Appendix I

Integrated Transport Assessment

Part 1 of 3

Wairakei South Fast Track Application

Integrated Transportation Assessment
Prepared for Bell Road Limited Partnership

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Executive Summary

This Integrated Transportation Assessment (**ITA**) has been prepared in support of the Wairakei South Fast Track application on behalf of Bell Road Limited Partnership (**BRLP**). The Wairakei South project (the development) is a comprehensively planned urban extension to the existing Wairakei urban growth area of a total 350 ha, providing for approximately 2,750 dwellings within 128 hectares (ha), 50 ha of Industrial land, 4 ha of commercial centres, and a primary school of 4 ha, together with supporting infrastructure.

The site is strategically located adjacent to the Papamoa East Interchange (**PEI**) and the Tauranga Eastern Link, SH2 (**TEL**) with secondary access via Bell Road and the Te Puke Highway, providing direct access to the wider Western Bay of Plenty and Tauranga transport networks and the eastern growth corridor.

The Development is located a short distance (approximately 1km) from the Te Okuroa Drive and The Sands Avenue corridors and the Te Tumu Future Urban Zone (**Te Tumu**) 1.The site location extends and integrates with established and planned future transport networks, communities and services. The points of connection to the strategic transport network such as the PEI and TEL provides for efficient transport movement distribution, avoiding unnecessary travel on established and planned transport capacity servicing existing and future growth areas. This location enables the development to integrate efficiently with existing and planned infrastructure and supports the delivery of a well-connected, multi-modal urban environment.

This assessment is structured to:

- Describe the current and future transport environments and strategic policy context;
- Describe the transport aspects of the development;
- Describe the transport effects assessment methodology, the evaluation of effects and determination of mitigation measures;
- Assess the development in terms of the transport provisions of the District Plan;
- Consider the potential construction traffic effects and management of these;
- Describe the transport mitigation and recommendations for conditions; and
- Determine an overall conclusion in relation to the development.

This ITA has been undertaken using Tauranga's integrated modelling framework, including the Tauranga Transport Strategic Model (**TTSM**) and the Tauranga Transport Hybrid Model (**TTHM**) supported by SIDRA (networked intersections) and Highway Capacity Manual assessments.

The modelling, undertaken by Beca, has been subject to independent peer review (Flow Transportation Consultants) and developed through an iterative stakeholder engagement process involving Western Bay of Plenty District Council (**WBOPDC**), Tauranga City Council (**TCC**), NZ Transport Agency (**NZTA**), and Bay of Plenty Regional Council (**BOPRC**).

The measure of performance adopted to determine the potential for adverse effects and the consequent need for mitigation has been based on a multi-criteria approach as follows:

- Where roading and intersection Level of Service (**LOS**) remains within the range LOS A – D, the long-term performance remains acceptable without mitigation; and

[1] Te Tumu is a planned Future Urban Zone identified within the Tauranga City Plan. It is located to the east of Wairakei and The Sands Town Centre and extends east along the coastal strip to the Kaituna Cut, where the Kaituna River discharges to the ocean. It is identified in Tauranga City Council's long-term planning to accommodate up to about 15,500 persons together with supporting infrastructure, services and employment land.

- Where the development results in a change from LOS A-D to LOS E or F and where the contributing traffic demands are greater than 10%, specific mitigation has been determined on the basis that it results in a LOS D or better outcome for the network; and
- Where the Do Minimum (excluding the development) LOS is already LOS E or F, specific mitigation has been determined on the basis that it results in a LOS at least equivalent or better than the Do Minimum network.

On this basis, mitigation measures are identified and respond to performance where the contributing effect is more than minor and attributable to the development. The approach also achieves an appropriately efficient long-term network performance outcome. Where the Do Minimum network (excluding the development) is already indicated to be congested, a performance at least equivalent to or improved on the Do Minimum performance is achieved. In this way the transport effects due to the development are mitigated and the additional infrastructure costs are borne by the development. The cost of growth generated by the development is appropriately attributed to it.

Accordingly, the assessment confirms that the surrounding transport network, including infrastructure planned for Te Tumu and the PEI infrastructure can accommodate the initial stages of development.

As the development progresses, a series of targeted upgrades are proposed and timed to ensure network performance and safety outcomes are achieved and further that the transport capacity planned for Te Tumu (which is included within the Do Minimum assessment case) continues to meet its development needs and LOS, and no new or additional transport infrastructure cost is imposed on land uses incorporated within the Do Minimum case, including Te Tumu.

The determined mitigation measures are focused on key corridors and intersections identified through an area of influence assessment informed by a comprehensive modelling exercise and application of the effects assessment methodology described above, including:

- The Sands Avenue corridor and its connection to, and including the PEI;
- The Bell Road / Te Puke Highway intersection, including the adjacent rail crossing;
- Domain Road interchange westbound on-ramp extension;
- Upgrading of Bell Road; and
- Bell Road / Parton Road intersection.

The assessment demonstrates that a proportion of the network pressures identified through the modelling arise from cumulative growth across the eastern Tauranga corridor, including future development within both Tauranga City and Te Tumu, rather than from the development in isolation.

The transport effects of the development, when assessed cumulatively with Te Tumu and other regional planned growth, have been mitigated such that the network performs at least at the Do Minimum scenario (i.e. the future network with committed infrastructure and growth, excluding the development), achieving acceptable levels of service and, in many cases, improved performance relative to that baseline. A staged mitigation and conditions framework has been developed to link the timing of infrastructure upgrades to defined development thresholds, with provision for review as development progresses. This ensures that network performance is maintained while enabling the staging response to be refined over time in the context of potential future network changes Specifically, the framework ensures that:

- Early development is enabled through establishment of access to the PEI and/or upgrades to the Bell Road corridor;

- Intermediate development stages trigger capacity upgrades to The Sands Avenue and Domain Road;
- Later stages deliver further intersection and network improvements, including enhancements at Te Okuroa Drive and the PEI;
- Development staging within the Wairakei South subdivision area is enabled; and
- Alternative future staging is able to be considered, assessed and authorised through a Development Staging Plan and Transport Network Accountability Report process that is structured to ensure the effects and mitigation costs due to the development are appropriately attributed to the development, avoiding the potential for any transferability to other organisations or agencies.

The proposed internal transport network is based on a clear hierarchy and supports a multi-modal system that prioritises walking, cycling and future public transport. The layout achieves a high level of connectivity, integrates with surrounding growth areas, and supports a walkable urban form consistent with the Urban Form and Transport Initiative (**UFTI**) and related policy frameworks.

Overall, the ITA demonstrates that the Wairakei South Development can be accommodated within the wider transport network, subject to the staged delivery of identified infrastructure upgrades. The Development provides for a resilient, integrated and future-proofed transport system that supports both the development itself and the broader eastern corridor growth strategy.

CONTENTS

Appendices

Appendix 1: Future Transport Environment (Document Summaries)

Appendix 2: Strategic Policy Document Summaries

Appendix 3: Beca Modelling Report

Appendix 4: Flow Peer Review Reports

Appendix 5: Letters of Support

Appendix 6: SIDRA Modelling Outputs

Appendix 7: HCM Ramp Capacity Assessments

Appendix 8: Link Area of Influence

Appendix 9: Intersection Area of Influence

Appendix 10: Tiaki Consultants PEI Bridge Structural Assessment

Appendix 11: PEI Walking and Cycling Assessment

Appendix 12: Level Crossing Safety Assessment

Appendix 13: Bell Road Rural Carriageway Assessment

Appendix 14: District Plan Assessment

Appendix 15: Recommended Transport Conditions Framework

Appendix 16: Off-site Transport Infrastructure

Figures

Abbreviations

ADT	Average Daily Traffic Volume
BOPRC	Bay of Plenty Regional Council
BRLP	Bell Road Limited Partnership
CAS	Crash Analysis System
ECMT	East Coast Main Truck (Railway)
GPS	Government Policy Statement on Transport
HCV	Heavy Commercial Vehicle
ha	Hectares
ITA	Integrated Transportation Assessment
LCSIA	Level Crossing Safety Impact Assessment
LOS	Level of Service
NZTA	New Zealand Transport Agency
NPS UD	National Policy Statement on Urban Development
PEI	Papamoa East Interchange
RLTP	Regional Land Transport Plan
RPTP	Regional Passenger Transport Plan
SH	State Highway
TCC	Tauranga City Council
Te Tumu	Te Tumu Future Urban Zone
TEL	Tauranga Eastern Link
TTHM	Tauranga Transport Hybrid Model
TTSM	Tauranga Strategic Transportation Model
UFTI	Urban Form + Transport Initiative
Vpd	Vehicles per day
vph	Vehicles per hour
Wairakei	Wairakei Urban Growth Area
WBOPDC	Western Bay of Plenty District Council

1.0 Introduction

The Wairakei South Development is being undertaken by Bell Road Limited Partnership (BRLP) as a comprehensively planned extension to the existing Wairakei Urban Growth Area at Papamoa East. The Development area comprises approximately a total 350 hectares of existing rural land. The Development is intended to create a balanced, resilient urban environment delivering approximately 2,750 dwellings within 128 hectares (ha), 50 ha of Industrial land, 4 ha of commercial centres, and a primary school of 4 ha alongside supporting community facilities, reserves, open space and ecological wetland areas.

Traffic and transportation considerations are central to this project. Wairakei South is strategically located immediately adjacent to the PEI and the TEL. This provides a direct multi-modal gateway to the Tauranga urban area, the Port of Tauranga, and the wider Bay of Plenty sub-region. Secondary strategic access is to be established via Bell Road and the Te Puke Highway servicing more southerly and westerly transport movements. Furthermore, the transport corridors within the site have been planned to future-proof potential longer-term connectivity and integration with:

- Te Tumu via the Bell Road corridor;
- Te Puke to the south via the secondary arterial transport network and a new road corridor as shown indicatively in UFTI; and
- Adjoining land, enabling future integration with surrounding areas, if and when they are developed.

The development therefore appropriately integrates with existing and planned infrastructure in a way that can minimise additional corridor requirements, while still achieving safe and effective transport outcomes. Planning for the transport network is intended to create a high degree of accessibility and liveability through a well-functioning multi-modal system, consistent with the mode shift and carbon reduction outcomes sought for the eastern corridor.

The purpose of this report is to bring together the transport planning, modelling, and framework information that underpins the Wairakei South Development. The assessment has a particular focus on:

- Interpreting transport model outcomes and applying them to decisions around the form of the internal road hierarchy and primary transport corridors;
- Identifying corridor widths, intersection treatments, and access management principles required to safeguard long-term network performance;
- Ensuring that the transport system is aligned with the Connected Centres vision in the UFTI and the Transport System Plan (**TSP**); and
- Demonstrating how the structure of the movement network will support a transit-oriented and walkable community integrated with neighbouring Wairakei and Te Tumu.

This report is structured to describe the following elements:

- Current transportation environment;
- Future transportation environment;

- Strategic policy context;
- Wairakei South framework plan and proposal;
- Transport demands and transportation modelling;
- Transport corridors, staging and form of infrastructure;
- Alignment with District Plan roading and transportation standards;
- Construction traffic management matters; and
- Recommendations and conclusions.

Based on the assessments undertaken to date, the following transport outcomes are anticipated for Wairakei South:

- A strategic transport system integrated with the existing and planned Wairakei and wider sub-regional network and anchored by the PEI and Bell Road to the Te Puke Highway corridor improvements;
- A multi-modal framework that prioritises walking, cycling and public transport, reducing reliance on private vehicle trips and supporting reduced emissions;
- An access-managed and hierarchical network that ensures safety, efficiency, and long-term resilience;
- Transport access and capacity aligned with development staging, providing for both early delivery and ultimate growth outcomes;
- A transport network that supports a well-functioning urban environment with live–work–learn–play opportunities close to home, reducing the need for long external trips; and
- Evaluation and minimisation of potential adverse environmental effects through integration of transport and land use design outcomes with stormwater, landscape, ecological and other environmental outcomes.

Overall, the transport elements for the Wairakei South Development are assessed as being appropriately planned to deliver a resilient, multi-modal and integrated urban environment that will complement the existing Wairakei Growth Area and contribute to the wider eastern corridor growth strategy.

2.0 Current Transport Environment

2.1 Site Location

The site location is shown in a sub-regional context on Figure 1 below. It is located on the southern side of Tauranga Eastern Link (TEL) which forms part of Stage Highway 2 (SH2). It is adjacent to Papamoa East and approximately 6km north of Te Puke.

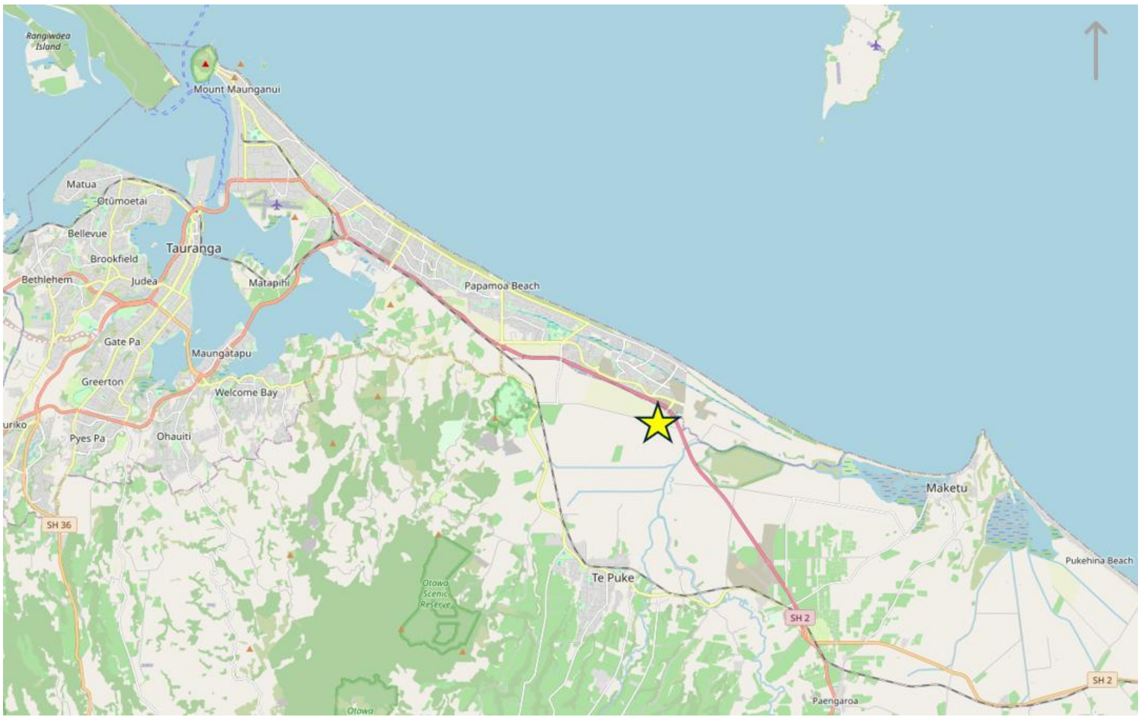


Figure 1 Site Location (Base Map Source: Open Street Map)

The extent of the development and an overview of the intended land use mix is shown on the following Figure 2.

Figure 2 Project Overview (Source: AEE Appendix E Subdivision Consent Landscape Package – Executive Summary)

The development area is substantially undeveloped at present and is used for farming. The overall area is generally bordered by the TEL to the north and east, and the Kopuaroa Canal to the south. Bell Road transects the development area and provides a link from the Te Puke Highway in the west, through the development area, before turning south, passing under the TEL and connecting into the Te Tumu area.

2.2 Growth Area Context

2.2.1 Wairakei Urban Growth Area

The Wairakei Urban Growth Area ('Wairakei') is located immediately north of the development site on the opposite side of the PEI and TEL. It forms part of TCC's identified urban growth areas and is currently being developed for residential, commercial and community purposes. The Sands town centre, which has been consented and is under construction, is a focal point of this growth area and provides for a wide range of local services, retail, and employment opportunities.

Wairakei is supported by a planned multi-modal transport network centered on The Boulevard and Te Okuroa Drive, with direct connectivity to the PEI. Development in Wairakei is well advanced, with significant residential development and supporting community infrastructure (including schools and reserves) under construction. The proximity of Wairakei to Wairakei South provides an opportunity for integration of transport and land use outcomes across both areas.

2.2.2 Te Tumu Future Urban Zone

Te Tumu) lies to the east of Wairakei, extending to the Kaituna River and the coast. Te Tumu is identified in TCC's long-term planning framework for future urban development. Structure planning for Te Tumu is progressing to enable a community of circa15,500 people, with provision for schools, reserves, community facilities and an employment precinct adjoining The Sands Town Centre and Wairakei areas.

Transport planning for Te Tumu is centered on a rapid transit corridor along The Boulevard, supported by an integrated walking and cycling network and strategic connections via the PEI. A potential future PEI bypass connection into Te Tumu has been identified to provide additional network capacity as development within Te Tumu progresses. The timing for this infrastructure is beyond the current TCC Long Term Plan.

Te Tumu is part of the wider Eastern Corridor growth strategy, with future connections indicated in UFTI toward Te Puke and the Rangiuru Business Park. Although Te Tumu is not yet rezoned or developed, its signaled future growth is a relevant consideration in assessing cumulative transport outcomes for the Papamoa East / Wairakei South context. A draft structure plan for the area is shown below as Figure 3.

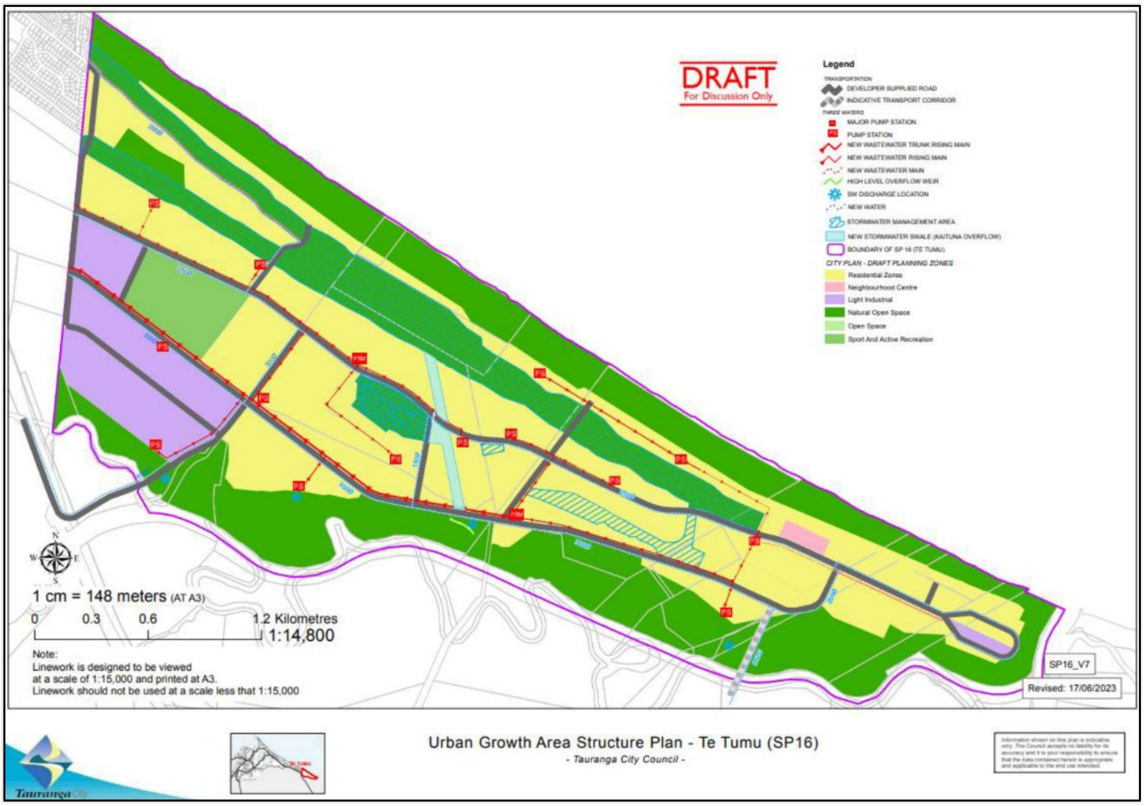


Figure 3 Draft Te Tumu Land Use Plan, June 2023 (Source: Te Tumu and Wairakei Internal Transport Infrastructure, Single Stage Business Case, April 2024)

2.3 Road Network Hierarchy

The TEL and the broader SH2 corridor form the primary transport corridor in the vicinity of the site. It is managed by the New Zealand Transport Agency (NZTA).

In the WBOPDC District Plan road hierarchy (Section 4B.4.1), SH2 and the TEL (where they are in the WBOPDC's jurisdiction) are classified as a Primary Arterial and a Motorway, respectively. Bell Road is classified as a local road.

The existing TCC road hierarchy in the area on the opposite (northern TCC) side of the PEI is shown as Figure 4 below.

Figure 4 Existing TCC Road Hierarchy (Source TCC: Mapi)

Figure 4 shows three main corridors serving Papamoa East:

- **Papamoa Beach Road** is classified as secondary collector. It changes to access road status at Stevenson Drive.
- **The Boulevard** forms the primary collector network, in combination with Golden Sands Drive, Palm Springs Boulevard, and Monticola Drive.
- **Te Okuroa Drive** is classified as an arterial road, running generally parallel to the TEL. It changes to secondary collector road status at Stevenson Drive.

All three roads are planned to continue south-east into the Te Tumu area in future.

2.4 Road Network Layout

The broader project area features two existing road corridors, the TEL (SH2) and Bell Road. The TEL is a median-divided four-lane state highway forming the strategic connection between Tauranga and Paengaroa.

Direct access to the TEL is limited (Limited Access Road) and occurs only via grade-separated interchanges, including the recently completed PEI directly adjacent to the site. The TEL operates with a 110km/h posted speed limit and is subject to tolls.

Bell Road is a local rural road managed by WBOPDC. It extends east from the Te Puke Highway and turns south adjacent to the TEL and then passes under the bridge that takes the TEL over the Kaituna River. It provides primary access to a public boat ramp on the Kaituna River, to local property and to a quarry site located within the Te Tumu area.

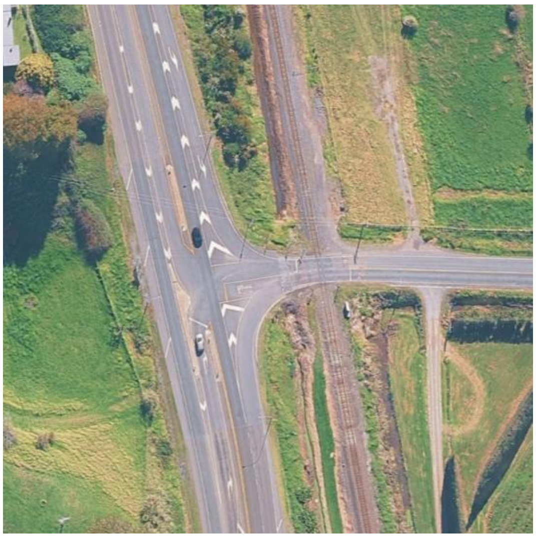
Bell Road has rural carriageway formation, providing one traffic lane in each direction with nominal shoulders. It is marked with a centreline and edge line and has a posted speed limit of 100km/h.

The intersection of Bell Road/Te Puke Highway is a Stop-controlled T-intersection. Te Puke Highway has priority and there are auxiliary left and right turn lanes on both its approaches. There is also a “seagull” style treatment to assist the movement out of Bell Road towards the north, shielding the right turn from the northbound through movement, which is a continuous uninterrupted movement. The East Coast Main Trunk Railway (ECMT) crosses Bell Road at a level crossing just east of the Te Puke Highway intersection.

The Bell Road/Parton Road intersection is also a Stop controlled T-intersection. Bell Road has priority. Parton Road connects north into Papamoa and travels over the TEL on a bridge, with no connectivity available to the TEL. This Parton Road corridor is a key connection between Wairakei and Te Puke.

These intersections and network features are shown in Table 2-1 below.

Table 2-1: Existing Network Layout

Bell Road/Te Puke Highway Intersection & ECMT Level Crossing	Bell Road/Parton Street Intersection
	
Bell Road, turning under TEL at Kaituna River Bridge	**PEI (Aerial Flow During Construction) including The Sands Avenue/Te Okuroa Drive Signals**
	

2.5 Road Safety

The NZTA Crash Analysis System (CAS) was accessed to review the road safety history of the area around the site. The search reviewed the most recent five-year period 2021-2025 inclusive, as well as any available data from 2026. The physical extent of the search included Bell Road, from Te Puke Highway to the TEL underpass at the Kaituna River.

The PEI opened in April 2026 and the road corridor has been subject to road safety audit procedures through its design and implementation phases. Similarly, The Sands Avenue corridor extending from the PEI north to Te Okuroa Drive opened to northbound traffic only in

April 2026. It is due to complete and vest in TCC in August 2026. Accordingly, there are no historical crash records to consider in relation to these sections of the road network.

A total of 19 crashes were reported. The location, nature and severity of these crashes is summarised in Table 2-2 below.

Table 2-2: CAS Summary

Location	Crashes by Severity			Total	Types and Factors
	Serious	Minor	Non-Injury		
Bell Road/Te Puke Highway Intersection	1	1	5	7	Loss of control, hit rear, hit by oncoming or turning traffic (5), missed intersection. Factors: failure to give way, driver inexperience, slippery road conditions.
Bell Road/Parton Road	-	1	3	4	Missed intersection (2), hit by turning traffic, loss of control. Factors: speed, frost/ice, failure to give way.
Bell Road ECMT Crossing	-	-	1	1	Car hit train. Factors: inattention and failure to give way.
Bell Road midblock sections	1	3	3	7	Cutting corner, loss of control (3), hit rear, u-turning vehicle hit cyclist. Factors: distraction inside vehicle, inexperience, inattention, stray animal on road.
TOTAL	2	5	12	19	-

Overall, the reported crashes are dispersed along Bell Road and reflect a mix of intersection-related conflicts and midblock loss-of-control events. The pattern is consistent with a rural road environment subject to a range of driver behaviours and external factors, rather than any one underlying safety issue. Notwithstanding this, the types and factors associated with the crashes indicate a particular area of focus for assessment of the potential transport effects attributable to the subdivision and land development proposal.

2.6 Traffic Volumes

Average daily traffic volumes on roads around the site have been sourced from the MobileRoad website and are summarised in the following Table:

Table 2-3: Average Daily Traffic Volumes

Road	Section	ADT (vpd)	% HCV
Bell Road	Between Parton Road and TEL	350	6.0%
	Between Te Puke Highway and TEL	3,500	5.4%
Te Puke Highway	North of Bell Road	14,400	7.0%
	South of Bell Road	15,900	3.5%
Parton Road	North of Bell Road	3,800	3%
TEL (SH2)	Between Parton Road and Kaituna River Bridge	5,714 eastbound (EB) 5,778 westbound (WB)	13% EB 18% WB

It is acknowledged that the area around the development is experiencing ongoing growth and that traffic volumes on the surrounding road network are forecast to increase over time. The volumes presented above provide a snapshot of existing conditions based on the most recent available counts.

The focus of this assessment is future traffic conditions, which have been assessed using the strategic transport modelling described later in Sections 6.0 to 8.0 of this report. This modelling incorporates infrastructure changes, background network growth and traffic associated with planned development in the wider eastern Tauranga area as well as what is proposed in Wairakei South.

3.0 Future Transport Environment

3.1 Overview

This section of the report describes planned changes to the transport network and land use environment around the site. It is structured to summarise:

- UFTI;
- the PEI project; and
- Wairakei-Te Tumu Infrastructure Business Case.

A consolidated summary is then presented for the following documents:

- the BOP Regional Land Transport Plan (RLTP) (2024-2034);
- the NZTA tolling policy;
- the BOP Regional Public Transport Plan (RPTP) 2022-32 and the NZTA Design Guidance;
- Wairakei / Te Tumu Framework Plan, The Sands Town Centre and Employment Precinct (RPS, 2017); and
- The Sands Town Centre Integrated Transport Assessment (Mott MacDonald, 2019).

A combined summary of the above documents is presented as Section3.6. Further details about the individual plans and strategies are included as **Appendix 1**.

3.2 Urban Form & Transport Initiative (UFTI)

The Urban Form and Transport Initiative (UFTI), completed in 2020, was a partnership between SmartGrowth, central government, tangata whenua, and local councils. It set out to respond to rapid growth, rising housing pressures, and increasing transport challenges by delivering an integrated land use and transport programme for the western Bay of Plenty.

The outcome is the Connected Centres programme – a 50-year blueprint for settlement and multimodal transport to guide future investment and planning.

UFTI aims to:

- shape a sustainable, liveable urban form.
- enable sufficient housing supply across existing and new centres.
- support access to jobs, education, and services as the population grows.
- improve transport outcomes: less congestion, safer travel, more choice, fewer emissions.
- deliver long-term social, cultural, environmental, and economic benefits.

A spatial overview of the Connected Centres Programme is shown as Figure 5 and Figure 6 below.

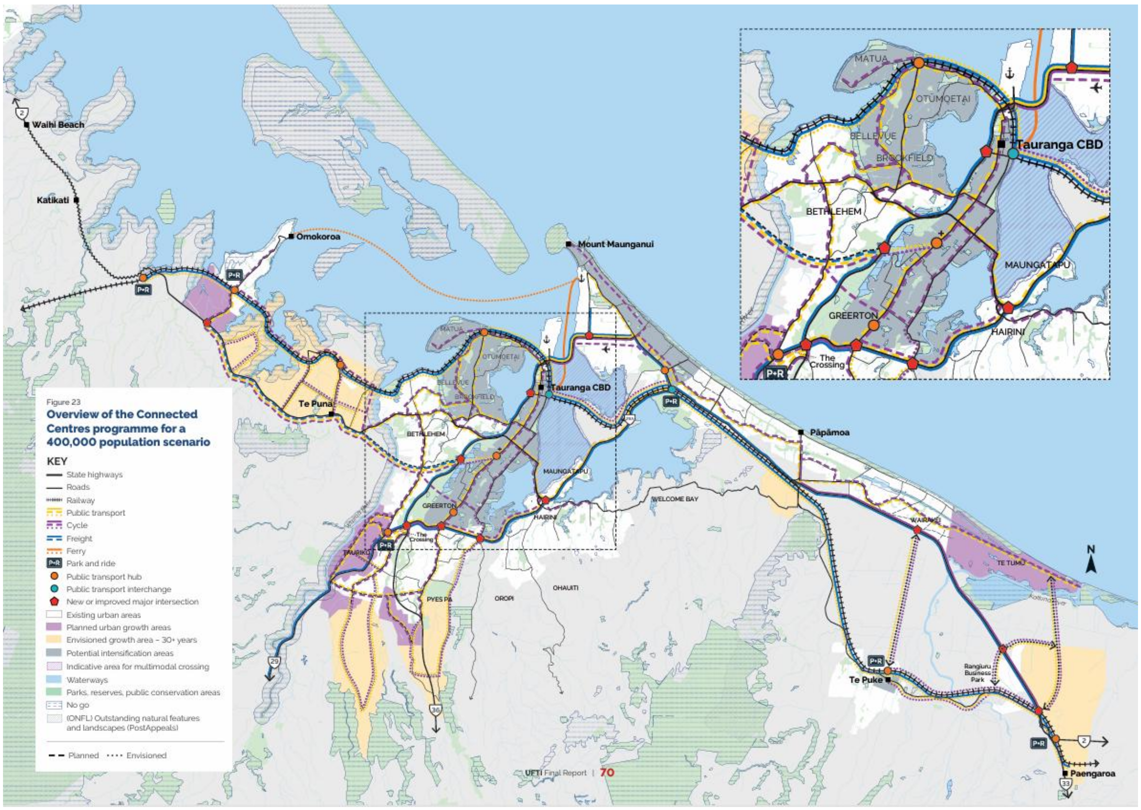


Figure 5 Connected Centres Overview (UFTI Final Report Figure 23)

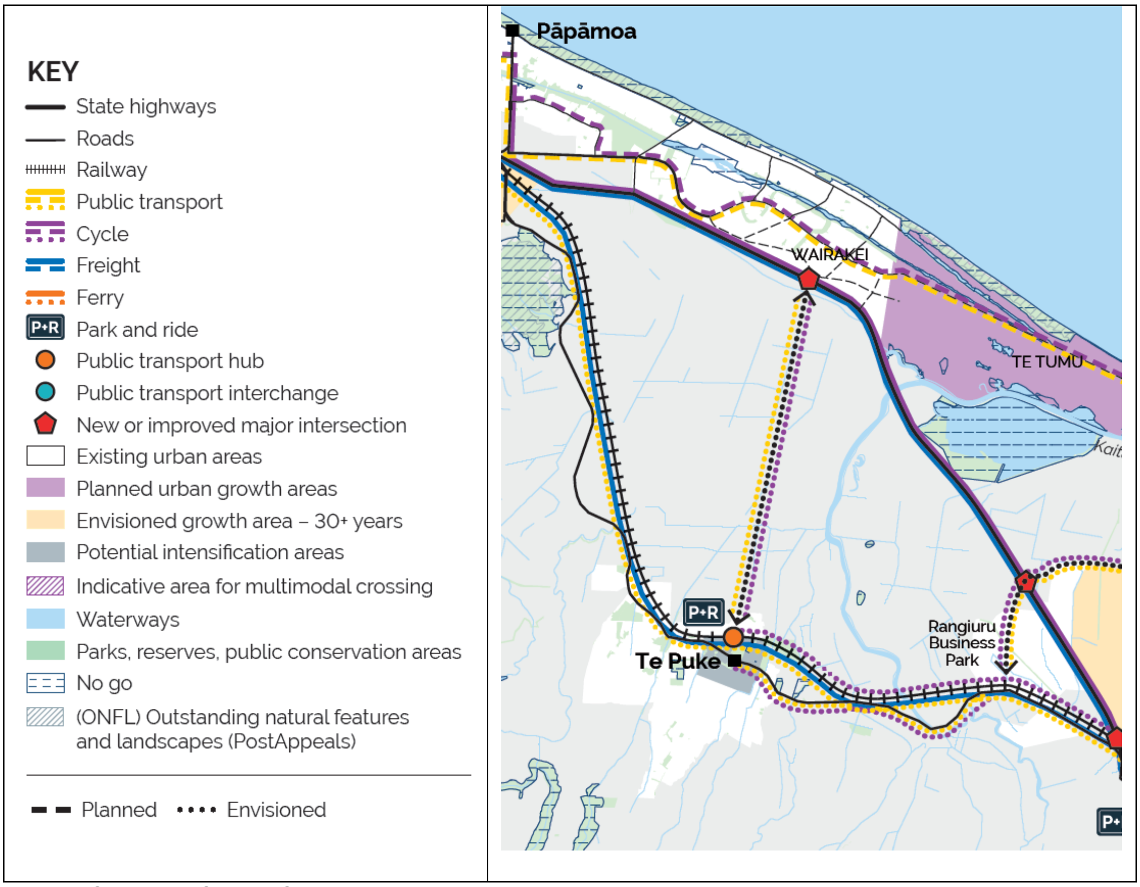


Figure 6 Connected Centres Overview (UFTI Final Report Figure 23) – Project Area Inset

Notably, UFTI envisages a transport corridor between Te Puke and Wairakei which would pass through Wairakei South. The three dotted lines (yellow, black and purple) indicate connections for public transport, cycling and road transport. This has been future-proofed within the subject site and is further described later in this assessment.

Figure 5 also shows a potential future connection to the eastern end of Te Tumu, linking this south to the Rangiuru Business Park interchange. This infrastructure and potential future connection has not been included in the assessments undertaken in this report. The infrastructure is not a funded project, but is understood to be a desired future link by the land owners (Ford Lands) and would have a significant reduced traffic demand impact at the PEI interchange and The Sands Avenue / Te Okuroa Drive corridor areas if implemented.

UFTI identified three core growth challenges:

- Housing & Transport Choice: undersupply of homes, limited dwelling types, and high private vehicle reliance.
- Access to Services: congestion and capacity constraints limiting wellbeing and productivity.
- Dispersed Growth: Tauranga's harbour geography and polycentric pattern funneling demand into a few constrained corridors.

Key features of the Connected Centres Programme include:

- Settlement Pattern: 95,000 new homes by 2070, split between intensification of existing centres (Te Papa, CBD, Mount Maunganui) and greenfield growth in Eastern (Te Tumu/Wairakei/Rangiuru), Western (Tauriko/Keenan Road), and Northern (Omokoroa/Te Puna) corridors.
- Density: minimum 30 dwellings/ha in greenfield areas, higher around PT hubs.
- Transport Corridors: four high-frequency PT corridors, supported by cycleways and walkable networks.
- Mode Shift: 15–20% PT/active share by 2048.
- Freight: reliable access to the Port of Tauranga and regional distribution.
- Principles: compact growth, integrated housing and transport, walkable neighbourhoods, climate resilience.
- Economics: efficiency ratio of 1.0–1.4, with long-term benefits outweighing costs.

Implementation is led by the SmartGrowth partnership, with:

- A joint spatial plan to align land use and transport.
- Priority actions: Te Papa intensification, Cameron Road corridor, Tauriko and Te Tumu planning, harbour crossing studies, and multimodal upgrades at PEI and Rangiuru.
- KPIs tracking housing supply, accessibility, mode share, safety, and emissions.

3.3 Papamoa East Interchange (PEI)

The recently completed PEI is a collaboration between TCC and NZTA with support from BOPRC and WBOPDC. The PEI is a full diamond interchange that connects into Papamoa East via The Sands Avenue. The interchange includes a bridge structure carrying The Sands Avenue over the TEL with on- and off-ramps connecting to the TEL in both directions. Signalised intersections are provided at the ramp terminals, forming a coordinated network with The Sands Avenue and Te Okuroa Drive corridor.

3.4 Road Tolling

The TEL is currently tolled. The tolling is planned to be removed once the TEL is paid off, which has been confirmed by NZTA for 2037/2038. Tolls on the TEL have therefore been removed in the 2048 and 2063 model scenarios (confirmed by the transport stakeholder group engagement) that are described later in this report.

Specific details of tolling on the TEL and elsewhere in the network are captured in the Beca modelling report that is included as **Appendix 3**.

3.5 Wairakei-Te Tumu Infrastructure Single Stage Business Case

TCC commissioned the Wairakei–Te Tumu Single Stage Business Case (SSBC) in 2024 to confirm the transport network requirements needed to unlock development of the Te Tumu Future Urban Zone. The SSBC applied the national business case approach to test long-list and short-list options, evaluate costs and benefits, and identify a preferred programme for transport investment.

The SSBC set out to:

- define the transport system upgrades necessary to enable Te Tumu to develop to its planned capacity.
- evaluate different investment options in terms of cost, performance, safety, mode shift and emissions outcomes.
- provide certainty on the cross-sections, functions, and staging of the two key east–west transport corridors (The Boulevard and Te Okuroa Drive).
- ensure alignment with the Urban Form and Transport Initiative (UFTI) and the Connected Centres vision.

The key conclusions of the SSBC included:

- the PEI is confirmed as the critical gateway for Te Tumu and the wider eastern corridor, with all growth scenarios requiring it and ultimately needing additional capacity.
- the Boulevard is confirmed as the rapid transit corridor with bus lanes, separated cycleways and pedestrian priority, while Te Okuroa Drive is designated as a higher-capacity traffic route with staged four-laning.
- initial housing can be supported on The Boulevard alone if travel demand management caps vehicle trip generation, but further development requires upgrades to Te Okuroa Drive and more PEI capacity.
- achieving high levels of public transport, walking and cycling use is essential for both network performance and emissions reduction objectives.
- the preferred option is affordable within the Long-Term Plan and its deliverable is within realistic construction timeframes.

3.6 Other Plans and Directions

Key points from the other documents listed above and included in more detail at **Appendix 1** are:

- **RLTP 2024–2034** sets the statutory direction for $8b of regional transport investment, focused on safety, resilience, emissions reduction, mode shift, and growth. Key projects include the PEI, Te Tumu multimodal infrastructure, Cameron Road corridor upgrades, and freight corridor improvements.
- **NZTA Tolling Policy**: TEL is tolled; December 2024 changes allow corridor-wide schemes, inflation-linked charges, mandatory HCV use, and require free alternatives. Consultation on

tolling the Takitimu North Link signals a broader move to corridor tolling. A national tolling plan is in development.

- **RPTP 2022–32 & PTDG (2023 draft)**: Framework for PT planning and design. Targets 20% mode share by 2032 and a zero-emission fleet by 2035. Growth areas like Wairakei South must protect PT corridors, integrate with PEI, provide for park-and-ride and active modes, and adopt national PT design standards for future-proofed, multimodal infrastructure.
- **Wairakei / Te Tumu Framework Plan (2017)**: Established the land use/transport framework for Papamoa East, anchored by Golden Sands Town Centre. Forecast ~11,500 dwellings and 110 ha Industrial land. Transport outcomes included Te Okuroa Drive as arterial, The Boulevard as collector/rapid transit corridor, integrated walking/cycling, and PT links. Principles reinforced through later planning and UFTI.
- **The Sands Town Centre ITA (2019)**: Confirmed alignment of land use and transport with structure plan modelling. Provided for signalised intersections, staged delivery of The Boulevard, access management on Te Okuroa Drive, and multimodal facilities. Long-term strategy confirms The Boulevard as the rapid transit spine.

4.0 Strategic Policy Context

4.1 Overview

Appendix 2 presents a summary of the following relevant transport policy documents:

- Government Policy Statement (GPS) – Transport
- Government Emissions Reduction Plan 2
- Regional Policy Statement (RPS)
- SmartGrowth
- Western Bay of Plenty Transport System Plan (TSP)
- Te Puke Spatial Plan
- Indicative Te Tumu Future Structure Plan
- Western Bay of Plenty District Plan
- Western Bay of Plenty – Development Code

4.2 Key Themes

Several consistent themes emerge across the national, regional and local strategies and statutory documents. All emphasise growth management and sequencing, requiring new development to align with existing and planned infrastructure, particularly in the eastern corridor.

There is a strong focus on mode shift and emissions reduction, with increased use of public transport, walking and cycling supported by rapid transit corridors, active mode networks, park-and-ride, and zero-emission fleets. Resilience and safety remain prominent, with networks expected to withstand climate and hazard risks while reducing deaths and serious injuries through design and investment.

Integration of land use and transport is also a key theme, promoting compact, well-designed communities that reduce car dependency and strengthen access to jobs, housing and freight networks.

At the local level, the District Plan and Development Code reinforce these outcomes through zoning, subdivision and engineering standards, while the Te Tumu Future Structure Plan demonstrates how coordinated staging, multimodal corridors and interchange capacity are critical to enabling large-scale greenfield growth.

4.3 Individual Snapshots

The **Government Policy Statement on Land Transport 2024 (GPS 2024)** sets national transport investment priorities of growth and productivity, resilience, safety, and value for money, with more than $22b over three years. It reintroduces Roads of National Significance, supports alternative funding like tolling, and reinforces the Auckland–Hamilton–Tauranga freight triangle. Wairakei South aligns by unlocking housing and jobs in the eastern corridor, connecting to the TEL and PEI, and delivering resilient, safe networks.

The Emissions Reduction Plan 2 (ERP2, 2026–30) provides the policy framework to cut transport emissions through EV uptake, road user charging, time-of-use pricing, zero-emission PT fleets, and support for green freight. Wairakei South is relevant through future-proofed PT corridors, EV charging potential at the PEI, walkable neighbourhoods, and a multimodal hierarchy that supports long-term decarbonisation.

The Bay of Plenty Regional Policy Statement (RPS) provides the statutory framework for compact growth, integrated transport, sequencing of development, and alignment with infrastructure capacity. Wairakei South fits as a logical extension of Wairakei, provided it delivers sustainable infrastructure, multimodal integration with the PEI and The Boulevard, and compact, walkable communities.

The SmartGrowth Strategy 2024–2074 is the sub-regional growth management partnership plan, designating Priority Development Areas (PDAs) such as Wairakei and Te Tumu. While Wairakei South is not included, it sits alongside these PDAs and should reflect the same principles of sequencing, connectivity, and compact growth consistent with the Connected Centres framework.

Western Bay of Plenty Transport System Plan (TSP, refreshed 2023) is the 30-year implementation plan for UFTI, staging key investments for mode shift and sustainable growth. It prioritises collector roads, bus priority, HOV lanes, park-and-ride, and multimodal corridors in the eastern growth areas. Wairakei South must integrate into these projects, ensuring PT alignment and active mode connectivity.

Te Puke Spatial Plan (draft, 2024) frames Te Puke within the eastern corridor, with focus on congestion relief, freight links to Rangiuru and TEL, diversification of travel modes, and climate resilience. Wairakei South should align with these principles, supporting corridor-wide coordination, freight access, multimodal design, and integrated stormwater and resilience measures.

The **draft Te Tumu Future Structure Pla**n provides for a coastal community of 15,500–25,000 people and around 2,500 jobs, centred on the Golden Sands Town Centre and supported by a transit-oriented network. Key elements include a rapid transit spine along The Boulevard, four-laning of Te Okuroa Drive, and strategic reliance on the PEI with provision for long-term links via Bell Road and Kaituna. Transport modelling confirms high internalisation of trips if local services are delivered alongside housing, and staging allows up to 1,450 dwellings via The Boulevard before further upgrades are required.

The **Western Bay of Plenty District Plan** is the statutory framework managing land use and subdivision across the District. Wairakei South is currently zoned Rural, with State Highway 2 and the PEI designated for strategic infrastructure. The **WBOPDC Development Code** guides the design and construction standards for subdivision and development infrastructure, ensuring assets vested in Council are safe, consistent and sustainable. It combines high-level design principles—such as integrated land use and transport, walkable neighbourhoods, multimodal networks, and low-impact stormwater management—with detailed construction standards for roads, pavements, footpaths, cycleways, kerbs, drainage, signage and testing. Aligned with strategies including SmartGrowth and the Walking and Cycling Strategy, it provides both a baseline for compliance and scope for innovative solutions.

5.0 Development Proposal

5.1 Overview

Wairakei South is intended to accommodate a mix of residential neighbourhoods, Industrial employment land and supporting community facilities over an extended development timeframe.

The development is expected to ultimately provide approximately 2,750 dwellings together with approximately 55 hectares (ha) of Industrial land, delivered progressively in stages. A concept framework plan is shown below as Figure 7.

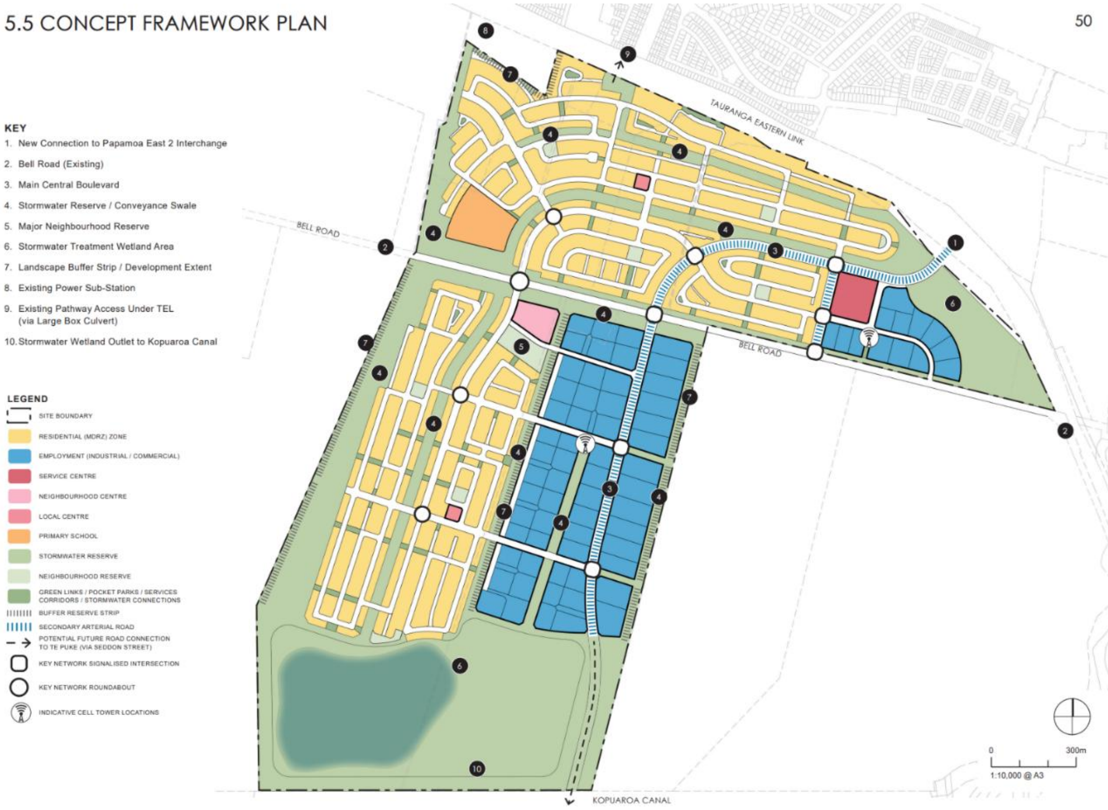


Figure 7 Concept Framework Plan (Source: AEE Appendix C – Master Plan Figure 5.5)

Development will occur within a connected street network that integrates with the surrounding transport system and provides access to the strategic road network via the PEI and the Bell Road corridor.

The transport framework for Wairakei South has been designed around a clear street hierarchy. A primary arterial connection links the development area to the PEI and provides the principal connection to the TEL corridor. This corridor has been purposely future proofed so as not to preclude potential future projects (unrelated to Wairakei South) such as a connection to Seddon

Street in Te Puke and the extension of Bell Road east towards Te Tumu. These opportunities are discussed further in Section 8.12 and Section 8.13.

A network of collector roads distributes traffic through the development area, while local residential streets provide property access and operate as low-speed neighbourhood environments.

The proposed street network also incorporates facilities for walking and cycling and is designed to provide connectivity between neighbourhoods and to the surrounding transport corridors. In particular, the PEI bridge provides the primary connection for active modes between the existing Wairakei urban area to the north and the future Wairakei South community.

Further detail on the structure of the internal transport network, typical street cross-sections and key transport infrastructure elements is provided in the following sections of this report, with supporting drawings included in Boffa Miskell's drawing package.

5.2 Staging

A preliminary staging plan for the development is shown in Figure 8 below. This is based on projections of annual infrastructure delivery and the likely annual build rate of houses. The sequencing of stages may vary over time in response to development patterns, infrastructure provision and wider network considerations.

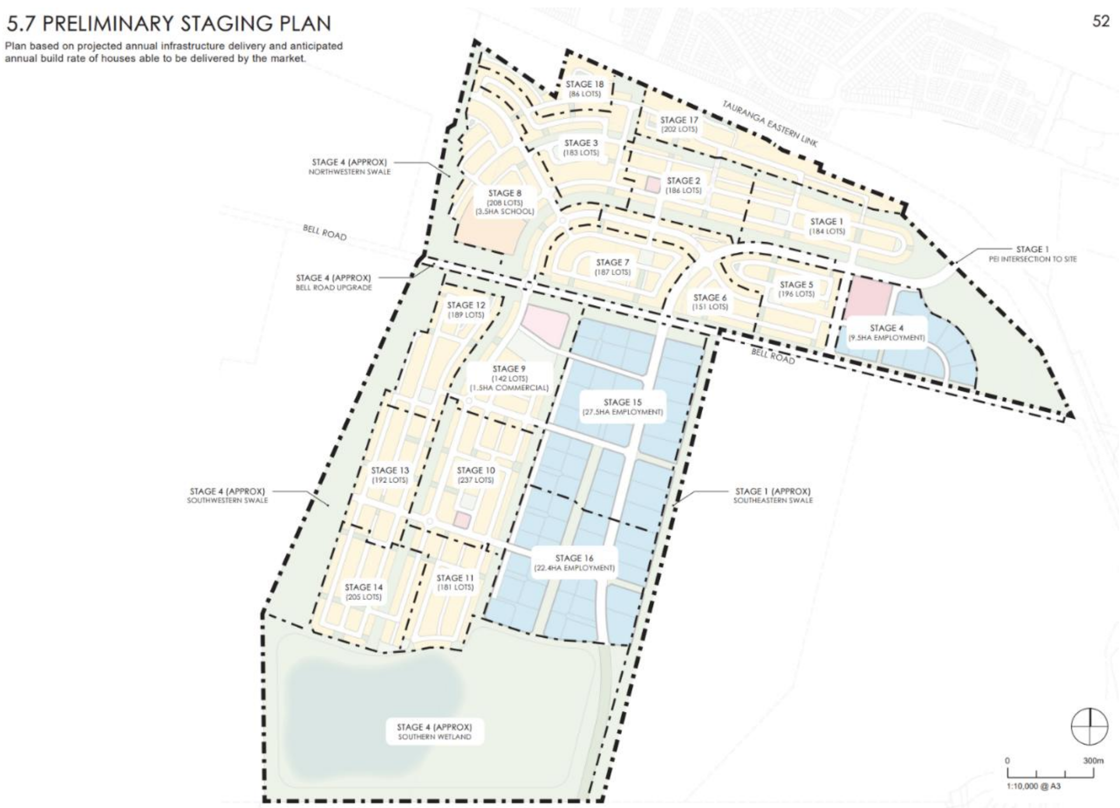


Figure 8 Preliminary Staging Plan (Source: AEE Appendix C – Master Plan Figure 5.7)

The staging of transport infrastructure for Wairakei South reflects the way transport networks typically respond to growth, which differs from connection-based infrastructure such as water and wastewater. While three waters systems are driven by immediate connection demand and require capacity to be available ahead of development, transport effects arise from travel behaviour and develop progressively over time.

Transport demand is concentrated in peak periods, distributes across the network, and is influenced by a range of factors including staging geography, network conditions, internal trip capture, mode choice, and the timing of the Industrial employment land. As a result, network effects do not increase linearly with each additional dwelling but instead emerge at specific points where capacity or performance thresholds are being reached.

Recognising these differences across infrastructure types, the staging approach adopted in this assessment is based on defined transport thresholds identified through the various levels of modelling. These thresholds (captured in the recommended transport conditions) indicate when targeted upgrades are required to maintain appropriate network performance. This enables transport infrastructure to be delivered incrementally, aligned with the progression of development and wider infrastructure provision, while avoiding both premature investment and delayed intervention.

5.3 Road Network Structure and Hierarchy

The Wairakei South transport network has been designed to integrate with the surrounding strategic road network while providing a clear internal hierarchy that supports efficient movement and appropriate neighbourhood street environments.

Access to the wider road network is provided primarily via the PEI which connects the development area to the TEL, The Sands Avenue and Te Okuroa Drive corridors.

A secondary connection to the wider road network is provided via Bell Road, which connects to Te Puke Highway and Parton Road and provides an alternative route for local traffic distribution. As described later in this report, upgrades to the Bell Road corridor and the Te Puke Highway intersection are proposed to support this function and ensure safe and efficient operation as development progresses.

The proposed transport network structure and road hierarchy are illustrated on Figure 9, with larger scale plans also included in the AEE Appendix C: Masterplan – Figure 5.11.

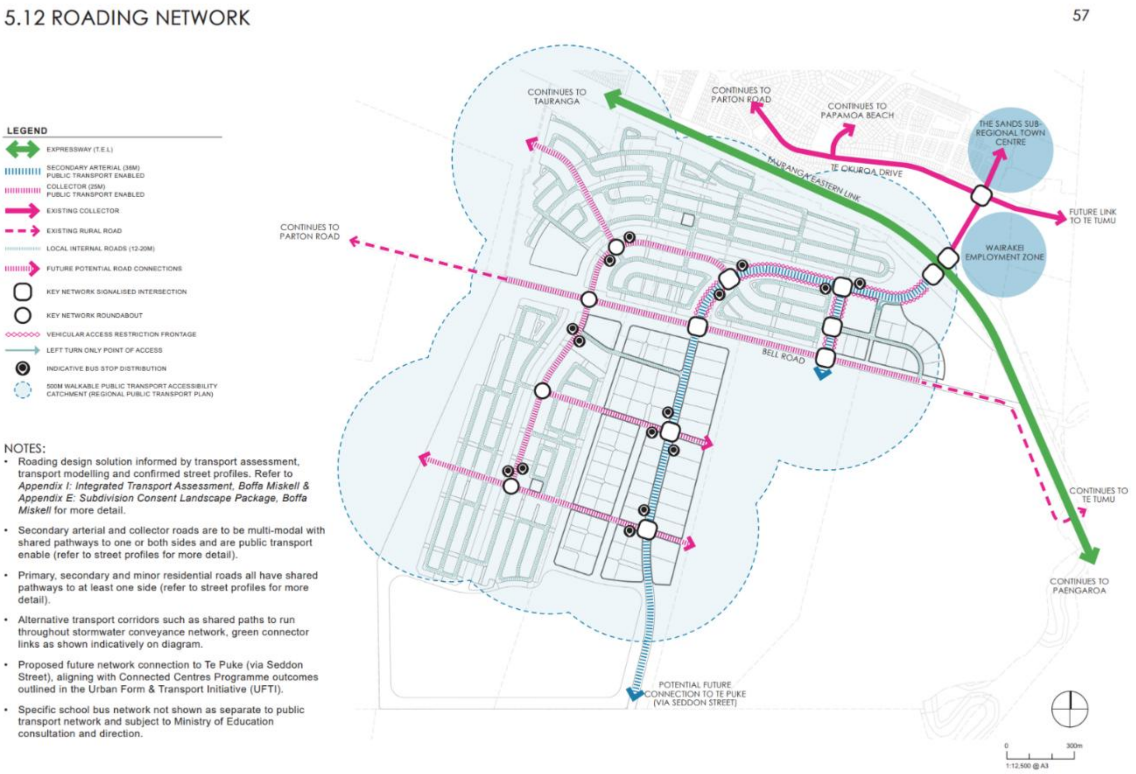


Figure 9 Road Network Structure and Hierarchy (Source: AEE Appendix C: Masterplan – Figures 5.12)

Within the development area, the street network is structured around a clear road hierarchy. A secondary arterial corridor extends south from the PEI and forms the main spine of the development. This corridor accommodates the highest traffic volumes within the development area and provides the principal movement route for vehicles, public transport, pedestrians and cyclists travelling to and from the wider network.

A series of collector roads connect to the arterial corridor and distribute traffic throughout the development area. These roads provide connections between neighbourhoods and to the external road network while also accommodating local bus (public transport) movements and active mode connections.

Local residential streets branch from the collector network and provide direct property access. These streets are designed to operate as low-speed environments that prioritise safety and local accessibility. Traffic calming features and street design elements are incorporated to support reduced operating speeds and to create a neighbourhood-focused street environment. These are described later in Section 5.7.

The overall network structure ensures that higher traffic volumes are accommodated on the arterial and collector corridors, while local streets function primarily for property access and neighbourhood circulation. This hierarchy supports efficient traffic distribution while maintaining appropriate safety and amenity outcomes within residential areas.

5.4 Multi-Modal Transport Network

The proposed transport network has been developed to support a range of travel modes including walking, cycling and future public transport services. The proposed multi-modal network is shown as Figure 10 below.

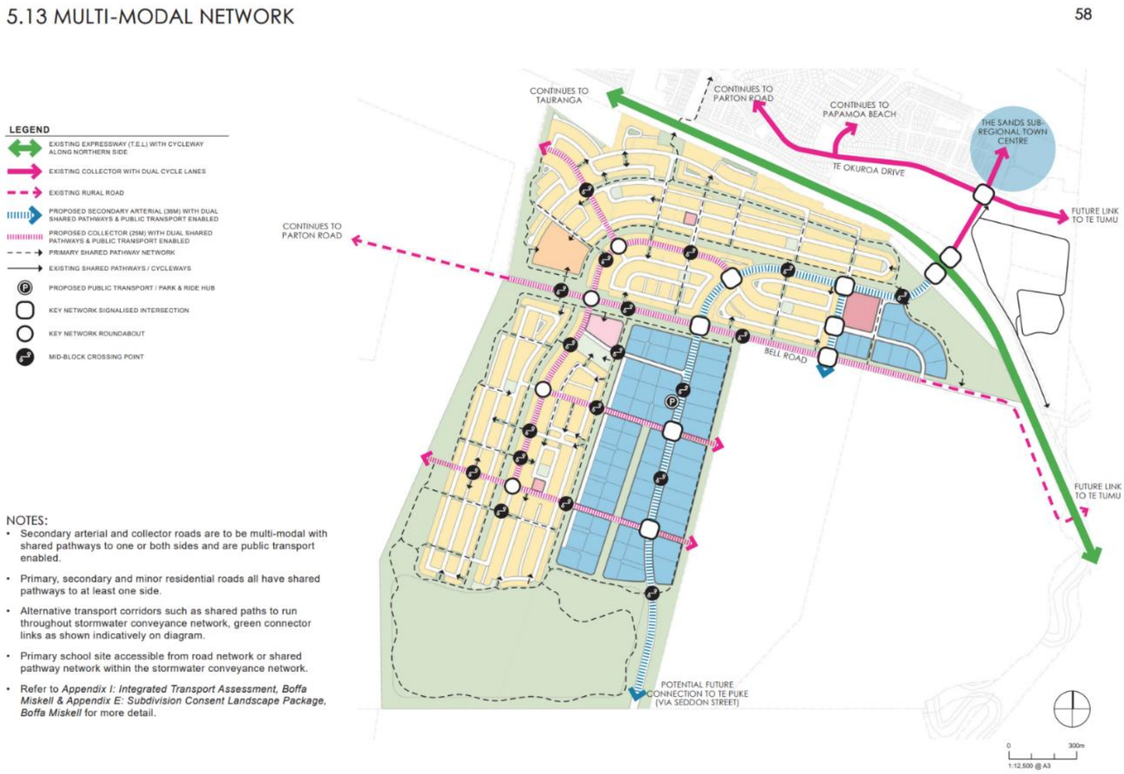


Figure 10 Multi-Modal Transport Network (Source: AEE Appendix C – Figure 5.13)

The secondary arterial and collector corridors have been designed as multi-modal streets that accommodate general traffic, active transport and future public transport services. Their street profiles accommodate bus stops and the necessary road space for safe and efficient public transport movements.

This is supported by a network of shared pathways and cycling facilities proposed to connect residential areas with local destinations including the planned neighbourhood centre, service centre, Industrial employment areas and the proposed primary school. These routes are integrated with the surrounding open space network to provide direct and attractive active transport connections.

The layout of the road and pathway network has also been designed to achieve alignment with the BOP RPTP objective of providing public transport access within a walkable catchment. The roading network design (AEE Appendix C – Figure 5.11) demonstrates that all areas within the development are located within 500m of public transport routes. These 500m walkable catchments are shown encompassing the development on Figure 9 above and this catchment outcome confirms alignment with the RPTP policy guidance.

Development of the multi-modal network has occurred in consultation with BOPRC Officers, with discussions focusing on the provision of public transport corridors, bus stop infrastructure and potential future service integration. This engagement has informed the design of the road hierarchy and cross-sections to ensure the network can support public transport operations when services are introduced. A letter of support from BOPRC is included as **Appendix 5**.

5.5 Proposed Road Cross-Sections

As described above, the proposed road typologies include:

- Secondary arterial roads;
- Residential collector roads;
- Primary residential streets;
- Secondary residential streets;
- Minor residential streets;
- Shared access lanes / private lanes'
- A specific typology for Bell Road; and
- Industrial collector roads;
- Industrial local streets.

Each road type has been designed to meet or exceed the relevant minimum requirements of the Development Code. The cross-sections reflect the intended function of each street within the wider network and support the various needs of the different transport modes.

They variously include provision for active transport facilities such as shared paths and cycleways, space for public transport stops and services, on-street parking where appropriate, streetscape planting and landscaping, and sufficient berm width to accommodate underground services and other infrastructure. Landscaping and utility service needs are addressed by other experts in other parts of the Application. The cross-sections are shown indicatively as Figure 11 to Figure 16 below. These together with larger scale and more comprehensively detailed perspective images are incorporated in the AEE at Appendix E Subdivision Consent Landscape Package Sheets 1.2.1 to 1.6.2.

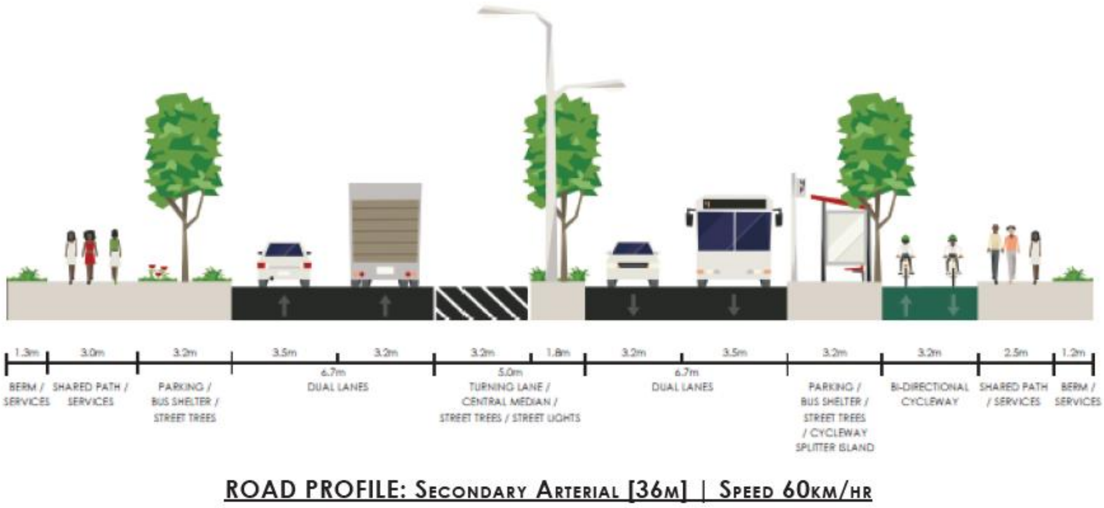


Figure 11 Secondary Arterial Cross-Section: (Source: AEE at Appendix E Subdivision Consent Landscape Package Sheets 1.2.1 to 1.6.2)

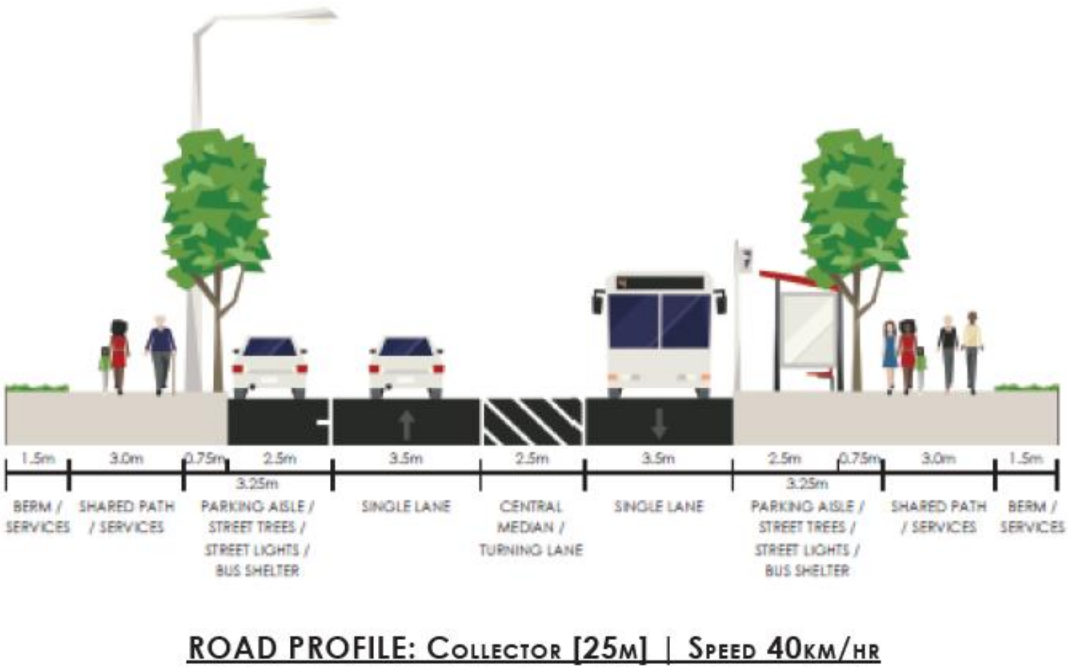


Figure 12 Collector (25m) Cross-Section: (Source: AEE at Appendix E Subdivision Consent Landscape Package Sheets 1.2.1 to 1.6.2)

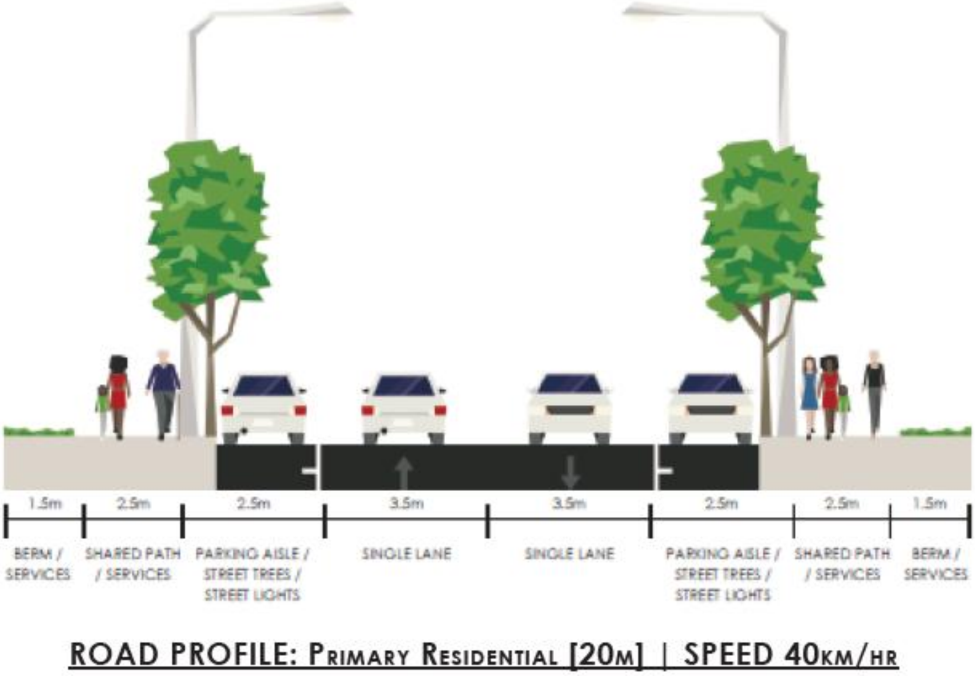


Figure 13 Primary Residential (20m) Cross-Section: (Source: AEE at Appendix E Subdivision Consent Landscape Package Sheets 1.2.1 to 1.6.2)

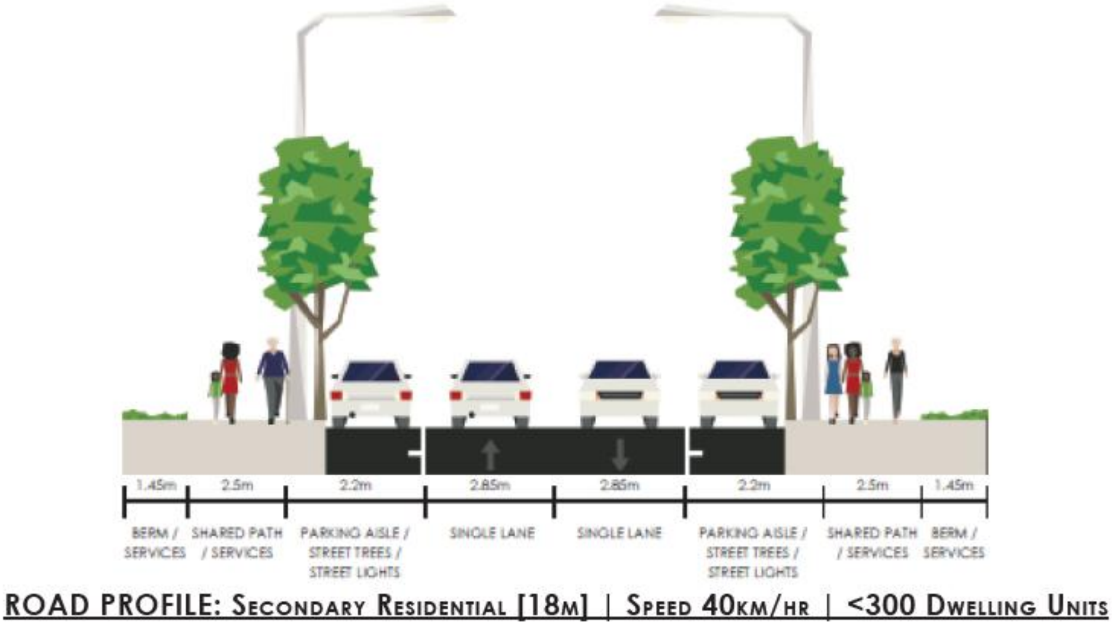


Figure 14 Secondary Residential (18m) Cross-Section: (Source: AEE at Appendix E Subdivision Consent Landscape Package Sheets 1.2.1 to 1.6.2)

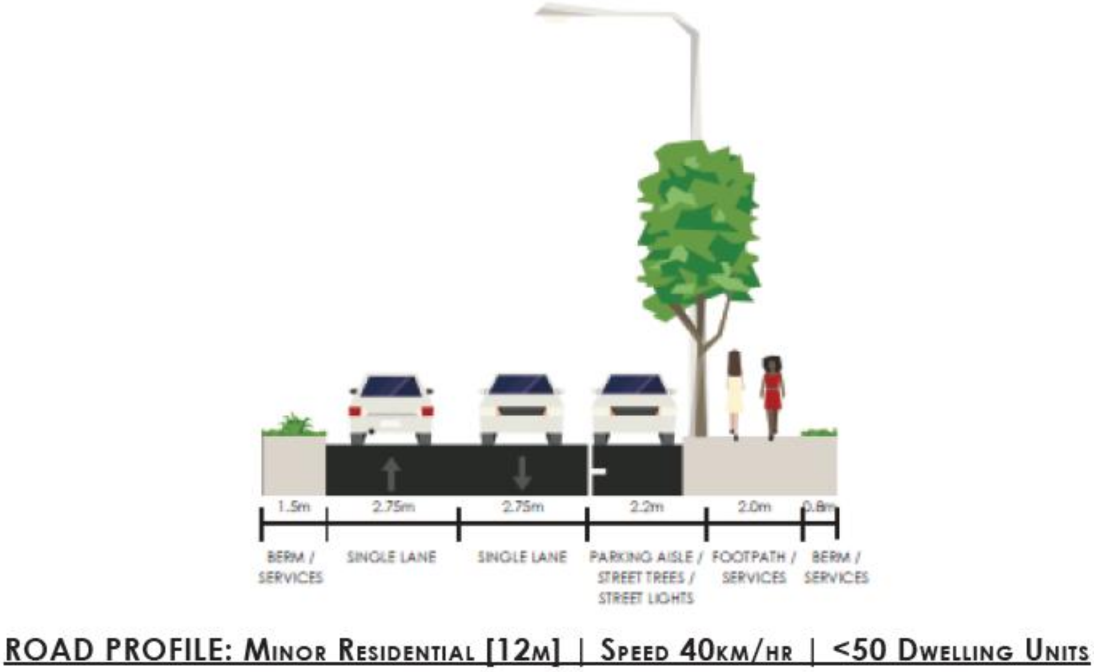


Figure 15 Minor Residential (12m) Cross-Section: (Source: AEE at Appendix E Subdivision Consent Landscape Package Sheets 1.2.1 to 1.6.2)

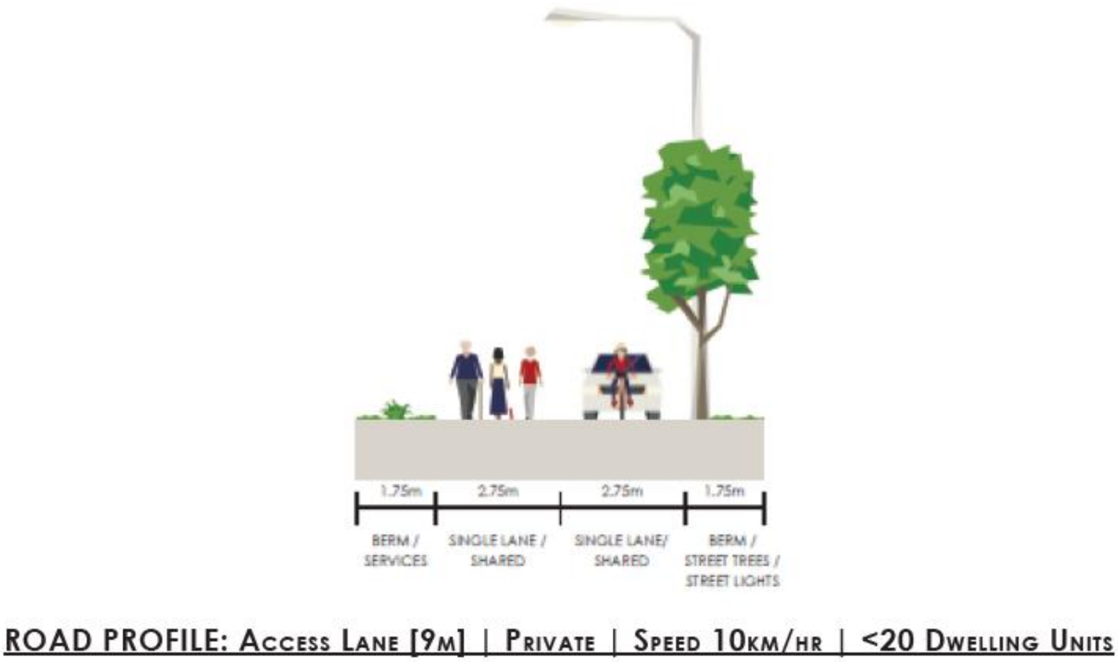


Figure 16 Access Lane (9m) Cross-Section: (Source: AEE at Appendix E Subdivision Consent Landscape Package Sheets 1.2.1 to 1.6.2)

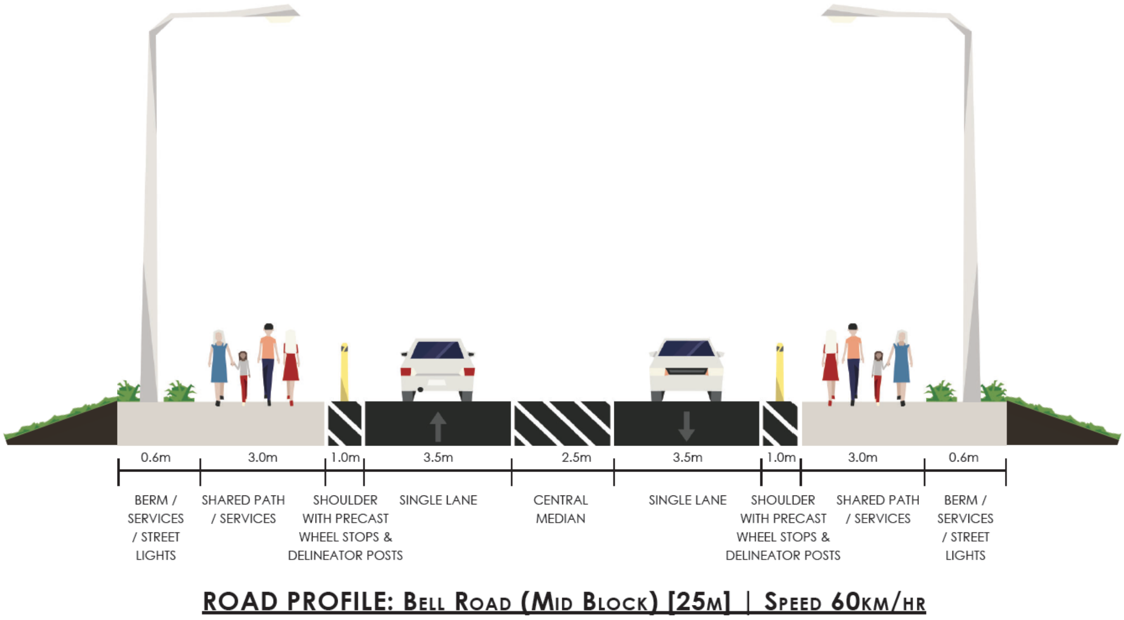


Figure 17 Bell Road Mid-block (25m) Cross-Section: (Source: AEE at Appendix E Subdivision Consent Landscape Package Sheets 1.2.1 to 1.6.2)

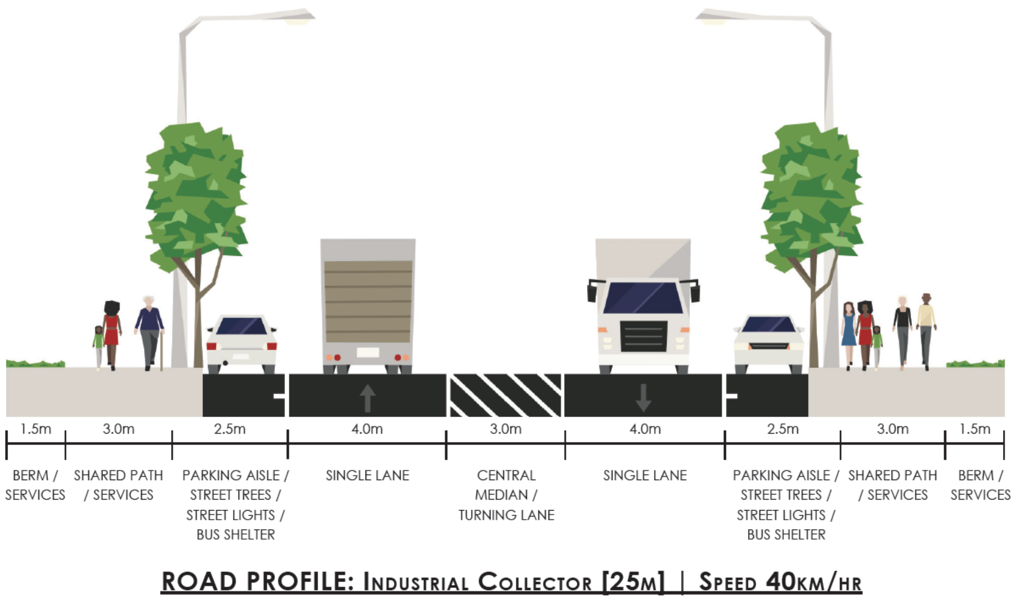


Figure 18 Industrial Collector (25m) Cross-Section: (Source: AEE at Appendix E Subdivision Consent Landscape Package Sheets 1.2.1 to 1.6.2)

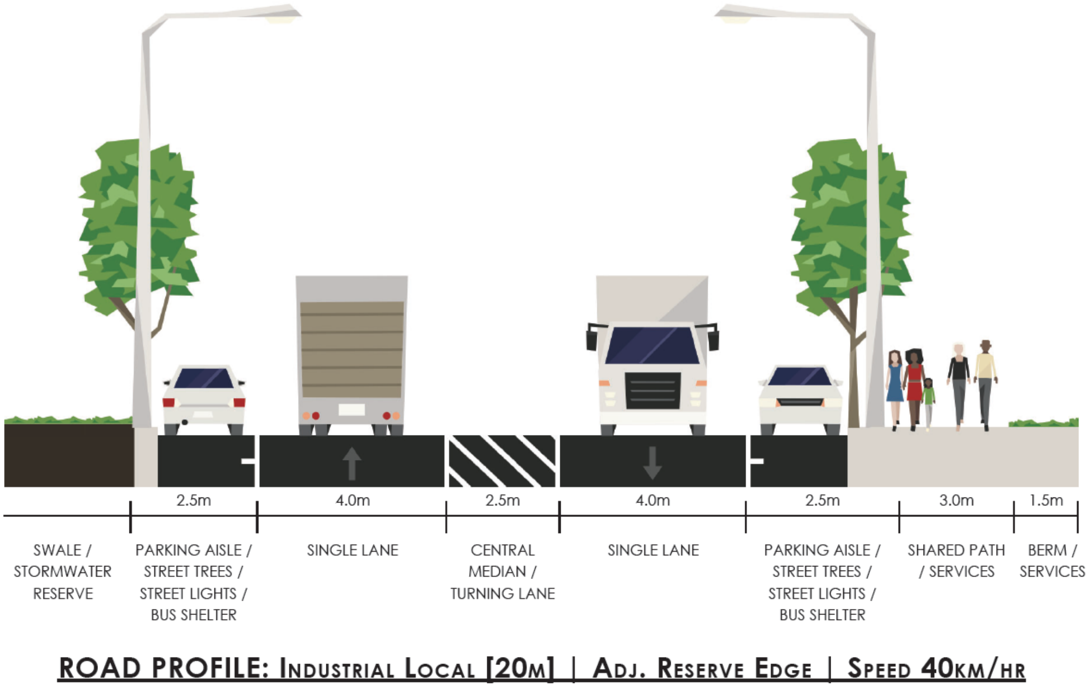


Figure 19 Industrial Local (20m) Cross-Section: (Source: AEE at Appendix E Subdivision Consent Landscape Package Sheets 1.2.1 to 1.6.2)

Larger versions of these drawings and detailed renders are included in the AEE at Appendix E Subdivision Consent Landscape Package Sheets 1.2.1 to 1.6.2. These cross sections are proposed to be enabled through the Transport condition framework (Section 11 and **Appendix 15**), based on the following summary Table:

Table 5-1: Summary Cross Section Forms for Adoption in the Transport Conditions Framework

Classification	Road Reserve Width (m)	Carriageway Width including Parking (m)	Public / Private	Max Grade (%)	Units Serviced (Inclusive)	Indicative Speed Limit (km/h)	Principal Function
Secondary Arterial	36	23.4	Public	10	Any	Up to 60	Through movement, limited access
Collector Road (Industrial)	25	16	Public	10	Any	Up to 50	
Collector Road (Residential)	25	14.5	Public	10	Any	Up to 50	Connectivity between local and secondary arterial and property access
Collector Road - Bell Road West (Mid-block)	25	10	Public	10	Any	Up to 60	
Collector Road - Bell Road Central (Mid-block)	25	11.5	Public	10	Any	Up to 60	Rural cross section transport network distribution, no direct access
Collector Road - Bell Road East (Mid-block)	25	12	Public	10	Any	Up to 60	
Industrial Reserve Edge	20	15.5	Public	10	Any	40	Local transport network distribution and accessibility
Primary Residential	20	12	Public	10	Any	40	Local access, some minor through function
Secondary Residential	18	10.1	Public	10	<300	40	Primary residential access
Local Residential	12	7.7	Public	12	<50	40	Local access
Access Lane	9	5.5	Private	20	<20	10	Shared street, multi-modal

5.6 Intersections

Conceptual designs for a range of intersections within and around the Wairakei South development are documented within the civil design package prepared by Maven Consultants (AEE Appendix D Engineering Drawings). This package includes the design of major intersections within the site, as well as those forming part of the proposed off-site mitigation works described in other parts of this report.

The intersection layouts have been informed by the transport modelling undertaken for the development, including the strategic modelling (TTSM), operational modelling (TTHM), and supplementary SIDRA assessments. This modelling has identified key movement patterns, turning demands, and network sensitivities, which have in turn informed the selection of intersection forms, lane configurations, and control types.

Within the development area, intersections have been designed to align with the proposed road hierarchy and intended street functions, supporting appropriate operating speeds and safe interaction between vehicles, pedestrians and cyclists. The selection of intersection types (including signalised intersections, roundabouts, and priority-controlled intersections) reflects the expected traffic volumes and movement patterns at each location.

For the surrounding network, the proposed intersection upgrades form part of the staged mitigation response identified through the assessment. These include modifications to existing intersections and the introduction of new intersection layouts where required to accommodate increased demand and maintain appropriate network performance as development progresses.

The detailed design of all intersections will be confirmed at detailed design stages, in consultation with the relevant road controlling authorities. This will include confirmation of geometry, lane arrangements, traffic control, and any associated safety or operational features, consistent with the applicable design standards and the conditions framework outlined in Section 11.0. Proposed conditions require designs to be in accordance with the Code of Practice and/or relevant (Austroads) roading design standards and further safety audit procedures are recommended in accordance with the WBOPDC Code of Practice requirements.

5.7 Safe Sight Distance Provisions

Maven Consultants has progressed the developed engineering design roading, intersection and off-site mitigation transport infrastructure. These drawings are included in the AEE at Appendix D: Engineering Drawings.

Safe sight distances have been assessed in accordance with Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections design guidance. The drawing package includes an overall sight distance compliance assessment check sheet confirming the ability for the proposed designs to achieve compliance.

In some minor and local road cases the sight distance may appear to be inconsistent with the design guidance due to close proximity of an adjacent intersection or a bend in the road corridor for example. These cases have been assessed independently on the basis of expected travel operational speed of approaching vehicles, which in these cases are all limited by the need to stop or give way at an intersection or due to the low speed radius curve of a bend or due to positive traffic management intervention such as is detailed on the traffic calming and speed management plans in the following sections. On an approach speed basis, compliance is expected in all cases.

To ensure a safe sight distance outcome for the Wairakei South development a specific condition of consent has been recommended in **Appendix 15** and **Appendix 16** of this report and incorporated with the AEE Appendix AD: Proposed Conditions.

5.8 Traffic Calming and Speed Management

Traffic calming and speed management measures have been incorporated into the internal road network to support safe operating speeds and to create a street environment that safely accommodates vehicles, pedestrians and cyclists.

This is achieved through a combination of network design, intersection control and vertical traffic calming devices. These measures are distributed throughout the development to reinforce appropriate speed environments consistent with the function of each street type.

Key traffic management measures include:

- signalised intersections at key locations along Bell Road and the secondary arterial;
- standard roundabouts at selected intersections within the residential areas;
- mini roundabouts at lower order intersections to moderate turning speeds and improve intersection control;
- signalised pedestrian crossings on key movement corridors; and
- raised speed tables and raised pedestrian crossing platforms along residential streets and near key destinations.

Together these measures act to regulate vehicle speeds, improve pedestrian crossing opportunities and enhance intersection safety throughout the network.

The distribution of these measures across the development is illustrated on Figure 20.

Figure 20 Traffic Calming and Speed Management Measures (Source: AEE Appendix E Subdivision Consent Landscape Package Sheet 1.7, 1.7.1 and 1.7.2)

The detailed form and spacing of traffic calming devices will be confirmed during the detailed engineering design stage in accordance with the applicable WBOPDC standards and relevant transport design guidance.

5.9 Car Parking

Car parking is proposed to be provided through a combination of on-site parking within individual development lots and on-street parking within the public road network. This approach is consistent with the intended urban form of the development and supports the creation of a walkable neighbourhood environment while ensuring that typical parking demand can be accommodated without adverse effects on the transport network.

For residential development, parking supply is primarily provided within individual lots. The National Policy Statement – Urban Design (NPS-UD) directed the removal of parking minimums from District Plans and as a consequence there are no minimum parking requirements for the proposed land uses in the WBOPDC.

Notwithstanding this, the applicant recognises the market demand for on-site parking, the environmental merit resulting from a constrained supply perspective as well as the potential for adverse off-site effects as a result of under supply. Accordingly, it is proposed that parking supply be required in accordance with the District Plan guidance (no minimum quantity requirement but includes accessible parking and design and layout guidance), but that guidance on supply is established in the Proposed Industrial, Residential and Commercial Area Design Guidelines (AEE Appendices AE, AF and AG).

By way of the further management of off-site (on-street) visitor parking, the recommended consent conditions propose a minimum supply of 1 space for every 7 residential units. Commercial and Industrial areas are recommended to demonstrate at the time of consent, the appropriate mitigation of potentially adverse off-site parking effects. These spaces are to be provided within the public road network through the inclusion of on-street parking bays within the road cross-sections that have been defined.

In relation to the provision for off-site visitor parking, this has drawn from Australian Roads and Maritime Services (RMS) evidential design guidance[2] with some further local consideration and assessment. The RMS guidance recommends 1 space per 5 residential dwellings with the ability to extend this to 1 in 7 in higher density living environments. In order to maintain a degree of restraint on the supply of off-site parking and to support public transport, walk and cycle and other alternative mode uses, the more constrained 1 space per 7 residential dwellings off-site visitor parking minimum supply level is recommended.

The road cross-sections (described above at Section 5.5) incorporate dedicated on-street parking spaces where appropriate, consistent with the intended street hierarchy and land use context.

Detailed parking layout and design will be undertaken at the subdivision and development stage and will be consistent with the relevant WBOPDC District Plan provisions and/or applicable national Building Code standards, including AS/NZS 2890.1 (Off-street Car Parking) and AS/NZS 2890.5 (On-street Parking).

5.10 Staging and Conditions Framework

A comprehensive transport conditions framework is proposed to ensure that the development of Wairakei South occurs in a manner that maintains the safe and efficient operation of the surrounding transport network and delivers the transport infrastructure required to support the development as it progresses.

The framework establishes a series of conditions that link the scale and timing of development within Wairakei South to the delivery of both internal transport infrastructure and upgrades to the surrounding road network. In particular, the conditions provide for staged implementation of network improvements aligned with the development thresholds identified through the strategic transport modelling undertaken for the development.

