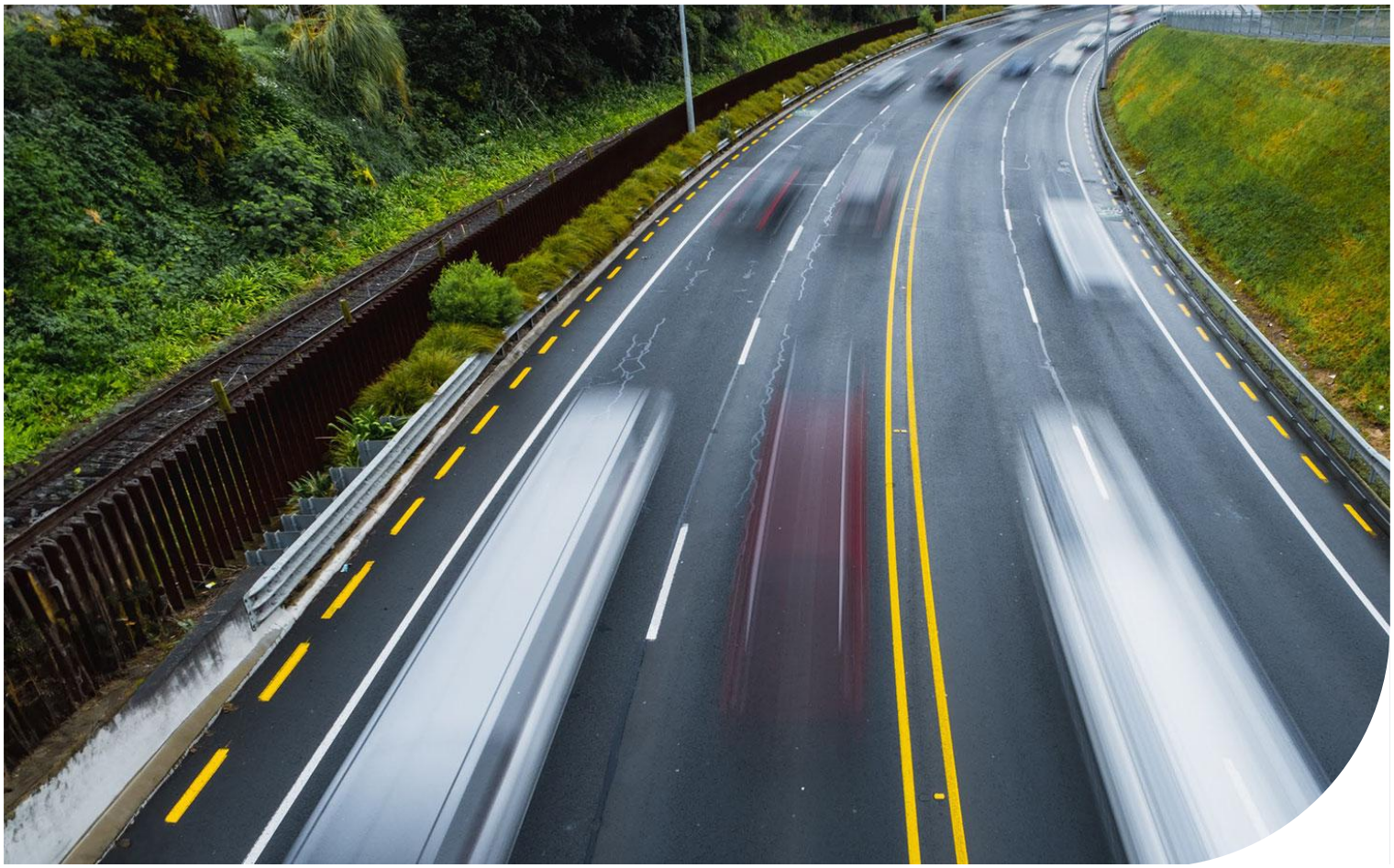

Assessment of Transport Effects

Alternative to the Brynderwyn Hills – Brynderwyn Hills section

2 April 2026

Revision A

10722-PTA-2B0-PE-RPT-0020

NZ TRANSPORT AGENCY WAKA KOTAHI

Roads of National Significance

Te Kāwanatanga o Aotearoa
New Zealand Government

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Glossary of Abbreviations and Defined Terms

The glossary of abbreviations and defined terms tables in Volumes A and B of the Substantive Application applies to this report and should be referred to in addition to the abbreviations and terms below.

Acronym / Abbreviation	Term
AADT	Annual Average Daily Traffic
CAS	NZTA's Crash Analysis System
CTMP	Construction Traffic Management Plan
DSI	Death and Serious Injury
HCV	Heavy Commercial Vehicle *A motor vehicle (other than a motorcar) that has a gross vehicle mass exceeding 3.5 tonnes.*
ITA	Integrated Transport Assessment
KiwiRAP	New Zealand Road Assessment Programme
LOS	Level of Service *A qualitative measure of intersection operating conditions based on average control delay per vehicle. LOS ranges from A (very low delay, free-flow conditions) to F (very high delay, oversaturated conditions with unstable queues). In this report, LOS D generally indicates approach capacity is nearing practical limits with moderate delays, while LOS F indicates the approach is operating over capacity with significant delays and persistent queuing.*
NZGTTM	New Zealand Guide to Temporary Traffic Management
ONRC	One Network Road Classification
RCA	Road Controlling Authority
SIDRA	Signalised and Unsignalised Intersection Design and Research Aid
SAP	Site access point *A designated location where construction traffic is authorised to enter or exit the construction site from the local road network.*
SMA	Stone Mastic Asphalt
SSTMP	Site Specific Traffic Management Plan *A specific plan developed for a particular site or activity that details the temporary traffic management controls required to safely manage interactions with live traffic.*
TREIS	Traffic Road Event Information System
TTM	Temporary Traffic Management
vpd	Vehicles per day

1. Introduction

1.1. Purpose and scope of this report

This report provides an assessment of the actual and potential transport effects associated with the construction and operation of the Brynderwyn Hills section of the Alternative to the Brynderwyn Hills project (the Project).

This assessment forms part of a suite of technical assessments prepared for NZTA to inform the Substantive Application under the Fast-track Approvals Act 2024 (FTAA) for the Project. This report should be read in conjunction with Volume A of the Substantive Application.

The scope of the assessment includes a description of the methodology applied in preparing the assessment, determination of the actual and potential effects generated by the Project, and details of the proposed measures to manage and mitigate adverse effects.

1.2. Qualifications and Experience

My name is Mehmet Ahmet. I am a Major Projects Director (Transport) at WSP New Zealand and have 24 years' experience in the transport sector.

I hold a Bachelor of Science in Geography from the University of Hertfordshire and a Masters of Science in Transport and Engineering from Napier University. I bring an international perspective having successfully delivered and led a broad range of transportation projects across various geographies. I am a Chartered Member of the Institute of Logistics and Transport, a member of the Transport Planning Society and a member of Engineering New Zealand.

My experience relevant to this Application is as follows:

- Matakana Link Road: The Matakana Link Road is a link road connection between Matakana Road and SH1 in the northern part of Warkworth. This road connection was identified in the Transport for Future Urban Growth business case as a priority connection necessary to support development in Warkworth and connection with the Ara Tühono – Pūhoi to Warkworth Road of National Significance (RoNS). I was Project Director for Matakana Link Road, leading on the development of both the Detailed Business Case and the specialist reports (lead specialist on the Integrated Transport Assessment (ITA)) for the Notice of Requirement (NoR).
- A10 Ely to Cambridge United Kingdom (UK): As Project Director, I led the development of the Outline Business Case for the A10 corridor between Ely and the Milton Roundabout, connecting to the A14 in Cambridge, as part of the Department for Transport's Major Road Network Programme. I was responsible for directing the multidisciplinary team to deliver a robust business case aligned with Department for Transport guidance. I also represented WSP and acted as the primary interface with the client and key stakeholders, ensuring alignment across technical, economic, and environmental considerations.
- Road Investment Strategy, Highways England, UK: A47/A12 Corridor Feasibility Study and Business Case: The purpose of the study was to inform investment planning for the strategic road network, predominantly focussing on road-based solutions along the corridor. The study was carried out in three stages and was guided by Department for Transport's Transport Analysis Guidance. I was Project Director for the A47/A12 study, taking responsibility for all outputs and presented the outcomes to the UK Government.

I have been actively involved in the Northland Corridor project since April 2025. My knowledge of the corridor is extensive, having played a key role in developing the Assessment of Transport Effects and supporting subsequent planning and design processes.

I led the Assessment of Transport Effects and was supported by the Technical Advisor's Transport Planning Team to carry out the assessments outlined in the Assessment methodology.

1.3. Code of Conduct

Although this Project is not being considered before the Environment Court, we confirm that we have read the Code of Conduct for expert witnesses as contained in section 9 of the Environment Court Practice Note 2023. We agree to comply with that Code. We are satisfied that the matters which we address in this Assessment are within our area of expertise, except where we state that we are relying on information provided by another person or expert. We have not omitted to consider material facts known to us that might alter or detract from the opinions we express.

2. Assessment Methodology

2.1. Assessment Framework

We developed this assessment using the NZTA Integrated Transport Assessment Guidance[1]. The purpose of the guideline is to outline NZTA's preferred methodology for undertaking integrated transport assessments.

We used the following approach to undertake a desktop assessment of temporary (during construction) and permanent (operational) transport effects.

2.2. Construction Phase

2.2.1. Transport Modelling – Construction Phase

Our assessment uses the year 2044 forecast model[2] to output future demands on SH1 and local roads impacted by construction traffic.

Our assessment assumes that construction will commence in 2030 and will take approximately five years to complete, and therefore, forecast models are available for 2034 and 2044. For this assessment we use 2044 as a conservative model year as it represents a reasonable worst-case scenario to assess, since traffic on the network is assumed to increase each year.

2.2.2. Temporary Traffic Management and Effects

To understand the potential effects of temporary traffic management on the road network, we mapped construction activities at a high level to typical Temporary Traffic Management (TTM) configurations that may be required on the existing network. We then undertook a qualitative assessment, drawing on comparable projects and established guidance, to understand the likely implications for capacity, delay, and safety.

Our assessment considered the types of TTM arrangements that are commonly applied in similar construction contexts (for example, shoulder closures, lane shifts, contraflow, stop–go operation, and temporary speed limits). The contractor will determine the specific form, location, and duration of TTM will through Site-Specific Traffic Management Plans (SSTMP) and this will be approved by the relevant Road Controlling Authority, in accordance with the New Zealand Guide to Temporary Traffic Management[3].

2.2.3. Effects of Construction Traffic Movements

Based on some broad assumptions regarding the construction methodology, we estimated construction traffic travelling between the Project work sites and off-site locations. We note that detailed construction methodologies will be developed by the appointed contractor following detailed design, and the Indicative Alignment may be subject to refinement within the Proposed Designation. Consequently, the following estimates represent a baseline scenario based on:

- The likely volume of construction materials required to deliver the Project; and
- A conservative assessment year (2044) to account for background traffic growth.

We assumed that potential haulage of material is to be along the existing state highway network with access provided at nominated Site Access Points (SAPs). Our assessment method comprised:

- Estimating the additional daily and peak-hour vehicles expected on the existing road network during construction, based on the anticipated material quantities.
- Comparing forecast background volumes for the construction years to the capacities of potentially affected road links and turning movements to assess whether residual capacity can accommodate the uplift from construction traffic.

[1] Integrated Transport Assessment, NZTA, June 2012
[2] Northland Corridor Model with 2044-year demands
[3] New Zealand guide to temporary traffic management, NZTA, April 2023

- We examined the five-year period (2020 to 2024) crash analysis[4] performed for the Assessment of Operational Effects (Section 6) to find areas of safety concern along the network sections likely to be used for construction logistics.

2.2.4. Construction Haulage Assumptions

To inform the assessment of construction traffic effects, we adopted the following haulage assumptions based on the indicative constructability methodology (see Section C4 of Volume A of the Substantive Application):

- The route ends with an interim tie in at The Braigh, south of Waipū and assumes crossing at Millbrook Road.
- Zone 2 (Brynderwyn Hills): Haul routes are assumed to utilise existing forestry tracks initially, moving to the main alignment as earthworks progress. A haul road connecting Zone 2 and Zone 1 is assumed to facilitate the movement of material north.
- Zone 3 and Zone 4 (South of Brynderwyns): An offline haul road is assumed along the main alignment between the base of the Brynderwyn Hills and the SH12 interchange. Material movement between Zone 3 and Zone 4 is assumed to utilise an at-grade crossing of SH12, managed via temporary traffic management measures.
- SH1 Crossings: Where haul routes cross the existing SH1 (e.g. Finlayson Brook Road, Waipū Gorge Road), we assume the contractor will construct bridges early to segregate construction traffic and reduce disruption.

2.3. Operational Phase

2.3.1. Modelling Scenarios

Much of our assessment of operational transport effects for the Project is based on the outputs of the Northland Corridor Model, developed by the Aurecon/WSP JV for the full corridor between Te Hana and Whangārei.[5] Although the model covers the entire corridor, we ran two scenarios from this model to enable a detailed assessment of effects of the Project and its interfaces with SH12, Millbrook Road and Shoemaker Road. These scenarios are a 'Reference Case Scenario' and 'Project Scenario'.

The **Reference Case Scenario** considers the future transport network without the Project. This scenario includes all anticipated land use and transport network changes but assumes that the Project is not constructed. As the Project is expected to open around 2038, our assessment uses the forecast model years 2044 and 2054. It includes:

- Warkworth to Te Hana of the Northland Corridor is assumed to be open and operational.
- Current and committed network improvements within the wider Northland transport system, but without the Project upgrade in place.
- Traffic forecasts prepared for 2044 and 2054 (main design year).

This scenario provides the "do-minimum" case for comparison.

The **Project Scenario** has the same network, land use, and demand assumptions as the Reference Case, but it includes the Project. The Project is modelled as a four-lane highway following the Indicative Alignment. It connects to SH1 in the south via an interim roundabout intersection at Baldrock Road, and to SH1 just south of Waipū through an interim tie-in at Millbrook Road / The Braigh. As part of the Indicative Alignment, a grade-separated interchange is also included near SH12. The potential for underlying assumptions concerning the Indicative Alignment to change has been considered, as discussed at Section 2.6, below.

2.3.2. Transport Models

[4] NZTA, Crash Analysis System (CAS)
[5] Northland Corridor Model – Base Model Development [10722-PTA-230-TR-RPT-0007]

We sourced the regional demand inputs to the Northland Corridor Model from the Whangārei District Council TRACKS model and Puhoi to Warkworth Model, which are the existing models for each area. Demand forecasts from these models and other forecasts for the Kaipara section formed the basis of the future-year matrices. Forecast years include 2034, 2044, and 2054 (main design year). Field data (traffic counts) have been used in the model (as noted below).

The Northland Corridor Model covers three weekday one-hour time periods:

- Morning peak (7:00–8:00);
- Inter-peak (average of 09:00–16:00); and
- Evening peak (average of 16:00–18:00).

The model does not directly represent holiday-period traffic for the Project; however, seasonal uplift factors have been incorporated to evaluate operational effects during periods of increased demand. We developed these factors using comprehensive annual traffic data by comparing holiday peak volumes with modelled weekday peak traffic. As a result, our approach captures traffic variations throughout the year.

We defined two vehicle classes in the model: light vehicles and Heavy Commercial Vehicles (HCVs). We derived Annual Average Daily Traffic (AADT) volumes used in this assessment by factoring up peak hour model volumes, using observed hourly daily relationships along the corridor (e.g. SH1 south of Kaiwaka, SH12 intersection counts, and Waipū).

We developed future year traffic demands for the years 2034, 2044, and 2054. These form the basis for the assessment of travel times, reliability, safety, and freight performance for the Project.

2.3.3. Holiday Peak Assumptions

We developed the Northland Corridor Model using traffic data collected during standard weekdays (Monday to Thursday). While this approach provides a consistent baseline for network modelling, it does not fully capture the elevated traffic volumes typically observed during weekends and public holidays. These periods often experience significant surges in demand due to recreational travel, regional events, and seasonal tourism, particularly along the SH1 corridor.

To ensure the model reflects realistic network conditions across all temporal scenarios, we derived peak adjustment factors for weekends and public holidays using hourly directional traffic count data from the Advanced Transport Management System (ATMS) for 2024 along the SH1 corridor[6].

We calculated the peak factor by dividing the average peak hour volume for a holiday or weekend by the average weekday peak hour volume for the corresponding week. These values were then averaged across both years to determine a representative peak factor for the holiday peak.

The results highlight the elevated traffic demand during non-working days compared to standard weekday conditions:

- Weekend peak factors range from 1.3 to 1.4, indicating a consistent uplift in volumes due to leisure travel and reduced commuter flows.
- Holiday peak factors range from 1.6 to 2.0, with Christmas showing the highest uplift — nearly double the weekday baseline — reflecting significant inter-regional and recreational travel.
- The variation across holidays suggests that while all public holidays experience increased demand, the magnitude of uplift is influenced by seasonal timing, regional events, and travel behaviour.

For the purpose of the operational assessment and sensitivity testing in this report, we adopted a holiday peak factor of 1.8. This value provides a robust test of network performance during high-demand periods.

2.3.4. Interchange Assessment

We carried out an assessment of the Project's proposed interchanges at Baldrock Road, SH12, and Waipū (The Braigh) to determine their performance under the forecast traffic volumes in the Project scenario. The analysis was carried out using the SIDRA intersection modelling software, using forecast traffic volumes from the Project Scenario.

[6] NZTA, Traffic Monitoring System

The primary assessment year for interim interchange layouts was 2044, reflecting the assumed staging where adjacent sections are expected to be operational by, enabling the interim connections at Baldrock Road and Waipū (The Braigh) to be removed or upgraded. The SH12 interchange was assessed in 2054, as it represents the proposed final interchange layout rather than an interim arrangement.

SIDRA outputs are reported using average delay, queue lengths and Level of Service (LOS), with detailed movement summaries provided in Appendix A3. Interchange performance has undergone sensitivity analysis, as discussed at Section 2.5 below.

2.3.5. Land Use Assumptions

Our land use inputs are consistent with the Northland Corridor Model assumptions adopted in the Investment Case, including[7]:

- Forecast growth in Warkworth, Waipū, Ruakākā, and wider Whangārei District.
- Growth assumptions aligned with Statistics NZ medium projections.
- Distribution of residential and employment growth as per district plan provisions and agreed modelling inputs.

2.3.6. Tolling

At the time of preparing this assessment, no decisions had been made regarding the introduction of tolling on the Brynderwyn Hills section of the Northland Corridor. For the purposes of the transport assessment, we have assumed that the Project will operate as an un-tolled facility.

2.3.7. Local Access and Private Property Access Assumptions

The new SH1 Mainline alignment will be classified as 'Limited Access', which restricts the number and locations where direct access to the main alignment is permitted, with no private direct accesses allowed for in the Project. The existing (old) State Highway 1 status is likely to be revoked, meaning it will become a local road maintaining the function of access for properties and businesses.

As part of the Project design development severing existing local roads and property accesses will be avoided and where practicable overbridges or underpasses will be constructed to maintain connectivity. In cases where it is impractical to maintain current alignments, the existing road will be stopped (severed) and a new access road will be constructed, often using existing paper roads to minimise the need for additional land acquisition.

Local access will follow a like-for-like replacement e.g., a severed sealed two-lane road will be replaced with a sealed two-lane road, and a severed gravel farm track with a similar gravel track. No provision for access upgrades or betterment has been included.

Private property access will be retained. However, where a property (e.g. farm) is fully acquired or the remaining land is considered non-viable, replacement access will not be provided. Like-for-like access replacement also applies to private driveways and lanes. Where farm operations are bisected by the project alignment access will be preserved.

2.4. Field Assessment

We undertook on-site traffic counts, with the results used to calibrate and validate the Northland Corridor Model. We used 2024 State Highway TMS count data and turning count data at key intersections from September 2025 (SH1/SH12, Millbrook Road, and Shoemaker Road). The base year adopted was 2024.

2.5. Sensitivity Testing

2.5.1. Interim Interchange Performance

We carried out a sensitivity analysis using forecast traffic volumes in year 2054 (beyond the standard design year) to test the performance of the interim interchanges at Baldrock Road and Waipū. The primary

[7] Northland Corridor Model - Medium Scenario Forecast Model Development [10722-PTA-230-TR-RPT-0008]

assessment assumes that the new motorway south of the Project (Te Hana to south of the Brynderwyn Hills section) and north of the Project (North Waipu to Port Marsden Highway section) will be operational before this time, enabling the removal or upgrade of these interim connections. However, for conservatism, we undertook this sensitivity test to understand how these interim interchanges would perform in 2054 in the event that the delivery of the adjacent sections is delayed, ensuring the designs have sufficient capacity to accommodate higher traffic demands.

2.5.2. Tolling

No sensitivity testing has been undertaken for a tolled scenario as tolling is being progressed through a separate workstream and sits outside the scope of this ITA.

Notwithstanding this, a tolled scenario would be expected to influence route choice and demand. Typically, tolling would likely reduce demand on the Project relative to the un-tolled scenario and increase the proportion of trips that remain on the existing SH1 route, particularly for price sensitive and discretionary trips. As a result, some of the operational benefits reported, including travel time savings and resilience, could be reduced compared with an un-tolled outcome, while volumes and effects on SH1 could be higher than those presented for the un-tolled assessment.

Targeted modelling sensitivity testing will be undertaken using the demand assumptions developed through the tolling workstream when available. This will confirm the likely operational effects on both the Project and SH1.

2.6. Alignment changes within the proposed route

The Indicative Alignment within the Proposed Designation represents a possible alignment which has been developed for assessment purposes and to illustrate what the Project's final design might look like, and the effects generated by its construction and operation. The alignment that gets built including the design and placement of bridges, culverts, stormwater systems, soil disposal areas and landscaping, will be refined and confirmed during the detailed design stage. As a result, this assessment has anticipated impacts within the Proposed Designation, rather than just the Indicative Alignment. The proposed conditions establish outcome-based criteria that will ensure effects on the environment are adequately avoided, remedied or mitigated, regardless of the final design and construction methodology for the Project. As such, should the final alignment within the Proposed Designation change, the effects assessment, proposed mitigation and recommendations outlined in this report would remain appropriate.

3. Existing Transport Network

3.1. General Overview

SH1 functions as the primary strategic transport corridor linking Auckland with Northland. Under the NZTA One Network Road Classification (ONRC)[8], it is designated as a nationally significant route, carrying inter-regional freight and passenger movements of high economic value.

Over recent decades, incremental upgrades have been implemented across various sections of SH1 to respond to rising traffic demand. Despite these interventions, the existing alignment continues to present geometric constraints, including steep grades, tight curves, and limited overtaking opportunities. These challenges have become more pronounced as traffic volumes have grown. Our review of crash data confirms a medium to high safety risk rating across this section of the SH1 corridor, reinforcing the need for further investment to support safe and reliable travel.

The Brynderwyn Hills section is a critical connection for the Northland region, linking Auckland and Whangārei and underpinning Northland's economic activity. This section has been subject to multiple weather-related closures, most notably during Cyclone Gabrielle in 2023, which caused major underslips and overslips and highlighted the vulnerability of this corridor.

The existing SH1 through the Brynderwyn Hills comprises a two-lane single carriageway with a posted speed limit of 80 km/h. The alignment traverses challenging and diverse topography, combining steep slopes with low-lying terrain susceptible to flooding. The surrounding environment includes Atlas Quarries, rural farm and lifestyle blocks to the east and west, and areas of native and exotic forest within the Brynderwyn Hills range.

3.2. Passing Lanes

These are the existing passing lane locations along SH1 between Baldrock Road and Millbrook Road:

- Northbound:
  - North of Baldrock Road adjacent to Absolute Concrete Limited: 605 m
  - Slow vehicle bay past SH12: 460 m
  - South of Pilbrow Hill: 300 m
  - North of Glenmohr Road: 1,190 m
- Southbound:
  - South of The Braigh: 1,100 m
  - South of Waipū Gorge Road: 3,800 m
  - North of Atlas Quarries: 420 m
  - Atlas Quarries: 500 m

The State Highway Geometric Design Manual (SHGDM)[9] recommends that passing lanes are a minimum of 800 m long including tapers and are located with an average spacing of 10-15km.

NZTA's Passing and Overtaking Policy[10] requires that state highways that carry more than 12,000 vehicles per day (vpd) should provide 1.5 km long passing lanes at 5 km spacing on flat terrain. For rolling terrain, the Policy recommends that a 2+1 lane arrangement should be provided. The existing corridor does not meet these requirements.

[8] One Network Framework (ONF), Classification Guidance, NZTA, November 2022
[9] State Highway geometric design manual (draft), NZTA, December 2000
[10] Transit Planning Policy Manual Version 1, Appendix 3E – Passing and overtaking, Transit NZ (now NZTA), August 2007

3.3. Local Road Network

The existing section of SH1 between Baldrock Road and Millbrook Road intersects with several local roads that provide access to nearby towns and settlements, including Waipū and The Braigh. These roads serve a mix of sparsely populated rural areas and more established rural-residential communities. Figure 1 illustrates the location of these intersections.

The key intersecting roads between Baldrock Road and Millbrook Road along SH1 are shown in Table 1 below. This includes the adjoining SH12, which provides a critical regional connection westwards towards Dargaville and Kaipara, as well as a series of local roads primarily serving rural properties.

Table 1: Local Road interfaces along the existing SH1

Road Name	ONRC System	AADT	HCV %	Width (m)
Baldrock Road	Secondary Collector	867	6%	7
SH12	State Highway / Primary Collector	4381	12%	9.8
Artillery Road	Private	n/a	n/a	7
Waipū Gorge Road	Access	212	6%	6
Schultz Road	Low Volume	49	8%	3.5
Glenmohr Road	Secondary Collector	202		7
Brooks Road	Access	325	8%	7.2
Finlayson Brook Road	Access	150	6%	5.5
The Braigh	Secondary Collector	1660	7%	9
Millbrook Road	Access	345	8%	7.5

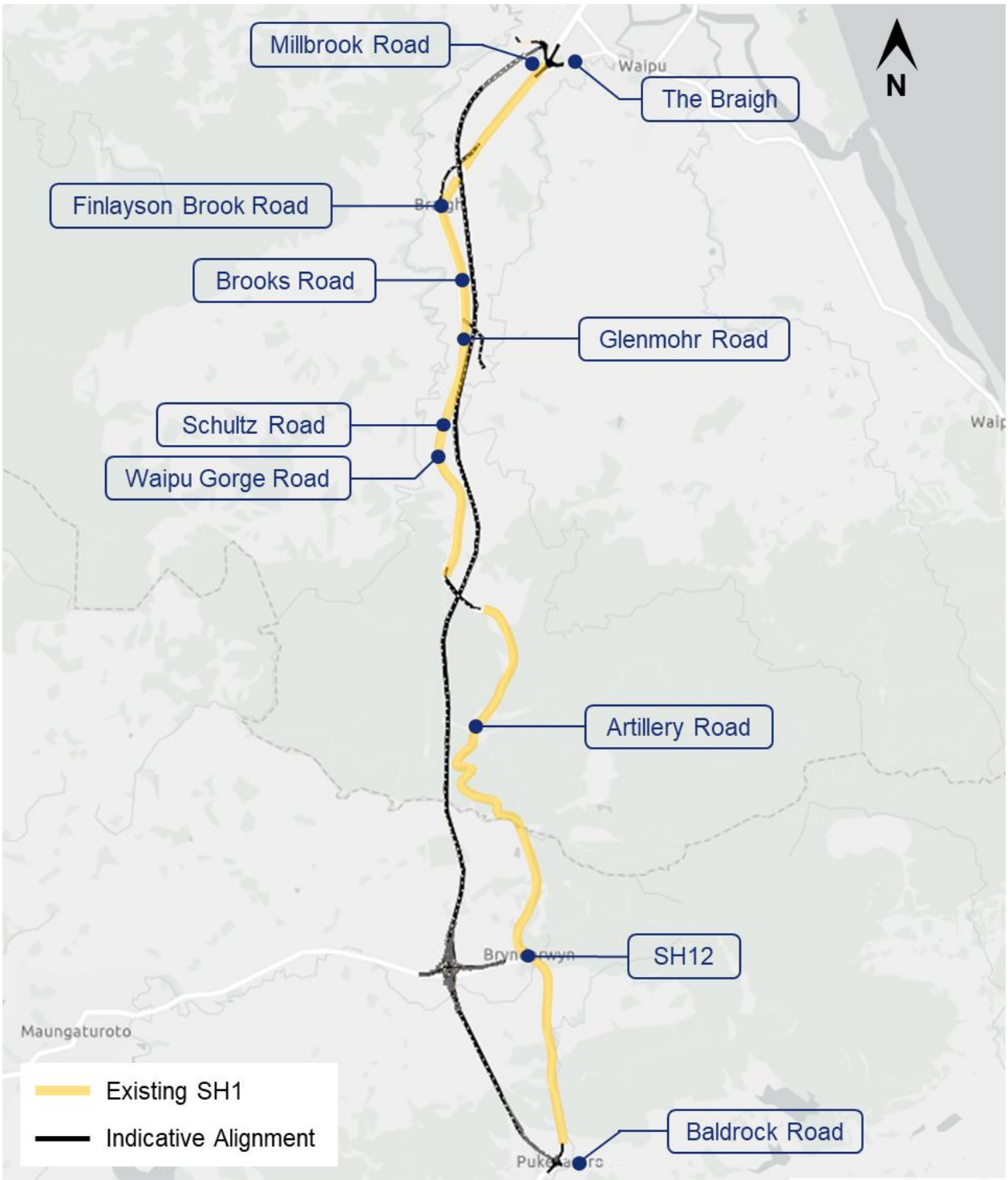


Figure 1: Local road interfaces along existing SH1 corridor

3.4. Traffic Volumes and Travel Times

3.4.1. General Traffic Volumes

The existing SH1 corridor carries a mix of inter-regional freight, commuter, and tourism traffic. Based on 2025 observed traffic counts, the AADT volumes vary along the route as follows:

- Baldrock Road to SH12: 10,985 vpd, with approximately 12% HCVs.
- SH12 to Millbrook Road/The Braigh: 9,620 vpd, with approximately 12% HCVs.

The high proportion of HCVs (approximately 12%) highlights the corridor's function as a nationally strategic freight route.

Figure 2 illustrates the average hourly traffic profile for a typical weekday. The profile indicates a steady increase in volumes during the AM peak, sustaining high volumes throughout the inter-peak period, and tapering off after the PM. This broad peak reflects the diverse mix of freight and long-distance travel, rather than a sharp commuter peaks often seen in urban environments.

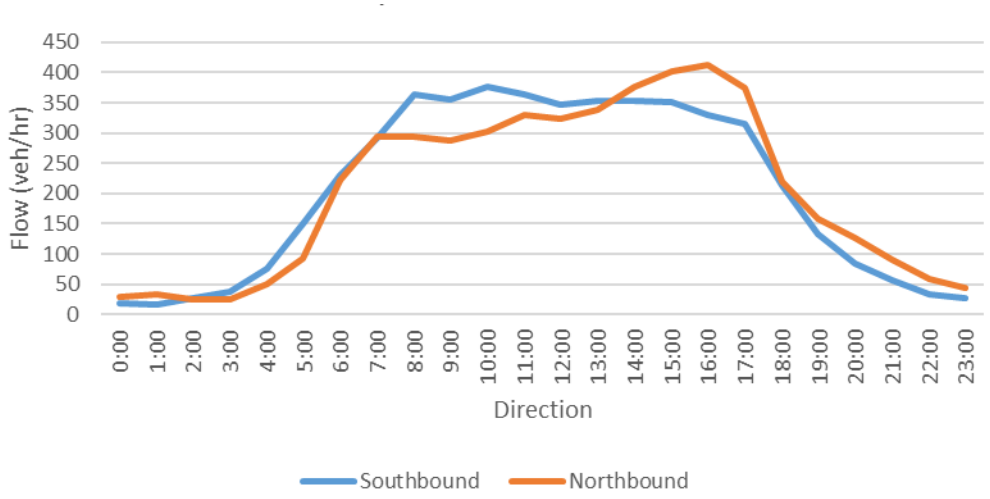


Figure 2: Hourly Traffic Profile of SH1 (Source: TMS, May 2024)

3.4.2. Holiday Traffic Volumes

Traffic volumes along the corridor are significantly higher during key holiday periods compared to typical weekdays. These increases in demand frequently result in network congestion and extended delays for holidaymakers, local residents, and freight operators.

