Evidence pack

Northland region

June 2025

Version 1.0

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More information

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Contents

Introduction

This Northland region section is part of the *Evidence pack*, which is intended to help in the preparation of the strategic front end of regional land transport plans (RLTPs).

It does this by providing a consistent set of data and information setting out the current and future state of New Zealand's transport system at a national and regional level, and what interventions are likely to be effective to address identified deficiencies.

This iteration (version 1, June 2025) is the first step in the collaborative development with the sector of consistent and comprehensive evidence and information. For future iterations we will be drawing on your feedback to iteratively improve it and close any data and analysis gaps.

For more background information about the evidence pack, see the Introduction and national summary.

What's in the evidence pack?

The complete evidence pack is available on the Transport Insights portal.

There you will find:

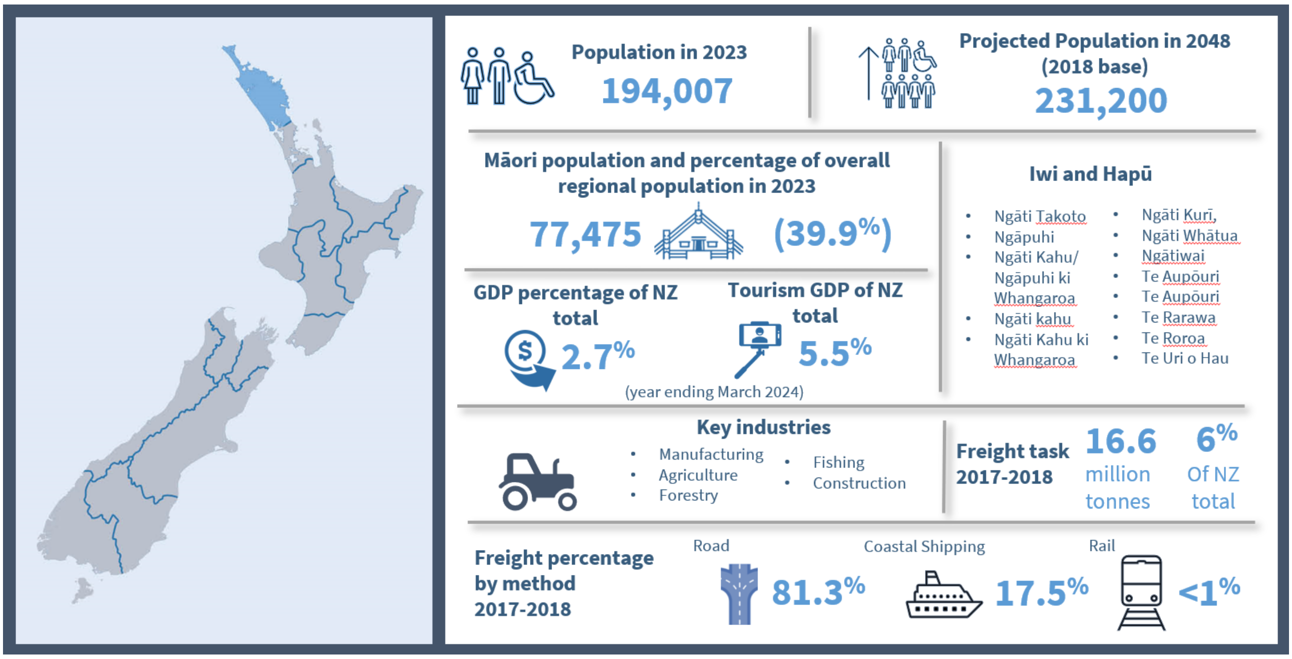
- evidence pack introduction and national summary, which gives you more background to the pack, its purpose and where the information and data are sourced from, and provides an overview for the whole country
- a section for each region, with data and information (calculated as strategic measures) specific to that region, and discussion of how it fits into the national network.

What's in this Northland region section?

Each regional section follows the same structure:

- **Northland overview** – a brief overview of the region.
- **Strategic measures** – which looks at how the region currently rates against the 14 strategic measures from the Land Transport Benefits Framework, and how it is expected to change over time.
- **Current and future challenges** – specific issues for the region to address.
- **Focusing effort** – identifies key areas to focus investment in the short and longer term, and includes targeted suggestions of potential interventions.
- **Appendices** – data sources for the strategic measures and more information on potential interventions.

Northland overview



Northland is a region of unique natural beauty with a nationally significant history. It is the site of the arrival of Kupe and the first encounters between Māori and Europeans. The land is narrow, less than 100km wide at its widest point and nowhere is more than 40km from the sea.

According to 2023–24 data, Northland's road network comprises approximately 6755km of roads, including 837km of state highways. Approximately 50 percent of these roads are unsealed, compared to the national average of 3 percent. This extensive network is vital for the region's predominantly rural population and its key industries, such as agriculture, forestry, and manufacturing.

The population of Northland is projected to grow by 4 percent to 231,200 by 2048 (2018 base). Most of this growth is projected to be people over 65 years. Nearly 70 percent of the population lives outside Whangārei.[1] Spill-over from Auckland is a key growth driver for the region, particularly for Kerikeri, Whangārei, Mangawhai, Ruakākā and along the eastern corridor from Whangārei to Auckland.

The state highway network in Northland plays a vital role in connecting these dispersed communities with each other, to Auckland, and to the rest of New Zealand. The Government Policy Statement on land transport (GPS) identifies two Roads of National Significance in the Whangārei to Auckland corridor. These new state highways present opportunities for economic growth and increased productivity.

Population growth has put pressure on housing and infrastructure, including transport. The largest amount of population growth will be in Whangārei through a mix of greenfield growth and urban redevelopment. This is triggering the need for significant urban developments, notably the Whangārei Hospital expansion, which will require integrated transport solutions.

High-growth coastal settlements such as Marsden/Ruakākā, Kerikeri/Waipapa, and Mangawhai will likely remain car dependent unless there is significant investment in public transport. Public transport in Whangārei is the CityLink bus service, with patronage numbers static for several years as trips have now reached capacity levels on some routes.[2]

The roads in Northland are disproportionately unsafe. The region contains 3.8 percent of the country's population, yet 6.8 percent of all fatal crashes that occurred during the 2023/24 financial year occurred in the

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[1] Northland Regional Council (2021). Regional Public Transport Plan for Northland 2021–2031. https://www.nrc.govt.nz/media/d5ungojg/regional-public-transport-plan-for-northland-2021-2031.pdf

[2] Northland Regional Council (2021). Regional Public Transport Plan for Northland 2021–2031. https://www.nrc.govt.nz/media/d5ungojg/regional-public-transport-plan-for-northland-2021-2031.pdf

region.[4] Since 1991, the number of death and serious injury crashes occurring on the region's roads have increased consistent with population growth.[3]

The Māori asset base is valued at $5.7 billion.[4] The primary and property sectors are of particular importance and the Māori economy will continue to grow.[5] As the Māori economy continues to grow, iwi are working together to focus on high-value opportunities and move up the value chain in key industries..[6]

Northland has high levels of unemployment, the highest of which is in the Far North district[7] and consequently this district, as well as pockets of Kaipara district and Whangārei district, have high levels of deprivation. 4–7 percent of the community have no access to a car or public transport and in many parts of the region, public transport does not exist or is extremely limited.[8]

Resilience is currently the biggest transport issue affecting Northland. The unique geology of the region, chiefly the Northland Allochthon soil group, which extends west of Northland and as far south as northern Auckland, is particularly prone to land sliding and tends to move even on gentle slopes.[9]

The next 30 years will see the risk for the transport network increase further because of increased rain and storm intensity, coastal and soil erosion, sea-level rise, flooding, slips, and storm surges.[10] Resilience issues will affect access and, consequently, the ability for the local economy to grow. The small number of connections between Northland and the rest of the country mean network resilience is of particular significance to the region for social and economic reasons.

The regional freight task in 2017/18 was 18.2 million tonnes, or 6.5 percent of the New Zealand total. 65 percent of this was moved within the region, 5 percent higher than the national average of 60 percent.[11] 81.3 percent of the freight task in Northland was moved by road, 17.5 percent by coastal shipping, and less than one percent by rail. Total freight volume is expected to increase 6 percent by 2033 and 25 percent by 2053.[12] In the future, freight will be dominated by demand-driven commodities (such as concrete, processed timber, manufacturing-retail), because of economic and population growth.[13] The volume of these commodities is expected to increase 22 percent by 2033 and 49 percent by 2053.[14]

With low levels of shipping, rail and public transport, Northland relies heavily on the state highway network to move freight and support tourism. An important development is a new rail link to Northport which is in

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3 Ministry of Transport (2022). Crash and injury data. https://www.transport.govt.nz/statistics-and-insights/safety-annual-statistics/sheet/crash-and-injury-data

4 Reserve Bank of New Zealand (2018). *Te Ōhanga Māori – The Māori Economy 2018*. https://www.rbnz.govt.nz/-/media/0212182a319f481ea4427bcf5dd703df.ashx

5 Reserve Bank of New Zealand (2018). *Te Ōhanga Māori – The Māori Economy 2018*. https://www.rbnz.govt.nz/-/media/0212182a319f481ea4427bcf5dd703df.ashx

6 Northland NZ (2015). *He Tangata, He Whenua, He Oranga – Tai Tokerau Maori Growth Strategy*. https://www.northlandnz.com/assets/Files-for-Download/Corporate-Library-Documents/2015-Tai-Tokerau-Maori-Growth-Strategy.pdf

7 Infometrics (2023) Quarterly Economic Monitor Northland Region. https://qem.infometrics.co.nz/northland-region/indicators/unemployment?compare=new-zealand.

8 MRCagney (NZ) Ltd (2020). *Transport needs in Northland*. Auckland. https://www.nrc.govt.nz/media/gxhlrlzm/northland-transport-needs-final-report-oct-2020.pdf

9 Harris and Orense (2012). Shear strength properties of Northland Allochthon soils under rainwater infiltration. https://www.issmge.org/uploads/publications/89/82/72.pdf

10 Ministry for the Environment and Stats NZ (2023). *New Zealand's Environmental Reporting Series: Our atmosphere and climate 2023*. https://environment.govt.nz/assets/publications/Environmental-Reporting/Our-atmosphere-and-climate-2023.pdf

11 Ministry of Transport (2019). *National freight demand study 2017/18*. https://www.transport.govt.nz/assets/Uploads/Report/NFDS3-Final-Report-Oct2019-Rev1.pdf

12 Ministry of Transport (2019). *New Zealand transport outlook – freight model*. https://www.transport.govt.nz/assets/Uploads/Data/Transportoutlook-updated/Freight-Model-Version-2- Documentation-20190423.pdf

13 Ministry of Transport (2019). *New Zealand transport outlook – freight model*. https://www.transport.govt.nz/assets/Uploads/Data/Transportoutlook-updated/Freight-Model-Version-2- Documentation-20190423.pdf.

14 Ministry of Transport (2019). *New Zealand transport outlook – freight model*. https://www.transport.govt.nz/assets/Uploads/Data/Transportoutlook-updated/Freight-Model-Version-2- Documentation-20190423.pdf

detailed design phase. This rail connection will help move freight from road to rail, which will reduce traffic congestion and emissions while making the supply chain more efficient. The proposed rail upgrades between Otiria and Whangārei, allowing for heavier freight loads, further support this initiative.[15]

Over the past two decades, Northland's transport network has seen significant improvements aimed at making travel easier, safer, and more efficient. One of the major projects has been the upgrade of SH1.[16] This includes widening key sections of the highway, adding safety features such as median and roadside barriers, and improving intersections to reduce accidents.[17]

15 KiwiRail (n.d.). Northland rail. https://www.kiwirail.co.nz/our-network/our-regions/northland-rail-rejuvenation/

16 Moffiet, N (2024, April 17). Auckland to Northland SH1 upgrade could grow GDP $1.2b per year – report. https://transporttalk.co.nz/news/auckland-to-northland-sh1-upgrade-could-grow-gdp-1-2b-per-year-report

17 NZTA (n.d.). NZUP factsheet - Northland. https://www.nzta.govt.nz/assets/planning-and-investment/docs/nzup/nzup-factsheet-northland.pdf

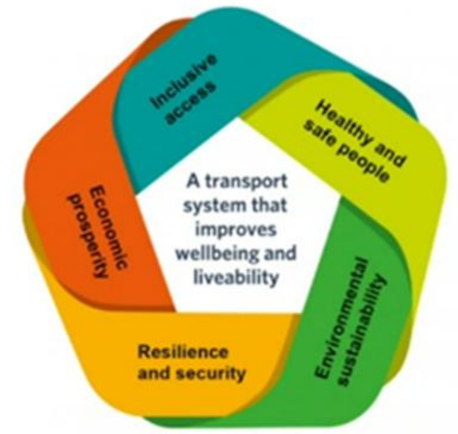
Strategic measures – current and future

This section provides tables summarising the 14 strategic measures in relation to this region. The data and evidence used to produce these results is included in Appendix A.