The indicative framework for transport conditions is included at **Appendix 15** and **Appendix 16** of this report. The developed and proposed transport conditions have been integrated with the comprehensive conditions set included with the AEE Appendix AD: Proposed Conditions.

[2] RMS (RTA) Guide to Traffic Generating Developments, Section 5.4)

6.0 Transport Assessment Methodology

6.1 Overview

The development has been comprehensively assessed using Tauranga's integrated transport modelling system and supplementary operational testing.

By way of overview, the assessment has drawn on two components of Tauranga's strategic modelling framework: the Tauranga Transport Strategy Model (TTSM) and the Tauranga Transport Hybrid Model (TTHM). These models perform different roles and are used together to inform both strategic demand forecasting and operational performance assessment[3].

The TTSM is a strategic, demand-based transport model used to forecast long-term travel patterns across the city under various growth and infrastructure scenarios. It estimates travel demand based on forecast population and employment growth and assigns that demand across the transport network to assess future network loading, corridor performance, and broad congestion patterns. The model is used primarily to test land-use scenarios, strategic policy interventions, and major network investments at a city-wide or sub-regional scale. It is not intended for site-level or intersection operational analysis.

The TTHM is a mesoscopic traffic simulation model used to assess network performance at a finer resolution, particularly within defined corridor areas. It enables more detailed analysis of link flows, intersection operation, route choice behavior and queuing than is possible within a strategic planning model. TTHM is used to test how traffic is likely to operate under future demand conditions, including the effects of network upgrades, intersection changes, and traffic management measures.

Together, the two models provide a complementary assessment framework, with TTSM establishing the strategic growth context and future demand profile, and TTHM providing a more operationally refined understanding of network performance.

Supplementary analysis was also undertaken using SIDRA and the Highway Capacity Manual (HCM) methodology specifically for ramp merge areas on the TEL.

6.2 Stakeholder Engagement

A structured transport stakeholder group engagement process was undertaken to support the development of this ITA and the associated transport modelling. The purpose of this engagement was to provide relevant transport agencies with visibility of the modelling approach and results, and to enable feedback to be incorporated as the assessment progressed.

The transport stakeholder group engagement included representatives from WBOPDC, TCC, Bay of Plenty Regional Council (BOPRC), the Bay of Plenty Regional Modelling Partnership, and NZTA. The project team (Bell Road Limited Partnership and Boffa Miskell), together with the modelling specialists (Beca), also participated in these sessions.

[3] Information sourced from 'Guidance on the Use of the Tauranga Transport Models', prepared by Beca for Tauranga City Council (18 December 2019).

A series of workshops and technical sessions were held throughout the assessment process and are documented in the engagement records (AEE Appendix AB: Consultation Summary Pack / Consultation Record). These sessions covered modelling assumptions, scenario development, and interim results from both the strategic modelling (TTSM) and the more detailed operational modelling (TTHM). They also provided a forum to discuss potential mitigation measures and the structure of transport-related consent conditions.

This iterative process enabled modelling inputs, assumptions and interpretation of results to be tested and refined in collaboration with the relevant transport authorities. It also ensured that the assessment approach, mitigation strategy and conditions framework were developed with input from the agencies responsible for the wider transport network.

BOPRC has provided a letter of support (included in **Appendix 5**) for the transport and public transport aspects of the development, confirming that the development aligns with the Regional Public Transport Plan, appropriately provides for multi-modal access, and future-proofs public transport infrastructure at this stage of the development. This reflects the outcomes of the engagement process in relation to public transport planning and integration.

NZTA has also been actively involved in the engagement process, including participation in modelling discussions and ongoing dialogue in relation to the PEI and associated network matters. NZTA has acknowledged the positive and collaborative nature of the engagement process undertaken to date in email correspondence dated 20 March 2026 (AEE Appendix AB: Consultation Summary Pack / Consultation Record).

TCC has also acknowledged the collaborative approach that has occurred in its correspondence dated 24 March 2026 (AEE Appendix AB: Consultation Summary Pack / Consultation Record).

6.3 Modelling Report (Beca)

A detailed technical report has been prepared by Beca documenting the transport modelling undertaken using the TTSM and TTHM. This report describes the model development process, assumptions, scenarios, inputs and outputs associated with the modelling work referenced in this ITA.

The modelling has been undertaken using the Tauranga Transport Modelling Suite, which is maintained by TCC, NZTA, WBOPDC and BOPRC and has been developed through multiple iterations informed by stakeholder engagement (AEE Appendix AB Consultation Summary Pack / Consultation Record).

The Beca modelling report is included in **Appendix 3** and forms the primary technical record of the modelling methodology and results.

This ITA does not reproduce the detailed modelling documentation contained within this report. Rather, it draws on the modelling outputs to assess the transport effects of the development and to interpret what the results mean in terms of network performance, mitigation requirements, and the appropriate form of transport conditions for the development.

6.4 Independent Modelling Peer Review (Flow)

The TTSM and TTHM modelling undertaken by Beca has been independently peer reviewed by Flow Transportation Specialists.

Flow Transportation Consultants (Flow) has been engaged throughout the modelling process and has provided input across multiple stages of model development, including review of land use assumptions, network representation, scenario testing, and the interpretation of modelling outputs. This process included detailed review comments and responses, which are documented in the peer review reports provided in **Appendix 4**.

The peer review confirms that an appropriate modelling methodology has been applied, and that the model outputs are sufficiently robust for assessing both the strategic and localised transport effects of the Wairakei South development.

Matters raised during the peer review process, including aspects of demand assumptions, network coding, pedestrian activity and intersection operation, have been addressed through iterative refinement of the modelling.

While the peer review notes that some uncertainty is inherent in modelling future land use and transport networks, this is typical for assessments of this scale. The modelling approach, including the use of multiple scenarios and sensitivity testing, provides an appropriate basis for identifying network sensitivities and informing the staged mitigation framework set out in this ITA.

6.5 Supplementary Analyses

Supplementary analyses were undertaken to provide a more detailed operational assessment of specific locations and network elements identified through the strategic modelling process. These analyses include intersection modelling undertaken using SIDRA Intersection software and ramp capacity checks undertaken using Highway Capacity Manual (HCM) methodologies.

6.5.1 SIDRA Modelling

To provide a more detailed operational check of key intersections, a supplementary SIDRA Network model has been developed for a subset of the network represented in the TTHM. The SIDRA model incorporates traffic demand derived from the TTHM Option 10B Mitigated scenario at 2048 and the Option 10D mitigated scenario at 2063 for both the AM and PM peak periods.

Diagrams of the modelled network and intersections[4] are included as **Appendix 6**. The modelled intersections are:

- The Sands Avenue/The Boulevard;
- The Sands Avenue/Bill Miller Drive;

[4] The Tara Road/Parton Road roundabout and the TEL/Te Puke/Highway roundabout have been modelled in SIDRA as isolated intersections and are not in the SIDRA Network model as they are remote from the core study area.

- The Sands Avenue/Te Okuroa Drive;
- PEI Northern and Southern intersections;
- the five new signalised intersections in Wairakei South;
- one new single lane roundabout in Wairakei South;
- Bell Road/Parton Road;
- Bell Road/Te Puke Highway;
- Tara Road/Parton Road;
- TEL/Te Puke Highway/SH33; and
- Latham Drive internal roundabout (east of The Sands Avenue/Bill Miller Drive intersection).

The TTHM is an Aimsun microsimulation model, which models individual vehicle movements dynamically across the network over time. SIDRA applies a deterministic intersection capacity analysis approach based on established gap-acceptance and signal control theory.

In practical terms, microsimulation models such as Aimsun represent traffic flow as a time-varying process across a wider network and are well suited to testing network interactions, route choice and traffic progression. By contrast, SIDRA focuses on the operational performance of individual intersections or small networks using defined peak demand conditions and established analytical relationships.

For this reason, SIDRA modelling is commonly used as a supplementary operational tool to test intersection layouts and signal control arrangements identified through strategic modelling. The SIDRA network model developed for this project therefore provides a more detailed representation of the operational performance of key intersections under peak demand conditions, including the examination of peak 15-minute demand periods for future modelling horizons.

Given the different modelling approaches adopted by the two tools, some variation in the operational metrics reported by Aimsun and SIDRA is expected. This reflects differences in how traffic demand is represented and how network interactions are modelled, rather than inconsistency in the underlying traffic forecasts. The SIDRA modelling should therefore be interpreted as a complementary operational check to the TTSM and TTHM modelling.

Appendix 6 includes network layouts and performance results for the modelled future scenarios, covering key intersections within the Wairakei South development and the surrounding transport network. For each intersection, the outputs present measures such as degree of saturation, average delay, level of service and queue performance for individual movements, approaches and the network (or intersection) as a whole. These results provide a detailed operational assessment of intersection performance under peak demand conditions and support the findings and conclusions of the other levels of modelling.

The SIDRA Network modelling provides a coordinated assessment of intersection performance across the key parts of the network under peak demand conditions. The results indicate that, overall, the network operates at an acceptable level, with most intersections performing with acceptable levels of service and with capacity pressures concentrated at key arterial locations, including The Sands Avenue/Te Okuroa Drive intersection and movements associated with the PEI. These locations are consistent with those identified through the wider modelling as the primary network constraints and are addressed through the staged mitigation framework. In all cases, the mitigation proposed achieves an equivalent or improved network performance outcome when compared with the Do Minimum network as a baseline.

The SIDRA Network model applies a coordinated signal optimisation process, determining cycle times, phase splits and offsets to minimise overall delay across the modelled network. In this case, a coordinated cycle time of approximately 130 seconds has been adopted, with offsets set to facilitate progression along key corridors, particularly The Sands Avenue and through the interchange. The resulting phase and offset arrangements indicate that priority is being allocated to the dominant through movements on the arterial network, with side road and turning movements experiencing higher delays where capacity is constrained.

This is an important outcome of the modelling, as it demonstrates how the network can be operated under a coordinated signal strategy to manage competing demands. In practice, signalised networks of this nature are actively managed by the network operators and signal timings, offsets and phasing can be adjusted over time in response to changing traffic patterns, network upgrades and operational priorities. This allows flexibility in how movements are prioritised, how queues are managed and stored and where delays are accommodated within the network.

Accordingly, the SIDRA Network represents one optimised operating scenario based on the modelled demand conditions. Actual network operation will evolve over time and can be adapted to respond to growth, staging of infrastructure and wider network changes. The modelling therefore provides a reasonable indication of how the network can perform, while recognising that real-world signal operation offers additional flexibility to manage performance as the network develops.

6.5.2 Highway Capacity Manual (HCM) Ramp Assessment

Supplementary analysis of freeway ramp merge performance has been undertaken using methodologies established in the Highway Capacity Manual (HCM). The HCM provides a widely recognised analytical framework for assessing the operational performance of freeway merge areas including the interaction between ramp traffic and mainline traffic within the merge influence area.

Under the HCM method, the operational performance of freeway merge areas is assessed primarily using traffic density within the merge influence area as the key performance metric. Density reflects the concentration of vehicles within the merge section and is used to determine the corresponding Level of Service (LOS). In addition to density and LOS, the HCM method provides checks on both ramp capacity and mainline freeway capacity, allowing the analysis to identify whether operational constraints arise due to limitations on the ramp flow entering the freeway or limitations on the available capacity of the freeway mainline or ramps themselves.

HCM calculations were undertaken for ramp merge locations associated with northbound and southbound on ramps at the Domain Road interchange and the PEI. Traffic volumes were taken from the TTSM and were converted to peak 15-minute flows for all 28 modelled cases across the AM and PM peaks in 2035, 2048 and 2063.

Appendix 7 presents a full summary of the input volumes and the results. Consistent with the area of influence findings that are described in the following section, only the Domain Road northbound on ramp exceeded capacity and required further investigation, for which mitigation has been recommended and is further described in the following assessments.

7.0 Area of Influence

7.1 Overview

An area of influence has been defined to identify the extent of the surrounding transport network over which the proposed development may reasonably be expected to generate material traffic effects.

Establishing this area enables the assessment to focus on those parts of the network where development-related traffic has the potential to materially affect operation. It also assists in distinguishing the effects of the development from changes in traffic conditions that arise from background growth or other unrelated developments on the wider network.

The defined area therefore provides a proportionate basis for determining where detailed assessment is required and where any transport effects can appropriately be attributed to the development.

In this case, the area of influence was identified by comparing TTSM volume and performance outputs for:

- the do-minimum networks (2035, 2048 and 2063) with no Wairakei South development; against
- the do-minimum networks with the Wairakei South development (2035, 2048 and 2063) and with no off-site network improvements.

Comparison of these scenarios for each assessment year enables locations where the development is predicted to influence traffic conditions to be identified, and the proportional contribution of development-generated traffic to those locations to be quantified.

A sensitivity test was also run to assess whether the area of influence was sensitive to the progress of development in Te Tumu. This is addressed in Section 7.2 below.

Two screening criteria were developed in consultation with modelling stakeholders and applied to identify links and intersections where the development has the potential to result in material transport effects.

The first criterion is a change in traffic demand of 10% or more, assessed using annual average daily traffic (AADT) for links and total peak hour intersection volumes (AM or PM) for intersections.

The second criterion is operating performance of LOS E or worse, assessed at either the link or intersection level in the AM or PM peak period, consistent with TTSM performance measures.

7.2 Link Screening Assessment

The full detail of the link area of influence assessment is included as **Appendix 8**.

The primary screening results are those shown in the first “with Te Tumu” table, which represents the full strategic growth context for the eastern Tauranga network.

Most links across the assessed network remain below the screening thresholds and continue to operate at acceptable levels of service with the inclusion of the Wairakei South development. Three locations trigger the screening criteria and are therefore to be carried forward for further investigation.

The first of these is The Sands Avenue between Te Okuroa Drive and the PEI, where traffic volumes are forecast to increase by approximately 43% in 2035, 39% in 2048 and 49% in 2063. While the link operates at LOS D in the DM scenario, the increased demand results in LOS E in the DM-CS scenario, and the link is therefore identified for further investigation.

The second location is Te Puke Highway south of Bell Road, where traffic volumes increase by approximately 10.4% in 2035. This link operates at LOS E in both the DM and DM-CS scenarios, however the increase in traffic exceeds the 10% screening threshold and it is therefore also identified for further investigation.

The third location is Domain Road south of the Domain Road interchange, where traffic volumes increase by approximately 10% in the 2063 model year. This link also operates at LOS E in both scenarios and therefore meets the screening criteria.

A sensitivity check was undertaken to test whether these outcomes are dependent on the progression of development at Te Tumu. The results of this test are provided in the lower “Without Te Tumu” table in **Appendix 8**.

This indicates that if Te Tumu does not proceed, the traffic increases on the identified links reduce below the screening thresholds and none of the links require further investigation. This confirms that the identified network pressures arise primarily from cumulative growth in the eastern Tauranga corridor rather than from the Wairakei South development in isolation. This issue is discussed further in Section 11.0 (Proposed Conditions).

7.3 Intersection Screening Results

The full detail of the intersection area of influence assessment is included as **Appendix 9**.

Overall, the results indicate that intersection performance across the assessed network remains acceptable with the inclusion of the proposed development. Most intersections operate with LOS A, B or C, with some operating at LOS D, consistent with the DM scenarios.

At a small number of locations, the DM network is predicted to operate at LOS E or LOS F in later model years. In these cases, the comparison shows that the inclusion of the Wairakei South development and associated network changes either maintains the same LOS or improves intersection performance relative to the Do-Minimum scenario (due to reassignment of traffic).

For example, at the Te Puke Highway/Welcome Bay Road roundabout, the DM scenario is forecast to operate at LOS E in the 2063 AM peak and LOS F in the 2063 PM peak, however with the Wairakei South development the intersection operates within LOS A–C, with traffic volumes changing by approximately 6–7%. At other locations, such as Parton Road / Bell Road, traffic volumes are forecast to increase by up to approximately 104% in the PM peak by 2048, however the intersection continues to operate within LOS A to LOS C in both scenarios.

Accordingly, the screening indicates that the proposed development does not result in any material adverse change in intersection LOS across the area of influence that would require further investigation in its own right.

Where intersections are subject to further consideration as part of this assessment, this arises from the link screening results described in Section 7.2, rather than from the intersection screening itself. In particular, The Sands Avenue corridor, the Te Puke Highway/Bell Road area and the Domain Road northbound on-ramp merge have been identified for further investigation due to link-level effects. The associated intersections within these corridors are therefore considered further in the detailed assessments that follow.

The analysis also shows that all new intersections proposed within the project area operate at LOS D or better in all modelled years.

7.4 Outcomes of the Area of Influence Assessment

The link and intersection screening assessments described above identify a small number of locations where further investigation of network performance is warranted. These locations arise primarily from the link screening results, with the intersection screening confirming that no additional locations require investigation beyond those already identified through the link analysis.

In particular, the screening identifies the following corridors and locations as requiring further consideration:

- The Sands Avenue corridor between Te Okuroa Drive and the PEI, where link-level analysis identifies increased traffic demand and emerging capacity pressures in future model years;
- Te Puke Highway south of Bell Road, where traffic growth and existing corridor constraints create sensitivity in the network; and
- Domain Road south of the Domain Road interchange, where future traffic demand indicates the potential for longer-term operational pressure.

These locations are carried forward for further investigation in Section 8.0 below.

In addition to the outcomes of the modelling-based screening exercise, a number of additional network matters have been identified through the transport stakeholder group and corridor planning considerations. These matters are not solely driven by model outputs but reflect broader operational, safety and network integration considerations. They include:

- walking and cycling connections across the PEI bridge;
- the Te Puke Highway/Bell Road intersection, including its interaction with the adjacent rail crossing;
- the upgrade of Bell Road to support its function as the primary external collector road for the development;
- the potential future extension of Bell Road eastward toward the Te Tumu growth area, supporting longer-term network connectivity;
- the potential future designation of a Seddon Street connection to Te Puke; and

- the opportunity to incorporate public transport priority measures, including bus priority and signal pre-emption where appropriate.

The following sections of this report examine each of these locations in more detail and identify the network responses required to address the effects identified through both the modelling assessment and the wider transport planning process.

The outcomes of this analysis inform the transport mitigation measures and implementation framework proposed for the development. These measures are linked to the conditions framework described in Section 11.0, **Appendix 15** and **Appendix 16** of this report.

8.0 Network Responses and Mitigation

The following sections of this report describe the transport network mitigation measures identified through the modelling and design process. The delivery of these measures is secured through the recommended Transport conditions framework set out in Section11.0, **Appendix 15** and **Appendix 16**, which links development staging to the implementation of the required transport infrastructure upgrades.

This section is structured to present an overview of findings first in Section 8.1. Further detail and supporting analyses are then presented in Sections 8.2 to 8.16.

8.1 Overview of Findings

The transport modelling and off-site transport network infrastructure assessments collectively inform the overall transport infrastructure staging requirements. Internally within the subdivision, these are predominantly a function of the progression of subdivision development. Externally, the transport infrastructure responses are required to respond to identified safety and capacity effects.

The collaborative transport stakeholder group modelling processes described in the preceding sections have informed a staged approach to the delivery of transport infrastructure associated with the Wairakei South development. This approach recognises that the development will occur progressively over an extended timeframe and that transport infrastructure can therefore be implemented in stages aligned with the scale and timing of development.

Through the iterative modelling process undertaken using the TTSM and TTHM frameworks, the development team and transport stakeholder group engagement identified a series of network sensitivity points where traffic demand begins to approach the operational capacity of the existing or planned network. These sensitivity points provide the basis for defining staged infrastructure responses, linking the progression of development within Wairakei South to the delivery of external network upgrades.

The modelling indicates that the existing, planned and funded (Do Minimum) transport network can accommodate the initial stages of development, subject to the establishment of appropriate localised connections to the PEI and upgrades to the Bell Road corridor to enable safe and efficient access to the wider network. These initial works therefore form the baseline enabling infrastructure required to support early development within the site.

As development progresses and cumulative traffic demand increases, further upgrades to the surrounding network are required to maintain acceptable levels of service and network resilience. In particular, the modelling identifies increasing sensitivity within The Sands Avenue corridor and at the PEI, reflecting the role of these facilities as the primary connections between the development area and the TEL corridor. The modelling also identifies the Bell Road / Te Puke Highway corridor as a location where operational and safety considerations arise as traffic volumes increase, particularly in relation to the railway level crossing and the Parton Road intersection.

The overall staging and mitigation findings are summarised and described in detail in the proposed transport conditions framework (section 11.0).

A finer-grained staged mitigation is detailed in the proposed conditions framework. This has been prepared to ensure an effective alignment between development effects and the funding of transport infrastructure. It also responds to a request by TCC to incorporate interim checkpoints for the activity generated demands, recognising the underlying assumptions in the modelling assessment process and also better enabling regard to be had for the unknown future environment. The following further interim staging has therefore been developed and is further described in the transport conditions framework at Section 11.0, **Appendix 15** and **Appendix 16** of this report:

Table 8-1: Initial Mitigation and Staging

Mitigation Measure	**Indicatively up to 2035**		
Development Release	Up to 500 dwellings reliant on Bell Road access corridor only	Up to 1,127 dwellings and 5ha of Industrial reliant on access via the PEI only	Up to 1,400 dwellings and 8ha of Industrial
Mitigation Requirements:			
Preparation of a Transport Network Accountability Report	✓	✓	✓
Legal access to PEI	-	✓	✓
Incorporation of a southern leg at the PEI southern signals and an eastbound off-ramp extension at the PEI northern signals	-	✓	✓
Widening of Bell Road	-	-	✓
Upgrading of Bell Road/Parton Road to include a right turn bay	✓	-	✓
Upgrading of Te Puke Highway/Bell Road intersection to signals	-	-	✓
Safety improvements at Bell Road level crossing	-	-	✓

The broader and overall strategic staging is described in the following Table**Error! Reference source not found.**.

Table 8-2: Longer-term Summary Mitigation and Staging

Mitigation Measure	2035	2048	2063
Development Release	Up to 1,734 dwellings and 8ha of Industrial	Up to 2,500 dwellings and 49ha of Industrial	Up to 2,750 dwellings and 55ha of Industrial
Mitigation Requirements:			
Preparation of a Transport Network Accountability Report	✓	✓	✓
Legal access to PEI	✓	✓	✓
Incorporation of a southern leg at the PEI southern signals and an eastbound off-ramp extension at the PEI northern signals	✓	✓	✓
Widening of Bell Road	✓	✓	✓
Upgrading of Bell Road/Parton Road to include a right turn bay	✓	✓	✓
Upgrading of Te Puke Highway/Bell Road intersection to signals	✓	✓	✓
Safety improvements at Bell Road level crossing	✓	✓	✓
Lengthening of Domain Road Northbound on ramp	-	✓	✓
Additional lanes on The Sands Avenue	-	✓	✓
Upgrades at Te Okuroa Drive/The Sands Avenue intersection,	-	-	✓
Eastbound PEI bypass lane (or alternate / equivalent)	-	-	✓
Latham Drive connection	-	-	✓
Free left turn lanes on The Sands Ave southern approach and The Boulevard eastern approach to the signalised intersection	-	-	✓

The Tables demonstrate an incremental and proportionate off-site transport infrastructure response. The preceding sections of this report describe the thresholds and triggering effect warranting the mitigation response and the consequent overall mitigating impact of the mitigation.

The proposed transport conditions framework (**Appendix 15**) links these requirements to each development stage. Initial development is enabled through the establishment of the primary access connections to the PEI and/or the Bell Road corridor and associated intersections.

Latter and more strategic stages of development trigger upgrades to The Sands Avenue corridor and improvements to the Domain Road interchange to accommodate increased traffic demand and maintain efficient access to the strategic road network.

Further stages of development introduce additional capacity and network connectivity measures, including upgrades to the Te Okuroa Drive / The Sands Avenue intersection and improvements to traffic distribution within the wider eastern Tauranga corridor.

In addition to the upgrades identified directly through the modelling exercise, several transport responses have also been identified through the transport stakeholder group engagement process and broader corridor planning considerations. These include safety and operational improvements at the Bell Road railway crossing, speed management and signalisation at the Te Puke Highway / Bell Road intersection, and the longer-term connection of Bell Road toward Te Tumu to support improved network connectivity and integration.

Overall, it is assessed that the proposed mitigation and the timing described will result in appropriately timed and staged mitigation. The overall effect of mitigation will result in the introduction of safety and/or capacity improvements for all road users in advance of the effects provided for and until such time as the corresponding stage of development is completed. At the completion of development within each stage, the mitigation has been determined to achieve an equivalent of better operational transport network performance compared with the Do Minimum case, exclusive of the Proposal. In this way the potential effects due to development staging will, where necessary, be mitigated in advance of the staged development effect.

On the basis of the transport mitigation recommended, the overall transport effects will be minor or less than minor.

8.2 General Transport Engineering and Implementation Matters

In addition to the specific network upgrades identified in this report, a series of general transport engineering conditions are proposed to ensure that the detailed design and implementation of transport infrastructure associated with the Wairakei South development occurs in a coordinated and technically robust manner.

These conditions (which have been integrated with the AEE Appendix AD: Proposed Conditions) address the standard engineering and delivery processes that apply to transport infrastructure within the proposal area and the surrounding road network. This includes requirements relating to detailed engineering design, subdivision and road vesting processes, access arrangements, signage and lighting, safety auditing and compliance with the applicable engineering standards.

The conditions also provide for the approval of detailed engineering design by the relevant road controlling authorities, including WBOPDC, TCC, NZTA and KiwiRail where relevant. This ensures that the final form of the infrastructure is subject to appropriate consultation and technical review prior to construction.

Provision is made for the detailed staging of the internal transport network to align with the progression of land development and the delivery of external transport infrastructure upgrades. In particular, the conditions require the preparation of a Development Staging Plan at the time of subdivision or building consent, demonstrating the cumulative level of development and confirming that the infrastructure thresholds established through the transport modelling have not been exceeded.

The conditions also provide for the establishment of the necessary implementation agreements, including Private Developer Agreements and/or Private Works Agreements, to facilitate the delivery of infrastructure works within the public road network.

8.3 Transport Effects Determination Methodology

The measure of performance adopted to determine the potential for adverse effects and the consequent need for mitigation has been based on a multi-criteria approach as follows:

- where roading and intersection Level of Service (LOS) remains within the range LOS A – D, the long-term performance remains acceptable without mitigation; and
- where the development results in a change from LOS A-D to LOS E or F and where the contributing traffic demands are greater than 10%, specific mitigation has been determined on the basis that it results in a LOS D or better outcome for the network; and
- where the Do Minimum (excluding the development) LOS is already LOS E or F, specific mitigation has been determined on the basis that it results in a LOS at least equivalent to or better than the Do Minimum network.

On this basis, mitigation measures are identified and respond to performance where the contributing effect is more than minor and attributable to the development. The approach also achieves an appropriately efficient long-term network performance outcome. Where the Do Minimum network (excluding the development) is already indicated to be congested, a performance at least equivalent to or improved on the Do Minimum performance is achieved. In this way the adverse transport effects due to the development are mitigated and the additional infrastructure costs are borne by the development. The cost of growth generated by the development is appropriately attributed to it.

Accordingly, the assessment confirms that the surrounding transport network, including infrastructure planned for Te Tumu and the PEI infrastructure can accommodate the initial stages of development.

As development progresses, a series of targeted upgrades are proposed and timed to ensure network performance and safety outcomes are achieved and further that the transport capacity planned for Te Tumu (which is included within the Do Minimum assessment case) continues to be meet its development needs and no new or additional transport infrastructure cost is imposed on land uses incorporated within the Do Minimum case, including Te Tumu.

8.4 Te Okuroa Drive/The Sands Avenue Intersection

The Sands Avenue corridor is a key connection between Wairakei South and Papamoa. The following mitigation measures address the key intersection and corridor capacity constraints identified through the modelling process.

The mitigation response at the Te Okuroa Drive/The Sands Avenue intersection has been developed through an iterative modelling process informed by the TTSM, TTHM and supplementary intersection modelling undertaken using SIDRA.

The adopted response includes targeted intersection upgrades together with capacity improvements to The Sands Avenue corridor between and including Te Okuroa Drive and the

PEI. At the intersection itself, an additional right-turn lane is proposed on The Sands Avenue northbound approach, resulting in a dual right-turn arrangement from The Sands Avenue (south) into Te Okuroa Drive (east). This configuration responds directly to the dominant turning movement identified through the modelling and improves lane utilisation, queue storage and discharge efficiency under peak conditions. The provision of dual right-turn lanes also reduces the potential for queues to extend south toward the PEI along The Sands Avenue corridor. The plans that have been prepared to depict these works are included in the AEE, Appendix D: Engineering Drawings.

The longer term 2063 modelling, enabling the final stages of Wairakei South development identified a need to introduce a 60m short 3rd southbound lane on The Sands Avenue northern approach to Te Okuroa Drive to mitigate the long-term incremental effects of the additional traffic demands. This further improves the overall capacity of the intersection and links with a new, additional 3rd southbound lane between Te Okuroa Drive and the PEI.

Modelling in the TTHM also identified that intersection performance can be further improved through the use of a double-diamond signal phasing[5] arrangement. Provision has therefore been made within the proposed conditions framework to enable the future upgrade of the intersection signal control system (SCATS[6]) to support implementation of this phasing arrangement as traffic demand increases.

In addition, widening of The Sands Avenue in the mid-block section between Te Okuroa Drive and the PEI has been incorporated. This widening improves approach capacity and progression along the corridor and supports the efficient operation of the signalised intersections at both ends of the mid-block section. A concept design for these works is included in the AEE Appendix D: Engineering Drawings, prepared by Maven Consultants.

8.5 Papamoa East Interchange (PEI)

The PEI forms the primary connection between Wairakei South, the TEL and Papamoa. The mitigation measures described below address both the establishment of the southern access connection and the longer-term interchange capacity upgrades identified through the modelling.

8.5.1 Segregation Strip Interface

The southern intersection of the PEI is currently being constructed in an interim three-leg configuration, reflecting the absence of a southern public road connection at this location at the time of design and construction. The land to the south of the interchange is controlled by BRLP, and the Wairakei South development introduces a fourth leg to this intersection to provide connectivity between the project area and the wider transport network via the PEI.

[5] Signal phasing refers to how movements at a signalised intersection are grouped and given green time during each cycle. For example, "split phasing" separates opposing movements to avoid conflicts. A "double-diamond" phasing arrangement pairs high right-turn movements from opposing approaches so they can operate efficiently while remaining safely separated from other traffic, improving the use of green time and overall intersection capacity.

[6] Sydney Coordinated Adaptive Traffic System

A Crown-owned segregation strip is presently located between the Wairakei South land and the TEL legal road parcel. This strip, which is shown on Figure 21 forms part of the interim access control arrangements associated with the current three-leg intersection layout.

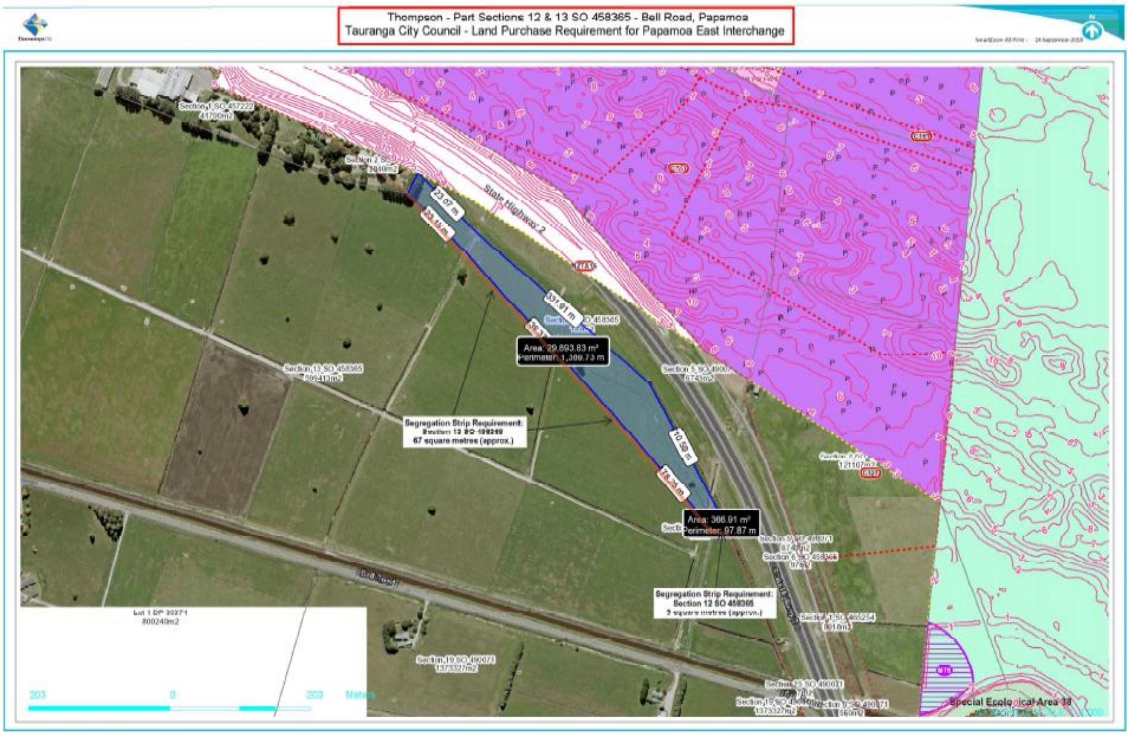


Figure 21 Segregation Strip Layout

To enable the proposed southern connection and the ultimate four-leg operation of the southern interchange intersection, partial removal and realignment of the segregation strip is required at the intersection location only. The balance of the segregation strip would remain in place.

The need to modify the segregation strip arises directly from the transition of the southern interchange intersection from its interim form to its ultimate configuration, rather than from the introduction of a new or additional direct access to the State Highway network. The proposed connection utilises the existing interchange infrastructure and is consistent with the strategic role of PEI in providing access to growth areas to the south. The indicative nature of the change required is shown on the following Figures:

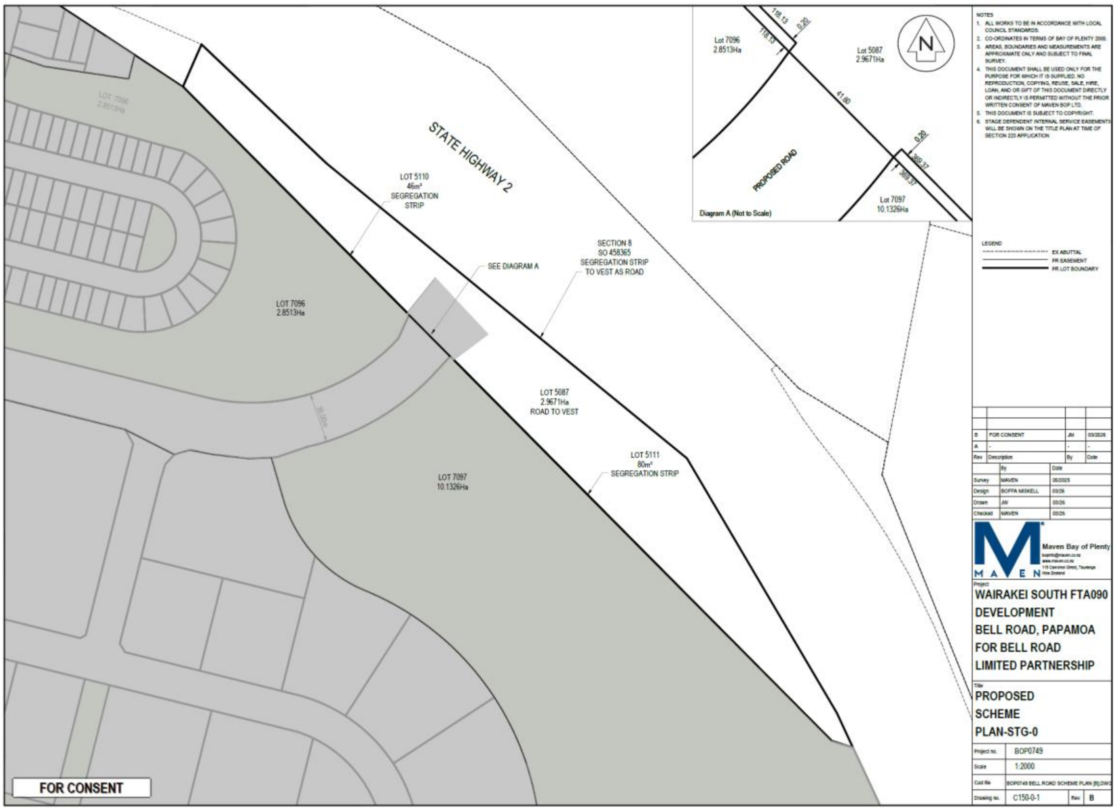


Figure 22: Indicative Changes to Segregation Strip, General Arrangement (Base Plans prepared by Maven Consultants)

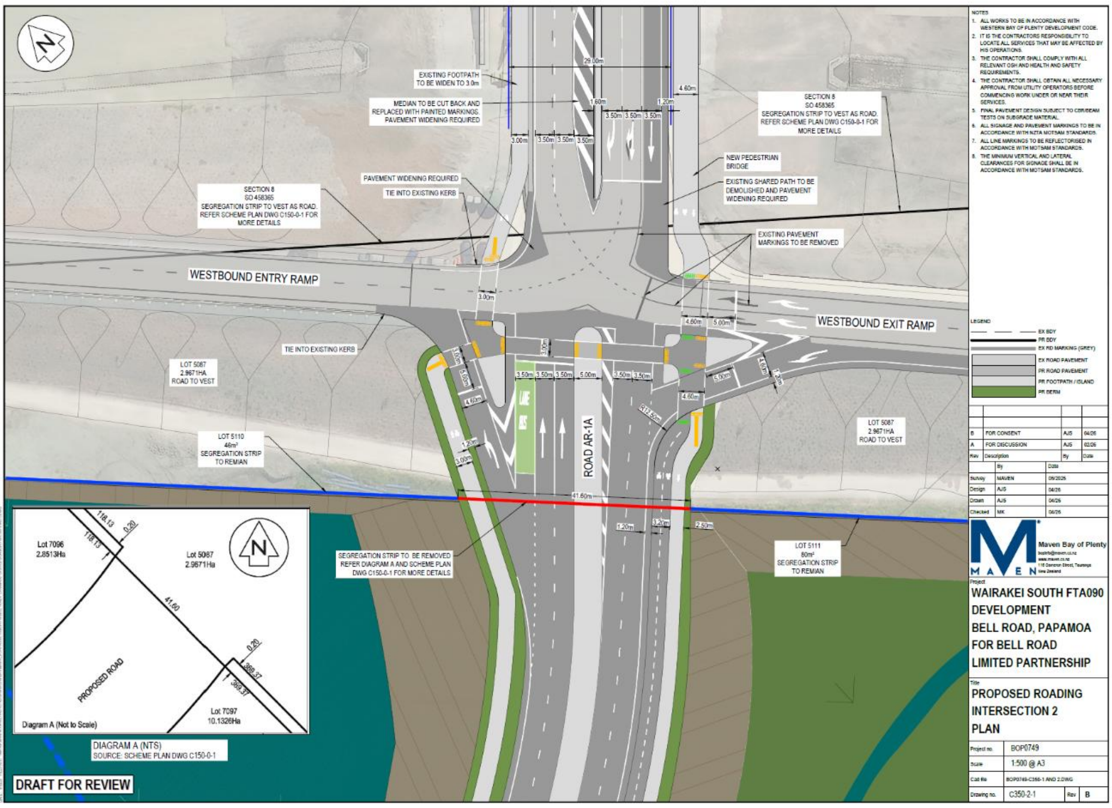


Figure 23 Indicative Changes to Segregation Strip, Detailed Layout (Base Plans prepared by Maven Consultants)

Initial discussions with WBOPDC and engagement with NZTA and TCC has been undertaken to confirm the appropriate process and form of agreement required to support partial removal of the segregation strip at the intersection location. A record of the engagement is included with the AEE, Appendix AB Consultation Summary Pack / Consultation Record and is dated 19/02/26. It is understood that the segregation strip adjustment would be depicted on the subdivision scheme plan, with survey and legal processes to give effect to the change undertaken following the grant of consent.

This approach ensures that the interface between Wairakei South and the PEI is addressed in a coordinated and legally appropriate way, while retaining flexibility for detailed design to be confirmed at later stages.

8.5.2 Capacity Upgrade

The introduction of a southern connection at the PEI results in increased traffic demand at both the northern and southern signalised intersections and along the short section of corridor between them. Modelling indicates that additional capacity will be required at the interchange to maintain efficient operation as development progresses.

The initial stage of works focuses on accommodating the new southern access connection and improving ramp lane capacity at the interchange. This includes modifications to the northern and southern PEI intersection ramp approaches to improve turning capacity and queue storage, together with the establishment of the signalised southern interchange intersection connecting Wairakei South to the TEL ramps.

As traffic demand increases over time, further capacity improvements within the interchange are required. These include widening of The Sands Avenue approach to the northern interchange intersection and additional southbound capacity between the northern and southern signalised intersections to improve traffic progression through the interchange.

This includes provision of an additional southbound lane on The Sands Avenue between Te Okuroa Drive and the southern PEI intersection, together with additional right-turn capacity on The Sands Avenue corridor. These upgrades improve approach capacity and support coordinated signal operation between the two interchange intersections.

Addition of the southbound lane across the PEI is able to be accommodated within the extents of the current bridge structure. This has been confirmed by an independent structural assessment undertaken by Tiaki Consultants (**Appendix 10**). A consequence of this is displacement of the walking and cycling infrastructure on the eastern side of the bridge, which is to be accommodated on a separate structure. This is further described in the following sections of this report.

The plans that have been prepared to depict these works are included in the AEE, Appendix D: Engineering Drawings.

8.5.3 Active Modes

Provision for walking and cycling across the PEI is an important component of the wider multimodal transport framework serving the eastern Tauranga growth corridor. The PEI bridge forms the primary connection between the existing Wairakei urban area to the north and the proposed Wairakei South project area to the south. As a result, it is expected to accommodate both local active travel movements between neighbourhoods and longer corridor movements associated with The Sands Avenue and Te Okuroa Drive transport corridors.

The current interchange bridge provides shared pedestrian and cycle facilities on both sides of the structure. The existing bridge cross-section and lane configuration is shown below as Figure 24.

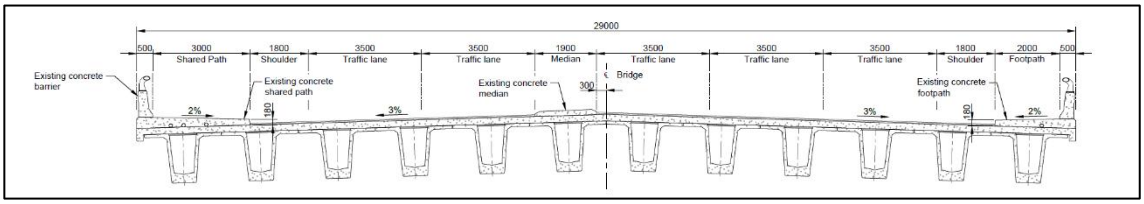


*Figure 24 Existing PEI Bridge (Source: Tiaki Consultants Report – **Appendix 10.** The cross section is a view of the bridge looking towards the south)*

In the wider corridor, the road cross section north of the PEI on The Sands Avenue corridor provides for:

- a 4.4m shared path on the western side; and
- a 3.6m bi-directional cycle lane and 1.8m footpath on the eastern side.

The Wairakei South Arterial south of the PEI intends the following cross-sectional features to integrate and align with the strategic form of the pedestrian and cycling movement network north of the PEI:

- a 3.0m shared path on the western side; and
- a 3.2m bi-directional cycle lane plus a 2.5m shared path on the eastern side.

An assessment of the adequacy of the existing PEI bridge facilities has been undertaken in conjunction with the broader transport modelling work for the development. This assessment considered forecast pedestrian and cycle demand under the Do Minimum (DM) and development scenarios for 2035, 2048 and longer-term growth conditions, and was informed by the mode share targets identified in the BOP RLTP. Current active mode share in the Tauranga area is approximately 10%, with a regional target of approximately 13% over time.

The full detail of the assessment is included as **Appendix 11**. The analysis indicates that the existing shared path facilities on the bridge are sufficient to accommodate forecast pedestrian and cycle demand through to the 2035 development horizon, including the initial stages of Wairakei South development (approximately 1,734 dwellings and 8 hectares of Industrial land). Under these conditions, the existing cross-section can continue to operate with shared path facilities on both sides of the bridge, consistent with Austroads guidance which permits shared paths of approximately 2.0 to 2.5 m width in constrained situations.

Beyond the 2035 modelled horizon, increases in travel demand associated with both Wairakei South and wider eastern corridor growth result in higher active mode movements across the interchange. Under these conditions, the modelling indicates that shared path facilities alone are no longer optimal and that greater separation between pedestrians and cyclists becomes desirable to maintain safe and efficient operation. In particular, forecast demand approaching the 2048 and longer-term model years supports provision of a bidirectional cycle facility together with a separate pedestrian footpath across the interchange structure.

The preferred arrangement therefore involves upgrading the active mode facilities across the PEI bridge in conjunction with the future widening of the interchange structure that is required to accommodate an additional southbound traffic lane. This coordinated approach enables both traffic and active mode capacity to be addressed at the same time and avoids the need for interim retrofitting works. Under the upgraded configuration, the bridge would provide:

- a bidirectional cycle and separate pedestrian path facility (approximately 4.6 m width) on the east side of the bridge as a separate structure; and
- an improved 3.0m wide shared path on the west side within the existing structure.

An indicative cross-section showing how this would be integrated with the bride structure cross section is shown as Figure 25 below.

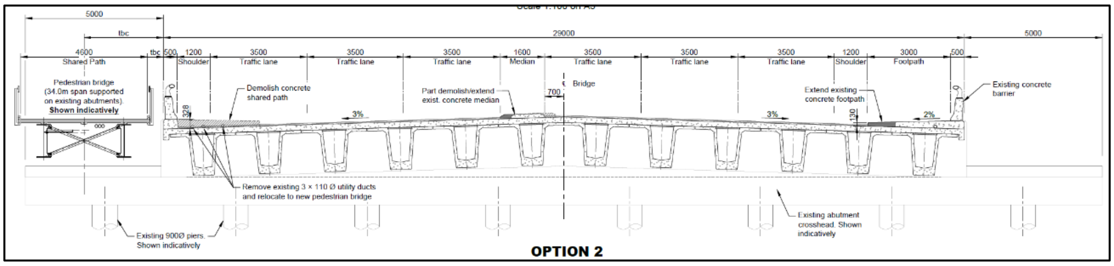


*Figure 25 Proposed Configuration of PEI Bridge (Source: Tiaki Consultants Report – **Appendix 10.** The cross section is a view of the bridge looking towards the south))*

This arrangement is consistent with Austroads guidance for cycling infrastructure and reflects the anticipated growth in pedestrian and cycling movements associated with the development of Wairakei South and the wider Te Tumu area. The allocation of space on the separate structure will take the form indicated in the following Figure, and with the inclusion of minimum required 300mm separation distances to bridge railing structures each side, the total design width is 4.60m:

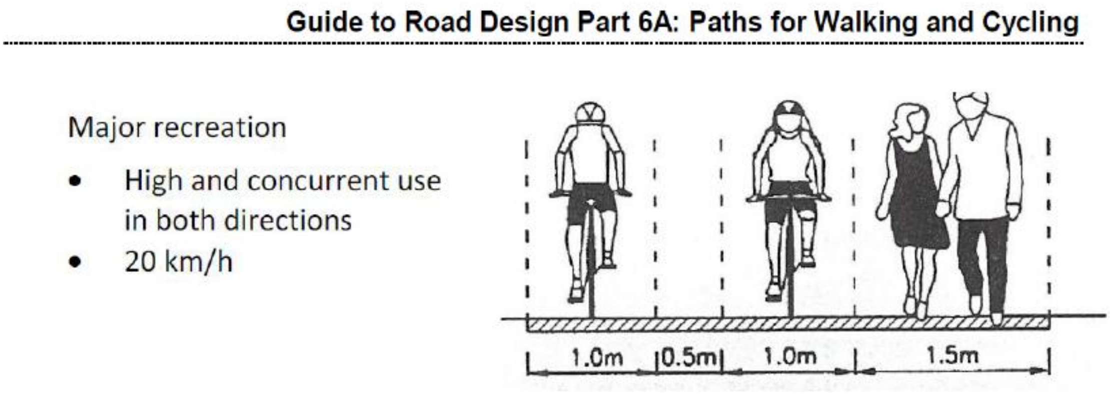


*Figure 26: Indicative PEI Pedestrian / Cycle Bridge Space Allocation (Source: Austroads Guide To Road Design Part 6A: Paths for Walking and Cycling – **Appendix 11**)*

Importantly, active mode facilities are proposed on both sides of the bridge structure. While Austroads guidance typically requires such facilities on only one side of a corridor, provision on both sides is appropriate in this location because it maintains continuity with the approach cross-sections on The Sands Avenue and within the Wairakei South arterial network. This arrangement avoids requiring pedestrians or cyclists to cross the interchange unnecessarily and provides a higher level of connectivity and accessibility between the surrounding communities.

Overall, the proposed approach ensures that the PEI bridge will continue to support safe and efficient pedestrian and cycling movements as the surrounding urban areas develop. The staged provision of upgraded active mode infrastructure alongside future traffic capacity improvements represents a proportionate and integrated response to the forecast growth in travel demand across the interchange.

8.6 Te Puke Highway/Bell Road Intersection

Bell Road provides an alternative connection to the wider network and plays an important role in distributing traffic from Wairakei South to and from the south and west. There is also evident demand for movement between Te Tumu and The Sands town centre area, through the Wairakei South Arterial network, linking with Bell Road and wider Te Puke, southern and western origins / destinations. The following mitigation measures address operational and safety matters at the Te Puke Highway intersection.

8.6.1 Mitigation Need

The Te Puke Highway/Bell Road intersection is currently a stop-controlled T-intersection with a seagull right-turn treatment providing access to and from Bell Road (see Table 2-1). Te Puke Highway runs close to the ECMTR rail line which constrains available queuing storage and introduces additional operational and safety considerations at the intersection and level crossing.

Strategic and operational assessment identified this intersection as a sensitivity point under future traffic demand conditions. Modelling indicates emerging capacity pressures over the long term, while the proximity of the railway crossing raises particular concerns in relation to queuing, heavy vehicle accommodation, and the interaction between road and rail movements.

While Wairakei South contributes a modest increase in traffic demand at this location (approximately 7 to 8%), the modelling indicates that the need for mitigation is also influenced by existing traffic volumes and other background growth along the Te Puke Highway corridor.

The recorded crash history shows a moderate number of reported crashes over the most recent five-year period, with a mix of intersection and midblock event. The crash history does not indicate a single dominant safety issue, but reinforces the importance of managing speed, queue interaction and conflicting movements at this location.

8.6.2 Options Considered

A range of intersection control options were tested at a high level to assess feasibility, operational performance and deliverability under ultimate (2063) traffic demands. These options were supported by SIDRA Network modelling and informed by concept level design layout testing.

A single-lane roundabout option was assessed and found to operate at an acceptable LOS under ultimate demands (LOS B). However, accommodating heavy vehicle queues clear of the railway crossing requires a minimum offset of approximately 25m from the Bell Road limit line, with additional space required to achieve desirable geometric radii for the roundabout itself.

This results in a large footprint, with consequential impacts on adjacent property and substantial earthworks due to local grade differences. These constraints limit the practicality of a roundabout solution in this location despite its acceptable operational performance.

Signalisation of the existing seagull intersection was also tested. Concept layouts demonstrate that a signalised arrangement can be accommodated within the existing road/rail corridor, with an enhanced offset to the current Bell Road limit line. SIDRA modelling indicates that the signalised option also operates at LOS B under 2063 demand, with average delays comparable to the roundabout option. A concept design for these works is included in the AEE, Appendix D: Engineering Drawings.

While signalisation requires a lower (80km/h) operating speed environment than the existing 100 km/h corridor, it provides greater flexibility to manage conflicting movements and queue interactions within the constrained space. Signalisation also provides the ability to actively manage vehicle queues on the Bell Road approach and integrate safe operation of the signals with the rail crossing operation (assessed in the following sections of this report).

8.6.3 Te Puke Highway Safe Speed Management

Implementation of traffic signals at the Te Puke Highway/Bell Road intersection introduces a different operating environment compared with the existing rural stop-controlled layout. For this reason, the potential application of an 80 km/h speed limit along a section of Te Puke Highway (indicatively expected to cover from Domain Road to Poplar Lane or a lesser section length as subsequently determined) has been considered alongside the signalisation concept.

The setting or changing of speed limits is governed by the Land Transport Rule: Setting of Speed Limits 2024, which establishes the statutory process by which Road Controlling Authorities (RCAs) may propose and implement speed limit changes. Under this framework, speed limits cannot be set or required by a development applicant. Any change must be initiated and progressed by the relevant RCA and approved through the processes established by the Rule.

Engagement has been undertaken with WBOPDC officers regarding the potential signalisation of the intersection and the associated speed management considerations. Council officers have confirmed that, should a speed change be pursued in the future, it could be advanced through the "*Alternative Method*" process provided for in the Rule.

This process includes preparation of a supporting assessment, consultation with affected parties and the community, preparation of a cost-benefit disclosure statement, and submission of the development for approval by the Director of Land Transport.

The engagement undertaken to date has therefore confirmed that a clear statutory pathway exists should a speed limit adjustment be considered necessary to support the signalised intersection design. Any such change would be progressed by Council in accordance with the Rule and following the required consultation and approval processes.

Consistent with this approach, the proposed conditions framework provides flexibility for the intersection mitigation to be progressed in consultation with Council and other relevant authorities, recognising that the final intersection design and any associated speed management measures will be confirmed through subsequent detailed design and statutory processes.

8.7 Bell Road Level Crossing

Due to changes in traffic volumes and the proximity of the Bell Road railway level crossing to the Te Puke Highway intersection, the safety performance of the crossing has been assessed as part of the Bell Road corridor mitigation strategy.

An independent Level Crossing Safety Impact Assessment (LCSIA) has been undertaken by Vitruvius. The full LCSIA report is included as **Appendix 12** to this report.

The purpose of the LCSIA is to assess the safety performance of the crossing under existing and future traffic conditions and to identify appropriate mitigation measures where required.

The LCSIA considers the influence of future traffic growth associated with Wairakei South together with background traffic growth on the surrounding road network. The assessment confirms that while the development contributes additional traffic movements at the crossing, the overall safety risk profile remains manageable with appropriate mitigation measures in place.

The recommended measures include:

- installation of barrier arms at the level crossing to provide additional protection for road users;

- localised pavement and crossing surface upgrades to improve vehicle tracking and ride quality across the rail interface; and
- associated signage and traffic control upgrades in accordance with the relevant Traffic Control Devices (TCDM) guidance.

These measures are expected to improve the overall safety performance of the crossing and assist in managing vehicle movements in close proximity to the Te Puke Highway intersection. The integrated rail crossing and Te Puke Highway signalised intersection concept has been designed in accordance with the NZTA Traffic Control Devices Manual (TCDM), *Part 9: Level Crossings* and incorporates safety emergency escape zone areas, signage together with barrier arm installation and coordinated signal control outcomes.

The LCSIA also notes that alternative intersection design approaches could be considered at detailed design stage of the Bell Road/Te Puke Highway intersection upgrade. This includes a potential left-in/left-out configuration at Bell Road with turning movements accommodated via a new roundabout at Poplar Lane. This option provides a potential alternative should signalisation or speed management changes at the Te Puke Highway intersection prove difficult to implement. Given the timing currently anticipated for these works, no direct consultation has been undertaken with KiwiRail to date regarding the level crossing works. However, detailed consideration of any alternative intersection arrangements would occur through the detailed design phase in consultation with WBOPDC and KiwiRail.

The recommended level crossing safety measures will be incorporated into the detailed design of the Bell Road corridor and implemented as part of the development mitigation works.

8.8 Bell Road Rural Carriageway Upgrade

Bell Road currently operates as a two-lane rural road providing a connection between Te Puke Highway, the Wairakei South project area and to the Te Tumu growth area to the east of the TEL. The existing carriageway width varies between approximately 8.0m and 8.2m. Existing traffic volumes are approximately 3,500 vehicles per day (vpd) between Te Puke Highway and Parton Road, reducing to approximately 350 vpd east of Parton Road.

A detailed assessment of the carriageway width requirements for Bell Road has been undertaken and is presented in **Appendix 13**. The purpose of this assessment is to compare existing and forecast traffic volumes on the corridor with the carriageway width guidance contained in the WBOPDC Development Code and the Austroads Guide to Road Design Part 3 Geometric Design.

The TTSM modelling indicates that the section between the Wairakei Southwestern development boundary and Parton Road is forecast to carry approximately 8,100 vpd by 2035 (modelling demand assumptions), increasing to approximately 9,000 vpd by 2063. On the section between Parton Road and Te Puke Highway, traffic volumes are forecast to increase to approximately 10,000 vpd over the same period. Then TTSM Round 3 modelling select link analyses indicate that traffic demands on Bell Road are expected to comprise both Wairakei South and wider non-Wairakei South generated demands. These included those movements that utilise Parton Road and those associated with movement to/from Te Tumu and The Sands town centre areas. The following Table shows how the modelling indicates the varied demand locations are expected to contribute to movement on Bell Road into the future.

Table 8-3: Wairakei South and Non-Wairakei South Traffic Demands on Bell Road Corridor

Roadway Section	West of Parton Road - ADT	West of Parton Road - %	East of Parton Road - ADT	East of Parton Road - %
Model Horizon Year - 2035				
Total Demand	10072		8077	
Paton Road Demand	3391	34%	-	
PEI North of Wairakei South Demand	2455	24%	2455	30%
Wairakei South Generated Demand	**4226**	**42%**	**5622**	**70%**
Total Non-Wairakei South Demand	**5846**	**58%**	**2455**	**30%**
Model Horizon Year - 2048				
Total Demand	9386		7991	
Paton Road Demand	3204	34%	-	
PEI North of Wairakei South Demand	1365	15%	1365	17%
Wairakei South Generated Demand	**4817**	**51%**	**6626**	**83%**
Total Non-Wairakei South Demand	**4569**	**49%**	**1365**	**17%**
Model Horizon Year - 2063				
Total Demand	10092		8997	
Paton Road Demand	3256	32%	-	
PEI North of Wairakei South Demand	1658	16%	1658	18%
Wairakei South Generated Demand	**5178**	**51%**	**7339**	**82%**
Total Non-Wairakei South Demand	**4914**	**49%**	**1658**	**23%**

The Table shows that the Wairakei South development is expected to contribute:

- 42-51% of the traffic demands on Bell Road west of Parton Road; and
- in the order of 70-82% east of Parton Road.

The assessments also indicate that the eastern section of Bell Road (Wairakei South to Parton Road) currently provides a carriageway width that is generally consistent with its existing traffic volumes. The western section (Parton Road to Te Puke Highway) is already narrower than desirable for the current level of traffic demand.

To accommodate the forecast traffic volumes associated with the first stage of development where Industrial land use is proposed (generating heavy commercial vehicle movements), widening to an overall carriageway width of approximately 12 m (including a 1.0 m unsealed shoulder) is identified as appropriate for both sections of the corridor. Cross sections depicting the recommended widening, sealed and unsealed shoulder areas and associated safety barrier arrangement are included in the AEE Appendix D: Engineering Drawings prepared by Maven Consultants.

To address this, the proposed conditions framework includes provision for carriageway widening and pavement assessment where required. The conditions have been recommended to require Bell Road corridor carriageway widening and pavement analysis, including consideration of heavy commercial vehicle (HCV) impacts on the pavement. The conditions enable the detailed engineering design process to confirm the appropriate carriageway and pavement upgrades required to support the future traffic demands on the corridor at the appropriate time. It has also been confirmed that there is sufficient width on the legal carriageway for this widening to be undertaken without encroaching on private land.

It is noted that the forecast traffic volumes on Bell Road reflect both background growth within the wider transport network and traffic associated with the Wairakei South development. The purpose of the condition is therefore to ensure that the corridor is upgraded to an appropriate standard to accommodate total network demand, with the apportionment of infrastructure delivery and funding to be addressed through subsequent infrastructure agreements where required.

8.9 Bell Road/Parton Road Intersection

The Bell Road/Parton Road intersection[7] sees increases of up to around 100% in the various scenarios. Although it does not trigger the LOS threshold, a safety and geometric upgrade is proposed to support the growing role of Bell Road as a connection between Wairakei South and the wider network. A concept plan for these works is included in the AEE, Appendix D: Engineering Drawings. It includes:

- provision of a right-turn bay on the Bell Road eastern approach, and
- improved left and right turning radius, and an extended central throat island on the Parton Road approach.

These changes improve the ability of the intersection to accommodate turning movements, increase storage capacity for queued vehicles, and reduce the potential for turning traffic to impede through movements on Bell Road.

Operational assessment of the upgraded intersection has been undertaken in SIDRA with the results presented in **Appendix 6**. Two sets of results are included showing a separated left and right turn lane on the Parton Road approach and the subsequent set, a single lane approach on the Parton Road approach. The modelling confirms that, with the single lane approach on Parton Road and the proposed improvements in place, all turning movements at the intersection operate at LOS C or better under forecast traffic volumes through to the 2063 assessment year.

8.10 Tara Road/Parton Road Intersection

The Tara Road/Parton Road roundabout was modelled as an isolated intersection in SIDRA. All movements operated with LOS B or better at 2048 (10B Mitigated) and 2063 (10D Mitigated). Movement summaries are included in **Appendix 6**.

8.11 Domain Road Interchange

The TTHM work identified the Domain Road interchange, and in particular the northbound on ramp merge, as a location where traffic demand in the morning peak period approaches the practical capacity of the existing westbound merge arrangement with the Tauranga Eastern Link (TEL) carriageway. The modelling indicated that this location is sensitive to growth in traffic demand and would benefit from an increase in merge length to maintain efficient ramp operations as the surrounding network develops.

The supplementary HCM assessment (presented in **Appendix 7** and explained in Section 6.5.2 above) identifies the Domain Road northbound on ramp as the only ramp location where the

[7] It is Intersection 24 in Appendix 9 (Intersection Area of Influence)

existing arrangement and modelled traffic volumes, trigger ramp capacity exceedance. This issue is evident in the morning (AM) peak period only.

The effects of the proposed development are established by comparing the DM scenarios with the CS-DM at the same year. In the 2035 AM comparison, the ramp is already operating above nominal capacity in the do-minimum case, with a ramp volume to capacity (V/C) ratio of 111%.

With Wairakei South added to the same network, this increases slightly to 113%, while merge density increases from 16.86 to 17.72 pc/km/ln[8] and LOS worsens from LOS C to LOS D. This indicates that the northbound merge is already sensitive in the do-minimum network and that Wairakei South adds further pressure at this location. However, at LOS D operation the performance is assessed as acceptable at 2035 demand assumptions.

In the 2048 AM comparison, the do-minimum case remains above nominal capacity at 104%, whereas the do-minimum with development case reduces marginally to 99%. Despite this, merge density increases from 19.10 to 20.13 pc/km/ln, with both cases operating at LOS D. The performance is improved over the 2035 demand assumptions as a result of wider network reassignment that occurs as a consequence of removal of the road tolling from the TEL programmed by NZTA to occur in 2036/37. The effect is a shift of traffic away from the local roads, including the Domain Road westbound on-ramp, to the TEL and other road user preferred points of access. Notwithstanding this the merge density increases and the TTHM modelling indicated extended queuing warranting targeted mitigation prior to exceeding the 2035 modelled demand assumptions.

By 2063 AM, neither the do-minimum nor the do-minimum-plus-development case exceeds ramp capacity, with ramp V/C ratios of 90% and 87% respectively. However, both scenarios continue to record LOS D conditions in the merge area, confirming that the Domain Road northbound ramp remains one of the more stressed merge locations within the wider network.

Overall, the HCM results confirm that the Domain Road northbound on-ramp is a sensitive location in the AM peak, particularly in the earlier model years, and support the provision of additional merge length as a targeted response to improve ramp performance. The TTHM modelling identified that the potential for additional queue length effects generated by the development would be more than mitigated by an extension of the westbound on-ramp merge by 50m. Accordingly, a recommendation is made for this work to be progressed prior to exceeding the 2035 model demand assumptions providing for up to 1,734 dwellings and 8ha of Industrial land development.

8.12 Potential Future Seddon Street Connection

During the strategic TTSM modelling a potential future road connection between the Bell Road corridor and Seddon Street in Te Puke was considered as part of sensitivity and future-proof testing of the wider network.

The transport modelling has included a sensitivity scenario (Sensitivity Test 2 – ST2) that incorporated a connection to Seddon Street to examine how an additional east–west link

[8] Passenger car equivalent (pc) per kilometre (km) per lane (ln).

between the Wairakei and Te Tumu areas and the Te Puke urban network might influence travel patterns across the wider sub-region.

The purpose of this testing was to understand how such a connection could redistribute travel demand if it were to occur in the future. Select Link analyses undertaken as part of the modelling indicated that a connection in this location could attract traffic movements from both the Wairakei, Wairakei South and Te Tumu areas and distribute movements more broadly across the surrounding network.

The modelling, which is described in full in **Appendix 3**, showed that the connection could attract a daily volume of approximately 12,000 vpd. This traffic was drawn mostly from (i.e.: had a reducing traffic movement effect on) Bell Road between the site and Te Puke Highway; on Parton Road between Bell Road and Te Okuroa Drive; on Te Puke Highway south of Bell Road and on the TEL east of the site.

The Seddon Street connection does not form part of the Wairakei South development proposal and is not identified as committed infrastructure within the current transport planning framework. At present there is no defined alignment or corridor protection in place. As such, it is appropriately regarded as a potential long-term network opportunity rather than infrastructure required to mitigate the transport effects of the development. Engagement directly on this with WBOPDC, dated 19 March 2026 (AEE Appendix AB Consultation Summary Pack / Consultation Record) resulted in the following advice from the Council:

"It is anticipated that the draft Te Puke Spatial Plan will reflect a future potential connection at Seddon Street connecting Te Puke to the potential development at Wairakei South. This will be subject to formal consultation and further decision making by Council".

Notwithstanding this, the planning and design undertaken for Wairakei South has had regard to the possibility that a connection in this general location may be considered in the future. The internal road network and overall structure plan have therefore been developed in a manner and with a surplus transport capacity that does not preclude the future provision of a connection toward the Bell Road corridor should such an initiative be pursued through future spatial planning processes led by other parties.

8.13 Potential Future Bell Road Eastern Extension

Bell Road currently extends east from the project area, passing under the TEL before terminating as a rural access track. TCC has indicated that a future extension of Bell Road toward the Te Tumu area could provide longer-term network resilience and an additional east-west connection within the eastern corridor.

In particular, such a connection could provide an alternative route between Te Tumu and the wider network, including in emergency or evacuation situations, and could potentially distribute traffic demand more broadly across the network rather than relying solely on movements through the PEI or in associated with the PEI bypass ramp. Enabling the future potential for this link to be established also presents as an alternative option with the potential to further delay implementation of a potential PEI bypass ramp. It also provides for longer term potential local traffic movement between Wairakei South and Te Tumu future living and employment areas, avoiding reliance on access via the PEI interchange.

While this concept has been raised through the strategic planning process, it does not form part of the Wairakei South proposal and would require the formation of a new connection across land outside the control of the Applicant.

Notwithstanding this, the Wairakei South transport network has been designed so as not to preclude such a connection in the future. The proposal includes the construction of a new secondary arterial connection from the PEI through the site, together with the upgrading of Bell Road to the eastern boundary of the project area. This provides a logical interface point should a future extension of Bell Road toward Te Tumu be progressed through subsequent planning processes by other parties. It also provides for this to be separately pursued as an alternative and/or staged longer-term mitigation response as is proposed to be provisioned within the proposed off-site transport mitigation conditions.

Accordingly, while a Bell Road eastward extension has been identified by TCC as a potential future opportunity, it is not proposed or relied upon as part of the mitigation package for the Wairakei South development. It has however been provisioned for within the Wairakei South development internal transport network via a secondary arterial road link connecting directly to Bell Road and the formation of Bell Road to the site's eastern boundary to a collector road standard.

8.14 Public Transport Servicing and Infrastructure

The design of the Wairakei South transport network includes a number of provisions to support the future introduction of public transport services.

Engagement has been undertaken with BOPRC Officers regarding the integration of public transport within the project area. Discussions have addressed potential bus route alignments, bus stop infrastructure, bus pre-emption at signals, signal priority measures and overall accessibility to public transport services.

A bus servicing route has been planned to traverse through the site with route termination points at Bayfair and The Sands town centre, where there will be interchange linkages with other services. Servicing within the site is provisioned to utilise the Collector and Sub-Arterial road networks and has flexibility to be staged over time. The provisioning for and timing of any service will be a matter for determination by BOPRC. Provisional servicing has been planned to operate a 30-minute frequency service in the early stages and for this to be increased to 15-minute frequencies in future. The planning and provisioning for public transport servicing within the transport modelling is described at section 2.2.7 of the Beca Modelling report (**Appendix 3).** The transport modelling for public transport has been aligned with the Regional Public Transport Plan (RPTP) and BOPRC future servicing forecasts. The modelling has demonstrated that increasing the frequency of servicing from 30 to 15-minute services is expected to result in an almost 3-fold increasing in ridership demands.

As part of this process, the development has incorporated several design measures intended to facilitate future public transport operations (most of which is included on the AEE Appendix C – Masterplan drawing set and also shown on the AEE Appendix E – Engineering Drawings), including:

- provision of secondary arterial and collector corridors capable of accommodating bus routes;

- identification of indicative bus stop locations integrated with shared walking and cycling facilities;
- design of street cross-sections that allow for in-lane bus stops and safe passenger boarding areas;
- provision for bus priority or bus pre-emption at signalised intersections where appropriate;
- consideration of bus priority measures at key network locations including the PEI; and
- network design that enables the BOP RPTP objective of providing public transport access within approximately 500 metres of project areas (see Figure 9 earlier).

Provision for potential bus priority signalling has also been considered in the future signalisation of the Bell Road/Te Puke Highway intersection.

TCC has asked for consideration of the potential for traffic lanes across the PEI and/or elsewhere to be provisioned for as T2 and/or T3 lanes. The application does not propose to establish T2 and/or T3 traffic lanes. The implementation of additional traffic lane capacity is planned to be staged and has been based of the regional transport modelling, including public transport (both forecast and a higher-frequency servicing case). T2 / T3 lane planning does not form part of the assumptions incorporated in the regional bus servicing modelling at this stage.

Notwithstanding this, the provision for additional traffic lane capacity across the PEI does not preclude the future consideration of T2 / T3 lane allocations, however this would be a separate proposal advanced by others. The Wairakei South interest in such an undertaking would involve regard for both the continued vehicular and public transport movement efficiency as is intended to be provisioned within the framework of this application.

The BOPRC has provided written officer support for the development that has been developed and which is proposed. This is included with the engagement correspondence and is dated 20 March 2026 (AEE Appendix AB Consultation Summary Pack / Consultation Record). Collectively, it has been concluded the measures proposed will ensure that the development is capable of supporting future public transport services including increased future servicing frequency where that is to be progressed, and that the transport network has been designed to align with regional public transport planning objectives.

8.15 Off-site Transport Infrastructure Staging Summary

The following sub-sections are based on the preceding identification of transport infrastructure and describe the basis for and proposed off-site transport infrastructure staging.

8.15.1 Bell Road Only Access Staging

SIDRA sensitivity analysis modelling has been progressed to evaluate the potential for initial staging of development access via the Bell Road corridor link only. The analyses have been undertaken on the basis of the 2035 Round 3 TTSM Do Minimum turning movement demands. The existing intersection form has been adopted. No deduction has been applied for traffic movements that may travel via Parton Road and therefore not present at the Te Puke Highway / Bell Road intersection

The potential for additional traffic demands to be accommodated due to the development proposal has been assessed with trip generation, arrival/departure and turning movement distributions allocated on the same consistent basis as has been adopted in the TTSM modelling.

Sensitivity analyses has indicated that up to 500 dwellings could initially be accommodated with access via the Bell Road corridor only. The analysis has been restricted to dwelling units only to avoid the potential additional road pavement impact effects that the Industrial land development potential is expected to present.

The following SIDRA modelling assessment results demonstrate the intersection performance assessment outcomes:

LANE SUMMARY

Site: 101 [2140 Te Puke Hwy Bell Rd AM-2035+500dwgs (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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

Lane Use and Performance

	Demand Flows [Total	Demand Flows HV]	Arrival Flows [Total	Arrival Flows HV]	Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue [Veh	95% Back Of Queue Dist]	Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	veh/h	%	veh/h	%	veh/h	v/c	%	sec			m		m	%	%
South: Te Puke Hwy															
Lane 1	744	10.0	744	10.0	1831	0.406	100	1.6	LOS A	0.0	0.0	Full	15000	0.0	0.0
Lane 2	387	5.0	387	5.0	757	0.512	100	14.6	LOS B	3.3	23.9	Short	160	0.0	NA
Approach	1132	8.3	1132	8.3		0.512		6.0	NA	3.3	23.9				
East: Bell Road															
Lane 1	604	5.0	604	5.0	1793	0.337	100	9.6	LOS A	0.0	0.0	Short	20	0.0	NA
Lane 2	158	10.0	158	10.0	291	0.542	100	27.7	LOS D	2.2	16.9	Full	680	0.0	0.0
Approach	762	6.0	762	6.0		0.542		13.3	LOS B	2.2	16.9				
North: Te Puke Hwy															
Lane 1	148	10.0	148	10.0	1734	0.086	100	8.1	LOS A	0.0	0.0	Short	90	0.0	NA
Lane 2	676	10.0	676	10.0	1831	0.369	100	0.7	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	824	10.0	824	10.0		0.369		2.0	NA	0.0	0.0				
All Vehicles	2718	8.2	2718	8.2		0.542		6.9	NA	3.3	23.9				

Figure 27: Te Puke Highway / Bell Road Intersection 2035 AM Peak Demands + 500 Dwellings

LANE SUMMARY

Site: 101 [2140 Te Puke Hwy Bell Rd PM-2035+500dwgs (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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

Lane Use and Performance																
	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Te Puke Hwy																
Lane 1	759	5.0	759	5.0	1889	0.402	100	1.5	LOS A	0.0	0.0	Full	15000	0.0	0.0
Lane 2	586	5.0	586	5.0	624	0.940	100	37.1	LOS E	16.3	118.9	Short	160	0.0	NA
Approach	1345	5.0	1345	5.0		0.940		17.0	NA	16.3	118.9				
East: Bell Road																
Lane 1	391	5.0	391	5.0	1793	0.218	100	9.7	LOS A	0.0	0.0	Short	20	0.0	NA
Lane 2	64	5.0	64	5.0	159	0.404	100	37.5	LOS E	1.3	9.2	Full	680	0.0	0.0
Approach	455	5.0	455	5.0		0.404		13.6	LOS B	1.3	9.2				
North: Te Puke Hwy																
Lane 1	362	5.0	362	5.0	1793	0.202	100	8.0	LOS A	0.0	0.0	Short	90	0.0	NA
Lane 2	800	5.0	800	5.0	1889	0.424	100	0.2	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	1162	5.0	1162	5.0		0.424		2.6	NA	0.0	0.0				
All Vehicles	2962	5.0	2962	5.0		0.940		10.8	NA	16.3	118.9				

Figure 28: Te Puke Highway / Bell Road Intersection 2035 PM Peak Demands + 500 Dwellings

The following assessments and observations are made:

- in the AM peak period, the worst movement is the right turn from Bell Road north to the seagull merge lane, operating at an acceptable LOS D;
- in the PM peak period both of the intersection right turn movements are shown to operate at LOS E. The average delay on each movement is 37 seconds/vehicle, just 2 seconds beyond the LOD D 35 seconds boundary. The indicated queue lengths remain within the currently available queue storage areas, without overspill into adjacent traffic lanes; and
- based on the previously indicated TTSM modelling results for 2048, the local road through traffic volumes are expected to be lower than for the 2035 model period due to the 3036/37 removal of tolling from the TEL. Accordingly, the post 2036/37 period with the same net addition of dwelling generated traffic demand is expected to operate at least equivalent or better than is indicated in the assessments described.

On the basis of these assessments, it is concluded that up to 500 dwellings can reasonably be accommodated with access solely via Bell Road. This limiting threshold has been specified in the off-site staging transport infrastructure conditions that have been recommended.

8.15.2 PEI Only Access Staging

A similar, but simplified assessment has been made in relation to initial staging for development via the PEI interchange only. For this to be enabled, it will be necessary for the southern PEI intersection to be formed with a southern leg providing for access into the Wairakei South subdivision area. Formation of the intersection and enabling access to/from the Wairakei South area necessarily requires formation of a left turn lane on the PEI westbound off-ramp and extension of the right turn lane on the PEI eastbound off-ramp which connects into the PEI northern intersection.

The staged TTHM 2048 Option 10B transport modelling demands have been adopted as the baseline for this assessment. The following assessment methodology has been applied:

- the 2048 TTHM Option 10B modelling incorporates staged development for both Te Tumu and Wairakei South future growth areas;
- the modelling for Wairakei South assumed transport network connectivity via both the PEI and the Bell Road corridors;
- the land use assumption for Wairakei South assumed a total 1,734 dwellings and 8ha Industrial land use could be developed;
- the transport mitigation determined necessary to support this level of development incorporated signalisation of the Bell Road / Te Puke Highway intersection, the Bell Road rail crossing safety improvements and the PEI interchange works described above. The Bell Road / Te Puke Highway and rail crossing works would not be required under this scenario where no access was established between the early subdivision staging and Bell Road;
- the 2048 TTHM Option 10B modelling determined a distributed split in the generated traffic demand would occur between the PEI and Bell Road points of access as follows:

Table 8-4: Transport Demand Distribution Assessment Between Bell Road and PEI Cordons to Wairakei South

PEI Cordon	**AM Peak Period (vph)**	**PM Peak Period (vph)**
PEI Cordon Total (2-way)	1,883	2,167
Bell Rd Cordon Total (2-way)	1,001	1,175
Total PEI & Bell Cordon (2-way)	**2,884**	**3,342**
PEI Cordon %	**65.3%**	**64.8%**
Bell Road Cordon %	**34.7%**	**35.2%**
Rounded PEI %	**65%**	**65%**
2048 Dwellings (Option 10B)	1,734	1,734
2048 Industrial (Option 10B)	8	8
PEI Access Only (Dwellings)	**1,127**	**1,127**
PEI Access Only Industrial (ha)	**5**	**5**

The assessment demonstrates that 65% of the total 2048 modelled demand travels via the PEI interchange. Accordingly, the same total development generated demand can be accommodated at the PEI, without altering the transport infrastructure requirement. Where there is no connection established to Bell Road from the subdivision development, the equivalent total traffic movement at the PEI will be generated by 65% of the TTHM 2048 modelled demands. This is equivalent to 1,127 dwellings and up top 5ha Industrial development. It is recognised that there may be some localised minor redistribution of turning movements as a result of the consolidation of access at the PEI only. Taking into consideration the pre-2048 operational period, the LOS A-C intersection performance (**Appendix 9**) and the residual capacity of the wider transport network links and intersections described at **Appendix 8** and **Appendix 9** to which this stage applies, it is concluded this interim staging is able to be readily accommodated with less than minor effect.

8.16 Crash Costs and Emissions

The crash costs and emissions assessments and summaries are described in the Beca Wairakei South Transport Modelling report (**Appendix 3**) as follows:

- Section 3 TTSM Modelling Results – Round 3;
- Appendix A: Technical Modelling Report Interim Findings:
    - Section 3.6 Vehicle Emissions; and
    - Section 3.7 Vehicle Crash Cost Estimate;
- Appendix D:
    - Crash Cost comparative option summary; and
    - Emissions comparative option summary.

By way of an overall assessment of the crash and emissions evaluations, the following observations can be made:

- the 2035 Core Scenario (CS-DM) indicate relatively high emissions outcomes compared with the 2048 and 2063 network performance. This appears predominantly due to the removal of tolling from the TEL in 2036/37, which in the 2035 model is artificially forcing traffic demands to travel longer distances and at slower speeds on the local road network rather than on the TEL. The impact at 2035 is also materially increased local road and Domain Road interchange congestion which contributes to the network performance;
- with removal of the tolls and traffic demands utilising the transport network to travel on their predominantly preferred and most efficient routes, together with the introduced network mitigation measures (for which corresponding capacity is not taken up until the corresponding staged development is fully completed); an overall improved network performance outcome is achieved through the 2048 and 2063 future year periods
- the sensitivity (ST) assessments which model the no-Te Tumu (ST1); the Seddon Street connection (ST2) and the Te Tumu high growth (ST3) scenarios indicate that either reduced land development, improved future Te Puke connectivity or increased Te Tumu future density all have the potential to produce improved emissions outcomes;

- the overall emissions impact due to the development is negligible. The site is well connected to the local and strategic transport network, significant employment and servicing land uses are internalised minimising the need for longer trip making and therefore consequent emissions effects;
- the crash cost data represents a similar overall performance outcome when comparted with the emissions results. The crash cost per person indicates an increased cost outcome moving from the 2035 to 2048 and 2063 future years. This is assessed to be predominantly due to the planned removal of tolling from the TEL, which, while having a reduced emissions outcome, shifts traffic from the lower speed road to the higher speed TEL environment with consequent increased crash cost impacts. This is an external effect that is not generated by the development; and
- the crash rates are generally lower on the Local Road, Arterial and Motorway environments where much of the generated travel is expected to occur. Travel on the Rural and Major Rural higher cost road network is minimised through the internalisation of trip making, the integrated local road networks and as a result of the consequent relatively shorter trip making.

By way of an overall summary, the crash cost and emissions cost effects are assessed as being negligibly impacted by the development proposal.

9.0 District Plan Assessment

A detailed assessment of the development against the relevant transport-related provisions of the WBOPDC District Plan is provided in **Appendix 14**.

The assessment addresses the applicable rules within Chapter 4B (Transportation, Access and Parking) and the subdivision provisions of Chapter 12 relating to transportation and property access. These provisions primarily relate to access design, internal road layout, parking and manoeuvring requirements, and the integration of the proposed network with the wider transport system.

Given the nature of the Development , a number of rules are appropriately addressed at a future stage when land use and building development occurs. In these cases, the assessment confirms that the subdivision layout and proposed roading network provide sufficient flexibility to enable compliance with the District Plan requirements. Matters such as vehicle crossings, parking provision, loading and on-site manoeuvring are to be confirmed through detailed design and subsequent development, supported by the proposed conditions framework. The assessment of compliance in relation to the development proposal has been made having regard for the design elements of the development and the recommended transport conditions framework described in this assessment.

Overall, it is assessed that the proposed subdivision is consistent with the relevant transport-related provisions of the District Plan. The design of the internal road network, access arrangements and staging of infrastructure appropriately respond to the requirements of the Plan and can support transport effects being appropriately managed as development proceeds. Further, the recommended Transport conditions have been appropriately framed to ensure the long-term outcomes sought by the development and intended through the District Plan provisions.

10.0 Construction Traffic Effects

10.1 Overview

The development of Wairakei South will involve large-scale earthworks and civil infrastructure construction undertaken over an extended, staged programme. The applicant has advised that construction is currently anticipated to commence from approximately 2029, with works progressing incrementally as land is developed and serviced. Additionally, some works are required within the road corridor environments as mitigation to enable development staging.

Given the scale of the development area (approximately 350 ha) and the long-term nature of development, construction traffic effects have the potential to incrementally interact with the surrounding road network over a number of years. These effects will be temporary in nature but, if unmanaged, could give rise to adverse safety and efficiency effects on the surrounding local road network and State Highway 2.

The purpose of this section is to identify the potential construction traffic effects at a strategic level and to outline the framework through which those effects will be appropriately managed. Detailed construction methodology, earthworks fill source locations, haul routes, access locations and traffic management measures will be confirmed through a contractor-prepared Construction Traffic Management Plan (CTMP) and associated Temporary Traffic Management Plans (TMPs), which will be subject to relevant authority authorisation prior to the commencement of works.

10.2 Construction Activities and Earthworks Context

Bulk earthworks associated with the Wairakei South development will involve a combination of site preparation, platform formation, road construction, stormwater infrastructure and servicing works. Preliminary earthworks assessments indicate that the development is strongly fill-dominant with existing ground levels expected to be raised by approximately 3 metres on average to enable the provision of housing, employment land, and supporting infrastructure. Fill material will be sourced externally to the site, with extensive use of on-site material redistribution and the use of settlement/preload fill anticipated to manage ground conditions.

The current civil engineering intent is to maximise the reuse of material on site, including the use of surplus material as preload and subsequent respread for landscaping purposes where appropriate. On that basis, off-site disposal of cut material is not anticipated in the early stages of development, and may remain minimal for an extended period, subject to final construction methodology.

Further, and for the purposes of understanding the potential scale of construction traffic effects on the public road network, an illustrative external haulage scenario (nominally export of nine million cubic metres of material over an extended period of twenty years) has been considered, as set out below.

10.3 Indicative Construction Traffic Generation Operational Demand Assessment

To demonstrate the potential magnitude of construction traffic effects where external haulage is required, an indicative scenario has been assessed assuming:

- 9 million cubic metres (solid) of material is transported to the site via the public road network over the construction period;
- a bulking factor of 1.2, resulting in approximately 10.8 million cubic metres (loose) of material transported;
- an average heavy vehicle capacity of 20m³ per truck; and
- construction activity spread over a twenty-year programme, with bulk earthworks undertaken for approximately six months per year.

On this basis, the illustrative scenario equates to:

- approximately 540,000 heavy vehicle loads (one-way loaded movement), or
- approximately 1,080,000 two-way heavy vehicle movements over the twenty-year period.

When distributed across an assumed 6 active earthworks months and an assumed 6 working days per week, this would equate on average to:

- approximately 345 two-way heavy vehicle movements per working day, or
- approximately 31 two-way (16 loaded one-way) heavy vehicle movements per hour over an 11-hour construction day.

The frequency of movements at individual access points would depend on the number and location of construction accesses provided. By way of example, if one site access was in operation, this would equate to approximately 31 two-way heavy vehicle movements per hour or approximately one movement every 2-3 minutes, or one movement in each direction (arriving or departing) every 3-4 minutes on average. The current and future road network capacity, including the capacity created by advancing staged transport infrastructure, is readily able to accommodate the addition of traffic demands at these levels.

This scenario is included for illustrative purposes only to conservatively demonstrate the scale of potential effects and the methodology used to assess them. The actual volume of material hauled in relation to any one stage of development, the duration of haulage, access arrangements and operating hours would be determined by the appointed contractor and confirmed through the CTMP.

10.4 Construction Traffic Management Framework

All construction traffic effects are to be managed through the preparation and implementation of a Construction Traffic Management Plan (CTMP), to be submitted for approval by the relevant road controlling authorities prior to the commencement of works.

The CTMP will be prepared by the construction contractor and would be subject to engagement with, and certification by the relevant Road Controlling Authority (RCA) for works affecting roads under their respective jurisdictions.

The CTMP will be required to:

- identify construction access locations and access layouts;
- confirm haul routes, including any restrictions on routes, times or vehicle types;
- manage the timing and frequency of heavy vehicle movements;
- provide for appropriate temporary traffic management measures in accordance with the New Zealand Guide to Temporary Traffic Management (NZGTTM);
- address the safety of all road users, including pedestrians and cyclists where relevant;
- ensure continued access for adjacent landowners, businesses and emergency services; and
- include communication, stakeholder liaison and complaints management procedures.

Where construction activities interact directly with the public road network, site-specific TMPs will be prepared and implemented in accordance with the approved CTMP and submitted to the relevant RCA for certification prior to works commencing.

The following framework for a CTMP is recommended for inclusion in the conditions to ensure appropriate and on-going consideration of the potential for effects within a changing future road network environment, to ensure appropriate engagement with the relevant authorities and to achieve mitigation of effects to a minor or less than minor degree:

The **CTMP** shall:

a. identify construction access locations and access layouts;
b. identify the location of a site office, amenities and on-site parking areas;
c. confirm haul routes, including any restrictions on routes, times or vehicle types;
d. manage the timing and frequency of heavy vehicle movements;
e. provide for appropriate temporary traffic management measures in accordance with the New Zealand Guide to Temporary Traffic Management (NZGTTM);
f. include provisions for the avoidance of detritus tracking on public roads and measures to respond and address this in the event it occurs;
g. address the safety of all road users, including pedestrians and cyclists where relevant;
h. ensure continued access for adjacent landowners, businesses and emergency services;
i. include communication, stakeholder liaison and complaints management procedures;
j. include provisions for transport of over-size vehicles and associated permits; and

k. where construction activities interact directly with the public road network, require site-specific TMPs to be prepared and implemented as appropriate, in accordance with the approved CTMP and submitted to the relevant RCA for certification prior to works commencing.

11.0 Proposed Transport Conditions Framework

The proposed framework for the Transport conditions has been prepared to capture both the general transport provisions to apply across the site and the particular implementation and staged off-site transport infrastructure provisions determined from the transportation modelling and assessment undertakings. This is included at **Appendix 15** and imagery showing the location and staging of the recommendations is included at **Appendix 16**.

This framework for the transport conditions has been integrated with the comprehensive AEE Appendix AD: Proposed Conditions. The AEE should be referred in relation to the form of conditions proposed for this Fast-Track application.

The General Transport Engineering framework conditions are based on the typical form of conditions applied by WBOPDC applied to subdivision consents. These have been further developed to represent application to this particular proposal.

The Transport Infrastructure Design and Staging conditions framework has been prepared specifically in relation to the development and captures the staged on and off-site transport infrastructure, the specific operational and implementation, future-proofing and construction effects management provisions that are recommended.

By way of a point of reference in relation to the staged off-site transport infrastructure recommended, the Figures included as **Appendix 16** have been prepared to show the geographic location and staged transport mitigation response.

12.0 Summary & Conclusion

This ITA has evaluated the transport effects of the proposed Wairakei South development, having regard to the existing and future transport environment, the strategic policy context, and the scale and nature of the development.

The assessment has been informed by Tauranga's integrated transport modelling framework, including the TTSM and TTHM, supported by supplementary SIDRA and HCM analyses. The modelling has been subject to independent peer review and developed through an iterative transport stakeholder group engagement process involving WBOPDC, TCC, NZTA and BOPRC. Records of engagement are included in the AEE Appendix AB Consultation Summary Pack / Consultation Record. This provides a robust and appropriate basis for assessing both the strategic and operational transport effects of the development.

An area of influence approach has been adopted to identify those parts of the surrounding network where the development may reasonably be expected to result in material transport effects. This has enabled a proportionate assessment focused on locations where changes in traffic demand and/or network performance are meaningful, while distinguishing these effects from those arising from background growth and other planned development in the eastern Tauranga corridor, including within Te Tumu.

The results of the assessment indicate that the majority of the surrounding transport network continues to operate at acceptable levels of service with the inclusion of the proposed development. A small number of locations were identified for further assessment primarily through link-based screening. These included:

- The Sands Avenue corridor between Te Okuroa Drive and the PEI;
- the Te Puke Highway corridor in the vicinity of Bell Road; and
- the Domain Road interchange and associated ramp merge areas.

At these locations, the modelling indicates that network sensitivity arises over time as cumulative growth occurs across the eastern corridor. The analysis demonstrates that these effects are not attributable to Wairakei South in isolation, but instead reflect the combined influence of planned growth, including development within Te Tumu and the wider urban area.

The assessment has identified a range of targeted mitigation measures to address these network sensitivities. These measures focus on capacity and operational improvements to key corridors and intersections, together with safety upgrades where required. Importantly, the need for these measures arises progressively and aligns with identified development thresholds.

A staged conditions framework has therefore been developed to link the delivery of transport infrastructure to the scale and timing of development. This framework ensures that:

- initial development is supported by the establishment of access to the PEI and/or upgrades to the Bell Road corridor;
- intermediate stages of development trigger capacity improvements to The Sands Avenue corridor and Domain Road interchange; and

- later stages of development require further upgrades to key intersections and network connections, including the Te Okuroa Drive/The Sands Avenue intersection and the PEI.

This approach recognises that transport effects develop progressively and enables infrastructure to be funded and delivered at the appropriate time to maintain network performance, while avoiding both premature investment and delayed intervention.

The proposed internal transport network has been designed with a clear hierarchy and a strong multi-modal focus. It provides for walking, cycling and future public transport, and integrates with the surrounding Wairakei and Te Tumu. The layout supports a walkable urban form and aligns with the Connected Centres vision established through UFTI, as well as the RLTP and RPTP.

Overall, the assessment demonstrates that the transport effects of the Wairakei South development are able to be appropriately managed and where necessary, mitigated within the surrounding network. The development does not give rise to any unmitigated adverse transport effects that would preclude its progression.

On this basis, it is assessed that the proposed development is consistent with the relevant national, regional and local transport policy framework, and will contribute to the delivery of an integrated, resilient and multi-modal transport system within the WBOPDC area and the eastern transport corridor. The transport outcomes associated with the development are therefore assessed to be appropriately managed and acceptable from a transportation perspective.