To quantify this seasonal variation, we analysed traffic count data from NZTA's TMS database to compare typical weekdays against holiday start and end days. Figure 3 illustrates the hourly flow comparison.

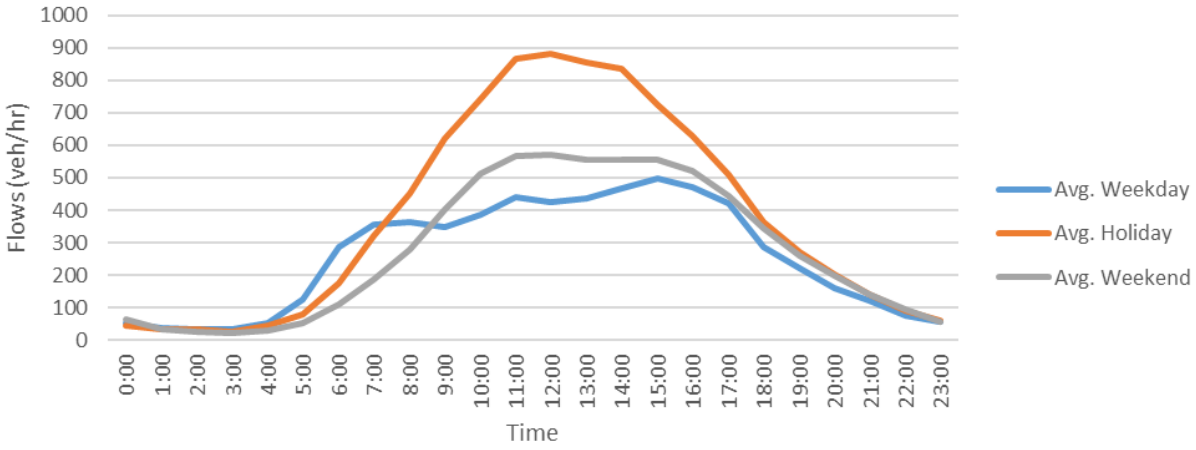


Figure 3: Hourly Traffic Flow Variation during Holidays (Source: TMS, May 2024)

The data demonstrates that peak holiday flows significantly exceed typical weekday flows, particularly during the middle of the day. This indicates that the route is highly susceptible to congestion during recreational peak periods.

3.4.3. Travel Times

We obtained travel times on SH1 in the 2024 Base Scenario from the Northland Corridor Model to get an average journey time for weekday morning peak (AM), inter-peak (IP), and evening peak (PM) periods

between Baldrock Road and Millbrook Road. Figure 4 illustrates the average travel times for each period in each direction on SH1 between Baldrock Road and Millbrook Road. The inter-peak period shows the longest travel time, with northbound journeys reaching 15.9 minutes. However, variability between peak periods is minimal, with the shortest time being 15.0 minutes during the southbound AM peak.

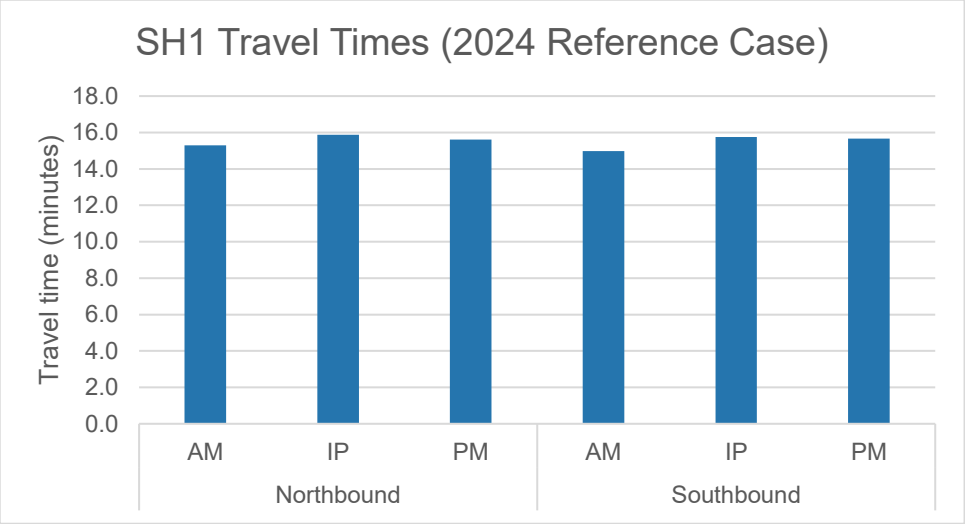


Figure 4: 2024 travel times on the Base Case SH1 from Baldrock Road to Millbrook Road

3.4.4. Travel Time Reliability

Travel time reliability refers to the consistency of a journey time. While average travel time variability between peak periods is currently moderate (as shown in Section 3.4.3), the geometric constraints of the Brynderwyn Hills section significantly impacts the predictability of individual journeys.

The lack of safe overtaking opportunities and steep gradients mean that journey times are highly sensitive to the presence of slow-moving heavy vehicles. A single heavy vehicle can create long platoons, introducing localised delays that are not always captured in average peak hour data but affect the user experience and journey planning certainty. For freight operators and time-critical travellers, this inability to maintain a consistent speed due to geometric constraints reduces the efficiency of the route, even in the absence of severe network congestion.

3.5. Route Resilience

SH1 between Auckland and Whangārei is of national strategic significance as it provides the primary inter—regional transport route between the Auckland and Northland regions. Over the past five years, the Brynderwyn Hills have experienced repeated weather-related disruptions. Notably, Cyclone Gabrielle caused extensive slips in February 2023, closing SH1 for several weeks. Other major weather events during this period have also led to prolonged closures, reinforcing the vulnerability of this section of SH1.

We examined the Traffic Road Event Information System (TREIS)[11] for records of resilience events along SH1 between Baldrock Road and Millbrook Road, from 2010-2024 (refer to Appendix A4). Table 2 summarises closures and their durations by year along SH1 for the last five years from 2020-2024.

Table 2: 2020-2024 road closures and durations along SH1 (Appendix A4)12

Planned/Unplanned	Description	Year	Closure duration (hours)
Unplanned	Crash	2020	1
Unplanned	Crash	2020	4
Unplanned	Crash	2021	16

[11] NZTA, Traffic Road Event Information System (TREIS)
[12] TREIS Data - Appendix A4

Planned/Unplanned	Description	Year	Closure duration (hours)
Unplanned	Crash	2022	27
Unplanned	Other	2022	7
Unplanned	Crash	2022	3
Unplanned	Crash	2022	1
Unplanned	Slip	2023	246
Unplanned	Slip	2023	246
Unplanned	Flooding	2023	27
Unplanned	Other	2023	185
Unplanned	Slip	2023	2002
Planned	Road Construction	2024	40
Planned	Road Construction	2024	6
Planned	Road Construction	2024	2928

Between 2020 and 2024, the route has experienced an increasing trend of unplanned closures under both average and extreme weather conditions[13], as shown in Figure 5. The significant increase in closure durations in 2023 is a direct result of slips and flooding caused by Cyclone Gabrielle. In 2024, closures increased further due to planned road work for major slip repairs, likely stemming from Cyclone Gabrielle.

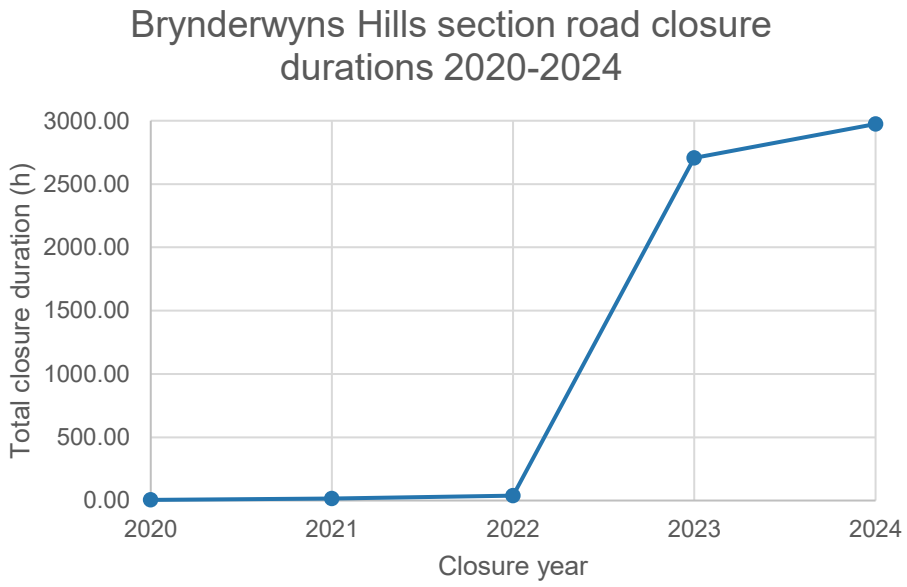


Figure 5: Road closure durations 2020-2024 (Appendix A4)[14]

As shown in Figure 6, SH12 and SH14 provide the only HPMV and freight-capable detour between Kaiwaka and Whangārei when SH1 over the Brynderwyn Hills is closed. This detour adds approximately 105 km to the journey and typically incurs an additional 90–150 minutes of travel time. Because SH14 connects into Whangārei rather than Waipū, vehicles needing to access Waipū must reroute south again

[13] NZTA, Traffic Road Event Information System (TREIS)
[14] TREIS data – Appendix A4

from Whangārei, further adding to travel distance and time. There is no HPMV- or freight-capable detour, nor a direct alternative route, between Kaiwaka and Waipū.

For light vehicles, an alternative coastal detour between Kaiwaka and Waipū is available via Kaiwaka – Mangawhai Road, Garbolino Road, Cove Road and Nova Scotia Drive. This route adds approximately 21 km to the journey and an additional 20–40 minutes of travel time.

Figure 6: Available Alternative Routes to SH1 Between Kaiwaka and Waipū[15]

3.6. Safety

Between Kaiwaka and Waipū, SH1 is a single carriageway that follows the undulating landform with restricted sightlines and steep grades in some locations. This landform presents limited opportunities for overtaking safely in congested conditions. Generally, the carriageway has shoulder widths of 1 to 2 m allowing for limited stopping for emergency or other reasons.

SH1 intersects with local roads between Kaiwaka and Waipū. There are relatively few intersections providing adequate acceleration and deceleration lanes on SH1, which increases the potential for conflicts between state highway traffic and local traffic. Increased risk of conflicts, steep grades, tight corners and restricted sightlines along SH1 (which has relatively high vehicle speeds), all contribute to a significant number of crashes.

We reviewed NZTA's Crash Analysis System (CAS) database for records of crashes along SH1 between Baldrock Road and Millbrook Road, during the five-year period from 1 January 2020 to 31 December 2024. We acknowledge that this safety period includes extended closures and disruptions along this section, and as a result, the number of recorded crashes is likely under-represented for this timeframe.

The extents of the analysis and crash locations grouped by intersections are indicated in Figure 8 and Figure 9 shows crash density along the existing SH1. Table 3 provides a breakdown of the reported crashes in terms of crash severity.

Table 3: CAS analysis of the Project (Baldrock Road to Millbrook Road) for 2020-2024

Severity	2020	2021	2022	2023	2024
Fatal crash	1	0	1	0	0
Serious crash	5	1	2	1	1
Minor crash	9	11	11	4	2
Non-injury crash	19	15	18	27	14

[15] NZTA, Detour Routes Tool, https://detours.myworksites.co.nz/

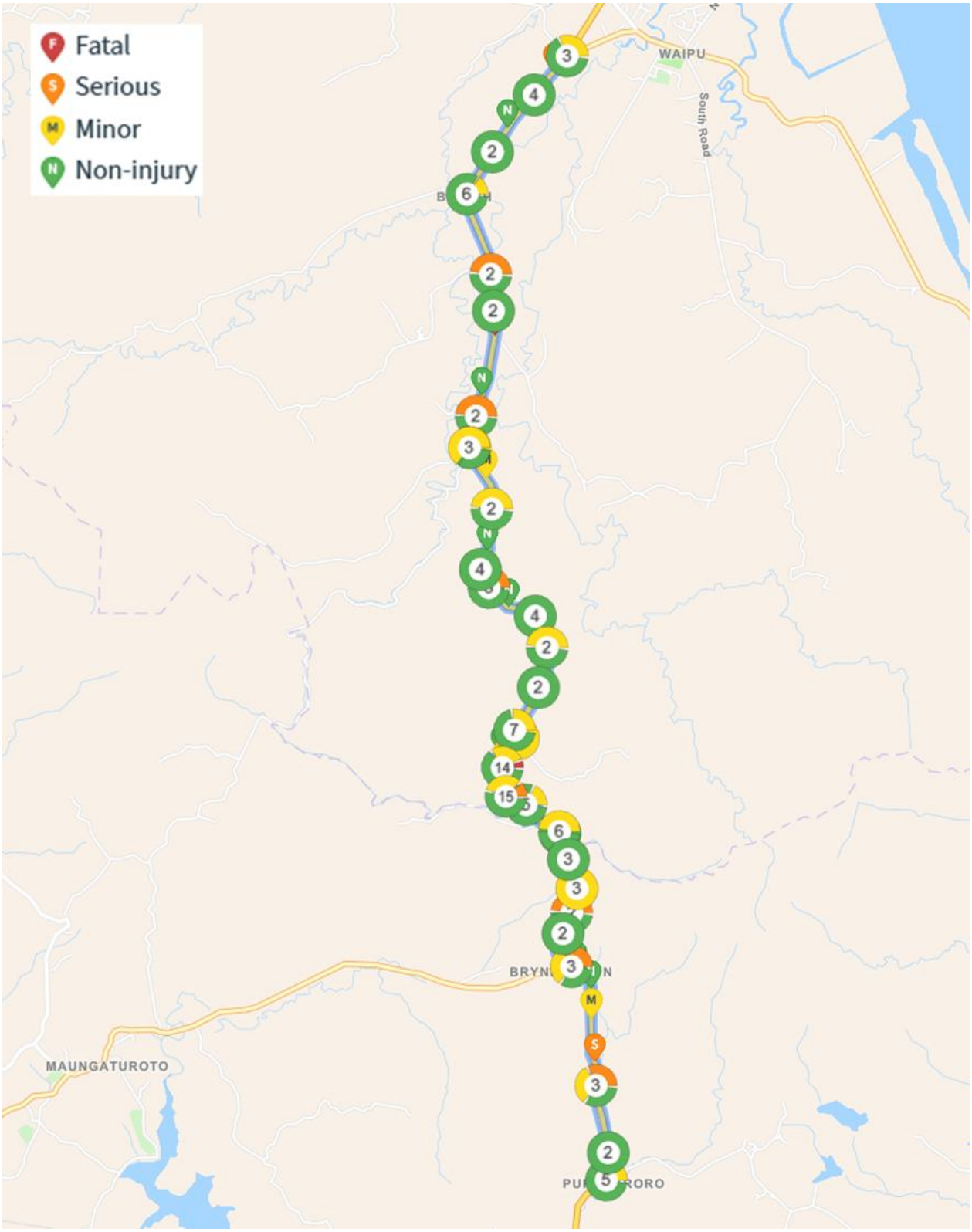


Figure 7: CAS analysis extents and crash location/severity[16]

[16] NZTA, Crash Analysis System (CAS), results for the years 2020 – 2024 inclusive, https://cas.nzta.govt.nz/

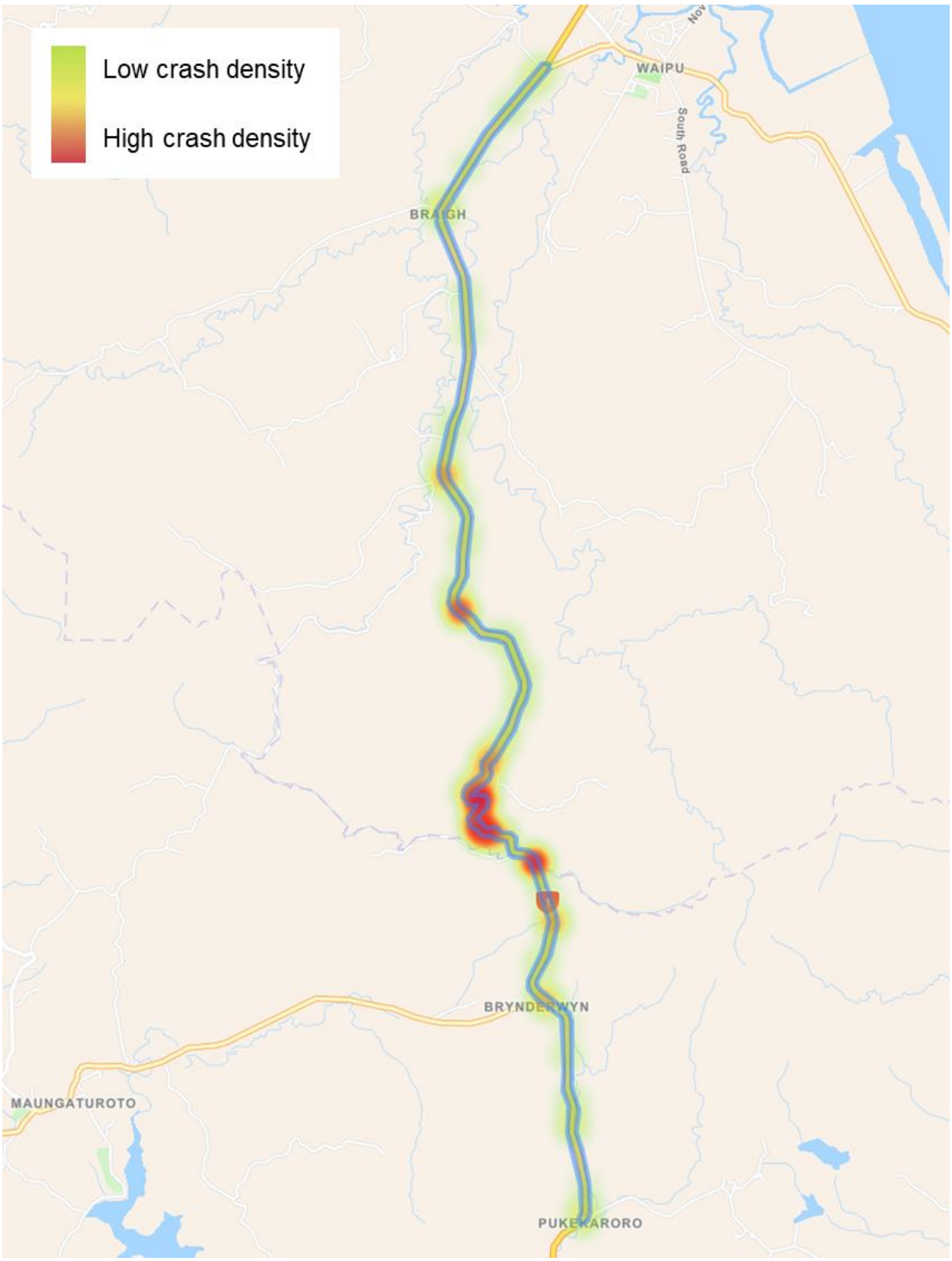


Figure 8: CAS analysis extents and crash location/severity[17]

We consulted NZTA's MegaMaps 2024 Edition[18] (MegaMaps) to determine the collective and personal risk ratings between Baldrock Road and Millbrook Road, as shown in Figure 9 and Figure 10.

MegaMaps indicates that the southern section of the Brynderwyns has:

- 'High' collective risk, meaning the average annual fatal and serious injury crashes per kilometre exceed 0.19[19] (Figure 8). For context, the New Zealand Road Assessment Programme (KiwiRAP) reports that only approximately 8% of the national network and 29% of the Northland and Auckland network fall into this high-risk category[20].
- 'High' personal risk, where the average annual fatal and serious injury crashes per 100 million vehicle-kilometres exceeds 9 (Figure 9). KiwiRAP data indicates that approximately 21% of the national network and 24% of the Northland and Auckland network have a 'High' personal risk rating.

[17] NZTA, Crash Analysis System (CAS), results for the years 2020 – 2024 inclusive, https://cas.nzta.govt.nz/
[18] NZTA, MegaMaps 2024 Edition
[19] New Zealand Road Assessment Programme, Highway Safety Ratings 2012-2016, https://www.kiwirap.org.nz/assets/pdf/KiwiRAP%202018%20compressed.pdf
[20] New Zealand Road Assessment Programme, https://www.kiwirap.org.nz/results.html

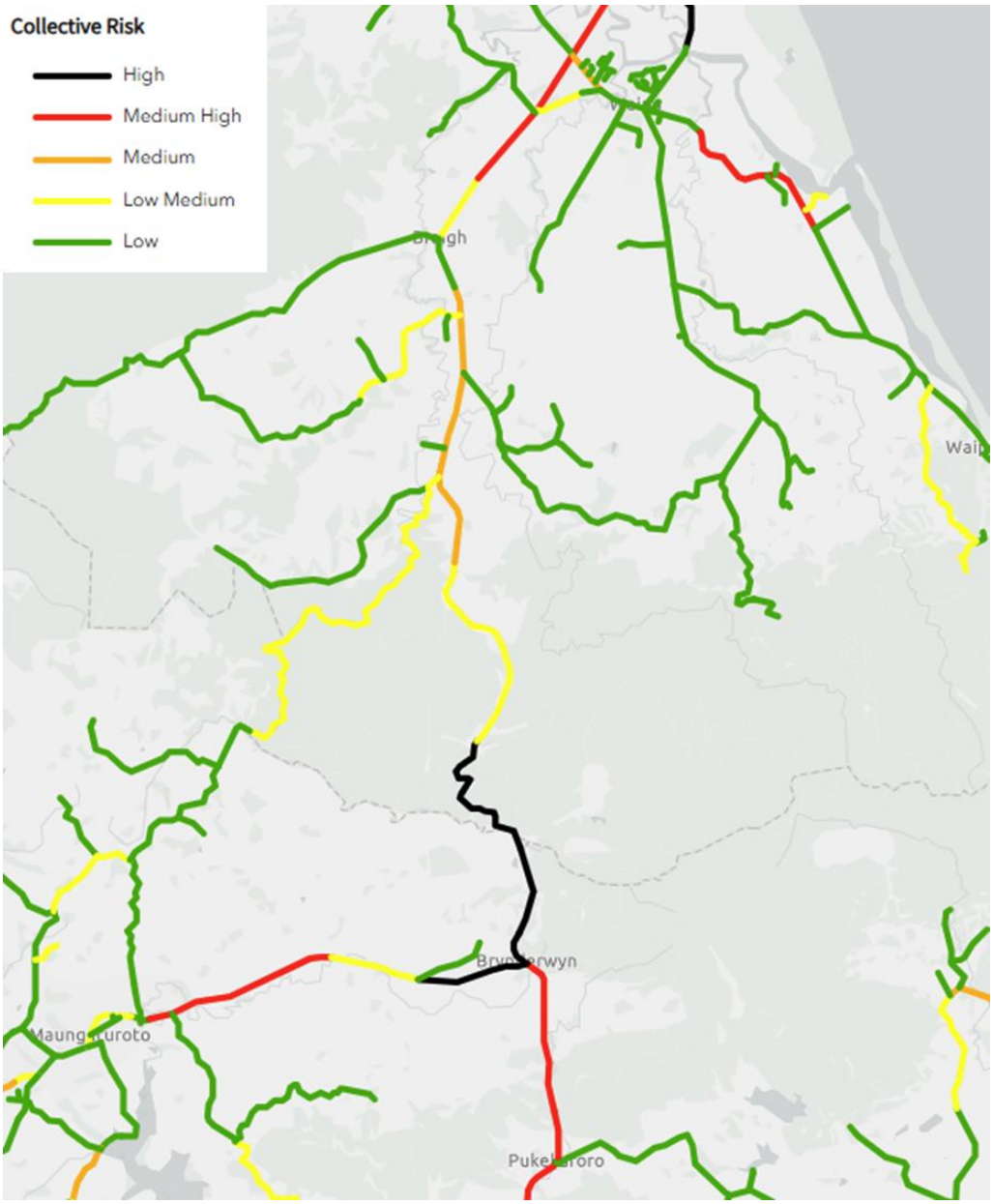


Figure 9: Collective risk between Baldrock Road and Millbrook Road, from NZTA MegaMaps

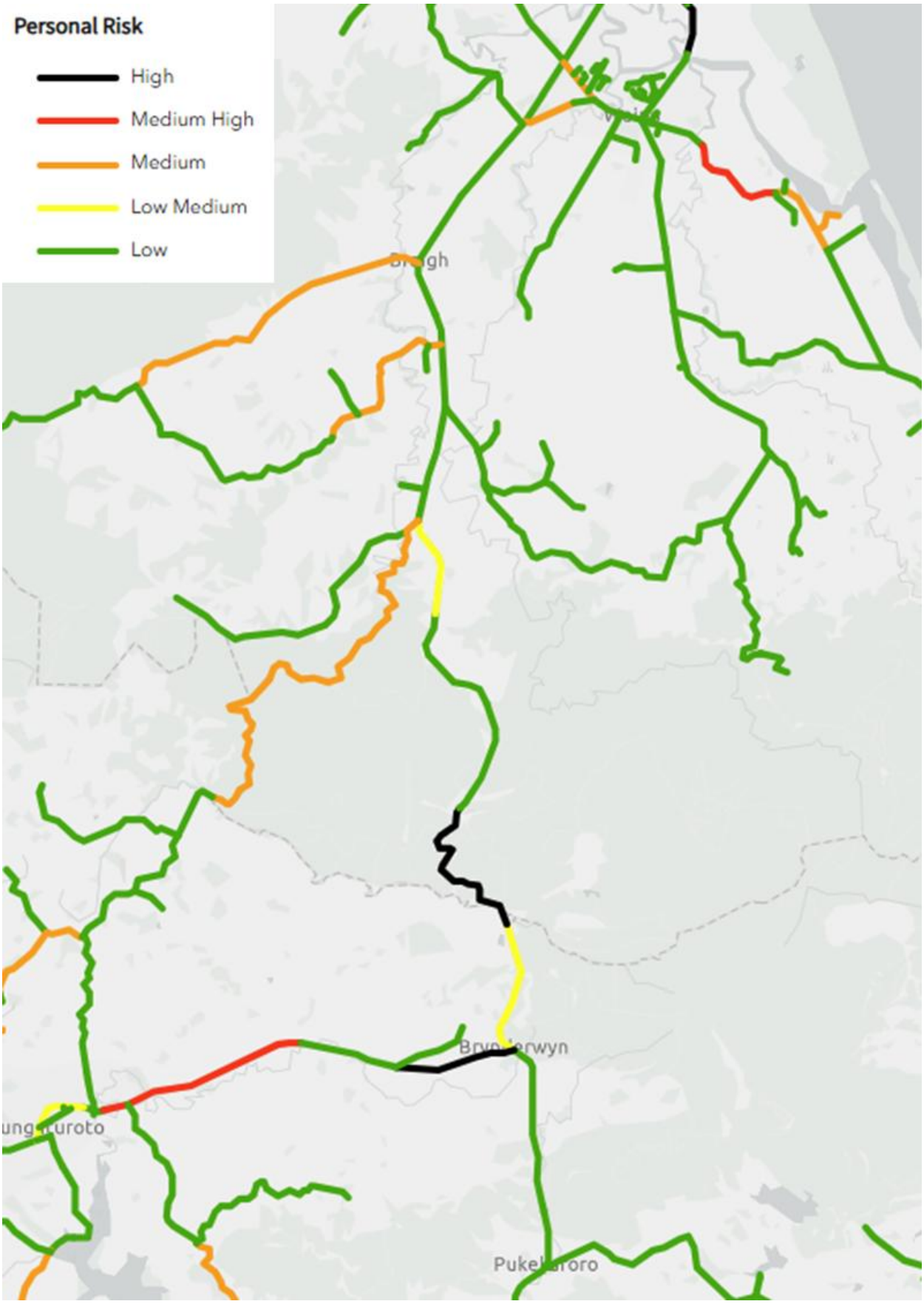


Figure 10: Personal risk between Baldrock Road and Millbrook Road, from NZTA MegaMaps

3.7. Road Freight Performance

The SH1 corridor has a nationally significant freight function, providing the principal link between Auckland, Whangārei, and Northland's port and industrial areas. Freight volumes on SH1 are high, with HCVs comprising around 10–12% of all traffic along the corridor.

The geometry of the Brynderwyn Hills section of SH1 creates challenges for freight vehicles. The route is a narrow two-lane carriageway with steep gradients and tight horizontal curves, resulting in reduced speeds on uphill sections.

Crash data (refer to Appendix A2) indicates that HCVs were involved in around 10% of reported injury crashes along the Project over the past five years. This share is broadly consistent with their proportion of overall traffic volumes. However, given the steep gradients and constrained geometry through the Brynderwyn Hills, crashes involving heavy vehicles tend to have higher severity outcomes, reflecting the increased risks of loss-of-control and limited recovery margins on this section of SH1.

3.8. Public Transport Network Performance

Public transport services are currently very limited along the SH1 corridor between the Brynderwyn Hills (SH12) and Waipū, including through the Brynderwyn Hills. Most scheduled services in the wider area are focused on connecting larger population centres such as Whangārei, Waipū, and Ruakākā, rather than providing regular coverage through the hills themselves.

Key services relevant to the Project section include:

- The Bream Bay Link, operating via Waipū, Ruakākā, Kaiwaka, and Whangārei, but only running on limited days (e.g. once weekly on Thursdays).
- InterCity and other long-distance coach services that use SH1 to connect Auckland with destinations across Northland.

Buses using SH1 through the Brynderwyn Hills are subject to the same physical constraints as heavy vehicles. Steep grades, sharp curves, and limited overtaking opportunities reduce operating speeds and increase exposure to delays during periods of congestion or when incidents occur. These conditions undermine reliability and travel time consistency, with weather events, slips, and crashes further compounding disruption.

3.9. Pedestrian and Cycle Network Performance

There are no dedicated pedestrian or cycle facilities along SH1 between Baldrock Road and Millbrook Road. As a result, pedestrian and cyclist movements along or across this section are very limited.

The road layout and geometry along this section is not well suited to walking or cycling, which further limits the attractiveness and practicality of using SH1 for these modes.

Our review of records on the CAS database showed no reported crashes involving pedestrians and/or cyclists along SH1 between Baldrock Road and Millbrook Road, during the five year period from 1 January 2020 to 31 December 2024. There was one fatal crash involving a pedestrian reported in the last ten years, which was unrelated to road geometry (none related to cyclists were reported).

4. Assessment of Construction Transport Effects

4.1. Overview

Our assessment of construction transport effects is based on the indicative construction methodology, staging approach and Project description set out in Section C4 of Volume A of the Substantive Application. The construction methodology will be confirmed and refined by the appointed contractor during detailed design and construction planning, including the preparation of a Construction Traffic Management Plan (CTMP) and site specific traffic management plans (SSTMPs).

Temporary construction transport effects have been assessed in two parts, being:

- Effects of Temporary Traffic Management (TTM); and
- Effects of Construction Traffic Movements.