The 14 strategic measures are a subset of 60+ measures included in the Land Transport Benefits Framework. They have been selected to provide a coarse but practical overview of the 5 Transport Outcomes, as shown in the diagram.

The tables provide indicative current and future values for the 14 strategic measures (grouped by outcome), to understand how each measure (and therefore outcome) is likely to change if there is no significant investment (beyond that already committed).

More detail about the measures can be found in the Land Transport Benefits Framework measures manual.



Healthy and safe people

Benefit framework measure	Units	Current (2023/24)	Future (2048)	Change
1.1.1 Collective risk (crash density)	Average annual fatal and serious per kilometre of road section	0.027	0.026	-0.001 (-4%)
1.1.3 Deaths and serious injuries (DSIs)	Number of DSIs (annual)	181	178	-3 (-2%)
1.1.4 Personal risk (crash rate)	Average annual DSI per 100 million vehicle kilometres travelled	7.783	7.783	0 (0%)
1.2.1 Road assessment rating – roads	Infrastructure risk rating (applies to both current and future)	High: 45.77% Medium-high: 26.44% Medium: 18.74% Low-medium: 8.34% Low: 0.71%		N/A

Insights

- If there is no significant investment (beyond that already committed), crash density and the number of deaths and serious injuries (DSI) are projected to decrease slightly by 2048. Projections are unavailable for other strategic measures for safety but indicate Northland currently performs poorly for this outcome on those strategic measures.
- Collective risk (crash density) shows where the biggest difference can be made in terms of absolute numbers of DSIs and is affected by population size and transport mode chosen. The average annual fatal and serious crashes per kilometre of road section in Northland are currently slightly lower than the national

average and the fifth-equal highest average of all regions. If there is no significant investment (beyond that already committed), crash density is projected to decrease by 4 percent by 2048.

- Northland has the sixth-highest number of DSI of all regions, with about 7 percent of the national total and lower than the average number of DSI of all regions. If there is no significant investment (beyond that already committed), the number of DSI is projected to decrease by only 2 percent by 2048.
- Personal risk (crash rate) highlights areas where a crash is more likely to occur based on use of the road network and is not affected by population size. The average annual DSI per 100 million vehicle kilometres travelled (VKT) in Northland is currently higher than the national average and the highest average of all regions.
- Infrastructure risk rating (IRR) describes the underlying level of risk a road presents to an individual road user based on key physical and operational attributes. The proportion of Northland's roads rated as being at medium-high and high risk (that is, with DSI per 100 million VKT equal to or greater than 8) is 22 percent more than the country as a whole and the highest proportion of all regions.

Resilience and security

Benefit framework measure	Units	Current (2023/24)	Future (2048)	Change
4.1.1 Availability of a viable alternative to high-risk and high-impact route	Percentage of high-risk, high-impact route with a viable alternative	Not included in this release		
4.1.2 Level of service and risk (note that for this evidence pack this data is from the National Resilience Assessment Tool (NRAT) and includes only state highways)	Number of identified sites in region by combined risk rating (future, geological and hydrological)	Low: 171 Med: 276 High: 84 Critical: 29 Not yet rated: 169	N/A	N/A

Insights

- If there is no significant investment (beyond that already committed), Northland is projected to have the second-highest number of future (emerging) risks. The low proportion of high and critical risks indicate Northland currently performs well for this outcome.
- Hazard events at identified risk sites can lead to unplanned closures of the state highway network, impacting network resilience. Northland is mostly at risk from geological events (rockfall, overslips, underslips), which make up 560 of the 729 resilience risk sites in the region.
- High and critical risks make up 20 percent of all risks in the region that have been rated to date. The proportion of high and critical risks is 15 percent lower than the national rate and the fourth-lowest of all regions.
- The risks include 39 sites with future (emerging) risks, due to the impact of climate change for example. Northland has the second-highest number of future (emerging) risks of all regions, if there is no significant investment (beyond that already committed).

Economic prosperity

Benefit framework measure	Units	Current (2023/24)	Future (2048)	%Change
5.1.2 Travel time reliability – motor vehicles (note for this evidence pack, the data only relates to state highway traffic monitoring system (TMS) sites)	Calculated using coefficient of variation (CoV); standard deviation of travel time divided by average minutes travel time Rate: High <0.3, Medium 0.3–0.6, Low >0.6)	Low: AM 12% Day 0% Med: AM 0% Day 4% High: AM 88% Day 96%	NA	NA
5.1.3 Travel time delay (note, data is from National Network Performance (NNP) model, which is currently limited to State Highway TMS sites).	Difference between average travel time during AM peak and average travel time during the inter-peak in minutes per kilometre (by mode) as a percentage	Car: 8% PT: N/A% Cycle: N/A%	Car: N/A% PT: N/A% Cycle: N/A%	Car: N/A% PT: N/A% Cycle: N/A%
5.2.2 Freight – mode share value	Percentage of value for each mode	Not included in this release		
5.2.3 Freight – mode share weight	Percentage of weight for each mode	Road: 98% Rail: 2%	Road: 98% Rail: 2%	Road: 0% Rail: 0%

Insights

- If there is no significant investment (beyond that already committed), the proportions of freight carried by road and rail in Northland are projected to remain unchanged in 2048. A projection is unavailable for travel time reliability, but the poor travel time reliability in Northland compared to the national rate and other regions indicate Northland currently performs poorly for this strategic measure.
- Travel time reliability can impact the efficient movement of people and goods. 12 percent of Northland's state highway network (limited to data based on where we have TMS sites only) has poor travel time reliability (that is, a high CoV), compared to 6 percent for the country as a whole and the third-highest proportion of all regions. Unexpected events on the state highway network impacts travel time reliability in Northland. The capability to estimate travel time reliability for future years is still being developed and is intended to be included in later iterations of the evidence pack.
- While road freight is more efficient over short distances, rail freight is safer, lower emissions and more efficient over longer distances. 98 percent of freight in Northland is carried by road, 12 percent higher than the national rate and the second-highest rate of all regions. 2 percent of freight in Northland is carried by rail, 11 percent lower than the national rate and the second-lowest rate of all regions. If there is no significant investment (beyond that already committed), these shares are projected to remain unchanged in 2048.
- The freight mode share appears to be consistent with forecast higher demand for imports and consumer goods, while primary sector exports are forecast to remain flat, reflecting relatively low exports, the geographic isolation of Northland and assuming the current configuration of ports will remain.

Environmental sustainability

Benefit framework measure	Units	Current (2023)	Future (2048)	Change
8.1.1 Greenhouse gas emissions (all vehicles)	Annual tonnes of CO_2 equivalents (CO_2-e) emitted	0.61 m	0.27 m	-0.35 m (-57%)
8.1.3 Light vehicle use impacts	Annual light vehicle kilometres travelled (light VKT)	2,172 m	2,075 m	-97 m (-4%)

Insights

- If there is no significant investment (beyond that already committed), Northland's greenhouse gas (GHG) emissions from all vehicles are projected to reduce significantly (primarily due to a highly uncertain assumed level of vehicle fleet electrification) and light vehicle VKT is projected to decrease slightly.
- Land transport is a major contributor to GHG emissions. Northland accounts for 4 percent of transport GHG emissions in New Zealand. This proportion of the national total is in the middle of the range of all regions. If there is no significant investment (beyond that already committed), both Northland's volume of GHG emissions and the proportion of the national total are projected to decrease by 2048, primarily through electrification of the vehicle fleet (as forecast using the Ministry of Transport Vehicle Fleet Model (VFM)). However, this assumed level of electrification has high uncertainty, and is a major factor affecting GHG emissions; therefore the calculated 57 percent decrease needs to be considered in this light.
- Light vehicle VKT is currently the largest source of transport GHG emissions. Electrification of the light vehicle fleet could be complemented by mode shift to public transport and/or active modes to maximise a reduction of GHG emissions. Northland accounts for 5 percent of light vehicle VKT in New Zealand. This proportion is in the middle of the range of all regions. If there is no significant investment (beyond that already committed), Northland's volume of light vehicle VKT is projected to decrease and the proportion of the national total is projected to remain unchanged in 2048.

Inclusive access

Benefit framework measure	Units	Current (2023)				Future (2048)				%Change			
10.2.1 People – mode share	Percentage by mode (Census (2023) journey to work and education)	Car: 91.00%				N/A				N/A			
		PT: 1.33%				N/A				N/A			
		Cycle: 0.99%				N/A				N/A			
		Peds: 6.67%				N/A				N/A			
10.3.1 Access to key social destinations (all modes)	Number of jobs (x1000) accessible by mode in AM peak (car 40 min, PT 45 min, cycle 45 min) and distance from city centre (km)		0–5	5–10	10+km		0–5	5–10	10+km		0–5	5–10	10+km
		Car:	31	31	35	Car:	37	36	40	Car:	18%	18%	16%
		PT:	17	6	1	PT:	19	7	1	PT:	14%	28%	51%
		Cycle:	29	20	2	Cycle:	34	25	3	Cycle:	17%	24%	42%

Insights

- If there is no significant investment (beyond that already committed), the proportion of jobs more than 5km from central Whangārei accessible by public transport and cycling is projected to increase by 2048. A projection is unavailable for mode share for journeys to work and education, but the high proportion of journeys by car in Northland compared to the national rate and other regions indicate Northland currently performs poorly for this outcome.
- The availability of public and shared transport services and active mode infrastructure can reduce car dependence, which can be a barrier to access for those who are on low incomes or unable to drive. Journeys to work and education in Northland by all modes are 3 percent of the national total and this proportion is in the middle of the range of all regions.
- Journeys by car in Northland are 12 percent higher than the national rate and this proportion is the highest in the country of all regions.
- Public transport use in Northland is 6 percent lower than the national rate and this proportion is in the middle of the range of all regions.
- The proportion of people cycling in Northland is less than half the national rate and is the lowest in the country of all regions.
- The proportion of people walking in Northland is 4 percent lower than the national rate and the lowest in the country of all regions.
- The low provision of public and shared transport services in lower socioeconomic areas and infrastructure for walking and cycling in urban areas impacts mode share for people in Northland.
- The accessibility of jobs by modes other than car increases people's ability to work. There are significantly more jobs accessible by car than other modes in Northland.
- Within 5km of central Whangārei, accessibility by car is approximately double that for public transport and slightly higher than cycling. For locations further out, the difference is much greater for both alternate modes. If there is no significant investment (beyond that already committed), the proportions of jobs more than 5km from central Whangārei accessible by public transport and cycling is projected to increase by 2048.
- A dispersed urban form in Whangārei and dispersed population throughout the region increases the demand for travel to work, in terms of distance travelled and dependence on cars, as there are few direct public transport options in locations distant from the city centre with more affordable housing. The lowest income households spend a greater proportion of their incomes on transport.[18] These factors combine to result in transport poverty (where people lack adequate access to affordable and reliable transport, hindering their ability to participate in essential activities like work).

[18] Te Manatū Waka Ministry of Transport (2022). *The distributional impacts of transport-related carbon policy*. https://www.transport.govt.nz/assets/Uploads/The-Distributional-Impacts-of-Transport-final-report-005.pdf

Interdependencies between outcomes

- Addressing the current and future challenges for one transport outcome can have negative impacts on others. On the other hand, it is possible to take an approach to each outcome that makes a positive impact on the others.
- For example, improving the quality of key state highways to better withstand current geological risks and future climate change impacts (see resilience and security) could enhance safety (see healthy and safe people), improve travel time reliability, and support the efficient movement of people to jobs and goods to markets. This would be especially effective on key transport routes within Northland and between Northland and the rest of New Zealand – particularly if Northport is expected to handle more freight in the future (see economic prosperity).
- Safety risks could be reduced further by increasing the coverage of public transport services further from central Whangārei, and more shared transport in dispersed areas, which could improve access to work and education (see inclusive access). This could also help reduce emissions, mitigating the long-term impacts of climate change (see environmental sustainability).

Current and future challenges

To achieve a land transport network that is safe, efficient and effective for Northland, it is important to understand it in combination with the needs and lives of the region's people and the unique natural and built environment.