Appendix 1: Future Transport Environment (Document Summaries)

Appendix 1: Future Transport Environment – Document Summaries

Regional Land Transport Plan (RLTP)

Overview

The Bay of Plenty Regional Land Transport Plan (RLTP) 2024–2034 is the statutory document that sets the strategic direction for land transport investment in the region. Prepared by the Regional Transport Committee under the Land Transport Management Act 2003, it outlines the 30-year vision for the transport system and identifies the region's 10-year investment priorities. The RLTP aligns with the Government Policy Statement on Land Transport 2024 and responds to the significant growth, resilience, safety and environmental challenges facing the Bay of Plenty region

Vision & Objectives

The 30-year vision for the RLTP is: "Our transport system meets the needs of our diverse communities, our environment and our economy".

The RLTP objectives are derived from the Ministry of Transport Outcomes Framework and are structured around:

- Healthy and safe people – minimise deaths and serious injuries, encourage active modes, and reduce harmful emissions.
- Environmental sustainability – transition to net zero carbon emissions, protect biodiversity, water and air quality.
- Inclusive access – provide equitable access to social and economic opportunities across all communities.
- Economic prosperity – enable efficient and reliable movement of people and freight, and unlock access to housing and employment land.
- Resilience and security – proactively manage risks from natural hazards, adapt to climate change, and recover quickly from disruptive events

Policies and Priorities

The RLTP provides an integrated policy framework that supports its objectives. Key policy directions include:

- Road safety programmes, safer speeds and investment in active modes.
- Decarbonisation of the public transport fleet and development of a regional EV charging network.
- Integration of transport and land use planning to support Future Development Strategies.
- Recognition of Māori aspirations and improving access to papakāinga and marae.
- Optimisation of strategic freight corridors, including SH29/29A, SH2, and the East Coast Main Trunk rail line.

The 10-year transport priorities are expressed through six strategic responses:

1. Supporting sustainable growth and housing supply by investing in key state highway corridors, high-frequency public transport, and integrated walking and cycling networks.

2. Developing an integrated freight system, including capacity and electrification improvements to the East Coast Main Trunk rail line.
3. Building resilience into the transport system by addressing climate risks and strengthening essential connections.
4. Reducing deaths and serious injuries through targeted infrastructure, enforcement and education programmes.
5. Transitioning to a sustainable, low-emission transport system through mode shift, demand management, and vehicle electrification.
6. Enhancing access to affordable and efficient travel choices, including improved rural services and community transport frameworks

Investment Programme

The RLTP identifies over $8 billion of transport investment over the 2024–2034 period, across state highway and local road improvements, public transport services and infrastructure, walking and cycling networks, and resilience projects. Regionally significant projects include the SH29/29A Western Corridor Growth Package, Takitimu North Link Stage 2, Hewletts Road and Mount Maunganui access improvements, Cameron Road multimodal corridor (Stage 2), Te Tumu internal infrastructure, and the Papamoa East Interchange.

Relevance to Wairakei South

The RLTP sets the regional investment framework within which Wairakei South will be delivered. The project is strongly aligned with the RLTP vision and objectives, contributing to growth management in the Eastern Corridor, supporting housing and employment land release, and integrating with regionally significant transport projects.

Key linkages include:

- The Papamoa East Interchange, identified as committed infrastructure in the RLTP programme which will serve as the main access for Wairakei South.
- Te Tumu internal infrastructure projects, providing multimodal connections, dedicated busways, and walking/cycling links that will integrate with Wairakei South.
- Planned investment in public transport services and park and ride facilities at Papamoa, which align with the project's multimodal transport aspirations.
- The emphasis on resilience, safety, and sustainability directly supports the transport planning for Wairakei South, particularly given its coastal and hazard-sensitive environment.

Transport Agency – Road Tolling

In the Bay of Plenty, the Tauranga Eastern Link (TEL) is already a tolled highway, charging approximately varying tolls for light and heavy vehicles to fund maintenance and operation of the corridor.

In December 2024, the Government approved new tolling rules to accelerate infrastructure delivery. The changes included:

- Tolling can apply to entire corridors, not just new road segments.
- Tolls may increase with inflation to ensure fairness over time.

- Toll roads must offer a free, viable route alternative; heavy vehicles may be required to use toll roads if designed to divert them away from built-up areas

The NZ Transport Agency has consulted on toll proposals for three new state highways in the North Island, including the Takitimu North Link (TNL) (14 km expressway between Tauranga and Ōmokoroa). The proposal covers a 35-year scheme to support Stage 1 maintenance and Stage 2 construction. Public consultation was held from September to October 2024.

While the NZTA has not yet adopted a formal national tolling plan, it is understood that internal work is underway to create one, aligning with Government expectations. A plan would, in due course, inform a system-wide strategy for tolling of major corridors, including those in the western Bay of Plenty.

Broader tolling policy changes could mean that future major transport infrastructure may include tolling proposals, but these would only proceed after consultation and if they meet corridor/tolling principles.

Regional Public Transport Plan (RPTP) & NZ Transport Agency Design Guidance

Overview

The RPTP 2022–32 is the statutory document guiding public transport planning in the Bay of Plenty. It provides the strategic framework for services, infrastructure, and funding decisions, aligning with the RLTP and UFTI Connected Centres vision.

Vision and Objectives

Vision:

More people using convenient, accessible public transport that enhances their lives, supports urban transformation8 and regional connectivity, while reducing our collective impact on the environment.

Objectives:

The vision is supported by seven key objectives with associated targets which will guide our delivery of public transport over the next ten years. These objectives also provide the framework for the policies and actions identified in Part 4.

The relevant design objectives are as follows:

Objective 1: Mode shift and carbon reduction

Public transport successfully contributes to the region's mode shift and greenhouse gas reduction goals.

Target: Plan and deliver a network to achieve 20% public transport mode share in the region's main urban areas by 2032.

Reduce public transport emissions by decarbonising the region's fleet.

Target: Zero tailpipe emissions from the region's public transport fleet by 2035.

Objective 2: Service planning and design

Convenient public transport that is accessible to all existing and potential customers.

Targets:

i. *70% of dwellings in Tauranga and Rotorua urban areas are within 500m of frequent public transport services by 2030.*

ii. *80% of residential dwellings in the region are within 500m of a public transport service by 2030.*

Objective 4: Public transport and land use integration

Integrated public transport and land use planning supports well-functioning urban environments11 that enable all people and communities to provide for their social, economic, and cultural wellbeing, and for their health and safety, now and into the future.

Target: A minimum of 47% of jobs in our main urban centres are accessible within 45 minutes travel time by public transport from all dwellings in the morning peak in 203012.

Policies

The relevant policy references are as follows:

Objective 3

Public transport services and infrastructure combine to deliver a safe, reliable, punctual and convenient customer experience while providing value for money.

Policy 3.4 Infrastructure quality

Encourage timely investment in, and provision of, public transport infrastructure and facilities that:

iii. ensure a high quality end-to-end journey experience for customers;

iv. give effect to national best practice public transport design guidance 22;

v. support the delivery of Policies 5.1-5.4 (Accessible Journey, Safety and Personal Security, Legibility, Amenity); and

iv. support the operational efficiency and reliability of public transport services.

Objective 4

Integrated public transport and land use planning supports well-functioning urban environments that enable all people and communities to provide for their social, economic, and cultural wellbeing, and for their health and safety, now and into the future.

Policy 4.1 Public transport and urban intensification

Ensure that urban environments where there is planned urban intensification and increased density of urban form are well-serviced by existing or planned public transport consistent with the requirements of the National Policy Statement on Urban Development.

Policy 4.2 Modal integration

Promote integration between public transport and other modes by:

- *vi.* *Providing safe and accessible walking, cycling and micro-mobility connections to public transport services and facilities.*
- *vii.* *Providing cycling and micro-mobility storage and parking facilities at public transport interchanges and other key locations.*
- *viii.* *Providing bike racks on buses.*
- *ix.* *Reducing conflict between buses and vulnerable users such as cyclists, pedestrians and micro-mobility users using appropriate design solutions which retain access for these modes.*
- *x.* *Identifying and developing locations considered suitable for park and ride facilities consistent with Policy 4.5.*

Policy 4.3 Services and infrastructure in new urban areas

Consider providing public transport services in new urban areas with a developed area of at least 10 hectares and a density of at least 15 dwellings per hectare, providing there is no impact on the viability of existing services, and where planned public transport infrastructure is consistent with the requirements in Policy 3.4.

Policy 4.4 Infrastructure timing

Proactively engage and collaborate with partner organisations and developers to identify, plan, consent and protect public transport corridors and infrastructure at the initial planning stages for new urban areas, ensuring sufficient corridor width and space for future supporting infrastructure is provided.

Policy 4.5 Park and ride

Apply the following principles when investigating and developing park and ride facilities:

- *i.* *locate to serve catchments where lower population densities, topography or other constraints mean fixed route services, on demand services, or active modes are less viable options;*
- *ii.* *locate to intercept car commuters as early as possible in their journey and ahead of bottlenecks to avoid adding to existing congestion;*
- *iii.* *locate and design to extend coverage of the public transport network;*
- *iv.* *locate and design to maximise uptake by people who would otherwise make their whole journey by car;*
- *v.* *consider the potential of park and ride as an alternative to providing car parking for developments in high demand urban areas;*
- *vi.* *consider the potential to improve other access options, including feeder services, and enhanced walking, cycling and micro-mobility access; and*
- *vii.* *ensure alignment with future land use plans, and flexibility to respond to future land use changes.*

Action Plan 2024

The 2024 Action Plan highlights important implementation measures like the Tauranga On-Demand Trial, Bus Decarbonisation Programme, Western Bay PT Services & Infrastructure Business Case, and fare reviews.

Relevance to Wairakei South

The RPTP provides clear direction for how public transport should be integrated into new growth areas. For Wairakei South, important considerations include:

- Density thresholds: Policy 4.3 identifies that new urban areas should only be provided with public transport services where developed areas exceed 10 hectares and achieve a minimum net density of 15 dwellings per hectare. The masterplan for Wairakei South, with 2,000–3,000 dwellings, is well above this threshold, meaning public transport provision will be expected and viable.
- Protection of corridors: Policy 4.4 requires early identification and protection of public transport corridors and interchange sites during the planning stage. Wairakei South must therefore ensure sufficient road corridor width is provided along its main spine routes to enable future bus priority and supporting facilities.
- Integration with Papamoa East Interchange (PEI): Policy 4.2 on modal integration, together with Policy 4.5 on Park and Ride, reinforce the need for seamless connection between public transport services and the wider regional transport system. The PEI will be the key access point for Wairakei South and is expected to function as a multimodal hub, potentially including Park and Ride facilities.
- Mode shift and emissions: Objective 1 commits the region to achieving a 20% public transport mode share by 2032 and a fully zero-emission fleet by 2035. Wairakei South's design, staging, and service integration will therefore need to actively support mode shift through walkable neighbourhoods, priority bus connections, and early uptake of clean fleet technology.

Overall, the RPTP establishes an expectation that Wairakei South will be designed and delivered as a public transport–ready community, consistent with the Connected Centres vision and the region's long-term mode shift and decarbonisation goals.

NZ Transport Agency Public Transport Design Guidance (PTDG)

The NZ Transport Agency's Public Transport Design Guidance (PTDG) was released as a draft in May 2023 as a best-practice resource for councils, developers and transport practitioners.

The guidance covers bus stops, interchanges, driver facilities, access connections, and priority measures. Its purpose is to provide a nationally consistent reference for planning and designing public transport infrastructure. The PTDG emphasises:

- Accessible and safe infrastructure that can be used by all people.
- Integration of public transport with walking, cycling and micro-mobility.
- Operational efficiency, including bus lanes, signal priority and layover needs.
- Facilities that support good customer experience, including shelters, wayfinding, and safety.
- Planning for zero-emission fleets, including space for electric bus charging.
- High-quality interchanges and Park and Ride facilities that enable seamless transfers.

Of relevance to Wairakei South, application of the PTDG means that all future public transport facilities including bus stops, corridors, interchange points and any park and ride areas — will be expected to follow these design standards. This guides the development to deliver infrastructure that is safe, accessible, and future-proofed for the transition to zero-emission fleets, while also integrating effectively with the wider regional network and supporting the Connected Centres vision.

Wairakei / Te Tumu Framework Plan, Golden Sands Town Centre and Employment Precinct (RPS 20/03/17)

In 2016/17 TCC, Bluehaven Management Ltd and Tumu Kaituna 14 worked collaboratively to development the Wairakei/Te Tumu Framework Plan, Golden Sand Town Centre and Employment Precincts

The Framework Plan was prepared as a partnership between land holders to:

- Underpin economic and commercial strength through design, development, infrastructure planning and marketability of the Golden Sands Town Centre and Wairakei/Te Tumu Employment Areas;
- Provide a clear pathway to understanding the outcomes sought and the building blocks necessary to deliver a functioning centre of retail, commercial, employment and community facilities; and to
- Establish guiding principles that underpin the Town Centre and employment precincts.

Prior to the Framework Plan, RPS Group (2016) completed a review of the Wairakei Urban Growth area and Te Tumu Structure Plan area and prepared development scenarios that provided for a range of residential densities (as well as the commercial/retail/employment areas of Wairakei/Te Tumu) for infrastructure planning and to identify other possible impacts potentially resulting from the planned growth yields. This work built on previous planning work undertaken by TCC and RPS for the Te Tumu Strategic Planning Study. The key findings included:

- Wairakei:
  - Total dwellings: approximately 3,841; and
  - Total population: approximately 7,896;
- Te Tumu:
  - Total dwellings: approximately 7,705 – 7,846; and
  - Total population: approximately 14,878 – 15,817.
- Commercial / Retail (Sub Regional Assessment) Te Tumu / Wairakei:
  - A target of 75% employment self-containment;
  - 110 ha Industrial land area provision;
  - 30 – 40,000m^2 Golden Sands Town Centre across about 26ha;
  - Two neighbourhood centres (Papamoa Junction and Te Tumu) that could support a supermarket; and
  - A series of local centres.

The overall Vision for the Framework plan comprised four key pillars:

- A connected place;
- Compact and walkable;
- Life indoors and outdoors; and
- Alive at all times.

Key partners to the Framework Plan undertook concept testing to evolve planning for the land holdings and in particular the Golden Sands Town Centre; its relationship with the Papamoa East Interchange; transport accessibility and land use zoning distributions. These were collectively workshopped to produce a joint framework approach.

Framework Plans were prepared describing:

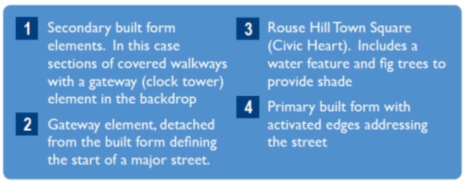
- Land use;

- Public Realm;
- Built Form Interface;
- Pedestrian and Cycle Movement;
- Public Transport; and
- Vehicle Movement.

The work included forecasting for houses; population; jobs; retail/commercial floor space and infrastructure spend. The key and strategic transport planning outcomes from the Framework Plans can be summarised as follows:

Table 1 Framework Plans – Key Transport Planning Outcomes (Source: RPS Tauranga City Council Wairakei / Te Tumu Framework Plan)

<table>
<tr><th>Framework Plan and Outcomes</th><th>Indicative Framework Plan</th></tr>
<tr><td>Land Use:

</td>
<td>
</td></tr>
<tr><td>Public Realm:

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<table>
<tr><th>Framework Plan and Outcomes</th><th>Indicative Framework Plan</th></tr>
<tr><td>

Pedestrian and Cycle Movement:

1. Bike storage and public art combined as a way finding feature
2. Public access to natural features or cultural heritage trails
3. High Street - outdoor dining integrated with walkways
4. Shared pathways that separate people and cyclists in primary pedestrian zones
5. Landscaped areas within the Wairakei Stream should promote exercise, and increase stewardship

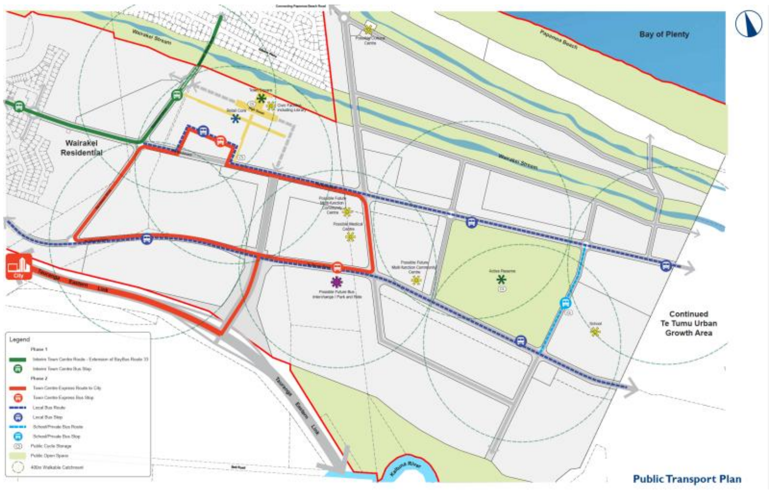
</td><td>

</td></tr>
<tr><td>

Public Transport:

1. Local school bus. Provide safe drop-off areas with the ability to cater for different bus sizes.
2. Integrated bus stops within Golden Sands Town Centre and adjacent to major road network.
3. Current Baybus route map, noting limited service to expanding residential areas in Wairakei
4. Current Baybus service.

</td><td>



</td></tr>
<tr><td>

Vehicle Movement:

1. Residential street servicing medium density residential. Threshold treatments and landscape detailing enhance built form
2. Integrated off-street parking within the Golden Sands Town Centre are attractive spaces
3. Shared street leading to a Town Square. Continuous pavement detail articulates slow speed environment
4. 'High Street' as a slower speed environment with parallel parking and pedestrian crossings
5. Way finding feature to delineate key roads.

</td><td>

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</table>

Largely, for the final structure plan, and zoning approach for Te Tumu the Framework Plan has remained intact, however a shift of planning approach has brought forward delivery of The Boulevard, ahead of the Te Okuroa Drive extension. The result has been a shifting of key land uses to the Boulevard corridor to align with the transit-oriented community approach adopted for Te Tumu post all modelling, assessments, engagement and key strategy outcomes (i.e.: UFTI).

The key transport planning outcomes that integrate with the Te Tumu structure plan area can be summarised as follows:

- In land use terms, the planned town centre is relied on as a key service provider for the Te Tumu;
- There is a seamless integration of employment lands across the Wairakei – Te Tumu boundary delivering a single integrated environment;
- Similarly, open space and school land uses planned within the Te Tumu area is a key facility in support of the panned town centre living environment;
- A comprehensively planned and integrated pedestrian and cycle network is shown, with a focus on these modes along the multi-modal The Boulevard corridor and also off-line alongside the Wairākei Stream;
- Public transport services are shown linking the key Te Tumu transport corridors, in particular The Boulevard, with the planned Wairakei town centre stops;
- The vehicle movement network indicates an arterial function for Te Okuroa Drive and a collector road hierarchy for The Boulevard, indicating different intended functions to each corridor; and
- The indicative sequencing shown in the Framework Plan document shows an integrated approach drawing on shared services such as the school and active reserve areas within the Te Tumu and the urban servicing and retail functions to be established within Wairakei.

Overall, it can be seen, that while some elements of both areas have progressed with on-going planning, there remains an integrated community approach that extends seamlessly across the Wairakei and Te Tumu interface areas. The multi-modal transport network and also the arterial vehicular network structures are deeply connected to the land use planning functions for both areas. The proposal is assessed as continuing to deliver an integrated connectivity for the two areas.

The Sands Town Centre and Development Area, Integrated Transport Assessment (Mott MacDonald 13/02/19)

Bluehaven Management Ltd, sought resource consent to provide for the implementation of the Sands Town Centre. As part of assessment work an Integrated Transportation Assessment (ITA), 13 February 2019, was prepared by Mott MacDonald for The Sands development proposal, along with key land use plans.

The Sands development area adjoins the western boundary of the Te Tumu structure plan area. It extends from the Wairakei Stream environment in the north, south across The Boulevard to the northern edge of Te Okuroa Drive.

The proposed Papamoa East Interchange establishes a link between the expressway in the south, across Te Okuroa Drive to The Boulevard at a point about mid-way across the site.

Since the grant of consent in 2019 there has been further iterative development planning for the site. At the time of writing this assessment a further consent and variation was granted, in part of the basis of a December 2020 ITA[1]. Consent was granted on 6 July 2021.

The consented development area is shown on the following Figure:

[1] Mott MacDonald ITA, December 2020, Rev V.

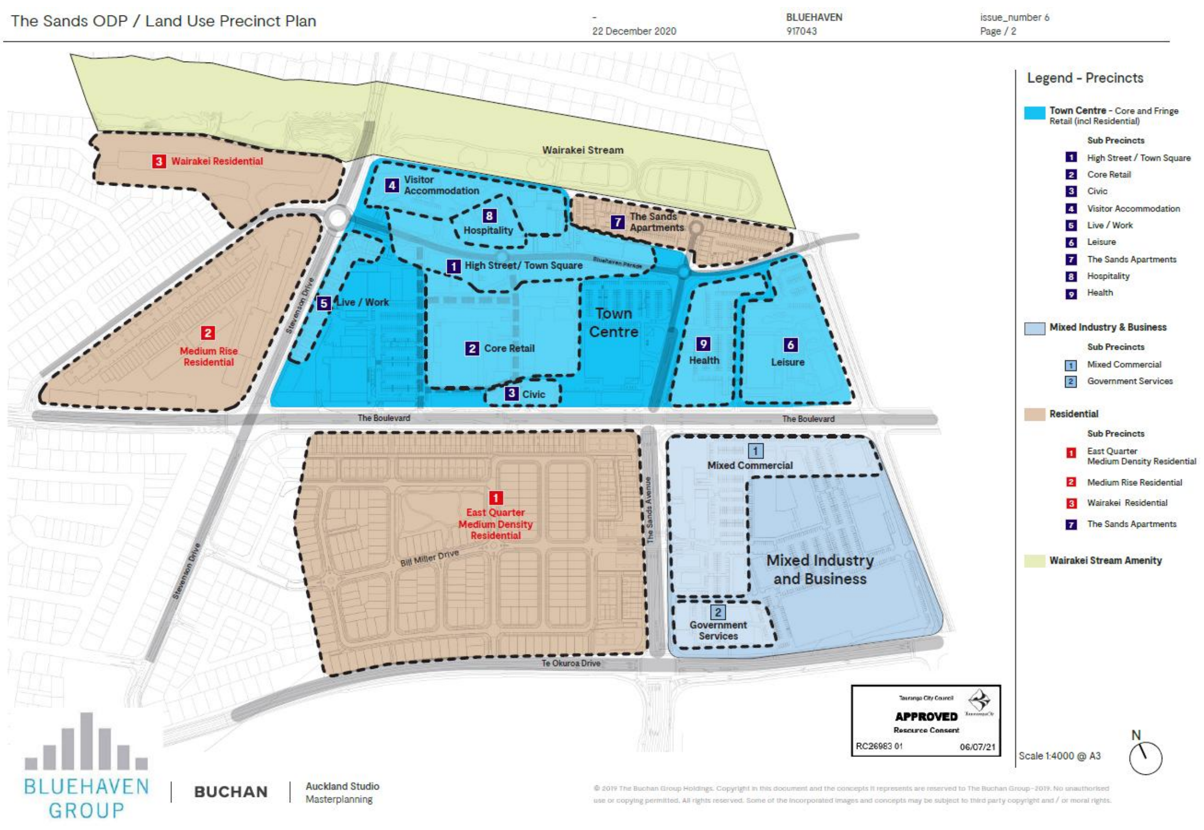


Figure 1 The Sands Town Centre Area (source: Resource Consent RC26983-01)

The Figure shows the planned location of both Te Okuroa Drive and Te Boulevard linkages with the Te Tumu structure plan area on the site's eastern boundary.

The resource consent notes the following specific exclusions from the grant of consent:

- The design of road intersections proposed as part of the EQMD Area;
- Number of pipes to cross Te Okuroa Drive East;
- The alignment of gravity lines on the south side of the buffer swales of Te Okuroa Drive and the effect that these have on the depth of PS158. This includes the depth of PS158; and
- Final landform design and proposed freeboard levels of buildings.

The key transport and movement outcome plans have been extracted from the Resource Consent and included at **Appendix D**. These include:

- Overall land use site plan;
- Land use precinct plan;
- Pedestrian and cycle movement plan;
- Public recreation and reserve areas;
- Public transport plan; and the
- Vehicle movement plan.

Key elements of the proposal for the town centre development together with a proposed staging of both development and transport infrastructure are also described in the consent. By way of an overall observation, the following key alignment observations can be made:

- The proposed land use outcomes are consistent with the assumptions the transport modelling has anticipated for the area;
- The Boulevard and Te Okuroa Drive strategic linkages are located to align with the proposed structure plan transport network;
- The conditions provide for early-stage development of The Boulevard link, aligned with anticipated staged progression for Te Tumu;
- The major intersection control forms are proposed as signalise intersections, providing for consistency in the way pedestrian, public transport and general traffic movement is managed;
- Turning access management is anticipated on Te Okuroa Drive, consistent with the higher traffic demands anticipated in that corridor; and
- A public transport network and stop infrastructure has been planned on the key transport routes and at stop locations in a way that will integrate with the structure plan.

The following indicative variations are also indicated on the plans:

- The section of Te Okuroa Drive east of The Sands Drive, connecting with the structure plan boundary is shown as a collector road. This is consistent with the current form of road hierarchy shown on Council's District Plan maps. The maps have not at this time anticipated any road hierarchy outcomes for Te Tumu.

  The proposed structure plan anticipates the initial section of Te Okuroa Drive as comprising a 4-lane median divided cross section with a secondary arterial road hierarchy. This is to both enable accommodation of the anticipated traffic demands as well as providing for the long-term management and control of access to property.

  It can be seen from the plans however that access management is anticipated by the consent in a way that is consistent with the outcome for the structure plan. The consent does not require the designation of the corridor as a collector road. Rather, it is recommended, where Te Okuroa Drive within the structure plan area is established as a secondary arterial, the same designation is carried through to link with The Sands Drive. Where an alternate road hierarchy outcome is determined, it is recommended the corridor is consistently defined between The Sands Drive and the structure plan area.

- The consent drawings show Te Okuroa Dr as a "*local bus route*".

  Current design outcomes for the structure plan anticipate a consolidation of the public transport servicing on the prioritised bus lanes proposed for The Boulevard. The corridor is planned to be established as a rapid transit corridor. Its location is well located to provide a central service route for the planned community. Te Okuroa Drive however is established with development potential for employment and living predominantly to one edge of the corridor. It would be inefficient for a bus service to be maintained over its full length, however in time, there could be potential for a local service on part of Te Okuroa Drive should demand warrant it.

  Therefore, it is assessed as appropriate that the consent plans indicate the potential for public transport services to be located on Te Okuroa Drive. The arrangement therefore does not foreclose the long-term potential for this, and to that extent the proposal is consistently formed.

Overall, therefore, the proposed The Sands town centre multi-modal transport system is assessed as being proposed in a form that aligns strongly with the long-term function for the structure plan.

Appendix 2: Strategic Policy Document Summaries

Appendix 2: Strategic Policy Document Summaries

Government Policy Statement (GPS) – Transport

Overview

The Government Policy Statement on Land Transport 2024/25–2033/34 (GPS 2024) sets the Government's strategic priorities and funding expectations for the land transport system. It guides investment of more than $22 billion over the first three years of the period and shapes Regional Land Transport Plans (RLTPs) and the National Land Transport Programme (NLTP). It is the primary instrument linking national transport objectives with regional and local planning.

Strategic Priorities/Other Headings

The GPS identifies four strategic priorities:

- Economic Growth and Productivity – the overarching priority, focusing on improving state highways, unlocking housing land, supporting freight efficiency, and enabling faster, safer movement of people and goods.
- Increased Maintenance and Resilience – significant increases in road maintenance funding, with a new focus on proactive pothole prevention and resilience to natural hazards.
- Safety – targeted investment in road policing, enforcement, safer infrastructure, and retrofitting safety measures.
- Value for Money – ensuring investments deliver efficient outcomes, controlling costs, and using "no frills" specifications to focus on core transport objectives

Investment Direction

Key investment directions in GPS 2024 include:

- Re-introduction of the Roads of National Significance (RoNS) programme, including Tauriko West (SH29) and Takitimu North Link in the Bay of Plenty.
- Identification of Roads of Regional Significance, improving safety and resilience of regional networks.
- Major public transport projects in Auckland and Wellington, alongside expectations of higher farebox recovery from councils.
- Continued focus on the Auckland–Hamilton–Tauranga freight triangle, with targeted rail investment.
- Explicit support for tolling, time-of-use charging, public private partnerships (PPPs) and alternative funding models for new infrastructure.

Relevance to Wairakei South

The GPS 2024 provides the national policy framework within which Wairakei South must be planned and assessed. The project strongly aligns with GPS objectives by unlocking significant new housing and employment land in the Eastern Corridor, supporting economic growth and productivity. Its integration with the Tauranga Eastern Link and the Papamoa East Interchange (PEI) reflects the GPS focus on state highway efficiency and freight connectivity.

Design responses to flooding, liquefaction and other local hazards (assessed by other experts) are expected to contribute to the GPS priority on resilience, while new internal intersections and corridors will be required to deliver cost-effective safety outcomes consistent with the Safe System approach. Funding for Eastern Corridor projects, including the PEI, is consistent with GPS 2024 investment directions and likely to be prioritised in the RLTP and NLTP.

Overall, Wairakei South demonstrates strong alignment with GPS 2024's strategic priorities, particularly in supporting growth, enabling resilient infrastructure, and integrating with nationally significant transport investments.

Government Emissions Reduction Plan 2

Overview

New Zealand's second Emissions Reduction Plan (ERP2) covers the period 2026–30 and sets out the policies and actions to achieve the second emissions budget (EB2) under the Climate Change Response Act 2002. ERP2 builds on the first emissions reduction plan (ERP1) and is designed to move New Zealand towards its legislated 2050 targets.

Key Pillars

ERP2 is anchored in New Zealand's Climate Strategy, which is structured around five pillars:

- Infrastructure is resilient and communities are well prepared.
- Credible markets support the climate transition.
- Clean energy is abundant and affordable.
- World-leading climate innovation boosts the economy.
- Nature-based solutions address climate change.

Transport Policies and Initiatives

Transport is a key focus as it accounted for 17.5% of gross emissions in 2022. ERP2 policies include:

- Expanding New Zealand's electric vehicle (EV) charging network to 10,000 public charging points by 2030.
- Transitioning all light vehicles from fuel excise to road user charges by 2027.
- Introducing legislation to enable time-of-use charging to manage congestion and reduce emissions.
- Reviewing barriers to uptake of zero-emission heavy vehicles, supported by the Low Emissions Heavy Vehicle Fund.
- Supporting decarbonisation of aviation and shipping, including green shipping routes by 2035 and sustainable aviation fuel development.
- Supporting continued transition to zero-emission buses in urban PT fleets, with all new buses to be zero-emission from July 2025

Relevance to Wairakei South

ERP2 reinforces the national direction for reducing transport emissions and supporting compact, multimodal growth. For Wairakei South, the key relevance lies in ensuring the proposal enables a transport network that is consistent with these objectives.

The proposal provides an opportunity to deliver road corridors that are public transport–ready, with sufficient width for future bus priority, zero-emission fleets, and active mode connections.

Integration with the Papamoa East Interchange creates the opportunity for regional agencies to provide Park and Ride facilities (and potentially EV charging) at a subregional hub. While delivery of such facilities would sit with council and transport providers, ensuring the proposal does not preclude space for these uses is consistent with ERP2's national direction on expanding EV charging infrastructure and supporting mode shift.

By planning for a connected internal road hierarchy, walkable neighbourhoods, and integration with the wider multimodal network, Wairakei South supports the ERP2 direction on mode shift and emissions reduction. While individual technology choices (such as zero-emission freight vehicles or industrial energy systems) sit outside the scope of this proposal. The proposal can future-proof corridors and protect land use patterns so they are compatible with these national shifts.

Overall, the proposal for Wairakei South demonstrates alignment with ERP2 by enabling a land use pattern and transport structure that will facilitate mode shift, resilience and low-carbon travel choices in the Eastern Corridor.

Regional Policy Statement (RPS)

Overview

The Bay of Plenty Regional Policy Statement (RPS) provides the overarching strategic framework for how growth and resource management is to be managed across the region. It is particularly influential in shaping decisions around urban expansion, transport integration, and infrastructure investment.

The RPS emphasises:

- Compact and sustainable urban form: Objective 23 seeks a compact, well-designed and sustainable urban form that efficiently accommodates regional growth.
- Integrated transport and land use: Objective 24 requires an efficient, sustainable, safe and affordable transport network that is integrated with land use patterns.
- Sequencing of development: Policy UG 6A directs that new urban growth should occur in sequence, making efficient use of existing serviced land before extending into new areas, and ensuring infrastructure is available to support growth.
- Infrastructure and investment alignment: Policy UG 10B requires rezoning and urban development decisions to take account of sustainable land uptake, existing or committed infrastructure, and the efficient use of public and private investment.
- Integrated management: The RPS highlights the need to coordinate land use, transport, and infrastructure decisions, recognising that poorly sequenced or uncoordinated growth can undermine both transport efficiency and environmental outcomes.

Relevance to Wairakei South

For Wairakei South, the RPS provides important strategic guidance rather than prescriptive requirements. Its relevance can be summarised as follows:

- Growth location and sequencing: The area lies adjacent to the existing Wairakei Urban Growth Area, meaning its potential development can be viewed as a logical extension provided it aligns with sequencing expectations and does not undermine investment already made in Wairakei or Te Tumu.

- Infrastructure alignment: Any proposal or development of Wairakei South will need to demonstrate that transport and three waters infrastructure can be provided in a sustainable and timely way, consistent with Policy UG 10B.
- Transport integration: The emphasis on an integrated, multimodal transport network supports Wairakei South adopting a structure that connects strongly into the Papamoa East Interchange and the rapid transit corridor planned along The Boulevard.
- Urban form outcomes: The RPS direction for a compact, well-designed urban environment underpins the need for Wairakei South to deliver a mix of land uses, walkable neighbourhoods, and a transport network that reduces reliance on private vehicle travel.

In summary, the Bay of Plenty RPS offers a **guiding framework** that supports growth in Wairakei South provided it is sequenced with other eastern corridor areas, integrated with infrastructure, and consistent with the region's goals for sustainable urban form and transport efficiency.

SmartGrowth

Overview

SmartGrowth is the established sub-regional growth management partnership for the western Bay of Plenty, involving Bay of Plenty Regional Council, Tauranga City Council, Western Bay of Plenty District Council, tāngata whenua, and central government, working collaboratively to plan for sustainable, well-coordinated growth.

Strategy and Vision

The SmartGrowth Strategy 2024–2074 outlines a long-term vision for growth, emphasizing integrated planning that combines housing, land use, infrastructure, transport, community development, cultural values, and environmental stewardship. Its aim is to build strong, resilient communities that are well-connected and prepared for future growth challenges.

Key Elements

A core feature of SmartGrowth's approach is the designation of Priority Development Areas (PDAs). These are growth zones where coordinated planning and investment are essential to unlock housing and infrastructure. In the eastern sub-region, the PDAs include Wairakei and Te Tumu, identified as key focus areas for expansion alongside other PDAs in the west (e.g., Tauriko West) and north (e.g., Ōmokoroa).

SmartGrowth emphasizes the Connected Centres approach, which supports urban development through high-quality transport links enabling access to local services within 15 minutes and sub-regional destinations within 30–45 minutes

The SmartGrowth Strategy is closely aligned with the Urban Form and Transport Initiative (UFTI) and the Tauranga Transport System Plan (TSP), which together specify transport investments such as rapid transit corridors and key infrastructure nodes

Relevance to Wairakei South

While Wairakei South is not explicitly named as a PDA, its proximity to Wairakei and Te Tumu, which are designated PDAs, places it within a strategic growth context. The SmartGrowth Strategy suggests several considerations that are of relevance to Wairakei South:

- Strategic alignment:
    - Wairakei South can be viewed as a logical extension of existing eastern growth zones, and its planning should reflect the same priorities of integration, connectivity, and sequencing.
- Infrastructure coordination:
    - Growth in Wairakei South can align with (and benefit from) the infrastructure frameworks established for Wairakei and Te Tumu PDAs, especially regarding transport corridors and rapid transit.
- Connected centre principles:
    - Wairakei South should be planned and assessed in a way that gives effect to the Connected Centres framework. This means being an area that supports well-connected, walkable neighbourhood designs that link into the broader sub–regional network.

Western Bay of Plenty Transport System Plan (TSP)

Overview

The Western Bay of Plenty Transport System Plan (TSP) is the 30-year implementation plan that gives effect to the Urban Form and Transport Initiative (UFTI) Connected Centres vision. It was refreshed in 2023 to align with regional growth and investment priorities. The TSP brings together Tauranga City Council, Western Bay of Plenty District Council, Bay of Plenty Regional Council, the NZ Transport Agency, tangata whenua, Port of Tauranga, KiwiRail, and Priority One to identify, stage and prioritise the transport projects needed to support sustainable growth.

Key Directions

The key directions articulated in the TSP are:

- Mode shift and travel choice:
    - The TSP emphasises reducing car dependency by making it safer and easier to travel by public transport, walking and cycling. Buses are to be given dedicated lanes and priority at intersections, supported by new bus facilities and park-and-ride sites.
- Support for Connected Centres:
    - Growth areas are to be linked into the regional network so that residents can reach local services within 15–30 minutes and sub-regional destinations within 30–45 minutes.

- Eastern corridor focus:
    - The TSP recognises Wairakei and Te Tumu as priority growth areas. Listed projects in the area include:
        1. Wairakei–Te Tumu collector roads and bus facility (developer-delivered): new collector network with bus priority, bus stops, cycleways and footpaths to serve urban growth.
        2. Te Okuroa Drive bus / HOV lanes (Parton Road east): completion of missing sections with bus and high-occupancy vehicle priority.
        3. Arataki to Papamoa East multimodal Stage 2: improved bus, walking and cycling facilities along the coastal corridor.
        4. Gloucester Street extension: new connection to strengthen local access and multimodal resilience.
        5. SH2 Tauranga Eastern Link shared use path (Domain Rd–Baypark): regional walking and cycling connection.
        6. Domain Road upgrade: urbanisation of southern sections with multimodal improvements.
        7. Park and Ride sites (Domain Road and Papamoa East): facilities to integrate with bus services and support mode shift.
        8. Te Puke to Rangiuru cycleway and PT access to TEL: long-term active mode and public transport connections to the regional network.

- Sustainable urban growth: The plan makes clear that transport projects are designed to support quality urban form outcomes, integrated land use and transport, and emissions reduction commitments.

Relevance to Wairakei South

The location of Wairakei South means that it is closely connected to the eastern corridor priorities, which include:

- Integration with corridor projects:
    - Development at Wairakei South would need to connect into the collector road and bus facility network planned for Wairakei/Te Tumu, ensuring consistency and interoperability.
- Public transport alignment:
    - The emphasis on dedicated bus facilities, bus/HOV lanes and park-and-ride provision in the eastern corridor suggests that Wairakei South should be planned with strong links to these facilities to support mode shift.
- Travel demand and emissions:
    - The TSP's focus on reducing car dependency and supporting emissions reduction targets indicates that a car-led development model would not align with regional direction. Instead, Wairakei South can support the plan by adopting a multi-modal street hierarchy, walkable neighbourhood design, and strong PT accessibility.

Te Puke Spatial Plan

Overview

The Te Puke Spatial Plan (TPSP) sets out how Te Puke will accommodate growth over the next 30–50 years, with transport integration a central theme. While centred on Te Puke township, the plan reinforces several principles that are directly applicable to Wairakei South. At the time of writing this report it was in draft form and going through consultation processes.

Key Transport Themes

The key themes of the TPSP include:

- Te Puke is framed as part of the SmartGrowth eastern corridor, highlighting the importance of coordinated planning across Pāpāmoa, Wairakei, Te Tumu, Rangiuru, and Te Puke. This corridor provides the primary east–west and north–south transport connections for housing, employment, and freight.
- Current safety and congestion pressure points on Jellicoe Street highlight the importance of timely intersection upgrades and network development.
- The TPSP identifies the need to diversify transport beyond private vehicles by improving public transport access, walking, and cycling links.
- Freight and employment access. The link between Te Puke, the Rangiuru Business Park, and the Tauranga Eastern Link underlines the role of the eastern corridor in supporting freight efficiency.
- Climate resilience. Flooding and stormwater constraints in Te Puke highlight the importance of aligning transport networks with resilient, adaptable infrastructure solutions, such as green corridors and integrated stormwater management.

Relevance to Wairakei South

The TPSP reinforces that growth in the eastern corridor must be coordinated, sequenced with transport capacity, and designed to reduce car dependency. For Wairakei South, this means aligning development with the wider corridor network, supporting mode shift through walking, cycling and public transport, and safeguarding freight access to the likes of the Tauranga Eastern Link and Port of Tauranga.

The plan also highlights the importance of resilience: ensuring transport networks are integrated with stormwater systems and designed with flood risk in mind. Taken together, these principles provide useful guidance for Wairakei South to ensure its transport network is efficient, resilient, and consistent with wider regional priorities.

Draft Te Tumu Future Structure Plan ITA

Overview

TCC commissioned an Integrated Transport Assessment for the Te Tumu Structure Plan in 2022[1].

The draft Te Tumu Structure Plan provides for a new coastal urban community at Papamoa East, accommodating a baseline population of around 15,500 people, with potential growth up to 25,000. Together with the adjoining Wairakei Growth Area, it is planned to support around 2,500 jobs. The transport strategy is built around a transit-oriented community with reduced reliance on private vehicles. Key features include a dedicated rapid transit corridor along The Boulevard, a permeable

[1] Te Tumu Structure Plan Transportation, prepared for TCC by Stantec, third draft update June 2022

walking and cycling network, and strategic connections via the Papamoa East Interchange (PEI) to the Tauranga Eastern Link (TEL).

Transport planning has been undertaken through multiple stages since 2016, involving modelling, optioneering, and integration with regional strategies such as the Urban Form and Transport Initiative (UFTI) and the Western Bay of Plenty Transport System Plan (TSP). The result is a multi-modal transport network designed to deliver safe, efficient and resilient access, while supporting land use density and emissions reduction objectives.

Key Points

Key points arising from the draft ITA were:

- The transport network is anchored by two principal corridors: The Boulevard, focused on public transport, and Te Okuroa Drive, focused on general traffic and walking/cycling.
- The Boulevard is safeguarded for a dedicated centre-running rapid transit service with integrated pedestrian and cycle facilities and protected intersections.
- Te Okuroa Drive requires four lanes west of the Ford land boundary to accommodate forecast demand, while The Boulevard can operate effectively with two traffic lanes plus rapid transit lanes.
- The Papamoa East Interchange is essential to enable development, with long-term resilience supported by corridor protection for the Bell Road link, a potential Kaituna Link, and future interchange upgrades.
- Transport modelling forecasts a high degree of internalisation, with 50–57% of trips within Wairakei–Te Tumu and over 80% within the wider Papamoa–Te Puke–Rangiuru area, dependent on mode shift to walking, cycling, and public transport.
- Staging analysis shows that up to about 1,450 dwellings can be supported with access only via The Boulevard, provided there is a balanced mix of land uses to reduce external trips.
- Safe speed design, segregated walking and cycling, and strong access management are embedded in the design philosophy to deliver safety and efficiency.

Relevance to Wairakei South

The Te Tumu ITA demonstrates how a large greenfield growth area can be enabled through a multi-modal transport network, high levels of trip internalisation, and reliance on the Papamoa East Interchange for strategic access to the TEL.

While Te Tumu and Wairakei are located north of the TEL within Tauranga City, and Wairakei South is proposed on the opposite side within the Western Bay of Plenty District, the three areas form part of the same growth corridor.

The conclusions of the Te Tumu ITA are relevant to Wairakei South in showing the importance of coordinated staging, protection of key transport corridors, and integration of land use and transport to reduce reliance on private vehicle trips. They also highlight the need to manage cumulative demand at the Papamoa East Interchange and to provide for consistent multi-modal outcomes across both sides of the TEL.

Western Bay of Plenty District Plan

Overview

The Western Bay of Plenty District Plan (Operative 2012, with plan changes) is the statutory planning instrument under the Resource Management Act that manages subdivision, land use and development across the District. It gives effect to the Bay of Plenty Regional Policy Statement and aligns with SmartGrowth's sub-regional growth strategy, setting the rules that guide urban form, infrastructure provision, and protection of natural and cultural resources.

The District Plan zones most of the Wairakei South area as Rural, with specific designations for State Highway 2 and the Papamoa East Interchange, and establishes the policy framework for managing future growth, including the sequencing and integration of land use with infrastructure capacity.

Key Points

The District Plan sets out the zoning framework, with most of Wairakei South currently zoned Rural, limiting urban development unless enabled through a plan change or Fast-Track consenting process. Designations apply for strategic infrastructure, including SH2 (Tauranga Eastern Link) and the Papamoa East Interchange, ensuring their function is safeguarded from incompatible land uses.

Objectives and policies emphasise integrated land use and infrastructure, compact urban form, protection of significant ecological and cultural features, and avoidance of development in high-risk hazard areas.

The Plan provides transport provisions, including road hierarchy, access standards, parking requirements, and expectations for walking and cycling connections. It is supported by the WBOP Development Code, which translates policy requirements into detailed design and construction standards for subdivision and infrastructure.

Any proposal for urbanisation of rural land must demonstrate strategic alignment, environmental sustainability, and the ability to be serviced by infrastructure consistent with District and regional frameworks.

Relevance to Wairakei South

The District Plan forms the statutory baseline for Wairakei South. Urban development cannot occur under the current Rural zoning and will therefore require a plan change to rezone the land for residential, commercial and industrial purposes.

The transport provisions of the District Plan establish the framework for subdivision road hierarchy, access management, parking and active mode requirements, and are directly linked to the Development Code standards that will govern subdivision design.

The District Plan also frames the expectations for integrated planning across the wider eastern corridor, requiring that growth in Wairakei South is sequenced with infrastructure capacity, avoids adverse effects on SH2 and the Papamoa East Interchange, and delivers multimodal networks consistent with SmartGrowth and the Transport System Plan. In this way, the District Plan provides both the regulatory context and performance expectations against which the transport outcomes for Wairakei South are assessed.

Western Bay of Plenty – Development Code

Overview

The Western Bay of Plenty District Council Development Code sets out the standards for the design and construction of subdivision and development infrastructure in the District. It provides a means of compliance with the District Plan and other statutory requirements. The Code applies to all subdivision and land development works that will be vested in Council, or that may impact on existing or future Council assets, It aims to enable consistent, safe and sustainable infrastructure outcomes across the District.

The design section of the Code establishes core urban design principles, including context-sensitive neighbourhood planning, integration of land use and transport, walkable block structures, multimodal networks, and low impact infrastructure design. It is aligned with higher-level strategies such as SmartGrowth, the Walking and Cycling Strategy, and the Built Environment Strategy, and is intended to embed those principles into local development outcomes.

The construction standards (CS4 Transportation) set out detailed technical requirements for roads, footpaths, cycleways, stormwater conveyance, pavements, kerbs, signage, and associated infrastructure. These include specifications for materials, testing regimes, surfacing, drainage, and safety features, ensuring that all assets constructed by developers and vested in Council meet consistent standards.

Relevance to Wairakei South

For Wairakei South, the Code is a key statutory reference point. It provides the baseline standards for the subdivision road hierarchy, access arrangements, berms, footpaths, cycleways, intersections, and stormwater that will form part of the development. It has scope to allow innovative, context-specific design solutions, provided these achieve the same or better outcomes against the Code’s principles.

Appendix 3: Beca Modelling Report

Sensitivity: General

Wairakei South Transport Modelling

Technical Modelling Report

Prepared for Bell Road Limited Partnership
Prepared by Beca Limited

2 April 2026

Contents

Appendices

Revision History

Revision Nº	Prepared By	Description	Date
1	Ali Danesh, Zoe Chen, Ivan Velilla	Draft Report for Client Review	24 March 2026
2	Ali Danesh, Zoe Chen, Ivan Velilla	Final Report	02 April 2026

Document Acceptance

Action	Name	Signed	Date
Prepared by	Ali Danesh, Zoe Chen, Ivan Velilla	Zoe	02 April 2026
Reviewed by	Subramanyam Uppuluri	URVRSubramanyam	02 April 2026
Approved by	Craig Richards	CRichards.	02 April 2026
on behalf of	Beca Limited		

Executive Summary

This report presents the findings of transport modelling undertaken to support the Fast Track Approvals Act Application for the proposed mixed land-use development in the Wairakei South area in Tauranga. The assessment utilised Tauranga Transport Modelling Suite (TTM 2023), comprising the Tauranga Transport Strategic Model (TTSM) and the Tauranga Transport Hybrid Model (TTHM). Together, these two tools were used to assess how the development influences travel patterns and transport network performance across the study area and to inform potential mitigation measures to address the transport effects of the proposed development.

TTSM

The TTSM modelling was undertaken in three rounds that sequentially updated and addressed previous round findings. This report focuses on Round 3, which is the final output. The Round 3 modelling incorporated several land use assumptions for Wairakei South based on the proposed land use and staging, and other growth areas as discussed in **Section 2.2.2**. The modelling was undertaken using the TTSM 2023 version. The road and PT networks within the Wairakei South area have been updated per the structure plan, and the wider area utilises the TTSM 2023 Do Minimum (DM) network. The land-use data for various Wairakei South traffic zones are shown in **Figure A.** The model years are 2035, 2048, and 2063. A detailed description of model scenarios and assumptions is discussed in **Sections 2.2.4** to **2.2.10**.

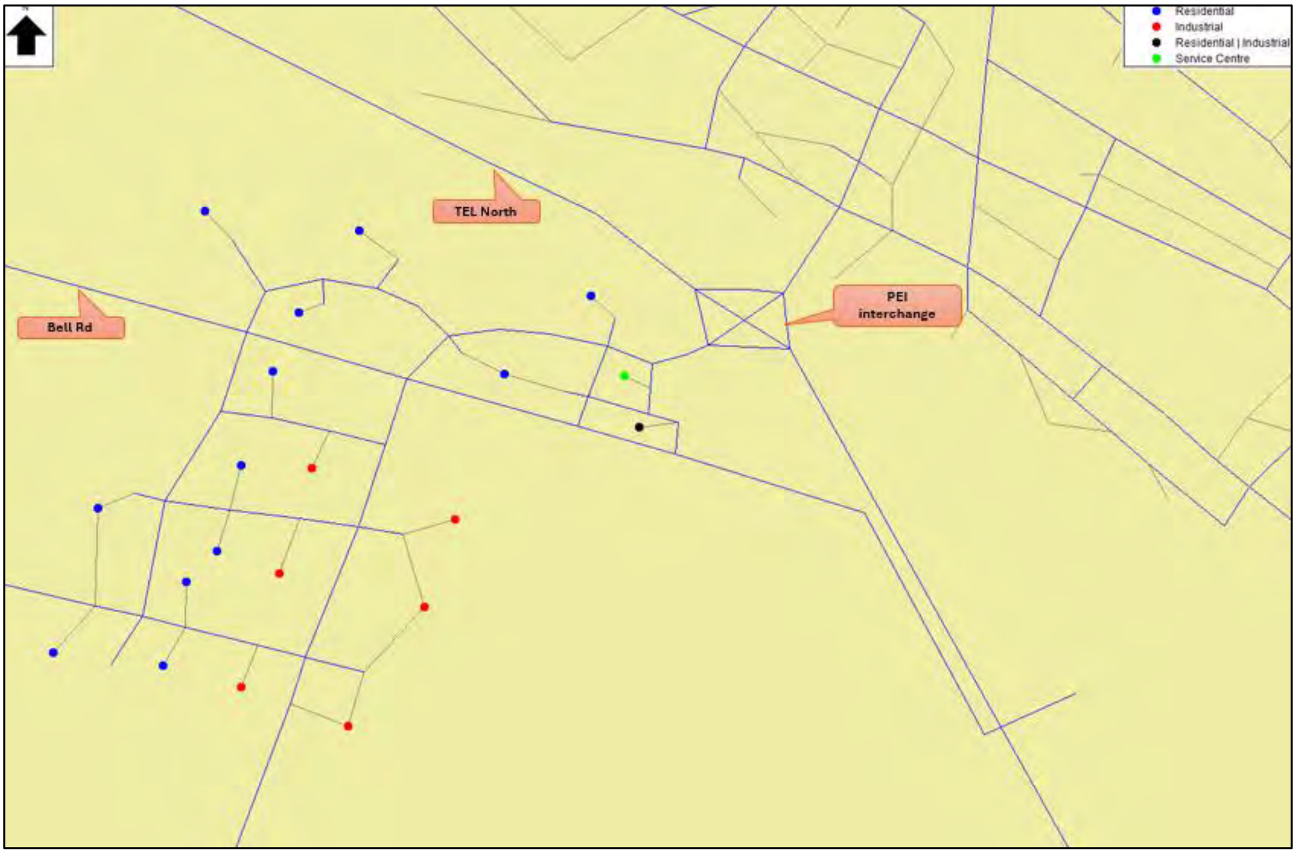


Figure A: Land Use types in Wairakei South area

The Round 3 modelled scenarios included the following:

- Do Minimum (DM): No Wairakei South development (2035, 2048, 2063) and with Te Tumu development.
- Core Scenario (CS): Staged Wairakei South development with land use redistributed across other growth areas (2035, 2048, 2063).

- Sensitivity Test 1 (ST1): Staged Wairakei South with land use redistributed across other growth areas and Te Tumu excluded (2035, 2048, 2063).
- Option 10A: Full Wairakei South with land use redistributed across other growth areas and Te Tumu excluded (2048, 2063).
- Comprehensive Sensitivity (CSS1/CSS2): CS land use plus the Eastbound Bypass Ramp at PEI Interchange and Bell Road connections to improve access to Te Tumu (2063).

Key Findings from the Round 3 modelling:

Discussion of key model outcomes from the modelled scenarios is summarised below:

Sector to Sector Demand

Daily vehicle travel patterns were analysed using a seven-sector system. The sectors are named as follows:

- Sector 1 – Wairakei
- Sector 2 – Te Tumu
- Sector 3 – Rangiuru/Maketu
- Sectors 4, 5 and 6 – Other areas
- Sector 7 – Wairakei South

The plots show the daily traffic distribution to and from the Wairakei South areas to the remaining six sectors for the 2035, 2048, and 2063 Core scenarios**.** The blue colour represents outbound trips from the Wairakei South area, while the green colour represents inbound trips to the Wairakei South area.

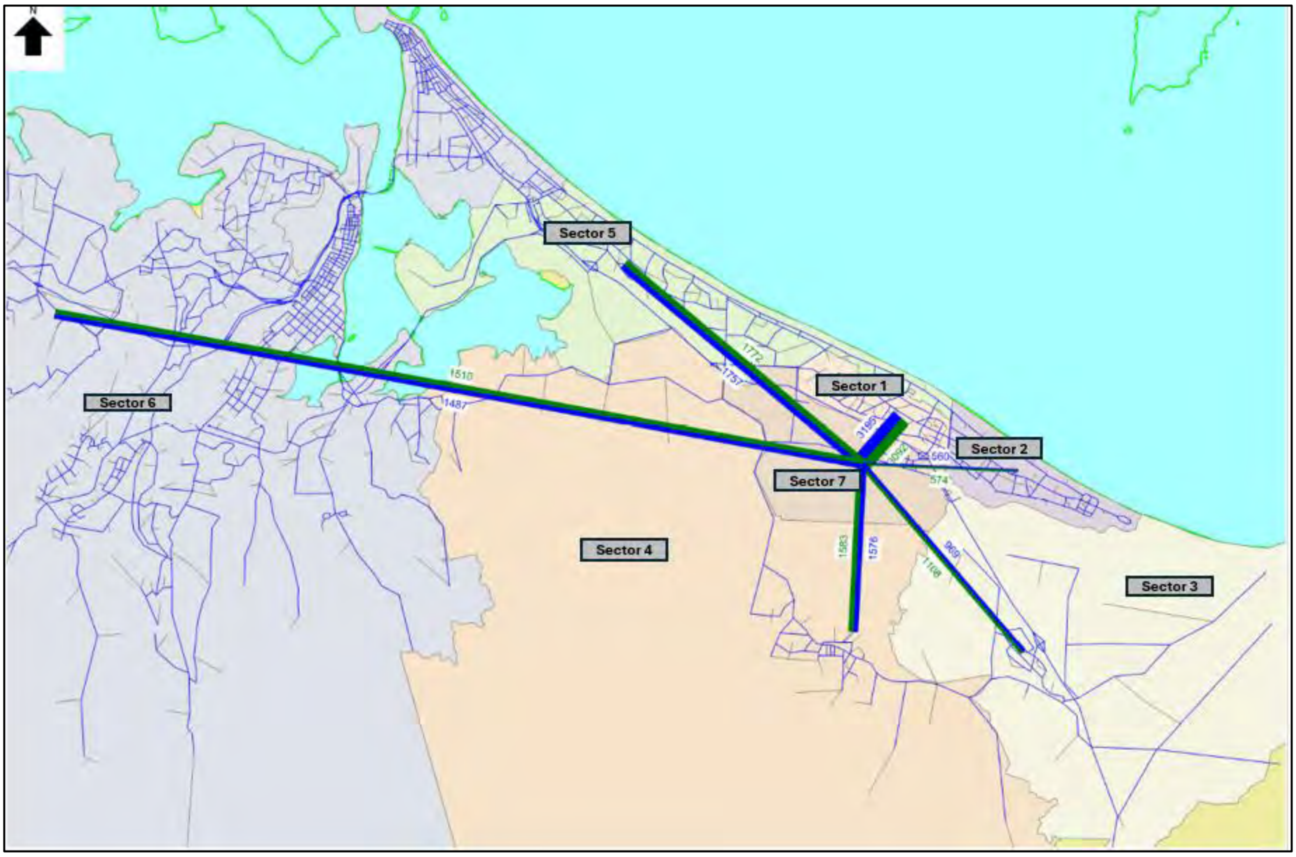


Figure B: Traffic Distribution from/to Wairakei South for 2035 Core Scenario

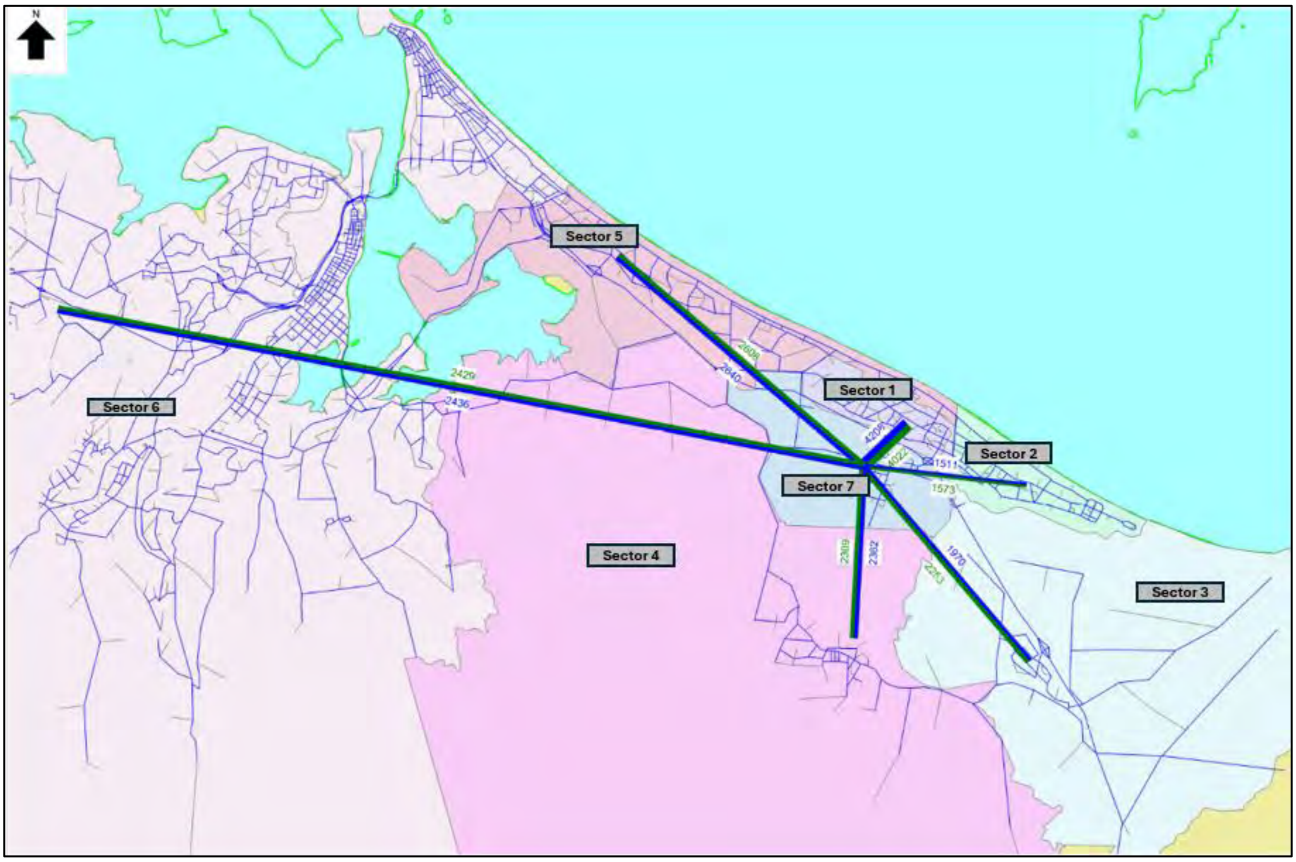


Figure C: Traffic Distribution from/to Wairakei South for 2048 Core Scenario

Figure D: Traffic Distribution from/to Wairakei South for 2063 Core Scenario

Level of Service (LOS)

LOS plots from TTSM are useful for understanding the general locations and potential severity of traffic congestion in the network. However, detailed TTHM modelling described below provides a more specific and accurate picture of network operation.

The TTSM modelling indicated that most intersections and road corridors operate at LOS D or better across all three forecast years. However, due to increased traffic demand, the Te Okuroa Drive/Sands Avenue intersection is projected to operate at LOS E in the TTSM 2048 and 2063 Do Minimum scenarios. These LOS matters were refined through subsequent TTHM modelling, with mitigation measures defined where necessary. A decline in performance is also noted on key corridors, particularly along Te Okuroa Drive, Sands Avenue, and the connections to the PEI ramp. Detailed LOS results for the key corridors and intersections are discussed in **Section 3.2**.

TTHM:

A microscopic subnetwork model has been developed from the Tauranga Transport Hybrid Model (TTHM) to assess the operational impacts of the proposed development on the surrounding road network. Cordon demands from TTSM were used as a starting point for demand development in TTHM and these demands were expanded to the three-hour model period and profiled using data derived from existing traffic counts.

The following scenarios have been modelled in TTHM:

2048

- Do-Minimum – Staged Te Tumu Demand, No Wairakei South Demand
- Option 10B – Staged Te Tumu Demand, Staged Wairakei South Demand
- Option 10C – No Te Tumu Demand, Full Wairakei South Demand

2063

- Do-Minimum – Staged Te Tumu Demand, No Wairakei South Demand
- Option 10C – No Te Tumu Demand, Full Wairakei South Demand
- Option 10D – Full Te Tumu Demand, Full Wairakei South Demand

For each of the development options, an unmitigated and mitigated scenario have been modelled:

- Unmitigated – With the Wairakei South development traffic and associated network upgrades
- Mitigated – As per the unmitigated scenario, plus additional interventions that could be applied to mitigate the development effects on network operation.

Key Findings:

The expected performance of the network for each peak with the mitigation upgrades is shown in **Figure E** for 2048 10B and **Figure F** for 2063 Option 10D.

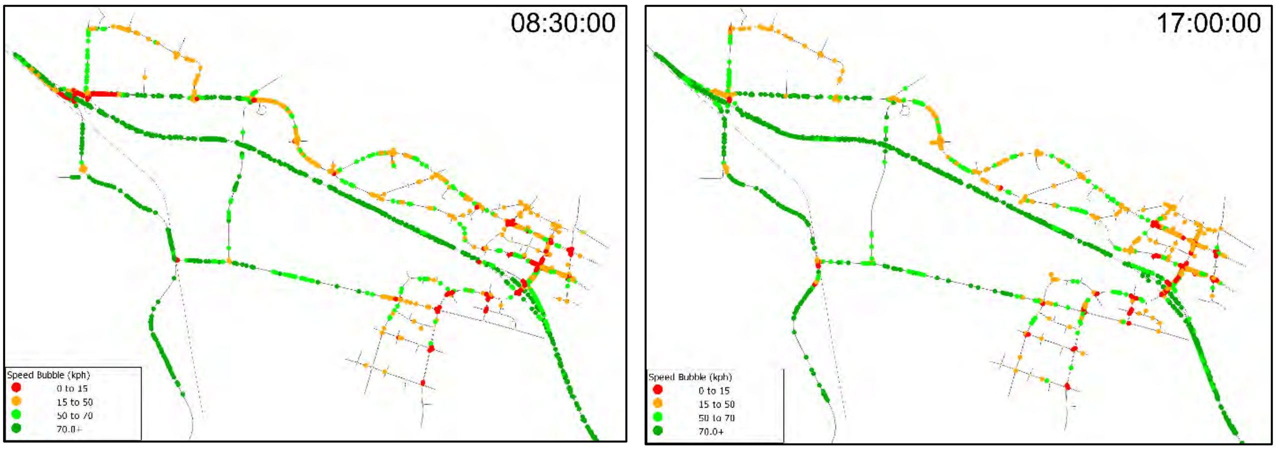


Figure E: 2048 Option 10B Network Performance

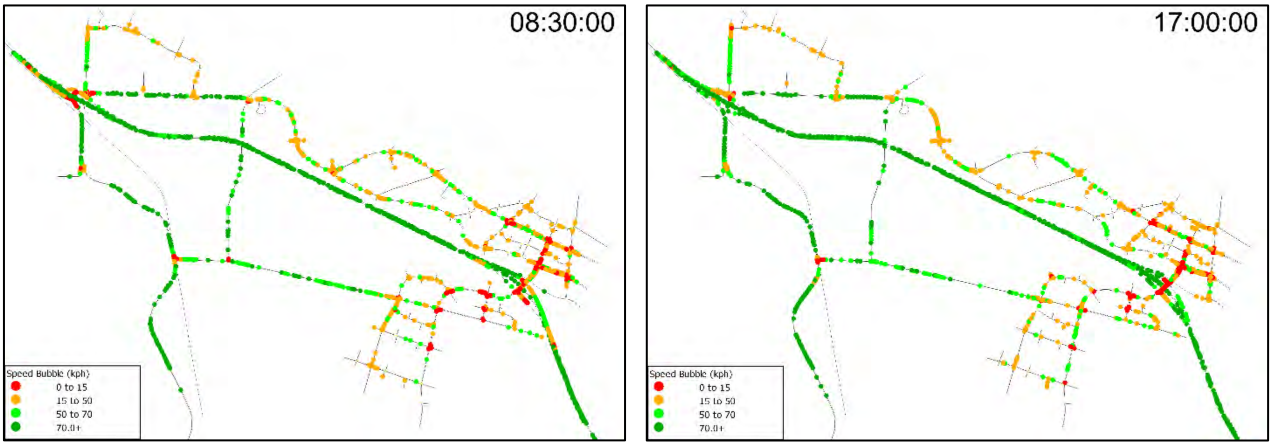


Figure F: 2063 Option 10D PM Network Performance

The key model outcomes from the modelled scenarios are summarised below:

- The modelling indicated a range of locations where mitigation interventions were necessary. The predominant and strategic locations where interventions were necessary included the Te Okuroa Drive / Sands Ave intersection, the PEI interchange, the Bell Road / Te Puke Highway intersection, and the northbound on ramp at the Domain Road interchange, amongst a range of other localised measures. These are further described in the reporting that follows.
- Intersections in the Wairakei South Development perform at an acceptable level of service across all modelled scenarios.
- The proposed infrastructure changes appropriately mitigate the network effects caused by the additional demand from the Wairakei South Development.
- The overall outcome of the modelled scenarios and identified mitigation is that the transport network with the Wairakei South development included, is expected to perform at least equivalent to or better than the Do Minimum transport network inclusive of the Te Tumu land use.

Peer Review

Flow Transportation Specialists has conducted a peer review of the TTSM and TTHM modelling work for this study. Peer review comments have been addressed. The ITA report will include the peer review reports.

1 Introduction

1.1 Background

Bell Road Limited Partnership is proposing to develop a mix of housing, employment, education and recreation activities in Wairakei South. The Wairakei South Fast Track Application site is shown in **Figure 1-1** (within the yellow boundary).

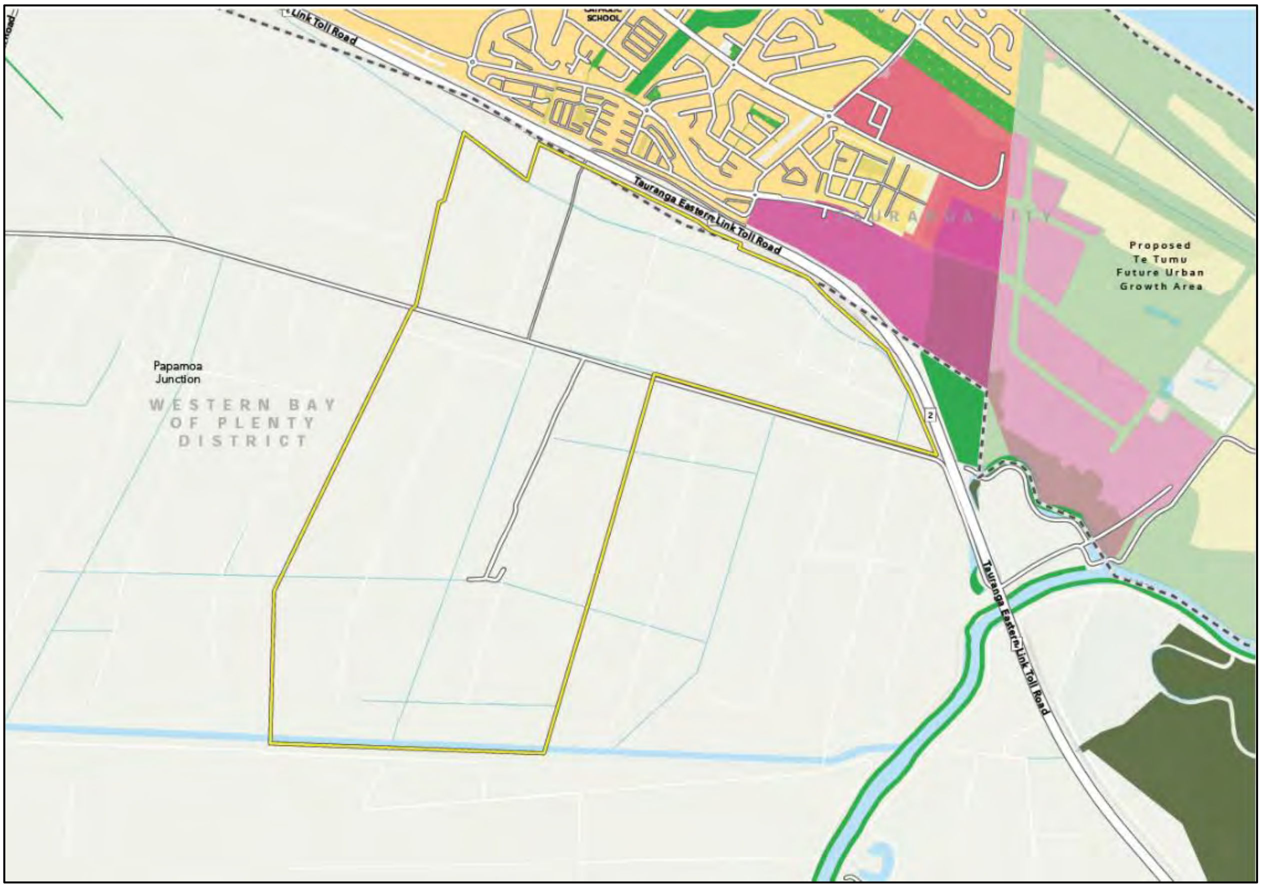


Figure 1-1: Wairakei South Project Area

This report describes the transport modelling that has been carried out in support of the Fast Track Approvals Act Application to inform the assessment of effects and mitigation being undertaken for the development. This modelling report has been prepared as an addendum to the Integrated Transport Assessment (ITA) report prepared by Boffa Miskell.

This report is intended to present the transport modelling findings, the effects and proposed mitigation for the development will be discussed in the ITA.

1.2 Model Set Up

Tauranga City Council, NZTA, WBoP District Council and Bay of Plenty Regional Council own and maintain a suite of transport models that cover the wider Tauranga area. The suite consists of two models arranged in a hierarchical structure and is described as follows:

1. The Tauranga Transport Strategic Model (**TTSM**) is used to model private vehicles, heavy commercial vehicles, public transport and cycle trips. It is a conventional 3.5 stage model developed in Cube Voyager software.

2. Vehicle demands from TTSM are disaggregated to a finer zone system and then fed into the Tauranga Transport Hybrid Model **(TTHM).** The TTHM is a dynamic, i.e., time-sliced mesoscopic/microscopic vehicle assignment model developed in Aimsun software. The TTHM contains a more detailed representation of road lanes, e.g., merging and lane changing, and of intersection layouts, e.g., turn lane usage and signal phasing.

1.3 General Approach

The wider network traffic effects have been assessed using TTSM, including impacts on traffic patterns, vehicle kilometre travelled and other network-wide considerations. TTSM modelling was undertaken for the 2035, 2048 and 2063 forecast years.

The vehicle demand outputs from the TTSM were used to develop a localised TTHM subnetwork model focused on the Wairakei South area. This subnetwork model was then used to assess the localised traffic effects of the development, including intersection performance, travel times, and levels of congestion. TTHM modelling was undertaken for the forecast years 2048 and 2063.

The modelling undertaken by TTSM and TTHM is discussed in more detail in the following sections.

2 TTSM Model Inputs and Assumptions

2.1 Previous Rounds of Modelling

Prior to the modelling analysis described in this report, two earlier rounds of modelling were conducted. Each round used a different network configuration and land use assumptions. The result of each round informed the refinement of assumptions for the Round 3 modelling. The overview of the Rounds 1 and 2 modelling is discussed below:

2.1.1 Round 1 Modelling Overview

The TTSM Round 1 modelling assumed 3,000 dwellings and 55 hectares of industrial land by 2048. The modelling comprised the following scenarios:

- **Core Scenarios:** Staged development of Wairakei South, with land use redistributed across other growth areas, assessed under Do Minimum (DM) networks for 2035, 2048, and 2063, and Do Something (DS) networks for 2048 and 2063.
- **Sensitivity Test 1 (ST1):** Staged Wairakei South development with land use redistribution across other growth areas, excluding Te Tumu, assessed under DS networks for 2048 and 2063.
- **Sensitivity Test 2 (ST2):** Core DS scenarios for 2048 and 2063, including the Seddon Street connection.
- **Sensitivity Test 3 (ST3):** High-growth land use in the Te Tumu area assessed using the 2063 DS network, including the SH2 eastbound off-ramp to Te Tumu, Bell Road, and Seddon Street connections.

Further details on model inputs, assumptions, and outputs are provided in **Appendix A**.

2.1.2 Round 2 Modelling Overview

For the TTSM Round 2 modelling, the total development yield was revised to 2,750 dwellings and 55 ha of industrial land by 2063, reflecting inputs from urban and landscape design, stormwater, and civil engineering assessments. The model scenarios include:

- **Core Scenarios:** Staged development of Wairakei South with land use redistributed across other growth areas, assessed under Do Minimum (DM) networks for 2035, 2048, and 2063. These scenarios include upgrading the Te Okuroa Drive / Sands Avenue intersection, providing two right-turn lanes from Te Okuroa Drive westbound to the PEI Interchange southbound in 2048 and 2063.
- **Sensitivity Test 1 (ST1):** Staged development of Wairakei South with land use redistribution across other growth areas, excluding Te Tumu, assessed under DM networks for 2035, 2048, and 2063.

Further details on model inputs, assumptions, and outputs are provided in **Appendix B**.

2.2 Round 3 Modelling

This section of the report discusses the TTSM Round 3 transport model assessment. This was undertaken following feedback and engagement with the Councils and NZTA, and to position the TTSM to align most effectively with the planned TTHM modelling. A full rerun of the modelled options discussed in the **Table 2-2** was undertaken.

2.2.1 Model Time Periods

The TTSM model is an average hour model (considers the average hour volume within the peak period) for the following time periods:

- AM peak: 7am to 9am.
- Interpeak (IP): 9am to 4pm.
- PM peak: 4pm to 6pm.

2.2.2 Land Use Inputs

In TTSM 2023, the Wairakei South project area is currently represented as a single rural zone. Hence, the land use in the project area has been updated based on the staging plan received from the client. The draft concept framework plan is shown in **Figure 2-1**.

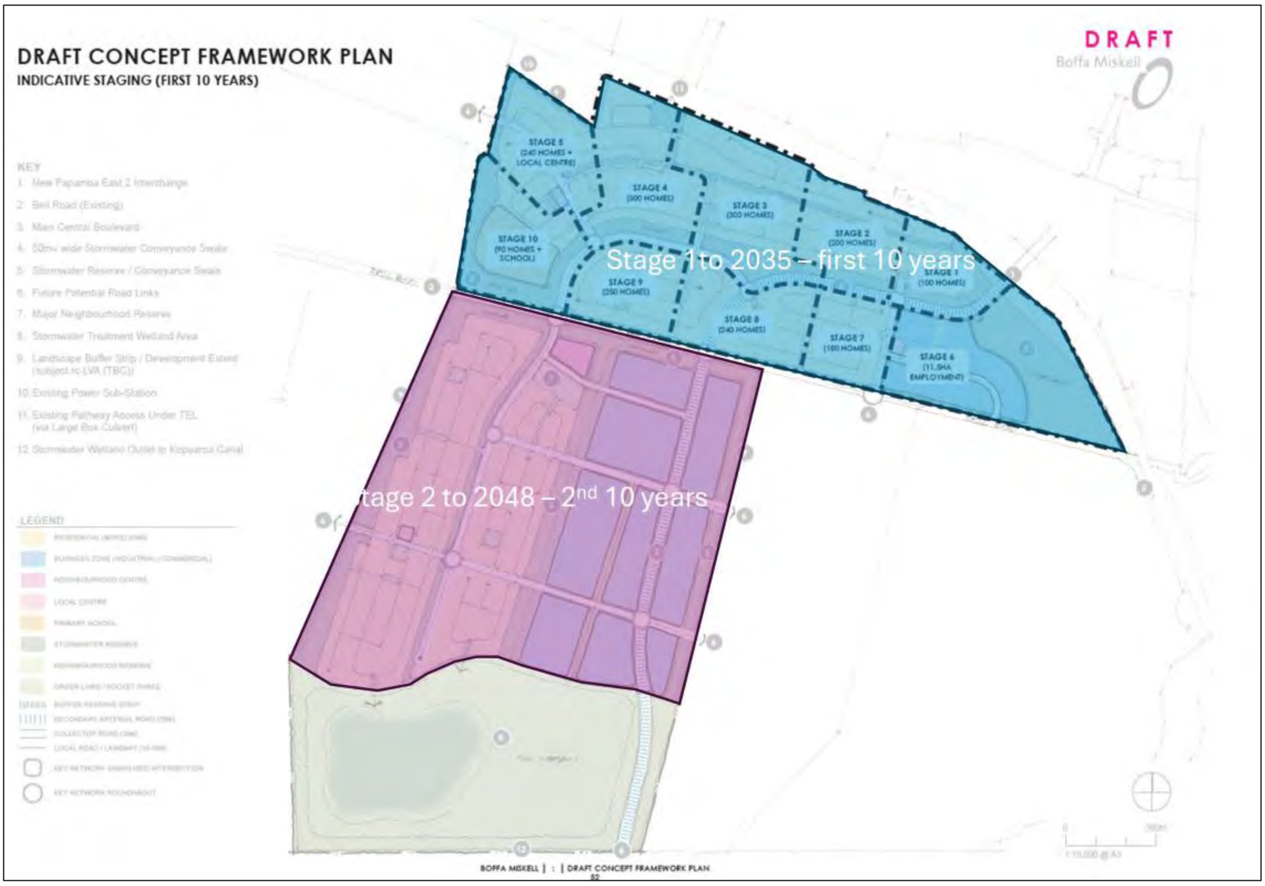


Figure 2-1: Wairakei South Draft Staging Plan

The Wairakei South modelling work incorporates updated land use data for the Sands Development area, which includes the Wairakei Town Centre, as well as mixed industrial and commercial zones from the TTSM 2023 version.

As agreed with the model owners (i.e., TCC, NZTA, BOPRC and WBOPDC) in the kick-off meeting, we have maintained the same overall totals for dwellings as per the TTSM 2023 baseline projections. Therefore, land use assumptions for other areas within the transport model had to be redistributed due to the inclusion of the Wairakei South development. This adjustment is specific to this study and is for modelling purposes only.

The following land use scenarios are assumed.

The TTSM Round 1 modelling was based on an assumed 3,000 dwellings and 55ha of industrial land in 2048. The total number of dwellings was later revised downward based on Urban and Landscape Design, stormwater, and civil engineering inputs to 2,750 dwellings and 55 ha of Industrial land in 2063 for TTSM Round 2 and Round 3 modelling.

Core Scenario (CS) – Redistribution from wider Growth Areas, staged Wairakei South, and no changes to Te Tumu development

This land use redistribution is based on Te Tumu and Wairakei proceeding as planned for residential land use. Initially, there were no plans to alter the industrial area in Te Tumu. However, due to challenges with the availability of industrial land in the wider model areas i.e. TBE and Omokoroa areas, adjustments were necessary. These changes were present in the Round 1 modelling. Subsequent Round 2 and 3 modelling reinstated the planned Industrial development staging in Te Tumu and deferred an equivalent 6ha Industrial development in Wairakei South to post 2048. Both the residential and Industrial development capacity were also later staged, with 250 dwellings and 6ha of industrial land use deferred until post 2048.

Sensitivity Test 1 (ST1) – Redistribution from wider Growth Areas, staged Wairakei South and no growth in Te Tumu

This scenario assumes no development in the Te Tumu area and staged growth in the Wairakei South area.

Option 10A – Redistribution from wider Growth Areas and no growth in Te Tumu

In this scenario, full development in Wairakei South by 2048 and no growth in Te Tumu is assumed.

Additional land use scenarios were tested during Round 1 and Round 2 modelling. Detailed inputs and assumptions for those scenarios are provided in **Appendix A** for Round 1 and **Appendix B** for Round 2 modelling, respectively.

Table 2-1 shows the summary of the land use data before (TTSM 2023 version) and after the redistribution scenarios (CS, ST1, and Option 10A) for 2035, 2048, and 2063, due to the inclusion of the Wairakei South development.

Table 2-1: Land Use Summary

Growth Area	Description	TTSM 2023			Core Scenario			Sensitivity Test 1			Option 10A
		2035	2048	2063	2035	2048	2063	2035	2048	2063	2048
Residential Land Use (Number of Dwellings)*											
Western Corridor	Keenan Road	301	1,620	2,500	0	0	2,500	0	1,620	4,719	1,620
	TBE Extn and Upper Belk Road	186	184	10,150	0	9	7,497	50	184	10,150	184
	Merrick Road	168	390	4,500	0	0	4,500	0	390	4,500	390
	Upper Joyce Road	219	218	3,250	0	0	3,250	0	1,199	4,343	949
Te Tumu	Te Tumu	827	3,384	5,964	827	3,384	5,964	0	0	0	0
Parau Farms	Parau Farms	608	631	631	0	631	631	608	631	631	631
Ōmokoroa Rural	Ōmokoroa Stage 3 Structure Plan	1,958	3,191	3,191	1,789	3,191	3,191	1,958	3,191	3,191	3,191
Wairakei South	Wairakei South	84	97	97	1,734	2,500	2,750	1,734	2,500	2,750	2,750
	Total	**4,350**	**9,715**	**30,283**	**4,350**	**9,715**	**30,283**	**4,350**	**9,715**	**30,283**	**9,715**
Industrial Land Use (Hectares)*											
TBE Extension	TBE Extension	43	70	100	42	42	65	43	66	100	60
Te Tumu	Te Tumu	9	36	63	9	36	63	0	0	0	0
Rangiuru	Rangiuru Business Park	110	148	148	110	148	148	110	148	148	148
Ōmokoroa Rural	Ōmokoroa Stage 3 Structure Plan	13	26	26	5	6	6	13	17	33	17
Wairakei South	Wairakei South	0	0	0	8	49	55	8	49	55	55
	Total	**174**	**280**	**336**	**174**	**280**	**336**	**174**	**280**	**336**	**280**

*Land use data rounded to the nearest whole number

Note : 'XX' indicates reduced land use compared to TTSM 2023, while 'XX' also denotes new or increased land use data compared to TTSM 2023

2.2.3 Target Trip Generation

As agreed with the model owners, the target trip generation for various types of land use in Wairakei South development is provided below:

- Residential – 7 to 8 trips/day
- Service Centre – 674 vehicles/hr in the 2035 PM peak hour. The TTSM predicted an average one-hour PM peak of 651 vehicles/hr in 2035
- Commercial (Local/Neighbourhood centres) – based on daily trips from similar facilities in the TTSM
- Industrial – 180 to 200 trips/ha/day.

2.2.4 Model Scenarios

The modelling was undertaken using the TTSM 2023 version. The model scenarios are shown in **Table 2-2**.

Table 2-2: Wairakei South Model Scenarios

Land Use	Scenario	Years	Description
Without the Wairakei South development	Do Minimum	2035, 2048 and 2063	- Project specific Do Minimum. - Updated TTSM 2023 to reflect the revised Sands Development land use data and new toll assumptions for the TEL and PEI Interchange[1] (refer to **Appendix C**).
With Staged Wairakei South and Te Tumu development	Core scenario	2035 (Stage 1 only) 2048 and 2063 (Stages 1 & 2)	It includes land use redistribution of Growth Areas and no changes to Te Tumu development.
With Staged Wairakei South and Te Tumu development **(uses Core Scenario land use)**	Comprehensive Sensitivity Test 1) (CSS1)	2048 and 2063	With Stage 2 Off Ramp in East Bound direction from SH2 to Te Tumu area
With Staged Wairakei South and Te Tumu development **(uses Core Scenario land use)**	Comprehensive Sensitivity Test 2) (CSS2)	2048 and 2063	With Stage 2 Off Ramp in East Bound direction and Bell Road connection to the Te Tumu area
With staged Wairakei South development and no development in Te Tumu	Sensitivity Test 1	2035 (Stage 1 only) 2048 and 2063 (Stages 1 & 2)	Includes land use redistribution of Growth Areas, excluding development in Te Tumu and staged development in Wairakei South

[1] https://nzta.govt.nz/about-us/public-consultation-hub/past-consultations/tauranga-eastern-link-toll-road

Land Use	Scenario	Years	Description
With full Wairakei South development and no development in Te Tumu	Option 10A	2048	It includes land use redistribution of Growth Areas, excluding development in Te Tumu and full development in Wairakei South

2.2.5 Network Assumptions

2.2.5.1 Do Minimum

The Do Minimum network assumptions are developed from the TTSM 2023 Do Minimum[2] transport network interventions and PT services with the following network adjustments:

- Without Stage 2 Off Ramp in East Bound direction from SH2 to Te Tumu area in 2048 and 2063
- Without the Bell Road connection to the Te Tumu area in 2063
- Intersection updates applied at three locations along Sands Avenue to reflect current design:
  - Te Okuroa Drive
  - Bill Miller Drive,
  - PEI interchange.

Figure 2-2 and **Figure 2-3** show the road network and intersections for the Do Minimum scenario in 2035, 2048 and 2063.

[2] https://econtent.tauranga.govt.nz/data/transport-model/ttsm23-update.pdf ; Please refer to Sections 2.2.1 and 2.3.1 for the Do Minimum Transport Network and PT assumptions used in TTSM 2023.

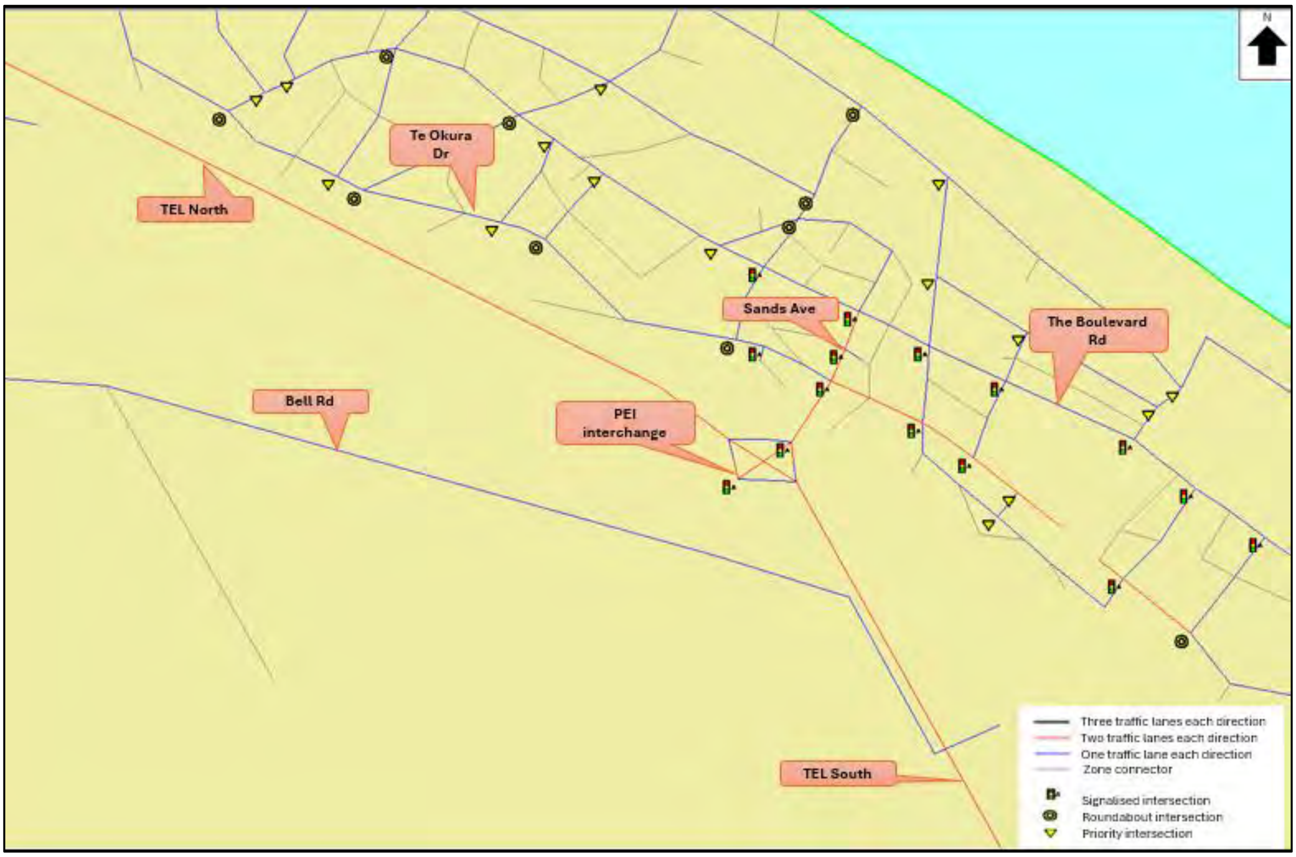


Figure 2-2: Road Network and Intersections – Do Minimum 2035

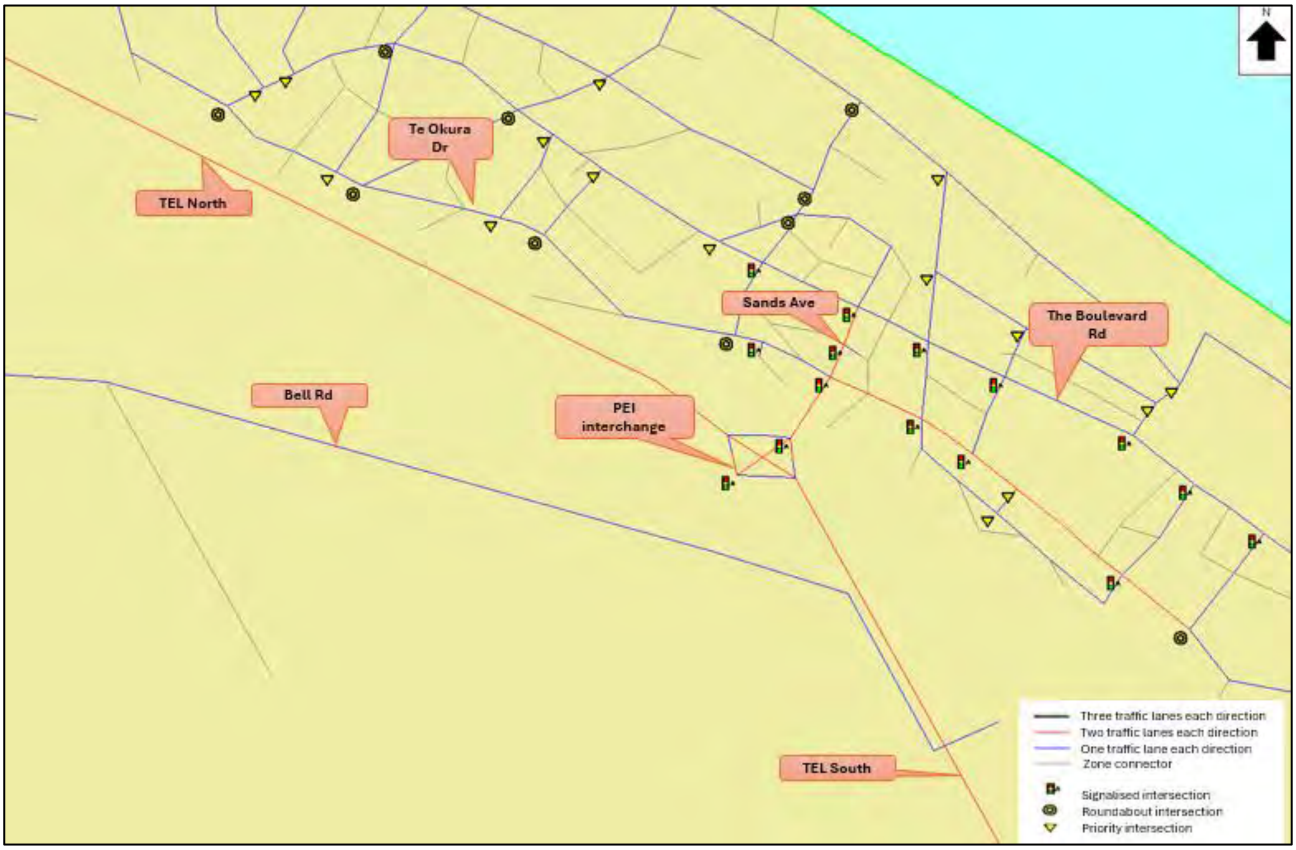


Figure 2-3: Road Network and Intersections – Do Minimum 2048 & 2063

2.2.6 Wairakei South Development Scenarios

2.2.6.1 Core Scenario and Sensitivity Test 1

The Wairakei South network assumptions are developed from the Do Minimum transport network interventions and PT services, plus network improvements as per the Wairakei South network plan received from the client.