4.2. Effects of Temporary Traffic Management

TTM will be required where construction activities interface with the live road network. The primary interface locations are expected to be at the Project tie ins, the SH12 interchange works, road realignments where the Project crosses existing roads, and at site access points (SAPs) where construction vehicles enter or exit the work site.

At this stage, the exact staging and the detailed layout of temporary traffic management will be confirmed by the contractor through the CTMP and SSTMP approval process and may vary as the Indicative Alignment is refined within the Proposed Designation. Regardless, the nature of effects and the required management approach are expected to be broadly consistent, because they are driven by the need to maintain traffic flow and safe access at a small number of network interfaces. In general, these activities are expected likely to require a combination of:

- Temporary speed limits and warning signage;
- Shoulder closures and narrow lane running where works are adjacent to live traffic;
- Short duration lane shifts or temporary diversions where tie ins or realignments are completed; and
- Controlled stop-go operations or temporary signals for short periods, where required to manage safety and maintain access.

These measures may result in temporary reductions in capacity at key locations, particularly during tie in works and when switching traffic between temporary and permanent alignments. Where works are more constrained, or where maintaining two-way flow is challenging, the contractor may also use off peak or night works to manage disruption.

Based on the indicative methodology, the most likely locations where TTM will be required include:

- The SH1 southern tie in in the Baldrock Road area;
- The SH12 interchange area, including temporary SH12 realignment and tie ins;
- Local road realignments such as Glenmohr Road;
- The SH1 realignment area near Finlayson Brook Road; and
- The northern tie in and local connections near Waipū (including tie ins to SH1 and Millbrook Road)

4.2.1. Site Access Points

Site Access Points (SAPs) are locations where construction vehicles enter and exit the work site from the existing road network. A number of SAPs are proposed to support construction across the Project zones within the Proposed Designation. SAP locations are indicative at this stage and may be refined by the contractor to suit construction staging, land access, and safety and operational requirements.

While the specific SAP locations may change, the effects and management approach are expected to be similar. Each SAP will require appropriate traffic management to safely manage heavy vehicle turning

movements, sightlines, the local speed environment, and any potential queuing. This will be addressed through the CTMP and SSTMP process in consultation with the relevant road controlling authority.

Indicative SAPs include:

- Millbrook Road: Access for Main Site Office, Zone 1 Office, diesel storage, and Waipū Interim Tie in (BR01) works.
- Finlayson Brook Road: Access for Zone 1 earthworks and Waipū Underpass (BR02) structure works.
- Glenmohr Road: Access for Zone 1 secondary office and Glenmohr Road Underpass (BR03) works.
- SH1 Waipū Gorge Road (RP 8.904): Access for SH1 Brynderwyn Underpass (BR04) works.
- SH1 Waipū Gorge Road (RP 11.341): Access for Zone 2 earthworks (Zentral forestry block).
- SH1 (RP 14.446): Access for Zone 3 earthworks near the summit.
- Brynderwyn Road: Access for SH12 Interchange earthworks and Underpass (BR05).
- SH1 (RP 0.774): Access for Zone 4 earthworks near Pukekaroro.

4.3. Effects of Construction Traffic Movements

4.3.1. Light Vehicle Movements

Light vehicle movements during construction will mainly be generated by construction workers travelling to and from site and visitors to site offices. At this stage, the detailed workforce profile and shift patterns are not confirmed and will be developed by the appointed contractor.

The general nature of construction traffic effects associated with workforce and visitor light vehicle movements is well understood for projects of this type.

Potential effects include short duration increases in traffic volumes on the surrounding road network at the beginning and end of the working day, potential interaction with commuter peaks during winter working days (which are more likely to overlap with peak periods given shorter working days), and localised effects near site office accesses due to turning movements and any queuing or short-term delay where access points interface with the live network.

Traffic modelling indicates that the surrounding network is generally operating with low levels of congestion in the assessment scenarios. As a result, any additional workforce and visitor light vehicle traffic is expected to result in no more than minor, short-duration operational effects, largely limited to the vicinity of compound access points and at the beginning and end of the working day. With parking contained within compounds and access arrangements appropriately managed through a Construction Traffic Management Plan (CTMP), effects on the wider network are expected to be temporary and localised.

4.3.2. Heavy Vehicle Movements

The Project earthworks balance is designed to be largely self-contained. Accordingly, the heavy vehicle movements associated with earthworks mass haul are assumed to occur on internal haul roads within the Proposed Designation and therefore will not interact with the live state highway or local road traffic network other than at specific managed interfaces (for example, where the haul route intersects with existing roads) which would be subject to site-specific traffic management measures.

Pavement and Material Importation

Heavy vehicle movements on the local network will be primarily driven by the importation of pavement aggregates and materials. Based on the indicative pavement quantities, Table 4 outlines the estimated heavy vehicle volumes associated with importing these materials.

For the purpose of estimating daily and peak-hour construction traffic, pavement importation has been indicative only, based on an assumed 1 year pavement construction programme with 200 working days at 10 hours per day. This programme is not confirmed and is used for estimation only. Actual delivery rates are expected to vary by zone and by activity, and works would be staged (rather than undertaken in

parallel across all zones), which would reduce the likelihood of concurrent peak demands at multiple site access points.

Table 4: Estimated heavy vehicle movements for importation of pavement material

Importation of Pavement Material	Zone 1	Zone 2	Zone 3	Zone 4
Pavement Aggregate volume (m^3)	211,830	87,261	73,684	71,896
Volume per Day (1-year programme) (m^3)	1059	436	368	359
Volume of truck (m^3)	16	16	16	16
Hours per day	10	10	10	10
Truck loads per day	66	27	23	22
Loads per hour	7	3	2	2
Loads per hour (two way)	13	5	5	4
Truck movements per day (two way)	132	55	46	45

There will be day-to-day variation in the number of HCV movements into and out of the Project site accesses over the course of construction. At times, an access may see little or no activity where construction has yet to start, has been completed, or is temporarily paused. Conversely, during critical stages there may be short-term increases in activity. For example, a higher volume of truck movements may occur when bridge beams are delivered for launching, or when large plant is brought to site.

The final construction methodology will be determined by the appointed contractor and may differ in some respects from the preliminary programme. Nonetheless, our assessment has been prepared on a conservative basis and is considered appropriate to identify the potential scale of construction traffic effects for the Project and for recommending suitable mitigation measures.

In practice, construction traffic volumes are likely to be lower than the levels assessed, particularly during peak periods. The reasons for this include:

- The heavy vehicle estimates are based on upper-bound assumptions in the indicative construction methodology.
- As noted in Section 2.2.2, the assessment used 2044 forecast traffic volumes as a conservative basis, even though the Project construction is expected to commence around 2030.
- The contractor and NZTA are expected to programme activities to avoid congested periods (such as AM / PM peaks) where practicable, in order to maximise efficiency and minimise impacts on the existing road network.
- On this basis, the assessed effects represent a worst-case scenario, and actual impacts during construction of the Project are likely to be lower.

4.3.3. SH1/SH12 Intersection Performance

We undertook an analysis of the existing SH1/SH12 intersection to assess its performance during construction, particularly given the proximity of the proposed perpendicular haul route crossing on SH12.

Our assessment utilised 2044 forecast traffic volumes from the Reference Case. These volumes were analysed using SIDRA modelling software to evaluate intersection performance during the morning and evening peak periods.

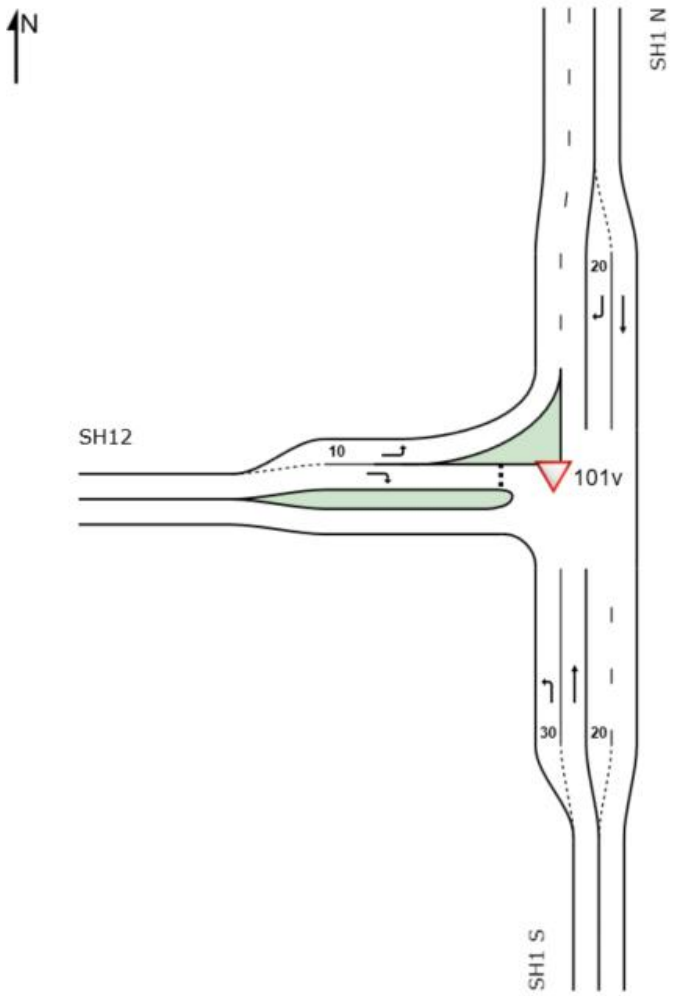


Figure 11: Indicative layout of the SH1/SH12 T-intersection modelled in SIDRA

A summary of the SH1/SH12 intersection performance during construction is provided below:

- **Traffic Volumes:** Traffic volumes during the evening peak period are slightly higher than in the morning peak.
- **Morning Peak:** The intersection is predicted to operate satisfactorily with minimal queues and delays on SH1. On the SH12 approach, the right-turn movement is predicted to operate at LOS D, with queues extending to 35 m and an average delay of 30 seconds.
- **Evening Peak:** The intersection is predicted to reach capacity during the evening peak. While queues and delays on SH1 remain minimal, the right-turn movement on SH12 is predicted to operate at LOS F. The anticipated queue on this approach is approximately 110 m, with an average delay of 1.5 minutes.

4.3.4. Construction Route Safety Assessment

We examined the crash history of the corridor (as outlined in Section 3.6) at the proposed SAPs to identify specific locations where the addition of construction traffic could increase existing safety risks. The analysis is presented in Table below:

Table 5: Crash History at Proposed Construction Access (2020–2024)

Indicative location / SAP	Total Crashes	Key Crash Types
SH1 / SH12 Interchange (Brynderwyn Road SAP)	**10** (including 1 Fatal, 3 Serious)	**Crossing/Turning, Head-On, Rear-End Collision, & Loss of Control:** High incidence of failure to give way and loss of control.
Millbrook Road (Main Office & Haul Crossing)	**3**	**Rear-End & Turning:** Failure to give way turning right in; rear-ended while slowing.
Finlayson Brook Road (Zone 1 Earthworks)	**4**	**Loss of Control:** Incidents related to gravel bends and distraction.
SH1 Underpass Access (RP 8.904)	**3** (including 1 Serious)	**Loss of Control:** Vehicles leaving the lane or colliding with barriers.
Zone 2 Access (RP 11.341)	**2**	**Crossing/Turning:** Truck pulling out into traffic lane, and distraction.
Zone 3 (SH1 RP 14.446), Zone 4 (SH1 RP 0.774), Glenmohr Rd	**0**	No reported crashes.

4.3.5. Assessment of Effects of Construction Traffic Movements

The construction of the Project will generate additional traffic movements on the network, primarily associated with workforce commuting and the importation of pavement aggregates. The earthworks strategy effectively minimises interaction where practicable with the local road network by retaining the majority of bulk haulage on offline haul roads.

The SH1 Base Scenario is not expected to experience congestion in the Reference Case[21], with the exception of the specific capacity constraints identified at the SH1/SH12 intersection. The wider network retains sufficient residual capacity to accommodate the forecast movements without resulting in significant queuing or delays, despite conservative construction traffic additions outlined in this assessment.

Our crash history analysis identified specific safety risks at SH1/SH12, Finlayson Brook Road, and the proposed SAPs along SH1 due to turning conflicts and visibility constraints.

Some safety risks exist during construction. The SH1/SH12 Interchange is expected to have a high-risk interface due to the frequency and severity of turning crashes recorded in the crash history. Additionally, the Zone 2 and Finlayson Brook Road accesses present specific hazards related to visibility and vehicle control which align with previous incidents at these locations.

Parking does not require mitigation. All construction vehicle parking will be contained within site compounds or designated work areas and will not occur on SH1 or local roads.

Overall, with construction activities managed through standard traffic management and approval processes required by the relevant Road Controlling Authorities, the adverse transport effects during construction are considered to be minor.

[21] Traffic volume and capacity analysis from Northland Corridor Model (2044).

5. Assessment of Operational Transport Effects

5.1. Overview

We have based our assessment of actual and potential effects for operational transport on assessing the difference between the Reference Case Scenario and the Project Scenario. Section 5.2.1 of this report sets out the Reference Case Scenario (base case). Section 5.3 provides our assessment of actual and potential effects generated by the Project Scenario when measured against the base case using year 2054 for the assessment.

5.2. Assessment Scenarios

5.2.1. Reference Case Scenario

The Reference Case represents the 'do-minimum' network against which effects of the Project are assessed. It assumes:

- Warkworth to Te Hana SH1 corridor is open and operational;
- Completion of current / committed improvements elsewhere on the SH1 corridor; and
- The Brynderwyn Hills section of the Project is not constructed, with SH1 through the Brynderwyn Hills remaining a two-lane highway in its current form.

Local Roads

Local roads between Baldrock Road and Shoemaker Road (see Section 3.3) interfacing with SH1 remain in their current form unless otherwise committed.

Traffic Volumes

We derived traffic growth from corridor counts (2025) and applied using the corridor model's land-use scenario, noting the programme's documented growth assumptions.

Figure 12 shows the forecast peak hourly traffic volumes on SH1 between Baldrock Road and Millbrook Road. It presents the 2024 modelled flows alongside the forecast 2044 and 2054 flows for the Reference Case scenario during the weekday morning peak (AM), inter-peak (IP), and evening peak (PM). The volumes shown represent the combined maximum northbound and southbound flows for each peak period. Figure 12 highlights that PM peak flows are higher than the AM and IP flows in 2024, 2044, and 2054.

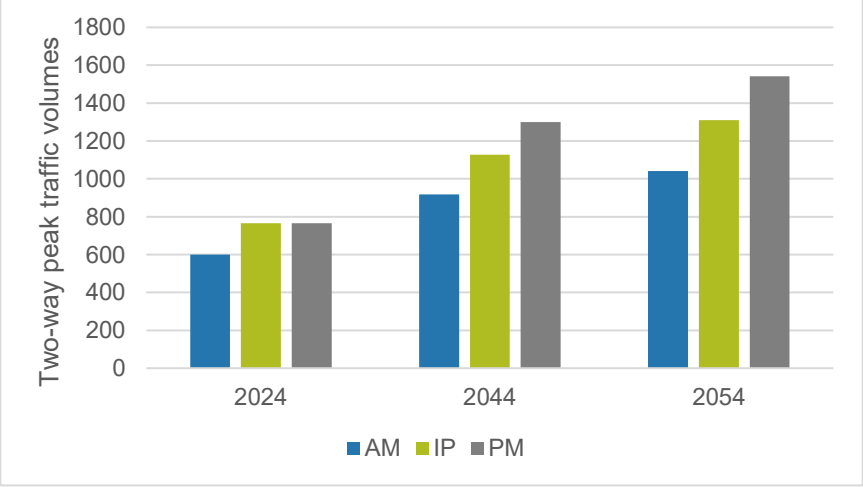


Figure 12: Reference Case scenario volumes by time period

Our modelling indicates that AADT on SH1 between Baldrock Road and Shoemaker Road is projected to grow at a rate of approximately 1.9% per annum between 2024 and 2054. This relates to an increase of about 50% from 2024 to 2044, and 75% from 2024 to 2054, without the Project in place. Our modelling also indicates daily traffic volumes on SH1 to be in the order of 18,600 vpd by 2054 in the Reference Case (Figure 13).

We assessed the growth rate per annum of the section using the last 15 years of TMS data from a site near Glenmohr Road[22]. The result of this assessment showed a 2.2% annual growth rate over the last 15 years, consistent with the forecast growth indicated by the modelling.

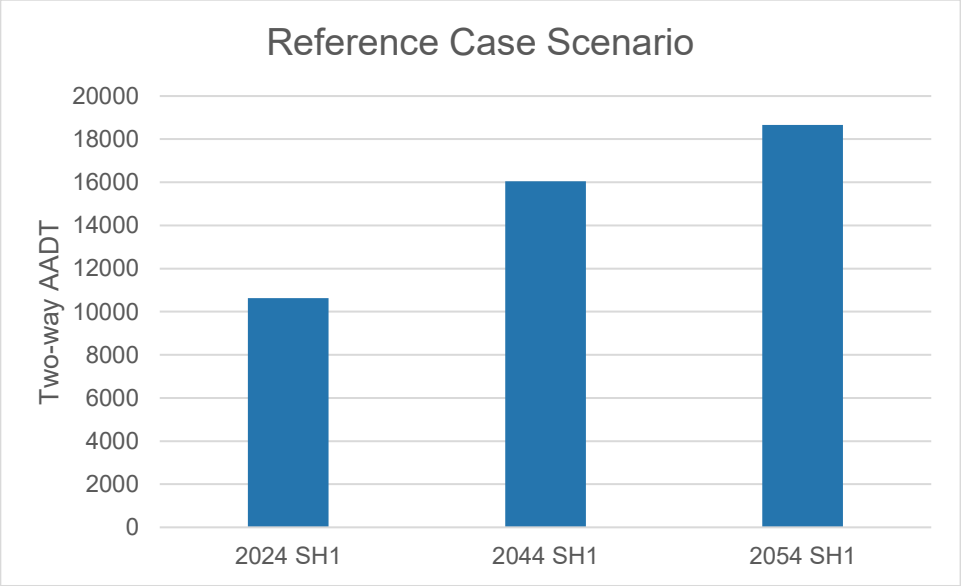


Figure 13: Reference Case scenario AADT

Our assessment shows that traffic is predicted to grow on all parts of SH1 in the Reference Case scenario. This is illustrated in Figure 14, which shows the forecast PM peak traffic volumes (sum of the northbound and southbound volumes) on the northern SH1 approach of key intersections along SH1 in the Reference Case scenario in 2024, 2044 and 2054.

[22] 2009 to 2023 counts at Site ID:01N00309, About 400m south of Glenmohr Rd about 650m N of Schultz Rd

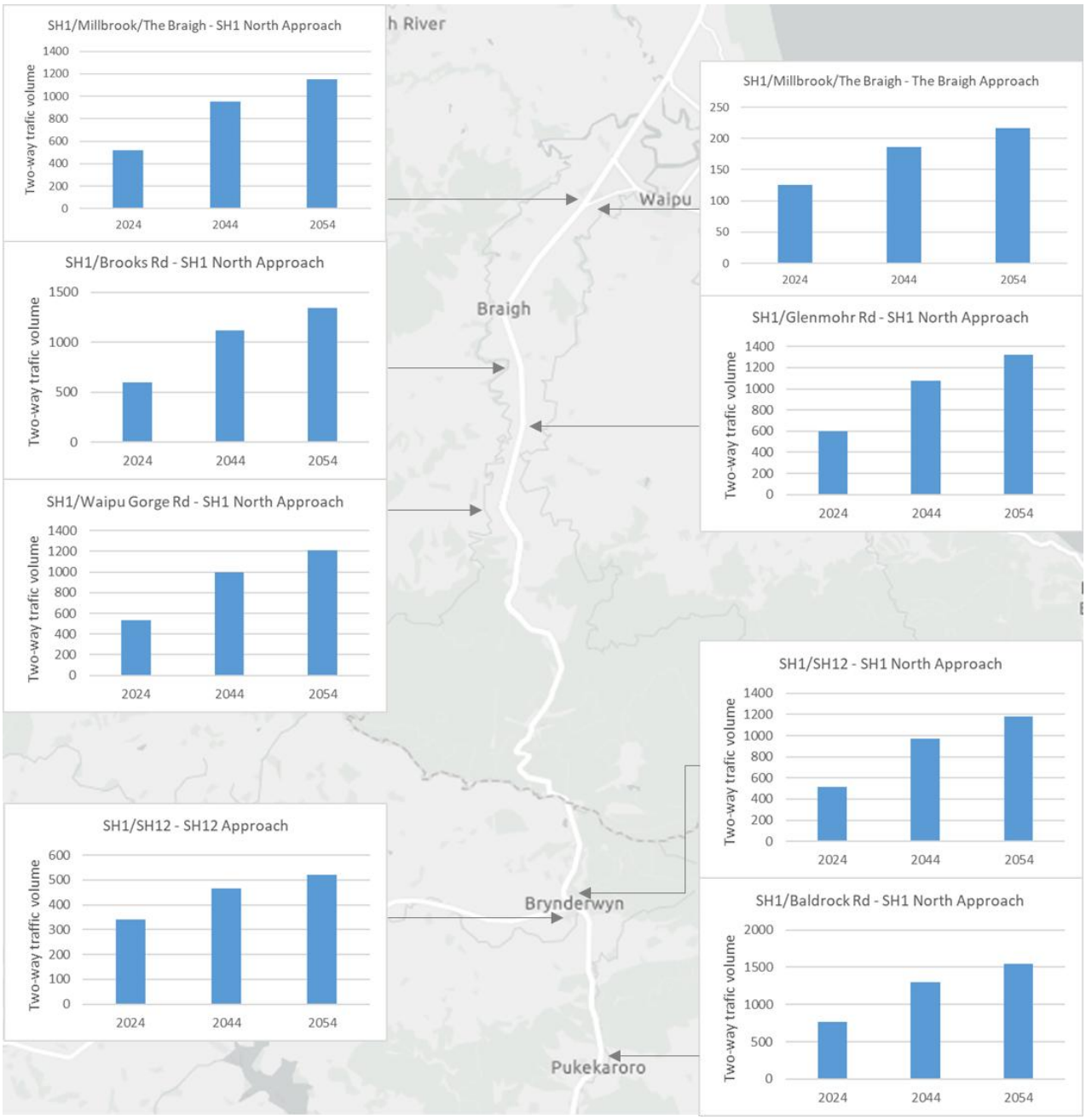


Figure 14: Forecast PM peak volumes on key parts of SH1 from Baldrock Road to Shoemaker Road.

Travel Times

We have compared travel times in 2024 with those forecast in the 2044 and 2054 Reference Case Scenario along the existing SH1, between Baldrock Road and Millbrook Road. The travel time was assessed to Millbrook Road because as part of the Brynderwyn Hills section, the Project route links back into the existing SH1.

Our assessment indicates that there is not expected to be significant increases in travel times between 2024 and 2054 in the Reference Case. This is illustrated in

Table 6 which shows the modelled 2024 and forecast 2044 and 2054 travel times along SH1 between Baldrock Road and Millbrook Road on a ‘normal’ weekday.

Table 6: Travel times in minutes on SH1 between Baldrock Road and Millbrook Road in the Reference Case

Direction	Segment	Period	Travel time (min)			Change 2024 to 2054	
			2024	2044	2054	Absolute	%
Northbound	Baldrock Road to Millbrook Road	AM	15	16	17	2	10%
		IP	16	17	17	1	7%
		PM	16	18	18	3	18%
Southbound	Millbrook Road to Baldrock Road	AM	15	16	16	1	10%
		IP	16	17	18	2	13%
		PM	16	18	18	3	17%

Travel Time Reliability

We do not expect travel time reliability of the existing SH1 in the Reference Case Scenario to significantly deteriorate. Our modelling indicates that this section of the SH1 corridor is generally capable of absorbing the anticipated increase in traffic volumes. As a result, congestion-related delays are unlikely to occur.

The geometric constraints through the Brynderwyn Hills remain unchanged in the Reference Case. We anticipate reliability issues to continue, as factors such as slow-moving heavy vehicles, weather-related disruption, or minor incidents on the steep and curved sections of the route still remain. While our model does not explicitly quantify reliability, the underlying physical characteristics of the corridor suggest that variability in travel times will continually persist and is likely to increase over time even in the absence of capacity constraints.

Route Resilience

The Reference Case carries the existing alignment across the Brynderwyn Hills, with vulnerability to slips and prolonged closures. Post-2023/24 recovery works provide only a short-term improvement; we still expect full-closure events of similar consequence on a decadal scale, with long detours when closures occur.

Safety

As noted above, though we anticipate traffic volumes to increase between 2024 and 2025 along this section of the SH1 corridor, our model does not predict any meaningful increase in congestion or queuing over the same period in the Reference Case. We do not expect congestion related crash risk to increase.

The underlying roadside and alignment risks will remain. Existing inherent safety risks, including the potential for rear end and head on crashes due to driver error, slow moving vehicles, or constrained overtaking opportunities, will continue to be present across the corridor.

Road Freight Performance

Freight volumes are expected to grow in proportion to general traffic in the Reference Case. HCVs are expected to continue to comprise approximately 12% of total volumes according to our model. While the network capacity is sufficient to accommodate this growth without significant delay, freight efficiency will remain constrained by the geometric limitations, underlying roadside risks and alignment of the existing SH1, in particular through the Brynderwyn Hills.

Public Transport Network Performance

We have assumed no material increase in scheduled services through the Brynderwyn Hills in the Reference Case (do-minimum) scenario. Inter-regional coach services (such as InterCity) will continue to operate on the existing SH1, while local connectors will likely remain focused on larger settlements. Reliability for coach operations will mirror general traffic reliability, meaning services will remain vulnerable

to the same geometric constraints and resilience events (such as slips and weather-related closures) as private vehicles.

Pedestrian and Cycle Network Performance

In the Reference Case, no specific improvements to pedestrian or cycle facilities are committed for the Brynderwyn Hills section of SH1. The corridor currently lacks dedicated infrastructure, with narrow shoulders and a high-speed environment making it unsuitable for most active mode users.

5.2.2. Project Scenario

The Project Scenario is the Reference Case in terms of wider network configuration (as per the description in section 5.2.1), land use assumptions and demand/forecast traffic volumes. In this context, network refers to the modelled road network configuration, land use refers to the development assumptions informing trip generation, and demand refers to the forecast traffic volumes derived from those assumptions.

The only difference is the inclusion of the Project (Indicative Alignment), modelled as a four-lane highway connecting Baldrock Road in the south to SH1 just north of Waipū.

Within the Project extents, key interchange arrangements include:

- A grade-separated interchange at SH12.
- An interim at-grade intersection/tie-in at Millbrook Road (Waipū). This intersection is designed to accommodate traffic demands until the construction of the North Waipu to Port Marsden Highway section of the Northland Corridor, at which point it will be upgraded to a full grade-separated interchange.

5.3. Assessment of actual and potential operational effects

We assessed the actual and potential operational transport effects generated by the Project Scenario. We also carried out sensitivity analysis to determine the performance of the interim interchanges at Baldrock Road and Waipū using forecast volumes in year 2054 (see Section 5.4).

5.3.1. Traffic Volumes

We modelled the forecast daily traffic volumes along the existing SH1 route and along the Indicative Alignment between Baldock Road and Millbrook Road, for both the Reference Case and Project scenarios, which is shown in Figure 15 The volumes shown represent the combined maximum northbound and southbound AADTs for each scenario. The “Corridor Total” is the combination of the volumes on the existing SH1 route (which will provide an alternative route once the Project is constructed) and the Project route in 2054.

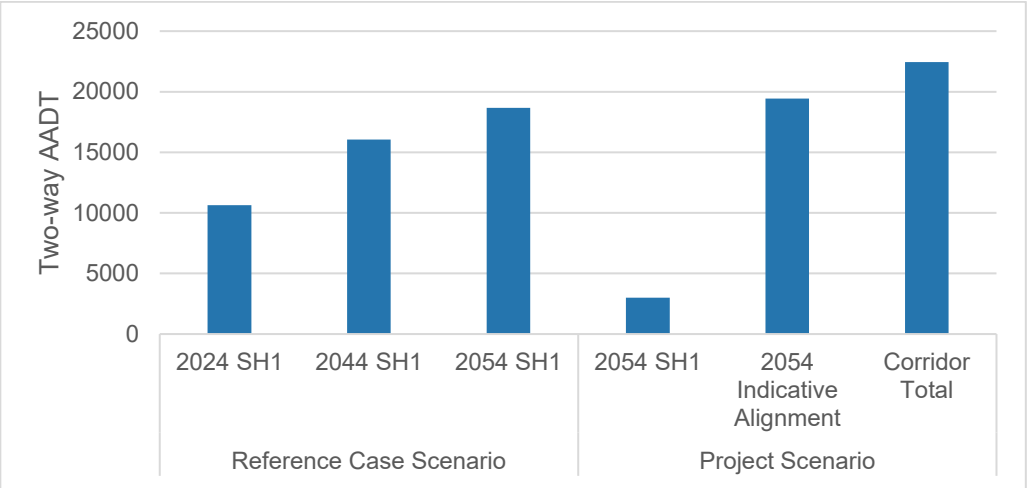


Figure 15: Traffic volumes between Baldrock Road and Millbrook Road

From our analysis, we expect traffic volumes on the existing SH1 route between Baldrock Road and Millbrook Road to reduce significantly once the Project is constructed and expect daily traffic volumes to be approximately 3,000 vpd in 2054 in the Project Scenario (15,600 fewer vpd, a decrease of 84%, compared to the Reference Case). We consider the rate of diversion to the Project to be relatively high because there is expected to be little local traffic needing to access destinations between Baldrock Road, SH12, and Waipū. Our analysis also shows that traffic volumes on the Project (between Baldrock Road and Millbrook Road) are expected to be approximately 19,400 vpd in 2054.

The traffic flows along the Project route are forecast to be higher than the along SH1 in the Reference case, 19,400 compared to 18,600 vpd in 2054. There are some traffic route switches between the Reference and Project scenarios that attract additional trips to the Project route:

- some trips from the west SH12 (external trips) divert from using the Paparoa to Mangapai route to the new Project route
- some trips from Paparoa and Maungaturoto do the same
- there are also some trips to/from the north, WDC and Marsden sectors, to the Mangawhai sector switching via Kaiwaka-Mangawhai Rd rather than Cove Road.

Note that the traffic difference is about 700vpd (2054), or 50 vph in both directions, which is similar to traffic flow changes in the weekday traffic models (used to estimate AADT).The reduction of traffic on the existing SH1 route, and the other routes noted above, will improve traffic operations along these routes, particularly at intersections where side road traffic delays will reduce due to lower opposing traffic flows along these routes.

5.3.2. Travel Times

We have assessed the travel time impact of the Project from Baldrock Road to the tie-in at Millbrook Road, to provide insight into potential travel time changes. We used the model to calculate forecast travel times for this trip in both directions on the existing SH1 and the Project route.

Figure 16 shows the travel time routes for the existing SH1 and Project Scenario. As part of the Project, the route links back into the existing SH1 at Millbrook Rd through the Waipū interim tie-in.