National context

New Zealand's transport networks are extensive and vital for the country's connectivity and economic prosperity. The state highway network spans about 11,750km,[19] while the local road network covers about 83,368km.[20] Additionally, the rail network consists of around 4128km of rail lines.[21]

Maintaining existing networks

Maintaining such a vast network requires significant effort. Annually, 5−10 percent of the road network (4750km to 9500km) needs resurfacing or rebuilding.[22] The network includes nearly 4200 bridges[23] on state highways and about 15,000 on local roads.[24] Urban growth and higher traffic volumes, especially of heavy vehicles, increase maintenance needs, which strains budgets. Neglecting maintenance can lead to safety risks, higher long-term costs, and disrupted connectivity.[25]

Looking ahead, future challenges are expected to intensify. Climate change is likely to increase the frequency and severity of extreme weather events, such as flooding and heatwaves, which can damage infrastructure and accelerate wear and tear. Technological advancements, such as the rise of electric and autonomous vehicles, may require new types of infrastructure and maintenance protocols. Additionally, population growth and urban sprawl will create pressure to further expand the network, which will lead to increasing the scale and complexity of maintenance operations.

Access to opportunities and enabling the efficient movement of freight around the country

The transport system underpins economic and social wellbeing, ensuring access to jobs, education, healthcare, and efficient freight movement. Remote and rural areas face significant access challenges, especially during adverse weather. These challenges include a lack of alternatives to private vehicle trips as public transport services are not a viable alternative because of coverage and frequency. In addition, there is a lack of redundancy in parts of the land transport system – some places rely on one or 2 critical lifelines to stay connected.

Looking ahead, existing access challenges in remote and rural areas will be exacerbated by the impacts of climate change and demographic change. The population is expected to remain static or decline in smaller, rural, and remote districts. In some areas, people aged over 65 are expected to make up more than 35 percent of the population. The affordability of local government rates increases will be an issue in these areas. Network resilience will be further challenged as damage caused by climate change becomes more frequent, outages last longer and repair costs increase. Rural and coastal communities may become increasingly isolated and have difficulty accessing essential services – this may particularly impact Māori.

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19 NZTA (n.d.). State highway frequently asked questions. https://www.nzta.govt.nz/roads-and-rail/research-and-data/state-highway-frequently-asked-questions/

20 Ministry of Transport (n.d.). Statistics and insights. https://www.transport.govt.nz/statistics-and-insights

21 Stats NZ (n.d.). Transport. https://www.stats.govt.nz/topics/transport

22 NZTA (n.d.). Road management and maintenance. https://nzta.govt.nz/roads-and-rail/management-and-maintenance/

23 NZTA (n.d.). Bridges and structures. https://www.nzta.govt.nz/roads-and-rail/bridges-and-structures/

24 Figure.NZ (n.d.). Number of bridges on local roads in New Zealand. https://figure.nz/chart/nHM7UwJuYIrWnLdT

25 Government of New Zealand (n.d.). Government Policy Statement on land transport 2024–34. https://www.transport.govt.nz/assets/Uploads/Government-Policy-Statement-on-land-transport-2024-FINAL.pdf

Freight is a key part of economic activity and is fundamental to making places great to live (liveability).[26] The efficient movement of freight is essential for economic productivity. Current freight inefficiencies such as delays, detours and highly variable travel times can increase costs by up to 20 percent.[27]

Looking ahead, total freight volume is expected to increase by 39 percent by 2053.[28] The location of freight origin and destination may change. A growing population in the largest urban areas means more goods will need to be moved to these locations, and industry and population concentration is occurring in the upper North Island. Climate change is expected to change the nature and location of primary production and increase the frequency of extreme weather events, disrupting transport networks, isolating communities, and affecting freight reliability.[29] Technological shifts, including the rapid growth of e-commerce and the transition to low-emission freight vehicles, will require significant infrastructure upgrades and new logistics strategies to ensure efficiency and sustainability.[30]

Resilience to natural hazards and climate change

New Zealand faces significant natural hazard risks, including earthquakes, floods, and cyclones, worsened by climate change. The land transport system has always been exposed to natural hazard risks, with minor closures or delays through small scale events like slips and localised flooding common. However, the network is increasingly exposed to national and regional scale events such as Cyclones Hale and Gabrielle and the Kaikoura earthquakes that caused widespread and significant damage.[31] For instance, Cyclone Gabrielle alone caused damage estimated at $13.5 billion.[32]

Recovery from small events is quick, but larger events, such as Cyclone Gabrielle, cause extensive damage and long recovery times. The state highway network performs critical lifeline functions for communities, and repeated disruption to these functions impacts communities' access to the services they need.

Looking ahead, the land transport system will have to adapt to escalating impacts from natural hazards and climate change now and into the future. These impacts include sea-level rise and ongoing changes in the physical environment, as well as increasingly severe and frequent climate-related events such as storms, flooding, droughts, and wildfires.[33] The probability of an Alpine Fault earthquake occurring in the next 50 years is 75 percent, and there is a 4 out of 5 chance that it will be a magnitude 8+ event.[34] Such an event has the potential to cause severe damage and disruption across the entire South Island, with major consequences for the rest of the country.

These types of impacts will continue and will affect communities and the transport networks that connect them. As damage becomes more frequent, outages last longer and repair costs increase, rural and coastal communities may become increasingly isolated and have difficulty accessing essential services, and this may especially impact Māori. In urban areas, the impacts of climate change on multimodal networks can be

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[26] Auckland Transport (2020). Auckland freight plan. https://at.govt.nz/media/1983982/auckland-freight-plan.pdf

[27] Ministry of Transport (2023). Aotearoa New Zealand Freight and Supply Chain Strategy. https://www.transport.govt.nz/assets/Uploads/MOT4806_Aotearoa-Freight-and-Supply-Chain-Strategy-p09-v03.pdf

[28] Ministry of Transport (2019). *New Zealand transport outlook – Freight model*. https://www.transport.govt.nz/assets/Uploads/Data/Transport-outlook-updated/Freight-Model-Version-2-Documentation-20190423.pdf

[29] KPMG & The Aotearoa Circle (2024). *Transport sector climate change scenarios: Report on big climate risks to New Zealand's transport sector*. https://kpmg.com/nz/en/home/media/press-releases/2024/06/report-on-big-climate-risks-to-new-zealand-s-transport-sector.html

[30] Ministry of Transport (n.d.). Climate change — emissions work programme. https://www.transport.govt.nz/area-of-interest/environment-and-climate-change/climate-change

[31] Byett, A, et al (2019). *Climate change adaptation within New Zealand's transport system*. Motu Economic and Public Policy Research. https://www.motu.nz/our-research/environment-and-resources/climate-change-impacts/climate-change-adaptation-within-new-zealands-transport-system

[32] NIWA (2024). Cyclone Gabrielle was intensified by human-induced global warming. https://niwa.co.nz/news/cyclone-gabrielle-was-intensified-human-induced-global-warming

[33] NZTA (2022). *Tiro Rangi: our climate adaptation plan 2022–2024*. https://www.nzta.govt.nz/assets/resources/tiro-rangi-our-climate-adaptation-plan-2022-2024/tiro-rangi-our-climate-adaptation-plan-20222024.pdf

[34] AF8 (2022). *AF8 Programme Strategy 2022–25*. https://af8.org.nz/media/fpxjy3uu/af8_programme-strategy-2022-25-jul22.pdf

complex, widespread and cascade across the land transport system. Interregional connections will also be disrupted.

Congestion and capacity constraints, especially in large and growing cities

New Zealand's road network is a vital part of the country's infrastructure, with significant portions now facing congestion and capacity constraints. This is particularly evident in Auckland, where congestion costs are estimated to range between $1.3 billion and $2.6 billion annually.[35]

The demand for transport in New Zealand has grown rapidly, meaning that in some places the demand exceeds the ability of the transport system to cater for it. This has resulted in frequent congestion across parts of the road and public transport networks, particularly on motorways in Auckland, Tauranga, Wellington, Queenstown and Christchurch. Previously confined to 'rush hour' periods, congestion has steadily lengthened and worsened over time.[36] Congestion on the local road network is a growing concern, especially in urban areas. Rail network capacity restraints currently affect both public transport services in Auckland and Wellington, and freight movements across the country. Population growth, dispersed land use patterns, and increasing vehicle ownership will continue to contribute to this issue into the future.

Looking ahead, a growing population in the largest urban areas means more people who need to get to work, education, business and entertainment. New Zealand's population is projected to reach over 6 million by the early 2030s, with much of this growth concentrated in urban areas.[37] This, combined with dispersed land use and rising vehicle ownership – currently at nearly 0.9 vehicles per person – will further strain transport corridors and worsen congestion.[38] Without significant investment, it is likely congestion will worsen, network productivity will fall, and emissions will rise. Future challenges include adapting for electric and autonomous vehicles, building resilience to climate impacts and reducing emissions through urban planning, mode shift and fleet carbonisation.

Reducing the level of harm to people and the environment

New Zealand's land transport system faces significant safety and environment challenges. In 2024, there were 292 road fatalities, placing New Zealand 7th highest in road deaths per capita among 35 OECD countries.[39] Contributing factors include adverse weather, unsafe driving behaviour, and poor road conditions. Rural road fatalities are disproportionately high, accounting for 60 percent of all road deaths, despite rural roads making up only 40 percent of the network.[40]

Air pollution from fossil fuels and particulate matter continues to impact public health, contributing to an estimated 2247 deaths in 2016.[41] While low-emission vehicles are essential for reducing transport-related emissions, they are not a complete solution. A broader systems approach – encompassing clean energy, sustainable manufacturing, and urban planning – is needed to fully address environmental harm.[42]

The impact on the environment, including climate, on and from the transport network and its use is another pressing issue. The extensive road system crosses many sensitive ecosystems, habitats, and waterways, leading to habitat fragmentation, noise pollution, artificial light, and stormwater discharges.

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[35] NZTA (2013). *The costs of congestion reappraised*. https://www.nzta.govt.nz/assets/resources/research/reports/489/docs/489.pdf

[36] NZTA (2024). *Significant land transport challenges facing New Zealand*. https://www.nzta.govt.nz/assets/planning-and-investment/nltp/2024/docs/significant-challenges-nltp-2024-27.pdf

[37] NZTA (n.d.). *Significant land transport challenges facing New Zealand*. https://www.nzta.govt.nz/assets/planning-and-investment/nltp/2024/docs/significant-challenges-nltp-2024-27.pdf

[38] NZTA (n.d.). *Significant land transport challenges facing New Zealand*. https://www.nzta.govt.nz/assets/planning-and-investment/nltp/2024/docs/significant-challenges-nltp-2024-27.pdf

[39] International Transport Forum (2024). Road safety country profile – New Zealand 2023. https://www.itf-oecd.org/sites/default/files/new-zealand-road-safety.pdf

[40] Stats NZ (n.d.). Transport. https://www.stats.govt.nz/topics/transport

[41] Emission: Impossible Ltd and the HAPINZ 3.0 team (2022) Key findings from HAPINZ. https://ehinz.ac.nz/projects/hapinz3/key-findings-from-hapinz/

[42] Auckland Council (2022). *Transport emissions reduction pathway*. https://www.aucklandcouncil.govt.nz/plans-projects-policies-reports-bylaws/our-plans-strategies/Documents/transport-emissions-reduction-pathway.pdf

Looking ahead, climate change is expected to intensify these impacts because of more frequent extreme weather events, increased infrastructure stress, and greater disruption to both human and natural systems. Future challenges will also include managing the environmental footprint of new transport technologies and ensuring that safety improvements keep pace with population growth and the needs of changing demographics (such as people with children), travel patterns (increased travel by older people) and vehicle types, while also taking advantage of new technologies (for example cooperative intelligent transport systems and alternatives to bitumen) to improve safety and environmental outcomes.