Figure 2-4 shows the road network, including intersections modelled for the year 2035 and **Figure 2-5** shows for the modelled years 2048 and 2063.

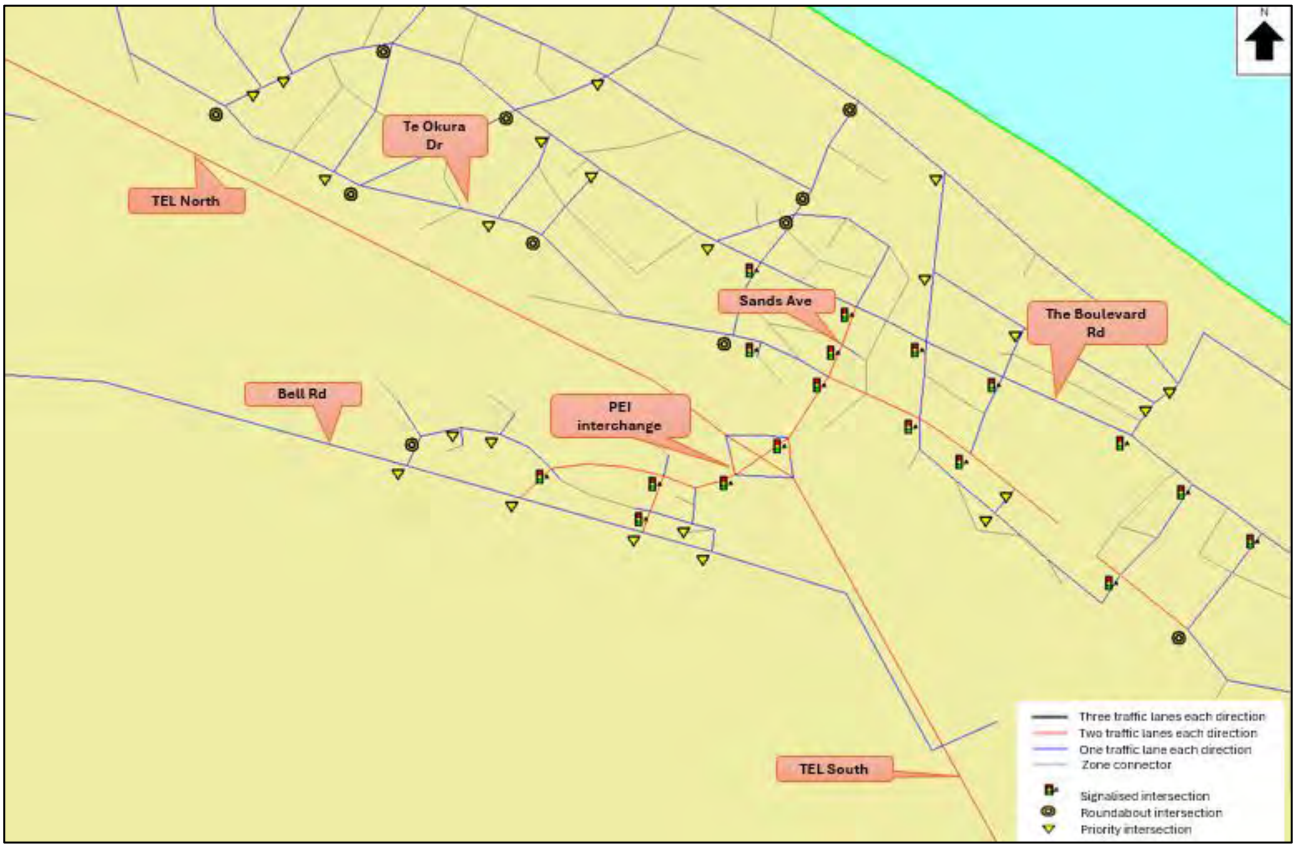


Figure 2-4: Wairakei South development – Year 2035

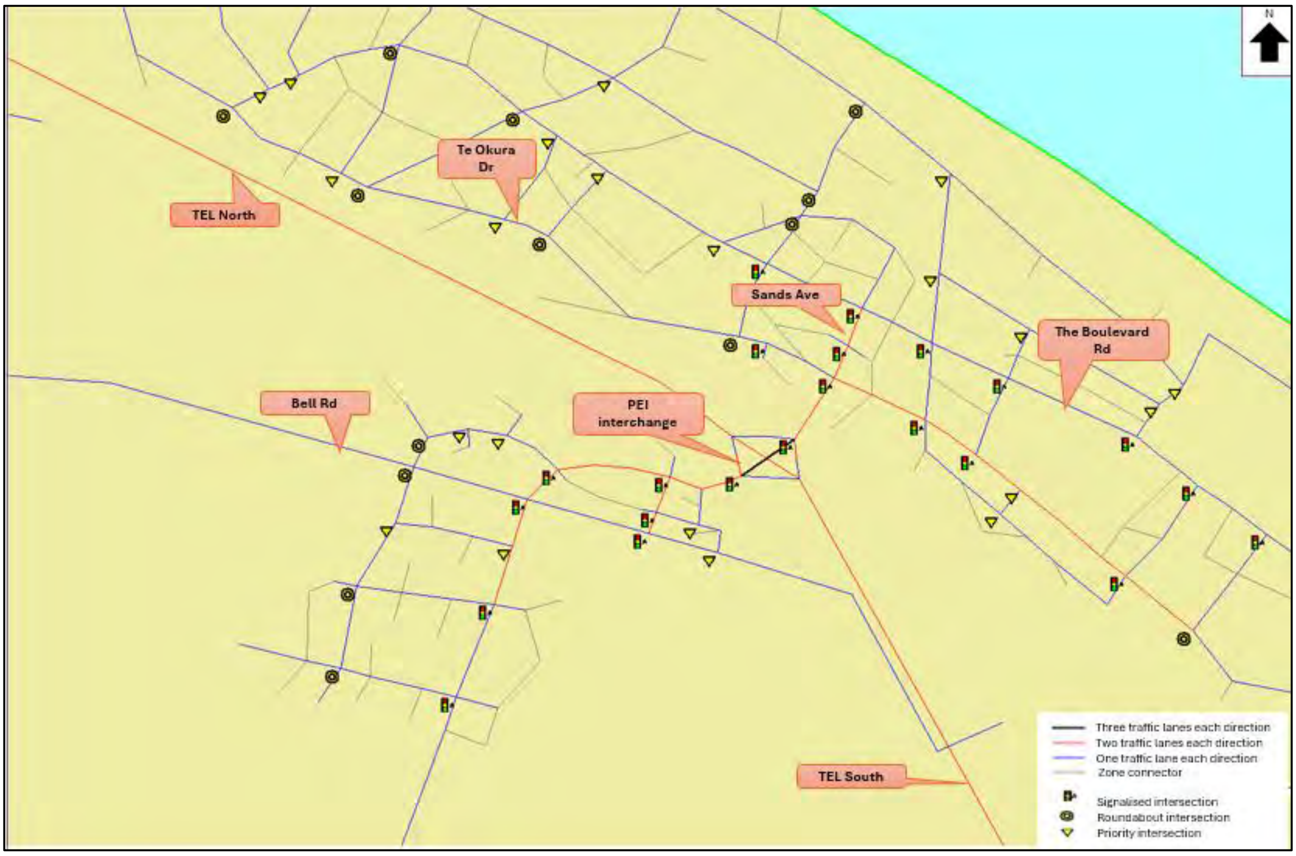


Figure 2-5: Wairakei South development – Year 2048 and 2063

2.2.6.2 Comprehensive Sensitivity Scenarios (CSS)

CSS1 and CSS2 networks are developed from the Core Scenario in 2048 and 2063, with the following network adjustments:

- CSS1 – With Stage 2 Off Ramp in East Bound direction from SH2 to Te Tumu area
- CSS2 – With Stage 2 Off Ramp in East Bound direction and the Bell Road connection to the Te Tumu area.

Figure 2-6 and **Figure 2-7** show the road network modelled for the CSS1 and CSS2 scenarios.

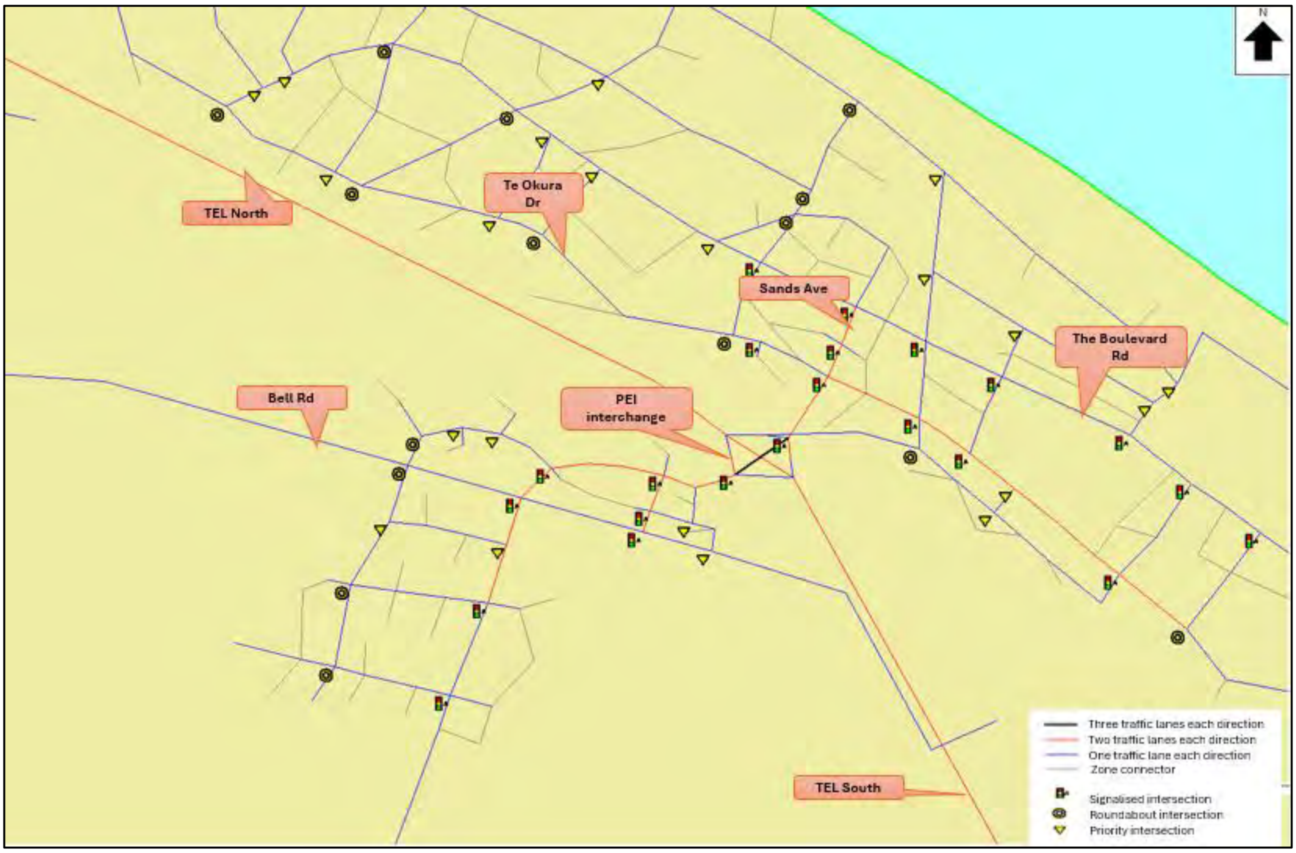


Figure 2-6: CSS1 Scenario – Year 2048 and 2063

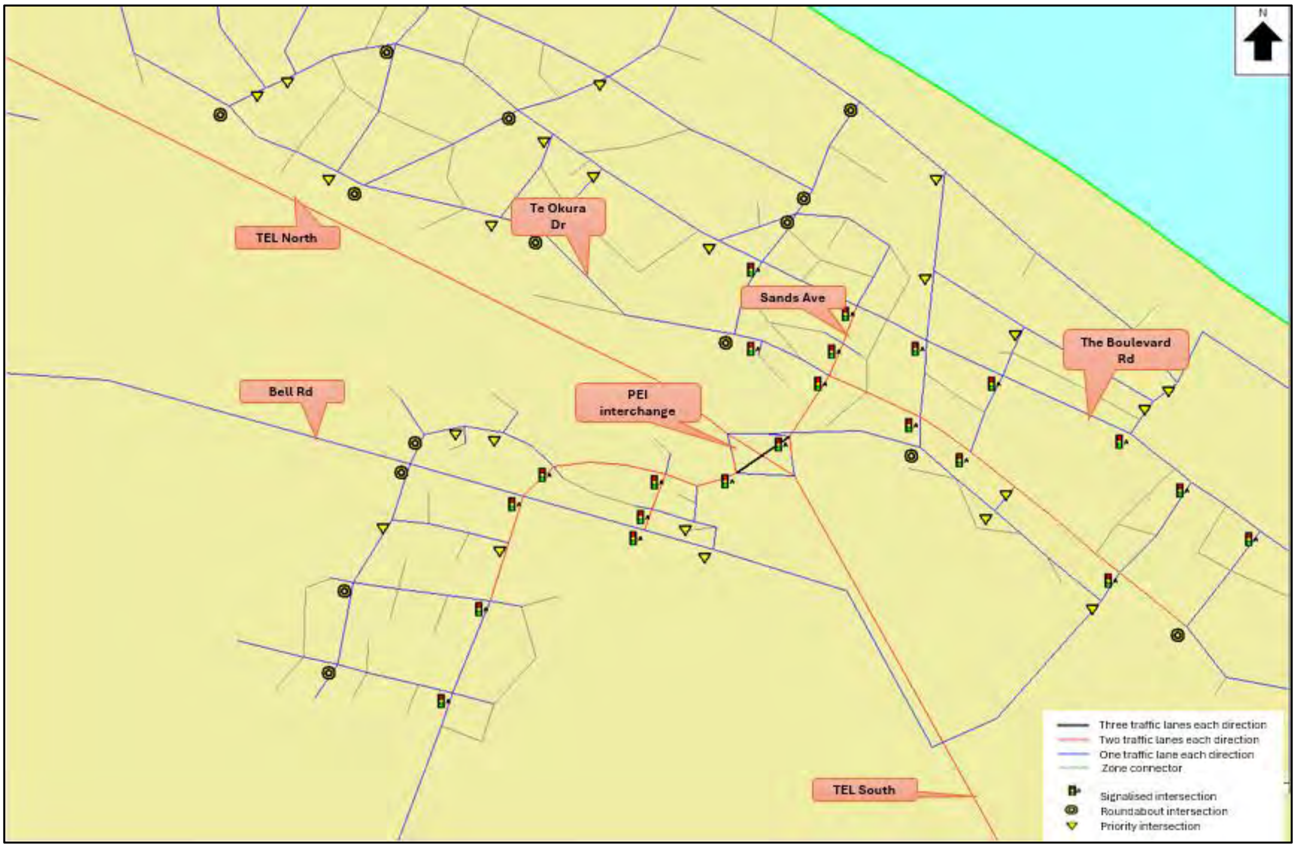


Figure 2-7: CSS2 Scenario – Year 2048 and 2063

2.2.7 Public Transport

2.2.7.1 Public Transport Services

The Wairakei South project area is currently not served by PT routes in the TTSM 2023 'Do Minimum' Scenario. Therefore, two new public bus services are included between Bayfair and Wairakei Town Centre, passing through SH2, the Domain Road Interchange, the Te Puke Highway, and the Wairakei South areas, in 2035, 2048, and 2063, as advised by Boffa Miskell for this modelling work. These services operate every 30 minutes during peak hours (AM/PM) and off-peak hours (IP).

2.2.7.2 PT Station Quality

The PT station quality information from the TTSM 2023 'Do Minimum' scenario was used for the Wairakei South transport modelling.

2.2.7.3 PT Fare

The PT fare from the TTSM 2023 'Do Minimum' scenario was used for the Wairakei South transport modelling.

2.2.8 Parking Costs

The parking costs from the TTSM 2023 'Do Minimum' scenario were used for the Wairakei South transport modelling.

2.2.9 Tolling Assumptions

The tolling assumptions for the scenarios were agreed with NZTA through the project are as follows:

- Takitimu Drive Toll Road: No toll in all model years as it is expected to end by 2031
- Takitimu North Link: The preferred tolling strategy (in $2021) from the Tauranga tolling study is adopted for the TNL corridors. This includes a combination of discounting/capping toll for the through movement (users of TNL Stage 1 and Stage 2) and time-varying toll with increased commuter peaks, as shown in **Table 2-3**.
- Tauranga Eastern Link (TEL) Toll Road and Papamoa East Interchange (PEI): The preferred tolling strategy (in $2025) from NZTA is adopted for the TEL and PEI corridors. This includes toll on the TEL mainline at the existing location and a new Toll gantry between Domain Road and PEI, as described in **Table 2-3**. No toll is assumed for the TEL in 2048 and 2063, as it is expected to end in 2037.

Table 2-3: Toll Strategy – TNL and TEL Corridor[3]

Movement	Vehicle Type	Peak		Model Year		
		AM/PM Peak	Off-Peak	2035	2048	2063
Takitimu North Link (in $2021)						
Takitimu North Link Stage 1 Only	Light	$3.10	$2.10	✓	✓	✓
	Heavy	$8.15	$5.50	✓	✓	✓
Takitimu North Link Stage 2 Only	Light	$3.10	$2.10	--	✓	✓
	Heavy	$8.15	$5.50	--	✓	✓
Through Movement (i.e. Takitimu North Link mainline)	Light	$4.10	$3.10	--	✓	✓
	Heavy	$10.80	$8.15	--	✓	✓
TEL Corridor (in $2025)[4]						
TEL Mainline	Light	$2.30	$2.30	✓	--	--
	Heavy	$5.60	$5.60	✓	--	--
Southern Movement (from/to TEL South to PEI)	Light	$2.30	$2.30	✓	--	--
	Heavy	$5.60	$5.60	✓	--	--
Northern Movement (from/to TEL North to PEI)	Light	$1.10	$1.10	✓	--	--
	Heavy	$2.80	$2.80	✓	--	--

2.2.10 Tauranga Cycle Model Feedback

The Tauranga Cycle Model (TCM) estimates new cycle trips based on the traffic and PT demands from the TTSM and the assumed cycle network interventions in TCM. The Tauranga Cycle Model (TCM) feedback of 'diverted' Car and PT trips back to TTSM is not included in this study, and we would not expect the modelled interventions to significantly change vehicle demands.

[3] Disclaimer - The proposed toll fee ($2021 and $2025) is assumed for modelling purposes only and is subject to further tolling studies and alignment with the government's policy.

[4] https://nzta.govt.nz/about-us/public-consultation-hub/past-consultations/tauranga-eastern-link-toll-road

3 TTSM Modelling Results – Round 3

This chapter discusses the Round 3 modelling sector-to-sector travel patterns and network Level of Service (LOS). Crash and emission model outputs are provided in **Appendix D.**

3.1 Sector Analysis

A sector to sector analysis was undertaken for all modelled scenarios to understand the travel patterns in the model. The overall TTSM 479 zones have been divided into 7 sectors for this analysis. **Figure 3-1** shows the locations of these sectors. The sectors are named as:

- Sector 1 – Wairakei
- Sector 2 – Te Tumu
- Sector 3 – Rangiuru/Maketu
- Sectors 4, 5 and 6 – Other areas
- Sector 7 – Wairakei South.

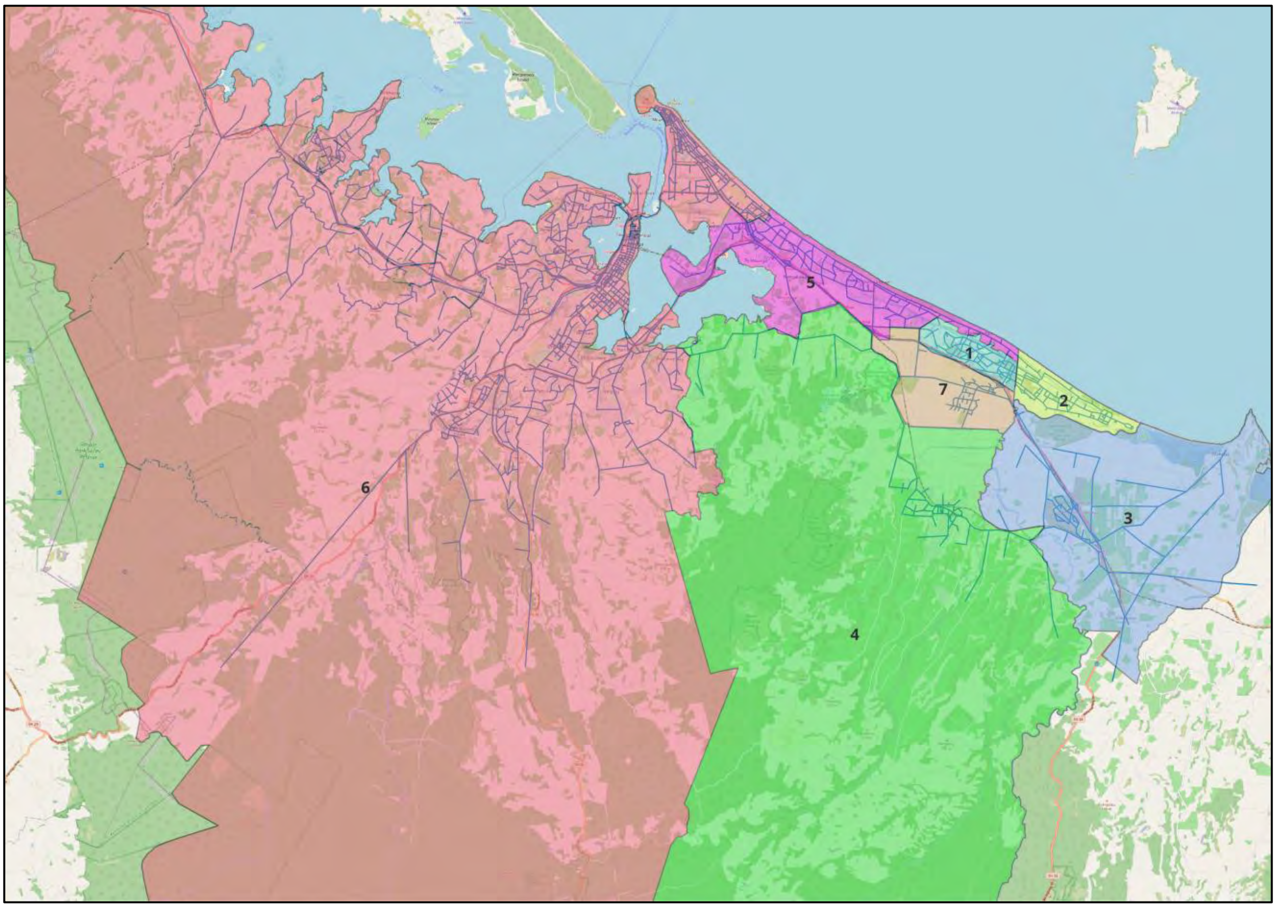


Figure 3-1: Sector Map

Table 3-1 provides the sector to sector daily vehicle demand for all modelled scenarios and **Table 3-2** summarises the daily traffic distribution patterns from Wairakei South to Wairakei/Te Tumu/Rangiuru and Other areas for all modelled scenarios.

Table 3-1: Sector to Sector Daily Vehicle Demand

Scenarios	Sectors	Wairakei	Te Tumu	Wairakei South	Rangiuru/ Maketu	Other areas	Total
2035 DM	Wairakei	17,709	2,568	93	2,942	19,032	42,344
	Te Tumu	2,520	955	11	568	2,605	6,658
	Wairakei South	99	12	3	29	383	526
	Rangiuru/Maketu	3,089	548	29	9,442	16,628	29,737
	Other areas	19,601	2,581	379	16,629	720,579	759,769
	Total	**43,018**	**6,664**	**515**	**29,610**	**759,227**	**839,035**
2035 CS	Wairakei	16,052	2,287	3,092	2,760	18,022	42,212
	Te Tumu	2,223	869	574	528	2,463	6,657
	Wairakei South	3,195	560	2,079	969	4,820	11,622
	Rangiuru/Maketu	2,856	507	1,108	9,215	16,237	29,924
	Other areas	18,534	2,435	4,865	16,412	705,696	747,943
	Total	**42,860**	**6,658**	**11,718**	**29,885**	**747,239**	**838,359**
2035 ST1	Wairakei	17,144	27	3,341	2,862	18,821	42,195
	Te Tumu	0	0	0	0	0	0
	Wairakei South	3,416	0	2,206	995	4,985	11,602
	Rangiuru/Maketu	2,866	0	1,103	9,129	15,695	28,793
	Other areas	19,362	0	5,041	16,256	712,357	753,017
	Total	**42,789**	**27**	**11,689**	**29,243**	**751,858**	**835,607**
2048 DM	Wairakei	18,244	4,893	101	4,032	19,944	47,213
	Te Tumu	4,870	5,354	19	1,937	5,975	18,156
	Wairakei South	106	22	3	35	414	580
	Rangiuru/Maketu	4,252	1,814	36	9,452	20,340	35,894
	Other areas	20,627	5,913	410	20,165	823,643	870,757
	Total	**48,099**	**17,996**	**569**	**35,621**	**870,315**	**972,600**
2048 CS	Wairakei	16,277	4,370	4,022	3,762	18,628	47,060
	Te Tumu	4,355	4,866	1,573	1,785	5,568	18,147
	Wairakei South	4,208	1,511	3,860	1,970	7,439	18,987
	Rangiuru/Maketu	3,829	1,673	2,253	8,985	19,660	36,400
	Other areas	19,248	5,565	7,346	19,616	798,407	850,182
	Total	**47,917**	**17,984**	**19,054**	**36,119**	**849,702**	**970,776**
2048_ST1	Wairakei	18,345	27	4,550	4,042	20,117	47,081
	Te Tumu	0	0	0	0	0	0
	Wairakei South	4,733	0	4,230	2,098	7,877	18,937
	Rangiuru/Maketu	4,036	0	2,334	9,057	19,385	34,812
	Other areas	20,782	0	7,879	19,744	822,993	871,398
	Total	**47,897**	**27**	**18,993**	**34,940**	**870,371**	**972,228**
2048_Option 10A	Wairakei	18,261	27	4,701	4,032	20,056	47,077
	Te Tumu	0	0	0	0	0	0
	Wairakei South	4,901	0	4,659	2,178	8,230	19,969
	Rangiuru/Maketu	4,021	0	2,413	9,041	19,348	34,824
	Other areas	20,707	0	8,231	19,725	821,378	870,041
	Total	**47,891**	**27**	**20,004**	**34,976**	**869,012**	**971,910**
	Wairakei	16,245	16,245	4,259	4,059	3,792	18,705

Scenarios	Sectors	Wairakei	Te Tumu	Wairakei South	Rangiuru/ Maketu	Other areas	Total
2048_CSS1	Te Tumu	4,392	4,392	4,817	1,572	1,779	5,586
	Wairakei South	4,221	4,221	1,494	3,845	1,988	7,439
	Rangiuru/Maketu	3,837	3,837	1,638	2,251	8,982	19,692
	Other areas	19,222	19,222	5,780	7,327	19,578	798,278
	Total	**47,917**	**47,917**	**17,989**	**19,054**	**36,120**	**849,700**
2048_CSS2	Wairakei	16,243	4,250	4,058	3,796	18,715	47,062
	Te Tumu	4,376	4,804	1,599	1,777	5,593	18,148
	Wairakei South	4,220	1,517	3,830	1,990	7,431	18,988
	Rangiuru/Maketu	3,845	1,641	2,246	8,978	19,690	36,400
	Other areas	19,234	5,779	7,321	19,580	798,271	850,185
	Total	**47,918**	**17,990**	**19,054**	**36,120**	**849,699**	**970,782**
2063_DM	Wairakei	18,469	8,098	98	3,982	19,582	50,230
	Te Tumu	8,105	14,580	32	3,575	10,385	36,677
	Wairakei South	104	36	3	34	406	583
	Rangiuru/Maketu	4,221	3,318	35	10,527	21,808	39,909
	Other areas	20,328	10,261	402	21,802	979,243	1,032,035
	Total	**51,226**	**36,293**	**571**	**39,921**	**1,031,424**	**1,159,435**
2063_CS	Wairakei	16,589	7,330	4,154	3,720	18,298	50,091
	Te Tumu	7,374	13,522	2,702	3,323	9,736	36,657
	Wairakei South	4,389	2,600	4,572	2,093	7,952	21,605
	Rangiuru/Maketu	3,756	3,066	2,463	10,057	21,135	40,477
	Other areas	18,950	9,758	7,765	21,290	951,641	1,009,404
	Total	**51,057**	**36,276**	**21,656**	**40,483**	**1,008,762**	**1,158,235**
2063_ST1	Wairakei	19,886	27	5,094	4,251	20,795	50,053
	Te Tumu	0	0	0	0	0	0
	Wairakei South	5,310	0	5,148	2,368	8,677	21,503
	Rangiuru/Maketu	4,196	0	2,616	10,229	20,677	37,717
	Other areas	21,555	0	8,672	21,587	987,075	1,038,890
	Total	**50,947**	**27**	**21,530**	**38,435**	**1,037,223**	**1,148,162**
2063_CSS1	Wairakei	16,569	7,165	4,210	3,736	18,412	50,093
	Te Tumu	7,408	13,303	2,751	3,345	9,853	36,660
	Wairakei South	4,406	2,588	4,535	2,135	7,941	21,605
	Rangiuru/Maketu	3,773	3,020	2,454	10,050	21,180	40,477
	Other areas	18,903	10,210	7,707	21,219	951,399	1,009,437
	Total	**51,059**	**36,286**	**21,657**	**40,485**	**1,008,786**	**1,158,273**
2063_CSS2	Wairakei	16,544	7,166	4,218	3,750	18,415	50,093
	Te Tumu	7,368	13,185	2,856	3,336	9,919	36,664
	Wairakei South	4,421	2,664	4,472	2,141	7,906	21,605
	Rangiuru/Maketu	3,803	3,040	2,434	10,036	21,165	40,477
	Other areas	18,927	10,234	7,676	21,222	951,387	1,009,446
	Total	**51,062**	**36,289**	**21,657**	**40,485**	**1,008,792**	**1,158,286**

Table 3-2: Wairakei South trip distribution proportions – Vehicles

Movement	2035			2048						2063				
	DM	CS	ST1	DM	CS	ST1	Opt 10A	CSS1	CSS2	DM	CS	ST1	CSS1	CSS2
Wairakei South – Wairakei South	0%	10%	10%	0%	11%	13%	13%	11%	11%	0%	12%	14%	12%	12%
Wairakei South – Wairakei	18%	30%	32%	18%	24%	28%	27%	24%	24%	18%	22%	27%	22%	22%
Wairakei South – Te Tumu	2%	5%	0%	4%	9%	0%	0%	9%	9%	6%	14%	0%	14%	14%
Wairakei South - Rangiuru/Maketu	6%	10%	10%	6%	12%	13%	13%	12%	12%	6%	12%	13%	12%	12%
Wairakei South – Other areas	73%	46%	48%	72%	43%	47%	47%	43%	43%	70%	41%	46%	40%	40%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Key points to note from the above tables are:

- No Te Tumu development (ST1 and Option 10A) results in a slight increase in Wairakei South–Wairakei and Wairakei South–Other area trips compared with the Core scenarios in 2035, 2048, and 2063.
- The proportion of local trips (Wairakei South–Wairakei South) is unchanged across the 2035 scenarios. It increases slightly in ST1 and Option 10A for 2048 and in ST1 for 2063, relative to the Core scenario.
- The proportion of trips contained within Wairakei and Wairakei South is approximately 40%.
- The proportion of trips between Wairakei South and Rangiuru/Maketu sectors is approximately 10% in 2035, 12% to 13% in 2048 and 11% to 13% in 2063 across the modelled scenarios.

3.2 Level of Service (LOS)

Level of Service is assessed based on the methodology described in **Appendix E**. LOS plots of link LOS (LOS A-F shown) and intersection LOS (Only LOS D-F shown) have been produced for the modelled scenarios. These plots show the worst LOS from all model periods (i.e., AM, IP, PM). Higher-quality LOS plots for all modelled scenarios are provided in **Appendix F**.

Note that LOS plots are for general traffic performance, and the results shown are indicative only. The key intersections and corridors considered in the LOS analysis are shown in **Figure 3-2.** A more detailed assessment of intersection LOS and delay undertaken using TTHM is provided in **Section 4.6.3**.

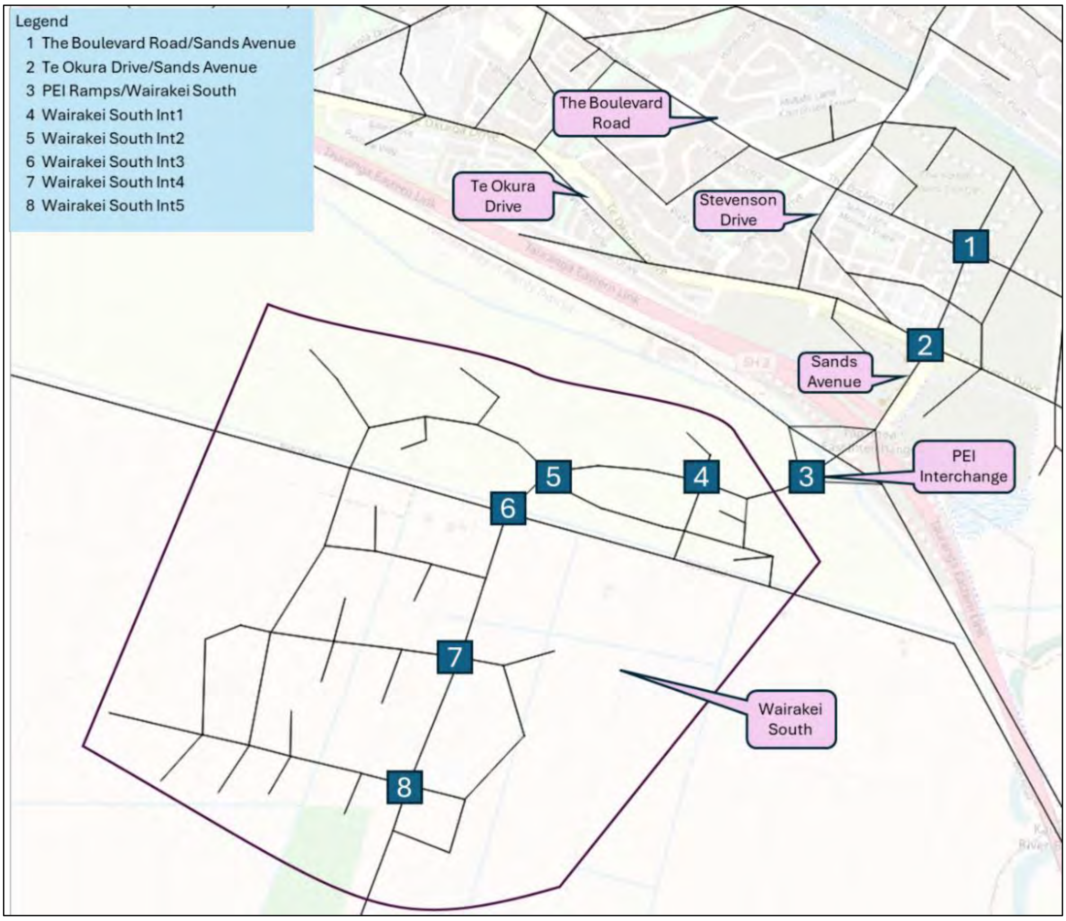


Figure 3-2: Key Intersections and Corridor

A summary of key intersections and a list of road sections with LOS D, E or F is provided in **Table 3-3** and **Table 3-4.**

Table 3-3: Key Intersections with LOS D or higher in the Wairakei South Study Area

Movement	2035			2048						2063				
	DM	CS	ST1	DM	CS	ST1	Opt 10A	CSS1	CSS2	DM	CS	ST1	CSS1	CSS2
The Boulevard Road/Sands Avenue	--	--	--	D	--	--	--	--	--	D	--	--	--	--
Te Okuroa Drive/Sands Avenue	D	D	D	E	D	D	D	D	D	E	D	D	E	D
PEI Ramps /Wairakei South	--	--	--	--	--	--	--	--	--	--	D	--	D	D
Wairakei South Int1	--	--	--	--	D	D	D	D	D	--	D	D	D	D
Wairakei South Int2	--	--	--	--	D	D	D	D	D	--	D	D	D	D
Wairakei South Int3	--	--	--	--	D	D	D	D	D	--	D	D	D	D
Wairakei South Int4	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Wairakei South Int5	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 3-4: Key road sections with LOS D or higher in the Wairakei South Study Area

Movement	2035			2048						2063				
	DM	CS	ST1	DM	CS	ST1	Opt 10A	CSS1	CSS2	DM	CS	ST1	CSS1	CSS2
Te Okuroa Drive between Stevenson Drive and Sands Avenue	--	--	--	--	E	--	--	D	D	--	D	--	D	D
Sands Avenue between PEI Ramps and Te Okuroa Drive	--	--	--	D	E	--	--	D	D	D	E	D	E	E
PEI North Off Ramp	--	--	--	D	D	--	--	D	D	D	D	--	D	D
PEI South Off Ramp	--	--	--	--	D	--	--	D	D	--	D	--	D	D

Key points from the above tables are:

- **2035:** Across all three scenarios, the Te Okuroa Drive / Sands Avenue intersection is the only location operating at LOS D. All other intersections and links in the study area operate at LOS C or better.
- **2048:** In the DM scenario, the Te Okuroa Drive / Sands Avenue intersection operates at LOS E in Do Minimum, but it improves to LOS D in other scenarios. In the Core Scenario, Sands Avenue between Te Okuroa Drive and PEI interchange operate at LOS E. In contrast, LOS improves in ST1 and Option 10A (where Te Tumu is not developed) and in CSS1 and CSS2 scenarios (where additional access points to Te Tumu are provided).
- **2063:** Te Okuroa Drive / Sands Avenue intersection operates at LOS E in DM and CSS1 scenarios but improves to LOS D in other scenarios. Sands Avenue between the PEI ramps and Te Okuroa Drive operates at LOS E in Core Scenario, CSS1, and CSS2 scenarios. In DM and ST1 scenarios, this corridor performs at LOS D due to the absence of development in Wairakei South and Te Tumu, respectively.

4 TTHM Subnetwork Modelling

4.1 Model Overview

A microscopic subnetwork model has been developed from TTHM to assess the operational impacts of the development on the surrounding road network. The 2048 Do Minimum TTHM scenario has been taken as the base scenario, with development traffic added and relevant network assumptions updated accordingly.

The modelled extent is presented in **Figure 4-1**.

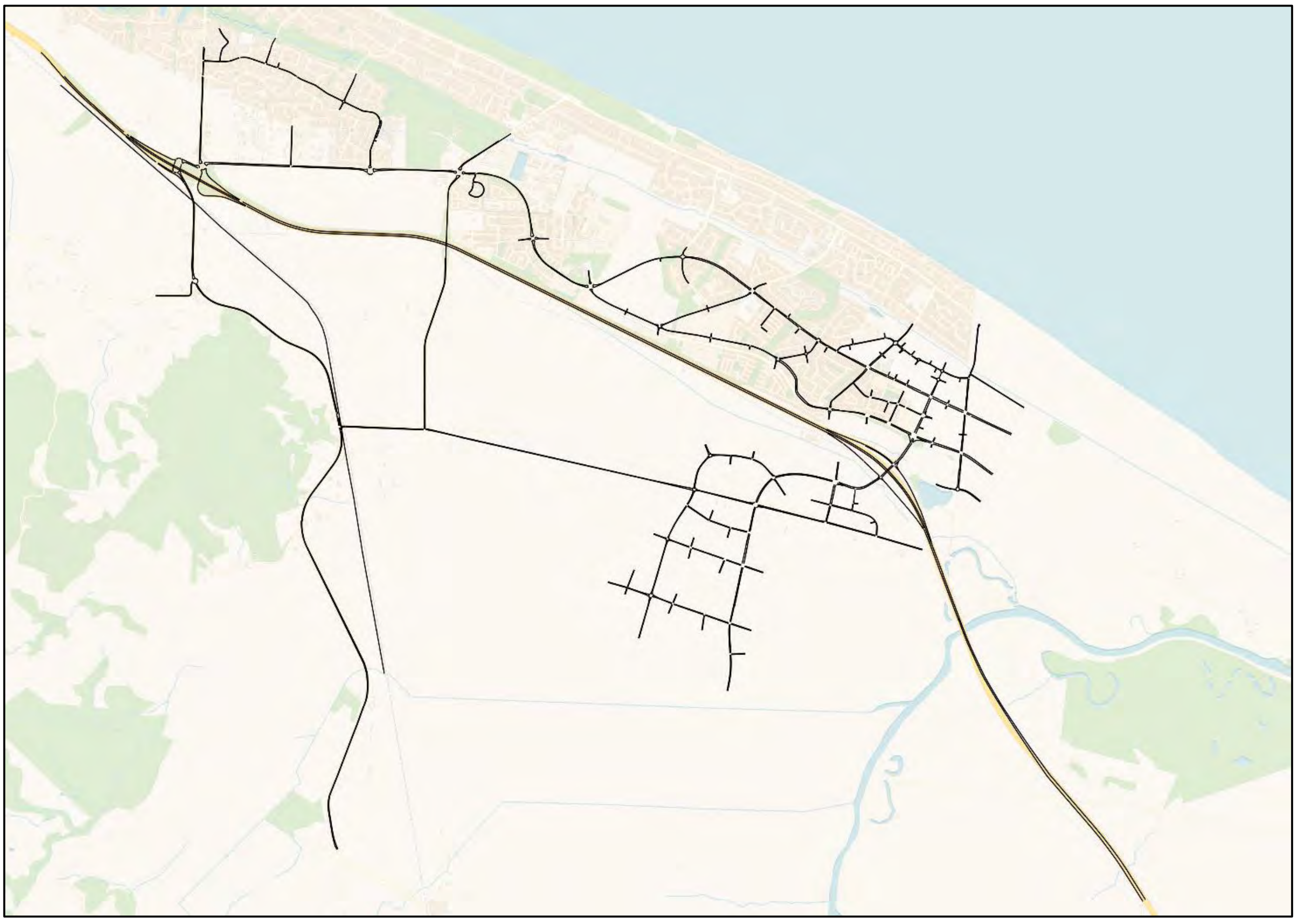


Figure 4-1: Modelled Extent

The modelled time periods are as follows:

- AM Peak: 6:30am – 9:30am with a peak hour of 8:00am – 9:00am
- PM Peak: 3:30pm – 6:30pm with a peak hour of 4:30pm – 5:30pm

TTHM modelling has been undertaken for the 2048 and 2063 forecast years.

The model has two levels of sequenced assignment which has been applied to all model runs, and are described as follows:

1. Static (or macro) assignment – this provides an initial set of routes for vehicles to take, but does not capture congestion in the network
2. Microscopic Dynamic Assignment – this allows vehicles to respond dynamically to congestion in the network

The following model parameters have been adjusted from the original TTHM:

- Adjusted the Percentage Following Static Paths from 80% to 60% - to allow vehicles to respond to congestion that cannot be represented in the static assignment (such as the Domain Road on-ramp merge)
- Increased the number of replications from 5 to 10 – to minimise the variation in results
- Merge parameters at the Domain Road on ramp to reflect the expected throughput.

The mesoscopic tier has been removed from the model as it is not considered necessary for a model of this size.

4.2 Methodology

A base year model has not been developed for this assessment. Much of the study area, including the proposed Wairakei South site and the Te Tumu area, remains greenfield in the base, and the PEI interchange is not yet constructed. Current traffic levels are low with minimal congestion, meaning a base year model would provide limited value given the significant changes expected in land use and infrastructure.

Existing google travel time information suggests that travel time via Te Okura Drive is around 5 minutes slower than SH2, which is to be expected as there is not much congestion in the area at the moment, and that the predominant route choice would be via SH2 which aligns with the future route choice. A similar 5–6-minute difference in travel time is observed between SH2 and Te Okura Drive in the future scenarios.

Instead, forecast models for 2048 and 2063 have been developed to reflect future network and development conditions. Future year demands have been taken from a TTSM cordon matrix.

The model process and outputs have been peer reviewed by Flow Transportation Specialists and all model related concerns have been addressed. The model is considered suitable for evaluating the effects of the Wairakei South development in the study area.

4.3 Modelled Scenarios

A summary of the option specifications for all the scenarios tested in the TTHM subnetwork model is presented in **Table 4-1**.

Table 4-1: Scenarios

Scenario	2048	2063
Do Minimum	Staged Te Tumu Development No Wairakei South Development	Full Te Tumu Development No Wairakei South Development
Option 10B	Staged Te Tumu Development Staged Wairakei South Development	-
Option 10C	No Te Tumu Development Full Wairakei South Development	No Te Tumu Development Full Wairakei South Development
Option 10D	-	Full Te Tumu Development Full Wairakei South Development

For each of the development options, an unmitigated and mitigated scenario has been modelled:

- Unmitigated – With the Wairakei South development traffic and associated network upgrades
- Mitigated – As per the unmitigated scenario, plus additional interventions required to mitigate the wider network development effects.

4.4 Network Assumptions

The network upgrades associated with the development, included in the option models, are summarised in **Table 4-2**.

Table 4-2: Network Assumptions

Network Changes	2048	2063
Te Okuroa Dr / Sands Ave – South Approach Additional Right Turn	x	x
Bell Rd / Te Puke Hwy Intersection – Upgraded to Signals	x	x
Eastbound Bypass Ramp at PEI*		x
Bell Rd Connection**		x

*Only present in 2063 Option 10D

**Only present in 2063 Option 10D – Represented as a new zone

Additional interventions were included in the mitigated scenarios; these upgrades are summarised in **Table 4-3** below:

Table 4-3: Mitigated Scenarios – Infrastructure Upgrades

Network Changes	2048		2063	
	Opt 10B	Opt10C	Opt 10C	Opt10D
Domain Rd Westbound On-Ramp – 50m Merge Lane Extension	x	x	x	x
Sands Ave / The Boulevard – South and East Approach Free Left Turns	x	x	x	x
Bill Miller Dr to Eastern Boundary Rd Connection				x
Te Okuroa Dr / Sands Ave – North Approach Additional Through Lane				x

The performance of the mitigation measures has been assessed under different loading scenarios (i.e. Option 10B, Option 10C, and Option 10D).

Parts of the network where the infrastructure upgrades are present are shown in **Figure 4-2** and **Figure 4-3**.

Figure 4-2: Option Scenarios Mitigated Links – Domain Area

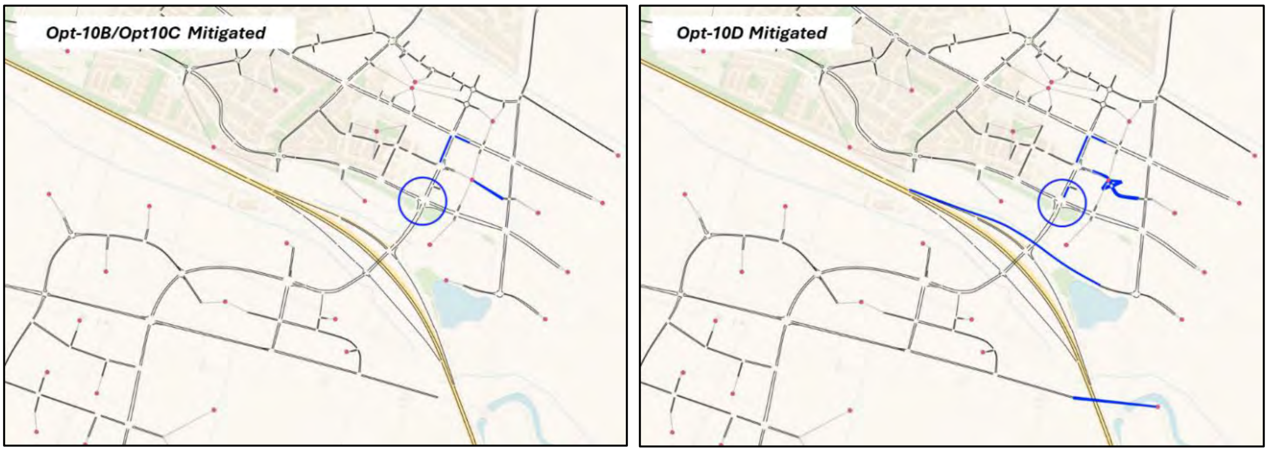


Figure 4-3: Option Scenarios Mitigated Links – Wairakei Town Centre Area

4.5 Demand Development

A separate set of 2048 and 2063 TTSM scenarios that informed the TTHM cordon demand were developed that incorporated feedback from initial runs of the option scenarios in TTHM. The feedback included:

- Speed reduction on the localised approaches towards the Domain Rd roundabout
- Capacity reduction on the Domain Rd westbound on ramp.

Cordon demands from this new set of scenarios were used as the starting point for demand expansion and profiling. TTSM demands represent average hourly trips during the peak period; these demands were then expanded to the three-hour model period and profiled using data derived from existing traffic counts.

Each zone in the model has been assigned a profile ID which corresponds to an expansion factor and a flow profile. These expansion factors are summarised in **Table 4-4** below, and the zone to profile ID correspondence is presented in **Figure 4-4**.

Table 4-4: Expansion Factors

Profile ID	Expansion Factors	
	AM	PM
1 – SH2 East	**2.7**	**2.8**
2 – SH2 West	**2.8**	**2.9**
3 – Residential	**2.5**	**2.6**
5 – Domain Rd	**2.9**	**2.9**
9 – Industrial	**3.0**	**2.9**
10 – Shopping Centre / Town Centre	**3.0**	**2.5**
11 – Te Puke Hwy	**2.5**	**2.5**
12 – Welcome Bay Rd	**2.4**	**2.4**
13 – Parton Rd	**2.7**	**2.8**
14 – Retirement Village	**3.0**	**3.0**

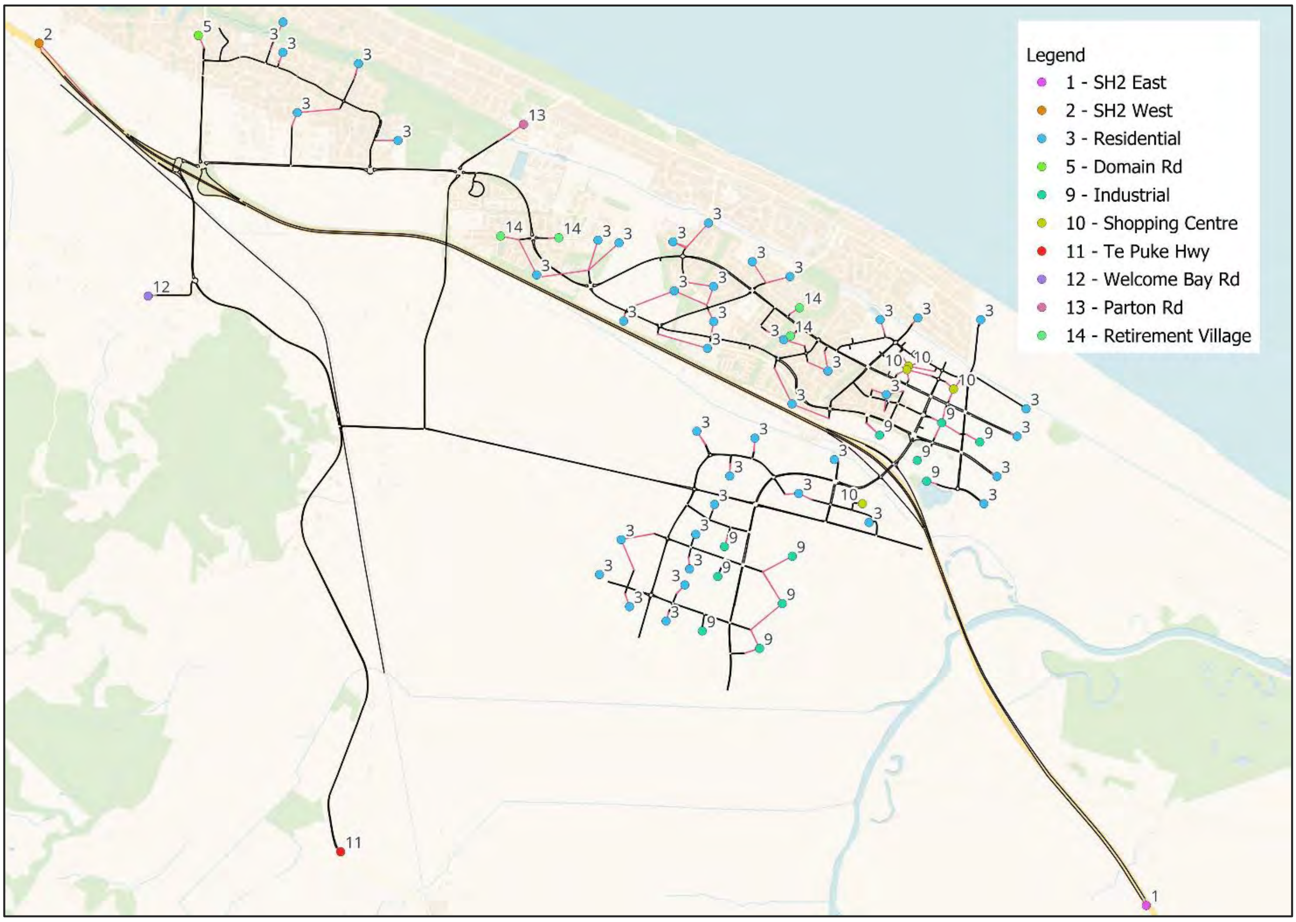


Figure 4-4: Zone Profiles

The total subnetwork level wide 3-hour demand for each scenario is summarised in **Table 4-5** below for all modelled scenarios.

Table 4-5: Demand Inputs

Scenario	AM (3-hr volume)		PM (3-hour volume)	
	2048	2063	2048	2063
Do Minimum	32,781	36,151	38,184	43,442
Option 10B	37,285	-	43,408	-
Option 10C	33,790	35,168	40,732	42,709
Option 10D	-	41,277	-	48,565

4.6 Modelling Results

4.6.1 Overview

To assess the impacts of the Wairakei South development on the surrounding network, the following measures from the model have been used:

- Observations on Route Choice Shifts
- Intersection Level of Service (LOS) of Key Intersections
- Travel Times Along Key Routes
- TTSM and TTHM Link Counts Comparison
- TTHM Congestion Plots – which are provided in **Appendix G**.

4.6.2 Observations on Route Choice Shifts

The following has been observed:

- **Westbound Traffic from the Wairakei North Area** – In scenarios where Tara Rd gets heavily congested, a small number of vehicles re-route using Parton Rd to enter SH2 via the Domain Rd On-Ramp
- **Eastbound Traffic from Te Puke Hwy / Welcome Bay Rd** – In the option scenarios, vehicles bound for the Wairakei Town Centre or SH2 East, shift from using the Domain Rd Roundabout to using the Bell Rd connection which connects to the PEI interchange.
- **Westbound Traffic from Wairakei South** – a slightly higher proportion of vehicles bound for SH2 West opt to use the Bell Rd Connection to Te Puke Hwy instead of the PEI interchange.

These observations were satisfactorily addressed by way of introduced mitigation measures, which Boffa Miskell have to include and recommend in the ITA report and proposed conditions.

4.6.3 Intersection Level of Service (LOS)

LOS is a graduated scale from A to F where A indicates free flow conditions, E indicates the intersection is operating at / or near capacity, and F indicates that the intersection is operating over capacity.

A map of the key intersections is provided in **Figure 4-5**. A summary of LOS for key intersections is presented from **Table 4-6** to **Table 4-9**.

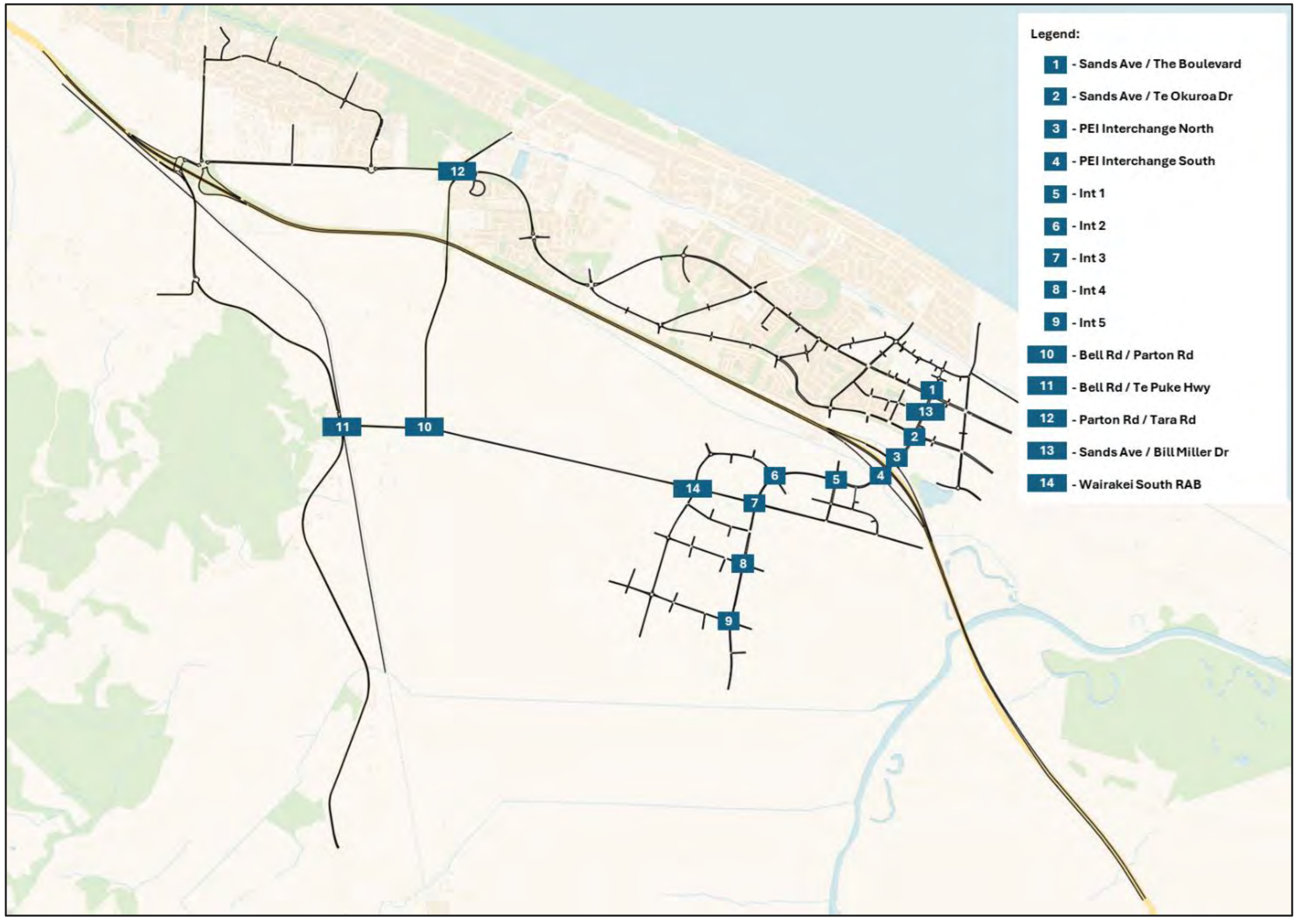


Figure 4-5: Key Intersections within the Network

Table 4-6: LOS for Key Intersections (2048 AM Peak)

ID	Location	2048 AM Peak									
		DM		Opt 10B - Unmitigated		Opt 10B - Mitigated		Opt 10C - Unmitigated		Opt 10C - Mitigated	
		Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
1	Sands Ave / The Boulevard	31	C	32	C	32	C	45	D	22	C
2	Sands Ave / Te Okuroa Dr	53	D	49	D	46	D	62	E	31	C
3	PEI Interchange North	14	B	18	B	17	B	16	B	17	B
4	PEI Interchange South	11	B	23	C	23	C	22	C	23	C
5	Wairakei South Development – Int 1	-	-	25	C	25	C	25	C	25	C
6	Wairakei South Development – Int 2	-	-	16	B	16	B	16	B	16	B
7	Wairakei South Development – Int 3	-	-	23	C	23	C	22	C	23	C
8	Wairakei South Development – Int 4	-	-	32	C	32	C	33	C	33	C
9	Wairakei South Development – Int 5	-	-	35	C	35	C	36	D	35	C
10	Bell Rd / Parton Rd	7	A	9	A	9	A	9	A	9	A
11	Bell Rd / Te Puke Hwy	7	A	20	C	20	C	20	C	20	C
12	Parton Rd / Tara Rd	4	A	5	A	5	A	5	A	5	A
13	Bill Miller Dr / Sands Ave	17	B	12	B	14	B	16	B	11	B
14	Wairakei South Development - RAB	-	-	6	A	6	A	7	A	7	A

Table 4-7: LOS for Key Intersections (2048 PM Peak)

ID	Location	2048 PM Peak									
		DM		Opt 10B - Unmitigated		Opt 10B - Mitigated		Opt 10C - Unmitigated		Opt 10C - Mitigated	
		Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
1	Sands Ave / The Boulevard	30	C	33	C	25	C	35	C	28	C
2	Sands Ave / Te Okuroa Dr	46	D	65	E	47	D	82	F	25	C
3	PEI Interchange North	18	B	30	C	43	D	32	C	18	B
4	PEI Interchange South	24	C	108	F	33	C	120	F	26	C
5	Wairakei South Development – Int 1	-	-	35	C	28	C	41	D	28	C
6	Wairakei South Development – Int 2	-	-	21	C	23	C	22	C	20	C
7	Wairakei South Development – Int 3	-	-	30	C	30	C	31	C	29	C
8	Wairakei South Development – Int 4	-	-	25	C	25	C	24	C	24	C
9	Wairakei South Development – Int 5	-	-	27	C	28	C	27	C	28	C
10	Bell Rd / Parton Rd	7	A	9	A	9	A	9	A	9	A
11	Bell Rd / Te Puke Hwy	7	A	24	C	24	C	23	C	23	C
12	Parton Rd / Tara Rd	4	A	4	A	4	A	5	A	4	A
13	Bill Miller Dr / Sands Ave	15	B	39	D	9	A	42	D	9	A
14	Wairakei South Development - RAB	-	-	6	A	6	A	7	A	7	A

Table 4-8: LOS for Key Intersections (2063 AM Peak)

ID	Location	2063 AM Peak									
		DM		Opt 10C - Unmitigated		Opt 10C - Mitigated		Opt 10D - Unmitigated		Opt 10D - Mitigated	
		Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
1	Sands Ave / The Boulevard	35	D	40	D	19	B	44	D	30	C
2	Sands Ave / Te Okuroa Dr	101	F	89	F	38	D	74	E	47	D
3	PEI Interchange North	56	E	19	B	17	B	19	B	20	C
4	PEI Interchange South	137	F	27	C	24	C	27	C	44	D
5	Wairakei South Development – Int 1	-	-	25	C	25	C	26	C	26	C
6	Wairakei South Development – Int 2	-	-	16	B	16	B	16	B	16	B
7	Wairakei South Development – Int 3	-	-	22	C	22	C	23	C	24	C
8	Wairakei South Development – Int 4	-	-	32	C	32	C	32	C	32	C
9	Wairakei South Development – Int 5	-	-	37	D	36	D	38	D	38	D
10	Bell Rd / Parton Rd	7	A	10	A	10	B	9	A	10	A
11	Bell Rd / Te Puke Hwy	7	A	20	C	20	C	20	C	20	C
12	Parton Rd / Tara Rd	4	A	5	A	5	A	5	A	4	A
13	Bill Miller Dr / Sands Ave	26	C	41	D	10	A	44	D	13	B
14	Wairakei South Development - RAB	-	-	9	A	9	A	9	A	10	A

Table 4-9: LOS for Key Intersections (2063 PM Peak)

ID	Location	2063 PM Peak									
		DM		Opt 10C - Unmitigated		Opt 10C - Mitigated		Opt 10D - Unmitigated		Opt 10D - Mitigated	
		Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
1	Sands Ave / The Boulevard	43	D	35	C	30	C	36	D	28	C
2	Sands Ave / Te Okuroa Dr	82	F	76	E	33	C	57	E	44	D
3	PEI Interchange North	86	F	28	C	24	C	21	C	39	D
4	PEI Interchange South	140	F	114	F	34	C	89	F	75	E
5	Wairakei South Development – Int 1	-	-	41	D	28	C	28	C	27	C
6	Wairakei South Development – Int 2	-	-	22	C	29	C	21	C	25	C
7	Wairakei South Development – Int 3	-	-	35	C	30	C	33	C	33	C
8	Wairakei South Development – Int 4	-	-	25	C	25	C	25	C	25	C
9	Wairakei South Development – Int 5	-	-	28	C	28	C	28	C	28	C
10	Bell Rd / Parton Rd	7	A	9	A	9	A	9	A	9	A
11	Bell Rd / Te Puke Hwy	6	A	23	C	24	C	24	C	25	C
12	Parton Rd / Tara Rd	4	A	5	A	5	A	5	A	5	A
13	Bill Miller Dr / Sands Ave	18	B	44	D	12	B	33	C	16	B
14	Wairakei South Development - RAB	-	-	8	A	8	A	8	A	9	A

The following findings from the LOS results are noted:

2048 AM Peak

- Intersections in the Wairakei South Development perform at an acceptable level of service in all scenarios.
- For Option 10B, the key intersections along Sands Ave perform similar to the Do-Minimum scenario both in the unmitigated and mitigated scenarios.
- For the Option 10C – Unmitigated scenario, the Boulevard / Sands Ave and Te Okuroa Dr / Sands Ave intersections perform worse compared to the Do-Minimum; in the mitigated scenario, these intersections perform better or similar compared to the Do-Minimum.

2048 PM Peak

- Intersections in the Wairakei South Development perform at an acceptable level of service in all scenarios.
- For both options in the unmitigated scenarios, there is heavier congestion on the southern half of the PEI interchange. Vehicles queuing back from the Te Okuroa Dr / Sands Ave intersection block the northbound traffic from the PEI interchange causing queues on the ramps. In the mitigated scenarios allow more time for the south approach to clear, mitigating the queueing at the ramps.

2063 AM/PM Peak

- Intersections perform significantly worse in the do-minimum scenario compared to 2048.
- Intersections in the Wairakei South Development perform at an acceptable level of service in all scenarios.
- For Option 10C, the absence of Te Tumu traffic helps alleviate the congestion round the Wairakei Town Centre Area, resulting in better performance for intersections along Sands Ave.
- For Option 10D, the PEI bypass link that leads to the Eastern Boundary Rd relieves some of the queuing from the southern approach of the Sands Ave / Te Okuroa Dr intersection, improving the LOS at this intersection in both the unmitigated and mitigated scenarios.

4.6.4 Travel Times

A map of the travel time routes is shown in **Figure 4-6**.

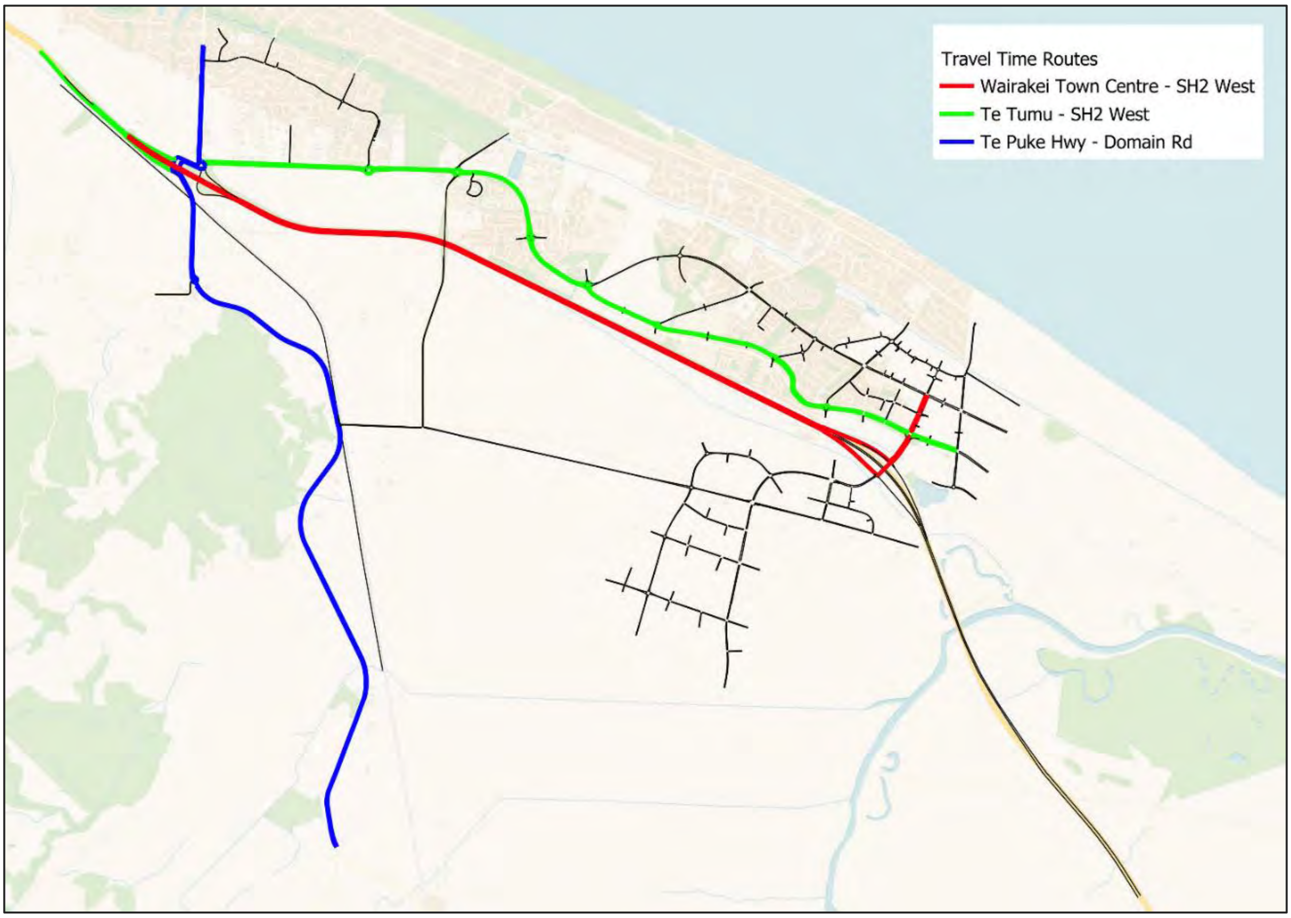


Figure 4-6: Travel Time Routes

The travel time comparisons for the modelled scenarios are presented in **Table 4-10** to **Table 4-13**.

Table 4-10: Travel Time Comparison (2048 AM Peak)

Travel Times	2048 AM Peak								
	DM	Opt 10B - Unmitigated	Diff*	Opt 10B - Mitigated	Diff*	Opt 10C - Unmitigated	Diff*	Opt 10C - Mitigated	Diff*
Wairakei Town Centre / SH2 West via SH2									
Westbound	8	8	+0	8	+0	8	+0	7	-1
Eastbound	7	7	+0	7	+0	7	+0	6	-1
Te Tumu / SH2 West via Tara Rd									
Westbound	17	25	+8	17	+0	18	+1	12	-5
Eastbound	12	11	-1	13	+1	11	-1	11	-1
Te Puke Hwy / Domain Rd									
Northbound	12	10	-2	8	-4	8	-4	7	-5
Southbound	7	9	+2	8	+1	8	+1	7	+0

*Difference with respect to the Do Minimum Scenario

The key findings from the 2048 AM peak travel time results are:

- There are small changes in travel time along SH2.
- Westbound travel time on Tara Road increase by 8 minutes in Option 10B unmitigated compared to the Do Minimum scenario. This increase in travel time is associated with higher volume on SH2, making it harder for vehicles to merge at the Domain Rd On-Ramp. By extending the Domain Road on-ramp merge, the westbound travel time in Option 10B mitigated scenario is similar to that in the Do Minimum scenario.
- Travel times for the northbound traffic along Te Puke Hwy reduces compared to the Do Minimum. With the new Wairakei South development, vehicles that previously used the Domain Rd roundabout in the Do Minimum to get to Wairakei South or SH2 East can now use Bell Rd. This rerouting reduces northbound traffic along Te Puke Hwy which results in lower travel times.

Table 4-11: Travel Time Comparison (2048 PM Peak)

Travel Times	2048 PM Peak								
	DM	Opt 10B - Unmitigated	Diff*	Opt 10B - Mitigated	Diff*	Opt 10C - Unmitigated	Diff*	Opt 10C - Mitigated	Diff*
Wairakei Town Centre / SH2 West via SH2									
Westbound	8	9	+1	8	+0	9	+1	7	-1
Eastbound	8	9	+1	8	+0	9	+1	6	-2
Te Tumu / SH2 West via Tara Rd									
Westbound	11	11	+0	11	+0	11	+0	11	+0
Eastbound	11	11	+0	11	+0	11	+1	11	+0
Te Puke Hwy / Domain Rd									
Northbound	6	7	+1	7	+1	7	+1	7	+1
Southbound	6	7	+1	7	+1	7	+1	7	+1

*Difference with respect to the Do Minimum Scenario

The key findings from the 2048 PM peak travel time results are:

- There is a one-minute increase in travel time for eastbound vehicles on SH2 in both option 10B and 10C compared to the Do Minimum scenario.
- There is a small reduction in travel time for vehicles on SH2 compared to the Do Minimum scenario in Option 10C - Mitigated.

Table 4-12: Travel Time Comparison (2063 AM Peak)

Travel Times	2063 AM Peak								
	DM	Opt 10C - Unmitigated	Diff*	Opt 10C - Mitigated	Diff*	Opt 10D - Unmitigated	Diff*	Opt 10D - Mitigated	Diff*
Wairakei Town Centre / SH2 West via SH2									
Westbound	9	9	+1	7	-2	10	+1	8	-1
Eastbound	9	7	-2	6	-3	7	-2	7	-2
Te Tumu / SH2 West via Tara Rd									
Westbound	13	10	-3	11	-2	17	+4	13	+0
Eastbound	17	12	-5	9	-8	15	-2	13	-4
Te Puke Hwy / Domain Rd									
Northbound	7	8	+1	6	-1	12	+5	7	+0
Southbound	6	7	+1	7	+1	8	+2	7	+1

*Difference with respect to the Do Minimum Scenario

Table 4-13: Travel Time Comparison (2063 PM Peak)

Travel Times	2063 PM Peak								
	DM	Opt 10C - Unmitigated	Diff*	Opt 10C - Mitigated	Diff*	Opt 10D - Unmitigated	Diff*	Opt 10D - Mitigated	Diff*
Wairakei Town Centre / SH2 West via SH2									
Westbound	9	10	+1	7	-2	10	+1	10	+1
Eastbound	10	8	-2	7	-3	8	-2	7	-3
Te Tumu / SH2 West via Tara Rd									
Westbound	18	11	-7	11	-7	14	-4	12	-6
Eastbound	15	11	-4	11	-4	12	-3	11	-4
Te Puke Hwy / Domain Rd									
Northbound	6	7	+1	7	+1	7	+1	7	+1
Southbound	6	7	+1	7	+1	7	+1	7	+1

*Difference with respect to the Do Minimum Scenario

The key findings from the 2063 AM and PM peak travel time results are:

- The westbound travel time on SH2 is slightly faster in 2063 AM peak compared to 2048. This is associated with reduction in land use and trip generation from the TTSM.
- Eastbound travel times on SH2 are faster compared to the Do Minimum in both Option 10C and 10D. In Option 10C, there is no Te Tumu traffic resulting in less congestion at Sands Ave. In Option 10D, the PEI bypass helps alleviate congestion along Sands Ave.
- There is a 4-minute increase in travel time in the westbound direction on Tara Rd and Te Puke Hwy for the Option 10D AM unmitigated scenario, caused by congestion at the Domain Rd On-Ramp with the full Te Tumu and Wairakei South traffic. By extending the Domain Road on-ramp merge, the westbound travel time in Option 10D mitigated scenario is similar to that in the Do Minimum scenario.

4.6.5 Link Counts Comparison

The locations for the link count comparison between TTSM and TTHM are shown in **Figure 4-7** below.

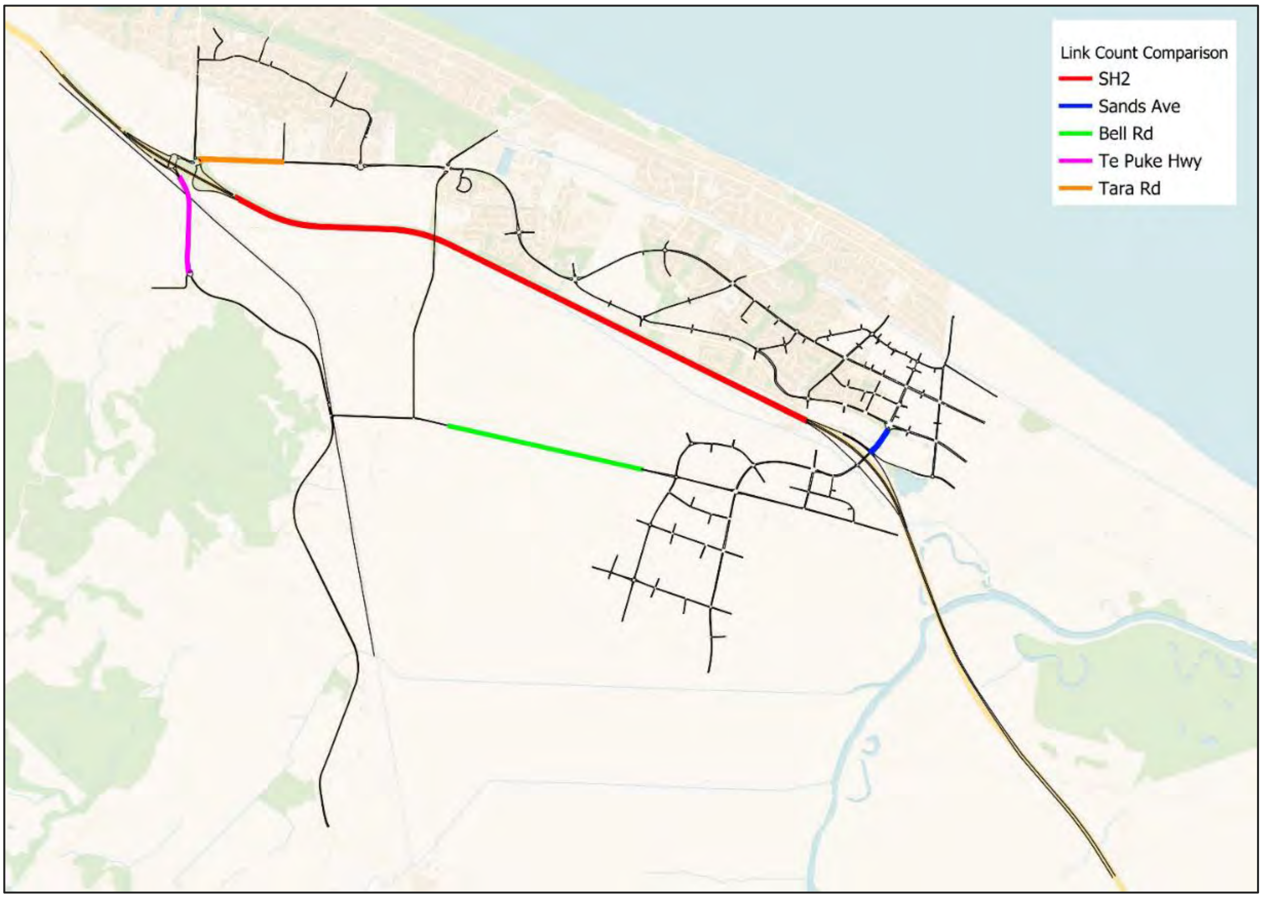


Figure 4-7: Link Count Locations

The link count comparisons for the 2048 Option 10B – Mitigated and 2063 Option 10D – Mitigated scenarios between TTSM and TTHM are summarised in **Table 4-14** and **Table 4-15**.

Table 4-14: Link Count Comparison (2048 Opt 10B)

Travel Times		2048 Opt 10B					
		2048 AM Peak			2048 PM Peak		
		TTSM	TTHM	Diff	TTSM	TTHM	Diff
1	SH2 – Eastbound	1,951	1,974	+23	2,426	1,982	-444
	SH2 – Westbound	2,150	1,902	-248	2,122	2,388	+266
2	Sands Ave – Northbound	1,679	1,749	+70	2,443	2,599	+156
	Sands Ave – Southbound	1,952	2,174	+222	1,921	2,033	+112
3	Bell Rd – Eastbound	233	423	+190	330	540	+210
	Bell Rd – Westbound	396	595	+199	401	600	+199
4	Te Puke Hwy – Northbound	892	851	-41	615	642	+27
	Te Puke Hwy – Southbound	563	615	+52	998	1,109	+111
5	Tara Rd – Eastbound	581	506	-75	1,006	966	-41
	Tara Rd – Westbound	1,066	1,152	+86	647	651	+4

Table 4-15: Link Count Comparison (2063 Opt 10D)

Travel Times		2063 Opt 10D					
		2063 AM Peak			2063 PM Peak		
		TTSM	TTHM	Diff	TTSM	TTHM	Diff
1	SH2 – Eastbound	2,060	2,535	+475	2,963	2,273	-691
	SH2 – Westbound	2,738	1,996	-743	2,311	2,852	+540
2	Sands Ave – Northbound	1,589	1,988	+399	2,158	2,378	+220
	Sands Ave – Southbound	2,144	2,376	+232	2,373	2,522	+149
3	Bell Rd – Eastbound	256	474	+218	383	694	+311
	Bell Rd – Westbound	458	694	+236	417	524	+107
4	Te Puke Hwy – Northbound	1095	1,050	-45	672	686	+14
	Te Puke Hwy – Southbound	626	700	+74	1277	1,337	+59
5	Tara Rd – Eastbound	635	558	-77	897	834	-64
	Tara Rd – Westbound	946	1,058	+112	717	846	+129

The key findings from the link count comparisons are:

AM Peak

- There is less traffic in the AM peak on SH2 Westbound since vehicles from Wairakei South are opting to use Bell Rd to head west instead of turning left at the PEI interchange.
- There are less vehicles heading northbound on Te Puke Hwy due to vehicles originating from Welcome Bay and Te Puke Hwy South opting to use Bell Rd to head east towards the Wairakei Town Centre or SH2 East.

PM Peak

- Vehicles are responding to the congestion at the PEI interchange and are rerouting to parallel roads to head east towards the Wairakei Town Centre.

A more detailed intersection count comparison is provided in **Appendix H**.

5 Summary and Conclusions

TTSM and TTHM modelling have been undertaken, and the key findings are outlined below

- The modelling indicated a range of locations where mitigation interventions were necessary. The predominant and strategic locations where interventions were necessary included the Te Okuroa Drive / Sands Ave intersection, the PEI interchange, the Bell Road / Te Puke Highway intersection and the northbound on ramp at the Domain Road interchange, amongst a range of other localised measures.
- Intersections in the Wairakei South Development perform at an acceptable level of service across all modelled scenarios.
- The proposed infrastructure changes appropriately mitigate the network effects caused by the additional demand from the Wairakei South Development.
- The overall outcome of the modelled scenarios and identified mitigation is that the transport network with the Wairakei South development included, is expected to perform at least equivalent to or better than the Do Minimum transport network inclusive of the Te Tumu land use.

The modelling for TTSM and TTHM has been peer reviewed and has been considered a robust assessment to inform the ITA.

A

Appendix A – Transport Modelling Report (Round 1 TTSM)

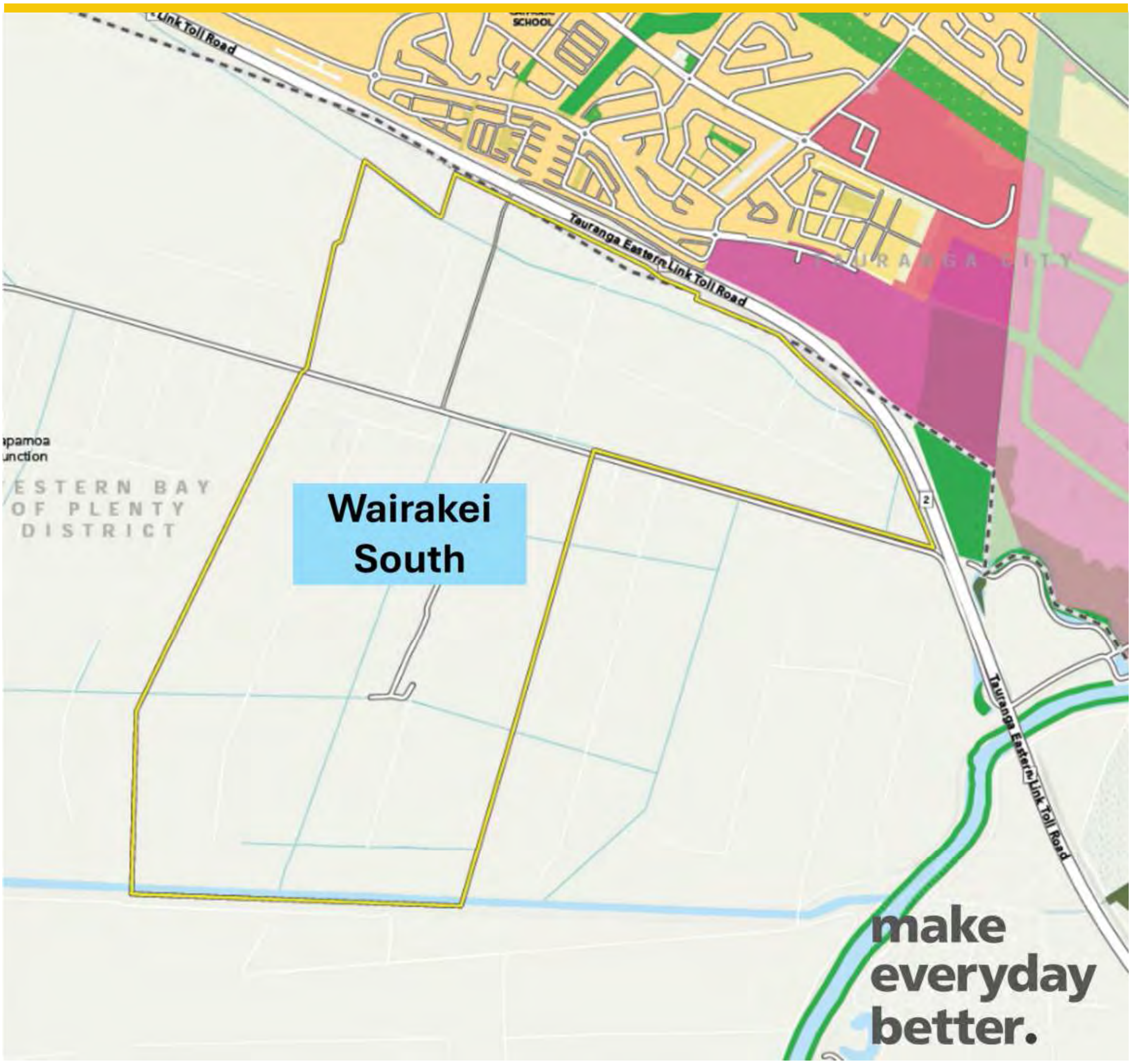
Sensitivity: General

Wairakei South Transport Modelling

Technical Modelling Report – Interim Findings

Prepared for Bell Road Limited Partnership
Prepared by Beca Limited

15 October 2025



Contents

Appendices

Revision History

Revision N°	Prepared By	Description	Date
01	Subramanyam Uppuluri	Draft Report for Client Review	15-Oct-2025

Document Acceptance

Action	Name	Signed	Date
Prepared by	Subramanyam Uppuluri		15-Oct-2025
Reviewed by	Craig Richards		15-Oct-2025
Approved by	Craig Richards		15-Oct-2025
on behalf of	Beca Limited		

Executive Summary

Bell Road Limited Partnership has engaged Beca to undertake the Wairakei South Transport Modelling using the Tauranga Transport Modelling Suite (TTM) 2023 version. The TTM suite includes the Tauranga Transport Strategic Model (TTSM) and the Tauranga Transport Hybrid Model (TTHM).

The transport modelling is required to inform the assessment of effects and mitigation being undertaken by Bell Road Limited Partnership in regard to the Wairakei South Fast Track consent application. Beca is responsible for providing the model outputs from the TTSM and TTHM packages to support the project team (i.e. Boffa Miskell) for this work.

Land Use Update

The Wairakei South model scenarios utilise the standard TTSM 2023 land-use inputs for the wider area, supplemented by updated land-use inputs aligned with the Wairakei South Structure Plan. The area comprises a mix of housing, employment, education, and recreation activities, with a significant portion designated for stormwater management. The land-use scenarios adopted for the transport modelling are shown below and outlined in **Section 2.1**.

- Option A – Redistribution from wider Growth Areas and no changes to Te Tumu development
- Sensitivity Test 1 (ST1) – Redistribution from wider Growth Areas and no growth in Te Tumu
- Sensitivity Test 2 (ST2) – Option A land use with Seddon Street Connection
- Sensitivity Test 3 (ST3) – High Te Tumu Population (25,000) in 2063.

Modelled Scenarios

The modelling was undertaken using the TTSM 2023 version. The wider area utilises the TTSM 2023 Do Minimum (DM) and Do Something (DS) networks, which include updated Road and PT networks within the Wairakei South area as per the structure plan. The model years are 2035, 2048 and 2063. A detailed description of model scenarios and assumptions is discussed in **Sections 2.3 to 2.8**.

- Core Scenarios – Option A land use with DM (2035, 2048 & 2063) and DS (2048 & 2063) networks
- Sensitivity Test 1 (ST1) – ST1 land use with DS (2048 & 2063) networks
- Sensitivity Test 2 (ST2) – DS Core Scenario (2048 & 2063) models, including the Seddon Street connection
- Sensitivity Test 3 (ST3) – ST3 land use with 2063 DS network, including the SH2 to Te Tumu East bound Off Ramp, Bell Road and Seddon Street connections.

Discussion of key model outcomes from the modelled scenarios are summarised below:

Target Trip Generation

As agreed with the model owners, the modelled trips are matched to the target trip generation for each land use in Wairakei South development, as summarised below:

- Residential – 7 to 8 trips/day
- Service Centre – Trip generation target is 674 vehicles/hr in the 2035 PM peak hour. The TTSM predicted an average one-hour PM peak of 651 vehicles/hr in 2035
- Commercial (Local/Neighbourhood centres) – based on daily trips from similar facilities in the TTSM
- Industrial – 180 to 200 trips/ha/day.

