKATO

Examining the role of the arts and culture within community and society.

Creative Waikato
Toi Waikato

THE WAIKATO ARTS NAVIGATOR FRAMEWORK

Drawing from our ongoing research, strategic development, and sector knowledge, we have developed a vision framework for Arts Navigation in our communities.

This brings together the outcomes of Creative Prosperity, Creative Experiences, Creative Wellbeing and Creative Excellence as key overarching components of a thriving Arts and Cultural Sector.

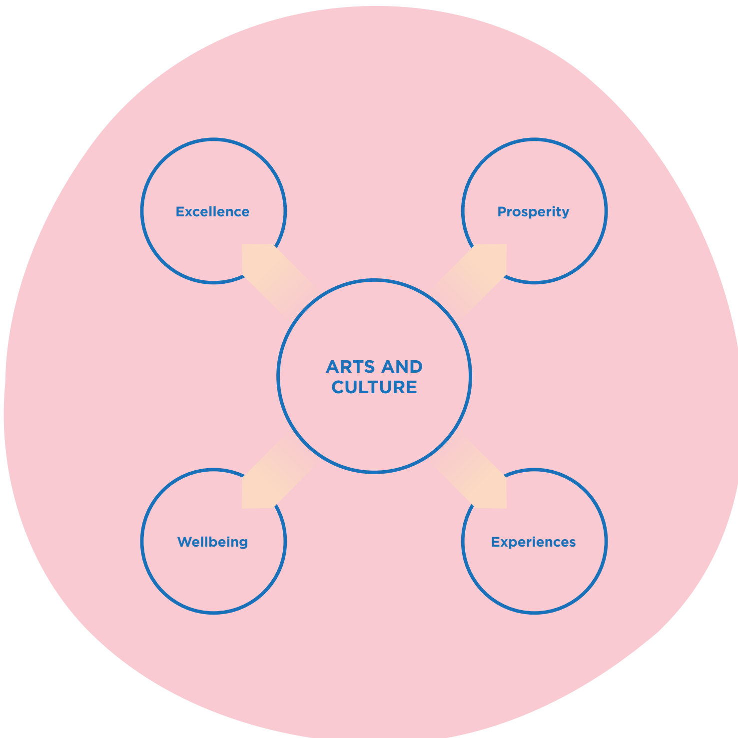
We understand the interconnected nature of the arts community. The ecosystem is vibrant and interconnected. A ripple in the water of development and activity in one area can connect and flow with other parts of the sector in unexpected ways. In Arts and Culture boundaries are fluid, genres and mediums can be re-imagined within other contexts, and while there are clear and established pathways for development and engagement, there are also new and innovative pathways for creative activity emerging all the time.

PROSPERITY: A strong creative economy that is vibrant, attracts people and strengthens the perception of the Waikato.

EXPERIENCES: An engaged community who values and participates in artistic and cultural expression.

WELLBEING: Create and strengthen communities, enhance mental and physical health, and develop a sense of identity through arts and culture.

EXCELLENCE: Celebrate our arts and culture through a culture of achievement with national and international recognition.



ARTS AND CULTURAL ECOSYSTEM MAP

Spaces/Venues/ Environments

Geographical contexts of interaction between people and arts activity:

Theatres, community halls, rehearsal spaces, galleries, studios, libraries, museums, marae, cultural hubs, empty private and public spaces, streets, gardens, parks, waterways, gullies etc.

Cultural Practices

Activities that relate people to each other, to the world around them, and allow them to enhance wellbeing:

Performances, shows, rehearsals, classes, workshops, discussions

Playing, exercising, creating, expressing, producing, caring, gathering and consuming

Cultural Ecosystem Benefits

There are a range of well-being impacts associated with cultural spaces and practices

IDENTITY: Belonging, Sense of Place, Spirituality

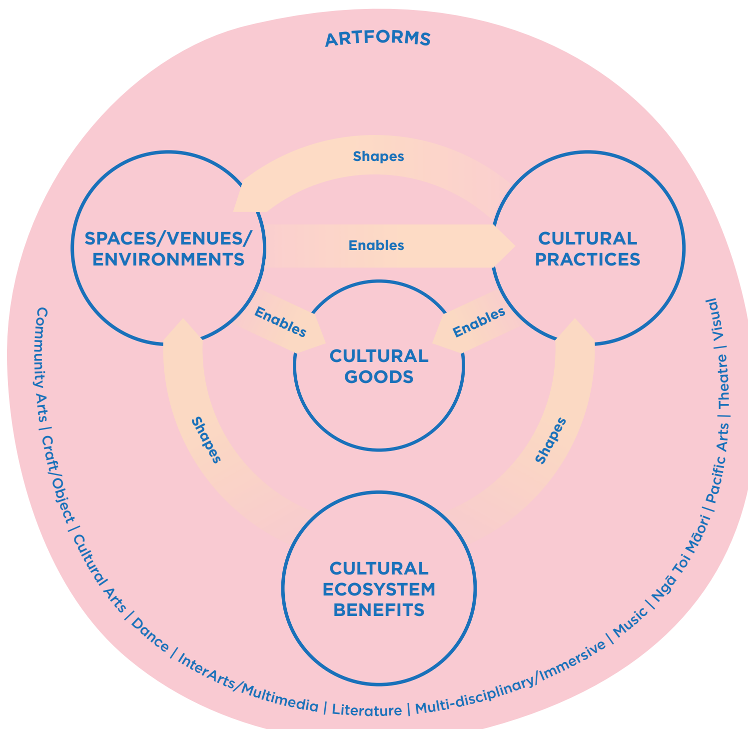
EXPERIENCES: Tranquility, Inspiration, Escape, Discovery, Curiosity

CAPABILITIES: Knowledge, Health, Dexterity, Judgement

PROSPERITY: Development, resilience, livability, sustainability

Cultural Goods

Service-benefit products: opportunities for recreation and tourism, personal growth, well-being, local performances and festivals



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ARTS AND CULTURAL ACTIVITIES EXIST WITHIN, AND ACROSS, ALL FACETS OF SOCIETY AND COMMUNITY.

Utilising the creative potential within the arts and cultural sector can enable capacity building, transformation, and change in order to create healthier communities over time. Investing in arts activity and development in a sustainable and aspirational manner, can support the ecosystem in a future focussed manner, nurturing strengths and skills, spearheading community visions, investment beyond grant making, and a robust communication of the understanding of value.

The Arts have a vital role to play throughout a thriving society. Arts funding is one of the most important functions and duties of our society. It is through the arts where we grow, where we reach understanding, and where we find common ground in a rapidly changing complex world. Artistic imagination and creativity are an essential part of what makes us human.

Art thinks about the world in its current state, and it can reimagine the world as it could be.

ARTS AND CULTURAL ECOSYSTEM WITHIN THE BROADER SOCIETY AND COMMUNITY

Health and Wellness
- Wellbeing for individuals
- Better care for each other
- Increased quality of life

Aging
- Physical and mental stimulation
- Entertainment
- Social interaction

Rehabilitation
- Purpose
- Self-case
- Social interaction
- Capability Development

Public Welfare
- Community Pride
- Mutual trust
- Safer and healthier communities

Livability
- Arts create vibrant cities
- Environmental impact
- Quality of Life

Environmental Sustainability
- Education and Innovation
- Advocating and driving awareness
- Communication

Economic Development
- Economic Wellbeing
- Support services and impact
- Sustainable Funding
- Workforce Development

Arts in the workforce
- Well-rounded workers who drive innovation
- Creative thinkers
- Solid communicators

Infrastructure
- Advocacy, communication, design, breaking down barriers
- Agriculture, Food, Transport, Housing,
- Planning and Community Development

Technology and Innovation
- Symbiotic relationship for creation and development
- Technology can be used to create and disseminate art

Education
- Arts are part of a well-rounded education
- Curiosity and exploration
- Important at all levels of education

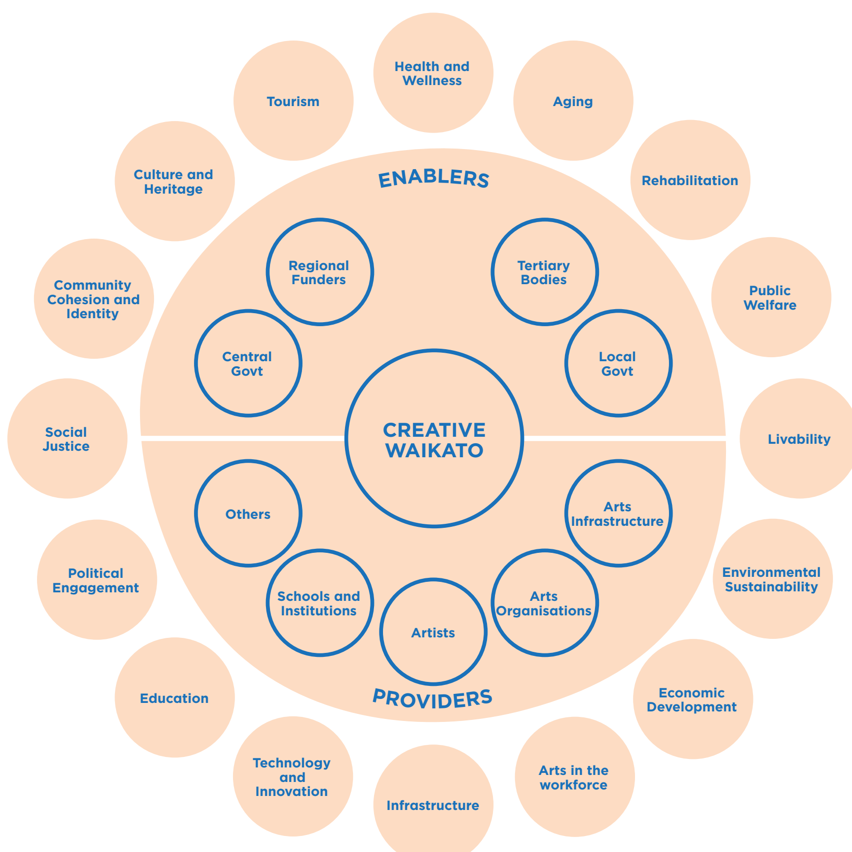
Political Engagement
- Can encourage political engagement, voting, and activation

Social Justice
- Civic dialogue to discuss issues and polices
- Arts facilitate dialogue

Community Cohesion and Identity
- Binds people together through shared experience
- Creates common vision for the future
- Arts bring people together

Culture and Heritage
- Art activity
- Diversity/Access/ Identity
- History and Tradition

Tourism
- Economic impact
- Empathy between communities
- Arts for travel



Creative Waikato
Toi Waikato

ARTS AND CULTURAL ECOSYSTEM GENERAL DETAILS BY ARTFORM

Infrastructure elements for the Arts and Cultural Sector.
General outline for the entire Waikato Region.

Literature
- Prose
- Fiction
- Non-fiction
- Poetry
- Classes/ Formal education
- Commissions
- Workshops
- Events
- Spoken Word
- Lyrics

Craft/Object
- Ceramics
- Quilting
- Pottery
- Textile art
- Studio space
- Art Galleries
- Classes/ Formal education
- Commissions

Visual Art
- Painting
- Photography
- Filmmaking
- Sculpture
- Murals
- Studio space
- Art Galleries
- Street Art
- Classes/ Formal education
- Commissions

Cultural Arts

Multicultural
- Dance
- Music
- Theatre
- Venues
- Rehearsal space
- Technical support
- Classes

Nga Toi Māori
- Kapahaka
- Taonga puoro
- Ta moko
- Whakairo
- Raranga
- Marae
- Rehearsal space
- Studio space
- Classes/ Formal education
- Commissions

Pacific Arts
- Dance
- Music
- Theatre
- Venues
- Rehearsal space
- Technical support
- Classes/ Formal education

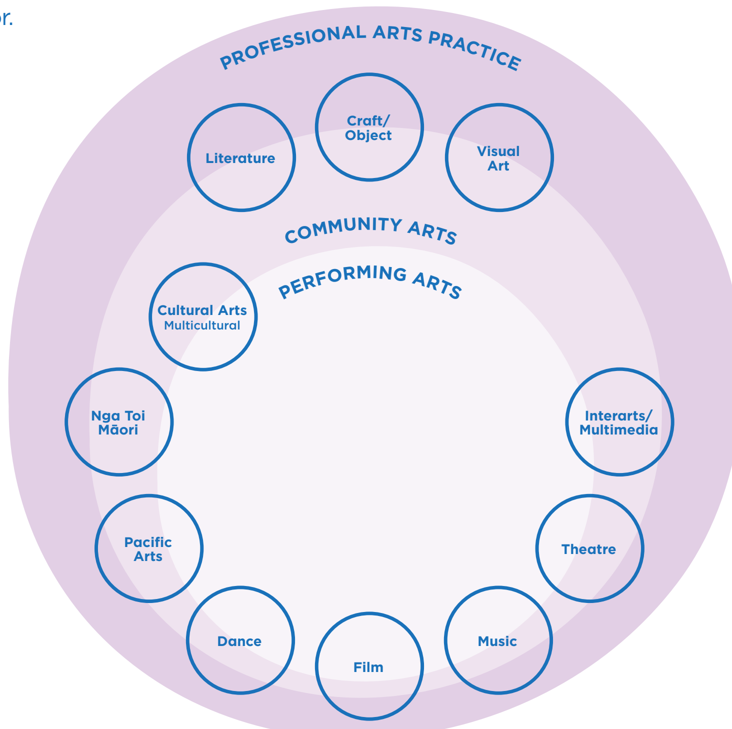
Dance
- Shows
- Classes/ Formal education
- Fitness
- Venues
- Rehearsal spaces
- Costuming
- Technical support

Film
- Art projects
- Commercial productions
- Storytelling
- Education
- Classes
- Formal education

Music
- Bands
- Orchestras
- Choirs
- Venues
- Rehearsal spaces
- Recording studios
- Technical support
- Classes/ Formal education
- Commissions

Theatre
- Musical Theatre
- Theatre
- Improv
- Venues
- Rehearsal Spaces
- Costuming
- Technical support
- Classes/ Formal education

Interarts/ Multimedia
- Immersive exhibitions
- Interactive work
- Light Festivals
- Projection mapping
- Corporate elements
- Tourism opportunities



ARTS AND CULTURAL ECOSYSTEM INTERCONNECTIVITY FRAMEWORK

Indicative grid for collaboration and interconnection between artforms for the Arts and Cultural Sector.

	Craft/ Object	Cultural Arts	Dance	Film	Inter-Arts	Literature	Music	Nga Toi Māori	Pacific Arts	Theatre	Visual Art
Craft/Object		●		●	●	●		●●	●		●●●
Cultural Arts	●		●●●	●		●	●●●			●●	●
Dance		●●●		●	●	●	●●●	●●	●●	●●●	
Film	●	●	●●		●●●	●●	●●●	●	●	●●	●●
Inter-Arts	●		●	●●●		●	●●●	●		●	●●●
Literature	●	●	●	●●	●		●●	●●	●	●●	●
Music		●●●	●●●	●●●	●●●	●●		●●●	●●	●●●	●
Nga Toi Maori	●●	●	●●	●	●	●●	●●●		●●	●●	●●●
Pacific Arts	●	●	●●	●		●	●●	●●		●●	●●●
Theatre	●	●●	●●●	●●	●	●●	●●●	●●	●●		●
Visual Art	●●●	●		●●	●●●	●	●	●●●	●●●	●	
Community Arts											
Performing Arts											
Professional Arts											
Festivals/ Large Events											

Information on this table based on knowledge of interconnected events and collaborations within the wider Waikato Arts and Cultural Sector. Weighting indicated more of a prevalence within a specific artform.
*number of dots indicates the prevalence of collaboration between artforms.
**intensity of colour indicates the prevalence of artform within the specified context

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Toi Waikato

STRATEGIC PLANNING AND POLICY COMMITTEE REPORT

Waipā DISTRICT COUNCIL

To:	The Chairperson and Members of the Strategic Planning and Policy Committee
From:	Strategic Projects Driver
Subject:	**NGAHINAPOURI VILLAGE CONCEPT PLAN – APPROVAL FOR PUBLIC ENGAGEMENT**
Meeting Date:	1 September 2020

1 EXECUTIVE SUMMARY

In October 2018, Boffa Miskell and Tonkin & Taylor were contracted by Council to complete the Ngahinapouri Village Concept Plan.

Various technical reports and initial stakeholder engagement have formed the basis of the draft Village Concept Plan.

The project team would like to re-engage with the public on this project, specifically around the Multi-Criteria Analysis and its results. We would like the public engagement period to run from Monday 7 September 2020 to 5:00pm, Friday 2 October 2020. The Committee are requested to provide approval for public engagement on the final draft Ngahinapouri Village Concept Plan and key information for engagement as provided in Appendices 1 and 2.

The following appendices accompany the report:

- Appendix 1: Final Draft Ngahinapouri Village Concept Plan *(document number 10092139)*
- Appendix 2: 99.1016 - Ngahinapouri Village Concept Plan – key information for engagement August 2020 (*document number 10451176*)
- Appendix 3: 2014 Beca Ngahinapouri Village Concept Plan *(document number 6809053)*

2 RECOMMENDATION

That

a) *The report titled 'Ngahinapouri Village Concept Plan – Approval To Consult' (document number 10440545) of Justine Kennedy, Strategic Projects Driver, be* ***RECEIVED****;*

b) *The Strategic Planning and Policy Committee **APPROVE** the final draft Ngahinapouri Village Concept Plan (document number 10092139) attached to this report as Appendix 1 and 99.1016 - Ngahinapouri Village Concept Plan – key information for engagement August 2020 (document number 10451176) attached to this report as Appendix 2 for public engagement, to run from Monday 7 September 2020 to 5:00pm, Friday 2 October 2020.*

3 BACKGROUND

In October 2018, Boffa Miskell and Tonkin & Taylor were contracted by Council to undertake and complete the Ngahinapouri Village Concept Plan.

Waipā 2050 Growth Strategy

In 2017, Council adopted the updated Waipā 2050 Growth Strategy, which sets out how the towns and villages in the Waipā district will provide for growth for the next 30 years. The N1, N2 and N3 growth cells on Reid Road have been identified to provide for large lot residential growth.

Previous work undertaken

In 2014, Beca produced a Village Concept Plan for Ngahinapouri which focussed on enabling expansion of Ngahinapouri School to the south. The Plan also proposed a realignment of Reid Road to the south, creating an offset-T intersection. The 2014 Plan was community-driven but the end result proved to be financially unfeasible at the time. Some short-term safety improvements were provided with the proposed road-realignment, but these were not proven long-term.

Stakeholder engagement

To date, the project team have met with Nga Iwi Toopu o Waipā, the Ngahinapouri Community Group, key landowners, Waka Kotahi New Zealand Transport Agency (NZTA) and Ministry of Education (MoE), as well as Council activity area managers, to get their input.

During this engagement, it became apparent that a key issue for the community is the intersection of SH39, Reid Road and Ngahinapouri Road. On 29 October 2019, a workshop was held to discuss the intersection. The workshop was attended by relevant Council activity area managers, the chairperson of the Ngahinapouri Community Group and representatives from NZTA and MoE. It was at this workshop that it was decided a Multi-Criteria Analysis of intersection options would be carried out to determine the optimal intersection outcome. This in turn will inform the draft Village Concept Plan, which incorporates structure plans for the N1, N2 and N3 growth cells, as well as provision for a small community hub. This aligns well with feedback received as part of the 2014 Beca Village Concept Plan and is something we are seeking to confirm with the community as part of the public engagement.

Multi-Criteria Analysis

Five intersection options were considered in the Multi-Criteria Analysis (MCA):

1. Do nothing (except local road upgrade)
2. Off-set T
3. Traffic lights
4. Roundabout
5. Off-set roundabout

These intersection options were assessed against criteria based on community and technical input. The criteria were agreed upon in collaboration with Waipa District Council, Boffa Miskell Ltd and Tonkin & Taylor staff. Each of the criteria has an agreed weighting which provides a balanced approach to the evaluation, with no single criteria being able to skew the overall results.

The criteria that were developed were:

Waipā District Council Objectives

Criteria	Evaluation criteria	Weighting
Connected with Community	Is this what the community wants?	5%
Environmental and Cultural Champion	Does this enhance the environmental and cultural wellbeing of the community?	5%
Economically Progressive	Does this contribute positively to the local economy and provide value to the community?	5%
Socially Responsible	Does this enhance quality of life for local community?	5%

Urban Design Objectives

Criteria	Evaluation criteria	Weighting
Community Facilities and Amenities	Does this enhance the proposed community?	5%
Self-explaining Roads	Does this provide a user-friendly intersection and road network for all users?	5%
Place Making	Does this contribute to the desired sense of place?	5%
Open space network	Does this enhance the open space network?	5%
Regulatory Risk	How likely is this to meet asset owner approval or achieve RMA compliance?	10%

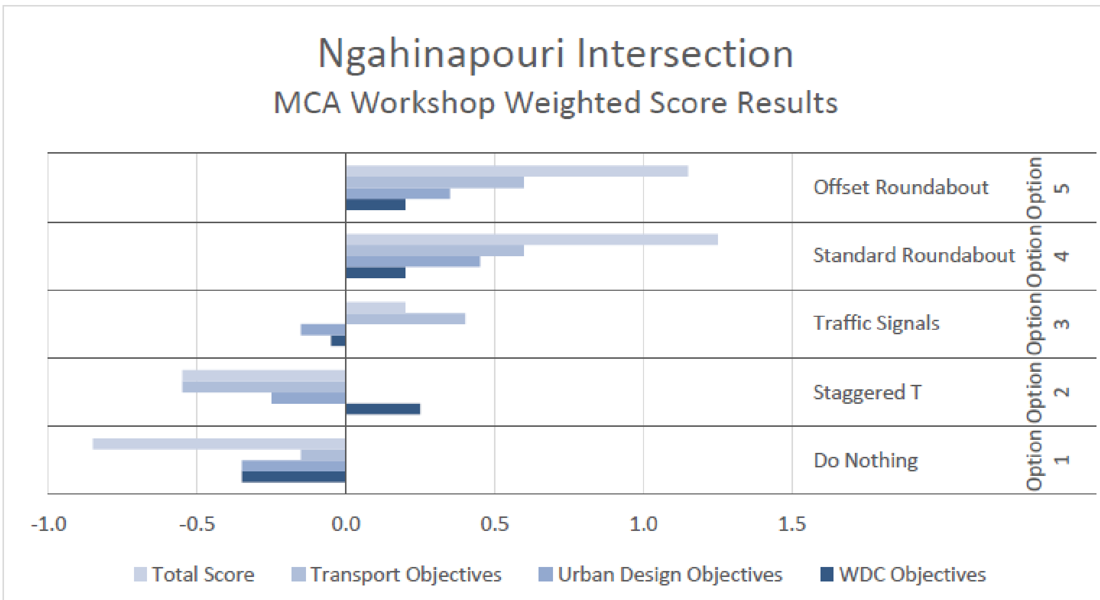
Transport Objectives

Criteria	Evaluation criteria	Weighting
Road safety (vehicle)	Does this reduce crash risk?	10%
Road safety (pedestrian and cyclist)	Does this enhance safety of vulnerable road users?	10%
Efficiency (traffic)	Does this improve traffic movements?	5%
Buildability	Is this feasible?	10%
Ongoing Liability	What are the long-term maintenance and operational risks?	15%

The Waipa District Council objectives align with the Waipā 2050 Growth Strategy. The objectives of NZTA, MoE and the community are encompassed in the finalised criteria.

On 15 January 2020, a joint workshop was held between Waipa District Council, Boffa Miskell and Tonkin & Taylor staff to review the criteria and develop an agreed score. Each criteria was scored on a seven-point scale, from -3 (Significant detraction (Fatal Flaw)) to 3 (Significant enhancement). The scoring of options was completed individually prior to the meeting to allow participants time to consider each option.

Each of the five intersection options was assessed against the criteria, with any discrepancies in score discussed and resolved to provide an agreed final score in the table below. In both the individual scenario and the agreed workshop assessment, the scores and results are very similar. Overall the results are consistent with the highest scoring option being the standard roundabout.



Intersection jurisdiction and funding

The intersection of State Highway 39, Reid Road and Ngahinapouri Road sits under the jurisdiction of Waka Kotahi New Zealand Transport Agency and Waipa District Council, with the Transport Agency responsible for the State Highway and Council responsible for Reid and Ngahinapouri Roads.

In terms of funding, any intersection upgrade is as a result of growth, therefore the expectation is that the intersection upgrade would be funded by Waipa District Council and through Development Contributions. The Transportation team have put forward business cases for the 2021-31 Long Term Plan which include funding to upgrade the intersection.

Where to from here?

The proposed public engagement period will run from Monday 7 September 2020 to 5:00pm, Friday 2 October 2020. Virtual engagement options are being considered to ensure effective engagement is provided for if Covid-19 alert levels remain at Alert Level 2 or move to more restrictive alert levels. In December we propose to return to the Strategic Planning and Policy Committee with the outcomes of the public engagement and to the final draft Ngahinapouri Village Concept Plan. Following this, we will request adoption of the draft Village Concept Plan at the December Council meeting.

4 OPTIONS AND ASSESSMENT

Intersection options

The Boffa Miskell Village Concept Plan presents the options currently being considered for the SH39 intersection at Ngahinapouri. These options have been established and agreed in collaboration with Waipa District Council (WDC), Boffa Miskell Ltd (Boffa Miskell) and T+T during the Village Concept Planning Process. The following 5 options have been considered in the MCA:

1. Do nothing (except local road upgrade)
2. Off-set T
3. Traffic lights
4. Roundabout
5. Off-set roundabout

The result of the MCA is a recommended intersection option for a roundabout.

Financial considerations

The relevant activity areas in Council, such as Transportation, Development Engineering, Property and Planning, are aware of this project and business cases will be put forward to Council's Long Term Plans (2021-31 and future Long Term Plans) for consideration to enable implementation of the Village Concept Plan.

Risk considerations

<u>COVID-19</u>

With all parts of New Zealand other than Auckland at COVID-19 Alert Level 2 from 12:00pm Wednesday 12 August until 11:59pm Wednesday 26 August, face-to-face engagements cannot occur under Council policy. This has potentially significant impacts on the proposed engagement process for this project. To mitigate this, engagement material and methods that don't require face-to-face meetings will be created and implemented as required. For example, we can reach out to the community using technology and social media platforms if necessary. We hope that we'll be able to move to Alert Level 1 prior to 7 September when community engagement commences.

<u>2014 BECA PLAN</u>

Some community members may still want to see the 2014 Beca plan realised, especially as it provides for expansion of the Ngahinapouri School grounds. Council has limited jurisdiction in Ngahinapouri – only the Reid Road and Ngahinapouri Road corridors and a small part of the carpark in front of the Ngahinapouri Hall, are under Council control. To mitigate this risk, the project team have had ongoing engagement with the Ngahinapouri Community Group throughout the project; this has included attending community group meetings and discussing their concerns. The project team has also engaged with representatives from NZTA and MoE, as they have jurisdiction over State Highway 39 and the Ngahinapouri School, respectively.

INTERSECTION

With regards to the intersection itself, some community members may be unhappy that the off-set T intersection is not the preferred option recommended in the draft Village Concept Plan. As outlined in the previous paragraph, Council has limited jurisdiction in this area. It is critical that Council continues to work closely with the community, NZTA and MoE. Council met with representatives of NZTA, MoE and the chairperson of the Ngahinapouri Community Group on 29 October 2019. At this meeting, intersection options were discussed, and it was agreed that a multi-criteria analysis would be carried out. It is now time to go back to the community with the outcomes of the multi-criteria analysis, and to explain the preferred outcome.

JKennedy

Justine Kennedy
STRATEGIC PROJECTS DRIVER

Reviewed by Kirsty Downey
MANAGER – STRATEGY

Approved by Debbie Lascelles
GROUP MANAGER – STRATEGY & COMMUNITY SERVICES

SUPPORTING INFORMATION: ASSESSMENT OF PROPOSAL

1 Statutory and policy requirements

National Policy Statement on Urban Development (NPS-UD)

The NPS-UD requires Councils in high-growth areas, such as Waipā, to ensure that they have adequate provision of serviced land for urban development in the short, medium and long term.

Waipā 2050 Growth Strategy

Growth cells N1, N2 and N3 have been identified in the District Growth Strategy, Waipā 2050, as being areas for large lot residential growth.

Waipā Significance and Engagement Policy

Council has considered the Significance and Engagement Policy and has taken into account the matters laid out in section 6. In the case of the draft Ngahinapouri Village Concept Plan, the community interest is likely to be very high.

Appendix 1

Final Draft Ngahinapouri Village Concept Plan (document number 10092139)

NGAHINAPOURI VILLAGE CONCEPT PLAN.

N1 / N2 / N3 GROWTH CELLS & NGAHINAPOURI VILLAGE.

20th AUGUST 2020 | REVISION: F | FINAL DRAFT: FOR CONSULTATION

Waipa DISTRICT COUNCIL

Boffa Miskell

Conceptual Artist's Impression of Village Commercial Precinct building with al-fresco dining, covered pedestrian frontage and on-street parking.

CONTENTS.

Document Quality Assurance

Bibliographic reference for citation:
Boffa Miskell, 2019. *NGAHINAPOURI VILLAGE CONCEPT PLAN: N1, N2 & N3 Growth Cells & Ngahinapouri Village.*
Report by Boffa Miskell Limited for Waipa District Council.

Prepared by:	Morné Hugo Associate Partner Landscape Architect Boffa Miskell Ltd	
Prepared by:	Blair Clinch Senior Landscape Architect Boffa Miskell Ltd	
Reviewed by:	Dave Moule Senior Principal Boffa Miskell Ltd	
Status: FINAL DRAFT	Revision / version: F	Issue date: August 2020

File ref: H18069_Village_Concept_Options_Document

Cover image: Artist's Impression: Village Commercial Centre

INTRODUCTION.

VISION.

The vision of the Ngahinapouri Village community is to develop a blueprint for sustainable growth, future development and look and feel of the Ngahinapouri township and community to 2050.

PURPOSE.

The purpose of the Ngahinapouri Village Concept Plan is to provide overall guidance for the sustainable growth, future development and look and feel of the township to 2050, by focusing on the specific needs, aspirations and vision of the community.

EXISTING DRAFT VILLAGE CONCEPT PLAN.

A Draft Village Concept Plan for part of Ngahinapouri was developed in 2014 by BECA, with a focus on the Reid Road entry and intersection with Kakaramea Road (SH39). The Draft Plan was developed in response to forecasted growth pressures for the Ngahinapouri and traffic safety concerns at the Reid Road / Kakaramea Road intersection and Ngahinapouri School. In particular, the Draft Plan provided direction on the following matters:

- Guidance on Reid Road alignment, landownership, community amenities, and parking and access for the school;
- Improvement of safety and connectivity for pedestrians;
- Provision for adaptable land use areas for future community amenities and car parking;
- Improvement of views and sightlines to enhance connectivity and a sense of arrival for the community and visitors.

Draft Village Concept Plan (BECA, 2014)

The community had direct involvement in developing the existing Draft Village Concept Plan and were consequently looking forward to seeing planned improvements being delivered. A subsequent engineering review identified certain constraints and cost impediments with the implementation of the Draft Plan, in particular, the recommended roading solutions. As such, Council decided it was prudent to further investigate the options by developing a wider Village Concept Plan that saw the inclusion of the three adjoining N1, N2 & N3 growth cells along Reid Road. This approach facilitates a cohesive, well-considered and connected future village development, with a consistent look and feel that is representative of the community's vision and aspirations.

Revised Village Concept Plan Extent of Scope

Draft Village Concept Plan Extent of Scope (BECA)

Revised Village Concept Plan Extent of Scope (Boffa Miskell)

The revised scope of the project is to deliver an updated Village Concept Plan for the wider Ngahinapouri township, including not only the village core centred around Ngahinapouri School and the Reid Road / Kakaramea Road (SH39) intersection, but also the three adjacent growth cells (N1, N2 & N3). The existing Draft Village Concept Plan has been incorporated into this revised Village Concept Plan.

NGAHINAPOURI GROWTH.

The village of Ngahinapouri is forecast to grow by 380-650 people (+190%-225% growth) by 2050. To provide for this growth, structure plans for the growth cells located in Ngahinapouri are required, as identified in the Waipa 2050 Growth Strategy (2017) and Waipa District Council (WDC) 2018 – 2028 Long Term Plan. Provisions within this village concept plan are based on a minimum forecast 2050 population.

CONTENTS OF THE VILLAGE CONCEPT PLAN.

This document outlines the process in preparing the Village Concept Plan, describes the design drivers identified to enable the sustainable growth and future development of the village and defines the design pillars that represent the fundamental elements to be included in the Village Concept Plan to achieve the community vision.

As part of the development of the Village Concept Plan, early engagement has been undertaken with the Ngahinapouri Community Group, key landowners, Iwi, Ministry of Education, and the New Zealand Transport Agency to better understand the key issues in the local community. Further consultation is also planned with the wider community. One of the key issues raised in the engagement to date has been the perceived traffic safety issues at the intersection of Kakaramea Road (SH39), Ngahinapouri Road, and Reid Road. Taking into account the feedback received from stakeholders in the early engagement, the Village Concept Plan has identified five options for the intersection:

1. **Do Nothing (Except Local Road Upgrade)**
2. **Staggered Intersection**
3. **Traffic Signals**
4. **Standard Roundabout**
5. **Offset Roundabout**

A Multi-Criteria Analysis (MCA) was undertaken to carefully consider each option using evaluation criteria related to the community, urban design, and transport. The MCA provides a subjective comparative analysis of the option variations for the intersection of SH39 and Reid Road and is weighted to mitigate any bias within the scoring of any one option. The MCA concluded that the preferred intersection form is a standard roundabout. The MCA is attached to this VCP in Appendix 4, and needs to be read in conjunction with the T+T Ngahinapouri Concept Plan: Transportation Assessment, dated October 2019, ref: 1008305.1000.

_01

PROCESS FOR PREPARING THE VILLAGE CONCEPT PLAN.

The Village Concept Plan is developed by following an iterative design approach, underpinned by the growth management functions of the Council and needs and aspirations of the Ngahinapouri Community. Waipa 2050 identifies a strong vision around matters relating to urban and rural living, employment, multi-modal transport and pedestrian movement, infrastructure and protection of the environment. This Concept Plan builds upon the Waipa 2050 vision and seeks to provide a framework for how Ngahinapouri may contribute to achieving the Waipa 2050 vision through sustainable future growth.

Preparation of the Village Concept Plan has been delivered following a staged approach, consisting of the following key tasks:

- **Stage 1: Background, inception and analysis** – review of existing Draft Concept Plan, background documentation and technical reports, and site visits.
- **Stage 2: Key stakeholder consultation** – initial engagement with key stakeholders, including community groups, Ngahinapouri School, landowners, NZTA, Ministry of Education, Waikato Regional Council, and mana whenua.
- **Stage 3: Concept Development** – refinement of key design drivers, preparation of preliminary concept options for the village and growth cells and further stakeholder engagement on concept options.
- **Stage 4: Detailed Village Concept Plan** – development of Detailed Village Concept Plan, including intersection design options, overall design guidelines, and infrastructure requirements, consultation with key stakeholders and wider community, refinement and completion of Concept Plan following community feedback.

The Village Concept Plan development has further been informed by supporting technical assessments including a Transportation Assessment, Three Waters Engineering Assessment, and a desktop Liquefaction Assessment.

Transportation Assessment & Three Waters Engineering Assessment (Tonkin & Taylor, 2019)

DESIGN DRIVERS.

Several key design drivers have been identified by Waipa District Council to achieve the vision and purpose of the Concept Plan and the outcomes sought by the community, including:

- Options relating to the Reid Rd, Kakaramea Rd (SH39) and Ngahinapouri Road intersection form and design;
- Recommended local transport network for N1, N2 and N3 growth cells, considering pedestrians, cyclists, community connectivity and landownership;
- Assessment of need for, and location of, commercial activity and community amenities, including toilets, parking and access to the school and reserve areas;
- Assessment of, and provision for, drainage and flood hazards;
- Facilitating improved safety and connectivity for pedestrians (including residents and pupils likely to use the area), potentially including a town cycle/walkway around the village.

The primary design drivers in the development of this Village Concept Plan, is the need to consider the options for the form and function of the Reid Rd, Kakaramea Rd (SH39) and Ngahinapouri Road intersection and inform any decision making on its final form by the relevant road controlling authorities.

The design of this main intersection has direct impacts on several key components within the village, including:

- Speed of vehicles travelling in both directions along the Kakaramea Road corridor and the direct impact of these vehicles on the character, safety and liveability of Ngahinapouri Village;
- Safety and ease of access for residents within the existing village and future residents within the N1, N2 and N3 growth cells;
- Form and function of proposed future town centre / mixed use commercial area;
- Considerations of cost and practicality of roading, infrastructure and land availability;
- Opportunities for expansion of Ngahinapouri School and related open space requirements;
- Quality, character and community well-being considerations for residents and visitors to Ngahinapouri.

DESIGN PILLARS.

For the purposes of developing the Village Concept Plan, we have grouped the key design drivers into the following 6 design pillars:

- **Roads & Transport**
- **Community Facilities & Amenities**
- **Pedestrian & Cycle Connectivity**
- **Visibility & Sense of Place**
- **Open Space Network**
- **Three Waters**

The design pillars are the key elements required to meet the aspiration and vision of the community and key stakeholders and are used to assess the qualities of each design option in achieving sustainable growth and a future development representative of the community vision and values.

INTERSECTION DESIGN OPTIONS.

The Village Concept Plan has been informed by the Tonkin & Taylor Transportation Assessment and subsequent MCA, which considered a range of options to address the impacts of the main intersection design and demonstrates several alternatives that have been considered. The options have each been formed in the context of the key design pillars. Using a MCA, which includes urban design, community and traffic considerations, a preferred option has been identified for further consultation with key stakeholders and the wider community.

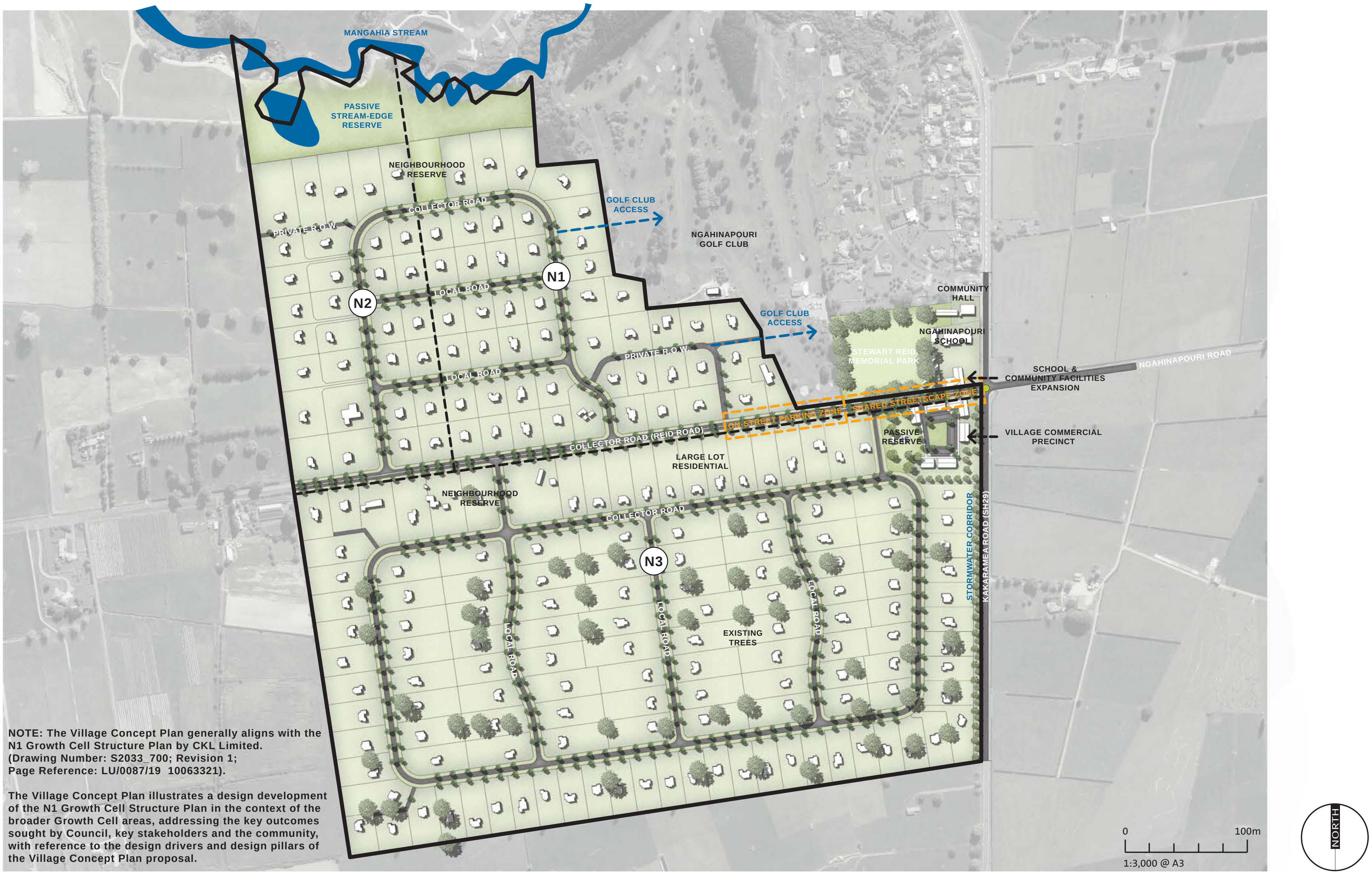
To fully test a possible design approach, 5 potential intersection and related town centre layout options have been developed, based on the MCA, as follows:

1. **Do Nothing (Except Local Road Upgrade)**
2. **Staggered Intersection**
3. **Traffic Signals**
4. **Standard Roundabout**
5. **Offset Roundabout**

The following section of the Concept Plan Report discusses the preferred intersection and town centre development options in more detail, including the various options (see Appendix One).

VILLAGE CONCEPT PLAN.

N1 / N2 / N3 GROWTH CELLS & NGAHINAPOURI VILLAGE.



NOTE: The Village Concept Plan generally aligns with the N1 Growth Cell Structure Plan by CKL Limited. (Drawing Number: S2033_700; Revision 1; Page Reference: LU/0087/19 10063321).

The Village Concept Plan illustrates a design development of the N1 Growth Cell Structure Plan in the context of the broader Growth Cell areas, addressing the key outcomes sought by Council, key stakeholders and the community, with reference to the design drivers and design pillars of the Village Concept Plan proposal.

_03

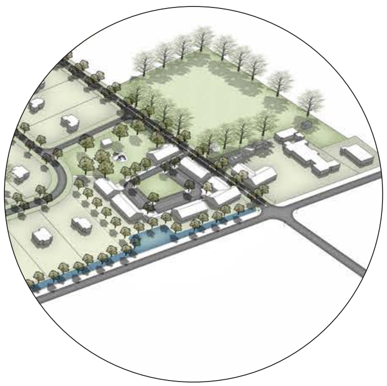
VILLAGE CONCEPT FEATURES.

OVERALL VILLAGE CONCEPT FEATURES.

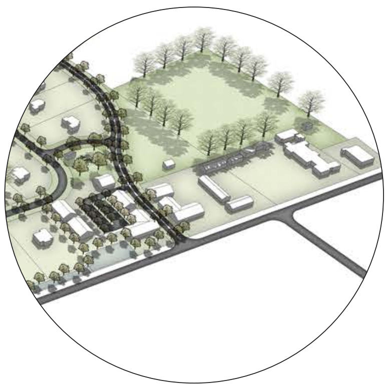
_04

INTERSECTION OPTIONS.

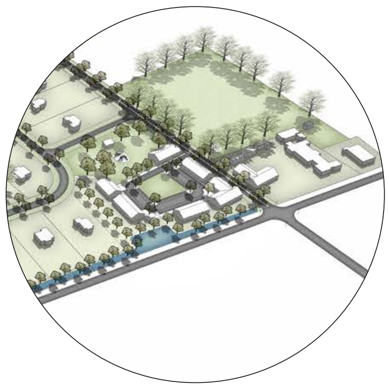
OPTION ONE:
Do Nothing
(Except Local Road Upgrade).



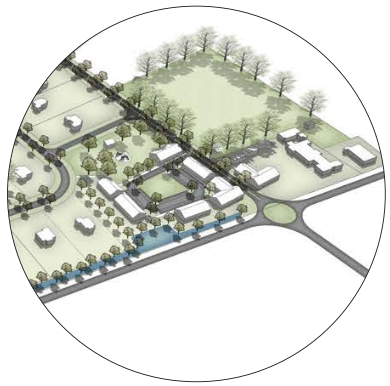
OPTION TWO:
Staggered Intersection.



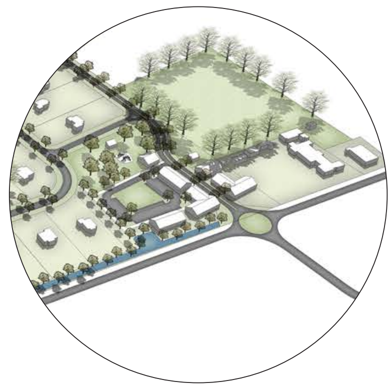
OPTION THREE:
Traffic Signals.



OPTION FOUR:
Standard Roundabout.



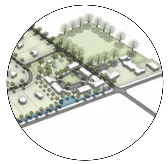
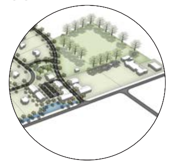
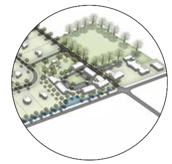
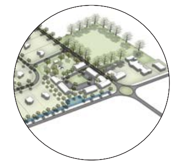
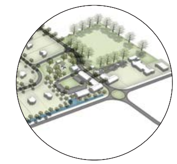
OPTION FIVE:
Offset Roundabout.



_05

OPTIONS MATRIX.

DESIGN OPTIONS.

OVERALL SELECTION FACTORS.	OPTION ONE: Do Nothing. 	OPTION TWO: Staggered Intersection. 	OPTION THREE: Traffic Signals. 	OPTION FOUR: Standard Roundabout. 	OPTION FIVE: Offset Roundabout. 
MCA SCORING.	-14.00 (-0.85)	-3.00 (-0.55)	3.00 (0.20)	20.00 (1.25)	19.00 (1.15)
MCA RANKING.	5TH	4TH	3RD	1ST	2ND
RECOMMENDED MCA OPTION.				RECOMMENDED MCA OPTION.	
ROUGH ORDER COST.	$3.75M	$6.15M	$6.70M	$8.95M	$10.45M
COST ESTIMATE RANKING.	1ST	2ND	3RD	4TH	5TH
SCORE VALUE RATIO.	-0.23	-0.09	0.03	0.14	0.11
OVERALL RANKING.	5TH	4TH	3RD	1ST	2ND

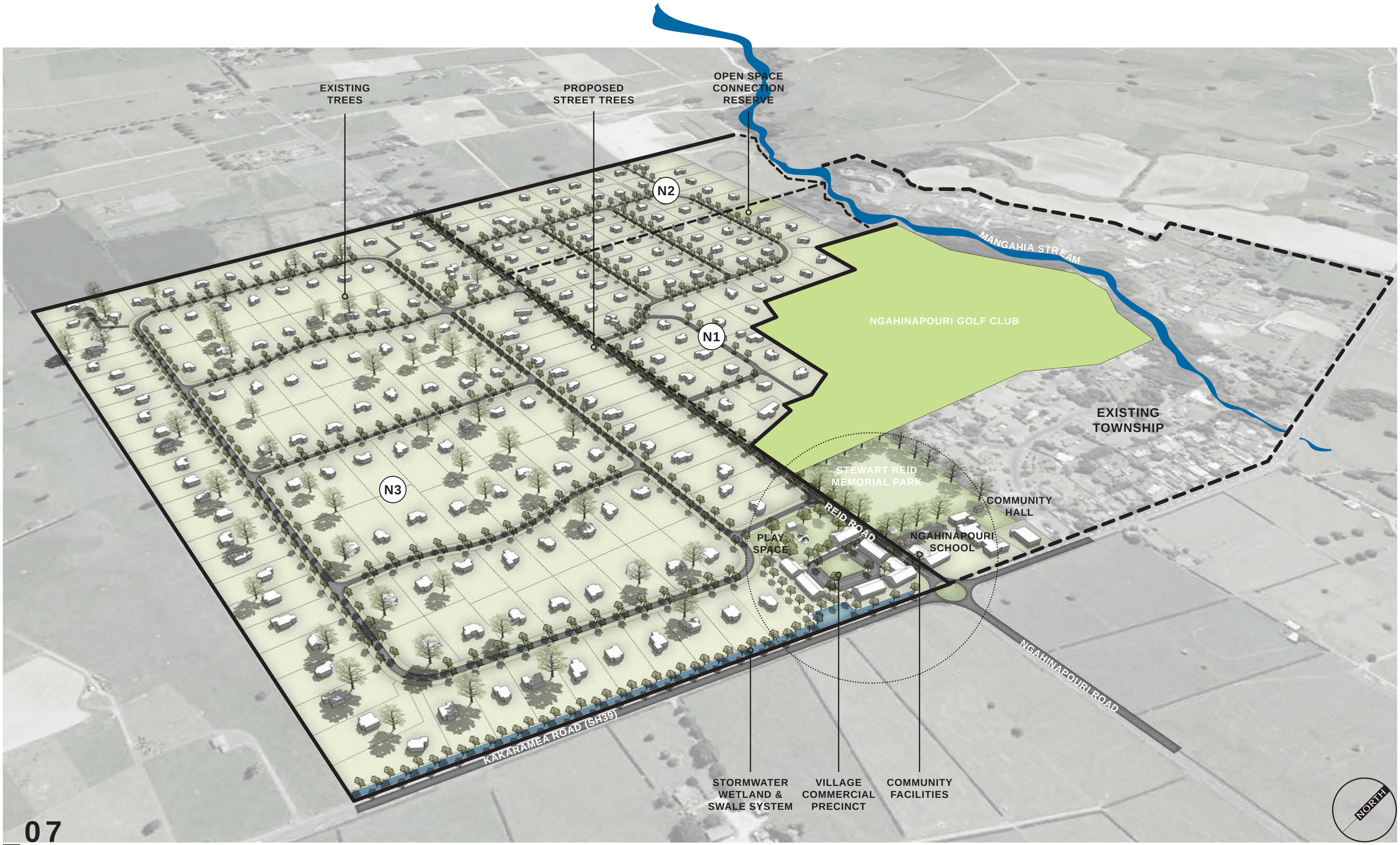
NOTE: Refer to Appendix 4: Multi-Criteria Analysis (M.C.A.) Assessment (Tonkin & Taylor, 2020) & Appendix 3: Transportation Assessment & Three Waters Engineering Assessment (Tonkin & Taylor, 2019) for detailed information on MCA scoring criteria, process and outcomes, and rough order costings.

RECOMMENDED OPTION.

_08

OPTION FOUR.

STANDARD ROUNDABOUT.



_07

OPTION FOUR.

STANDARD ROUNDABOUT FEATURES.

Roads & Transport.

1. Reduced Speed Zone: Roundabout at intersection of Reid Road, Ngahinapouri Road & SH39. Including roundabout and road-side landscaping.

Community Facilities & Amenities.

2. Village Core / Commercial Centre: A mixed-use centre providing goods, services, hospitality, entertainment and office space offerings to the community and visitors.

3. Community Facilities Expansion: Community orientated facilities including healthcare, childcare and exercise facilities. Option to redevelop community hall.

Pedestrian & Cycle Connectivity.

4. Reid Road Shared Streetscape: Allocation of space to promote and prioritise pedestrian and cycle use and connectivity between community, school, open space and commercial amenities and facilities.

5. Golf Course Access: Direct public pedestrian and golf cart access to Ngahinapouri Golf Course.

6. Shared Paths: Broad paths along connector roads within the village to provide quality and safe pedestrian and cycle connections to community, school, open space and commercial amenities and facilities.

Visibility & Sense of Place.

7. Visual Prominence of Village Core / Commercial Hub: A larger catchment of frequent and transient visitors and customers are captured by locating commerce at the visually prominent intersection with State Highway 39.

8. Building Typology, Form & Scale: Buildings that reflect the enduring rural character of Ngahinapouri and the surrounding landscape through appropriate colour and material use, building form, configuration and scale.

9. Landscape & Streetscape: Hard landscape materials that prioritise safety and wayfinding, while preserving and building upon a sense of rural character through considered allocation of space. Planting at a range of scales that compliment roading and built-form scales, with species that are cohesive with those existing within the surrounding landscape. Retention of existing vegetation where possible.

Open Space Network.

10. Diversity of Use: Provision of active and passive recreational areas that have strong pedestrian and cycle connection between them and existing open space areas. Opportunity for amenities including playgrounds, trails, sports areas and facilities.

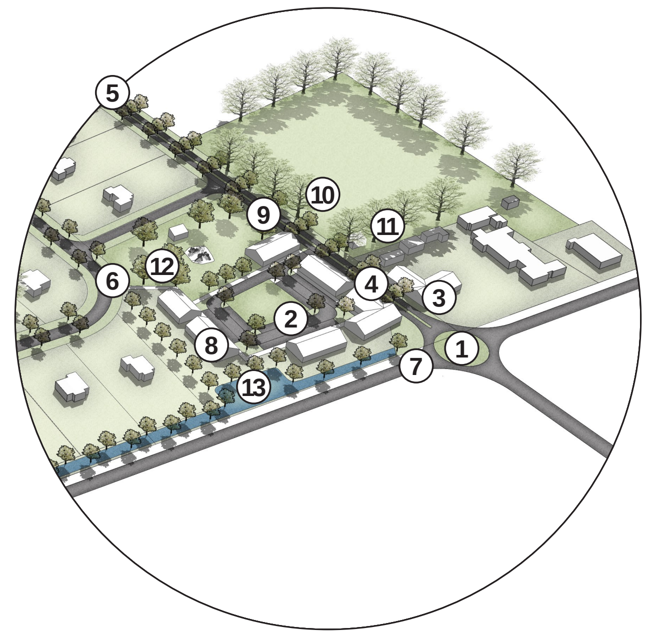
11. Complimentary Facilities & Amenities: Supporting amenities including public bathrooms, rubbish bins, drinking fountains, shelters and signage located within the open space network.

12. Planting: Provides for increased amenity for users, expansion of habitat, nature play and opportunity for integrated stormwater treatment.

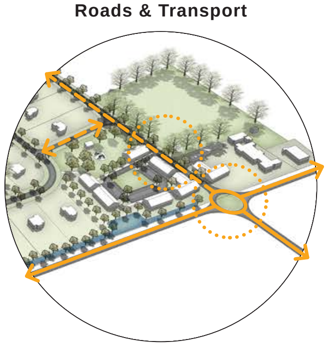
Three Waters.

13. Integrated Design: Stormwater treatment devices including planted swales, ponds, raingardens and engineered solutions where appropriate for a responsible and resilient development that respects the wider landscape catchment and contributes to increased water-quality.

OPTION 4: BIRD'S-EYE PERSPECTIVE.

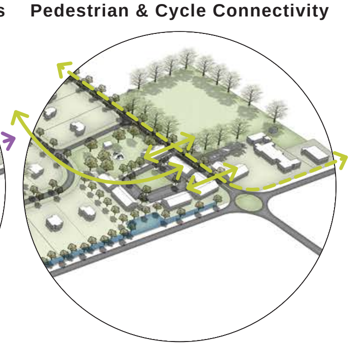


Roads & Transport

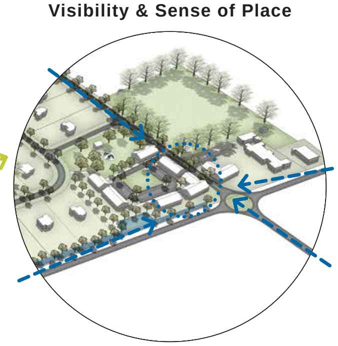


Community Facilities & Amenities

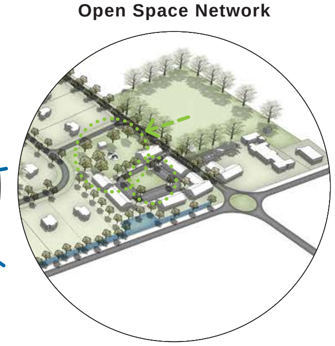
Pedestrian & Cycle Connectivity



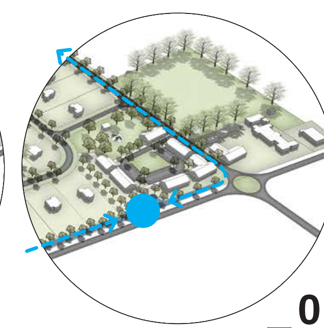
Visibility & Sense of Place



Open Space Network



Three Waters

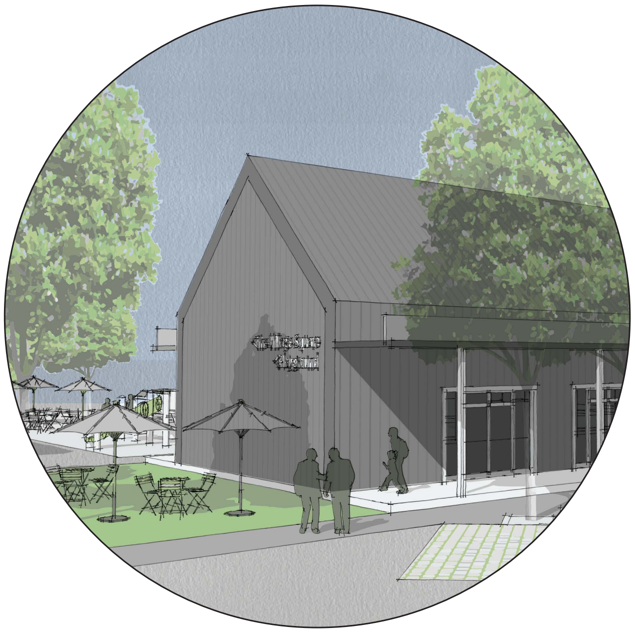


_08

OPTION FOUR.

STANDARD ROUNDABOUT.
DEVELOPMENT VISION & POTENTIAL.

Community Facilities & Amenities.



Community Facilities Expansion: Community orientated facilities including healthcare, childcare and exercise facilities.

Building Typology, Form & Scale: Buildings that reflect the enduring rural character of Ngahinapouri and the surrounding landscape through appropriate colour and material use, building form, configuration and scale.

Village Commercial Precinct & Open Space.

Village Core / Commercial Centre: A mixed-use centre providing goods, services, hospitality, entertainment and office space offerings to the community and visitors.

Diversity of Use: Provision of active and passive recreational areas that have strong pedestrian and cycle connection between them and existing open space areas. Opportunity for amenities including playgrounds, trails, sports areas and facilities.

Pedestrianised Shared Streetscape & Stormwater Treatment.

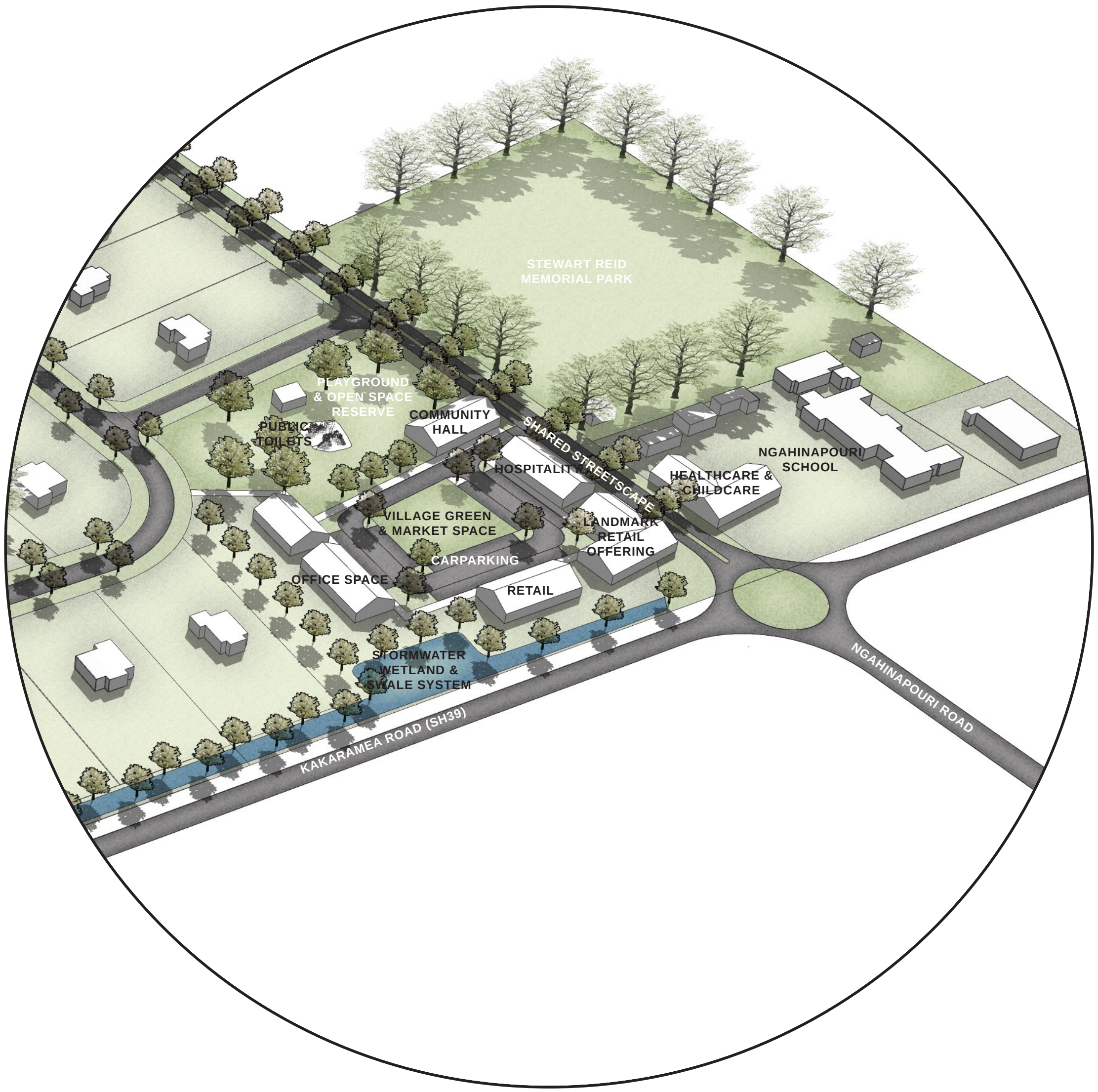
Reid Road Shared Streetscape: Allocation of space to promote and prioritise pedestrian and cycle use and connectivity between community, school, open space and commercial amenities and facilities.

Integrated Design: Stormwater treatment devices including planted swales, ponds, raingardens and engineered solutions where appropriate for a responsible and resilient development that respects the wider landscape catchment and contributes to increased water-quality.

_09

OPTION FOUR.

STANDARD ROUNDABOUT.
DEVELOPMENT VISION & POTENTIAL.



_10

Boffa Miskell

About Boffa Miskell

Boffa Miskell is a leading New Zealand professional services consultancy with offices in Auckland, Hamilton, Tauranga, Wellington, Christchurch, Dunedin and Queenstown. We work with a wide range of local and international private and public sector clients in the areas of planning, urban design, landscape architecture, landscape planning, ecology, biosecurity, cultural heritage, graphics and mapping. Over the past four decades we have built a reputation for professionalism, innovation and excellence. During this time we have been associated with a significant number of projects that have shaped New Zealand's environment.

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APPENDIX ONE.

INTERSECTION DESIGN OPTIONS.

OPTION ONE.

DO NOTHING (EXCEPT LOCAL ROAD UPGRADE).

_11

OPTION ONE.

DO NOTHING INTERSECTION FEATURES.

Roads & Transport.

1. Reduced Speed Zone: Potential opportunities for limited areas of traffic calming measures. Including road-side landscaping.

Community Facilities & Amenities.

2. Village Core / Commercial Centre: A mixed-use centre providing goods, services, hospitality, entertainment and office space offerings to the community and visitors.

3. Community Facilities Expansion: Community orientated facilities including healthcare, childcare and exercise facilities. Option to redevelop community hall.

Pedestrian & Cycle Connectivity.

4. Reid Road Shared Streetscape: Allocation of space to promote and prioritise pedestrian and cycle use and connectivity between community, school, open space and commercial amenities and facilities.

5. Golf Course Access: Direct public pedestrian and golf cart access to Ngahinapouri Golf Course.

6. Shared Paths: Broad paths along connector roads within the village to provide quality and safe pedestrian and cycle connections to community, school, open space and commercial amenities and facilities.

Visibility & Sense of Place.

7. Visual Prominence of Village Core / Commercial Hub: A larger catchment of frequent and transient visitors and customers are captured by locating commerce at the visually prominent intersection with State Highway 39.

8. Building Typology, Form & Scale: Buildings that reflect the enduring rural character of Ngahinapouri and the surrounding landscape through appropriate colour and material use, building form, configuration and scale.

9. Landscape & Streetscape: Hard landscape materials that prioritise safety and wayfinding, while preserving and building upon a sense of rural character through considered allocation of space. Planting at a range of scales that compliment roading and built-form scales, with species that are cohesive with those existing within the surrounding landscape. Retention of existing vegetation where possible.

Open Space Network.

10. Diversity of Use: Provision of active and passive recreational areas that have strong pedestrian and cycle connection between them and existing open space areas. Opportunity for amenities including playgrounds, trails, sports areas and facilities.

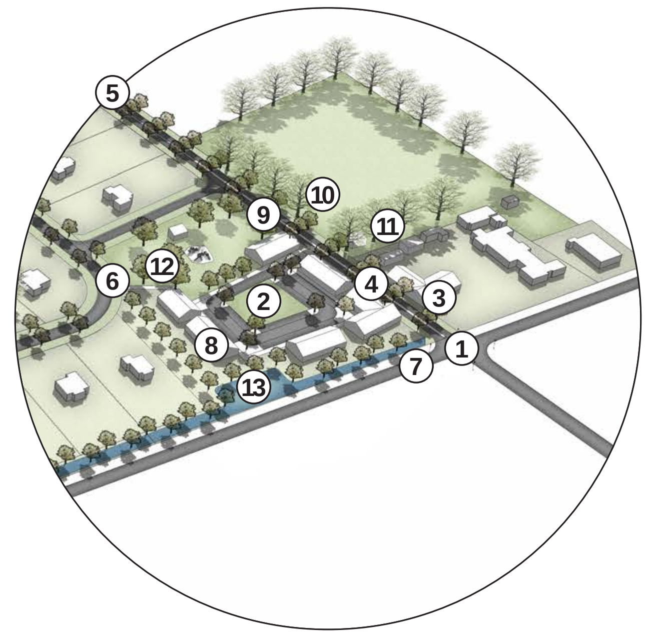
11. Complimentary Facilities & Amenities: Supporting amenities including public bathrooms, rubbish bins, drinking fountains, shelters and signage located within the open space network.

12. Planting: Provides for increased amenity for users, expansion of habitat, nature play and opportunity for integrated stormwater treatment.

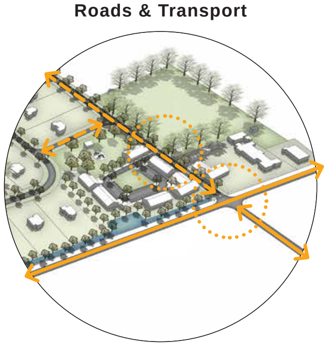
Three Waters.