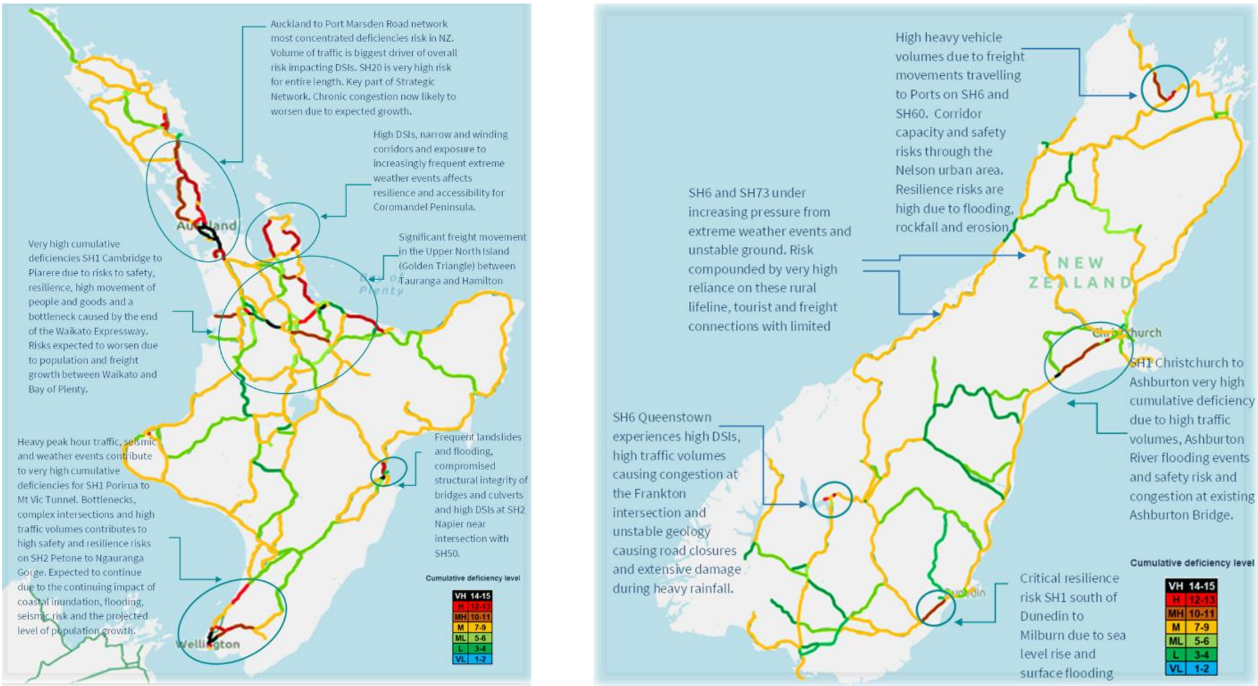

Figure 1: Cumulative (resilience, reliability and safety) deficiencies across the state highway network (source: NZTA data[43])

[43] Analysis of NZTA National Resilience Assessment Tool (NRAT), NZTA average annual daily traffic and NZTA cumulative risk using DSI data from 2019 to 2023.

Regional context

Northland's transport network plays a major role in the upper North Island. The upper North Island is vital to New Zealand's social and economic success. It's home to over half of New Zealand's population and generates more than 50 percent of the national GDP. Nearly 75 percent of the country's population growth over the next 20 years is expected in the upper North Island.

Figure 2: Current strategic network in the upper North Island (source: Arataki)

The Northland transport network connects to:

- south: SH1 Northern corridor as the primary connection to the rest of New Zealand
- south: SH16 as an alternate route.

These connections provide critical links to the rest of New Zealand, urban areas, freight hubs, ports, employment areas and tourist hotspots.

Route resilience and security

Northland's connection to the rest of New Zealand relies on SH1 and the North Auckland rail line, both of which have faced significant disruptions in recent years. These disruptions include crashes, adverse weather events leading to flooding, slips, and erosion, necessitating extensive rehabilitation work. These issues are made worse by increasing traffic volumes, especially during holiday periods.[44]

Road safety

Northland has a disproportionately poor road safety record, worsened by poor driver behaviour. The combination of challenging terrain and sub-standard road quality, such as unsealed local roads, leaves little room for error. Drivers' lack of awareness of the environment, other road users, and traffic rules results in a

[44] Northland Regional Council (2023). Northland Regional Land Transport Plan 2021–2027 (2023 Review). Northland Regional Council. https://www.nrc.govt.nz/resource-library-summary/transport-publications/

high number of crashes causing death or serious injury. Many of Northland's roads and roadsides are not designed, built, or maintained to accommodate driver mistakes, leading to frequent severe accidents.[45]

Heavy vehicles often use local unsealed roads to access arterial routes or when diverted, adversely affecting all road users, the environment, and public health due to dust.[46]

Infrastructure challenges

The hazardous environment makes maintaining existing infrastructure expensive and difficult. Growing volumes of heavy vehicles and increased community expectations about road quality drive up the investment needed to maintain current assets. Significant local variances in infrastructure quality and a lack of resilience hinder the region's ability to meet its transport needs. Northland remains heavily reliant on road transport, but changing demands driven by community and business expectations are putting additional pressure on the network.[47]

Urban transport pressure in Whangārei

Rapid growth in and around Whangārei has led to congestion caused by conflicts between short and long trips, movement and place functions, and the movement of people and goods. This issue can be mitigated through integrated planning, design, and management of urban transport networks and land use.[48]

Connectivity issues

Northland's economic potential is hindered by poor connectivity to Auckland and the rest of the country. The region relies heavily on the state highway network, particularly SH1, to transport products to market. While there are hopes for an increased share of freight on the rail network, Northland remains dependent on road transport. Both road and rail links have experienced severe disruptions in recent years, isolating communities, extending travel times and costs, and potentially damaging local road surfaces due to extended heavy traffic use. At times, the movement of people and freight is restricted or completely blocked.[49]

Socio-economic deprivation and transport disadvantage

Outside of Whangārei City, travel options are limited, especially in rural communities where transport disadvantage is most pronounced. There is a heavy reliance on private motor vehicles to access employment, health, education, and cultural opportunities, with no other options available. The historical disconnect between transport planning and land use/spatial planning has resulted in a vehicle-centric network with little consideration for alternative modes of transport.[50]

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[45] Northland Regional Council (2023). Northland Regional Land Transport Plan 2021–2027 (2023 Review). Northland Regional Council. https://www.nrc.govt.nz/resource-library-summary/transport-publications/

[46] Northland Regional Council (2023). Northland Regional Land Transport Plan 2021–2027 (2023 Review). Northland Regional Council. https://www.nrc.govt.nz/resource-library-summary/transport-publications/

[47] Northland Regional Council (2023). Northland Regional Land Transport Plan 2021–2027 (2023 Review). Northland Regional Council. https://www.nrc.govt.nz/resource-library-summary/transport-publications/

[48] Northland Regional Council (2023). Northland Regional Land Transport Plan 2021–2027 (2023 Review). Northland Regional Council. https://www.nrc.govt.nz/resource-library-summary/transport-publications/

[49] Northland Regional Council. (2023). Northland Regional Land Transport Plan 2021–2027 (2023 Review). Northland Regional Council. https://www.nrc.govt.nz/resource-library-summary/transport-publications/

[50] Northland Regional Council (2020). *Northland transport needs investigation report*. https://www.nrc.govt.nz/media/gxhlrlzm/northland-transport-needs-final-report-oct-2020.pdf

State highway hotspots

The following data sets have been overlaid to identify 'hotspots' (cumulative deficiencies) on the state highway network:

- **Reliability**: Measured by the average annual daily traffic (AADT), which calculates the total number of vehicles, including heavy vehicles, passing through traffic count sites. High to medium reliability issues are identified when highways frequently operate at or near their capacity of 20,000 vehicles per day.
- **Resilience**: Assessed by examining the risk of disruptions across the state highway network over the past 12 years.
- **Safety**: Derived from the NZTA Collective Risk Map, which uses historical crash data from 2019 to 2023 to identify areas with higher accident risks.

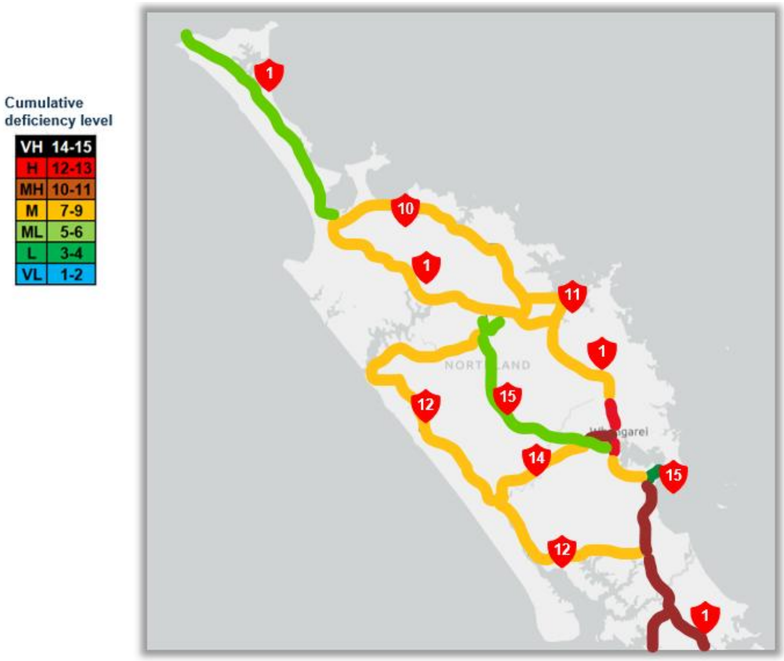

Figure 4: Cumulative deficiencies on the state highway network in Northland (source: NZTA data)

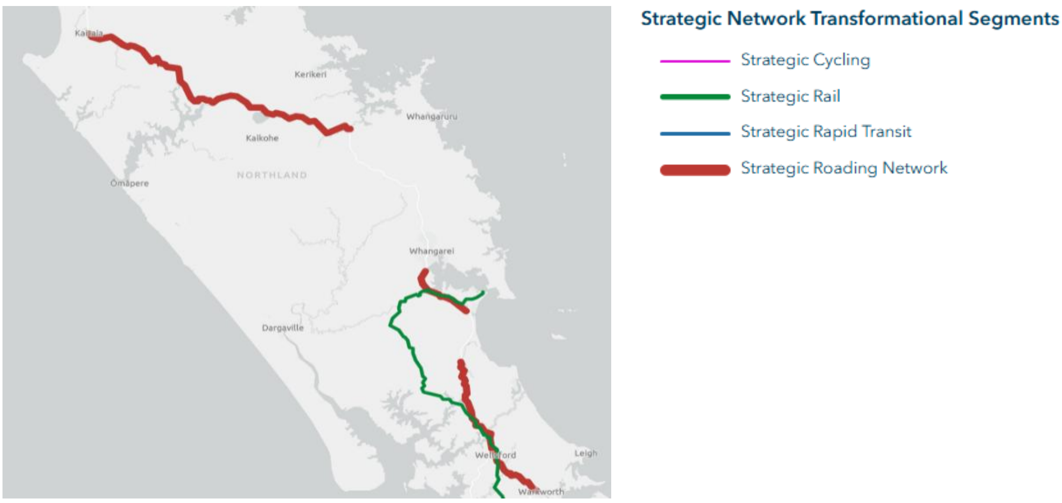

Figure 3: Arataki strategic network where transformational change is required (source: Arataki)

High deficiency: urban Whangārei

Whangārei is the main centre of Northland, serves as a hub for employment, education, essential services and retail. Most of the region's growth is occurring in and around this urban centre, as well as coastal communities, such as Mangawhai and Ruakākā.

Whangārei attracts significant volumes of traffic from the wider region via the state highway network, causing congestion at peak times and affecting freight movement, safety, and travel times. Some routes are already at capacity.

Nearly half of Whangārei district's population lives outside the main urban area, drawn to rural and coastal communities for their lifestyle advantages, good schools, and the 30-minute journey times to the city. However, these communities face several risks and challenges:

- They are typically serviced by single roads prone to closure due to crashes, slips, and flooding.
- They lack regular public transport services.
- The distance discourages active modes and contributes to high dependence on private vehicles for daily travel needs.

The Whangārei urban centre functions as a crucial hub for essential services and retail, such as the Whangārei Hospital, NorthTec and retail and service sector businesses. These attract significant traffic from the wider region, although limited public transport options impact overall accessibility and efficiency of the road network.

The cumulative deficiencies in the urban section SH1 and SH14 stem from factors affecting journey reliability, resilience, and safety. These challenges are due to historical growth patterns and geographical constraints. These highways carry substantial local traffic volumes, causing congestion at peak times and affecting freight movement, safety, and travel times.

Key issues include:

- the ongoing $759 million[51] reconstruction and expansion of the hospital, creating significant access problems and disrupting traffic flow
- commuter traffic from coastal communities, tourism, and rural areas makes congestion worse
- education-related traffic, with the college located near the hospital on SH14 adding to the traffic burden – this is further complicated by low-density housing development along SH14, leading to urban sprawl and increased travel distances[52]
- the centralisation of services in the CBD, requiring residents from rural areas to travel by car to access essential facilities – limited public transport options make these journeys more difficult, adding to the overall deficiency in the transport network.[53]

Recent development trends indicate significant expansion northward into areas such as Tikipunga and Te Kamo, as well as along the SH14 corridor. This trend is expected to intensify pressure on the existing transport network, showing the urgent need for improved access through active transport modes and enhanced public transport services.

