

Tauranga to Gisborne

CORRIDOR MANAGEMENT PLAN

2

2018-2028

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Executive summary

The Tauranga to Gisborne corridor comprises SH2 from Tasman Quay/Hewletts Road intersection (Mount Maunganui) in the west to its intersection with SH35 in Gisborne (Matawhero) in the east. Travelling west from the Port of Tauranga, the corridor includes the Tauranga Eastern Link (TEL) toll road, passes through Matata, Edgecumbe and Opotiki, continuing through the Waioeka Gorge to Gisborne. There is a freight rail line that runs alongside the corridor between Tauranga and Matata, west of Edgecumbe; and a closed rail line between Matawai and Gisborne.

The corridor is approximately 304km long (2.7% of the state highway network). The total value of assets along the corridor is \$520M (2.2% of the total national asset value).

The corridor is the major transport route linking the Gisborne Region and the Tauranga/Bay of Plenty Region. The corridor is varied in nature, being a four-lane divided road in the urban west between Tauranga and Papamoa, before transitioning to a rural environment with long straight road sections, occasional out of context curves by the BoP coast to Edgecumbe. East of Edgecumbe the corridor is characterised by single-lane bridges and a winding geometry through woodlands along the banks of the Waimana River before opening back to rural farmland through to Opotiki. The road from Opotiki raises up through steep and winding forested terrain through the Waioeka Gorge, to the highest point at 716m, west of Matawai. The corridor gradually descends to Te Karaka returning to a rural nature before ending at the SH35 intersection west of Gisborne. SH2 is the key connection for Gisborne and the surrounding Eastland (Tairāwhiti) region to the Bay of Plenty and Auckland, for tourism, vital fuel and food supplies as well as exporting local products.

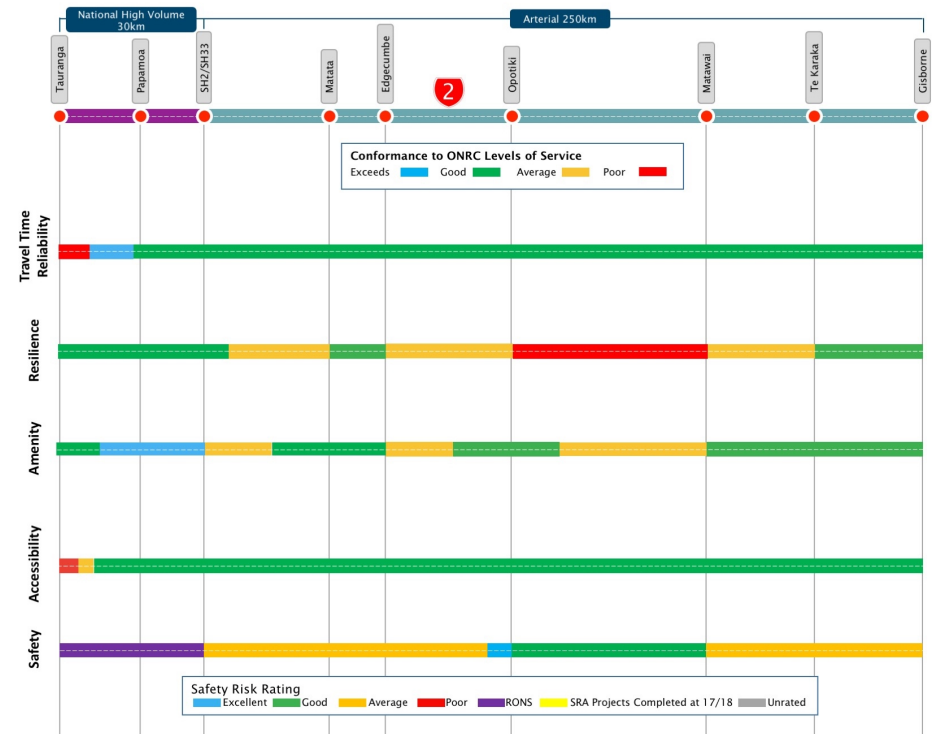
Customers using this corridor are generally regular users, with a good understanding of the road conditions and its limits. The Level of Service (LOS) is generally good throughout the whole corridor, but is readily subject to closure due to storms and flooding resulting in disruption to business sustainability and extensive detours for all other users. Future considerations should include the maintenance burden from such events, the opportunity for business expansion with improved HPMV capacity and a community strategy to improve general prospects and driver behaviour for locals.