13. Integrated Design: Stormwater treatment devices including planted swales, ponds, raingardens and engineered solutions where appropriate for a responsible and resilient development that respects the wider landscape catchment and contributes to increased water-quality.

OPTION 1: BIRD'S-EYE PERSPECTIVE.

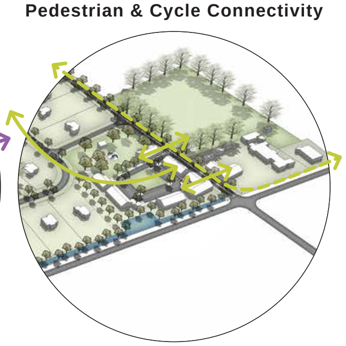


Roads & Transport

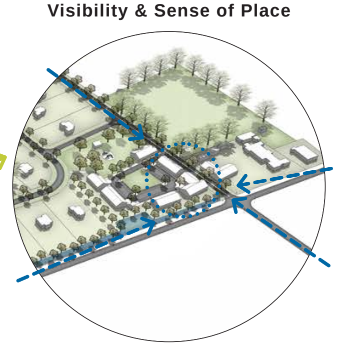


Community Facilities & Amenities

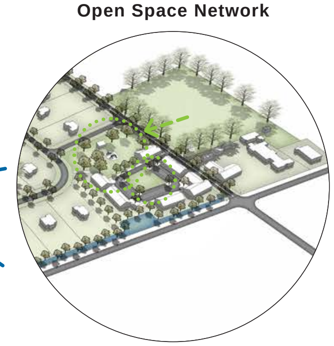
Pedestrian & Cycle Connectivity



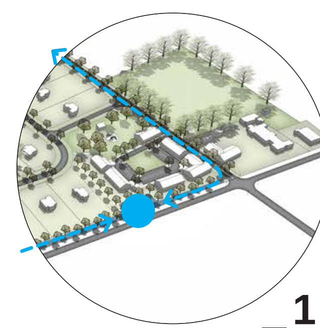
Visibility & Sense of Place



Open Space Network



Three Waters



_12

OPTION TWO.

STAGGERED INTERSECTION.

_13

OPTION TWO.

STAGGERED INTERSECTION FEATURES.

Roads & Transport.

1. Reduced Speed Zone: SH39 between Reid Road & Ngahinapouri Road. Including dedicated right-turn lane and road-side landscaping.

Community Facilities & Amenities.

2. Village Core / Commercial Centre: A mixed-use centre providing goods, services, hospitality, entertainment and office space offerings to the community and visitors.

3. Community Facilities Expansion: Community orientated facilities including healthcare, childcare and exercise facilities. Option to redevelop community hall.

Pedestrian & Cycle Connectivity.

4. Reid Road Shared Streetscape: Allocation of space to promote and prioritise pedestrian and cycle use and connectivity between community, school, open space and commercial amenities and facilities.

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Open Space Network.

10. Diversity of Use: Provision of active and passive recreational areas that have strong pedestrian and cycle connection between them and existing open space areas. Opportunity for amenities including playgrounds, trails, sports areas and facilities.

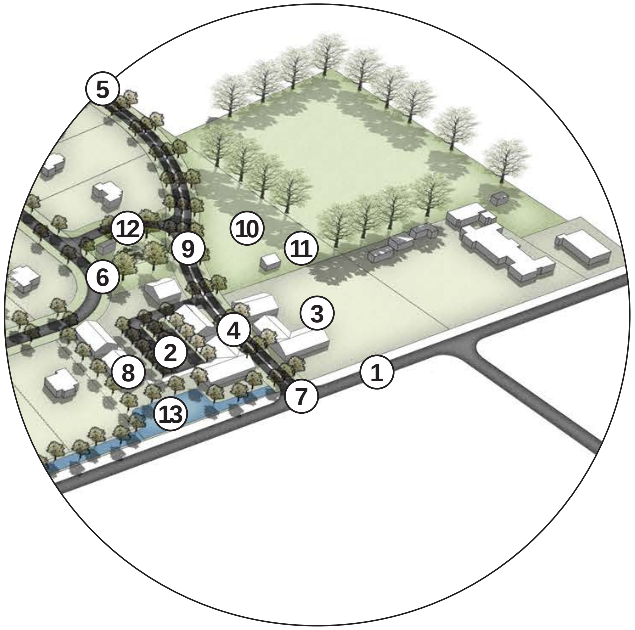
11. Complimentary Facilities & Amenities: Supporting amenities including public bathrooms, rubbish bins, drinking fountains, shelters and signage located within the open space network.

12. Planting: Provides for increased amenity for users, expansion of habitat, nature play and opportunity for integrated stormwater treatment.

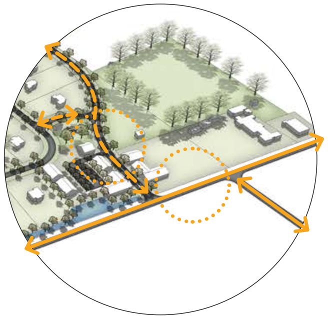
Three Waters.

13. Integrated Design: Stormwater treatment devices including planted swales, ponds, raingardens and engineered solutions where appropriate for a responsible and resilient development that respects the wider landscape catchment and contributes to increased water-quality.

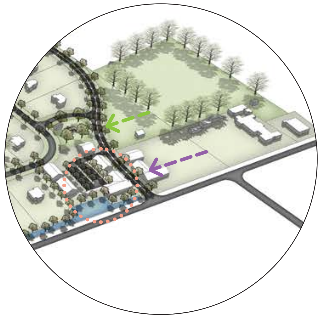
OPTION 2: BIRD'S-EYE PERSPECTIVE.



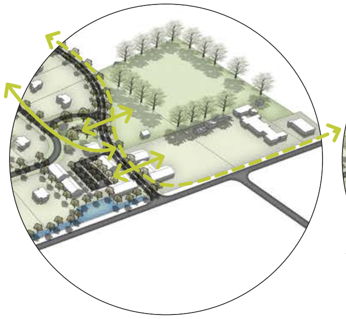
Roads & Transport



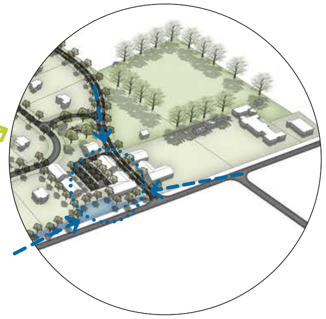
Community Facilities & Amenities



Pedestrian & Cycle Connectivity



Visibility & Sense of Place



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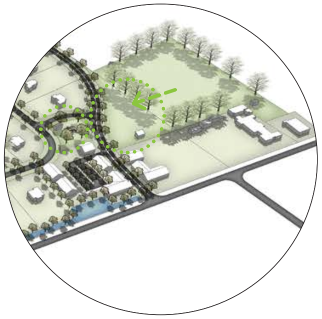

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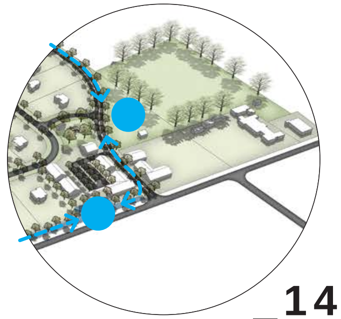

_14

OPTION THREE.

TRAFFIC SIGNALS.

_15

OPTION THREE.

TRAFFIC SIGNALS FEATURES.

Roads & Transport.

1. Reduced Speed Zone: Traffic lights at the intersection of Reid Road, Ngahinapouri Road & SH39. Including road-side landscaping.

Community Facilities & Amenities.

2. Village Core / Commercial Centre: A mixed-use centre providing goods, services, hospitality, entertainment and office space offerings to the community and visitors.

3. Community Facilities Expansion: Community orientated facilities including healthcare, childcare and exercise facilities. Option to redevelop community hall.

Pedestrian & Cycle Connectivity.

4. Reid Road Shared Streetscape: Allocation of space to promote and prioritise pedestrian and cycle use and connectivity between community, school, open space and commercial amenities and facilities.

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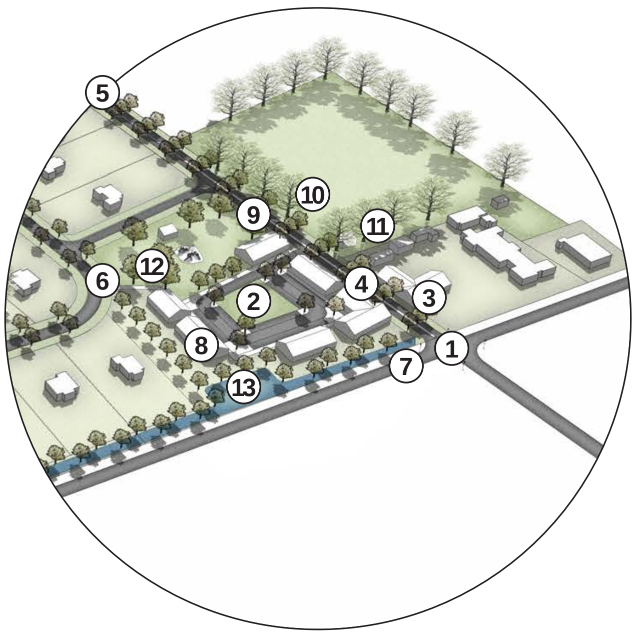
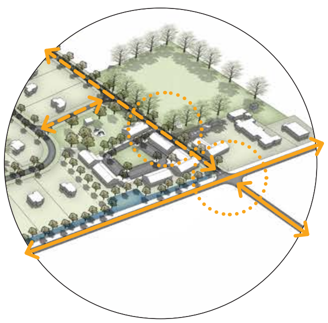
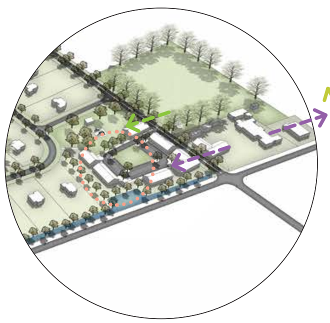
OPTION 3: BIRD'S-EYE PERSPECTIVE.



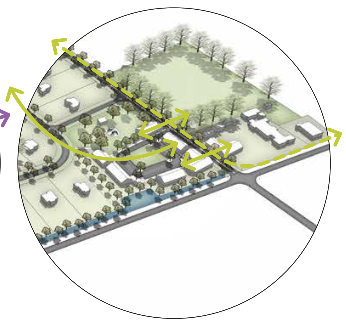
Roads & Transport



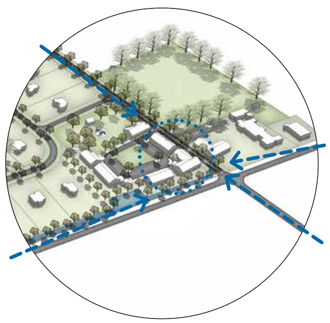
Community Facilities & Amenities



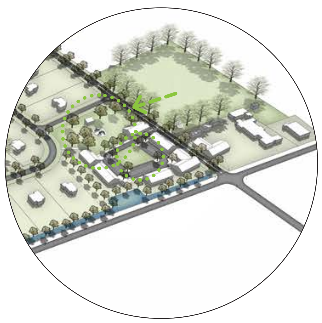
Pedestrian & Cycle Connectivity



Visibility & Sense of Place



Open Space Network



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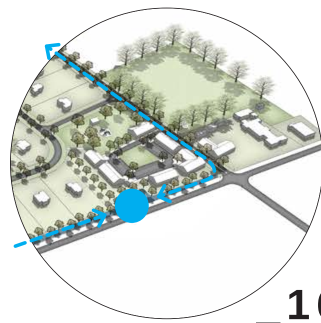

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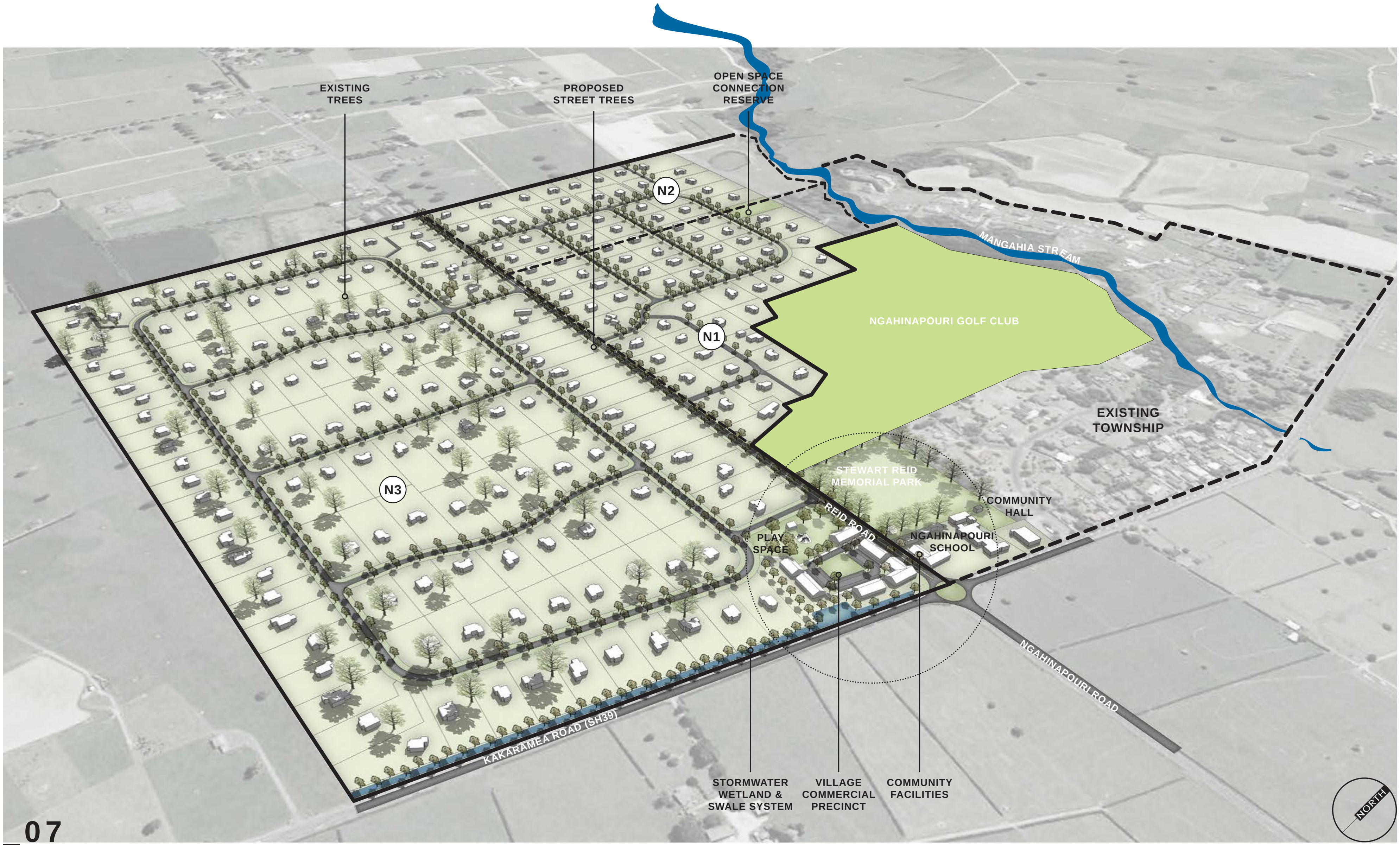
OPTION FOUR.

STANDARD ROUNDABOUT.



_07

OPTION FOUR.

STANDARD ROUNDABOUT FEATURES.

Roads & Transport.

1. Reduced Speed Zone: Roundabout at intersection of Reid Road, Ngahinapouri Road & SH39. Including roundabout and road-side landscaping.

Community Facilities & Amenities.

2. Village Core / Commercial Centre: A mixed-use centre providing goods, services, hospitality, entertainment and office space offerings to the community and visitors.

3. Community Facilities Expansion: Community orientated facilities including healthcare, childcare and exercise facilities. Option to redevelop community hall.

Pedestrian & Cycle Connectivity.

4. Reid Road Shared Streetscape: Allocation of space to promote and prioritise pedestrian and cycle use and connectivity between community, school, open space and commercial amenities and facilities.

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Open Space Network.

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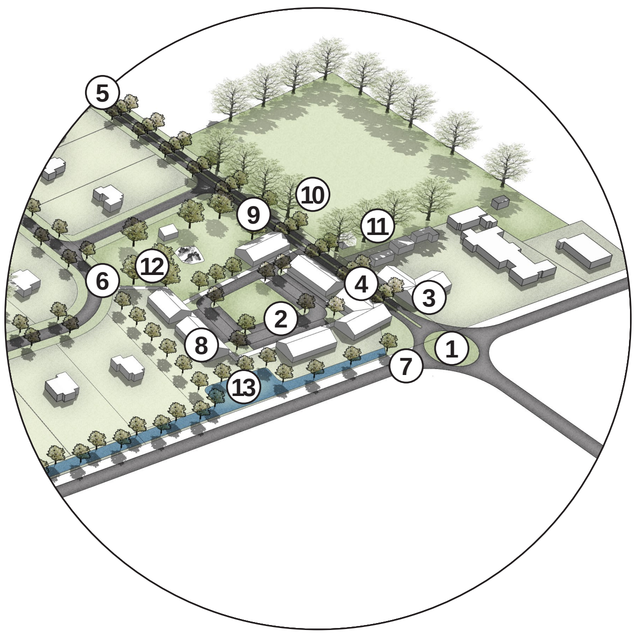
11. Complimentary Facilities & Amenities: Supporting amenities including public bathrooms, rubbish bins, drinking fountains, shelters and signage located within the open space network.

12. Planting: Provides for increased amenity for users, expansion of habitat, nature play and opportunity for integrated stormwater treatment.

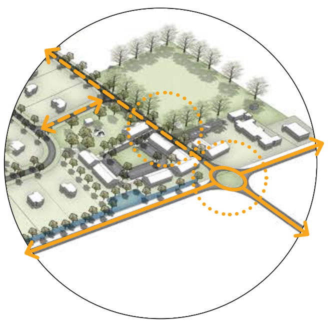
Three Waters.

13. Integrated Design: Stormwater treatment devices including planted swales, ponds, raingardens and engineered solutions where appropriate for a responsible and resilient development that respects the wider landscape catchment and contributes to increased water-quality.

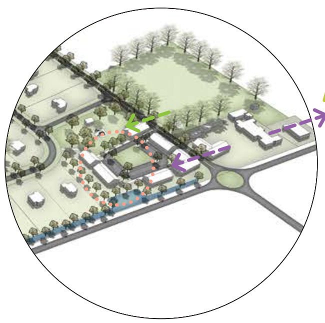
OPTION 4: BIRD'S-EYE PERSPECTIVE.



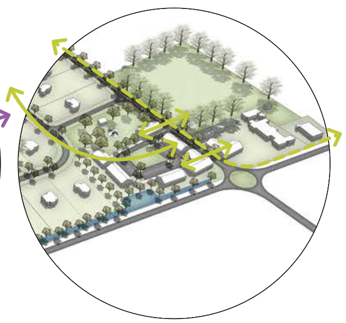
Roads & Transport



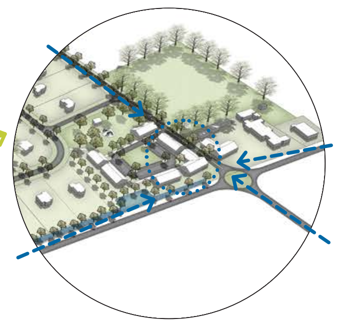
Community Facilities & Amenities



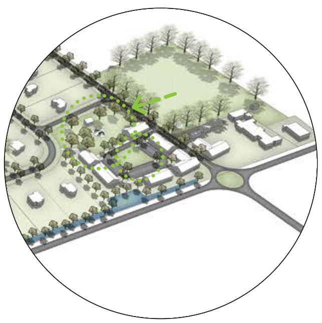
Pedestrian & Cycle Connectivity



Visibility & Sense of Place



Open Space Network



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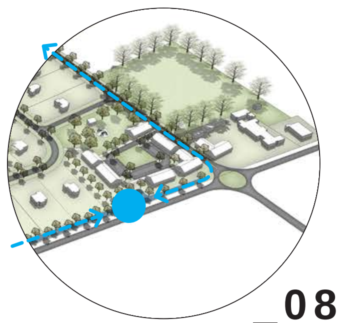

_08

OPTION FIVE.

OFFSET ROUNDABOUT.

_19

OPTION FIVE.

OFFSET ROUNDABOUT FEATURES.

Roads & Transport.

1. Reduced Speed Zone: Roundabout at intersection of Reid Road, Ngahinapouri Road & SH39, with staggered approach from Reid Road & Ngahinapouri Road. Including dedicated right-turn lane and road-side landscaping.

Community Facilities & Amenities.

2. Village Core / Commercial Centre: A mixed-use centre providing goods, services, hospitality, entertainment and office space offerings to the community and visitors.

3. Community Facilities Expansion: Community orientated facilities including healthcare, childcare and exercise facilities. Option to redevelop community hall.

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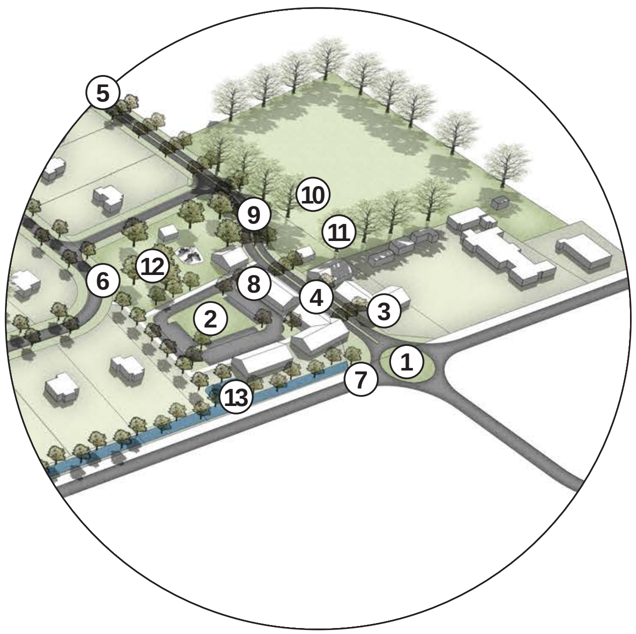
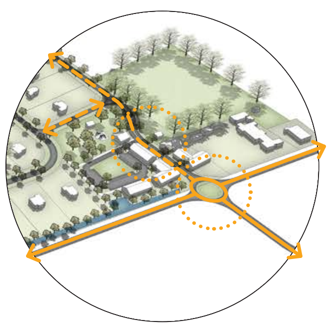
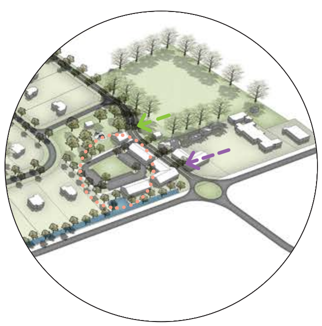
OPTION 5: BIRD'S-EYE PERSPECTIVE.



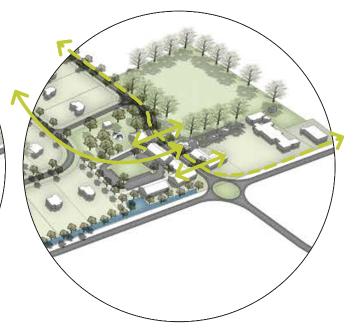
Roads & Transport



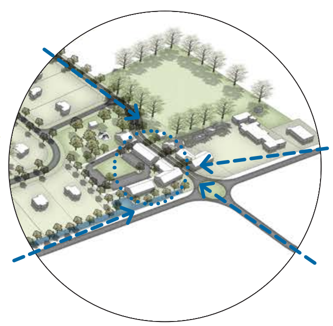
Community Facilities & Amenities



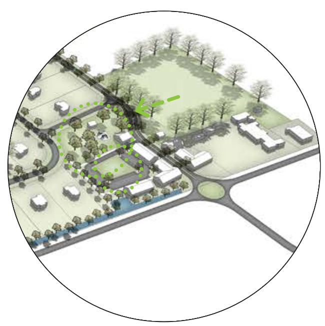
Pedestrian & Cycle Connectivity



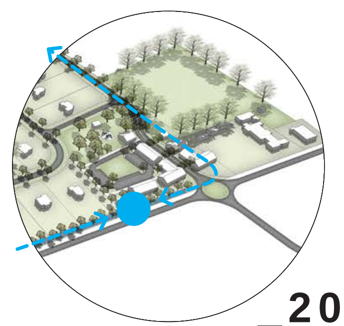
Visibility & Sense of Place



Open Space Network



Three Waters



APPENDIX TWO.

VILLAGE CENTRE & RESIDENTIAL DESIGN GUIDELINES.

DESIGN GUIDELINES.

PURPOSE OF THE GUIDELINES.

The Design Guidelines for the Village Commercial Centre and Large Lot Residential Growth Cells are not intended to be either overly complex or prescriptive but are aimed at providing guidance to potential future developers and to consent authorities on the outcomes supported by the local community and key stakeholders.

Where applications for resource consent are made, the guidelines provide a means of compliance with design-related assessment criteria.

VILLAGE COMMERCIAL CENTRE.

Design guidelines for the Ngahinapouri Village Commercial Centre are intended to provide guidance around the community's aspirations for the development of a vibrant, community focused village core for Ngahinapouri. This commercial centre will provide smaller scale services to support the day to day needs of the community. A range of activities are promoted within the Village Commercial Centre, and pedestrian frontages identified to reinforce the pedestrian focus and vibrancy of this area.

Village Character and Community Focus

Traditionally a village centre is more than a conglomeration of commercial activities and services. A well-designed village centre creates opportunities and spaces for communities to gather, interact, do business and take part in passive and sometimes active recreation activities. Traditionally the village square or village green has provided a central open space for informal trade, markets and associated recreation activities.

The vision for Ngahinapouri Village is to develop a small but well-conceived and well-used village centre, providing local service offering and incorporating a mixed use of commercial, office and recreation activities.

The proposed gateway location of the village centre is of fundamental importance to ensure the viability and sustainability of the centre from a commercial perspective. Good visibility from the Kakaramea Road corridor is essential to ensure that passing trade is captured to support the viability of the small commercial node. The village centre will be accessed directly off Reid Road, with a mix of external angled on-street parking and longer stay off street parking being provided.

Mixed-Uses and Activities

The following components would be provided to support the retail and service functions of the village centre:

- Village Green or Public Square for markets and passive recreation functions
- Multi-age and abilities children's play space
- Community centre and related social infrastructure
- Live-work office or small-scale manufacturing component
- High-amenity open space and quality planting
- Electric vehicle charging station

Built Form, Bulk and Scale

The built form of the village centre should be of a high quality and of an appropriate scale that is sympathetic to the unique character of Ngahinapouri. The architectural design should be reflective of the smaller scale village character of the township, using simple and appropriate materials and finishes.

- Building heights are limited to 14m in height within the village centre.
- Building should incorporate a 3m minimum depth continuous covered shopfront on all key building frontages.
- The architectural design should incorporate vertical elements or components with a permitted maximum height of 14m on key nodes or landmark corners of the development.
- Future built form at the corner of SH39 and Reid Road should be designed to address both SH39 and Reid Road.
- Buildings adjacent to SH39 should be consistently set back along the Highway, with a passive frontage facing the Highway and an active frontage and yard facing the proposed car park.

Pedestrian Focus

The overall design for Ngahinapouri Village is centred on providing strong connectivity for pedestrians and cyclists. The Reid Road Shared Streetscape allocates space to promote and prioritise pedestrian and cycle use and connectivity between community, school, open space and commercial amenities and facilities.

The concept design also provides safe pedestrian access and connectivity between the Village Commercial Centre and the Ngahinapouri Golf Course to the west via Reid Road. Direct public pedestrian and golf cart access to Ngahinapouri Golf Course is provided to promote overall connectivity through-out the village and ensure that the golf course and existing residential areas to the north are fully integrated into the overall vision for the village.

Connection to Residential Growth Cells

Shared Paths of 3m width should be provided as shown along key collector roads within the village to provide quality and safe pedestrian and cycle connections to community, school, open space and commercial amenities and facilities.

DESIGN GUIDELINES.

N1, N2 & N3 LARGE LOT RESIDENTIAL.

Design guidelines for the N1, N2 & N3 Large Lot Residential Growth Cells are centred around ensuring that the overall rural lifestyle character and amenity of Ngahinapouri are maintained and enhanced.

It provides guidance around the community's aspirations for the development of a sustainable residential development that provides quality and multi-mode transport networks, diverse public space, exercise facilities and opportunities to develop private homes and properties that promote a greater quality of life and sense of community.

Building Placement.

Lot Size

2500 - 5000m2 Typical Lot Size.

Building Placement and Integration into Landscape

Buildings should be located a minimum distance of 15m from the front and back boundaries of the lot and a minimum of 10m from the side boundaries for sites larger than 2500m2.

For sites smaller than 2500m2 road frontage setback of 15m for collector roads and 10m for local roads should be applied, with side and rear yard setbacks of 5m.

Buildings are recommended to be integrated into the surrounding landscape or vegetation pattern and the design should consider the effect of its location on views from public places such as roads, parks, reserves and neighbouring houses. The house should avoid being located where it will dominate the view from public places or neighbouring houses.

Landscape development of properties should include clusters of specimen tree planting around the buildings on site, to ensure buildings are viewed from the streetscape and distant views as sitting nestled within a green landscape framework.

Proposed building platforms and dwellings should be staggered and avoid being developed in a straight line. This visually blends better with the surrounding landscape and improves privacy between neighbouring dwellings.

Retention of existing vegetation and tree plantings which extend above the house roof height will help integrate the building into the existing landscape setting. Planting of new vegetation will also help to filter views of the houses from the surrounding landscape.

To enhance passive street surveillance over the streetscape, an unobstructed viewshaft zone should be maintained in front of each house where no large vegetation is recommended. This is to ensure the street can still be viewed from each dwelling and vice versa.

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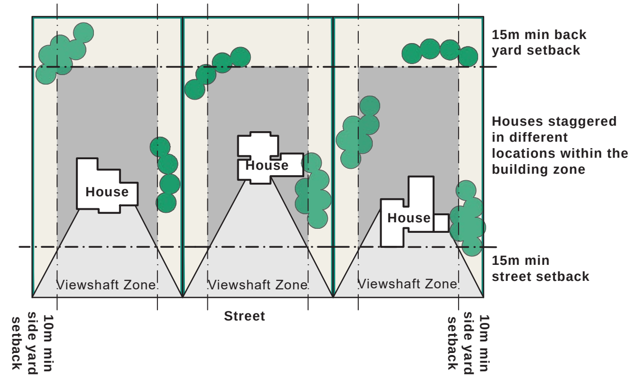


Driveways

Driveways should follow the contour of the landscape and not require unnecessarily large retaining walls or battered slopes. Visually recessive materials should be used such as asphalt, exposed aggregate concrete, charcoal-coloured concrete or metal. Use of bright or plain concrete, and material such as lime chip is discouraged.

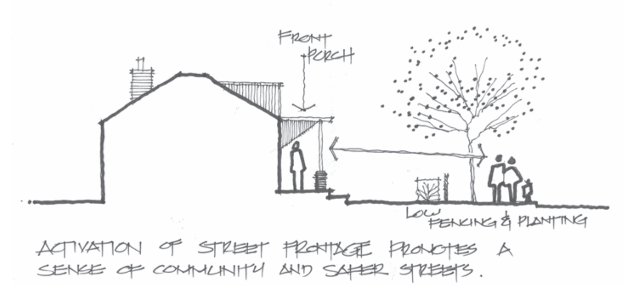
Street Frontage

Street frontage is important as it allows neighbours to interact with one another and therefore increases the neighbourhood's passive surveillance. It is important that a strong visual connection exists between residential frontages and the adjacent streetscape. Houses should be designed to have primary living areas within the dwelling facing the street frontage, with large windows allowing residents within the dwellings to visually connect with the streetscape environment.

Front yard landscaping should take the form of low shrub and groundcover planting, to a maximum height of 1.2m, combined with informal clusters of specimen trees with clear stems, to allow visual connection below the crown of the trees.

Large shrubs and low branching trees should be avoided, as these can block views both outward and inwards to properties and have a detrimental impact on safety and security within the neighbourhood.

By having an attractive street frontage, it also makes for a high-quality neighbourhood that people will enjoy and want to spend time in.



Site Fencing

Front boundary fences and hedges should be 1.2m high, while side and rear fencing can be between 1.2m high and 1.8m high. A clipped hedge can be used as an alternative or in combination with the front, side or rear boundary fencing.

All fencing within the development should be stained with an environmentally friendly exterior waterborne timber stain. This colour should be co-ordinated with the colours of the house.

Retaining Walls

Where retaining walls are required they should not exceed a height greater than 1.5m, and if greater height is required, stepped retaining should be used.

Any retaining walls that can be seen from a public viewpoint should be enhanced by plant cover using a suitable shrub, groundcover, or creeper. Retaining walls on site boundaries should be avoided, and where possible they should be incorporated into the house structure.

Building Design.

Height

N1, N2, N3 large lot residential zone maximum building height is 8m.

Building Size & Site Coverage

Maximum total building coverage on each site should be designed to comply with Rule 3.4.2.7 of the District Plan.

Impermeable Surfaces

Impermeable surfaces on each site should be design to comply with Rule 3.4.2.8 of the District Plan.

Roof Form & Style

Generous building eves, overhangs and roofs that are darker than the walls can give off the impression of the building sitting into the landscape. The following roof forms are recommended:

- Gable End Roof
- Monopitch Roof
- Combination Gable And Hip Roof

The following roof designs are discouraged:

- Flat Roof
- Full Hip Roof

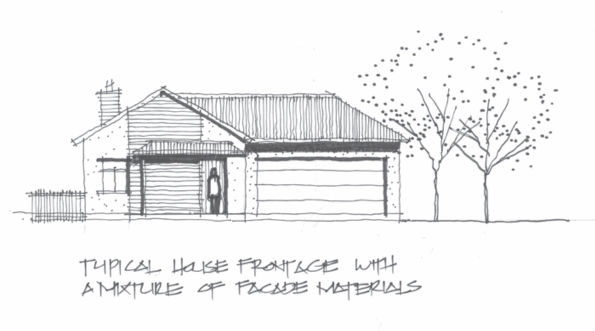
Monopitch Roof

Gable End Roof

Combination Gable And Hip Roof

Balconies, Porches & Landings

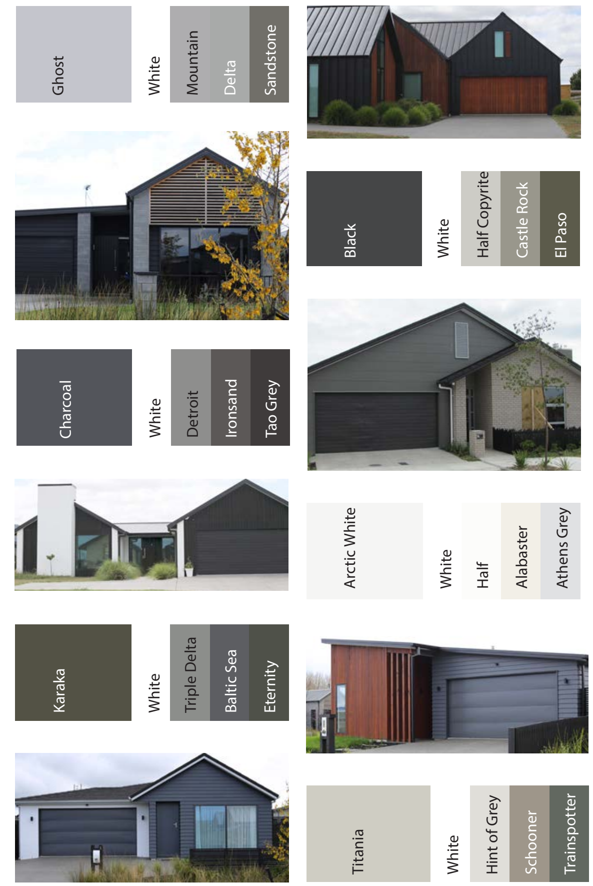
Houses are recommended to be designed with a usable front porch to define the entry of the house. The porch must be accessible from a primary living area. The front porch should have a minimum depth of 2.5m and be wide enough to make it is a usable space. A minimum size of 15m2 is required. The front porch creates a sense of visual connectivity and promotes community interaction. community and active surveillance over the streetscape.



Materials and Colours

The preference within the development is the use of natural and muted colour tones which blend into the surrounding landscape.

Two to three complimentary materials should be used per house. The front facade cladding should be applied in a ratio of 1:3, however brick cladding should not exceed 50 percent of any publicly visible frontage.



APPENDIX THREE.

TRANSPORTATION ASSESSMENT & THREE WATERS ENGINEERING ASSESSMENT (TONKIN & TAYLOR, 2019).

REPORT

Tonkin+Taylor

Waipa Ngahinapouri Concept Plan: Transportation Assessment

Prepared for
Boffa Miskell
Prepared by
Tonkin & Taylor Ltd
Date
October 2019
Job Number
1008305.1000.v5

Exceptional thinking together
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Document Control

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Distribution:

Boffa Miskell	1 PDF copy
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1 Ngahinapouri: Concept Plan

1.1 Structure Plan Areas

Figure 1.1: Approximate extents of the Ngahinapouri Concept Plan (image sourced from Google Earth)

The Concept Plan covers the area of Ngahinapouri around Reid Road, to the west of State Highway 39 (SH39) and on the western extents of Ngahinapouri village; this area is currently rural, but zoned for future large-lot residential development.

This concept plan covers three growth areas previously identified by Waipa District Council, being N1, N2 and N3 as labelled in Figure 1.1 above, with access points anticipated as shown.

1.2 Existing Situation

1.2.1 Existing Transport Environment

Reid Road runs through the middle of the concept plan area, being the only existing road adjoined to N1 and N2, with N3 also adjoining SH39 on its eastern extents.

Ngahinapouri Road forms the eastern side of the crossroads between Reid Road and State Highway 39, and is an important rural distributor from Ngahinapouri.

Reid and Ngahinapouri Roads are considered to be Local Roads by the Waipa District Plan, with SH39 being a Major Arterial.

Both roads are generally consistent with a rural environment, and as such there are currently no cycling and minimal pedestrian facilities.

Table 1.1: Road Details (Existing)

Road Name	Total Width (m)	Lanes	Shoulder	Cycle Facilities	Footpaths	Posted Speed (km/hr)
Reid Road	5.5	2	None	None	None	70 – 100
SH39 (north Reid Road intersection)	12.2	2 + median	2x 2.5 m wide	None	Narrow short length on eastern side opposite school, and along western side north of school	70
SH39 (south Reid Road intersection)	7.5 – 10.0	2 (+ median between speed threshold and intersection)	2x 0.5 m wide (rural area, widening to intersection)	None	None	70 – 100
Ngahinapouri Road (to Gillard Road)	6.0	2	None	None	None	100

Note: Measurements are approximate only using aerial imagery

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 intersection of Reid Road, Ngahinapouri Road and SH39, as well as the length of Reid Road in front of the concept plan area and Ngahinapouri Road to the intersection with Gillard Road. Full CAS outputs can be found in Appendix A.

Fundamentally there have been no recorded injury crashes at this intersection. However, considering the type of crash involved failure to give way and turning conflicts there is still an element of increased risk at this intersection.

Table 1.2: 10-Year Crash History

Road Name	Number of Crashes	Non-injury	Minor Injury (M)	Death or Serious (DSI)	Crash Injury Rate	Years
Reid Road	0	0	0	0	0.0	n/a
SH39 (intersection associated)	4	4	0	0	0.0	1x 2011 1x 2012 2x 2018
Ngahinapouri Road (to intersection with Gillard Road)	0	0	0	0	0.0	n/a

Note: For SH39, one crash was removed as it was an out of control crash which happened 150 m south of the intersection with Reid Road and deemed not to be associated with the intersection, while one 100 m north of the intersection was counted as it was a nose-to-tail due to queuing traffic and so could have been related to the intersection.

1.2.3 Current Crash Prediction

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

For this assessment, SH39 was assessed as an urban mid-block (70 km/hr or less) plus an urban cross-road intersection, as per section 2.1.1: Methodology by site and crash type, of the Crash Estimation Compendium.

Reid and Ngahinapouri Roads were assessed as rural mid-block (80 km/hr plus) not including the intersection as this is already accounted for with SH39.

Table 1.3: Crash Model Results (Existing Annual Rate)

Road Name	Predicted Injury Crash Rate (existing)	Recorded Injury Crash Rate	Differential: Predicted to Actual	Differential Rate
Reid Road	0.02	0.0	-0.02	-100%
SH39	0.17	0.0	-0.17	-100%
Ngahinapouri Road (to intersection with Gillard Road)	0.06	0.0	-0.06	-100%

Over the last ten years, all three intersections have experienced a lower injury crash rate than the calculated statistical norm for this type intersection in this environment.

It is noted that SH39 intersection does not feature on NZTA's published high risk intersections listing, and is therefore not programmed for any investigations or works. However, there does appear to be a possible underlying issue with this intersection (predominantly failure to give way) which results in slightly elevated risk environment.

1.2.4 Current Road Safety

The existing road network is that of a rural village, with urbanised 70 km/h speed limits along its main road, in this case SH39, and open road speed limits taking over on side roads. There is a footpath on the western side of SH39, north of the school, behind kerb and channel, but open drains on the East (except directly opposite the school). There are no cycle facilities other than a sealed shoulder.

Outside the school there is one refuge island on the State Highway to connect to the section of footpath on the opposite side, which we understand is a dedicated link to the bus stop only; Given the relatively high speed environment, we consider this to this presents an elevated risk to pedestrians, especially during the hours of darkness as no dedicated crossing lighting is apparent.

However, the crash record (refer Appendix A) reveals there are no recorded accidents involving pedestrians or cyclists, and none that caused injury to any party.

This suggests that the level of risk for road users in Ngahinapouri appears to be no worse than any other rural community on a State Highway. This is likely to be because, to regular users, the level of perceived risk is greater than the actual risk, resulting in a more cautious approach to crossing. It does not account for changes in population or traffic volumes which will increase the level of exposure and therefore increase the risk of conflict.

1.2.5 Current Travel Patterns

No traffic survey has been undertaken, however using recognised industry -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 SH39, and Waipa District Council for Reid and Ngahinapouri Roads) for tracking and forecasting maintenance activities on their respective networks. It was noted that the traffic count numbers were all identified as estimates from and so we cannot guarantee the accuracy of the data.

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

Table 1.4: Assumed Traffic Volumes from RAMM Data

Road Name	Average Daily Traffic (ADT) (veh/day)	Date of Count / Estimate	Heavy Vehicles (%)
Reid Road	280	1/12/2016	0
SH39	7,472	25/12/2017	12
Ngahinapouri Road	870	1/12/2016	0

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

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

Table 1.5: Attractors and Type

Attractor Name	Approximate Distance from T6	Attractor Type	Attractions
Hamilton	15 km	Primary Attractor	• Largest population centre within 0.5 hrs travel • Large employment area • Nearest schools above primary • Large retail bases, including niche shops and large supermarkets • Recreational facilities
Pirongia	12 km	Secondary Attractor	• Nearest shops • Employment
Te Awamutu	18 km	Secondary Attractor	• Employment • Shopping • Schools
Local Rural Areas	1 km plus	Secondary Attractor	• Employment • Outdoor Recreation

From these assumptions we can reasonably assume that the majority of traffic will travel north and east (various routes to Hamilton and some rural areas), with the rest travelling south; and return from those same directions in similar proportions.

Westbound traffic moving away from this area (i.e.: along Reid Road) is less likely as there are very few businesses in that direction, and the road network is local to Ngahinapouri, looping back around to connect again with SH39 both to the north and south of the village, which makes it more efficient to join the State Highway at the Reid Road intersection.

1.2.6 Public Transport

There are currently no bus routes, or other method of public transport, servicing Ngahinapouri, with no immediate plans by Waikato regional Council to fund such a service. Although a limited number of school buses operate services taking students from Ngahinapouri to Hamilton.

1.2.7 Other Modes

Currently for local trips to the school and sports facilities, it is possible cycling and walking will be used by children, recreational users, and those with no access to, or choose not to use, a private vehicle.

However, we consider that the majority of trips are likely to be private vehicle-based regardless of the distance to travel, for example children being dropped off by parents on the way to work.

1.3 Proposed Situation

Figure 1.2: Proposed Ngahinapouri Concept Plan road network (source Boffa Miskell)

The proposed development area is intended to be a mixture of various lot sizes of essentially low density residential, ranging from 3,000 m^2, to 10,000 m^2.

At the time of writing, the current plan developed for Ngahinapouri results in an estimated lot yield for the new area of between 200 and 210 lots.

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 without the need for additional public road infrastructure.

The primary accesses from these growth areas occur at three points along Reid Road, the northern areas having two, and the southern area having one, despite accounting for the largest land area; this is not considered an issue, as the likely lot generation, and therefore traffic generation, is not high enough to cause an impediment to exiting onto Reid Road.

At the time of writing, there is a commercial area provided for on the south-western corner of the Reid Road / SH39 intersection; when developing this commercial area, it is key that no motorised vehicle inter-connectivity is allowed between the southern growth area (N3) and either Reid Road or SH39, as this would provide a means of egress for properties along the eastern side of this growth area and allow that area to be used in an unintended manner by through-traffic.

Reid Road provides primary access to SH39, and from there to the wider State Highway and local road networks, and it is anticipated the vast majority of vehicles will head in this direction due to the circular nature of travelling west along Reid Road.

1.3.1.2 Existing Road Upgrades

We consider the following improvements to the local roading network are necessary to provide continues safe and efficient access. Especially those routes providing connectivity to new growth areas and the existing (and future) amenities. The proposal recommends appropriate upgrades which enhance the urban nature and slow vehicle speeds by providing positive calming measures.

Reid Road

Reid Road effectively becomes a Collector Road (according to the District Plan) however, considering the relatively modest volumes of traffic the local road standard should be sufficient.

Currently Reid Road does not meet this standard and should be widened to a minimum of 7.0 m (two 3 m wide traffic lanes and 0.5 m shoulders) for its length from SH39 intersection to the intersection with new road N2. Consideration should be given to providing 1.5 m shoulders that will also serve as cycle ways.

Along the widened length of Reid Road, within the urbanised area, we recommend the provision of 1.5 m wide footpaths on both sides of the road together with a 50 km/h speed limit.

Traffic calming in the form of gateway thresholds, vertical “visual narrowing’ and potentially localised physical narrowing (to 5.0 m) with raised platforms should also be considered to tie in with urban design elements and preferred pedestrian crossing positions.

Given the proposed urban nature of this section of road, kerb and channel would be appropriate, together with enhanced street lighting.

New Roads

New roads N1 to 3 should be developed as residential local rods given the housing density and proposed “urbanised” look and feel of the area. According to the District Plan the minimum width should be 6.0 m, with 1.5 m shoulder on either side to allow for cycling, and 1.5 m wide footpaths. Kerb and channel would also be appropriate.

Intersections should be a traditional priority controlled T (Give way).

SH39

SH39 will require improvements to footpaths between Reid Road and at least Holmwood Drive, to provide safe pedestrian access to the school and other amenities, with some consideration given to rationalisation of direct access to the State Highway. Improved lighting for the pedestrian crossing is also recommended.

SH39/Reid Road intersection will require some form of improvement in future years and this is discussed further in section 1.4.2.

1.3.2 Proposed Pedestrian and Cycling Links

The new growth areas are designed to encourage cycling and pedestrian facilities, with links alongside public roads as well as through existing and new recreational areas within Ngahinapouri.

As well as providing walking and cycling facility along Reid Road and new development roads, consideration should be given to providing direct pedestrian and cyclist access to Duncan Road and Holmwood Drive if possible.

1.4 Modelling Assessments

1.4.1 Trip Distribution

Using the attractors as a guide (see section 1.2), the traffic flow has been is proportionally split based on the most popular routes and likely destinations, this has been applied at each connection to the road network to develop a high level "model" of the predicted travel patterns at each intersection, compounding to the SH39 intersection.

This provides an assumed traffic pattern and turning flows to inform any high level intersection models which in turn give an indication on current performance and level of deterioration associated with the change in land use.

1.4.1.1 Modelling Basis

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).
- Due to the lack of options for vehicles exiting the growth areas turning west, traffic out of these three access points are assumed to be 90% heading east (towards SH39) and 10% heading west.
- Where Heavy Traffic is 'Unknown' it is assumed to be 1%.

1.4.1.2 Model Limitations

It is important to note that, due to the high level of this assessment, no verification can be provided and results are determined from engineering judgement and available information.

1.4.1.3 Development Traffic Generation

Traffic growth within road networks is almost entirely due to land use changes and development growth. As this is a conceptual proposal, we have taken a more conservative approach and compounded the underlying traffic growth (2% per annum) with the predicted trip generation from the development.

Two development scenarios have been considered:

1. Low Development: A scenario whereby the lot yield as presented in the Concept 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 Concept Plan, to account for a worst case scenario of smaller lot types and future in-fill development.

The daily trip generation per lot was assumed to be 10 veh/day which is generally considered to be appropriate for housing.

Table 1.6: Trip Generation

Scenario	vpd	Peak Vph
Low Density	2,000	200
High Density	4,000	400

1.4.2 Intersection Modelling

Given the low increase in peak hour traffic on the Reid Road access roads N1, N2, and N3, it is not strictly necessary to carry out exhaustive modelling. For clarity a typical scenario has been calculated using the worst case assumption (i.e. Road N3 where we have determined a flow range between 120 and 240 vehicles per hour). Even in the most conservative scenario a level of service of A is achieved therefore we consider that the proposed development can be accommodated within Reid road with no detriment to efficiency.

The Intersection with SH39 requires a higher degree of scrutiny with a potential peak traffic increase of almost 400 vehicles in future years. We have carried out limited modelling using Sidra software to provide an understanding of the current and proposed scenarios and to evaluate suggested improvement options. Further details of the modelling undertaken are in Appendix B.

1.4.2.1 SH39 Current Alignment (Do Nothing)

This covers both the existing situation now and with appropriate growth to 2035 as baselines, and the Do Minimum situation for development (i.e.: no change to intersection despite development).

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 1.7: AM Peaks

Scenario	SH39 North		SH39 South		Reid Road	Ngahinapouri Road
	Through Lane	Right Turn Bay	Through Lane	Right Turn Bay		
2018 (no dev)	A	A	A	A	B	C
2018 + LD	A	A	A	A	C	D
2018 + HD	A	A	A	A	C	D
2035 (no dev)	A	A	A	A	C	E
2035 + LD	A	A	A	A	D	F
2035 + HD	A	A	A	A	F	F

Table 1.8: PM Peaks

Scenario	SH39 North		SH39 South		Reid Road	Ngahinapouri Road
	Through Lane	Right Turn Bay	Through Lane	Right Turn Bay		
2018 (no dev)	A	A	A	A	B	C
2018 + LD	A	A	A	A	B	C
2018 + HD	A	A	A	A	B	C
2035 (no dev)	A	A	A	A	C	D
2035 + LD	A	A	A	A	C	E
2035 + HD	A	A	A	A	C	E

These results indicate that, for both AM and PM peaks, the existing intersection is operating acceptably at current traffic levels, and the natural increase in traffic levels to 2035.

In future years there will be an erosion of performance and increased waiting times for drivers exiting Reid Road and Ngahinapouri Road, which will be exacerbated by the increase in traffic from development areas. This is likely to create peak hour frustration for drivers and increase the potential for drivers to take an inappropriate course of action.

On this basis, we recommend a material change to the alignment of the intersection to reduce side road delays as a result of the development. The following sections provide a high level evaluation of the options considered:

1 Option 1 Staggered-T: Re-align Reid Road to the south to offset the minor roads from one another.

2 Option 2 – Signalised Intersection: Re-configure the existing cross-roads layout to provide traffic signal phasing for all directions.

3 Option 3 to 5 – Roundabout: Re-configure the existing cross-roads layout to provide a roundabout arrangement.

Considering that the highest level of impact occurs during the morning peak, as drivers attempt to exit Reid Road, we have only reported on the changes in LOS for that period for option assessment purposes.

1.4.2.2 Option 1 Staggered-T

Table 1.9: AM Peaks, Option 1 – Staggered-T

Scenario	SH39 North		SH39 South		Reid Road	Ngahinapouri Road
	Through Lane	Right Turn Bay	Through Lane	Right Turn Bay		
2018 + LD	A	A	A	A	B	C
2018 + HD	A	A	A	A	C	C
2035 + LD	A	B	A	A	C	E
2035 + HD	A	B	A	A	D	E

These results indicate that this intersection operates more efficiently than the existing cross-roads. However, there are still long delays for vehicles on Ngahinapouri Road.

1.4.2.3 Option 2 – Signals

Table 1.10: AM Peaks, Option 2 - Signals

Scenario	SH39 North		SH39 South		Reid Road	Ngahinapouri Road
	Through Lane	Right Turn Bay	Through Lane	Right Turn Bay		
2018 + LD	A	B	B	B	B	B
2018 + HD	A	B	B	B	C	B
2035 + LD	A	B	B	B	C	C
2035 + HD	A	B	B	B	C	C

These results indicate that this intersection operates more efficiently than the existing cross-roads for side roads although, as expected, there is a slight deterioration in performance for SH39. Whilst traffic signals would provide a significant enhancement for pedestrian safety, fundamentally the installation of an isolated controlled intersection in a rural high speed environment is more likely to create problems with failure to stop and rear end crashes.

1.4.2.4 Options 3 to 5 – Roundabout

From a traffic flow perspective, all roundabout options all operate in the same manner and the choices between the three depend on other comparative advantages and disadvantages such as land purchasing costs.

1.4.2.5 Table 1.11: AM Peaks, Options 3 to 5 – Roundabout

Scenario	SH39 North	SH39 South	Reid Road	Ngahinapouri Road
2018 + LD	A	A	A	A
2018 + HD	A	A	A	A
2035 + LD	A	A	B	B
2035 + HD	A	A	B	B

The results indicate that the intersection operates more efficiently than the existing cross-roads, and maintains acceptable levels of service beyond 2035. There is little or no detriment to the efficiency of SH39 and significant benefits to both Ngahinapouri Road and Reid Road. Whilst there are potential risks associated with a rural roundabout, the traffic calming effect would be a benefit to the township.

1.4.3 Crash Prediction Modelling

The crash prediction model (see section 1.2.3) has been updated using the predicted trip generation as follows:

Table 1.12: Crash Model Results (Combined Annual Rates)

Road Name	**Predicted Injury Crash Rate** (current)	**Predicted Injury Crash Rate** (existing + LD)	**Predicted Injury Crash Rate** (2035 only)	**Predicted Injury Crash Rate** (2035 + HD)
Reid Road	0.02	0.13	0.02	0.25
SH39	0.17	0.18	0.21	0.37
Ngahinapouri Road (to intersection with Gillard Road)	0.06	0.07	0.08	0.09

This indicates that, predicted injury crash rate will increase with the increase in traffic volumes, with the exception of Ngahinapouri Road where traffic growth remains relatively minor.

It also shows an increase in expected injury crashes as development increases, which is expected given the additional volume of traffic on each road in addition to the new flows from the development.

Noting that these results assume no change to the existing road or intersection arrangements, further assessment was undertaken for the three option types and is presented below:

Table 1.13: Crash Model Results (SH39 Intersection Changes)

Scenario	**Predicted Injury Crash Rate** (2035)	**Predicted Injury Crash Rate** (2035 + development)
Do Nothing	0.21	0.37
Staggered-T		0.59
Traffic Signals		0.61
Roundabout		0.36

This comparison indicates that, of the options under consideration, a roundabout is likely to have the lowest injury crash rates (based on NZTA's prediction formula).

1.5 Impact Assessment

The development potential, as presented in this plan, is expected to generate approximately 2,000 veh/day, with a conservative future vehicle generation of 4,000 veh/day (should future subdivision be permitted).

This will increase the traffic movements on the local roads and SH39, especially during peak travel times. However modelling indicates that the existing road network is largely unaffected by this. The SH39 intersection will remain largely unaffected until 2035 when some form of intervention will be necessary to counter the increased delays from side road turning traffic.

The assessment of traffic growth shows that the risks of an injury crashes also increase with this increased level of exposure, with the SH39 intersection being the worst effected with a potential doubling of risk from its current levels.

On this basis we recommend a future improvement to the intersection which effectively deals with the safety and efficiency risks.

1.5.1 SH39 Intersection Options

As indicated in the previous section, at some point before 2035, the intersection of Reid Road, SH39 and Ngahinapouri Road will require upgrading to cater for traffic volumes and improve safety.

The options being considered were identified in detail in modelling section 1.4.2, and are as follows:

- Do nothing
- Option 1 – Staggered-T
- Option 2 – Signalised Intersection
- Option 3 – Elongated Roundabout
- Option 4 – Traditional Roundabout
- Option 5 – Offset Roundabout

Fundamentally, the assessment of options 1 and 6 have virtually identical results, as do all roundabout options (3, 4 and 5).

The following table summarises the findings from the assessment and high level modelling:

Table 1.14: SH39 Combined Assessment Results for 2035 (with development)

Road Name	Predicted Injury Crash Rate HD)	Worst LoS for Intersection
Do Nothing	0.36	F
Staggered-T	0.49	E
Traffic Signals	0.55	C
Roundabout	0.28	B

This comparison shows that, in a worst-case scenario of normal traffic growth of 2% per annum to 2035 added to a higher density development scenario, the best performing intersection option would be a roundabout.

A more detailed option assessment of each option is presented in Table 1.15 below:

Table 1.15: Intersection Option Considerations

Option	Advantages	Disadvantages
Do Nothing	• Familiar layout for users • Forces a stop at the intersection for side-road users • No cost implications	• Run-through risks for side-roads, resulting impacts at high speeds • Four movements (Right and Ahead for each side-road) must find gaps in two lanes of relatively fast moving traffic (70 km/hr) against one another • Carry-through speed on SH39 expected to be higher than posted limit • Increased crash risk in the future
Option 1 Staggered-T	• Familiar layout for users • Forces a stop at the intersection for side-road users • Increases traffic flow efficiency of intersection as a whole • Run-through less likely as no road directly opposite • Traffic on Reid Road slowed by corners on re-alignment • Two conflicting movements removed (Ahead for each side-road)	• While less likely, any run-through still occurs at high speed • Two movements (Right for each side-road) must find gaps in two lanes of relatively fast moving traffic (70 km/hr) • Two Ahead movements are added to those needing to turn right off the State Highway (SH), increasing SH queue lengths • Right turning queues are back-to-back, which could cause queuing in the SH through-lanes at peak times • Carry-through speed on SH39 expected to be higher than posted limit • Predicted injury-crash frequency much higher than some other options • Requires land and considerable road realignment of Reid Road
Option 2 Signalised Intersection	• Should cause traffic to slow down from all directions, anticipating lights changing • Increases traffic flow efficiency of side-roads • Conflicting movements managed (reduced human error) • Pedestrian crossing of roads is significantly improved	• Not a typical rural intersection control, likely to be “unexpected” for most road users • Run-through risks for side-roads, resulting impacts at high speeds • Out of context for environment, and difficult to effectively sign for, so will be unexpected for SH users • Possible lack of compliance during quiet periods • Reduces traffic flow efficiency of SH traffic flows • Predicted injury-crash frequency much higher than all other options • High cost option with ongoing maintenance liability

Option	Advantages	Disadvantages
Option 3 Elongated Roundabout	• As Option 3 • Traffic on at least two approaches (depending on design) slowed by curves in road re-alignment	• As Option 3 • Non-standard layout may cause confusion • Depending on length of elongation, speed through the roundabout may become an issue • Relies on correct driver behaviour/signal usage to prevent difficulty in judging intentions (especially for those on southern approach) • Likely to require more land
Option 4 Traditional Roundabout	• Familiar layout for users • Traffic forced to give-way from all directions • Increases traffic flow efficiency of intersection as a whole • Run-through less likely as roundabout blocks line of sight • Impact speeds much lower • Predicted injury-crash frequency lower than all other options • Six conflicting movements removed (Ahead for each side-road, Right for all approaches) as every movement is effectively a left-turn • Splitter islands on lead ins can be used as pedestrian refuges	• Run-through still a potential risk, but reduced • In order to allow truck movements common on SH39, roundabout will need to have wide circulating lanes and/or be a reasonably large diameter • No obligation to come to a complete stop • Reduces through traffic efficiency, side road peak traffic demand could take precedence over SH through traffic in certain circumstances • Higher risk for on-road cyclists due to having to merge with the live traffic stream on approach • Land required to large footprint
Option 5 Offset Roundabout	• Effectively the same as Option 3 • Offset roundabout will improve deflection and visibility of intersection • Possible advantages in land acquisition	• As Option 3

These considerations are predominantly related to efficiency and safety and are to offer a high level differentiation between options.

1.6 High-level 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 concept area, specifically targeting the SH39 intersection and the upgrade of Reid Road. The high-level cost estimate will need to be refined at concept and detailed design stage, and will need to also consider aspects around services and/or service relocation.

Table 1.16: High-level Cost Summary by Option

	Option 1	Option 2	Option 3	Option 4	Option 5
Option construction estimate	$0.50M	$1.50M	$3.50M	$3.00M	$4.30M
Reid Road upgrade construction costs	$1.30M	$1.85M	$1.85M	$1.85M	$1.55M
Preliminary and General estimate (30% of construction)	$0.55M	$1.00M	$1.60M	$1.45M	$1.75M
Design Fee estimate (15% of contract)	$0.35M	$0.65M	$1.05M	$0.95M	$1.15M
Land Purchase estimate	$0.35M	$0.00M	$0.20M	$0.15m	$0.65M
Subtotal:	$3.05M	$5.00M	$8.20M	$7.40M	$9.40M
Contingency (50% of subtotal)	$1.5M	$2.5M	$4.1M	$3.70M	$4.7M
Budget Provision	$4.55M	$7.5M	$12.3M	$11.10M	$14.1M

This high-level cost estimate is on the following basis:

- The typical cross section used for Reid Road 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.
- Reid Road is upgraded for the full length of the development frontage (approx. 1.1 km), except where a realignment is happening (assumed re-alignment will be built to the same standard and included in intersection upgrade costs).
- A nominal earthworks quantity was assumed based on the road upgrade following the existing vertical alignment with no undercutting for poor ground conditions considered.
- No landscaping, beautification or other enhancement has been assumed (i.e.: grassed berms only).
- No minor roads are included for upgrade or construction.
- Preliminary and General is assumed at 30%.
- Professional fees associated with the design, consenting and construction observation have been included at 15% of the overall physical works costs, based on previous similar projects on the State Highway network.

Land costs are based on concept design land take areas only, supplied by Boffa Miskell, and derived using the valuations given on Waipa District Council’s online rates database for 2016 (3 years old), as shown in Table 1.17. **We strongly suggest that a qualified land valuer is engaged to assess the market value of the land parcels to provide an appropriate budget provision.**

Table 1.17: Land Cost Workings

Property	Land Area (m2)	Land value (last RV)	Date of last RV
29 Reid Road (south-west corner)	5,978	$275,000	1/08/2016
1189 Kakaramea Road (school - north-west corner)	2,000	$180,000	1/08/2016
1182 Kakaramea Road (north-east, tiny corner property)	1,162	$138,000	1/08/2016
1146 Kakaramea Road (south-east corner)	676,860	$3,070,000	1/08/2016

2 Conclusion

The traffic generated through the proposal can be accommodated within the existing road network in the short term with only minimal impact on the operation of SH39, Reid Road and Ngahinapouri Road. (I.e. increase in delays by approximately 5 seconds and increasing the risk of injury crashes from approximately one every 4 years to approximately one every 3 years).

In a worst-case scenario the expected traffic generation can also be accommodated by the road network with some improvements to the SH39 intersection (over a minute in additional delay in 2035, and a doubling of injury crash risk from approximately one every 3 years to 2 every 3 years).

Within 15 years or so we anticipate that SH39 intersection will require improvement to accommodate the predicted underlying (normal) traffic growth, this is further impacted by the additional traffic anticipated from development of the structure plan areas. Based on this high-level assessment, we consider that a roundabout is likely to provide the most appropriate solution both in the immediate future and in the long term.

Reid Road will require widening to accommodate the increase in local traffic, with associated traffic calming and improvements to walking and cycling facilities.

3 Recommendations

Based on our analysis, we recommend the following actions for further consideration:

1. Reid Road widening to 7.0 m and include cycle and pedestrian facilities to enable connectivity with existing and future village amenities.
2. The footpath should also be extended along SH39 to connect the village and the existing path on the western side.
3. Consideration should be given to relocation of the school bus-stop on the eastern side of SH39 to a position off the State Highway, to eliminate the risk to students crossing the high-speed road. In lieu of moving the bus stop, a better facility for crossing the State Highway should be provided, and appropriately lit.
4. Inter-connectivity between the main roads (SH39 and Reid Road) and the residential roads should be avoided when the proposed commercial area is developed.
5. More detailed modelling and assessment, including survey of traffic volumes and turning count data, should be conducted to inform and verify the design options.

4 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 Ngahinapouri Village Concept 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.