Whangārei has mostly seen development characterised by large standalone housing in greenfield locations, with relatively low uptake of medium-density or mixed-use opportunities. Recognising this, Whangārei District Council has prioritised infill redevelopment and intensification through its Future Development Strategy (FDS). Aligning these urban planning initiatives with investments in public transport and active transport modes represents a critical opportunity to foster sustainable urban growth and mitigate urban sprawl.

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[51] Radio New Zealand (2024). 'No plans for scaling back of Whangārei's hospital redevelopment'. https://www.rnz.co.nz/news/national/536640/no-plans-for-scaling-back-of-whangarei-s-hospital-redevelopment

[52] Whangārei District Council (2023). Draft Future Development Strategy. https://www.wdc.govt.nz/Council/Strategic-Programmes/Future-Growth/Draft-Future-Development-Strategy

[53] Whangārei District Council (2023). Traffic management. https://www.wdc.govt.nz/Services/Roads-and-Transportation/Roads/Traffic-management

Some of the proposed and committed activities on this corridor include:

- Roads of National Significance – SH1 Whangārei to Port Marsden
- Roads of National Significance – alternative to Brynderwyns
- SH14 transport improvements
- SH1 Awanui commercial vehicle regional safety centre
- Far North slip and flood management.

Medium to high − Whangārei to Auckland corridor SH1 (nationally strategic corridor)

Frequent disruption on the critical connection between Whangārei and Auckland creates major challenges for industries moving goods in and out of the region, and severely limits the flow of visitors, impacting the tourism and hospitality sectors, which in turn hurts the region's economy.

There is a strong reliance on SH1, which passes through difficult terrain and has frequently faced lengthy closures in recent years, especially after severe weather events. This vulnerability was highlighted by the severe weather events in 2023, which disrupted road and rail connections between Northland and the rest of the country, leading to substantial business disruption.

The North Auckland Line provides a rail connection to Auckland but does not play a major role in the movement of goods or people between regions. The line faces resilience issues and is frequently closed for repair. The lack of a rail connection to Northport also limits the attractiveness of rail as a way of moving freight between Northland and Auckland.

Over the past two decades, noticeable growth and development has occurred along the SH1 corridor, stretching from Wellsford to Kaiwaka, Mangawhai, Waipū, Ruakākā, and Whangārei. Upgrades have reduced travel times and improved reliability, particularly for journeys from Whangārei to Auckland improving accessibility to employment opportunities in the North Shore. This corridor has increasingly become a focal point for residential expansions and economic activity, driven in part by continual improvements in SH1 connectivity.

Currently, there is no integrated spatial plan for the Whangārei to Auckland Corridor. Long-term planning efforts are predominantly confined within local government boundaries, limiting opportunities to maximise the benefits derived from inter-regional transport investments and address cross-boundary issues.

Some of the proposed and committed activities on this corridor include:

- Roads of National Significance – SH1 Whangarei to Port Marsden
- Roads of National Significance – Alternative to Brynderwyns
- SH1 Brynderwyn Hills immediate works and corridor strategy.

Medium deficiency: Mangamuka Gorge route

The Mangamuka Gorge route faces significant current and future challenges.

1. **Frequent slips and closures**: The route has a history of frequent slips and closures, particularly during severe weather events. For example, in August 2022, multiple significant slips led to the closure of SH1 through the Mangamuka Gorge. These closures disrupt connectivity and require extensive repair efforts.[54]
2. **Climate change impacts**: The increasing frequency and intensity of severe weather events, such as heavy rainfall and storms, are expected to make the vulnerability of the route worse. This could lead to more frequent and severe slips, flooding, and rockfalls.[55]

[54] NZTA (2022). SH1 Mangamuka Gorge slip repairs. https://www.nzta.govt.nz/projects/northland-corridor/sh1-mangamuka-gorge-slip-repairs/

[55] Far North District Council (2022). Record weather underlines climate change challenge. https://www.fndc.govt.nz/Your-council/News-story-archive/archive/2022/Record-weather-underlines-climate-change-challenge

3. **Geological and topographical challenges**: The challenging geology and topography of the area make it difficult to implement long-term solutions. The terrain is prone to instability, which complicates engineering efforts to stabilise the route.[56]
4. **Limited redundancy and alternative routes**: There are limited alternative routes available, and those that do exist are often substandard. This lack of redundancy means that closures of the Mangamuka Gorge route have significant impacts on connectivity for the region.[57]
5. **Ongoing maintenance and repair costs**: The continuous need for maintenance and repairs due to slips and other natural hazards results in high costs. For instance, the recent repair efforts involved addressing 36 slips, with 16 deemed critical, required complex engineering solutions.[58]
6. **Community and economic impact**: The route is a strategic connection for many relatively isolated communities. Frequent closures disrupt access to essential services, economic activities, and social connections, impacting the overall well-being of the region.[59]

Climate change has intensified these vulnerabilities leading to more frequent and severe slips and closures. For instance, the severe weather events in 2023 caused significant damage, leading to long-term closures and substantial business disruption. The soil in the area is generally soft and unstable, making the land particularly susceptible to the effects of severe weather.[60]

Addressing these challenges will require a comprehensive and strategic approach. This includes investigating long-term solutions to improve the route's resilience, exploring potential alternative routes, and implementing measures to mitigate the impacts of climate change.

Proposed and committed activities

Some of the proposed and committed activities on this corridor include:

- Far North Slip and Flood Management project
- SH10 Kaeo Bridge upgrade.

The region's state highways generally have a medium cumulative deficiency rating, primarily due to resilience and safety risks. To address these issues, several projects have been proposed, such as the Far North Slip and Flood Management project and the legacy cyclone rebuilding activities for SH12 and SH14. These initiatives aim to reduce resilience and safety risks, thereby improving overall journey reliability.

The NZTA maintenance, operations, and renewals (MOR) programme will continue to focus on rebuilding the network and enhancing the level of service over the next 10 years, impacting other state highways in the region.

The Roads of National Significance (RoNS) SH1 Whangārei to Port Marsden project is stage 3 of the Northern Corridor programme, aimed at improving connectivity with Auckland. This project proposes a 4-lane, mainly grade-separated highway, to address cumulative deficiencies between Whangārei and the SH15 intersection. Section 3B of this project focuses on urban Whangārei, aiming to alleviate congestion, and improve resilience and safety in that area.

Currently, there are no focused or sufficient activities around reducing cumulative deficiencies on the urban Whangārei section of SH14. SH10 and SH11 will rely on the MOR programme for any incremental improvements to their current medium deficiency rating. The recent completion of flood and slip rebuilding

[56] NZTA (2022). SH1 Mangamuka Gorge slip repairs. https://www.nzta.govt.nz/projects/northland-corridor/sh1-mangamuka-gorge-slip-repairs/

[57] NZTA (2022). SH1 Mangamuka Gorge slip repairs. https://www.nzta.govt.nz/projects/northland-corridor/sh1-mangamuka-gorge-slip-repairs/

[58] NZTA (2022). SH1 Mangamuka Gorge slip repairs. https://www.nzta.govt.nz/projects/northland-corridor/sh1-mangamuka-gorge-slip-repairs/

[59] NZTA (2022). SH1 Mangamuka Gorge slip repairs https://www.nzta.govt.nz/projects/northland-corridor/sh1-mangamuka-gorge-slip-repairs/

[60] NZTA (2022). SH1 Mangamuka Gorge slip repairs. https://www.nzta.govt.nz/projects/northland-corridor/sh1-mangamuka-gorge-slip-repairs/

work through the Mangamuka Gorge has reopened this regionally strategic corridor, but no projects are planned to see through the transformational changes required to improve the deficiencies.

Focusing effort

Note: this section has a high-level strategic focus; we'll develop more specificity in future iterations of the evidence pack.

Based on the preceding sections and consideration of investment priorities identified in regional plans, the following list of areas of investment focus have been identified.

Longer-term investment focus

Resilience

- Work with communities to plan when to defend, accommodate, or retreat, and implement these plans where needed.
- Reduce future network resilience challenges by understanding the construction and geology of new roads to mitigate landslips and low-lying areas prone to flooding.
- Investigate how to cost-effectively make long-term resilience improvements to SH1 and SH10 through and around the Mangamuka Gorge.

Transport connectivity

- Implement the planned improvements to the Brynderwyn Hills section of SH1.
- Continue to improve regional movement patterns between urban centres/key employment centres and rural areas/areas of poor access.
- Create connected walking and cycling networks in urban areas – this includes the completion of cycling networks in Whangārei and improved active-mode facilities in smaller towns.
- Continue to make changes to the allocation of space on existing roads and streets to enable and encourage mode shift to public transport, walking, and cycling.
- Deliver an integrated public transport network.

Economic and urban development

- Continue to align transport investments with urban development plans – supporting, enabling, and encouraging growth and development in areas that have good travel choices and shorter trip lengths
- Work with partners to investigate how to increase the share of freight moved to and beyond Auckland by rail and coastal shipping.
- Focus on improving travel in and around key destinations with complex transport interconnections, especially inter-regional connections, town centres and key freight and industrial hubs.

Safety and environment

- Continue to invest in safety infrastructure, education, enforcement, and incentives that significantly reduce harm caused by the region's transport system.
- Focus improvement on local corridors that have safety deficiencies across multiple modes.
- Deliver interventions, activities, and investments needed to achieve vehicle kilometres travelled (VKT) and emissions reduction across the region.
- Continue to reduce the environmental impact of the maintenance, operations and improvement across the transport network including waste minimisation and resource efficiency.

Community and accessibility

- Work with iwi/hapū partners to improve or maintain, as appropriate, physical access to marae, papakāinga, wāhi tapu, and wāhi taonga.
- Continue to improve the design and provision of transport infrastructure and services to meet the needs of people of all ages and abilities, focusing on communities with unmet needs.

- Continue to improve access to social and economic opportunities, especially by public transport, walking, and cycling, so these low-cost, sustainable, and healthy travel options are safely used for more journeys.
- Explore opportunities to support the mobile or digital delivery of essential services.

Short-term investment focus

Projects in the shorter term typically will involve low-cost, low-risk, high-effectiveness improvements and projects that 'set the scene' to incrementally enable (or transition to) longer-term outcomes.

Steps to make progress towards transport outcomes in a more efficient and cost-effective way include:

- renewing the focus on small-scale projects
- getting more from existing infrastructure, by making the most of existing networks, services, and demand management
- reallocating existing road space, particularly for public transport and active modes
- seeking continuous improvement in network resilience through maintenance, renewals, and low-cost, low-risk investments
- influencing travel behaviour and growth patterns.

Resilience

- Develop an understanding of routes that provide critical connections, the conditions of these, the pressures, and the level of investment needed to address impacts.
- Continue MOR programme to deliver incremental improvements on SH10 and SH11.
- Identify transport assets and infrastructure at risk of natural hazards and impacts of climate change, identifying priorities for network resilience and options for alternate routes less likely to be disrupted.
- Identify, plan and maintain alternate routes with appropriate level of service to support community resilience and safe movement of freight.
- Develop a plan for maintaining, operating, and replacing end-of-life infrastructure.

Transport connectivity

- Investigate connecting NorthPort to the North Auckland rail line to maximise the potential of freight movement.
- Expand and improve walking and cycling facilities and infrastructure in smaller towns.
- Speed up development of walking, cycling and micro-mobility networks in Whangārei by finishing planned networks and redesigning streets to make them safe and appealing.
- Investigate how to efficiently and effectively improve public transport in growing urban communities such as Ruakākā and Mangawhai.
- Explore regional connectivity for movement of people from the Far North and Kaipara who need to travel to Whangārei for essential services.

Economic and urban development

- Supporting multi-modal, resilient, reliable, and efficient freight and business travel around key parts of the network, especially interregional connections, and key freight and industrial hubs.
- Support safe and reliable movement of visitors across the region.
- Influence growth through the Future Development Strategy to make sure future greenfield development is integrated with public transport and active mode networks to create medium-density residential areas.

Safety and environment

- Continue safety improvements that target high-risk intersections, run-off road crashes, high-volume roads, and head-on crashes on high-risk rural roads, on SH1 between Whangārei to Warkworth, Kawakawa to Kaitaia.
- Start to implement safety and accessibility improvements to the Twin Coast Highway.

- Plan what interventions, activities, and investments are needed to achieve vehicle kilometres travelled (VKT) and emissions reduction, focusing on Whangārei.
- Reduce the environmental impact of the maintenance, operations and improvement across the transport network by supporting and enabling low-emission, low-carbon and low-impact policies, practices, and standards.