Demand Statistics

No significant change in overall vehicle and public transport trips is expected in 2035, 2048, and 2063, as the TTSM model redistributes demand based on network changes; hence, we do not anticipate major shifts in overall demand between the various modelled scenarios. However, due to land use growth and improved road and public transport services, overall demand for vehicles and public transport is expected to be higher in the forecast years (2035, 2048 and 2063) compared to 2018.

Sector to Sector demand

Vehicle travel patterns were analysed using a seven-sector system. The sector map is presented in **Figure A**. The sectors are named as follows:

- Sector 1 – Wairakei
- Sector 2 – Te Tumu
- Sector 3 – Rangiuru/Maketu
- Sectors 4, 5 and 6 – Other areas
- Sector 7 – Wairakei South.

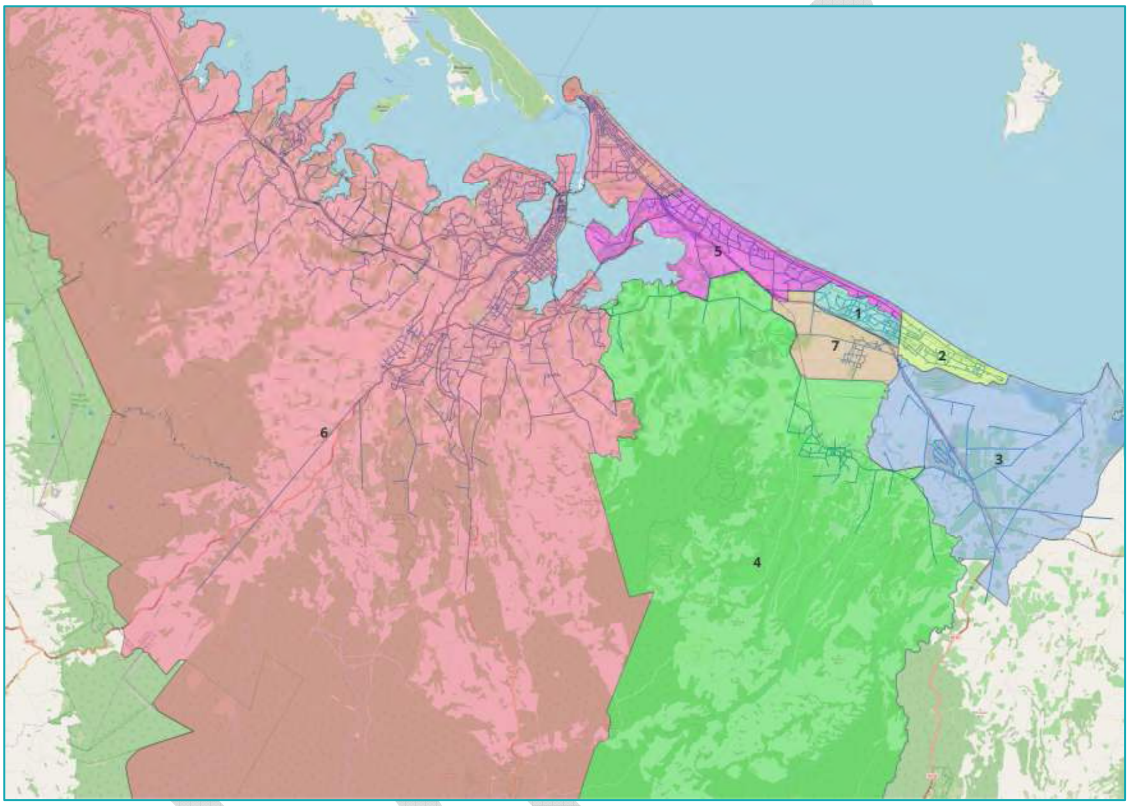


Figure A: Sector Map

Table A summarises daily sector-to-sector trip proportions for the Core scenarios. Detailed sector-to-sector traffic distribution of vehicles, including sensitivity tests, is provided in **Table 3-3**.

Table A: Wairakei South Daily Vehicles Trip Distribution Proportions for Core Scenarios

Movement	2035	2048		2063	
	CS_DM	CS_DM	CS_DS	CS_DM	CS_DS
Wairakei South – Wairakei South	11%	13%	13%	13%	13%
Wairakei South – Wairakei	29%	23%	23%	22%	21%
Wairakei South – Te Tumu	5%	9%	8%	14%	14%
Wairakei South - Rangiuru/Maketu	10%	12%	13%	12%	12%
Wairakei South – Other areas	45%	43%	43%	40%	40%
Total	**100%**	**100%**	**100%**	**100%**	**100%**

The proportion of local trips (Wairakei South–Wairakei South) is unchanged across the 2035 scenarios. It increases slightly in ST1 for 2048 and 2063, and decreases in ST2 for 2048 and 2063, as well as in ST3 for 2063, relative to the Core scenarios.

The proportion of trips between Wairakei South and Rangiuru/Maketu sectors is approximately 10% in 2035, 12% to 13% in 2048 and 11% to 13% in 2063 across the modelled scenarios.

Select Link Analysis Results

Figure B shows the select link analysis locations.

Figure B: Select Link Locations

West PEI location

Strong two-way flows between Wairakei South and the Wairakei/Te Tumu areas via the PEI Interchange and Sands Avenue. A moderate share of movements between Wairakei South and Te Puke/Rangiuru and to the TEL (west of Domain Road). A small proportion of Wairakei South traffic continues to wider destinations, including the Te Papa Peninsula (via the Harbour and Maungatapu Bridges) and Mount Maunganui.

West Bell Road location

Traffic is predominantly between Wairakei South and Te Puke, Wairakei, and Te Tumu. Some Wairakei South traffic continues to wider areas such as TEL North (west of Domain Road), Welcome Bay Road, the Te Papa Peninsula (via the Harbour and Maungatapu Bridges), and Mount Maunganui.

Seddon Street connection

Most movements are between Te Puke and Wairakei/Te Tumu, passing through Wairakei South and the PEI Interchange, as the Seddon Street connection provides direct access between these areas. Model results indicate diversion from Te Puke Highway and the TEL to the Seddon Street corridor.

Level of Service

LOS plots are useful for understanding the locations and severity of traffic congestion in the network. LOS plots are provided in **Appendix E**. The key intersections and road sections or links considered in the LOS analysis are shown in **Figure C.**

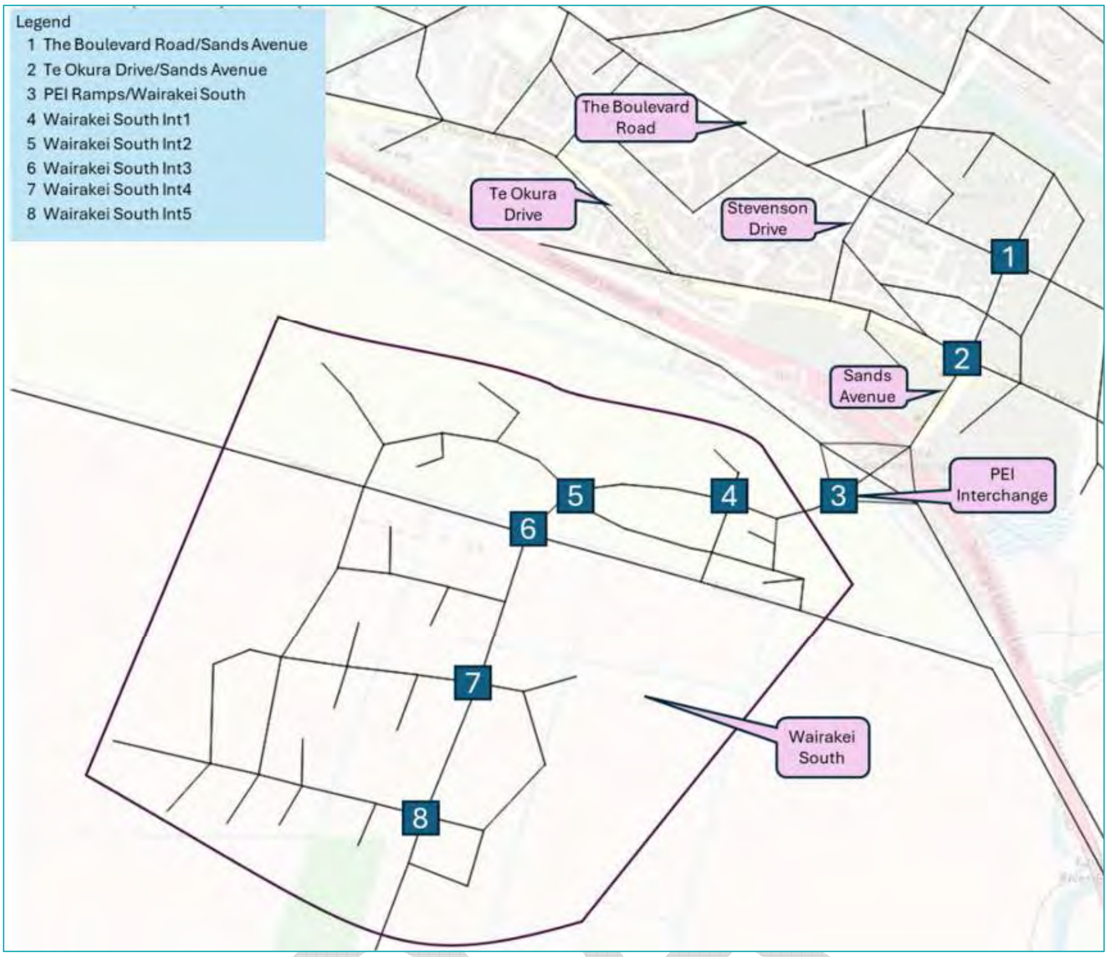


Figure C: Key Intersections and Corridors

A summary of key intersections and a list of road sections with LOS D, E or F is provided in **Table B**.

Table B: Key Intersections and Road Sections with LOS D or higher in the Wairakei South Study Area

Intersection	2035 Do Minimum		2048 Do Minimum		2048 Do Something			2063 Do Minimum		2063 Do Something			
	CS	ST1	CS	ST1	CS	ST1	ST2	CS	ST1	CS	ST1	ST2	ST3
Intersections													
The Boulevard Road/Sands Avenue	--	--	--	--	--	--	--	D	--	D	--	D	D
Te Okura Drive/Sands Avenue	D	D	E	E	E	E	E	E	E	E	E	E	F
PEI Ramps /Wairakei South	--	--	--	--	--	--	D	D	--	D	--	E	E
Wairakei South Int1	D	--	D	D	D	D	E	D	D	D	D	D	E
Wairakei South Int2	--	--	D	D	D	D	D	D	D	D	D	E	D
Wairakei South Int3	--	--	D	D	D	D	D	D	D	D	D	D	E
Wairakei South Int4	--	--	--	--	--	--	E	--	--	--	--	E	E
Wairakei South Int5	--	--	--	--	--	--	E	--	--	--	--	E	E

Intersection	2035 Do Minimum		2048 Do Minimum		2048 Do Something			2063 Do Minimum		2063 Do Something			
	CS	ST1	CS	ST1	CS	ST1	ST2	CS	ST1	CS	ST1	ST2	ST3
Road Sections or Links													
Te Okura Drive between Stevenson Drive and Sands Avenue	D	D	D	D	D	D	D	D	D	D	D	D	D
Sands Avenue between PEI Ramps and Te Okura Drive	--	--	E	D	E	D	E	E	D	E	D	E	E
PEI North Off Ramp			D	--	D	--	D	D	--	D	--	D	E
PEI South Off Ramp			D	--	D	--	--	D	--	D	--	--	D

Next steps in the modelling task will be to agree on network changes with the client team, including scenario testing and complete the comprehensive model scenario as per the agreed methodology.

Sensitivity: General

1 Introduction

1.1 Background

The Wairakei South Fast Track Application site is shown in **Figure 1-1** (within the yellow boundary). It is proposed to comprise a mix of housing, employment, education and recreation activities. A significant portion of the area will be designated for stormwater management.

Figure 1-1: Wairakei South Project Area

Bell Road Limited Partnership has engaged Beca to undertake the Wairakei South Transport Modelling using the Tauranga Transport Modelling Suite (TTM) 2023 version. The TTM suite includes the Tauranga Transport Strategic Model (TTSM) and the Tauranga Transport Hybrid Model (TTHM).

The transport modelling is required to inform the assessment of effects and mitigation being undertaken by Bell Road Limited Partnership. Beca is responsible for providing the model outputs from the TTSM and TTHM packages to support the project team (i.e. Boffa Miskell) for this work.

This technical report documents the model inputs, assumptions and outputs from TTSM for the Wairakei South transport modelling scenarios.

2 Model Inputs and Assumptions

2.1 Model Time Periods

The TTSM model is an average hour model (considers the average hour volume within the peak period) for the following time periods:

- AM peak: 7am to 9am.
- Interpeak (IP): 9am to 4pm.
- PM peak: 4pm to 6pm.

2.2 Land Use Inputs

In TTSM 2023, the Wairakei South project area is currently represented as a single rural zone. Hence, the land use in the project area has to be updated based on the staging plan received from the client. The draft concept framework plan is shown in **Figure 2-1**.

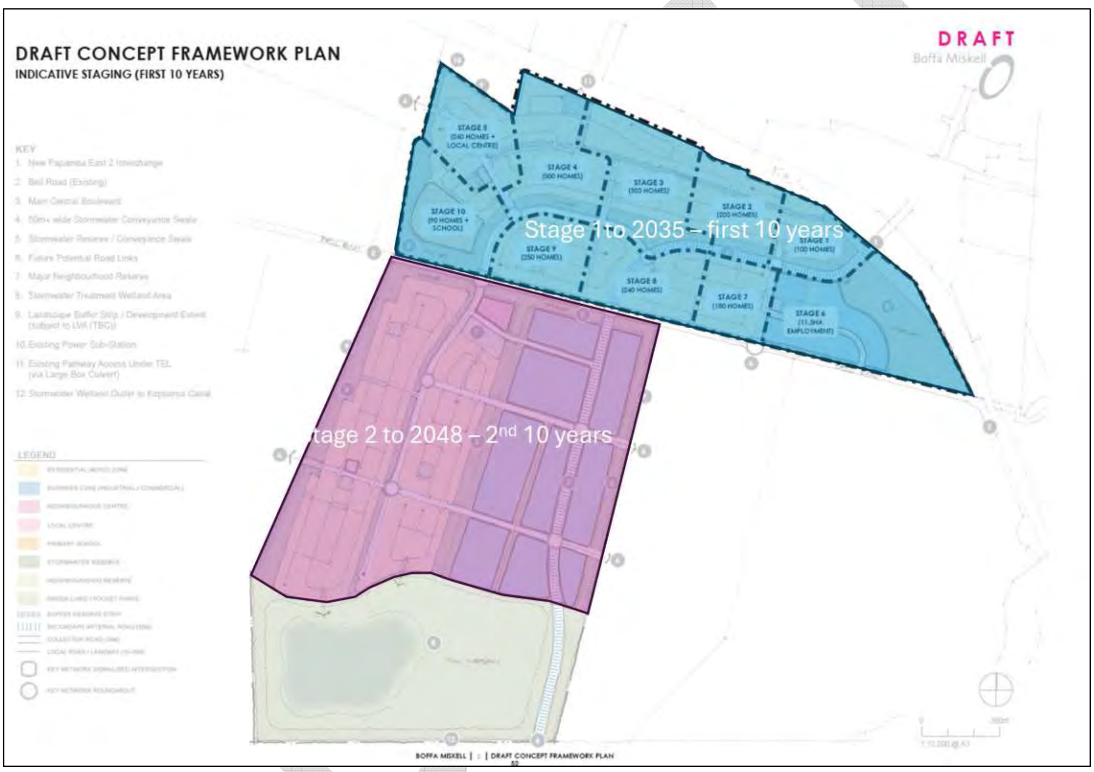


Figure 2-1: Wairakei South Draft Staging Plan

The Wairakei South modelling work also incorporates updated land use data for the Sands Development area, which includes the Wairakei Town Centre, as well as mixed industrial and commercial zones from the TTSM 2023 version.

As agreed with the model owners (i.e., TCC, NZTA, and WBOPDC) in the kick-off meeting, we have maintained the same overall totals for dwellings as per the TTSM 2023 baseline projections. Therefore, land use assumptions for other areas within the transport model were redistributed due to the inclusion of the Wairakei South development. This adjustment is specific to this study and is for modelling purposes only.

The following land use scenarios were modelled for Wairakei South transport modelling:

Option A – Redistribution from wider Growth Areas and no changes to Te Tumu development

This land use redistribution is based on Te Tumu and Wairakei proceeding as planned for residential land use. Initially, there were no plans to alter the industrial area in Te Tumu. However, due to challenges with Industrial land availability in the surrounding TBE and Omokoroa areas, adjustments were necessary. Consequently, a slight modification to the industrial land use in Te Tumu was made, which will only affect the year 2048 and will not influence any other years.

The redistribution is focused on unzoned future land development areas in the region; however, we have had to include some zoned areas due to the level of redistribution required.

Sensitivity Test 1 (ST1) – Redistribution from wider Growth Areas and no growth in Te Tumu

This scenario assumes no development in the Te Tumu area and growth in the Wairakei South area. This land use redistribution is in the wider growth areas.

2.2.1 Sensitivity Test 2 (ST2) – Seddon Street Connection

This scenario assesses the impact of incorporating the Seddon Street connection to Te Puke in 2048 and 2063. **Option A** land use was used in this scenario.

2.2.2 Sensitivity Test 3 (ST3) – High Te Tumu Population

This scenario was modelled with a population of 25,000 in Te Tumu for 2063, aiming to test the impact of higher densities in Te Tumu, as included in prior TCC structure plan modelling. The redistribution of land use is in the wider growth areas.

Table 2-1 show the summary of the land use data before (TTSM 2023 version) and after the redistribution scenarios (Option A, ST1, and ST3) for 2035, 2048, and 2063, due to the inclusion of the Wairakei South development.

Table 2-1: Land Use Summary

Growth Area	Description	TTSM 2023			Option A			ST 1			ST 3
		2035	2048	2063	2035	2048	2063	2035	2048	2063	2063
Residential Land Use (Number of Dwellings)*											
Western Corridor	Keenan Road	301	1,620	2,500	0	0	2,500	0	1,620	4,468	2,500
	TBE Extn and Upper Belk Road	186	184	10,150	0	0	7,247	0	184	10,150	5,788
	Merrick Road	168	390	4,500	0	0	4,500	0	390	4,500	2,948
	Upper Joyce Road	219	218	3,250	0	0	3,250	0	699	4,343	2,275
Te Tumu	Te Tumu	827	3,384	5,964	827	3,384	5,964	0	0	0	9,951
Parau Farms	Parau Farms	608	631	631	0	140	631	408	631	631	631
Ōmokoroa Rural	Ōmokoroa Stage 3 Structure Plan	1,958	3,191	3,191	1,540	3,191	3,191	1,958	3,191	3,191	3,191
Wairakei South	Wairakei South	84	97	97	1,984	3,000	3,000	1,984	3,000	3,000	3,000
	Total	**4,350**	**9,715**	**30,283**	**4,350**	**9,715**	**30,283**	**4,350**	**9,715**	**30,283**	**30,283**
Industrial Land Use (Hectares)*											
TBE Extension	TBE Extension	43	70	100	42	42	66	43	60	100	68
Te Tumu	Te Tumu	9	36	63	9	30	63	0	0	0	63
Rangiuru	Rangiuru Business Park	110	148	148	110	148	148	110	148	148	148
Ōmokoroa Rural	Ōmokoroa Stage 3 Structure Plan	13	26	26	5	6	6	13	17	33	3
Wairakei South	Wairakei South	0	0	0	8	55	55	8	55	55	55
	Total	**174**	**280**	**336**	**174**	**280**	**336**	**174**	**280**	**336**	**336**

*Land use data rounded to the nearest whole number

Note : 'XX' indicates reduced land use compared to TTSM 2023, while 'XX' also denotes new or increased land use data compared to TTSM 2023

2.2.3 Target Trip Generation

As agreed with the model owners, the target trip generation for various types of land use in Wairakei South development are provided below:

- Residential – 7 to 8 trips/day
- Service Centre – Trip generation target is 674 vehicles/hr in the 2035 PM peak hour. The TTSM predicted an average one-hour PM peak of 651 vehicles/hr in 2035
- Commercial (Local/Neighbourhood centres) – based on daily trips from similar facilities in the TTSM
- Industrial – 180 to 200 trips/ha/day.

2.3 Model Scenarios

The modelling was undertaken using the TTSM 2023 version. The model scenarios are shown in **Table 2-2**.

Table 2-2: Wairakei South Model Scenarios

Land Use	Scenarios		Mode Years	Description
Without the Wairakei South development	Standard TTSM 2023 Scenarios	Do Minimum	2035, 2048 and 2063	TTSM 2023 models have been updated to reflect the revised Sands Development land use data and new toll assumptions for the TEL and PEI Interchange[1] (refer to **Appendix A**).
		Do Something	2048 and 2063	
With Wairakei South and Te Tumu development **(Option A)**	Core Scenarios	Do Minimum	2035 (Stage 1 only) 2048 and 2063 (Stages 1 & 2)	It includes land use redistribution of Growth Areas and no changes to Te Tumu development.
		Do Something	2048 and 2063 (Stages 1 & 2)	
With Wairakei South development and no development in Te Tumu	Sensitivity Test 1 Scenarios	Do Minimum	2035 (Stage 1 only) 2048 and 2063 (Stages 1 & 2)	It includes land use redistribution of Growth Areas, excluding development in Te Tumu.
		Do Something	2048 and 2063 (Stages 1 & 2)	
With Wairakei South and Te Tumu, plus Seddon Street	Sensitivity Test 2 Scenarios	Do Something	2048 and 2063 (Stages 1 & 2)	It includes land use redistribution of Growth Areas, including Te Tumu development and a connection to Seddon Street.
With Wairakei South and Te Tumu high growth, plus Seddon Street	Sensitivity Test 3 Scenario	Do Something	2063 (Stages 1 & 2)	It includes Te Tumu, which has a high growth rate (i.e., 25,000 population), and a connection to Seddon Street.

[1] https://nzta.govt.nz/about-us/public-consultation-hub/past-consultations/tauranga-eastern-link-toll-road

2.4 Network Assumptions

2.4.1 Do Minimum (DM) Scenarios

The Wairakei South network assumptions are developed from the TTSM 2023 Do Minimum[2] transport network interventions and PT services plus network improvements as per the Wairakei South network plan. The following assumptions were made for the DM scenario in the Wairakei South area, along with the wider area using the TTSM 2023 transport network and PT services.

Road network including Intersections

- Without Stage 2 Off Ramp in East Bound direction from SH2 to Te Tumu area in 2048 and 2063
- Without the Bell Road connection to the Te Tumu area in 2063
- Wairakei South transport network plan as received from the Client.

Public Transport

New public bus services between Bayfair terminal and Wairakei Town Centre, passing through SH2, Domain Road Interchange, Te Puke Highway and the Wairakei South areas in 2035, 2048 and 2063. These services operate every 30 minutes during peak hours (AM/PM) and off-peak hours (IP).

Figure 2-2 shows the road network, including intersections modelled for the year 2035 and **Figure 2-3** for the modelled years 2048 and 2063.

[2] https://econtent.tauranga.govt.nz/data/transport-model/ttsm23-update.pdf ; Please refer to Sections 2.2.1 and 2.3.1 for the Do Minimum Transport Network and PT assumptions used in TTSM 2023.

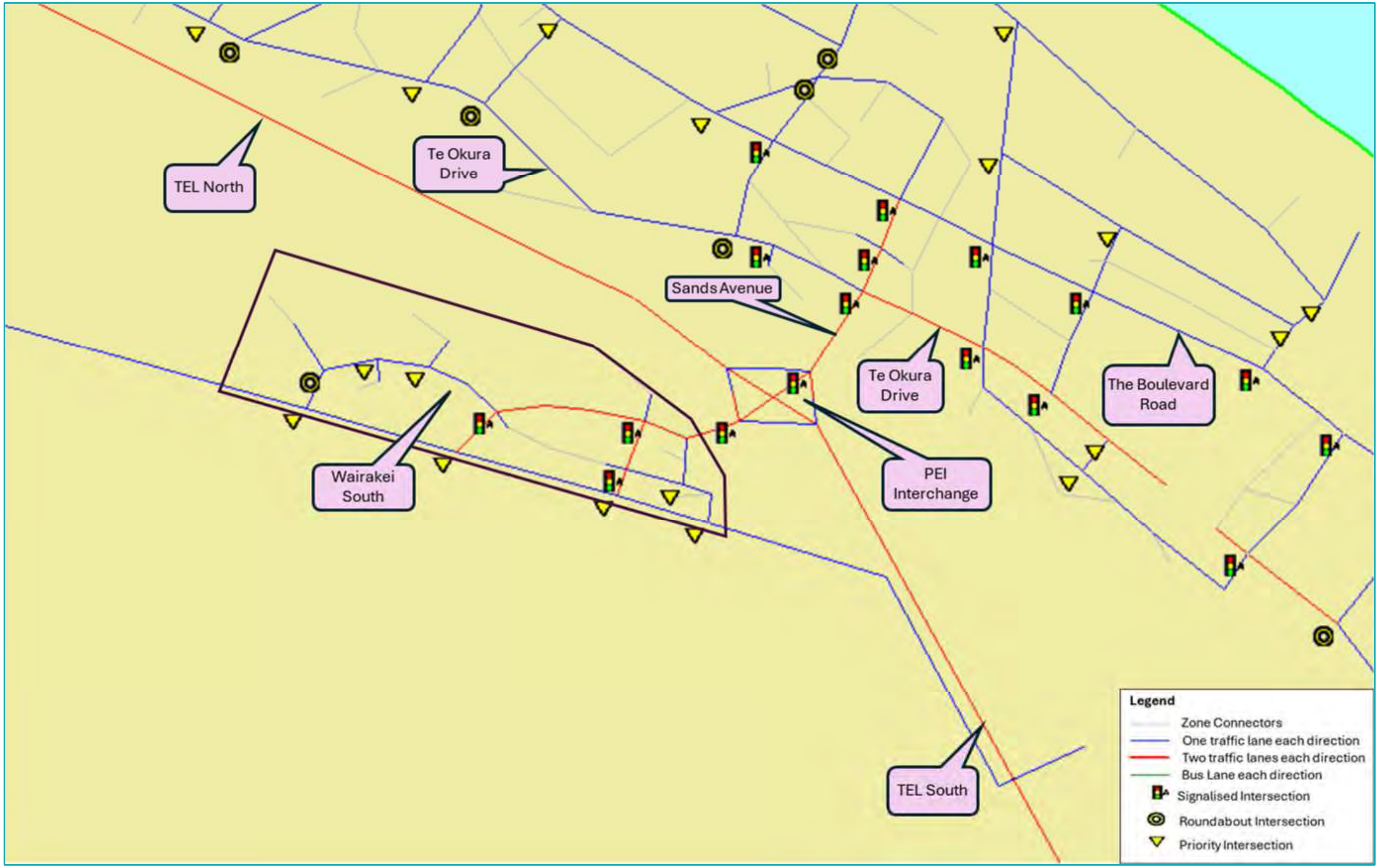


Figure 2-2: Wairakei South – 2035 Do Minimum Network (Core Scenarios)

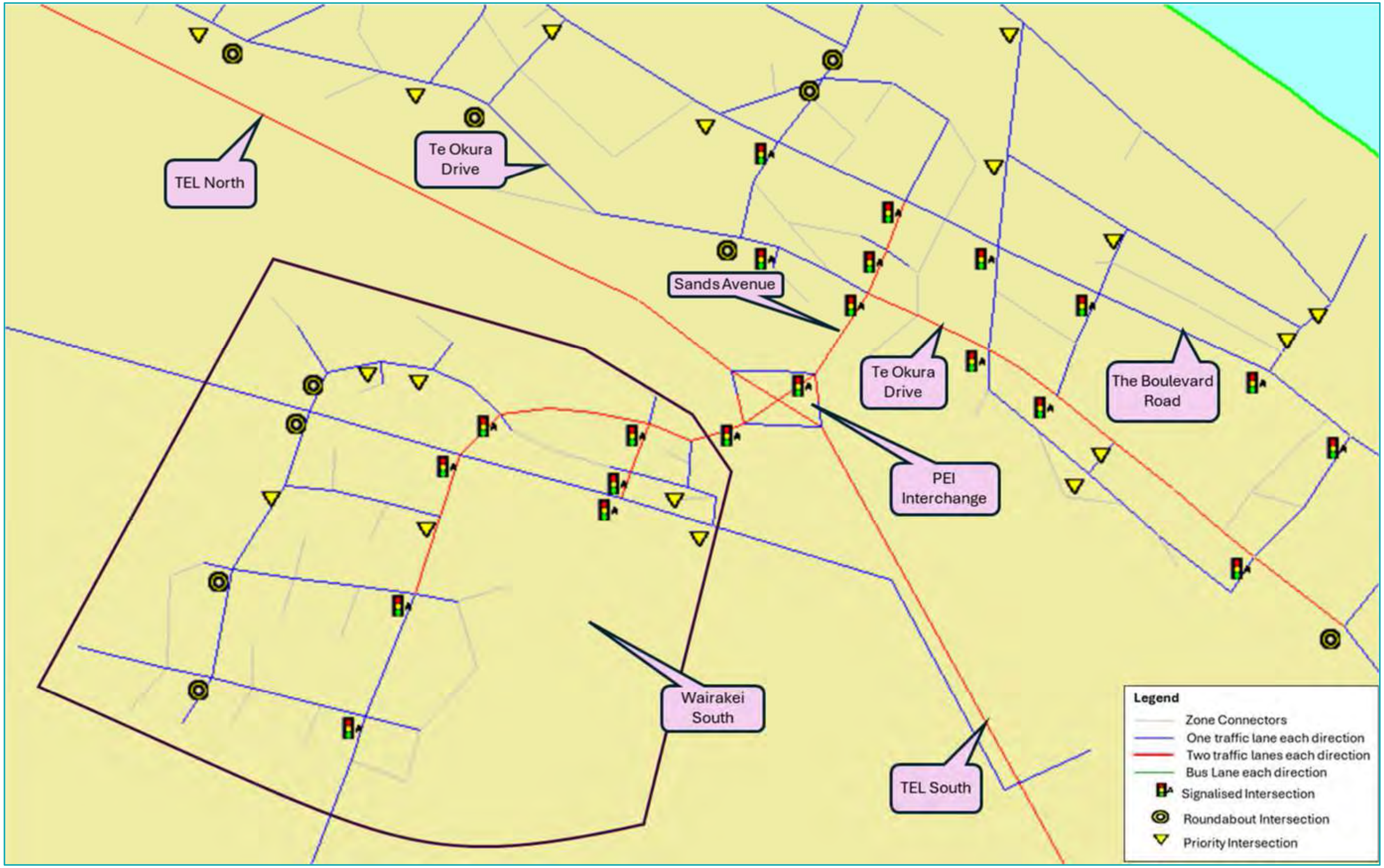


Figure 2-3: Wairakei South – 2048 and 2063 Do Minimum Network (Core Scenarios)

2.4.2 Do Something Scenarios

The Wairakei South network assumptions are developed from the TTSM 2023 Do Something[3] transport network interventions and PT services plus network improvements as per the Wairakei South network plan. The following assumptions were made for the Do Something in the Wairakei South area, along with the wider area using the TTSM 2023 transport network and PT services.

Road network including Intersections

- Same as the Do Minimum Scenario in the Wairakei South area and Wider areas uses the TTSM 2023 DS assumptions

Public Transport

New public bus services between Bayfair terminal and Wairakei Town Centre, passing through SH2, Domain Road Interchange, Te Puke Highway and the Wairakei South areas in 2035, 2048 and 2063. These services operate every 7.5 minutes during peak hours (AM/PM) and off-peak hours (IP).

Figure 2-4 shows the road network, including intersections for the modelled years 2048 and 2063.

[3] https://econtent.tauranga.govt.nz/data/transport-model/ttsm23-update.pdf ; Please refer to Sections 2.2.2 and 2.3.2 for the Do Something Transport Network and PT assumptions used in TTSM 2023.

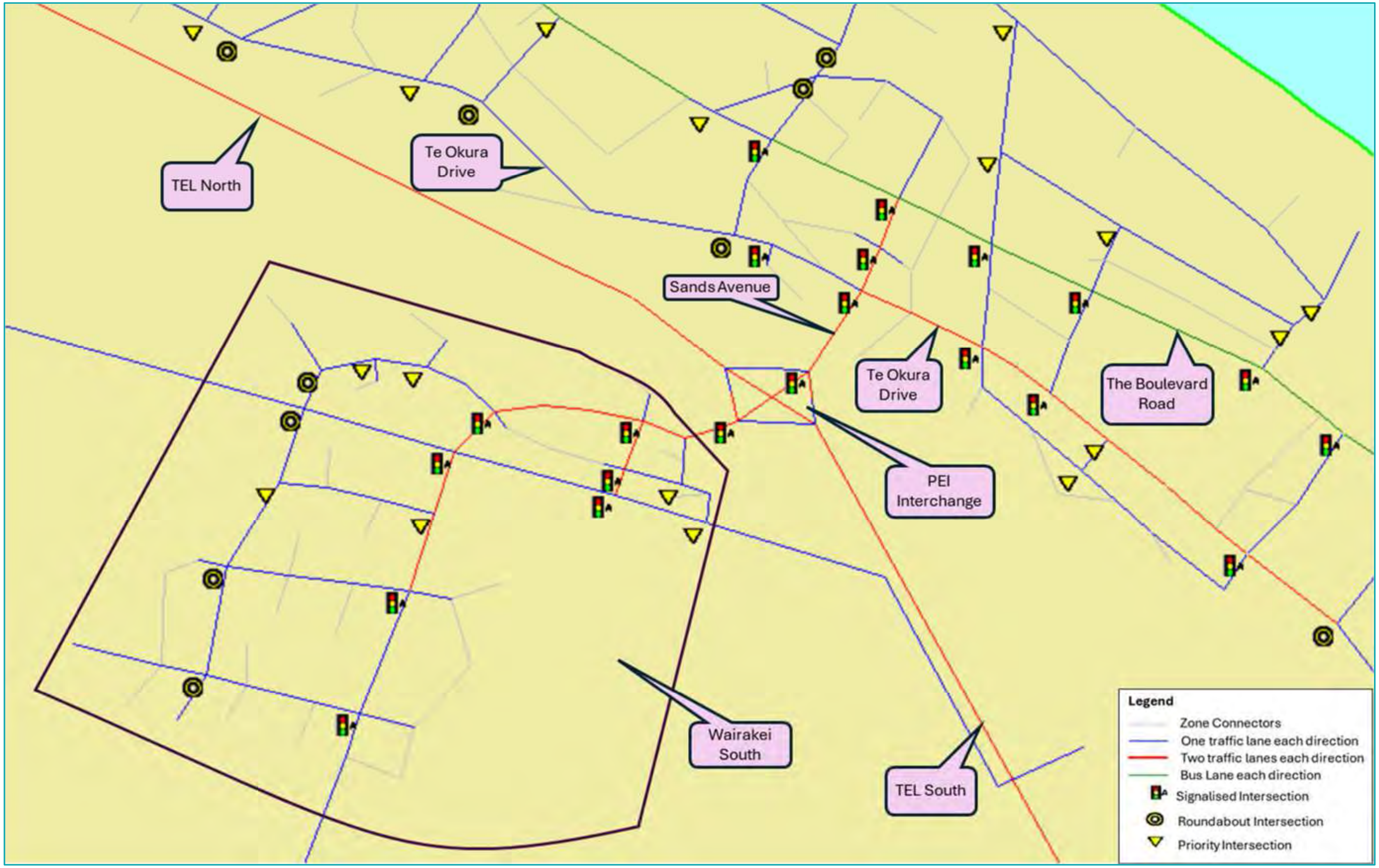


Figure 2-4: Wairakei South – 2048 and 2063 Do Something Network

2.5 Public Transport

2.5.1 Public Transport Services

The Wairakei South project area is currently not served by PT routes in the TTSM 2023 'Do Minimum' and 'Do Something' Scenarios. Therefore, two new public bus services are included between Bayfair Terminal and Wairakei Town Centre, passing through SH2, the Domain Road Interchange, the Te Puke Highway, and the Wairakei South areas, in 2035, 2048, and 2063, as advised by Boffa Miskell for this modelling work.

2.5.2 PT Station Quality

The PT station quality information from TTSM 2023 'Do Minimum' and 'Do Something' Scenarios was used for the Wairakei South transport modelling.

2.5.3 PT Fare

The PT fare from the TTSM 2023 'Do Minimum and Do Something' Scenarios were used for the Wairakei South transport modelling.

2.6 Parking Costs

The parking costs from the TTSM 2023 'Do Minimum' and 'Do Something' Scenarios were used for the Wairakei South transport modelling.

2.7 Tolling Assumptions

The tolling assumptions for the Do Minimum and Do Something Scenarios from TTSM 2023 are as follows:

- Takitimu Drive Toll Road: No toll in all model years as it is expected to end by 2031
- Takitimu North Link: The preferred tolling strategy (in $2021) from the Tauranga tolling study is adopted for the TNL corridors. This includes a combination of discounting/capping toll for the through movement (users of TNL Stage 1 and Stage 2) and time-varying toll with increased commuter peaks, as shown in **Table 2-3**.
- Tauranga Eastern Link (TEL) Toll Road and Papamoa East Interchange (PEI): The preferred tolling strategy (in $2025) from the NZTA website is adopted for the TEL and PEI corridors. This includes toll on the TEL mainline at the existing location and a new Toll gantry between Domain Road and PEI, as described in **Table 2-3**. No toll is assumed for the TEL in 2048 and 2063, as it is expected to end in 2037.

Table 2-3: Toll Strategy – TNL and TEL Corridor[4]

Movement	Vehicle Type	AM/PM Peak	Off-Peak	Model Year 2035	2048	2063
Takitimu North Link (in $2021)						
Takitimu North Link Stage 1 Only	Light	$3.10	$2.10	✓	✓	✓
	Heavy	$8.15	$5.50	✓	✓	✓
Takitimu North Link Stage 2 Only	Light	$3.10	$2.10	--	✓	✓
	Heavy	$8.15	$5.50	--	✓	✓
Through Movement (i.e. Takitimu North Link mainline)	Light	$4.10	$3.10	--	✓	✓
	Heavy	$10.80	$8.15	--	✓	✓

[4] Disclaimer - The proposed toll fee ($2021 and $2025) is assumed for modelling purposes only and is subject to further tolling studies and alignment with the government's policy.

Movement	Vehicle Type	AM/PM Peak	Off-Peak	Model Year 2035	2048	2063
TEL Corridor (in $2025)[5]						
TEL Mainline	Light	$2.30	$2.30	✓	--	--
	Heavy	$5.60	$5.60	✓	--	--
Southern Movement (from/to TEL South to PEI)	Light	$2.30	$2.30	✓	--	--
	Heavy	$5.60	$5.60	✓	--	--
Northern Movement (from/to TEL North to PEI)	Light	$1.10	$1.10	✓	--	--
	Heavy	$2.80	$2.80	✓	--	--

2.8 Tauranga Cycle Model Feedback

The Tauranga Cycle Model (TCM) estimates new cycle trips based on the traffic and PT demands from the TTSM and the assumed cycle network interventions in TCM. The Tauranga Cycle Model (TCM) feedback of 'diverted' Car and PT trips back to TTSM is not included in this study, and we would not expect the modelled interventions to significantly change vehicle demands.

[5] https://nzta.govt.nz/about-us/public-consultation-hub/past-consultations/tauranga-eastern-link-toll-road

3 Model Results

This chapter discusses the following key modelling results:

- Change in the total demand statistics
- Changes in the total vehicle travel statistics
- Change in the Sector-to-Sector travel pattern of vehicles
- Select Link analysis results at key locations
- Road network level of service
- Changes in vehicle emissions
- Changes in vehicle crash costs.

Detailed plots and figures are provided in the appendices.

3.1 Total Demand Statistics

The overall peak hour and average daily (vehicles and PT) demand statistics are provided in **Appendix B**. An occupancy factor of 1.23 is used to convert private vehicle trips to person-trips in the calculation of the PT mechanised mode shares.

Key observations are discussed below:

- No significant change in overall vehicle and public transport trips is expected in 2035, 2048, and 2063, as the TTSM model redistributes demand based on network changes; hence, we do not anticipate major shifts in overall demand between the various modelled scenarios.
- Due to the growth in land use, accompanied by additional road network interventions and improved public transport services, the overall demand for vehicles and public transport is higher in the forecast years (2035,2048 and 2063) compared to the base year of 2018.

3.2 Total Network Vehicle Statistics

Table 3-1 provides the total vehicle network statistics and **Table 3-2** shows the percentage (%) change in network statistics for the scenarios.

Key points from the tables below are:

- Across DM and DS scenarios, all sensitivity tests show lower VKT than the core scenarios. Sensitivity Test (ST1) delivers the most considerable VKT reduction, with indicative decreases of 0.9% (2035), 0.3% and 0.4% (2048), and 1.9% and 2.6% (2063) across DM and DS scenarios. This is attributed to the exclusion of Te Tumu development in the ST1 scenario.
- For VHT, the sensitivity test (ST1) is lower than the core scenarios in 2035 and 2048, but higher in 2063. ST2 shows slightly higher VHT than the core in 2048 (+0.1%) and 2063 (+0.2%). ST3 shows lower VHT than the core in 2063.
- The average trip length per person is the same in 2035 across Core and ST1 scenarios, slightly lower in 2048 and 2063 ST1 scenarios compared to Core scenarios. This is attributed to the exclusion of Te Tumu development in the ST1 scenario.

Table 3-1: Network Vehicle Statistics

Scenarios / Measure	Population	Average Daily VKT[1a]	Average Daily Congested VHT[2a]	Average Daily Free Flow VHT[2a]	Average Daily Delays VHT[2a]	Average Daily Vehicle Trips	VKT / Person	Vehicle Trips / Person	Average Trip Length (km)
2035_CS_DM	246,800	6,553,818	132,358	103,886	28,472	838,524	27	3.4	7.8
2035_ST1_DM	246,900	6,493,099	131,254	103,044	28,210	835,720	26	3.4	7.8
2048_CS_DM	281,100	7,724,175	157,811	120,998	36,813	970,955	27	3.5	8.0
2048_ST1_DM	281,700	7,689,716	157,677	120,704	36,973	971,305	27	3.4	7.9
2048_CS_DS	281,100	7,841,981	151,500	121,416	30,084	952,848	28	3.4	8.2
2048_ST1_DS	281,700	7,815,993	150,752	121,049	29,703	953,520	28	3.4	8.2
2048_ST2_DS	281,700	7,827,482	151,614	121,579	30,035	952,916	28	3.4	8.2
2063_CS_DM	345,300	9,077,350	205,595	143,229	62,366	1,158,345	26	3.4	7.8
2063_ST1_DM	344,000	8,838,931	212,013	139,695	72,318	1,148,216	26	3.3	7.7
2063_CS_DS	345,300	9,328,525	188,796	144,631	44,166	1,138,125	27	3.3	8.2
2063_ST1_DS	344,000	9,155,633	188,649	141,925	46,724	1,129,061	27	3.3	8.1
2063_ST2_DS	344,000	9,315,951	189,106	144,903	44,203	1,138,189	27	3.3	8.2
2063_ST3_DS	346,000	9,270,847	186,018	144,234	41,785	1,135,029	27	3.3	8.2

Table 3-2: Percentage (%) Change in Network Statistics for Option Scenarios

Scenarios / Measure	Population	Average Daily VKT[1a]	Average Daily Congested VHT[2a]	Average Daily Free Flow VHT[2a]	Average Daily Delays VHT[2a]	Average Daily Vehicle Trips	VKT / Person	Vehicle Trips / Person	Average Trip Length (km)
2035_ST1_DM vs 2035_CS_DM	0.0%	-0.9%	-0.8%	-0.8%	-0.9%	-0.3%	-3.7%	+0.0%	+0.0%
2048_ST1_DM vs 2048_CS_DM	+0.2%	-0.4%	-0.1%	-0.2%	+0.4%	+0.0%	+0.0%	-2.9%	-1.3%
2048_ST1_DS vs 2048_CS_DS	+0.2%	-0.3%	-0.5%	-0.3%	-1.3%	+0.1%	+0.0%	+0.0%	+0.0%
2048_ST2_DS vs 2048_CS_DS	+0.2%	-0.2%	+0.1%	+0.1%	-0.2%	+0.0%	+0.0%	+0.0%	+0.0%
2063_ST1_DM vs 2063_CS_DM	-0.4%	-2.6%	+3.1%	-2.5%	+16.0%	-0.9%	0.0%	-2.9%	-1.3%
2063_ST1_DS vs 2063_CS_DS	-0.4%	-1.9%	-0.1%	-1.9%	+5.8%	-0.8%	0.0%	0.0%	-1.2%
2063_ST2_DS vs 2063_CS_DS	-0.4%	-0.1%	+0.2%	+0.2%	+0.1%	0.0%	0.0%	0.0%	0.0%
2063_ST3_DS vs 2063_CS_DS	+0.2%	-0.6%	-1.5%	-0.3%	-5.4%	-0.3%	0.0%	0.0%	0.0%

[1a,2a] *The Vehicle Kilometres Travelled (VKT) and Vehicle Hour Travelled (VHT) data are calculated by adjusting distances on the external links*

3.3 Sector to Sector Analysis

A sector to sector analysis was undertaken for all modelled scenarios to understand the travel patterns in the model. The overall TTSM 479 zones have been divided into 7 sectors for this analysis. **Figure 3-1** shows the locations of these sectors. The sectors are named as:

- Sector 1 – Wairakei
- Sector 2 – Te Tumu
- Sector 3 – Rangiuru/Maketu
- Sectors 4, 5 and 6 – Other areas
- Sector 7 – Wairakei South.

Figure 3-1: Sector Map

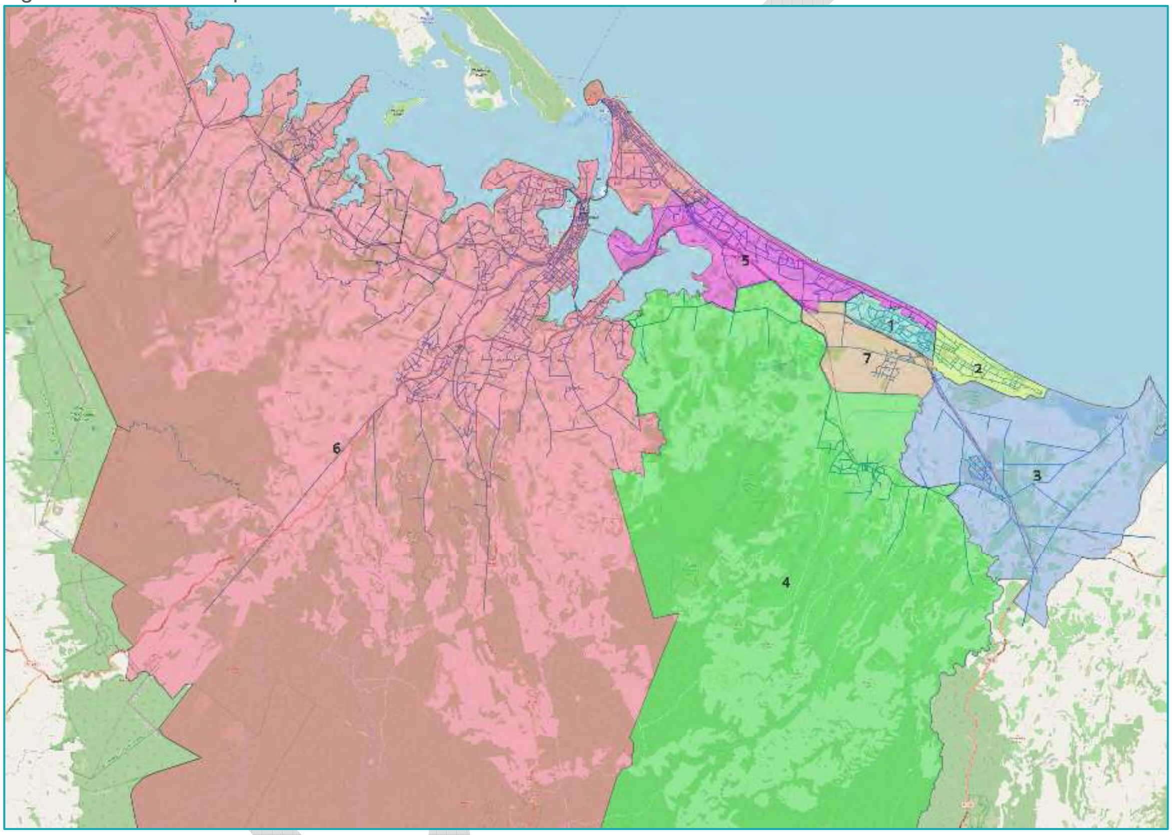


Table 3-3 provides the sector to sector daily vehicle demand for all modelled scenarios.

Table 3-3: Sector to Sector Daily Vehicle Demand

Scenarios	Sectors	Wairakei	Te Tumu	Wairakei South	Rangiuru/ Maketu	Other areas	Total
2035 CS_DM	Wairakei	15,957	2,282	3,303	2,761	17,923	42,226
	Te Tumu	2,199	864	633	531	2,443	6,670
	Wairakei South	3,464	606	2,449	1,058	5,108	12,685
	Rangiuru/Maketu	2,856	504	1,188	9,208	16,192	29,949
	Other areas	18,399	2,413	5,184	16,374	704,625	746,995
	Total	**42,875**	**6,670**	**12,758**	**29,931**	**746,291**	**838,524**
	Wairakei	17,035	27	3,572	2,865	18,699	42,198

Scenarios	Sectors	Wairakei	Te Tumu	Wairakei South	Rangiuru/ Maketu	Other areas	Total
2035 ST1_DM	Te Tumu	28	2	0	0	1	31
	Wairakei South	3,694	-	2,598	1,084	5,282	12,658
	Rangiuru/Maketu	2,859	0	1,181	9,123	15,649	28,812
	Other areas	19,205	0	5,370	16,215	711,232	752,022
	Total	**42,821**	**29**	**12,721**	**29,285**	**750,863**	**835,720**
2048 CS_DM	Wairakei	16,299	4,270	4,311	3,695	18,491	47,065
	Te Tumu	4,153	4,706	1,702	1,691	5,279	17,531
	Wairakei South	4,619	1,583	4,975	2,226	8,200	21,604
	Rangiuru/Maketu	3,790	1,553	2,523	8,993	19,577	36,437
	Other areas	19,066	5,254	8,119	19,598	796,281	848,319
	Total	**47,927**	**17,366**	**21,630**	**36,204**	**847,829**	**970,955**
2048 ST1_DM	Wairakei	18,316	27	4,872	3,950	19,902	47,066
	Te Tumu	28	1	0	0	3	33
	Wairakei South	5,136	-	5,400	2,360	8,636	21,532
	Rangiuru/Maketu	3,966	0	2,597	9,038	19,270	34,870
	Other areas	20,470	0	8,678	19,680	818,975	867,804
	Total	**47,917**	**29**	**21,546**	**35,027**	**866,786**	**971,305**
2048 CS_DS	Wairakei	16,413	4,250	4,292	3,626	17,962	46,543
	Te Tumu	4,162	4,219	1,684	1,657	5,396	17,118
	Wairakei South	4,533	1,541	4,953	2,228	8,201	21,456
	Rangiuru/Maketu	3,740	1,513	2,550	9,116	19,688	36,606
	Other areas	18,568	5,342	8,163	19,742	779,309	831,124
	Total	**47,416**	**16,865**	**21,642**	**36,369**	**830,556**	**952,848**
2048 ST1_DS	Wairakei	18,174	27	4,823	3,865	19,694	46,583
	Te Tumu	28	1	0	0	3	33
	Wairakei South	5,001	-	5,305	2,346	8,744	21,395
	Rangiuru/Maketu	3,890	0	2,605	9,126	19,396	35,017
	Other areas	20,312	0	8,810	19,835	801,535	850,492
	Total	**47,405**	**29**	**21,543**	**35,172**	**849,371**	**953,520**
2048 ST2_DS	Wairakei	16,171	4,169	3,999	3,614	18,599	46,552
	Te Tumu	4,054	4,125	1,561	1,645	5,746	17,131
	Wairakei South	4,235	1,434	4,435	2,143	9,220	21,467
	Rangiuru/Maketu	3,724	1,500	2,475	9,314	19,596	36,610
	Other areas	19,250	5,651	9,179	19,656	777,421	831,158
	Total	**47,434**	**16,879**	**21,649**	**36,373**	**830,582**	**952,916**
2063 CS_DM	Wairakei	16,665	7,484	4,159	3,627	18,156	50,090
	Te Tumu	7,314	13,504	2,858	3,330	9,654	36,659
	Wairakei South	4,546	2,655	5,091	2,199	8,140	22,631
	Rangiuru/Maketu	3,732	3,016	2,573	10,088	21,088	40,497
	Other areas	18,803	9,616	7,977	21,281	950,790	1,008,468
	Total	**51,060**	**36,274**	**22,659**	**40,525**	**1,007,828**	**1,158,345**
2063 ST1_DM	Wairakei	20,028	27	5,176	4,180	20,642	50,053
	Te Tumu	28	1	0	0	2	33
	Wairakei South	5,450	-	5,715	2,488	8,868	22,521
	Rangiuru/Maketu	4,146	0	2,728	10,249	20,611	37,733

Scenarios	Sectors	Wairakei	Te Tumu	Wairakei South	Rangiuru/ Maketu	Other areas	Total
	Other areas	21,326	0	8,904	21,558	986,087	1,037,876
	Total	**50,978**	**29**	**22,523**	**38,476**	**1,036,211**	**1,148,216**
2063 CS_DS	Wairakei	16,690	7,501	4,125	3,555	17,620	49,491
	Te Tumu	7,379	12,625	2,856	3,285	9,895	36,041
	Wairakei South	4,444	2,628	5,046	2,196	8,154	22,468
	Rangiuru/Maketu	3,666	2,946	2,596	10,236	21,233	40,676
	Other areas	18,291	9,821	8,039	21,424	931,874	989,449
	Total	**50,470**	**35,521**	**22,661**	**40,697**	**988,776**	**1,138,125**
2063 ST1_DS	Wairakei	19,820	27	5,116	4,098	20,509	49,570
	Te Tumu	28	1	0	0	2	33
	Wairakei South	5,303	-	5,597	2,476	9,014	22,391
	Rangiuru/Maketu	4,066	0	2,729	10,359	20,738	37,893
	Other areas	21,226	0	9,078	21,693	967,177	1,019,174
	Total	**50,444**	**29**	**22,521**	**38,626**	**1,017,441**	**1,129,061**
2063 ST2_DS	Wairakei	16,505	7,396	3,838	3,538	18,222	49,500
	Te Tumu	7,233	12,426	2,649	3,265	10,485	36,059
	Wairakei South	4,148	2,450	4,548	2,103	9,233	22,482
	Rangiuru/Maketu	3,621	2,912	2,536	10,465	21,146	40,679
	Other areas	18,981	10,357	9,098	21,329	929,705	989,469
	Total	**50,489**	**35,540**	**22,669**	**40,700**	**988,791**	**1,138,189**
2063 ST3_DS	Wairakei	15,788	8,489	3,736	3,501	17,999	49,513
	Te Tumu	8,572	19,038	3,307	3,896	12,674	47,488
	Wairakei South	4,048	2,989	4,342	2,153	8,986	22,519
	Rangiuru/Maketu	3,639	3,348	2,471	10,430	20,800	40,688
	Other areas	18,448	12,816	8,842	21,273	913,441	974,821
	Total	**50,497**	**46,681**	**22,698**	**41,253**	**973,900**	**1,135,029**

Table 3-3 summarises the daily traffic distribution patterns from Wairakei South to Wairakei/Te Tumu/Rangiuru and Other areas for all modelled scenarios.

Table 3-4: Wairakei South trip distribution proportions – Vehicles

Movement	2035 Do Minimum		2048 Do Minimum		2048 Do Something			2063 Do Minimum		2063 Do Something			
	CS	ST1	CS	ST1	CS	ST1	ST2	CS	ST1	CS	ST1	ST2	ST3
Wairakei South – Wairakei South	11%	11%	13%	14%	13%	14%	11%	13%	15%	13%	14%	11%	11%
Wairakei South – Wairakei	29%	32%	23%	27%	23%	26%	21%	22%	27%	21%	27%	20%	19%
Wairakei South – Te Tumu	5%	0%	9%	0%	8%	0%	8%	14%	0%	14%	0%	13%	15%
Wairakei South - Rangiuru/Maketu	10%	10%	12%	13%	13%	13%	12%	12%	13%	12%	13%	11%	11%
Wairakei South – Other areas	45%	47%	43%	46%	43%	47%	48%	40%	45%	40%	46%	45%	44%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Key points to note from the above tables are:

- No Te Tumu development (ST1) results in a slight increase in Wairakei South–Wairakei and Wairakei South–Other area trips compared with the Core scenarios in 2035, 2048, and 2063.
- The proportion of local trips (Wairakei South–Wairakei South) is unchanged across the 2035 scenarios. It increases slightly in ST1 for 2048 and 2063, and decreases in ST2 for 2048 and 2063, as well as in ST3 for 2063, relative to the Core scenarios.
- The proportion of trips contained within Wairakei and Wairakei South is approximately 40%.
- The proportion of trips between Wairakei South and Rangiuru/Maketu sectors is approximately 10% in 2035, 12% to 13% in 2048 and 11% to 13% in 2063 across the modelled scenarios.

3.4 Select Link Outputs

Figure 3-2 shows the select link analysis locations. The select link analysis for West PEI and West of Bell Road is carried out for all modelled scenarios in 2035, 2048, and 2063. Additionally, the Seddon Street connection is examined in Sensitivity Test 2 (2048 and 2063) and Sensitivity Test 3 (2063).

Figure 3-2: Select Link Locations

Figure 3-3 to **Figure 3-10** shows the select link travel pattern results for 2035, 2048 and 2063 Core scenario land use with the Do minimum network and Sensitivity Test 2 land use with the Do Something network. High quality select link plots are provided in **Appendix C.**

Discussion of the model results from the figures below:

West PEI location

- Strong two-way flows between Wairakei South and the Wairakei/Te Tumu areas via the PEI Interchange and Sands Avenue.
- A moderate share of movements between Wairakei South and Te Puke/Rangiuru and to the TEL (west of Domain Road).
- A small proportion of Wairakei South traffic continues to wider destinations, including the Te Papa Peninsula (via the Harbour and Maungatapu Bridges) and Mount Maunganui.

West Bell Road location

- Traffic is predominantly between Wairakei South and Te Puke, Wairakei, and Te Tumu.
- Some Wairakei South traffic continues to wider areas such as TEL North (west of Domain Road), Welcome Bay Road, the Te Papa Peninsula (via the Harbour and Maungatapu Bridges), and Mount Maunganui.

Seddon Street connection

- Most movements are between Te Puke and Wairakei/Te Tumu, passing through Wairakei South and the PEI Interchange, as the Seddon Street connection provides direct access between these areas.
- Model results indicate diversion from Te Puke Highway and the TEL to the Seddon Street corridor.

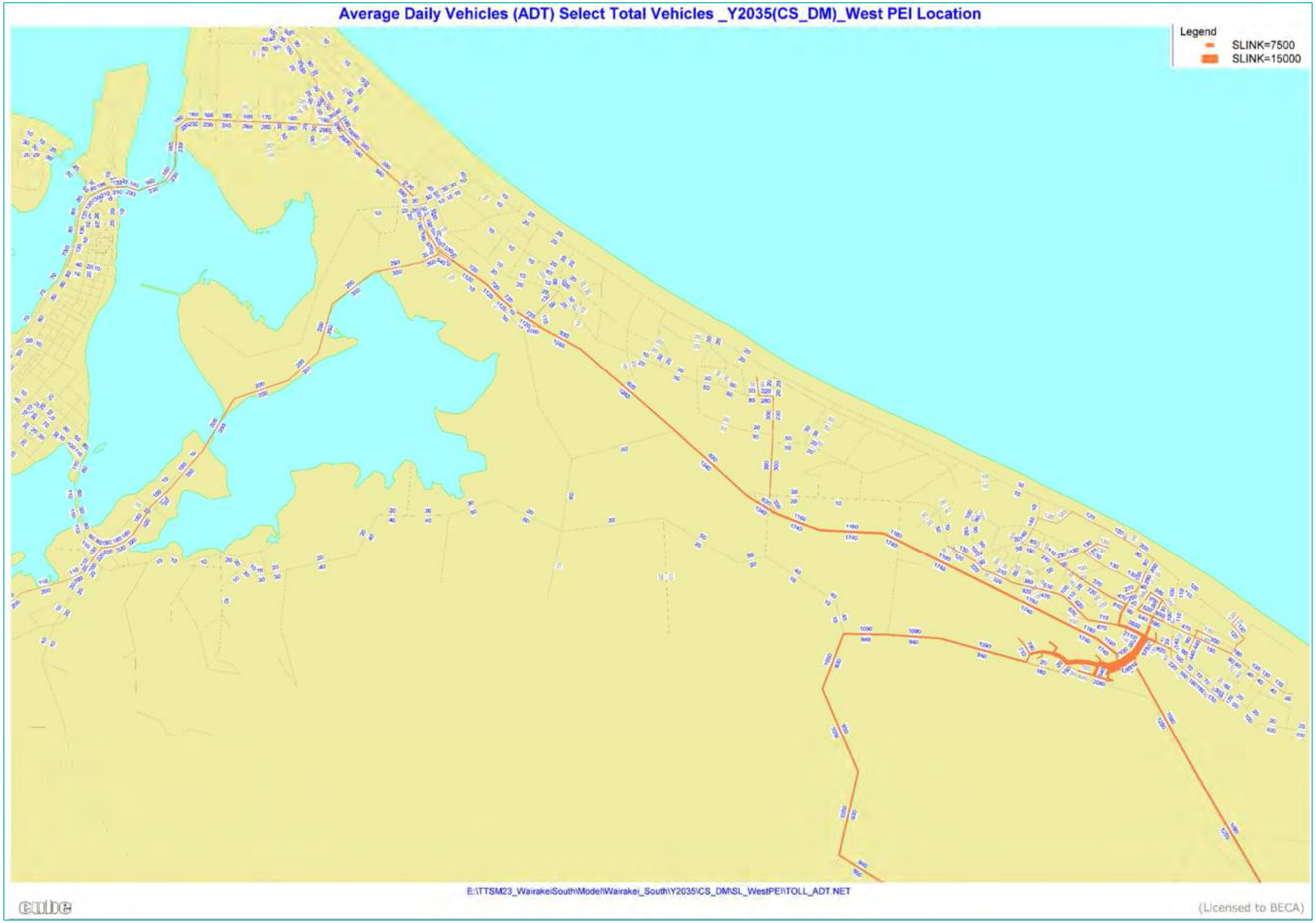


Figure 3-3: Select Link Travel Pattern for 2035 Core Scenario land use with Do Minimum Network – West PEI Location

Figure 3-4: Select Link Travel Pattern for 2035 Core Scenario land use with Do Minimum Network – West Bell Road Location

Sensitivity: General

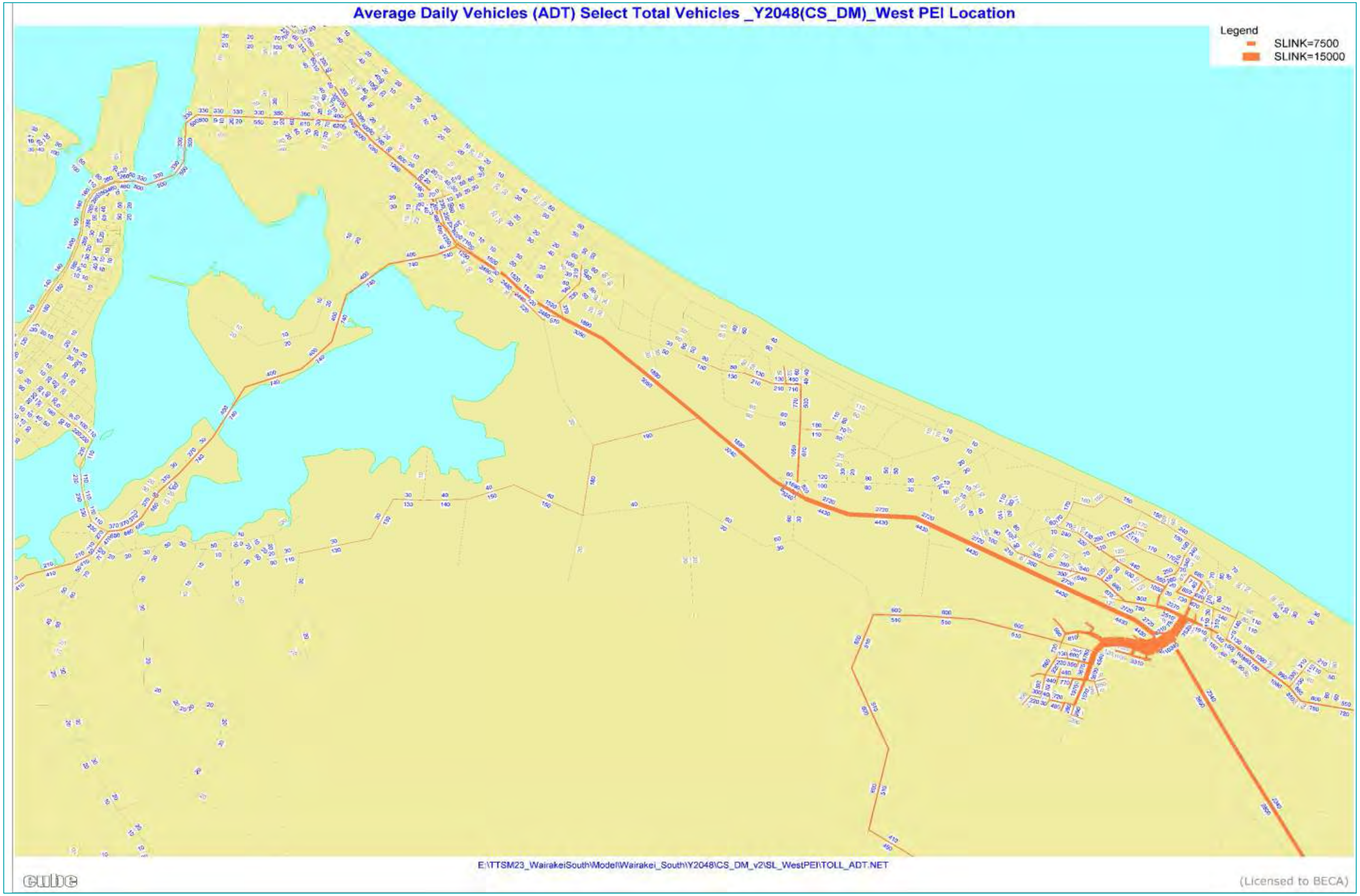


Figure 3-5: Select Link Travel Pattern for 2048 Core Scenario land use with Do Minimum Network – West PEI Location

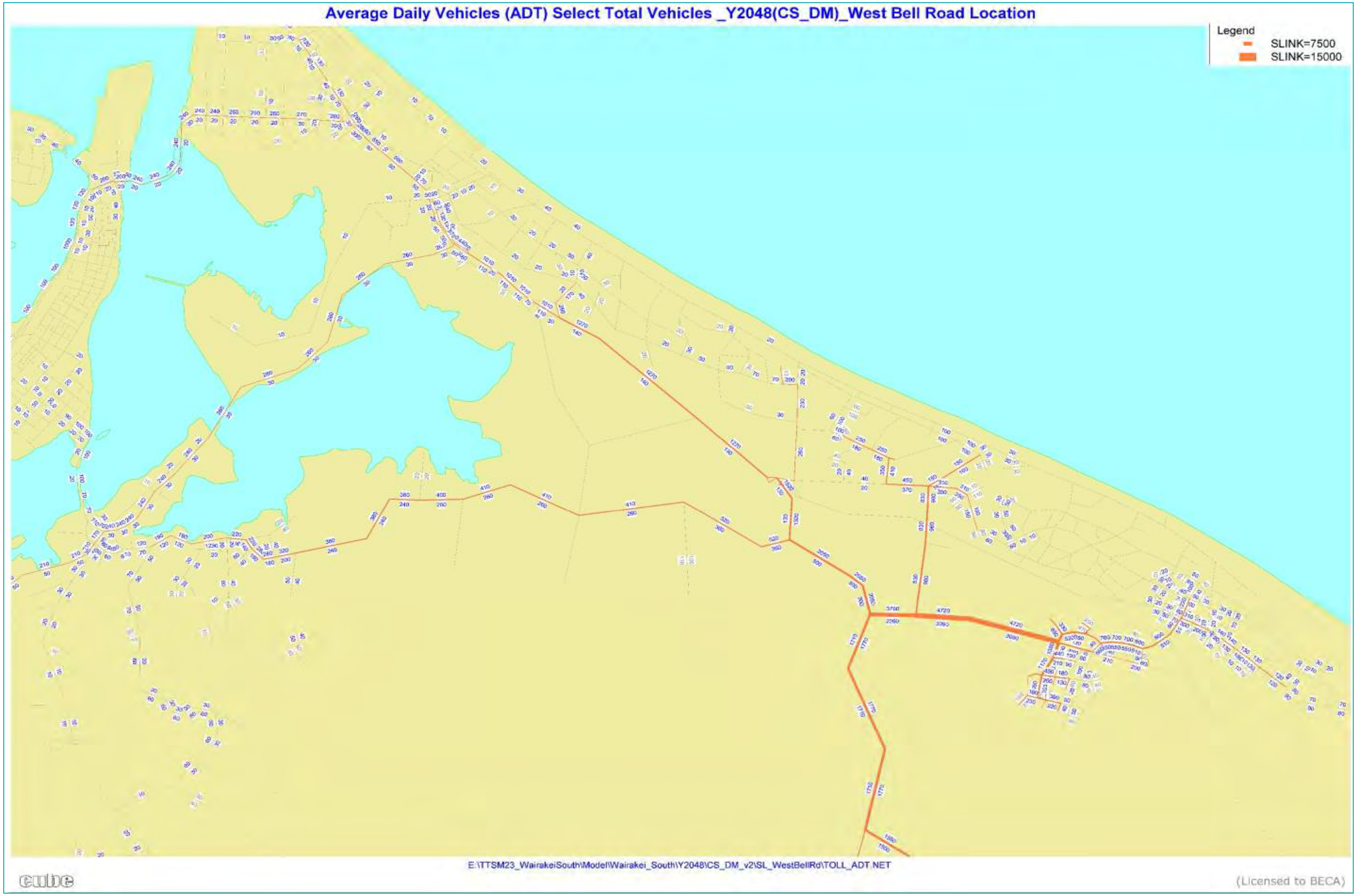


Figure 3-6: Select Link Travel Pattern for 2048 Core Scenario land use with Do Minimum Network – West Bell Road Location

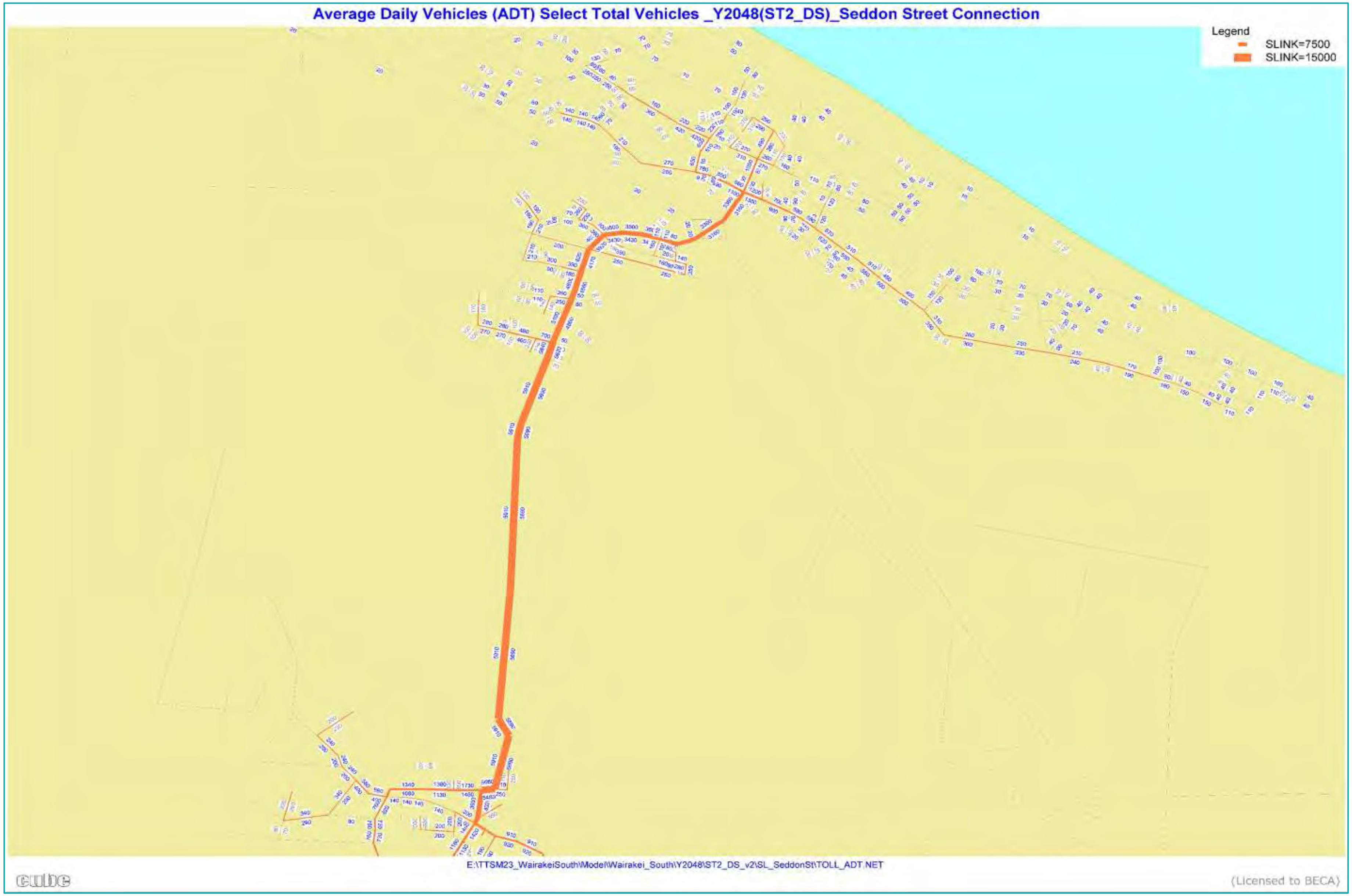


Figure 3-7: Select Link Travel Pattern for 2048 Sensitivity Test 2 land use with Do Something Network

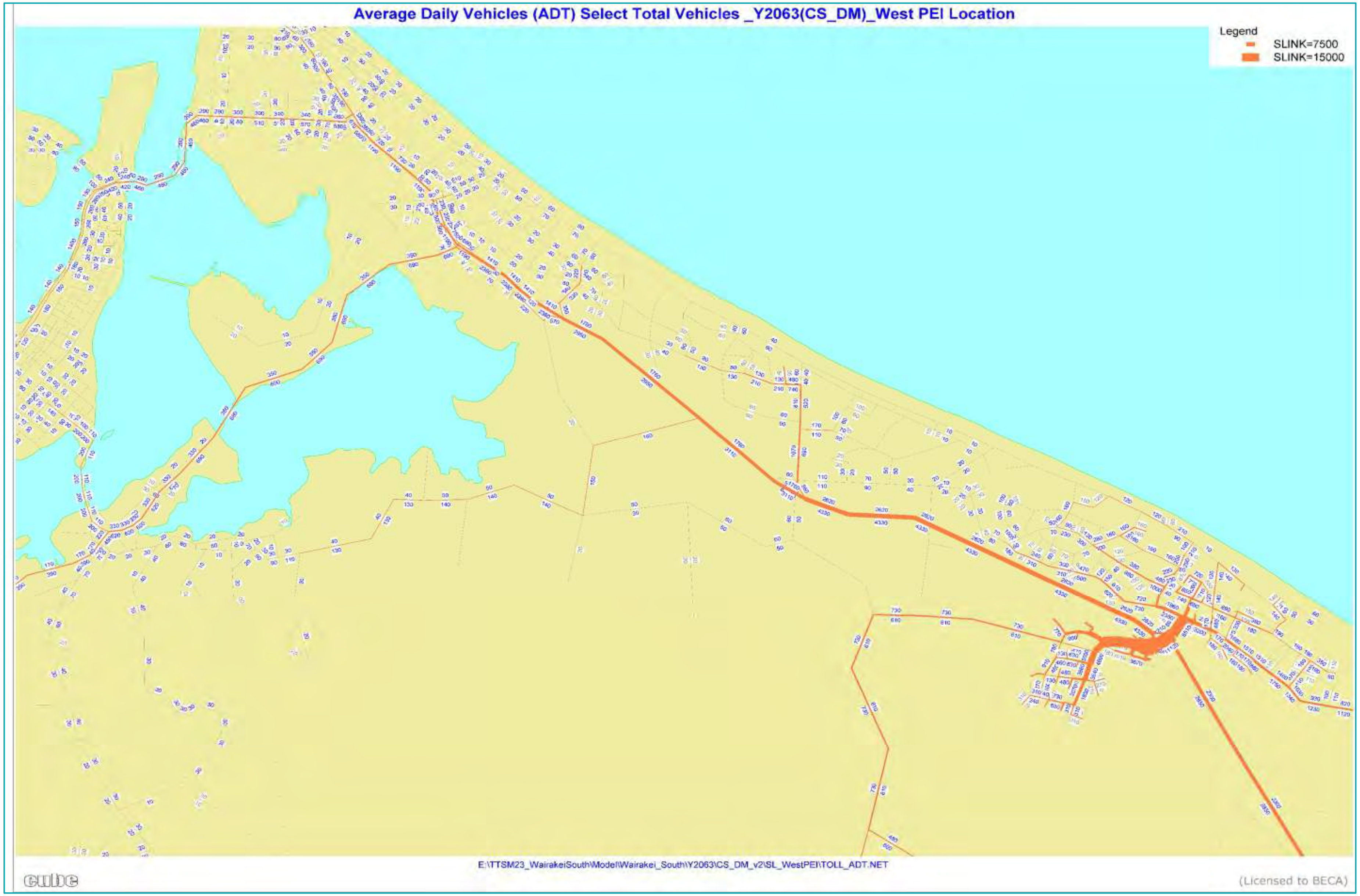


Figure 3-8: Select Link Travel Pattern for 2063 Core Scenario land use with Do Minimum Network – West PEI Location

Figure 3-9: Select Link Travel Pattern for 2063 Core Scenario land use with Do Minimum Network – West Bell Road Location

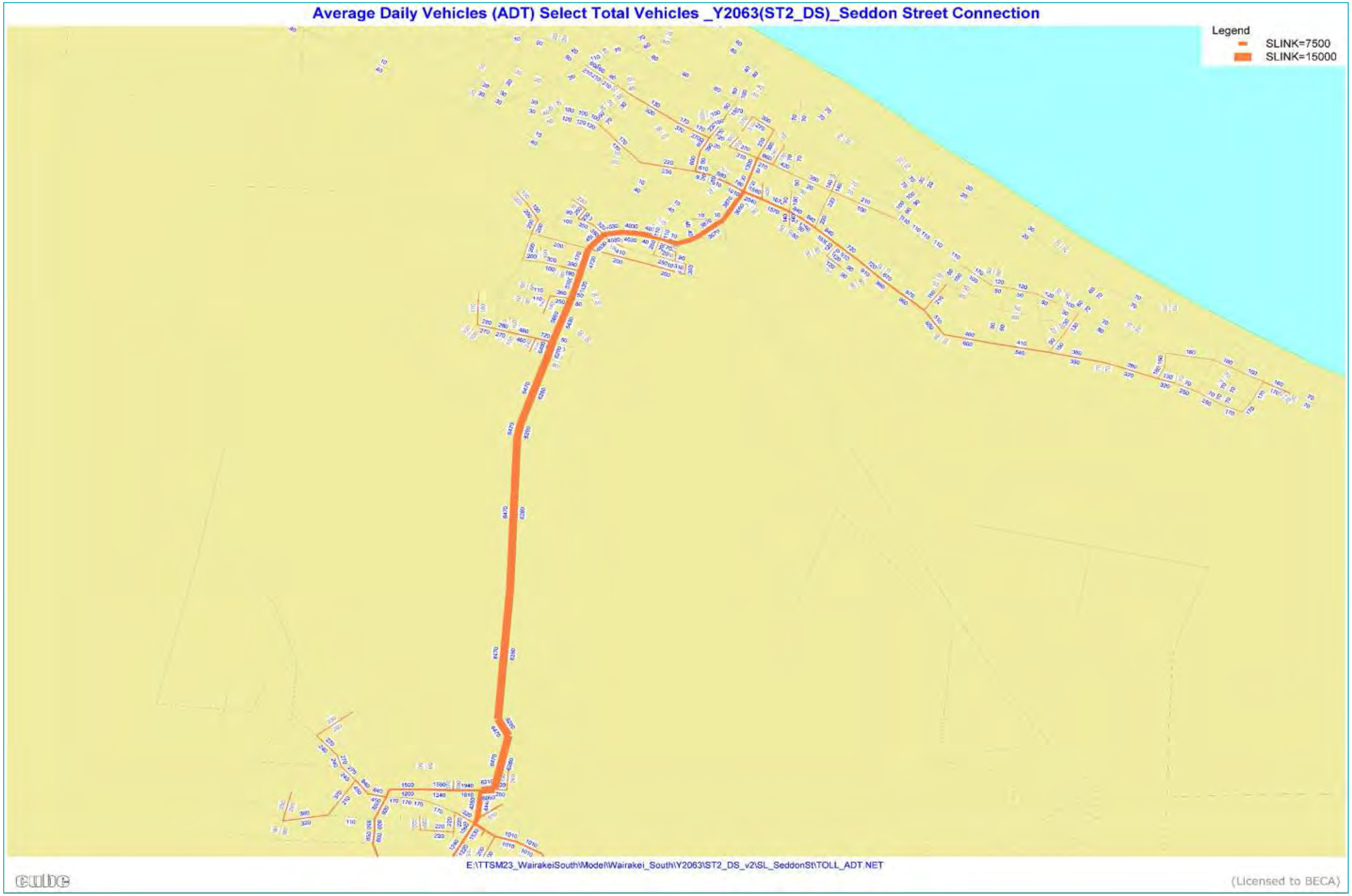


Figure 3-10: Select Link Travel Pattern for 2063 Sensitivity Test 2 land use with Do Something Network

3.5 Level of Service

Level of Service is assessed based on the methodology laid out in **Appendix D**. LOS plots of link LOS (LOS A-F shown) and intersection LOS (Only LOS D-F shown) have been produced for the modelled scenarios. These plots show the worst LOS from all model periods (i.e., AM, IP, PM). Higher-quality LOS plots for all modelled scenarios are provided in **Appendix E**.

Note that LOS plots are for general traffic performance, and the results shown are indicative only. The key intersections and corridors considered in the LOS analysis are shown in **Figure 3-11.**

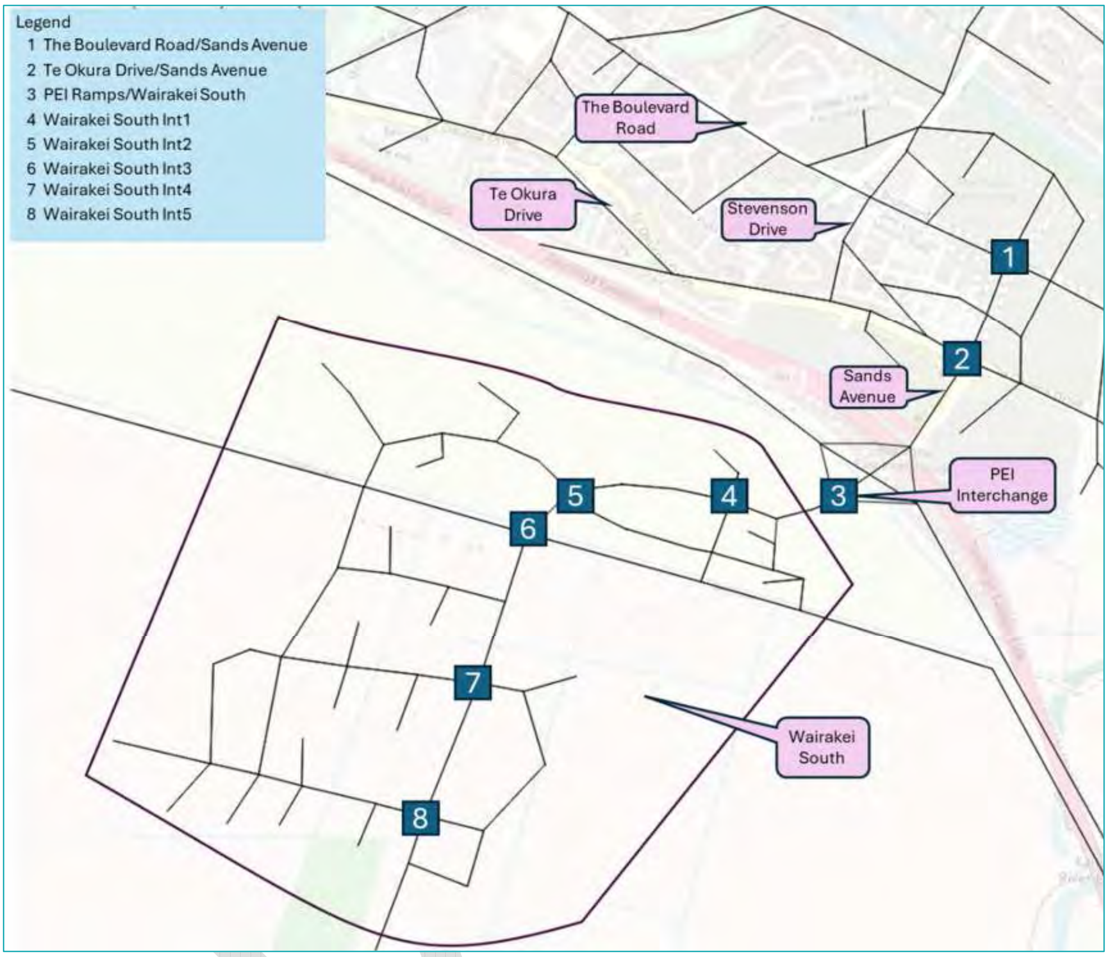


Figure 3-11: Key Intersections and Corridors

A summary of key intersections and a list of road sections with LOS D, E or F is provided in **Table 3-5** and **Table 3-6**.

Table 3-5: Key Intersections with LOS D or higher in the Wairakei South Study Area

Intersection	2035 Do Minimum		2048 Do Minimum		2048 Do Something			2063 Do Minimum		2063 Do Something			
	CS	ST1	CS	ST1	CS	ST1	ST2	CS	ST1	CS	ST1	ST2	ST3
The Boulevard Road/Sands Avenue	--	--	--	--	--	--	--	D	--	D	--	D	D
Te Okura Drive/Sands Avenue	D	D	E	E	E	E	E	E	E	E	E	E	F
PEI Ramps /Wairakei South	--	--	--	--	--	--	D	D	--	D	--	E	E
Wairakei South Int1	D	--	D	D	D	D	E	D	D	D	D	D	E
Wairakei South Int2	--	--	D	D	D	D	D	D	D	D	D	E	D
Wairakei South Int3	--	--	D	D	D	D	D	D	D	D	D	D	E
Wairakei South Int4	--	--	--	--	--	--	E	--	--	--	--	E	E
Wairakei South Int5	--	--	--	--	--	--	E	--	--	--	--	E	E

Table 3-6: Key Links with LOS D or higher in the Wairakei South Study Area

Links or Road Sections	2035 Do Minimum		2048 Do Minimum		2048 Do Something			2063 Do Minimum		2063 Do Something			
	CS	ST1	CS	ST1	CS	ST1	ST2	CS	ST1	CS	ST1	ST2	ST3
Te Okura Drive between Stevenson Drive and Sands Avenue	D	D	D	D	D	D	D	D	D	D	D	D	D
Sands Avenue between PEI Ramps and Te Okura Drive	--	--	E	D	E	D	E	E	D	E	D	E	E
PEI North Off Ramp			D	--	D	--	D	D	--	D	--	D	E
PEI South Off Ramp			D	--	D	--	--	D	--	D	--	--	D

Key points from the above tables are:

- In 2035, key intersections and links operate at an LOS D or above in both the Core and ST1 scenarios. Wairakei South Intersection 1 improves from LOS D (Core) to LOS C (ST1).
- In 2048, ST2 shows reduced performance across key intersections and links compared with the other scenarios. This is driven by additional traffic from Te Puke using the Seddon Street connection to access the Wairakei South area, including the Sands Development and Te Tumu.
- In 2063, ST2 continues to show reduced performance across key intersections and links relative to the other scenarios. ST3, with a higher Te Tumu population (25,000), records the poorest performance for the majority of intersections and links compared with the Core scenario.

3.6 Vehicle Emissions

Vehicle emissions are estimated by applying NZTA Waka Kotahi's Vehicle Emission Prediction Model 6.3 (VEPM) emission rates to link flows by speed band and vehicle type for each scenario. For details on the VEPM assumptions, refer to **Appendix F**. Vehicle emissions are estimated for each link in TTSM by applying the VEPM rates to the vehicle (Cars/HCV) travel time and speed. The emissions are then summed across all links in the model.

The summary of vehicle emission statistics in terms of CO_2eq is given in **Figure 3-12.** The values above the charts show the percentage change compared to the respective Core DM and DS scenarios.

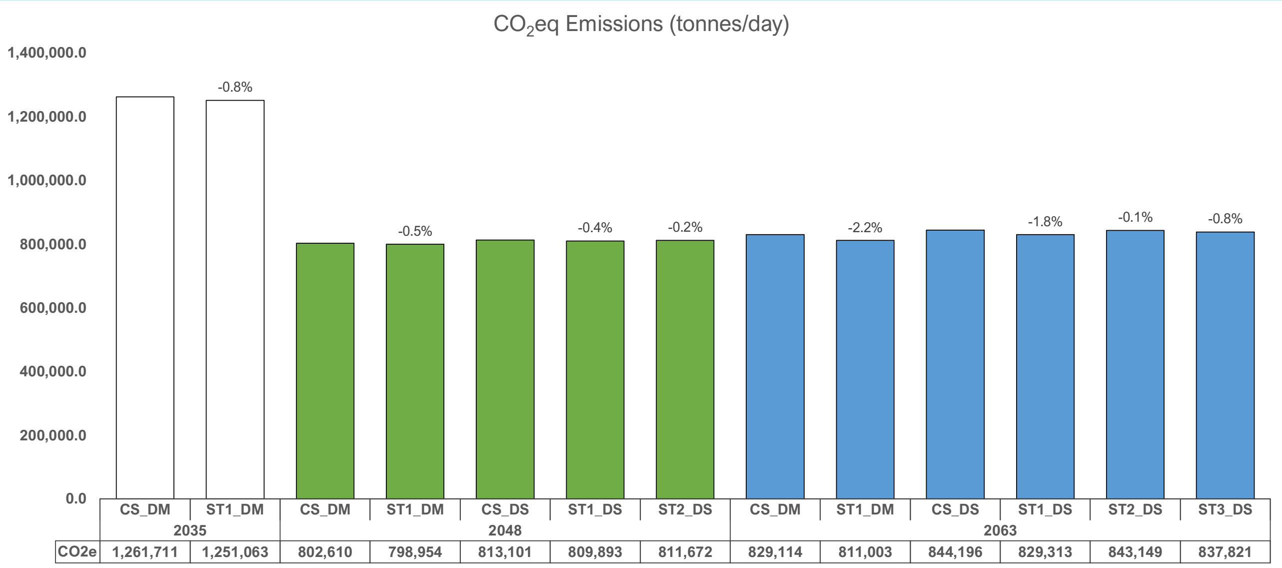


Figure 3-12: Daily CO2eq (tonnes/day)

Across the DM and DS scenarios, all sensitivity tests produce lower daily emissions (CO2-eq) than the core scenarios. ST1 yields the most considerable reductions, with indicative decreases of 0.8% (2035); 0.5% and 0.4% (2048); and 2.2% and 1.8% (2063) for DM and DS, respectively. ST2 shows smaller decreases of about 0.2% in 2048 and 0.1% in 2063. ST3 reduces emissions by about 0.8% in 2063.