Freight using this corridor is generally bound for the Port of Tauranga for international distribution and collection of supplies for the region, or carrying timber to Eastland Port in Gisborne. Inter-regional freight includes local produce to key servicing locations including Kawerau for timber and Edgecumbe for dairy. Kawerau is serviced by a freight rail line which carries the majority of timber products to the Port of Tauranga, minimising vehicle freight on the corridor. Opotiki is in the early stages of developing a port for local fisheries and aquaculture.

Capital works have focused on capacity and safety improvements east of Tauranga, providing relief for peak hour traffic and freight distribution. A limited level of investment to date

elsewhere through the corridor has focused on maintenance of existing assets. The Safe Roads programme will bring investment between Wainui Road and west of Opotiki on the section with a high crash frequency and severity. A future scenario for this corridor may require limited investment to realise its full potential. The corridor has a relatively short section that is not available for HPMV. Bringing the full corridor up to HPMV standard will open opportunities for business expansion and investment.

Figure 1 - Performance of the corridor against ONRC outcomes



Corridor resilience is the primary concern for State Highway 2 with alternatives limited in the event of a closure, particularly through the Waioeka Gorge. A road closure in the event of slips, rockfalls, black ice, fallen trees and flooding can limit the economic sustainability of business, particularly on the East Coast. Management of weather events and general incidents is paramount, but this corridor has areas of low resilience and high vulnerability to service disruption.

Introduction

Purpose

What is the corridor management plan?

This Corridor Management Plan describes the customer service delivery story for the Tauranga to Gisborne corridor, as measured against the One Road Network Classification performance framework. It is intended to describe the investment story, i.e. why invest in this corridor, in a context everyone can understand whether the activities are delivered through investment in the State Highways maintenance, operations, renewals and improvements programmes.

The corridor management plan considers a combination of:

- The **pressures** on the system that are resulting in increased demand or a reduction in levels of service
- The **current state** of the system and how it is performing
- The **response** the Agency is investing in to deliver the customer levels of service along the corridor.

It is important to note that this is a first-generation Corridor Management Plan, therefore, we expect it to be improved as we learn from this approach. It sets a firm foundation to improve from in the next 2-3 years, utilising a common framework and consistent data sets across the 30 corridors.

Why is it needed?

The corridor plan provides a link between the long-term planning outlook, the 10-year medium term investment programme and the three-year land transport programmes for the next funding round.

Traditionally, the approach to investing in maintenance and renewals is to consider each asset activity in isolation, i.e. pavement, structures, drainage, and in isolation of capital expenditure. The CMP approach considers all assets within the corridor and takes a holistic view of the customer levels of service they provide throughout the corridor.

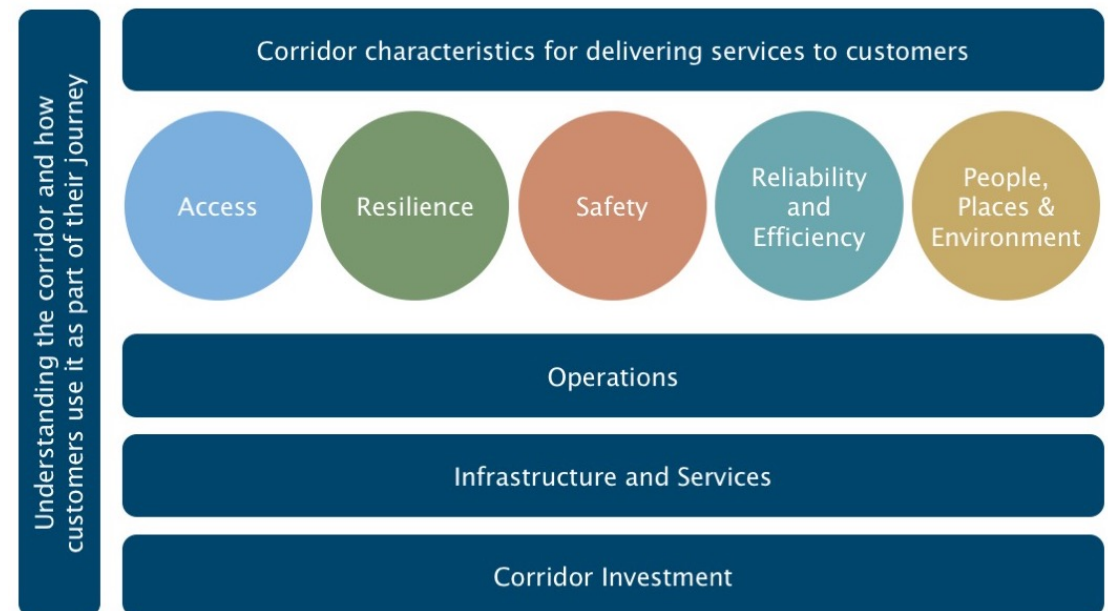
Planning is currently undertaken at the regional level, but typically significant journeys traverse more than one region. By considering the significant customer journeys and destinations, the Corridor Management Plan is a vehicle to engage in regional and inter-regional conversations by focusing on the issues that are important and may extend beyond the state highways network.