Community and accessibility

- Address reliability and congestion on SH14 to improve access to the rebuild of Whangārei Hospital.
- Deliver bus stop access upgrades and infrastructure improvements.
- Improve public transport service quality and reliability by increasing frequency and coverage.
- Improve access to opportunities for iwi Māori, focusing on enabling papakāinga development and improving access to sites of cultural significance with high safety risk.
- Improve travel choice and access to social and economic opportunities, focusing on low income/low access areas.
- Continue and develop community transport/on-demand services where appropriate and develop a community transport policy and funding framework.

Potential interventions

As part of the PIE programme, NZTA is developing the Intervention Catalogue (IC) tool, which compiles a wide range of empirical data relating to the implementation of transport projects and how effective they were in achieving the intended outcomes. We'll continue to add to this over time, using data from benefit realisation associated with the investment logic mapping (ILM) process.

An AI interface for supporting queries and providing relevant evidence is currently being investigated.

An example of how exploratory use of this tool might be used to match potential interventions to deficiencies to understand and compare the likely relative effectiveness is included in Appendix A.

The process seeks to avoid potential pitfalls that might occur during option formulation:

- an over-reliance on preconceived ideas
- a focus on the more obvious supply-side measures, such as infrastructure and management rather than demand-side measures such as regulation and pricing
- a general lack of awareness of the wider range of policy measures available
- lack of evidence of the performance of those measures in other contexts
- lack of a formalised or consistent approach for option generation.

The example tables included in Appendix A take the focus areas and related transport issues from the previous section of this report and maps them to some relevant interventions from the KonSULT knowledgebase.

Insights

Using IC is only intended to inform the option formulation process. It does not replace the need for judgement, but rather provides a set of empirical evidence that supports decisions, along with additional information sources.

The table of IC interventions included in Appendix A indicates the following:

- Most interventions related to addressing the identified Northland deficiencies are likely to be cost effective.
- Most interventions have mostly a positive (or neutral) effect across all outcomes, much more so than negative.
- Some of the most effective interventions for Northland indicated by IC include:
    - infrastructure improvements (safe systems)
    - multi-modal planning in Whangārei (including road space reallocation)
    - existing network road maintenance.

Short-list of most effective interventions

It is intended that the information and tools provided above will assist consideration and development of projects to be included in the next RLTP and NLTP.

It provides a starting point for us to understand regional issues and investment opportunities, which can then be expanded upon through further engagement between approved organisations and NZTA to increase the likelihood of suitable projects being submitted for funding via the NLTP.

Appendix A: Data sources for the strategic measures

This appendix references all relevant data sources and assumptions for the 14 strategic measures reported within each regional chapter.

Because this is the first attempt at providing the evidence pack, and the development of the associated tools and processes under the Planning and Investment Evidence base (PIE) programme is still ongoing, we do not yet have the full capability to report outputs for all measures, particularly for future years. In these instances, we have noted that the data is 'not available' by using the 'N/A' abbreviation as a placeholder until such time this can be addressed by a subsequent version of the evidence pack.

Similarly, the process has identified the need for better understanding and reporting of data quality ratings, version control and internal consistency (that is, a single source of truth). These are all things we intend to improve in subsequent releases.

Bearing the above in mind, we have adopted the following general convention for this version in how we report numbers:

- For large numbers, only report 3–4 significant figures (and using rounding units of thousands or millions).
- For small numbers (including percentages), report to one decimal place by default, but make exceptions where appropriate (for example where more or less detail is required to make meaningful comparisons).

The focus is on convenience and the useability of the data. As such, it doesn't necessarily imply a particular level of accuracy (especially for future year forecasts, which have a great deal of uncertainty associated with them).

Each section below (grouped by outcome) provides data for all regions to allow comparison in terms of how each region contributes to the national total. It also provides any important caveats and limitations associated with each of the measures for that outcome.

Healthy and safe people

To understand the current and future safety risk both at the regional and national level, we calculated deaths and series injuries, personal risk and collective risk as shown in the following table. More details can be found in the Land Transport Benefits Framework.

Benefit framework measure	Units
1.1.1 Collective risk (crash density)	Average annual fatal and serious per kilometre of road section
1.1.3 Deaths and serious injuries (DSIs)	Number of DSIs (annual)
1.1.4 Personal risk (crash rate)	Average annual DSI per 100 million vehicle kilometres

Notes, caveats and data limitations:

- Data for the number of deaths and series injuries (DSIs) is sourced from the Crash Analysis System (CAS) database managed by NZTA.
- Regional VKTs and network length in kilometres is sourced from the NZTA official data published for financial year 2023/24.[61]
- Generally, DSI measures are calculated as multi-year rolling average. However, because of time and resource constraints the following data is for the financial year 2023/24 only.
- Future year growth factor is based on regional VKT change. This method to calculate this change is discussed in more detail for the 'E.4 Environmental sustainability' section later in this appendix.

[61] https://www.nzta.govt.nz/planning-and-investment/learning-and-resources/transport-data/data-and-tools/

- It is assumed that crash rates remain constant over time. This is consistent with safety expert advice that application of crash trend adjustment factors for long term future predictions may no longer be supported by evidence.
- Future year DSIs were estimated based on the regional change on VKT (all vehicles) between 2023 and 2048 adopted for the GHG emissions measure (8.1.1). This assumes the crash rate (per VKT) remains constant (that is, no crash trend reduction factors applied).

Region	Current 2023/24			Future 2048		
	DSIs #	Per km	Per 100 million VKT	DSIs #	Per km	Per 100 million VKT
01 – Northland	181	0.027	7.783	176	0.026	7.554
02 – Auckland	593	0.073	4.267	924	0.114	6.651
03 – Waikato	416	0.035	6.372	501	0.042	7.678
04 – Bay of Plenty	184	0.038	5.321	210	0.044	6.059
05 – Gisborne	33	0.015	7.779	37	0.016	8.737
06 – Hawke's Bay	125	0.027	7.005	145	0.031	8.135
07 – Taranaki	82	0.021	6.293	97	0.024	7.429
08 – Manawatū-Whanganui	234	0.026	7.718	231	0.026	7.619
09 – Wellington	171	0.039	4.671	230	0.052	6.289
10 – Top of the South	117	0.027	6.868	151	0.035	8.848
11 – Canterbury	346	0.021	5.007	480	0.030	6.942
12 – West Coast	43	0.014	7.548	43	0.014	7.545
13 – Otago	137	0.013	4.799	142	0.013	4.968
14 – Southland	51	0.007	3.877	53	0.007	4.024
15 – Chatham Islands	0	0.000	0.000	0	0.000	0
National	**2713**	**0.025**	**5.451**	**3419**	**0.035**	**5.055**

Infrastructure risk rating (safety)

We calculate strategic measure 1.2.1 Road assessment rating to understand the current situation of infrastructure risk both at regional and national level. This measure can be used for any safety-related investment benefits, particularly those that target road infrastructure to improve safety. It is a comprehensive measure that considers land use, road type, alignment, average annual daily traffic (AADT), intersection density, land and shoulder width, roadside hazards and access density. More details can be found in the Land Transport Benefits Framework.

Benefit framework measure	Units
1.2.1 Road assessment rating – roads	Average infrastructure risk rating

Notes, caveats and data limitations:

- Data to calculate the regional infrastructure risk rating (IRR) measure in the following table is sourced from Megamaps, which is a geospatial platform managed by NZTA.[62]
- IRR data used to calculate regional and national measure values in the following table was calculated in Megamaps in 2024. The raw data used is for the period 2019–23.
- The data in Megamaps is for each road segment, intersection or corridor. We have aggregated it to calculate regional percentages under each risk band.

Region	High	Medium-high	Medium	Low-medium	Low
01 – Northland	45.77%	26.44%	18.74%	8.34%	0.71%
02 – Auckland	14.92%	17.54%	48.12%	13.18%	6.24%
03 – Waikato	21.40%	25.42%	34.39%	15.15%	3.64%
04 – Bay of Plenty	17.10%	20.74%	37.82%	19.35%	4.99%
05 – Gisborne	50.43%	19.93%	21.93%	7.50%	0.21%
06 – Hawke's Bay	33.47%	25.30%	29.79%	9.16%	2.28%
07 – Taranaki	28.83%	24.08%	33.13%	13.13%	0.83%
08 – Manawatū-Whanganui	41.81%	19.13%	25.67%	12.43%	0.96%
09 – Wellington	17.98%	19.51%	41.67%	13.62%	7.22%
10 – Top of the South	33.70%	23.83%	28.06%	12.94%	1.47%
11 – Canterbury	10.87%	29.16%	42.29%	16.36%	1.32%
12 – West Coast	17.75%	29.97%	38.04%	13.61%	0.63%
13 – Otago	21.83%	37.95%	26.55%	12.63%	1.04%
14 – Southland	6.99%	41.27%	37.99%	13.34%	0.42%
National%	**23.21%**	**2.29%**	**13.50%**	**34.25%**	**26.75%**

[62] https://spatial.nzta.govt.nz/apps/megamaps/

Resilience and security

This transport outcome is about minimising and managing the risks from natural and human-made hazards, anticipating and adapting to emerging threats, and recovering effectively from disruptive events. We intended to use strategic measure 4.1.1 and 4.1.2 from the Land Transport Benefits Framework to understand the resilience and security situation at national and regional level. However, we don't currently have data to calculate measure 4.1.1, so this time around we have only calculated measure 4.1.2. The intent of the measure 4.1.2 is to allow for description and measurement of the risk to level of service by unplanned disruption (including earthquakes, storms, volcanos and tsunamis). This measure is generally used for any investment that focuses on maintaining or increasing the resilience of the transport network.

Benefit framework measure	Units
4.1.1 Availability of a viable alternative to high-risk and high-impact route	Percentage of high-risk, high-impact route with a viable alternative
4.1.2 Level of service and risk	Number of identified sites in region by combined risk rating (future, geological and hydrological)

Notes, caveats and data limitations:

- The data for the following measure is sourced from the National Resilience Assessment Tool (NRAT) managed by NZTA.[63]
- The following table shows the regional number of resilience risks on state highways under each risk band. This includes hydrological, geological and future risks.
- 'No rating' is for considered risk sites that have not yet been rated.
- There is no easy way to currently calculate future projections for this measure, but we are working on the capability to do so.

Regions	Critical	High	Moderate	Low	No rating
01 – Northland	29	84	276	171	169
02 – Auckland	5	13	29	41	1
03 – Waikato	20	175	212	174	149
04 – Bay of Plenty	16	64	153	121	67
05 – Gisborne	1	7	35	49	74
06 – Hawke's Bay	18	123	72	30	143
07 – Taranaki	0	11	9	0	98
08 – Manawatū-Whanganui	1	11	9	8	8
09 – Wellington	39	37	25	118	1
10 – Top of the South	9	51	59	177	91
11 – Canterbury	32	88	57	195	46
12 – West Coast	34	49	21	34	37
13 – Otago	26	84	86	247	172
14 – Southland	27	23	18	28	14
National	**257**	**820**	**1061**	**1393**	**1070**

[63] https://national-resilience-assessment-tool-nzta.hub.arcgis.com/

Economic prosperity

This transport outcome is about supporting economic activity via local, regional, and international connections, with efficient movements of people and products. We calculated the following strategic measures from the [Land Transport Benefits Framework] to measure the economic prosperity outcomes at both regional and national level.

Benefit framework measure	Units
5.1.2 Travel time reliability – motor vehicles (note for this evidence pack, the data only relates to state highway traffic monitoring system (TMS) sites)	Calculated using coefficient of variation (CoV); standard deviation of travel time divided by average minutes travel time Rate: Low <0.3, Medium 0.3–0.6, High >0.6)
5.1.3 Travel time delay	Difference between average travel time during AM peak and average travel time during the Inter Peak in minutes per kilometre (by mode) as a percentage
5.2.2 Freight – mode share value	Percentage of value for each mode
5.2.3 Freight – mode share weight	Percentage of weight for each mode

Notes, caveats and limitations:

- Data for travel time reliability and delay measures is sourced from the National Network Performance (NNP) platform managed by NZTA.
- The sources used to calculate following measures is limited to the TMS sites only – that is, for state highways. In future, as more data is available in NNP for local roads, we intend to calculate using extensive local and state highway roads. Additionally, NNP will be able to assess both travel time delay and travel time reliability.
- The data for 5.1.2 Travel time reliability and 5.1.3 Travel time delay is for a typical day.
- Where we have gained access to regional model origin–destination data (for Auckland, Waikato, Wellington and Christchurch), we have used this to estimate current and future values of travel time for all available modes.
- Measure 5.2.2 Freight – mode share value has been selected as one of the 14 strategic measures but currently, there is insufficient data to reliably calculate this. Therefore, the data table for this measure remains unpopulated as a placeholder.
- Measure 5.2.3 Freight – mode share weight would ideally include coastal shipping but currently only includes road and rail modes.
- Future road freight is based on the same data used to forecast heavy commercial vehicle (HCV) VKT (also used for other measures) combined with average cargo weight from weigh-in-motion (WiM) sites (collected for the North Island only, but also applied to the South Island due to lack of data from the South Island). This data covers seven years and shows a trend of average load sizes decreasing over time. This trend line was used to estimate the 2048 average cargo weight (4615kg). Compared to the 2024 value (4822kg), this implies the average load size is projected to decrease by 7%. In contrast, national HCV VKT is projected to increase by 39% (2024 to 2048).
- The last seven years of rail freight net tonne-kilometres (NTK) by line segment has been provided by KiwiRail. This indicates that the amount of freight is reasonably steady over this period (with a small decline over the last few years). Based on the overall trend, we have assumed future year (2048) NTK will remain the same as current day (2024)
- A discrepancy in the rail data has been noted, where a 27km section of the network is missing from the calculations. This is possibly the section between Palmerston North and Woodville, which has been noted for further follow up.