Tonkin & Taylor Ltd

Report prepared by:	Authorised for Tonkin & Taylor Ltd by:
Timothy Broadhead	Glen Nicholson
Transportation Engineer	Project Director

Reviewed by:

Alan Gregory

Principal Transport Planner

TIBR
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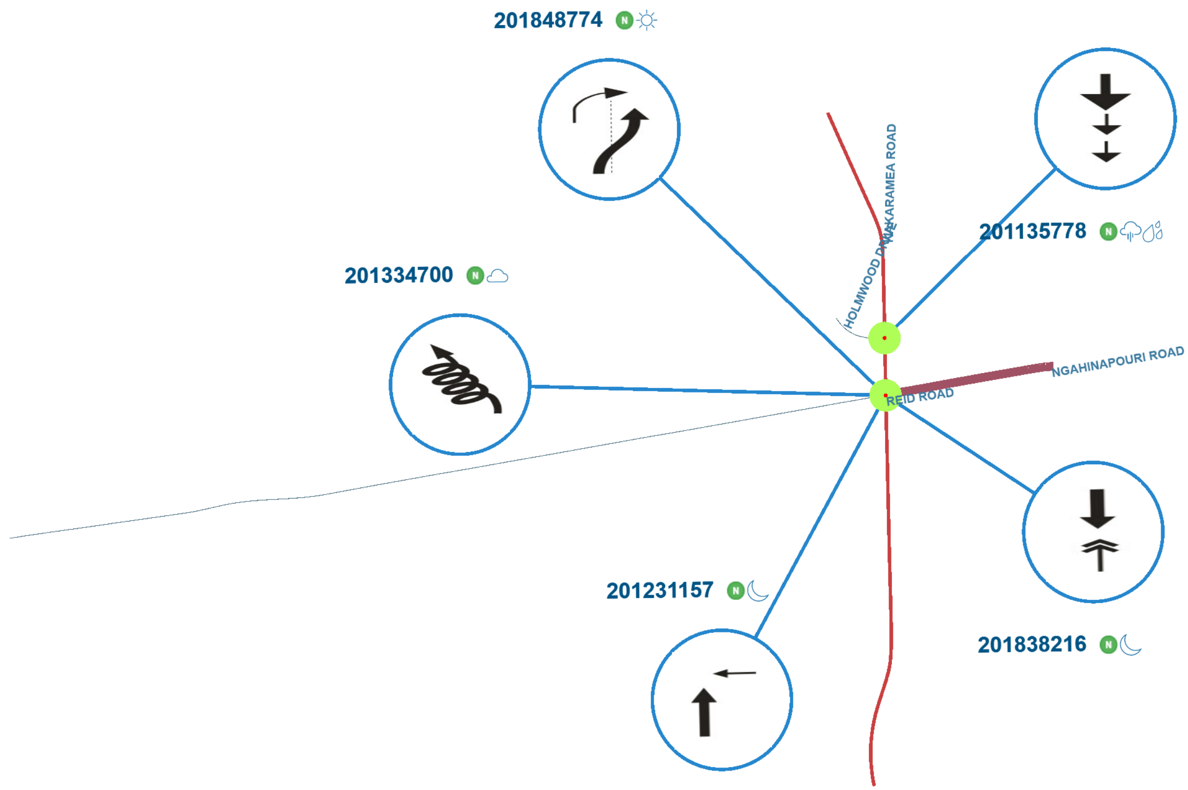
Appendix A: CAS Outputs


201848774
201135778
201334700
201231157
201838216
KAKARAMEA ROAD
HOLMWOOD DRIVE
NGAHINAPOURI ROAD
REID ROAD

Untitled query

Saved sites

Reid-SH3

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
SH 39		I	NGAHINAPOURI ROAD	201848774	21/09/2018	Fri	08:05	Car/Wagon1 NDB on Kakaramea Road overtaking hit Car/Wagon2 NDB on Kakaramea Road turning right	CAR/WAGON2, alcohol test below limit	Dry	Bright sun	Fine	Crossroads	Stop	0	0	0
SH 39		I	NGAHINAPOURI ROAD	201231157	02/05/2012	Wed	19:37	Car/Wagon1 NDB on SH 39 hit Car/Wagon2 crossing at right angle from right	CAR/WAGON1, alcohol suspected CAR/WAGON2, did not check/notice another party from other dirn, failed to give way at priority traffic control	Dry	Dark	Fine	Crossroads	Stop	0	0	0
SH 39		I	NGAHINAPOURI ROAD	201838216	15/02/2018	Thu	03:09	Car/Wagon1 SDB on Kakaramea road hit Car/Wagon2 reversing along road	CAR/WAGON2, alcohol test below limit, evading enforcement, intentional collision	Dry	Dark	Fine	T Junction	Stop	0	0	0
SH 39	100m	N	NGAHINAPOURI ROAD	201135778	24/06/2011	Fri	16:15	Car/Wagon1 SDB on SH 39 hit rear end of Car/Wagon2 stop/slow for queue	CAR/WAGON1, following too closely, ENV: slippery road due to rain	Wet	Twilight	Light rain	Nil (Default)	Unknown	0	0	0
SH 39	150m	S	REID ROAD	201334700	05/06/2013	Wed	16:34	Car/Wagon1 NDB on SH 39 lost control; went off road to left, Car/Wagon1 hit ditches	CAR/WAGON1, other lost control, overseas/migrant driver fail to adjust to nz roads, suddenly braked	Dry	Overcast	Fine	Nil (Default)	Unknown	0	0	0

1-5 of 5

Appendix B: Intersection Modelling Outputs

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)	64.0 km/h	64.0 km/h
Travel Distance (Total)	915.7 veh-km/h	1098.9 pers-km/h
Travel Time (Total)	14.3 veh-h/h	17.2 pers-h/h
Demand Flows (Total)	905 veh/h	1086 pers/h
Percent Heavy Vehicles (Demand)	7.6 %	
Degree of Saturation	0.255	
Practical Spare Capacity	233.8 %	
Effective Intersection Capacity	3549 veh/h	
Control Delay (Total)	0.94 veh-h/h	1.13 pers-h/h
Control Delay (Average)	3.7 sec	3.7 sec
Control Delay (Worst Lane)	21.2 sec	
Control Delay (Worst Movement)	24.3 sec	24.3 sec
Geometric Delay (Average)	2.5 sec	
Stop-Line Delay (Average)	1.3 sec	
Idling Time (Average)	0.9 sec	
Intersection Level of Service (LOS)	NA	
95% Back of Queue - Vehicles (Worst Lane)	0.9 veh	
95% Back of Queue - Distance (Worst Lane)	6.3 m	
Queue Storage Ratio (Worst Lane)	0.01	
Total Effective Stops	237 veh/h	284 pers/h
Effective Stop Rate	0.26	0.26
Proportion Queued	0.12	0.12
Performance Index	16.8	16.8
Cost (Total)	385.76 $/h	385.76 $/h
Fuel Consumption (Total)	80.2 L/h	
Carbon Dioxide (Total)	192.1 kg/h	
Hydrocarbons (Total)	0.017 kg/h	
Carbon Monoxide (Total)	0.275 kg/h	
NOx (Total)	0.366 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): 1.6 %

Number of Iterations: 5 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 2.8% 1.4% 0.7%

Intersection Performance - Annual Values		
Performance Measure	**Vehicles**	**Persons**
Demand Flows (Total)	434,526 veh/y	521,432 pers/y
Delay	450 veh-h/y	540 pers-h/y
Effective Stops	113,668 veh/y	136,401 pers/y
Travel Distance	439,541 veh-km/y	527,449 pers-km/y
Travel Time	6,863 veh-h/y	8,235 pers-h/y
Cost	185,167 $/y	185,167 $/y
Fuel Consumption	38,499 L/y	
Carbon Dioxide	92,230 kg/y	
Hydrocarbons	8 kg/y	
Carbon Monoxide	132 kg/y	
NOx	176 kg/y	

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Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\Ngahinapouri\N_Reid SH39 Int.sip8

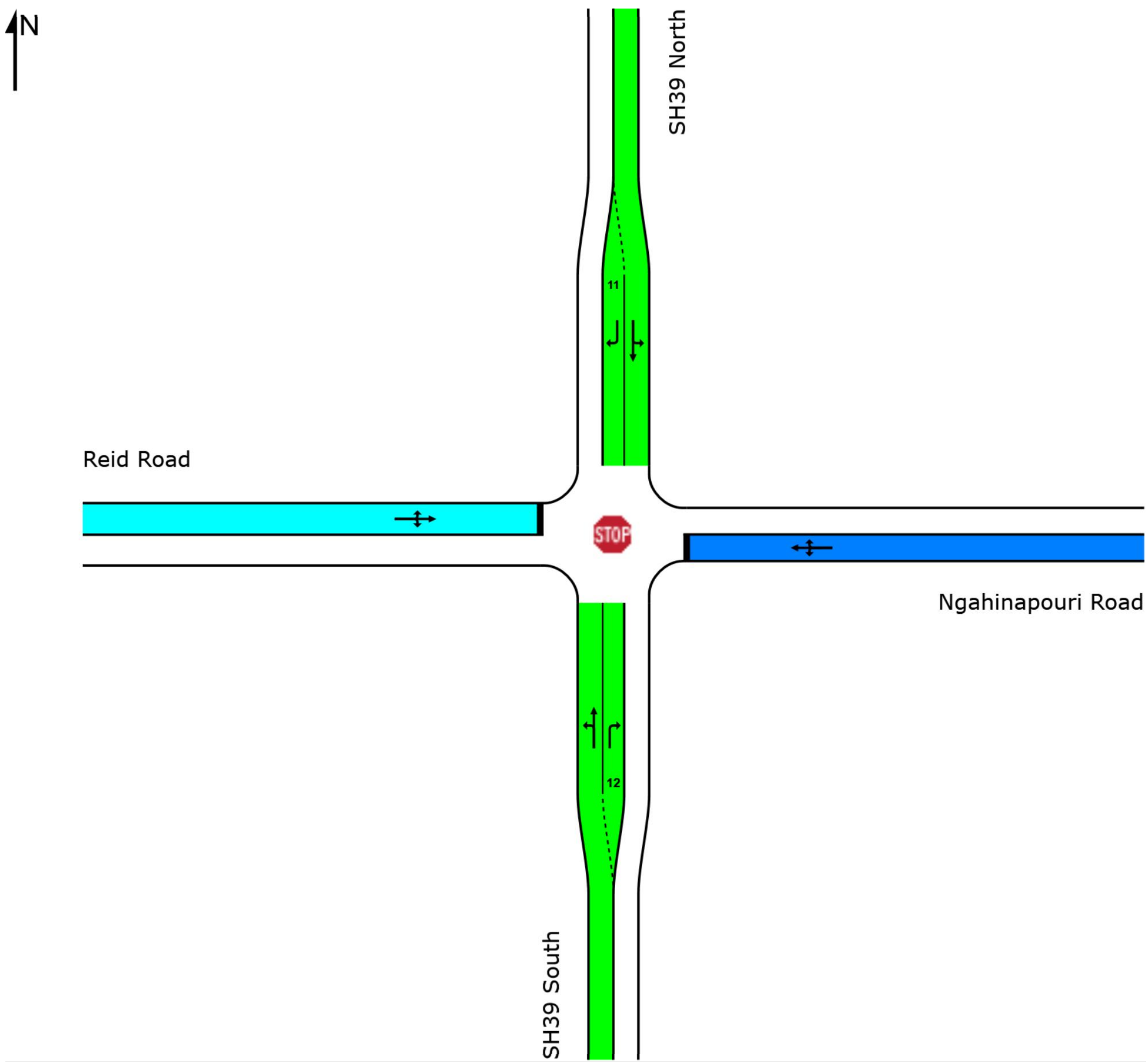
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2018_Existing_AM]

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

	Approaches				Intersection
	South	East	North	West	
LOS	NA	C	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.

Organisation: TONKIN & TAYLOR | Processed: Wednesday, 12 June 2019 10:42:28 AM
Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\Ngahinapouri\N_Reid SH39 Int.sip8

DELAY (CONTROL)

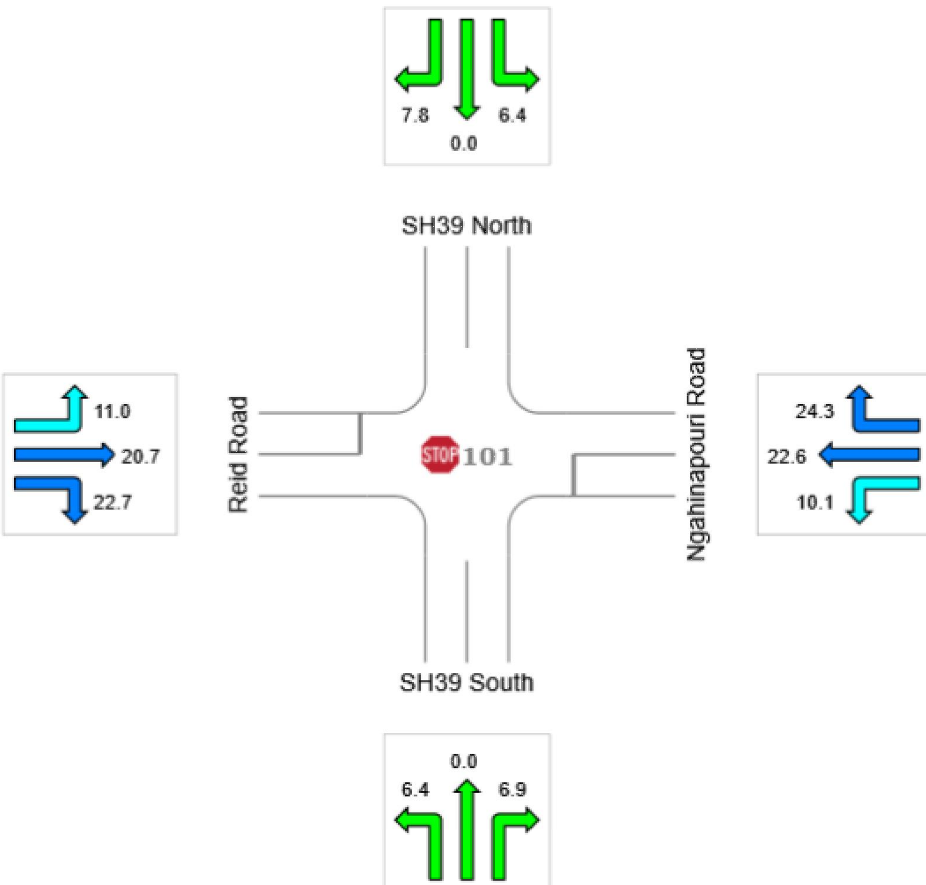
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 101 [2018_Existing_AM]

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

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	2.0	21.2	2.1	14.3	3.7
LOS	NA	C	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.

Organisation: TONKIN & TAYLOR | Processed: Wednesday, 12 June 2019 10:42:28 AM
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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)	65.2	km/h	65.2	km/h
Travel Distance (Total)	865.8	veh-km/h	1039.0	pers-km/h
Travel Time (Total)	13.3	veh-h/h	15.9	pers-h/h
Demand Flows (Total)	856	veh/h	1027	pers/h
Percent Heavy Vehicles (Demand)	8.0	%		
Degree of Saturation	0.291			
Practical Spare Capacity	236.5	%		
Effective Intersection Capacity	2939	veh/h		
Control Delay (Total)	0.67	veh-h/h	0.80	pers-h/h
Control Delay (Average)	2.8	sec	2.8	sec
Control Delay (Worst Lane)	20.0	sec		
Control Delay (Worst Movement)	22.8	sec	22.8	sec
Geometric Delay (Average)	2.2	sec		
Stop-Line Delay (Average)	0.7	sec		
Idling Time (Average)	0.4	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	0.4	veh		
95% Back of Queue - Distance (Worst Lane)	2.5	m		
Queue Storage Ratio (Worst Lane)	0.00			
Total Effective Stops	193	veh/h	231	pers/h
Effective Stop Rate	0.23		0.23	
Proportion Queued	0.08		0.08	
Performance Index	14.8		14.8	
Cost (Total)	353.20	$/h	353.20	$/h
Fuel Consumption (Total)	75.3	L/h		
Carbon Dioxide (Total)	180.7	kg/h		
Hydrocarbons (Total)	0.016	kg/h		
Carbon Monoxide (Total)	0.257	kg/h		
NOx (Total)	0.362	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): 3.6 %

Number of Iterations: 6 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 3.7% 1.8% 0.9%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	410,779	veh/y	492,935	pers/y
Delay	320	veh-h/y	385	pers-h/y
Effective Stops	92,483	veh/y	110,979	pers/y
Travel Distance	415,604	veh-km/y	498,725	pers-km/y
Travel Time	6,377	veh-h/y	7,653	pers-h/y
Cost	169,538	$/y	169,538	$/y
Fuel Consumption	36,159	L/y		
Carbon Dioxide	86,739	kg/y		
Hydrocarbons	7	kg/y		
Carbon Monoxide	123	kg/y		
NOx	174	kg/y		

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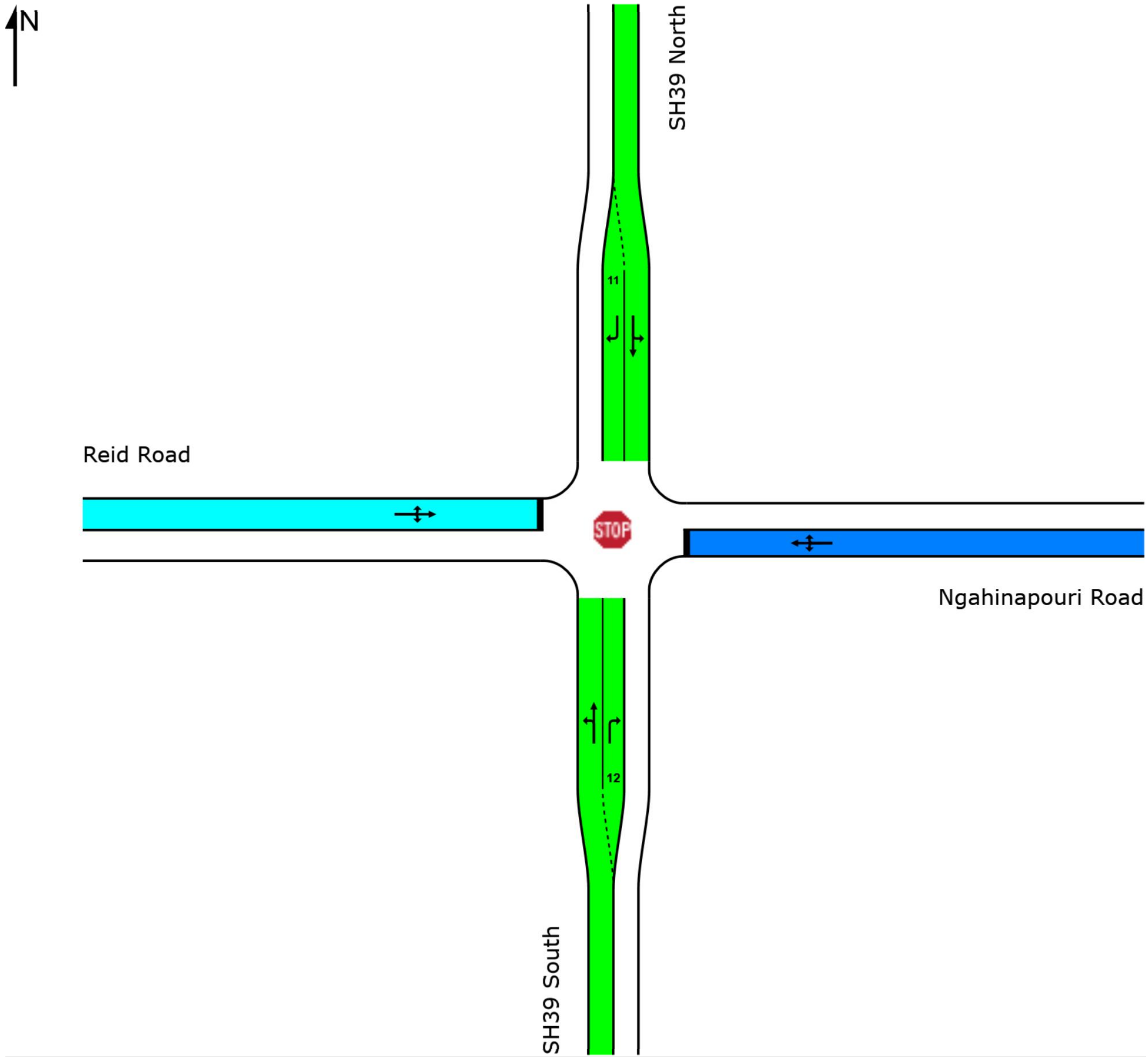
LANE LEVEL OF SERVICE

Lane Level of Service

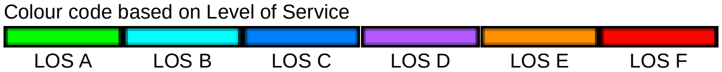
Site: 101 [2018_Existing_PM]

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

	Approaches				Intersection
	South	East	North	West	
LOS	NA	C	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.

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Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\Ngahinapouri\N_Reid SH39 Int.sip8

DELAY (CONTROL)

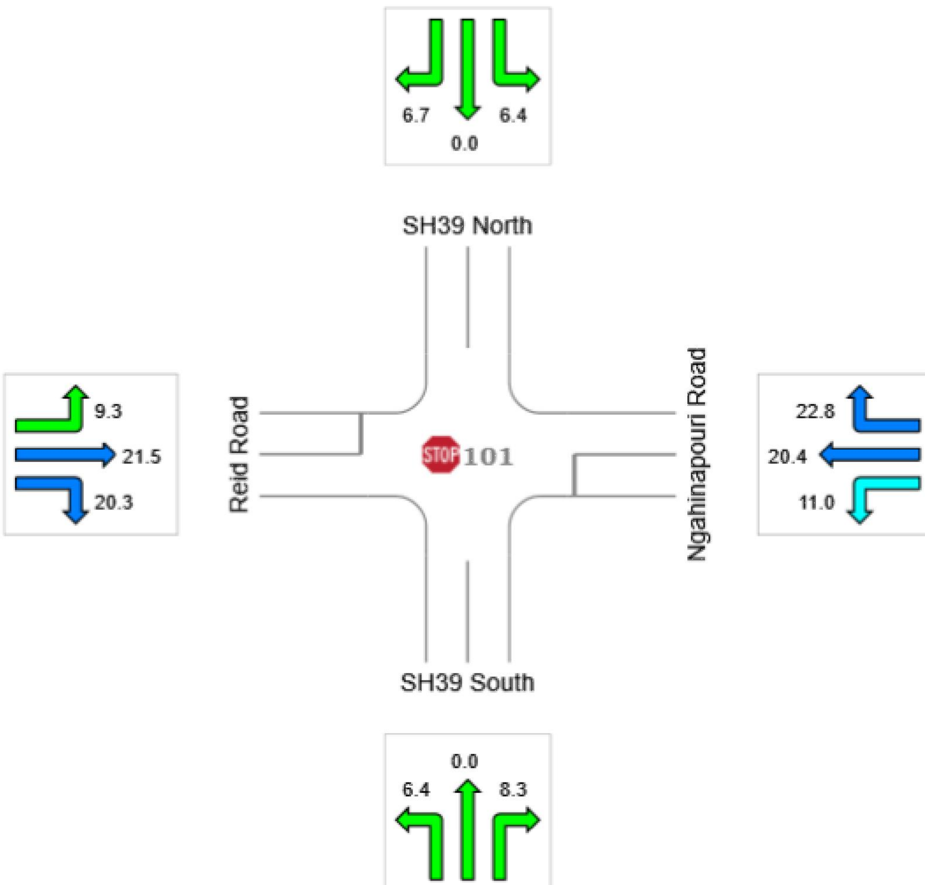
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 101 [2018_Existing_PM]

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

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	2.3	20.0	2.0	14.5	2.8
LOS	NA	C	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.

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Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\Ngahinapouri\N_Reid SH39 Int.sip8

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)	62.0 km/h	62.0 km/h
Travel Distance (Total)	1043.9 veh-km/h	1252.7 pers-km/h
Travel Time (Total)	16.8 veh-h/h	20.2 pers-h/h
Demand Flows (Total)	1032 veh/h	1238 pers/h
Percent Heavy Vehicles (Demand)	6.7 %	
Degree of Saturation	0.328	
Practical Spare Capacity	143.5 %	
Effective Intersection Capacity	3140 veh/h	
Control Delay (Total)	1.61 veh-h/h	1.93 pers-h/h
Control Delay (Average)	5.6 sec	5.6 sec
Control Delay (Worst Lane)	25.5 sec	
Control Delay (Worst Movement)	30.0 sec	30.0 sec
Geometric Delay (Average)	3.2 sec	
Stop-Line Delay (Average)	2.4 sec	
Idling Time (Average)	1.8 sec	
Intersection Level of Service (LOS)	NA	
95% Back of Queue - Vehicles (Worst Lane)	1.4 veh	
95% Back of Queue - Distance (Worst Lane)	10.1 m	
Queue Storage Ratio (Worst Lane)	0.01	
Total Effective Stops	370 veh/h	444 pers/h
Effective Stop Rate	0.36	0.36
Proportion Queued	0.19	0.19
Performance Index	21.8	21.8
Cost (Total)	466.98 $/h	466.98 $/h
Fuel Consumption (Total)	92.5 L/h	
Carbon Dioxide (Total)	221.0 kg/h	
Hydrocarbons (Total)	0.020 kg/h	
Carbon Monoxide (Total)	0.319 kg/h	
NOx (Total)	0.377 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): 1.6 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 2.8% 1.4% 0.7%

Intersection Performance - Annual Values		
Performance Measure	**Vehicles**	**Persons**
Demand Flows (Total)	495,158 veh/y	594,190 pers/y
Delay	771 veh-h/y	925 pers-h/y
Effective Stops	177,729 veh/y	213,275 pers/y
Travel Distance	501,065 veh-km/y	601,278 pers-km/y
Travel Time	8,085 veh-h/y	9,702 pers-h/y
Cost	224,151 $/y	224,151 $/y
Fuel Consumption	44,401 L/y	
Carbon Dioxide	106,100 kg/y	
Hydrocarbons	9 kg/y	
Carbon Monoxide	153 kg/y	
NOx	181 kg/y	

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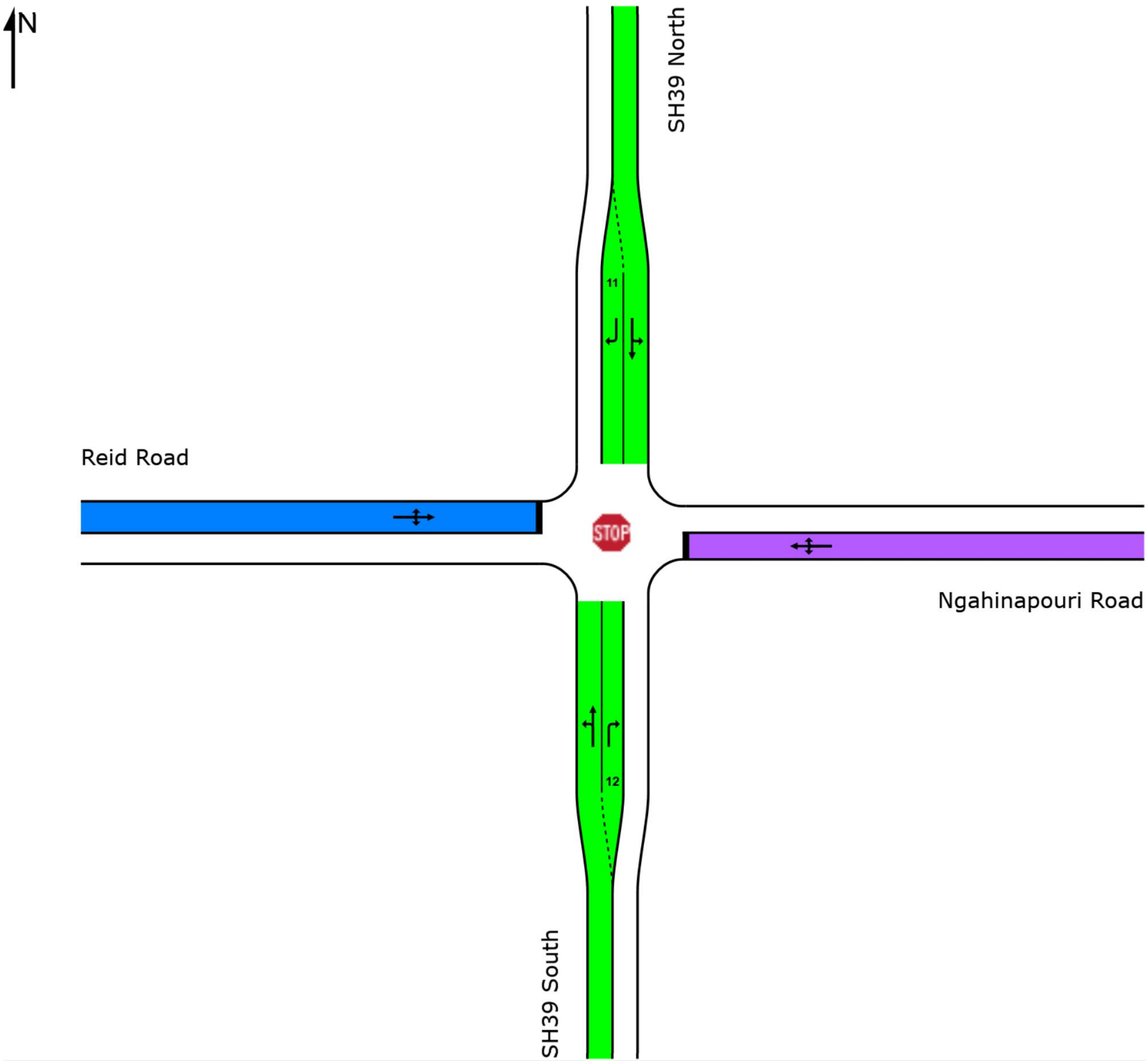
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2018_Low Dev_AM]

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

	Approaches				Intersection
	South	East	North	West	
LOS	NA	D	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.

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DELAY (CONTROL)

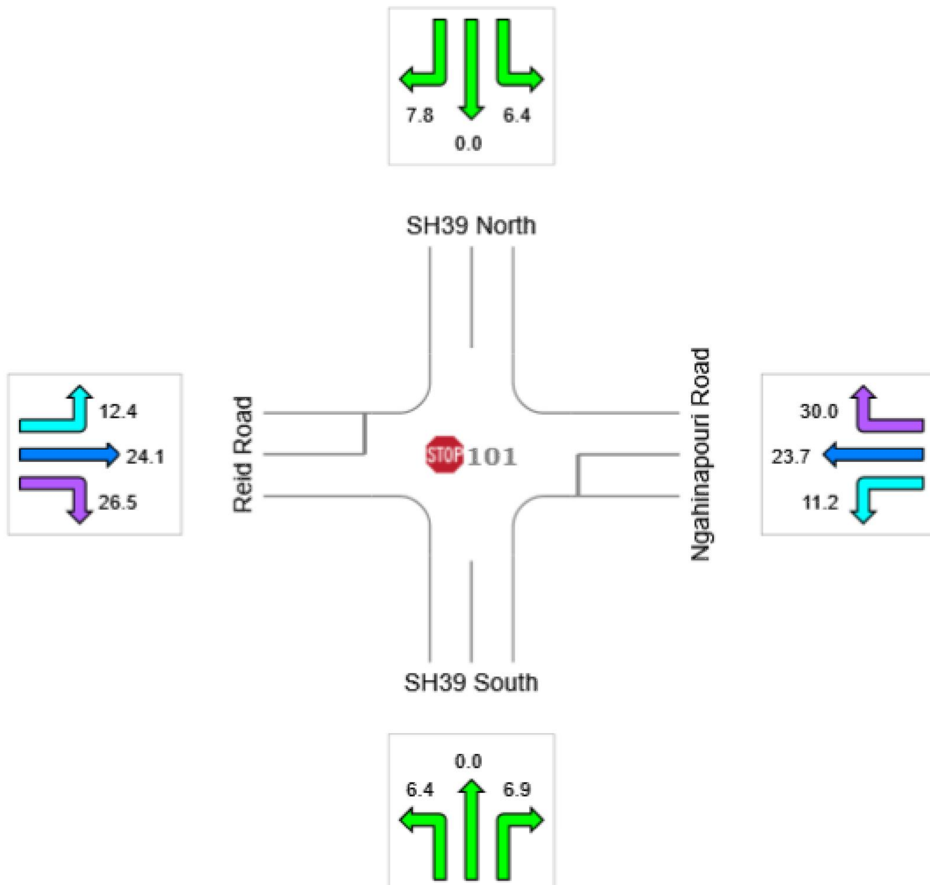
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 101 [2018_Low Dev_AM]

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

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	2.0	25.5	2.1	16.4	5.6
LOS	NA	D	NA	C	NA



Colour code based on Level of Service

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

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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_PM]

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

Intersection Performance - Hourly Values

Performance Measure	Vehicles	Persons
Travel Speed (Average)	64.5 km/h	64.5 km/h
Travel Distance (Total)	911.8 veh-km/h	1094.1 pers-km/h
Travel Time (Total)	14.1 veh-h/h	17.0 pers-h/h
Demand Flows (Total)	901 veh/h	1081 pers/h
Percent Heavy Vehicles (Demand)	7.6 %	
Degree of Saturation	0.291	
Practical Spare Capacity	236.5 %	
Effective Intersection Capacity	3094 veh/h	
Control Delay (Total)	0.84 veh-h/h	1.01 pers-h/h
Control Delay (Average)	3.3 sec	3.3 sec
Control Delay (Worst Lane)	21.0 sec	
Control Delay (Worst Movement)	24.3 sec	24.3 sec
Geometric Delay (Average)	2.5 sec	
Stop-Line Delay (Average)	0.9 sec	
Idling Time (Average)	0.6 sec	
Intersection Level of Service (LOS)	NA	
95% Back of Queue - Vehicles (Worst Lane)	0.4 veh	
95% Back of Queue - Distance (Worst Lane)	2.6 m	
Queue Storage Ratio (Worst Lane)	0.00	
Total Effective Stops	233 veh/h	280 pers/h
Effective Stop Rate	0.26	0.26
Proportion Queued	0.10	0.10
Performance Index	16.2	16.2
Cost (Total)	379.99 $/h	379.99 $/h
Fuel Consumption (Total)	79.6 L/h	
Carbon Dioxide (Total)	190.8 kg/h	
Hydrocarbons (Total)	0.017 kg/h	
Carbon Monoxide (Total)	0.273 kg/h	
NOx (Total)	0.366 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): 3.6 %

Number of Iterations: 6 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 3.7% 1.8% 0.9%

Intersection Performance - Annual Values

Performance Measure	Vehicles	Persons
Demand Flows (Total)	432,505 veh/y	519,006 pers/y
Delay	402 veh-h/y	483 pers-h/y
Effective Stops	111,875 veh/y	134,251 pers/y
Travel Distance	437,652 veh-km/y	525,182 pers-km/y
Travel Time	6,785 veh-h/y	8,142 pers-h/y
Cost	182,394 $/y	182,394 $/y
Fuel Consumption	38,227 L/y	
Carbon Dioxide	91,599 kg/y	
Hydrocarbons	8 kg/y	
Carbon Monoxide	131 kg/y	
NOx	176 kg/y	

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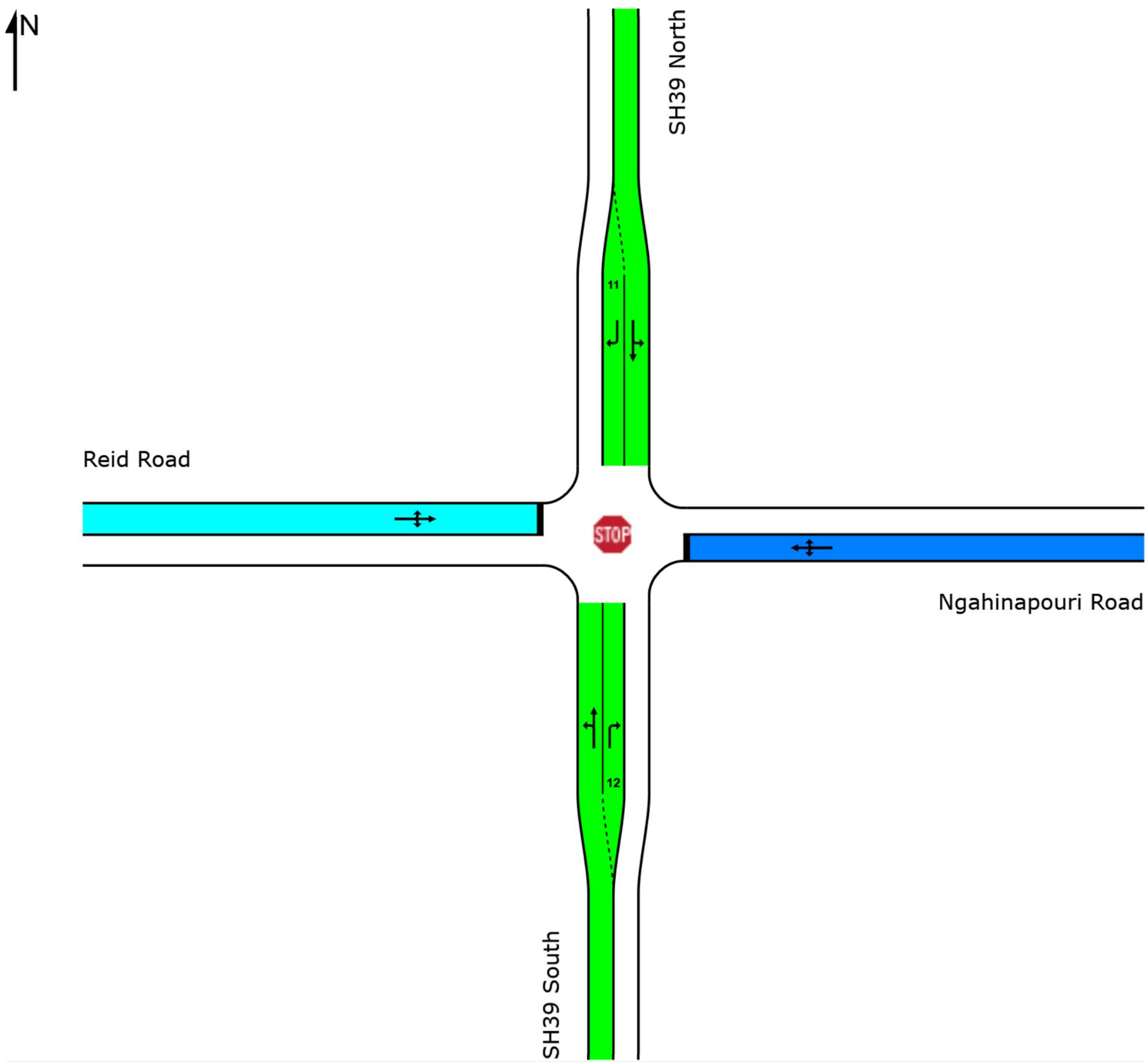
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2018_Low Dev_PM]

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

	Approaches				Intersection
	South	East	North	West	
LOS	NA	C	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.

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DELAY (CONTROL)

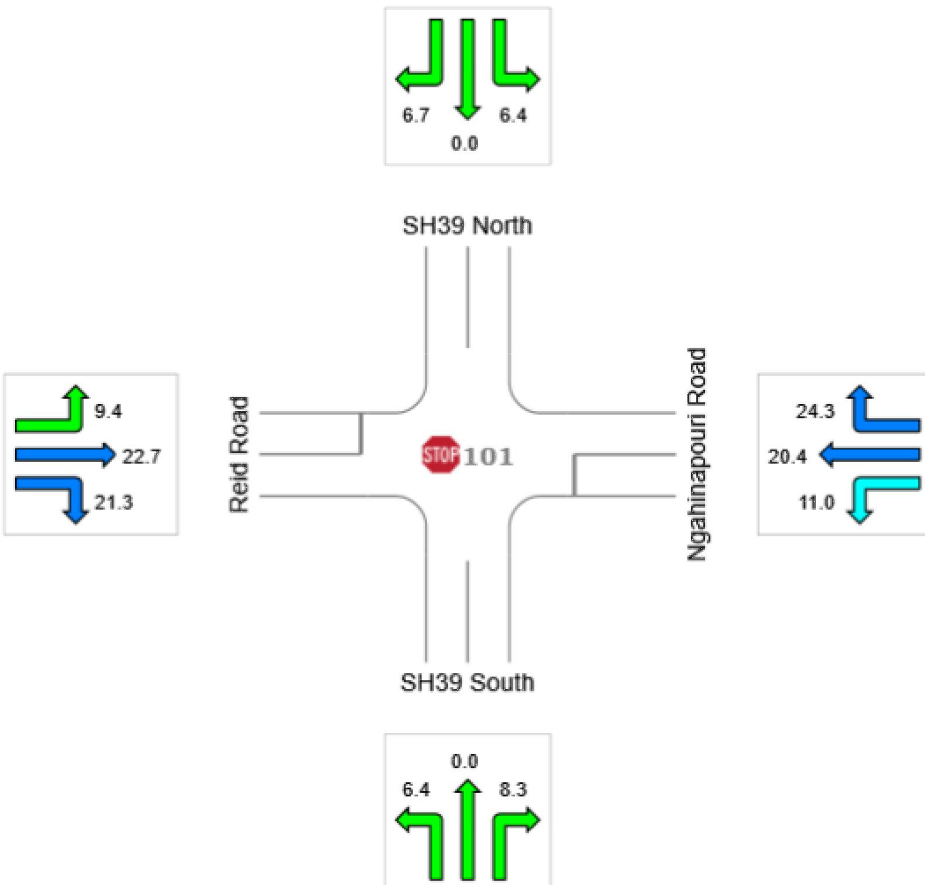
Average control delay per vehicle, or average pedestrian delay (seconds)

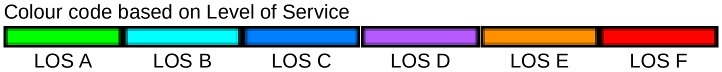
Site: 101 [2018_Low Dev_PM]

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

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	2.3	21.0	2.0	13.2	3.3
LOS	NA	C	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.

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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)	1167.8	veh-km/h	1401.3	pers-km/h
Travel Time (Total)	19.6	veh-h/h	23.6	pers-h/h
Demand Flows (Total)	1154	veh/h	1384	pers/h
Percent Heavy Vehicles (Demand)	6.0	%		
Degree of Saturation	0.599			
Practical Spare Capacity	33.5	%		
Effective Intersection Capacity	1925	veh/h		
Control Delay (Total)	2.59	veh-h/h	3.10	pers-h/h
Control Delay (Average)	8.1	sec	8.1	sec
Control Delay (Worst Lane)	30.0	sec		
Control Delay (Worst Movement)	35.9	sec	35.9	sec
Geometric Delay (Average)	3.7	sec		
Stop-Line Delay (Average)	4.3	sec		
Idling Time (Average)	2.9	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	4.0	veh		
95% Back of Queue - Distance (Worst Lane)	28.2	m		
Queue Storage Ratio (Worst Lane)	0.02			
Total Effective Stops	537	veh/h	645	pers/h
Effective Stop Rate	0.47		0.47	
Proportion Queued	0.25		0.25	
Performance Index	28.9		28.9	
Cost (Total)	557.44	$/h	557.44	$/h
Fuel Consumption (Total)	105.0	L/h		
Carbon Dioxide (Total)	250.3	kg/h		
Hydrocarbons (Total)	0.023	kg/h		
Carbon Monoxide (Total)	0.362	kg/h		
NOx (Total)	0.387	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): 1.6 %

Number of Iterations: 5 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 2.8% 1.4% 0.7%

Intersection Performance - Annual Values

Performance Measure	Vehicles		Persons	
Demand Flows (Total)	553,769	veh/y	664,522	pers/y
Delay	1,241	veh-h/y	1,489	pers-h/y
Effective Stops	257,835	veh/y	309,403	pers/y
Travel Distance	560,539	veh-km/y	672,647	pers-km/y
Travel Time	9,421	veh-h/y	11,305	pers-h/y
Cost	267,573	$/y	267,573	$/y
Fuel Consumption	50,376	L/y		
Carbon Dioxide	120,141	kg/y		
Hydrocarbons	11	kg/y		
Carbon Monoxide	174	kg/y		
NOx	186	kg/y		

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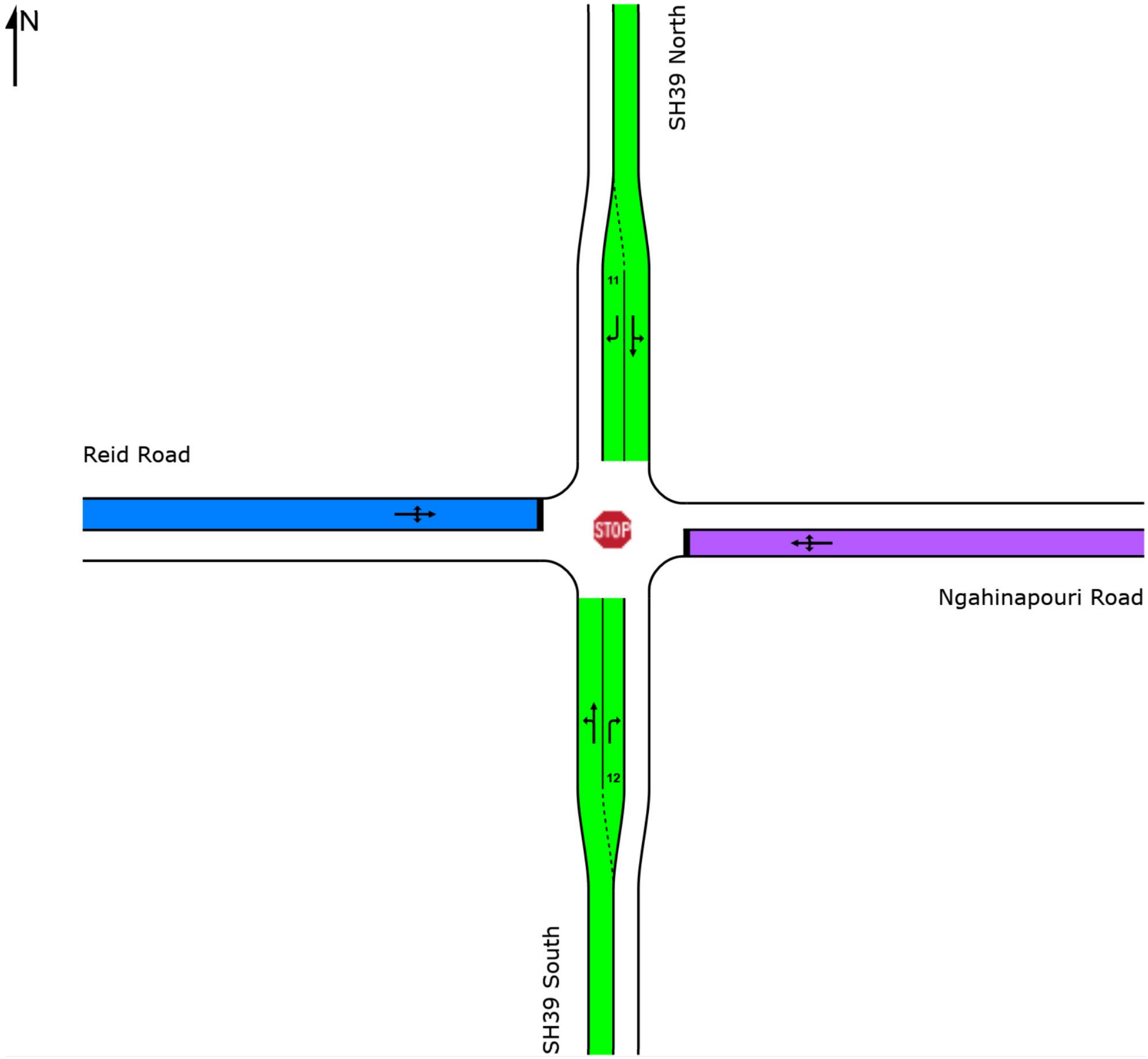
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2018_Hi Dev_AM]

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

	Approaches				Intersection
	South	East	North	West	
LOS	NA	D	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.

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DELAY (CONTROL)

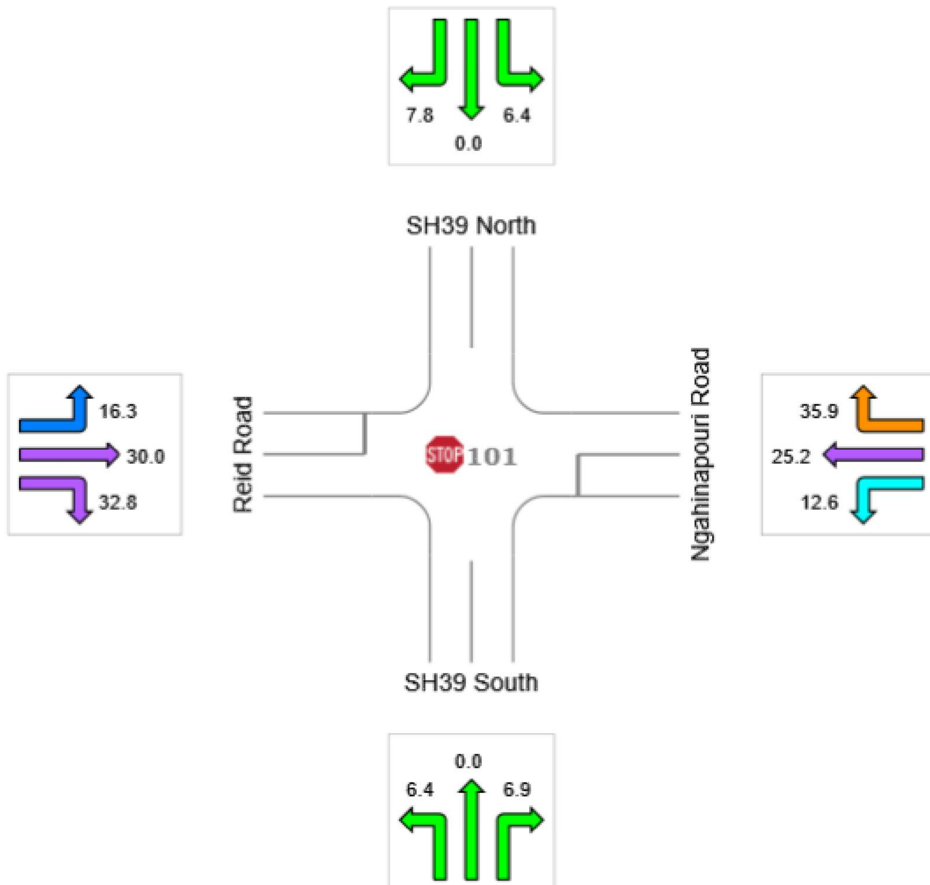
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 101 [2018_Hi Dev_AM]

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

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	2.0	30.0	2.1	21.0	8.1
LOS	NA	D	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.

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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)	63.9 km/h	63.9 km/h
Travel Distance (Total)	954.5 veh-km/h	1145.4 pers-km/h
Travel Time (Total)	14.9 veh-h/h	17.9 pers-h/h
Demand Flows (Total)	943 veh/h	1132 pers/h
Percent Heavy Vehicles (Demand)	7.3 %	
Degree of Saturation	0.291	
Practical Spare Capacity	236.5 %	
Effective Intersection Capacity	3239 veh/h	
Control Delay (Total)	1.01 veh-h/h	1.21 pers-h/h
Control Delay (Average)	3.8 sec	3.8 sec
Control Delay (Worst Lane)	21.9 sec	
Control Delay (Worst Movement)	25.5 sec	25.5 sec
Geometric Delay (Average)	2.7 sec	
Stop-Line Delay (Average)	1.1 sec	
Idling Time (Average)	0.8 sec	
Intersection Level of Service (LOS)	NA	
95% Back of Queue - Vehicles (Worst Lane)	0.7 veh	
95% Back of Queue - Distance (Worst Lane)	4.8 m	
Queue Storage Ratio (Worst Lane)	0.00	
Total Effective Stops	271 veh/h	325 pers/h
Effective Stop Rate	0.29	0.29
Proportion Queued	0.11	0.11
Performance Index	17.6	17.6
Cost (Total)	405.18 $/h	405.18 $/h
Fuel Consumption (Total)	83.7 L/h	
Carbon Dioxide (Total)	200.3 kg/h	
Hydrocarbons (Total)	0.017 kg/h	
Carbon Monoxide (Total)	0.287 kg/h	
NOx (Total)	0.369 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): 3.6 %

Number of Iterations: 6 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 3.7% 1.8% 0.9%

Intersection Performance - Annual Values		
Performance Measure	**Vehicles**	**Persons**
Demand Flows (Total)	452,716 veh/y	543,259 pers/y
Delay	483 veh-h/y	579 pers-h/y
Effective Stops	130,144 veh/y	156,173 pers/y
Travel Distance	458,160 veh-km/y	549,792 pers-km/y
Travel Time	7,168 veh-h/y	8,602 pers-h/y
Cost	194,487 $/y	194,487 $/y
Fuel Consumption	40,156 L/y	
Carbon Dioxide	96,132 kg/y	
Hydrocarbons	8 kg/y	
Carbon Monoxide	138 kg/y	
NOx	177 kg/y	

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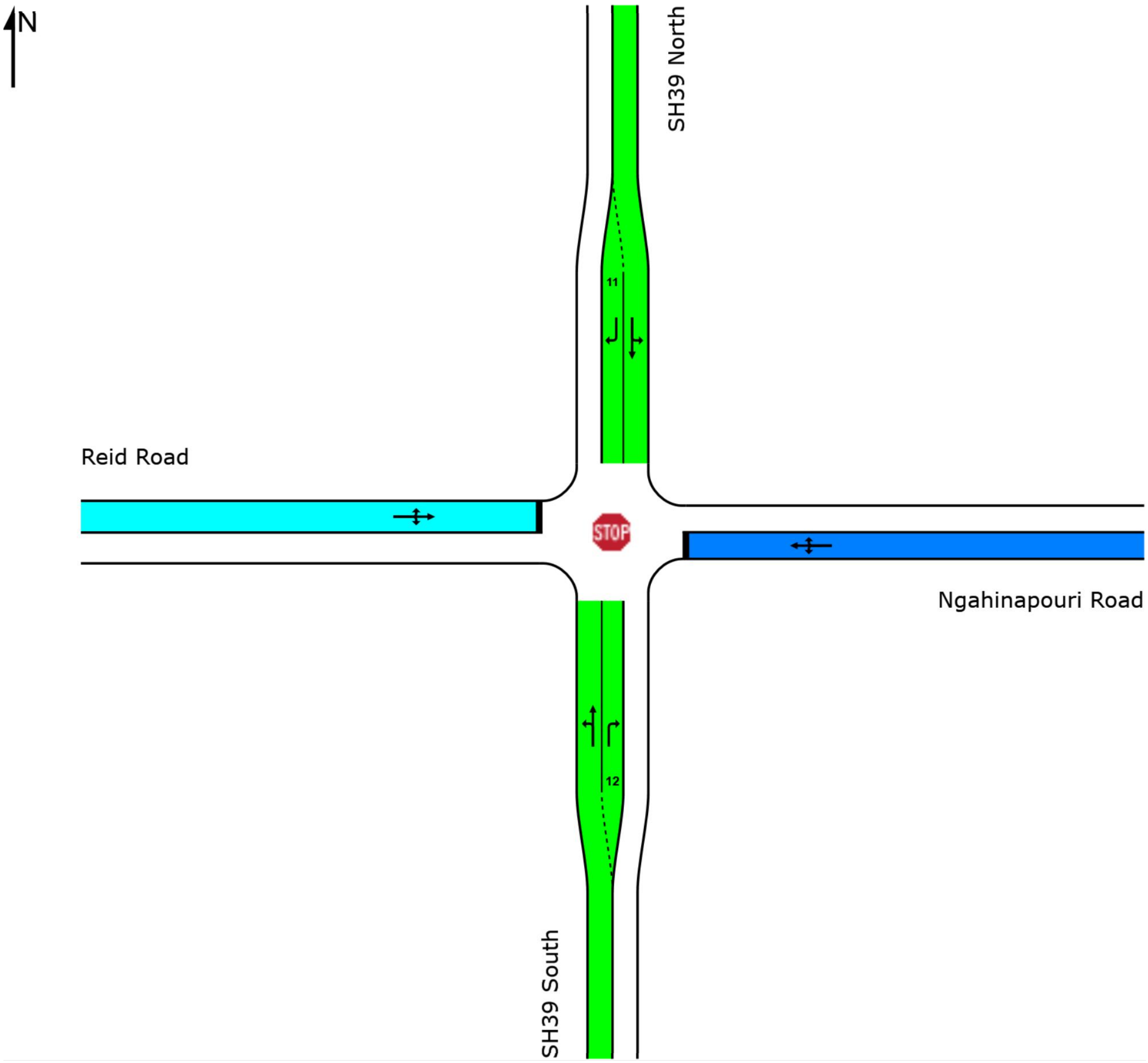
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2018_Hi Dev_PM]

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

	Approaches				Intersection
	South	East	North	West	
LOS	NA	C	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.

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DELAY (CONTROL)

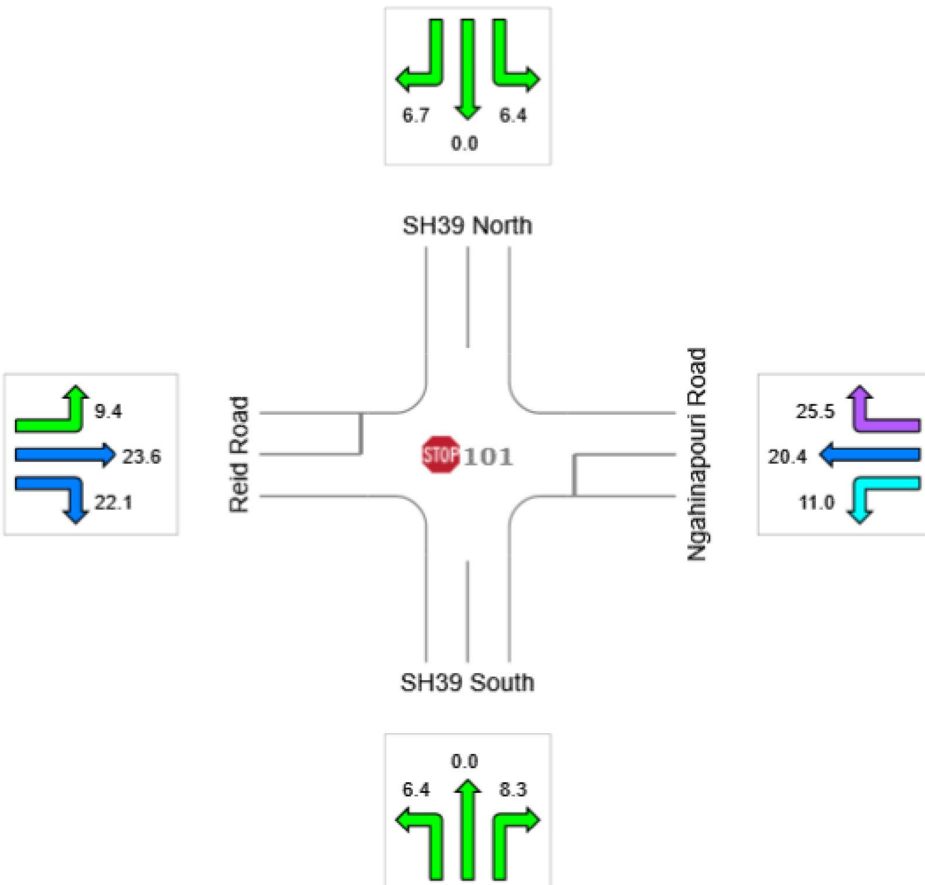
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 101 [2018_Hi Dev_PM]

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

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	2.3	21.9	2.0	13.4	3.8
LOS	NA	C	NA	B	NA



Colour code based on Level of Service

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

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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_No Dev_AM]

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

Intersection Performance - Hourly Values		
Performance Measure	**Vehicles**	**Persons**
Travel Speed (Average)	61.8 km/h	61.8 km/h
Travel Distance (Total)	1228.8 veh-km/h	1474.5 pers-km/h
Travel Time (Total)	19.9 veh-h/h	23.9 pers-h/h
Demand Flows (Total)	1215 veh/h	1458 pers/h
Percent Heavy Vehicles (Demand)	7.6 %	
Degree of Saturation	0.577	
Practical Spare Capacity	38.6 %	
Effective Intersection Capacity	2104 veh/h	
Control Delay (Total)	1.97 veh-h/h	2.36 pers-h/h
Control Delay (Average)	5.8 sec	5.8 sec
Control Delay (Worst Lane)	46.4 sec	
Control Delay (Worst Movement)	53.1 sec	53.1 sec
Geometric Delay (Average)	2.5 sec	
Stop-Line Delay (Average)	3.3 sec	
Idling Time (Average)	2.8 sec	
Intersection Level of Service (LOS)	NA	
95% Back of Queue - Vehicles (Worst Lane)	2.6 veh	
95% Back of Queue - Distance (Worst Lane)	18.0 m	
Queue Storage Ratio (Worst Lane)	0.01	
Total Effective Stops	340 veh/h	408 pers/h
Effective Stop Rate	0.28	0.28
Proportion Queued	0.15	0.15
Performance Index	25.2	25.2
Cost (Total)	542.10 $/h	542.10 $/h
Fuel Consumption (Total)	108.5 L/h	
Carbon Dioxide (Total)	260.0 kg/h	
Hydrocarbons (Total)	0.023 kg/h	
Carbon Monoxide (Total)	0.370 kg/h	
NOx (Total)	0.491 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): 2.4 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 4.2% 2.0% 1.0%

Intersection Performance - Annual Values		
Performance Measure	**Vehicles**	**Persons**
Demand Flows (Total)	583,074 veh/y	699,688 pers/y
Delay	945 veh-h/y	1,134 pers-h/y
Effective Stops	163,372 veh/y	196,047 pers/y
Travel Distance	589,807 veh-km/y	707,768 pers-km/y
Travel Time	9,543 veh-h/y	11,452 pers-h/y
Cost	260,206 $/y	260,206 $/y
Fuel Consumption	52,097 L/y	
Carbon Dioxide	124,778 kg/y	
Hydrocarbons	11 kg/y	
Carbon Monoxide	177 kg/y	
NOx	236 kg/y	

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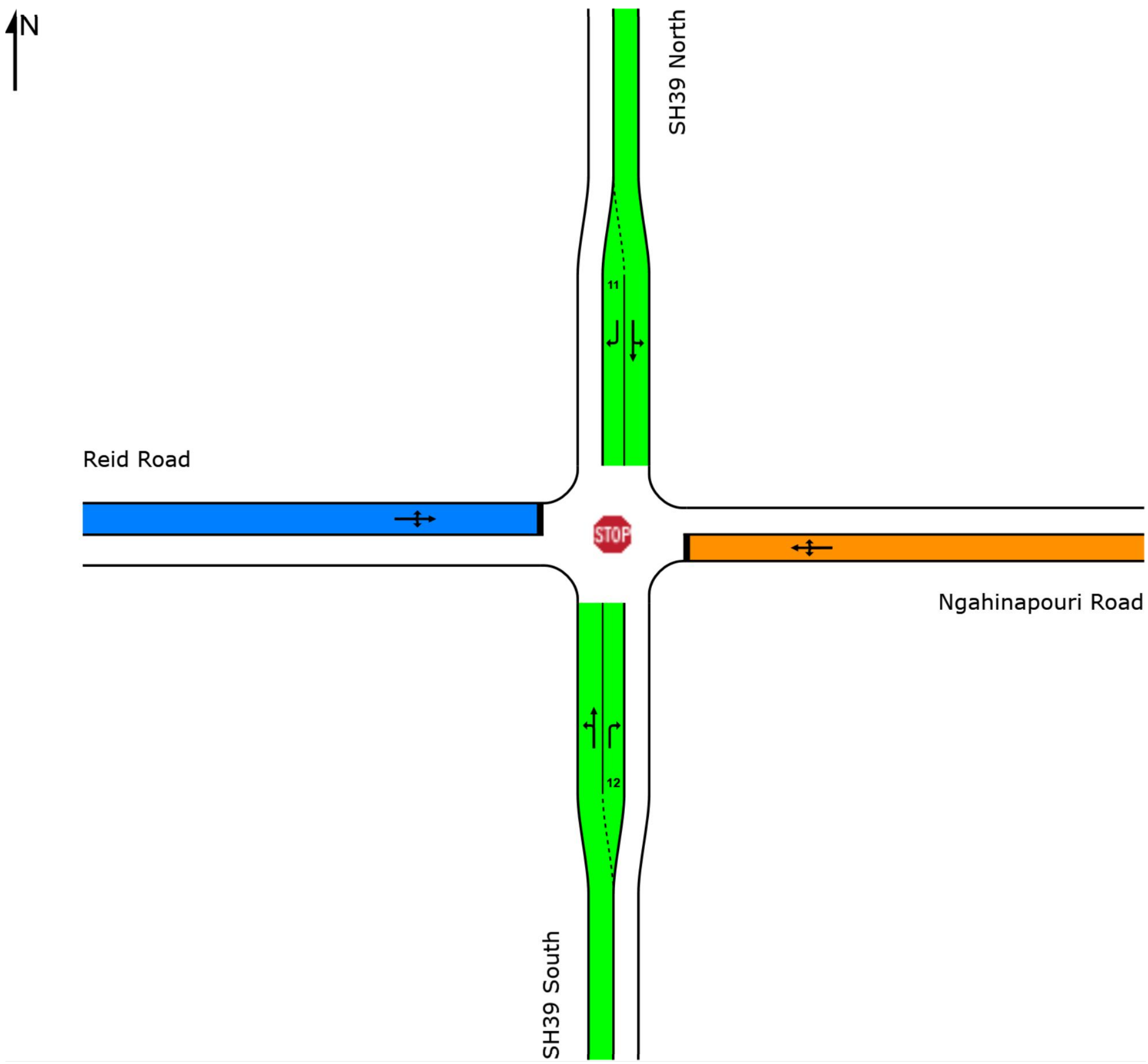
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2035_No Dev_AM]

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

	Approaches				Intersection
	South	East	North	West	
LOS	NA	E	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.

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DELAY (CONTROL)

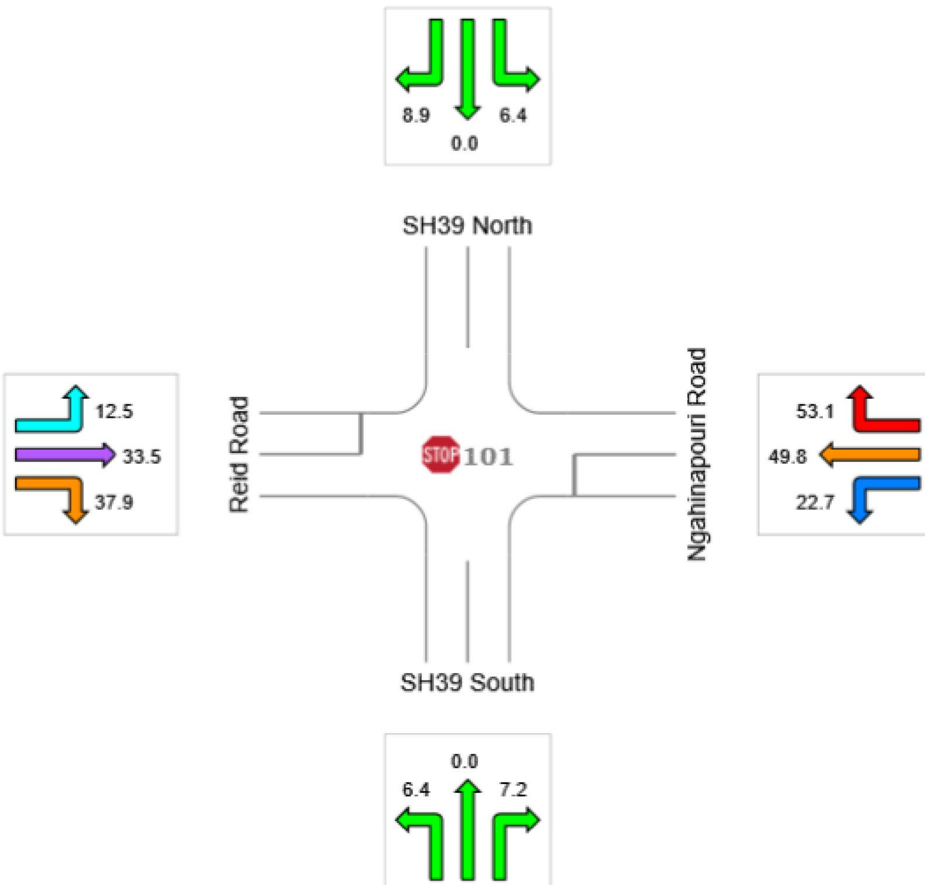
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 101 [2035_No Dev_AM]

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

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	2.1	46.4	2.2	20.2	5.8
LOS	NA	E	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.