3.7 Vehicle Crash Cost Estimate

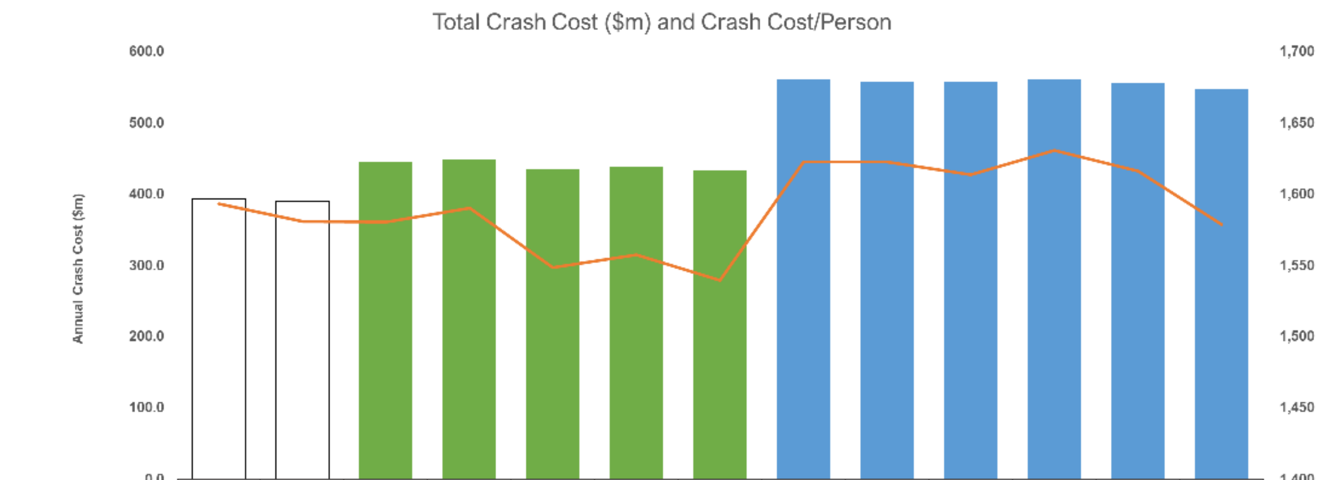
Future crash costs were estimated using crash rates ($/km) from the past 5 years (i.e. 2014-2018) of crash data in Tauranga. Crash rates vary by speed and road type and capture changes in travel amount (due to demographic changes and the associated demand for travel, mode shift, changes in trip length or shifts in traffic of different road types). The crash costs for each road category are provided in **Table 3-7.**

Table 3-7: Crash Rates by Road Category

Road Type	Speed Band (km/hr)	Crash Rates (Cents/Veh Km)
Local Road	<=60	16.88
Arterial	<=60	16.71
	>60 & <=80	11.68
Rural	<=60	12.41
	>60 & <80	45.38
	>=80	80.18
Major Rural	<=60	16.88
	>60 & <80	9.15
	>=80	27.4
Motorway	<=60	16.56
	>60 & <80	2.09
	>=80	7.6
All Categories		**19.64**

Crash costs in future years were estimated for individual links in TTSM using VKT and speeds, then combined across the network to generate a network-wide crash cost. Hence, it does not account for location-specific safety improvements.

Figure 3-13 shows the annual crash cost (in $2015) for each scenario and the crash cost per person.



	CS_DM	ST1_DM	CS_DM	ST1_DM	CS_DS	ST1_DS	ST2_DS	CS_DM	ST1_DM	CS_DS	ST1_DS	ST2_DS	ST3_DS
	2035		2048					2063					
Annual Crash Cost($m)	$393	$390	$444	$448	$435	$439	$434	$560	$558	$557	$561	$556	$546
Cost/Person	1,593	1,580	1,580	1,590	1,548	1,557	1,539	1,623	1,622	1,613	1,630	1,616	1,579

Figure 3-13: Crash Costing Results ($2015)

Key points from the above figure are:

- In 2035, ST1 shows lower total crash cost and crash cost per person than the core scenarios, reflecting the absence of the Te Tumu development.
- In 2048, total crash cost and crash cost per person increased in ST1 and decreased in ST2 relative to core scenarios.
- In 2063, ST1 (DM) and ST3 (DS) reduce both total crash cost and crash cost per person, while ST1 (DS) increases them when compared to core scenarios. For ST2 (DS), the total crash cost rises, but the crash cost per person falls compared to the core scenarios.

4 Next Steps

This transport modelling has informed the project team with regard to traffic generation and effects of the development / future network operation. The team is now working on revised modelling inputs and assumptions to be applied in subsequent sensitivity tests prior to completing a single ‘comprehensive modelling scenario’ on the preferred Fast Track Application proposal.

A

Appendix A – TEL and PEI Interchange Toll Assumptions

Tauranga Eastern Link Toll Road

NZ TRANSPORT AGENCY WAKA KOTAHI

Te Kāwanatanga o Aotearoa
New Zealand Government

25-SH-090

B

Appendix B – Demand Statistics

Wairakei South Transport Modelling
Demand Statistics

Scenarios / Measures	All Vehicles (Vehicle Trips)				PT (Person Trips)				PT Mechanised Mode Share			
	AM	IP	PM	ADT	AM	IP	PM	ADT	AM	IP	PM	ADT
2018	46,499	45,019	49,816	641,582	2,469	933	546	13,051	4.10%	1.70%	0.90%	1.60%
2035_CS_DM	61,291	58,133	67,120	838,524	3,381	1,372	1,089	19,509	4.30%	1.90%	1.30%	1.90%
2035_ST1_DM	60,939	58,043	66,682	835,720	3,433	1,381	1,064	19,602	4.40%	1.90%	1.30%	1.90%
2048_CS_DM	70,824	67,359	77,719	970,955	3,746	1,539	1,238	21,839	4.10%	1.80%	1.30%	1.80%
2048_ST1_DM	70,707	67,504	77,474	971,305	3,742	1,535	1,199	21,686	4.10%	1.80%	1.20%	1.80%
2048_CS_DS	68,376	66,401	76,367	952,848	6,780	2,696	2,881	40,668	7.50%	3.20%	3.00%	3.40%
2048_ST1_DS	68,299	66,562	76,150	953,520	6,720	2,666	2,783	40,064	7.40%	3.20%	2.90%	3.30%
2048_ST2_DS	68,381	66,407	76,372	952,916	6,778	2,692	2,876	40,622	7.50%	3.20%	3.00%	3.30%
2063_CS_DM	83,593	80,783	92,073	1,158,345	4,227	1,768	1,382	24,819	3.90%	1.70%	1.20%	1.70%
2063_ST1_DM	82,475	80,288	90,922	1,148,216	4,280	1,751	1,290	24,549	4.00%	1.70%	1.10%	1.70%
2063_CS_DS	80,876	79,704	90,578	1,138,125	7,601	3,075	3,171	45,807	7.10%	3.00%	2.80%	3.20%
2063_ST1_DS	79,931	79,264	89,481	1,129,061	7,418	2,989	2,986	44,308	7.00%	3.00%	2.60%	3.10%
2063_ST2_DS	80,884	79,708	90,582	1,138,189	7,597	3,072	3,168	45,766	7.10%	3.00%	2.80%	3.20%
2063_ST3_DS	80,664	79,485	90,330	1,135,029	7,683	3,113	3,195	46,306	7.20%	3.10%	2.80%	3.20%

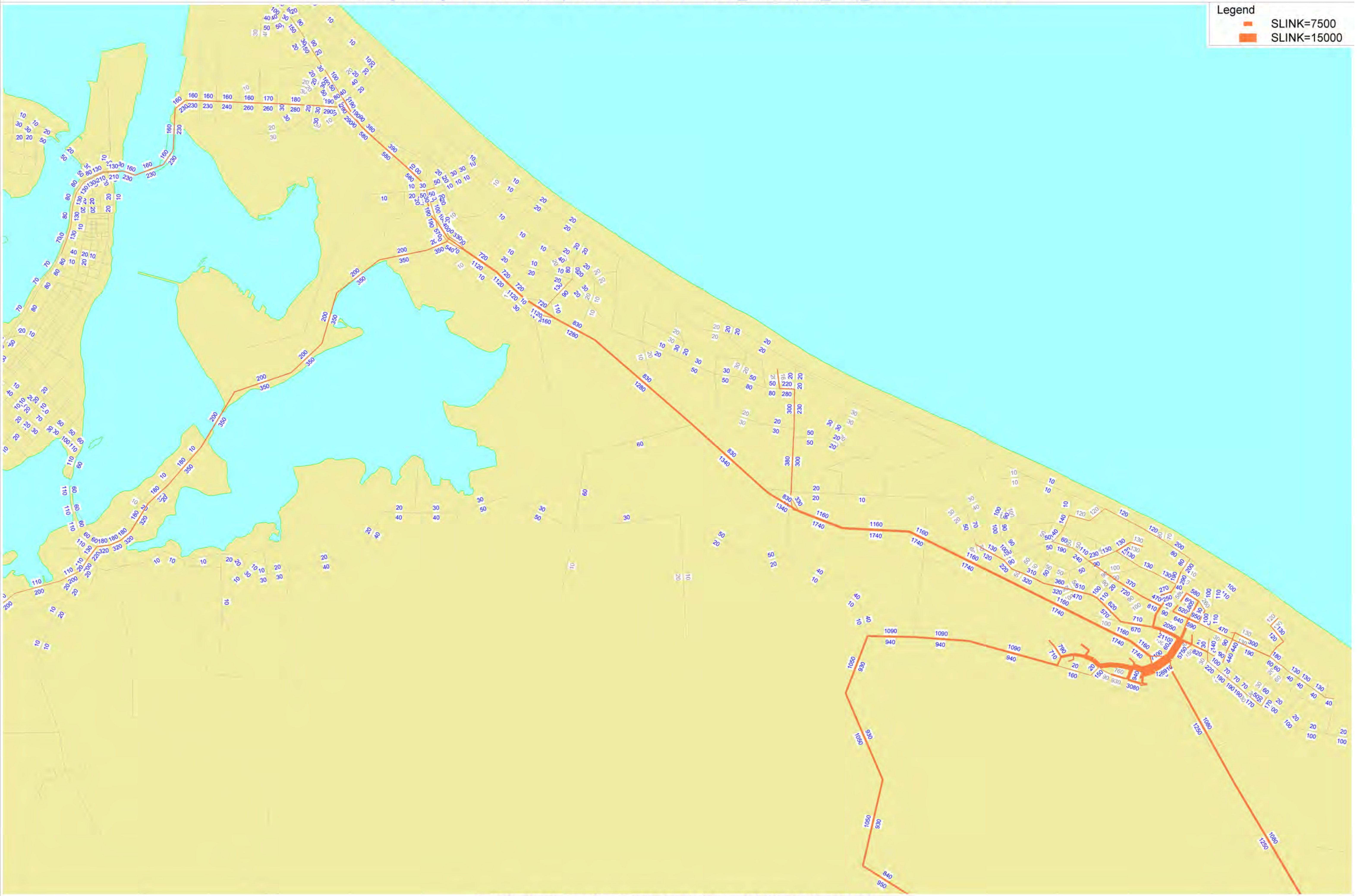
Notation:

CS	Core Scenarios	DM	Do Minimum
ST1	Sensitivity Test 1	DS	Do Something
ST2	Sensitivity Test 2		
ST3	Sensitivity Test 3		

C

Appendix C – Select Link Analysis Plots

Average Daily Vehicles (ADT) Select Total Vehicles _Y2035(CS_DM)_West PEI Location



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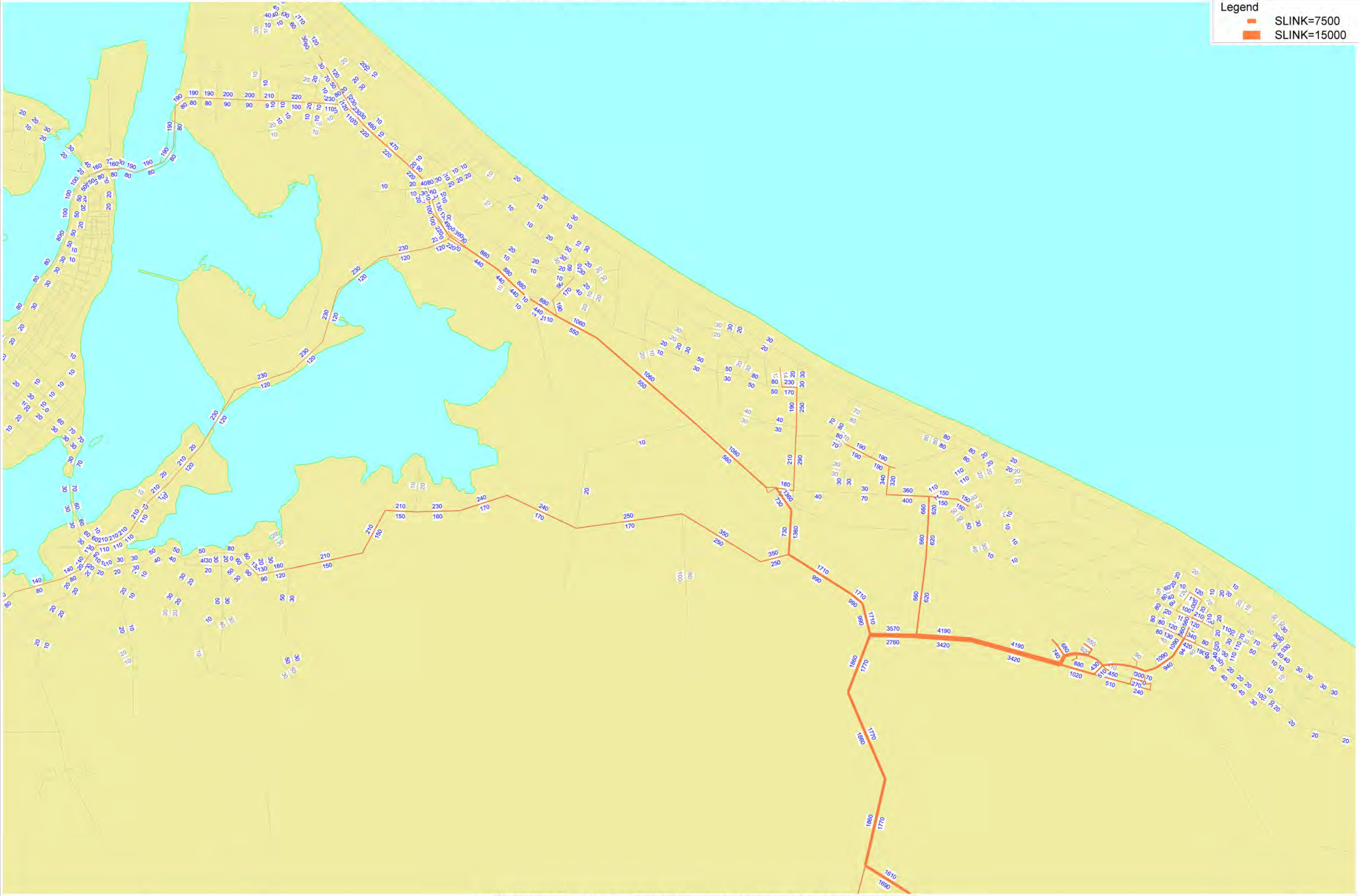
Average Daily Vehicles (ADT) Select Total Vehicles _Y2035(CS_DM)_West Bell Road Location



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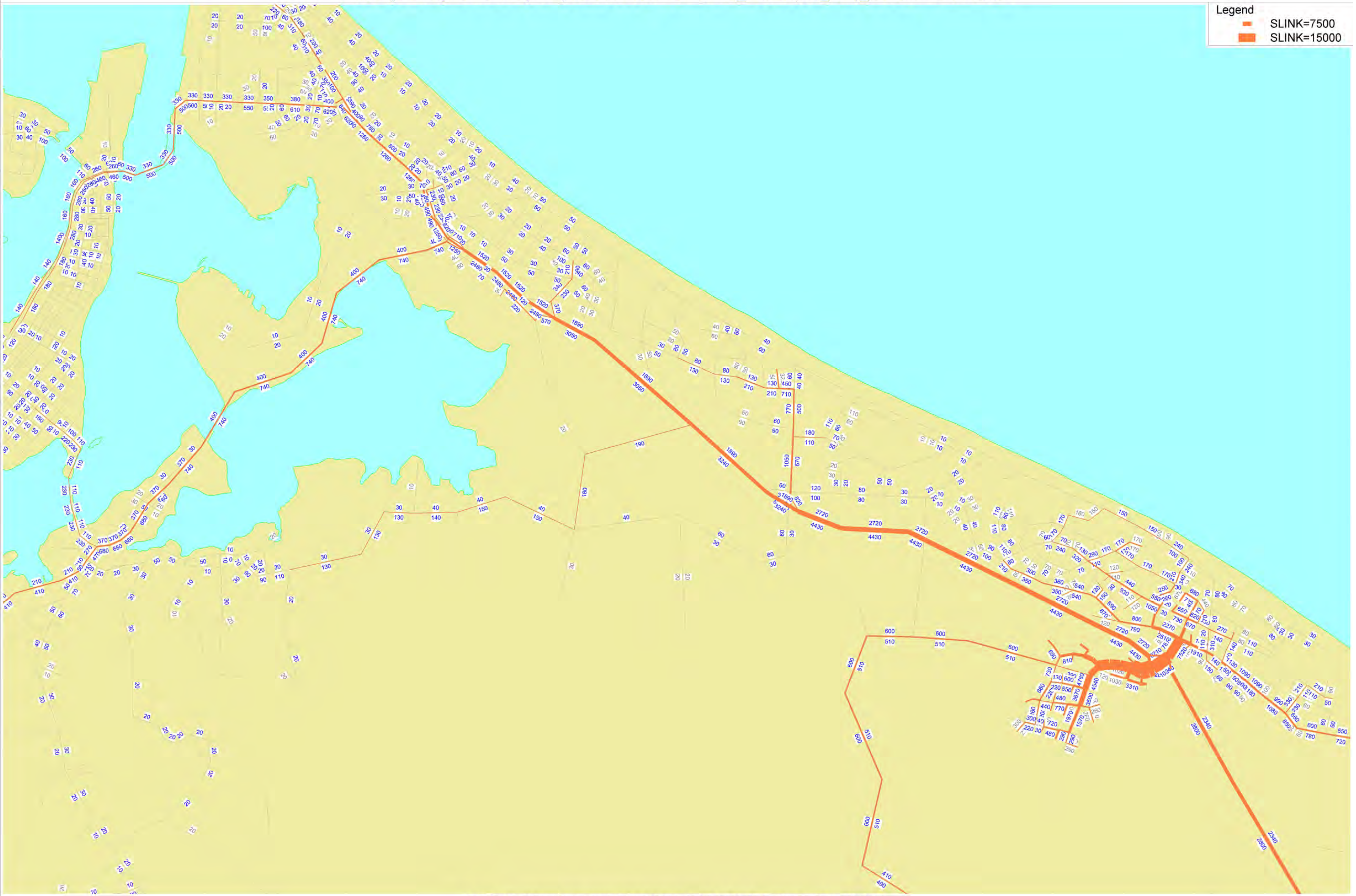
Average Daily Vehicles (ADT) Select Total Vehicles _Y2048(CS_DM)_West PEI Location



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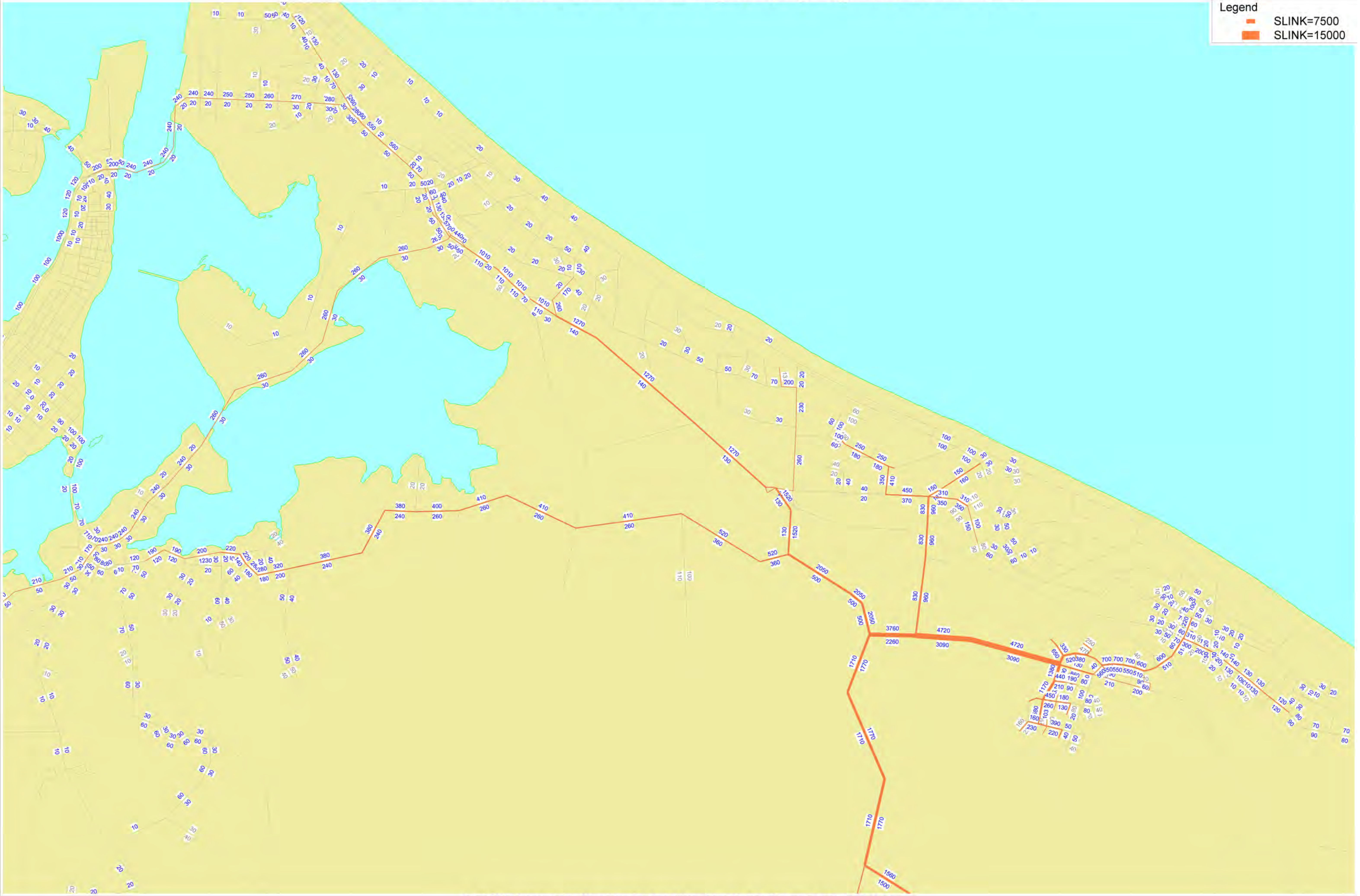
Average Daily Vehicles (ADT) Select Total Vehicles _Y2048(CS_DM)_West Bell Road Location



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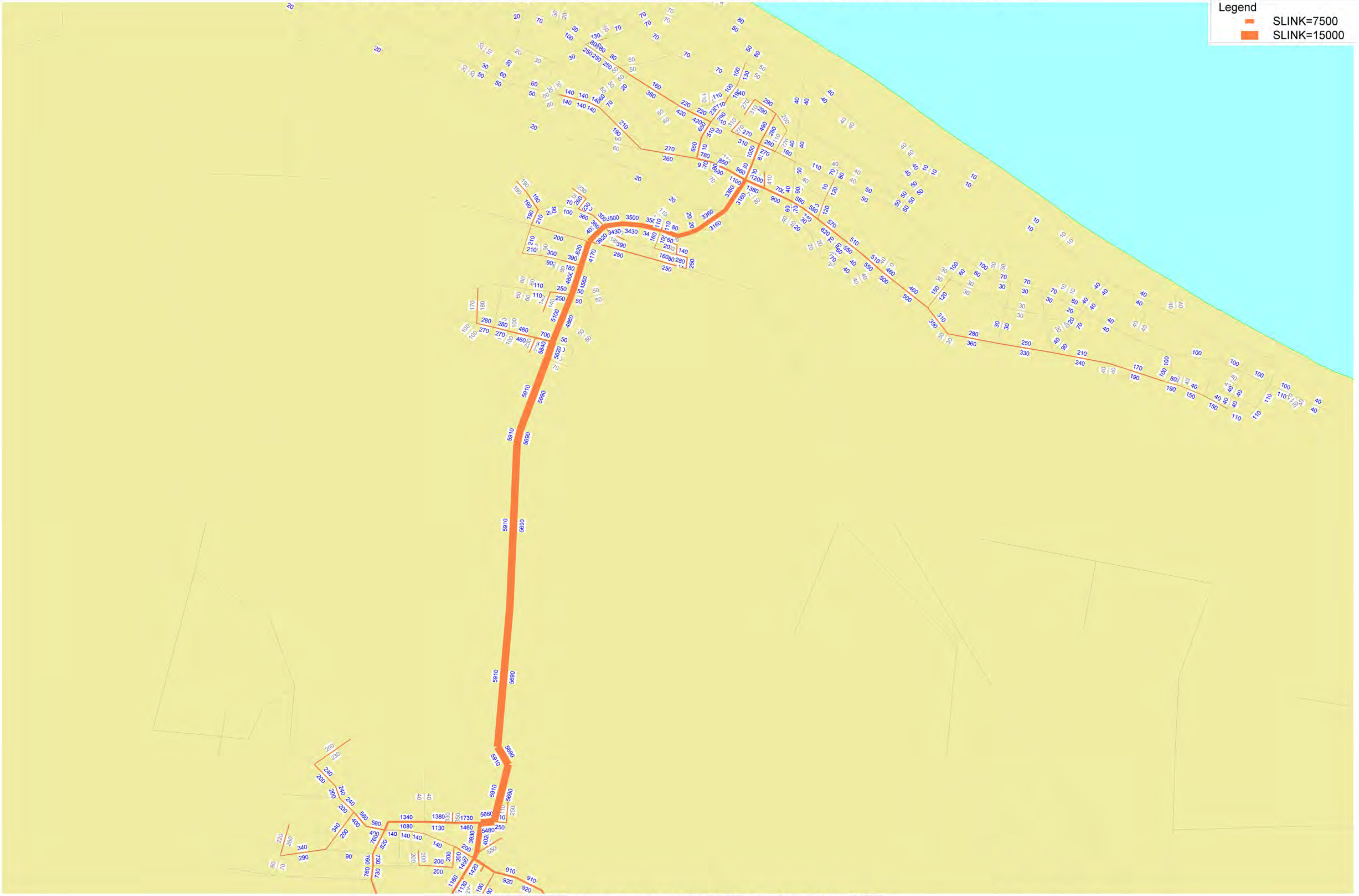
Average Daily Vehicles (ADT) Select Total Vehicles _Y2048(ST2_DS)_Seddon Street Connection



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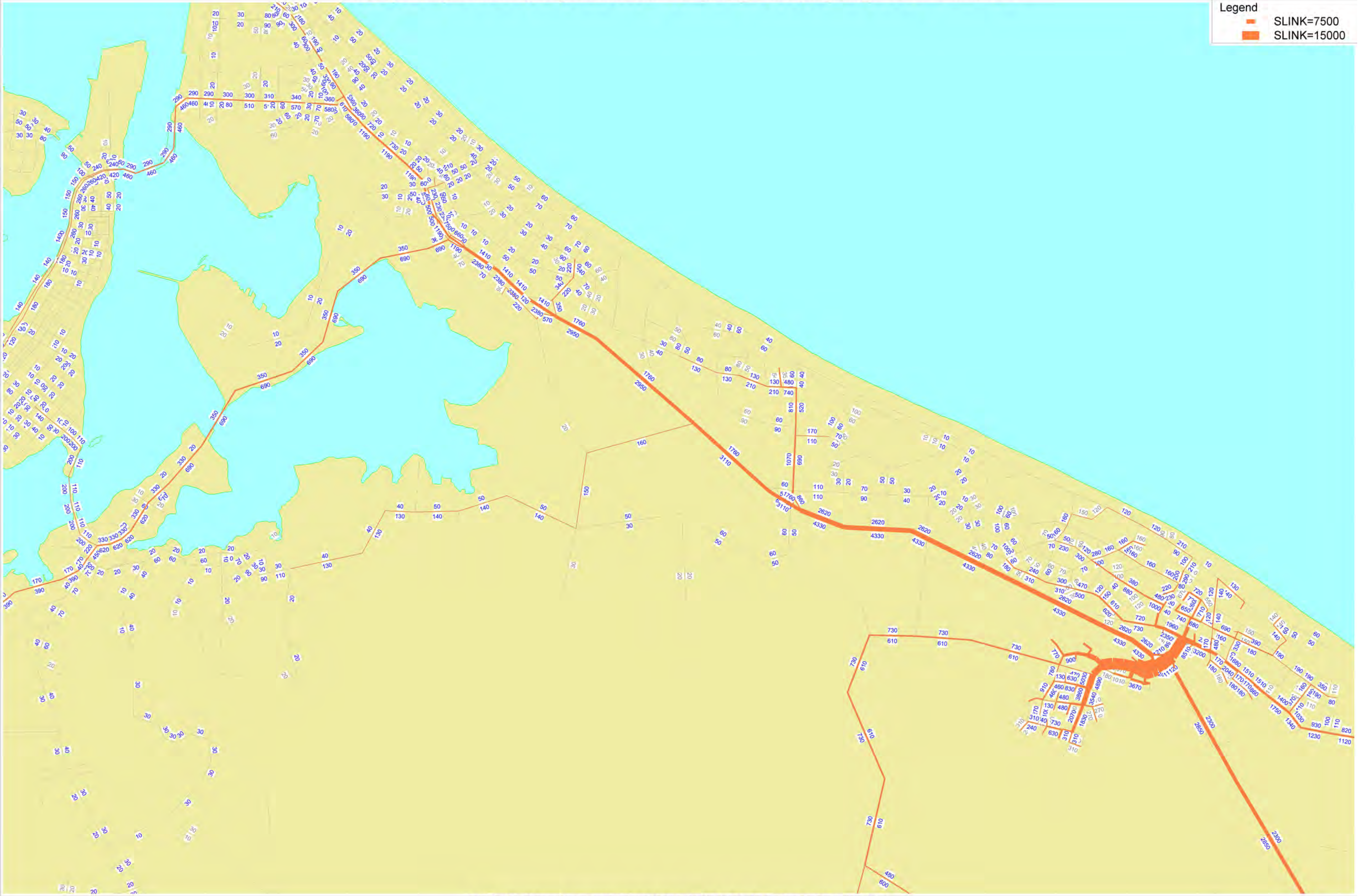
Average Daily Vehicles (ADT) Select Total Vehicles _Y2063(CS_DM)_West PEI Location



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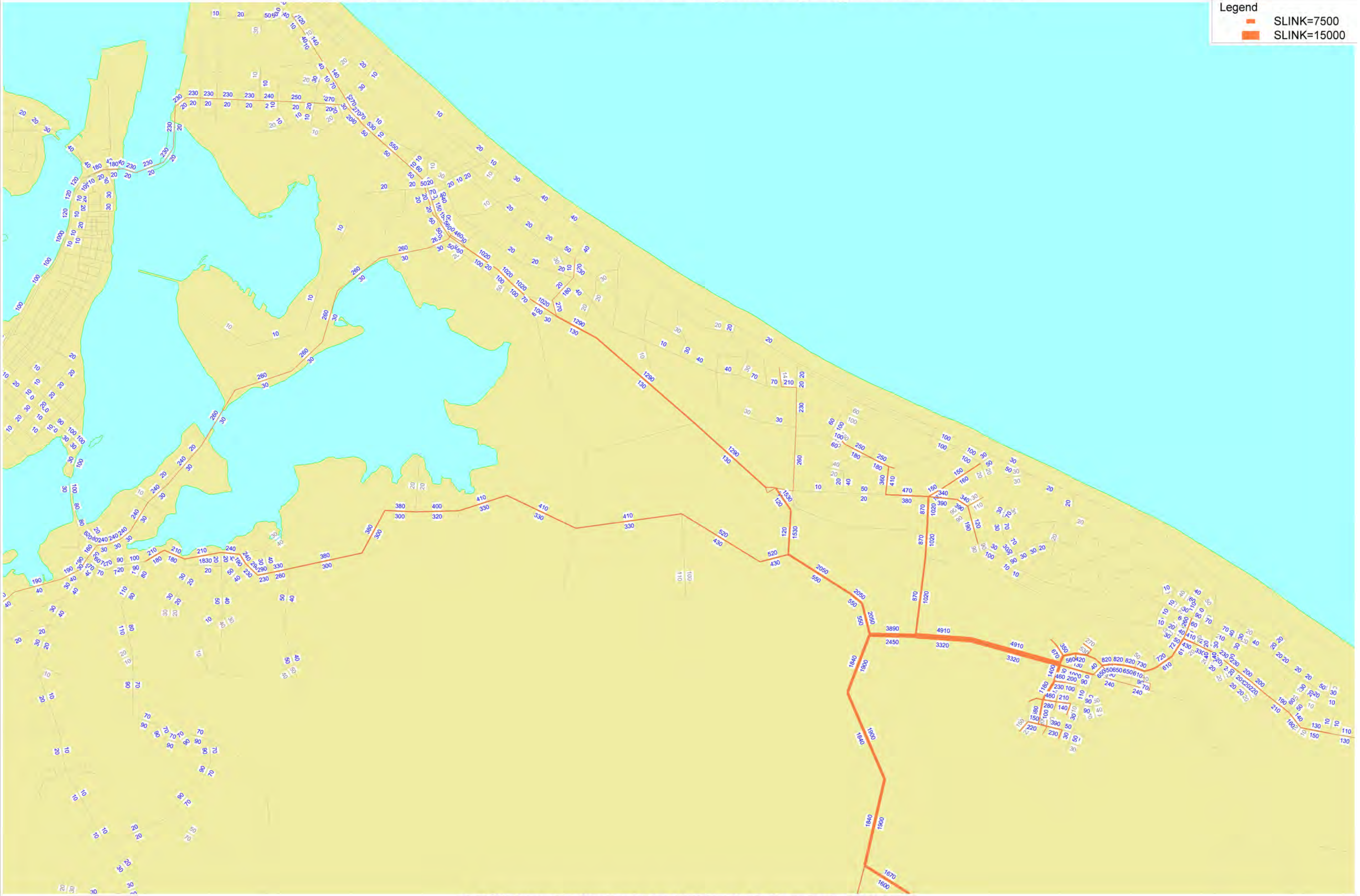
Average Daily Vehicles (ADT) Select Total Vehicles _Y2063(CS_DM)_West Bell Road Location



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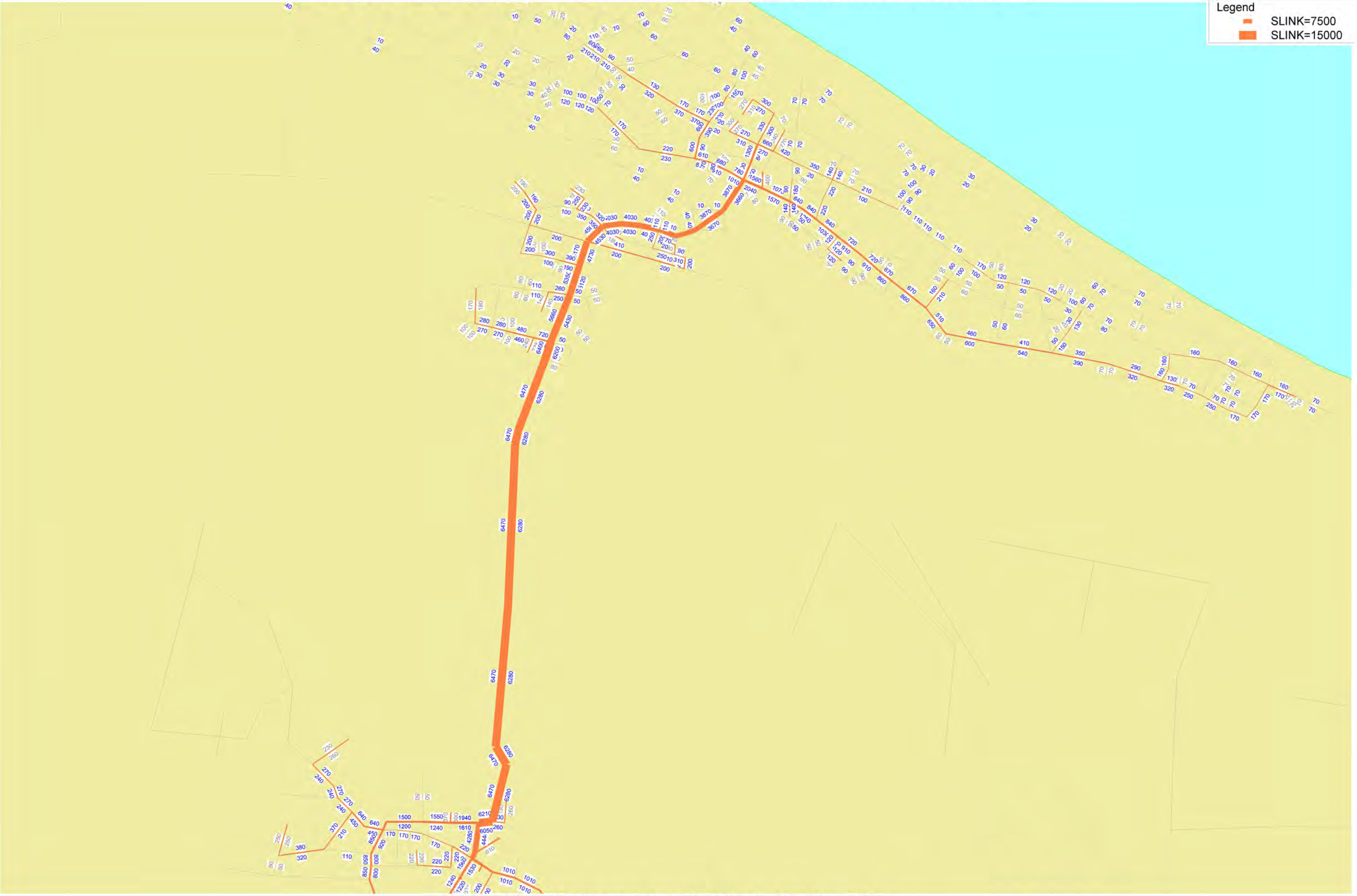
Average Daily Vehicles (ADT) Select Total Vehicles _Y2063(ST2_DS)_Seddon Street Connection



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D

Appendix D – Level of Service Criteria

Level of Service

To assess the level of congestion (for general traffic), a process was developed using weighted average delay (for intersections) and volume/capacity ratios (for links) to estimate the LOS for the whole network. The LOS criteria adopted for the analysis are shown below.

LOS Criteria for Link and Intersection Types

LOS	Intersection[6] (Weighted Average Delay, s)	Rural[7] (rolling) (V/C)	Rural (level) (V/C)	Freeway[8] (FFS<80) (V/C)	Freeway (FFS>80) (V/C)	Arterial[9] & Local (V/C)
A	< 10	< 0.04	< 0.05	< 0.26	< 0.30	< 0.26
B	10 - 20	0.04 - 0.15	0.05 - 0.17	0.26 - 0.40	0.30 - 0.48	0.26 - 0.43
C	20 - 35	0.15 – 0.30	0.17 – 0.33	0.40 – 0.60	0.48 – 0.70	0.43 – 0.62
D	35 - 55	0.30 – 0.46	0.33 – 0.58	0.60 – 0.85	0.70 – 0.90	0.62 – 0.82
E	55 - 80	0.46 – 0.90	0.58 – 1.00	0.85 – 1.00	0.90 – 1.00	0.82 – 1.00
F	> 80	> 0.9	> 1.00	> 1.00	> 1.00	> 1.00

The Weighted Average Delay for intersections is the normal volume-weighted delay plus an additional weight factor (delay). This additional factor was included to place more weight on critical movements when calculating the "representative average" condition at the intersections.

The calculated LOS indicates a high-level qualitative measure to assess the combined performance of intersections and links for the model network. A more comprehensive LOS assessment is recommended for specific corridors or intersections for detailed studies.

The calculated Link LOS doesn't consider queuing or delay originating at downstream intersections. Hence, the network performance should be assessed using both link and intersection combined.

In general, LOS A-D indicates that intersections and links perform with an acceptable level of service. LOS E indicates that intersection/links are performing at a poor level of service, and further investigation/modelling may be needed. LOS F indicates the intersections/links are over capacity.

Note that LOS plots are for general traffic performance, and the results provided in this report are indicative only. HOV lanes are not explicitly modelled in TTSM because their performance is expected to be better than that of general traffic lanes in reality. Freight and buses can travel at free-flow speeds on their dedicated lanes. Hence, LOS plots do not represent freight and buses as well.

[6] HCM2000 Chapter16- Signalised Intersection.

[7] Austroad Part2- Roadway Capacity, 1988. Assumed 80% of sight distance length.

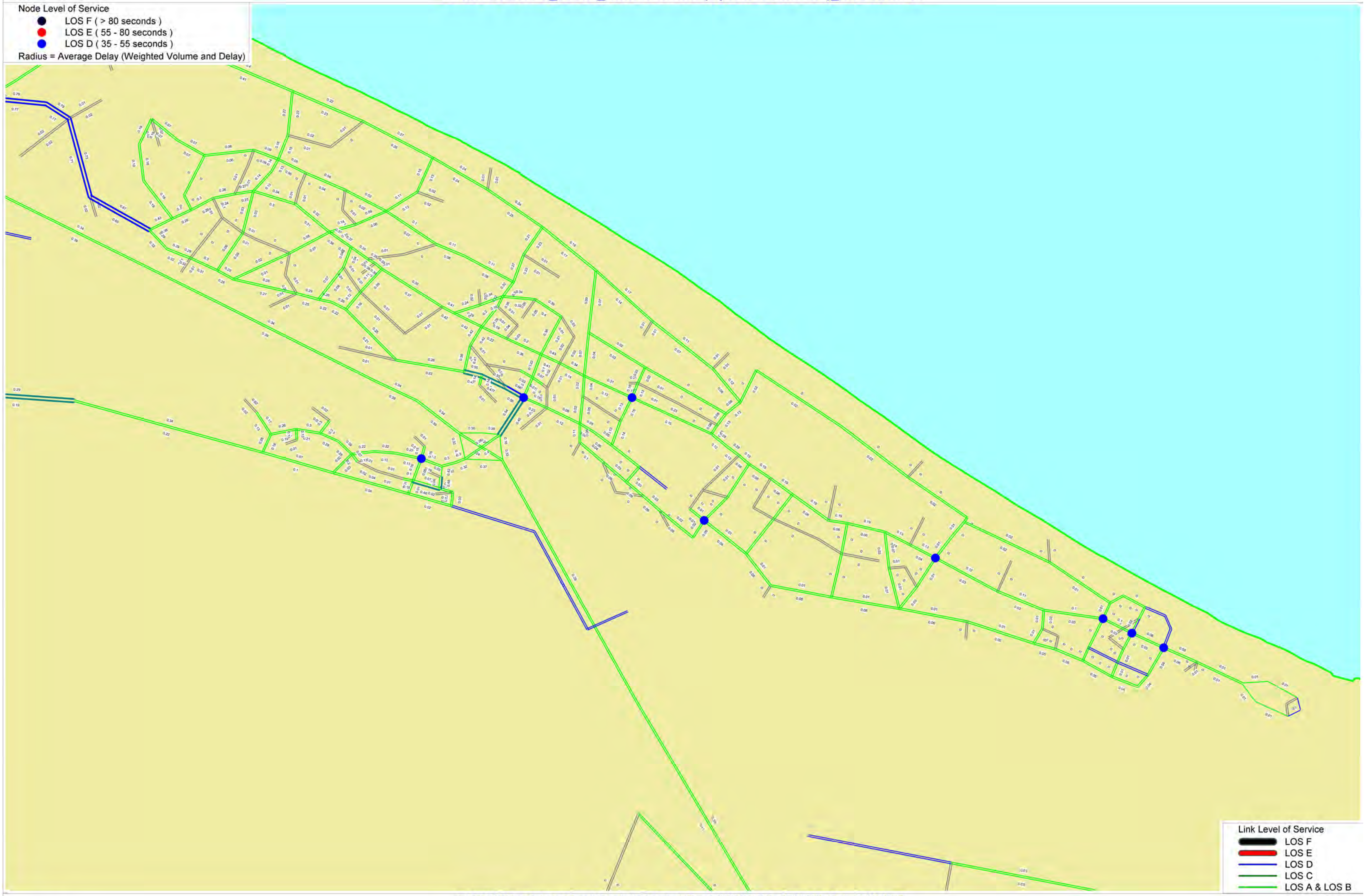
[8] HCM2000 Chapter23- Basic Freeway Segment.

[9] Technical paper "*Performance Measures and Threshold Value for Northeast Ohio Areawide Coordinating Agency's (NOACA's) Congestion Management Process, NOACA, August 2007*"

E

Appendix E – Level of Service Plots

Level of Service_Y2035_Core Scenario (Option A land use)_Do Minimum



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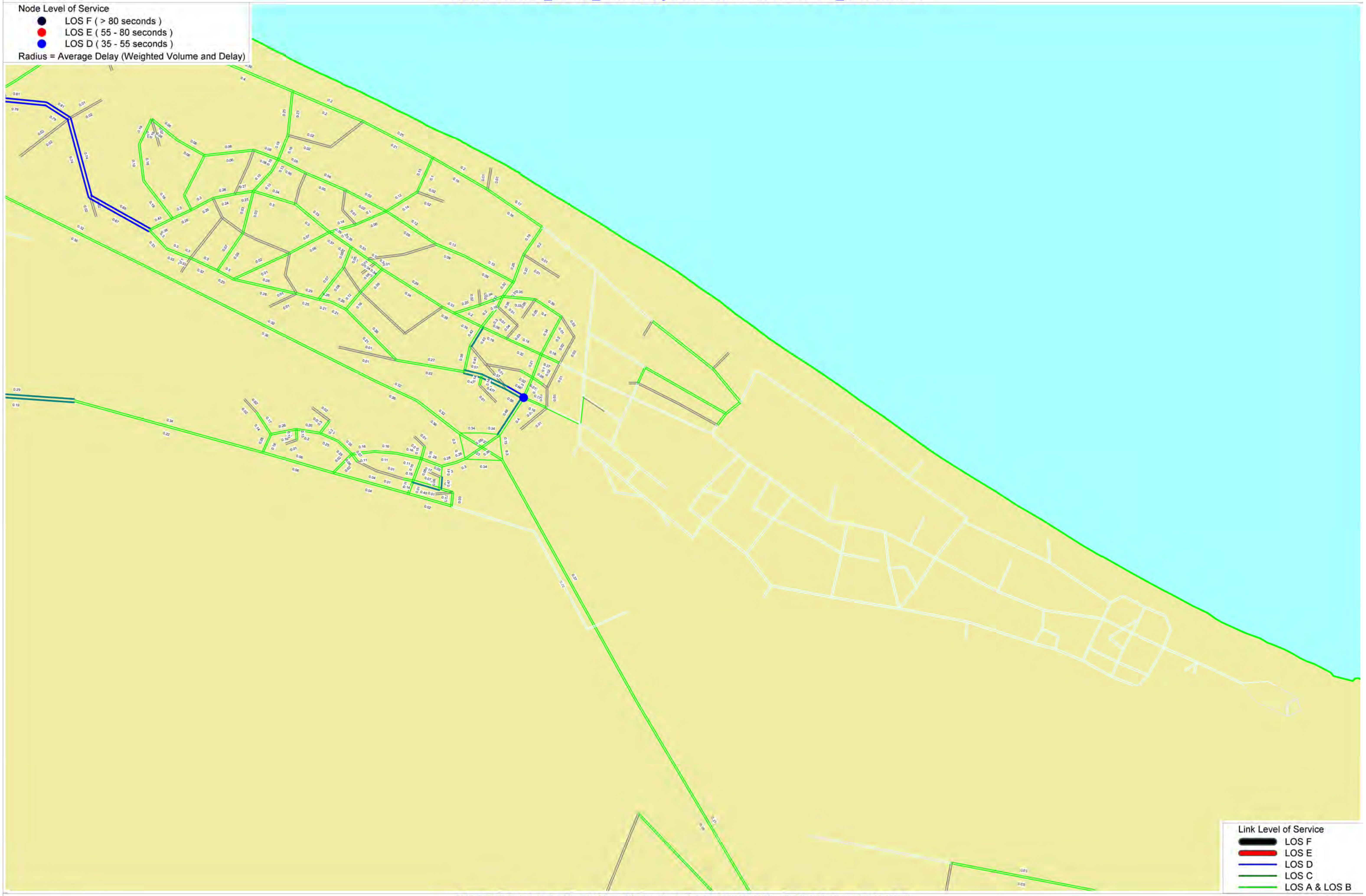
Level of Service_Y2035_Sensitivity Test 1 Scenario land use_Do Minimum



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Level of Service_Y2048_Core Scenario (Option A land use)_Do Minimum

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Level of Service_Y2048_Sensitivity Test 1 Scenario land use_Do Minimum
Node Level of Service
LOS F (> 80 seconds)
LOS E (55 - 80 seconds)
LOS D (35 - 55 seconds)
Radius = Average Delay (Weighted Volume and Delay)
Link Level of Service
LOS F
LOS E
LOS D
LOS C
LOS A & LOS B
E:\TTSM23_WairakeiSouth\Model\Wairakei_South\Y2048\ST1_DM_v2\LOS_Toll_MAX.NET
cube
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Level of Service_Y2048_Core Scenario (Option A land use)_Do Something

E:\TTSM23_WairakeiSouth\Model\Wairakei_South\Y2048\CS_DS_v2\LOS_Toll_MAX.NET

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Level of Service_Y2048_Sensitivity Test 1 Scenario land use_Do Something

E:\TTSM23_WairakeiSouth\Model\Wairakei_South\Y2048\ST1_DS_v2\LOS_Toll_MAX.NET

Level of Service_Y2048_Sensitivity Test 2 Scenario land use_Do Something

E:\TTSM23_WairakeiSouth\Model\Wairakei_South\Y2048\ST2_DS_v2\LOS_Toll_MAX.NET

Level of Service_Y2063_Core Scenario (Option A land use)_Do Minimum

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Level of Service_Y2063_Sensitivity Test 1 Scenario land use_Do Minimum

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Level of Service_Y2063_Core Scenario (Option A land use)_Do Something

E:\TTSM23_WairakeiSouth\Model\Wairakei_South\Y2063\CS_DS_v2\LOS_Toll_MAX.NET

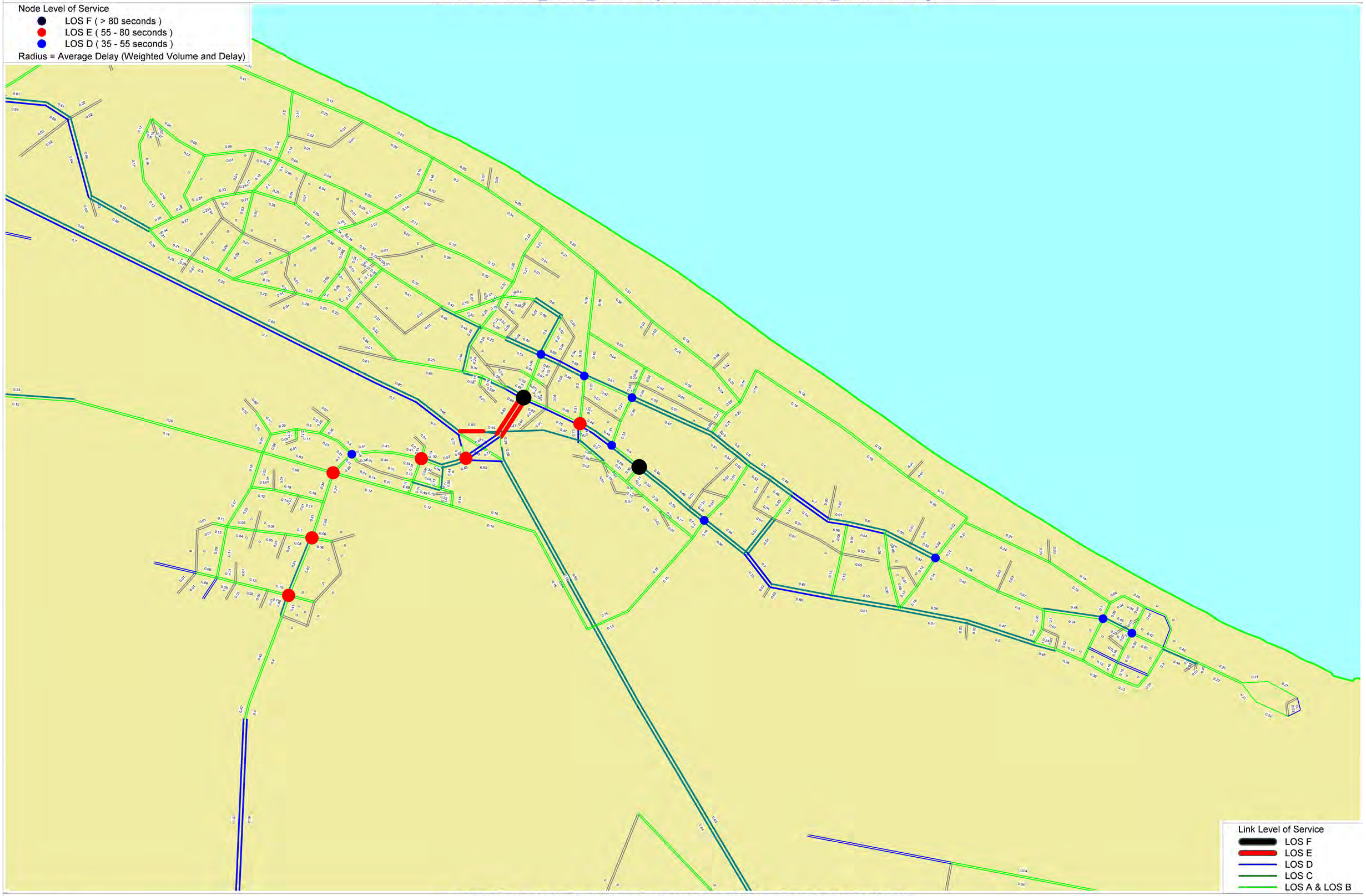
Level of Service_Y2063_Sensitivity Test 1 Scenario land use_Do Something

E:\TTSM23_WairakeiSouth\Model\Wairakei_South\Y2063\ST1_DS_v2\LOS_Toll_MAX.NET

Level of Service_Y2063_Sensitivity Test 2 Scenario land use_Do Something

E:\TTSM23_WairakeiSouth\Model\Wairakei_South\Y2063\ST2_DS_v2\LOS_Toll_MAX.NET

Level of Service_Y2063_Sensitivity Test 3 Scenario land use_Do Something



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F

Appendix F – Vehicle Emission Model Guidelines

Vehicle Emission Guidelines

NZ Transport Agency's VEPM version 6.3 (released in April 2022) is used in TTSM22. Features of the VEPM 6.3 model are outlined below:

- VEPM estimates vehicle tail-pipe emissions only, i.e., does not include vehicle manufacture or energy generation.
- Depending on average vehicle speeds, VEPM provides grams per km of travel rates.
- VEPM rates are based on assumed vehicle fleet composition in future years.
- VEPM provides methane (CH4) and nitrous oxide (N2O) emission factors to calculate carbon dioxide equivalent (CO_2-eq) emission factors instead of carbon dioxide (CO_2).

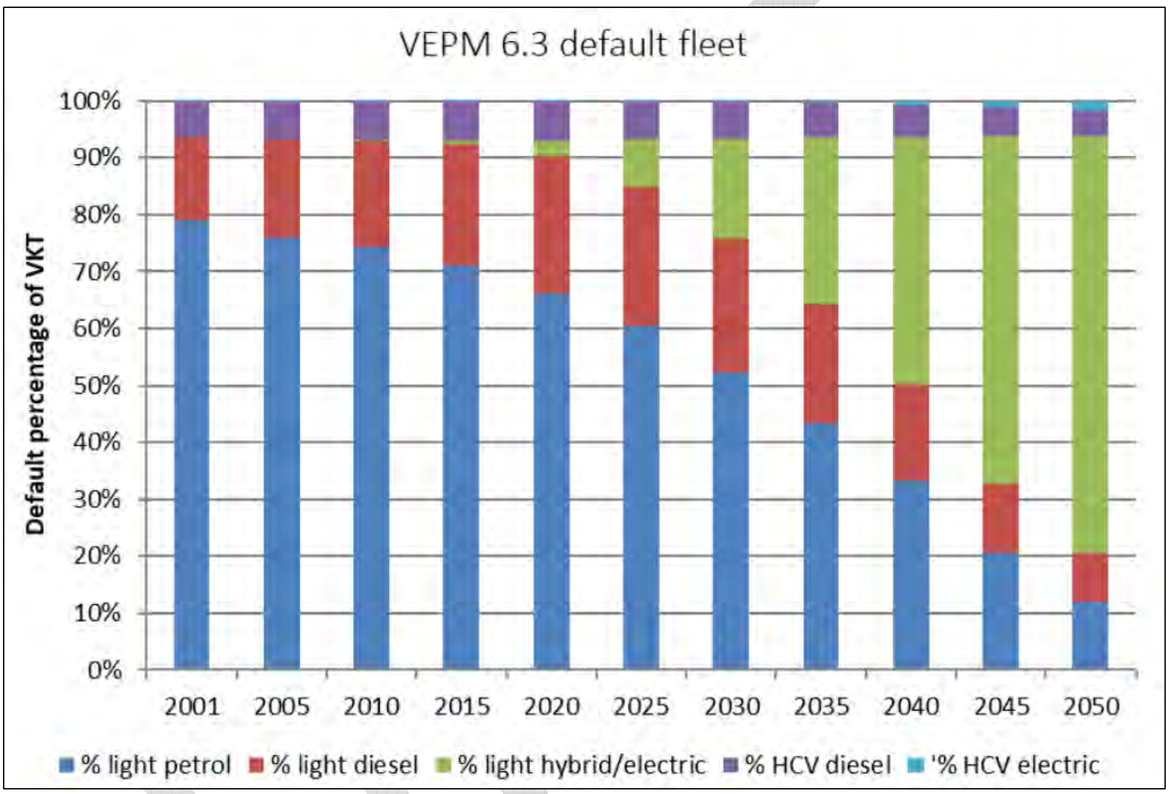

Figure A: Assumed Vehicle Fleet in VEPM 6.3

According to the VEPM, while light petrol vehicles (blue) will dominate in 2020, light hybrid/electric vehicles will make up most of the fleet in 2050. However, the changes in fleet assumptions are based on VEPM 6.3, and these assumptions can change in later versions of VEPM. **Figure B** shows how the CO_2-eq emission factors might vary for different speeds and model years, considering these assumptions.

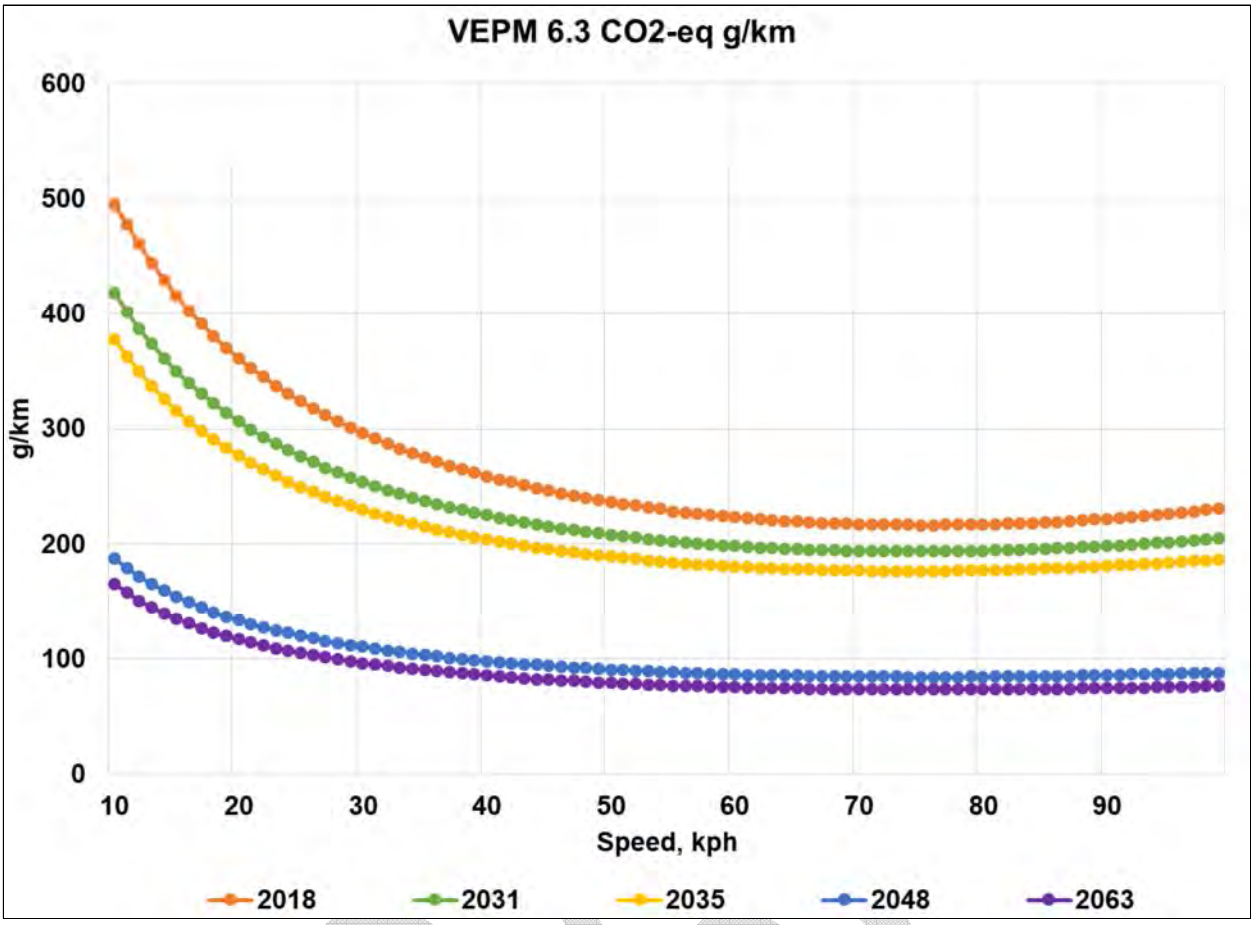

Figure B: VEPM 6.3 CO_2-eq Emission Rates

From the figure, CO_2-eq emissions are high at lower speeds and gradually reduce as speed increases. CO_2-eq emission rates are significantly lower in 2048 and 2063[10] compared to 2018.

[10] The 2063 model uses the 2051 emission rates from NZ Transport Agency's VEPM version 6.3

B

Appendix B – Transport Modelling Report (Round 2 TTSM)

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1 December 2025

Bell Road Limited Partnership
PO Box 11057
Palm Beach
Papamoa 3151

Attention: Mark Apeldoorn (Boffa Miskell)

Dear Mark

Wairakei South Transport Modelling Round 2 TTSM Results

1 Purpose

Beca recently completed the Round 1 transport modelling in the Tauranga Transport Strategic Model (TTSM) for the Wairakei South project area, the findings of this are described in the Beca technical modelling report dated 15th October 2025. From this, the project team has identified the operational performance of the Te Okuroa Drive (TOD) / Sands Avenue intersection and queueing across the Papamoa East Interchange (PEI) as a key issue requiring further analysis.

Subsequently, Round 2 transport modelling has been undertaken by Beca to address the concerns identified in the Round 1 modelling. Round 2 focuses on updating the road network and land use assumptions to improve the operational performance of the TOD / Sands Avenue intersection and reduce queueing across the PEI interchange.

This document summarises the model assumptions, scenarios modelled and outcomes of the Round 2 modelling for the Wairakei South study.

2 Scenario and Assumptions

2.1 Baseline Modelling Input Refinements

The baseline assumptions from Round 1 models served as the starting point for developing the baseline for Round 2 models. In Round 2, some land use and network changes are applied as discussed below.

2.1.1 Land Use Refinements

The land use changes are as follows:

- Reduce the number of dwellings in Wairakei South, as shown in **Table 2-1**.
- Reinstate the 6ha industrial land use in Te Tumu in 2048 and defer 6ha of industrial land in Wairakei South from 2048 to 2063.

The comparison of total dwellings and industrial land use in the Wairakei South area between Round 1 and Round 2 modelling is provided in **Table 2-1**.

make everyday better.

Table 2-1: Wairakei South Land Use Summary

Description	Model Year	Residential (Number of Houses)	Industrial (ha)
Round 1 Modelling	2035	1,984	8
	2048	3,000	55
	2063	3,000	55
Round 2 Modelling	2035	1,734	8
	2048	2,500	49
	2063	2,750	55

The various land use options modelled are discussed below:

- Option 1: Round 2 Residential land use and Round 1 Industrial land use
- Option 2: Round 1 Residential land use and Round 2 Industrial land use
- Option 3: Combination of both Residential and Industrial land use data (i.e., Round 2)
- Option 4: Round 2 Residential and Industrial land use and reduce 32,000 sqm GFA (retail and commercial) in the Wairakei Town Centre.

2.1.2 Network Refinements

The network refinements are summarised in **Table 2-2** below.

Table 2-2: Network Refinements

S.No	Description	2035	2048	2063
1	New zone connection to Sands Avenue for the Wairakei Town Centre zone to reflect likely distribution.	✓	✓	✓
2	Reduce the travel speed on Stevenson Drive to 30 km/hr. This is not a speed limit reduction, but rather a reflection of the change in traffic speeds resulting from the traffic calming measures on Stevenson Drive.	✓	✓	✓
3	Two right turn lanes from TOD west to PEI interchange south at the Te Okuroa Drive (TOD) / Sands Avenue intersection		✓	✓

2.2 Model Scenarios

The 2048 Core Scenario (Do Minimum) modelling was undertaken for the four land use options under two models with a different lane arrangement at the TOD/Sands Avenue Intersection. The model scenarios are shown in **Table 2-3**.

Table 2-3: Model Scenarios

Models	Network	Land Use	Scenarios		Model Years
Test 1	One right-turn lane from the TOD west to the PEI interchange south	Options 1 to 3	Core Scenario	Do Minimum	2048
Test 2	Two right-turn lanes from the TOD west to the PEI interchange south	Options 1 to 4			

Note that for the Test 1 model, the Residential land use for Wairakei South was assumed to be 2,750 dwellings in 2048. Following project team advice, 2,500 dwellings were assumed for the Test 2 model in 2048.

2.2.1 Preferred Option and Subsequent Model Scenarios

It was agreed with the project team that the preferred land use option and test model were applied to the remaining scenarios listed below:

- 2035 Core Scenario (Do Minimum) – with Round 2 land use in Wairakei South and Te Tumu
- 2035 Sensitivity Test1(Do Minimum) – with Round 2 land use in Wairakei South but without Te Tumu
- 2048 Sensitivity Test1 (Do Minimum) – with Round 2 land use in Wairakei South but without Te Tumu
- 2063 Core Scenario (Do Minimum) – with Round 2 land use in Wairakei South and Te Tumu
- 2063 Sensitivity Test1 (Do Minimum) – with Round 2 land use in Wairakei South but without Te Tumu.

2.3 Other Input Assumptions

All other input assumptions for Core and Sensitivity Test 1 Scenarios, as well as the rest of the wider network assumptions, were consistent with the Wairakei South Round 1 modelling scenarios.

3 Findings

In the Test 1 model, land use options 1 to 3 are evaluated, while the Test 2 model incorporates land use options 1 to 4 for the 2048 Core Scenario (Do Minimum). The intersection turn volumes for Test 1 and Test 2 models have been provided separately for the purpose of the SIDRA modelling. The Level of Service (LOS) for the TOD/Sands Avenue intersection, as confirmed by TTSM, has identified Test 2 model, which employs Option 3 land use derived from Round 2 modelling, as the preferred scenario. This scenario is subsequently applied to the remaining model scenarios.

A summary of the Level of Service (LOS) for the TOD/Sands Avenue intersection is provided in **Table 3-1**.

Table 3-1: LOS for TOD / Sands Avenue Intersection

Models	Land Use Option		
	Option 1	Option 2	Option 3
Test 1	E	E	E
Test 2	D	D	D

3.1 Traffic Flow Changes

Figure 3-1 shows the daily traffic flow changes in the study area between Round 2 (Test 2 model) and Round 1 modelling for the 2048 Core Scenario (Do Minimum). In the figure, red indicates an increase in traffic volume, and blue indicates a reduction in traffic volume.

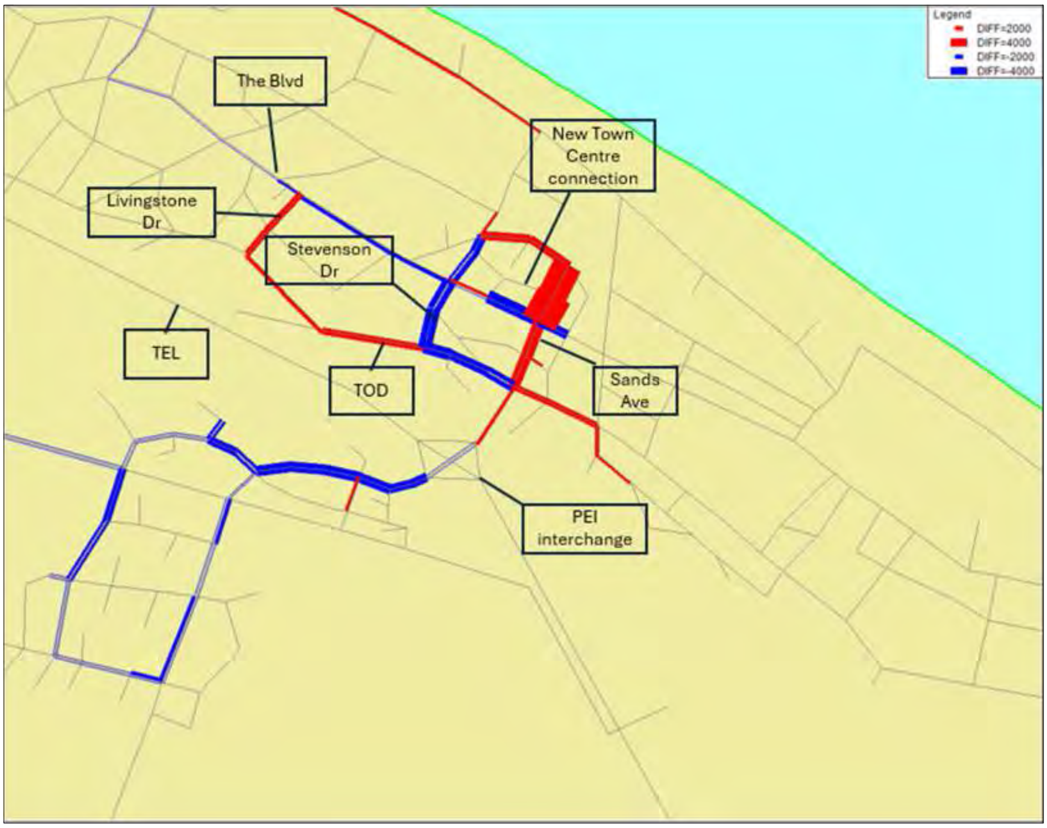


Figure 3-1: Daily Traffic Flow Changes (Round 2 vs Round 1 – 2048 Core Scenario Do Minimum)

The new Wairakei Town Centre connection to Sands Avenue has shifted some traffic onto Sands Avenue. The speed reduction on Stevenson Drive has further redistributed traffic, increasing the use of Livingstone Drive and the Boulevard as alternative routes to Sands Avenue.

Lower trip generation was observed in Wairakei South due to land-use refinements. In 2048, Round 2 had less residential and industrial land use than Round 1, resulting in fewer vehicle trips from the Wairakei South area.

3.2 Intersection Volume Changes

Classified intersection traffic volumes for the major intersections in the study area have been provided separately. **Table 3-2** provides the hourly traffic volume (i.e. light and heavy vehicles) at the TOD / Sands Avenue intersection during the PM peak for Round 1 and Round 2 modelling using Option 3 land use.

Table 3-2: TOD / Sands Avenue Intersection Volume – PM peak

Scenario	2048			2063	
	Round 1	Round 2 Test 1	Round 2 Test 2	Round 1	Round 2
Intersection Volume (vph)	5,013	5,029	5,120	5,906	5,907

A comparison between Round 1 and Round 2 shows minimal change in overall traffic volumes at the TOD/Sands Avenue Intersection. However, there is a noticeable change in vehicle route choices at this intersection (see **Figure 3-1**), for both the modelled years 2048 and 2063.

3.3 Level of Service (LOS)

LOS plots for the major intersections and key corridors have been provided separately. Refer to the Round 1 modelling report for the LOS calculation methodology. The key intersections and road sections considered in the LOS analysis are shown in **Figure 3-2**. Higher quality LOS plots for all modelled scenarios are provided in **Appendix A**.

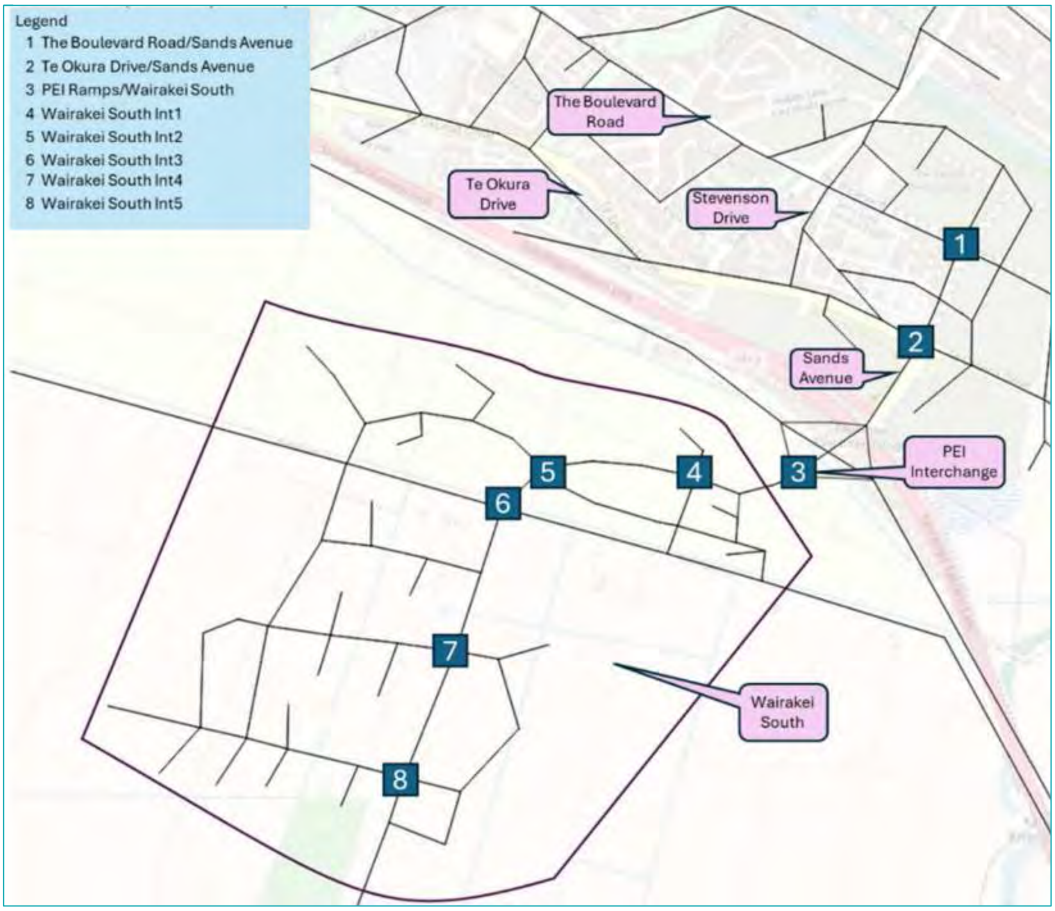


Figure 3-2: Key Intersection and Corridors

A summary of key intersections and a list of road sections with LOS D, E or F between Round 1 and Round 2 models is provided in **Table 3-3** and **Table 3-4** respectively.

Table 3-3: LOS Summary of Key Intersections

Intersection	Round 1 Modelling						Round 2 Modelling (Stage 2)					
	2035 Do Minimum		2048 Do Minimum		2063 Do Minimum		2035 Do Minimum		2048 Do Minimum		2063 Do Minimum	
	CS	ST1	CS	ST1	CS	ST1	CS	ST1	CS	ST1	CS	ST1
The Boulevard Road/Sands Avenue	--	--	--	--	D	--	--	--	--	--	--	--
TOD/Sands Avenue	D	D	E	E	E	E	D	D	D	D	D	D
PEI Ramps /Wairakei South	--	--	--	--	D	--	--	--	--	--	D	--
Wairakei South Int1	D	--	D	D	D	D	--	--	D	D	D	D
Wairakei South Int2	--	--	D	D	D	D	--	--	D	D	D	D
Wairakei South Int3	--	--	D	D	D	D	--	--	D	D	D	D

Table 3-4: LOS Summary of Key Road Sections

Intersection	Round 1 Modelling						Round 2 Modelling (Stage 2)					
	2035 Do Minimum		2048 Do Minimum		2063 Do Minimum		2035 Do Minimum		2048 Do Minimum		2063 Do Minimum	
	CS	ST1	CS	ST1	CS	ST1	CS	ST1	CS	ST1	CS	ST1
TOD between Stevenson Drive and Sands Avenue	D	D	D	D	D	D	--	D	D	D	--	D
Sands Avenue between PEI Ramps and TOD	--	--	E	D	E	D	--	--	E	D	E	D
PEI North Off Ramp	--	--	D	--	D	--	--	--	D	D	D	--
PEI South Off Ramp	--	--	D	--	D	--	--	--	D	--	D	--

Key points from the above tables for Round 2 models are:

- In 2035, the TOD / Sands Avenue intersection operates at LOS D in both Core and Sensitivity Test scenarios. On road sections, the performance of TOD between Stevenson Drive and Sands Avenue degraded in the Sensitivity Test and operates at LOS D.
- In 2048, the intersections have the same performance in both scenarios. In terms of road sections, the performance of Sands Avenue and PEI South Off Ramp improved in the Sensitivity Test 1 scenario.
- In 2063, PEI Ramps / Wairakei South intersection improved in the Sensitivity Test 1 scenario. In terms of road sections, the performance of Sands Avenue and PEI Off Ramps improved in Sensitivity Test 1; however, the performance of TOD between Stevenson Drive and Sands Avenue decreased.

4 Recommendations

Following project team discussions on the findings, Round 2 models, which employ Option 3 land use and Test 2 turning movement lane arrangement for the TOD/Sands Avenue Intersection, have been identified as the preferred option for the 2048 Core Scenario Do Minimum model. The cordon demand from these scenarios will be used to test network performance in the operational model (i.e., TTHM).

Yours sincerely

Craig Richards

Technical Director - Transportation

on behalf of

Beca Limited

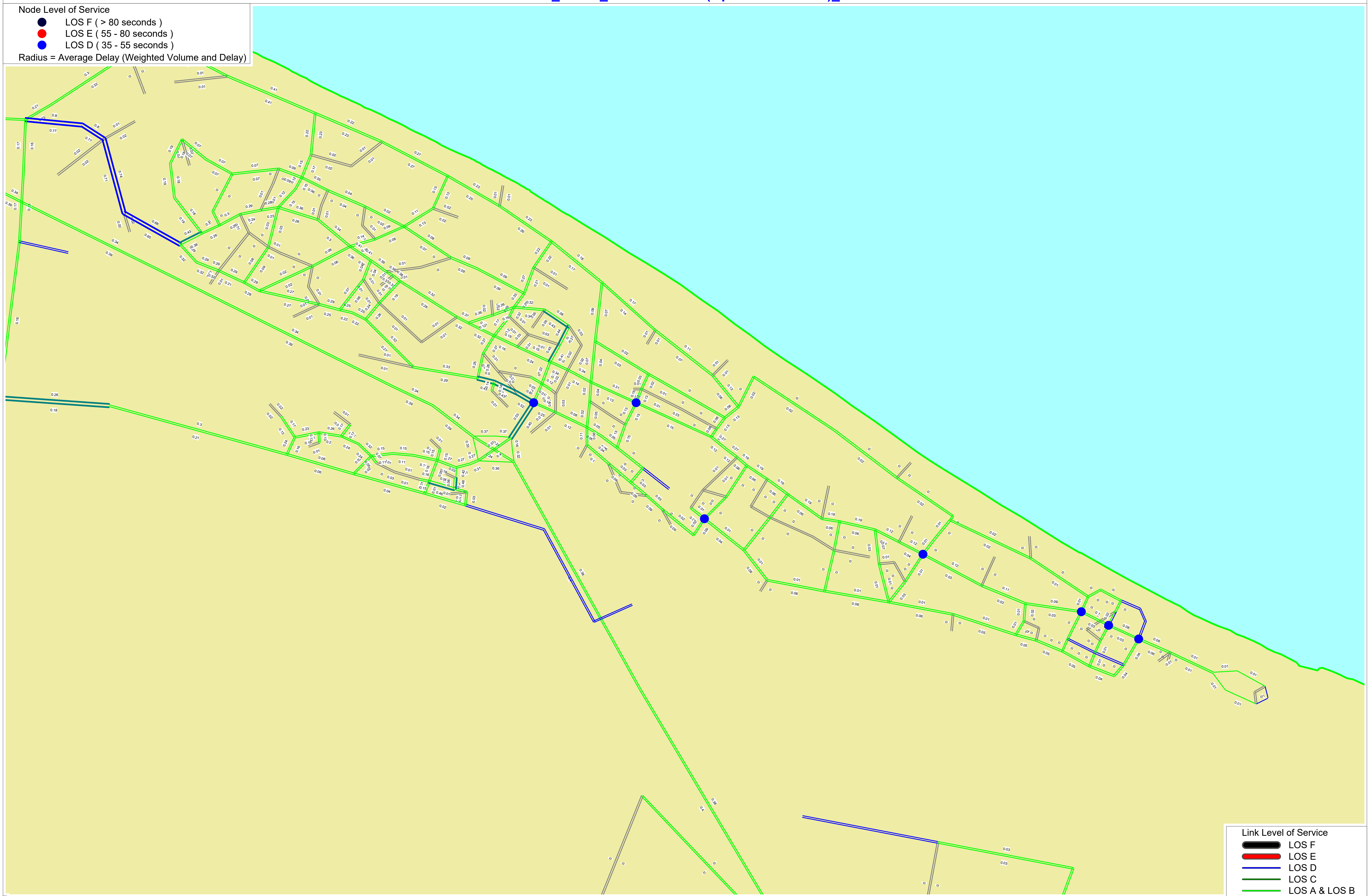
Phone Number: +64 (7) 5773899
Email: Craig.Richards@beca.com

Copy
Rod Bailey, Bell Road Limited Partnership

A

Appendix A – Level of Service Plots

Level of Service_Y2035_Core Scenario (Option 3 land use)_Do Minimum



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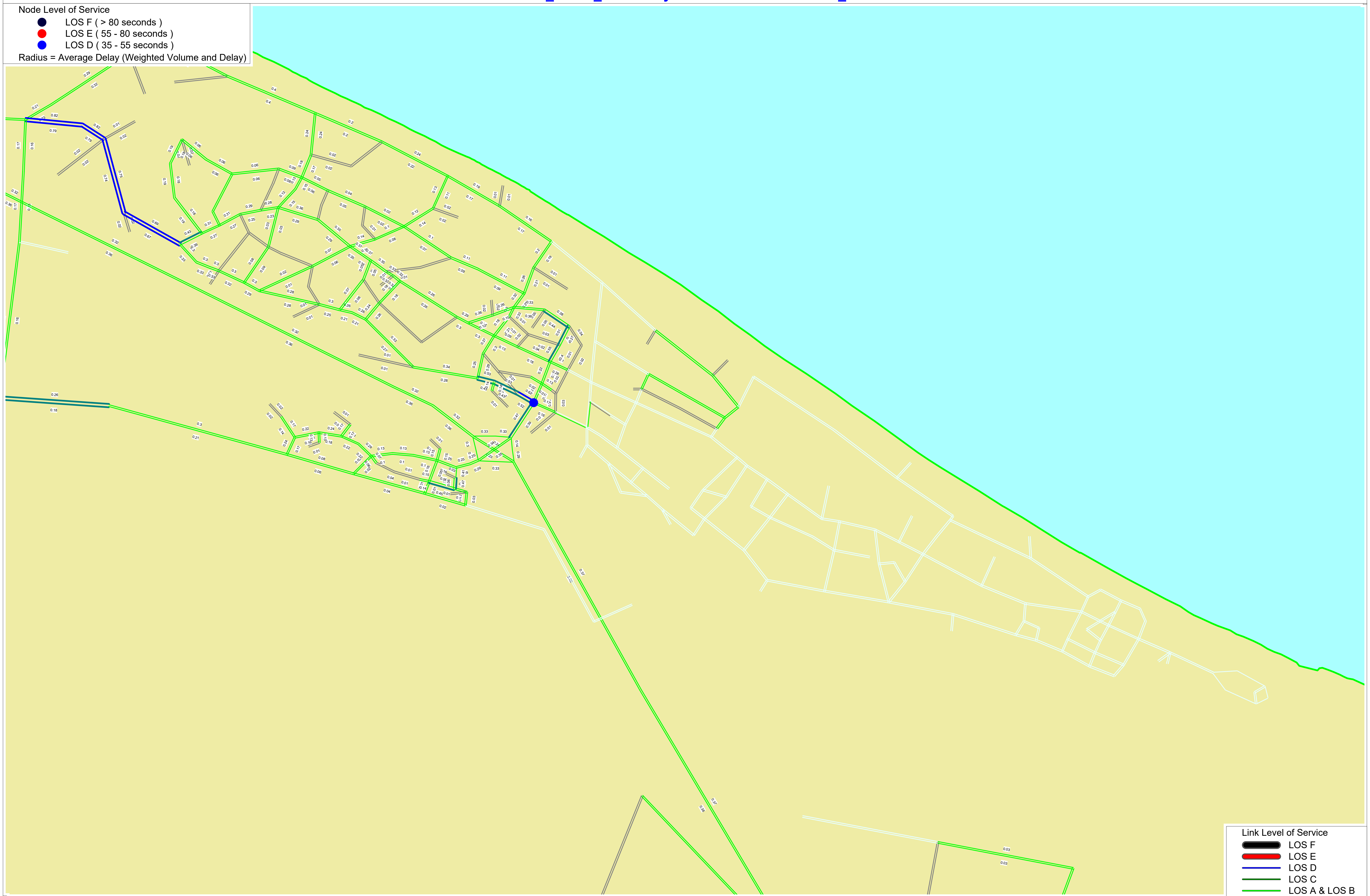
Level of Service_Y2035_Sensitivity Test 1 Scenario land use_Do Minimum



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Level of Service_Y2048_Core Scenario (Option 3 land use)_Do Minimum

C:\Users\AD488\Projects\TTSM\TTSM23_WairakeiSouth\Model\Wairakei_South_R2\Y2048_v2\CS_DM_v3\Option 3_v3\LOS_Toll_MAX.NET

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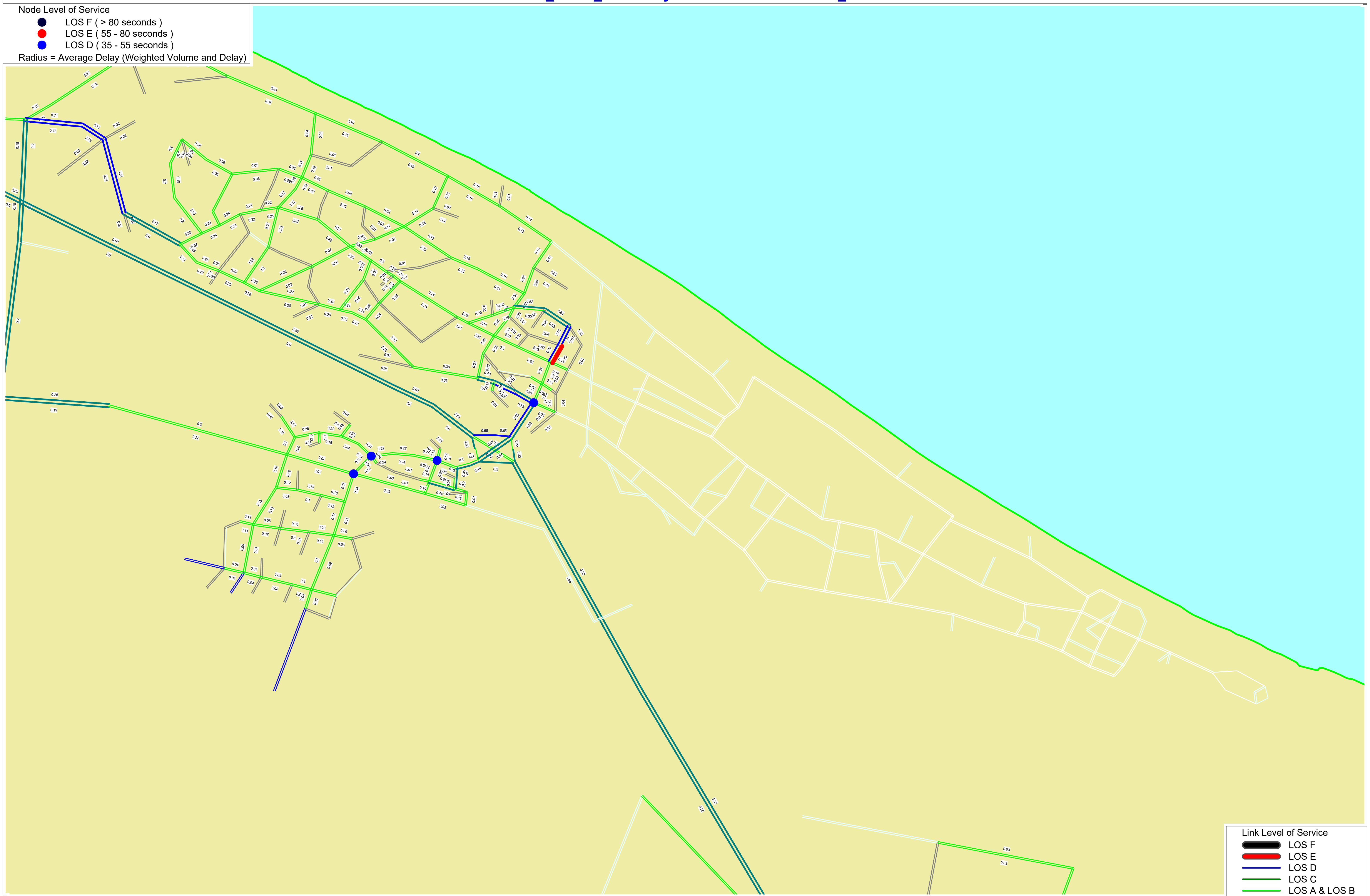
Level of Service_Y2048_Sensitivity Test 1 Scenario land use_Do Minimum



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Level of Service_Y2063_Core Scenario (Option 3 land use)_Do Minimum

C:\Users\AD488\Projects\TTSM\TTSM23_WairakeiSouth\Model\Wairakei_South_R2\Y2063\CS_DM_v3\LOS_Toll_MAX.NET

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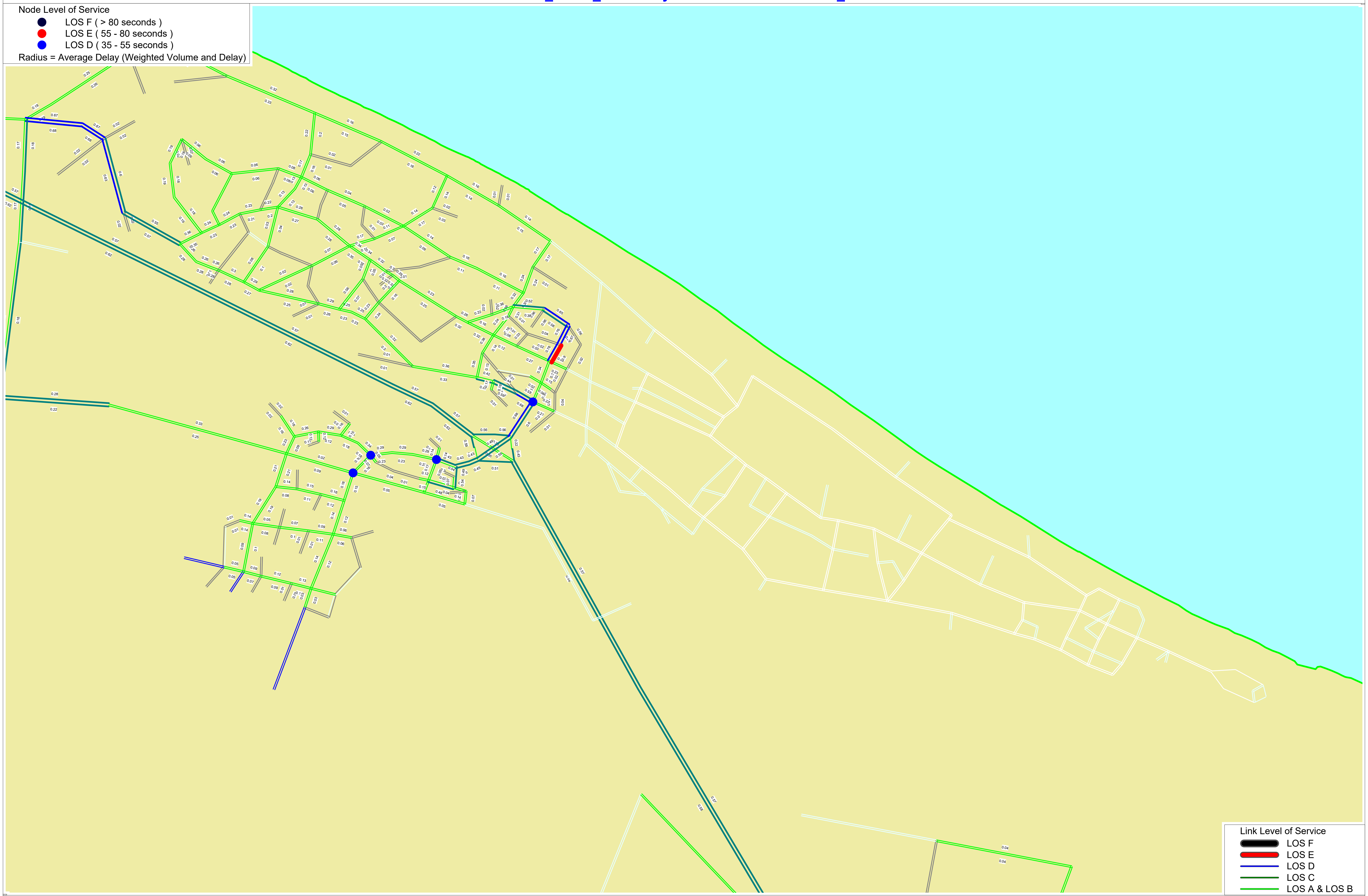
Level of Service_Y2063_Sensitivity Test 1 Scenario land use_Do Minimum



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C

Appendix C - TEL and PEI Interchange Toll Assumptions


2
Tauranga Eastern Link Toll Road
N
29 A
2
Pāpāmoa
Tara Road
Welcome Bay
Domain Road Interchange
Pāpāmoa East Interchange
Proposed second toll point
2
Maketu
Existing toll gantry
Free alternative route
Te Puke
Paengaroa Roundabout
2
Paengaroa
33
Proposed toll pricing
Light vehicles **$1.10**
Heavy vehicles **$2.80**
Light vehicles **$2.30**
Heavy vehicles **$5.60**
Light vehicles **$2.30**
Heavy vehicles **$5.60**
(no change)
NZ TRANSPORT AGENCY
WAKA KOTAHI
Te Kāwanatanga o Aotearoa
New Zealand Government
25-SH-090

D

Appendix D – Crash and Emissions (TTSM)

Crash Cost

Road Type	Speed Band (km/hr)	Crash Cost (Cents/Veh km)	2035_DM	2035_CS_DM	2035_ST1_DM	2048_DM	2048_CS_DM	2048_ST1_DM	2048_Opt10A_DM	2048_CSS1	2048_CSS2	2063_DM	2063_CS_DM	2063_ST1_DM	2063_CSS1	2063_CSS2
Local Road	<=60	16.88	353,721,413	352,385,350	343,009,243	430,808,721	428,437,130	410,369,138	411,149,364	427,804,672	428,192,559	533,546,604	539,903,975	492,467,834	539,425,135	539,859,257
Arterial	<=60	16.71	400,099,439	398,614,585	400,000,002	456,384,347	456,605,346	462,833,990	463,673,202	456,414,625	456,288,557	524,629,377	527,561,568	531,252,170	527,262,214	527,320,136
	>60 & <=80	11.68	106,134,201	105,999,077	105,387,292	110,857,586	110,273,656	110,440,356	110,457,616	110,339,291	110,346,215	114,461,391	113,937,656	113,717,344	113,887,744	113,986,683
	>80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rural	<=60	12.41	62,137,866	60,784,028	61,408,872	72,398,615	69,396,665	72,282,858	72,265,618	69,385,854	69,400,793	90,571,344	86,869,446	92,383,272	86,900,623	86,952,148
	>60 & <80	45.38	14,223,079	15,178,304	15,254,395	19,618,844	20,123,171	27,503,559	25,017,697	20,097,704	20,105,936	34,296,425	34,070,410	38,041,464	34,197,554	34,039,377
	>=80	80.18	56,299,049	50,816,728	50,161,918	65,574,631	58,824,367	61,574,114	61,628,478	58,847,719	58,849,364	129,594,992	116,248,604	125,206,252	115,960,937	116,154,429
Major Rural	<=60	16.88	76,700,624	75,163,672	75,504,737	68,764,353	66,083,627	69,050,748	69,152,050	66,108,174	66,127,933	79,464,485	78,784,822	79,257,496	78,502,381	78,837,006
	>60 & <80	9.15	44,759,564	51,723,424	51,951,103	93,571,083	99,809,348	102,177,478	103,741,712	99,795,825	99,758,471	101,892,961	110,915,886	112,028,077	111,079,255	110,923,422
	>=80	27.4	530,959,041	525,016,009	524,084,981	541,902,156	530,345,693	543,825,649	542,923,847	530,414,303	530,408,902	620,765,734	617,698,127	614,613,595	617,701,695	617,199,229
Motorway	<=60	16.56	5,634,529	5,773,617	5,650,120	8,311,847	8,709,599	8,236,325	8,245,265	9,430,208	9,430,571	9,107,603	9,501,875	8,589,898	10,777,740	10,808,847
	>60 & <80	2.09	25,295,353	25,300,940	25,220,827	29,421,594	29,540,501	29,271,058	29,288,211	29,579,553	29,589,952	31,194,505	31,300,650	30,859,685	31,332,169	31,380,518
	>=80	7.6	468,589,301	473,975,770	463,753,040	629,510,051	644,931,680	619,887,867	620,108,388	646,117,173	646,353,721	686,135,969	700,829,806	655,825,202	703,209,649	703,824,805
Total Excluding AR3/Total Crash Cost	**Annual Crash Cost($)**		**$2,144,553,459**	**$2,140,731,503**	**$2,121,386,528**	**$2,527,123,827**	**$2,523,080,784**	**$2,517,453,141**	**$2,517,651,448**	**$2,524,335,102**	**$2,524,852,971**	**$2,955,661,389**	**$2,967,622,825**	**$2,894,242,288**	**$2,970,237,097**	**$2,971,285,856**

Emmisions

Scenarios/Measure	Carbon monoxide (CO)	Carbon dioxide (CO2) equivalent	Volatile organic compounds (VOC)	Nitrogen oxides (NOx)	Nitrogen dioxide (NO2)	PM2.5 E	PM10.0 BT	Fuel Consumption	Population	CO2-eq/ Person
2035_DM	2,269	1,262,537	62	2,191	458	53	128	500,198	244,900	5.2
2035_CS_DM	2,263	1,260,697	62	2,187	457	53	128	499,468	244,900	5.1
2035_ST1_DM	2,240	1,249,806	62	2,170	452	53	127	495,108	244,900	5.1
2048_DM	843	801,906	29	742	150	15	147	310,358	279,600	2.9
2048_CS_DM	842	801,500	29	741	150	15	146	310,169	279,600	2.9
2048_ST1_DM	837	799,243	28	740	149	15	147	309,301	279,600	2.9
2048_Opt10A_DM	838	799,494	28	740	149	15	147	309,394	279,600	2.9
2048_CSS1	843	801,848	29	741	150	15	146	310,301	279,600	2.9
2048_CSS2	843	801,956	29	741	150	15	146	310,342	279,600	2.9
2063_DM	806	828,774	30	724	144	15	173	319,804	342,800	2.4
2063_CS_DM	809	829,000	30	722	144	15	173	319,880	342,800	2.4
2063_ST1_DM	787	812,715	29	710	141	14	170	313,592	342,800	2.4
2063_CSS1	810	829,420	30	722	144	15	174	320,035	342,800	2.4
2063_CSS2	810	829,787	30	722	144	15	174	320,181	342,800	2.4

E

Appendix E – Level of Service Information (TTSM)

The criteria adopted for the LOS analysis is shown in **Table E-1**.