5.1.2 Travel time reliability – motor vehicles

Region	Daily (CoV)			Peak time (CoV)		
	Low	Medium	High	Low	Medium	High
01 – Northland	96.43%	3.57%	0.00%	88.24%	0.00%	11.76%
02 – Auckland	96.67%	2.50%	0.83%	78.57%	9.18%	12.24%
03 – Waikato	94.59%	1.35%	4.05%	95.00%	0.00%	5.00%
04 – Bay of Plenty	100.00%	0.00%	0.00%	80.56%	19.44%	0.00%
05 – Gisborne	96.30%	3.70%	0.00%	100.00%	0.00%	0.00%
06 – Hawke's Bay	98.95%	1.05%	0.00%	65.38%	34.62%	0.00%
07 – Taranaki	94.74%	5.26%	0.00%	69.44%	16.67%	13.89%
08 – Manawatū-Whanganui	92.11%	7.89%	0.00%	82.56%	8.14%	9.30%
09 – Wellington	92.37%	6.78%	0.85%	67.90%	30.86%	1.23%
10 – Top of the South	100.00%	0.00%	0.00%	86.49%	10.81%	2.70%
11 – Canterbury	94.39%	3.96%	1.65%	73.98%	16.84%	9.18%
12 – West Coast	96.30%	1.23%	2.47%	98.08%	0.00%	1.92%
13 – Otago	92.59%	6.79%	0.62%	75.56%	17.78%	6.67%
14 – Southland	93.27%	5.77%	0.96%	71.43%	21.43%	7.14%
National	**95.30%**	**3.84%**	**0.86%**	**77.34%**	**15.54%**	**7.12%**

5.1.3 Travel time delay

Region	Peak (mins/km)	Inter-peak (mins/km)	Difference (mins/km)	%Change
01 – Northland	0.78	0.85	0.7	8.40%
02 – Auckland	0.77	0.86	0.8	10.23%
03 – Waikato	0.79	0.87	0.8	9.17%
04 – Bay of Plenty	0.69	0.76	0.6	8.18%
05 – Gisborne	0.75	0.77	0.2	3.30%
06 – Hawke's Bay	0.79	0.87	0.7	9.15%
07 – Taranaki	0.80	0.88	0.7	8.46%
08 – Manawatū-Whanganui	0.73	0.78	0.4	5.72%
09 – Wellington	0.83	1.00	0.2	16.94%
10 – Top of the South	0.82	0.84	0.1	1.98%
11 – Canterbury	0.75	0.77	0.2	3.46%
12 – West Coast	0.74	0.77	0.2	3.13%
13 – Otago	0.74	0.78	0.3	4.69%
14 – Southland	0.73	0.76	0.2	3.23%
National	**0.76**	**0.83**	**0.6**	**8.17%**

5.2.3 Freight – mode share weight – base year 2024

Region	Road (m NKT/yr)	Rail (m NKT/yr)	Total (m NKT/yr)	Road (%)	Rail (%)
01 – Northland	912	17	929	98%	2%
02 – Auckland	2904	132	3036	96%	4%
03 – Waikato	5016	751	5767	87%	13%
04 – Bay of Plenty	2208	534	2742	81%	19%
05 – Gisborne	301	0	301	100%	0%
06 – Hawke's Bay	1120	31	1152	97%	3%
07 – Taranaki	603	59	661	91%	9%
08 – Manawatū-Whanganui	1824	646	2470	74%	26%
09 – Wellington	1004	102	1106	91%	9%
10 – Top of the South	1193	60	1253	95%	5%
11 – Canterbury	4045	563	4608	88%	12%
12 – West Coast	409	313	722	57%	43%
13 – Otago	1396	220	1616	86%	14%
14 – Southland	776	73	849	91%	9%
15 – Chatham Islands	0	0	0	100%	0%
Grand total	**23,712**	**3,500**	**27,212**	**87%**	**13%**

5.2.3 Freight – mode share weight – future year 2048

Region	Road (m NKT/yr)	Rail (m NKT/yr)	Total (m NKT/yr)	Road (%)	Rail (%)
01 – Northland	912	17	929	98%	2%
02 – Auckland	2,904	132	3,036	96%	4%
03 – Waikato	5,016	751	5,767	87%	13%
04 – Bay of Plenty	2,208	534	2,742	81%	19%
05 – Gisborne	301	0	301	100%	0%
06 – Hawke's Bay	1,120	31	1,152	97%	3%
07 – Taranaki	603	59	661	91%	9%
08 – Manawatū-Whanganui	1,824	646	2,470	74%	26%
09 – Wellington	1,004	102	1,106	91%	9%
10 – Top of the South	1,193	60	1,253	95%	5%
11 – Canterbury	4,045	563	4,608	88%	12%
12 – West Coast	409	313	722	57%	43%
13 – Otago	1,396	220	1,616	86%	14%
14 – Southland	776	73	849	91%	9%
15 – Chatham Islands	0	0	0	100%	0%
Grand total	**23,712**	**3,500**	**27,212**	**87%**	**13%**

Environmental sustainability

This transport outcome is about transitioning to net zero carbon emissions, and maintaining or improving biodiversity, water quality and air quality. We calculated following strategic measures from the Land Transport Benefits Framework to the measure the economic prosperity outcomes at both regional and national level.

Benefit framework measure	Units
8.1.1 Greenhouse gas emissions (all vehicles)	Annual tonnes of CO_2 equivalents (CO_2-e) emitted
8.1.3 Light vehicle use impacts	Annual light vehicle kilometres travelled (light VKT)

Notes, caveats and limitations:

- Current year data for VKT is sourced from NZTA's open data portal.
- Future light national VKT projections have been sourced from the NZTA 2024 Light VKT projection models. These are based on Stats NZ population growth and forecasts for GDP and fuel prices (mid-range assumptions have been adopted for this evidence pack).
- Future regional light vehicle VKT distribution is based on research work done by Beca (VKT and GHG emissions baseline report – NZTA research note 008 September 2022). This assumes the base year light VKT per capita remains unchanged and uses population projection to estimate light VKT within each territorial local authority (TLA). The results are aggregated to spatial areas and adjusted to reconcile with the Ministry of Transport (MoT) observed and projected national totals. It uses base and projected light vehicle fleet GHG emissions factors from the Vehicle Fleet Emission Model (VFEM) to calculate GHG emissions for the baseline spatial areas. The report year 2035 (future) VKT values (by region) have been adjusted (scaled) to 2048 national light vehicle (LV) totals.
- Future year regional heavy vehicle VKT distribution has been calculated using growth factors comprising trend data, Stats NZ medium population forecast and Ministry of Business, Innovation and Employment (MBIE) GDP forecast data. This is a placeholder calculation pending further work on HCV demand forecasting currently being developed (using this general approach) as part of the PIE programme.
- GHG emissions have been estimated by applying light and heavy VKT to Vehicle Emissions Prediction Model (VEPM) (v7.0) emission rates (for current and future years) using the default MoT Vehicle Fleet Model (VFM) assumptions within VEPM (for each year) and average vehicle speeds from NNP or regional transport models (Auckland, Waikato, Wellington and Christchurch).
- Estimates of VKT are key inputs to multiple measures (such as vehicle emissions (affecting both health and environmental measures), DSIs, freight etc. Care has been taken to ensure consistency at the national, regional and local levels.

8.1.1 Greenhouse gas emissions (all vehicles)

Region	Current 2024	Future 2048	Change	% Change	Contribution
01 – Northland	0.61	0.27	-0.35	-57%	4%
02 – Auckland	3.58	2.19	-1.38	-39%	26%
03 – Waikato	2.00	1.36	-0.64	-32%	14%
04 – Bay of Plenty	1.01	0.63	-0.38	-38%	7%
05 – Gisborne	0.13	0.07	-0.06	-48%	1%
06 – Hawke's Bay	0.52	0.30	-0.22	-42%	4%
07 – Taranaki	0.35	0.19	-0.16	-46%	3%
08 – Manawatū-Whanganui	0.87	0.49	-0.38	-44%	6%
09 – Wellington	0.93	0.45	-0.48	-52%	7%
10 – Top of the South	0.51	0.36	-0.15	-30%	4%
11 – Canterbury	1.98	1.26	-0.71	-36%	14%
12 – West Coast	0.17	0.10	-0.08	-44%	1%
13 – Otago	0.78	0.40	-0.38	-48%	6%
14 – Southland	0.38	0.21	-0.17	-46%	3%
15 – Chatham Islands	0.002	0.001	-0.001	-39%	0.02%
National	**13.83**	**8.29**	**-5.54**	**-40%**	**100%**

8.1.3 Light vehicle use impacts

Region	Current 2024	Future 2048	Change	% Change	Contribution
01 – Northland	2172	2075	-97	-4%	5%
02 – Auckland	13137	20504	7367	56%	29%
03 – Waikato	5597	6514	918	16%	12%
04 – Bay of Plenty	3056	3349	293	10%	7%
05 – Gisborne	369	420	52	14%	1%
06 – Hawke's Bay	1581	1810	229	14%	3%
07 – Taranaki	1199	1397	198	17%	3%
08 – Manawatū-Whanganui	2702	2523	-179	-7%	6%
09 – Wellington	3488	4746	1258	36%	8%
10 – Top of the South	1484	1854	370	25%	3%
11 – Canterbury	6182	8583	2402	39%	14%
12 – West Coast	494	476	-18	-4%	1%
13 – Otago	2610	2624	14	1%	6%
14 – Southland	1175	1182	7	1%	3%
15 – Chatham Islands	5	4	-0.4	-7.9%	0%
National	**45250**	**58062**	**12812**	**28%**	**100%**

Inclusive access

This transport outcome is about enabling all people to participate in society through access to social and economic opportunities, such as work, education and health care. We calculated the 10.2.1 and 10.3.1 strategic measures from the Land Transport Benefits Framework to measure the inclusive access outcome both at the national and regional level.

Benefit framework measure	Units
10.2.1 People – mode share	Percentage by mode (Census (2023) journey to work and education)
10.3.1 Access to key social destinations (all modes)	Number of jobs (x1000) accessible by mode in AM peak (car 40 min, PT 45 min, cycle 45 min) and distance from city centre (km)

Notes, caveats and limitations:

- There is a limited information about measure 10.2.1 in the Land Transport Benefits Framework measures manual – that is, its intent, scope, forecasting methods etc are not defined yet.
- Mode share data, that is main means of travel to work and education, is sourced from census 2023 outputs produced by Stats NZ.[64]
- The data for all public transport (PT) modes (buses, trains and ferries) is aggregated together.
- Where we have gained access to regional model origin–destination data (for Auckland, Waikato, Wellington and Christchurch), we've used this to estimate current and future values of 10.2.1 People – mode share based on modelled relative changes applied to the base year census values.