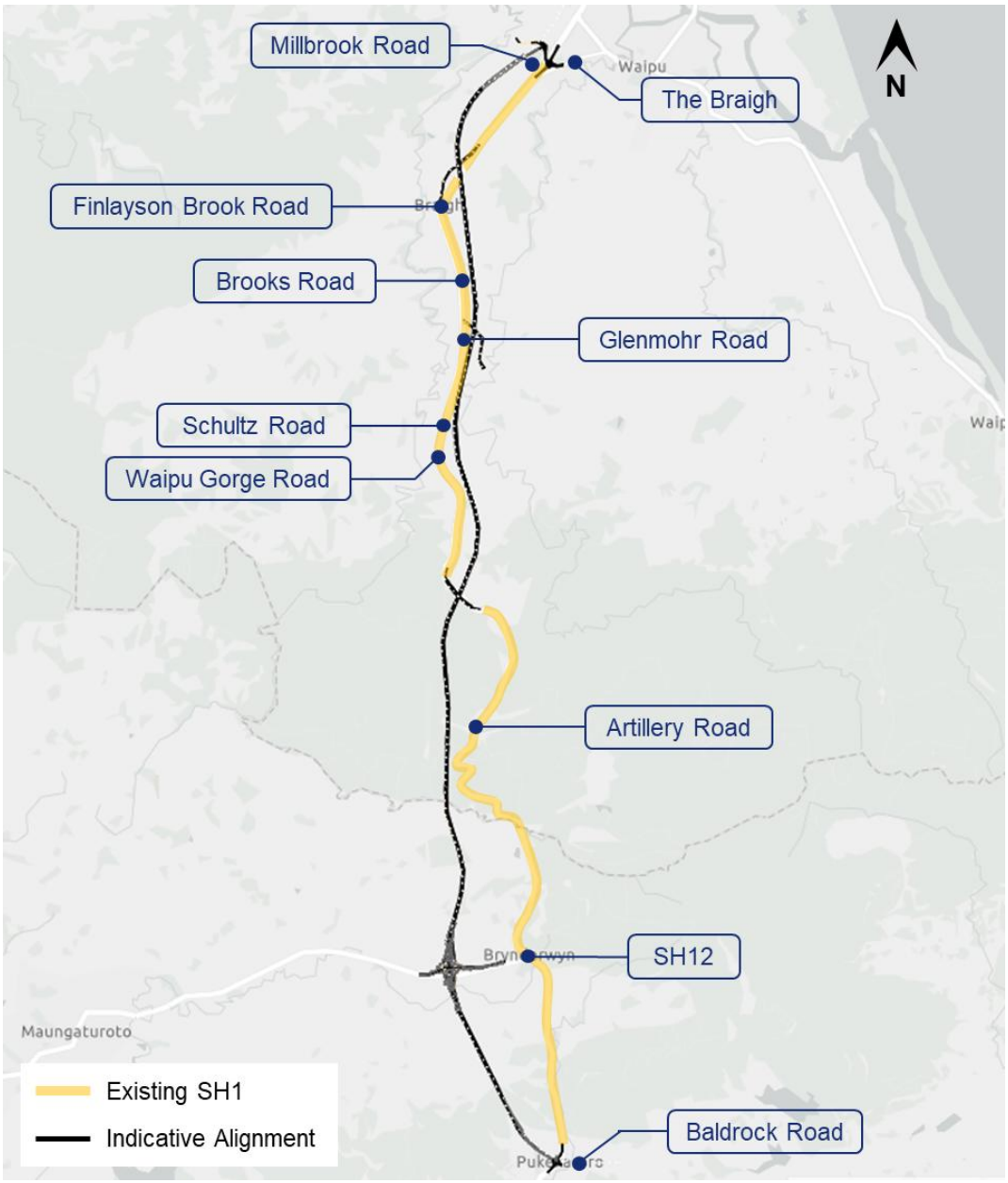


Figure 16: Travel time routes between Baldrock Road and Millbrook Road

To assess the Project's impact on through-traffic, we compared travel times on the existing SH1 under the Reference Case Scenario and Project Scenario, as well as travel times along the Indicative Alignment in the Project Scenario. The output of this assessment is shown in Figure 17.

The results of our analysis indicate a reduction in travel times for both the existing SH1 and the Indicative Alignment in the Project Scenario, compared to the Reference Case in 2054:

- Existing SH1 (Project Scenario): Travel times decrease by between 2.7 and 4.8 minutes (a 16% to 26% reduction) depending on time period and direction
- Indicative Alignment: Travel times decrease by between 3.8 and 5.6 minutes (a 23% to 30% reduction), also depending on the time period and direction.
- The greatest improvement in travel time savings on SH1 between Baldrock Road and Millbrook Road occurs in the northbound evening peak, where travel times reduce from approximately 18 minutes to 14 minutes.

In the Project Scenario, travel times on both the existing SH1 and the Project route tend to be consistent across directions and time periods, suggesting free-flow conditions.

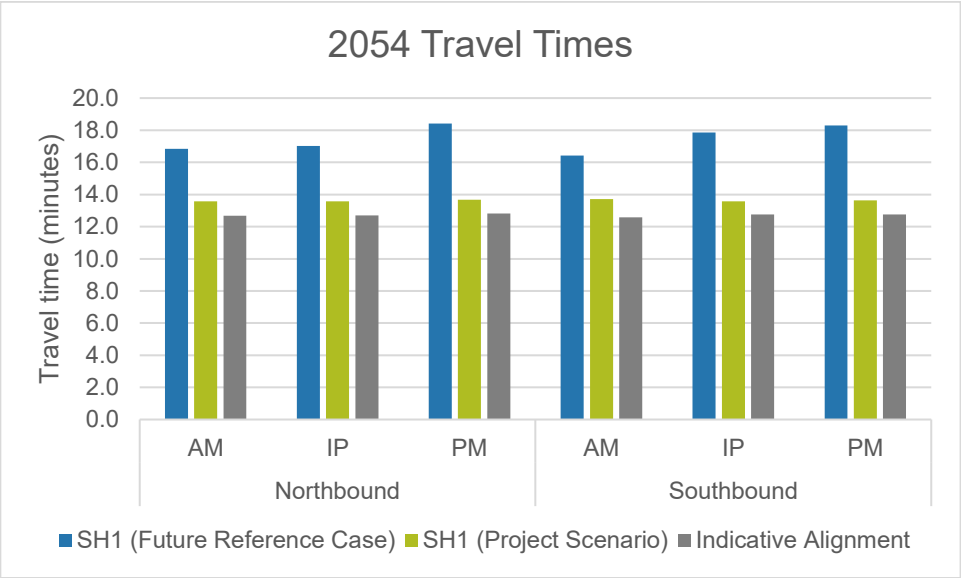


Figure 17: Travel times between Baldrock Road and Millbrook Road

5.3.3. Interchanges and Tie-Ins

The Project includes interchanges at Baldrock Road and SH12, and an interim tie-in at Waipū (The Braigh). We assessed the operational performance outcomes for each location using SIDRA, these are summarised below.

Baldrock Road Interchange

The Baldrock Road/SH1 at-grade roundabout links the existing SH1 with the new alignment, as shown in Figure 18.

From the results of our SIDRA intersection modelling analysis, we anticipate the roundabout to have very low levels of delay/free flow conditions (LOS A). The 2044 holiday peak period results indicate that the interim roundabout layout could result in queues on the SH1 new mainline extending to approximately 155 m, but resulting delays are relatively low (approximately 30 seconds at the Baldrock Road approach). The SIDRA movement summaries for this intersection are presented in Appendix A3.

Figure 18: Baldrock Road roundabout - Project Scenario (source: Northland Corridor – Section 2B Planning Hub)

SH12 Interchange

The SH12 Interchange is a grade-separated dumbbell-style interchange, shown in Figure 19 below, which connects SH12 and the existing SH1 with the new alignment.

Overall, the results of our SIDRA intersection modelling assessment suggest that the interchange will operate satisfactorily in year 2054 in the AM, PM and Holiday peaks, at a LOS B or higher in all movements. The SIDRA movement summaries for this interchange are presented in **Appendix A3**.

Figure 19: SH12/SH1 interchange - Project Scenario (source: Northland Corridor – Section 2B Planning Hub)

Waipū Interim Tie-In (Interim Layout)

An at-grade interim tie-in has been proposed at Waipū to link traffic flows between the existing SH1 and the new Project alignment, as shown in Figure 20 below.

The results of our SIDRA intersection modelling analysis indicate that the interim tie-in is expected to operate satisfactorily in the 2044 holiday peak period (1.8 times the PM peak), with the existing SH1/The Braigh roundabout operating overall at LOS B. The longest queues are expected to extend to 45 m on the SH1 north approach. The SIDRA movement summaries for this tie-in are presented in **Appendix 3**.

Figure 20: Waipū Interim tie-in - Project Scenario (source: Northland Corridor – Section 2B Planning Hub)

5.3.4. Travel Time Reliability

Section 3.4.4 describes the current issues with travel time reliability along SH1, between Baldrock Road and Millbrook Road. Section 5.2.1 discusses that in the Reference Case Scenario, material deterioration in travel time reliability is not expected, as forecast traffic volumes remain well below capacity along this section of SH1. The Project will nonetheless provide several benefits that will improve travel time reliability across the corridor, namely:

- The Project will provide a new four-lane alignment with higher design speeds and significantly improved geometry. Even though the existing SH1 is not forecast to become congested, the Project will enable higher, more consistent speeds and reduce interactions between faster and slower vehicles. This will support more stable travel times under a range of conditions.
- The availability of two traffic lanes in each direction on the Indicative Alignment will remove the reliance on short passing lanes along the existing SH1. General traffic will not be constrained behind slow-moving vehicles, which will reduce variability in travel times.
- Reduced traffic volumes along the existing SH1 route will allow light vehicles using that route to be less constrained by slow moving HCVs, particularly on the steeper graded sections.
- HCVs will benefit from the improved gradients, curvature, and separation from local access movements on the new route. This will result in more predictable travel times for freight, which is particularly sensitive to geometric constraints on the existing corridor.

Taken together, these improvements will provide a more reliable and predictable corridor for all users. The Project will enable individuals and businesses to plan their travel with increased certainty and will contribute to a more resilient network that can accommodate minor disruptions without significant variability in travel times.

5.3.5. Safety

Section 3.6 describes the current safety issues along the existing SH1 route between Baldrock Road and Shoemaker Road, and Section 5.2.1 discusses the expected safety conditions in the Reference Case Scenario. As noted in Section 5.3.1, the Project will carry the majority of through traffic that currently uses the existing SH1. From our model, the AADT along the Project is forecast to be approximately 19,500 in 2054.

Traffic volumes along the existing SH1 route will reduce significantly once the Project is in place, which will have positive effects on the safety performance of this section.

We expect the Project to deliver significantly improved safety performance compared to the existing SH1 within the Project extents. The safety elements of the Project will be constructed to the RoNS standardised design, including:

- Providing a four-lane divided motorway with separate northbound and southbound traffic, which will reduce the potential for head on crashes along the Project route.
- Removing through traffic from the existing SH1 and local road network, including HCVs that contribute to increased crash risk.
- Introducing a grade separated interchange at SH12, which will reduce turning related conflicts and reduce intersection crash risk.
- Improving horizontal and vertical alignment, including gentler gradients and wider curves which reduce the likelihood of loss of control crashes.
- Reducing traffic volumes along the existing SH1, which will improve safety conditions for the remaining local access movements that continue to use that corridor.
- Classifying the motorway as ‘Limited Access’, which restricts direct access points to the main alignment and removes private property accesses, reducing conflict points and providing consistency along the corridor.

Indicative reductions in Death and Serious Injury (DSI) crash rates associated with the design elements included in the Project are positive (outlined in Table below). The Indicative Alignment incorporates the key RoNS Standardised Design safety features (for example, median and roadside barrier provision, wider shoulders and audio-tactile markings) that underpin these reductions. We have drawn these values from the NZTA Standard Safety Intervention Toolkit[23] and the NZTA Standardised Designs Solutions guidance, which provide evidence-based DSI reduction factors for individual safety treatments consistent with the RoNS Standardised Design cross section.

Overall, the Indicative Alignment will provide a significantly safer alternative to the existing SH1 between the Project Extents.

Table 7: Indicative DSI crash reduction factors for key safety elements included in the Project design

Design element on Project	Indicative reduction in DSI crashes
Continuous median and roadside barriers	**≈ 75% DSI reduction**
Median barrier	**≈ 65% DSI reduction**
Roadside barrier	**≈ 30% DSI reduction**
Wider sealed shoulders	**≈ 25% DSI reduction**
Audio-tactile markings	**≈ 20% DSI reduction**

5.3.6. Route Resilience

We expect the introduction of the Project, a high-quality alternative route to the existing SH1 between Baldrock Road and Millbrook Road, to reduce the impacts of incidents, such as crashes and natural events like slips and flooding, on travel along this section. This improvement will mean improved resilience for those travelling between Auckland and Northland in several ways including:

- An alternative route will provide a greater level of security and availability of travel routes between Auckland and Northland.
- The Project route will have four traffic lanes. This design will allow the route to be opened sooner following a crash than is currently possible along the existing SH1 route, which is primarily a single carriageway.
- As noted in Section 5.3.5 above, the number of serious or fatal injury crashes both along the existing SH1 route and in the corridor overall is forecast to reduce, which will consequently reduce the number of times the route is closed.

As a result, the resilience of the wider state highway network will be significantly improved by the Project.

5.3.7. Road Freight Performance

As noted in Section 5.2.1, our modelling indicates that freight volumes will increase within the overall Project corridor, and we expect HCVs to prefer to use the Indicative Alignment. The reduced travel times, improved geometry, and improved predictable journeys on the Project will be more attractive to HCVs, as their value of time and desire for travel time certainty are higher than other vehicles. This is expected to reduce the volume of HCVs on the existing SH1.

This trend is represented in Figure 21, which shows the forecasted HCV volumes along the existing SH1 route and the Project route in the Reference Case Scenario and Project Scenario. The volumes shown in Figure 21 represent the combined maximum northbound and southbound AADTs for each scenario multiplied by the corresponding heavy vehicle percentage.

[23] NZTA Standard Safety Intervention Toolkit

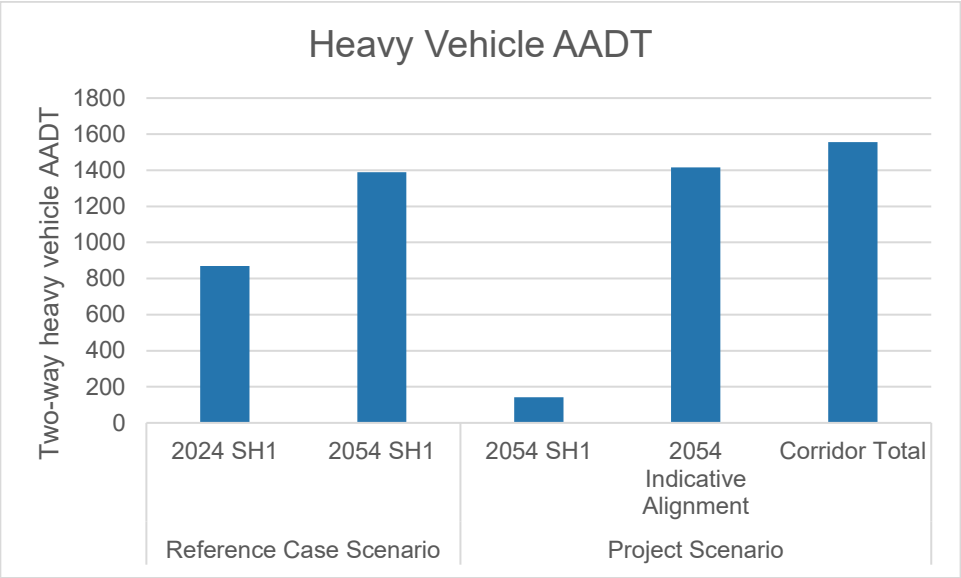


Figure 21: Heavy vehicle AADTs along SH1 and the Project Scenario

Our assessment indicates that the numbers of HCVs using the existing SH1 route in 2054 are predicted to be approximately 90% lower in the Project Scenario compared to the Reference Case Scenario.

The Project will improve freight performance in a number of ways:

- The Project will be constructed to high design standards, with grades and alignment more favourable to HCVs.
- Improved travel times for freight will improve opportunities for trade by effectively bringing freight destinations closer together.
- The indicative design has four lanes which will improve safety and travel times by eliminating the need for risky overtaking manoeuvres.
- Travel times and travel time reliability for HCVs will reduce in the same way as described for general traffic in Sections 5.3.2 and 5.3.4, as a result of the Project.
- Safety for HCVs will also improve as described for general traffic in Section 5.3.5.

Overall, we expect the Project to have a positive impact on the performance and safety of freight.

5.3.8. Public Transport Network Performance

The Project will have a minimal additional impact on the performance for existing or potential public transport vehicles. The same performance improvements forecast above for general traffic will be experienced by the regional bus services that run between Auckland and Whangārei as a result of the Project.

5.3.9. Pedestrian and Cycle Network Performance

Pedestrians and cyclists will generally be prohibited from using the mainline carriageway of the Project, consistent with its function as a high-speed motorway.

Connectivity for pedestrians and cyclists on local roads will be maintained where these roads interact with the Project. Grade-separation of impacted local roads will ensure that local community severance is avoided.

We expect the predicted reduction in general traffic and heavy vehicle movements on the existing SH1 under the Project Scenario, based on our modelling assessment, to offer a more suitable environment for recreational cycling, supporting active mode connectivity for the local community.

5.4. Sensitivity Testing

We carried out a sensitivity analysis to determine the performance of the interim interchanges at Baldrock Road and Waipū using forecast volumes in year 2054. The findings are summarised below.

- **Baldrock Road intersection** – we expect the interim roundabout layout to perform satisfactorily during the morning and evening peak period, achieving LOS A. However, during the holiday peak period, we projected the roundabout to slightly exceed capacity, operating at LOS E with queue lengths of up to 635 m on the SH1 new mainline approach and delays of up to 2 minutes on the south-east Baldrock Road approach.
- **Waipū Interim Tie-in** – the interim layout performs satisfactorily in the morning and evening peak periods, where we expect both roundabouts to operate at LOS A overall. However, the performance during the holiday peak period worsens, with the SH1/The Braigh roundabout falling to LOS D overall. Notably, the SH1 north approach has LOS E and a degree of saturation of 1.03, with queues of approximately 185 m but only about 60 seconds of delay. Additionally, The Braigh east approach operates at LOS F, experiencing delays of over 2 minutes but with a shorter queue of approximately 70 m.

5.5. Summary of Operational Traffic Assessment

Overall, our assessment of operational transport effects indicates that the Project will deliver significant positive benefits to the transport network:

- **Traffic Volumes:** The Project effectively separates through-traffic from local traffic, with the new alignment expected to carry approximately 19,500 vpd in 2054, significantly relieving the existing SH1.
- **Travel Times:** Journey times on the new alignment are forecast to be 3.8 to 5.6 minutes quicker (23%–30%) compared to the future do-minimum scenario, providing efficiency gains for the region.
- **Safety:** The adoption of a median-separated, four-lane alignment with grade-separated interchanges is expected to significantly reduce DSI crash risks (by up to 75% for key crash types) compared to the existing SH1.
- **Resilience:** The new route provides an alternative route to the existing Brynderwyn Hills section of SH1, ensuring more reliable access during extreme weather events.
- **Freight:** Freight operators will benefit from improved geometric standards, consistent travel times, and reduced interaction with local traffic.

Overall, the operational transport effects are positive, helping improve safety, resilience, and increasing capacity of the existing network.

6. Proposed Mitigation Measures for Addressing Potential Effects

6.1. Construction Transport Effects

Our assessment of construction transport effects has been undertaken on the basis that construction activities will be subject to standard traffic management, safety, and operational controls required by the relevant Road Controlling Authorities (RCA). These controls will be implemented through the contractor's construction planning and approval processes.

Construction transport effects will be managed through the preparation, approval, and implementation of a CTMP, supported by SSTMPs where construction activities interface with the live road network. The CTMP will set out the overarching framework for managing construction traffic and temporary traffic management for the Project as a whole, while SSTMPs will address location-specific interfaces, including tie-ins, realignments, and site access points.

The CTMP and SSTMPs will be prepared by the contractor and approved by the relevant Road Controlling Authority prior to the commencement of construction activities. These plans will be required to comply with the New Zealand Guide to Temporary Traffic Management (NZGTTM) and any applicable NZTA and local authority requirements in force at the time of construction.

On this basis, construction transport effects identified in our assessment are expected to be appropriately managed through standard industry practice and regulatory controls, without the need for Project-specific mitigation measures to be defined at this stage.

6.1.1. Haul Route Interfaces with State Highways

Where construction haul routes intersect the state highway network, there is potential for safety and operational effects associated with turning movements and interactions with through traffic. These interfaces will be managed through site-specific traffic management planning to ensure that haul route crossings do not adversely affect the safety or efficiency of the state highway network.

In developing SSTMPs for state highway crossings, consideration will be given to the location of the crossing relative to nearby intersections and queues, the need to maintain clear operating space on the state highway approaches, and the management of construction vehicle turning movements during periods of higher traffic demand. Construction haul route interfaces are expected to be appropriately managed through standard industry practice and regulatory controls, without the need for Project-specific mitigation measures to be defined at this stage.

6.2. Operational Transport Effects

Our assessment of operational transport effects indicates that the Project results in overall positive effects when compared with the Reference Case, including significant improvements to safety, resilience, and corridor performance.

We have identified no adverse operational transport effects that require specific mitigation measures.

We undertook sensitivity testing of the interim tie-ins at Baldrock Road and Waipū using 2054 forecast traffic volumes to understand performance if delivery of the adjacent corridor sections is delayed, and the interim arrangements are generally expected to operate satisfactorily.

Where the Project alters access to the local road network, safe access will be reinstated or alternative arrangements provided to maintain connectivity for landowners.

Overall, the Project will have significant positive transport effects. No mitigation measures are necessary for the operational stage of the Project.

7. Conclusion

This report has assessed the actual and potential transport effects associated with the construction and operation of the Project.

7.1. Construction Effects

The construction of the Project involves significant earthworks and material movements across four distinct zones. Our assessment indicates that:

- The proposed earthworks strategy minimises interaction with the local road network by prioritising offline haul routes and utilising grade-separated crossings where possible.
- Traffic modelling indicates the existing SH1 network retains sufficient residual capacity to accommodate the forecast construction workforce and material delivery traffic.
- Potential safety risks and capacity constraints at the SH1/SH12 intersection during evening peaks have been identified and can be effectively managed through appropriate mitigation measures.

With the implementation of a comprehensive CTMP and SSTMPs, in accordance with the Road Controlling Authorities requirements, construction traffic effects are assessed as minor.

7.2. Operational Effects

The operation of the Project serves as a key mitigation measure for the deficiencies identified in the existing network. Our assessment indicates that the Project is expected to deliver positive effects, including:

- A predicted reduction in DSI crash risk of up to 75% for key crash types through the provision of a median-separated, four-lane alignment.
- The creation of a resilient alternative route that improves the security of the connection between Auckland and Northland against disruptions.
- Forecast travel time savings of 23%–30% and improved journey reliability for freight and general traffic.
- A significant reduction in traffic volumes on the existing SH1, returning the existing SH1 to a more local function that better supports community access.

Overall, the operational transport effects are assessed as highly positive, contributing to significant improvements in safety, resilience, and the capacity of the existing network.

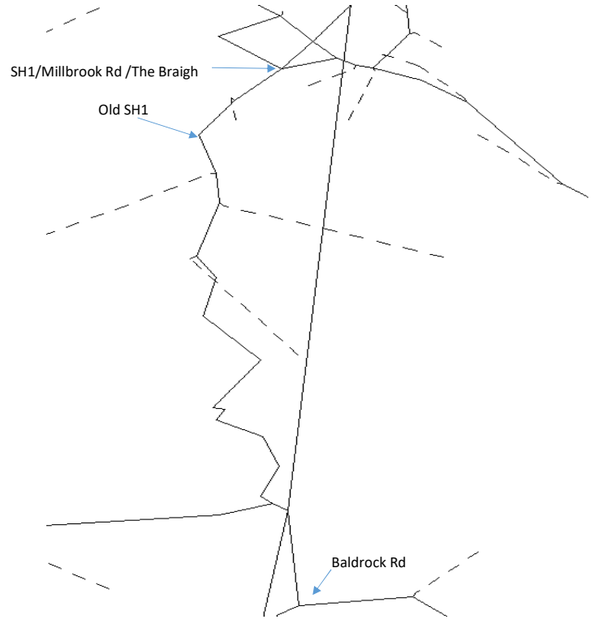
APPENDICES

Appendix 1
Traffic Survey Counts and Analysis

2024 Reference Scenario - Demand on Existing Network

All flows in vehicles

					Avg 1 Hr								Avg 1 Hr						
Intersection	Approach	MVMT	Start Time	End Time	Lights	Heavies	Total	Start Time	End Time	Lights	Heavies	Total	Start Time	End Time	Lights	Heavies	Total	AADT	%HV
SH1/Baldrock Rd	SH1 North	NB	7:00	8:00	257	36	293	9:00	16:00	351	38	389	16:00	18:00	337	21	358	5302	9%
SH1/Baldrock Rd	SH1 North	SB	7:00	8:00	285	22	307	9:00	16:00	341	37	378	16:00	18:00	388	21	409	5322	7%
SH1/SH12	SH12	EB	7:00	8:00	126	12	138	9:00	16:00	123	15	138	16:00	18:00	171	9	180	2052	8%
SH1/SH12	SH12	WB	7:00	8:00	142	15	157	9:00	16:00	140	19	159	16:00	18:00	152	10	162	2266	9%
SH1/SH12	SH1 North	NB	7:00	8:00	158	30	188	9:00	16:00	236	26	262	16:00	18:00	225	15	240	3546	10%
SH1/SH12	SH1 North	SB	7:00	8:00	202	18	220	9:00	16:00	243	29	272	16:00	18:00	257	16	273	3784	8%
SH1/Waipu Gorge Rd	Waipu Gorge Rd	EB	7:00	8:00	22	1	23	9:00	16:00	16	1	17	16:00	18:00	16	1	17	251	4%
SH1/Waipu Gorge Rd	Waipu Gorge Rd	WB	7:00	8:00	18	1	19	9:00	16:00	17	1	18	16:00	18:00	20	1	21	263	4%
SH1/Waipu Gorge Rd	SH1 North	NB	7:00	8:00	176	30	206	9:00	16:00	246	26	272	16:00	18:00	235	15	250	3703	10%
SH1/Waipu Gorge Rd	SH1 North	SB	7:00	8:00	217	19	236	9:00	16:00	254	29	283	16:00	18:00	270	17	287	3954	8%
SH1/Glenmohr Rd	SH1 North	NB	7:00	8:00	218	31	249	9:00	16:00	273	28	301	16:00	18:00	261	17	278	4137	9%
SH1/Glenmohr Rd	SH1 North	SB	7:00	8:00	242	20	262	9:00	16:00	282	31	313	16:00	18:00	303	18	321	4379	8%
SH1/Glenmohr Rd	Glenmohr rd	EB	7:00	8:00	34	2	36	9:00	16:00	34	2	36	16:00	18:00	39	1	40	516	4%
SH1/Glenmohr Rd	Glenmohr rd	WB	7:00	8:00	51	2	53	9:00	16:00	33	2	35	16:00	18:00	31	1	32	517	4%
SH1/Brooks Rd	Brooks Rd	EB	7:00	8:00	32	2	34	9:00	16:00	18	2	20	16:00	18:00	18	2	20	307	7%
SH1/Brooks Rd	Brooks Rd	WB	7:00	8:00	21	2	23	9:00	16:00	18	2	20	16:00	18:00	23	1	24	299	7%
SH1/Brooks Rd	SH1 North	NB	7:00	8:00	242	33	275	9:00	16:00	286	29	315	16:00	18:00	261	17	278	4331	9%
SH1/Brooks Rd	SH1 North	SB	7:00	8:00	255	22	277	9:00	16:00	296	33	329	16:00	18:00	303	18	321	4569	8%
SH1/Access	Access	EB	7:00	8:00	19	1	20	9:00	16:00	14	1	15	16:00	18:00	16	1	17	219	3%
SH1/Access	Access	WB	7:00	8:00	15	1	16	9:00	16:00	15	1	16	16:00	18:00	16	1	17	223	3%
SH1/Access	SH1 North	NB	7:00	8:00	254	34	288	9:00	16:00	294	30	324	16:00	18:00	280	18	298	4484	9%
SH1/Access	SH1 North	SB	7:00	8:00	263	23	286	9:00	16:00	304	33	337	16:00	18:00	328	19	347	4730	8%
SH1/Millbrook/The Braigh	Millbrook Rd	EB	7:00	8:00	0	0	0	9:00	16:00	0	0	0	16:00	18:00	0	0	0	0	0%
SH1/Millbrook/The Braigh	Millbrook Rd	WB	7:00	8:00	0	0	0	9:00	16:00	0	0	0	16:00	18:00	0	0	0	0	0%
SH1/Millbrook/The Braigh	SH1 North	NB	7:00	8:00	193	30	223	9:00	16:00	234	27	261	16:00	18:00	219	16	235	3586	10%
SH1/Millbrook/The Braigh	SH1 North	SB	7:00	8:00	202	20	222	9:00	16:00	245	31	276	16:00	18:00	266	17	283	3846	9%
SH1/Millbrook/The Braigh	The Braigh	EB	7:00	8:00	61	3	64	9:00	16:00	59	3	62	16:00	18:00	60	2	62	885	4%
SH1/Millbrook/The Braigh	The Braigh	WB	7:00	8:00	61	3	64	9:00	16:00	60	3	63	16:00	18:00	62	2	64	894	4%



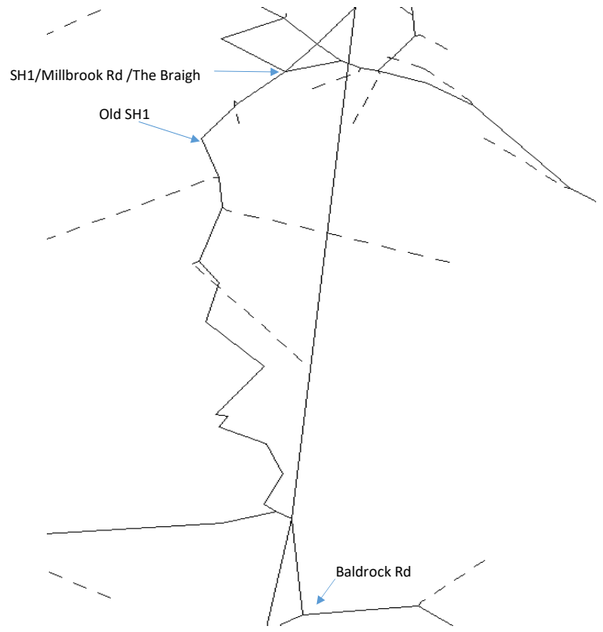
2024 Reference Scenario Travel Times

		AM		IP		PM	
Sections	Direction	Travel Time (sec)	Average Speed (Km/hr)	Travel Time (sec)	Average Speed (Km/hr)	Travel Time (sec)	Average Speed (Km/hr)
Baldrock Rd to SH1/SH12	NB	124	88.57	125	88.34	125	88.47
Baldrock Rd to SH1/SH12	SB	124	88.63	125	88.45	125	88.4
Millbrook Rd to Brynderwyn	NB	794	66.27	828	63.47	812	64.73
Millbrook Rd to Brynderwyn	SB	775	66.5	820	64.13	815	64.54