Table E-1: LOS Criteria for Link and Intersection Types

LOS	Intersection[3] (Weighted Average Delay, s)	Rural[4] (rolling) (V/C)	Rural (level) (V/C)	Freeway[5] (FFS<80) (V/C)	Freeway (FFS>80) (V/C)	Arterial[6] & Local (V/C)
A	< 10	< 0.04	< 0.05	< 0.26	< 0.30	< 0.26
B	10 - 20	0.04 - 0.15	0.05 - 0.17	0.26 - 0.40	0.30 - 0.48	0.26 - 0.43
C	20 - 35	0.15 – 0.30	0.17 – 0.33	0.40 – 0.60	0.48 – 0.70	0.43 – 0.62
D	35 - 55	0.30 – 0.46	0.33 – 0.58	0.60 – 0.85	0.70 – 0.90	0.62 – 0.82
E	55 - 80	0.46 – 0.90	0.58 – 1.00	0.85 – 1.00	0.90 – 1.00	0.82 – 1.00
F	> 80	> 0.9	> 1.00	> 1.00	> 1.00	> 1.00

[3] HCM2000 Chapter16- Signalised Intersection.

[4] Austroad Part2- Roadway Capacity, 1988. Assumed 80% of sight distance length.

[5] HCM2000 Chapter23- Basic Freeway Segment.

[6] Technical paper "*Performance Measures and Threshold Value for Northeast Ohio Areawide Coordinating Agency's (NOACA's) Congestion Management Process, NOACA, August 2007*"

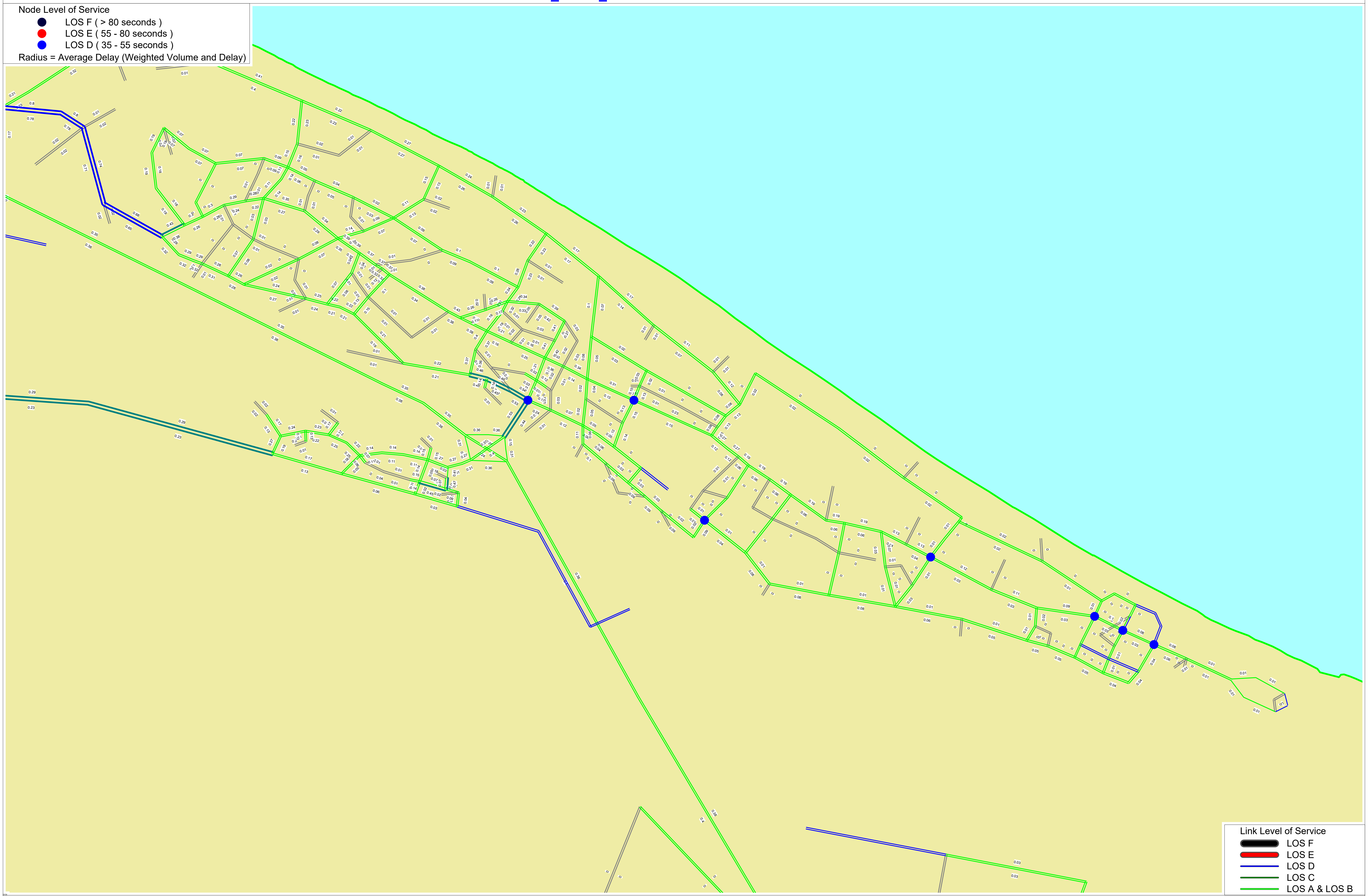
F

Appendix F – TTSM Level of Service Plots

Level of Service_Y2035_Do Minimum

C:\Users\AD488\Local Projects\TTSM\TTSM23_WairakeiSouth\Model\Wairakei_South_R3\Y2035\DM\LOS_Toll_MAX.NET

Level of Service_Y2035_Core Scenario



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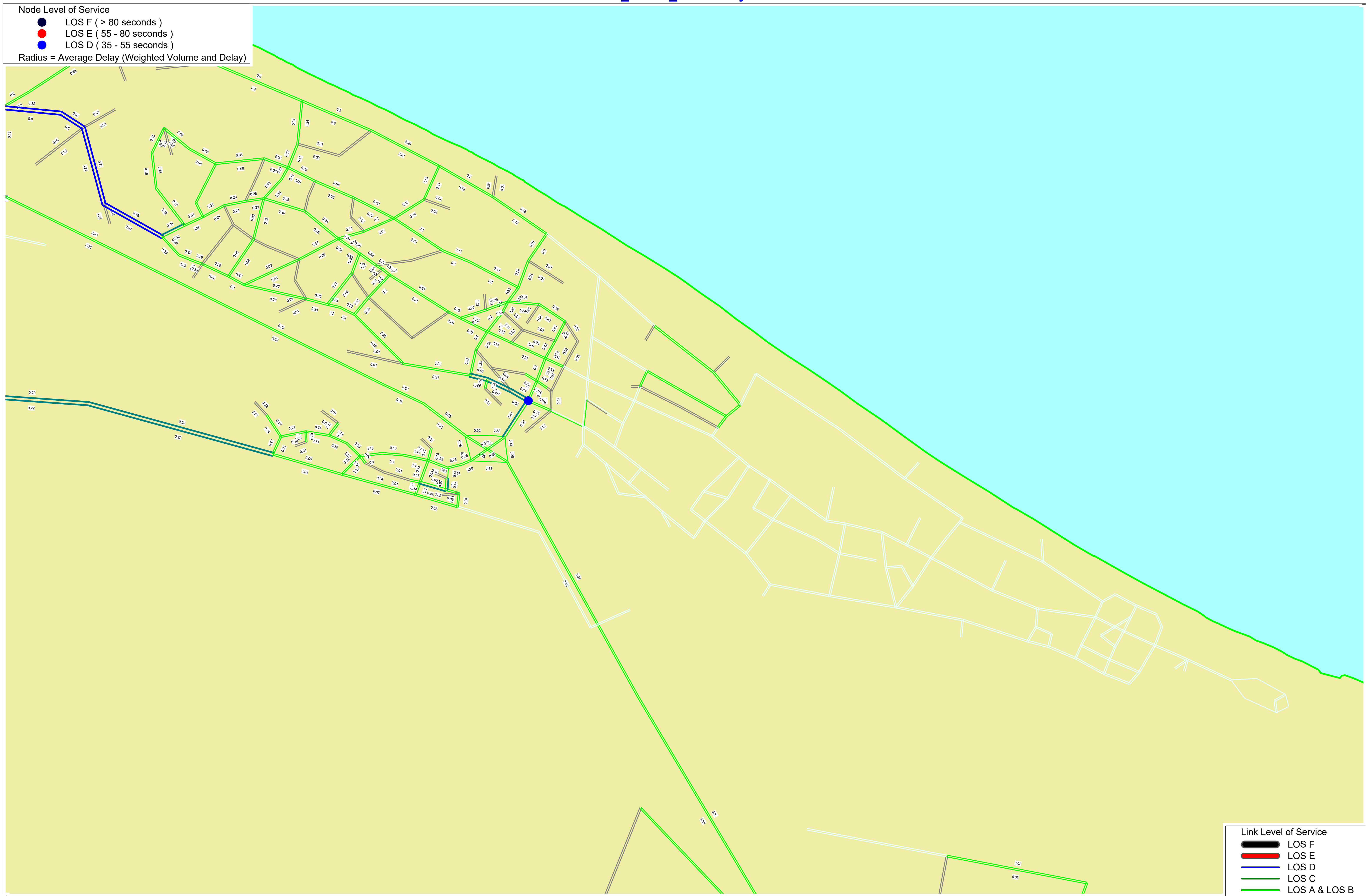
Level of Service_Y2035_Sensitivity Test 1 Scenario



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Level of Service_Y2048_Do Minimum

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Level of Service_Y2048_Core Scenario

C:\Users\AD488\Local Projects\TTSM\TTSM23_WairakeiSouth\Model\Wairakei_South_R3\Y2048\CS_DM\LOS_Toll_MAX.NET

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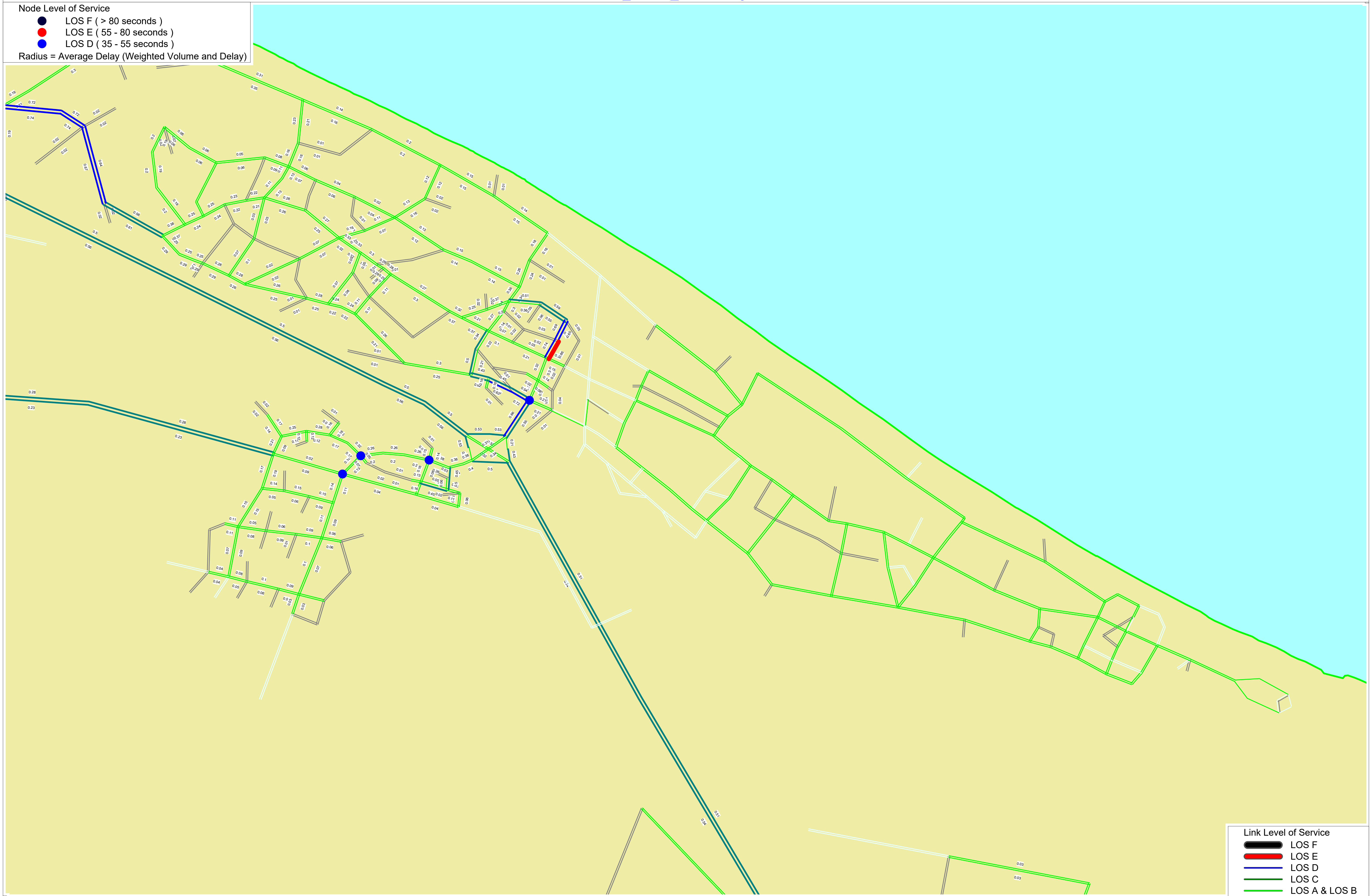
Level of Service_Y2048_Sensitivity Test 1 Scenario



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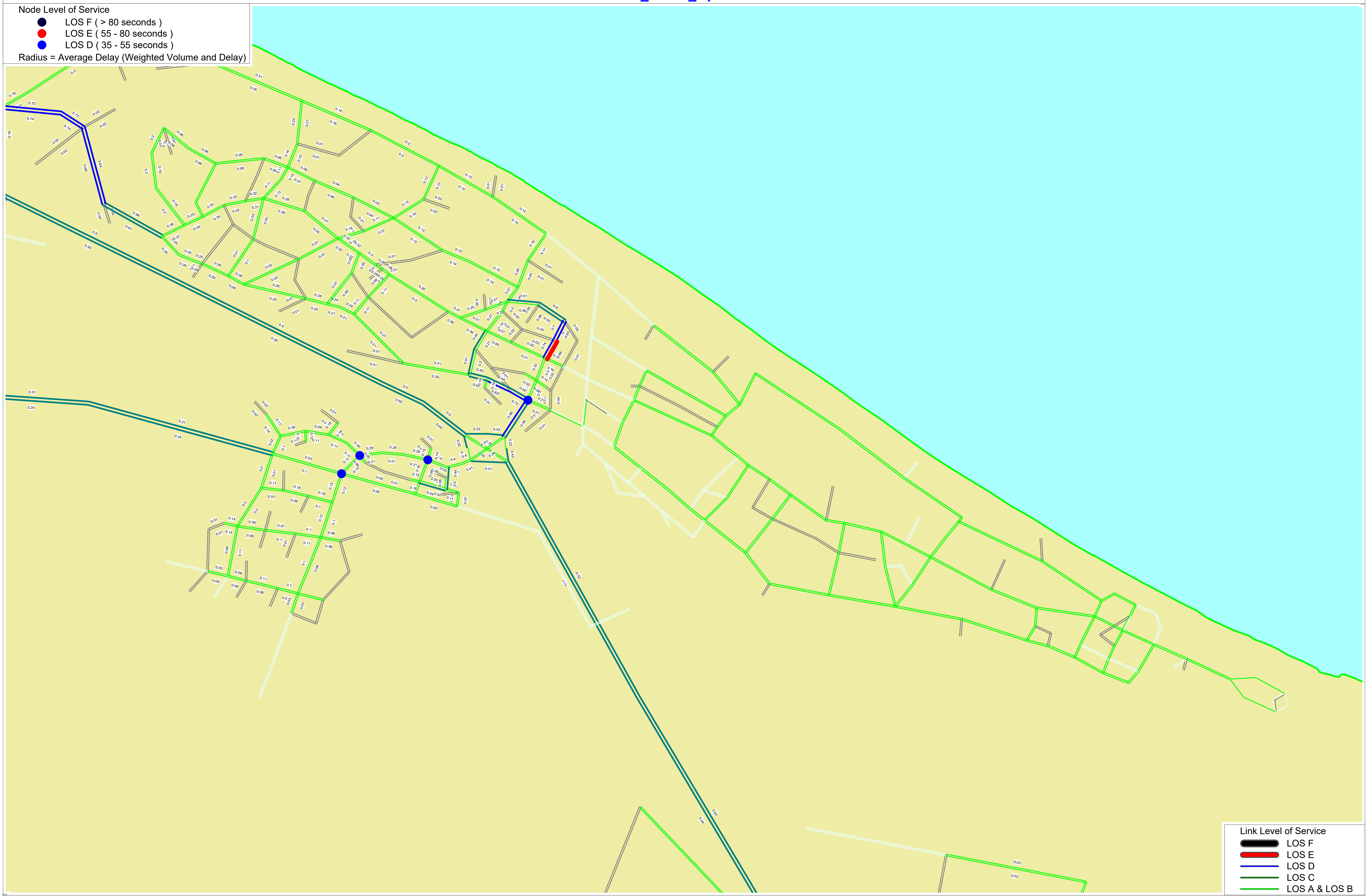
Level of Service_Y2048_Option 10A Scenario



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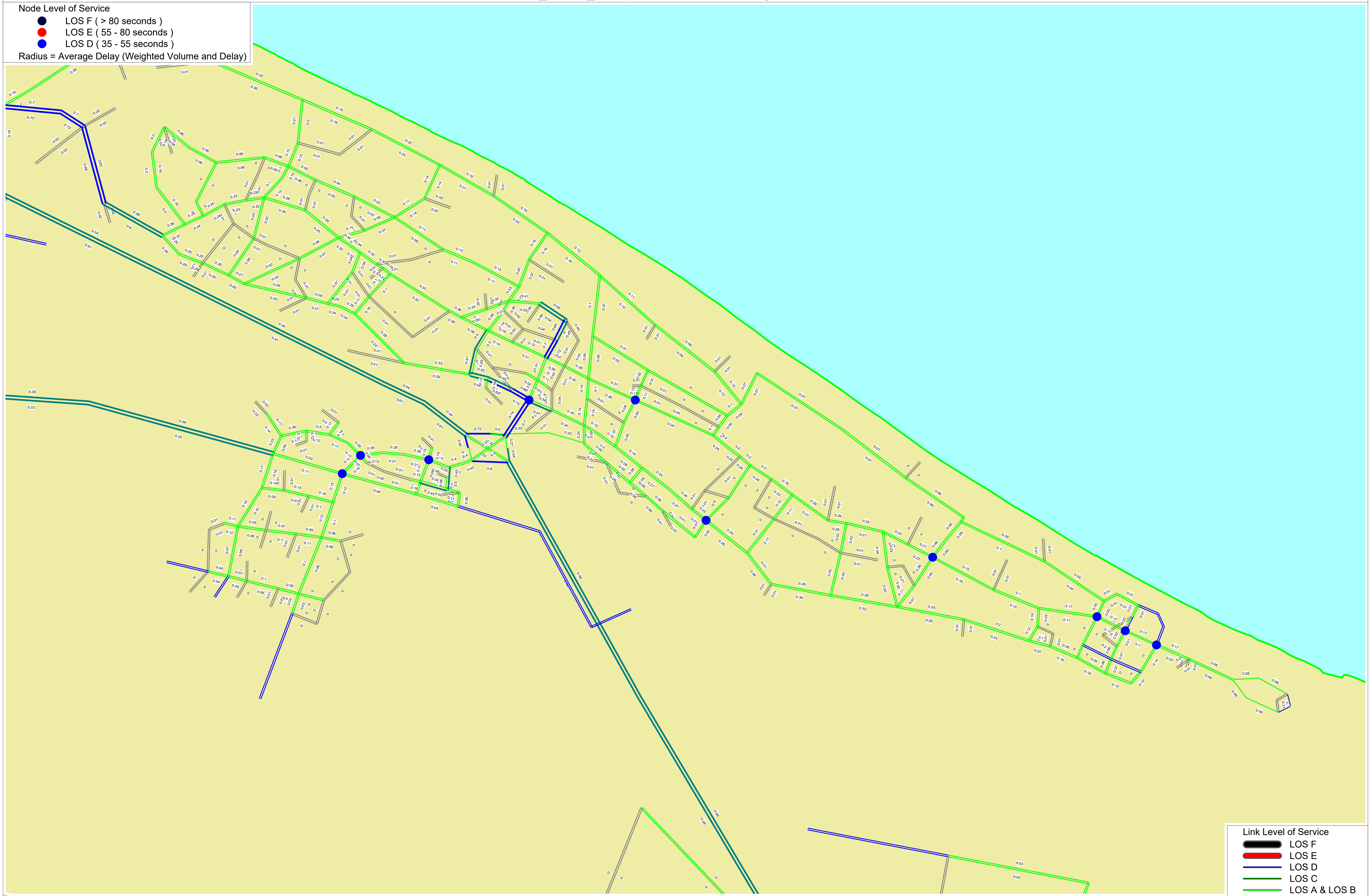
Level of Service_Y2048_Comprehensive Sensitivity Scenario 1



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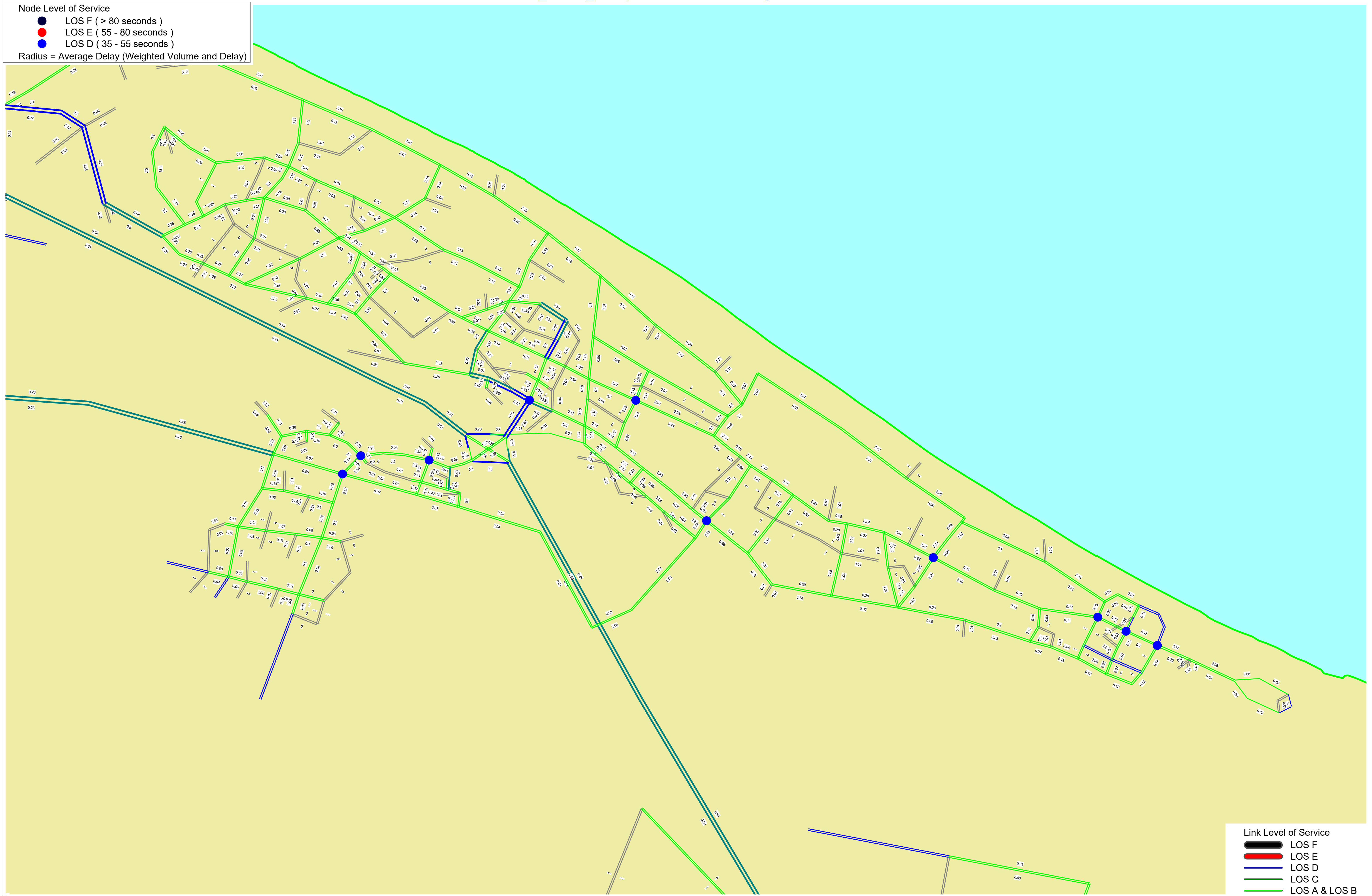
Level of Service_Y2048_Comprehensive Sensitivity Scenario 2



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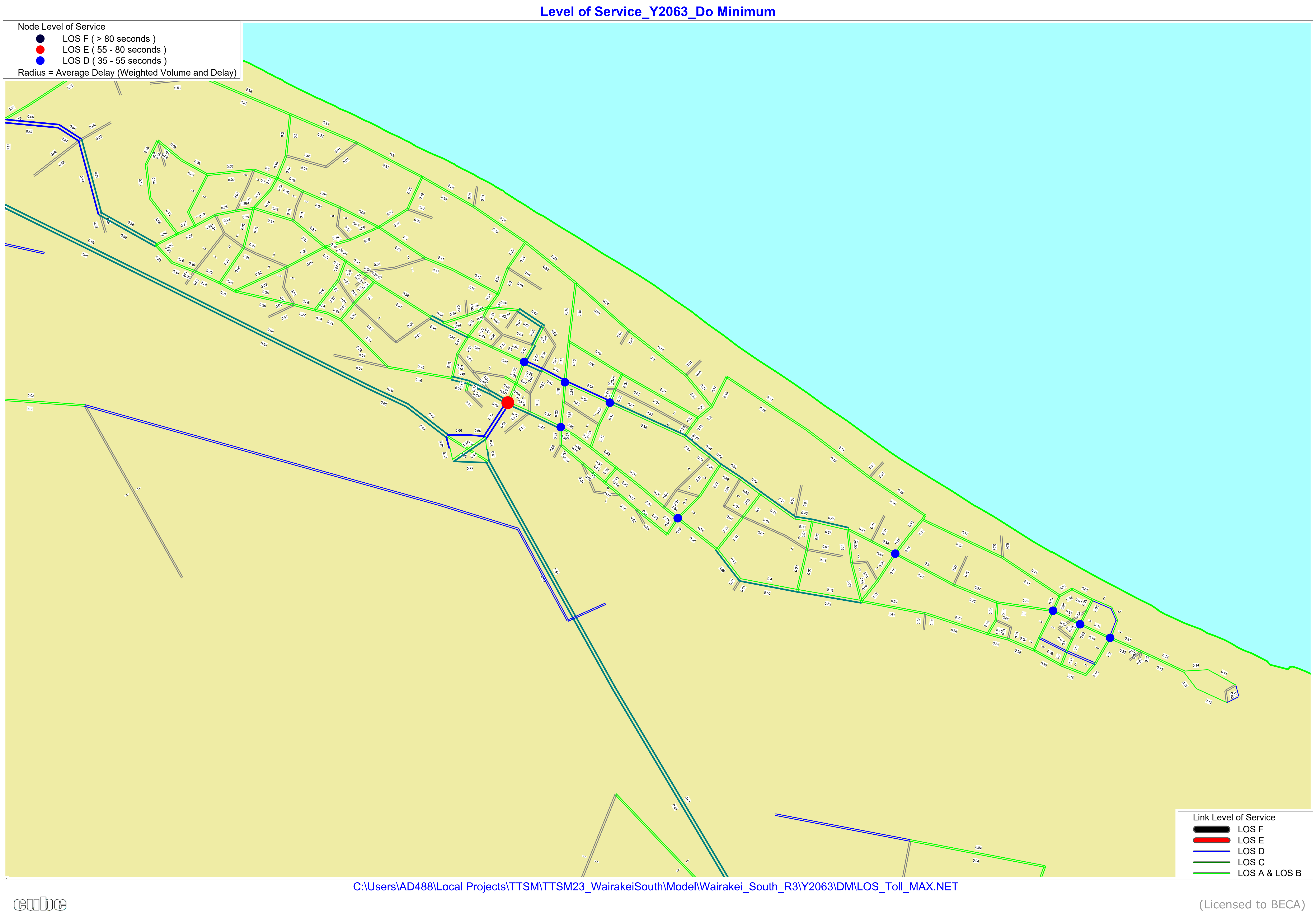

Level of Service_Y2063_Do Minimum
Node Level of Service
LOS F (> 80 seconds)
LOS E (55 - 80 seconds)
LOS D (35 - 55 seconds)
Radius = Average Delay (Weighted Volume and Delay)
Link Level of Service
LOS F
LOS E
LOS D
LOS C
LOS A & LOS B
C:\Users\AD488\Local Projects\TTSM\TTSM23_WairakeiSouth\Model\Wairakei_South_R3\Y2063\DM\LOS_Toll_MAX.NET
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Level of Service_Y2063_Core Scenario

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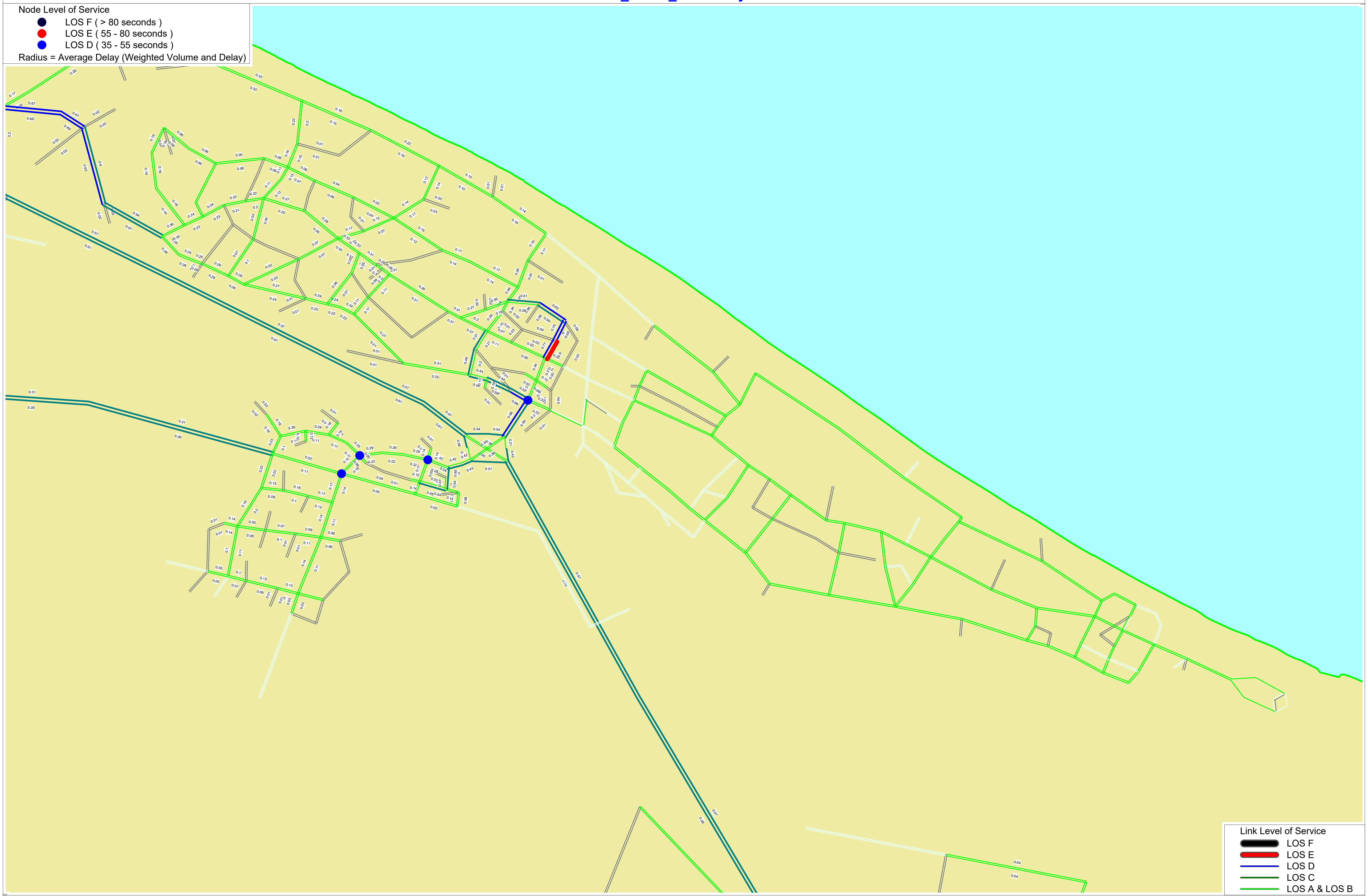
Level of Service_Y2063_Sensitivity Test 1 Scenario



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Level of Service_Y2063_Comprehensive Sensitivity Scenario 1

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Level of Service_Y2063_Comprehensive Sensitivity Scenario 2

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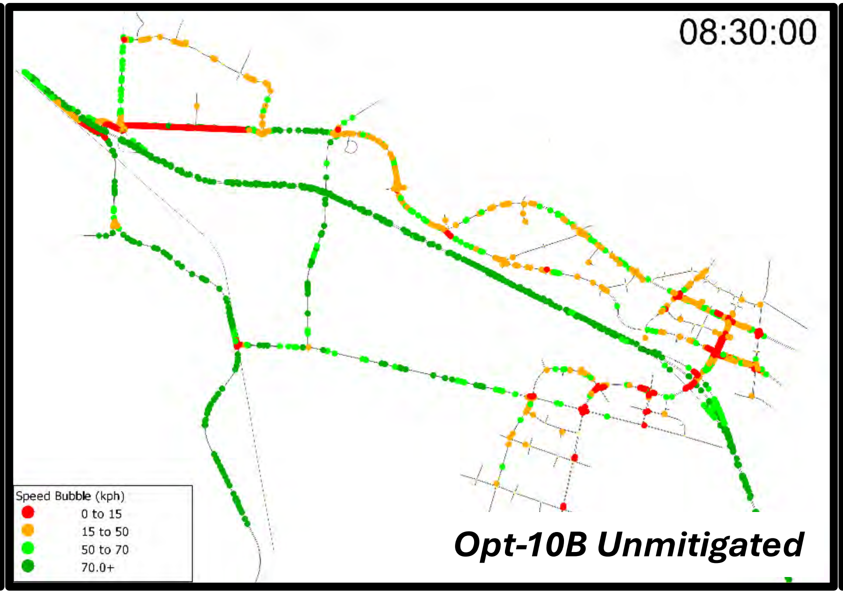
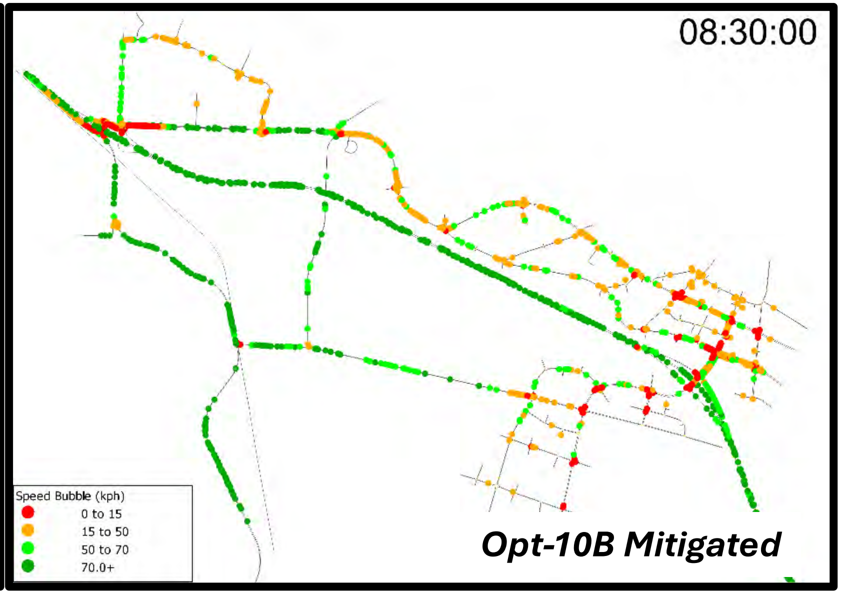
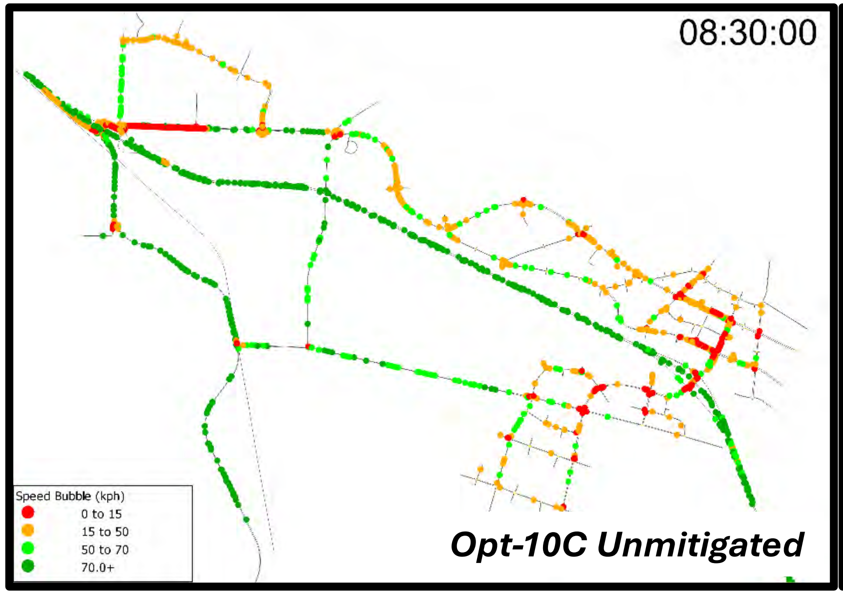
G

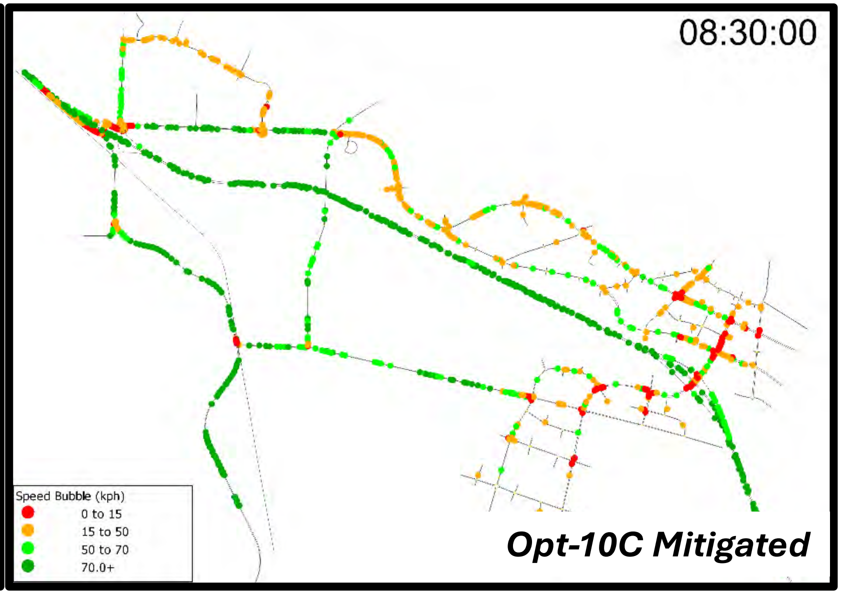
Appendix G – TTHM Congestion Plots

2048 AM Peak Congestion Comparison – Network Wide

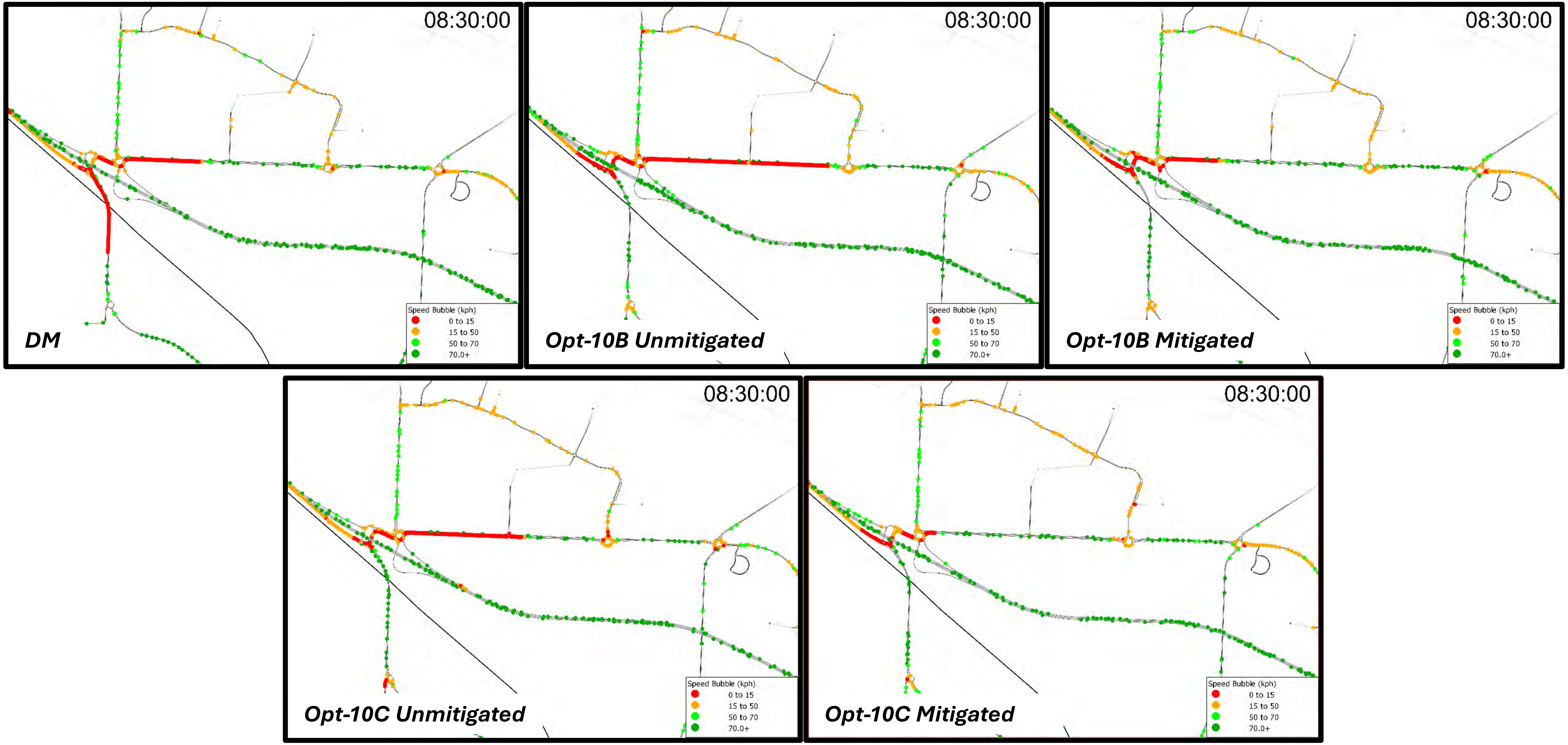




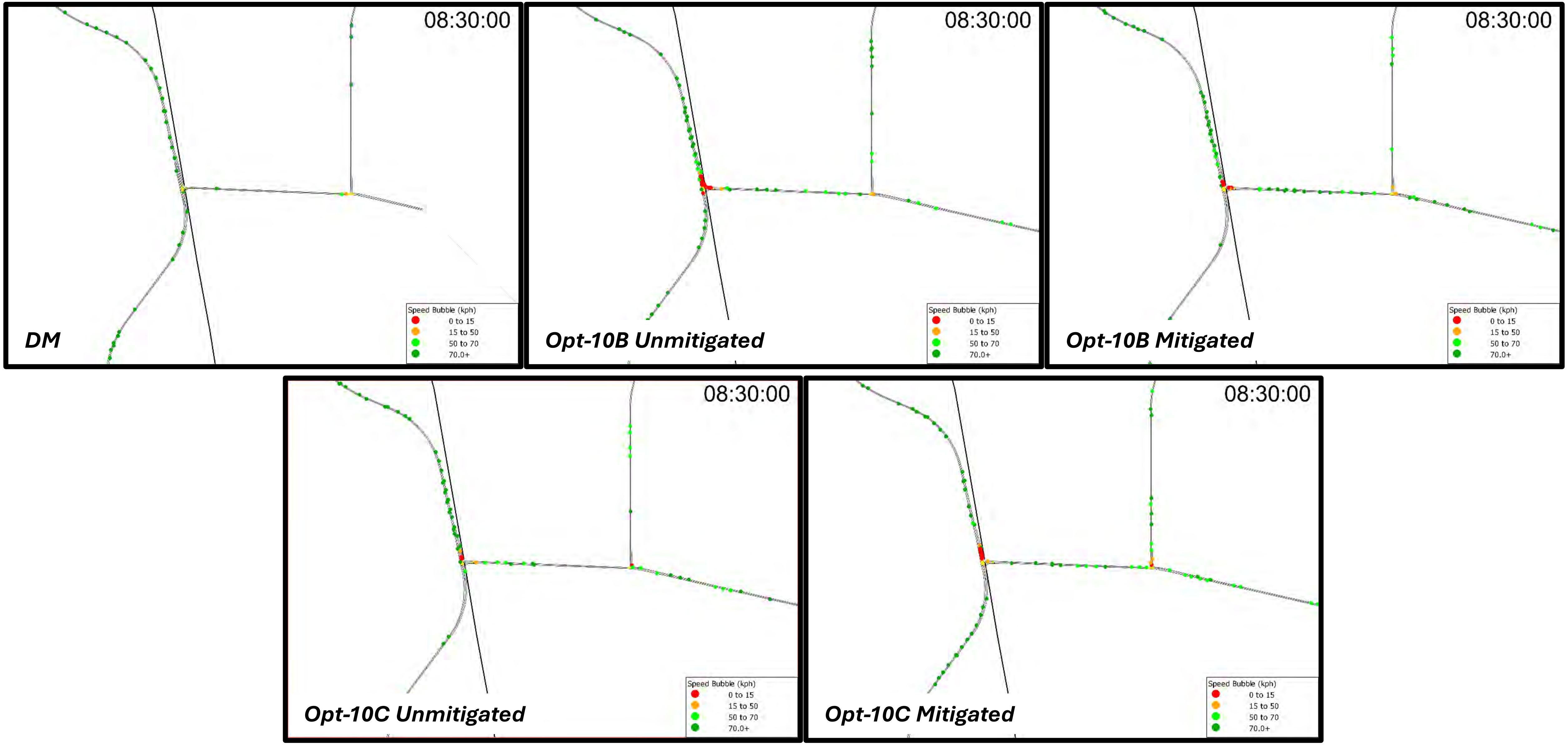




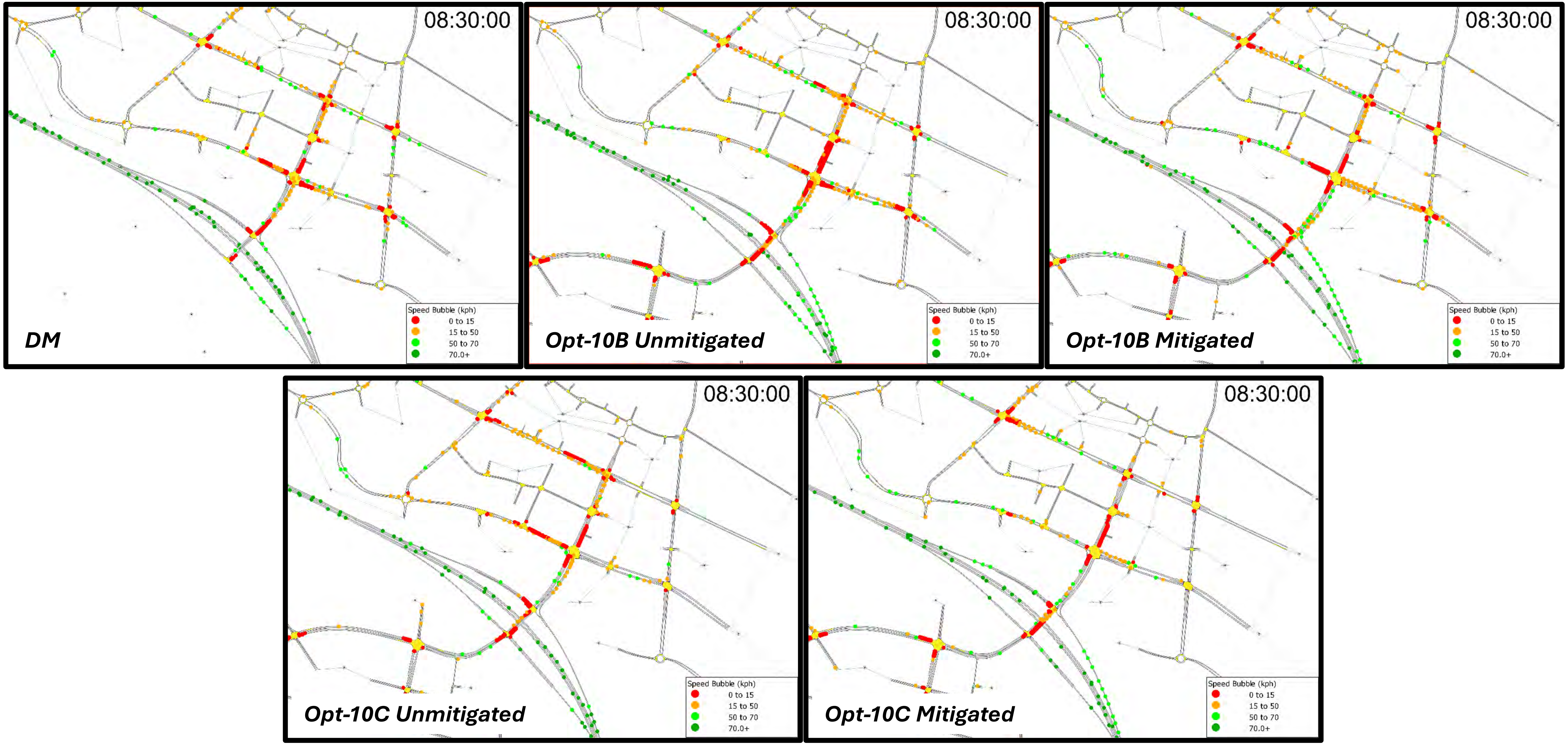
2048 AM Peak Congestion Comparison - Domain



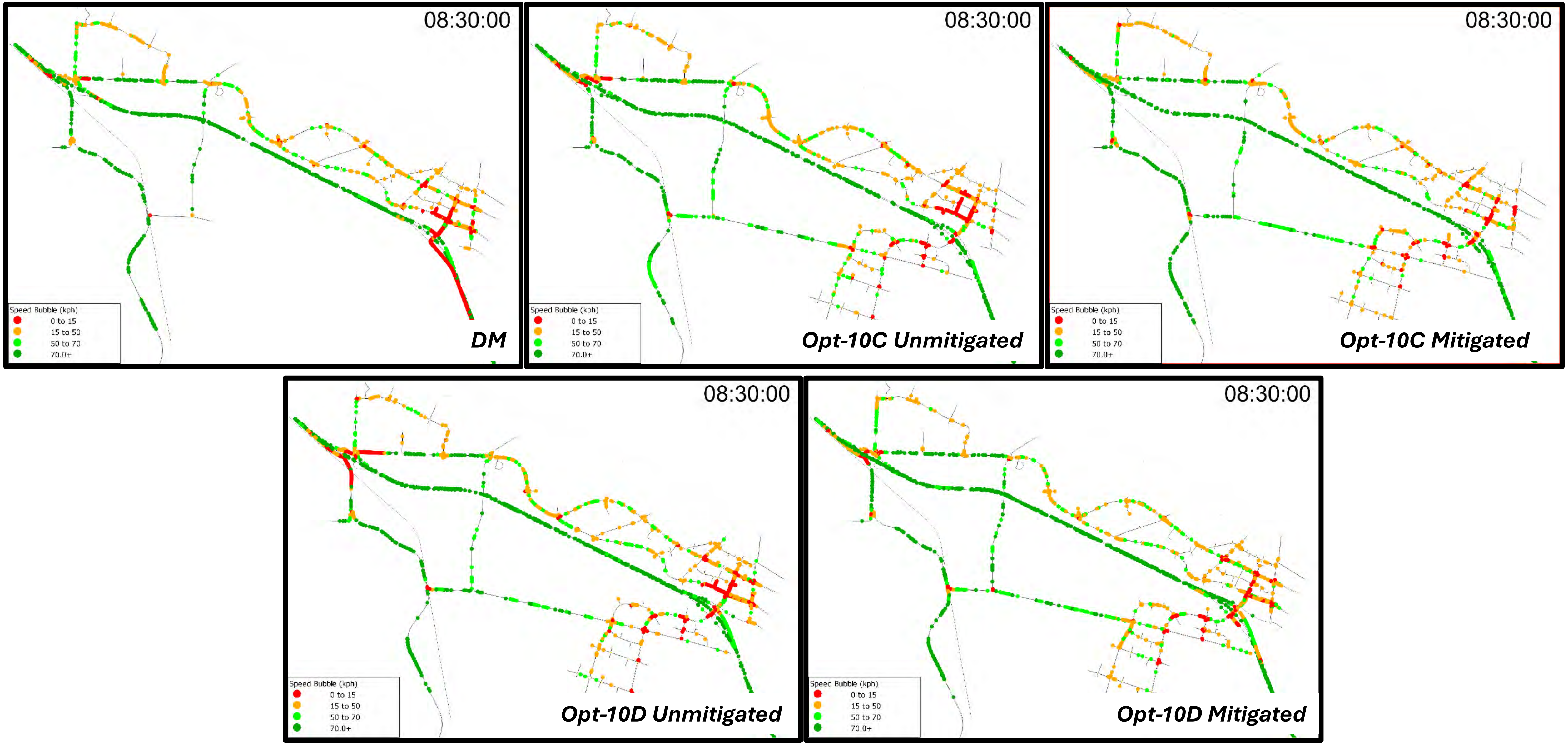
2048 AM Peak Congestion Comparison – Te Puke Hwy



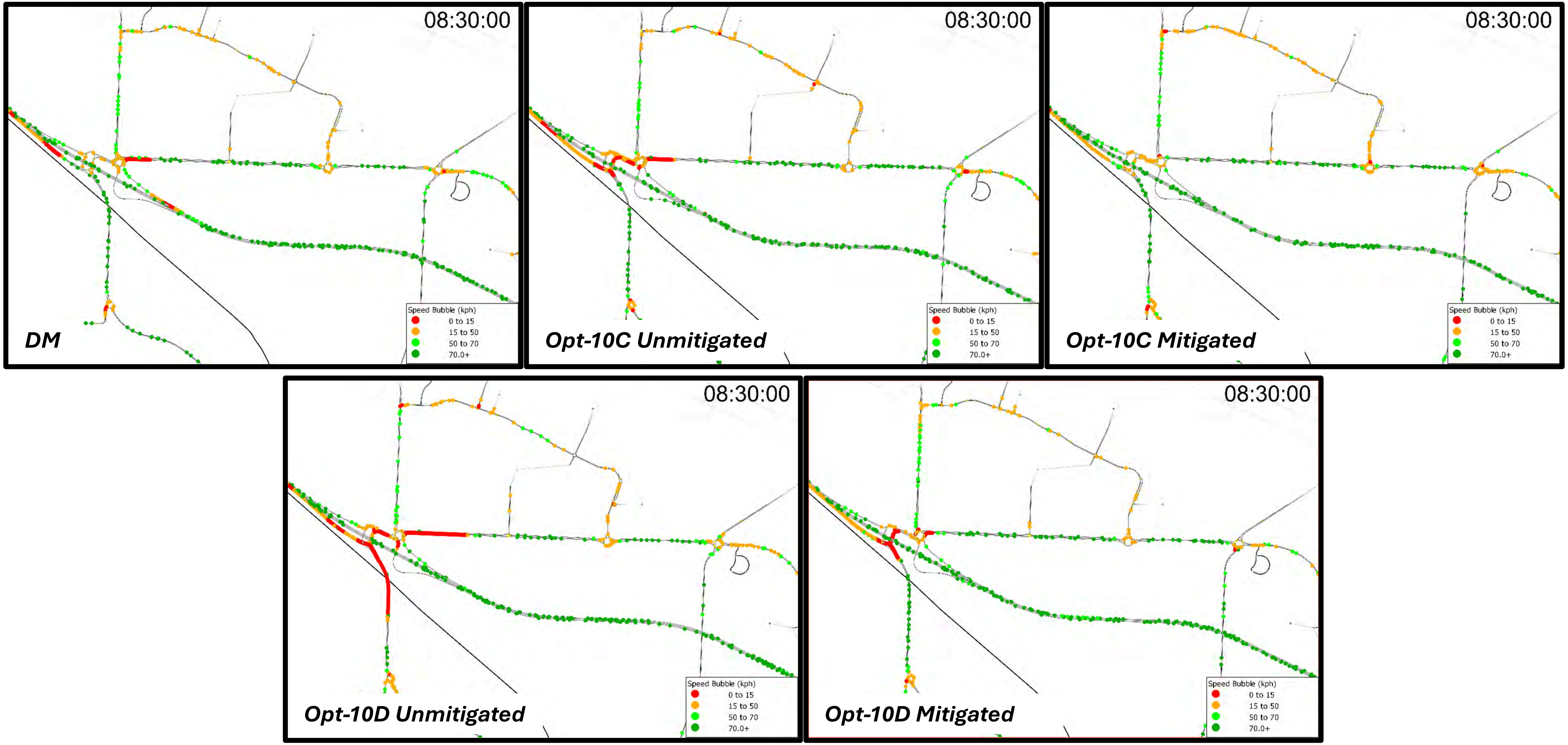
2048 AM Peak Congestion Comparison - Wairakei



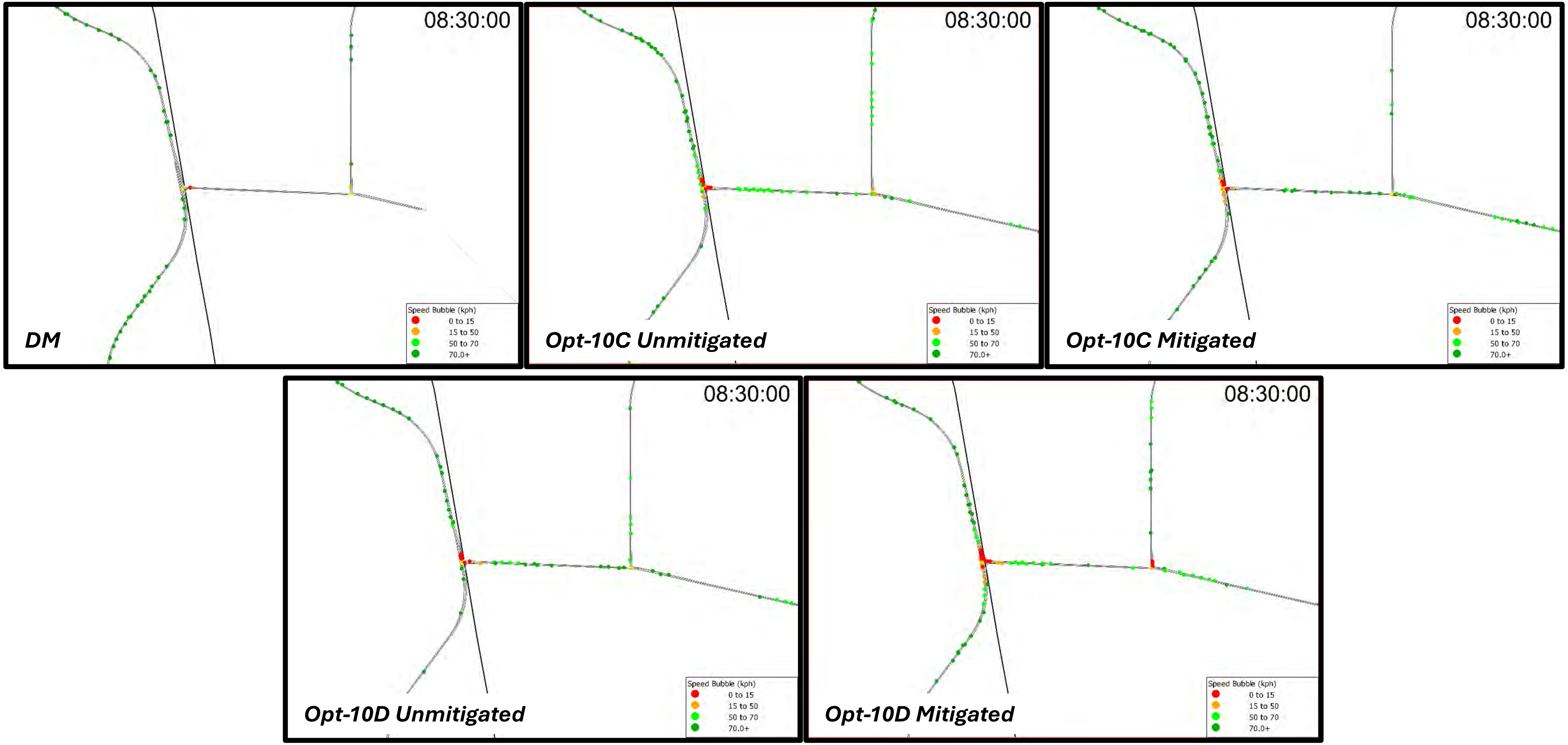
2063 AM Peak Congestion Comparison – Network Wide



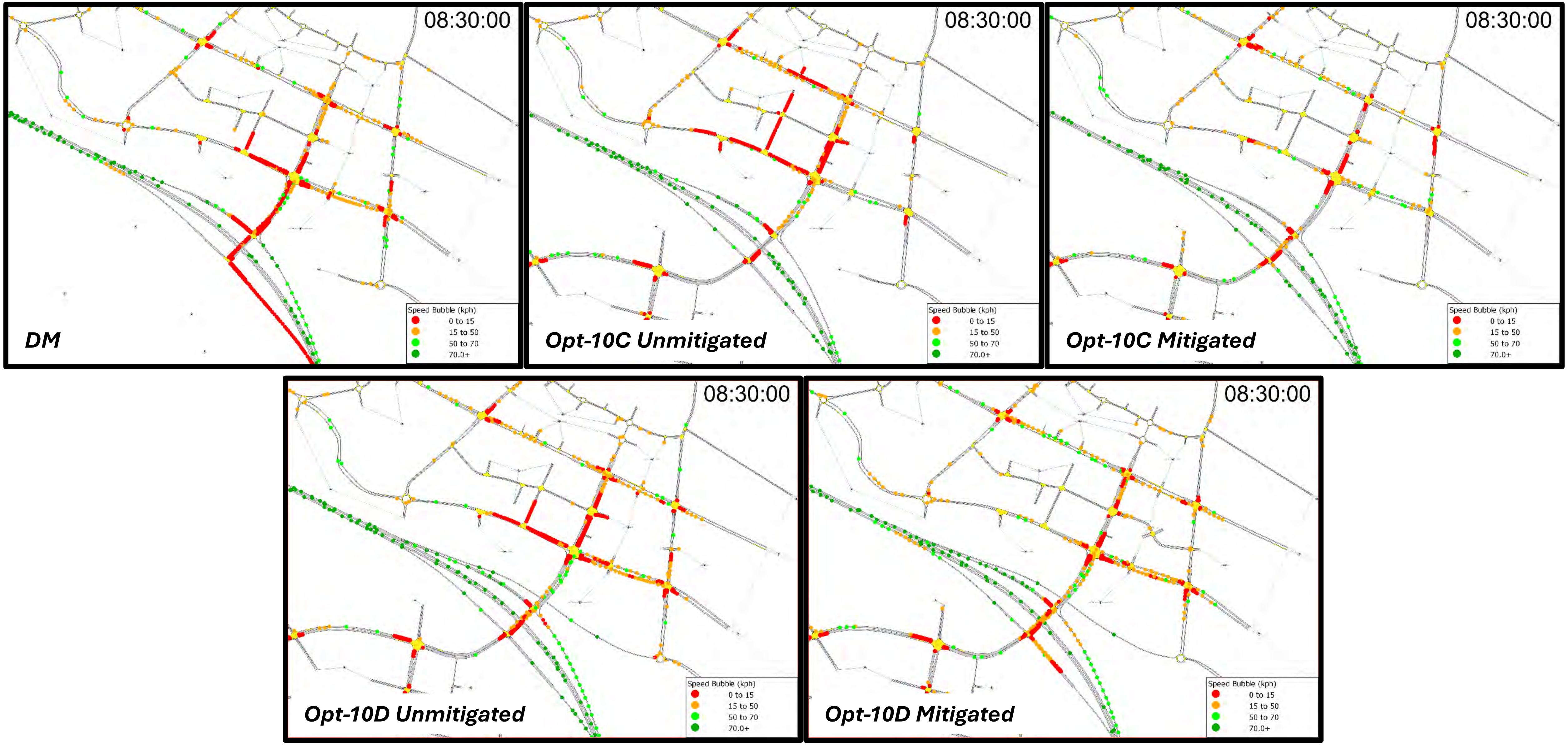
2063 AM Peak Congestion Comparison - Domain



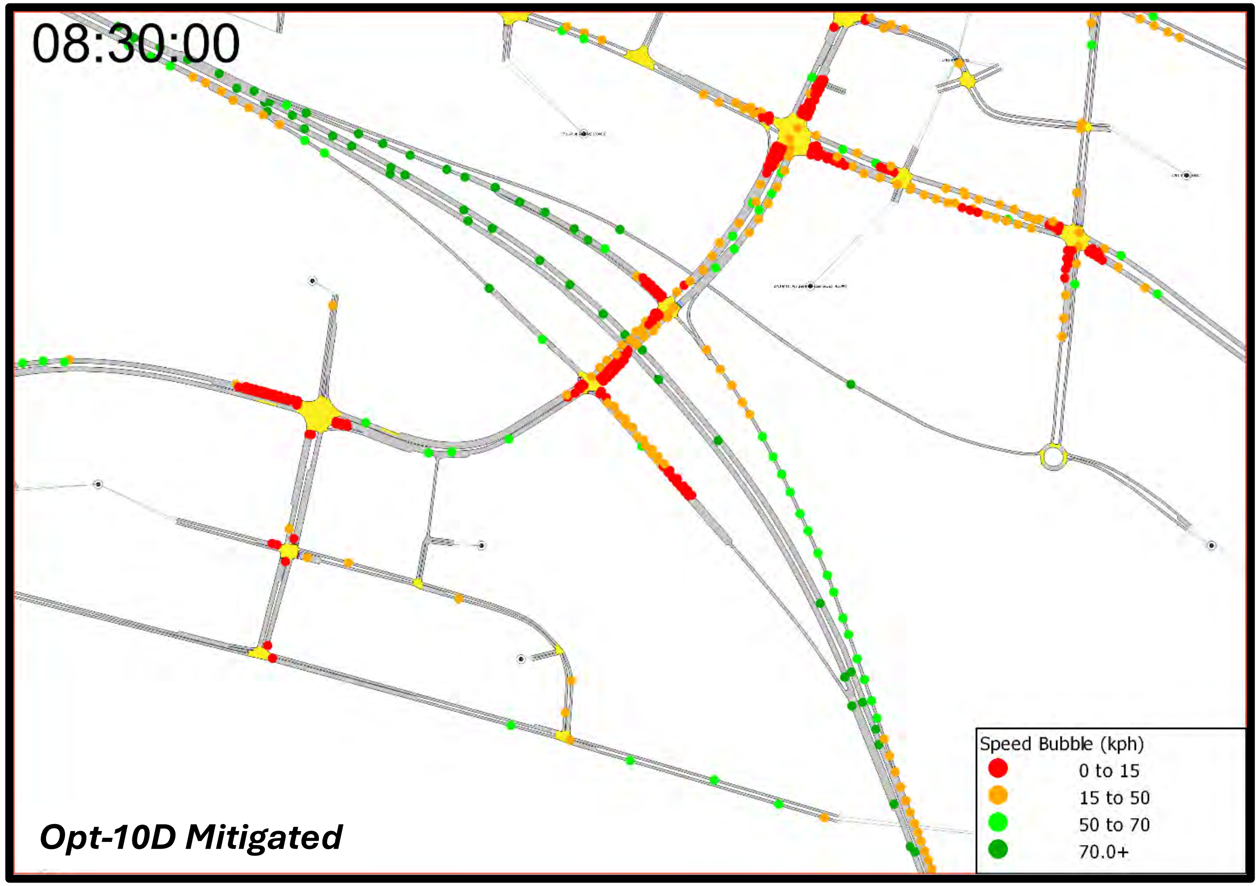
2063 AM Peak Congestion Comparison – Te Puke Hwy



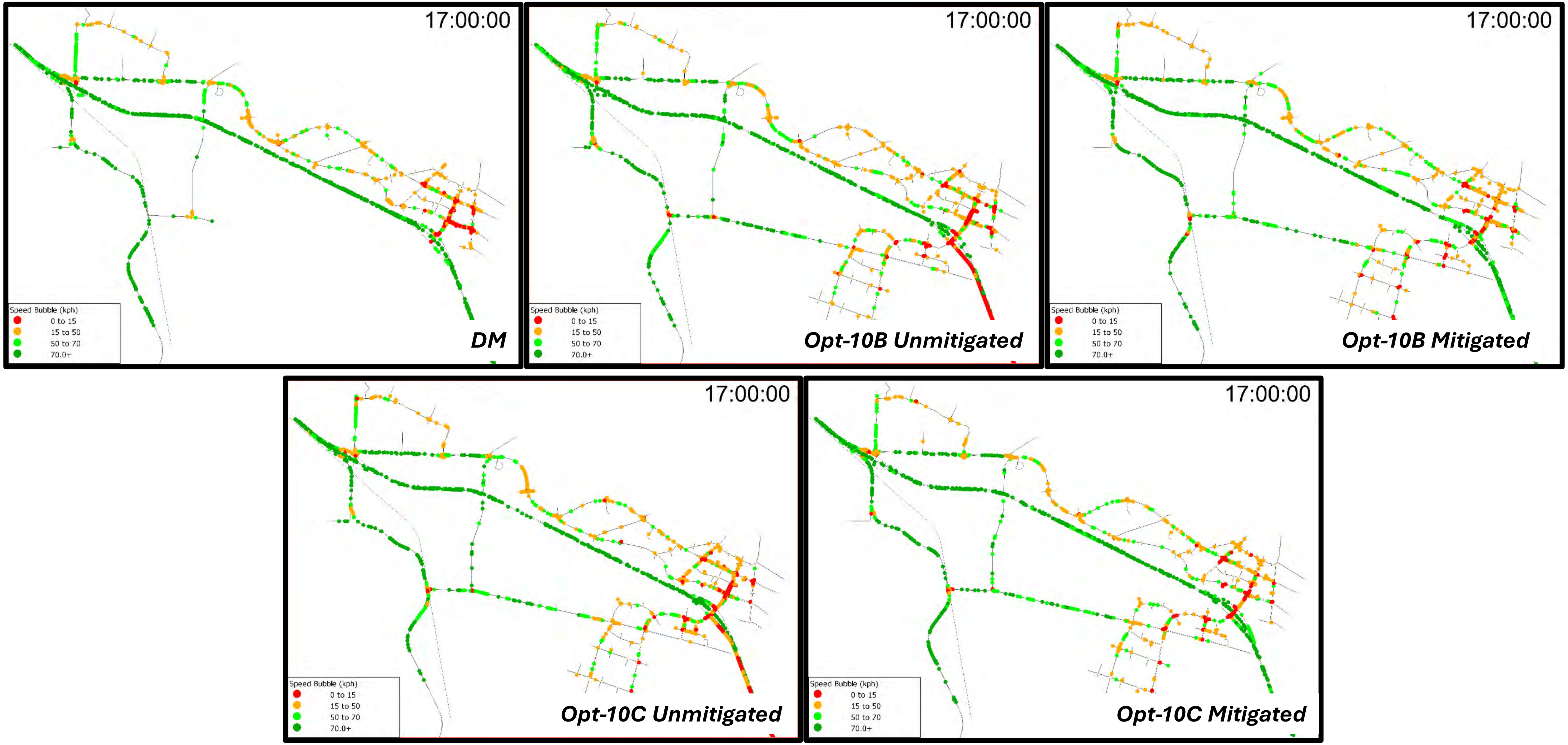
2063 AM Peak Congestion Comparison - Wairakei



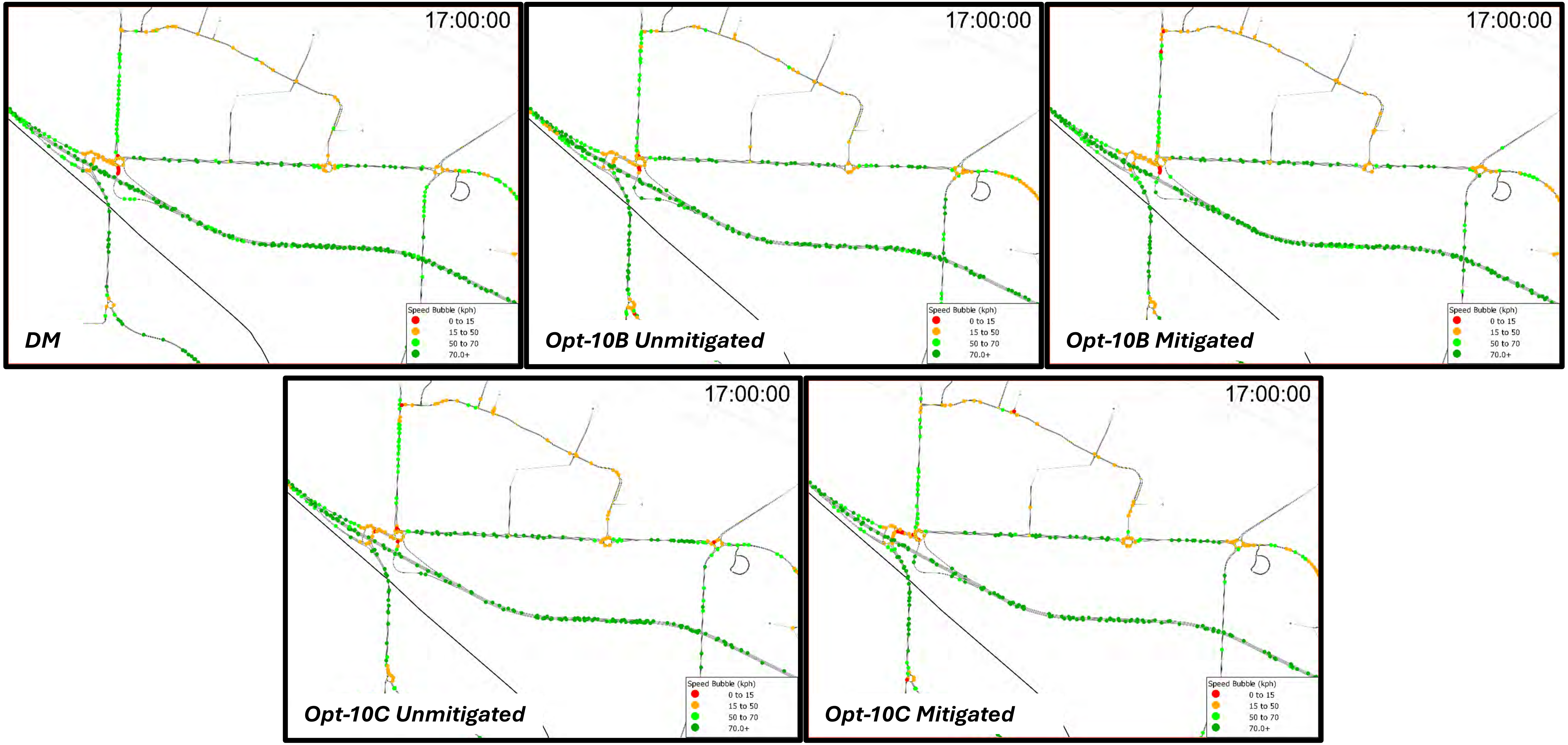
2063 AM Peak Congestion Comparison – PEI Bypass / Bell Rd Connection



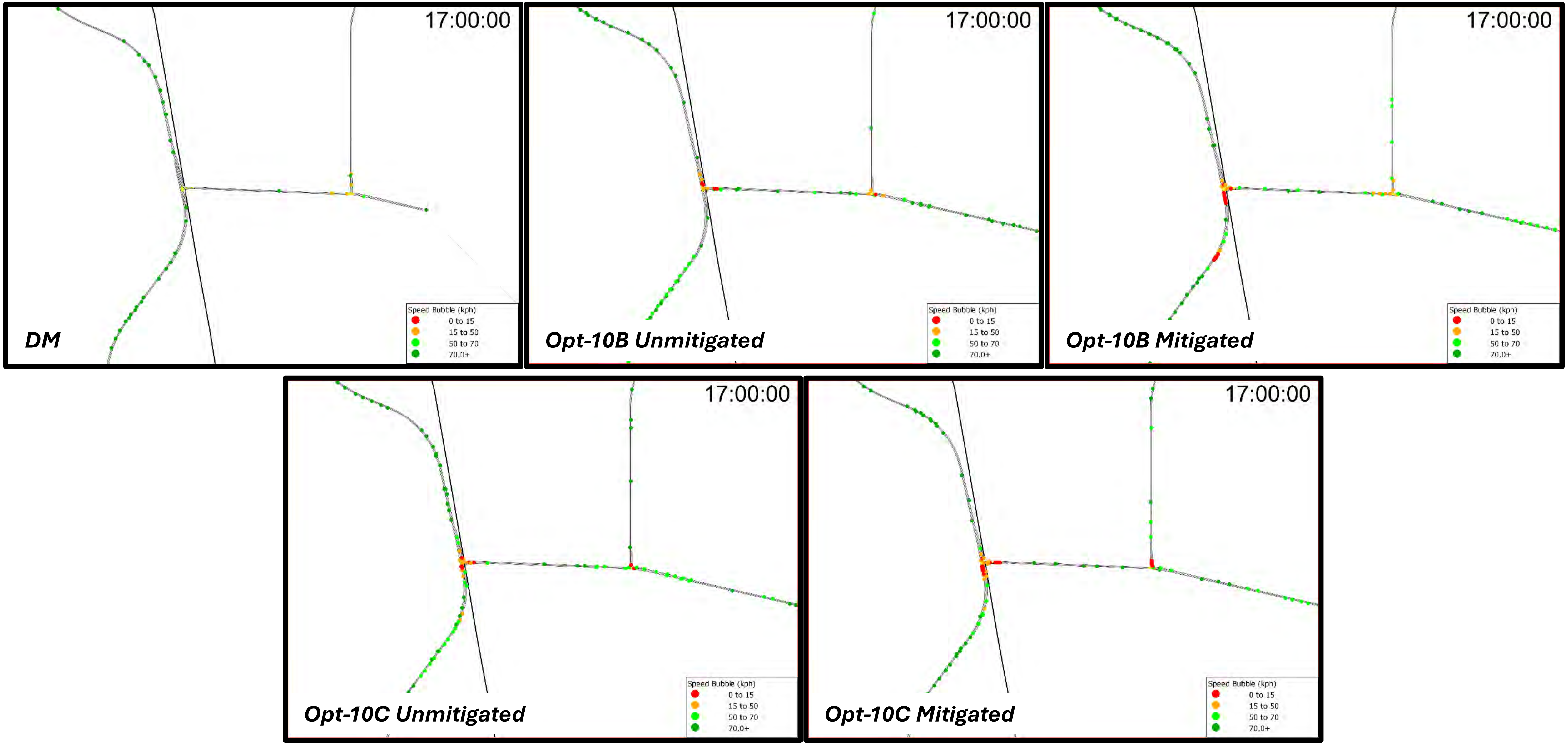
2048 PM Peak Congestion Comparison – Network Wide



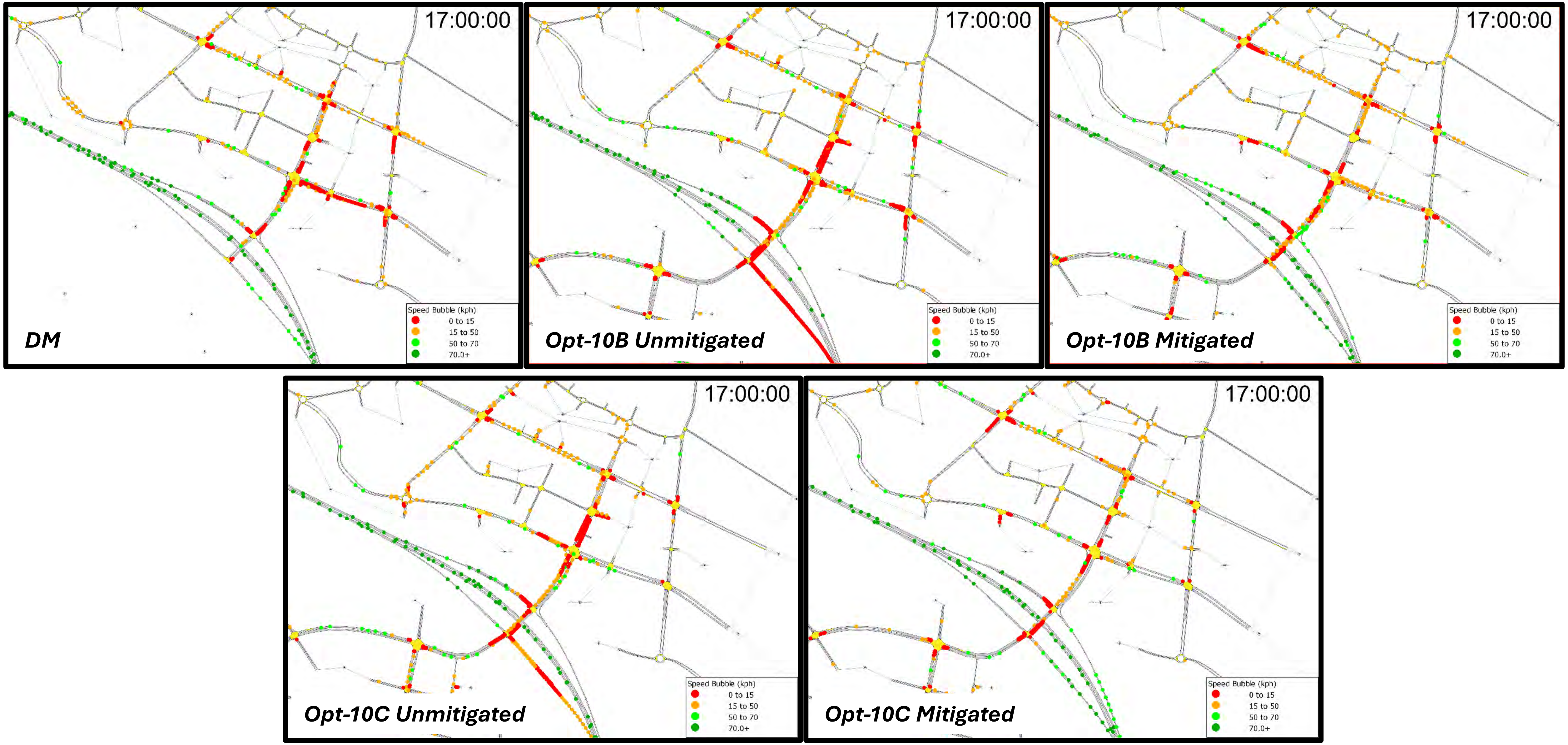
2048 PM Peak Congestion Comparison - Domain