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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)	64.4 km/h	64.4 km/h
Travel Distance (Total)	1159.8 veh-km/h	1391.7 pers-km/h
Travel Time (Total)	18.0 veh-h/h	21.6 pers-h/h
Demand Flows (Total)	1146 veh/h	1376 pers/h
Percent Heavy Vehicles (Demand)	8.0 %	
Degree of Saturation	0.390	
Practical Spare Capacity	151.3 %	
Effective Intersection Capacity	2940 veh/h	
Control Delay (Total)	1.10 veh-h/h	1.32 pers-h/h
Control Delay (Average)	3.4 sec	3.4 sec
Control Delay (Worst Lane)	34.6 sec	
Control Delay (Worst Movement)	40.9 sec	40.9 sec
Geometric Delay (Average)	2.2 sec	
Stop-Line Delay (Average)	1.3 sec	
Idling Time (Average)	1.0 sec	
Intersection Level of Service (LOS)	NA	
95% Back of Queue - Vehicles (Worst Lane)	0.9 veh	
95% Back of Queue - Distance (Worst Lane)	6.0 m	
Queue Storage Ratio (Worst Lane)	0.00	
Total Effective Stops	269 veh/h	323 pers/h
Effective Stop Rate	0.23	0.23
Proportion Queued	0.09	0.09
Performance Index	20.6	20.6
Cost (Total)	480.13 $/h	480.13 $/h
Fuel Consumption (Total)	101.2 L/h	
Carbon Dioxide (Total)	242.6 kg/h	
Hydrocarbons (Total)	0.021 kg/h	
Carbon Monoxide (Total)	0.345 kg/h	
NOx (Total)	0.485 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): 4.6 %

Number of Iterations: 7 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 2.7% 1.3% 0.6%

Intersection Performance - Annual Values

Performance Measure	Vehicles	Persons
Demand Flows (Total)	550,232 veh/y	660,278 pers/y
Delay	527 veh-h/y	633 pers-h/y
Effective Stops	129,134 veh/y	154,961 pers/y
Travel Distance	556,697 veh-km/y	668,036 pers-km/y
Travel Time	8,640 veh-h/y	10,368 pers-h/y
Cost	230,461 $/y	230,461 $/y
Fuel Consumption	48,553 L/y	
Carbon Dioxide	116,462 kg/y	
Hydrocarbons	10 kg/y	
Carbon Monoxide	165 kg/y	
NOx	233 kg/y	

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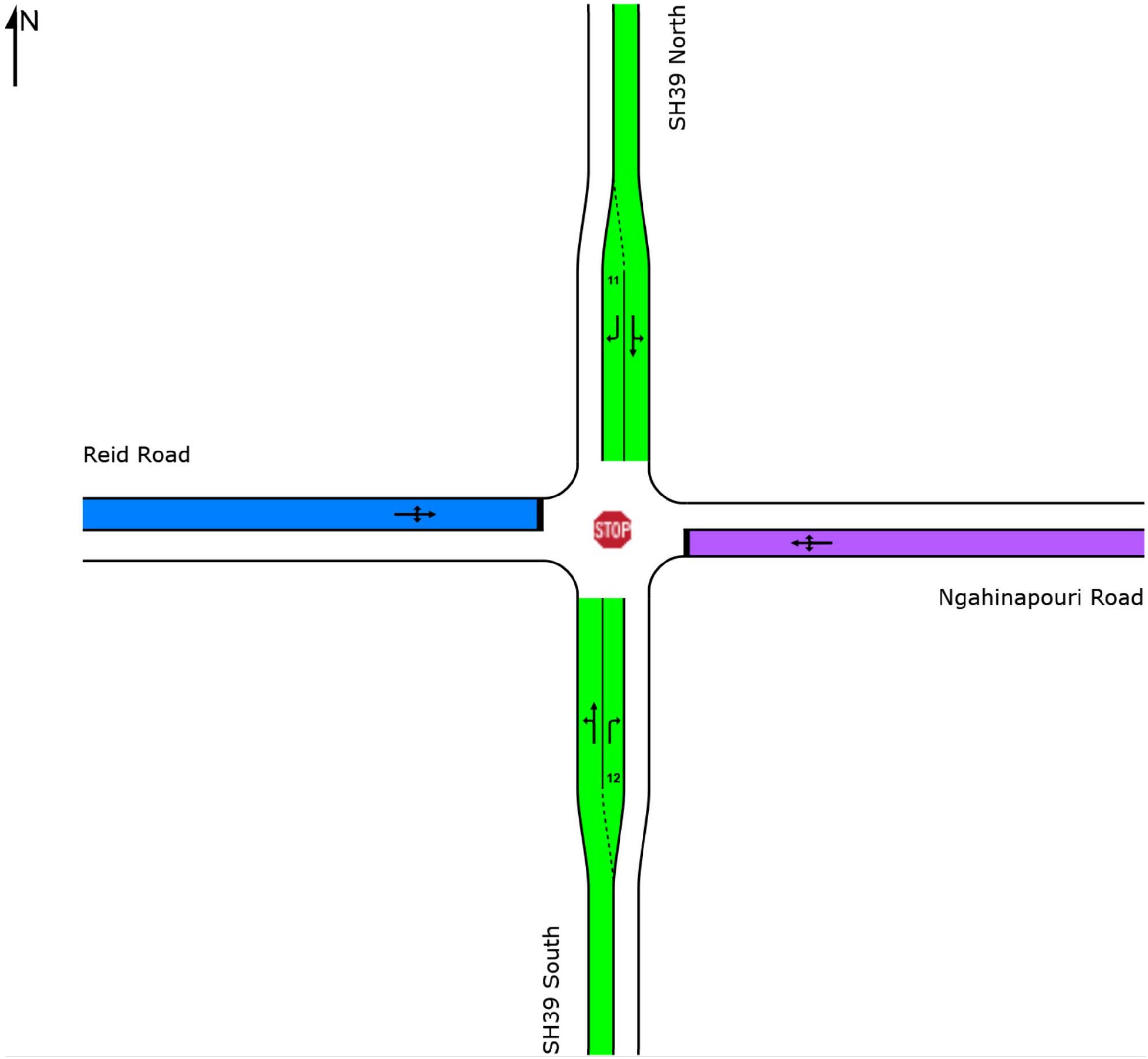
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2035_No Dev_PM]

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

	Approaches				Intersection
	South	East	North	West	
LOS	NA	D	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.

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DELAY (CONTROL)

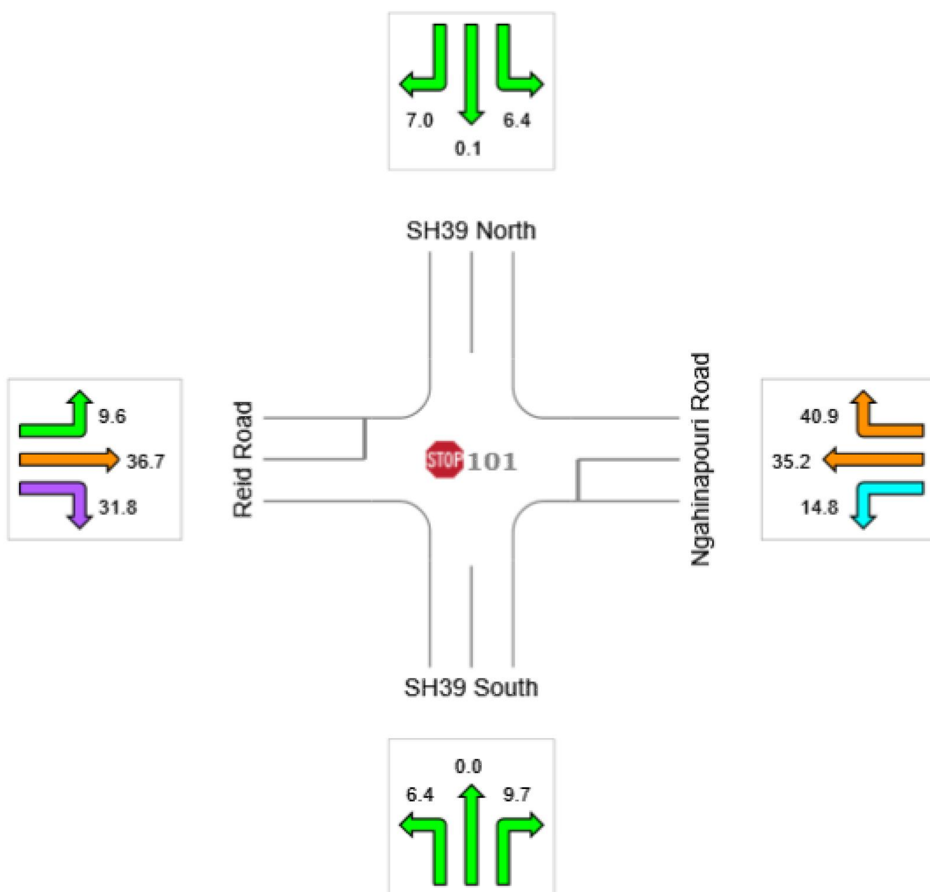
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 101 [2035_No Dev_PM]

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

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	2.6	34.6	2.0	17.9	3.4
LOS	NA	D	NA	C	NA



Colour code based on Level of Service

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

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INTERSECTION SUMMARY

Site: 101vv [Do Min - 2035_Low Dev_AM]

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

Intersection Performance - Hourly Values		
Performance Measure	**Vehicles**	**Persons**
Travel Speed (Average)	58.2 km/h	58.2 km/h
Travel Distance (Total)	1355.9 veh-km/h	1627.0 pers-km/h
Travel Time (Total)	23.3 veh-h/h	28.0 pers-h/h
Demand Flows (Total)	1340 veh/h	1608 pers/h
Percent Heavy Vehicles (Demand)	6.9 %	
Degree of Saturation	0.718	
Practical Spare Capacity	11.4 %	
Effective Intersection Capacity	1866 veh/h	
Control Delay (Total)	3.55 veh-h/h	4.26 pers-h/h
Control Delay (Average)	9.5 sec	9.5 sec
Control Delay (Worst Lane)	68.7 sec	
Control Delay (Worst Movement)	78.1 sec	78.1 sec
Geometric Delay (Average)	3.0 sec	
Stop-Line Delay (Average)	6.5 sec	
Idling Time (Average)	5.4 sec	
Intersection Level of Service (LOS)	NA	
95% Back of Queue - Vehicles (Worst Lane)	3.5 veh	
95% Back of Queue - Distance (Worst Lane)	24.4 m	
Queue Storage Ratio (Worst Lane)	0.02	
Total Effective Stops	494 veh/h	592 pers/h
Effective Stop Rate	0.37	0.37
Proportion Queued	0.21	0.21
Performance Index	33.4	33.4
Cost (Total)	654.17 $/h	654.17 $/h
Fuel Consumption (Total)	121.9 L/h	
Carbon Dioxide (Total)	291.4 kg/h	
Hydrocarbons (Total)	0.026 kg/h	
Carbon Monoxide (Total)	0.415 kg/h	
NOx (Total)	0.502 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): 2.4 %

Number of Iterations: 5 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 4.2% 2.0% 1.0%

Intersection Performance - Annual Values		
Performance Measure	**Vehicles**	**Persons**
Demand Flows (Total)	643,200 veh/y	771,840 pers/y
Delay	1,705 veh-h/y	2,046 pers-h/y
Effective Stops	236,938 veh/y	284,326 pers/y
Travel Distance	650,819 veh-km/y	780,983 pers-km/y
Travel Time	11,191 veh-h/y	13,429 pers-h/y
Cost	314,001 $/y	314,001 $/y
Fuel Consumption	58,518 L/y	
Carbon Dioxide	139,867 kg/y	
Hydrocarbons	12 kg/y	
Carbon Monoxide	199 kg/y	
NOx	241 kg/y	

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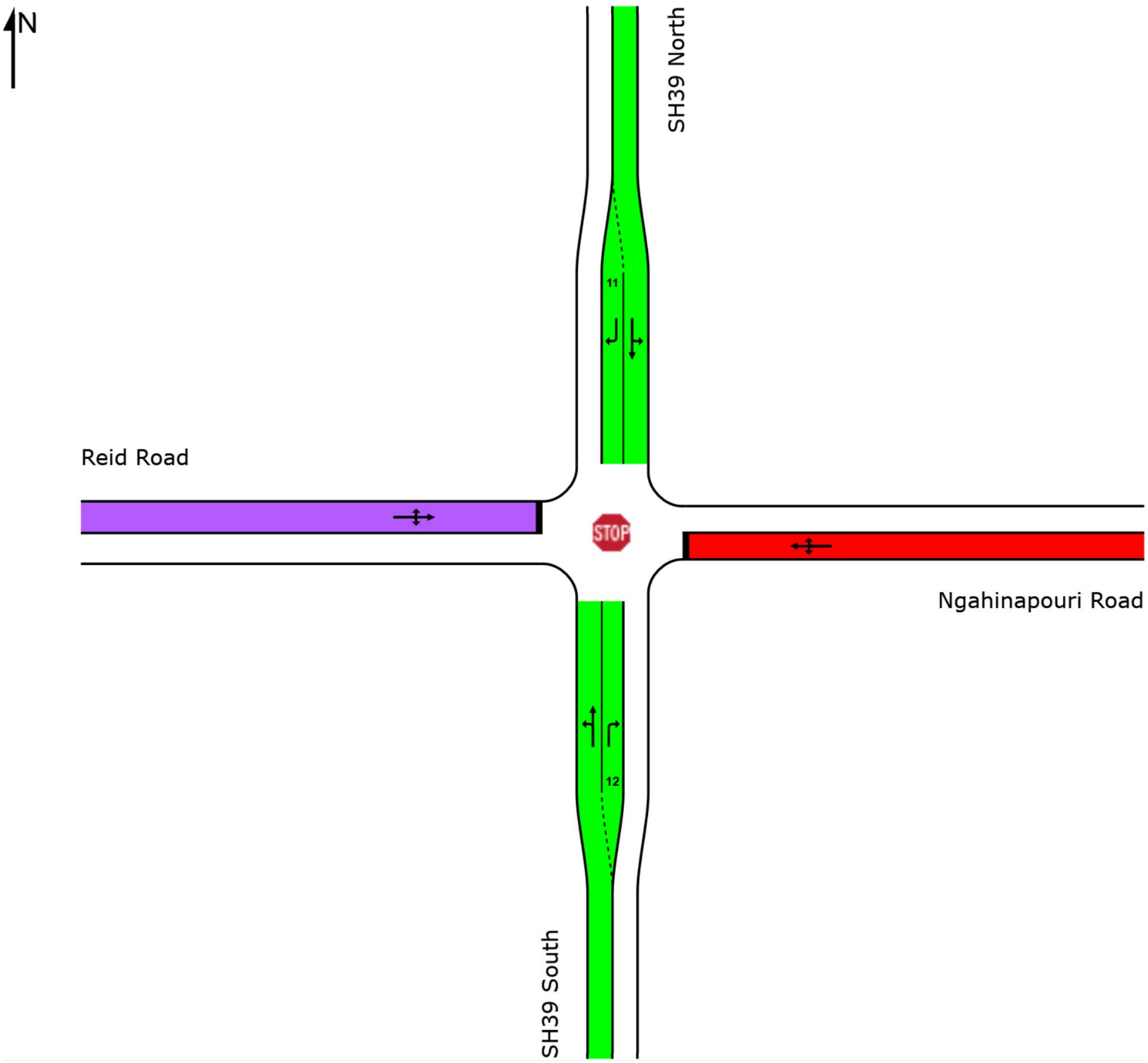
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101vv [Do Min - 2035_Low Dev_AM]

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

	Approaches				Intersection
	South	East	North	West	
LOS	NA	F	NA	D	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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DELAY (CONTROL)

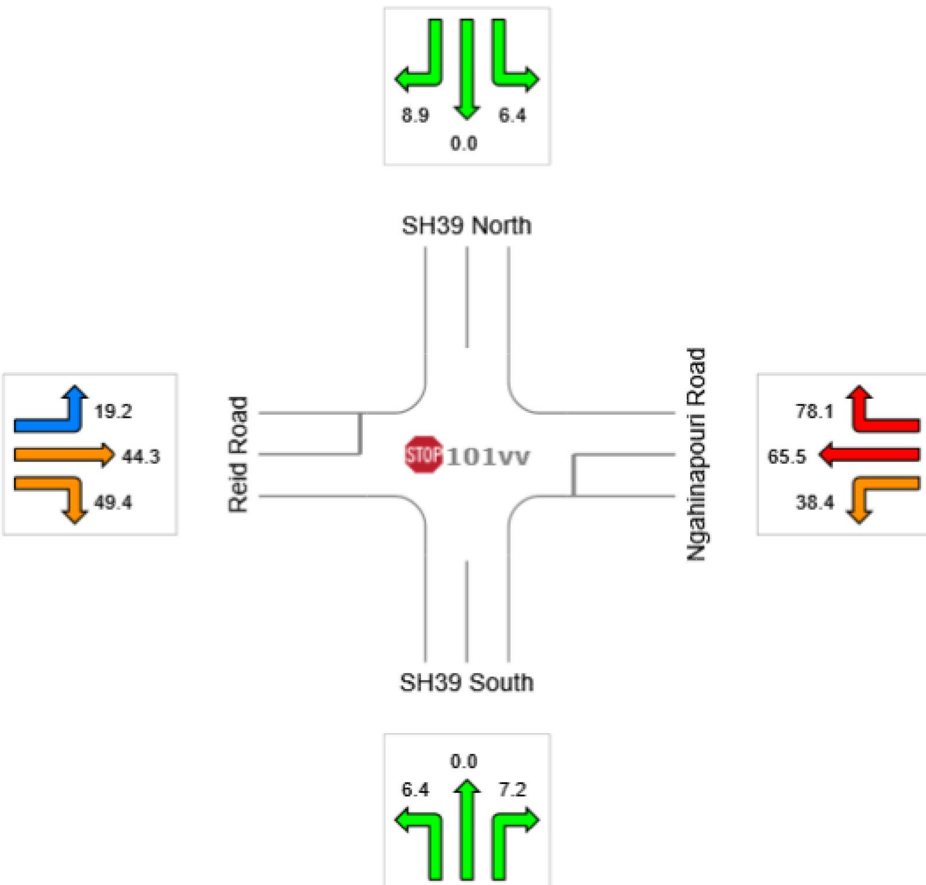
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 101vv [Do Min - 2035_Low Dev_AM]

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

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	2.1	68.7	2.2	27.8	9.5
LOS	NA	F	NA	D	NA



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

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INTERSECTION SUMMARY

Site: 101vv [Do Min - 2035_Low Dev_PM]

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

Intersection Performance - Hourly Values

Performance Measure	Vehicles		Persons	
Travel Speed (Average)	63.7	km/h	63.7	km/h
Travel Distance (Total)	1206.8	veh-km/h	1448.1	pers-km/h
Travel Time (Total)	18.9	veh-h/h	22.7	pers-h/h
Demand Flows (Total)	1193	veh/h	1431	pers/h
Percent Heavy Vehicles (Demand)	7.7	%		
Degree of Saturation	0.390			
Practical Spare Capacity	151.3	%		
Effective Intersection Capacity	3059	veh/h		
Control Delay (Total)	1.35	veh-h/h	1.63	pers-h/h
Control Delay (Average)	4.1	sec	4.1	sec
Control Delay (Worst Lane)	37.6	sec		
Control Delay (Worst Movement)	44.9	sec	44.9	sec
Geometric Delay (Average)	2.4	sec		
Stop-Line Delay (Average)	1.7	sec		
Idling Time (Average)	1.3	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	0.9	veh		
95% Back of Queue - Distance (Worst Lane)	6.5	m		
Queue Storage Ratio (Worst Lane)	0.01			
Total Effective Stops	311	veh/h	373	pers/h
Effective Stop Rate	0.26		0.26	
Proportion Queued	0.11		0.11	
Performance Index	22.4		22.4	
Cost (Total)	510.26	$/h	510.26	$/h
Fuel Consumption (Total)	105.7	L/h		
Carbon Dioxide (Total)	253.2	kg/h		
Hydrocarbons (Total)	0.022	kg/h		
Carbon Monoxide (Total)	0.361	kg/h		
NOx (Total)	0.489	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): 4.6 %

Number of Iterations: 7 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 2.7% 1.3% 0.6%

Intersection Performance - Annual Values

Performance Measure	Vehicles		Persons	
Demand Flows (Total)	572,463	veh/y	686,956	pers/y
Delay	650	veh-h/y	780	pers-h/y
Effective Stops	149,281	veh/y	179,138	pers/y
Travel Distance	579,256	veh-km/y	695,108	pers-km/y
Travel Time	9,095	veh-h/y	10,914	pers-h/y
Cost	244,925	$/y	244,925	$/y
Fuel Consumption	50,718	L/y		
Carbon Dioxide	121,549	kg/y		
Hydrocarbons	11	kg/y		
Carbon Monoxide	173	kg/y		
NOx	235	kg/y		

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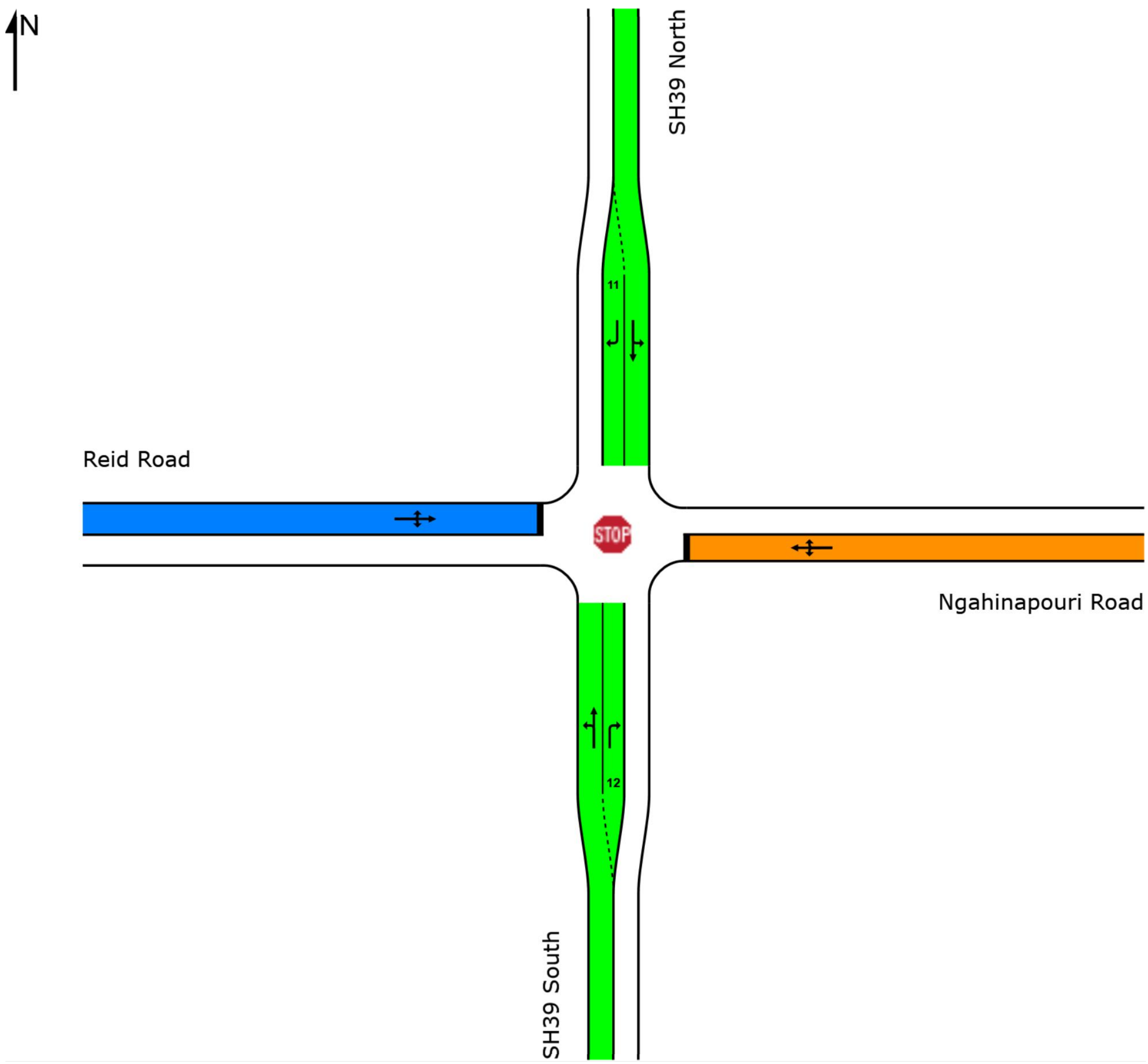
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101vv [Do Min - 2035_Low Dev_PM]

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

	Approaches				Intersection
	South	East	North	West	
LOS	NA	E	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.

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DELAY (CONTROL)

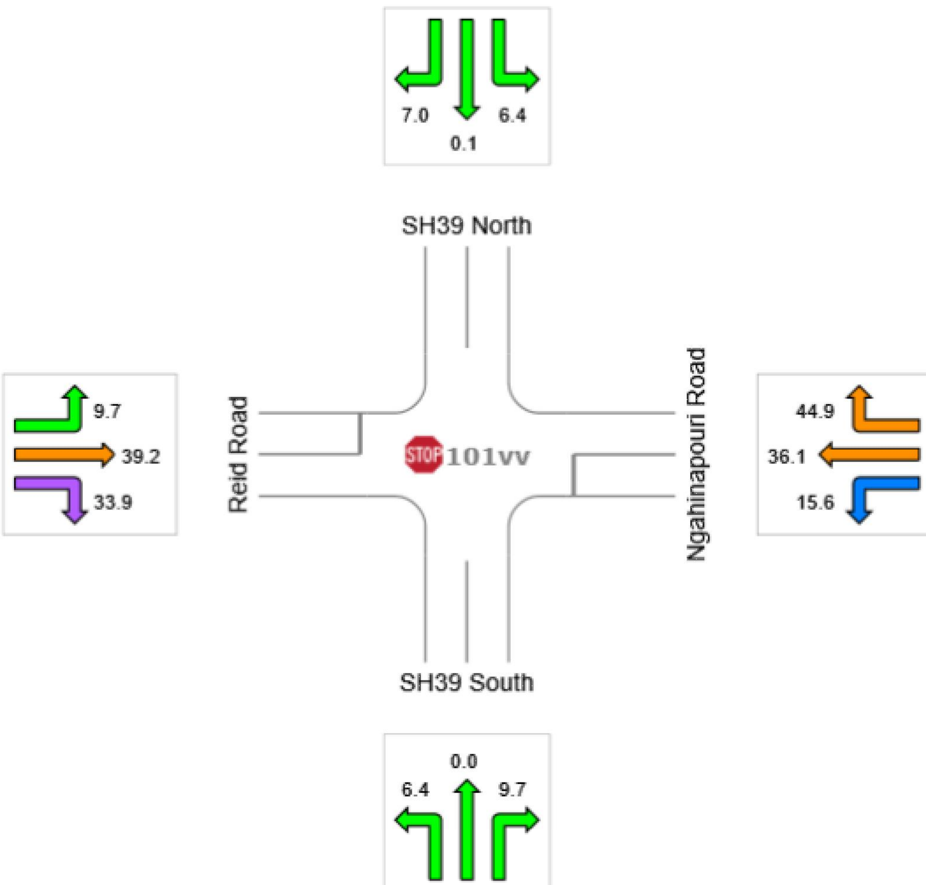
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 101vv [Do Min - 2035_Low Dev_PM]

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

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	2.6	37.6	2.0	17.5	4.1
LOS	NA	E	NA	C	NA



Colour code based on Level of Service

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

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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 [Do Min - 2035_Hi Dev_AM]

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

Intersection Performance - Hourly Values		
Performance Measure	**Vehicles**	**Persons**
Travel Speed (Average)	47.3 km/h	47.3 km/h
Travel Distance (Total)	1479.8 veh-km/h	1775.7 pers-km/h
Travel Time (Total)	31.3 veh-h/h	37.5 pers-h/h
Demand Flows (Total)	1462 veh/h	1755 pers/h
Percent Heavy Vehicles (Demand)	6.3 %	
Degree of Saturation	0.981	
Practical Spare Capacity	-18.5 %	
Effective Intersection Capacity	1490 veh/h	
Control Delay (Total)	9.72 veh-h/h	11.67 pers-h/h
Control Delay (Average)	23.9 sec	23.9 sec
Control Delay (Worst Lane)	113.2 sec	
Control Delay (Worst Movement)	125.6 sec	125.6 sec
Geometric Delay (Average)	3.5 sec	
Stop-Line Delay (Average)	20.5 sec	
Idling Time (Average)	15.5 sec	
Intersection Level of Service (LOS)	NA	
95% Back of Queue - Vehicles (Worst Lane)	15.4 veh	
95% Back of Queue - Distance (Worst Lane)	107.5 m	
Queue Storage Ratio (Worst Lane)	0.09	
Total Effective Stops	889 veh/h	1067 pers/h
Effective Stop Rate	0.61	0.61
Proportion Queued	0.29	0.29
Performance Index	60.9	60.9
Cost (Total)	925.27 $/h	925.27 $/h
Fuel Consumption (Total)	141.4 L/h	
Carbon Dioxide (Total)	337.2 kg/h	
Hydrocarbons (Total)	0.031 kg/h	
Carbon Monoxide (Total)	0.466 kg/h	
NOx (Total)	0.515 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): 2.4 %

Number of Iterations: 5 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 4.2% 2.0% 1.0%

Intersection Performance - Annual Values		
Performance Measure	**Vehicles**	**Persons**
Demand Flows (Total)	701,811 veh/y	842,173 pers/y
Delay	4,668 veh-h/y	5,601 pers-h/y
Effective Stops	426,831 veh/y	512,197 pers/y
Travel Distance	710,292 veh-km/y	852,350 pers-km/y
Travel Time	15,010 veh-h/y	18,013 pers-h/y
Cost	444,129 $/y	444,129 $/y
Fuel Consumption	67,878 L/y	
Carbon Dioxide	161,864 kg/y	
Hydrocarbons	15 kg/y	
Carbon Monoxide	224 kg/y	
NOx	247 kg/y	

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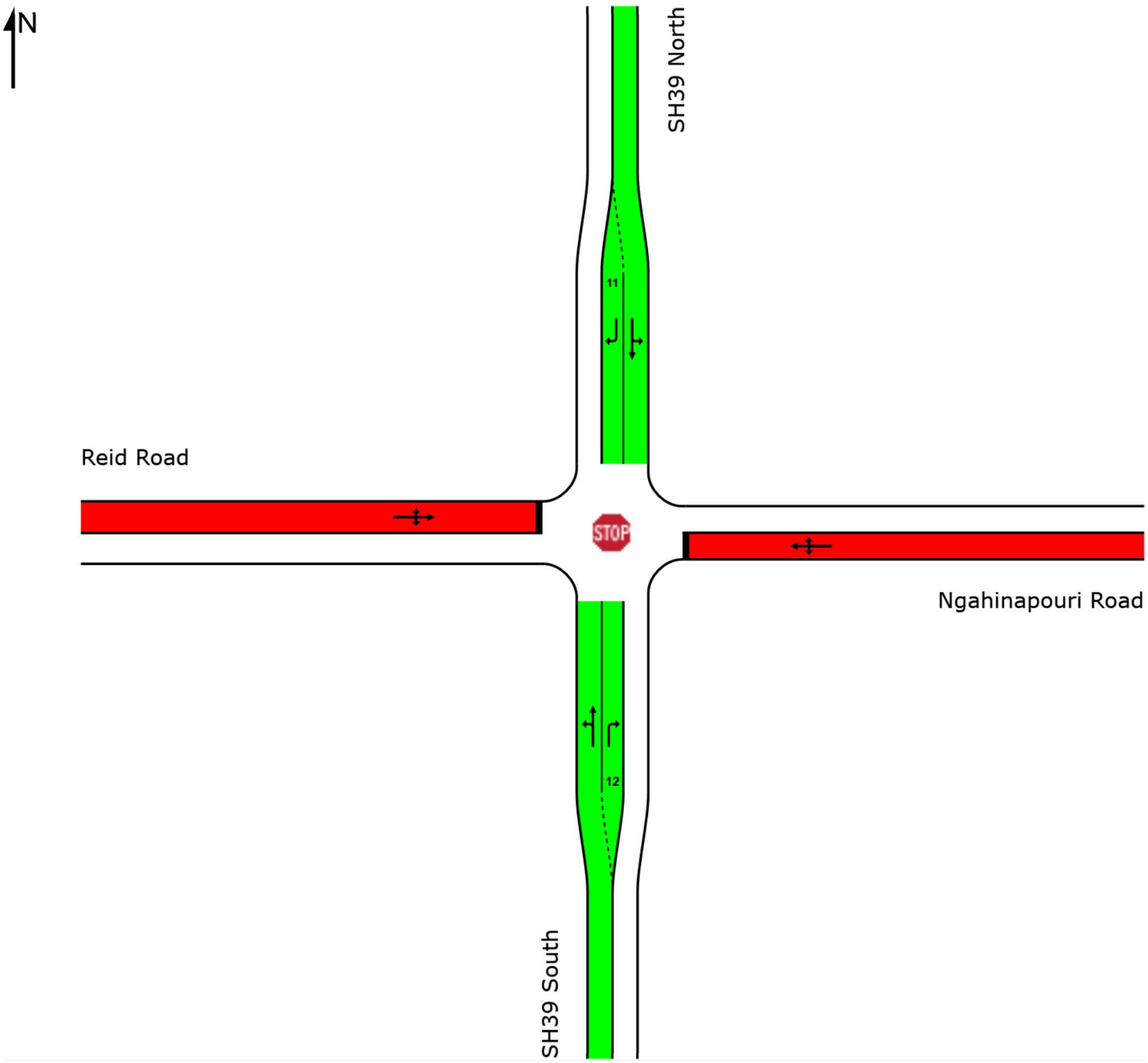
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [Do Min - 2035_Hi Dev_AM]

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

	Approaches				Intersection
	South	East	North	West	
LOS	NA	F	NA	F	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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DELAY (CONTROL)

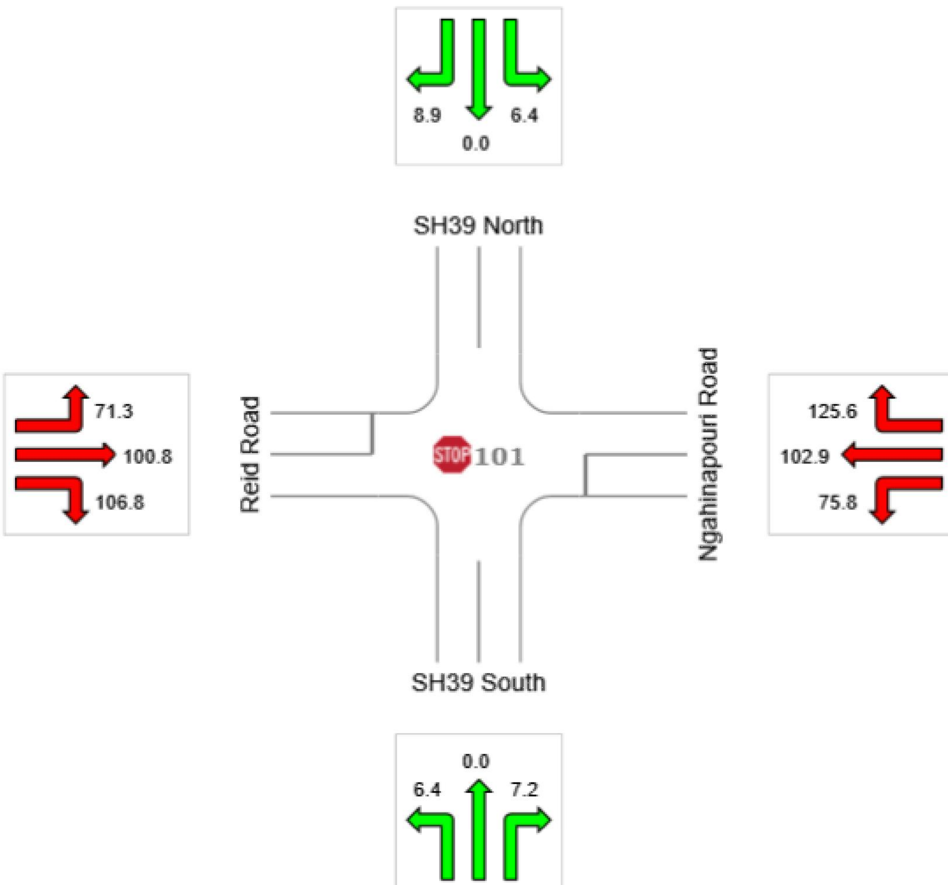
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 101 [Do Min - 2035_Hi Dev_AM]

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

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	2.1	113.2	2.2	81.4	23.9
LOS	NA	F	NA	F	NA



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INTERSECTION SUMMARY

Site: 101 [Do Min - 2035_Hi Dev_PM]

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

Intersection Performance - Hourly Values		
Performance Measure	**Vehicles**	**Persons**
Travel Speed (Average)	63.0 km/h	63.0 km/h
Travel Distance (Total)	1248.4 veh-km/h	1498.1 pers-km/h
Travel Time (Total)	19.8 veh-h/h	23.8 pers-h/h
Demand Flows (Total)	1234 veh/h	1480 pers/h
Percent Heavy Vehicles (Demand)	7.5 %	
Degree of Saturation	0.390	
Practical Spare Capacity	151.3 %	
Effective Intersection Capacity	3164 veh/h	
Control Delay (Total)	1.62 veh-h/h	1.94 pers-h/h
Control Delay (Average)	4.7 sec	4.7 sec
Control Delay (Worst Lane)	40.6 sec	
Control Delay (Worst Movement)	48.7 sec	48.7 sec
Geometric Delay (Average)	2.6 sec	
Stop-Line Delay (Average)	2.1 sec	
Idling Time (Average)	1.7 sec	
Intersection Level of Service (LOS)	NA	
95% Back of Queue - Vehicles (Worst Lane)	1.1 veh	
95% Back of Queue - Distance (Worst Lane)	7.8 m	
Queue Storage Ratio (Worst Lane)	0.01	
Total Effective Stops	351 veh/h	422 pers/h
Effective Stop Rate	0.28	0.28
Proportion Queued	0.13	0.13
Performance Index	24.2	24.2
Cost (Total)	538.28 $/h	538.28 $/h
Fuel Consumption (Total)	109.7 L/h	
Carbon Dioxide (Total)	262.8 kg/h	
Hydrocarbons (Total)	0.023 kg/h	
Carbon Monoxide (Total)	0.375 kg/h	
NOx (Total)	0.492 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): 4.6 %

Number of Iterations: 7 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 2.7% 1.3% 0.6%

Intersection Performance - Annual Values		
Performance Measure	**Vehicles**	**Persons**
Demand Flows (Total)	592,168 veh/y	710,602 pers/y
Delay	776 veh-h/y	931 pers-h/y
Effective Stops	168,613 veh/y	202,336 pers/y
Travel Distance	599,253 veh-km/y	719,103 pers-km/y
Travel Time	9,514 veh-h/y	11,417 pers-h/y
Cost	258,376 $/y	258,376 $/y
Fuel Consumption	52,664 L/y	
Carbon Dioxide	126,121 kg/y	
Hydrocarbons	11 kg/y	
Carbon Monoxide	180 kg/y	
NOx	236 kg/y	

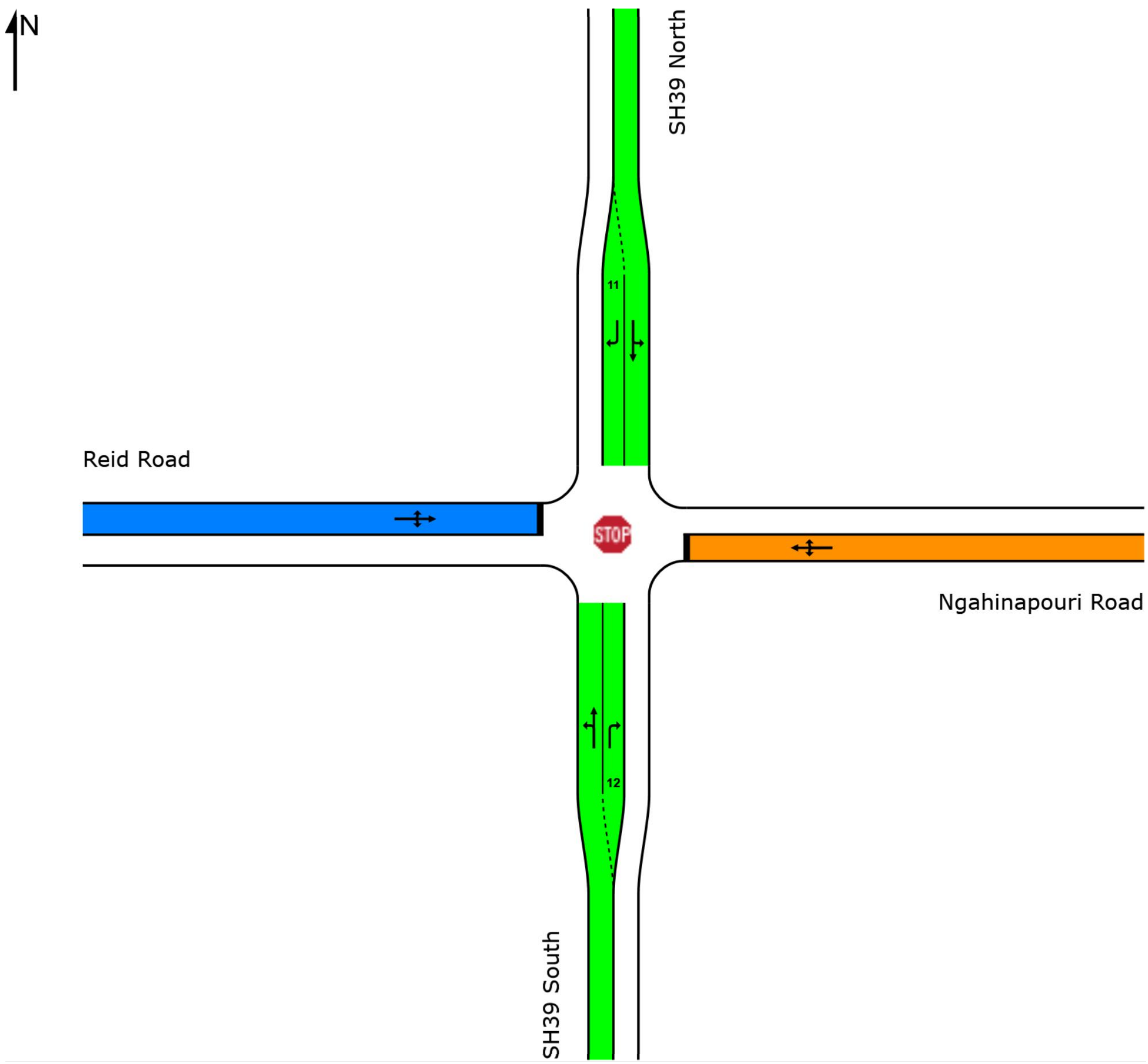
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [Do Min - 2035_Hi Dev_PM]

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

	Approaches				Intersection
	South	East	North	West	
LOS	NA	E	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.

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DELAY (CONTROL)

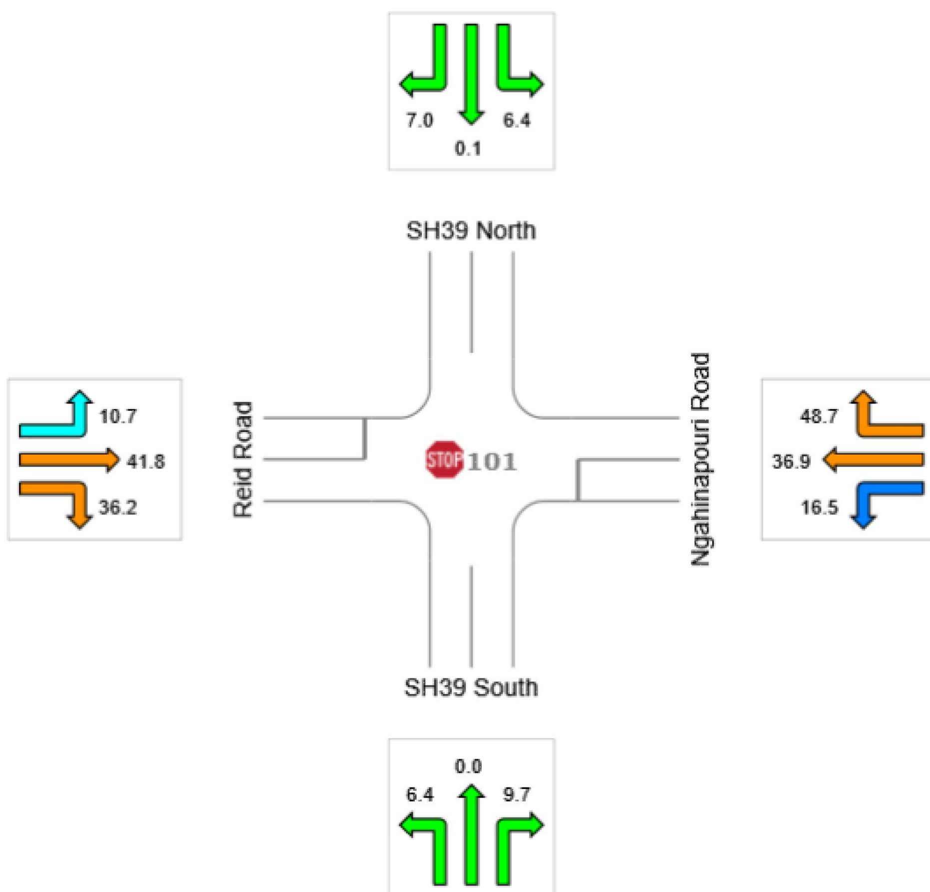
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 101 [Do Min - 2035_Hi Dev_PM]

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

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	2.6	40.6	2.0	18.7	4.7
LOS	NA	E	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.

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NETWORK SUMMARY

Network: N101 [2018_Low Dev_Staggered T_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	13.04		
Speed Efficiency	1.27		
Congestion Coefficient	0.78		
Travel Speed (Average)	63.7 km/h		63.7 km/h
Travel Distance (Total)	1170.8 veh-km/h		1404.9 pers-km/h
Travel Time (Total)	18.4 veh-h/h		22.1 pers-h/h
Desired Speed	50.0 km/h		
Demand Flows (Total for all Sites)	1915 veh/h		2298 pers/h
Arrival Flows (Total for all Sites)	1915 veh/h		2298 pers/h
Demand Flows (Entry Total)	1063 veh/h		
Midblock Inflows (Total)	1 veh/h		
Midblock Outflows (Total)	-33 veh/h		
Percent Heavy Vehicles (Demand)	9.0 %		
Percent Heavy Vehicles (Arrival)	9.0 %		
Degree of Saturation	0.339		
Control Delay (Total)	1.40 veh-h/h		1.68 pers-h/h
Control Delay (Average)	2.6 sec		2.6 sec
Control Delay (Worst Lane)	16.6 sec		
Control Delay (Worst Movement)	20.0 sec		20.0 sec
Geometric Delay (Average)	1.8 sec		
Stop-Line Delay (Average)	0.9 sec		
Queue Storage Ratio (Worst Lane)	0.01		
Total Effective Stops	381 veh/h		457 pers/h
Effective Stop Rate	0.20	0.33 per km	0.20
Proportion Queued	0.10		0.10
Performance Index	21.8		21.8
Cost (Total)	547.79 $/h	0.47 $/km	547.79 $/h
Fuel Consumption (Total)	107.5 L/h	91.8 mL/km	
Fuel Economy	9.2 L/100km		
Carbon Dioxide (Total)	257.4 kg/h	219.8 g/km	
Hydrocarbons (Total)	0.022 kg/h	0.019 g/km	
Carbon Monoxide (Total)	0.358 kg/h	0.305 g/km	
NOx (Total)	0.528 kg/h	0.451 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)	919,074 veh/y	1,102,889 pers/y
Delay	672 veh-h/y	807 pers-h/y
Effective Stops	182,844 veh/y	219,412 pers/y
Travel Distance	561,967 veh-km/y	674,360 pers-km/y
Travel Time	8,823 veh-h/y	10,587 pers-h/y
Cost	262,939 $/y	262,939 $/y
Fuel Consumption	51,597 L/y	
Carbon Dioxide	123,541 kg/y	
Hydrocarbons	11 kg/y	
Carbon Monoxide	172 kg/y	

NOx	253 kg/y

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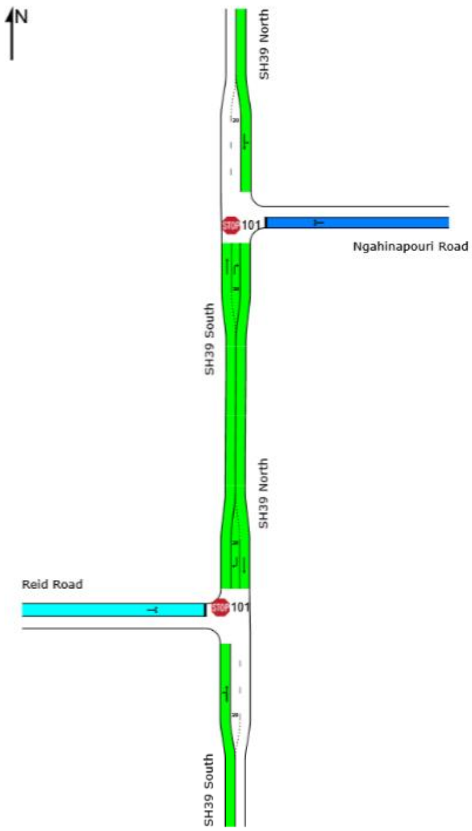
LANE LEVEL OF SERVICE

Lane Level of Service for Network Sites

Network: N101 [2018_Low Dev_Staggered T_AM]

New Network
Network Category: (None)



Colour code based on Level of Service

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

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NETWORK SUMMARY

Network: N101 [2018_Low Dev_Staggered T_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	13.40		
Speed Efficiency	1.31		
Congestion Coefficient	0.77		
Travel Speed (Average)	65.3 km/h		65.3 km/h
Travel Distance (Total)	1006.4 veh-km/h		1207.6 pers-km/h
Travel Time (Total)	15.4 veh-h/h		18.5 pers-h/h
Desired Speed	50.0 km/h		
Demand Flows (Total for all Sites)	1628 veh/h		1954 pers/h
Arrival Flows (Total for all Sites)	1628 veh/h		1954 pers/h
Demand Flows (Entry Total)	901 veh/h		
Midblock Inflows (Total)	7 veh/h		
Midblock Outflows (Total)	-7 veh/h		
Percent Heavy Vehicles (Demand)	9.5 %		
Percent Heavy Vehicles (Arrival)	9.5 %		
Degree of Saturation	0.320		
Control Delay (Total)	0.79 veh-h/h		0.94 pers-h/h
Control Delay (Average)	1.7 sec		1.7 sec
Control Delay (Worst Lane)	15.5 sec		
Control Delay (Worst Movement)	17.4 sec		17.4 sec
Geometric Delay (Average)	1.4 sec		
Stop-Line Delay (Average)	0.3 sec		
Queue Storage Ratio (Worst Lane)	0.00		
Total Effective Stops	240 veh/h		288 pers/h
Effective Stop Rate	0.15	0.24 per km	0.15
Proportion Queued	0.06		0.06
Performance Index	17.1		17.1
Cost (Total)	442.85 $/h	0.44 $/km	442.85 $/h
Fuel Consumption (Total)	90.3 L/h	89.7 mL/km	
Fuel Economy	9.0 L/100km		
Carbon Dioxide (Total)	216.4 kg/h	215.1 g/km	
Hydrocarbons (Total)	0.018 kg/h	0.018 g/km	
Carbon Monoxide (Total)	0.301 kg/h	0.300 g/km	
NOx (Total)	0.468 kg/h	0.465 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)	781,642 veh/y	937,971 pers/y
Delay	377 veh-h/y	452 pers-h/y
Effective Stops	115,036 veh/y	138,043 pers/y
Travel Distance	483,052 veh-km/y	579,663 pers-km/y
Travel Time	7,395 veh-h/y	8,874 pers-h/y
Cost	212,570 $/y	212,570 $/y
Fuel Consumption	43,332 L/y	
Carbon Dioxide	103,895 kg/y	
Hydrocarbons	9 kg/y	
Carbon Monoxide	145 kg/y	

NOx	225	kg/y

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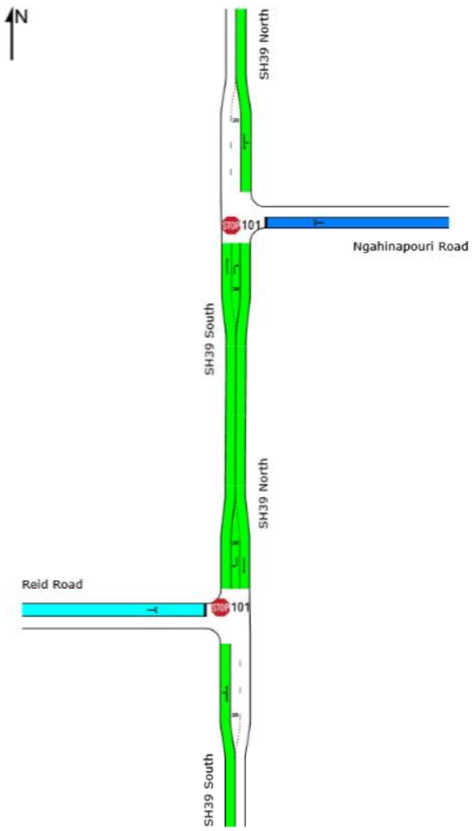
LANE LEVEL OF SERVICE

Lane Level of Service for Network Sites

Network: N101 [2018_Low Dev_Staggered T_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.

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NETWORK SUMMARY

Network: N101 [2018_Hi Dev_Staggered T_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	12.71		
Speed Efficiency	1.24		
Congestion Coefficient	0.80		
Travel Speed (Average)	62.2 km/h		62.2 km/h
Travel Distance (Total)	1307.1 veh-km/h		1568.5 pers-km/h
Travel Time (Total)	21.0 veh-h/h		25.2 pers-h/h
Desired Speed	50.0 km/h		
Demand Flows (Total for all Sites)	2133 veh/h		2559 pers/h
Arrival Flows (Total for all Sites)	2133 veh/h		2559 pers/h
Demand Flows (Entry Total)	1185 veh/h		
Midblock Inflows (Total)	6 veh/h		
Midblock Outflows (Total)	-37 veh/h		
Percent Heavy Vehicles (Demand)	8.6 %		
Percent Heavy Vehicles (Arrival)	8.6 %		
Degree of Saturation	0.476		
Control Delay (Total)	2.12 veh-h/h		2.54 pers-h/h
Control Delay (Average)	3.6 sec		3.6 sec
Control Delay (Worst Lane)	19.1 sec		
Control Delay (Worst Movement)	23.3 sec		23.3 sec
Geometric Delay (Average)	2.1 sec		
Stop-Line Delay (Average)	1.5 sec		
Queue Storage Ratio (Worst Lane)	0.01		
Total Effective Stops	534 veh/h		641 pers/h
Effective Stop Rate	0.25	0.41 per km	0.25
Proportion Queued	0.14		0.14
Performance Index	26.7		26.7
Cost (Total)	638.71 $/h	0.49 $/km	638.71 $/h
Fuel Consumption (Total)	122.1 L/h	93.4 mL/km	
Fuel Economy	9.3 L/100km		
Carbon Dioxide (Total)	292.2 kg/h	223.6 g/km	
Hydrocarbons (Total)	0.026 kg/h	0.020 g/km	
Carbon Monoxide (Total)	0.405 kg/h	0.310 g/km	
NOx (Total)	0.571 kg/h	0.437 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)	1,023,663 veh/y	1,228,396 pers/y
Delay	1,015 veh-h/y	1,219 pers-h/y
Effective Stops	256,271 veh/y	307,525 pers/y
Travel Distance	627,411 veh-km/y	752,893 pers-km/y
Travel Time	10,091 veh-h/y	12,109 pers-h/y
Cost	306,581 $/y	306,581 $/y
Fuel Consumption	58,623 L/y	
Carbon Dioxide	140,271 kg/y	
Hydrocarbons	12 kg/y	
Carbon Monoxide	194 kg/y	

NOx	274 kg/y

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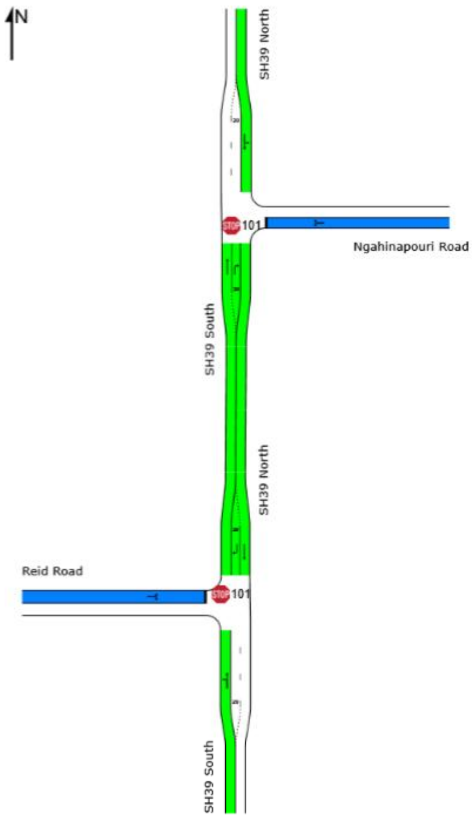
LANE LEVEL OF SERVICE

Lane Level of Service for Network Sites

Network: N101 [2018_Hi Dev_Staggered T_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.

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NETWORK SUMMARY

Network: N101 [2018_Hi Dev_Staggered T_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	13.32		
Speed Efficiency	1.30		
Congestion Coefficient	0.77		
Travel Speed (Average)	64.9 km/h		64.9 km/h
Travel Distance (Total)	1053.3 veh-km/h		1264.0 pers-km/h
Travel Time (Total)	16.2 veh-h/h		19.5 pers-h/h
Desired Speed	50.0 km/h		
Demand Flows (Total for all Sites)	1703 veh/h		2044 pers/h
Arrival Flows (Total for all Sites)	1703 veh/h		2044 pers/h
Demand Flows (Entry Total)	943 veh/h		
Midblock Inflows (Total)	7 veh/h		
Midblock Outflows (Total)	-7 veh/h		
Percent Heavy Vehicles (Demand)	9.3 %		
Percent Heavy Vehicles (Arrival)	9.3 %		
Degree of Saturation	0.320		
Control Delay (Total)	0.93 veh-h/h		1.11 pers-h/h
Control Delay (Average)	2.0 sec		2.0 sec
Control Delay (Worst Lane)	16.0 sec		
Control Delay (Worst Movement)	18.1 sec		18.1 sec
Geometric Delay (Average)	1.5 sec		
Stop-Line Delay (Average)	0.4 sec		
Queue Storage Ratio (Worst Lane)	0.00		
Total Effective Stops	280 veh/h		336 pers/h
Effective Stop Rate	0.16	0.27 per km	0.16
Proportion Queued	0.06		0.06
Performance Index	18.3		18.3
Cost (Total)	470.51 $/h	0.45 $/km	470.51 $/h
Fuel Consumption (Total)	95.1 L/h	90.3 mL/km	
Fuel Economy	9.0 L/100km		
Carbon Dioxide (Total)	228.0 kg/h	216.5 g/km	
Hydrocarbons (Total)	0.020 kg/h	0.019 g/km	
Carbon Monoxide (Total)	0.318 kg/h	0.302 g/km	
NOx (Total)	0.483 kg/h	0.458 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)	817,516 veh/y	981,019 pers/y
Delay	445 veh-h/y	534 pers-h/y
Effective Stops	134,413 veh/y	161,295 pers/y
Travel Distance	505,593 veh-km/y	606,712 pers-km/y
Travel Time	7,786 veh-h/y	9,343 pers-h/y
Cost	225,847 $/y	225,847 $/y
Fuel Consumption	45,670 L/y	
Carbon Dioxide	109,464 kg/y	
Hydrocarbons	9 kg/y	
Carbon Monoxide	152 kg/y	

NOx	232 kg/y

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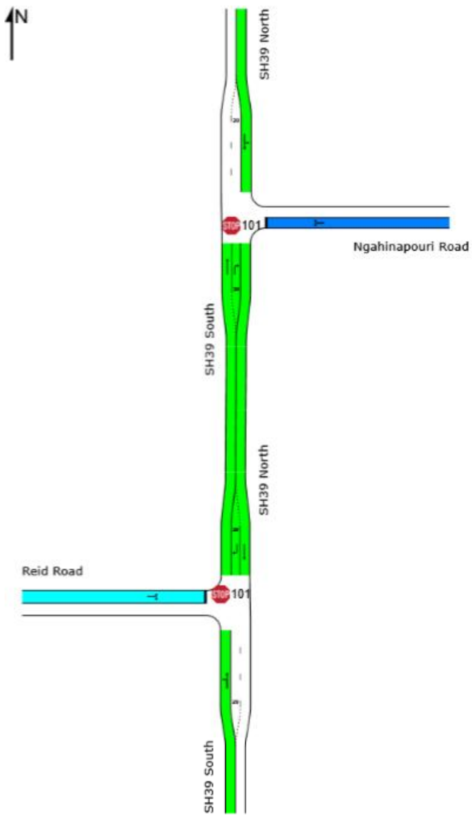
LANE LEVEL OF SERVICE

Lane Level of Service for Network Sites

Network: N101 [2018_Hi Dev_Staggered T_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.