2044 Reference Scenario - Demand on Existing Network

All flows in vehicles

					Avg 1 Hr										Avg 1 Hr					
Intersection	Approach	MVMT	Start Time	End Time	Lights	Heavies	Total	Start Time	End Time	Lights	Heavies	Total	Start Time	End Time	Lights	Heavies	Total	AADT	%HV
SH1/Baldrock Rd	SH1 North	NB	7:00	8:00	430	30	460	9:00	16:00	464	65	529	16:00	18:00	581	31	612	7589	8%
SH1/Baldrock Rd	SH1 North	SB	7:00	8:00	403	41	444	9:00	16:00	534	66	600	16:00	18:00	662	26	688	8464	8%
SH1/SH12	SH12	EB	7:00	8:00	162	26	188	9:00	16:00	185	22	207	16:00	18:00	232	12	244	2994	9%
SH1/SH12	SH12	WB	7:00	8:00	183	16	199	9:00	16:00	199	36	235	16:00	18:00	206	16	222	3253	10%
SH1/SH12	SH1 North	NB	7:00	8:00	304	26	330	9:00	16:00	300	36	336	16:00	18:00	439	21	460	5047	7%
SH1/SH12	SH1 North	SB	7:00	8:00	299	27	326	9:00	16:00	385	51	436	16:00	18:00	494	21	515	6192	8%
SH1/Waipu Gorge Rd	Waipu Gorge Rd	EB	7:00	8:00	33	2	35	9:00	16:00	22	1	23	16:00	18:00	22	1	23	348	5%
SH1/Waipu Gorge Rd	Waipu Gorge Rd	WB	7:00	8:00	22	1	23	9:00	16:00	20	1	21	16:00	18:00	28	1	29	320	4%
SH1/Waipu Gorge Rd	SH1 North	NB	7:00	8:00	331	26	357	9:00	16:00	314	36	350	16:00	18:00	448	22	470	5259	7%
SH1/Waipu Gorge Rd	SH1 North	SB	7:00	8:00	316	27	343	9:00	16:00	397	51	448	16:00	18:00	510	21	531	6382	7%
SH1/Glenmohr Rd	SH1 North	NB	7:00	8:00	393	28	421	9:00	16:00	351	38	389	16:00	18:00	474	23	497	5831	7%
SH1/Glenmohr Rd	SH1 North	SB	7:00	8:00	342	29	371	9:00	16:00	430	53	483	16:00	18:00	556	23	579	6896	7%
SH1/Glenmohr Rd	Glenmohr rd	EB	7:00	8:00	41	3	44	9:00	16:00	42	2	44	16:00	18:00	61	2	63	668	5%
SH1/Glenmohr Rd	Glenmohr rd	WB	7:00	8:00	77	3	80	9:00	16:00	46	2	48	16:00	18:00	40	2	42	724	4%
SH1/Brooks Rd	Brooks Rd	EB	7:00	8:00	50	3	53	9:00	16:00	25	2	27	16:00	18:00	23	2	25	424	7%
SH1/Brooks Rd	Brooks Rd	WB	7:00	8:00	25	3	28	9:00	16:00	21	3	24	16:00	18:00	35	2	37	377	9%
SH1/Brooks Rd	SH1 North	NB	7:00	8:00	427	30	457	9:00	16:00	370	40	410	16:00	18:00	487	25	512	6141	7%
SH1/Brooks Rd	SH1 North	SB	7:00	8:00	351	31	382	9:00	16:00	445	55	500	16:00	18:00	581	24	605	7147	7%
SH1/Access	Access	EB	7:00	8:00	26	1	27	9:00	16:00	18	1	19	16:00	18:00	20	1	21	288	4%
SH1/Access	Access	WB	7:00	8:00	19	1	20	9:00	16:00	18	1	19	16:00	18:00	22	1	23	281	5%
SH1/Access	SH1 North	NB	7:00	8:00	444	31	475	9:00	16:00	380	41	421	16:00	18:00	496	25	521	6299	7%
SH1/Access	SH1 North	SB	7:00	8:00	360	32	392	9:00	16:00	454	56	510	16:00	18:00	591	24	615	7285	7%
SH1/Millbrook/The Braigh	Millbrook Rd	EB	7:00	8:00	0	0	0	9:00	16:00	0	0	0	16:00	18:00	0	0	0	0	0%
SH1/Millbrook/The Braigh	Millbrook Rd	WB	7:00	8:00	0	0	0	9:00	16:00	0	0	0	16:00	18:00	0	0	0	0	0%
SH1/Millbrook/The Braigh	SH1 North	NB	7:00	8:00	357	27	384	9:00	16:00	306	37	343	16:00	18:00	406	22	428	5140	7%
SH1/Millbrook/The Braigh	SH1 North	SB	7:00	8:00	276	29	305	9:00	16:00	379	53	432	16:00	18:00	502	22	524	6130	8%
SH1/Millbrook/The Braigh	The Braigh	EB	7:00	8:00	87	4	91	9:00	16:00	74	4	78	16:00	18:00	90	3	93	1165	4%
SH1/Millbrook/The Braigh	The Braigh	WB	7:00	8:00	84	3	87	9:00	16:00	75	3	78	16:00	18:00	90	3	93	1159	3%



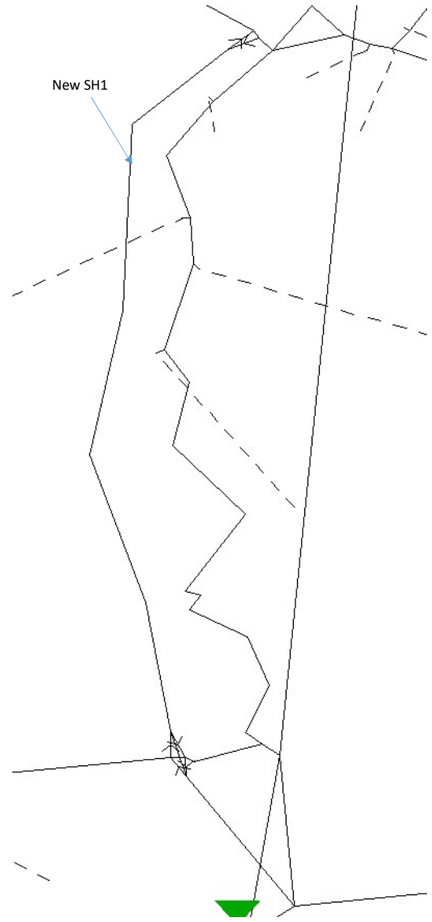
2044 Reference Scenario Travel Times

		AM		IP		PM	
Sections	Direction	Travel Time (sec)	Average Speed (Km/hr)	Travel Time (sec)	Average Speed (Km/hr)	Travel Time (sec)	Average Speed (Km/hr)
Baldrock Rd to SH1/SH12	NB	125	88.07	126	87.28	127	86.71
Baldrock Rd to SH1/SH12	SB	125	88.18	128	86.45	129	85.68
Millbrook Rd to Brynderwyn	NB	863	60.95	871	60.38	924	56.89
Millbrook Rd to Brynderwyn	SB	842	62.49	902	58.33	922	57.01

2044 Project Scenario - 2044 Demand on Existing Network + Alternative to Brynderwyn Hills

All flows in vehicles

			Avg 1 Hr					Avg 1 Hr										
Intersection	Approach	MVMT	Start Time	End Time	Lights	Heavies	Total	Start Time	End Time	Lights	Heavies	Total	Start Time	End Time	Lights	Heavies	Total	AADT	%HV
Old SH1/Baldrock Rd/New SH1	Old SH1 North	NB	7:00	8:00	2	1	3	9:00	16:00	4	1	5	16:00	18:00	14	0	14	88	9%
Old SH1/Baldrock Rd/New SH1	Old SH1 North	SB	7:00	8:00	21	0	21	9:00	16:00	9	0	9	16:00	18:00	15	0	15	162	0%
Old SH1/Baldrock Rd/New SH1	Baldrock Rd	EB	7:00	8:00	137	5	142	9:00	16:00	117	1	118	16:00	18:00	214	1	215	1936	1%
Old SH1/Baldrock Rd/New SH1	Baldrock Rd	WB	7:00	8:00	109	2	111	9:00	16:00	125	14	139	16:00	18:00	122	16	138	1923	8%
Old SH1/Baldrock Rd/New SH1	New SH1 North	NB	7:00	8:00	458	29	487	9:00	16:00	488	66	554	16:00	18:00	592	34	626	7928	8%
Old SH1/Baldrock Rd/New SH1	New SH1 North	SB	7:00	8:00	416	42	458	9:00	16:00	559	66	625	16:00	18:00	681	26	707	8792	7%
Old SH1/Baldrock Rd/New SH1	Roundabout		7:00	8:00	495	31	526	9:00	16:00	568	66	634	16:00	18:00	696	26	722	9034	7%
SH1/SH12	I/C Ramp		7:00	8:00	146	23	169	9:00	16:00	181	32	213	16:00	18:00	201	9	210	2943	11%
SH1/SH12	I/C Roundabout		7:00	8:00	187	32	219	9:00	16:00	203	36	239	16:00	18:00	242	12	254	3395	11%
SH1/SH12	SH12 W of I/C	EB	7:00	8:00	165	26	191	9:00	16:00	188	22	210	16:00	18:00	237	13	250	3043	9%
SH1/SH12	SH12 W of I/C	WB	7:00	8:00	186	16	202	9:00	16:00	202	36	238	16:00	18:00	209	16	225	3296	10%
SH1/SH12	SH12 at I/C	EB	7:00	8:00	146	23	169	9:00	16:00	169	19	188	16:00	18:00	202	9	211	2693	9%
SH1/SH12	SH12 at I/C	WB	7:00	8:00	44	9	53	9:00	16:00	21	4	25	16:00	18:00	36	3	39	435	14%
SH1/SH12	SH12 E of I/C	EB	7:00	8:00	0	0	0	9:00	16:00	1	0	1	16:00	18:00	1	0	1	13	0%
SH1/SH12	SH12 E of I/C	WB	7:00	8:00	3	0	3	9:00	16:00	1	0	1	16:00	18:00	0	0	0	15	0%
btw SH12 to Waipu I/C	New SH1 North	NB	7:00	8:00	336	25	361	9:00	16:00	327	39	366	16:00	18:00	453	25	478	5442	7%
btw SH12 to Waipu I/C	New SH1 North	SB	7:00	8:00	312	28	340	9:00	16:00	412	51	463	16:00	18:00	514	21	535	6538	7%
SH1/SH12	Old SH1 North	NB	7:00	8:00	2	1	3	9:00	16:00	5	1	6	16:00	18:00	15	0	15	100	8%
SH1/SH12	Old SH1 North	SB	7:00	8:00	24	0	24	9:00	16:00	9	0	9	16:00	18:00	15	1	16	169	2%
SH1/Waipu Gorge Rd	Waipu Gorge Rd	EB	7:00	8:00	33	2	35	9:00	16:00	22	1	23	16:00	18:00	22	1	23	348	5%
SH1/Waipu Gorge Rd	Waipu Gorge Rd	WB	7:00	8:00	22	1	23	9:00	16:00	10	1	11	16:00	18:00	28	1	29	217	5%
SH1/Waipu Gorge Rd	Old SH1 North	NB	7:00	8:00	30	2	32	9:00	16:00	19	1	20	16:00	18:00	25	1	26	318	5%
SH1/Waipu Gorge Rd	Old SH1 North	SB	7:00	8:00	41	1	42	9:00	16:00	22	1	23	16:00	18:00	32	1	33	382	3%
SH1/Glenmohr Rd	Old SH1 North	NB	7:00	8:00	92	4	96	9:00	16:00	56	3	59	16:00	18:00	50	2	52	887	4%
SH1/Glenmohr Rd	Old SH1 North	SB	7:00	8:00	67	3	70	9:00	16:00	54	3	57	16:00	18:00	77	2	79	882	4%
SH1/Glenmohr Rd	Glenmohr rd	EB	7:00	8:00	41	3	44	9:00	16:00	42	2	44	16:00	18:00	61	2	63	668	5%
SH1/Glenmohr Rd	Glenmohr rd	WB	7:00	8:00	77	3	80	9:00	16:00	46	2	48	16:00	18:00	40	2	42	724	4%
SH1/Brooks Rd	Brooks Rd	EB	7:00	8:00	50	3	53	9:00	16:00	25	2	27	16:00	18:00	23	2	25	424	7%
SH1/Brooks Rd	Brooks Rd	WB	7:00	8:00	25	3	28	9:00	16:00	21	3	24	16:00	18:00	35	2	37	377	9%
SH1/Brooks Rd	Old SH1 North	NB	7:00	8:00	126	6	132	9:00	16:00	75	5	80	16:00	18:00	63	4	67	1198	5%
SH1/Brooks Rd	Old SH1 North	SB	7:00	8:00	76	5	81	9:00	16:00	69	5	74	16:00	18:00	102	4	106	1136	5%
SH1/Access	Access	EB	7:00	8:00	26	1	27	9:00	16:00	18	1	19	16:00	18:00	20	1	21	288	4%
SH1/Access	Access	WB	7:00	8:00	19	1	20	9:00	16:00	18	1	19	16:00	18:00	22	1	23	281	5%
SH1/Access	Old SH1 North	NB	7:00	8:00	145	7	152	9:00	16:00	86	6	92	16:00	18:00	78	4	82	1384	5%
SH1/Access	Old SH1 North	SB	7:00	8:00	88	5	93	9:00	16:00	81	5	86	16:00	18:00	118	4	122	1316	5%
SH1/Millbrook/The Braigh	I/C Ramp		7:00	8:00	336	25	361	9:00	16:00	412	51	463	16:00	18:00	514	21	535	6575	7%
SH1/Millbrook/The Braigh	I/C Roundabout		7:00	8:00	417	28	445	9:00	16:00	458	55	513	16:00	18:00	565	25	590	7356	7%
SH1/Millbrook/The Braigh	Millbrook Rd W of I/C		7:00	8:00	82	3	85	9:00	16:00	54	3	57	16:00	18:00	51	2	53	850	4%
SH1/Millbrook/The Braigh	Millbrook Rd W of I/C		7:00	8:00	50	3	53	9:00	16:00	48	3	51	16:00	18:00	58	2	60	749	5%
SH1/Millbrook/The Braigh	Millbrook Rd at I/C		7:00	8:00	417	28	445	9:00	16:00	381	40	421	16:00	18:00	503	27	530	6273	7%
SH1/Millbrook/The Braigh	Millbrook Rd at I/C		7:00	8:00	50	3	53	9:00	16:00	47	3	50	16:00	18:00	56	2	58	734	5%
SH1/Millbrook/The Braigh	Millbrook Rd E of I/C		7:00	8:00	407	28	435	9:00	16:00	379	40	419	16:00	18:00	500	25	525	6225	7%
SH1/Millbrook/The Braigh	Millbrook Rd E of I/C		7:00	8:00	352	30	382	9:00	16:00	458	54	512	16:00	18:00	568	23	591	7240	7%
SH1/Millbrook/The Braigh	Old SH1 North	NB	7:00	8:00	404	28	432	9:00	16:00	337	40	377	16:00	18:00	437	24	461	5646	7%
SH1/Millbrook/The Braigh	Old SH1 North	SB	7:00	8:00	310	31	341	9:00	16:00	406	54	460	16:00	18:00	545	22	567	6576	8%
SH1/Millbrook/The Braigh	The Braigh	EB	7:00	8:00	130	5	135	9:00	16:00	111	5	116	16:00	18:00	122	4	126	1705	4%
SH1/Millbrook/The Braigh	The Braigh	WB	7:00	8:00	113	5	118	9:00	16:00	116	5	121	16:00	18:00	122	4	126	1728	4%



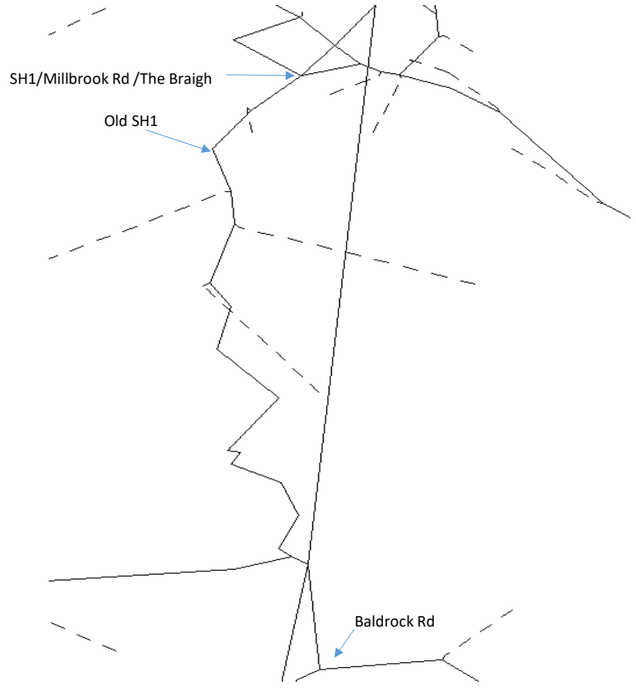
2044 Project Scenario - Travel Times

			AM		IP		PM		
	Sections	Direction	Travel Time (sec)	Average Speed (Km/hr)	Travel Time (sec)	Average Speed (Km/hr)	Travel Time (sec)	Average Speed (Km/hr)	
Old SH1	Baldrock Rd to SH1/SH12	NB	124	88.81	124	88.81	124	88.8	
Old SH1	Baldrock Rd to SH1/SH12	SB	119	92.73	119	92.74	119	92.73	
New SH1	Baldrock Rd to SH1/SH12	NB	228	68.71	229	68.34	230	68.16	
New SH1	Baldrock Rd to SH1/SH12	SB	212	69.65	215	68.82	216	68.54	
Old SH1	Millbrook Rd to Brynderwyn	NB	690	76.26	691	76.14	695	75.71	
Old SH1	Millbrook Rd to Brynderwyn	SB	701	75.01	695	75.68	698	75.39	
New SH1	Millbrook Rd to Brynderwyn	NB	717	80.19	717	80.21	720	79.88	
New SH1	Millbrook Rd to Brynderwyn	SB	673	83.62	676	83.21	677	83.09	
Old SH1	Baldrock to Millbrook Rd	NB	1634		1629		1636		
Old SH1	Baldrock to Millbrook Rd	SB	1830		1837		1843		
New SH1	Baldrock to Millbrook Rd	NB	758	84.47	759	84.36	762	83.97	
New SH1	Baldrock to Millbrook Rd	SB	753	84.18	759	83.53	761	83.32	

2054 Reference Scenario - Demand on Existing Network

All flows in vehicles

					Avg 1 Hr								Avg 1 Hr						
Intersection	Approach	MVMT	Start Time	End Time	Lights	Heavies	Total	Start Time	End Time	Lights	Heavies	Total	Start Time	End Time	Lights	Heavies	Total	AADT	%HV
SH1/Baldrock Rd	SH1 North	NB	7:00	8:00	480	33	513	9:00	16:00	534	69	603	16:00	18:00	688	40	728	8706	8%
SH1/Baldrock Rd	SH1 North	SB	7:00	8:00	458	45	503	9:00	16:00	636	72	708	16:00	18:00	783	30	813	9954	7%
SH1/SH12	SH12	EB	7:00	8:00	180	28	208	9:00	16:00	220	24	244	16:00	18:00	259	14	273	3468	9%
SH1/SH12	SH12	WB	7:00	8:00	202	17	219	9:00	16:00	237	38	275	16:00	18:00	232	17	249	3754	10%
SH1/SH12	SH1 North	NB	7:00	8:00	342	29	371	9:00	16:00	337	40	377	16:00	18:00	531	30	561	5760	8%
SH1/SH12	SH1 North	SB	7:00	8:00	342	30	372	9:00	16:00	457	56	513	16:00	18:00	598	24	622	7302	7%
SH1/Waipu Gorge Rd	Waipu Gorge Rd	EB	7:00	8:00	38	2	40	9:00	16:00	25	2	27	16:00	18:00	24	1	25	402	5%
SH1/Waipu Gorge Rd	Waipu Gorge Rd	WB	7:00	8:00	24	2	26	9:00	16:00	22	2	24	16:00	18:00	33	1	34	367	6%
SH1/Waipu Gorge Rd	SH1 North	NB	7:00	8:00	373	29	402	9:00	16:00	353	40	393	16:00	18:00	541	31	572	6001	7%
SH1/Waipu Gorge Rd	SH1 North	SB	7:00	8:00	360	30	390	9:00	16:00	470	56	526	16:00	18:00	617	25	642	7511	7%
SH1/Glenmohr Rd	SH1 North	NB	7:00	8:00	446	32	478	9:00	16:00	394	42	436	16:00	18:00	567	32	599	6633	7%
SH1/Glenmohr Rd	SH1 North	SB	7:00	8:00	387	33	420	9:00	16:00	505	59	564	16:00	18:00	670	52	722	8127	8%
SH1/Glenmohr Rd	Glenmohr rd	EB	7:00	8:00	45	3	48	9:00	16:00	46	3	49	16:00	18:00	72	2	74	751	5%
SH1/Glenmohr Rd	Glenmohr rd	WB	7:00	8:00	90	3	93	9:00	16:00	52	3	55	16:00	18:00	45	2	47	829	4%
SH1/Brooks Rd	Brooks Rd	EB	7:00	8:00	59	3	62	9:00	16:00	29	3	32	16:00	18:00	26	2	28	497	7%
SH1/Brooks Rd	Brooks Rd	WB	7:00	8:00	27	3	30	9:00	16:00	23	3	26	16:00	18:00	42	2	44	417	8%
SH1/Brooks Rd	SH1 North	NB	7:00	8:00	485	34	519	9:00	16:00	416	44	460	16:00	18:00	581	34	615	6985	7%
SH1/Brooks Rd	SH1 North	SB	7:00	8:00	394	35	429	9:00	16:00	520	61	581	16:00	18:00	699	27	726	8327	7%
SH1/Access	Access	EB	7:00	8:00	30	1	31	9:00	16:00	21	1	22	16:00	18:00	22	1	23	331	4%
SH1/Access	Access	WB	7:00	8:00	20	1	21	9:00	16:00	20	1	21	16:00	18:00	25	1	26	310	4%
SH1/Access	SH1 North	NB	7:00	8:00	504	35	539	9:00	16:00	427	45	472	16:00	18:00	590	34	624	7163	7%
SH1/Access	SH1 North	SB	7:00	8:00	404	35	439	9:00	16:00	531	61	592	16:00	18:00	711	28	739	8491	7%
SH1/Millbrook/The Braigh	Millbrook Rd	EB	7:00	8:00	0	0	0	9:00	16:00	0	0	0	16:00	18:00	0	0	0	0	0%
SH1/Millbrook/The Braigh	Millbrook Rd	WB	7:00	8:00	0	0	0	9:00	16:00	0	0	0	16:00	18:00	0	0	0	0	0%
SH1/Millbrook/The Braigh	SH1 North	NB	7:00	8:00	403	31	434	9:00	16:00	347	41	388	16:00	18:00	485	32	517	5880	8%
SH1/Millbrook/The Braigh	SH1 North	SB	7:00	8:00	308	32	340	9:00	16:00	445	58	503	16:00	18:00	607	25	632	7168	8%
SH1/Millbrook/The Braigh	The Braigh	EB	7:00	8:00	100	4	104	9:00	16:00	80	4	84	16:00	18:00	105	3	108	1283	4%
SH1/Millbrook/The Braigh	The Braigh	WB	7:00	8:00	96	3	99	9:00	16:00	86	4	90	16:00	18:00	105	3	108	1336	3%



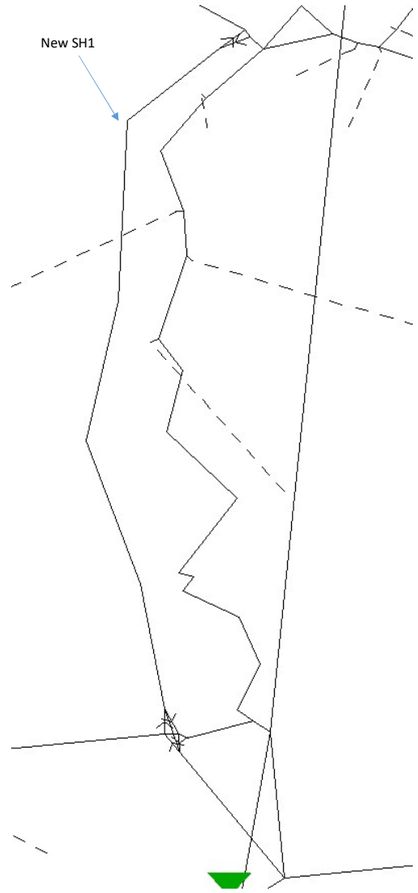
2054 Reference Scenario Travel Times

		AM		IP		PM	
Sections	Direction	Travel Time (sec)	Average Speed (Km/hr)	Travel Time (sec)	Average Speed (Km/hr)	Travel Time (sec)	Average Speed (Km/hr)
Baldrock Rd to SH1/SH12	NB	126	87.71	128	86.26	130	84.73
Baldrock Rd to SH1/SH12	SB	125	87.84	131	84.07	133	82.97
Millbrook Rd to Brynderwyn	NB	885	59.4	893	58.89	975	53.92
Millbrook Rd to Brynderwyn	SB	860	61.16	940	55.97	965	54.49

2054 Project Scenario - 2054 Demand on Existing Network + Alternative to Brynderwyn Hills

All flows in vehicles

			Avg 1 Hr					Avg 1 Hr					Avg 1 Hr						
Intersection	Approach	MVMT	Start Time	End Time	Lights	Heavies	Total	Start Time	End Time	Lights	Heavies	Total	Start Time	End Time	Lights	Heavies	Total	AADT	%HV
Old SH1/Baldrock Rd/New SH1	Old SH1 North	NB	7:00	8:00	3	1	4	9:00	16:00	5	1	6	16:00	18:00	18	0	18	109	7%
Old SH1/Baldrock Rd/New SH1	Old SH1 North	SB	7:00	8:00	27	0	27	9:00	16:00	11	0	11	16:00	18:00	18	0	18	199	0%
Old SH1/Baldrock Rd/New SH1	Baldrock Rd	EB	7:00	8:00	164	6	170	9:00	16:00	139	2	141	16:00	18:00	247	1	248	2293	2%
Old SH1/Baldrock Rd/New SH1	Baldrock Rd	WB	7:00	8:00	133	3	136	9:00	16:00	145	15	160	16:00	18:00	145	16	161	2238	7%
Old SH1/Baldrock Rd/New SH1	New SH1 North	NB	7:00	8:00	522	32	554	9:00	16:00	564	72	636	16:00	18:00	689	40	729	9118	8%
Old SH1/Baldrock Rd/New SH1	New SH1 North	SB	7:00	8:00	477	45	522	9:00	16:00	671	72	743	16:00	18:00	774	30	804	10328	7%
Old SH1/Baldrock Rd/New SH1	Roundabout		7:00	8:00	580	34	614	9:00	16:00	682	72	754	16:00	18:00	794	30	824	10642	6%
SH1/SH12	I/C Ramp		7:00	8:00	163	25	188	9:00	16:00	216	33	249	16:00	18:00	224	10	234	3405	10%
SH1/SH12	I/C Roundabout		7:00	8:00	205	17	222	9:00	16:00	240	38	278	16:00	18:00	268	14	282	3870	9%
SH1/SH12	SH12 W of I/C	EB	7:00	8:00	184	28	212	9:00	16:00	224	24	248	16:00	18:00	264	14	278	3528	9%
SH1/SH12	SH12 W of I/C	WB	7:00	8:00	205	17	222	9:00	16:00	240	38	278	16:00	18:00	235	17	252	3798	10%
SH1/SH12	SH12 at I/C	EB	7:00	8:00	163	25	188	9:00	16:00	201	20	221	16:00	18:00	225	10	235	3119	8%
SH1/SH12	SH12 at I/C	WB	7:00	8:00	49	10	59	9:00	16:00	24	5	29	16:00	18:00	43	4	47	504	14%
SH1/SH12	SH12 E of I/C	EB	7:00	8:00	0	0	0	9:00	16:00	1	0	1	16:00	18:00	1	0	1	13	0%
SH1/SH12	SH12 E of I/C	WB	7:00	8:00	3	0	3	9:00	16:00	1	0	1	16:00	18:00	0	0	0	15	0%
btw SH12 to Waipu I/C	New SH1 North	NB	7:00	8:00	387	28	415	9:00	16:00	370	41	411	16:00	18:00	536	30	566	6201	7%
btw SH12 to Waipu I/C	New SH1 North	SB	7:00	8:00	360	31	391	9:00	16:00	494	56	550	16:00	18:00	592	29	621	7715	7%
SH1/SH12	Old SH1 North	NB	7:00	8:00	3	1	4	9:00	16:00	6	1	7	16:00	18:00	19	0	19	121	7%
SH1/SH12	Old SH1 North	SB	7:00	8:00	30	0	30	9:00	16:00	11	0	11	16:00	18:00	18	1	19	207	2%
SH1/Waipu Gorge Rd	Waipu Gorge Rd	EB	7:00	8:00	38	2	40	9:00	16:00	25	2	27	16:00	18:00	24	1	25	402	5%
SH1/Waipu Gorge Rd	Waipu Gorge Rd	WB	7:00	8:00	24	2	26	9:00	16:00	22	2	24	16:00	18:00	33	1	34	367	6%
SH1/Waipu Gorge Rd	Old SH1 North	NB	7:00	8:00	34	2	36	9:00	16:00	21	1	22	16:00	18:00	29	1	30	355	5%
SH1/Waipu Gorge Rd	Old SH1 North	SB	7:00	8:00	48	1	49	9:00	16:00	24	1	25	16:00	18:00	37	1	38	426	3%
SH1/Glenmohr Rd	Old SH1 North	NB	7:00	8:00	107	4	111	9:00	16:00	62	4	66	16:00	18:00	55	2	57	996	4%
SH1/Glenmohr Rd	Old SH1 North	SB	7:00	8:00	75	3	78	9:00	16:00	59	3	62	16:00	18:00	90	3	93	979	4%
SH1/Glenmohr Rd	Glenmohr rd	EB	7:00	8:00	45	3	48	9:00	16:00	46	3	49	16:00	18:00	72	2	74	751	5%
SH1/Glenmohr Rd	Glenmohr rd	WB	7:00	8:00	90	3	93	9:00	16:00	52	3	55	16:00	18:00	45	2	47	829	4%
SH1/Brooks Rd	Brooks Rd	EB	7:00	8:00	59	3	62	9:00	16:00	29	3	32	16:00	18:00	26	2	28	497	7%
SH1/Brooks Rd	Brooks Rd	WB	7:00	8:00	27	3	30	9:00	16:00	23	3	26	16:00	18:00	42	2	44	417	8%
SH1/Brooks Rd	Old SH1 North	NB	7:00	8:00	145	6	151	9:00	16:00	84	6	90	16:00	18:00	69	4	73	1346	5%
SH1/Brooks Rd	Old SH1 North	SB	7:00	8:00	82	5	87	9:00	16:00	75	5	80	16:00	18:00	119	4	123	1246	5%
SH1/Access	Access	EB	7:00	8:00	30	1	31	9:00	16:00	21	1	22	16:00	18:00	22	1	23	331	4%
SH1/Access	Access	WB	7:00	8:00	20	1	21	9:00	16:00	20	2	22	16:00	18:00	25	1	26	320	6%
SH1/Access	Old SH1 North	NB	7:00	8:00	167	7	174	9:00	16:00	97	6	103	16:00	18:00	85	4	89	1555	5%
SH1/Access	Old SH1 North	SB	7:00	8:00	94	6	100	9:00	16:00	87	6	93	16:00	18:00	138	4	142	1445	5%
SH1/Millbrook/The Braigh	I/C Ramp		7:00	8:00	387	28	415	9:00	16:00	494	56	550	16:00	18:00	592	24	616	7743	7%
SH1/Millbrook/The Braigh	I/C Roundabout		7:00	8:00	468	37	505	9:00	16:00	545	61	606	16:00	18:00	654	27	681	8619	7%
SH1/Millbrook/The Braigh	Millbrook Rd W of I/C		7:00	8:00	92	4	96	9:00	16:00	61	3	64	16:00	18:00	58	3	61	958	5%
SH1/Millbrook/The Braigh	Millbrook Rd W of I/C		7:00	8:00	56	4	60	9:00	16:00	53	4	57	16:00	18:00	66	2	68	841	5%
SH1/Millbrook/The Braigh	Millbrook Rd at I/C		7:00	8:00	479	31	510	9:00	16:00	430	46	476	16:00	18:00	592	33	625	7164	7%
SH1/Millbrook/The Braigh	Millbrook Rd at I/C		7:00	8:00	56	4	60	9:00	16:00	52	4	56	16:00	18:00	63	2	65	824	6%
SH1/Millbrook/The Braigh	Millbrook Rd E of I/C		7:00	8:00	467	31	498	9:00	16:00	428	44	472	16:00	18:00	589	32	621	7093	7%
SH1/Millbrook/The Braigh	Millbrook Rd E of I/C		7:00	8:00	404	34	438	9:00	16:00	544	59	603	16:00	18:00	653	26	679	8469	7%
SH1/Millbrook/The Braigh	Old SH1 North	NB	7:00	8:00	465	32	497	9:00	16:00	382	44	426	16:00	18:00	517	32	549	6456	7%
SH1/Millbrook/The Braigh	Old SH1 North	SB	7:00	8:00	350	34	384	9:00	16:00	482	59	541	16:00	18:00	631	25	656	7688	7%
SH1/Millbrook/The Braigh	The Braigh	EB	7:00	8:00	150	6	156	9:00	16:00	124	6	130	16:00	18:00	137	4	141	1913	4%
SH1/Millbrook/The Braigh	The Braigh	WB	7:00	8:00	128	5	133	9:00	16:00	131	5	136	16:00	18:00	138	4	142	1944	3%



2054 Project Scenario - Travel Times

			AM		IP		PM		
	Sections	Direction	Travel Time (sec)	Average Speed (Km/hr)	Travel Time (sec)	Average Speed (Km/hr)	Travel Time (sec)	Average Speed (Km/hr)	
Old SH1	Baldrock Rd to SH1/SH12	NB	124	88.81	124	88.81	124	88.8	
Old SH1	Baldrock Rd to SH1/SH12	SB	119	92.73	119	92.73	119	92.73	
New SH1	Baldrock Rd to SH1/SH12	NB	229	68.5	231	67.76	233	67.23	
New SH1	Baldrock Rd to SH1/SH12	SB	213	69.48	219	67.61	219	67.56	
Old SH1	Millbrook Rd to Brynderwyn	NB	690	76.24	691	76.1	696	75.51	
Old SH1	Millbrook Rd to Brynderwyn	SB	704	74.75	696	75.59	699	75.27	
New SH1	Millbrook Rd to Brynderwyn	NB	719	79.96	719	80	724	79.5	
New SH1	Millbrook Rd to Brynderwyn	SB	674	83.49	679	82.92	679	82.88	
Old SH1	Baldrock to Millbrook Rd	NB	814		815		820		
Old SH1	Baldrock to Millbrook Rd	SB	823		815		818		
New SH1	Baldrock to Millbrook Rd	NB	761	84.17	762	83.97	769	83.28	
New SH1	Baldrock to Millbrook Rd	SB	755	84.01	766	82.84	766	82.84	

Appendix 2
NZTA CAS Data Outputs

Standard Advanced

NC Section 2B - Baldrock Rd to Shoemaker Rd

Saved sites

Section 2B - Baldrock Rd to Shoemaker Rd

Crash severity

Fatal Crash, Serious Crash, Minor Crash, Non-Injury Crash

Crash year

2020 — 2024

Site details report

Fatal crashes: 3 | **Injury crashes:** 48 | **Non-injury crashes:** 96 | **Total crashes:** 147

Overall crash statistics

Crash severity

Crash severity	Number	%	Social cost $(m)
Fatal	3	2.04	47.24
Serious	10	6.80	20.21
Minor-injury	38	25.85	11.78
Non-injury	96	65.31	4.51
TOTAL	147	100.00	83.74

Crash numbers

Year	Fatal	Serious	Minor	Non-injury
2020	1	5	10	20
2021	0	1	11	16
2022	1	2	11	19
2023	1	1	4	27
2024	0	1	2	14
TOTAL	3	10	38	96
Percent	2.04	6.80	25.85	65.31

Crash type and cause statistics

Overall casualty statistics

Injury severity

Injury severity	Number	% all casualties
Fatal	3	4.17
Serious Injured	14	19.44
Minor Injured	55	76.39
TOTAL	72	100.00

Casualty numbers

Year	Fatal	Serious Injured	Minor Injured
2020	1	7	17
2021	0	2	12
2022	1	2	15
2023	1	2	5
2024	0	1	6
TOTAL	3	14	55
Percent	4.17	19.44	76.39

Note: Last 5 years of crashes shown (unless query includes specific date range).