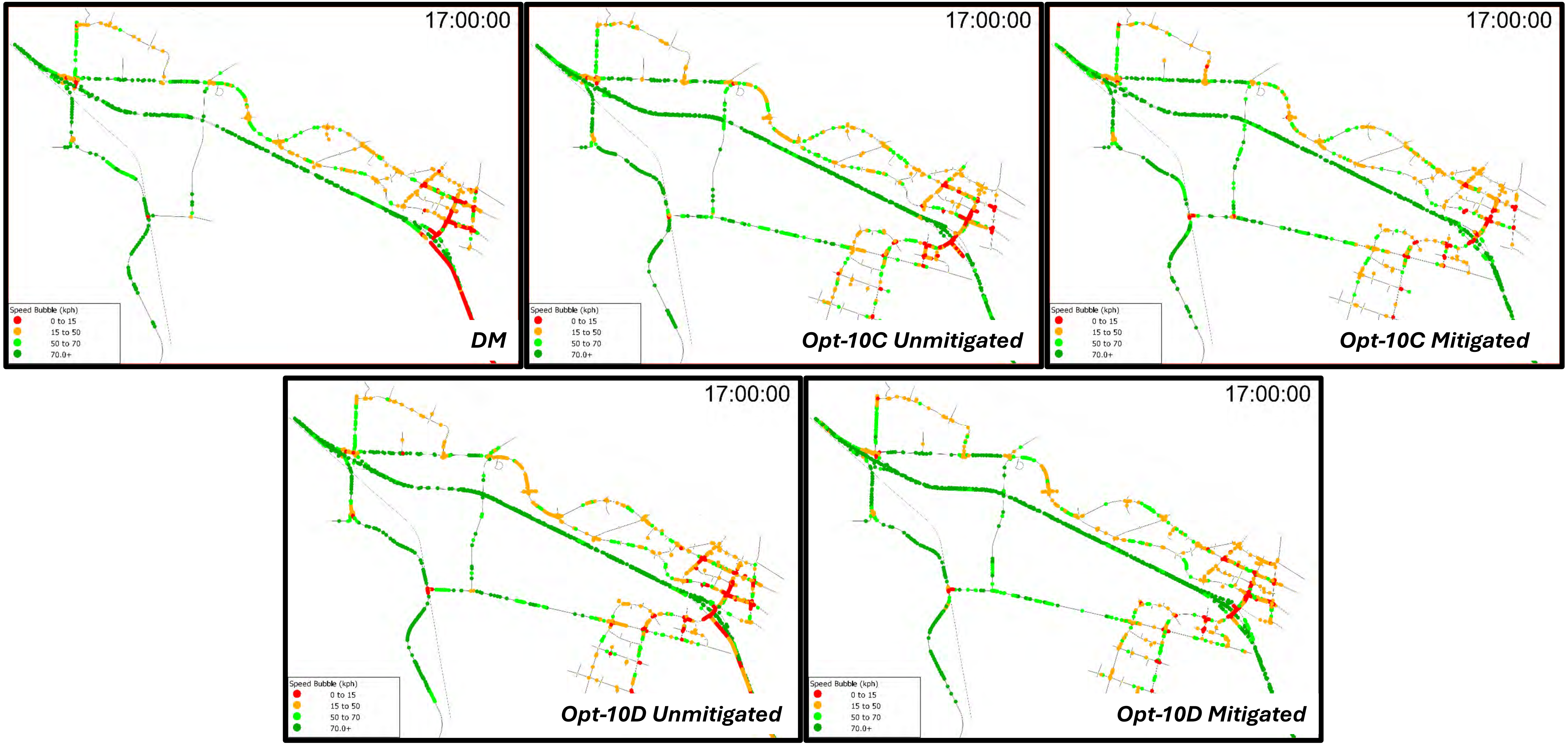
2048 PM Peak Congestion Comparison – Te Puke Hwy



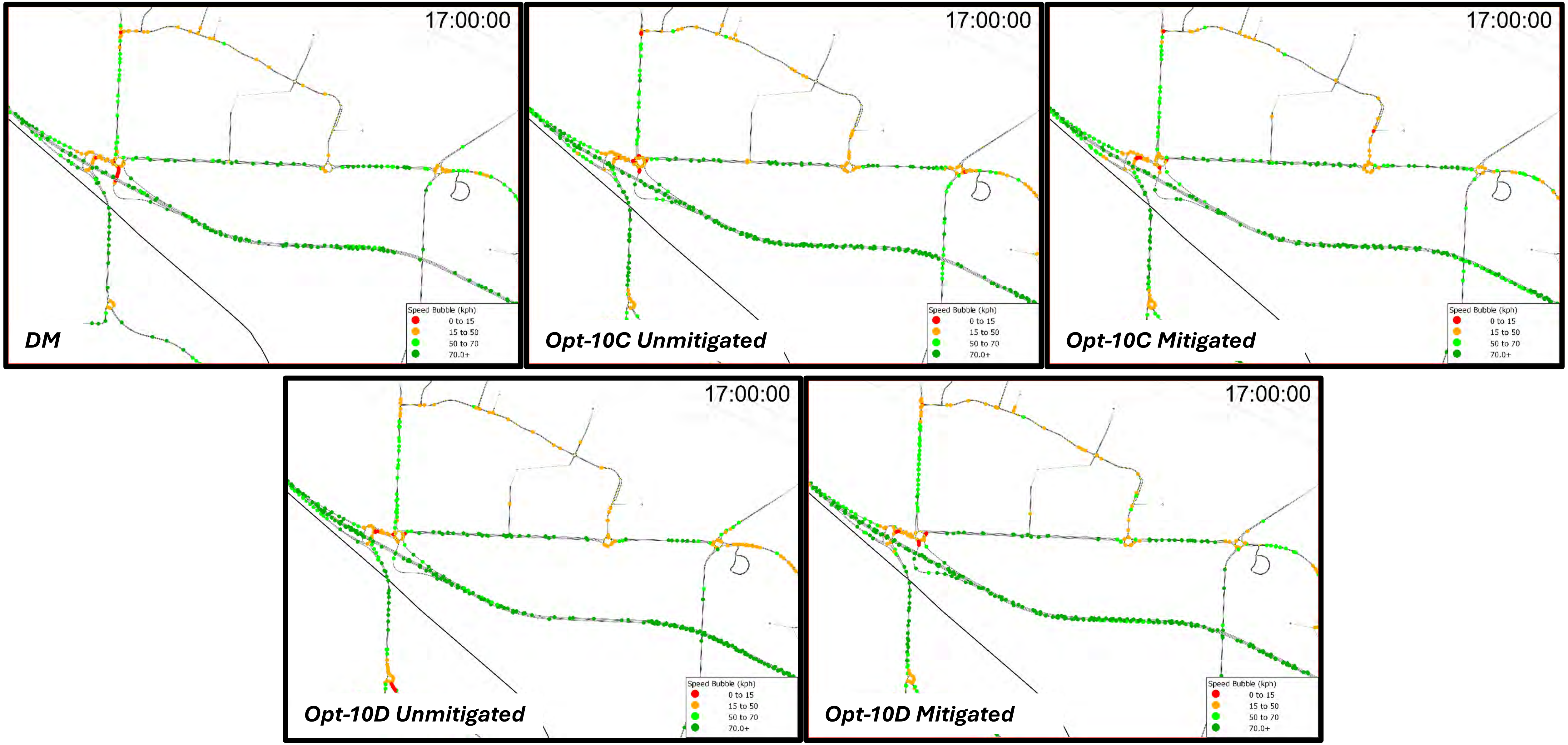
2048 PM Peak Congestion Comparison - Wairakei



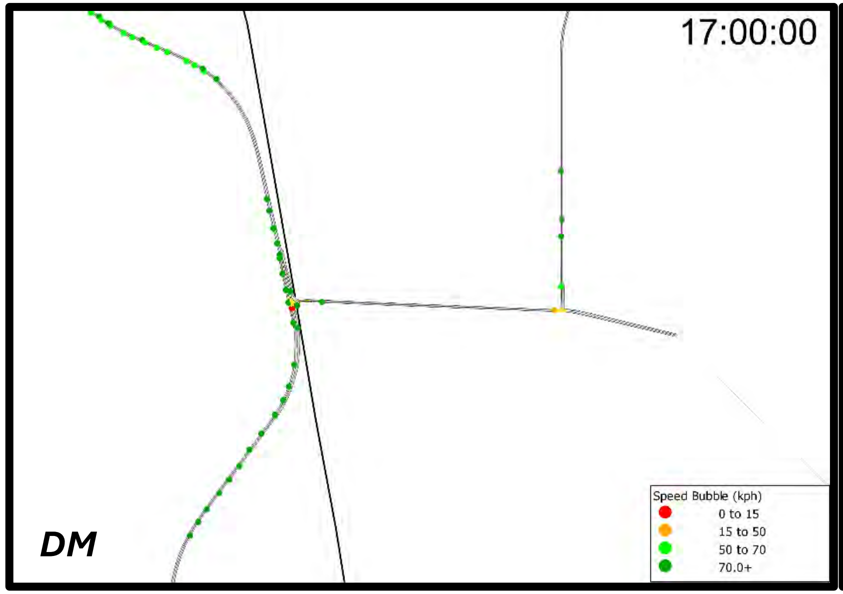
2063 PM Peak Congestion Comparison – Network Wide

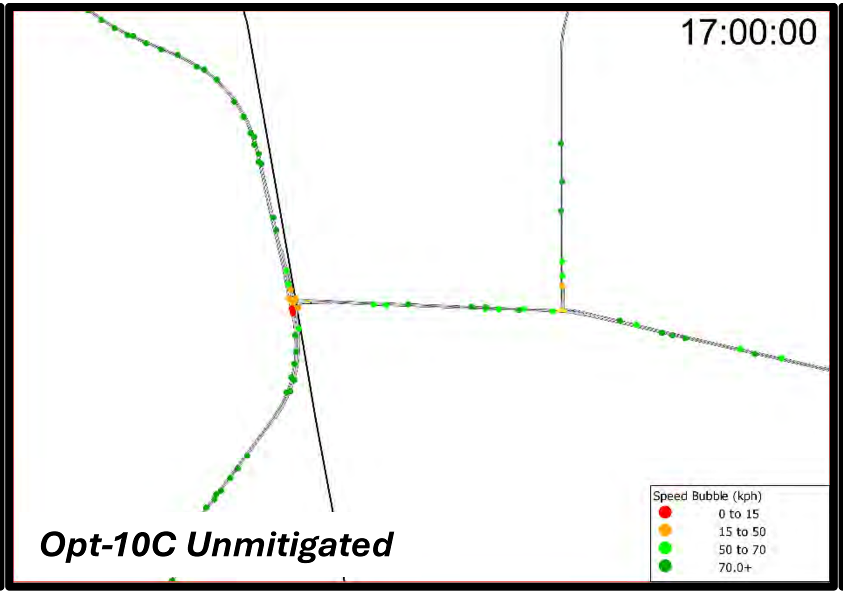


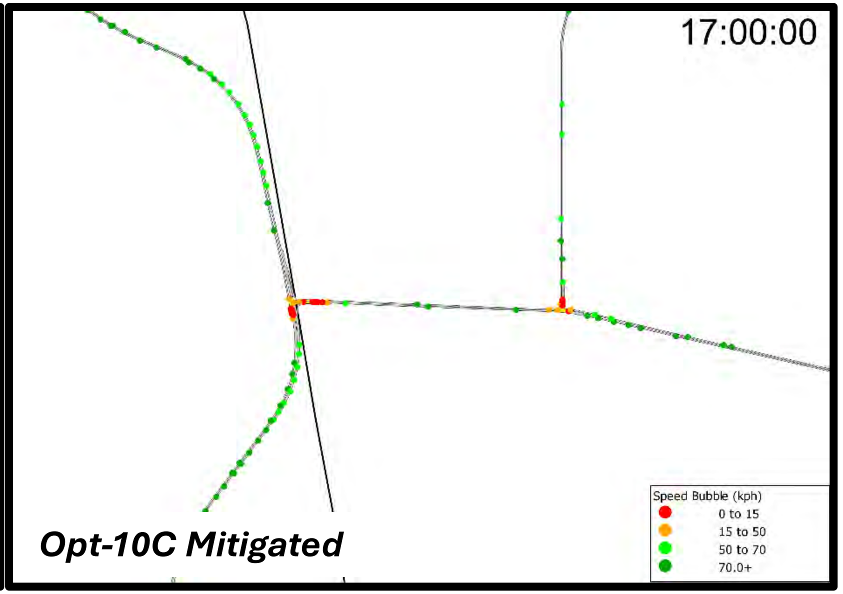
2063 PM Peak Congestion Comparison - Domain

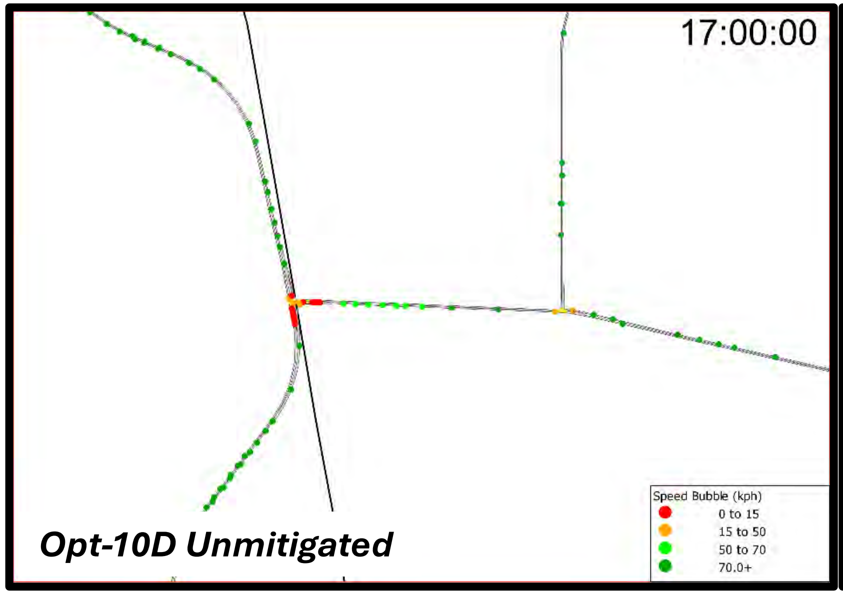


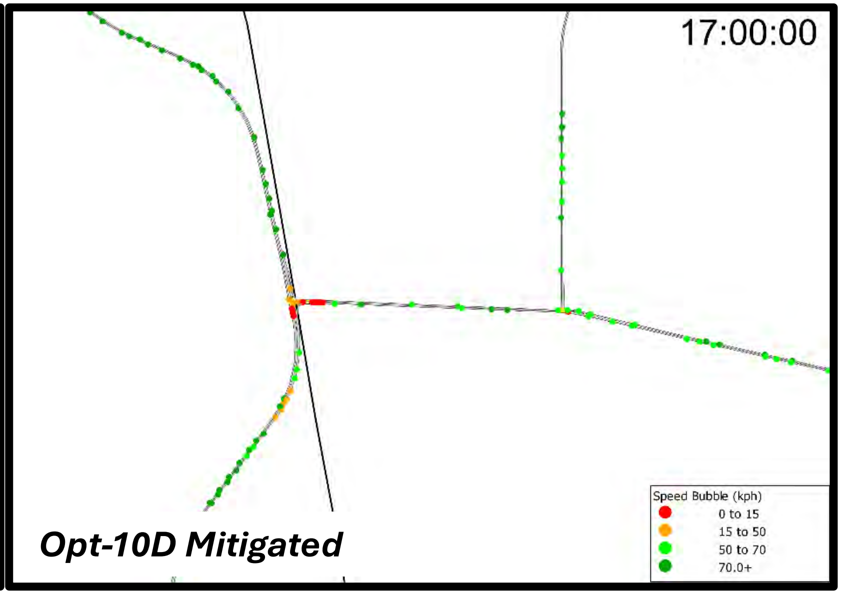
2063 PM Peak Congestion Comparison – Te Puke Hwy



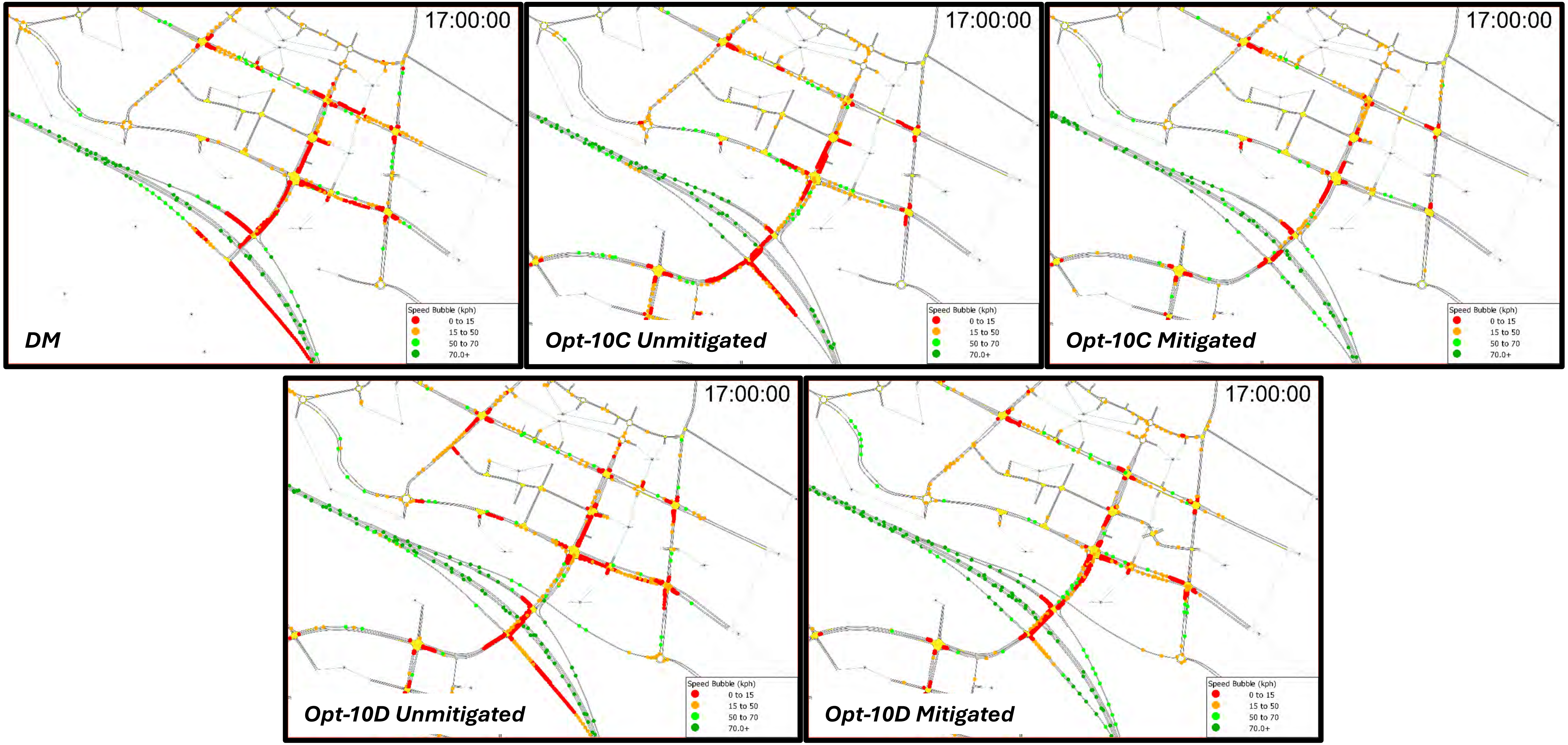




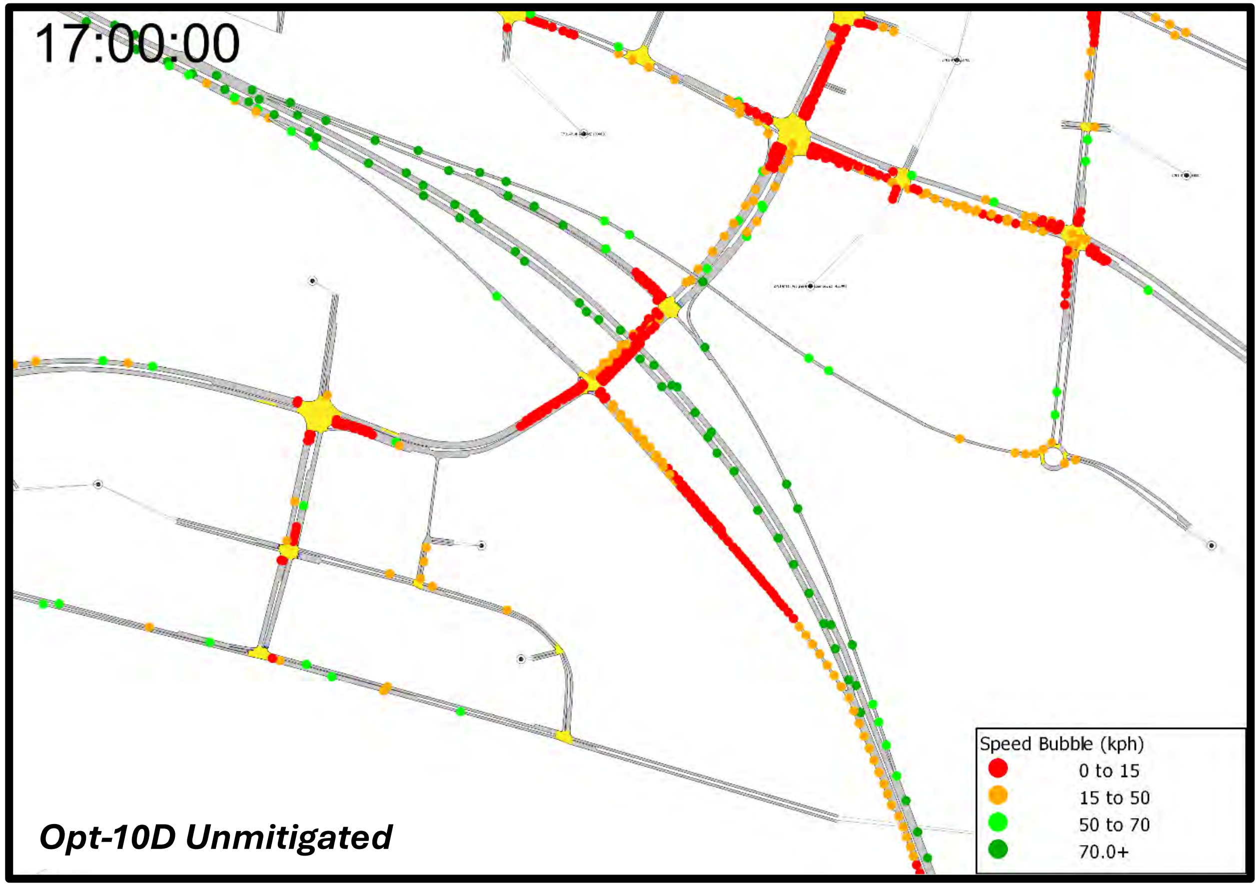


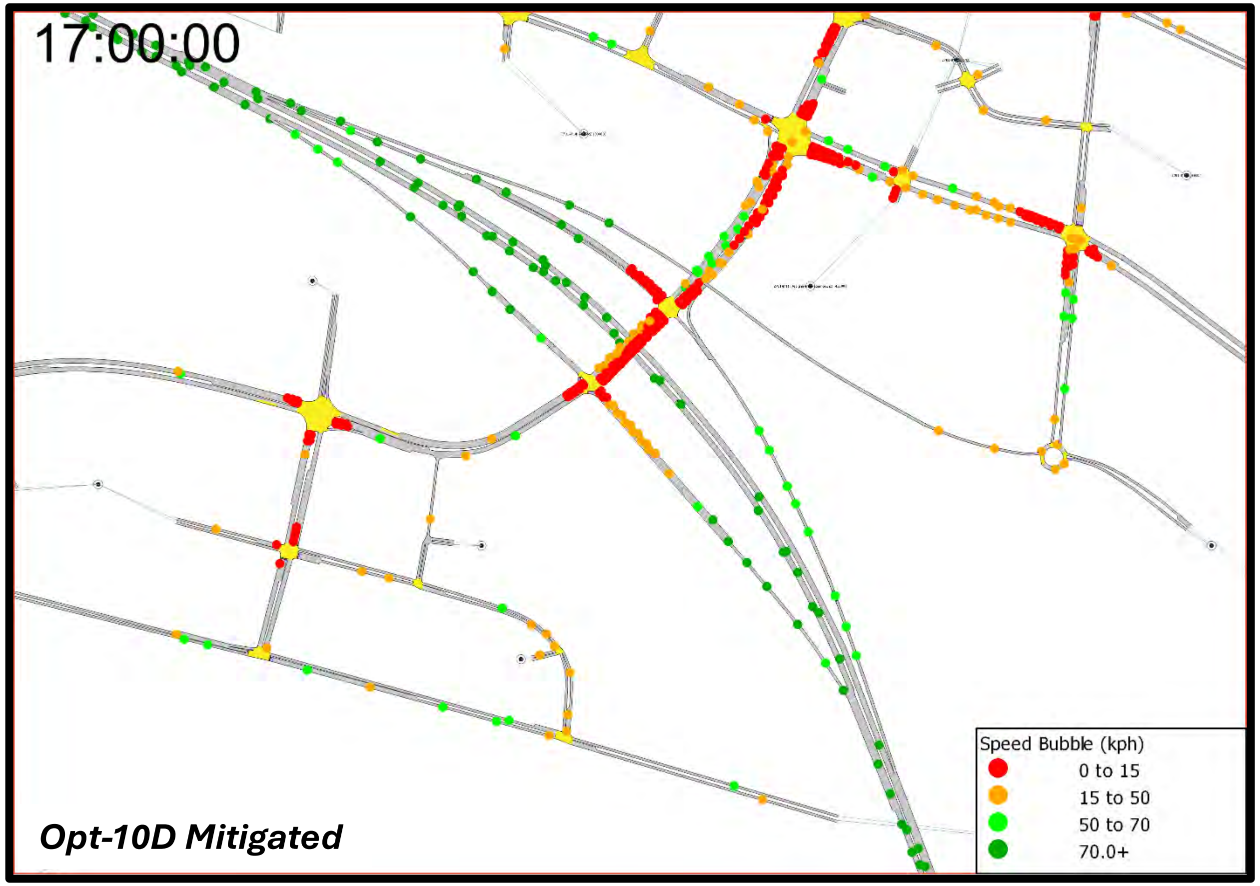


2063 PM Peak Congestion Comparison - Wairakei



2063 PM Peak Congestion Comparison – PEI Bypass / Bell Rd Connection





H

Appendix H – TTSM and TTHM Link Count Comparison

2048						
Intersection	Approach	Movement	Opt 10B AM		Opt 10B PM	
			TTSM	TTHM	TTSM	TTHM
			Count (vehs)	Count (vehs)	Count (vehs)	Count (vehs)
Sands Ave / The Boulevard	S	Left	78	428	244	836
		Thru	269	87	660	219
		Right	132	266	60	446
	E	Left	168	131	252	156
		Thru	172	164	176	191
		Right	77	17	97	22
	N	Left	58	3	139	8
		Thru	403	47	644	86
		Right	0	18	0	53
	W	Left	0	21	0	36
		Thru	163	196	95	173
		Right	3	693	1	551
Sands Ave / Te Okuroa Drive	S	Left	459	263	815	441
		Thru	450	763	881	1434
		Right	938	729	991	723
	E	Left	1012	891	1003	752
		Thru	82	60	132	102
		Right	29	43	83	61
	N	Left	10	113	10	64
		Thru	482	907	800	1086
		Right	7	33	5	33
	W	Left	0	36	0	63
		Thru	222	176	85	92
		Right	654	373	310	193
Sands Avenue / PEI Interchange North	S	Thru	1058	1039	1564	1531
		Right	212	281	138	153
	N	Left	840	870	555	540
		Thru	1307	1304	1557	1494
	W	Left	789	705	1123	1055
		Right	176	83	275	82
Sands Avenue / PEI Interchange South	S	Left	383	257	348	227
		Thru	778	881	787	817
	E	Left	161	143	277	339
		Right	491	433	916	860
	N	Thru	678	594	923	725
		Right	805	798	909	843
Wairakei South Development - Int 1	S	Left	0	4	21	6
		Thru	4	4	7	7
		Right	275	284	444	435
	E	Left	60	59	136	151
		Thru	497	413	565	469
		Right	47	46	101	73
	N	Left	106	109	64	65
		Thru	5	4	6	7
		Right	17	21	13	14
	W	Left	19	20	23	44
		Thru	779	742	626	547
		Right	10	12	26	39
Wairakei South Development - Int 2	S	Left	5	6	7	19
		Thru	341	380	383	307
		Right	7	29	22	68
	E	Left	29	38	22	22
		Thru	11	10	6	10
		Right	19	3	0	10
	N	Left	5	3	0	1
		Thru	384	298	379	294
		Right	125	137	219	192
	W	Left	448	385	293	315
		Thru	19	7	15	9
		Right	1	5	1	2
Wairakei South Development - Int 3	S	Left	5	4	19	5
		Thru	348	138	397	231
		Right	10	9	10	26
	E	Left	11	15	15	83
		Thru	18	20	35	61
		Right	3	3	3	30
	N	Left	0	1	0	7
		Thru	348	198	316	129
		Right	66	143	86	183
	W	Left	1	274	12	127
		Thru	13	21	14	41

		Right	0	7	0	2
Wairakei South Development - Int 4	S	Left	2	2	1	3
		Thru	118	44	143	75
		Right	1	1	1	1
	E	Left	1	1	1	1
		Thru	1	6	2	23
		Right	34	27	78	51
	N	Left	76	45	37	27
		Thru	105	64	97	64
		Right	113	57	138	77
	W	Left	87	37	110	61
		Thru	2	27	1	11
		Right	1	3	1	2
Wairakei South Development - Int 5	S	Left	2	1	9	1
		Thru	19	2	38	2
		Right	0	0	0	0
	E	Left	0	0	0	0
		Thru	1	4	1	13
		Right	0	16	0	28
	N	Left	0	29	0	14
		Thru	34	0	19	0
		Right	73	39	80	53
	W	Left	101	29	107	49
		Thru	1	18	1	6
		Right	12	1	4	1
Bell Rd / Parton Rd	E	Thru	177	306	274	393
		Right	80	117	89	148
	N	Left	98	165	79	143
		Right	189	170	140	127
	W	Left	130	98	184	122
		Thru	338	430	362	457
Bell Rd / Te Puke Highway	S	Thru	656	522	712	586
		Right	296	226	333	225
	E	Left	331	314	324	301
		Right	34	163	90	218
	N	Left	172	299	214	353
		Thru	624	589	686	648
Parton / Tara	S	Left	81	89	67	82
		Thru	35	36	61	60
		Right	94	88	145	127
	E	Left	132	160	108	122
		Thru	815	798	521	496
		Right	8	7	11	10
	N	Left	11	10	9	10
		Thru	63	70	43	46
		Right	240	200	120	103
	W	Left	125	102	224	182
		Thru	466	386	777	684
		Right	91	100	69	98
Bill Miller / Sands	S	Left	0	11	0	48
		Thru	478	749	962	1447
		Right	2	81	1	64
	E	Left	1	84	2	170
		Thru	3	1	7	3
		Right	0	17	1	35
	N	Left	70	76	74	60
		Thru	497	961	813	1015
		Right	7	6	10	8
	W	Left	0	15	0	17
Wairakei South Development - RAB	S	Left	92	205	156	254
		Thru	58	49	65	70
		Right	3	119	4	37
	E	Left	2	62	0	65
		Thru	84	103	137	174
		Right	4	3	3	12
	N	Left	2	1	0	1
		Thru	30	30	22	27
		Right	81	110	70	103
	W	Left	223	160	227	263
		Thru	9	182	21	133
		Right	204	257	194	215

2063						
Intersection	Approach	Movement	Opt 10D AM		Opt 10D PM	
			TTSM	TTHM	TTSM	TTHM
			Count (vehs)	Count (vehs)	Count (vehs)	Count (vehs)
Sands Ave / The Boulevard	S	Left	87	481	246	821
		Thru	297	57	658	234
		Right	135	274	98	364
	E	Left	335	293	339	149
		Thru	241	233	341	301
		Right	98	26	115	36
	N	Left	100	4	218	15
		Thru	421	37	669	90
		Right	0	19	0	59
	W	Left	0	13	0	48
		Thru	220	231	174	208
		Right	3	636	4	425
Sands Ave / Te Okuroa Drive	S	Left	458	231	721	375
		Thru	479	770	938	1246
		Right	812	996	715	758
	E	Left	1138	1022	1416	1274
		Thru	103	72	122	96
		Right	41	32	63	65
	N	Left	7	97	10	50
		Thru	670	992	905	930
		Right	10	48	33	53
	W	Left	0	44	0	77
		Thru	245	187	85	79
		Right	550	358	289	296
Sands Avenue / PEI Interchange North	S	Thru	1255	1255	1695	1621
		Right	217	318	153	156
	N	Left	951	986	720	720
		Thru	1407	1393	1890	1806
	W	Left	493	730	679	754
		Right	173	83	252	95
Sands Avenue / PEI Interchange South	S	Left	365	219	390	272
		Thru	854	1009	832	809
	E	Left	174	155	292	345
		Right	618	561	1017	966
	N	Thru	663	580	885	828
		Right	917	903	1257	1072
Wairakei South Development - Int 1	S	Left	3	4	31	9
		Thru	4	5	18	18
		Right	235	245	421	407
	E	Left	54	54	109	159
		Thru	516	430	577	387
		Right	48	47	85	76
	N	Left	102	101	66	63
		Thru	4	3	6	7
		Right	17	23	14	16
	W	Left	19	19	24	34
		Thru	883	877	735	598
		Right	23	12	18	10
Wairakei South Development - Int 2	S	Left	9	15	29	56
		Thru	445	451	457	328
		Right	8	27	14	45
	E	Left	29	39	26	21
		Thru	11	10	6	14
		Right	15	2	0	10
	N	Left	3	4	6	8
		Thru	417	318	425	235
		Right	116	137	190	161
	W	Left	464	449	320	304
		Thru	19	7	23	9
		Right	1	5	1	4
Wairakei South Development - Int 3	S	Left	7	3	19	4
		Thru	454	170	473	273
		Right	4	11	29	50
	E	Left	31	46	40	200
		Thru	67	73	112	209
		Right	7	12	24	70
	N	Left	0	1	0	8
		Thru	396	216	372	101
		Right	51	148	79	150
	W	Left	1	311	3	80
		Thru	8	19	36	59

		Right	0	5	0	2
Wairakei South Development - Int 4	S	Left	2	3	2	5
		Thru	184	62	210	111
		Right	1	2	1	1
	E	Left	1	1	1	1
		Thru	1	7	2	23
		Right	36	26	80	53
	N	Left	78	43	40	28
		Thru	161	92	142	96
		Right	94	67	140	123
	W	Left	101	44	124	79
		Thru	2	29	2	10
		Right	1	3	2	2
Wairakei South Development - Int 5	S	Left	1	1	1	1
		Thru	21	2	39	2
		Right	0	0	0	0
	E	Left	0	0	0	0
		Thru	1	4	10	14
		Right	0	17	0	30
	N	Left	0	27	0	16
		Thru	35	0	21	0
		Right	128	69	124	83
	W	Left	166	48	174	84
		Thru	1	19	1	7
		Right	13	1	4	1
Bell Rd / Parton Rd	E	Thru	194	346	324	487
		Right	88	129	97	207
	N	Left	106	163	119	166
		Right	185	158	157	135
	W	Left	137	96	177	124
		Thru	399	532	340	358
Bell Rd / Te Puke Highway	S	Thru	571	466	753	620
		Right	321	239	340	231
	E	Left	350	339	381	353
		Right	29	168	101	280
	N	Left	215	386	177	251
		Thru	665	630	564	555
Parton / Tara	S	Left	44	92	69	129
		Thru	35	35	62	59
		Right	92	97	143	138
	E	Left	95	152	112	116
		Thru	472	723	562	616
		Right	10	7	11	10
	N	Left	10	11	9	9
		Thru	37	66	47	45
		Right	116	165	137	119
	W	Left	112	109	182	146
		Thru	451	410	680	587
		Right	56	96	117	133
Bill Miller / Sands	S	Left	0	6	0	16
		Thru	518	762	1000	1346
		Right	2	79	1	31
	E	Left	1	146	29	226
		Thru	2	2	7	6
		Right	0	32	2	53
	N	Left	64	133	78	126
		Thru	686	984	919	807
		Right	9	9	15	14
	W	Left	1	17	1	21
Wairakei South Development - RAB	S	Left	105	237	174	309
		Thru	64	98	92	98
		Right	1	121	9	40
	E	Left	5	83	19	63
		Thru	99	125	174	265
		Right	21	17	18	34
	N	Left	0	0	2	1
		Thru	36	37	27	36
		Right	78	110	73	115
	W	Left	246	187	212	192
		Thru	7	213	28	98
		Right	251	300	219	240

Appendix 4: Flow Peer Review Reports

flow
TRANSPORTATION SPECIALISTS

20 February 2026

Mr M Appeldoorn
Boffa Miskell
Level 5, 35 Grey Street
TAURANGA 3110

Dear Mark

REVIEW OF STRATEGIC TRANSPORT MODELLING FOR BELL ROAD DEVELOPMENT, PAPAMOA

This letter provides a review of the strategic transport modelling carried out by Beca, using the Tauranga Transport Strategic Model (TTSM), for the assessment of the proposed development at Bell Road, Papamoa.

We are assuming that the reader has familiarity with the project, and the transport modelling carried to assess the project.

We have been working with the Beca Project Team on this project since September 2025, and we have provided comments on each phase of the work. Our comments are set out in the register attached as Appendix A, but by way of an overall summary, we consider that the matters that we summarise below have been appropriately addressed, an appropriate methodology has been applied, and the model results are appropriately robust of the purposes of the assessment of the **strategic** transport effects associated with the Wairakei South Fast Track consent application.

The main points of our review of the strategic modelling are as follows:

- At the outset, we noted that the assumption that the Bell Road development will happen instead of development elsewhere within the region (i.e. total population is assumed to be capped for a given year) is important. It reduces the **overall predicted effects** of the proposed development on the transport networks, but it allows the **local intensification of transport demands** to be appropriately reflected within the area of influence around the development in a manner that is in accordance with standard practices around New Zealand
- We also note that there is a reasonable level of uncertainty around future assumptions, referring both to land use and transport investment, and it is standard practice to carry out a range of sensitivity tests. The key tests that have been appropriately applied in this case relate to the level and rate of development of the Te Tumu area, and the timing of particular transport investments
- We had raised concerns as part of an earlier peer review of the Papamoa Eastern Interchange (PEI), in terms of the proportion of trips predicted to be heading to/from the east versus the west. We raised this again at an early stage of our review, and the attached register reflects the discussions on this point, and the further work carried out to address this issue

- We raised concerns at an early stage about the modelled operation of the Papamoa East Interchange, and the need to assume that the two signalised intersections within the interchange operate as a pair, once the interchange changes from being "one sided" to being a full diamond interchange as a result of the proposed development. This leads to a less efficient operation, but it is essential that the intersections are modelled as they will actually operate. Beca acknowledged this point and stated that the subsequent detailed modelling using the Tauranga Transport Hybrid Model (TTHM) will reflect this combined signal phasing
- Our subsequent reviews have considered some of the predicted effects of the development, including the predicted trip distribution, and the need for mitigation (i.e. network upgrades) at some locations, such as along Bell Road. The responses addressed our queries on this matter
- The latest (Round 3) results indicate that the vast majority of intersections local to Wairakei/Wairakei South are predicted to operate no worse than level of service D, with the Sands Avenue link between PEI and Te Okuroa Drive being the main location of interest. (There are one or two others in the plots from the Round 3 modelling). The more detailed work that is about to be carried out using the TTHM will indicate if these levels of service are predicted to lead to queues blocking back through intersections.

Conclusion

In conclusion, we consider that the strategic transport modelling using TTSM has been carried out to a standard that is appropriate for the current phase of work. We note that:

- The accuracy of **any** model outputs depends on the voracity of the model inputs, and there are clearly risks/uncertainties in future modelling in an area as dynamic as the Western Bay of Plenty. However, the TTSM is the appropriate modelling tool to evaluate transport network performance outcomes due to the Wairakei South development proposal, at a strategic level. The tool has been appropriately applied. The risks have been mitigated by the inputs from the various transport agencies, their buy in to the modelling assumptions, and through the use of TTSM
- This review relates only to the strategic modelling, at this stage. As noted above, more detailed modelling is about to be carried out using TTHM and that model is the right tool to assess the extent of queueing, and in particular to determine if this queueing is predicted to extend back through closely spaced intersections.

Yours sincerely

Ian Clark

Ian Clark
DIRECTOR

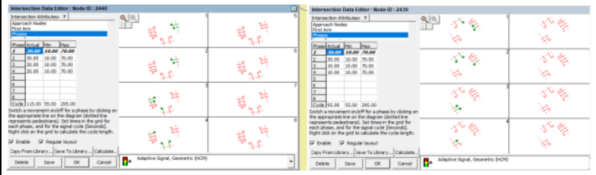
Reference: \\flownz.local\Shares\Projects\BLGL\001 Wairakei South transport modeling peer review\4.0 Reporting\L1B260220.docx – iclark

Appendix A: Wairakei South TTSM Peer Review Comments

<table>
<tr><th>ID</th><th>Date</th><th>Subject</th><th>Review Comment</th><th>Consequence and Severity of Limitation</th><th>Modeller Response / Action</th><th>Reviewer response</th><th>Status of issue</th><th>ID</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>1</td><td>28-Aug</td><td>Land use assumptions</td><td>TCC have accepted the concept of the total land use being capped at the same level (without and with Bell Road development), and have accepted the redistribution</td><td>Comment only</td><td></td><td></td><td>Closed</td><td>1</td></tr>
<tr><td>2</td><td></td><td></td><td>We queried the validity of testing with 0 then 100% of the Te Tumu development, and Mark explained the context, thus justifying testing of both scenarios</td><td>Comment only</td><td></td><td></td><td>Closed</td><td>2</td></tr>
<tr><td>3</td><td></td><td>PEI</td><td>We referred to previous modelling which had a suprisingly high proportion of traffic from Papamoa East heading to/from the east, whereas we had expected a higher dominance of trips/to/from the west</td><td>Beca to review, see additional comments below</td><td>Our response is provided in Item No 8</td><td></td><td>Closed</td><td>3</td></tr>
<tr><td>4</td><td></td><td></td><td>We referred to the need for the two signalised intersections within the PEI to "operate as a pair", especially with the change from a one sided interchange to a full diamond, with the development.   It could be that a signal head is on green, but it is not fed by any traffic stream during that phase - the model should be tricked to reflect this (eg by coding the approach to red, if it is fed by no traffic during a particular phase).</td><td>Beca to review phasing assumption, see additional comments below</td><td>Our response is provided in Item No 7</td><td>Addressed in item 7</td><td>Closed</td><td>4</td></tr>
<tr><td>5</td><td></td><td></td><td>We discussed how these interchanges actually operate within Tauranga, as it may be that they don't operate the same as Auckland motorway interchanges. We referred to the adjacent Sandhurst Drive interchange - and checks should be made against actual SCATS phasing</td><td>Beca to review phasing assumption, see additional comments below</td><td>Our response is provided in Item No 7</td><td>Addressed in item 7</td><td>Closed</td><td>5</td></tr>
<tr><td>6</td><td></td><td></td><td>Mark pointed out changes to the actual layout at the partially completed intersection of the link from PEI with Te Okuroa Drive - referring to give way left turns. Layout to be changed in TTSM</td><td>Beca to review modelled layout</td><td>Yes, the latest intersection layout as received from the Mark is implemented in the TTSM.</td><td>No further commen required</td><td>Closed</td><td>6</td></tr>
<tr><td>7</td><td>22-Sept</td><td>PEI Signal Phasing</td><td>Attachment 1 shows the Beca coding for the PEI (page 1), while page 2 shows our suggestions, based on how motorway interchanges are normally run in Auckland – with no traffic held in the midblock. We understand the point that coordination is achieved (in part) by the CUBE randomness factor, but in our coding, phase 1 at the western intersection will always operate with phase 1 at the eastern intersection. Our main concern is the operation of the interchange with the extra leg due to the Wairakei South development. In our view this means that Beca phase 1 (with both westbound and westbound through traffic) will not be possible, and it is more likely that these through movements will be separated, as shown in our suggested phasing.

I realise this is a fairly detailed matter for the TTSM, but in my view it is fundamental to the effect of the Wairakei South development, which will change the PEI from a one sided interchange to a standard diamond. And my concern is that the TTSM (with the current coding) currently suggests that the PEI will operate with a satisfactory level of service – whereas problems may emerge when we then get on to AIMSUN or SIDRA tests, when the signal phasing may then have greater coordination.</td><td>Moderate - may be more significant with TTHM</td><td>We have conducted a sensitivity test in the 2048 CS DM scenario in TTSM using your suggested phasing plan for PEI Intersections. We have slightly adjusted your phasing plan due to the CUBE package limitations, which restrict shared turn movements to a single phase, rather than multiple phases as shown below.

Intersection Node 2439 – Sands Avenue/PEI Off Ramp (from Domain Road)/PEI On Ramp (towards TEL)
Intersection Node 2440 – Wairakei South/PEI On Ramp (towards Domain Road)/PEI Off Ramp (from TEL)


The new phasing plan had a minimal impact on the travel patterns of vehicle users, with a minor increase of 280 daily vehicles on Bell Road (see attached flow difference New vs Old phasing plan at PEI Interchange). Also, the performance of the study area intersections and links remains relatively unchanged with the new phasing plan. As a result, we do not consider it necessary to update the TTSM.

We will implement your suggested phasing plan for the more detailed preferred option testing in the TTHM AIMSUN model.</td><td>Thanks for running the sensitivity test. It is good to confirm that the phasing changes at the interchange are unlikely to have a significant impact on overall operation or traffic distribution.</td><td>Closed for TTSM, phasing to be tested in TTHM</td><td>7</td></tr>
<tr><td>8</td><td></td><td>Split of east v west traffic at PEI</td><td>Our question is how much traffic heading to Papamoa East or Wairakei South is predicted to head along the Tauranga Eastern Link to/from the west, to Tauranga, as opposed to to/from the east, to Te Puke/Rangiuru. Our observation from the previous work was that we thought there was too much traffic heading to/from the east, whereas we had expected the majority to be heading to/from the west.

Attachment 2 explores the currently predicted split, with the CS DM 2048 scenario, for the AM peak, showing the predicted turning flows at the PEI. At the bottom of page 1 we set out the resulting flows to/from Wairakei South, while at the top of page 2 we set out similar info for Papamoa East. So for example, AM peak outbound traffic:
•Papamoa East: 39% to east, 25% to Wairakei South, 37% toward Tauranga
•Wairakei South: 35% toward Tauranga, 47% to Papamoa East, 19% to east.
(Both add up to 101% due to rounding).

We are not sure what we can do to get some comfort that these figures make sense, but
•Does 39% of traffic from Papamoa East to Te Puke/Rangiuru seem high? Why is the figure for Wairakei South so much lower, at 19%?
•Does 47% of traffic from Wairakei South to Papamoa East seem high?</td><td>Moderate, but may be significant, if modelled distribution does not seem plausible</td><td>A higher share (i.e. 39% of traffic) from Papamoa East to Te Puke/Rangiuru seems to be a plausible result as the model reflects strong eastward connectivity via SH2/TEL, relatively short generalised travel time to those destinations, and a significant draw from Rangiuru Business Park which is expected to be fully developed by 2048, serving as the primary employment hub.

As shown in the select link analysis output west of the PEI location, the Wairakei South development trips are distributed accordingly to the model, where the Te Puke area has direct access via the Te Puke highway, resulting in a reduced eastbound traffic share towards the Rangiuru Business Park.

We also note that the higher share when compared to Wairakei South is influenced by the topic of your second question, regarding the higher Wairakei South distribution into Papamoa East. i.e. the higher share from Papamoa East (as a proportion in comparison to Wairakei South) may be partly due to the high draw from Wairakei South into Papamoa East, reducing the proportion of trips from Wairakei South to the East.
Overall, we consider that the model predicts plausible travel pattern results.

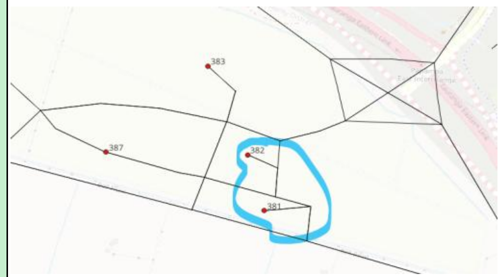
Papamoa East encompasses the Sands development, which features the Wairakei Town Centre, as well as mixed industrial and commercial areas. This area serves as a key employment hub in the region. Therefore, the model predicts a strong flow of localised trips between the Wairakei South (i.e., a residential development of 3,000 dwellings) and Papamoa East areas. And as a proportion, less trips to the East.

Overall, we consider that the model predicts plausible travel pattern results.</td><td>This is an interesting topic, as the proposed development is new and there are no existing traffic patterns for us to check against. I reviewed the Commuter Waka website, which provides Main Means of Travel to Work data from the 2018 and 2023 Census. I then compared the Home Based Work (HBW) trips from the 2018 & 48 TTSM with the Census data for trips originating in Sector 29 (Wairakei West and Wairakei Central), and summarised them by travel direction:
oTo West – trips to sectors west of Sector 29
oTo East/Te Puke – trips to sectors east of Sector 29 (Sectors 32 & 33)

Key observations:
oCensus data shows a notable increase in total demand between 2018 and 2023, along with a reduction in westbound trip share, which the model has reflected (2018–2048).
oThe modelled increase in demand share to the East/Te Puke (2018–2048) is largely offset by reduced trip shares to existing employment areas such as Papamoa Beach South (Sector 23), Wairakei Central (Sector 28), and Tauranga City (Sectors 15 & 16), which appears reasonable. It is important to note that demands to these areas are still predicted to grow, the reduction refers to demand share only.
oThe data suggests the model may have underestimated westbound trip share in 2018, although it has captured the overall trends well.
oHBW represents only part of the total trip generation, and I am unclear about its contribution to the full AM peak/daily totals. While the effects on TTSM may be low, it could be more relevant for developing the Aimsun model demands, particularly for assessing the Papamoa East interchange.
Table 1: Work Trip Comparisons – Sector 29 (Wairakei West & Central, SA2)<table><tr><th></th><th>2018 TTSM HBW AM</th><th>2018 Census</th><th>2023 Census</th><th>2048 TTSM HBW AM</th></tr><tr><td>To West</td><td>70%</td><td>93%</td><td>80%</td><td>53%</td></tr><tr><td>To East/Te Puke</td><td>16%</td><td>4%</td><td>14%</td><td>33%</td></tr><tr><td>Internal</td><td>13%</td><td>3%</td><td>6%</td><td>14%</td></tr></table></td><td>Closed, but we are aware that the land use has since been updated in TTSM. Demand adjustment to be undertaken in TTHM.

See additional comments below.</td><td>8</td></tr>
<tr><td>9</td><td></td><td>Trip Generation</td><td>The above point is around trip distribution, and before we get to that, we should consider trip generation. We think we are right in saying you've only provided the GIS volume plots with the Wairakei South development in place, not those with the Do Min (with no development at Wairakei South). This will be important to allow us to understand the difference (between the No Development v With Development scenario), for a cordon area around Bell Road. And then how this compares with a “first principles” trip generation assessment, which may show us what proportion of development trips are assumed to be internal to Wairakei South.</td><td>Beca to review trip generation</td><td>Please see the link to download the without Wairakei South development GIS shapefiles for the 2035 DM, 2048 DM/DS and 2063 DM/DS scenarios</td><td>We have reviewed the Do Minimum and Core Scenario GIS network plots and summarised the demands for the Wairakei South Development. In the 2048 Core Scenario, the full development is predicted to generate around 40,000 vehicles per day (see attached). The anticipated land use includes approximately 3,160 households and 54 hectares of employment, equating to about 34,000 vehicles per day based on the trip rates set out in the model assumptions document (7.5/HH and 190/Ha for residential and employment respectively). This suggests that the model is predicting an additional ~6,000 daily trips associated with the primary school and commercial developments, which appears reasonable. Overall, we consider the modelled demands are consistent with the trip generation assumptions</td><td>Closed, but we are aware that the land use has since been updated.

See additional comments below.</td><td>9</td></tr>
<tr><td>10</td><td>20-Nov</td><td>Round 2 TTSM modelling, preliminary comments</td><td>What were the changes to the land use assumptions for these latest runs, and what were the reasons for these changes?</td><td>Request for clarification</td><td>As advised by the client, residential and industrial land uses will not be fully developed by 2048, and residential land use is expected to be lower in 2063 in Round 2 when compared to Round 1 models.
Section 2.1.1 and Table 2-1 of the Round 2 Technical Letter discuss the land-use assumptions. This technical letter was sent to the Flow on 12 Dec 2025.</td><td></td><td>Closed</td><td>10</td></tr>
<tr><td>11</td><td></td><td></td><td>What network changes were made at the TOD/Sands Avenue intersection (or elsewhere)?</td><td>Request for clarification</td><td>Please refer to Section 2.1.2 for the network refinements implemented in the Round 2 models.</td><td></td><td>Closed</td><td>11</td></tr>
<tr><td>12</td><td></td><td></td><td>Yes we would like to briefly review the results of the Round 2 modelling</td><td>Request for clarification</td><td>We have issued the Round 2 models' results to the Flow on 12 Dec 2025</td><td></td><td>Closed</td><td>12</td></tr>
<tr><td>13</td><td>16-Dec</td><td>Round 2 TTSM modelling results</td><td>Figure 3-1 sets out traffic flow changes resulting from the updated land use and network assumptions. We think these are not absolute changes, but "banded widths".</td><td>Comment only</td><td>Noted</td><td></td><td>Closed</td><td>13</td></tr>
<tr><td>14</td><td></td><td></td><td>The flow increases on Livingstone Drive and Sands Avenue appear to be roughly equal to the decrease on Stevenson Drive, south of The Boulevard. However, there increases are predicted on Sands Avenue north of The Boulevard, without a corresponding decrease of the same magnitude on other routes (see plot 1 below)</td><td>Probably a minor issue</td><td>The results appear plausible, as flow changes in the TTSM reflect the redistribution of Wairakei TC demand resulting from network refinements, as discussed in Table 2-2.</td><td>OK, no further action required</td><td>Closed</td><td>14</td></tr>
<tr><td>15</td><td></td><td></td><td>Figure 3-1 shows a slight increase in traffic approaching PEI from the north, due to the increase in industrial development assumed in Te Tumu in 2048 (relative to the Round 1 modelling). The decrease in traffic approaching PEI from the south is more significant, due to the decrease in both industrial and residential development</td><td>Comment only</td><td>Noted</td><td></td><td>Closed</td><td>15</td></tr>
<tr><td>16</td><td></td><td></td><td>Table 3-3 provides a level of service summary for various key intersections. All intersections are now showing as no worse than D, while the Sands Avenue link between PEI and Te Okuroa Drive is predicted to be E. The subsequent TTHM runs will indicate if these levels of service are predicted to lead to queues blocking back through intersections</td><td>Comment only</td><td>Noted</td><td></td><td>Closed for TTSM, but TTHM to examine this further</td><td>16</td></tr>
<tr><td>17</td><td></td><td>PPT for 9 Dec meeting</td><td>We had previously seen the network wide statistics at slide 11, which were fairly unremarkable. For example all 2063 tests that come from the Do Something scenario have similar average trip length, and similar PT demands, but different total hours delayed.</td><td>Comment only</td><td>Noted</td><td></td><td>Closed</td><td>17</td></tr>
</table>

ID	Date	Topic	Comment	Category	Response	Reviewer response	Status	ID
18			However, slide 17 now provides extra detail in terms of public transport demand assignments, revealing that very little PT demand is predicted for persons heading to/from Wairakei South, i.e. 26 to 28 persons per day in 2048. While this suggests that more could be done to invest in PT, at this stage this (in conjunction with the lack of a loop via the cycle model), may mean that the TTSM results are overly conservative, as greater use of non car modes is to be anticipated.	Minor	The new PT services serving the Wairakei South development operate at 30-minute headways in the 2035, 2048, and 2063 Core Scenario Do-Minimum network. This relatively low frequency is likely contributing to the very low PT demand to/from Wairakei South observed. At this stage, cycle model interventions are unlikely to materially change vehicle or PT demand in the Study area.	OK, no further action required	Closed	18
19			Similarly, we had previously seen the select link plots from the round 1 modelling, but slide 11 (see plot 2 below) indicates a "point of interest" immediately south of the PEI - we wonder what traffic is doing apparently travelling round in a square - does it imply a U turn?	Minor	The point of interest, which is south of PEI, has industrial land use and a local centre that includes a Motorist Service Centre (petrol station), 2 fast food restaurants, a truck stop, a café and is represented by zones 381 and 382. So, the model predicts trips originating from residential land uses to these employment-attracting places in the Wairakei South development.  	OK, no further action required	Closed	19
	9/02/2026	**Round 3 TTSM results**						
20		**LOS plots**	As per item 16 above, the round 3 results indicate that the vast majority of intersections local to Wairakei/Wairakei South are predicted to operate no worse than D, with the Sands Avenue link between PEI and Te Okuroa Drive the main location of interest. (There are one or two others in the new plots). The subsequent TTHM runs will indicate if these levels of service are predicted to lead to queues blocking back through intersections	Comment only	Noted		Closed for TTSM, but TTHM to examine this further	20
21		**Wider area LOS plots**	Some of the following comments should possibly have been raised at an earlier stage, but the new wider area plots have raised several points of interest, as they have highlighted the fact that a reasonable proportion of development related trips is predicted to approach via Bell Road rather than the PEI:		Response below			21
21.1			Are we right in saying that no improvement works are planned along Bell Road, apart from signals at the intersection with Te Puke Highway	Request for clarification	As agreed with the the client, Te Puke Highway will have traffic management measures in place, including a speed limit reduction to 80 km/h between the Domain Road interchange and Poplar Lane to support the safe operation of the signals. We have had initial discussions with the Western Bay of Plenty District Council (WBOPDC) and are moving towards a more formal engagement to align our plans.	OK, no further action required	Closed	21.1
21.2			Is a right turn bay required at the intersection of Bell Road/Parton Road?	Request for clarification	Yes, our client is proposing this as a mitigation measure to address the conditions with Wairakei South development scenarios and is implemented in the Round 3 modelling work.	OK, no further action required	Closed	21.2
21.3			Signals are assumed at Te Puke Highway/Bell Road. Have the transport agencies agreed with this assumption, or would a roundabout be a more appropriate treatment?	Request for clarification	As noted under ID 21.1, our client is actively progressing this matter. An outline roundabout concept was developed and assessed against a signalised intersection option. The roundabout has been discounted because: a) it would significantly impact adjacent properties, including the loss of dwellings b) it would be very costly to construct due to extensive earthworks c) it cannot achieve the required safety separation from the adjacent railway Accordingly, the preferred approach is a signalised intersection that can be integrated with upgraded level-crossing signalisation. Our client has also, on a confidential basis, commissioned an independent Level Crossing Safety Impact Assessment (LCSIA) for the Bell Road crossing to determine the optimal design, integration with the signals, and the required upgrade to the crossing.	OK, no further action required	Closed	21.3
21.4			The LOS plots indicate a deterioration along Te Puke Highway, due to the development. Can more detail provided around the capacity assumed, leading to the poor level of service predicted along this route. The ADTs are predicted to be around 16,000 vpd north of Bell Road, and slightly over 20,000 vpd south of Bell Road. The lower figure, in particular, is not that remarkable.	Request for clarification	Network coding: •In TTSM, Te Puke Highway is coded as a rural highway type with a capacity of 1,400 in both the Do Minimum (DM, without Wairakei South) and Core/ST scenarios (with Wairakei South). South of Bell Road: •Daily traffic increases in the Core/ST scenarios relative to DM. Despite the higher volumes, the corridor operates at Level of Service (LOS) E in both DM and Core/ST. Hence, the Wairakei South development has little effect on overall network performance in this section. North of Bell Road: •In Core/ST, southbound daily traffic increases while northbound daily traffic decreases compared to DM. This directional change is driven by the reduced speed on Te Puke Highway (Domain Road Interchange to Poplar Lane) to 80 km/h in the Core/ST scenarios. This has resulted in LOS E in Southbound in Core/ST Scenarios compared to LOS D in DM. Daily flow difference plots are attached.	OK, no further action required	Closed	21.4
21.5			The ADT plots indicate minimal changes in flows on Welcome Bay Road, just west of Te Puke Highway, for the tests for a particular year (eg comparing only 2048 scenarios), but the LOS at Welcome Bay Road/Kairua Road is predicted to oscillate in 2048, and greater delays are predicted by 2063. Is this an issue worth exploring further, or is too remote from the proposed development to affect the assignment closer to Wairakei South?	Request for clarification	This location is too remote, as the % change in daily vehicles between DM (without Wairakei South development) and the Core Scenarios (with Wairakei South development) is very low and well below the 10% threshold. Hence, the Wairakei South development will not contribute materially to the turning movements at the Welcome Bay Road/Kairua Road intersection.	OK, no further action required	Closed	21.5
22		Origins/destinations	Select link plots were provided within the Oct 2025 "Interim Findings" technical note. Can some quick checks be made to confirm that the broad origins/destinations are relatively unaltered by the subsequent updates to the model, and that the broad volume of through traffic predicted to travel from Te Puke Highway and the PEI, via Bell Road, for the scenario with the development is roughly as previously reported. We are particualrly interested in the proportions of internal trips (within Wairakei South) and between Wairakei and Wairakei South, for the various land use scenarios.	Request for clarification	Please see below the 7 Sector analysis model outputs, which provide the proportions of internal trips (within Wairakei South) and between Wairakei and Wairakei South. Overall, the Round 3 models' % trips are similar to those of the previous Round 1 models. (Tables below)	Acceoted, distribution seems similar	Closed	22

Round 1 Model Results

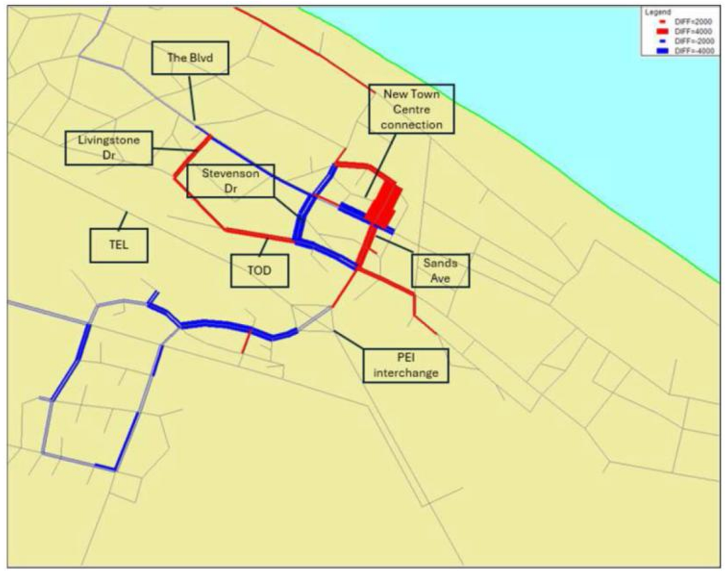
	2035		2048					2063					
	CS_DM	ST1_DM	CS_DM	ST1_DM	CS_DS	ST1_DS	ST2_DS	CS_DM	ST1_DM	CS_DS	ST1_DS	ST2_DS	ST3_DS
Wairakei South - Wairakei South	11%	11%	13%	14%	13%	14%	11%	13%	15%	13%	14%	11%	11%
Wairakei South - Wairakei	29%	32%	23%	27%	23%	26%	21%	22%	27%	21%	27%	20%	19%
Wairakei South - Te Tumu	5%	0%	9%	0%	8%	0%	8%	14%	0%	14%	0%	13%	15%
Wairakei South - Rangiuru/Maketu	10%	10%	12%	13%	13%	13%	12%	12%	13%	12%	13%	11%	11%
Wairakei South - Others	45%	47%	43%	46%	43%	47%	48%	40%	45%	40%	46%	45%	44%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Round 3 Model Results

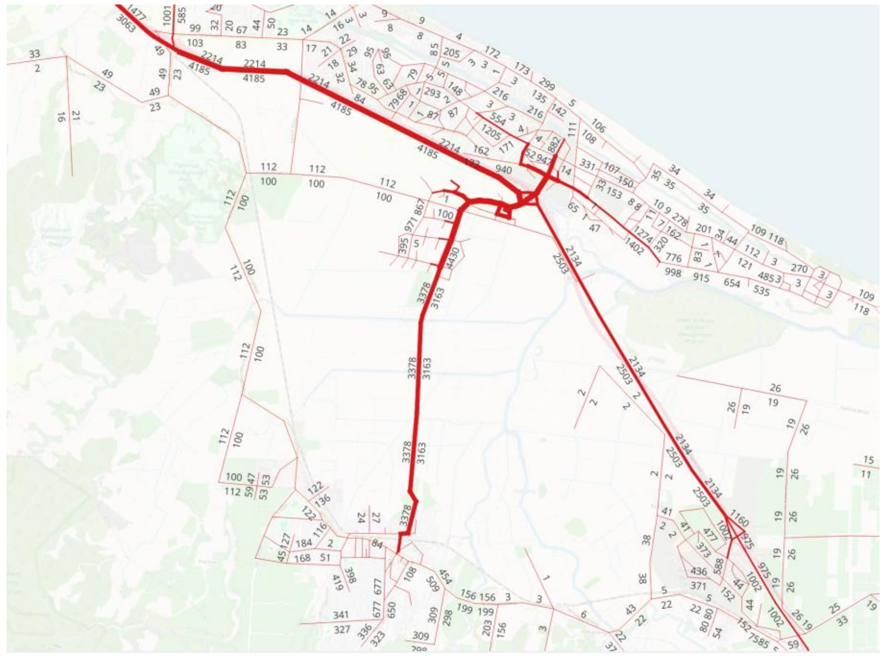
	2035			2048						2063				
	DM	CS	ST1	DM	CS	ST1	Option 10A	CSS1	CSS2	DM	CS	ST1	CSS1	CSS2
Wairakei South - Wairakei South	0%	10%	10%	0%	11%	13%	13%	11%	11%	0%	12%	14%	12%	12%
Wairakei South - Wairakei	18%	30%	32%	18%	24%	28%	27%	24%	24%	18%	22%	27%	22%	22%
Wairakei South - Te Tumu	2%	5%	0%	4%	9%	0%	0%	9%	9%	6%	14%	0%	14%	14%
Wairakei South - Rangiuru/Maketu	6%	10%	10%	6%	12%	13%	13%	12%	12%	6%	12%	13%	12%	12%
Wairakei South - Others	73%	46%	48%	72%	43%	47%	47%	43%	43%	70%	41%	46%	40%	40%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

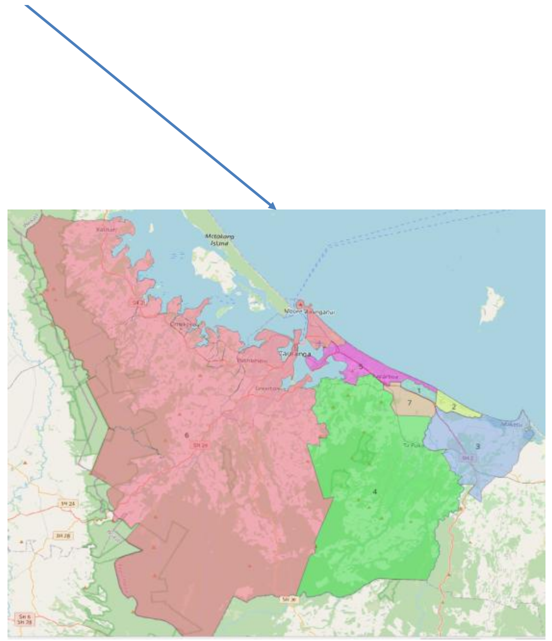
Appendix A: Wairakei South TTSM Peer Review Comments

Plot 1: Figure 3.1 from Round 2 modelling report (see item 14 above)



Plot 2: select link plot just south of PEI (se item 19 above)





flow
TRANSPORTATION SPECIALISTS

24 March 2026

Mr M Appeldoorn
Boffa Miskell
Level 5, 35 Grey Street
TAURANGA 3110

Dear Mark

REVIEW OF AIMSUM MICRO-SIMULATION MODELLING FOR BELL ROAD DEVELOPMENT, PAPAMOA

This letter provides a review of the Aimsun modelling carried out by Beca, using a subnetwork model of Tauranga Transport Hybrid Model (TTHM), for the assessment of the proposed Wairakei South development at Bell Road, Papamoa.

We are assuming that the reader has familiarity with the project, and the transport modelling carried to assess the project.

We have been working with the Beca project team since September 2025 and have provided comments throughout each phase of the work . Our comments are included in the register attached as Appendix A. In summary, we consider that the matters outlined below have been appropriately addressed, a suitable methodology has been applied, and the model results are sufficiently robust for assessing the localised transport effects associated with the Wairakei South Fast Track consent application.

The main points of our review of the micro-simulation modelling are as follows:

- We note that the Aimsun model extent has been expanded to include local parallel connections to SH2 between Papamoa East and Pacific Coast Highway. This is beneficial for capturing route choice between the state highway and local roads. However, it may require comparison of modelled travel times with observed conditions to build confidence in model's route choice predictions
    - Beca has undertaken a high-level check using Google Maps travel times. While this is not typically sufficient for formal validation, it indicates the model reasonably reflects real-world travel time differences and is considered adequate given the significant future land use and network changes in the project area.
- It is noted that the microsimulation model initially mismatched some land uses with incorrect traffic flow profiles when compared against the anticipated land uses in the Tauranga City Plan
    - This has been discussed with the Beca team and has since been corrected in the model.
- We queried whether school pick-up/drop-off activity and retail pass-by trips were appropriately captured in the micro-simulation model demands, noting that these trip types are often not explicitly represented in strategic models

  - The Beca team advised that the TTSM does not explicitly model pass-by activity. However, total trips to and from the school and retail areas in Wairakei South have been derived from forecast trip generation, which is expected to implicitly account for pass-by and pick-up/drop-off movements.
- We also queried the assumed retail typology for the Wairakei South area, as different retail formats can result in materially different traffic generation profiles
  - The Beca team confirmed that retail trip generation assumptions are based on characteristics similar to those at the Bayfair Shopping Centre, reflecting a relatively high traffic-generating retail environment. Notwithstanding this, the overall scale of retail development is modest (approximately 3 hectares) and is therefore not expected to be a dominant driver of traffic demand.
- We note that the microsimulation model demands were developed using the 'average' hour demands generated by TTSM. We initially raised concerns that the full 3-hour demands may have been derived using a 1-to-3 hour expansion, which could result in an underestimation of demand
  - This has since been clarified with the Beca team, who confirmed that the peak 1-hour demands (assumed as 55% of the total 2-hour demand) were used to derive the 3-hour demand profile, which is considered a more appropriate approach.
- In addition, the anticipated land use pattern along The Sands Avenue and the proposed public transport network along The Boulevard suggest that significant pedestrian activity is likely within the Town Centre zone and along key PT routes. We raised concerns that the interim model provided for review did not fully account for pedestrian activity at intersections
  - This has been raised with the modelling team and has now been addressed in the model. On another note, we note that partial pedestrian protection has been assumed at intersections along The Sands Avenue. We suggest this assumption to be discussed with the Council's signal control team.
- We raised concerns that, at the Papamoa East Interchange signals, the model assumes vehicles travelling onto the overbridge encounter a red (dead) phase. This does not align with typical interchange signal coordination, which generally aims to provide a green wave for dominant movements
  - Beca acknowledged this and advised that a similar arrangement is currently in place at the existing interchange, and at other state highway interchanges in Tauranga (e.g. SH2/Chapel Road). They also noted that the proposed phasing will be discussed with NZTA, who will be responsible for interchange operations once upgraded. We consider this approach reasonable, but note the risk that queues could extend back to The Sands Avenue intersection if this arrangement is not implemented.
- At the Sands Avenue/Te Okuroa Drive intersection, we noted that the double left turn lane from Te Okuroa Drive east approach may experience a high occurrence of near-miss events due to the insufficient inter-green time assigned at the traffic signals
  - This has been discussed with Beca team and since rectified in the models.
- We note that significant queuing is predicted during the AM peak at the SH2/Pacific Coast Highway interchange in the "without mitigation" scenarios. This is driven by the on-ramp capacity being manually capped at 1,500 vehicles per hour, resulting in queues spilling back onto Pacific Coast

Highway and the local road network (including Tara Road). While this adjusted capacity is lower than typical motorway on-ramp capacities (generally in the order of 1,800 – 2,000 vehicles per hour, based on the Highway Capacity Manual, HCM), it represents a conservative assumption and illustrates potential network performance if on-ramp capacity is constrained.

  - Notwithstanding this, we raised concerns regarding the proposed mitigation (i.e. increasing the merge length by 50 m), noting that merge length is only one of several factors influencing on-ramp capacity. Other key factors include SH2 mainline traffic volumes, downstream weaving conditions, and the proportion of heavy/slow vehicles, as suggested by HCM.
  - The Beca team has subsequently undertaken sensitivity testing, including increasing the on-ramp capacity to 1,700 vehicles per hour, which results in a noticeable reduction in predicted congestion at the interchange. It is also noted that increasing the merge length is considered as one of several potential mitigation measures.

Conclusion

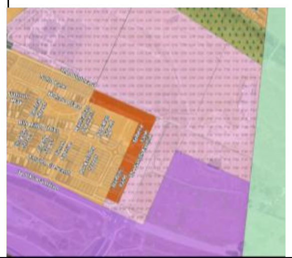
In conclusion, it is considered that the Aimsun micro-simulation modelling has been conducted to a standard deemed appropriate for the current stage of the project. We note that:

- The reliability of model outputs is inherently dependent on the accuracy of the underlying input data. While there are recognised uncertainties associated with forecasting in a rapidly evolving context such as the Western Bay of Plenty, the Aimsun modelling undertaken for the Wairakei South Fast Track application has been appropriately implemented to assess likely traffic impacts at a localised scale
- While some uncertainties remain, primarily concerning land use assumptions (e.g., retail typology) and aspects of the forecast network, including pedestrian activity, on-ramp merge capacity, and PEI interchange phasing, these matters have been discussed with the Beca team, who consider that appropriate measures have been, or will be, implemented to address them.

Yours sincerely

Qing Li
Associate

Reference: P:\BLGL\001 Wairakei South transport modeling peer review\4.0 Reporting\L2B260324.docx – QLi

ID	Date	Subject	Review Comment	Consequence and Severity of Limitation	Modeller Response / Action	Reviewer response	Status of issue, remaining risks
1	8-Oct	**Subnetwork area**	The Aimsun sub-area model will include SH2, Bell Road, Pacific Coast Highway, and several local roads north of the Papamoa East Interchange. This extent seems appropriate.	**Comment only, see Comment 5 below**			
2		**Base Validation**	It is proposed that, due to the significant changes in land use and network configuration within the project area, base model validation may not be particularly meaningful. I agree with this at a high level, though it may still be useful to see some comments on the TTHM base model validation in the area (e.g. travel times along SH2 and Pacific Coast Highway, if available) to confirm that TTHM captures realistic travel speeds along these roads, as these may influence route choice in the forecast model (see data maps from TTHM development report below).	**Comment only, see Comment 5 below**			
3		**TTHM Demand**	The Aimsun model will be developed using TTSM forecast demands (1 hr each peak). The expansion from 1-hour to 4-hour (?) periods will be based on demand profiles for different land use types (e.g. residential, employment, school, etc).	**Comment only**			
4			Based on our discussions to date, the TTSM base model may slightly underpredict traffic demands to Tauranga Central/West. While we agree that an update to TTSM may not be required, some demand adjustments are recommended (at the cordon level), particularly by refining the cordon demands using comparisons between the 2018 Census Travel to Work data and TTSM home-based work trip distributions.	**Comment only**			
Interim Model Review							
5	6-Mar	**Subnetwork area / base validation discussion**	The subnetwork has been expanded to include Tara Road and Te Okuroa Drive between Papamoa East and the SH2 / Te Puke Highway interchange. This extension is intended to better capture route choice behaviour between SH2 and the northern local road network. Based on the above, it may be beneficial to review the base model travel times along these sections to confirm that the model appropriately represents relative travel times on SH2 and the parallel local routes (refer Comment 2 above). Select link analysis also indicates that the vast majority of Golden Sands East/Te Tumu traffic is predicted to use the SH2 interchange to travel towards west/Tauranga City, which seesm plausible.	**Request for clarification**	The travel time routes from the full TTHM model calibration do not include any route on Tara Road or Te Okuroa Drive, and the travel time route on SH2 is very long from SH29A to SH33 so a base year travel time comparison would not yield any helpful insights about relative travel times and route choice. Instead, existing google travel time information shown in the **Google TT** tab suggests that travel time via Te Okura Drive is around 5 minutes slower than SH2, which is to be expected as there is not much congestion in the area at the moment, and that the predomanint route choice would be via SH2 which aligns with what the select link anyalsis shows. A similar 5-6 minute difference in travel time is observed between SH2 and Te Okura Drive in the future scenarios. We therefore consider that further comparison of base year travel time is not ncessary.	Noted, appreciate that detailed travel time data may not be avaliable and agree that GoogleMaps data can be used as a high level check. No additional comments.	**Closed**
6		**Land Use Zoning**	It is noted that the land use along Sands Avenue has been assumed to be residential. This does not appear to align with the Tauranga City Plan, which designates the area as Town Centre, Neighbourhood Centre and industrial zoning. This discrepancy could have implications for the traffic demands and demand profiles. A further review of the Aimsun model demand indicates that traffic east of Sands Avenue (Zone 28700) was initially based on employment-generated trips but appeared to follow a residential demand profile. This has been discussed with the Beca team, and these profiles will be revised to reflect an employment-based traffic profile. **We note that the City Plan identifies some Town Centre developments along Sands Avenue East, which the TTSM has assumed to be located north of The Boulevard. It may be worthwhile to verify that the total Town Centre developments included in TTSM align with the City Plan projections. Futhermore, the traffic signal settings along Sands Avenue (potentially the Wairakei South Spine Road) should also reflect this enviroment (high pedestrian/PT activities).** 	**Request for clarification, potentially significant (awaiting updated models)**	Changes have been made to the profile type of the following zones: Zone 45000 - updated to Industrial Zone 28700 - updated to Indsutrial Zone 33800 - updated to Shopping/Town Centre Zone 42200 - updated to Shopping/Town Centre Pedestrian phases have now been included into all signals along Sands Avenue and the Wairakei South Spine Rd.	Noted, some descrepancies have been noted for Scenario 10C demands, where the flat profile is still applied in the PM peak. Agree that these are unlikely to result in significant issues in the final scenario (10 D, with both Te Tumu and Wairakei South). This has been communicated with Beca team and will be rectified in the model.	**Closed**
7		**Model Demand - TTSM**	Based on our discussion on 27 February, the TTSM was updated to reflect the congestion observed in the TTHM, particularly the high AM peak congestion at the SH2 / Te Puke Highway northbound on-ramp. The localised capacity adjustments applied to the SH2 northbound on-ramp in TTSM appear to be consistent with the capacity assumptions adopted (1500 vph) in Aimsun. However, the Aimsun modelling also identified congestion along Domain Road / Tara Road due to queue spillback from the on-ramp. These knock-on effects have not yet been incorporated into the TTSM (80 kph along Tara Rd). That being said, the possiblity of vehicles re-routing due to a localised congestion may be low. The Beca team noted that the reduced ramp capacity did not materially alter traffic demand patterns in TTSM, which is a plausible outcome given the localised nature of the constraint.	**Comment only**	The AM network wide flow difference plot shown in the **TTSM Flow Diff** tab shows around 50-80vph differences with /without the localised capacity changes. Further adjustments to Tara Road within TTSM are not expected to materially change the modelled traffic patterns.	Noted, no additional comments.	**Closed**
8		**Demand Process & profiles**	As discussed previously, the Aimsun model demands have been derived from TTSM outputs, which represent average hourly trips across a two-hour peak period. On that basis, could you please clarify whether the expansion from TTSM to Aimsun has been undertaken on a 1-to-3 hour or 2-to-3 hour basis? We also note that some zones may contain mixed land uses (e.g. school and residential). How were the demand expansion factors and temporal profiles determined for these mixed-use zones? The source of the demand profiles outlined in the Beca presentation appears reasonable. We however note these do not appear to include a school related profile. A flat profile has been assigned to the origin demand associated with Centroid 27014807 (Shopping Centre) in both AM and PM. Could you please clarify the basis for this assumption and the data source used to derive the profile?	**Request for clarification**	Expansion has been undertaken on a 1-to-3 hour basis. Expansion factors are presented in the **Profiles** tab. For mixed use zones, the profile for the predominant land use has been used. Profile for town centre/shopping area for PM peak has been updated based on the Bayfair Shopping Centre site which is presented in the **Profiles** tab. Shopping/town centre area are not typically open in the AM peak hours and trips are associated with staff or service vehicles.Therefore, we have adopted a flat profile for outbound trips in the AM peak. Outbound trips in the AM peak are also low and changing the profile is unlikely to make a material difference to the model findings.	A 1-to-3 hour expansion may result in traffic demands being slightly underestimated compared with the 2-to-3 hour expansion, which should be applied. Beca team has confirmed that this has been addressed by using 1 hour peak demands drived from the TTSM data (0.55 of the two hour demands). We also note that Scenario 10C (no Te Tumu) still adopts a flat profile for PM peak retail demands (model recieved on 16 March). The Beca team has confirmed that this will be rectified in the model. For mixed-use zones, applying a predominant land use profile may slightly underestimate peak volumes at school areas. However, as the majority of zones in the model represent a single land use, this approach is considered acceptable	**Closed, minor**
9		**Pass - by Trips**	It is noted that the proposed development includes a school and a retail area, both of which are expected to generate pass-by trips that are typically not captured in regional model trip patterns. Could you please confirm whether the impact of pass-by trips has been considered in the Aimsun model? While these trips are unlikely to materially affect the overall assessment, they may lead to some underestimation of localised traffic effects around the school and retail areas.	**Request for clarification**	Pass-by trips have not been explicitly considered. However, the total trips generated to and from the school and retail areas in Wairakei South in TTSM have been based on the expected trip generation. These movements have been modelled as new trips on the network. As a result, traffic volumes on the local network around the school and retail areas are representative, and may even be conservatively high.	Noted, While the traffic generation associated with the retail land uses in the model is dependent on the assumptions for the Local Centre Zone, the overall scale of development is relatively modest (approximately 3 hectares) and is therefore not expected to be a primary driver of traffic demand. The adoption of trip generation rates based on characteristics similar to the Bayfair Shopping Centre, representing a relatively high traffic-generating retail environment, is considered acceptable for assessment purposes.	**Closed**
10		**On ramp capacity adjustment & the proposed mitigation**	The merge parameters at the Domain Road WB on ramp have been manually adjusted to reflect a capacity of ~1,500 vehicles per hour during the AM peak in the DM model. This has been increased to a higher value in the mitigated option, with 1,688 vehicles passing through the on ramp between 8 and 9 am. It is indicated by Beca Team that this has been achived by extending the on ramp merge lane distance by 50 meters in the Aimsun model. The travel time comparison between the 10B and 10B mitigated scenario indicates that the above change may resutl in a 10 mins travel time saving between Golden Sands and Domain Road on ramp, which is relatively significant compared to the level of mitigation proposed. In our view, it would be best to verify this assumption through additional checks (SIDRA/HCM on ramp/merging assessment). **Could a higher on-ramp capacity (say 1,800 - 2,000 vph, suggested by HCM) attract additional traffic to Domain Road from the Wairakei South development, and if so, what would be the implications for Bell Road? Further detail on the higher-capacity sensitivity tests would be helpful to understand these potential network impacts.**	**Potentially significant in determining the appropriateness and adequacy of the proposed mitigation measures, and the likely impacts along Bell Road and Te Puke Highway.**	Sensitivity testing has been done with a 1,600vph and 1,700vph capacity which shows that travel time results are significantly lower even with a small increase in capacity. Increasing the merge length is one potential way to achieve this slightly higher capacity, but we recognise that the 1,700vph could be achieved with the existing layout. Sensitivity testing results are provided in **Sensitivity Tests** tab. At the higher ramp capacity, Bell Road volume does not change much and the Bell Road / Te Puke Hwy intersection continues to perform well.	Thanks for the additional information on the sensitivity tests. It appears that the 1,500 vph capacity scenario represents a worst-case scenario. In practice, the on-ramp capacity would be influenced by factors such as demand, motorway mainline traffic, and potential weaving behaviour between interchanges, which is challenging to capture . Nevertheless, we agree with the approach to use the model to illustrate what may occur if the on-ramp capacity is constrained, highlighting situations where mitigation measures may be required to address the issue. We however do would like to highlight that the currently proposed mitigation measures (i.e. a 50 m extension of the on ramp merge area) may still need to be confirmed.	**Closed, minor**

11		**Traffic signal settings - Sands Avenue/Te Okura Drive intersection**	Pedestrian phases have been included at the Sands Ave / Te Okuroa Dr intersection. Could you please confirm the assumed pedestrian demand (activation rate) on each approach? The proposed change in phasing arrangement between the AM and PM peaks may be theoretically justified; **however, it has the potential to create driver expectancy issues, particularly for unfamiliar users. This could increase the risk of hesitation or late decision-making.** We note that the double left turn lanes are assumed in the model from Te Okuroa Drive to Sands Avenue south. This may need to be verified against the future intersection layout. A high number of near-miss events have also been observed at this intersection between left-turning vehicles from Te Okuroa Drive East and southbound through vehicles on the Spine Road. This conflict pattern raises potential safety concerns. Consideration should be given to increasing the intergreen time for the left-turn movement (or otherwise reviewing the staging arrangement) to mitigate the risk and improve operational safety. This has been communicated with Beca team and this will be addressed in the latest models	**Potentially significant (diamond vs split phasing)**	The double left turn lanes have been coded as per the latest drawings for the Sands Development. Please see the drawing in the **Drawings** tab. Network coding has been updated at the TOD / Sands Ave intersection to mitigate the conflict between the left turning vehicles from TOD East and the southbound through vehicles on Sands Ave.	Noted, the proposed mitigation includes assigning a give-way control to the left-turn movement, which is also controlled by traffic signals. It is unclear how this arrangement would operate in practice. A more typical approach to mitigating the potential collision risk would be to increase the all-red time between the conflicting phases. This has been communicated to the Beca team, who have indicated that the issue will be addressed in the model.	**Closed**
12		**Traffic signal settings - other observations**	It is noted that no pedestrian phases have been included at the other signalised intersections along Sands Avenue or Wairakei South Spine Road through the Te Tumu and Wairakei South developments. This appears inconsistent with a corridor enviroment with high bus activities (bus frequency = 8 buses per hour, two-way) and town centre developments. A back-of-the-envelope calculation indicates that pedestrian phases could be activated by PT users alone in approximately 8 out of 36 signal cycles (i.e. over 20% of cycles). This has been communicated with Beca team and they indicated they will adress this in the latest models No bus stops have been assumed along the spine road within the Wairakei South development, albeit bus services have been coded in the model. The location and frequency of bus stops should inform the assumed pedestrian demand and corresponding signal phasing at adjacent intersections. At the Papamoa East Interchange signals, the model assumes that vehicles travelling onto the overbridge encounter a dead phase (red light). This does not align with typical interchange signal coordination, which generally seeks to facilitate a green wave for dominant movements. If this arrangement is intentional, it may require specific departure approval from NZTA.	**Moderate to Significant (pedestiran and PEI phasing)**	Pedestrian phasing has now been added to the The Boulevard / Sands Ave, Bill Miller / Sands Ave, and the signalised intersections across the Wairakei South Area. Bus stops have now been coded in. We have reviewed phasing at other interchanges in Tauranga which show similar phasing to what we have modelled, and allow vehicles to travel onto the overbridge with the red light - refer to **Interchange Phasing tab**. The current PEI phasing (phase B1) already allows vehicles onto the overbridge and aligns with how we are currently running it in the model. The PEI interchange will also have a longer overbridge (~120m) compared to other interchanges around Tauranga and therefore have more spacing for queueing without blocking back the interchange. These examples show strong precedent that NZTA can run the phasing we are proposing. We are also engaging with NZTA and TTOC in parallel to discuss the interchange phasing.	The mode includes a 6-second late start for left-turn movements to provide pedestrian protection at most of the intersections. Additional information on how the pedestrian phase timings were determined would be helpful, including clarification on the type of pedestrian protection assumed (e.g. full or partial protection), the duration of the green man phase, the pedestrian clearance (flashing red) time, and the assumed pedestrian activation rates. The Beca team has confirmed that the current model assumes partial pedestrian protection with an approximate 35–40% activation rate. While this may be acceptable, there is a risk that Council may seek full pedestrian protection with higher activation rates, particularly at the town centre intersections. We therefore recommend that the pedestrian protection assumptions be clearly documented in the model report. With regard to the interchange signal phasing, while this arrangement may currently be permitted, a safety audit may still be required to confirm its suitability once the interchange is upgraded to accommodate additional movements. We also note that, based on the queues observed in the model, queues from the PEI could extend back to The Sands Avenue intersection if this arrangement is not implemented. We agree with the appraoch of discussing this assumption with NZTA and recommend that this potential risk also be discussed in the model report.	**Closed, minor**

9.1 Count Data

9.1.1 Link Counts

The following plots show the link counts that were used in the calibration / validation of the model. Two sets of counts are shown, those counts that were available through Tauranga City Council, Western Bay of Plenty, NZTA or previous projects, and those counts that were taken during the surveys in August to supplement the existing counts.

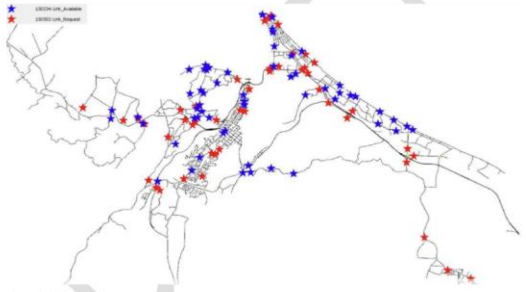


Figure 9-1: Link Counts

9.2 Travel Time Data

Travel times have been collected from GPS data for the month of August 2018. Figure 9-3 shows the routes that have travel times measured. Note that these routes are segmented into smaller lengths for analysis and used in validation.

Figure 9-3: Travel Time Routes

Appendix 5: Letters of Support

20th March 2026

Blue Haven Group
C/- Rod Bailey

By Email: [redacted]
Cc: Mark Apeldoorn [redacted]

Tēnā koe,

Letter of Support – Wairakei South Fast-Track Consent Application (Transport and Public Transport Matters)

Bay of Plenty Regional Council (BOPRC) appreciates the engagement undertaken to date regarding the transport and public transport elements of the Wairakei South Fast-Track Application. This letter summarises Transport Planning staff's technical position in relation to multi-modal transport, notably public transport, walking and cycling.

Staff acknowledge the receipt of the updated design information (including indicative bus stop locations and road cross-sections), the supporting memorandum circulated on 9th February 2026, and the discussions held on the 18th of February 2026. Staff also acknowledge the regional modelling to date and the public transport passenger forecasts.

Based on the material provided and the commitments outlined by the applicant, staff provide the following comments:

1. Collector Road and Bus Route Provisions

The Bay of Plenty Regional Public Transport Plan 2022-32 (RPTP 2022) is the region's key statutory public transport planning document, guiding the design and delivery of public transport services, information, and infrastructure. Objective 4 of the RPTP 2022[1] recognises the importance of an integrated approach between public transport and urban form encouraging the provision of infrastructure that supports the efficiency and reliability of public transport.

The proposal includes a public transport enabled collector road network. We also note that the subdivision layout achieves 500 metres (m) of walkable public transport accessibility catchment in the multimodal network. Staff support retaining the public transport enabled road network and multimodal network through the fast-track consent process, as these support future route optimisation and multi-modal access.

[1] Policy 3.4, 4.1 and 4.3 of the RPTP 2022 support the design of well-functioning urban environments.

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2. Bus Priority and Pre-Emption Measures

BOPRC staff support the inclusion of bus priority and pre-emption provisions, especially;

- Bus priority/pre-emption across the Papamoa East Interchange.
- Internal bus or transit signal priority at the proposed signalised intersections.
- The potential signalisation and bus priority for future public transport at Bell Road / Te Puke Highway intersection.

These measures reflect an appropriate future-proofing approach for the strategic public transport spine through Wairakei South.

3. Bus Stops, Cross Sections, and Multimodal Design

Policy 4.2 of the RPTP promotes the integration between public transport and other modes particularly the provision of safe and accessible walking, cycling and micro-mobility connections to public transport services. Staff at BOPRC support the design of the indicative bus stop layouts, shared path interfaces, and collector/arterial cross sections to be prepared in accordance with New Zealand Transport Agency's Waka Kotahi's Public Transport Draft Design Guidance. The design supports:

- Safe in-lane bus stops.
- Multimodal access.
- Integration with cycle lanes and shared paths.

Staff consider these provisions as appropriate for this stage of the project.

Conclusion

Based on the information provided and engagement to date, BOPRC staff are satisfied that the proposal:

- Positively aligns with the Regional Public Transport Plan.
- Future-proofs public transport infrastructure.
- Provides for bus access within a 500 m access consistent with regional expectations.

On this basis, BOPRC provides staff-level support for the public transport and transport-related aspects of the Wairakei South Fast-Track Application, noting that any formal council position remains subject to the Fast-Track Consents process.

Thank you for the ongoing collaboration. We look forward to continued collaboration to deliver sustainable and accessible Public Transport for the Wairakei South Development.

Ngā mihi,

Andrew Williams
Manager, Transport Strategy
Bay of Plenty Regional Council

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