10.2.1 People – mode share

Region	%Car	%PT	%Cycle	%Peds
01 – Northland	91.00%	1.33%	0.99%	6.67%
02 – Auckland	77.81%	11.29%	1.32%	9.58%
03 – Waikato	86.34%	2.69%	2.49%	8.48%
04 – Bay of Plenty	87.36%	2.06%	3.37%	7.22%
05 – Gisborne	89.78%	0.43%	2.54%	7.25%
06 – Hawke's Bay	88.12%	0.99%	2.96%	7.93%
07 – Taranaki	87.18%	1.25%	2.91%	8.66%
08 – Manawatū-Whanganui	86.33%	1.77%	2.60%	9.30%
09 – Wellington	63.97%	18.40%	2.98%	14.64%
10 – Top of the South	80.14%	1.09%	7.53%	11.24%
11 – Canterbury	85.26%	0.17%	3.27%	11.30%
12 – West Coast	79.75%	4.44%	6.27%	9.54%
13 – Otago	73.35%	4.38%	3.77%	18.50%
14 – Southland	87.70%	0.70%	3.40%	8.21%
Auckland city	77.78%	11.30%	1.32%	9.59%
Hamilton city	82.96%	4.96%	3.08%	9.01%
Tauranga city	85.33%	2.92%	4.65%	7.10%
Wellington city	48.62%	28.51%	3.59%	19.29%

64 https://explore.data.stats.govt.nz/?fs[0]=2023%20Census%2C0%7CTransport%23CAT_TRANSPORT%23&pg=0&fc=2023%20Census&bp=true&snb=9

Region	%Car	%PT	%Cycle	%Peds
Christchurch city	77.74%	5.84%	7.20%	9.22%
Queenstown-Lakes District	79.27%	4.13%	5.77%	10.83%
National total	**79.45%**	**7.46%**	**2.91%**	**10.19%**

Accessibility to employment

Notes, caveats and limitations:

- Data is sourced from the Accessibility Toolkit (ATK).
- It uses network-based travel times (by mode) between household locations and employment locations. This uses recorded travel times for general traffic, bus timetables for PT and road network distance with a constant average speed applied for cycles (the default used in OpenTripPlanner, which is 5m/s = 18km/h).
- Measure 10.3.1 currently estimates accessibility to employment rather than social destinations. Further work is progressing using ATK to also include access to social destinations, which will be included in subsequent versions of this evidence pack.
- ATK has been used to estimate future accessibility in a very limited way by only looking at changes associated with land-use growth based on population and employment sub-regional projections (while keeping base year travel times by mode). It may be possible to improve this in future releases, where other tools (currently being developed) can provide suitable inputs to ATK regarding future network performance (including travel times).

10.3.1 Access to key social destinations (all modes)

Region	Mode	Current year (2023)			Future year (2048)		
		0–5km	5–10km	10+km	0–5km	5–10km	10+km
01 – Northland	Car	31,292	30,536	35,034	36,807	35,913	40,486
	PT	16,850	5,845	869	19,200	7,465	1,311
	Cycle	29,138	19,854	2,377	34,068	24,541	3,369
02 – Auckland	Car	716,503	536,916	455,088	899,714	670,758	582,690
	PT	313,788	177,213	124,557	388,878	224,214	151,103
	Cycle	355,847	280,586	216,239	451,914	355,494	265,792
03 – Waikato	Car	133,357	133,999	213,804	176,632	177,837	276,406
	PT	69,881	25,929	9,321	95,049	33,744	12,351
	Cycle	104,923	82,607	16,567	140,886	112,340	21,034
04 – Bay of Plenty	Car	79,040	77,841	93,611	103,455	101,584	107,430
	PT	35,631	23,794	18,017	47,915	32,656	20,225
	Cycle	58,707	40,240	26,289	77,374	54,337	29,099
05 – Gisborne	Car	17,327	17,265	25,979	18,308	18,254	27,378
	PT	9,241	144	147	9,421	137	150
	Cycle	15,211	10,255	517	15,898	9,799	849
06 – Hawke's Bay	Car	72,436	71,160	165,625	82,291	81,101	186,660
	PT	18,570	12,495	21,930	20,305	13,607	26,451
	Cycle	27,802	26,148	59,881	30,745	29,448	70,751
07 – Taranaki	Car	36,869	36,779	81,917	41,180	40,985	91,527
	PT	17,946	6,379	3,989	19,839	7,537	4,939
	Cycle	27,594	21,814	5,315	30,784	26,806	6,171
08 – Manawatū-Whanganui	Car	63,400	60,858	116,324	70,215	68,118	129,915
	PT	42,455	8,809	12,769	47,710	12,863	14,373
	Cycle	49,725	27,467	15,275	55,486	31,480	16,815

09 – Wellington	Car	226,937	203,306	257,735	254,242	227,977	286,594
	PT	149,015	87,351	100,318	169,490	97,902	112,643
	Cycle	160,012	138,296	82,987	178,699	153,837	93,008
10 – Top of the South	Car	59,509	39,238	43,526	65,205	43,653	48,604
	PT	33,554	20,850	2,236	36,531	23,406	2,550
	Cycle	48,104	34,767	5,135	52,973	39,147	5,744
11 – Canterbury	Car	246,820	237,377	350,704	298,103	286,139	440,946
	PT	135,521	83,670	25,420	164,523	99,853	33,350
	Cycle	197,173	163,672	46,480	238,400	196,568	59,540
12 – West Coast	Car	6,225	6,455	14,589	5,843	6,196	13,893
	PT	3,757	183	1,862	3,445	210	2,326
	Cycle	5,537	4,664	3,015	5,099	4,604	3,432
13 – Otago	Car	59,213	58,364	112,598	62,075	61,521	128,941
	PT	45,898	27,674	13,916	48,301	33,897	16,699
	Cycle	53,343	41,614	12,458	55,959	47,303	15,473
14 – Southland	Car	32,733	33,106	69,145	34,463	34,638	71,342
	PT	20,598	10,281	2,169	21,320	13,138	2,138
	Cycle	27,027	22,387	4,685	28,399	26,232	4,374
National	Car	1,781,661	1,543,200	2,035,679	2,148,533	1,854,674	2,432,812
	PT	912,705	490,617	337,520	1,091,927	600,629	400,609
	Cycle	1,160,143	914,371	497,220	1,396,684	1,111,936	595,451

Appendix B: Intervention Catalogue

As part of the PIE programme, NZTA is developing the Intervention Catalogue (IC) tool, which compiles a wide range of empirical data relating to the implementation of transport projects and how effective they have been in achieving the intended outcomes. We'll continue to add to this over time, using data from benefit realisation associated with the investment logic mapping (ILM) process.

An AI interface for supporting queries and providing relevant evidence is currently being investigated.

For this evidence pack, a limited subset of data (related to 80 interventions) based on the KonSULT knowledgebase maintained by the University of Leeds in the UK, on sustainable urban land use and transport has been made available to demonstrate how IC might be applied to explore and identify the effectiveness of various interventions as part of the option formulation process.

Effectiveness is reported using a simple qualitative 1–5 scale that is indicative rather than absolute, and results may vary based on context.

The screenshot in Figure 5 shows the interventions we extracted from the KonSULT knowledgebase. This data is available in the summary spreadsheet: Extract-of-IC-KonSULT-data-(interventions-typology).xlsx.

Figure 5: Extract of IC KonSULT data

We've used the data shown in Figure 5 to create a draft interactive tool ([Spreadsheet-deficiency-to-intervention-example.xlsx]) that allows users to explore the effectiveness and trade-offs associated with a range of interventions that are associated with a user-specified list of issues or deficiencies.

The tables shown in the screenshots below are examples of how the tool can be used (and is not necessarily recommending any of the interventions currently selected).

User Inputs Issue/Deficiency *1) User to provide list of issues/deficencies below*	Intervention Catalogue Intervention Group *2) User drop down menus to explore availble Groups*	Intervention Catalogue IC Interventions *3) User drop down menus to explore Interventions in Group*	IC Lever	*4) Select Area Type* Area	*5) Review likely effectiveness of s* Effectiveness (1-5)	Cost Min.	Max.
Consolidate growth, shorten trip lengths, co locating transport hubs with community services	Regulation (pricing and incentives)	Public transport fare reductions	Pricing	Tier 1	3	0	0
Design and Planning - adaptable 'scenarios-based' (defend, accommodate, retreat), identify critical routes, improve operational responses to events	Spatial and place-based planning	Design and Planning	Resiliance	Tier 1	0	0	0
perceived safety (incl. crime)	Deliver new or upgraded infrastructure and services	Safe system approach	Safe System	Tier 1	4	0	0
prioritise low risk low cost maintenance projects	Maintain and optimise existing networks and services	Maintaining the existing road network level of service	Infrastructure	Tier 1	3	0	1
Implement high quality improvements that bring about mode change	Maintain and optimise existing networks and services	Conversion of road capacity to shared and active modes	Optimisation	Tier 1	2	0	2
perceived safety (incl. crime)	Deliver new or upgraded infrastructure and services	Safe system approach	Safe System	Tier 1	4	0	0
rapid transport network	Spatial and place-based planning	Spatially integrated land use and transport networks	Multi-modal planning	Tier 1	4	0	1
Improved services	Deliver new or upgraded infrastructure and services	Fixed line mass public transport	Public transport	Tier 1	3	0	5
Road pricing	Regulation (pricing and incentives)	Time and distance based charges	Pricing	Tier 1	2	-4	0
PT Fares	Regulation (pricing and incentives)	Public transport fare reductions	Pricing	Tier 1	3	0	0
Road safety plans, safe speed limits, reduce dangerous behavior	Deliver new or upgraded infrastructure and services	Safe system approach	Safe System	Tier 1	4	0	0
Encourage Evs (low emission zones)	Maintain and optimise existing networks and services	Banning polluting vehicles from a defined area	Management	Tier 1	2	0	1
Encourage active modes	Deliver new or upgraded infrastructure and services	Networks for small, low powered, low speed transport devices	MAAS	Tier 1	4	0	1
Encourage active modes	Education and awareness	School based travel behaviour change	Travel reduction	Tier 1	4	0	1
Accessible infrastructure	Deliver new or upgraded infrastructure and services	On call shared transport	Public transport	Tier 1	2	0	1
Adaptable approach to road space management (e-scooters)	Deliver new or upgraded infrastructure and services	Networks for small, low powered, low speed transport devices	MAAS	Tier 1	4	0	1
More Freq Rail &PT Services	Deliver new or upgraded infrastructure and services	New rail services on existing lines	Public transport	Tier 1	1	0	3
Bus Priority	Maintain and optimise existing networks and services	Reduce journey times and improve reliability of bus services	Public transport	Tier 1	3	0	1

Figure 6: Example of using tool to explore overall effectiveness and cost of potential interventions based on a list of user specified deficiencies or issues (entered in the first column)

User Inputs Issue/Deficiency *1) User to provide list of issues/deficencies below*	Intervention Catalogue IC Interventions *3) User drop down menus to explore Interventions in Group*	MoT Outcome(s) Economic prosperity Min.	Max.	Environment Min.	Max.	Health Min.	Max.	Inclusive access Min.	Max.	Safety Min.	Max.	Resilience Min.	Max.
Consolidate growth, shorten trip lengths, co locating transport hubs with community services	Public transport fare reductions	0	0	0	2	0	2	0	4	0	1	0	0
Design and Planning - adaptable 'scenarios-based' (defend, accommodate, retreat), identify critical routes, improve operational responses to events	Design and Planning	0	0	0	0	0	0	0	0	0	0	0	0
perceived safety (incl. crime)	Safe system approach	-2	2	-1	3	0	0	0	3	0	5	0	0
prioritise low risk low cost maintenance projects	Maintaining the existing road network level of service	0	1	0	2	0	1	0	3	0	3	0	2
Implement high quality improvements that bring about mode change	Conversion of road capacity to shared and active modes	-1	2	-1	3	-1	4	0	3	0	3	0	0
perceived safety (incl. crime)	Safe system approach	-2	2	-1	3	0	0	0	3	0	5	0	0
rapid transport network	Spatially integrated land use and transport networks	0	3	0	2	0	3	0	4	0	3	0	0
Improved services	Fixed line mass public transport	-1	3	0	2	0	0	0	2	0	3	0	0
Road pricing	Time and distance based charges	0	3	0	4	0	3	-3	3	0	3	0	0
PT Fares	Public transport fare reductions	0	0	0	2	0	2	0	4	0	1	0	0
Road safety plans, safe speed limits, reduce dangerous behavior	Safe system approach	-2	2	-1	3	0	0	0	3	0	5	0	0
Encourage Evs (low emission zones)	Banning polluting vehicles from a defined area	-2	0	0	1	0	4	-2	0	0	1	0	0
Encourage active modes	Networks for small, low powered, low speed transport devices	0	0	-1	1	0	0	0	2	-1	0	0	0
Encourage active modes	School based travel behaviour change	0	1	0	3	0	3	0	1	0	4	0	0
Accessible infrastructure	On call shared transport	0	0	0	1	0	1	0	3	0	1	0	0
Adaptable approach to road space management (e-scooters)	Networks for small, low powered, low speed transport devices	0	0	-1	1	0	0	0	2	-1	0	0	0
More Freq Rail &PT Services	New rail services on existing lines	0	0	0	2	0	2	0	3	0	2	0	0
Bus Priority	Reduce journey times and improve reliability of bus services	0	2	0	2	-1	2	0	3	0	2	0	0

Figure 7: Example of using tool to explore overall trade-offs between outcomes associated with potential interventions