Crash type

Crash type	Crash numbers	% All crashes
Overtaking crashes	11	7.48
Straight road lost control/head on	28	19.05
Bend - lost control/Head on	72	48.98
Rear end/obstruction	24	16.33
Crossing/turning	10	6.80
Pedestrian crashes	0	0.00
Miscellaneous crashes	2	1.36
TOTAL	147	100.00

Casualty types

Casualty types	Fatalities	Serious injuries	Minor injuries
Cyclists	0	0	0
Drivers	2	6	32
Motorcycle pillions	0	0	0
Motorcycle riders	0	6	8
Other	0	0	0
Passengers	0	2	15
Pedestrians	1	0	0
Total	3	14	55

Note:Motorcycle stats include Mopeds.

Note:for Cyclist casualty numbers, query Road User Type - Cyclist, not Vehicle Type - Cycle

Driver and vehicle statistics

Drivers at fault or part fault in injury crashes - by age

Age	Male	Female	Unknown	Total	Percentage (%)
0-4	0	0	0	0	0.00
5-9	0	0	0	0	0.00
10-14	0	0	0	0	0.00
15-19	2	4	0	6	10.91
20-24	0	3	0	3	5.45
25-29	6	2	0	8	14.55
30-34	4	0	0	4	7.27
35-39	2	1	0	3	5.45
40-44	4	0	0	4	7.27
45-49	4	1	0	5	9.09
50-54	6	0	0	6	10.91
55-59	3	3	0	6	10.91
60-64	3	0	0	3	5.45
65-69	1	1	0	2	3.64
70-74	1	2	0	3	5.45
75-79	1	1	0	2	3.64
80-84	0	0	0	0	0.00
85-89	0	0	0	0	0.00
90-94	0	0	0	0	0.00
95-99	0	0	0	0	0.00
100+	0	0	0	0	0.00
	0	0	0	0	0.00
TOTAL	37	18	0	55	100.00
Percent	67.27	32.73	0.00	100.00	–

Note: Driver information is not calculated for non-injury crashes.

Crash factors

Crash factors	Crash numbers	% All crashes
#N/A	100	68.03
Alcohol	24	16.33
Disabled, old age or illness	1	0.68
Failed to give way or stop	10	6.80
Fatigue	20	13.61
Incorrect lanes or position	35	23.81
Miscellaneous factors	12	8.16
Overtaking	6	4.08
Pedestrian factors	0	0.00
Poor handling	32	21.77
Poor judgement	18	12.24
Poor observation	28	19.05
Position on Road	26	17.69
Road factors	33	22.45
Travel Speed	23	15.65
Unknown	0	0.00
Vehicle factors	5	3.40
Weather	9	6.12
TOTAL	382	259.86

Crashes with:

Factor groups	Crash numbers	% All crashes
All road user factors	117	79.59
Driver only factors	143	97.28
Pedestrian factors	0	0.00
Vehicle factors	5	3.40
Road factors	33	22.45
Environment factors	11	7.48
No identifiable factors	0	0.00
Retired codes - no future use	0	0.00
TOTAL	309	210.20

Note: Factors are counted once against a crash - i.e. two fatigued drivers count as one fatigue crash factor.

Note: Driver/vehicle factors are not available for non-injury crashes for Northland, Auckland, Waikato and Bay of Plenty before 2007. This will influence numbers and percentages.

Note: % represents the % of crashes in which the cause factor appears.

Drivers at fault or part fault in injury crashes - by licence

Licence	Male	Female	Unknown	Total	Percentage (%)
Full	24	10	0	34	61.82
Learner	5	2	0	7	12.73
Restricted	6	5	0	11	20.00
Overseas	1	0	0	1	1.82
Wrong class	1	0	0	1	1.82
Never Licensed	0	1	0	1	1.82
Unknown	0	0	0	0	0.00
Forbidden	0	0	0	0	0.00
TOTAL	37	18	0	55	100.00
Percent	67.27	32.73	0.00	100.00	–

Note: Driver information is not calculated for non-injury crashes.

Vehicles involved in injury crashes (vehicle count)

Vehicle type	No. of vehicles	% of vehicles in injury crashes
Car/Wagon	44	55.00
SUV	6	7.50
Van	2	2.50
Ute	8	10.00
Truck	5	6.25
Truck HPMV	0	0.00
Bus	0	0.00
Motorcycle	14	17.50
Moped	0	0.00
Train	0	0.00
Cycle	0	0.00
Other	1	1.25
Unknown	0	0.00
50 Max	0	0.00
Left scene	0	0.00
Uncoupled towed vehicle	0	0.00
TOTAL	80	100.00

Number of parties in crash

Party type	All crashes	% All crashes
Single party	88	59.86
Multiple party, including pedestrian	1	0.68
Multiple party, excluding pedestrian	58	39.46
TOTAL	147	100.00

Vulnerable road users

Crash types	Number	Percentage (%)
Cyclist crashes	0	0.00
Pedestrian crashes	1	0.68
Motorcycle crashes	16	10.88
All other crashes	130	88.44
TOTAL	147	100.00

Note: Some crashes involve more than one vulnerable road user type.

Note: Motorcycle stats include Mopeds.

Road environment statistics

Road type

Road type	State highway	Local road	Unknown	N/A	Total	Percentage (%)
Urban	3	1	0	0	4	2.72
Open	143	0	0	0	143	97.28
Unknown	0	0	0	0	0	0.00
TOTAL	146	1	0	0	147	100.00
Percent	99.32	0.68	0.00	0.00	100.00	–

Natural light conditions

Conditions	Injury	Non-injury	Total	%
Light/overcast	35	49	84	57.14
Dark/twilight	16	45	61	41.50
Unknown	0	2	2	1.36
TOTAL	51	96	147	100.00

Conditions

Conditions	Injury	Non-injury	Total	%
Dry	31	57	88	59.86
Ice or Snow	0	0	0	0.00
Wet	20	38	58	39.46
Null	0	1	1	0.68
TOTAL	51	96	147	100.00

Vehicles involved in injury crashes (crash count)

Vehicle type	Injury crashes	% of injury crashes
Car/Wagon	36	70.59
SUV	5	9.80
Van	2	3.92
Ute	8	15.69
Truck	5	9.80
Truck HPMV	0	0.00
Bus	0	0.00
Motorcycle	12	23.53
Moped	0	0.00
Train	0	0.00
Cycle	0	0.00
Other	1	1.96
Unknown	0	0.00
50 Max	0	0.00
Left scene	0	0.00
Uncoupled towed vehicle	0	0.00
TOTAL	69	135.29

Intersection/midblock

Intersection/mid-block	Total	%
Intersection	18	12.24
Midblock	129	87.76
TOTAL	147	100.00

Objects struck

Objects struck	Injury crashes	%	Non-injury crashes	%
Crashes w/obj struck	26	17.69	69	46.94

Object struck	Injury crashes	%	Non-injury crashes	%
Animals	0	0.00	3	2.04
Bridges/Tunnels	0	0.00	0	0.00
Cliffs	9	6.12	17	11.56
Debris	1	0.68	0	0.00
Embankments	1	0.68	2	1.36
Fences	1	0.68	12	8.16
Guide /Guard rails	10	6.80	28	19.05
Houses	0	0.00	0	0.00
Traffic Islands	0	0.00	0	0.00
Street Furniture	0	0.00	0	0.00
Kerbing	1	0.68	0	0.00
Landslips	0	0.00	1	0.68
Parked vehicle	1	0.68	1	0.68
Trains	0	0.00	0	0.00
Sight Rails	0	0.00	0	0.00
Poles	1	0.68	0	0.00
Stationary Vehicle	0	0.00	1	0.68
Roadwork	0	0.00	2	1.36
Traffic Sign	0	0.00	3	2.04
Trees	1	0.68	4	2.72
Drainage Structures	2	1.36	1	0.68
Ditches	3	2.04	6	4.08
Other	1	0.68	0	0.00
Thrown or dropped objects	0	0.00	0	0.00
Water	0	0.00	0	0.00
TOTAL	32	–	81	–

Note: % represents the % of crashes in which the object is struck.

Vehicle usage in injury crashes

Vehicle usage	Fatal Crash	Serious Crash	Minor Crash	Total	Percentage (%)
Private	6	14	45	65	81.25
Attenuator Truck	0	1	0	1	1.25
Agricultural	0	0	0	0	0.00
Ambulance	0	0	0	0	0.00
Campervan	0	0	0	0	0.00
Concrete mixer	0	0	0	0	0.00
Fire	0	0	0	0	0.00
Logging truck	0	0	0	0	0.00
Mobile crane	0	0	0	0	0.00
Police	0	0	0	0	0.00
Rental	0	1	0	1	1.25
Road Working	0	0	1	1	1.25
Scheduled service Bus	0	0	0	0	0.00
School bus	0	0	0	0	0.00
Tanker	0	0	0	0	0.00
Taxi	0	0	0	0	0.00
Tour Bus	0	0	0	0	0.00
Trade person	0	0	1	1	1.25
Work travel	0	0	5	5	6.25
Work vehicle	0	0	6	6	7.50
Other	0	0	0	0	0.00
Null	0	0	0	0	0.00
TOTAL	6	16	58	80	100.00
Percent	7.50	20.00	72.50	100.00	–

Time period statistics

Month by injury/ non-injury crashes

Month	Injury crashes	%	Non-injury crashes	%	Total	%
Jan	7	13.73	14	14.58	21	14.29
Feb	4	7.84	9	9.38	13	8.84
Mar	4	7.84	5	5.21	9	6.12
Apr	4	7.84	7	7.29	11	7.48
May	2	3.92	8	8.33	10	6.80
Jun	3	5.88	6	6.25	9	6.12
Jul	1	1.96	10	10.42	11	7.48
Aug	0	0.00	6	6.25	6	4.08
Sep	6	11.76	7	7.29	13	8.84
Oct	7	13.73	5	5.21	12	8.16
Nov	6	11.76	10	10.42	16	10.88
Dec	7	13.73	9	9.38	16	10.88
TOTAL	51	100.00	96	100.00	147	100.00

Day/period

Day/Period	All crashes	% All crashes
Weekday	78	53.06
Weekend	69	46.94
TOTAL	147	100.00

Day/period by hour

Day/Period	00:00 - 02:59	03:00 - 05:59	06:00 - 08:59	09:00 - 11:59	12:00 - 14:59	15:00 - 17:59	18:00 - 20:59	21:00 - 23:59	Total
Weekday	4	4	12	14	11	18	8	7	78
Weekend	5	8	12	6	7	10	12	9	69
TOTAL	9	12	24	20	18	28	20	16	147

Day/period by hour DOW

Day/Period	00:00 - 02:59	03:00 - 05:59	06:00 - 08:59	09:00 - 11:59	12:00 - 14:59	15:00 - 17:59	18:00 - 20:59	21:00 - 23:59	Total
Mon	1	4	3	4	1	7	2	2	24
Tue	1	1	3	1	1	1	3	3	14
Wed	1	0	3	5	3	4	2	0	18
Thu	1	2	1	0	3	3	1	2	13
Fri	1	1	2	4	3	3	3	5	22
Sat	3	2	7	2	4	7	8	0	33
Sun	1	2	5	4	3	3	1	4	23
TOTAL	9	12	24	20	18	28	20	16	147

Appendix 3
SIDRA Analysis Outputs

MOVEMENT SUMMARY

Site: 101 [2044 AM (Site Folder: 2B-SH1 - Baldrock Rd)]

Output produced by SIDRA INTERSECTION Version: 9.0.1.9664

Reprocess the Site in this Version to see the selected Movement Class results. All results may be affected by reprocessing compared with Version 9.0 results.

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Baldrock Rd															
21	L2	All MCs	18	0.0	18	0.0	0.105	4.6	LOS A	0.6	4.1	0.51	0.46	0.51	55.2
22	T1	All MCs	102	0.0	102	0.0	0.105	4.1	LOS A	0.6	4.1	0.51	0.46	0.51	57.3
23	R2	All MCs	4	0.0	4	0.0	0.105	11.2	LOS B	0.6	4.1	0.51	0.46	0.51	58.4
Approach			124	0.0	124	0.0	0.105	4.4	LOS A	0.6	4.1	0.51	0.46	0.51	57.0
NorthEast: Existing SH1															
24	L2	All MCs	13	0.0	13	0.0	0.021	5.1	LOS A	0.1	0.8	0.57	0.50	0.57	55.0
25	T1	All MCs	9	0.0	9	0.0	0.021	4.7	LOS A	0.1	0.8	0.57	0.50	0.57	57.2
26	R2	All MCs	1	0.0	1	0.0	0.021	11.8	LOS B	0.1	0.8	0.57	0.50	0.57	58.2
Approach			23	0.0	23	0.0	0.021	5.2	LOS A	0.1	0.8	0.57	0.50	0.57	56.0
NorthWest: SH1 (to/from Expressway)															
27	L2	All MCs	1	0.0	1	0.0	0.323	3.0	LOS A	2.2	15.3	0.19	0.55	0.19	53.2
28	T1	All MCs	112	0.0	112	0.0	0.323	2.6	LOS A	2.2	15.3	0.19	0.55	0.19	55.1
29	R2	All MCs	423	0.0	423	0.0	0.323	9.7	LOS A	2.2	15.3	0.19	0.55	0.19	56.1
Approach			536	0.0	536	0.0	0.323	8.2	LOS A	2.2	15.3	0.19	0.55	0.19	55.9
SouthWest: Existing SH1															
30	L2	All MCs	448	0.0	448	0.0	0.322	3.3	LOS A	2.3	15.9	0.33	0.43	0.33	56.0
31	T1	All MCs	1	0.0	1	0.0	0.322	2.9	LOS A	2.3	15.9	0.33	0.43	0.33	58.3
32	R2	All MCs	39	0.0	39	0.0	0.322	10.0	LOS A	2.3	15.9	0.33	0.43	0.33	59.4
Approach			488	0.0	488	0.0	0.322	3.8	LOS A	2.3	15.9	0.33	0.43	0.33	56.3

All Vehicles	1172	0.0	1172	0.0	0.323	5.9	LOS A	2.3	15.9	0.29	0.49	0.29	56.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [2044 PM (Site Folder: 2B-SH1 - Baldrock Rd)]

Output produced by SIDRA INTERSECTION Version: 9.0.1.9664

Reprocess the Site in this Version to see the selected Movement Class results. All results may be affected by reprocessing compared with Version 9.0 results.

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Baldrock Rd															
21	L2	All MCs	58	0.0	58	0.0	0.158	5.6	LOS A	1.0	6.9	0.65	0.58	0.65	54.7
22	T1	All MCs	104	0.0	104	0.0	0.158	5.2	LOS A	1.0	6.9	0.65	0.58	0.65	56.8
23	R2	All MCs	1	0.0	1	0.0	0.158	12.3	LOS B	1.0	6.9	0.65	0.58	0.65	57.9
Approach			163	0.0	163	0.0	0.158	5.4	LOS A	1.0	6.9	0.65	0.58	0.65	56.0
NorthEast: Existing SH1															
24	L2	All MCs	14	0.0	14	0.0	0.021	6.8	LOS A	0.1	0.9	0.72	0.59	0.72	54.1
25	T1	All MCs	3	0.0	3	0.0	0.021	6.3	LOS A	0.1	0.9	0.72	0.59	0.72	56.2
26	R2	All MCs	1	0.0	1	0.0	0.021	13.5	LOS B	0.1	0.9	0.72	0.59	0.72	57.3
Approach			18	0.0	18	0.0	0.021	7.1	LOS A	0.1	0.9	0.72	0.59	0.72	54.7
NorthWest: SH1 (to/from Expressway)															
27	L2	All MCs	1	0.0	1	0.0	0.471	3.1	LOS A	3.9	27.4	0.27	0.54	0.27	53.0
28	T1	All MCs	171	0.0	171	0.0	0.471	2.7	LOS A	3.9	27.4	0.27	0.54	0.27	54.9
29	R2	All MCs	601	0.0	601	0.0	0.471	9.8	LOS A	3.9	27.4	0.27	0.54	0.27	55.8
Approach			773	0.0	773	0.0	0.471	8.2	LOS A	3.9	27.4	0.27	0.54	0.27	55.6
SouthWest: Existing SH1															
30	L2	All MCs	588	0.0	588	0.0	0.424	3.4	LOS A	3.5	24.3	0.38	0.43	0.38	55.9
31	T1	All MCs	15	0.0	15	0.0	0.424	2.9	LOS A	3.5	24.3	0.38	0.43	0.38	58.2
32	R2	All MCs	43	0.0	43	0.0	0.424	10.0	LOS B	3.5	24.3	0.38	0.43	0.38	59.3
Approach			646	0.0	646	0.0	0.424	3.8	LOS A	3.5	24.3	0.38	0.43	0.38	56.2

All Vehicles	1600	0.0	1600	0.0	0.471	6.1	LOS A	3.9	27.4	0.36	0.50	0.36	55.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [2044 Holi pk (Site Folder: 2B-SH1 - Baldrock Rd)]

Output produced by SIDRA INTERSECTION Version: 9.0.1.9664

Reprocess the Site in this Version to see the selected Movement Class results. All results may be affected by reprocessing compared with Version 9.0 results.

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Baldrock Rd															
21	L2	All MCs	104	0.0	104	0.0	0.652	23.4	LOS C	7.8	54.8	1.00	1.17	1.44	44.1
22	T1	All MCs	187	0.0	187	0.0	0.652	22.9	LOS C	7.8	54.8	1.00	1.17	1.44	45.5
23	R2	All MCs	2	0.0	2	0.0	0.652	30.0	LOS C	7.8	54.8	1.00	1.17	1.44	46.2
Approach			294	0.0	294	0.0	0.652	23.1	LOS C	7.8	54.8	1.00	1.17	1.44	45.0
NorthEast: Existing SH1															
24	L2	All MCs	24	0.0	24	0.0	0.148	25.0	LOS C	1.3	8.9	1.00	0.90	1.00	42.8
25	T1	All MCs	5	0.0	5	0.0	0.148	24.6	LOS C	1.3	8.9	1.00	0.90	1.00	44.2
26	R2	All MCs	2	0.0	2	0.0	0.148	31.7	LOS C	1.3	8.9	1.00	0.90	1.00	44.8
Approach			32	0.0	32	0.0	0.148	25.4	LOS C	1.3	8.9	1.00	0.90	1.00	43.2
NorthWest: SH1 (to/from Expressway)															
27	L2	All MCs	2	0.0	2	0.0	0.898	4.5	LOS A	22.0	154.3	0.93	0.52	0.93	50.8
28	T1	All MCs	307	0.0	307	0.0	0.898	4.0	LOS A	22.0	154.3	0.93	0.52	0.93	52.5
29	R2	All MCs	1082	0.0	1082	0.0	0.898	11.2	LOS B	22.0	154.3	0.93	0.52	0.93	53.4
Approach			1392	0.0	1392	0.0	0.898	9.6	LOS A	22.0	154.3	0.93	0.52	0.93	53.2
SouthWest: Existing SH1															
30	L2	All MCs	1059	0.0	1059	0.0	0.836	6.0	LOS A	14.9	104.3	0.92	0.67	0.98	53.7
31	T1	All MCs	26	0.0	26	0.0	0.836	5.5	LOS A	14.9	104.3	0.92	0.67	0.98	55.8
32	R2	All MCs	78	0.0	78	0.0	0.836	12.6	LOS B	14.9	104.3	0.92	0.67	0.98	56.8
Approach			1163	0.0	1163	0.0	0.836	6.4	LOS A	14.9	104.3	0.92	0.67	0.98	54.0

All Vehicles	2880	0.0	2880	0.0	0.898	9.8	LOS A	22.0	154.3	0.93	0.65	1.00	52.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [2054 AM (Site Folder: 2B-SH1 - Baldrock Rd)]

Output produced by SIDRA INTERSECTION Version: 9.0.1.9664

Reprocess the Site in this Version to see the selected Movement Class results. All results may be affected by reprocessing compared with Version 9.0 results.

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Baldrock Rd															
21	L2	All MCs	20	0.0	20	0.0	0.129	4.9	LOS A	0.7	5.2	0.55	0.49	0.55	54.9
22	T1	All MCs	122	0.0	122	0.0	0.129	4.4	LOS A	0.7	5.2	0.55	0.49	0.55	57.1
23	R2	All MCs	5	0.0	5	0.0	0.129	11.5	LOS B	0.7	5.2	0.55	0.49	0.55	58.1
Approach			147	0.0	147	0.0	0.129	4.7	LOS A	0.7	5.2	0.55	0.49	0.55	56.8
NorthEast: Existing SH1															
24	L2	All MCs	16	0.0	16	0.0	0.028	5.5	LOS A	0.2	1.1	0.61	0.54	0.61	54.8
25	T1	All MCs	12	0.0	12	0.0	0.028	5.1	LOS A	0.2	1.1	0.61	0.54	0.61	57.0
26	R2	All MCs	1	0.0	1	0.0	0.028	12.2	LOS B	0.2	1.1	0.61	0.54	0.61	58.0
Approach			28	0.0	28	0.0	0.028	5.6	LOS A	0.2	1.1	0.61	0.54	0.61	55.8
NorthWest: SH1 (to/from Expressway)															
27	L2	All MCs	1	0.0	1	0.0	0.364	3.0	LOS A	2.6	18.3	0.21	0.55	0.21	53.2
28	T1	All MCs	132	0.0	132	0.0	0.364	2.6	LOS A	2.6	18.3	0.21	0.55	0.21	55.1
29	R2	All MCs	471	0.0	471	0.0	0.364	9.7	LOS A	2.6	18.3	0.21	0.55	0.21	56.1
Approach			603	0.0	603	0.0	0.364	8.1	LOS A	2.6	18.3	0.21	0.55	0.21	55.9
SouthWest: Existing SH1															
30	L2	All MCs	497	0.0	497	0.0	0.363	3.4	LOS A	2.7	18.8	0.38	0.44	0.38	55.8
31	T1	All MCs	1	0.0	1	0.0	0.363	3.0	LOS A	2.7	18.8	0.38	0.44	0.38	58.1
32	R2	All MCs	41	0.0	41	0.0	0.363	10.1	LOS B	2.7	18.8	0.38	0.44	0.38	59.2
Approach			539	0.0	539	0.0	0.363	3.9	LOS A	2.7	18.8	0.38	0.44	0.38	56.1

All Vehicles	1318	0.0	1318	0.0	0.364	6.0	LOS A	2.7	18.8	0.32	0.50	0.32	56.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [2054 PM (Site Folder: 2B-SH1 - Baldrock Rd)]

Output produced by SIDRA INTERSECTION Version: 9.0.1.9664

Reprocess the Site in this Version to see the selected Movement Class results. All results may be affected by reprocessing compared with Version 9.0 results.

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Baldrock Rd															
21	L2	All MCs	62	0.0	62	0.0	0.207	6.4	LOS A	1.4	9.6	0.72	0.65	0.72	54.3
22	T1	All MCs	135	0.0	135	0.0	0.207	5.9	LOS A	1.4	9.6	0.72	0.65	0.72	56.4
23	R2	All MCs	1	0.0	1	0.0	0.207	13.0	LOS B	1.4	9.6	0.72	0.65	0.72	57.4
Approach			198	0.0	198	0.0	0.207	6.1	LOS A	1.4	9.6	0.72	0.65	0.72	55.7
NorthEast: Existing SH1															
24	L2	All MCs	16	0.0	16	0.0	0.027	8.1	LOS A	0.2	1.3	0.79	0.64	0.79	53.3
25	T1	All MCs	4	0.0	4	0.0	0.027	7.6	LOS A	0.2	1.3	0.79	0.64	0.79	55.3
26	R2	All MCs	1	0.0	1	0.0	0.027	14.7	LOS B	0.2	1.3	0.79	0.64	0.79	56.3
Approach			21	0.0	21	0.0	0.027	8.3	LOS A	0.2	1.3	0.79	0.64	0.79	53.8
NorthWest: SH1 (to/from Expressway)															
27	L2	All MCs	1	0.0	1	0.0	0.545	3.2	LOS A	5.2	36.2	0.32	0.53	0.32	52.8
28	T1	All MCs	202	0.0	202	0.0	0.545	2.8	LOS A	5.2	36.2	0.32	0.53	0.32	54.7
29	R2	All MCs	686	0.0	686	0.0	0.545	9.9	LOS A	5.2	36.2	0.32	0.53	0.32	55.7
Approach			889	0.0	889	0.0	0.545	8.3	LOS A	5.2	36.2	0.32	0.53	0.32	55.5
SouthWest: Existing SH1															
30	L2	All MCs	681	0.0	681	0.0	0.504	3.6	LOS A	4.6	31.9	0.47	0.46	0.47	55.5
31	T1	All MCs	19	0.0	19	0.0	0.504	3.2	LOS A	4.6	31.9	0.47	0.46	0.47	57.8
32	R2	All MCs	44	0.0	44	0.0	0.504	10.3	LOS B	4.6	31.9	0.47	0.46	0.47	58.9
Approach			744	0.0	744	0.0	0.504	4.0	LOS A	4.6	31.9	0.47	0.46	0.47	55.8

All Vehicles	1853	0.0	1853	0.0	0.545	6.3	LOS A	5.2	36.2	0.43	0.52	0.43	55.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [2054 Holi pk (Site Folder: 2B-SH1 - Baldrock Rd)]

Output produced by SIDRA INTERSECTION Version: 9.0.1.9664

Reprocess the Site in this Version to see the selected Movement Class results. All results may be affected by reprocessing compared with Version 9.0 results.