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NETWORK SUMMARY

Network: N101 [2035_Low Dev_Staggered T_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	12.71		
Speed Efficiency	1.24		
Congestion Coefficient	0.80		
Travel Speed (Average)	62.2 km/h		62.2 km/h
Travel Distance (Total)	1553.3 veh-km/h		1864.0 pers-km/h
Travel Time (Total)	25.0 veh-h/h		30.0 pers-h/h
Desired Speed	50.0 km/h		
Demand Flows (Total for all Sites)	2531 veh/h		3037 pers/h
Arrival Flows (Total for all Sites)	2531 veh/h		3037 pers/h
Demand Flows (Entry Total)	1340 veh/h		
Midblock Inflows (Total)	87 veh/h		
Midblock Outflows (Total)	-1 veh/h		
Percent Heavy Vehicles (Demand)	9.2 %		
Percent Heavy Vehicles (Arrival)	9.2 %		
Degree of Saturation	0.481		
Control Delay (Total)	2.46 veh-h/h		2.95 pers-h/h
Control Delay (Average)	3.5 sec		3.5 sec
Control Delay (Worst Lane)	36.3 sec		
Control Delay (Worst Movement)	44.1 sec		44.1 sec
Geometric Delay (Average)	1.7 sec		
Stop-Line Delay (Average)	1.8 sec		
Queue Storage Ratio (Worst Lane)	0.01		
Total Effective Stops	492 veh/h		590 pers/h
Effective Stop Rate	0.19	0.32 per km	0.19
Proportion Queued	0.12		0.12
Performance Index	30.7		30.7
Cost (Total)	726.86 $/h	0.47 $/km	726.86 $/h
Fuel Consumption (Total)	142.8 L/h	91.9 mL/km	
Fuel Economy	9.2 L/100km		
Carbon Dioxide (Total)	342.2 kg/h	220.3 g/km	
Hydrocarbons (Total)	0.030 kg/h	0.019 g/km	
Carbon Monoxide (Total)	0.473 kg/h	0.304 g/km	
NOx (Total)	0.713 kg/h	0.459 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)	1,214,653 veh/y	1,457,583 pers/y
Delay	1,178 veh-h/y	1,414 pers-h/y
Effective Stops	236,093 veh/y	283,312 pers/y
Travel Distance	745,596 veh-km/y	894,715 pers-km/y
Travel Time	11,984 veh-h/y	14,381 pers-h/y
Cost	348,891 $/y	348,891 $/y
Fuel Consumption	68,544 L/y	
Carbon Dioxide	164,254 kg/y	
Hydrocarbons	14 kg/y	
Carbon Monoxide	227 kg/y	

NOx	342 kg/y

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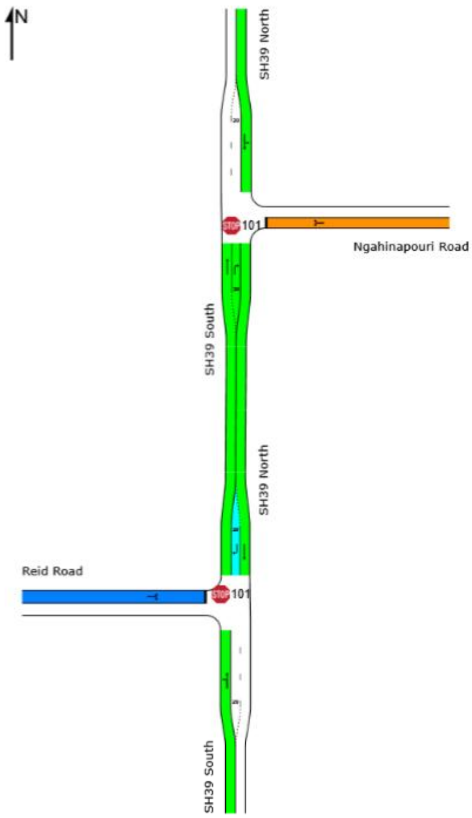
LANE LEVEL OF SERVICE

Lane Level of Service for Network Sites

Network: N101 [2035_Low Dev_Staggered T_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: Wednesday, 12 June 2019 10:43:07 AM
Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\Ngahinapouri\N_Reid SH39 Int.sip8

NETWORK SUMMARY

Network: N101 [2035_Low Dev_Staggered T_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	13.33		
Speed Efficiency	1.30		
Congestion Coefficient	0.77		
Travel Speed (Average)	65.0 km/h		65.0 km/h
Travel Distance (Total)	1350.6 veh-km/h		1620.7 pers-km/h
Travel Time (Total)	20.8 veh-h/h		24.9 pers-h/h
Desired Speed	50.0 km/h		
Demand Flows (Total for all Sites)	2185 veh/h		2622 pers/h
Arrival Flows (Total for all Sites)	2185 veh/h		2622 pers/h
Demand Flows (Entry Total)	1193 veh/h		
Midblock Inflows (Total)	37 veh/h		
Midblock Outflows (Total)	-7 veh/h		
Percent Heavy Vehicles (Demand)	9.6 %		
Percent Heavy Vehicles (Arrival)	9.6 %		
Degree of Saturation	0.429		
Control Delay (Total)	1.16 veh-h/h		1.40 pers-h/h
Control Delay (Average)	1.9 sec		1.9 sec
Control Delay (Worst Lane)	22.9 sec		
Control Delay (Worst Movement)	27.5 sec		27.5 sec
Geometric Delay (Average)	1.3 sec		
Stop-Line Delay (Average)	0.6 sec		
Queue Storage Ratio (Worst Lane)	0.00		
Total Effective Stops	322 veh/h		386 pers/h
Effective Stop Rate	0.15	0.24 per km	0.15
Proportion Queued	0.06		0.06
Performance Index	23.2		23.2
Cost (Total)	592.61 $/h	0.44 $/km	592.61 $/h
Fuel Consumption (Total)	121.1 L/h	89.6 mL/km	
Fuel Economy	9.0 L/100km		
Carbon Dioxide (Total)	290.4 kg/h	215.0 g/km	
Hydrocarbons (Total)	0.025 kg/h	0.018 g/km	
Carbon Monoxide (Total)	0.403 kg/h	0.299 g/km	
NOx (Total)	0.634 kg/h	0.469 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)	1,048,927 veh/y	1,258,712 pers/y
Delay	559 veh-h/y	671 pers-h/y
Effective Stops	154,344 veh/y	185,213 pers/y
Travel Distance	648,288 veh-km/y	777,946 pers-km/y
Travel Time	9,975 veh-h/y	11,970 pers-h/y
Cost	284,452 $/y	284,452 $/y
Fuel Consumption	58,113 L/y	
Carbon Dioxide	139,378 kg/y	
Hydrocarbons	12 kg/y	
Carbon Monoxide	194 kg/y	

NOx	304 kg/y

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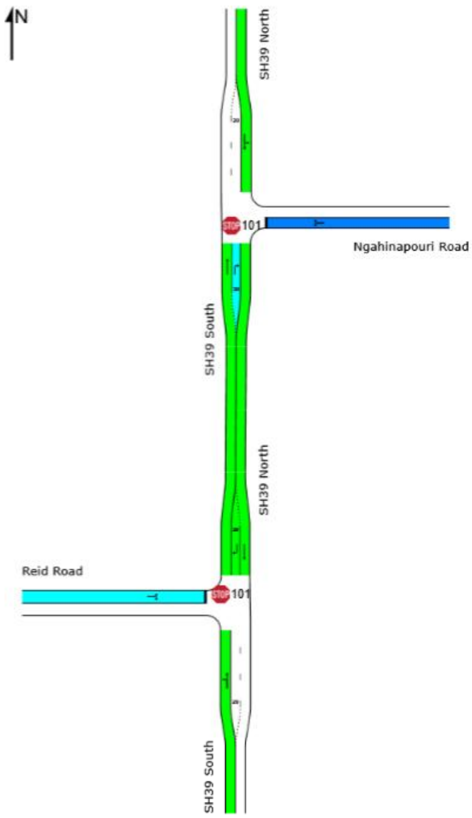
LANE LEVEL OF SERVICE

Lane Level of Service for Network Sites

Network: N101 [2035_Low Dev_Staggered T_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: Wednesday, 12 June 2019 10:43:09 AM
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NETWORK SUMMARY

Network: N101 [2035_Hi Dev_Staggered T_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	12.21		
Speed Efficiency	1.20		
Congestion Coefficient	0.83		
Travel Speed (Average)	59.9 km/h		59.9 km/h
Travel Distance (Total)	1636.1 veh-km/h		1963.3 pers-km/h
Travel Time (Total)	27.3 veh-h/h		32.8 pers-h/h
Desired Speed	50.0 km/h		
Demand Flows (Total for all Sites)	2664 veh/h		3197 pers/h
Arrival Flows (Total for all Sites)	2664 veh/h		3197 pers/h
Demand Flows (Entry Total)	1462 veh/h		
Midblock Inflows (Total)	5 veh/h		
Midblock Outflows (Total)	-5 veh/h		
Percent Heavy Vehicles (Demand)	8.7 %		
Percent Heavy Vehicles (Arrival)	8.7 %		
Degree of Saturation	0.693		
Control Delay (Total)	3.64 veh-h/h		4.37 pers-h/h
Control Delay (Average)	4.9 sec		4.9 sec
Control Delay (Worst Lane)	37.2 sec		
Control Delay (Worst Movement)	45.2 sec		45.2 sec
Geometric Delay (Average)	2.0 sec		
Stop-Line Delay (Average)	2.9 sec		
Queue Storage Ratio (Worst Lane)	0.03		
Total Effective Stops	677 veh/h		812 pers/h
Effective Stop Rate	0.25	0.41 per km	0.25
Proportion Queued	0.16		0.16
Performance Index	36.3		36.3
Cost (Total)	824.58 $/h	0.50 $/km	824.58 $/h
Fuel Consumption (Total)	153.5 L/h	93.8 mL/km	
Fuel Economy	9.4 L/100km		
Carbon Dioxide (Total)	367.3 kg/h	224.5 g/km	
Hydrocarbons (Total)	0.032 kg/h	0.020 g/km	
Carbon Monoxide (Total)	0.506 kg/h	0.309 g/km	
NOx (Total)	0.722 kg/h	0.442 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)	1,278,821 veh/y	1,534,585 pers/y
Delay	1,747 veh-h/y	2,097 pers-h/y
Effective Stops	324,922 veh/y	389,906 pers/y
Travel Distance	785,324 veh-km/y	942,389 pers-km/y
Travel Time	13,104 veh-h/y	15,724 pers-h/y
Cost	395,797 $/y	395,797 $/y
Fuel Consumption	73,675 L/y	
Carbon Dioxide	176,313 kg/y	
Hydrocarbons	15 kg/y	
Carbon Monoxide	243 kg/y	

NOx	347 kg/y

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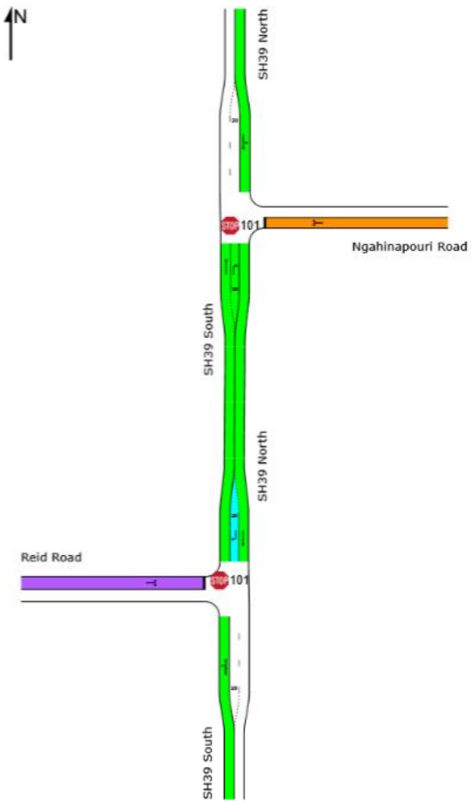
LANE LEVEL OF SERVICE

Lane Level of Service for Network Sites

Network: N101 [2035_Hi Dev_Staggered T_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: Wednesday, 12 June 2019 10:43:12 AM
Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\Ngahinapouri\N_Reid SH39 Int.sip8

NETWORK SUMMARY

Network: N101 [2035_Hi Dev_Staggered T_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	13.25		
Speed Efficiency	1.29		
Congestion Coefficient	0.77		
Travel Speed (Average)	64.6 km/h		64.6 km/h
Travel Distance (Total)	1377.9 veh-km/h		1653.5 pers-km/h
Travel Time (Total)	21.3 veh-h/h		25.6 pers-h/h
Desired Speed	50.0 km/h		
Demand Flows (Total for all Sites)	2229 veh/h		2675 pers/h
Arrival Flows (Total for all Sites)	2229 veh/h		2675 pers/h
Demand Flows (Entry Total)	1234 veh/h		
Midblock Inflows (Total)	7 veh/h		
Midblock Outflows (Total)	-7 veh/h		
Percent Heavy Vehicles (Demand)	9.4 %		
Percent Heavy Vehicles (Arrival)	9.4 %		
Degree of Saturation	0.429		
Control Delay (Total)	1.32 veh-h/h		1.59 pers-h/h
Control Delay (Average)	2.1 sec		2.1 sec
Control Delay (Worst Lane)	22.9 sec		
Control Delay (Worst Movement)	27.6 sec		27.6 sec
Geometric Delay (Average)	1.5 sec		
Stop-Line Delay (Average)	0.7 sec		
Queue Storage Ratio (Worst Lane)	0.00		
Total Effective Stops	362 veh/h		435 pers/h
Effective Stop Rate	0.16	0.26 per km	0.16
Proportion Queued	0.07		0.07
Performance Index	24.2		24.2
Cost (Total)	616.85 $/h	0.45 $/km	616.85 $/h
Fuel Consumption (Total)	124.2 L/h	90.2 mL/km	
Fuel Economy	9.0 L/100km		
Carbon Dioxide (Total)	297.8 kg/h	216.2 g/km	
Hydrocarbons (Total)	0.025 kg/h	0.018 g/km	
Carbon Monoxide (Total)	0.414 kg/h	0.301 g/km	
NOx (Total)	0.637 kg/h	0.462 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)	1,070,148 veh/y	1,284,177 pers/y
Delay	635 veh-h/y	761 pers-h/y
Effective Stops	173,847 veh/y	208,616 pers/y
Travel Distance	661,406 veh-km/y	793,687 pers-km/y
Travel Time	10,236 veh-h/y	12,284 pers-h/y
Cost	296,087 $/y	296,087 $/y
Fuel Consumption	59,639 L/y	
Carbon Dioxide	142,965 kg/y	
Hydrocarbons	12 kg/y	
Carbon Monoxide	199 kg/y	

NOx	306 kg/y

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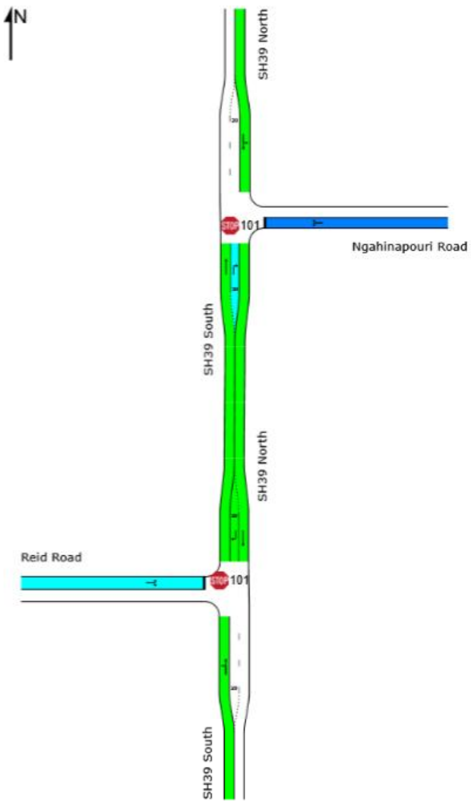
LANE LEVEL OF SERVICE

Lane Level of Service for Network Sites

Network: N101 [2035_Hi Dev_Staggered T_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: Wednesday, 12 June 2019 10:43:14 AM
Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\Ngahinapouri\N_Reid SH39 Int.sip8

INTERSECTION SUMMARY

Site: 101v [Opt2 - 2018_Low Dev_AM]

New Site
Site Category: (None)
Signals - Fixed Time Isolated   Cycle Time = 30 seconds (Site Practical Cycle Time)

Intersection Performance - Hourly Values

Performance Measure	Vehicles		Persons	
Travel Speed (Average)	55.3	km/h	55.3	km/h
Travel Distance (Total)	1043.9	veh-km/h	1252.7	pers-km/h
Travel Time (Total)	18.9	veh-h/h	22.7	pers-h/h
Demand Flows (Total)	1032	veh/h	1238	pers/h
Percent Heavy Vehicles (Demand)	6.7	%		
Degree of Saturation	0.740			
Practical Spare Capacity	21.6	%		
Effective Intersection Capacity	1394	veh/h		
Control Delay (Total)	3.60	veh-h/h	4.31	pers-h/h
Control Delay (Average)	12.5	sec	12.5	sec
Control Delay (Worst Lane)	18.1	sec		
Control Delay (Worst Movement)	18.7	sec	18.7	sec
Geometric Delay (Average)	2.7	sec		
Stop-Line Delay (Average)	9.9	sec		
Idling Time (Average)	5.6	sec		
Intersection Level of Service (LOS)	LOS B			
95% Back of Queue - Vehicles (Worst Lane)	6.5	veh		
95% Back of Queue - Distance (Worst Lane)	49.4	m		
Queue Storage Ratio (Worst Lane)	0.06			
Total Effective Stops	791	veh/h	949	pers/h
Effective Stop Rate	0.77		0.77	
Proportion Queued	0.82		0.82	
Performance Index	45.6		45.6	
Cost (Total)	667.02	$/h	667.02	$/h
Fuel Consumption (Total)	126.6	L/h		
Carbon Dioxide (Total)	302.2	kg/h		
Hydrocarbons (Total)	0.027	kg/h		
Carbon Monoxide (Total)	0.384	kg/h		
NOx (Total)	0.797	kg/h		

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Intersection LOS value for Vehicles is based on average delay for all vehicle 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 Main (Timing-Capacity) Iterations: 0.0%   0.0%   0.0%

Intersection Performance - Annual Values

Performance Measure	Vehicles		Persons	
Demand Flows (Total)	495,158	veh/y	594,190	pers/y
Delay	1,726	veh-h/y	2,071	pers-h/y
Effective Stops	379,554	veh/y	455,465	pers/y
Travel Distance	501,065	veh-km/y	601,278	pers-km/y
Travel Time	9,061	veh-h/y	10,873	pers-h/y
Cost	320,168	$/y	320,168	$/y
Fuel Consumption	60,770	L/y		
Carbon Dioxide	145,038	kg/y		
Hydrocarbons	13	kg/y		
Carbon Monoxide	184	kg/y		
NOx	383	kg/y		

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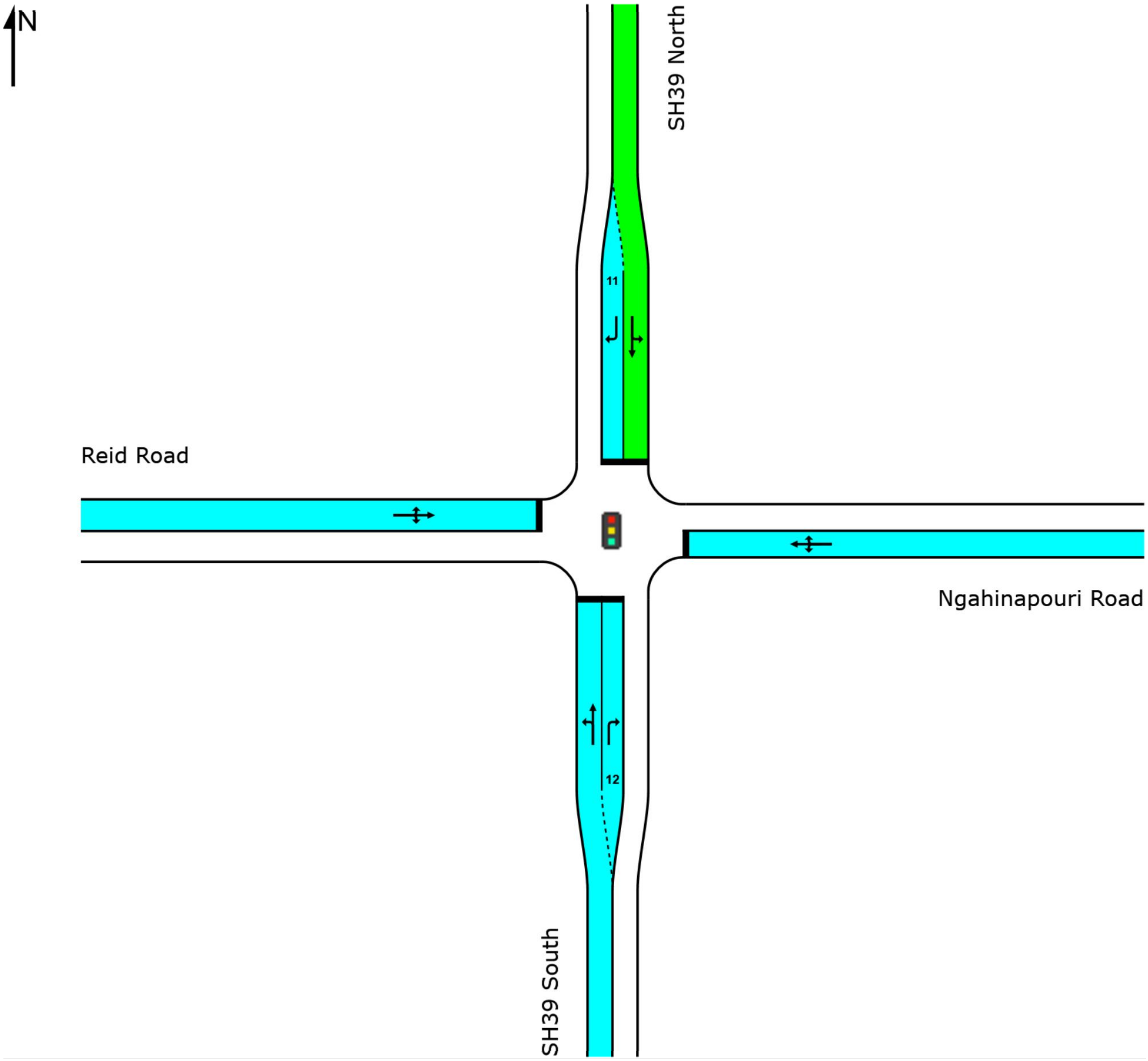
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101v [Opt2 - 2018_Low Dev_AM]

New Site
Site Category: (None)
Signals - Fixed Time Isolated   Cycle Time = 30 seconds (Site Practical Cycle Time)

	Approaches				Intersection
	South	East	North	West	
LOS	B	B	A	B	B



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.

Organisation: TONKIN & TAYLOR | Processed: Wednesday, 12 June 2019 10:42:42 AM
Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\Ngahinapouri\N_Reid SH39 Int.sip8

DELAY (CONTROL)

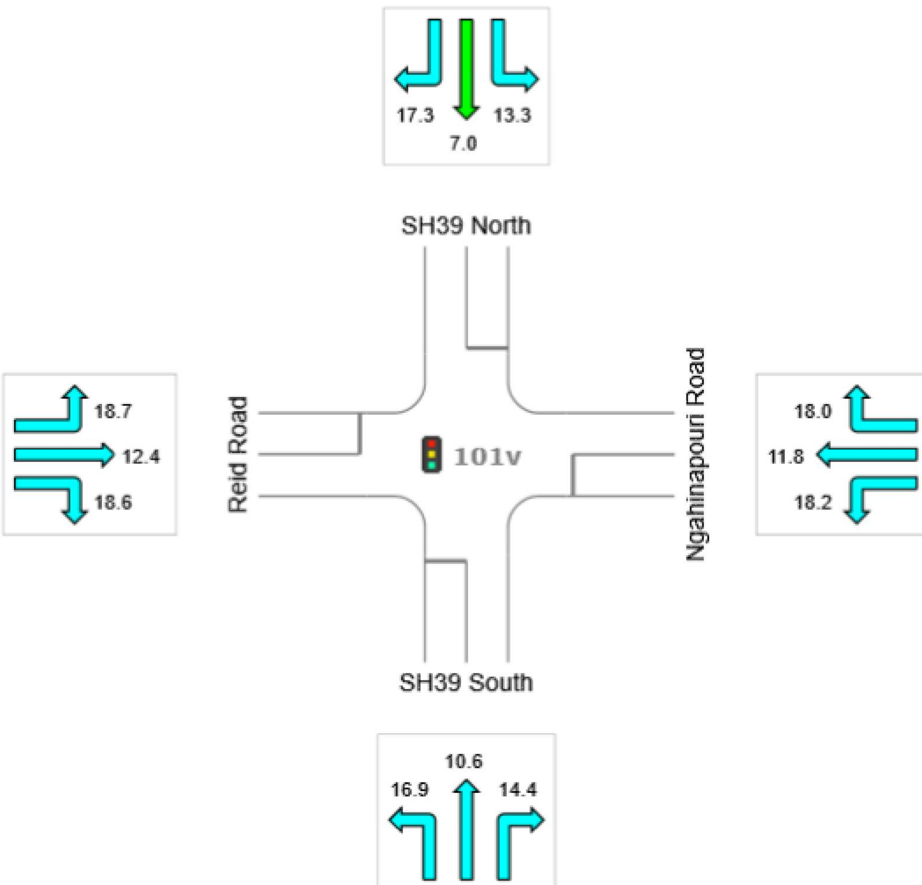
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 101v [Opt2 - 2018_Low Dev_AM]

New Site
Site Category: (None)
Signals - Fixed Time Isolated   Cycle Time = 30 seconds (Site Practical Cycle Time)

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	12.0	17.5	9.3	18.1	12.5
LOS	B	B	A	B	B



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.

Organisation: TONKIN & TAYLOR | Processed: Wednesday, 12 June 2019 10:42:42 AM
Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\Ngahinapouri\N_Reid SH39 Int.sip8

INTERSECTION SUMMARY

Site: 101v [Opt2 - 2018_Low Dev_PM]

New Site
Site Category: (None)
Signals - Fixed Time Isolated   Cycle Time = 30 seconds (Site Practical Cycle Time)

Intersection Performance - Hourly Values

Performance Measure	Vehicles	Persons
Travel Speed (Average)	55.2 km/h	55.2 km/h
Travel Distance (Total)	911.8 veh-km/h	1094.1 pers-km/h
Travel Time (Total)	16.5 veh-h/h	19.8 pers-h/h
Demand Flows (Total)	901 veh/h	1081 pers/h
Percent Heavy Vehicles (Demand)	7.6 %	
Degree of Saturation	0.779	
Practical Spare Capacity	15.5 %	
Effective Intersection Capacity	1156 veh/h	
Control Delay (Total)	3.21 veh-h/h	3.85 pers-h/h
Control Delay (Average)	12.8 sec	12.8 sec
Control Delay (Worst Lane)	18.7 sec	
Control Delay (Worst Movement)	18.7 sec	18.7 sec
Geometric Delay (Average)	2.2 sec	
Stop-Line Delay (Average)	10.6 sec	
Idling Time (Average)	5.6 sec	
Intersection Level of Service (LOS)	LOS B	
95% Back of Queue - Vehicles (Worst Lane)	8.1 veh	
95% Back of Queue - Distance (Worst Lane)	61.3 m	
Queue Storage Ratio (Worst Lane)	0.08	
Total Effective Stops	729 veh/h	875 pers/h
Effective Stop Rate	0.81	0.81
Proportion Queued	0.84	0.84
Performance Index	41.6	41.6
Cost (Total)	598.38 $/h	598.38 $/h
Fuel Consumption (Total)	115.8 L/h	
Carbon Dioxide (Total)	276.7 kg/h	
Hydrocarbons (Total)	0.024 kg/h	
Carbon Monoxide (Total)	0.342 kg/h	
NOx (Total)	0.805 kg/h	

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Intersection LOS value for Vehicles is based on average delay for all vehicle 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 Main (Timing-Capacity) Iterations: 0.0% 0.0% 0.0%

Intersection Performance - Annual Values

Performance Measure	Vehicles	Persons
Demand Flows (Total)	432,505 veh/y	519,006 pers/y
Delay	1,541 veh-h/y	1,849 pers-h/y
Effective Stops	350,074 veh/y	420,089 pers/y
Travel Distance	437,652 veh-km/y	525,182 pers-km/y
Travel Time	7,927 veh-h/y	9,512 pers-h/y
Cost	287,223 $/y	287,223 $/y
Fuel Consumption	55,564 L/y	
Carbon Dioxide	132,804 kg/y	
Hydrocarbons	12 kg/y	
Carbon Monoxide	164 kg/y	
NOx	386 kg/y	

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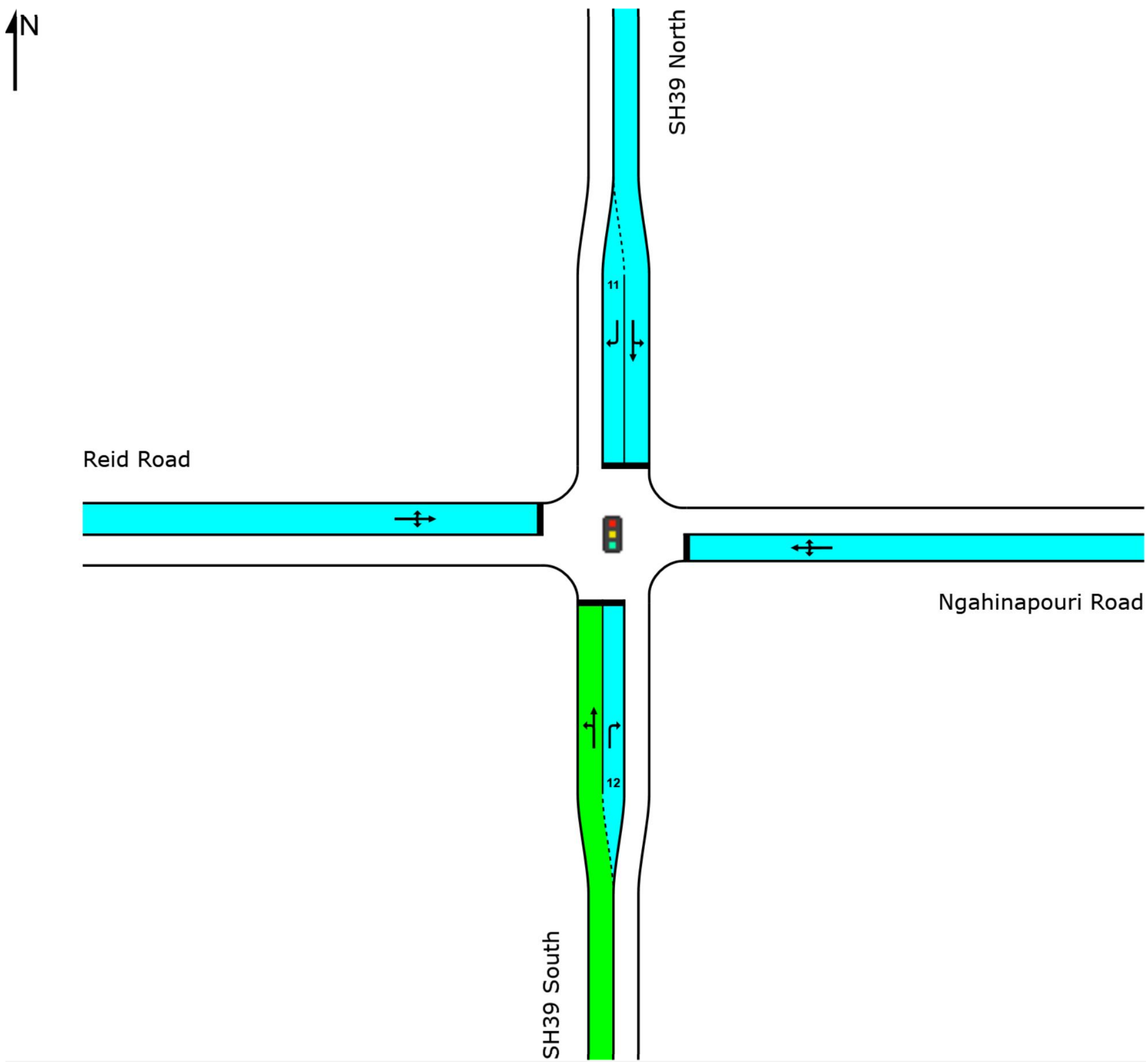
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101v [Opt2 - 2018_Low Dev_PM]

New Site
Site Category: (None)
Signals - Fixed Time Isolated   Cycle Time = 30 seconds (Site Practical Cycle Time)

	Approaches				Intersection
	South	East	North	West	
LOS	A	B	B	B	B



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.

Organisation: TONKIN & TAYLOR | Processed: Wednesday, 12 June 2019 10:42:42 AM
Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\Ngahinapouri\N_Reid SH39 Int.sip8

DELAY (CONTROL)

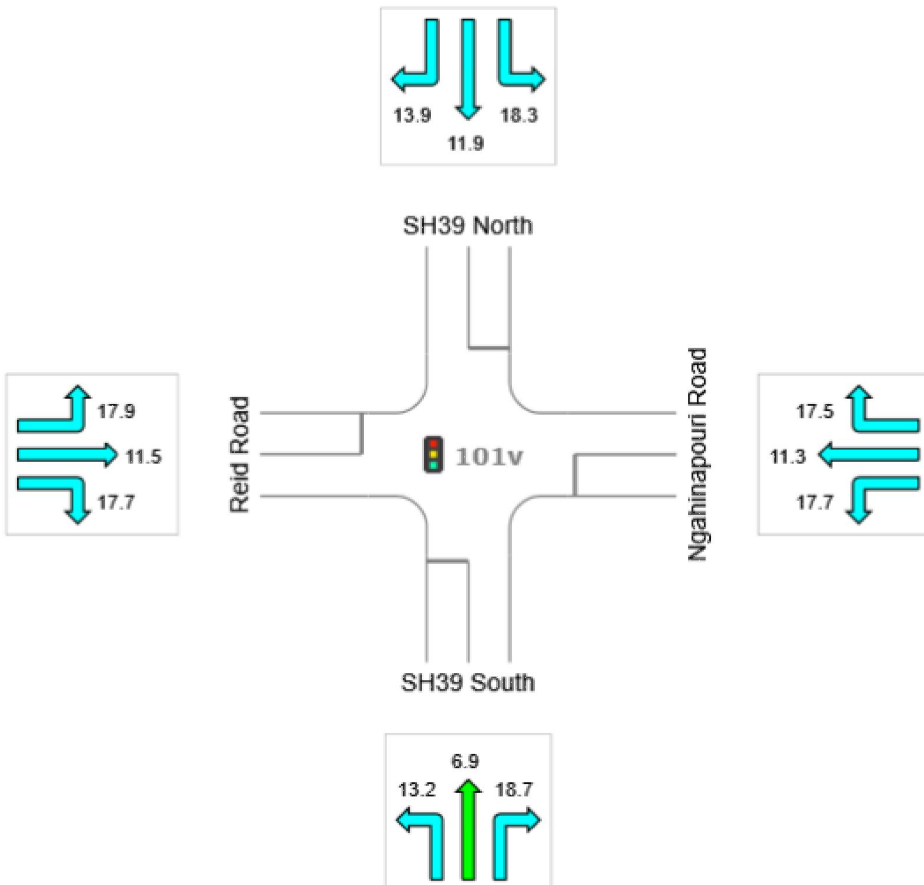
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 101v [Opt2 - 2018_Low Dev_PM]

New Site
Site Category: (None)
Signals - Fixed Time Isolated   Cycle Time = 30 seconds (Site Practical Cycle Time)

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	9.9	17.1	13.4	17.2	12.8
LOS	A	B	B	B	B



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: 101v [Opt2 - 2018_Hi Dev_AM]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 30 seconds (Site Practical Cycle Time)

Intersection Performance - Hourly Values		
Performance Measure	**Vehicles**	**Persons**
Travel Speed (Average)	54.0 km/h	54.0 km/h
Travel Distance (Total)	1167.8 veh-km/h	1401.3 pers-km/h
Travel Time (Total)	21.6 veh-h/h	25.9 pers-h/h
Demand Flows (Total)	1154 veh/h	1384 pers/h
Percent Heavy Vehicles (Demand)	6.0 %	
Degree of Saturation	0.751	
Practical Spare Capacity	19.9 %	
Effective Intersection Capacity	1537 veh/h	
Control Delay (Total)	4.48 veh-h/h	5.37 pers-h/h
Control Delay (Average)	14.0 sec	14.0 sec
Control Delay (Worst Lane)	21.1 sec	
Control Delay (Worst Movement)	21.7 sec	21.7 sec
Geometric Delay (Average)	3.0 sec	
Stop-Line Delay (Average)	11.0 sec	
Idling Time (Average)	6.1 sec	
Intersection Level of Service (LOS)	LOS B	
95% Back of Queue - Vehicles (Worst Lane)	6.5 veh	
95% Back of Queue - Distance (Worst Lane)	49.4 m	
Queue Storage Ratio (Worst Lane)	0.06	
Total Effective Stops	928 veh/h	1113 pers/h
Effective Stop Rate	0.80	0.80
Proportion Queued	0.86	0.86
Performance Index	53.5	53.5
Cost (Total)	755.66 $/h	755.66 $/h
Fuel Consumption (Total)	139.0 L/h	
Carbon Dioxide (Total)	331.2 kg/h	
Hydrocarbons (Total)	0.030 kg/h	
Carbon Monoxide (Total)	0.427 kg/h	
NOx (Total)	0.807 kg/h	

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Intersection LOS value for Vehicles is based on average delay for all vehicle 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 Main (Timing-Capacity) Iterations: 0.0% 7.1% 0.3%

Intersection Performance - Annual Values		
Performance Measure	**Vehicles**	**Persons**
Demand Flows (Total)	553,769 veh/y	664,522 pers/y
Delay	2,148 veh-h/y	2,578 pers-h/y
Effective Stops	445,351 veh/y	534,421 pers/y
Travel Distance	560,539 veh-km/y	672,647 pers-km/y
Travel Time	10,373 veh-h/y	12,448 pers-h/y
Cost	362,716 $/y	362,716 $/y
Fuel Consumption	66,710 L/y	
Carbon Dioxide	158,996 kg/y	
Hydrocarbons	14 kg/y	
Carbon Monoxide	205 kg/y	
NOx	388 kg/y	

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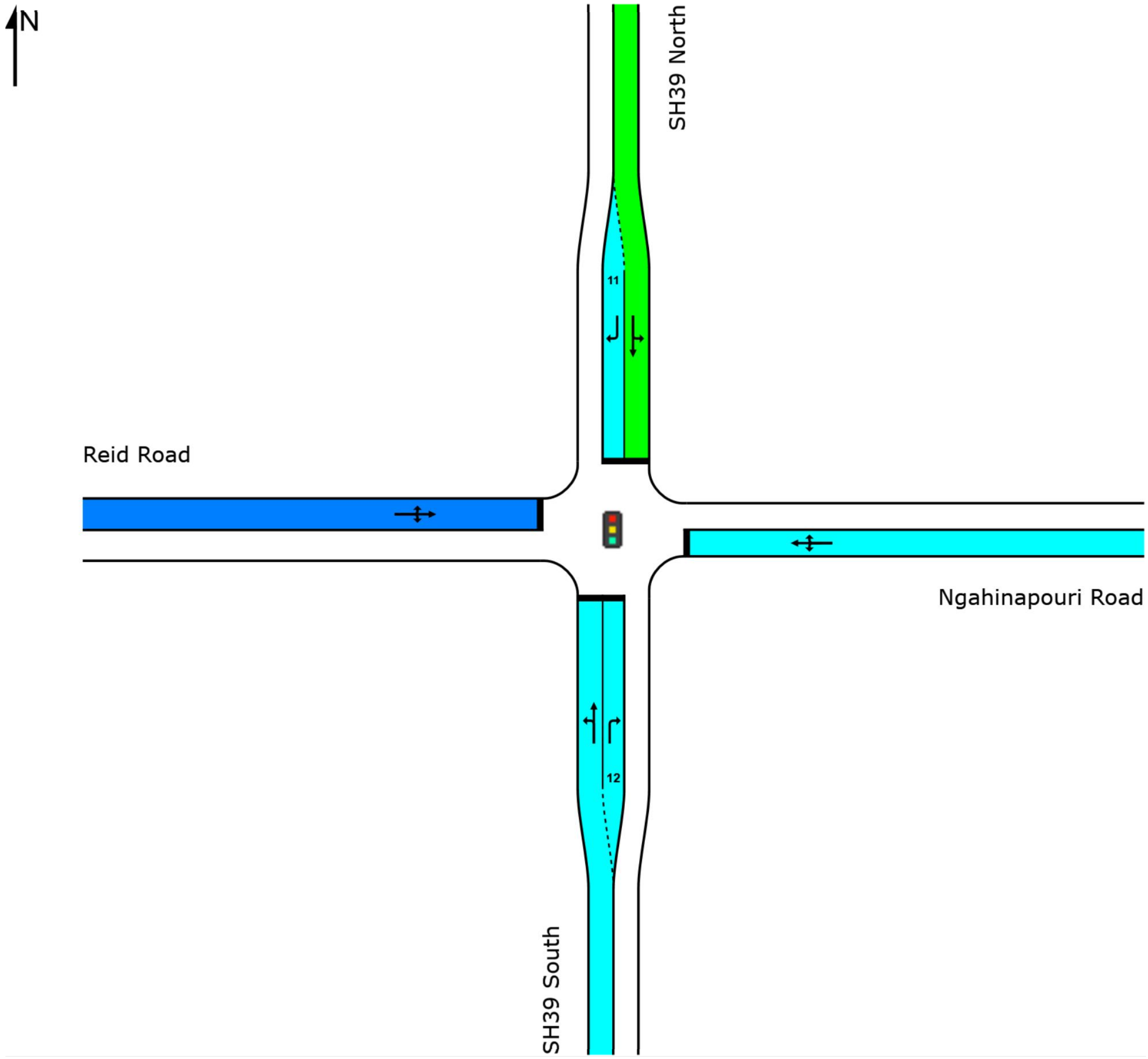
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101v [Opt2 - 2018_Hi Dev_AM]

New Site
Site Category: (None)
Signals - Fixed Time Isolated   Cycle Time = 30 seconds (Site Practical Cycle Time)

	Approaches				Intersection
	South	East	North	West	
LOS	B	B	A	C	B



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.

Organisation: TONKIN & TAYLOR | Processed: Wednesday, 12 June 2019 10:42:43 AM
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DELAY (CONTROL)

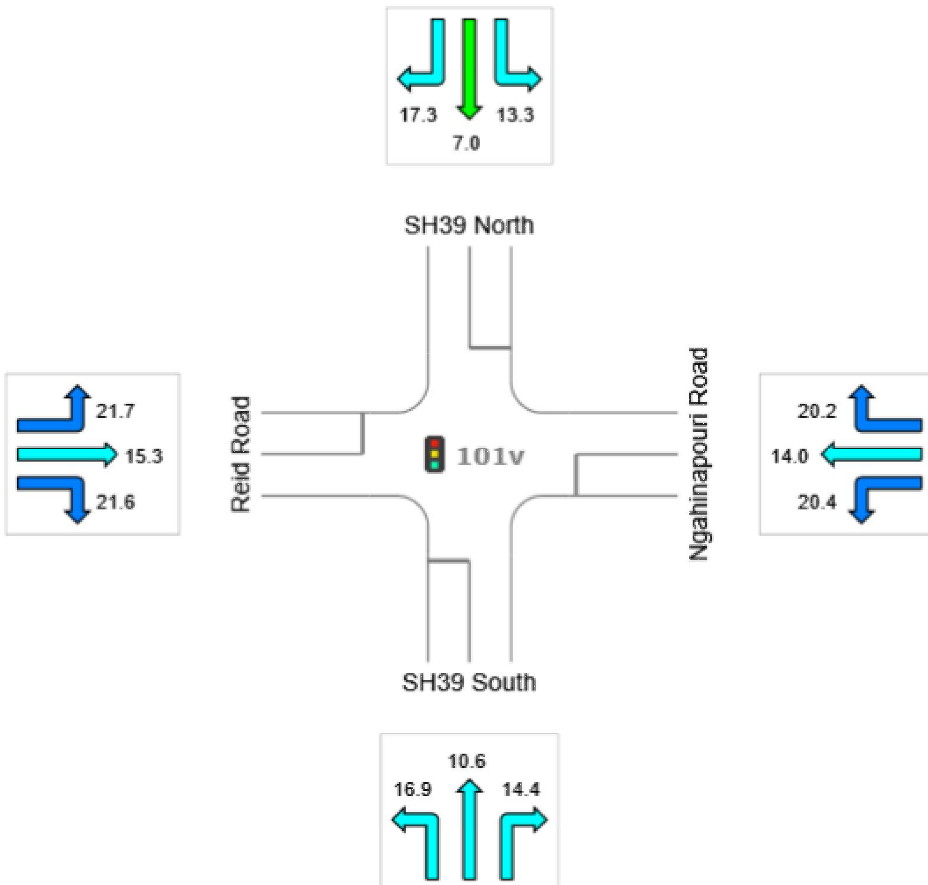
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 101v [Opt2 - 2018_Hi Dev_AM]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 30 seconds (Site Practical Cycle Time)

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	12.0	19.6	9.3	21.1	14.0
LOS	B	B	A	C	B



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).
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Organisation: TONKIN & TAYLOR | Processed: Wednesday, 12 June 2019 10:42:43 AM
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INTERSECTION SUMMARY

Site: 101v [Opt2 - 2018_Hi Dev_PM]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 30 seconds (Site Practical Cycle Time)

Intersection Performance - Hourly Values

Performance Measure	Vehicles		Persons	
Travel Speed (Average)	55.0	km/h	55.0	km/h
Travel Distance (Total)	954.5	veh-km/h	1145.4	pers-km/h
Travel Time (Total)	17.4	veh-h/h	20.8	pers-h/h
Demand Flows (Total)	943	veh/h	1132	pers/h
Percent Heavy Vehicles (Demand)	7.3	%		
Degree of Saturation	0.779			
Practical Spare Capacity	15.5	%		
Effective Intersection Capacity	1210	veh/h		
Control Delay (Total)	3.42	veh-h/h	4.11	pers-h/h
Control Delay (Average)	13.1	sec	13.1	sec
Control Delay (Worst Lane)	18.7	sec		
Control Delay (Worst Movement)	18.7	sec	18.7	sec
Geometric Delay (Average)	2.4	sec		
Stop-Line Delay (Average)	10.7	sec		
Idling Time (Average)	5.7	sec		
Intersection Level of Service (LOS)	LOS B			
95% Back of Queue - Vehicles (Worst Lane)	8.1	veh		
95% Back of Queue - Distance (Worst Lane)	61.3	m		
Queue Storage Ratio (Worst Lane)	0.08			
Total Effective Stops	762	veh/h	915	pers/h
Effective Stop Rate	0.81		0.81	
Proportion Queued	0.85		0.85	
Performance Index	43.7		43.7	
Cost (Total)	625.49	$/h	625.49	$/h
Fuel Consumption (Total)	119.8	L/h		
Carbon Dioxide (Total)	286.2	kg/h		
Hydrocarbons (Total)	0.025	kg/h		
Carbon Monoxide (Total)	0.356	kg/h		
NOx (Total)	0.808	kg/h		

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Intersection LOS value for Vehicles is based on average delay for all vehicle 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 Main (Timing-Capacity) Iterations: 0.0% 0.0% 0.0%

Intersection Performance - Annual Values

Performance Measure	Vehicles		Persons	
Demand Flows (Total)	452,716	veh/y	543,259	pers/y
Delay	1,644	veh-h/y	1,973	pers-h/y
Effective Stops	365,946	veh/y	439,135	pers/y
Travel Distance	458,160	veh-km/y	549,792	pers-km/y
Travel Time	8,336	veh-h/y	10,004	pers-h/y
Cost	300,235	$/y	300,235	$/y
Fuel Consumption	57,519	L/y		
Carbon Dioxide	137,398	kg/y		
Hydrocarbons	12	kg/y		
Carbon Monoxide	171	kg/y		
NOx	388	kg/y		

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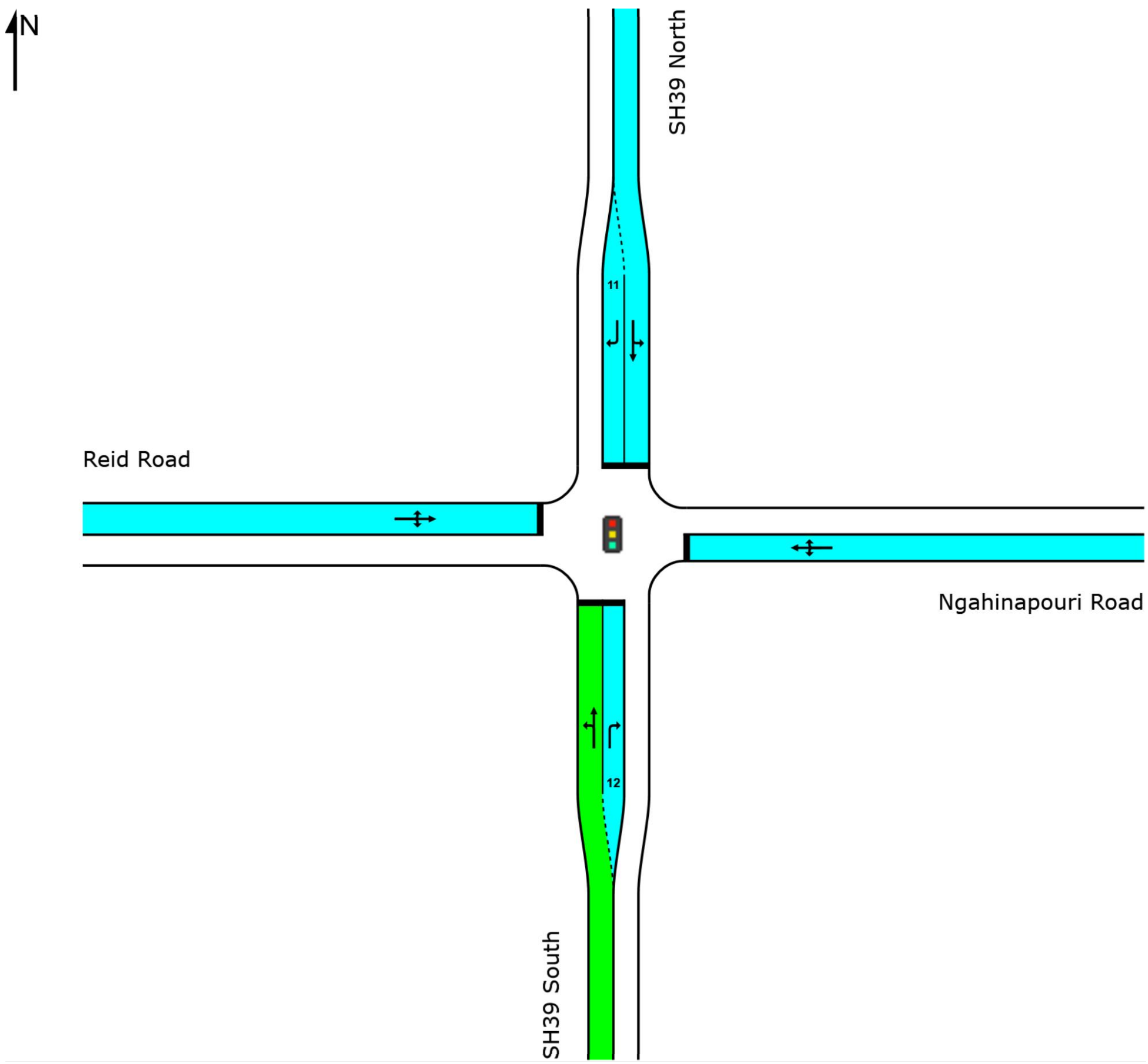
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101v [Opt2 - 2018_Hi Dev_PM]

New Site
Site Category: (None)
Signals - Fixed Time Isolated   Cycle Time = 30 seconds (Site Practical Cycle Time)

	Approaches				Intersection
	South	East	North	West	
LOS	A	B	B	B	B



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).
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Organisation: TONKIN & TAYLOR | Processed: Wednesday, 12 June 2019 10:42:43 AM
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DELAY (CONTROL)

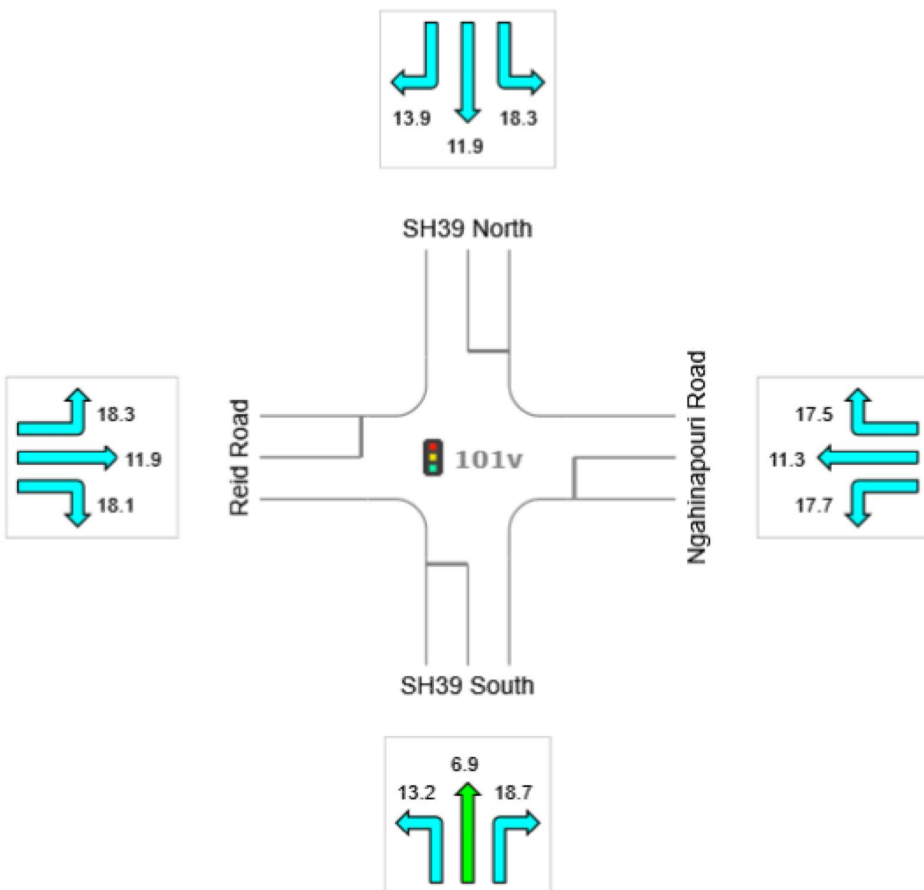
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 101v [Opt2 - 2018_Hi Dev_PM]

New Site
Site Category: (None)
Signals - Fixed Time Isolated   Cycle Time = 30 seconds (Site Practical Cycle Time)

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	9.9	17.1	13.4	17.7	13.1
LOS	A	B	B	B	B



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: 101v [Opt2 - 2035_Low Dev_AM]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 40 seconds (Site Practical Cycle Time)

Intersection Performance - Hourly Values		
Performance Measure	**Vehicles**	**Persons**
Travel Speed (Average)	54.6 km/h	54.6 km/h
Travel Distance (Total)	1355.9 veh-km/h	1627.0 pers-km/h
Travel Time (Total)	24.8 veh-h/h	29.8 pers-h/h
Demand Flows (Total)	1340 veh/h	1608 pers/h
Percent Heavy Vehicles (Demand)	6.9 %	
Degree of Saturation	0.788	
Practical Spare Capacity	14.2 %	
Effective Intersection Capacity	1701 veh/h	
Control Delay (Total)	5.00 veh-h/h	6.00 pers-h/h
Control Delay (Average)	13.4 sec	13.4 sec
Control Delay (Worst Lane)	25.0 sec	
Control Delay (Worst Movement)	25.7 sec	25.7 sec
Geometric Delay (Average)	2.6 sec	
Stop-Line Delay (Average)	10.9 sec	
Idling Time (Average)	6.8 sec	
Intersection Level of Service (LOS)	LOS B	
95% Back of Queue - Vehicles (Worst Lane)	10.4 veh	
95% Back of Queue - Distance (Worst Lane)	79.7 m	
Queue Storage Ratio (Worst Lane)	0.10	
Total Effective Stops	971 veh/h	1166 pers/h
Effective Stop Rate	0.72	0.72
Proportion Queued	0.73	0.73
Performance Index	65.4	65.4
Cost (Total)	854.03 $/h	854.03 $/h
Fuel Consumption (Total)	159.8 L/h	
Carbon Dioxide (Total)	381.5 kg/h	
Hydrocarbons (Total)	0.034 kg/h	
Carbon Monoxide (Total)	0.488 kg/h	
NOx (Total)	0.982 kg/h	

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Intersection LOS value for Vehicles is based on average delay for all vehicle 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 Main (Timing-Capacity) Iterations: 0.0% 24.5% 0.2%

Intersection Performance - Annual Values		
Performance Measure	**Vehicles**	**Persons**
Demand Flows (Total)	643,200 veh/y	771,840 pers/y
Delay	2,402 veh-h/y	2,882 pers-h/y
Effective Stops	466,274 veh/y	559,528 pers/y
Travel Distance	650,819 veh-km/y	780,983 pers-km/y
Travel Time	11,924 veh-h/y	14,309 pers-h/y
Cost	409,933 $/y	409,933 $/y
Fuel Consumption	76,687 L/y	
Carbon Dioxide	183,108 kg/y	
Hydrocarbons	16 kg/y	
Carbon Monoxide	234 kg/y	
NOx	471 kg/y	

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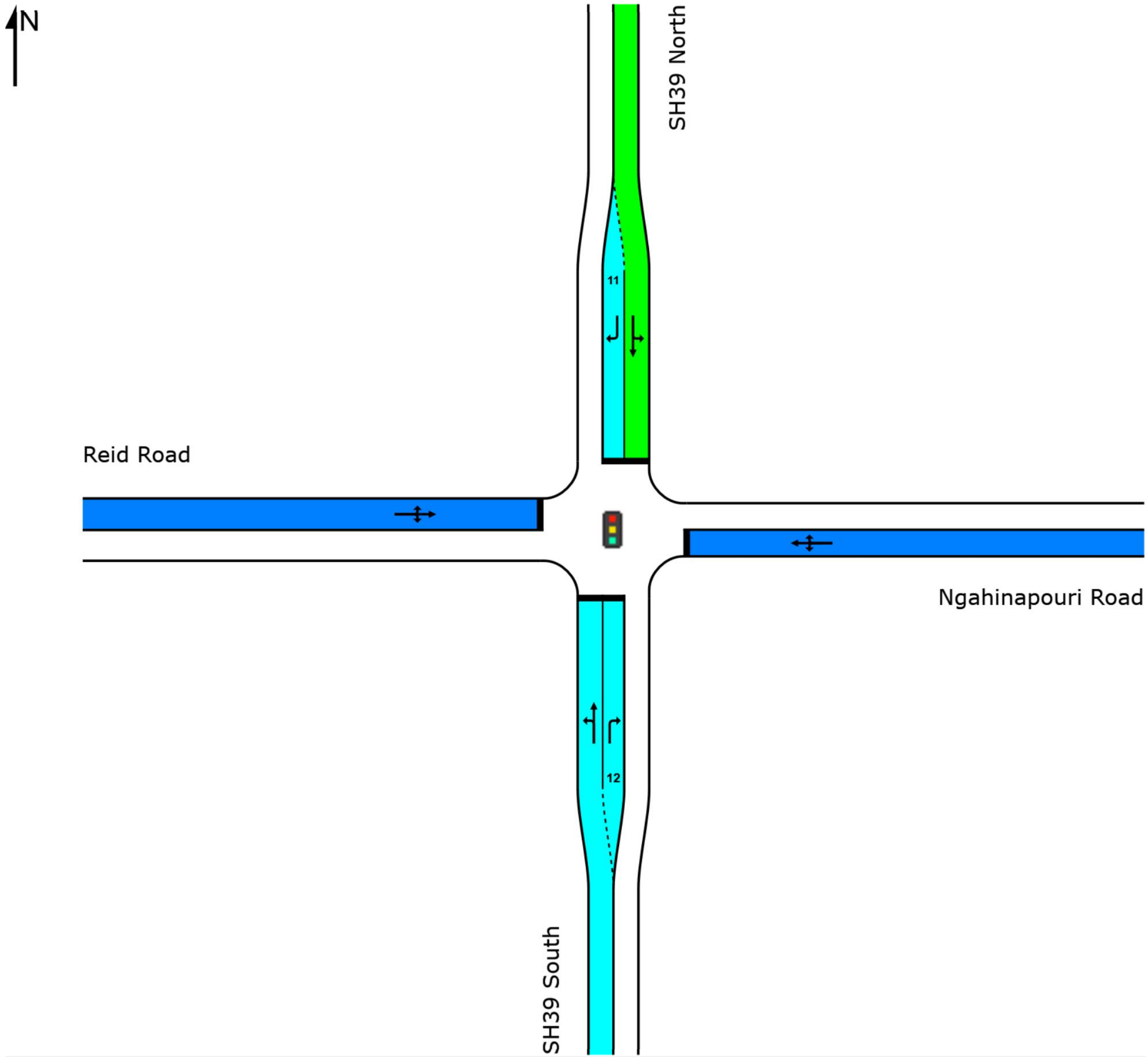
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101v [Opt2 - 2035_Low Dev_AM]

New Site
Site Category: (None)
Signals - Fixed Time Isolated   Cycle Time = 40 seconds (Site Practical Cycle Time)

	Approaches				Intersection
	South	East	North	West	
LOS	B	C	A	C	B



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.

Organisation: TONKIN & TAYLOR | Processed: Wednesday, 12 June 2019 10:42:44 AM
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DELAY (CONTROL)

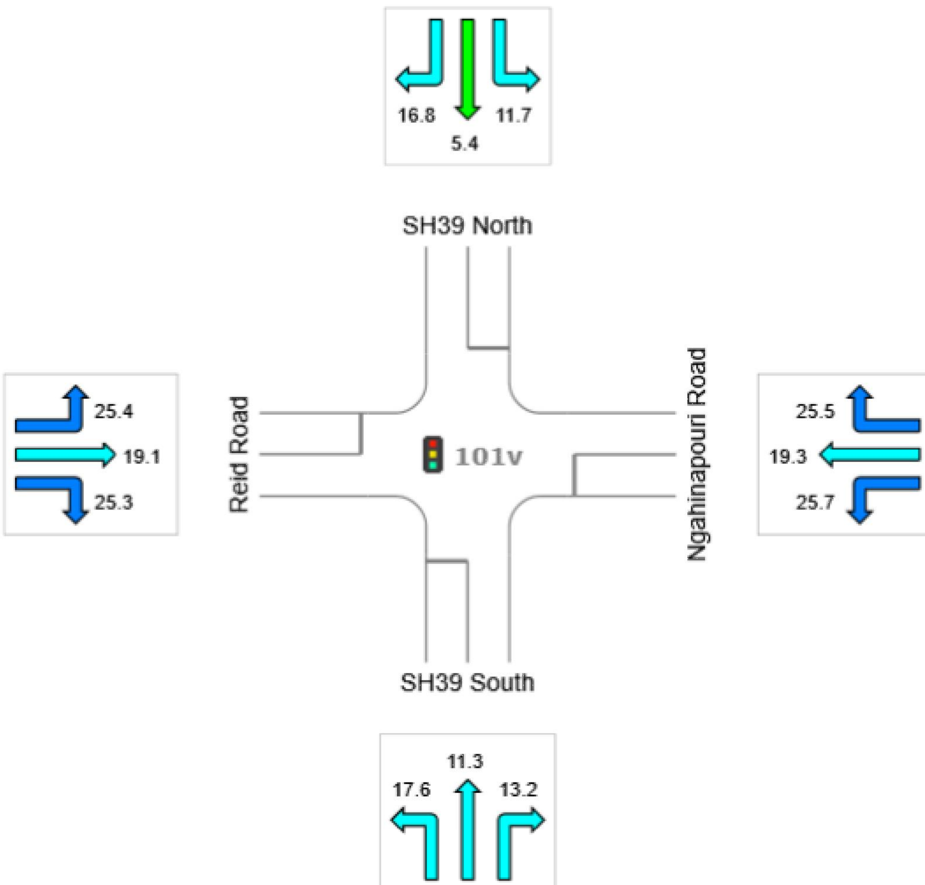
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 101v [Opt2 - 2035_Low Dev_AM]

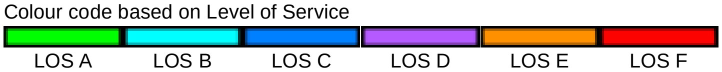
New Site
Site Category: (None)
Signals - Fixed Time Isolated   Cycle Time = 40 seconds (Site Practical Cycle Time)

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	12.2	25.0	7.7	24.8	13.4
LOS	B	C	A	C	B



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.

Organisation: TONKIN & TAYLOR | Processed: Wednesday, 12 June 2019 10:42:44 AM
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INTERSECTION SUMMARY

Site: 101v [Opt2 - 2035_Low Dev_PM]

New Site
Site Category: (None)
Signals - Fixed Time Isolated   Cycle Time = 40 seconds (Site Practical Cycle Time)

Intersection Performance - Hourly Values

Performance Measure	Vehicles		Persons	
Travel Speed (Average)	55.7	km/h	55.7	km/h
Travel Distance (Total)	1206.8	veh-km/h	1448.1	pers-km/h
Travel Time (Total)	21.7	veh-h/h	26.0	pers-h/h
Demand Flows (Total)	1193	veh/h	1431	pers/h
Percent Heavy Vehicles (Demand)	7.7	%		
Degree of Saturation	0.783			
Practical Spare Capacity	14.9	%		
Effective Intersection Capacity	1523	veh/h		
Control Delay (Total)	4.08	veh-h/h	4.89	pers-h/h
Control Delay (Average)	12.3	sec	12.3	sec
Control Delay (Worst Lane)	23.2	sec		
Control Delay (Worst Movement)	23.8	sec	23.8	sec
Geometric Delay (Average)	2.2	sec		
Stop-Line Delay (Average)	10.1	sec		
Idling Time (Average)	6.0	sec		
Intersection Level of Service (LOS)	LOS B			
95% Back of Queue - Vehicles (Worst Lane)	12.4	veh		
95% Back of Queue - Distance (Worst Lane)	93.8	m		
Queue Storage Ratio (Worst Lane)	0.11			
Total Effective Stops	883	veh/h	1059	pers/h
Effective Stop Rate	0.74		0.74	
Proportion Queued	0.74		0.74	
Performance Index	58.5		58.5	
Cost (Total)	761.17	$/h	761.17	$/h
Fuel Consumption (Total)	147.3	L/h		
Carbon Dioxide (Total)	352.1	kg/h		
Hydrocarbons (Total)	0.031	kg/h		
Carbon Monoxide (Total)	0.440	kg/h		
NOx (Total)	0.995	kg/h		

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Intersection LOS value for Vehicles is based on average delay for all vehicle 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 Main (Timing-Capacity) Iterations: 0.6%   0.0%   0.0%

Intersection Performance - Annual Values

Performance Measure	Vehicles		Persons	
Demand Flows (Total)	572,463	veh/y	686,956	pers/y
Delay	1,957	veh-h/y	2,349	pers-h/y
Effective Stops	423,716	veh/y	508,459	pers/y
Travel Distance	579,256	veh-km/y	695,108	pers-km/y
Travel Time	10,407	veh-h/y	12,488	pers-h/y
Cost	365,360	$/y	365,360	$/y
Fuel Consumption	70,689	L/y		
Carbon Dioxide	169,014	kg/y		
Hydrocarbons	15	kg/y		
Carbon Monoxide	211	kg/y		
NOx	477	kg/y		

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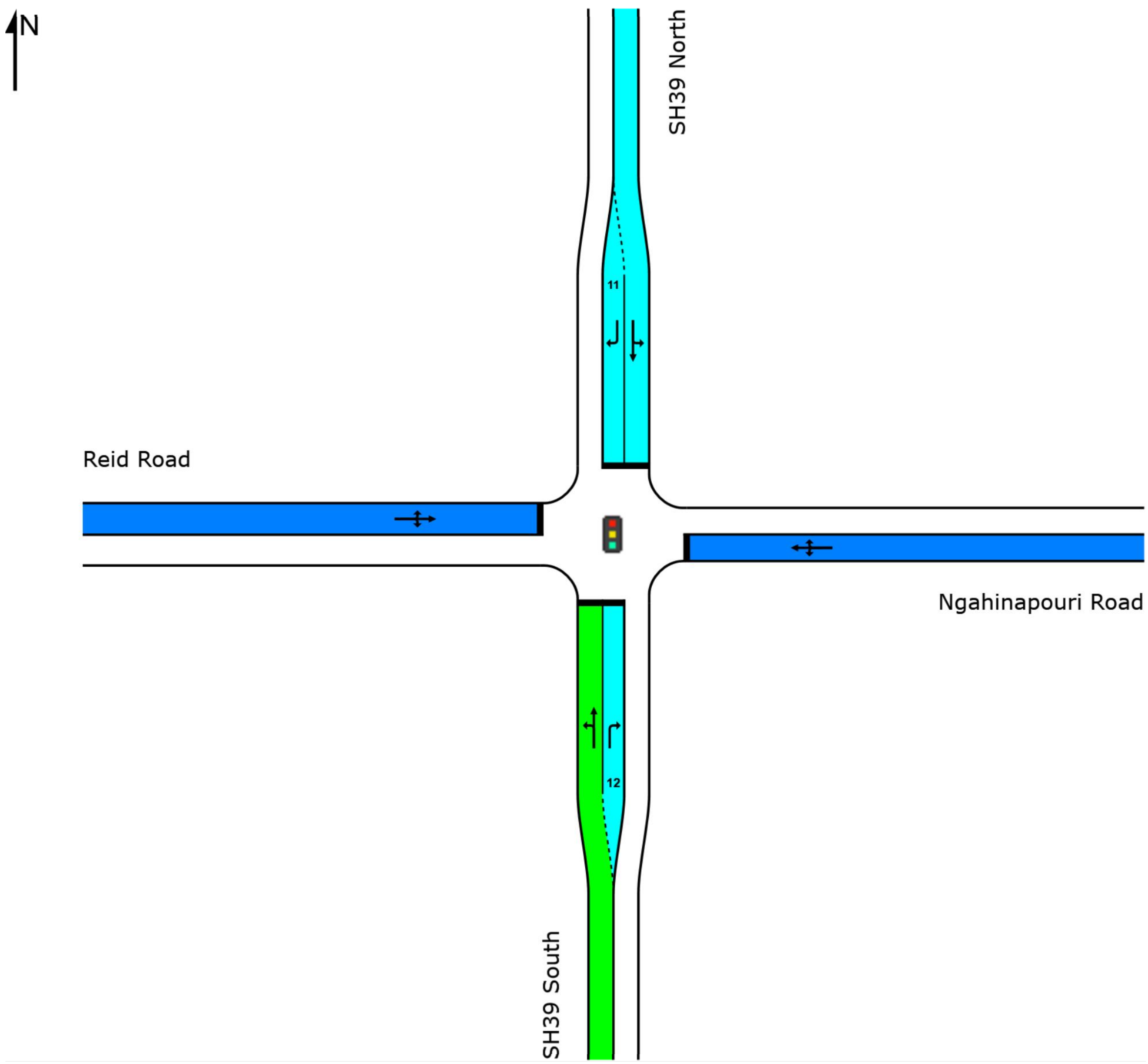
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101v [Opt2 - 2035_Low Dev_PM]

New Site
Site Category: (None)
Signals - Fixed Time Isolated   Cycle Time = 40 seconds (Site Practical Cycle Time)

	Approaches				Intersection
	South	East	North	West	
LOS	A	C	B	C	B



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).
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DELAY (CONTROL)

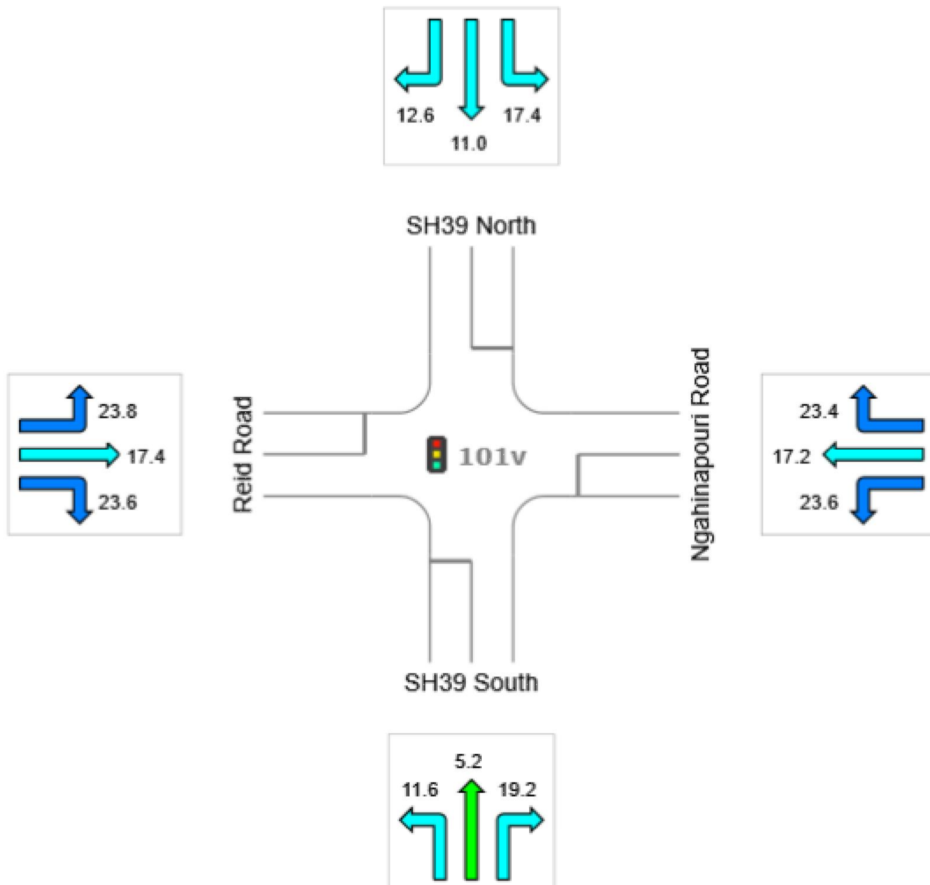
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 101v [Opt2 - 2035_Low Dev_PM]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 40 seconds (Site Practical Cycle Time)

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	8.7	22.9	12.5	23.2	12.3
LOS	A	C	B	C	B



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: 101v [Opt2 - 2035_Hi Dev_AM]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 40 seconds (Site Practical Cycle Time)

Intersection Performance - Hourly Values

Performance Measure	Vehicles	Persons
Travel Speed (Average)	50.9 km/h	50.9 km/h
Travel Distance (Total)	1479.8 veh-km/h	1775.7 pers-km/h
Travel Time (Total)	29.1 veh-h/h	34.9 pers-h/h
Demand Flows (Total)	1462 veh/h	1755 pers/h
Percent Heavy Vehicles (Demand)	6.3 %	
Degree of Saturation	0.865	
Practical Spare Capacity	4.1 %	
Effective Intersection Capacity	1691 veh/h	
Control Delay (Total)	7.39 veh-h/h	8.87 pers-h/h
Control Delay (Average)	18.2 sec	18.2 sec
Control Delay (Worst Lane)	26.0 sec	
Control Delay (Worst Movement)	26.6 sec	26.6 sec
Geometric Delay (Average)	2.8 sec	
Stop-Line Delay (Average)	15.4 sec	
Idling Time (Average)	9.9 sec	
Intersection Level of Service (LOS)	LOS B	
95% Back of Queue - Vehicles (Worst Lane)	13.6 veh	
95% Back of Queue - Distance (Worst Lane)	103.6 m	
Queue Storage Ratio (Worst Lane)	0.13	
Total Effective Stops	1226 veh/h	1472 pers/h
Effective Stop Rate	0.84	0.84
Proportion Queued	0.81	0.81
Performance Index	83.0	83.0
Cost (Total)	1013.99 $/h	1013.99 $/h
Fuel Consumption (Total)	178.9 L/h	
Carbon Dioxide (Total)	426.7 kg/h	
Hydrocarbons (Total)	0.038 kg/h	
Carbon Monoxide (Total)	0.545 kg/h	
NOx (Total)	1.063 kg/h	

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Intersection LOS value for Vehicles is based on average delay for all vehicle 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 Main (Timing-Capacity) Iterations: 0.0% 16.8% 0.4%

Intersection Performance - Annual Values

Performance Measure	Vehicles	Persons
Demand Flows (Total)	701,811 veh/y	842,173 pers/y
Delay	3,548 veh-h/y	4,258 pers-h/y
Effective Stops	588,620 veh/y	706,344 pers/y
Travel Distance	710,292 veh-km/y	852,350 pers-km/y
Travel Time	13,960 veh-h/y	16,752 pers-h/y
Cost	486,715 $/y	486,715 $/y
Fuel Consumption	85,884 L/y	
Carbon Dioxide	204,815 kg/y	
Hydrocarbons	18 kg/y	
Carbon Monoxide	262 kg/y	
NOx	510 kg/y	

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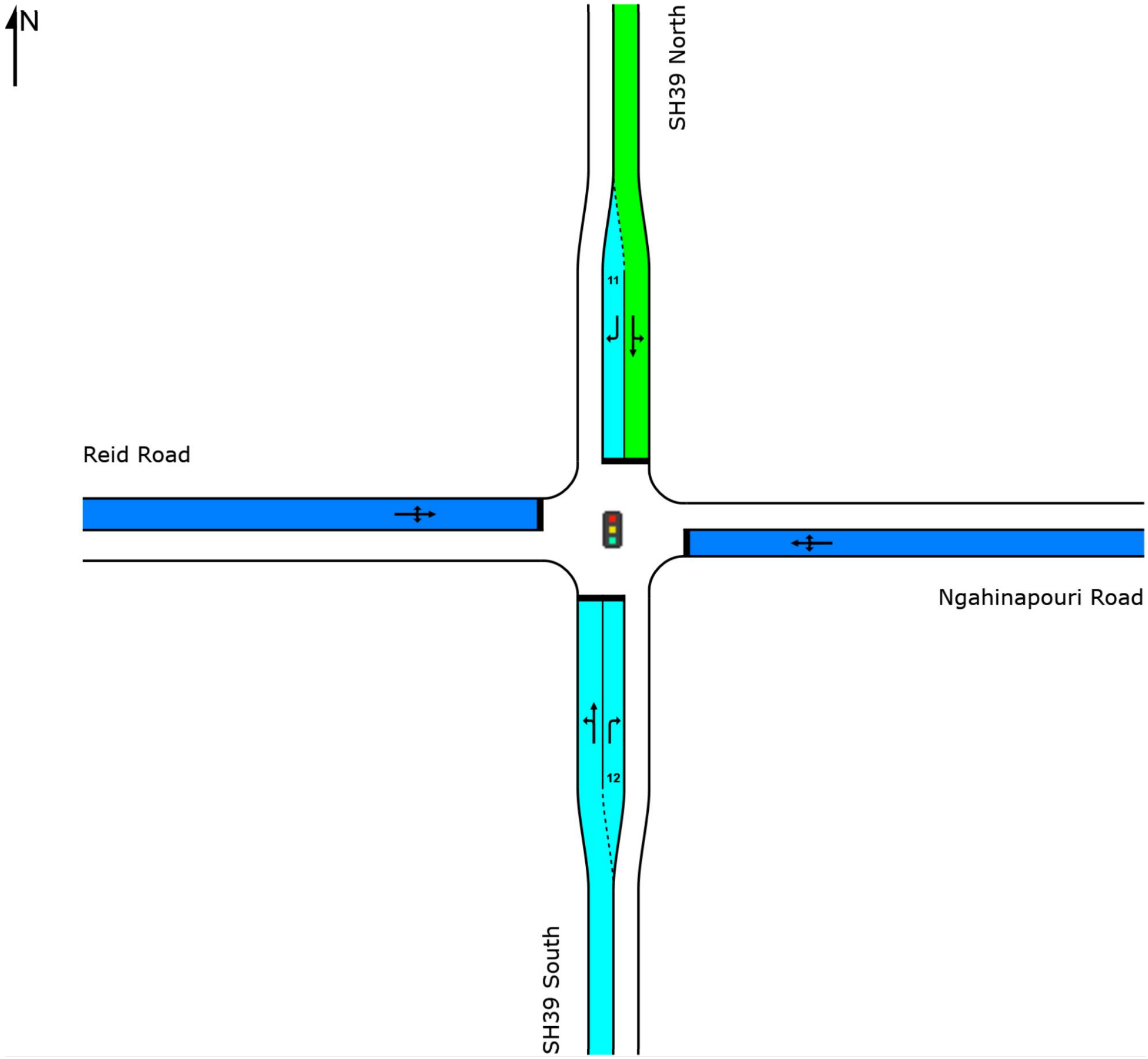
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101v [Opt2 - 2035_Hi Dev_AM]

New Site
Site Category: (None)
Signals - Fixed Time Isolated   Cycle Time = 40 seconds (Site Practical Cycle Time)

	Approaches				Intersection
	South	East	North	West	
LOS	B	C	A	C	B



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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DELAY (CONTROL)

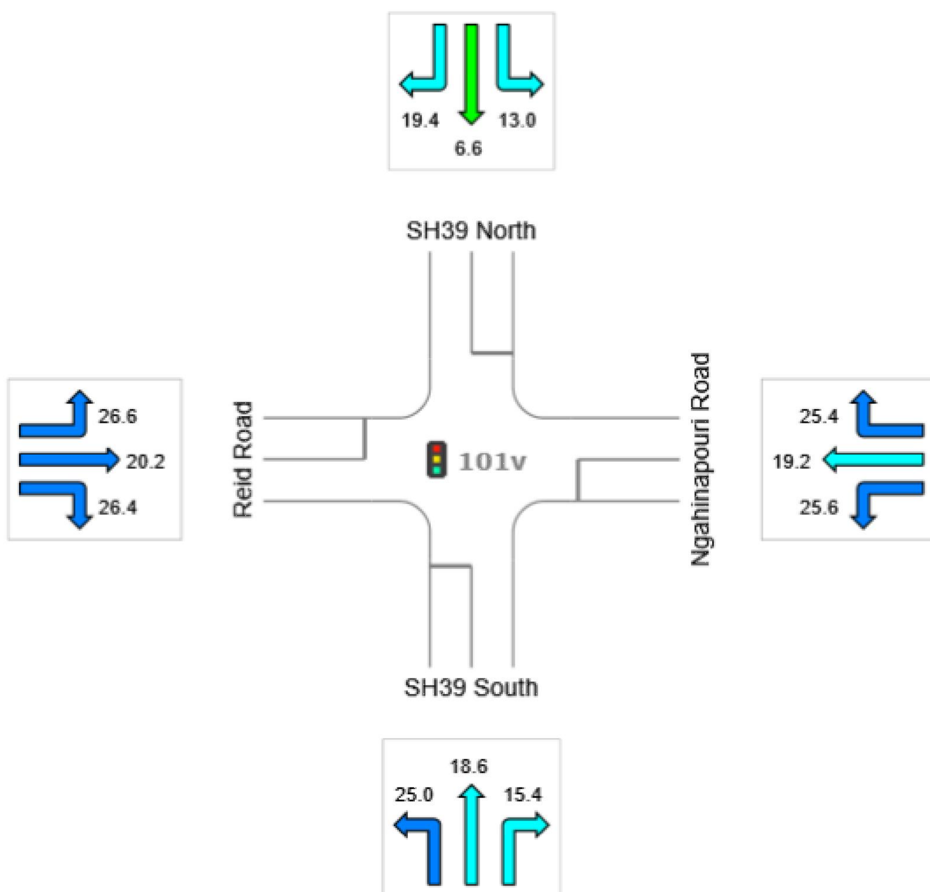
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 101v [Opt2 - 2035_Hi Dev_AM]

New Site
Site Category: (None)
Signals - Fixed Time Isolated   Cycle Time = 40 seconds (Site Practical Cycle Time)

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	18.5	24.9	9.1	26.0	18.2
LOS	B	C	A	C	B



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: 101v [Opt2 - 2035_Hi Dev_PM]

New Site
Site Category: (None)
Signals - Fixed Time Isolated   Cycle Time = 40 seconds (Site Practical Cycle Time)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	55.3	km/h	55.3	km/h
Travel Distance (Total)	1248.4	veh-km/h	1498.1	pers-km/h
Travel Time (Total)	22.6	veh-h/h	27.1	pers-h/h
Demand Flows (Total)	1234	veh/h	1480	pers/h
Percent Heavy Vehicles (Demand)	7.5	%		
Degree of Saturation	0.783			
Practical Spare Capacity	14.9	%		
Effective Intersection Capacity	1575	veh/h		
Control Delay (Total)	4.36	veh-h/h	5.23	pers-h/h
Control Delay (Average)	12.7	sec	12.7	sec
Control Delay (Worst Lane)	23.8	sec		
Control Delay (Worst Movement)	24.3	sec	24.3	sec
Geometric Delay (Average)	2.3	sec		
Stop-Line Delay (Average)	10.4	sec		
Idling Time (Average)	6.3	sec		
Intersection Level of Service (LOS)	LOS B			
95% Back of Queue - Vehicles (Worst Lane)	12.4	veh		
95% Back of Queue - Distance (Worst Lane)	93.8	m		
Queue Storage Ratio (Worst Lane)	0.11			
Total Effective Stops	916	veh/h	1099	pers/h
Effective Stop Rate	0.74		0.74	
Proportion Queued	0.75		0.75	
Performance Index	61.1		61.1	
Cost (Total)	790.14	$/h	790.14	$/h
Fuel Consumption (Total)	151.3	L/h		
Carbon Dioxide (Total)	361.7	kg/h		
Hydrocarbons (Total)	0.032	kg/h		
Carbon Monoxide (Total)	0.455	kg/h		
NOx (Total)	0.998	kg/h		

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Intersection LOS value for Vehicles is based on average delay for all vehicle 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 Main (Timing-Capacity) Iterations: 0.6% 0.0% 0.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	592,168	veh/y	710,602	pers/y
Delay	2,093	veh-h/y	2,511	pers-h/y
Effective Stops	439,534	veh/y	527,441	pers/y
Travel Distance	599,253	veh-km/y	719,103	pers-km/y
Travel Time	10,841	veh-h/y	13,010	pers-h/y
Cost	379,265	$/y	379,265	$/y
Fuel Consumption	72,642	L/y		
Carbon Dioxide	173,604	kg/y		
Hydrocarbons	15	kg/y		
Carbon Monoxide	218	kg/y		
NOx	479	kg/y		

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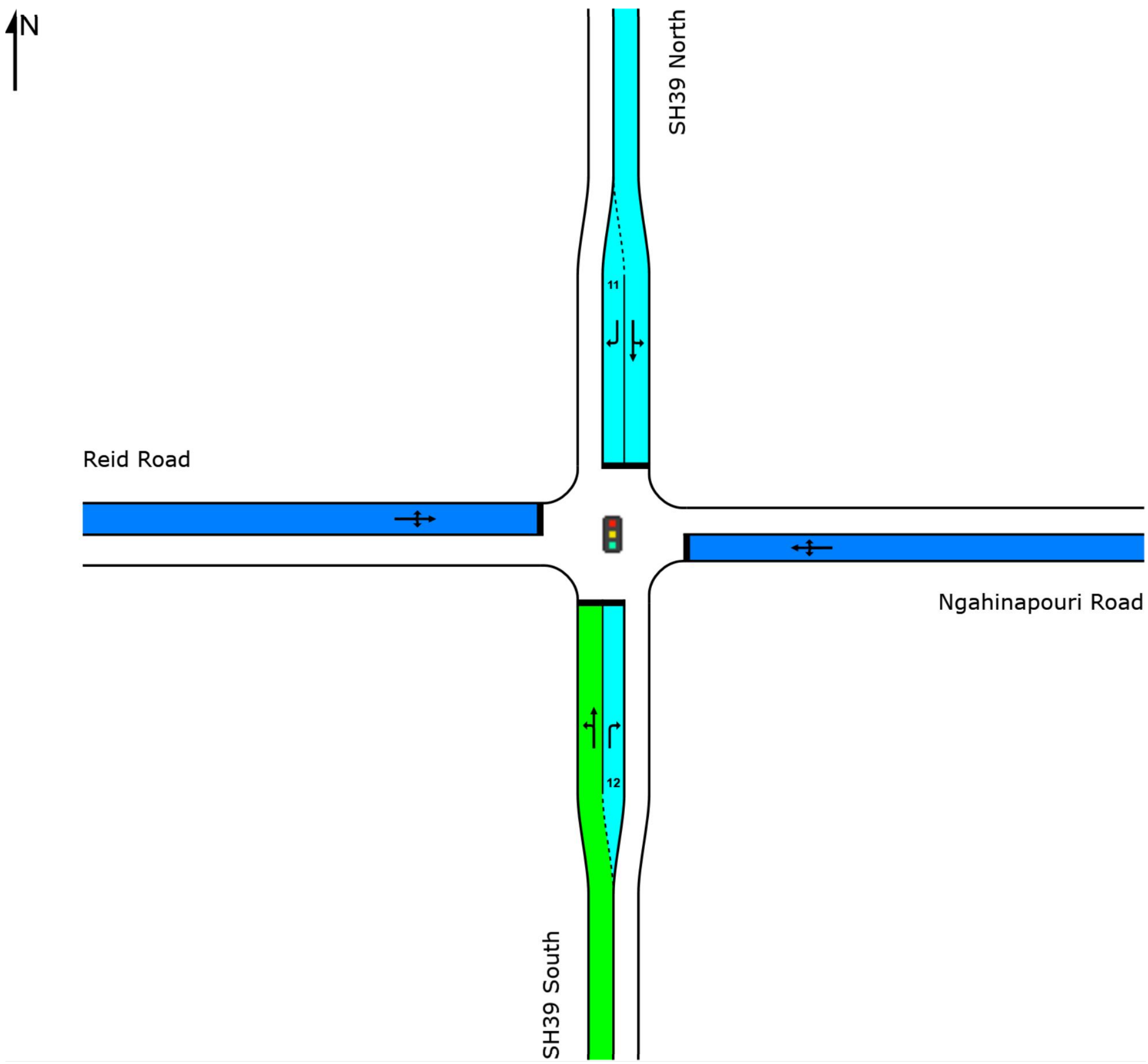
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101v [Opt2 - 2035_Hi Dev_PM]

New Site
Site Category: (None)
Signals - Fixed Time Isolated   Cycle Time = 40 seconds (Site Practical Cycle Time)

	Approaches				Intersection
	South	East	North	West	
LOS	A	C	B	C	B



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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DELAY (CONTROL)

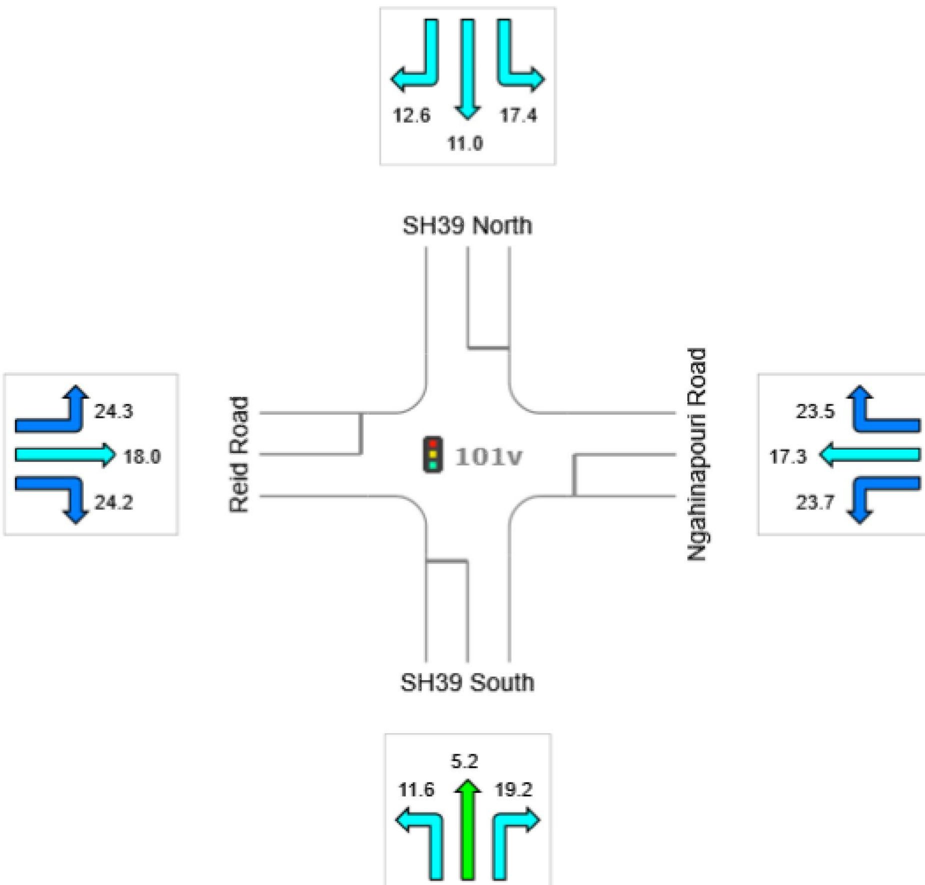
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 101v [Opt2 - 2035_Hi Dev_PM]

New Site
Site Category: (None)
Signals - Fixed Time Isolated   Cycle Time = 40 seconds (Site Practical Cycle Time)

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	8.7	23.0	12.5	23.8	12.7
LOS	A	C	B	C	B



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: 101vv [Opt3to5 - 2018_Low Dev_AM]

New Site
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values		
Performance Measure	**Vehicles**	**Persons**
Travel Speed (Average)	58.2 km/h	58.2 km/h
Travel Distance (Total)	1066.0 veh-km/h	1279.2 pers-km/h
Travel Time (Total)	18.3 veh-h/h	22.0 pers-h/h
Demand Flows (Total)	1032 veh/h	1238 pers/h
Percent Heavy Vehicles (Demand)	6.7 %	
Degree of Saturation	0.421	
Practical Spare Capacity	102.1 %	
Effective Intersection Capacity	2453 veh/h	
Control Delay (Total)	2.14 veh-h/h	2.56 pers-h/h
Control Delay (Average)	7.5 sec	7.5 sec
Control Delay (Worst Lane)	9.7 sec	
Control Delay (Worst Movement)	13.4 sec	13.4 sec
Geometric Delay (Average)	6.2 sec	
Stop-Line Delay (Average)	1.3 sec	
Idling Time (Average)	0.1 sec	
Intersection Level of Service (LOS)	LOS A	
95% Back of Queue - Vehicles (Worst Lane)	3.7 veh	
95% Back of Queue - Distance (Worst Lane)	28.0 m	
Queue Storage Ratio (Worst Lane)	0.02	
Total Effective Stops	576 veh/h	692 pers/h
Effective Stop Rate	0.56	0.56
Proportion Queued	0.43	0.43
Performance Index	30.6	30.6
Cost (Total)	636.12 $/h	636.12 $/h
Fuel Consumption (Total)	129.4 L/h	
Carbon Dioxide (Total)	308.7 kg/h	
Hydrocarbons (Total)	0.026 kg/h	
Carbon Monoxide (Total)	0.384 kg/h	
NOx (Total)	0.860 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): 1.7 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 2.7% 1.6% 0.8%

Intersection Performance - Annual Values		
Performance Measure	**Vehicles**	**Persons**
Demand Flows (Total)	495,158 veh/y	594,190 pers/y
Delay	1,025 veh-h/y	1,230 pers-h/y
Effective Stops	276,605 veh/y	331,926 pers/y
Travel Distance	511,687 veh-km/y	614,025 pers-km/y
Travel Time	8,787 veh-h/y	10,544 pers-h/y
Cost	305,340 $/y	305,340 $/y
Fuel Consumption	62,106 L/y	
Carbon Dioxide	148,161 kg/y	
Hydrocarbons	13 kg/y	
Carbon Monoxide	184 kg/y	
NOx	413 kg/y	

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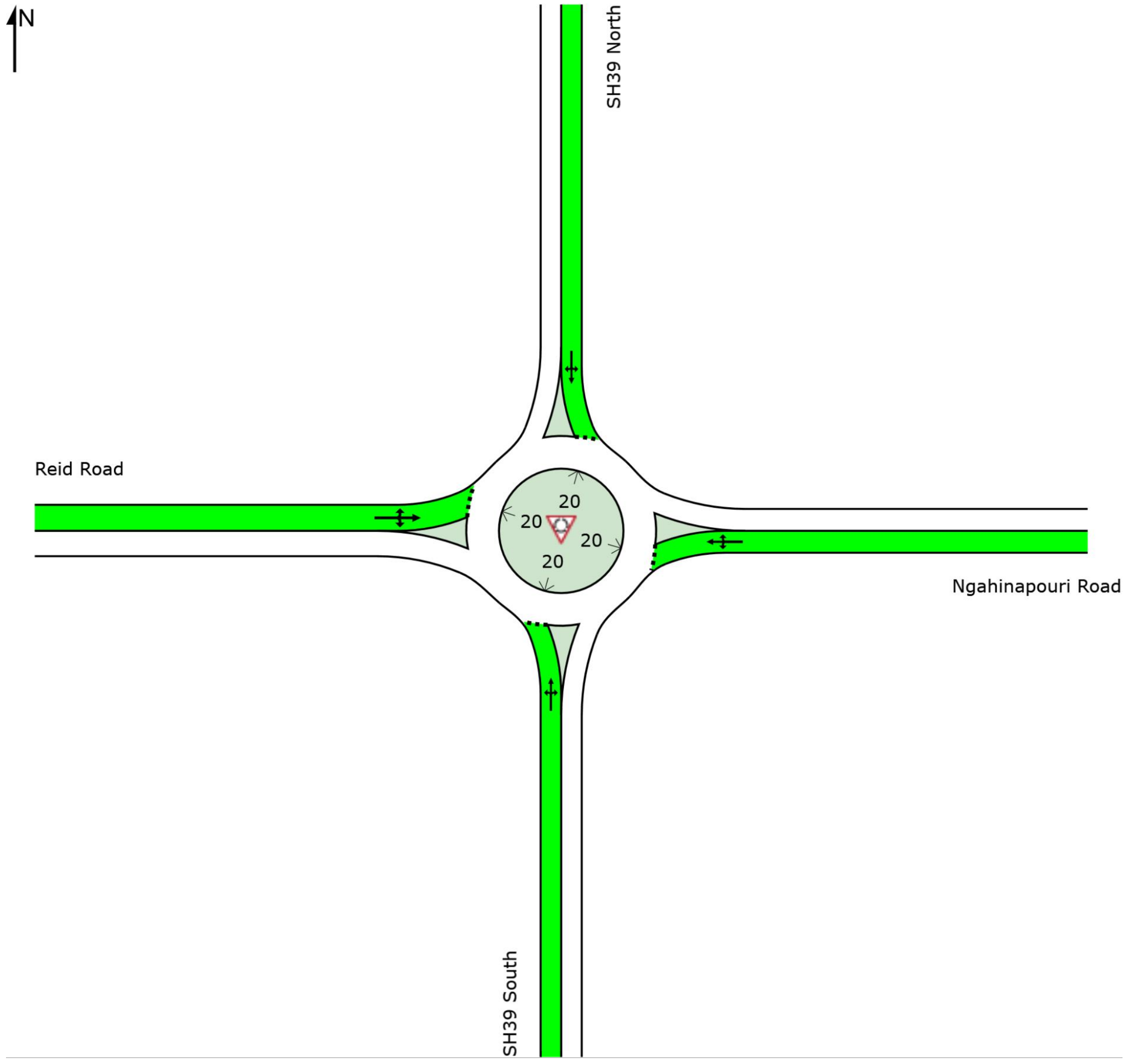
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101vv [Opt3to5 - 2018_Low Dev_AM]

New Site
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	A	A	A	A	A



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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DELAY (CONTROL)

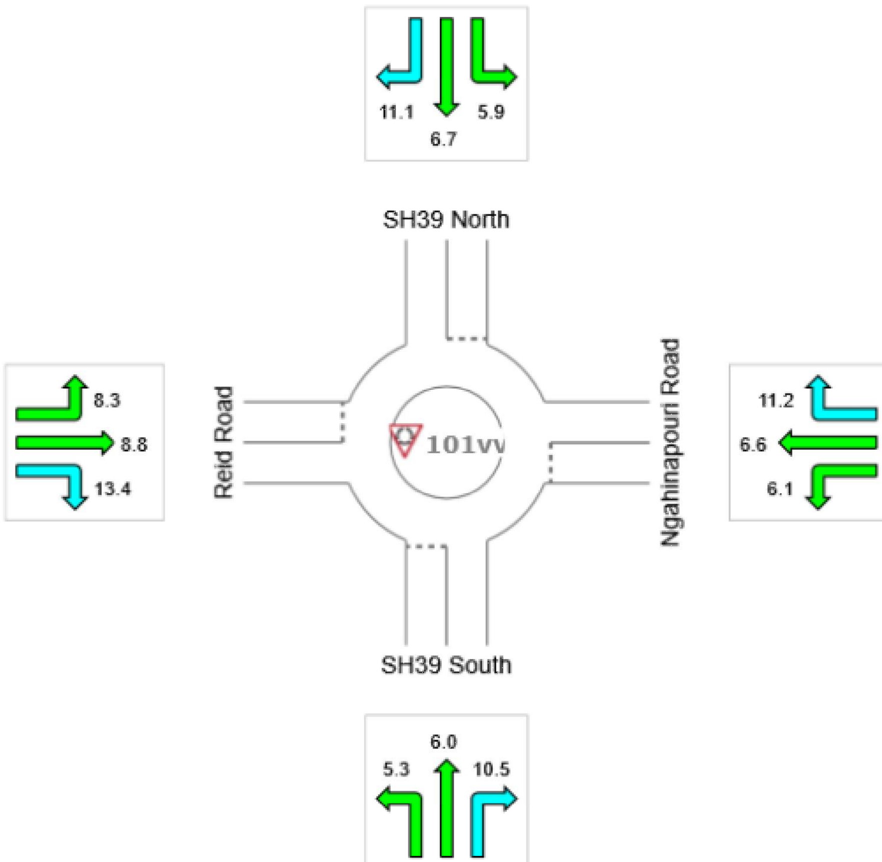
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 101vv [Opt3to5 - 2018_Low Dev_AM]

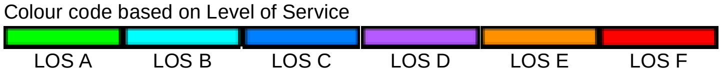
New Site
Site Category: (None)
Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	6.9	9.7	6.9	9.4	7.5
LOS	A	A	A	A	A



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).
Roundabout Level of Service Method: SIDRA Roundabout LOS
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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INTERSECTION SUMMARY

Site: 101vv [Opt3to5 - 2018_Low Dev_PM]

New Site
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	58.8	km/h	58.8	km/h
Travel Distance (Total)	930.1	veh-km/h	1116.1	pers-km/h
Travel Time (Total)	15.8	veh-h/h	19.0	pers-h/h
Demand Flows (Total)	901	veh/h	1081	pers/h
Percent Heavy Vehicles (Demand)	7.6	%		
Degree of Saturation	0.415			
Practical Spare Capacity	104.9	%		
Effective Intersection Capacity	2172	veh/h		
Control Delay (Total)	1.65	veh-h/h	1.98	pers-h/h
Control Delay (Average)	6.6	sec	6.6	sec
Control Delay (Worst Lane)	11.3	sec		
Control Delay (Worst Movement)	12.8	sec	12.8	sec
Geometric Delay (Average)	5.9	sec		
Stop-Line Delay (Average)	0.7	sec		
Idling Time (Average)	0.0	sec		
Intersection Level of Service (LOS)	LOS A			
95% Back of Queue - Vehicles (Worst Lane)	3.6	veh		
95% Back of Queue - Distance (Worst Lane)	26.9	m		
Queue Storage Ratio (Worst Lane)	0.02			
Total Effective Stops	454	veh/h	545	pers/h
Effective Stop Rate	0.50		0.50	
Proportion Queued	0.33		0.33	
Performance Index	25.8		25.8	
Cost (Total)	550.77	$/h	550.77	$/h
Fuel Consumption (Total)	116.0	L/h		
Carbon Dioxide (Total)	277.1	kg/h		
Hydrocarbons (Total)	0.023	kg/h		
Carbon Monoxide (Total)	0.337	kg/h		
NOx (Total)	0.844	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): 1.3 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 2.0% 1.2% 0.6%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	432,505	veh/y	519,006	pers/y
Delay	792	veh-h/y	951	pers-h/y
Effective Stops	218,137	veh/y	261,764	pers/y
Travel Distance	446,444	veh-km/y	535,733	pers-km/y
Travel Time	7,598	veh-h/y	9,118	pers-h/y
Cost	264,369	$/y	264,369	$/y
Fuel Consumption	55,670	L/y		
Carbon Dioxide	133,025	kg/y		
Hydrocarbons	11	kg/y		
Carbon Monoxide	162	kg/y		
NOx	405	kg/y		

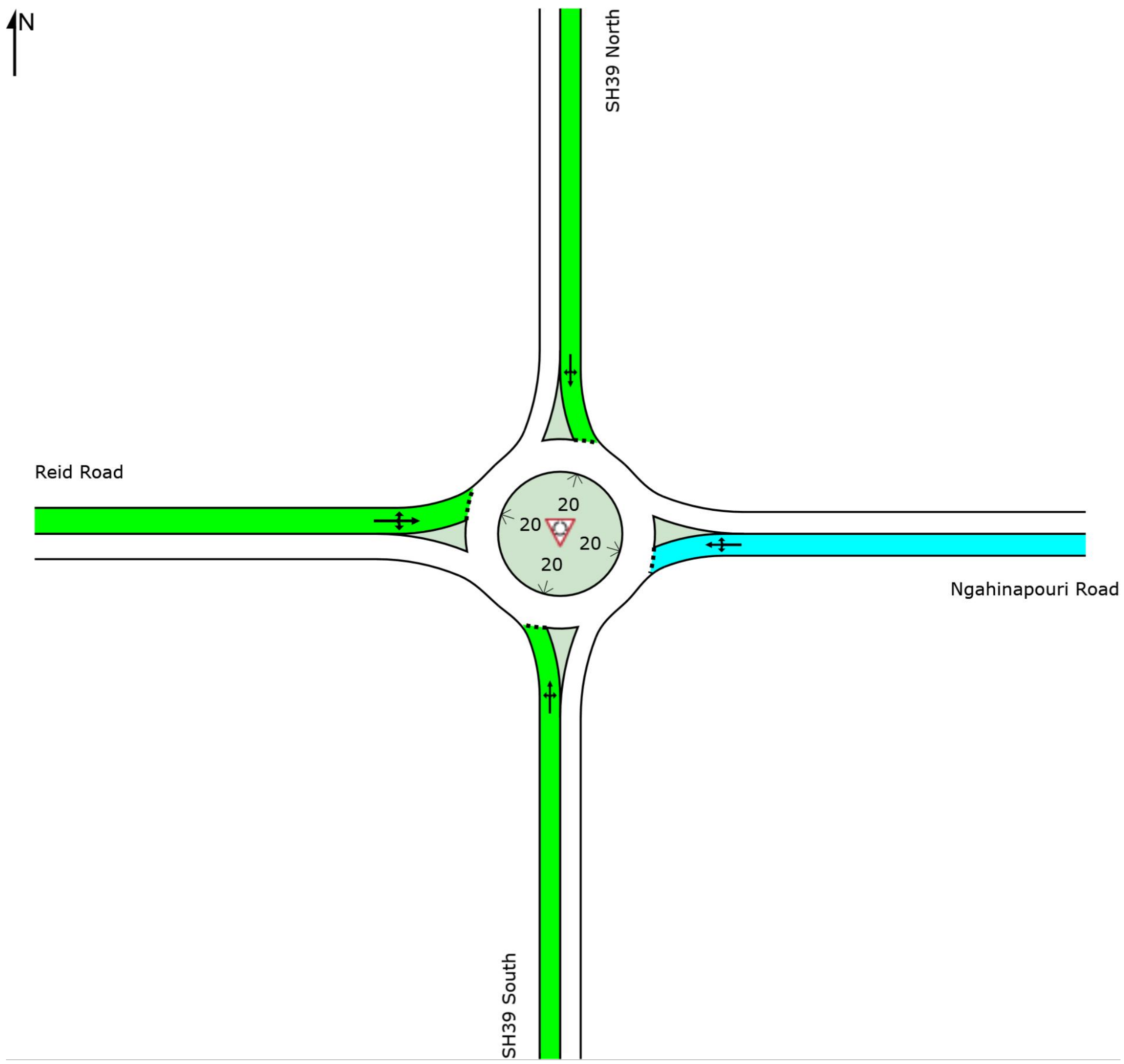
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101vv [Opt3to5 - 2018_Low Dev_PM]

New Site
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	A	B	A	A	A



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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DELAY (CONTROL)

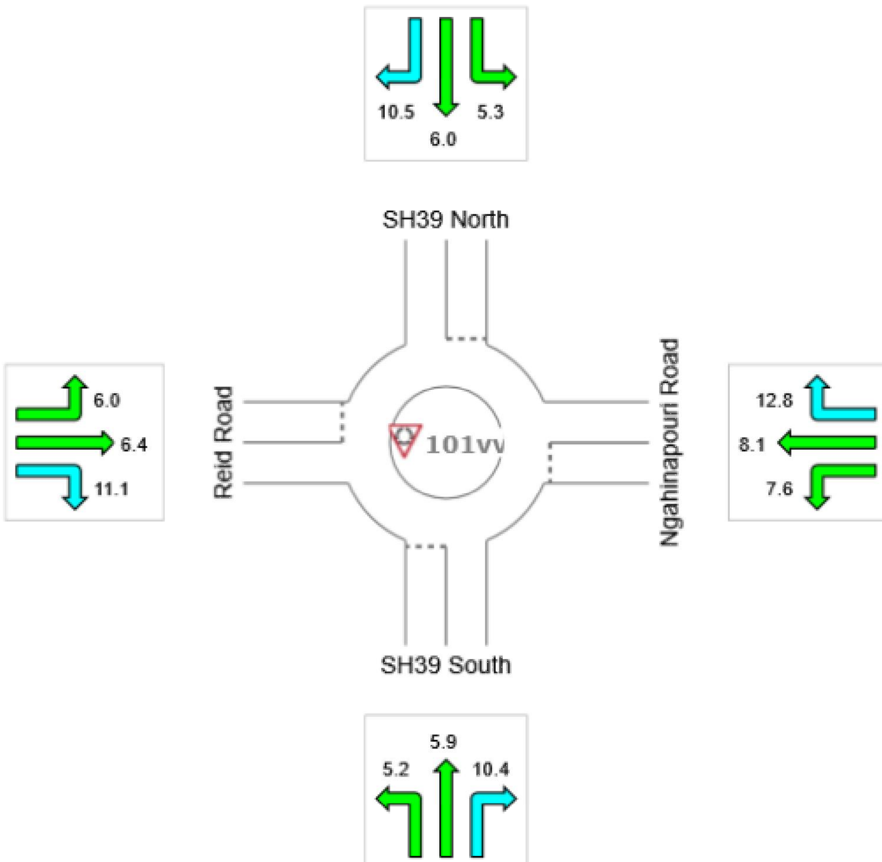
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 101vv [Opt3to5 - 2018_Low Dev_PM]

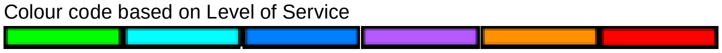
New Site
Site Category: (None)
Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	6.8	11.3	6.2	7.1	6.6
LOS	A	B	A	A	A



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).
Roundabout Level of Service Method: SIDRA Roundabout LOS
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Organisation: TONKIN & TAYLOR | Processed: Wednesday, 12 June 2019 11:53:00 AM
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INTERSECTION SUMMARY

Site: 101vv [Opt3to5 - 2018_Hi Dev_AM]

New Site
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values		
Performance Measure	**Vehicles**	**Persons**
Travel Speed (Average)	58.1 km/h	58.1 km/h
Travel Distance (Total)	1191.0 veh-km/h	1429.2 pers-km/h
Travel Time (Total)	20.5 veh-h/h	24.6 pers-h/h
Demand Flows (Total)	1154 veh/h	1384 pers/h
Percent Heavy Vehicles (Demand)	6.0 %	
Degree of Saturation	0.421	
Practical Spare Capacity	102.0 %	
Effective Intersection Capacity	2742 veh/h	
Control Delay (Total)	2.51 veh-h/h	3.01 pers-h/h
Control Delay (Average)	7.8 sec	7.8 sec
Control Delay (Worst Lane)	9.9 sec	
Control Delay (Worst Movement)	13.9 sec	13.9 sec
Geometric Delay (Average)	6.2 sec	
Stop-Line Delay (Average)	1.7 sec	
Idling Time (Average)	0.2 sec	
Intersection Level of Service (LOS)	LOS A	
95% Back of Queue - Vehicles (Worst Lane)	3.7 veh	
95% Back of Queue - Distance (Worst Lane)	28.1 m	
Queue Storage Ratio (Worst Lane)	0.02	
Total Effective Stops	687 veh/h	825 pers/h
Effective Stop Rate	0.60	0.60
Proportion Queued	0.48	0.48
Performance Index	34.8	34.8
Cost (Total)	708.94 $/h	708.94 $/h
Fuel Consumption (Total)	141.2 L/h	
Carbon Dioxide (Total)	336.4 kg/h	
Hydrocarbons (Total)	0.029 kg/h	
Carbon Monoxide (Total)	0.426 kg/h	
NOx (Total)	0.872 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): 1.7 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 2.7% 1.6% 0.8%

Intersection Performance - Annual Values		
Performance Measure	**Vehicles**	**Persons**
Demand Flows (Total)	553,769 veh/y	664,522 pers/y
Delay	1,205 veh-h/y	1,446 pers-h/y
Effective Stops	329,850 veh/y	395,820 pers/y
Travel Distance	571,684 veh-km/y	686,020 pers-km/y
Travel Time	9,845 veh-h/y	11,814 pers-h/y
Cost	340,289 $/y	340,289 $/y
Fuel Consumption	67,770 L/y	
Carbon Dioxide	161,473 kg/y	
Hydrocarbons	14 kg/y	
Carbon Monoxide	205 kg/y	
NOx	418 kg/y	

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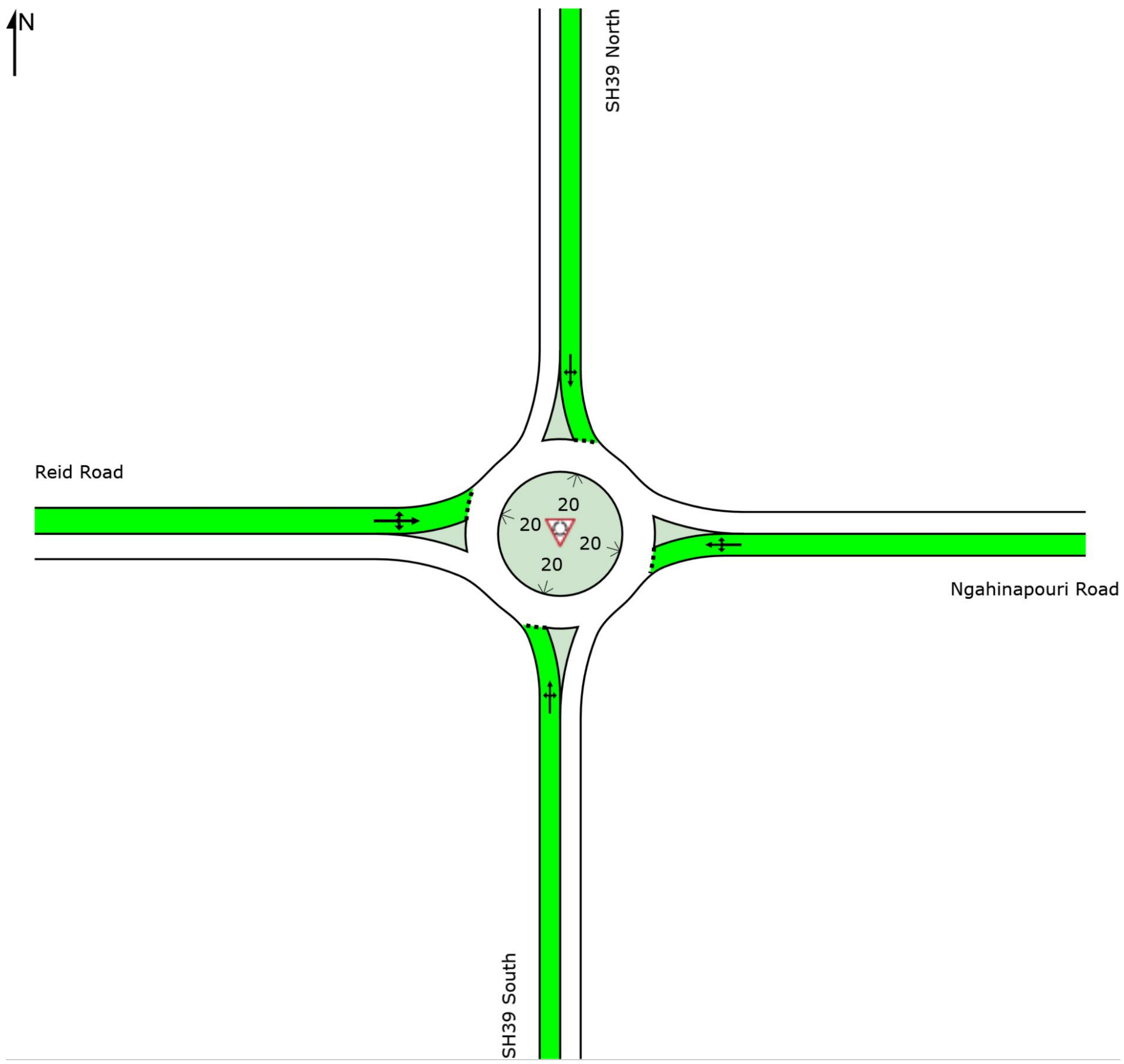
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101vv [Opt3to5 - 2018_Hi Dev_AM]

New Site
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	A	A	A	A



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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DELAY (CONTROL)

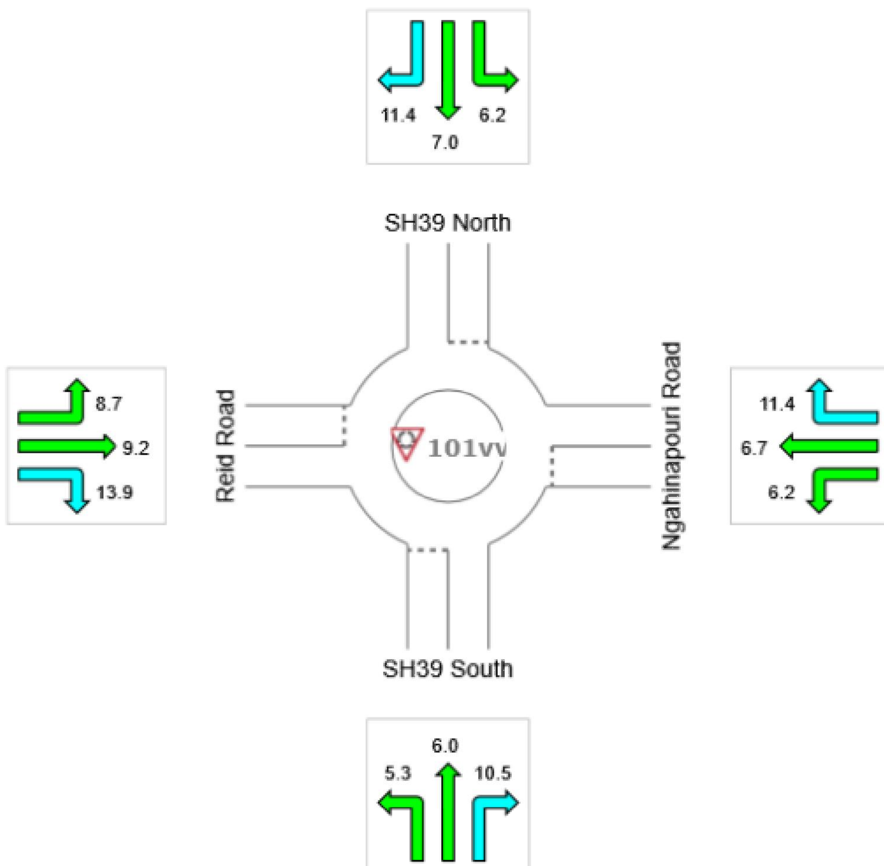
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 101vv [Opt3to5 - 2018_Hi Dev_AM]

New Site
Site Category: (None)
Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	6.9	9.9	7.2	9.8	7.8
LOS	A	A	A	A	A



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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INTERSECTION SUMMARY

Site: 101vv [Opt3to5 - 2018_Hi Dev_PM]

New Site
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values		
Performance Measure	**Vehicles**	**Persons**
Travel Speed (Average)	58.7 km/h	58.7 km/h
Travel Distance (Total)	973.2 veh-km/h	1167.8 pers-km/h
Travel Time (Total)	16.6 veh-h/h	19.9 pers-h/h
Demand Flows (Total)	943 veh/h	1132 pers/h
Percent Heavy Vehicles (Demand)	7.3 %	
Degree of Saturation	0.424	
Practical Spare Capacity	100.4 %	
Effective Intersection Capacity	2223 veh/h	
Control Delay (Total)	1.76 veh-h/h	2.11 pers-h/h
Control Delay (Average)	6.7 sec	6.7 sec
Control Delay (Worst Lane)	11.4 sec	
Control Delay (Worst Movement)	12.9 sec	12.9 sec
Geometric Delay (Average)	5.9 sec	
Stop-Line Delay (Average)	0.8 sec	
Idling Time (Average)	0.0 sec	
Intersection Level of Service (LOS)	LOS A	
95% Back of Queue - Vehicles (Worst Lane)	3.6 veh	
95% Back of Queue - Distance (Worst Lane)	27.3 m	
Queue Storage Ratio (Worst Lane)	0.02	
Total Effective Stops	486 veh/h	583 pers/h
Effective Stop Rate	0.51	0.51
Proportion Queued	0.36	0.36
Performance Index	27.0	27.0
Cost (Total)	575.44 $/h	575.44 $/h
Fuel Consumption (Total)	120.1 L/h	
Carbon Dioxide (Total)	286.8 kg/h	
Hydrocarbons (Total)	0.024 kg/h	
Carbon Monoxide (Total)	0.352 kg/h	
NOx (Total)	0.850 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): 1.4 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 2.3% 1.3% 0.6%

Intersection Performance - Annual Values		
Performance Measure	**Vehicles**	**Persons**
Demand Flows (Total)	452,716 veh/y	543,259 pers/y
Delay	843 veh-h/y	1,012 pers-h/y
Effective Stops	233,101 veh/y	279,722 pers/y
Travel Distance	467,139 veh-km/y	560,567 pers-km/y
Travel Time	7,959 veh-h/y	9,551 pers-h/y
Cost	276,211 $/y	276,211 $/y
Fuel Consumption	57,637 L/y	
Carbon Dioxide	137,651 kg/y	
Hydrocarbons	12 kg/y	
Carbon Monoxide	169 kg/y	
NOx	408 kg/y	

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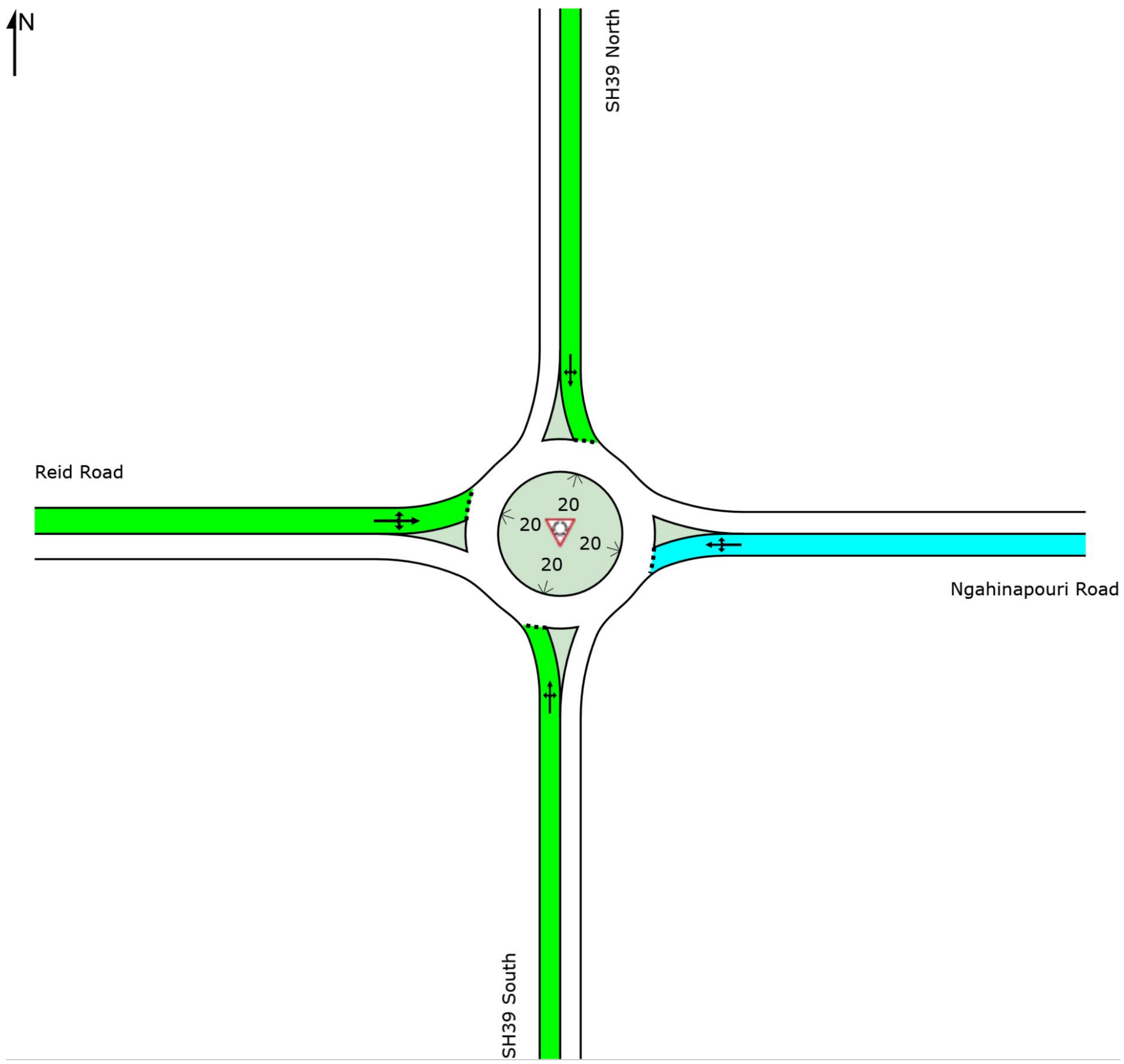
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101vv [Opt3to5 - 2018_Hi Dev_PM]

New Site
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	A	B	A	A	A



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.

Organisation: TONKIN & TAYLOR | Processed: Wednesday, 12 June 2019 11:53:01 AM
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DELAY (CONTROL)

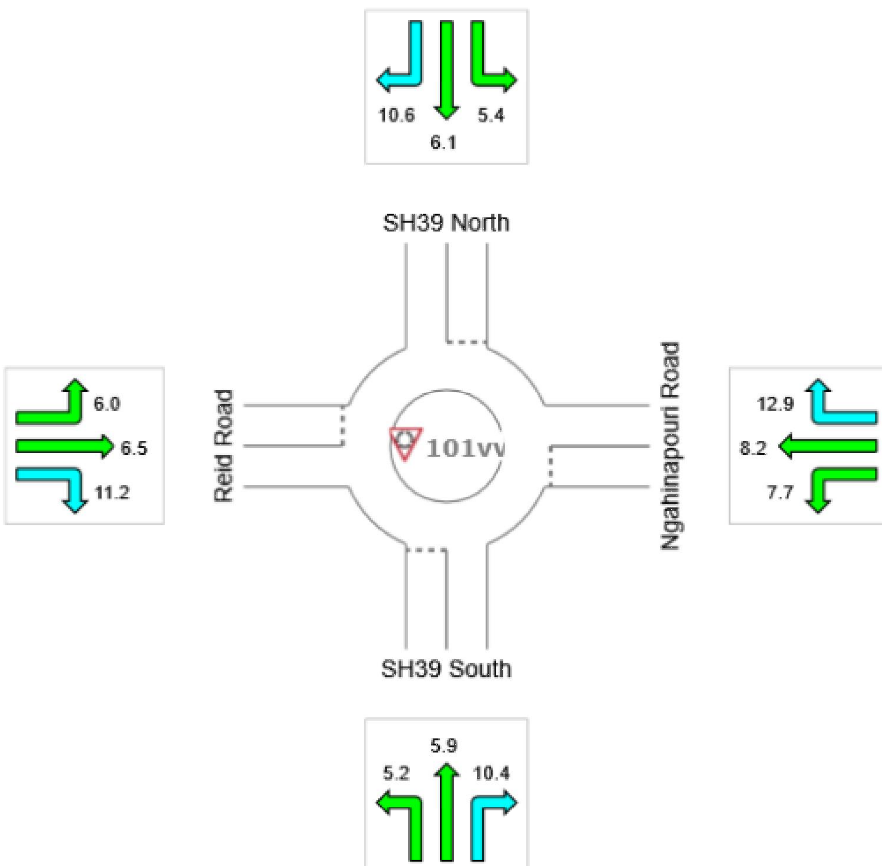
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 101vv [Opt3to5 - 2018_Hi Dev_PM]

New Site
Site Category: (None)
Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	6.8	11.4	6.4	7.2	6.7
LOS	A	B	A	A	A



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.

Organisation: TONKIN & TAYLOR | Processed: Wednesday, 12 June 2019 11:53:01 AM
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INTERSECTION SUMMARY

Site: 101vv [Opt3to5 - 2035_Low Dev_AM]

New Site
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values		
Performance Measure	**Vehicles**	**Persons**
Travel Speed (Average)	57.5 km/h	57.5 km/h
Travel Distance (Total)	1385.2 veh-km/h	1662.2 pers-km/h
Travel Time (Total)	24.1 veh-h/h	28.9 pers-h/h
Demand Flows (Total)	1340 veh/h	1608 pers/h
Percent Heavy Vehicles (Demand)	6.9 %	
Degree of Saturation	0.581	
Practical Spare Capacity	46.3 %	
Effective Intersection Capacity	2306 veh/h	
Control Delay (Total)	2.99 veh-h/h	3.59 pers-h/h
Control Delay (Average)	8.0 sec	8.0 sec
Control Delay (Worst Lane)	11.4 sec	
Control Delay (Worst Movement)	15.5 sec	15.5 sec
Geometric Delay (Average)	6.2 sec	
Stop-Line Delay (Average)	1.8 sec	
Idling Time (Average)	0.3 sec	
Intersection Level of Service (LOS)	LOS A	
95% Back of Queue - Vehicles (Worst Lane)	6.4 veh	
95% Back of Queue - Distance (Worst Lane)	47.7 m	
Queue Storage Ratio (Worst Lane)	0.04	
Total Effective Stops	791 veh/h	950 pers/h
Effective Stop Rate	0.59	0.59
Proportion Queued	0.56	0.56
Performance Index	43.5	43.5
Cost (Total)	847.03 $/h	847.03 $/h
Fuel Consumption (Total)	171.5 L/h	
Carbon Dioxide (Total)	409.2 kg/h	
Hydrocarbons (Total)	0.035 kg/h	
Carbon Monoxide (Total)	0.505 kg/h	
NOx (Total)	1.164 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): 2.7 %
Number of Iterations: 7 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 2.0% 1.0% 0.5%

Intersection Performance - Annual Values		
Performance Measure	**Vehicles**	**Persons**
Demand Flows (Total)	643,200 veh/y	771,840 pers/y
Delay	1,437 veh-h/y	1,725 pers-h/y
Effective Stops	379,806 veh/y	455,768 pers/y
Travel Distance	664,873 veh-km/y	797,847 pers-km/y
Travel Time	11,566 veh-h/y	13,879 pers-h/y
Cost	406,575 $/y	406,575 $/y
Fuel Consumption	82,322 L/y	
Carbon Dioxide	196,437 kg/y	
Hydrocarbons	17 kg/y	
Carbon Monoxide	243 kg/y	
NOx	559 kg/y	

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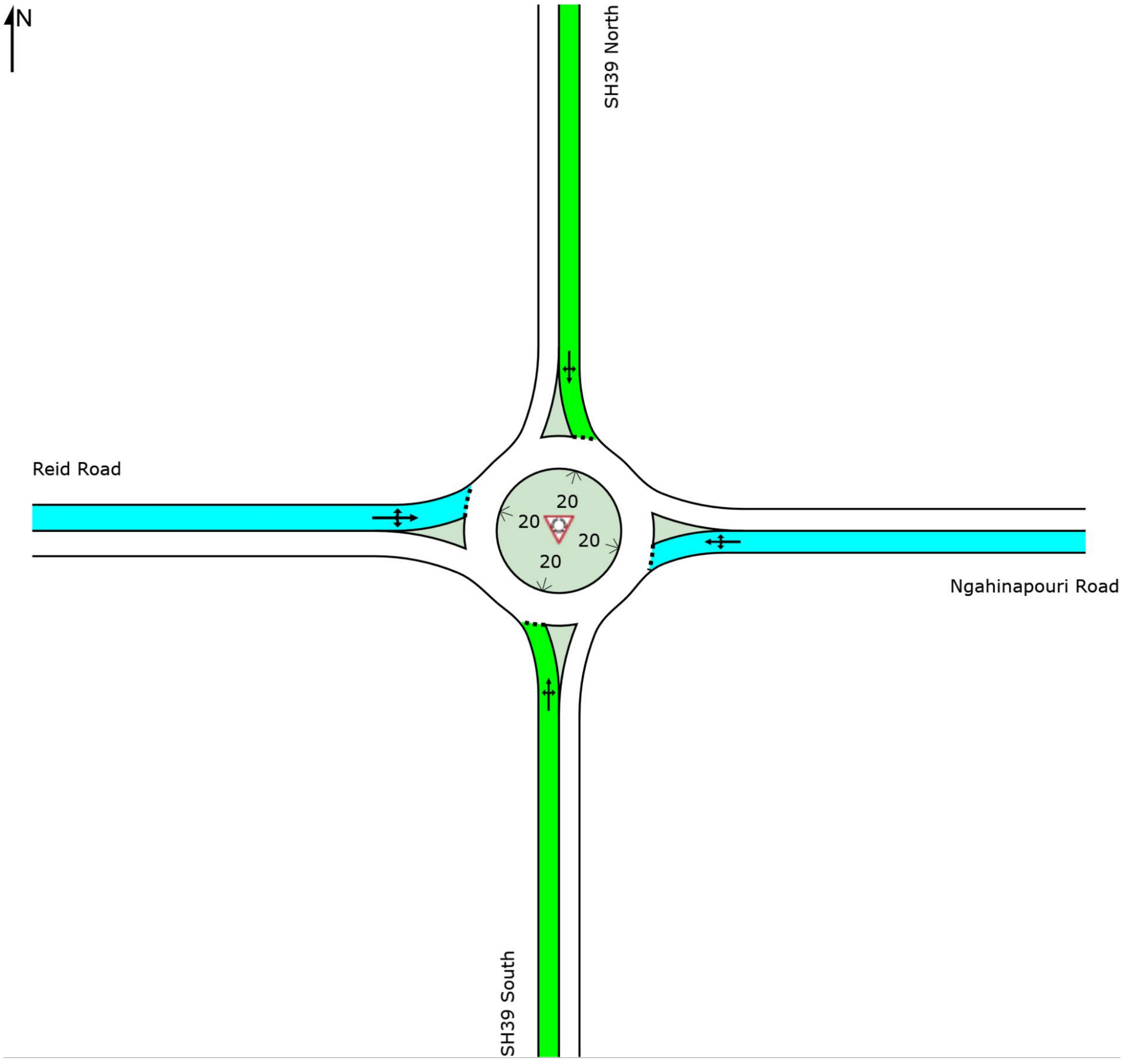
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101vv [Opt3to5 - 2035_Low Dev_AM]

New Site
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	A	B	A	B	A



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).
Roundabout Level of Service Method: SIDRA Roundabout LOS
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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DELAY (CONTROL)

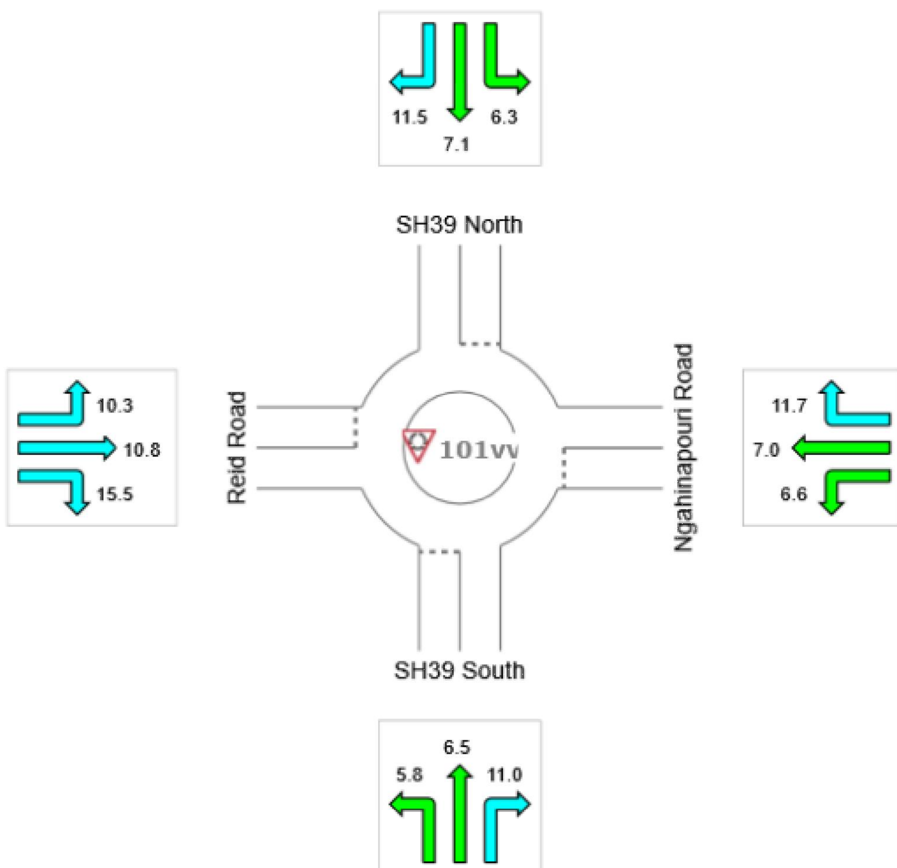
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 101vv [Opt3to5 - 2035_Low Dev_AM]

New Site
Site Category: (None)
Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	7.4	10.2	7.4	11.4	8.0
LOS	A	B	A	B	A



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.