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Baldrock Rd															
21	L2	All MCs	112	0.0	112	0.0	1.007	117.5	LOS F	28.8	201.9	1.00	2.00	3.58	21.0
22	T1	All MCs	242	0.0	242	0.0	1.007	117.1	LOS F	28.8	201.9	1.00	2.00	3.58	21.3
23	R2	All MCs	2	0.0	2	0.0	1.007	124.2	LOS F	28.8	201.9	1.00	2.00	3.58	21.5
Approach			356	0.0	356	0.0	1.007	117.3	LOS F	28.8	201.9	1.00	2.00	3.58	21.2
NorthEast: Existing SH1															
24	L2	All MCs	28	0.0	28	0.0	0.339	36.8	LOS D	1.9	13.0	0.97	1.01	1.08	37.8
25	T1	All MCs	7	0.0	7	0.0	0.339	36.3	LOS D	1.9	13.0	0.97	1.01	1.08	38.8
26	R2	All MCs	2	0.0	2	0.0	0.339	43.4	LOS D	1.9	13.0	0.97	1.01	1.08	39.3
Approach			38	0.0	38	0.0	0.339	37.1	LOS D	1.9	13.0	0.97	1.01	1.08	38.1
NorthWest: SH1 (to/from Expressway)															
27	L2	All MCs	2	0.0	2	0.0	1.043	46.6	LOS D	90.8	635.3	1.00	1.17	2.00	33.7
28	T1	All MCs	364	0.0	364	0.0	1.043	46.1	LOS D	90.8	635.3	1.00	1.17	2.00	34.4
29	R2	All MCs	1236	0.0	1236	0.0	1.043	53.2	LOS E	90.8	635.3	1.00	1.17	2.00	34.8
Approach			1602	0.0	1602	0.0	1.043	51.6	LOS E	90.8	635.3	1.00	1.17	2.00	34.7
SouthWest: Existing SH1															
30	L2	All MCs	1226	0.0	1226	0.0	1.015	37.7	LOS D	59.2	414.3	1.00	1.55	2.44	37.3
31	T1	All MCs	34	0.0	34	0.0	1.015	37.2	LOS D	59.2	414.3	1.00	1.55	2.44	38.3
32	R2	All MCs	80	0.0	80	0.0	1.015	44.4	LOS D	59.2	414.3	1.00	1.55	2.44	38.8
Approach			1340	0.0	1340	0.0	1.015	38.1	LOS D	59.2	414.3	1.00	1.55	2.44	37.4

All Vehicles	3336	0.0	3336	0.0	1.043	53.0	LOS E	90.8	635.3	1.00	1.41	2.34	33.4

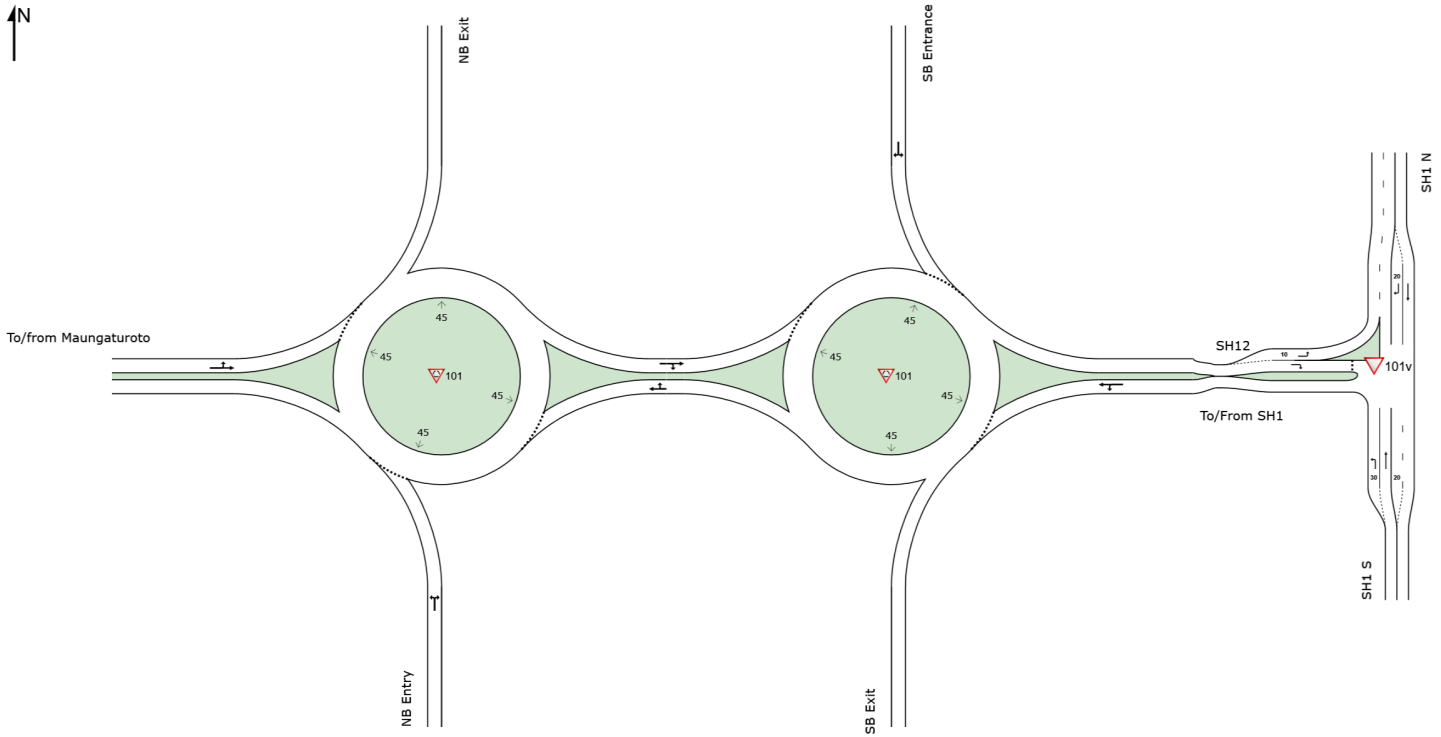
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

NETWORK LAYOUT

Network: N101 [SH1/SH12 2054 AM (Network Folder: General)]

New Network
Network Category: (None)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SITES IN NETWORK		
Site ID	**CCG ID**	**Site Name**
101	NA	2B. NB AM 2054
101	NA	2B. SB AM 2054
101v	NA	SH1/SH12 AM 2054 - Conversion

MOVEMENT SUMMARY

Site: 101 [2B. NB AM 2054 (Site Folder: 2B-SH12 - Single In)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [SH1/SH12 2054 AM (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: NB Entry															
1	L2	All MCs	179	11.0	179	11.0	0.124	3.2	LOS A	0.2	1.9	0.20	0.37	0.20	55.5
3	R2	All MCs	1	11.0	1	11.0	0.124	9.9	LOS A	0.2	1.9	0.20	0.37	0.20	53.4
Approach			180	11.0	180	11.0	0.124	3.3	LOS A	0.2	1.9	0.20	0.37	0.20	55.5
East: To/from SH1															
5	T1	All MCs	73	11.0	73	11.0	0.042	2.4	LOS A	0.0	0.0	0.00	0.26	0.00	56.1
6	R2	All MCs	1	11.0	1	11.0	0.042	9.6	LOS A	0.0	0.0	0.00	0.26	0.00	54.1
Approach			74	11.0	74	11.0	0.042	2.5	LOS A	0.0	0.0	0.00	0.26	0.00	56.1
West: To/from Maungaturoto															
10	L2	All MCs	28	11.0	28	11.0	0.146	2.9	LOS A	0.3	2.3	0.02	0.26	0.02	56.7
11	T1	All MCs	223	11.0	223	11.0	0.146	2.4	LOS A	0.3	2.3	0.02	0.26	0.02	55.7
Approach			252	11.0	252	11.0	0.146	2.5	LOS A	0.3	2.3	0.02	0.26	0.02	55.9
All Vehicles			505	11.0	505	11.0	0.146	2.8	LOS A	0.3	2.3	0.08	0.30	0.08	55.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [2B. SB AM 2054 (Site Folder: 2B-SH12 - Single In)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [SH1/SH12 2054 AM (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: To/From SH1															
4	L2	All MCs	1	11.0	1	11.0	0.004	4.0	LOS A	0.0	0.1	0.40	0.35	0.40	54.6
5	T1	All MCs	3	11.0	3	11.0	0.004	3.5	LOS A	0.0	0.1	0.40	0.35	0.40	51.9
Approach			4	11.0	4	11.0	0.004	3.7	LOS A	0.0	0.1	0.40	0.35	0.40	52.9
North: SB Entrance															
7	L2	All MCs	1	11.0	1	11.0	0.055	3.8	LOS A	0.1	0.8	0.35	0.60	0.35	45.7
9	R2	All MCs	68	11.0	68	11.0	0.055	10.5	LOS B	0.1	0.8	0.35	0.60	0.35	45.7
Approach			69	11.0	69	11.0	0.055	10.4	LOS B	0.1	0.8	0.35	0.60	0.35	45.7
West: To/from Maungaturoto															
11	T1	All MCs	1	11.0	1	11.0	0.128	2.4	LOS A	0.0	0.0	0.00	0.63	0.00	36.8
12	R2	All MCs	222	11.0	222	11.0	0.128	9.6	LOS A	0.0	0.0	0.00	0.63	0.00	47.7
Approach			223	11.0	223	11.0	0.128	9.6	LOS A	0.0	0.0	0.00	0.63	0.00	47.7
All Vehicles			297	11.0	297	11.0	0.128	9.7	LOS A	0.1	0.8	0.09	0.62	0.09	47.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101v [SH1/SH12 AM 2054 - Conversion (Site Folder: 2B-SH12 - Single In)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [SH1/SH12 2054 AM (Network Folder: General)]

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: SH1 S															
1	L2	All MCs	1	11.0	1	11.0	0.001	5.7	LOS A	0.0	0.0	0.00	0.57	0.00	50.9
2	T1	All MCs	5	11.0	5	11.0	0.003	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach			6	11.0	6	11.0	0.003	0.9	NA	0.0	0.0	0.00	0.10	0.00	59.0
North: SH1 N															
8	T1	All MCs	28	11.0	28	11.0	0.016	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
9	R2	All MCs	3	11.0	3	11.0	0.002	5.7	LOS A	0.0	0.0	0.04	0.55	0.04	50.6
Approach			32	11.0	32	11.0	0.016	0.6	NA	0.0	0.0	0.00	0.05	0.00	59.4
West: SH12															
10	L2	All MCs	1	11.0	1	11.0	0.001	5.7	LOS A	0.0	0.0	0.00	0.52	0.00	53.1
12	R2	All MCs	1	11.0	1	11.0	0.001	5.9	LOS A	0.0	0.0	0.13	0.53	0.13	52.0
Approach			2	11.0	2	11.0	0.001	5.8	LOS A	0.0	0.0	0.07	0.53	0.07	52.5
All Vehicles			40	11.0	40	11.0	0.016	0.9	NA	0.0	0.0	0.01	0.09	0.01	58.9

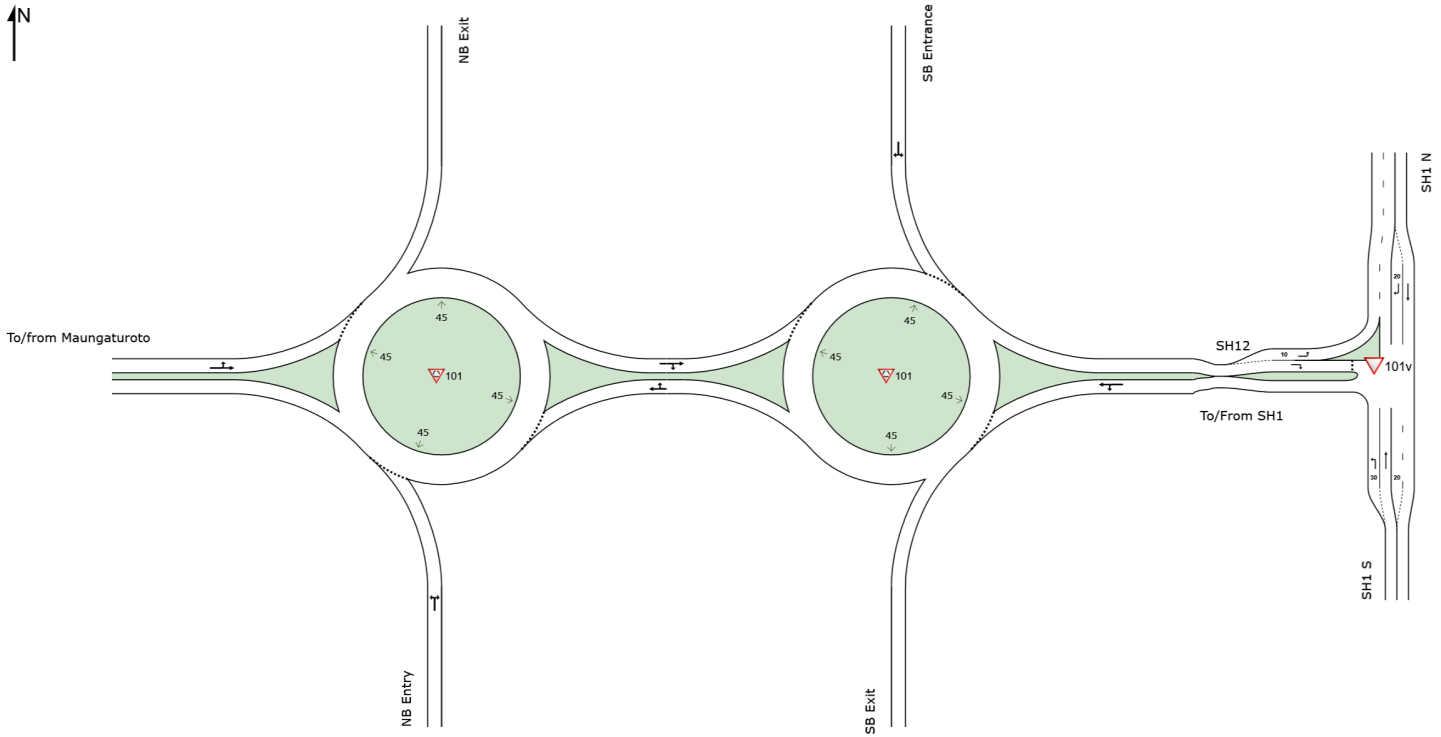
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

NETWORK LAYOUT

Network: N101 [SH1/SH12 2054 PM (Network Folder: General)]

New Network
Network Category: (None)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SITES IN NETWORK		
Site ID	**CCG ID**	**Site Name**
101	NA	2B. NB PM 2054
101	NA	2B. SB PM 2054
101v	NA	SH1/SH12 PM 2054 - Conversion

MOVEMENT SUMMARY

Site: 101 [2B. NB PM 2054 (Site Folder: 2B-SH12 - Single In)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [SH1/SH12 2054 PM (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: NB Entry															
1	L2	All MCs	229	11.0	229	11.0	0.153	3.1	LOS A	0.3	2.4	0.17	0.36	0.17	55.7
3	R2	All MCs	1	11.0	1	11.0	0.153	9.8	LOS A	0.3	2.4	0.17	0.36	0.17	53.7
Approach			231	11.0	231	11.0	0.153	3.2	LOS A	0.3	2.4	0.17	0.36	0.17	55.6
East: To/from SH1															
5	T1	All MCs	53	11.0	53	11.0	0.031	2.4	LOS A	0.0	0.0	0.00	0.26	0.00	56.0
6	R2	All MCs	1	11.0	1	11.0	0.031	9.6	LOS A	0.0	0.0	0.00	0.26	0.00	54.1
Approach			54	11.0	54	11.0	0.031	2.6	LOS A	0.0	0.0	0.00	0.26	0.00	56.0
West: To/from Maungaturoto															
10	L2	All MCs	48	11.0	48	11.0	0.177	2.9	LOS A	0.4	2.9	0.03	0.26	0.03	56.7
11	T1	All MCs	258	11.0	258	11.0	0.177	2.4	LOS A	0.4	2.9	0.03	0.26	0.03	55.6
Approach			306	11.0	306	11.0	0.177	2.5	LOS A	0.4	2.9	0.03	0.26	0.03	55.9
All Vehicles			591	11.0	591	11.0	0.177	2.8	LOS A	0.4	2.9	0.08	0.30	0.08	55.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [2B. SB PM 2054 (Site Folder: 2B-SH12 - Single In)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [SH1/SH12 2054 PM (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: To/From SH1															
4	L2	All MCs	1	11.0	1	11.0	0.002	4.1	LOS A	0.0	0.0	0.41	0.36	0.41	54.6
5	T1	All MCs	1	11.0	1	11.0	0.002	3.6	LOS A	0.0	0.0	0.41	0.36	0.41	51.9
Approach			2	11.0	2	11.0	0.002	3.8	LOS A	0.0	0.0	0.41	0.36	0.41	53.6
North: SB Entrance															
7	L2	All MCs	1	11.0	1	11.0	0.044	4.0	LOS A	0.1	0.6	0.38	0.60	0.38	45.6
9	R2	All MCs	53	11.0	53	11.0	0.044	10.7	LOS B	0.1	0.6	0.38	0.60	0.38	45.6
Approach			54	11.0	54	11.0	0.044	10.5	LOS B	0.1	0.6	0.38	0.60	0.38	45.6
West: To/from Maungaturoto															
11	T1	All MCs	1	11.0	1	11.0	0.149	2.4	LOS A	0.0	0.0	0.00	0.63	0.00	36.8
12	R2	All MCs	258	11.0	258	11.0	0.149	9.6	LOS A	0.0	0.0	0.00	0.63	0.00	47.7
Approach			259	11.0	259	11.0	0.149	9.6	LOS A	0.0	0.0	0.00	0.63	0.00	47.7
All Vehicles			315	11.0	315	11.0	0.149	9.7	LOS A	0.1	0.6	0.07	0.62	0.07	47.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101v [SH1/SH12 PM 2054 - Conversion (Site Folder: 2B-SH12 - Single In)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [SH1/SH12 2054 PM (Network Folder: General)]

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: SH1 S															
1	L2	All MCs	1	11.0	1	11.0	0.001	5.7	LOS A	0.0	0.0	0.00	0.57	0.00	50.9
2	T1	All MCs	19	11.0	19	11.0	0.010	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach			20	11.0	20	11.0	0.010	0.3	NA	0.0	0.0	0.00	0.03	0.00	59.7
North: SH1 N															
8	T1	All MCs	19	11.0	19	11.0	0.010	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
9	R2	All MCs	1	11.0	1	11.0	0.001	5.8	LOS A	0.0	0.0	0.08	0.53	0.08	50.4
Approach			20	11.0	20	11.0	0.010	0.3	NA	0.0	0.0	0.00	0.03	0.00	59.7
West: SH12															
10	L2	All MCs	1	11.0	1	11.0	0.001	5.7	LOS A	0.0	0.0	0.00	0.52	0.00	53.1
12	R2	All MCs	1	11.0	1	11.0	0.001	5.9	LOS A	0.0	0.0	0.14	0.53	0.14	52.0
Approach			2	11.0	2	11.0	0.001	5.8	LOS A	0.0	0.0	0.07	0.53	0.07	52.5
All Vehicles			42	11.0	42	11.0	0.010	0.6	NA	0.0	0.0	0.01	0.05	0.01	59.3

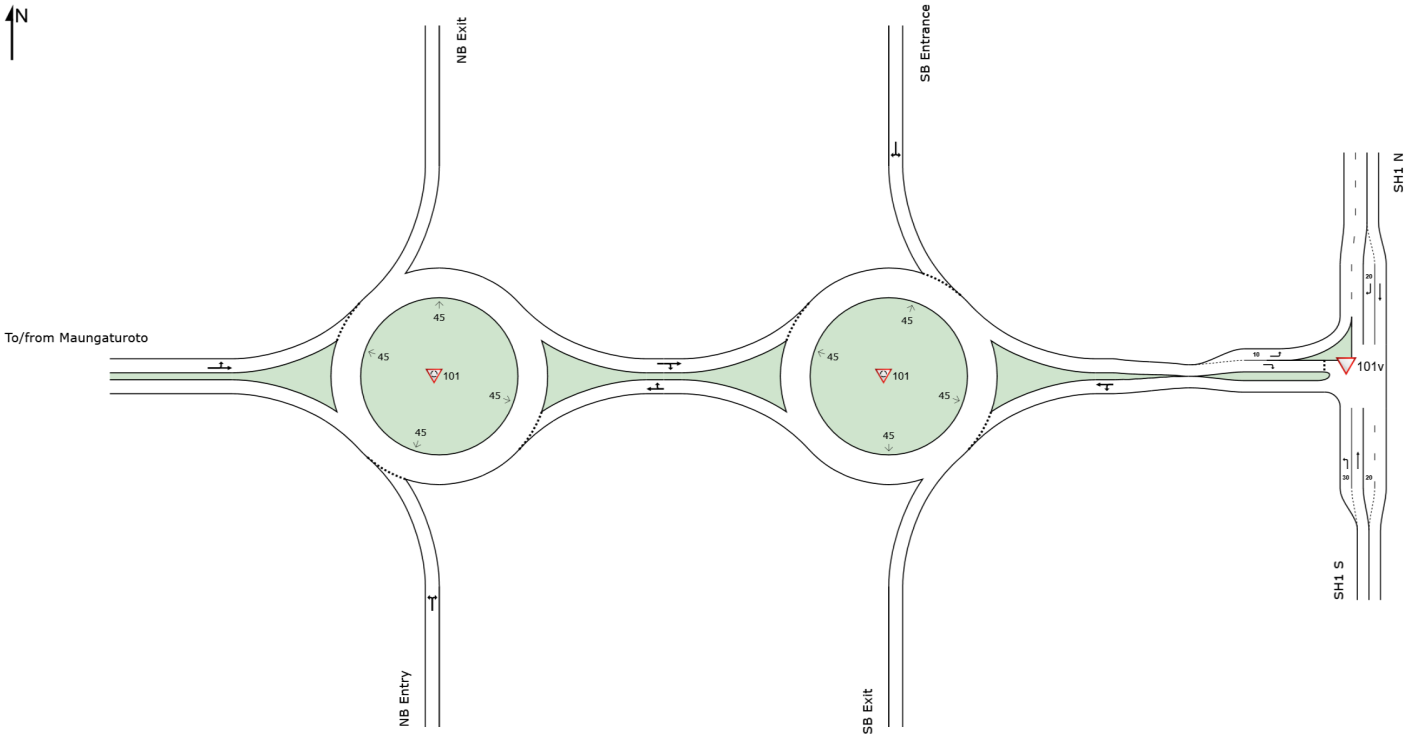
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

NETWORK LAYOUT

Network: N101 [SH1/SH12 2054 PM Holiday 1.8 rate (Network Folder: General)]

New Network
Network Category: (None)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SITES IN NETWORK		
Site ID	**CCG ID**	**Site Name**
101	NA	2B. NB PM 2054_Holiday 1.8 rate
101	NA	2B. SB PM 2054_Holiday 1.8 rate
101v	NA	SH1/SH12 PM 2054_Holiday 1.8 rate - Conversion

MOVEMENT SUMMARY

Site: 101 [2B. NB PM 2054_Holiday 1.8 rate (Site Folder: 2B-SH12 - Single In)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [SH1/SH12 2054 PM Holiday 1.8 rate (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: NB Entry															
1	L2	All MCs	413	11.0	413	11.0	0.286	3.4	LOS A	0.7	5.1	0.27	0.38	0.27	55.2
3	R2	All MCs	2	11.0	2	11.0	0.286	10.1	LOS B	0.7	5.1	0.27	0.38	0.27	52.9
Approach			415	11.0	415	11.0	0.286	3.4	LOS A	0.7	5.1	0.27	0.38	0.27	55.2
East: To/from SH1															
5	T1	All MCs	95	11.0	95	11.0	0.056	2.4	LOS A	0.0	0.0	0.00	0.26	0.00	56.0
6	R2	All MCs	2	11.0	2	11.0	0.056	9.6	LOS A	0.0	0.0	0.00	0.26	0.00	54.1
Approach			97	11.0	97	11.0	0.056	2.6	LOS A	0.0	0.0	0.00	0.26	0.00	56.0
West: To/from Maungaturoto															
10	L2	All MCs	87	11.0	87	11.0	0.320	2.9	LOS A	0.8	6.3	0.05	0.26	0.05	56.6
11	T1	All MCs	464	11.0	464	11.0	0.320	2.4	LOS A	0.8	6.3	0.05	0.26	0.05	55.4
Approach			552	11.0	552	11.0	0.320	2.5	LOS A	0.8	6.3	0.05	0.26	0.05	55.7
All Vehicles			1063	11.0	1063	11.0	0.320	2.9	LOS A	0.8	6.3	0.13	0.31	0.13	55.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [2B. SB PM 2054_Holiday 1.8 rate (Site Folder: 2B-SH12 - Single In)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [SH1/SH12 2054 PM Holiday 1.8 rate (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: To/From SH1															
4	L2	All MCs	2	11.0	2	11.0	0.004	5.4	LOS A	0.0	0.1	0.56	0.44	0.56	53.9
5	T1	All MCs	2	11.0	2	11.0	0.004	4.9	LOS A	0.0	0.1	0.56	0.44	0.56	50.6
Approach			4	11.0	4	11.0	0.004	5.2	LOS A	0.0	0.1	0.56	0.44	0.56	52.7
North: SB Entrance															
7	L2	All MCs	2	11.0	2	11.0	0.090	5.1	LOS A	0.2	1.4	0.53	0.66	0.53	44.9
9	R2	All MCs	95	11.0	95	11.0	0.090	11.8	LOS B	0.2	1.4	0.53	0.66	0.53	44.9
Approach			97	11.0	97	11.0	0.090	11.7	LOS B	0.2	1.4	0.53	0.66	0.53	44.9
West: To/from Maungaturoto															
11	T1	All MCs	2	11.0	2	11.0	0.268	2.4	LOS A	0.0	0.0	0.00	0.63	0.00	36.8
12	R2	All MCs	464	11.0	464	11.0	0.268	9.6	LOS A	0.0	0.0	0.00	0.63	0.00	47.7
Approach			466	11.0	466	11.0	0.268	9.6	LOS A	0.0	0.0	0.00	0.63	0.00	47.7
All Vehicles			567	11.0	567	11.0	0.268	9.9	LOS A	0.2	1.4	0.09	0.63	0.09	47.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101v [SH1/SH12 PM 2054_Holiday 1.8 rate - Conversion (Site Folder: 2B-SH12 - Single In)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [SH1/SH12 2054 PM Holiday 1.8 rate (Network Folder: General)]

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: SH1 S															
1	L2	All MCs	2	11.0	2	11.0	0.001	5.7	LOS A	0.0	0.0	0.00	0.57	0.00	50.9
2	T1	All MCs	34	11.0	34	11.0	0.019	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach			36	11.0	36	11.0	0.019	0.3	NA	0.0	0.0	0.00	0.03	0.00	59.7
North: SH1 N															
8	T1	All MCs	34	11.0	34	11.0	0.019	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
9	R2	All MCs	2	11.0	2	11.0	0.002	5.8	LOS A	0.0	0.0	0.11	0.53	0.11	50.2
Approach			36	11.0	36	11.0	0.019	0.3	NA	0.0	0.0	0.01	0.03	0.01	59.6
West: SH12															
10	L2	All MCs	2	11.0	2	11.0	0.001	5.7	LOS A	0.0	0.0	0.00	0.52	0.00	53.1
12	R2	All MCs	2	11.0	2	11.0	0.002	6.2	LOS A	0.0	0.0	0.19	0.53	0.19	51.8
Approach			4	11.0	4	11.0	0.002	5.9	LOS A	0.0	0.0	0.10	0.52	0.10	52.5
All Vehicles			76	11.0	76	11.0	0.019	0.7	NA	0.0	0.0	0.01	0.06	0.01	59.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (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).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [2C. NB 2044 AM (Site Folder: 2B/C-Waipu interim interchange (2B))]

Output produced by SIDRA INTERSECTION Version: 9.0.1.9664

Reprocess the Network in this Version to see the selected Movement Class results. All results may be affected by reprocessing compared with Version 9.0 results.

Network: N101 [2B Waipu interim int - 2044 AM (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Mainline Expressway															
1	L2	All MCs	1	0.0	1	0.0	0.272	3.1	LOS A	0.6	4.9	0.20	0.58	0.20	52.1
3	R2	All MCs	414	10.0	414	10.0	0.272	9.8	LOS A	0.6	4.9	0.20	0.58	0.20	46.4
Approach			415	10.0	415	10.0	0.272	9.8	LOS A	0.6	4.9	0.20	0.58	0.20	46.4
East: To/from SH1															
4	L2	All MCs	383	0.0	383	0.0	0.251	2.9	LOS A	0.7	4.8	0.08	0.34	0.08	56.1
5	T1	All MCs	59	0.0	59	0.0	0.251	2.3	LOS A	0.7	4.8	0.08	0.34	0.08	59.8
Approach			442	0.0	442	0.0	0.251	2.8	LOS A	0.7	4.8	0.08	0.34	0.08	56.6
West: To/from Millbrook Rd															
11	T1	All MCs	93	0.0	93	0.0	0.089	4.0	LOS A	0.2	1.4	0.51	0.47	0.51	50.4
12	R2	All MCs	11	0.0	11	0.0	0.089	11.2	LOS B	0.2	1.4	0.51	0.47	0.51	58.0
Approach			103	0.0	103	0.0	0.089	4.8	LOS A	0.2	1.4	0.51	0.47	0.51	51.6
All Vehicles			960	4.3	960	4.3	0.272	6.0	LOS A	0.7	4.9	0.18	0.46	0.18	51.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [2C. Waipu Int/Existing SH1 2044 AM (Site Folder: 2B/C-Waipu interim interchange (2B))]

Output produced by SIDRA INTERSECTION Version: 9.0.1.9664

Reprocess the Network in this Version to see the selected Movement Class results. All results may be affected by reprocessing compared with Version 9.0 results.

Network: N101 [2B Waipu interim int - 2044 AM (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: SH1 South															
1	L2	All MCs	11	0.0	11	0.0	0.145	6.7	LOS A	0.3	2.4	0.54	0.67	0.54	55.4
2	T1	All MCs	71	0.0	71	0.0	0.145	6.8	LOS A	0.3	2.4	0.54	0.67	0.54	65.8
3	R2	All MCs	85	0.0	85	0.0	0.145	14.4	LOS B	0.3	2.4	0.54	0.67	0.54	66.0
Approach			166	0.0	166	0.0	0.145	10.7	LOS B	0.3	2.4	0.54	0.67	0.54	65.5
East: The Braigh															
4	L2	All MCs	49	0.0	49	0.0	0.111	4.5	LOS A	0.3	1.8	0.52	0.47	0.52	55.4
5	T1	All MCs	79	0.0	79	0.0	0.111	3.9	LOS A	0.3	1.8	0.52	0.47	0.52	51.0
6	R2	All MCs	1	0.0	1	0.0	0.111	11.1	LOS B	0.3	1.8	0.52	0.47	0.52	58.6
Approach			129	0.0	129	0.0	0.111	4.2	LOS A	0.3	1.8	0.52	0.47	0.52	53.3
North: SH1 North															
7	L2	All MCs	1	0.0	1	0.0	0.280	5.6	LOS A	0.7	4.9	0.37	0.64	0.37	61.7
8	T1	All MCs	44	0.0	44	0.0	0.280	5.6	LOS A	0.7	4.9	0.37	0.64	0.37	63.9
9	R2	All MCs	354	0.0	354	0.0	0.280	13.2	LOS B	0.7	4.9	0.37	0.64	0.37	53.2
Approach			399	0.0	399	0.0	0.280	12.4	LOS B	0.7	4.9	0.37	0.64	0.37	55.0
West: To/From interchange															
10	L2	All MCs	420	0.0	420	0.0	0.348	3.6	LOS A	1.0	7.0	0.41	0.44	0.41	53.8
11	T1	All MCs	66	0.0	66	0.0	0.348	3.0	LOS A	1.0	7.0	0.41	0.44	0.41	57.2
12	R2	All MCs	9	0.0	9	0.0	0.348	10.2	LOS B	1.0	7.0	0.41	0.44	0.41	58.9
Approach			496	0.0	496	0.0	0.348	3.6	LOS A	1.0	7.0	0.41	0.44	0.41	54.3

All Vehicles	1191	0.0	1191	0.0	0.348	7.6	LOS A	1.0	7.0	0.43	0.54	0.43	56.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [2C. NB 2044 PM (Site Folder: 2B/C-Waipu interim interchange (2B))]

Output produced by SIDRA INTERSECTION Version: 9.0.1.9664

Reprocess the Network in this Version to see the selected Movement Class results. All results may be affected by reprocessing compared with Version 9.0 results.

Network: N101 [2B Waipu interim int - 2044 PM (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Mainline Expressway															
1	L2	All MCs	2	0.0	2	0.0	0.346	3.1	LOS A	0.9	6.6	0.22	0.58	0.22	52.0
3	R2	All MCs	527	10.0	527	10.0	0.346	9.9	LOS A	0.9	6.6	0.22	0.58	0.22	46.3
Approach			529	10.0	529	10.0	0.346	9.9	LOS A	0.9	6.6	0.22	0.58	0.22	46.3
East: To/from SH1															
4	L2	All MCs	587	0.0	587	0.0	0.356	2.8	LOS A	1.1	8.0	0.04	0.34	0.04	56.4
5	T1	All MCs	63	0.0	63	0.0	0.356	2.3	LOS A	1.1	8.0	0.04	0.34	0.04	60.2
Approach			651	0.0	651	0.0	0.356	2.8	LOS A	1.1	8.0	0.04	0.34	0.04	56.8
West: To/from Millbrook Rd															
11	T1	All MCs	59	0.0	59	0.0	0.057	4.6	LOS A	0.1	0.9	0.58	0.50	0.58	50.3
12	R2	All MCs	2	0.0	2	0.0	0.057	11.8	LOS B	0.1	0.9	0.58	0.50	0.58	57.9
Approach			61	0.0	61	0.0	0.057	4.8	LOS A	0.1	0.9	0.58	0.50	0.58	50.7
All Vehicles			1241	4.2	1241	4.2	0.356	5.9	LOS A	1.1	8.0	0.14	0.45	0.14	51.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [2C. Waipu Int/Existing SH1 2044 PM (Site Folder: 2B/C-Waipu interim interchange (2B))]

Output produced by SIDRA INTERSECTION Version: 9.0.1.9664

Reprocess the Network in this Version to see the selected Movement Class results. All results may be affected by reprocessing compared with Version 9.0 results.

Network: N101 [2B Waipu interim int - 2044 PM (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: SH1 South															
1	L2	All MCs	11	0.0	11	0.0	0.093	7.8	LOS A	0.2	1.6	0.66	0.70	0.66	54.0
2	T1	All MCs	33	0.0	33	0.0	0.093	7.8	LOS A	0.2	1.6	0.66	0.70	0.66	64.8
3	R2	All MCs	47	0.0	47	0.0	0.093	15.4	LOS B	0.2	1.6	0.66	0.70	0.66	65.0
Approach			91	0.0	91	0.0	0.093	11.8	LOS B	0.2	1.6	0.66	0.70	0.66	64.0
East: The Braigh															
4	L2	All MCs	59	0.0	59	0.0	0.142	5.8	LOS A	0.4	2.5	0.68	0.60	0.68	54.6
5	T1	All MCs	78	0.0	78	0.0	0.142	5.3	LOS A	0.4	2.5	0.68	0.60	0.68	49.8
6	R2	All MCs	1	0.0	1	0.0	0.142	12.5	LOS B	0.4	2.5	0.68	0.60	0.68	57.7
Approach			138	0.0	138	0.0	0.142	5.6	LOS A	0.4	2.5	0.68	0.60	0.68	52.6
North: SH1 North															
7	L2	All MCs	1	0.0	1	0.0	0.426	5.6	LOS A	1.2	8.6	0.40	0.64	0.40	61.4
8	T1	All MCs	63	0.0	63	0.0	0.426	5.7	LOS A	1.2	8.6	0.40	0.64	0.40	63.7
9	R2	All MCs	561	0.0	561	0.0	0.426	13.3	LOS B	1.2	8.6	0.40	0.64	0.40	52.9
Approach			625	0.0	625	0.0	0.426	12.5	LOS B	1.2	8.6	0.40	0.64	0.40	54.5
West: To/From interchange															
10	L2	All MCs	484	0.0	484	0.0	0.375	3.2	LOS A	1.2	8.3	0.31	0.38	0.31	54.4
11	T1	All MCs	89	0.0	89	0.0	0.375	2.7	LOS A	1.2	8.3	0.31	0.38	0.31	57.9
12	R2	All MCs	11	0.0	11	0.0	0.375	9.9	LOS A	1.2	8.3	0.31	0.38	0.31	59.6
Approach			584	0.0	584	0.0	0.375	3.3	LOS A	1.2	8.3	0.31	0.38	0.31	55.0

All Vehicles	1438	0.0	1438	0.0	0.426	8.0	LOS A	1.2	8.6	0.41	0.54	0.41	55.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [2C. NB 2044 Hol Pk (1.8*PM) (Site Folder: 2B/C-Waipu interim interchange (2B))]

Output produced by SIDRA INTERSECTION Version: 9.0.1.9664

Reprocess the Network in this Version to see the selected Movement Class results. All results may be affected by reprocessing compared with Version 9.0 results.

Network: N101 [2B Waipu interim int - 2044 Hol (1.8*PM) (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Mainline Expressway															
1	L2	All MCs	4	0.0	4	0.0	0.649	3.7	LOS A	2.5	19.3	0.47	0.59	0.47	51.1
3	R2	All MCs	949	10.0	949	10.0	0.649	10.5	LOS B	2.5	19.3	0.47	0.59	0.47	45.0
Approach			954	10.0	954	10.0	0.649	10.5	LOS B	2.5	19.3	0.47	0.59	0.47	45.1
East: To/from SH1															
4	L2	All MCs	1057	0.0	1057	0.0	0.643	2.9	LOS A	3.7	26.0	0.09	0.33	0.09	56.0
5	T1	All MCs	114	0.0	114	0.0	0.643	2.3	LOS A	3.7	26.0	0.09	0.33	0.09	59.7
Approach			1171	0.0	1171	0.0	0.643	2.8	LOS A	3.7	26.0	0.09	0.33	0.09	56.4
West: To/from Millbrook Rd															
11	T1	All MCs	106	0.0	106	0.0	0.169	9.0	LOS A	0.5	3.6	0.90	0.80	0.90	47.0
12	R2	All MCs	4	0.0	4	0.0	0.169	16.2	LOS B	0.5	3.6	0.90	0.80	0.90	55.6
Approach			111	0.0	111	0.0	0.169	9.3	LOS A	0.5	3.6	0.90	0.80	0.90	47.5
All Vehicles			2235	4.2	2235	4.2	0.649	6.4	LOS A	3.7	26.0	0.29	0.47	0.29	50.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [2C. Waipu Int/Existing SH1 2044 Hol (1.8*PM) (Site Folder: 2B/C-Waipu interim interchange (2B))]

Output produced by SIDRA INTERSECTION Version: 9.0.1.9664

Reprocess the Network in this Version to see the selected Movement Class results. All results may be affected by reprocessing compared with Version 9.0 results.

Network: N101 [2B Waipu interim int - 2044 Hol (1.8*PM) (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: SH1 South															
1	L2	All MCs	19	0.0	19	0.0	0.380	15.1	LOS B	1.3	9.4	1.00	0.95	1.00	46.1
2	T1	All MCs	59	0.0	59	0.0	0.380	15.1	LOS B	1.3	9.4	1.00	0.95	1.00	58.3
3	R2	All MCs	85	0.0	85	0.0	0.380	22.7	LOS C	1.3	9.4	1.00	0.95	1.00	58.5
Approach			163	0.0	163	0.0	0.380	19.1	LOS B	1.3	9.4	1.00	0.95	1.00	57.4
East: The Braigh															
4	L2	All MCs	106	0.0	106	0.0	0.611	23.9	LOS C	2.8	19.4	1.00	1.15	1.39	43.8
5	T1	All MCs	140	0.0	140	0.0	0.611	23.3	LOS C	2.8	19.4	1.00	1.15	1.39	34.8
6	R2	All MCs	2	0.0	2	0.0	0.611	30.5	LOS C	2.8	19.4	1.00	1.15	1.39	45.8
Approach			248	0.0	248	0.0	0.611	23.6	LOS C	2.8	19.4	1.00	1.15	1.39	39.7
North: SH1 North															
7	L2	All MCs	2	0.0	2	0.0	0.850	10.7	LOS B	6.4	45.0	0.94	0.82	1.14	57.9
8	T1	All MCs	114	0.0	114	0.0	0.850	10.8	LOS B	6.4	45.0	0.94	0.82	1.14	59.9
9	R2	All MCs	1009	0.0	1009	0.0	0.850	18.4	LOS B	6.4	45.0	0.94	0.82	1.14	48.2
Approach			1125	0.0	1125	0.0	0.850	17.6	LOS B	6.4	45.0	0.94	0.82	1.14	49.9
West: To/From interchange															
10	L2	All MCs	872	0.0	872	0.0	0.726	4.1	LOS A	3.9	27.1	0.70	0.51	0.70	52.0
11	T1	All MCs	161	0.0	161	0.0	0.726	3.5	LOS A	3.9	27.1	0.70	0.51	0.70	55.1
12	R2	All MCs	19	0.0	19	0.0	0.726	10.7	LOS B	3.9	27.1	0.70	0.51	0.70	56.7
Approach			1052	0.0	1052	0.0	0.726	4.1	LOS A	3.9	27.1	0.70	0.51	0.70	52.5

All Vehicles	2588	0.0	2588	0.0	0.850	12.8	LOS B	6.4	45.0	0.85	0.73	0.98	50.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [2C. NB 2054 AM (Site Folder: 2B/C-Waipu interim interchange (2B))]

Output produced by SIDRA INTERSECTION Version: 9.0.1.9664

Reprocess the Network in this Version to see the selected Movement Class results. All results may be affected by reprocessing compared with Version 9.0 results.

Network: N101 [2B Waipu interim int - 2054 AM (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Mainline Expressway															
1	L2	All MCs	1	0.0	1	0.0	0.309	3.1	LOS A	0.8	5.8	0.22	0.58	0.22	52.0
3	R2	All MCs	468	10.0	468	10.0	0.309	9.9	LOS A	0.8	5.8	0.22	0.58	0.22	46.3
Approach			469	10.0	469	10.0	0.309	9.9	LOS A	0.8	5.8	0.22	0.58	0.22	46.3
East: To/from SH1															
4	L2	All MCs	436	0.0	436	0.0	0.286	2.9	LOS A	0.8	5.8	0.10	0.34	0.10	56.0
5	T1	All MCs	65	0.0	65	0.0	0.286	2.3	LOS A	0.8	5.8	0.10	0.34	0.10	59.7
Approach			501	0.0	501	0.0	0.286	2.8	LOS A	0.8	5.8	0.10	0.34	0.10	56.5
West: To/from Millbrook Rd															
11	T1	All MCs	104	0.0	104	0.0	0.105	4.3	LOS A	0.2	1.7	0.56	0.50	0.56	49.9
12	R2	All MCs	14	0.0	14	0.0	0.105	11.6	LOS B	0.2	1.7	0.56	0.50	0.56	57.7
Approach			118	0.0	118	0.0	0.105	5.2	LOS A	0.2	1.7	0.56	0.50	0.56	51.3
All Vehicles			1088	4.3	1088	4.3	0.309	6.1	LOS A	0.8	5.8	0.20	0.46	0.20	51.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [2C. Waipu Int/Existing SH1 2054 AM (Site Folder: 2B/C-Waipu interim interchange (2B))]

Output produced by SIDRA INTERSECTION Version: 9.0.1.9664

Reprocess the Network in this Version to see the selected Movement Class results. All results may be affected by reprocessing compared with Version 9.0 results.

Network: N101 [2B Waipu interim int - 2054 AM (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: SH1 South															
1	L2	All MCs	12	0.0	12	0.0	0.173	7.1	LOS A	0.4	3.0	0.59	0.69	0.59	54.9
2	T1	All MCs	82	0.0	82	0.0	0.173	7.1	LOS A	0.4	3.0	0.59	0.69	0.59	65.4
3	R2	All MCs	97	0.0	97	0.0	0.173	14.7	LOS B	0.4	3.0	0.59	0.69	0.59	65.6
Approach			191	0.0	191	0.0	0.173	11.0	LOS B	0.4	3.0	0.59	0.69	0.59	65.1
East: The Braigh															
4	L2	All MCs	55	0.0	55	0.0	0.131	4.8	LOS A	0.3	2.2	0.57	0.50	0.57	55.1
5	T1	All MCs	91	0.0	91	0.0	0.131	4.2	LOS A	0.3	2.2	0.57	0.50	0.57	50.6
6	R2	All MCs	1	0.0	1	0.0	0.131	11.4	LOS B	0.3	2.2	0.57	0.50	0.57	58.3
Approach			146	0.0	146	0.0	0.131	4.5	LOS A	0.3	2.2	0.57	0.50	0.57	53.0
North: SH1 North															
7	L2	All MCs	1	0.0	1	0.0	0.319	5.7	LOS A	0.8	5.9	0.41	0.65	0.41	61.4
8	T1	All MCs	46	0.0	46	0.0	0.319	5.8	LOS A	0.8	5.9	0.41	0.65	0.41	63.6
9	R2	All MCs	399	0.0	399	0.0	0.319	13.4	LOS B	0.8	5.9	0.41	0.65	0.41	52.9
Approach			446	0.0	446	0.0	0.319	12.6	LOS B	0.8	5.9	0.41	0.65	0.41	54.5
West: To/From interchange															
10	L2	All MCs	475	0.0	475	0.0	0.401	3.8	LOS A	1.2	8.6	0.47	0.46	0.47	53.4
11	T1	All MCs	75	0.0	75	0.0	0.401	3.2	LOS A	1.2	8.6	0.47	0.46	0.47	56.8
12	R2	All MCs	11	0.0	11	0.0	0.401	10.4	LOS B	1.2	8.6	0.47	0.46	0.47	58.4
Approach			560	0.0	560	0.0	0.401	3.8	LOS A	1.2	8.6	0.47	0.46	0.47	53.9

All Vehicles	1343	0.0	1343	0.0	0.401	7.8	LOS A	1.2	8.6	0.48	0.56	0.48	56.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [2C. NB 2054 PM (Site Folder: 2B/C-Waipu interim interchange (2B))]

Output produced by SIDRA INTERSECTION Version: 9.0.1.9664

Reprocess the Network in this Version to see the selected Movement Class results. All results may be affected by reprocessing compared with Version 9.0 results.

Network: N101 [2B Waipu interim int - 2054 PM (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: NB Entry															
1	L2	All MCs	2	0.0	2	0.0	0.416	3.2	LOS A	1.2	8.8	0.26	0.58	0.26	51.9
3	R2	All MCs	632	10.0	632	10.0	0.416	10.0	LOS A	1.2	8.8	0.26	0.58	0.26	46.1
Approach			634	10.0	634	10.0	0.416	9.9	LOS A	1.2	8.8	0.26	0.58	0.26	46.1
East: To/from SH1															
4	L2	All MCs	681	0.0	681	0.0	0.413	2.8	LOS A	1.5	10.3	0.05	0.34	0.05	56.3
5	T1	All MCs	72	0.0	72	0.0	0.413	2.3	LOS A	1.5	10.3	0.05	0.34	0.05	60.0
Approach			753	0.0	753	0.0	0.413	2.8	LOS A	1.5	10.3	0.05	0.34	0.05	56.7
West: To/from Millbrook Rd															
11	T1	All MCs	66	0.0	66	0.0	0.071	5.3	LOS A	0.2	1.2	0.65	0.57	0.65	49.6
12	R2	All MCs	3	0.0	3	0.0	0.071	12.5	LOS B	0.2	1.2	0.65	0.57	0.65	57.4
Approach			69	0.0	69	0.0	0.071	5.6	LOS A	0.2	1.2	0.65	0.57	0.65	50.1
All Vehicles			1456	4.3	1456	4.3	0.416	6.0	LOS A	1.5	10.3	0.17	0.46	0.17	51.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [2C. Waipu Int/Existing SH1 2054 PM (Site Folder: 2B/C-Waipu interim interchange (2B))]

Output produced by SIDRA INTERSECTION Version: 9.0.1.9664

Reprocess the Network in this Version to see the selected Movement Class results. All results may be affected by reprocessing compared with Version 9.0 results.

Network: N101 [2B Waipu interim int - 2054 PM (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: SH1 South															
1	L2	All MCs	12	0.0	12	0.0	0.111	8.6	LOS A	0.3	2.1	0.73	0.74	0.73	53.0
2	T1	All MCs	34	0.0	34	0.0	0.111	8.6	LOS A	0.3	2.1	0.73	0.74	0.73	64.0
3	R2	All MCs	53	0.0	53	0.0	0.111	16.2	LOS B	0.3	2.1	0.73	0.74	0.73	64.2
Approach			98	0.0	98	0.0	0.111	12.7	LOS B	0.3	2.1	0.73	0.74	0.73	63.2
East: The Braigh															
4	L2	All MCs	67	0.0	67	0.0	0.177	6.7	LOS A	0.5	3.4	0.76	0.69	0.76	54.2
5	T1	All MCs	86	0.0	86	0.0	0.177	6.2	LOS A	0.5	3.4	0.76	0.69	0.76	49.1
6	R2	All MCs	1	0.0	1	0.0	0.177	13.4	LOS B	0.5	3.4	0.76	0.69	0.76	57.3
Approach			155	0.0	155	0.0	0.177	6.5	LOS A	0.5	3.4	0.76	0.69	0.76	52.0
North: SH1 North															
7	L2	All MCs	1	0.0	1	0.0	0.504	5.8	LOS A	1.6	11.2	0.46	0.65	0.46	61.1
8	T1	All MCs	75	0.0	75	0.0	0.504	5.9	LOS A	1.6	11.2	0.46	0.65	0.46	63.3
9	R2	All MCs	654	0.0	654	0.0	0.504	13.5	LOS B	1.6	11.2	0.46	0.65	0.46	52.5
Approach			729	0.0	729	0.0	0.504	12.7	LOS B	1.6	11.2	0.46	0.65	0.46	54.1
West: To/From interchange															
10	L2	All MCs	582	0.0	582	0.0	0.448	3.3	LOS A	1.6	11.0	0.36	0.39	0.36	54.1
11	T1	All MCs	101	0.0	101	0.0	0.448	2.7	LOS A	1.6	11.0	0.36	0.39	0.36	57.5
12	R2	All MCs	12	0.0	12	0.0	0.448	9.9	LOS A	1.6	11.0	0.36	0.39	0.36	59.3
Approach			695	0.0	695	0.0	0.448	3.3	LOS A	1.6	11.0	0.36	0.39	0.36	54.7

All Vehicles	1677	0.0	1677	0.0	0.504	8.2	LOS A	1.6	11.2	0.46	0.55	0.46	54.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [2C. NB 2054 Hol Pk (1.8*PM) (Site Folder: 2B/C-Waipu interim interchange (2B))]

Output produced by SIDRA INTERSECTION Version: 9.0.1.9664

Reprocess the Network in this Version to see the selected Movement Class results. All results may be affected by reprocessing compared with Version 9.0 results.

Network: N101 [2B Waipu interim int - 2054 Hol (1.8*PM) (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: NB Entry															
1	L2	All MCs	4	0.0	4	0.0	0.828	4.2	LOS A	4.1	30.9	0.64	0.60	0.64	50.5
3	R2	All MCs	1137	10.0	1137	10.0	0.828	11.0	LOS B	4.1	30.9	0.64	0.60	0.64	44.2
Approach			1141	10.0	1141	10.0	0.828	11.0	LOS B	4.1	30.9	0.64	0.60	0.64	44.2
East: To/from SH1															
4	L2	All MCs	1226	0.0	1194	0.0	0.726	2.9	LOS A	5.6	39.2	0.13	0.33	0.13	55.8
5	T1	All MCs	128	0.0	125	0.0	0.726	2.3	LOS A	5.6	39.2	0.13	0.33	0.13	59.4
Approach			1355	0.0	1319	0.0	0.726	2.8	LOS A	5.6	39.2	0.13	0.33	0.13	56.1
West: To/from Millbrook Rd															
11	T1	All MCs	119	0.0	119	0.0	0.290	13.3	LOS B	0.9	6.5	1.00	0.93	1.00	42.7
12	R2	All MCs	5	0.0	5	0.0	0.290	20.5	LOS C	0.9	6.5	1.00	0.93	1.00	52.3
Approach			124	0.0	124	0.0	0.290	13.6	LOS B	0.9	6.5	1.00	0.93	1.00	43.3
All Vehicles			2620	4.3	2584	4.4	0.828	7.0	LOS A	5.6	39.2	0.40	0.48	0.40	49.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [2C. Waipu Int/Existing SH1 2054 Hol (1.8*PM) (Site Folder: 2B/C-Waipu interim interchange (2B))]

Output produced by SIDRA INTERSECTION Version: 9.0.1.9664

Reprocess the Network in this Version to see the selected Movement Class results. All results may be affected by reprocessing compared with Version 9.0 results.

Network: N101 [2B Waipu interim int - 2054 Hol (1.8*PM) (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: SH1 South															
1	L2	All MCs	21	0.0	21	0.0	0.574	34.3	LOS C	2.5	17.6	1.00	1.12	1.39	32.2
2	T1	All MCs	61	0.0	61	0.0	0.574	34.4	LOS C	2.5	17.6	1.00	1.12	1.39	45.2
3	R2	All MCs	95	0.0	95	0.0	0.574	41.9	LOS D	2.5	17.6	1.00	1.12	1.39	45.3
Approach			177	0.0	177	0.0	0.574	38.4	LOS D	2.5	17.6	1.00	1.12	1.39	44.0
East: The Braigh															
4	L2	All MCs	121	0.0	121	0.0	0.991	132.1	LOS F	9.9	69.4	1.00	1.89	3.30	19.4
5	T1	All MCs	161	0.0	161	0.0	0.991	131.6	LOS F	9.9	69.4	1.00	1.89	3.30	11.9
6	R2	All MCs	2	0.0	2	0.0	0.991	138.8	LOS F	9.9	69.4	1.00	1.89	3.30	19.7
Approach			284	0.0	284	0.0	0.991	131.8	LOS F	9.9	69.4	1.00	1.89	3.30	15.4
North: SH1 North															
7	L2	All MCs	2	0.0	2	0.0	1.030	52.5	LOS E	26.5	185.7	1.00	1.72	3.20	35.9
8	T1	All MCs	135	0.0	135	0.0	1.030	52.5	LOS E	26.5	185.7	1.00	1.72	3.20	36.6
9	R2	All MCs	1177	0.0	1177	0.0	1.030	60.1	LOS E	26.5	185.7	1.00	1.72	3.20	24.8
Approach			1314	0.0	1314	0.0	1.030	59.3	LOS E	26.5	185.7	1.00	1.72	3.20	26.3
West: To/From interchange															
10	L2	All MCs	1047	0.0	1047	0.0	0.870	5.5	LOS A	7.0	49.3	0.95	0.62	0.99	50.5
11	T1	All MCs	182	0.0	182	0.0	0.870	4.9	LOS A	7.0	49.3	0.95	0.62	0.99	53.5
12	R2	All MCs	21	0.0	21	0.0	0.870	12.2	LOS B	7.0	49.3	0.95	0.62	0.99	55.0
Approach			1251	0.0	1251	0.0	0.870	5.5	LOS A	7.0	49.3	0.95	0.62	0.99	51.0

All Vehicles	3025	0.0	3025	0.0	1.030	42.7	LOS D	26.5	185.7	0.98	1.24	2.19	31.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Appendix 4
TREIS Data

Official	Planned	SH	Start Location	Start SH	Start RS	Start RP	End Location	cation Descrip	Start Description	End Description	Impact	Impact Edited	Status	Description	Event Comments	Event Type	System Start Date	Start Da	tart Mon	Start Yea	Start Time	System End Date	ent Duration (d,h,	Duration (hl	Hours	Minutes	Total Minutes	Duration	Closure Duration
Official	Unplanned	1N	01N-0303/11.62	01N	303	11.62	01N-0303/11.62	Whangarei to Brynderwyn	Waipu	Waipu	Caution	Road Closed	Resolved	Crash	Due to an earlier crash SH1 Brynderwyn, the road is now open to southbound traffic.	Road Hazard	17-Oct-2020 05:40:00	17	Oct	2020	5:40:00	17-Oct-2020 06:46:04	1 h, 6 m	1.06	1	6	66	1.10	1.10
Official	Unplanned	1N	01N-0303/05.91	01N	303	5.91	01N-0303/05.91	Whangarei to Brynderwyn	Waipu	Waipu	Road Closed	Road Closed	Resolved	Crash	Due to a serious incident in this area the road is closed. Emergency services are on site. Please delay your journey or use an alternative route.	Road Hazard	03-Jan-2020 17:36:00	3	Jan	2020	17:36:00	03-Jan-2020 21:40:34	4 h, 4 m	4.04	4	4	244	4.07	4.07
Official	Unplanned	1N	01N-0303/11.59	01N	303	11.59	01N-0303/11.59	Whangarei to Brynderwyn	Waipu	Waipu	Road Closed	Road Closed	Resolved	Crash	SH1 over the Brynderwyn Hills is now OPEN again. Thank you for your patience during this extended closure period.	Road Hazard	19-May-2021 15:10:00	19	May	2021	15:10:00	20-May-2021 06:43:17	15 h, 33 m	15.33	15	33	933	15.55	15.55
Official	Unplanned	1N	01N-0303/15.61	01N	303	15.61	01N-0303/15.61	Waipu to Kaiwaka	Brynderwyn	Brynderwyn	Caution	Road Closed	Resolved	Crash	The road is now open following a serious crash. Please drive with care.	Road Hazard	31-Dec-2022 14:53:00	31	Dec	2022	14:53:00	01-Jan-2023 18:08:35	1 d, 3 h, 15 m	27.15	27	15	1635	27.25	27.25
Official	Unplanned	1N	01N-0303/11.95	01N	303	11.95	01N-0303/11.95	Whangarei to Brynderwyn	Waipu	Waipu	Road Closed	Road Closed	Resolved	Other	Due to a serious crash, SH1 is closed between Waipu and SH12. Follow the directions of emergency services on scene and expect delays.	Road Hazard	03-Sep-2022 08:29:00	3	Sep	2022	8:29:00	03-Sep-2022 15:39:00	7 h, 10 m	7.10	7	10	430	7.17	7.17
Official	Unplanned	1N	01N-0303/15.78-B	01N	303	15.78-B	01N-0303/08.13-B	Brynderwyn to Waipu	END SLOW VEHICLE BAY (END RAIL RHS) TO JUNCTION SH 1N/12	WAIPU GORGE RD TO END PASSING LANE LHS (SIGNS)	Caution	Road Closed	Resolved	Slip	Due to large slips on the Brynderwyn Hills, SH1 is closed from SH12 intersection, Brynderwyn to Waipu. One lane will be open to northbound traffic only between 8am and 8pm on Saturday 4th and Sunday 5th of Feb and open to southbound traffic only on Monday 6th of Feb. Light vehicles use alternative route via Kaiwaka and Mangawhai until further notice. Heavy vehicles use SH12 & SH14.	Area Warning	27-Jan-2023 13:58:00	27	Jan	2023	13:58:00	06-Feb-2023 20:12:32	10 d, 6 h, 14 m	246.14	246	14	14774	246.23	246.23
Official	Unplanned	1N	01N-0303/08.13-B	01N	303	08.13-B	01N-0303/01.02-B	Brynderwyn to Waipu	WAIPU GORGE RD TO END PASSING LANE LHS (SIGNS)	THE BRAIGH TO START PASSING LANE LHS (P/POLE LHS)	Caution	Road Closed	Resolved	Slip	Due to large slips on the Brynderwyn Hills, SH1 is closed from SH12 intersection, Brynderwyn to Waipu. One lane will be open to northbound traffic only between 8am and 8pm on Saturday 4th and Sunday 5th of Feb and open to southbound traffic only on Monday 6th of Feb. Light vehicles use alternative route via Kaiwaka and Mangawhai until further notice. Heavy vehicles use SH12 & SH14.	Area Warning	27-Jan-2023 13:58:00	27	Jan	2023	13:58:00	06-Feb-2023 20:12:32	10 d, 6 h, 14 m	246.14	246	14	14774	246.23	246.23
Unofficial	Unplanned	1N	01N-0303/05.31	01N	303	5.31	01N-0303/05.31	Whangarei to Brynderwyn	Waipu	Waipu	Caution	Road Closed	Resolved	Flooding	Flooding across both lanes at SH1 and Glenmohr Rd. Cars cannot pass. Police diverting traffic back othrer way	Road Hazard	10-Jan-2023 13:16:00	10	Jan	2023	13:16:00	11-Jan-2023 16:36:35	1 d, 3 h, 20 m	27.20	27	20	1640	27.33	27.33
Unofficial	Unplanned	1N	01N-0303/15.76	01N	303	15.76	01N-0303/15.76	Waipu to Brynderwyn	Brynderwyn	Brynderwyn	Road Closed	Road Closed	Resolved	Other	Due to large slips on the Brynderwyn Hills, between Brynderwyn and Waipu, the road is closed until further notice. Take extra care and drive to the conditions on alternative routes.	Road Work	06-Feb-2023 20:11:00	6	Feb	2023	20:11:00	14-Feb-2023 13:20:37	7 d, 17 h, 9 m	185.09	185	9	11109	185.15	185.15
Official	Unplanned	1N	01N-0303/15.57	01N	303	15.57	01N-0303/02.34	Waipu to Brynderwyn	Brynderwyn	Waipu	Road Closed	Road Closed	Resolved	Slip	Due to major works at large slip sites over the Brynderwyn Hills, this section of SH1 is closed in both directions for approx 2 weeks (until 6am, Mon 01 May), subject to weather and other factors. Allow extra time for following detour routes.	Area Warning	06-Feb-2023 20:00:00	6	Feb	2023	20:00:00	01-May-2023 06:00:00	83 d, 10 h, 0 m	2002.00	2002	0	120120	2002.00	2002.00
Official	Planned	1N	01N-0303/15.73	01N	303	15.73	01N-0303/08.73	Brynderwyn to Waipu	Brynderwyn	Waipu	Caution	Road Closed	Resolved	Road Construction	Following a period of closure for major slip repairs, SH1 over the Brynderwyn Hills is now open in both directions for all vehicle types.	Area Warning	27-Jun-2024 06:00:00	27	Jun	2024	6:00:00	28-Jun-2024 22:00:00	1 d, 16 h, 0 m	40.00	40	0	2400	40.00	40.00
Official	Planned	1N	01N-0303/05.79	01N	303	5.79	01N-0303/05.79	Brynderwyn to Waipu	Waipu	Waipu	Caution	Road Closed	Resolved	Road Construction	Following a period of closure for major slip repairs, SH1 over the Brynderwyn Hills is now open in both directions for all vehicle types.	Road Work	27-Jun-2024 00:02:00	27	Jun	2024	0:02:00	27-Jun-2024 06:14:27	6 h, 12 m	6.12	6	12	372	6.20	6.20
Official	Planned	1N	01N-0303/15.73	01N	303	15.73	01N-0303/08.73	Brynderwyn to Waipu	Brynderwyn	Waipu	Road Closed	Road Closed	Resolved	Road Construction	Due to major works at large slip sites over the Brynderwyn Hills, this section of SH1 is fully closed (24/7) in both directions with reopening scheduled for 11.59pm (midnight) on Wed 26 June. These works are subject to weather and other factors. Plan ahead to follow detour options below:	Area Warning	25-Feb-2024 23:59:00	25	Feb	2024	23:59:00	26-Jun-2024 23:59:00	122 d, 0 m	2928.00	2928	0	175680	2928.00	2928.00
Official	Unplanned	1N	01N-0319/01.16	01N	319	1.16	01N-0319/01.16	between SH12 and Kaiwaka both directions	Brynderwyn	Brynderwyn	Road Closed	Road Closed	Resolved	Crash	A serious incident has been reported to emergency services in this area and SH1 is closed between Baldrock Rd and SH12. Please delay your journey or use an alternative route.	Road Hazard	30-Oct-2022 07:55:00	30	Oct	2022	7:55:00	30-Oct-2022 10:27:45	2 h, 32 m	2.32	2	32	152	2.53	2.53
Unofficial	Unplanned	12	012-0202/19.32	12	202	19.32	012-0202/19.32	Ruawai to Brynderwyn	Brynderwyn	Brynderwyn	Caution	Road Closed	Resolved	Crash	2 car mva blocking both lanes	Road Hazard	28-Mar-2022 12:46:00	28	Mar	2022	12:46:00	28-Mar-2022 13:49:48	1 h, 3 m	1.03	1	3	63	1.05	1.05