Organisation: TONKIN & TAYLOR | Processed: Wednesday, 12 June 2019 11:53:01 AM
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INTERSECTION SUMMARY

Site: 101vv [Opt3to5 - 2035_Low Dev_PM]

New Site
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values		
Performance Measure	**Vehicles**	**Persons**
Travel Speed (Average)	58.2 km/h	58.2 km/h
Travel Distance (Total)	1231.2 veh-km/h	1477.4 pers-km/h
Travel Time (Total)	21.2 veh-h/h	25.4 pers-h/h
Demand Flows (Total)	1193 veh/h	1431 pers/h
Percent Heavy Vehicles (Demand)	7.7 %	
Degree of Saturation	0.567	
Practical Spare Capacity	49.9 %	
Effective Intersection Capacity	2103 veh/h	
Control Delay (Total)	2.31 veh-h/h	2.77 pers-h/h
Control Delay (Average)	7.0 sec	7.0 sec
Control Delay (Worst Lane)	12.6 sec	
Control Delay (Worst Movement)	14.2 sec	14.2 sec
Geometric Delay (Average)	5.9 sec	
Stop-Line Delay (Average)	1.0 sec	
Idling Time (Average)	0.0 sec	
Intersection Level of Service (LOS)	LOS A	
95% Back of Queue - Vehicles (Worst Lane)	6.1 veh	
95% Back of Queue - Distance (Worst Lane)	45.5 m	
Queue Storage Ratio (Worst Lane)	0.04	
Total Effective Stops	623 veh/h	748 pers/h
Effective Stop Rate	0.52	0.52
Proportion Queued	0.45	0.45
Performance Index	36.9	36.9
Cost (Total)	742.48 $/h	742.48 $/h
Fuel Consumption (Total)	155.6 L/h	
Carbon Dioxide (Total)	371.8 kg/h	
Hydrocarbons (Total)	0.031 kg/h	
Carbon Monoxide (Total)	0.450 kg/h	
NOx (Total)	1.142 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): 2.2 %
Number of Iterations: 6 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 2.6% 1.3% 0.7%

Intersection Performance - Annual Values		
Performance Measure	**Vehicles**	**Persons**
Demand Flows (Total)	572,463 veh/y	686,956 pers/y
Delay	1,107 veh-h/y	1,329 pers-h/y
Effective Stops	299,212 veh/y	359,054 pers/y
Travel Distance	590,971 veh-km/y	709,166 pers-km/y
Travel Time	10,159 veh-h/y	12,191 pers-h/y
Cost	356,391 $/y	356,391 $/y
Fuel Consumption	74,679 L/y	
Carbon Dioxide	178,459 kg/y	
Hydrocarbons	15 kg/y	
Carbon Monoxide	216 kg/y	
NOx	548 kg/y	

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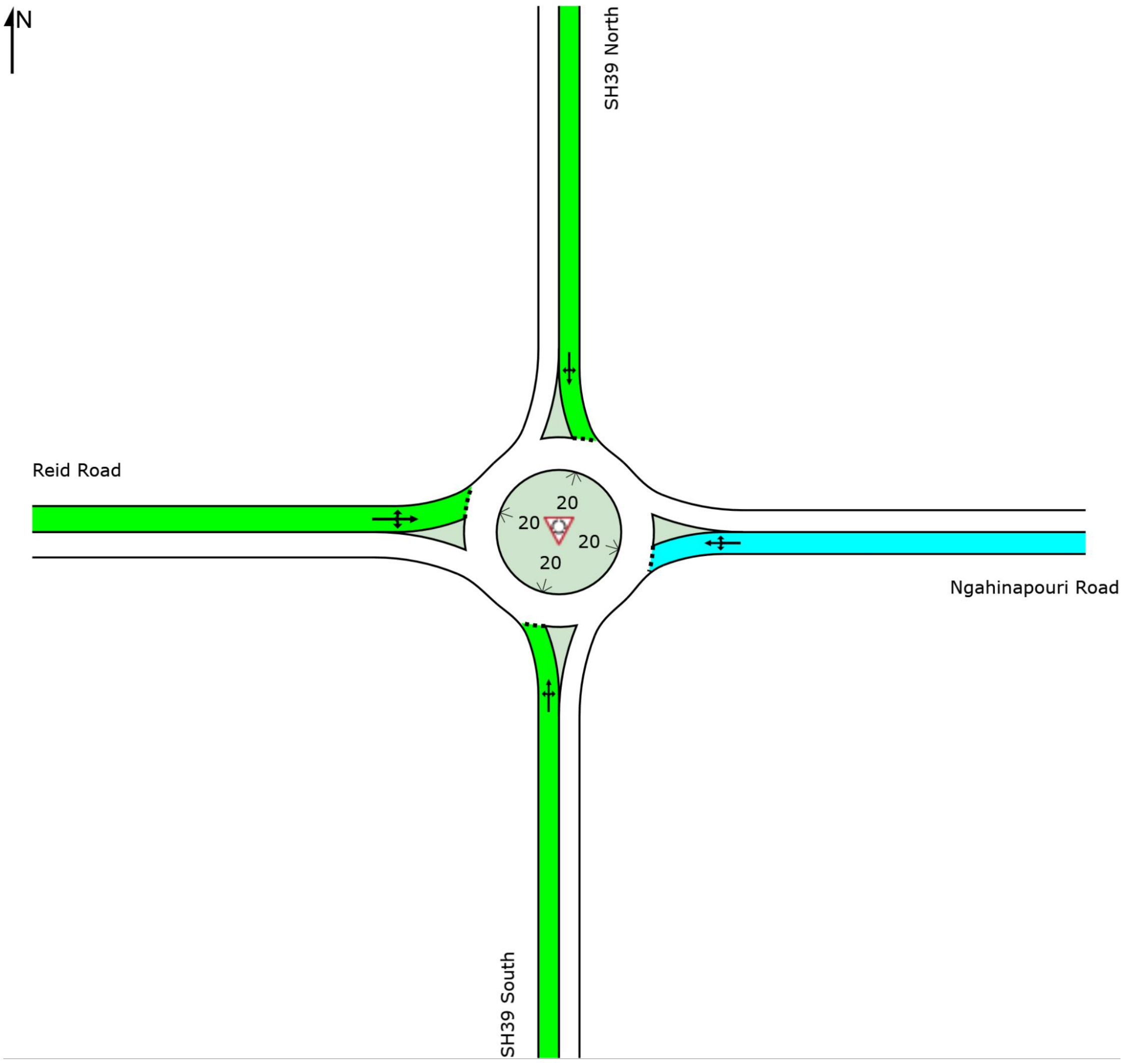
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101vv [Opt3to5 - 2035_Low Dev_PM]

New Site
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	A	B	A	A	A



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.

Organisation: TONKIN & TAYLOR | Processed: Wednesday, 12 June 2019 11:53:02 AM
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DELAY (CONTROL)

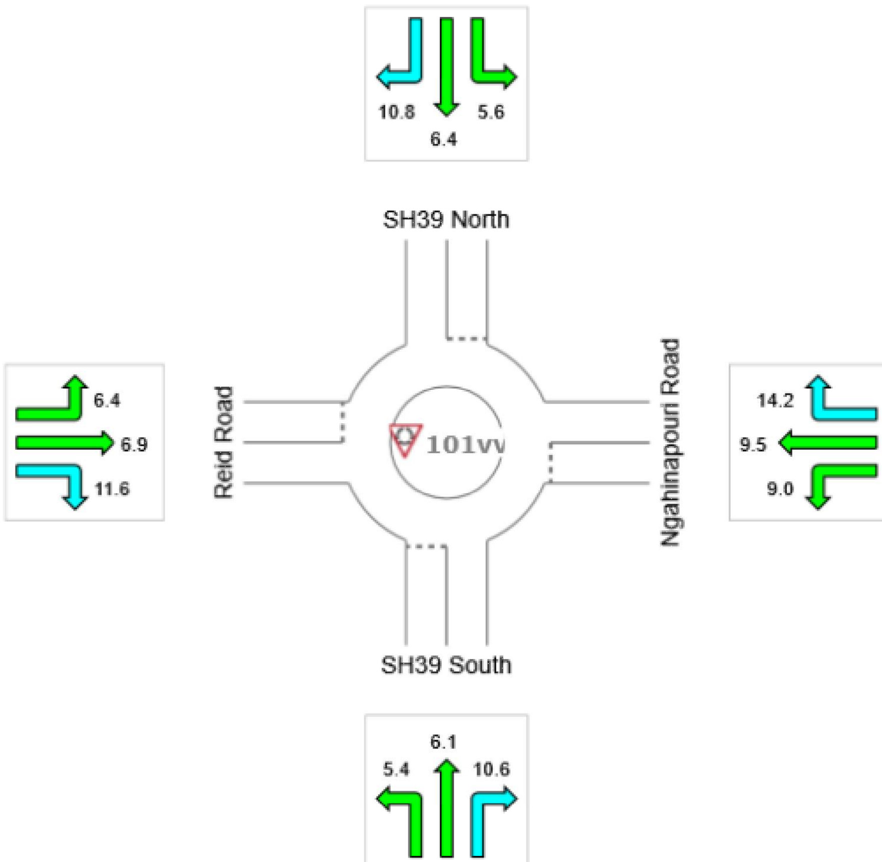
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 101vv [Opt3to5 - 2035_Low Dev_PM]

New Site
Site Category: (None)
Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	7.0	12.6	6.6	7.6	7.0
LOS	A	B	A	A	A



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.

Organisation: TONKIN & TAYLOR | Processed: Wednesday, 12 June 2019 11:53:02 AM
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INTERSECTION SUMMARY

Site: 101v [Opt3to5 - 2035_Hi Dev_AM]

New Site
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values		
Performance Measure	**Vehicles**	**Persons**
Travel Speed (Average)	57.2 km/h	57.2 km/h
Travel Distance (Total)	1510.1 veh-km/h	1812.2 pers-km/h
Travel Time (Total)	26.4 veh-h/h	31.7 pers-h/h
Demand Flows (Total)	1462 veh/h	1755 pers/h
Percent Heavy Vehicles (Demand)	6.3 %	
Degree of Saturation	0.581	
Practical Spare Capacity	46.2 %	
Effective Intersection Capacity	2515 veh/h	
Control Delay (Total)	3.50 veh-h/h	4.20 pers-h/h
Control Delay (Average)	8.6 sec	8.6 sec
Control Delay (Worst Lane)	12.5 sec	
Control Delay (Worst Movement)	16.5 sec	16.5 sec
Geometric Delay (Average)	6.2 sec	
Stop-Line Delay (Average)	2.4 sec	
Idling Time (Average)	0.5 sec	
Intersection Level of Service (LOS)	LOS A	
95% Back of Queue - Vehicles (Worst Lane)	6.4 veh	
95% Back of Queue - Distance (Worst Lane)	47.9 m	
Queue Storage Ratio (Worst Lane)	0.04	
Total Effective Stops	927 veh/h	1112 pers/h
Effective Stop Rate	0.63	0.63
Proportion Queued	0.60	0.60
Performance Index	48.6	48.6
Cost (Total)	924.86 $/h	924.86 $/h
Fuel Consumption (Total)	183.6 L/h	
Carbon Dioxide (Total)	437.7 kg/h	
Hydrocarbons (Total)	0.038 kg/h	
Carbon Monoxide (Total)	0.548 kg/h	
NOx (Total)	1.176 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): 2.7 %
Number of Iterations: 7 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 2.0% 1.0% 0.5%

Intersection Performance - Annual Values		
Performance Measure	**Vehicles**	**Persons**
Demand Flows (Total)	701,811 veh/y	842,173 pers/y
Delay	1,680 veh-h/y	2,016 pers-h/y
Effective Stops	444,737 veh/y	533,685 pers/y
Travel Distance	724,870 veh-km/y	869,844 pers-km/y
Travel Time	12,682 veh-h/y	15,218 pers-h/y
Cost	443,935 $/y	443,935 $/y
Fuel Consumption	88,134 L/y	
Carbon Dioxide	210,097 kg/y	
Hydrocarbons	18 kg/y	
Carbon Monoxide	263 kg/y	
NOx	564 kg/y	

Organisation: TONKIN & TAYLOR | Processed: Wednesday, 12 June 2019 11:53:02 AM
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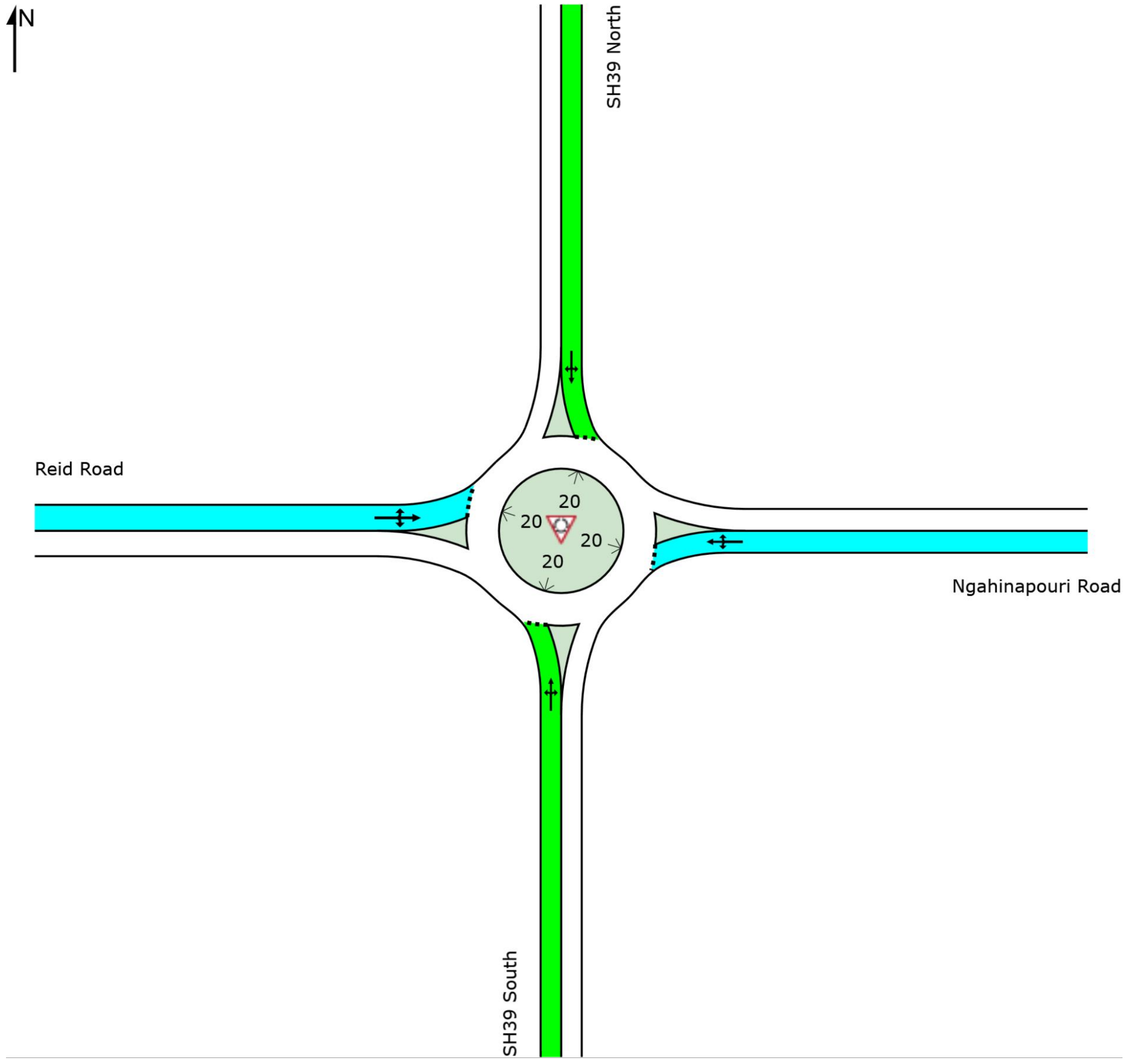
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101v [Opt3to5 - 2035_Hi Dev_AM]

New Site
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	A	B	A	B	A



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.

Organisation: TONKIN & TAYLOR | Processed: Wednesday, 12 June 2019 11:53:02 AM
Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\Ngahinapouri\N_Reid SH39 Int.sip8

DELAY (CONTROL)

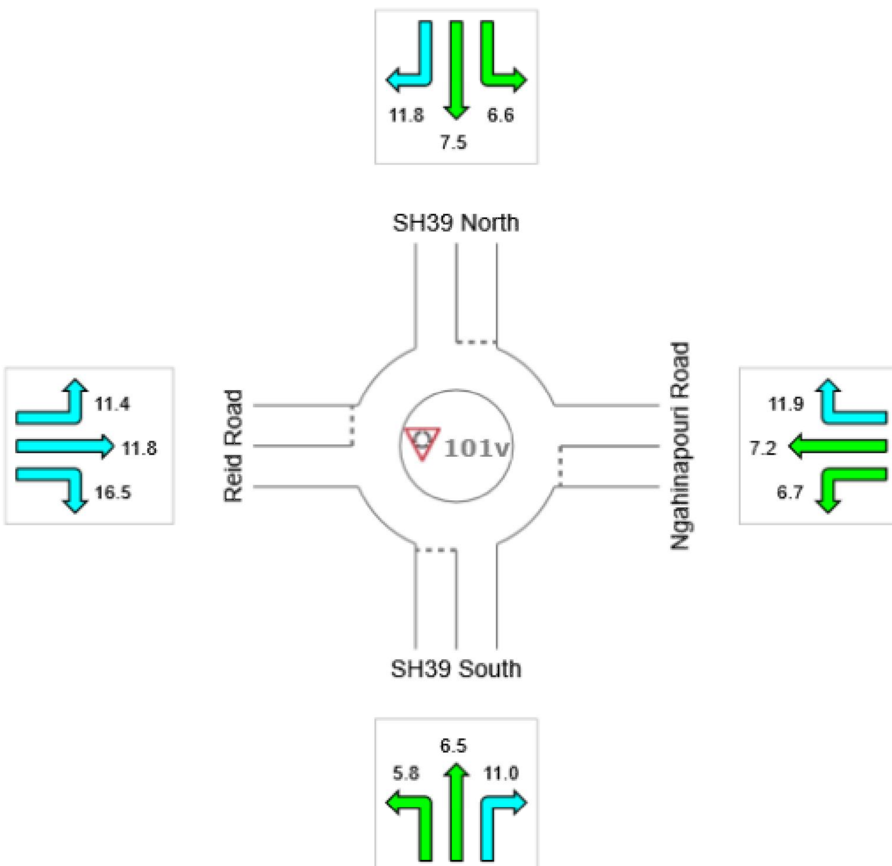
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 101v [Opt3to5 - 2035_Hi Dev_AM]

New Site
Site Category: (None)
Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	7.4	10.4	7.7	12.5	8.6
LOS	A	B	A	B	A



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.

Organisation: TONKIN & TAYLOR | Processed: Wednesday, 12 June 2019 11:53:02 AM
Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\Ngahinapouri\N_Reid SH39 Int.sip8

INTERSECTION SUMMARY

Site: 101v [Opt3to5 - 2035_Hi Dev_PM]

New Site
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	58.1	km/h	58.1	km/h
Travel Distance (Total)	1273.2	veh-km/h	1527.8	pers-km/h
Travel Time (Total)	21.9	veh-h/h	26.3	pers-h/h
Demand Flows (Total)	1234	veh/h	1480	pers/h
Percent Heavy Vehicles (Demand)	7.5	%		
Degree of Saturation	0.578			
Practical Spare Capacity	47.1	%		
Effective Intersection Capacity	2135	veh/h		
Control Delay (Total)	2.43	veh-h/h	2.91	pers-h/h
Control Delay (Average)	7.1	sec	7.1	sec
Control Delay (Worst Lane)	12.7	sec		
Control Delay (Worst Movement)	14.2	sec	14.2	sec
Geometric Delay (Average)	5.9	sec		
Stop-Line Delay (Average)	1.2	sec		
Idling Time (Average)	0.0	sec		
Intersection Level of Service (LOS)	LOS A			
95% Back of Queue - Vehicles (Worst Lane)	6.2	veh		
95% Back of Queue - Distance (Worst Lane)	46.2	m		
Queue Storage Ratio (Worst Lane)	0.04			
Total Effective Stops	660	veh/h	792	pers/h
Effective Stop Rate	0.53		0.53	
Proportion Queued	0.47		0.47	
Performance Index	38.3		38.3	
Cost (Total)	767.35	$/h	767.35	$/h
Fuel Consumption (Total)	159.7	L/h		
Carbon Dioxide (Total)	381.4	kg/h		
Hydrocarbons (Total)	0.032	kg/h		
Carbon Monoxide (Total)	0.465	kg/h		
NOx (Total)	1.148	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): 2.4 %
Number of Iterations: 6 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 2.8% 1.4% 0.7%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	592,168	veh/y	710,602	pers/y
Delay	1,165	veh-h/y	1,398	pers-h/y
Effective Stops	316,683	veh/y	380,019	pers/y
Travel Distance	611,135	veh-km/y	733,362	pers-km/y
Travel Time	10,517	veh-h/y	12,620	pers-h/y
Cost	368,328	$/y	368,328	$/y
Fuel Consumption	76,645	L/y		
Carbon Dioxide	183,082	kg/y		
Hydrocarbons	15	kg/y		
Carbon Monoxide	223	kg/y		
NOx	551	kg/y		

Organisation: TONKIN & TAYLOR | Processed: Wednesday, 12 June 2019 11:53:03 AM
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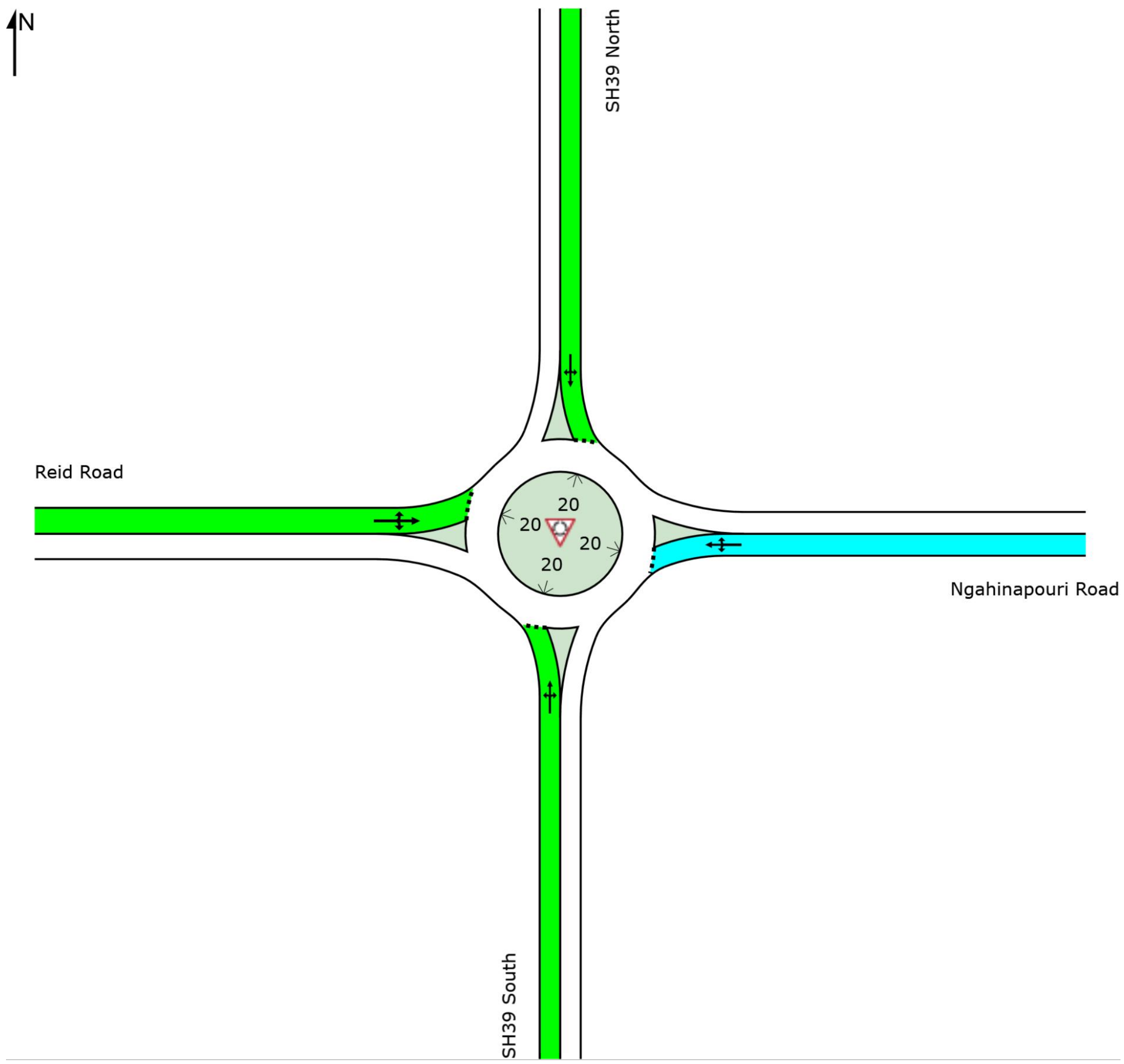
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101v [Opt3to5 - 2035_Hi Dev_PM]

New Site
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	A	B	A	A	A



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
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Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\Ngahinapouri\N_Reid SH39 Int.sip8

DELAY (CONTROL)

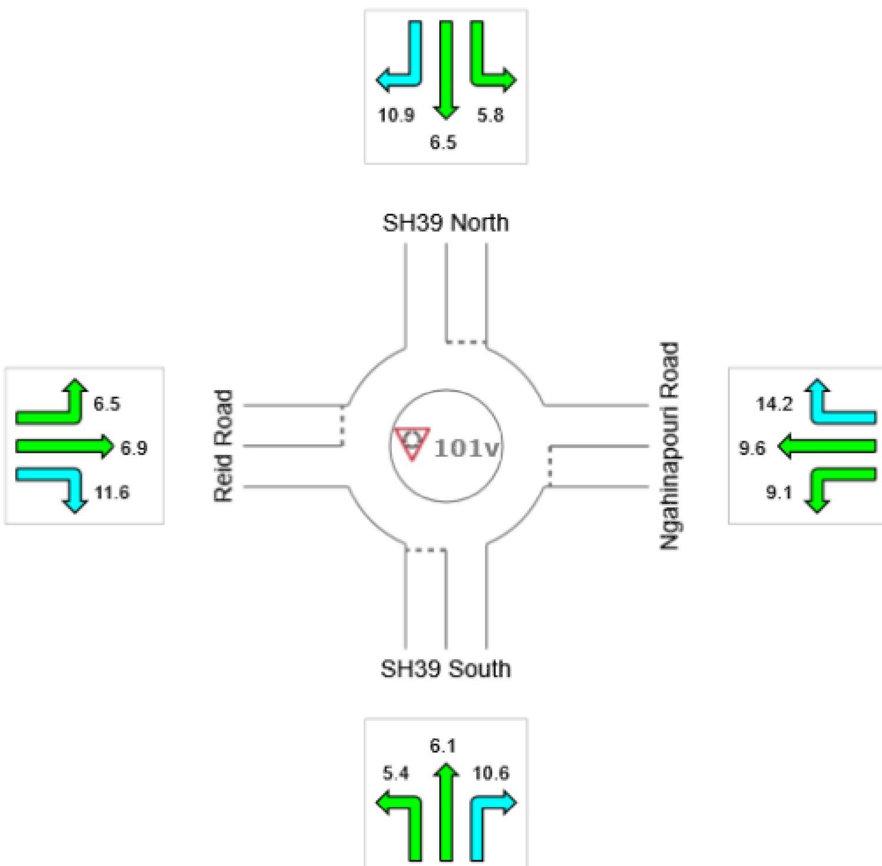
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: 101v [Opt3to5 - 2035_Hi Dev_PM]

New Site
Site Category: (None)
Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	7.0	12.7	6.8	7.6	7.1
LOS	A	B	A	A	A



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).
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Project: \\ttgroup.local\corporate\Hamilton\Projects\1008305\1008305.1000\WorkingMaterial\Traffic\Modelling\SIDRA\Ngahinapouri\N_Reid SH39 Int.sip8

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REPORT

Tonkin+Taylor

Ngahinapouri village concept plan

Three waters assessment

Prepared for
Boffa Miskell Ltd
Prepared by
Tonkin & Taylor Ltd
Date
August 2019
Job Number
1008350.1000.v3

Exceptional thinking together
www.tonkintaylor.co.nz

Document Control

Title: Ngahinapouri village concept plan					
Date	**Version**	**Description**	**Prepared by:**	**Reviewed by:**	**Authorised by:**
7/6/19	1	Draft report	J Mogridge	S Jones	G Nicholson
02/08/19	2	Draft. Updated report following Waipa DC comments	J Mogridge	S Jones	
23/08/19	3	Final	J Mogridge	S Jones	G Nicholson

Distribution:

Boffa Miskell Ltd — 1 PDF copy

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Table of contents

Executive summary

The Waipa district has been identified as a high growth area. To provide for this growth, a village concept plan is required to support the development of three growth cells located in Ngahinapouri named N1, N2 and N3.

Tonkin & Taylor Ltd (T+T) have been appointed by Boffa Miskell Ltd (Boffa Miskell) to investigate and provide technical assessments of the stormwater, wastewater and water supply requirements for the growth cells. These assessments will support the Village Concept Plan being prepared by Boffa Miskell.

Existing three waters infrastructure, drainage and flood risk has been assessed as well as population demands and the required standards, criteria and best practice. The key conclusions and recommendations described in more detail within this report are as follows:

Stormwater

- Due to the catchment position of the growth cells, peak flow control of the 2 year ARI and higher magnitude events is not recommended to avoid coincidence with the larger flood peaks.
- Further assessment through modelling is recommended to ensure that the post development pass-forward flow approach does not have a negative impact on properties to the west of the growth cells between Ngahinapouri and the Waipa River.
- Retention, reuse and onsite soakage of the post-development water quality volume will be required to provide stormwater treatment and erosion control. Onsite soakage will need to be tested and designed on a lot by lot basis.
- Road berms need to be of sufficient width to accommodate swales and low impact stormwater treatment systems such as rain gardens and soakage basins if required. The sizing of such devices will be dependent on the final road layout and onsite soakage testing.

Wastewater

- On-site wastewater treatment and discharge systems.

Water supply

- Water supply will need to be managed through rainwater tanks and the bore water supply.
- Groundwater investigations will be required to ensure proposed lots can be serviced by the bore supply without having a negative impact on the existing supply.
- Water quality needs to meet standards.

1 Introduction

The Waipa district has been identified as a high growth area in the National Policy Statement on Urban Development Capacity. The village of Ngahinapouri is forecast to grow by 380-650 people (+190%-225% growth) by 2050. To provide for this growth, a village concept plan for the growth cells located in Ngahinapouri are required, as identified in the Waipa2050 Growth Strategy (2017) and Waipa District Council (WDC) 2018 – 2028 Long Term Plan (Figure 1.1).

The extents of the 2035 growth cells shown in Figure 1.1 have since changed so that growth cell N1 covers the N1 and N2 area shown in this figure and N2 covers the area labelled as N3.

The growth cells have a total area of approximately 102 ha in size, to the west of SH39 on both the northern and southern sides of Reid Road.

Tonkin & Taylor Ltd (T+T) have been requested by Boffa Miskell Ltd (Boffa Miskell) to investigate and provide technical assessments of the stormwater, wastewater and water supply requirements for the growth cells. These assessments will support the village concept plan for each cell and Plan Changes to the District Plan.

The purpose of this assessment is to:

1. Identify the existing drainage, stormwater features and flood risk within, and associated with, the growth cell areas.
2. Recommend high level stormwater infrastructure and management requirements for development within the growth cell areas.
3. Identify existing wastewater and water supply networks and limitations associated with the growth cell areas.
4. High level assessment of population demands and recommendations for water supply and wastewater within the growth cell areas.

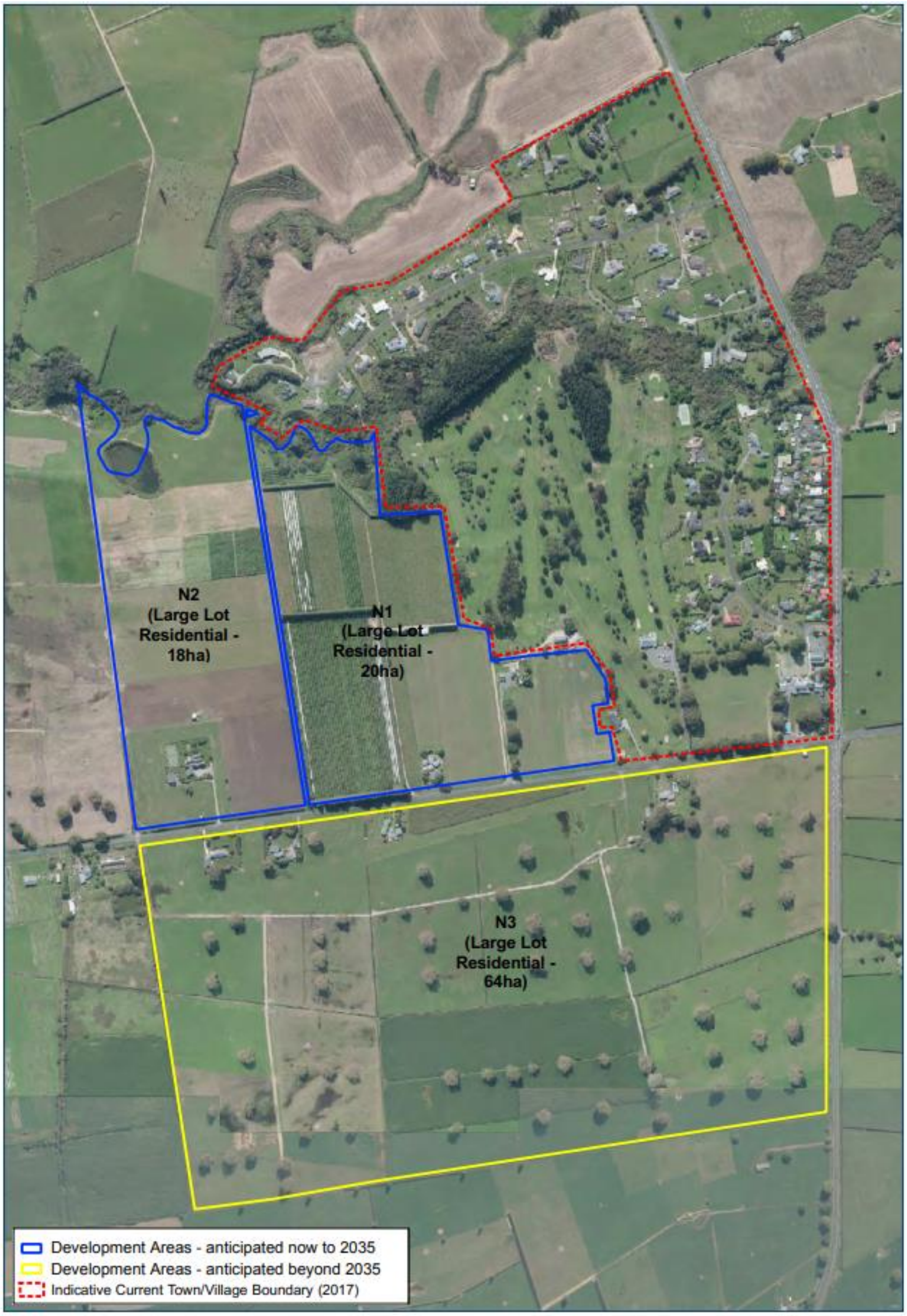

Figure 1.1: Ngahinapouri growth cells (Figure from Waipa2050 Growth Strategy 2017). The extents of the 2035 growth cells have since changed so that growth cell N1 covers the N1 and N2 area shown in this figure and N2 covers the area labelled as N3.

2 Stormwater assessment

2.1 Catchment descriptions

2.1.1 Topography

The existing topography (2007-2008 LiDAR data) within the growth cells is shown in Figure 2.1. The land around the growth cells is predominantly flat with a sharp drop in elevation within the natural floodplain of the Mangahia stream at the northern edge of the growth cells.

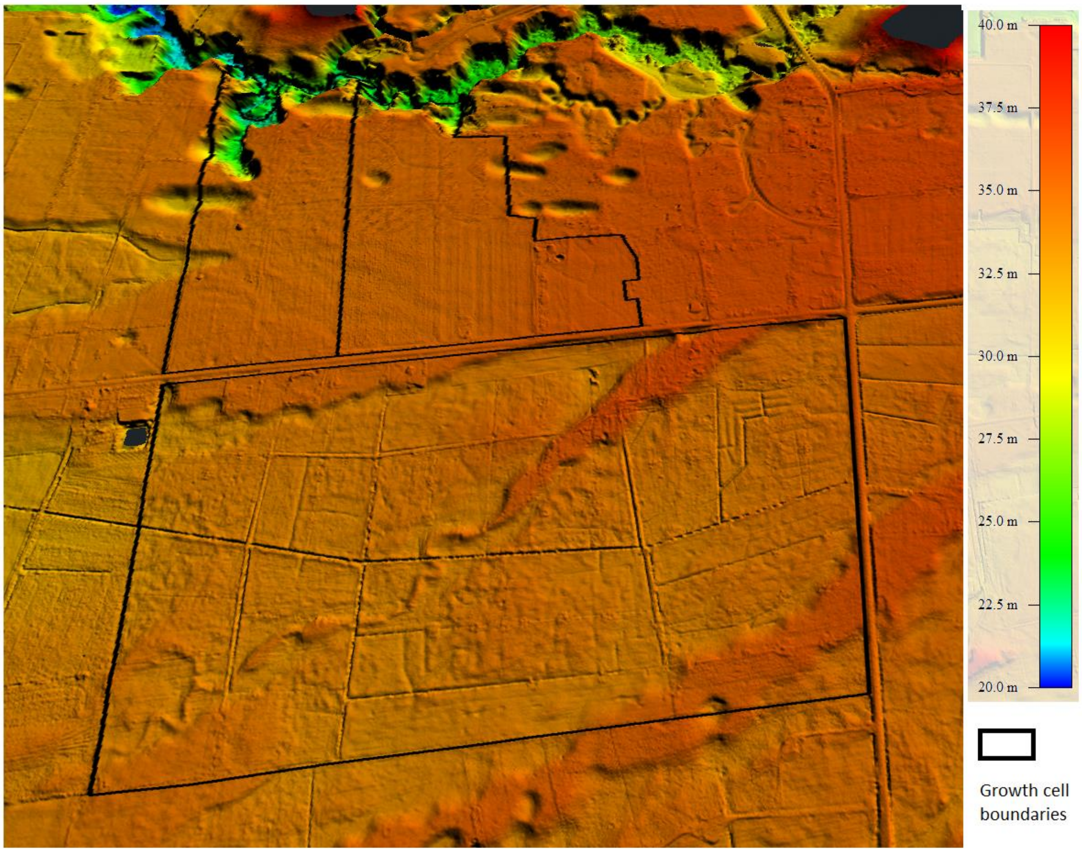

Figure 2.1: Ngahinapouri existing topography (2007-2008 LiDAR)

2.1.2 Existing watercourses and drainage

Figure A1 in Appendix A shows the existing watercourses and drainage within and surrounding the growth cell, generated from 2007-2008 LiDAR.

Runoff within the cells to the north of Reid Road, flow in either a northerly direction to the Mangahia stream, or west directly to the Waipa River. Runoff to the south of Reid Road flows west and south-west directly to the Waipa River. Flows from the Mangahia also discharge to the Waipa River. There are no existing stormwater utilities within the village according to the Waipa DC GIS portal.

2.1.3 Geology

The Landcare Research Soil Permeability Map (https://soils-maps.landcareresearch.co.nz) shows that soils around Ngahinapouri have a moderate permeability.

2.1.4 Existing flood risk and hydrology

The WDC GIS portal does not identify a flood hazard risk at Ngahinapouri. The northern boundaries of the growth cells are within the natural floodplain of the Mangahia stream however and there is a small area of flood hazard defined within the channel gully at the north-west corner of the growth cells. This area is defined at open space/reserve in the latest village concept plan.

2.2 Stormwater standards and criteria

2.2.1 Waikato Regional Council guidelines

Waikato Regional Council (WRC) released two new guideline documents in June 2018 to address stormwater management: Waikato stormwater management guideline (TR2018/01) and Waikato stormwater runoff modelling guideline (TR2018/02).

The stormwater management guidelines includes best practice low impact design approaches and devices for stormwater treatment. It also includes techniques and recommendations for minimising imperviousness and disturbance. These best practices and recommendations should be used throughout the planning and design stages of development.

Within the guideline documents there are five requirements related to peak flow control criteria:

1. Rainfall data used for all rainfall events shall have 24-hour rainfall distribution.
2. The rainfall data for the 2, 10 and 100-year ARI events should be increased for the post-development scenario to allow for predicted climate change.
   Where there are existing downstream flooding issues, depending on the site’s position in the catchment, it is recommended that the post-development peak discharge for the 100-year ARI rainfall event for a new development be limited to 80% of the pre-development peak discharge (unless there is a catchment study that demonstrates that this is not required).
3. In terms of intermediate storm control, depending on the site’s position in the catchment, the 2 and 10-year ARI post-development peak discharges shall not exceed the 2 and 10-year ARI pre-development peak discharges.
4. Peak flow control is generally only recommended for projects located in the top half of catchments so as to avoid concerns over coincidence of peaks aggravating downstream flooding concerns.

Developments will also need to be designed to retain (reuse or soak) the initial abstraction volume of runoff.

The guidelines also include the following requirements for water quality treatment:

1. The water quality volume is the runoff volume from the 1/3 of the 2-year 24 hour rainfall event at a given location.
2. The water quality volume should be used to determine storage volumes and flow rates to size stormwater management devices.
3. In areas where the water quality event rainfall is greater than 30 mm, water quality treatment should be designed using a rainfall depth of 30 mm to determine the water quality volume. This only applies to water quality criteria. Extended detention will require design for the full, un-adjusted volume.
4. Where nutrients are a contaminant of concern, for example in contained lake catchments, a treatment train approach must be used to improve nitrogen and phosphorus removal efficiencies. This is due to the limited ability of individual stormwater management devices to achieve significant removal of nitrogen and phosphorus on their own.

The WRC guidelines recommends the protection of first and second order streams and the piping natural water courses is not supported.

2.2.2 Regional Infrastructure Technical Specification (RITS)

The Regional Infrastructure Technical Specification (RITS) includes documentation on how to design and construct stormwater infrastructure in the participating councils' areas. Section 4 of RITS sets out requirements for the design and construction of stormwater systems for land development and subdivision.

The primary objective of the stormwater system is to manage stormwater runoff to minimise flood damage and adverse effects on the environment. The stormwater system design philosophy aims to protect people, properties and ecological values by preventing or mitigating the quality and the quantity effects of stormwater on the built and natural environment.

New stormwater systems shall achieve the following minimum standards:

1 The stormwater system shall operate by gravity. Pumped systems are not acceptable due to ongoing maintenance costs.
2 The primary stormwater system shall be capable of conveying the design storm event without surcharge.
3 The secondary stormwater system shall be capable of conveying the 100 year ARI storm event within a defined path and without causing undue risk or damage to persons or property.
4 The stormwater system shall not connect or be able to overflow to the wastewater system.
5 Development shall not increase peak discharge rates for design events to the receiving waters. However an increase may be acceptable for:
   a Large events where it is demonstrated that there are no additional adverse effects, which are no more than minor, on the environment or downstream properties as a result of the increase, or
   b Where at source mitigation is not practicable but an offset mitigation is used.
6 Development shall prevent, or minimise, any increase in discharge volumes to receiving waters to the extent reasonably practicable.
7 The stormwater system shall provide the required amount of treatment (section 4.2.3 in the RITS document).

The RITS document also sets out a stormwater management disposal hierarchy to mitigate downstream flooding, scour and water quality impacts:

1 Retention of rainwater/stormwater for reuse on site.
2 Soakage techniques.
3 Treatment and detention and gradual release to a watercourse.
4 Treatment and detention and gradual release to a piped stormwater system.

The RITS guideline acknowledges that it may differ to the WRC guidelines and that the WRC document prevails.

2.3 Stormwater management approach

2.3.1 Flood and erosion risk

Due to the sites position within both the Mangahia stream and the Waipa River catchments peak flood flow control of runoff directly from the cells in the 2 year ARI and higher magnitude events would not be appropriate, to avoid coincidence of peaks aggravating downstream flooding concerns (see WRC peak flow control criteria point 5, section 2.2.1).

Following a rainfall event runoff directly from the growth cells are expected to discharge to the Waipa River before the flood hydrograph from the upper catchment arrives. It is therefore likely to be more appropriate to pass forward flows from the growth cells with regards to flood risk.

For the flowpaths that currently drain west, there are properties between the growth cells and the Waipa River however. It is therefore recommended that further assessment through modelling is undertaken to ensure that the post development pass-forward flow approach does not have a negative impact on these properties.

The Mangahia stream channel is an incised gully so erosion control is required and points of discharge to the stream need to be managed so velocities do not exceed the maximum permissible values stated in the WRC guidelines.

In terms of volume control for downstream erosion prevention, it is recommended that the difference between pre and post-development total volume for smaller storms up to the 2-year ARI event be retained (rainwater re-use, soakage or bio-retention) where possible. Given the size of the growth cells and that post-development impervious surfaces are limited, it is likely that the pre to post-developed 2 year ARI volume difference will be smaller than the post-developed water quality volume (1/3 of the 2 year ARI 24 hour rainfall) and erosion volume can therefore be managed through stormwater treatment. The ecological corridor at the Mangahia stream should be improved where possible.

2.3.2 Stormwater treatment

The receiving environments for the growth cells are the Mangahia stream and the Waipa River which are natural streams and water quality treatment will be required for the post-developed water quality volume (1/3 of the 2 year ARI 24 hour rainfall) including extended detention (1/2 of the water quality volume).

Retention, reuse and onsite soakage of the water quality volume will therefore be required to provide stormwater treatment and erosion control. Impermeable surfaces should be minimised where possible using techniques and recommendations in the WRC guidelines to reduce the post-developed volume.

Water tanks for each lot are recommended so rainfall runoff is reduced and water can be stored for household water supply, as a water supply will not be provided to the growth cell.

Onsite soakage will need to be tested and designed on a lot by lot basis by a suitably qualified stormwater engineer using site specific investigation data. If on-site soakage investigations show that the post-developed water quality rainfall volume cannot be achieved through water tanks and soakage then bio-retention devices or a suitable wetland will need to be designed.

Vegetated swales are recommended as appropriate devices to convey overland flows using the best practice methods in the WRC guidelines. These should be aligned adjacent to roads in the berm area of the road where possible.

Road berms need to be of sufficient width to accommodate vegetated swales and low impact stormwater treatment systems such as rain gardens and soakage basins if required. Onsite soakage will need to be tested and if water quality treatment of the final road layout cannot be achieved within the berm space then a suitable wetland will need to be designed. Given the current topography and overland drainage paths (Figure A1 in Appendix A), the east or northern areas of the growth cells would be an appropriate location for such a device. The WRC and RITS guideline documents should be used for best practice design.

An allowance for swales is included in the collector road cost estimate as presented in the Tonkin and Taylor Transportation Assessment for Ngahinapouri. It is assumed that the construction and design costs of other stormwater treatment devices within the growth cell will be the responsibility of the developer(s).

3 Wastewater and water supply assessment

Ngahinapouri lies outside of any reticulated water supply or reticulated wastewater network. The Waipa2050 Growth Strategy (2017) vision for Ngahinapouri states that the village will remain un-serviced in terms of both wastewater and water supply.

3.1 Wastewater

The large lot residential zone has an average lot size of 5000 m^2 (Part E Section 15 Rule 15.4.2.1 (n) of the District Plan) whilst the WRC requirements for on-site wastewater treatment includes a minimum effective effluent disposal area of 2,500 m^2. Therefore, subject to the soakage capacity of the prevailing soil conditions, large lot residential development with on-site wastewater treatment would comply with the WRC requirements. Other interactions with groundwater, flood plains and overland flow paths would also need to be considered in the design.

The design of such devices is covered in the Waikato Regional Plan, Section 3.5.7 Implementation Methods – Onsite Sewerage Discharges and the Auckland Regional Council 2004 On-site Wastewater Systems Design and Management Manual – Technical Publication Third Edition (TP58). TP58 states that a soil profile determination should be undertaken to determine soakage rates and the document provides guidance on how this assessment should be undertaken.

Key design criteria for such systems are listed in Table 3.1.

Table 3.1: Key wastewater design criteria

Item	Waikato Regional Plan, Section 3.5.7 Implementation Methods – Onsite Sewerage Discharges	Comments
Effluent volume	Maximum 1,300 l/day	Averaged over any one month
Septic Tank Size	Minimum 3,000 litres	
Effective disposal area onto or into land	Minimum 2,500 m^2	

Each lot will therefore need to be of sufficient size to accommodate an effective disposal area. The siting of such systems on each lot must avoid interaction with streams, flood waters, overland flow paths and avoid risks of groundwater contamination. To achieve this, the Regional Plan stipulates separation distances from wastewater effluent fields and these environments. The soil profile and soakage capacity will need to be determined on a lot by lot basis in accordance with TP58 to determine appropriate on-site wastewater treatment devices.

3.2 Water supply

As the village will remain un-serviced, water supply will need to be managed through rainwater tanks and private bore water supplies.

Groundwater investigations will be required to ensure proposed lots can be serviced by bore supply without having a negative impact on the existing bores in the village. Rainwater tanks for each lot are recommended to reduce pressure on the bore supply and help meet stormwater treatment requirements.

Water quality will need to be tested to ensure that it meets the requirements of the Ministry of Health's Drinking Water Standards for New Zealand 2005 (revised 2008) and any potential updates to these standards following proposed national reforms on potable water supply.

4 Conclusions and recommendations

Ngahinapouri is identified for growth in the Waipa2050 Growth Strategy (2017) and Waipa District Council (WDC) 2018 – 2028 Long Term Plan.

The key conclusions and recommendations from the technical assessments of the stormwater, wastewater and water supply requirements to support the village concept plan for the growth cells are as follows:

Stormwater

- Due to the position of the growth cell within the wider Mangahia stream and Waipa River catchments, peak flow control of the 2 year ARI and higher magnitude events is not recommended to avoid coincidence with the larger flood peaks.
- There are properties between the growth cells and the Waipa River and it is recommended that further assessment through modelling is undertaken to ensure that the post development pass-forward flow approach does not have a negative impact on these properties.
- Retention, reuse and onsite soakage of the post-development water quality volume will be required to provide stormwater treatment and erosion control. Water tanks for each lot are recommended to help meet these requirements and water supply demands.
- Onsite soakage will need to be tested and designed on a lot by lot basis. If on-site soakage investigations show that the post-developed water quality rainfall volume cannot be achieved through water tanks and soakage then bio-retention devices or a suitable wetland will need to be designed.
- Road berms need to be of sufficient width to accommodate swales and low impact stormwater treatment systems such as rain gardens and soakage basins if required. The sizing of such devices will be dependent on the final road layout and onsite soakage testing.
- An allowance for swales is included in the collector road cost estimate as presented in the Tonkin and Taylor Transportation Assessment for Ngahinapouri. It is assumed that the construction and design costs of other stormwater treatment devices within the growth cell will be the responsibility of the developer(s).

Wastewater

- The growth cell will not be provided with a public wastewater system and hence is required to be serviced by on-site wastewater treatment and discharge systems.
- The design of these devices need to comply with the Waikato Regional Plan, Section 3.5.7 Implementation Methods – Onsite Sewerage Discharges and the Auckland Regional Council 2004 On-site Wastewater Systems Design and Management Manual – Technical Publication Third Edition (TP58).
- The soil profile and soakage capacity will need to be determined on a lot by lot basis in accordance with TP58 to determine appropriate on-site wastewater treatment devices.

Water supply

- Water supply will need to be managed through rainwater tanks and the bore water supply.
- Groundwater investigations will be required to ensure proposed lots can be serviced by the bore supply without having a negative impact on the existing supply.

5 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 Ngahinapouri Village Concept 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.

Tonkin & Taylor Ltd

Report prepared by:

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James Mogridge

Water Engineer

Authorised for Tonkin & Taylor Ltd by:

....

Glen Nicholson

Project Director

Report technically reviewed by Shaun Jones – Senior Water Resources Engineer

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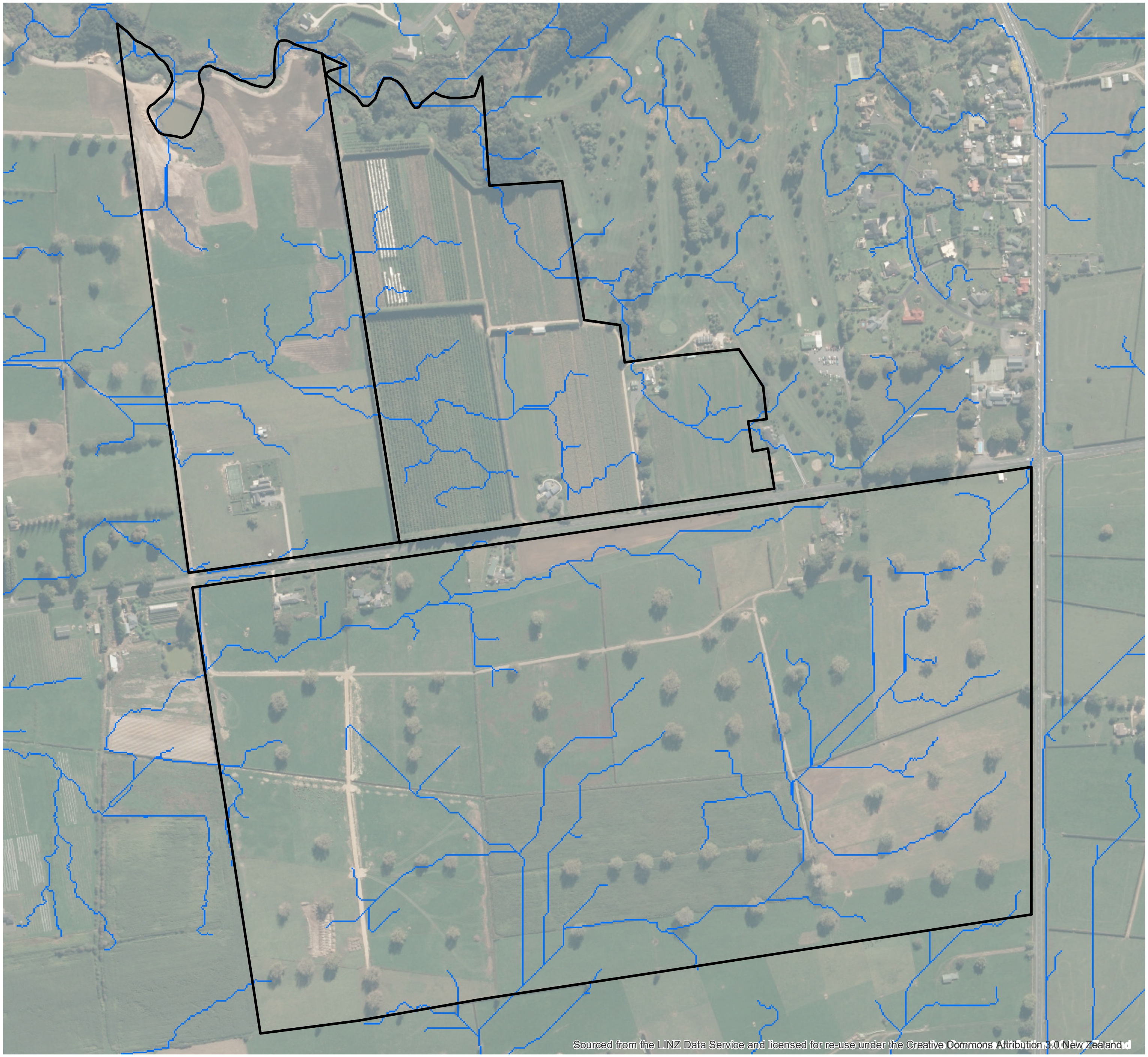
Appendix A: Stormwater Figures

- **Figure A1: Ngahinapouri drainage map**

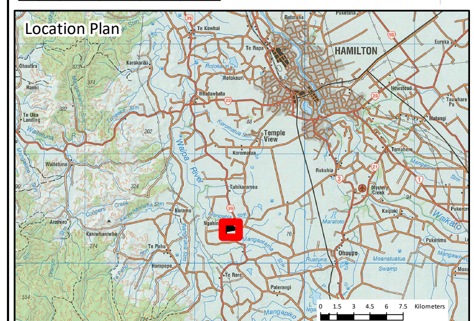


LEGEND

- Overland Flowpaths
- Ngahinapouri Growth Cells

A3 SCALE:1:5,000

0 40 80 120 160 200 Meters



Notes:
Topo map and aerial sourced from LINZ Data (Crown Copyright Reserved).
Applicability:
This figure has been prepared with respect to the particular brief given to Tonkin + Taylor.
Tonkin + Taylor do not accept responsibility for any loss or damage resulting from the use of the information and any person relying on the information does so at their own risk.

Flowpath routes generated using 2008-2009 LiDAR topographical data

DRAWN	JMOR	May.19
CHECKED	JJBR	Aug.19
APPROVED	GGN	Aug.19

ARCFILE
FigureA1_Ngahinapouri_drainage_map.mxd

SCALE (AT A3 SIZE)
1:5,000

PROJECT No.
1008305.1000

Tonkin+Taylor
Level 5, 711 Victoria Street, Hamilton
www.tonkintaylor.co.nz

BOFFA MISKELL
WAIPA STRUCTURE PLAN
Ngahinapouri Town
Drainage map

FIGURE A1

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APPENDIX FOUR.

MULTI-CRITERIA ANALYSIS (M.C.A.) ASSESSMENT (TONKIN & TAYLOR, 2020).

Tonkin+Taylor

Job No: 1008305.2000
13 March 2020

Boffa Miskell Ltd
PO Box 1094
Waikato Mail Centre
Hamilton 3240

Attention: Dave Moule

Dear Dave

Ngahinapouri Multi-Criteria Analysis

1 Introduction

As part of the Village Concept Plan process for Ngahinapouri and in line with Variation Order 2 (VO2), Tonkin & Taylor Ltd (T+T) have been requested to undertake a Multi Criteria Analysis (MCA) for the intersection options presented in the Village Concept.

The form of the intersection is a key part of the Village Concept Plan therefore a robust and transparent approach to the assessment of each option was required. This report presents the reasoning behind the criteria chosen for the MCA, their weighting as well as summarising the results of the scoring undertaken.

This MCA should be read in conjunction with the T+T Ngahinapouri Concept Plan: Transportation Assessment, dated October 2019, ref: 1008305.1000 and the Boffa Miskell Village Concept plan.

2 Options

The Boffa Miskell Village Concept Plan presents the options currently being considered for the SH39 intersection at Ngahinapouri. These options have been established and agreed in collaboration with Waipa District Council (WDC), Boffa Miskell Ltd (Boffa Miskell) and T+T during the Village Concept Planning Process. The following 5 options have been considered in the MCA:

1. Do Nothing (except local road upgrade)
2. Staggered-Intersection
3. Signalised Junction
4. Standard Roundabout
5. Offset Roundabout

3 MCA criteria and weighting

The criteria used to evaluate the options were agreed through discussion with WDC stakeholders to be the most appropriate representation of the Council’s overarching community, urban design and transport outcomes. Each of the criteria has an agreed weighting (as a percentage) which provides a balanced approach to the evaluation, with no single criteria being able to skew the overall results.

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Being predominantly a transport element assessment, the highest weighted category is transport objectives amounting to 50% of the overall score. Criteria are presented Table 3.1 through to Table 3.3.

Table 3.1: WDC Objectives

Criteria	Evaluation criteria	Weighting
Connected with Community	Is this what the community wants?	5%
Environmental and Cultural Champion	Does this enhance the environmental and cultural wellbeing of the community?	5%
Economically Progressive	Does this contribute positively to the local economy and provide value to the community?	5%
Socially Responsible	Does this enhance quality of life for local community?	5%

Table 3.2: Urban Design Objectives

Criteria	Evaluation criteria	Weighting
Community Facilities and Amenities	Does this enhance the proposed community?	5%
Self-explaining Roads	Does this provide a user-friendly intersection and road network for all users?	5%
Place Making	Does this contribute to the desired sense of place?	5%
Open space network	Does this enhance the open space network?	5%
Regulatory Risk	How likely is this to meet asset owner approval or achieve RMA compliance?	10%

Table 3.3: Transport Objectives

Criteria	Evaluation criteria	Weighting
Road safety (vehicle)	Does this reduce crash risk?	10%
Road safety (pedestrian and cyclist)	Does this enhance safety of vulnerable road users?	10%
Efficiency (traffic)	Does this improve traffic movements?	5%
Buildability	Is this feasible?	10%
Ongoing Liability	What are the long-term maintenance and operational risks?	15%

Criteria for the WDC objectives have been chosen to align with the Waipa 2050 Growth Strategy. Further information on the design criteria is presented in the Village Concept Plan.

The objectives of the New Zealand Transport Agency (NZTA), the Ministry of Education (MoE) and the community are encompassed in the finalised criteria. These objectives were established during a workshop held at WDC on 29 October 2019.

The weighting of the various criteria reflects the discussions held with each stakeholder and have been agreed following consultation with Boffa Miskell and WDC.

4 Scoring

Scoring was undertaken using a seven-point scale (Figure 4.1) to improve granularity of results and to allow for subtle differences between options to be represented in the scoring.

3	Significant enhancement
2	Moderate enhancement
1	Slight enhancement
0	Neutral
-1	Slight detraction
-2	Moderate detraction
-3	Significant detraction (Fatal Flaw)

Figure 4.1: Seven-point scale.

Any criteria that scores a '-3', is considered to be a fatal flaw within the option and should automatically exclude it from further consideration.

The scoring of options was completed individually prior to the workshop to allow participants time to consider each option and how they perceive the relative "fit" to the evaluation criteria. The consolidated results were shared prior to provide a shared understanding of the trends and any significant differences in opinion or interpretation. A summary of the weighted results from the individual scoring broken down by objective is given in Figure 4.2.

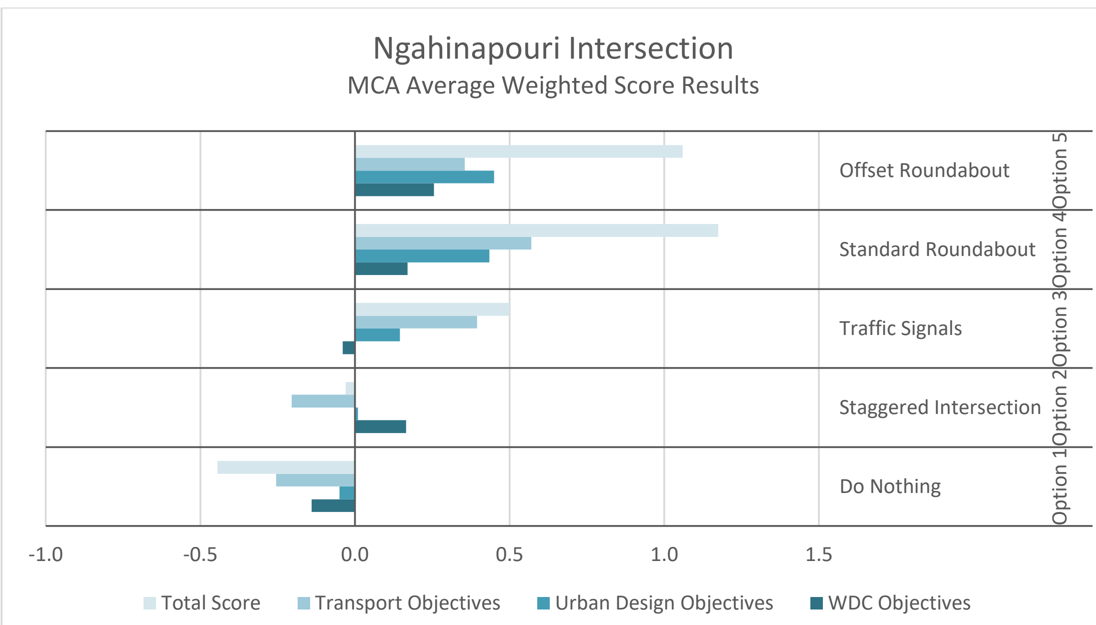


Figure 4.2: Average of individual MCA scores

A joint workshop was held at WDC offices on 15 January 2020 with representatives of planning, engineering and urban design directorates as well as consultant representatives of T+T and Boffa Miskell, to review the criteria and develop an agreed score.

Prior to reviewing the scores, the participants confirmed that the objectives and criteria were correct; the weighting for each criterion was appropriate and the seven-point scale suitable.

Each of the five options was assessed from first principles, with any discrepancies in score discussed and resolved to provide an agreed final score in Table 4.1. Rough Order Cost Estimates for each option have been presented in the T+T transportation assessment and added to Table 4.1 for completeness. The rough order costs for all oprtions, including Options 2 to 5 indicated in Table 4.1 below, also include the costs associated with the required local road upgrades. For the purposes of the MCA, costs have not been assessed, instead each option has been assessed on merit only with the costs factored in at the end. The workshop scores, broken down in to the three objectives, are shown in Figure 4.3 below.

Table 4.1: MCA Score Summary

Option	Description	Weighted Score	Ranking	Rough Order Cost
1	Do Nothing (apart from local road upgrades)	-0.85	5	$3.75m
2	Staggered Intersection	-0.55	4	$6.15m
3	Traffic Signals	0.20	3	$6.70m
4	Standard Roundabout	1.25	1	$8.95m
5	Offset Roundabout	1.15	2	$10.45m

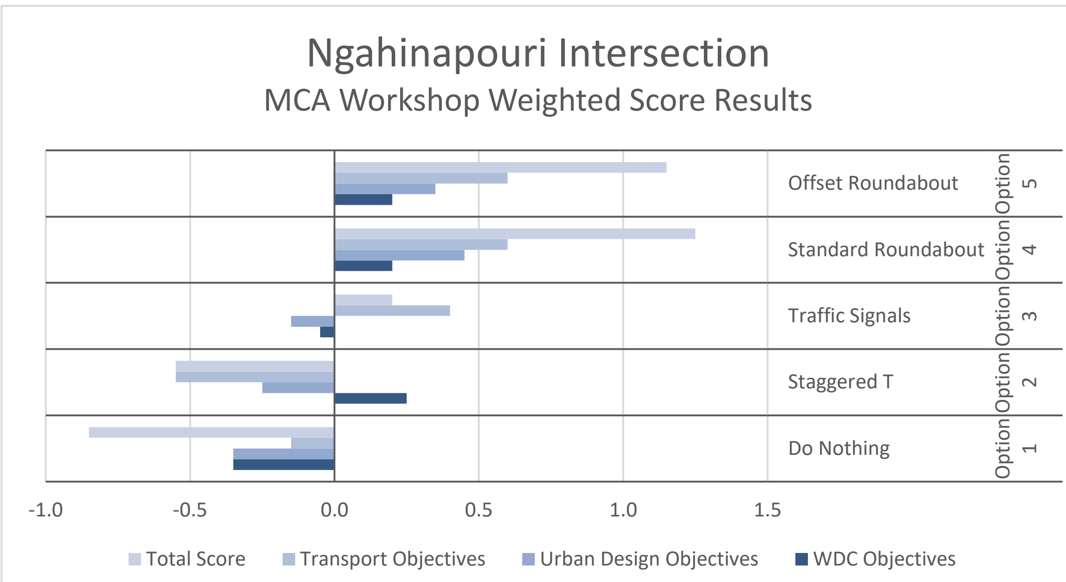


Figure 4.3: Workshop MCA Scores

4.1 Discussion on scoring

In both the individual scenario and the agreed workshop assessment the scores and results are very similar. The main differences are in the value put on urban design, and Council objectives differing due to the variation in perception of value between individuals.

Overall the results are consistent with the highest scoring option being the standard roundabout.

Specific commentary around scoring was captured as follows.

4.1.1 WDC objectives

There have been significant complaints from residents over the intersection layout in its current form. The staggered intersection was the original idea that was socialised with the residents, a roundabout was not originally proposed, and subsequent discussions indicate that it will be the preferred option.

4.1.2 Urban design objectives

The staggered intersection option is likely to reduce developable land and may detract from Waipa 2050 objectives[1].

Consideration of pedestrians, cyclists, motorists and residents is included within the self-explaining roads scoring.

Regulatory risk covers a high-level risk-based assessment on acceptability of the proposal and if it will result in a legal challenge situation (i.e. Environment Court). Further, NZTA may restrict future development if the intersection is not appropriate (i.e. place a limit on number of lots or trip generation until an improved intersection is constructed). NZTA have previously indicated that they would support a roundabout at this location.

4.1.3 Transport objectives

Safety and efficiency scores are derived from empirical data provided in the earlier T+T transportation assessment for crash prediction and intersection modelling.

5 Conclusion

The outcome of the MCA takes account of a diverse range of criteria which represent the objectives of Waipa District Council, Urban Design and Transportation. The MCA provides a subjective comparative analysis of the option variations for the interaction of SH39 and Reid Road and is weighted to mitigate any bias within the scoring of any one option.

The MCA examined four intersection design options against the benchmark of “do nothing”: Staggered intersection; Traffic Signals; Standard Roundabout; and Offset Roundabout. These intersection forms are discussed in detail in the T+T Transportation Assessment, dated October 2019, ref: 1008305.1000 and the Boffa Miskell Village Concept plan.

The MCA indicates that the preferred intersection form is a roundabout. Given that results of the workshop scoring indicate that a roundabout is the preferred option, and that the standard roundabout is also the highest scoring and least expensive of the two roundabout options, it is not considered necessary to undertake a more detailed cost benefit analysis at this stage.

[1] Waipa 2050 Growth Strategy, Waipa District Council (November 2017)

6 Applicability

This report has been prepared for the exclusive use of our client Boffa Miskell Ltd, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

T+T agrees this report may also be used by Waipa District Council 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 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.

Tonkin & Taylor Ltd

Report prepared by:	Authorised for Tonkin & Taylor Ltd by:
....	....
Alan Gregory Senior Transport Planner	Glen Nicholson Project Director

TIBR
p:\1008305\1008305.2000\issueddocuments\200313.tibr.ngahinapouri mca.ltr rpt.docx

Appendix A: Workshop MCA scoring table

Scored based on 2035 full development scenario

Workshop Scoring

Any criteria that has a -3 should be assumed as a fatal flaw for the option
Need to confirm weightings with Stakeholders prior to scoring
Need to complete a rationale for scoring when confirmed

Multi-criteria Analysis (MCA)

			Option 1		Option 2		Option 3		Option 4		Option 5		
			Do Nothing		Staggered T		Traffic Lights		Standard Roundabout		Offset Roundabout		
Criteria	**Evaluation criteria**	**Weighting**	*Score*	*Weighted score*	*Score*	*Weighted score*	*Score*	*Weighted score*	*Score*	*Weighted score*	*Score*	*Weighted score*	Notes
WDC Objectives		20%	-7.00	-0.35	5.00	0.25	-1.00	-0.05	4.00	0.20	4.00	0.20	
Connected with Community	Is this what the community wants?	5%	-2.00	-0.10	2.00	0.10	-2.00	-0.10	1.00	0.05	1.00	0.05	significant complaints from residents already, staggered T was original best idea but roundabout was not originally proposed
Environmental and Cultural Champion	Does this enhance the environmental and cultural wellbeing of the community?	5%	-1.00	-0.05	1.00	0.05	-1.00	-0.05	1.00	0.05	1.00	0.05	
Economically Progressive	Does this contribute positively to the local economy and provide value to the community?	5%	-2.00	-0.10	1.00	0.05	1.00	0.05	1.00	0.05	1.00	0.05	
Socially Responsible	Does this enhance quality of life for local community?	5%	-2.00	-0.10	1.00	0.05	1.00	0.05	1.00	0.05	1.00	0.05	
Urban Design Objectives		30%	-5.00	-0.35	-3.00	-0.25	-1.00	-0.15	8.00	0.45	7.00	0.35	
Community Facilities and Amenities	Does this enhance the proposed community?	5%	-1.00	-0.05	1.00	0.05	0.00	0.00	2.00	0.10	2.00	0.10	staggered T can reduce developable land and may deteract from Waipa 2050 objectives
Self-explaining Roads	Does this provide a user-friendly intersection and road network for all users?	5%	-1.00	-0.05	-1.00	-0.05	2.00	0.10	2.00	0.10	2.00	0.10	Consideration of pedestrians, cyclists, motorists and residents should be included
Place Making	Does this contribute to the desired sense of place?	5%	-1.00	-0.05	-1.00	-0.05	-1.00	-0.05	2.00	0.10	2.00	0.10	
Open space network	Does this enhance the open space network?	5%	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.05	1.00	0.05	
Regulatory Risk	How likely is this to meet asset owner approval or achieve RMA compliance?	10%	-2.00	-0.20	-2.00	-0.20	-2.00	-0.20	1.00	0.10	0.00	0.00	high level risk based assessment onn acceptability of the proposal and if it will result in a legal challenge situation (i.e. Environment Court) - NZTA may restrict future development if the intersection is not appropopriate - NZTA support roundabout
Transport Objectives		50%	-2.00	-0.15	-5.00	-0.55	5.00	0.40	8.00	0.60	8.00	0.60	
Road safety (vehicle)	Does this reduce crash risk?	10%	-2.00	-0.20	-1.00	-0.10	1.00	0.10	3.00	0.30	3.00	0.30	Refer to T+T technical report for crash modelling
Road safety (pedestrian and cyclist)	Does this enhance safety of vulnerable road users?	10%	-2.00	-0.20	-2.00	-0.20	2.00	0.20	1.00	0.10	1.00	0.10	
Efficiency (traffic)	Does this improve traffic movements?	5%	-1.00	-0.05	0.00	0.00	1.00	0.05	3.00	0.15	3.00	0.15	Refer to T+T technical report for traffic modelling
Buildability	Is this feasible?	10%	3.00	0.30	-1.00	-0.10	2.00	0.20	2.00	0.20	2.00	0.20	this assesses relative difficulty in construction and accommodation works such as enhanced stormater detention and potential for diversion of other assets - requires large amount of land for staggered T
Ongoing Liability	what are the long term maintenance and operational risks?	15%	0.00	0.00	-1.00	-0.15	-1.00	-0.15	-1.00	-0.15	-1.00	-0.15	
TOTAL SCORE		**100%**	**-14.00**	**-0.85**	**-3.00**	**-0.55**	**3.00**	**0.20**	**20.00**	**1.25**	**19.00**	**1.15**	
COST ESTIMATE ($M)				3.75		6.15		6.7		8.95		10.45	Based on latest cost estimates from T+T technical report. Includes a 60% contingency
Score Value Ratio				-0.23		-0.09		0.03		0.14		0.11	this is a crude BCA proxy for comparative purposes
Ranking				5		4		3		1		2	

Appendix 2

99.1016 - Ngahinapouri Village Concept Plan – key information for engagement August 2020 (document number 10451176)

Ngahinapouri Village concept plan – key information for engagement

What is the Ngahinapouri Village Concept Plan?

A village concept plan was developed in 2014 by Beca on behalf of Waipā District Council to assist in providing for sustainable growth of the village as it develops in the future. This plan was not adopted due to Council cost and safety considerations regarding the intersection of State Highway 39, Reid Road and Ngahinapouri Road.

In 2019 Council contracted Boffa Miskell and Tonkin & Taylor to begin work again on a village concept plan for Ngahinapouri. The purpose of this plan was expanded to include structure plans for the three growth cells identified for large lot residential development in the Waipa 2050 Growth Strategy. This process has so far involved engagement with key community stakeholders as well as Waka Kotahi New Zealand Transport Agency and the Ministry of Education.

Now we have structure plans for the three growth cells and a recommended option for the intersection of State Highway 39, Reid Road and Ngahinapouri Road.

Who was involved in developing the plan.

The draft village concept plan so far incorporates feedback from key community stakeholders, Waka Kotahi New Zealand Transport Agency, the Ministry of Education and Council managers.

What you told us….

We've taken on board feedback from key community stakeholders and looked at the 2014 village concept plan. From this, we understand that your key ideas are:

1) A community hub to provide for amenities such as a church, creche and café.
2) New large lot residential areas for growth that provide improved safety and connectivity for pedestrians and cyclists.
3) Primary school expansion to meet growing population demands.
4) An improved intersection of Ngahinapouri Road, Reid Road and SH39 to help alleviate current and future safety concerns.

What we did…

1) <u>A community hub to provide for amenities such as a church, creche and café.</u>

You wanted the area to provide for a mix of amenities such as a church, creche and café, with good linkages to Stewart Reid Memorial Park, Ngahinapouri Golf Club and Ngahinapouri School. You also told us that any future development would need to fit the village atmosphere and work for you long term.

In order to achieve this, we included a community hub on the corner of Reid Road and State Highway 39, opposite Ngahinapouri School.

[Add images of the growth area from Ngahinapouri Village Concept Options Document FINAL DRAFT]

- **Let's check in! Do you still support the idea of a community hub for Ngahinapouri?**

☐ **Yes**

☐ **No**
☐ **Not sure**

2) New large lot residential areas for growth that provide improved safety and connectivity for pedestrians and cyclists.

In order to achieve these ideas, we made sure we included walking and cycling links in our structure plans for the three large lot residential growth cells. These links will mean children can safely walk or cycle to school, families can walk down to the local community hub and there's a safe area for people to exercise.

[Add images of the growth cells structure plans from Ngahinapouri Village Concept Options Document FINAL DRAFT]

- **This is underway! Structure plans for the growth cells have been developed.**

3) Primary school expansion to meet growing population demands.

To address this idea, we met with representatives from the Ministry of Education to find out what its plans were for any expansion of Ngahinapouri School. Ministry data for projected growth areas does not support the expansion of the school other than through the provision of roll growth classrooms if required. An expansion of the school grounds is not possible unless the trustees of the adjacent reserve wanted to sell a portion to the Ministry. The school has capacity for 175 students and currently has out-of-zone pupils enrolled. The Ministry has indicated that they expect the school to manage down their out-of-zone pupil numbers which will assist with capacity concerns.

- **Who makes the decisions about schools? The Ministry of Education is responsible for decisions about schools across New Zealand. This includes school population demands, growth and expansion of current facilities.**

4) An improved intersection of Ngahinapouri Road, Reid Road and SH39 to help address current and future safety concerns.

Due to the location of State Highway 39, Council engaged with representatives from Waka Kotahi New Zealand Transport Agency. Traffic volumes on State Highway 39 are expected to increase.
Traffic modelling was carried out by Tonkin & Taylor, which looked at no development, low development and high development scenario impacts on traffic volumes in the village. The low development scenario is the level of development that arises from the Waipa 2050 Growth Strategy and is what Council expects to see occur in Ngahinapouri. A 2% per annum growth in traffic volumes was assumed for the modelling.
Modelling showed that the existing intersection will be sufficient for current and predicted traffic volumes until about 2035. After that, the modelling suggested there would be increasingly long wait times for vehicles on Ngahinapouri and Reid Roads at peak times in the morning and evening.

Because of this, Council asked Tonkin & Taylor to investigate different options for the intersection. Five options were investigated and scored against twelve criteria in three key areas: Waipa District Council objectives, Urban Design objectives and Transport objectives.

The options….

1) Option One: Do nothing.
2) Option Two: Staggered T intersection
3) Option Three: Traffic Lights
4) Option Four: Traditional roundabout
5) Option Five: Realigned roundabout

How we scored each option…

Using your feedback, we identified twelve criteria in three key areas: Waipā District Council (WDC) Objectives, Urban Design Objectives (Community desires) and Transport Objectives.

WDC Objectives

Criteria	Evaluation criteria	Weighting
Connected with Community	Is this what the community wants?	5%
Environmental and Cultural Champion	Does this enhance the environmental and cultural wellbeing of the community?	5%
Economically Progressive	Does this contribute positively to the local economy and provide value to the community?	5%
Socially Responsible	Does this enhance quality of life for local community?	5%

Urban Design Objectives

Criteria	Evaluation criteria	Weighting
Community Facilities and Amenities	Does this enhance the proposed community?	5%
Self-explaining Roads	Does this provide a user-friendly intersection and road network for all users?	5%
Place Making	Does this contribute to the desired sense of place?	5%
Open space network	Does this enhance the open space network?	5%
Regulatory Risk	How likely is this to meet asset owner approval or achieve RMA compliance?	10%

Transport Objectives

Criteria	Evaluation criteria	Weighting
Road safety (vehicle)	Does this reduce crash risk?	10%
Road safety (pedestrian and cyclist)	Does this enhance safety of vulnerable road users?	10%
Efficiency (traffic)	Does this improve traffic movements?	5%
Buildability	Is this feasible?	10%
Ongoing Liability	What are the long-term maintenance and operational risks?	15%

How it was scored…

Scoring was undertaken using a seven-point scale (Figure 4.1) to improve granularity of results and to allow for subtle differences between options to be represented in the scoring.

3	Significant enhancement
2	Moderate enhancement
1	Slight enhancement
0	Neutral
-1	Slight detraction
-2	Moderate detraction
-3	Significant detraction (Fatal Flaw)

Figure 4.1: Seven-point scale.

Who was involved…

Key stakeholders from each criteria group provided objective feedback based on their technical expertise. They included representatives from Tonkin & Taylor, Boffa Miskell and technical experts from Waipā District Council's roading and infrastructure teams.

The results…

Based on each option:

1) Option One: Do nothing.

Pros

+ No cost to Council to acquire property

Cons

- Level of service degrades over time; traffic queues will begin to form during peak times
- Safety concerns will increase with traffic volumes

2) Option Two: Staggered T intersection

Pros

+ Provides land for school expansion

Cons

- Increase in potential turning conflicts for traffic and risk of increase in severe crashes if people make mistakes and turn in front of oncoming traffic
- Doesn't slow SH39 traffic down

3) Option Three: Traffic Lights

Pros

+ Doesn't encroach on school
+ Safer for pedestrians
+ Small intersection footprint; doesn't require much land
+ Relatively quick and easy to build

Cons

- Unexpected intersection form for rural highway which could lead to increase in crashes if people fail to stop

4) Option Four: Traditional roundabout - RECOMMENDED

Pros

+ Doesn’t encroach on school
+ Safest intersection form for vehicles
+ Slows traffic down while keeping it flowing

Cons

- Requires land purchase

5) Option Five: Realigned roundabout

Pros

+ Doesn’t encroach on school
+ Safest intersection form for vehicles
+ Slows traffic down while keeping it flowing

Cons

- Most expensive intersection option due to road realignment
- Requires land purchase

Let’s check in! Do you support the intersection recommendation? Why / why not?

So what’s next?

We’ll further refine the recommended roundabout intersection to include in the final Ngahinapouri Village Concept Plan. From there it will go to the Strategic Planning & Policy Committee in November, with final adoption of the Plan in December.

Once the plan is adopted, the projects will go into the Long Term Plan for funding consideration.

Appendix 3

2014 Beca Ngahinapouri Village Concept Plan (document number 6809053)

STRATEGIC PLANNING AND POLICY COMMITTEE REPORT

Waipā DISTRICT COUNCIL

INFORMATION ONLY

To:	The Chairperson and Members of the Strategic Planning and Policy Committee
From:	Karl Tutty, Manager Compliance
Subject:	**DOG CONTROLS ON MOUNT KAKEPUKU**
Meeting Date:	Tuesday, 1 September 2020

1 EXECUTIVE SUMMARY

In May 2019 the Te Kōpua Marae Trustees (Marae Committee) raised concerns with Council regarding the walkways on Mount Kakepuku being available for people walking their dogs and also the process followed to make decisions on the draft Dog Control Policy in 2015. Subsequently a request has been made for Council to reconsider the application of dog controls on the Maunga.

As dog restrictions are specified in the Waipā District Dog Control Policy and associated Bylaw, any change or review of the restrictions as applied to the Maunga requires a full public review of the policy, which is not scheduled until 2025.

As this matter was raised by tāngata whenua it has been referred to the Iwi Consultative Committee for consideration. The report to the Iwi Consultative Committee will seek feedback on the identification of areas of interest to Iwi in terms of dogs, and what levels of control should be applied to those areas.

The following appendices are included with this report:

- Appendix 1 – Dog Control Policy 2015 (document number 15107172)
- Appendix 2 – Letter from the Chairperson of the Te Kōpua Marae Trustees and Te Kōpua Marae Committee dated 30 May 2019 (document number 10449155)
- Appendix 3 – Letter from Mayor Jim Mylchreest dated 29 July 2019 (document number 9965053)
- Appendix 4 – Letter from the Chairperson of the Te Kōpua Marae Trustees and Te Kōpua Marae Committee dated 30 October 2019 (10449148)
- Appendix 5 – Email from the Chairperson of the Te Kōpua Marae Trustees and Te Kōpua Marae Committee dated 7 July 2020 (document number 10449139)
- Appendix 6 – Example of new signs installed at Mount Kakepuku.

2 RECOMMENDATION

*That the report titled '***DOG CONTROLS ON MOUNT KAKEPUKU***' (document number 10432868) of Karl Tutty, Manager Compliance, be received.*

3 BACKGROUND

The Dog Control Act 1996 requires all council's to have a Dog Control Policy, which amongst many other matters, can impose controls on dog access to different areas within the District (refer to Appendix 1 for the Waipā District Dog Control Policy).

The Waipā policy provides for three different restrictions: prohibited areas where dogs are not allowed at all, off-lead exercise areas where dogs can be exercised off lead, with the balance of all public places being areas where dogs can be taken provided they are on a lead (on-lead).

At present Mount Kakepuku ("the Maunga") has two restrictions. The summit and area under the control of the Department of Conservation ("DOC") is a dog prohibited area (unless a permit has been obtained from DOC) but the balance which is managed by Waipā District Council has no specific designation so is by default a dog on lead area. All DOC areas across the District are treated in the same manner.

The mountain is popular with dog owners, and in 2019 it became clear to Council that many dog owners were confused as to the controls in place, and were letting their dogs off lead in the Council area of the reserve and were taking dogs into the DOC area. As a result Council installed new signs clearly showing the restrictions and where they applied (refer to Appendix 6). These were installed at the start of the access track and at the point the track crosses from Council land into DOC land.

After the installation of the new signs a letter was received from Te Kōpua Marae Trustees (Appendix 2), and it was clear that confusion continued in respect to the controls that were in place. The Marae Committee was of the belief that Council had amended the rules as they applied to the Maunga.

The Maunga is sacred, including historic pa sites and other significant areas, not only the summit. The Marae Committee appeared to be of the understanding that dogs had been prohibited on the Maunga and that Council had decided to allow access to dogs, when that was not the case. Council responded to that letter on 29 July 2019 (attached as Appendix 3) confirming "*there has been no change to the restrictions in place on Mount Kakepuku, but rather that Council has attempted to clarify the situation relating to dogs in this area, including new signage*".

Once this matter was clarified, the Te Kōpua Marae Trustees raised concerns in their letter of 30 October 2019 as to the consultation process that took place in 2015 which resulted in the decision to allow dogs on leash in the Council reserve on the Maunga (Appendix 4).

The 2015 policy review was a full public consultative review, and no submissions were received in respect to Kakepuku Maunga specifically. Therefore the Maunga was subject to the standard 'dog on lead' controls that apply to all public places by default. This was a continuation of what existed in the 2011 policy.

In a subsequent email dated 7 July 2020 (Appendix 5) the statement was made by Mr. George Te Ruki that:

"*as tangata whenua we do not agree that Council is restricted by its Dog Control Policy and Bylaw in making a decision on our request to make Kakepuku maunga a dog prohibitive area, without first having to undertake a full review of its Dog Control Policy and Bylaw in respect of all public places in the Waipa District*".

It is staff's view that making the amendments suggested by the Marae Trustees will require a full review of the Dog Control Policy.

4 OPTIONS AND ASSESSMENT

Staff are in full agreement with the Marae Committee that they and the groups they represent should have been partners in any decisions related to the Maunga at the time the policy was reviewed.

It is Council's process for all such reviews to be signalled to relevant Council Committees and the Consultation Plan at the time indicated the Iwi Consultative Committee were to see the draft Policy at their July 2015 meeting. This did not occur and it is noted there was not a submission from Ngā Iwi Toopu o Waipā. This may be because no changes were proposed to the existing controls.

As well as the usual public notices, an extensive round of meetings and workshops were held across the District to identify those areas where controls should be applied.

Staff have examined whether a Reserve Management Plan or other approach may be an option prior to the Dog Control Policy statutory review in 2025, but the review of the Policy appears to be the only robust process under which to consider this issue.

It is staff's view that changes through any other process would be unenforceable if not recorded in the Policy and Bylaw. Council could remove the signs and discourage use of the area, but could not enforce that level of control.

It has been examined whether the schedules of the Policy could be changed without a full policy review. The legal advice was that this is a significant change, and as the schedules were subject to deliberations along with the Policy itself that they form part of the Policy and cannot be amended separately.

The Policy does have an exemption clause that states “Council may grant exemptions from this policy where it considers this prudent”. It is the staff view that this is intended to cater for a temporary relaxation of restrictions (for example allowing dogs off lead in a reserve for a weekend competition) rather than a permanent imposition of a restriction. Council could not “exempt” an area from being dog on lead, and increase controls to make it dog prohibited.

The Policy is due for review in 2025. The review will be a full public-consultative process as the schedules of the restrictions are part of the Policy, and as this is a suggestion to add an area to the prohibited area schedule so increasing controls in the area affected, it is deemed to be a significant change that reduces the existing rights of the public.

Deciding to bring the review of the Policy forward is not a decision or commitment to adopt the change that the Marae Trustees have requested. It is merely the start of the process to consider that request. There may also be other areas of significance that other iwi may wish to see managed differently which have not been identified.

There are a number of areas where dogs are currently permitted off-lead that are subject to concept plans suggesting this change. As has been the case previously, there is likely to be significant pressure from dog owners requesting relaxation of controls or new off-lead areas of which at present none are proposed.

Council has a statutory requirement under the Dog Control Act 1996 to “undertake, promote, and encourage the development of such services and programmes as it considers desirable to promote responsible dog ownership and the welfare of dogs” and in the Policy indicated an intention to support “on-going development of dog exercise areas, in particular signage, bins and fencing”. Consideration must be given to balance areas lost in terms of dog access, against finding new areas.

While the formal review of the Policy could remain at 2025, there is obviously work to do prior to ensure that the process includes all partners and stakeholders, and that this work could start earlier. This would ensure all possible amendments are incorporated into the process.

Consequently the matter has been referred to the Iwi Consultative Committee to examine this particular aspect of the Policy (to identify and record areas of interest to Iwi in terms of dogs, and what levels of control should be applied to those areas). This would give a comprehensive view of the scale of concern.

Depending on the outcome from that process, the Iwi Consultative Committee can, if required, make recommendation back to the Strategic Planning and Policy Committee who can then consider whether there is a need to bring the review of the Policy forward.

This process would ensure issues of importance to Iwi are identified early, and the formal review would be better informed by a draft policy reflecting these areas prior to full public consultation.

Karl Tutty
MANAGER COMPLIANCE

Approved by Wayne Allan
GROUP MANAGER DISTRICT GROWTH AND REGULATORY SERVICES

SUPPORTING INFORMATION: ASSESSMENT OF PROPOSAL

1 Statutory and policy requirements

Legal and regulatory considerations

Dog Control Act 1996
10 Duty of territorial authorities to adopt policy on dogs

(1) Every territorial authority must adopt, in accordance with the special consultative procedure set out in section 83 of the Local Government Act 2002, a policy in respect of dogs in the district of the territorial authority.

(2) For the purposes of subsection (1), the territorial authority must, under section 83(1)(e) of the Local Government Act 2002, give notice of the draft policy to every person who is, according to its register, the owner of a dog.

(3) Every policy adopted under this section—

(a) shall specify the nature and application of any bylaws made or to be made under section 20; and

(b) shall identify any public places in which dogs are to be prohibited, either generally or at specified times, pursuant to a bylaw made under section 20(1)(a); and

(c) shall identify—

(i) any particular public places; and

(ii) any areas or parts of the district,—

in which dogs (other than working dogs) in public places are to be required by a bylaw made under section 20(1)(b) to be controlled on a leash; and

(d) shall identify those areas or parts of the district in respect of which no public places or areas are to be identified under paragraph (b) or paragraph (c); and

(e) shall identify any places within areas or parts of the district specified in paragraph (c)(ii) of this subsection that are to be designated by a bylaw under section 20(1)(d) as dog exercise areas in which dogs may be exercised at large; and

(ea) must state whether dogs classified by the territorial authority as menacing dogs under section 33A or 33C are required to be neutered under section 33E(1)(b) and,—

(i) if so, whether the requirement applies to all such dogs; and

(ii) if not, the matters taken into account by it in requiring any particular dog to be neutered; and (eb) must state whether dogs classified by any other territorial authority as menacing dogs under section 33A or 33C are required to be neutered under section 33EB(2) if the dog is registered with the territorial authority and,—

(i) if so, whether the requirement applies to all such dogs; and

(ii) if not, the matters taken into account by it in requiring any particular dog to be neutered; and

(f) shall include such other details of the policy as the territorial authority thinks fit including, but not limited to, details of the policy in relation to—

(i) fees or proposed fees; and

(ii) owner education programmes; and

(iii) dog obedience courses; and

(iv) the classification of owners; and

(iv) the disqualification of owners; and

(v) the issuing of infringement notices.

(4) In adopting a policy under this section, the territorial authority must have regard to—

(a) the need to minimise danger, distress, and nuisance to the community generally; and

(b) the need to avoid the inherent danger in allowing dogs to have uncontrolled access to public places that are frequented by children, whether or not the children are accompanied by adults; and

(c) the importance of enabling, to the extent that is practicable, the public (including families) to use streets and public amenities without fear of attack or intimidation by dogs; and

(d) the exercise and recreational needs of dogs and their owners.

(5) Every statement or publication of a policy adopted under this section—

(a) shall identify any land within the district that is included in—

(i) a controlled dog area or open dog area under section 26ZS of the Conservation Act 1987; or

(ii) a national park constituted under the National Parks Act 1980; or

(iii) Te Urewera, as defined in section 7 of the Te Urewera Act 2014; and

(b) may contain such other information and advice in relation to dogs as the territorial authority thinks fit.

(6) The territorial authority must give effect to a policy adopted under this section—

(a) by making the necessary bylaws under section 20, which must come into force not later than the 60th day after the adoption of the policy; and

(b) by repealing, before the 60th day after the adoption of the policy, any bylaws that are inconsistent with the policy.

(7) No territorial authority shall make any bylaw that is inconsistent with the policy under this section that, at the time of the making of the bylaw, is in force in its district.

(8) The territorial authority may, at any time, adopt, in accordance with the special consultative procedure, an amended policy under this section and this section shall apply, with the necessary modifications, to the adoption of that amended policy.

(8A) The adoption of a policy or amended policy in accordance with this section satisfies the requirements of sections 86, 155, and 156(1) of the Local Government Act 2002 in respect of any bylaw to which subsection (6) applies.

(9) This section shall come into force on the day on which this Act receives the Royal assent.

(10) Subsection (8) applies subject to section 10AA.

Local Government Act 2002

83 Special consultative procedure

(1) Where this Act or any other enactment requires a local authority to use or adopt the special consultative procedure, that local authority must—

(a) prepare and adopt—

(i) a statement of proposal; and

(ii) if the local authority considers on reasonable grounds that it is necessary to enable public understanding of the proposal, a summary of the information contained in the statement of proposal (which summary must comply with section 83AA); and

(b) ensure that the following is publicly available:

(i) the statement of proposal; and

(ii) a description of how the local authority will provide persons interested in the proposal with an opportunity to present their views to the local authority in accordance with section 82(1)(d); and

(ii) a statement of the period within which views on the proposal may be provided to the local authority (the period being not less than 1 month from the date the statement is issued); and

(c) make the summary of the information contained in the statement of proposal prepared in accordance with paragraph (a)(ii) (or the statement of proposal, if a summary is not prepared) as widely available as is reasonably practicable as a basis for consultation; and

(d) provide an opportunity for persons to present their views to the local authority in a manner that enables spoken (or New Zealand sign language) interaction between the person and the local authority, or any representatives to whom an appropriate delegation has been made in accordance with Schedule 7; and

(e) ensure that any person who wishes to present his or her views to the local authority or its representatives as described in paragraph (d)—

(i) is given a reasonable opportunity to do so; and

(ii) is informed about how and when he or she may take up that opportunity.

(3) For the purpose of, but without limiting, subsection (1)(d), a local authority may allow any person to present his or her views to the local authority by way of audio link or audio-visual link.

(4) This section does not prevent a local authority from requesting or considering, before making a decision, comment or advice from an officer of the local authority or any other person in respect of the proposal or any views on the proposal, or both.

Appendix 1

Dog Control Policy 2015 (document number 15107172)

Waipa
DISTRICT COUNCIL

Dog Control Policy

2015

15094072

Table of Contents

First adopted:	**1997**
Revision dates/version:	2015
Next review date:	2025
Engagement required:	S83 Local Government Act 2002
Document number:	15060220
Associated documents:	Dog Control Bylaw 2015
Policy Owner:	Environmental Services

Dog Control Policy 2015

1. Purpose and scope

1.1 The purpose of the Waipa District Council's Dog Control Policy is to implement the requirements of the Dog Control Act 1996 in maintaining a safe and healthy community, to protect children, and to provide for the needs of dogs and their owners. This will be achieved by a commitment to public education, combined with enforcement action where this is necessary.

1.2 Council's role is to administer the requirements of the Dog Control Act 1996 through the application of this policy and the associated bylaw.

2. Definitions

2.1 For the purposes of this Policy the following definitions shall apply:

Term	Definition
"Council"	means the Waipa District Council
"Dangerous Dog"	means a dog classified as dangerous pursuant to section 31 of the Dog Control Act 1996
"Delegated Officer"	Council officer with the formal delegation to consider the matter to which the reference refers.
"Disability Assist Dog"	means a dog certified by one of the following organisations as being a dog trained to assist (or as being a dog training to assist) a person with a disability: (a) Hearing Dogs for Deaf People in New Zealand (b) Mobility Assistance Dogs Trust (c) New Zealand Epilepsy Assist Dogs Trust (d) Royal New Zealand Foundation of the Blind (e) Top Dog Companion Trust (f) An organisation specified by Order of Council under Section 78D of the Dog Control Act 1996
"District"	means the District of Waipa as administered by the Waipa District Council
"Dog Control Officer"	shall have the same meaning as ascribed to it in Section 2 of the Dog Control Act 1996 and includes "Animal Control Officer"
"Dog"	shall mean any entire or neutered dog
"Dog Exercise Area"	means a public place designated in Schedule Two hereto where a dog may be exercised off a leash but under control
"Dog Prohibited Area"	means a public place designated in Schedule One hereto where dogs are prohibited
"Dog Ranger"	shall have the same meaning as ascribed to it in Section 2 of the Dog Control Act 1996

Term	Definition
"Dwelling"	a house, building, caravan or other structure that is self-contained and used for residential purposes
"Hunting Dog"	shall mean any dog used for hunting game
"In season"	shall mean the oestrus or heat cycle of any bitch
"Infringement Offence"	shall have the same meaning as ascribed to it in Section 2 of the Dog Control Act 1996
"Land"	means contiguous lots in the same ownership irrespective of the number of dwellings
"Menacing dog"	means a dog classified as menacing pursuant to section 33A of the Dog Control Act 1996
"Muzzle"	means a basket type or similar muzzle that allows panting and drinking
"Occupier"	in respect to land or dwelling means the owner, or person residing at the address with the authority of the owner
"Owner"	In respect to a dog shall have the same meaning as ascribed to it in Section 2 of the Dog Control Act 1996
"Public Place"	shall have the same meaning as ascribed to it in Section 2 of the Dog Control Act 1996
"Urban Area"	means an area of Waipa District designated in Schedule 3
"Working Dog"	shall have the same meaning as ascribed to it in Section 2 of the Dog Control Act 1996

3. Guiding principles

3.1 This policy is written pursuant to Section 10 of the Dog Control Act 1996 ("the Act"). Council, in adopting this policy, must have regard to:

(a) The need to minimise danger, distress, and nuisance to the community generally; and

(b) The need to avoid the inherent danger in allowing dogs to have uncontrolled access to public places that are frequented by children, whether or not the children are accompanied by adults; and

(c) The importance of enabling, to the extent that is practicable, the public (including families) to use streets and public amenities without fear of attack or intimidation by dogs; and

(d) The exercise and recreational needs of dogs and their owners.

4. Policies

4.1. Education

4.1.1. Council places importance on assisting dog owners to meet their obligations. Council will have available at all times, a range of information material that is free of charge. All new dog owners, or owners new to the District, will be provided with an information/registration pack. Dog owners subject to enforcement action will be provided with relevant education and training material and Dog Control Officers will have discretion whether or not to follow up with the enforcement action, if the dog owner can demonstrate they have taken steps, through education and training to be compliant with the Act.

4.1.2. Council staff will also ensure that there is a reasonable range of information for dog owners available for borrowing from public libraries within the District.

4.2. Dog prohibited areas

4.2.1. The areas specified in Schedule One shall be dog prohibited areas. No owner, or person for the time being in charge of any dog, shall allow that dog to enter or be in or on any dog prohibited area (with the exception of a disability assist dog).

4.2.2. Council or a Delegated Officer may grant consent, on request by any person or organisation, to allow the entry of dogs on to any dog prohibited area specified in Schedule One (dog prohibited areas), for example for a special event, subject to any conditions imposed. Requests must be made in writing at least six weeks prior to the requirement/event.

4.3. Dogs in public places - dog on leash areas

4.3.1 Dogs controlled on a leash may have access to any park or reserve or public place within the District, other than designated dog prohibited areas – see Schedule One for full list. (Note: this restriction does not apply to disability assist dogs and other working dogs that are there for the purpose of working – see interpretation of "working dog" above).

4.4. Dog exercise areas

4.4.1 There are also public places within the Waipa District that are designated as dog exercise areas where dogs may be **EXERCISED OFF A LEASH BUT UNDER CONTROL** – these areas are specified in Schedule Two. Council supports on-going development of dog exercise areas, in particular signage, bins and fencing.

4.4.2 No owner or person for the time being in charge of a dog shall allow that dog to be off a leash in any area other than a dog exercise area, or on private property with the consent of the owner or occupier.

4.5. Children's playgrounds

4.5.1 All children's playgrounds in public places, and any area within 5 meters of any unfenced children's playground is prohibited to dogs.

4.5.2 All children's playgrounds located within a designated dog exercise area will be fenced, and the fenced area prohibited to dogs.

4.6. Limit on number of dogs to be kept

4.6.1 To protect dog welfare and reduce the likelihood of nuisance, no owner or occupier of any land within the urban areas specified in Schedule Three shall allow to remain or keep on the land for a period exceeding 14 days, more than two dogs in total at any one time (which exceed three months of age), and no occupier of any dwelling on land not specified in Schedule Three, shall allow to remain, or keep at the dwelling for a period exceeding 14 days, more than 5 dogs in total at any one time (which exceed 3 months of age), unless the owner or occupier is the holder of a permit issued by Council or a Delegated Officer (see Dog Control Bylaw and Council's website for more information on obtaining a permit). Permits will only be issued where there is sufficient justification to do so and Council is satisfied no nuisance will arise. Permits will be reviewed every three (3) years or where circumstances change. Owners will be required to comply with all other policies.

4.7. Minimum standards for housing dogs

4.7.1 Dogs need to be accommodated in appropriate housing for their welfare. This also assists in preventing nuisance conditions such as barking or wandering. The owner of every dog shall provide that dog with a weather proof kennel or place of shelter which shall:

(a) Be constructed on a raised floor off the ground;

(b) Be of sufficient size so as to allow the dog to stand up, move freely, stretch out and recline; and

(c) Be kept in a clean and sanitary condition at all times.

4.7.2 The owner of every dog shall provide for the dog to have access to clean water on the owner's property at all times.

4.8. Fouling

4.8.1 Dog owners must clean up after their dogs if the dog fouls in a public area.

4.9. Dog faeces bins

4.9.1 Dog exercise areas will be provided, where possible, with sufficient litter bins to allow owners to immediately collect and dispose of dog faeces.

4.9.2 Bins will be located at the Delegated Officer's discretion, but will not be located on private property or any place not accessible for cleaning, emptying and/or maintaining.

4.9.3 It shall be an offence for any person to damage or otherwise interfere with, including removing the contents of, any dog faeces bin, without the authority of Council or a Delegated Officer.

4.10. Nuisances

4.10.1 The owner of every dog is required to take all practicable steps to prevent the dog from being or becoming a nuisance (e.g. by its persistent barking, howling or whining). This includes confining bitches in season, within a private property or within a vehicle or cage to minimise providing an attraction to other dogs.

4.10.2 Dogs must be kept in conditions that do not create health issues for other dogs or people, which includes appropriate accommodation for sick or diseased dogs. No person shall tease or provoke a dog in a manner that may cause aggression or a nuisance. An owner must take all reasonable steps to ensure that a dog does not injure, endanger, intimidate, or otherwise cause distress to any person.

4.11. Confinement and control of dogs

4.11.1 In any public place or private way, dogs must be under control of the owner or a designated person responsible for its control at all times in the interest of public safety.

4.12. Uncontrolled dogs

4.12.1 Dogs that are regularly not under control cause a range of issues. Council or a Delegated Officer may require an owner to de-sex a dog that has not been kept under control on two or more occasions in a 12 month period.

4.13. Menacing dogs and dangerous dogs

4.13.1 Council requires mandatory neutering of dogs classified as menacing in accordance with the provisions of the Act. This prevents breeding and there is evidence that neutering reduces a dogs desire to roam, and may reduce possible aggression.

4.13.2 If a dog has been classified as a menacing dog in another district, where it was not required to be neutered, but moves to the Waipa District, it will be a requirement for the dog to be neutered once residing in the Waipa District. Menacing dogs are also required to wear a muzzle in public.

4.13.3 In the absence of pedigree breeding papers American Staffordshire Bull terriers will be considered predominantly "American pit-bull type" as defined by schedule 4 of the Dog Control Act 1996 where they display the traits of that type.4.13.4 Dogs classified as Dangerous in accordance with the Act are also required to be neutered, have fencing requirements applied, and must wear a muzzle in public.

4.13.5 A muzzle as required by this policy is defined as a basket type or similar muzzle that prevents biting, but allows open mouth panting and drinking. "Gentle Leaders", "Halti's" and other similar accessories are not considered to be muzzles under this policy.

4.14. Neutering of dog

4.14.1 Council encourages neutering of dogs with the view that this will reduce the number of unwanted dogs being impounded, reduce the number of wandering dogs and dog offences.

4.14.2 Discounted fees are available for urban dogs that have been de-sexed, and all dogs rehomed from Council pounds must be de-sexed at the time of or immediately following rehoming, although exceptions may be permitted by a Delegated Officer.

4.14.3 Council may be able to assist with the cost of neutering of dogs that may not otherwise be de-sexed, provided the following criteria is met:

(a) The dog is currently registered, and

(b) The owner has a low income/community services card, and

(c) The owner shows commitment to keeping the dog long-term and in a way that meets minimum welfare standards, or

(d) The dog is being rehomed from a Waipa District Council pound.

4.15. Unclaimed impounded dogs

4.15.1 Where an impounded dog has not been claimed by its owner within the statutory seven day period following a written notice being received by the owner, or if an impounded dog has been surrendered, Council may dispose of the dog in a manner that it considers appropriate within the constraints of the law.

4.15.2 Where dogs cannot be re-homed, and destruction is the only practicable option, then dogs will generally be euthanased by a qualified veterinarian. In these cases, euthanasia will be undertaken as soon as practicable, and on an individual basis rather than a number of dogs at one time.

4.15.3 This policy does not preclude Council or a Delegated Officer from administering an alternative humane method of destruction in circumstances where administering an injection is not practicable. In these cases, the dog will be suitably restrained, and health and safety considerations complied with at all times.

4.16. Rehoming dogs

4.16.1 Council or a Delegated Officer will give priority to re-homing unclaimed or unwanted dogs where circumstances are appropriate to do so. Where a decision has been made to rehome an unclaimed pound dog, the dog may be held for an extended period in the pound, or placed into foster care. Dogs available for rehoming will be held in Council pounds only where there is sufficient capacity and where operational budgets can support this.

4.16.2 Any dog with a breed type listed in Schedule 4 (Menacing dogs) of the Act will not be rehomed, except where approval is given by the Delegated Officer.

4.16.3 Any rehomed dog will be required to be registered and micro-chipped prior to adoption, at the cost of the new owner. Neutering and vaccination will also be required at the time of adoption, or within an agreed time-frame following adoption, unless an exception is granted by a Delegated Officer.

4.16.4 Any dog rehomed will have a trial period of two weeks for the new owner to assess the dog for suitability within the home environment. If the dog is returned during this time, the registration and micro-chip fee will be refunded. All other costs must be covered by the owner, unless rehomed to another owner.

4.17. Offences, penalties and impounding

4.17.1 The Act allows for a range of enforcement measures for breaches under the Act at the discretion of Council or a Delegated Officer. Enforcement measures include education, prosecution, infringement notices, classification of the dog as dangerous or menacing, and the impounding of dogs.

4.17.2. Minor offences which have been the result of a genuine oversight or mistake may be treated as a "warning only" on the first occasion. Depending on the circumstances of each case, all other offences are likely to result in other penalties. However, each case will be treated on its merits.

4.17.3 A rating system, which takes a number of factors into consideration, is applied to more serious offences, e.g. dog bites/attacks, to ensure consistency in approach.

4.17.4 Council will consider undertaking a prosecution of owners and seek destruction of dogs responsible for serious attacks or repeated incidents, particularly if a dog is already classified as dangerous or menacing.

4.18. Probationary and disqualified dog owners

4.18.1 The Act provides the ability for Council to classify certain dog owners as probationary (section 21) or to disqualify certain dog owners from owning dogs (section 25).

4.18.2 Classification as a probationary owner means the person is unable to own any dog (except for dogs already registered by that person at the time of the offence) for a two year period following the classification.

4.18.3 Disqualification means the person cannot own any dog for up to a five year period following the disqualification.

4.18.4 Any person that is classified as probationary may be required to undertake, at his or her own expense, a dog owner education programme and/or dog obedience course approved by Council or a Delegated Officer pursuant to section 23A of the Act.

4.19. Fees and charges

4.19.1 Registration of dogs is required by owners of all dogs over three months of age.

4.19.2 Council approves a schedule of fees and charges each year by resolution in relation to the registration of dogs, and also impounding charges for both dogs and stock.

4.19.3 Council's current policy is to cover operational costs through both fees and charges and general rates, which helps to keep registration fees at a reasonable level. All owners pay registration fees, and owners subject to enforcement action are expected to cover costs through impounding and sustenance fees.

4.19.4 Discounts off registration fees are available to urban dog owners and owners of disability assist dogs who meet certain criteria, such discounts and criteria to be set by Council as part of reviewing and approving the annual fees and charges.

4.19.5 Subject to the Act, fees and charges should be paid in full unless exceptional circumstances can be shown, to be determined by the Delegated Officer.

4.20. Co-operation with other agencies

4.20.1 Council will work with NZ Police, the Ministry for Primary Industries, and the Society for Prevention of Cruelty to Animals, and other agencies working with animals to achieve the object of the Dog Control Act 1996 or the Animal Welfare Act 1999.

4.21. Exemptions from policy

4.21.1 Council may grant exemptions from this Policy where it considers this prudent.

5. Amendments

5.1 This policy may be amended when required subject to the provisions of the Act.

6. Application and review

6.1 The policy will be reviewed as required, to meet the needs of the organisation and best practice.

6.2 The policy will take effect from the date it is signed by both the policy owner and Chief Executive; however a one (1) year period from that point will be allowed for implementation and full compliance to be achieved.

Signed:	Signed:
Wayne Allan	Garry Dyet
MANAGER PLANNING AND REGULATORY	**CHIEF EXECUTIVE**
(POLICY OWNER)	Date: 2 December 2015
Date: 2 December 2015	

Schedule One: Dog prohibited areas

The below areas are prohibited to dogs and are specifically detailed on Council maps, which may be amended from time to time.

WARD	
Cambridge	- Victoria Square, Victoria Street - Cambridge Swimming Pool, Williamson Street - Cambridge Cemetery (Hautapu), Hannon Road - John Kerkof Park Cambridge Soccer Grounds, Vogel Street (excludes town belt pedestrian circuit track corridor) - Cambridge Athletic and Harrier Club grounds, Vogel Street (excludes town belt pedestrian circuit track corridor which is dog on lead) - Cambridge Rugby Sub-Union grounds, Taylor Street - Leamington Sports ground, Carlyle Street (playing fields only)
Te Awamutu	- Te Awamutu Rose Gardens, Gorst Avenue - Te Awamutu Events Centre, Selwyn Lane - Albert Park, Albert Park Drive - Kihikihi Cemetery, Oliver Street - Jean Gatton Reserve Church Street, (Kihikihi)
Pirongia	- Pirongia Rugby Football Club, Kane Street - Pirongia Cemetery, Oak Lane - Paterangi Cemetery, Cnr Sing and Paterangi Roads - Ōhaupo Memorial Park (upper field), Forkert Road
Maungatautari	- Mighty River Domain (Karapiro Domain) – excludes that part of Te Awa River Ride within the Maungatautari Road corridor (Te Awa River Ride is "dog on leash") and excludes the Gate 3 dog exercise area. - Pukerimu Cemetery, Kaipaki Road, Cambridge - Maungatautari Scenic Reserve, Pukeatua
All Areas	- Within any fenced public playground or play area, or within 5m of any unfenced public playground or play area - Reserves where animals are being grazed - All Department of Conservation Reserves unless a permit has been obtained from the Department

The following schools/pre-schools have also designated their grounds as prohibited:

WARD	AT ALL TIMES
Cambridge	- Cambridge High School, Swayne Road - Cambridge Early Learning Centre, Fort Street - Cambridge Primary School, Wilson Street - Cambridge Middle School, Clare Street - Leamington School, Lamb Street - Cambridge East School, Williams Street - Leamington Playcentre, Cnr Burns and Thompson Streets
Te Awamutu	- Te Awamutu Primary School, Teasdale Street - Pekerau School, Te Rahu Road - Kihikihi School, Whitmore Street - St Patricks School, Alexandra Street - Kihikihi Kindergarten, Linden Street
Kakepuku	- Wharepapa School, Wharepapa South Road - Puahue School, Puahue Road - Pokuru Primary School, Pokuru Road
Pirongia	- Pirongia School, Beechey Street - Ngahinapouri School, Kakaramea Road - Kaipaki School, Kaipaki Road - Ohaupo School, State Highway 3
Maungatautari	- Hautapu School, Cnr Forrest and Hautapu Roads - Te Miro School, Te Miro Road

All schools/pre-schools listed will be responsible for providing and maintaining their own signage in relation to these designations.

Schedule Two: Dog exercise areas

WARD	LOCATION
Cambridge	- McKinnon Park, Taylor Street - Gasworks Site, Alpha Street, (east of cycleway only) - Bryan (Blackie) Mayo Reserve, from Thornton Road to Watkins Road - Settlers Track to Riverside Park, Dominion Avenue - Te Kō Utu Park , Albert Street (lake area) - Camellia Path, Lake Te Kō Utu - Gil Lumb Park, Pope Terrace - Polo grounds at Lamb Street (except when in use for Polo) - Former Cambridge Landfill, Shelley Street, Cambridge - Tree Trust Walkway, Addison Street to Leamington Cemetery - The dog exercise area Wordsworth Street east (excluding sports fields) - Walkway between Bryan Mayo Reserve and Watkins Road
Te Awamutu	- Anchor Park back half area in proximity of Raeburne and Colgan Streets - Centennial Park, Rewi Street - Eileen Montefiore Park, Factory Road (excluding the walkway to Factory Road) - Turere Park , Turere Lane - Rear area of Sculpture Park, accessed off Albert Park and Domain Drive until such time it is required for another purpose - Rear of Memorial Park through to Racecourse Road - Kihikihi Domain Oliver Street (except when exclusive use is required for events or site bookings) - Former Kihikihi Landfill Site - Leslie Street (Kihikihi) - Ash Grove, Chatsfield Drive - Te Rahu Road Reserve, 246 Te Rahu Road - Rosehill Reserve, Laird Place (when developed) - Te Awamutu Stadium Fairview Road to Armstrong Avenue, Grass embankments (when not in use for sports events) - Mahana Lane Reserve, Mahana Lane
Pirongia	- Lake Ngaroto Bank Road (note: walkway around the lake is dog on leash) - Former Pirongia Landfill (closed), Kane Street, Pirongia - River walkway, Crozier Street north, Pirongia - Acacia Reserve, Airport Road - Ohaupo Memorial Park – lower field - Kahikatea Park, Ohaupo
Maungatautari	- Mighty River Domain – Gate 3 grassed carpark (when not in use for events. Dog owners should check with domain management)

Dogs may be exercised off-leash, but under control in the above areas as **specifically detailed on Council maps**, which may be amended from time to time. Other areas in private ownership or not otherwise under Council control, may be used to exercise dogs off lead with the owner's permission provided dogs remain under control.

Schedule Three: Urban areas

Properties in the following areas are considered urban for the purposes of this bylaw:

- Te Miro Settlement
- Bruntwood Settlement
- Cambridge township including Leamington
- Hautapu Settlement
- Fencourt Settlement
- Karapiro Settlement
- Kihikihi township
- Ohaupo township
- Ngahinapouri settlement
- Te Pahu Settlement
- Pirongia township
- Rukuhia Settlement
- Lowe Road/Peacockes Road Settlement
- Airport Settlement (Ohaupo Road/Robertson Road)
- Te Awamutu township
- Te Mawhai Settlement
- Tokanui Settlement (Including The Crescent and Croasdale Road)

NOTE: The boundaries of the above urban areas are specifically detailed on Council maps, which may be amended from time to time.

The above may differ from urban areas shown in Council's District Plan or other documents.

Appendix 2

Letter from the Chairperson of the Te Kōpua Marae Trustees and Te Kōpua Marae Committee dated 30 May 2019 (document number10449155)

TE KŌPUA MARAE TRUSTEES

30 May 2019

His Worship the Mayor
Waipa District Council
Private Bag 2402
TEAWAMUTU 3840

Tenaa koe Jim

Dog Exercise Areas and Dogs on leash on Mount Kakepuku

At our Marae Committee meeting on Sunday,7 April 2019, two of our Committee members who had attended a recent meeting of the Kakepuku Mountain Conservation Society ("KMCS") raised the issue of a letter that had been sent by the Society to the Marae Committee several months earlier seeking our support for Council to ban the exercise of dogs on a leash on the tracks within the Council recreation reserve on Kakepuku Maunga.

At that time, our secretary was under the impression we had responded to that request and that I had sent a letter to the Society supporting its stance. The issue was discussed further at that meeting and the Committee agreed that I should send another letter to the Mayor or Council Chief Executive and to Nga Iwi Toopu o Waipa, confirming the Committee's support for the KMCS's stance that Council ban the exercise of dogs on leash on tracks in the Council recreation reserve on the maunga and, also confirm the Committee's previous stance that it opposes the applications submitted several years ago to develop bicycle tracks on the maunga and gondolas.

I delayed writing to Council until we located the letter from the KCMS, and I had gathered more information re Council's policy on dogs on leash and dog exercise areas.

The KMCS had in fact written to the Marae Committee in November 2018 advising that it intended to approach Council about banning the classification of a dog exercise area in the Council recreation reserve on Kakepuku maunga and seeking our support to this proposal and, our secretary had referred that letter to me to reply to. Unfortunately, I inadvertently overlooked replying to the Society's letter and sending Council a letter, supporting the Society's approach to object to Council's proposal to allow the walking of dogs on leash within the tracks on the recreation reserve part of Kakepuku maunga.

However, the issue was discussed again at our Committee meeting on 5 May 2019 and the Committee resolved that I write to the Mayor and Nga Iwi Toopu o Waipa, expressing our concerns over the following:

1. Council's policy to allow dogs on leash on the tracks on that part of Kakepuku Maunga that has the status of a recreation reserve vested in Council;

2. The lack of any prior consultation with Te Kōpua Marae Committee, as representatives of Ngati Unu and Ngati Kahu, tangata whenua for the rohe from Kakepuku maunga to Pirongia Maunga, over this policy.

and

3. Confirm the Committee's previous stance that it opposes any development of Kakepuku Maunga for the purposes of a bicycle trail and gondolas.

In respect of 1 above, I attach for your information a page from Council's website which shows that dogs on leash on the Council reserve on the maunga is now part of Council's Dog Control policy.

The Marae Committee, as members of Ngati Unu and Ngati Kahu, tangata whenua for Kakepuku maunga and surrounding lands, are therefore very concerned at Council's decision to allow the tracks on the Council reserve on the maunga to be used for a dog exercise area without any prior consultation with us and, strongly oppose such a policy on the grounds that we regard the whole of the maunga (not just the pa sites on the summit of the maunga) as a waahi tapu site, it is of considerable cultural and spiritual significance to Ngati Unu and Ngati Kahu and other tribes and, poses a significant health and safety risk to visitors to the maunga and, to the indigenous flora on the maunga.

I understand from our delegate to Nga Iwi Toopu o Waipa, that the proposal to allow dogs on leash on the tracks within the recreation reserve part of the maunga, was not referred to NITOW for comment. I also do not recall any mention being made about this proposal in a draft reserve management plan for Council's recreation reserve on the maunga, when Council's Planner and Tony Roxburgh came to the Marae several years ago to discuss the draft reserve management plan. The Committee provided some feedback to them on this draft plan, but we heard nothing further, so I assume there is no approved reserve management plan for the reserve in place, nor is there provision in that plan to allow dogs on leash in the reserve?

I look forward to your response in due course so that we may consider our options to resolve this issue. I am happy to discuss this issue with you.

✧ TE KŌPUA MARAE TRUSTEES ✧
✧ MORGAN ROAD PŌKURU P.O BOX 449 TE AWAMUTU ✧

Kaati raa

Na George Waraki Teruki
Chairperson, Te Kōpua Marae Trustees and Te Kōpua Marae Committee
5 Opal Place, Chartwell, Hamilton 3210
(Ph 07 85587868, e-mail geo.teruki@kinect.co.nz)

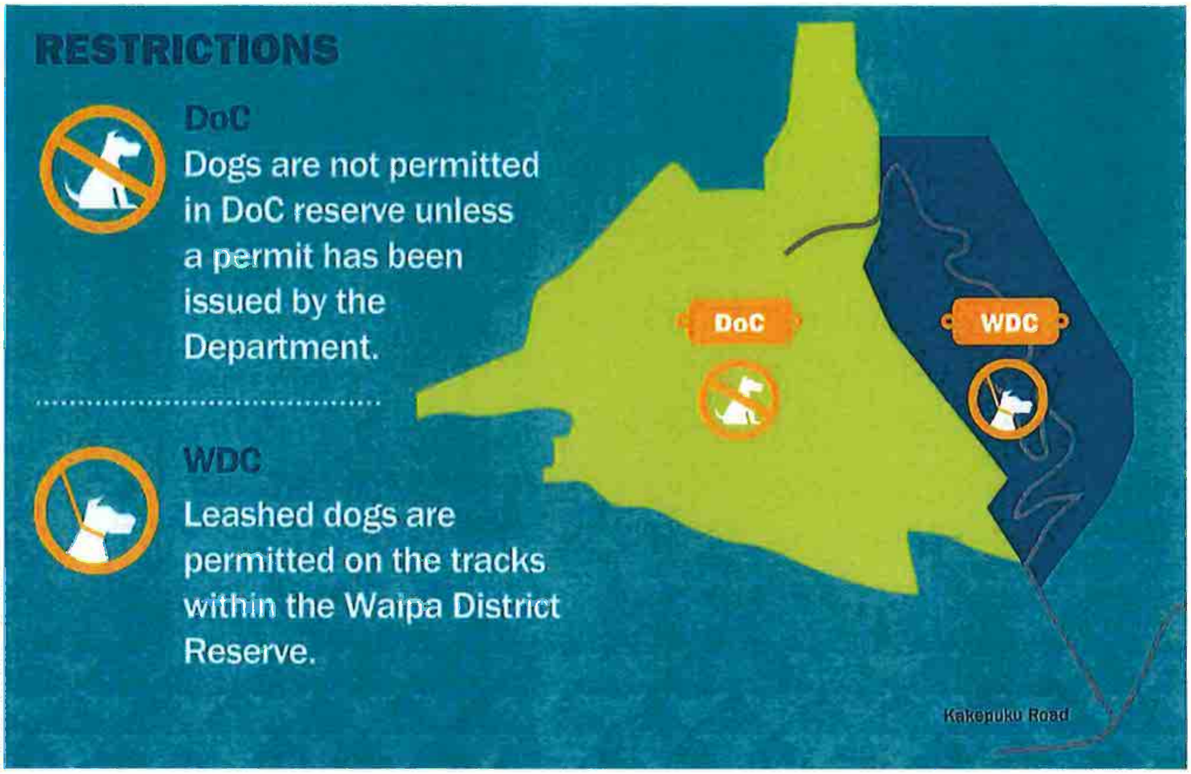
Dog exercise areas in Waipā's rural areas

As well as in our main towns, there are dog exercise areas located in Pirongia, Ohaupō, Acacia Narrows, and at Lake Ngā Roto and Lake Karāpiro.

If you'd like a printed version of this map, pop in to the Council office in Te Awamutu or Cambridge and grab a copy of the Doggy Dos and Doggy Don'ts brochure.

Dog restrictions on Mount Kakepuku

Mount Kakepuku is joint-managed by Council and by the Department of Conservation (DoC). Dogs on leads are only permitted on the tracks within the Waipā District Council reserve area. Please keep an eye out for the DoC signage as you approach the summit, as the top of the mountain is a tapu (sacred) area where dogs are prohibited.



Page reviewed: 29 Mar 2019 12:28pm

Appendix 3

Letter from Mayor Jim Mylchreest dated 29 July 2019 (document number 9965053)

Waipa DISTRICT COUNCIL

Postal Address
Private Bag 2402
Te Awamutu 3840
New Zealand

Head Office
07 872 0030
101 Bank Street
Te Awamutu 3800

Cambridge Office
07 823 3800
23 Wilson Street
Cambridge 3434

29 July 2019

33-15-01

19052524

Te Kopua Marae Trustees
PO Box 449
Te Awamutu 3840

Attn: George Te Ruki

Tena Koe George

DOG CONTROLS MOUNT KAKEPUKU

Thank you for taking the time to meet with me, and Karl Tutty the Manager responsible for dog control. We now better understand the concerns of the Trustees.

As discussed, please be assured that there has been no change to the restrictions in place on Mount Kakepuku, but rather that Council has attempted to clarify the situation relating to dogs in this area, including new signage. This has highlighted that there were a range of misunderstandings as to what those rules were.

All public places in the Waipa District are dog-on-lead areas unless specifically designated otherwise under Councils Dog Control Policy and Bylaw. The other possible designations are “Dog off lead exercise area” and “dog prohibited areas”.

The Maunga was a dog on lead area when these documents were first developed, and when last reviewed in 2015 no changes were proposed so it was retained as a dog on lead area. This was a full public consultation process, and while there were no submissions from NITOW at the time of that review, the Maunga was specifically discussed by Council during deliberations, which resulted in clarification that dogs on lead were only permitted “on the track”. There is no Reserve Management Plan in place.

Going forward, to progress a move from dog-on-lead to dog prohibited would require a full review of the Policy and Bylaw as it is a move that restricts a ‘freedom’ that dog owners have at present, so it is considered a significant amendment that cannot be done in isolation. The decision for Council is whether this full review should be undertaken now in respect to this issue, or whether this issue (and other unrelated issues that the public may raise) all be considered together when the policy falls due for its statutory review in 2025.

31 May 2019

As discussed, Council must also be conscious there may be other areas where similar concerns exist, and it would make sense to investigate this further rather than do a review for one site, and then identify others.

It may also give an opportunity for Council to explore other areas that could be allowed for dog access or exercise and make overall changes to the policy that better recognise the interest of all parties involved. Either way this would have to be a full public consultation process.

Please be assured that we are now aware of the cultural concerns and will take steps to ensure the "dogs on leads" is enforced in the meantime.

Noho ora mai

Jim Mylchreest
MAYOR

Appendix 4

Letter from the Chairperson of the Te Kōpua Marae Trustees and Te Kōpua Marae Committee dated 30 October 2019 (10449148)

TE KŌPUA MARAE TRUSTEES

30 October 2019

His Worship the Mayor
Waipa District Council
Private Bag 2402
TEAWAMUTU 3840

Tenaa koe Jim

Dog Exercise Areas and Dogs on leash on Mount Kakepuku

I refer to my letter of 22 August 2019, which was tabled at Council's Iwi Consultation meeting held here at Te Kopua Marae on Wednesday 4 September 2019.

You will recall that in my letter I pointed out that the Te Kopua Marae Committee (which includes all the Trustees) had, at its meeting on 4 August 2019, resolved as follows:

- That we, as members of the hapu of Ngati Unu and Ngati Kahu, are tangata whenua for Kakepuku maunga and surrounding lands and as such, hold mana whenua over these lands and are therefore, the Crown's treaty partner in respect of the maunga and the surrounding lands, not a stakeholder.

- That as the Crown's Treaty partner, there needs to be prior and full consultation with us by Council and the Department of Conservation, in respect of any activities/policies/bylaws affecting/impacting on Kakepuku maunga and surrounding lands.

- That as tangata whenua and the Crown's Treaty partner, we do not accept the situation brought to our attention recently by the Kakepuku Mountain Conservation Society of Council allowing dogs on leash on the tracks on the recreation reserve part of Kakepuku maunga, because it is provided for in Council's 2015 Dog Control Policy and Bylaw and, Council's intention as stated in your letter of 29 July 2019, to leave the situation as is until such time as the Policy is reviewed but Council will ensure the "dogs on leads" on the tracks on Kakepuku maunga is enforced in the meantime

- That there was no prior consultation in 2015 by Council with us, as tangata whenua for Kakepuku maunga and surrounding lands and as the Crown's Treaty partner, regarding Council's Dog Control Policy and Bylaw.

- That there is no approved reserve management plan in place for the recreation reserve part of Kakepuku maunga administered by the Council or for that part of the maunga administered by the Department of Conservation as historic reserve and therefore there is no reserve management plan for Kakepuku maunga that allows for "dogs on leash/lead" on tracks on the maunga.

- That until such time as Council accepts/recognises that Ngati Unu, Ngati Kahu are tangata whenua for Kakepuku maunga and surrounding lands and is the Crown's Treaty partner in respect of these lands and not a stakeholder, the Committee believes that we will not be able to enter into any meaningful consultation with Council in respect of this "dogs on leash" issue or any other activity/proposal/policy affecting the maunga.

Whilst there was some discussion on the issues raised at the Iwi Consultation meeting, the outcome of that discussion did not really provide any positive responses or solutions to the issues raised above and, at the Marae Committee's subsequent meeting on Sunday 6 October 2019, the Committee resolved that I write to you again and seek from Council its written views/comments on each of the the issues raised so that we may consider our position as tangata whenua going forward in respect of this "dogs on leash"" issue and any other activity/proposal/policy affecting the maunga.

I look forward to your reply in due course.

Kaati raa.

Na George Waraki Teruki
Chairperson, Te Kōpua Marae Trustees and Te Kōpua Marae Committee
5 Opal Place, Chartwell, Hamilton 3210
(Ph 07 85587868, e-mail geo.teruki@kinect.co.nz)

Appendix 5

Email from the Chairperson of the Te Kōpua Marae Trustees and Te Kōpua Marae Committee dated 7 July 2020 (document number 10449139)

From: George Teruki <geo.teruki@kinect.co.nz>
Sent: Tuesday, 7 July 2020 11:24 AM
To: Jim Mylchreest <Jim.Mylchreest@waipadc.govt.nz>; Cathy Plowright <Cathy.Plowright@waipadc.govt.nz>; Waitiahoaho Te Ruki <waitiahoahot@yahoo.com>; Shane Te Ruki <Shane.TeRuki2@waipadc.govt.nz>; Gary David Brent Waraki Merekiherika <waraki.teruki77@gmail.com>; janet hedges <cjhedges@xtra.co.nz>
Subject: Fwd: Fwd: Re: Dogs on Leash - Kakepuku Maunga

Tenaa koe Jim

I refer to my e-mail of 19 March 2020. Now that we are out of lock down and back to level one, I trust all is well with Council and staff.

The marae has re-opened and we had our first Committee meeting since the one prior to the lock-down period on Sunday 5 July 2020. The Committee raised this issue again and asked if I had received Council's reply to the issues (as per the bullet points) in my letter of 30 October 2019 (copy attached) to Council, which I sent to Council in response to Council's letter of 29 July 2019 (copy attached) and subsequent Nga Iwi Toopu o Waipa hui held here at the marae on 4 September 2019.

I informed the Committee that I had sent a reminder to Council on 19 March 2020 just prior to the commencement of the lock-down but had not yet received a reply. The Committee resolved that I write to you again as we wish to consider, in light of the nature of Council's response/comment on each of the issues I raised in my letter of 30 October 2019, what action/s would be appropriate for us as tangata whenua and as a treaty partner in respect of Kakepuku maunga, to take in order to achieve our objective of making Kakepuku maunga a dog prohibitive area.

Would you please therefore let me know when I may expect to receive Council's response to the issues (as per the bullet points) raised in my letter of 30 October 2019. I would add that, as tangata whenua we do not agree that Council is restricted by its Dog Control Policy and Bylaw in making a decision on our request to make Kakepuku maunga a dog prohibitive area, without first having to undertake a full review of its Dog Control Policy and Bylaw in respect of all public places in the Waipa District.

Kia ora George

Appendix 6

Example of new signs installed at Mount Kakepuku

STRATEGIC PLANNING AND POLICY COMMITTEE REPORT

Waipā DISTRICT COUNCIL

To:	The Chairperson and Members of the Strategic Planning and Policy Committee
From:	Governance
Subject:	**RESOLUTION TO EXCLUDE THE PUBLIC**
Meeting Date:	1 September 2020

1 RECOMMENDATION

THAT the public be excluded from the following parts of the proceedings of this meeting.

The general subject of the matter to be considered while the public is excluded, the reason for passing this resolution in relation to each matter, and the specific grounds under section 48(1) of the Local Government Official Information and Meetings Act 1987 for the passing of this resolution are as follows:

General subject of each matter to be considered	Reason for passing this resolution in relation to each matter	Ground(s) under section 48(1) for the passing of this resolution
District Plan work programme	*Good reason to withhold exists under section 7 Local Government Official Information and Meetings Act 1987*	*Section 48(1)(a)*

This resolution is made in reliance on section 48(1)(a) of the Local Government Official Information and Meetings Act 1987 and the particular interest or interests protected by Section 6 or Section 7 of that Act, which would be prejudiced by the holding of the whole or relevant part of the proceedings of the meeting in public, are as follows:

Item No.	Section	Interest
11	*Section 7(2)(j)*	*To prevent the disclosure or use of official information for improper gain or advantage.*