How will we use it?

The CMP will provide the customer story and case for investment in maintenance, renewal and improvement on the corridor, based on targeting maintenance to achieve the appropriate customer levels of service within the context of providing value for money. The information presented in the corridor management plan helps to inform the business case for investment in state highways for the subsequent triennial period.

In conjunction with the long-term view, the CMP will provide for engagement with key stakeholders and partners to shape the future of the corridor. It responds to the needs of the users of the corridor to shape the future service levels.

Figure 2 - Corridor management plan framework



The corridor at a glance

Corridor overview

The Tauranga to Gisborne corridor comprises SH2 from Tasman Quay/Hewletts Road intersection (Mount Maunganui) in the west to its intersection with SH35 in Gisborne (Matawhero) in the east. Travelling west from the Port of Tauranga, the corridor includes the Tauranga Eastern Link (TEL) toll road, passes through Matata, Edgecumbe and Opotiki, continuing through the Waioeka Gorge to Gisborne. There is a freight rail line that runs alongside the corridor between Tauranga and Matata, west of Edgecumbe; and a closed rail line between Matawai and Gisborne.

The corridor is the major transport route linking the Gisborne Region and Tauranga/BoP Region. The corridor is varied in nature, being a four-lane divided road in the urban west between Tauranga and Papamoa, before transitioning to a rural environment with long straight road sections, occasional out of context curves by the BoP coast to Edgecumbe. East of Edgecumbe the corridor is characterised by single-lane bridges and a winding geometry through woodlands along the banks of the Waimana River before opening back to rural farmland through to Opotiki. The road from Opotiki raises up through steep and winding forested terrain through the Waioeka Gorge, to the highest point at 716m, west of Matawai. The corridor gradually descends to Te Karaka returning to a rural nature before ending at the SH35 intersection west of Gisborne. SH2 is the key connection for Gisborne and the surrounding Eastland (Tairawhiti) region to the BoP, for tourism, vital fuel and food supplies as well as exporting local products.

The regional economy

The BoP Region has approximately 270,000 residents (6% of New Zealand’s population) with 6% of national employment, contributing 5% of NZ GDP. The Gisborne Region has approximately 44,000 residents (1% of New Zealand’s population) with 1.0% of national employment contributing almost 1% of NZ GDP.

Tauranga, as the commercial centre of the BoP Region, has a high representation of employment in health care and social assistance, retail trade, education and training, and manufacturing, accounting for around 45% of the paid employees in Tauranga and the region as a whole. The Eastern BoP Region has a high representation of employment in agriculture, forestry and fishing, manufacturing, education and training, accounting for almost 60% of the paid employees.

The unemployment rate in the BoP Region is around 9%, compared with 7% for all of New Zealand. Agriculture, tourism, forestry and fishing are the primary export earners. Port of Tauranga, tourism, forestry and timber processing, agriculture, Edgecumbe dairy processing plants and Kawerau timber processing, as well as health services are other important areas for industry in both the BoP and Gisborne Regions’ economies.

Agriculture, forestry and fishing underpin the Gisborne Region’s economy, accounting for around 22% of the paid employees. The region has a high representation of employment in health care and other social assistance, with education and training, manufacturing and retail trade making up 40% of employment.

The Gisborne Region in particular has a generally aging and declining population. The region is highly reliant on primary industries for employment and is highly vulnerable to international market price reductions for timber and other primary industry products. Good resilience of the corridor, particularly through the Waioeka Gorge is therefore paramount.

Figure 3 – Corridor overview



Understanding our customers

Key customers

The majority of the corridor is utilised by freight operators and tourism who utilise a range of transport modes including walking, cycling, rail freight and road vehicles. Different customers have different needs, expectations, and personal circumstances for using the transport network, therefore what customers' value needs to be understood in the context of who they are.

Daily commuters and users

Insights into daily commuters and users:

Road use: There are a number of small communities located along the corridor that rely on it as the main connection between home, work and local shops. While the volumes are relatively low, the corridor is the lifeblood of these communities.

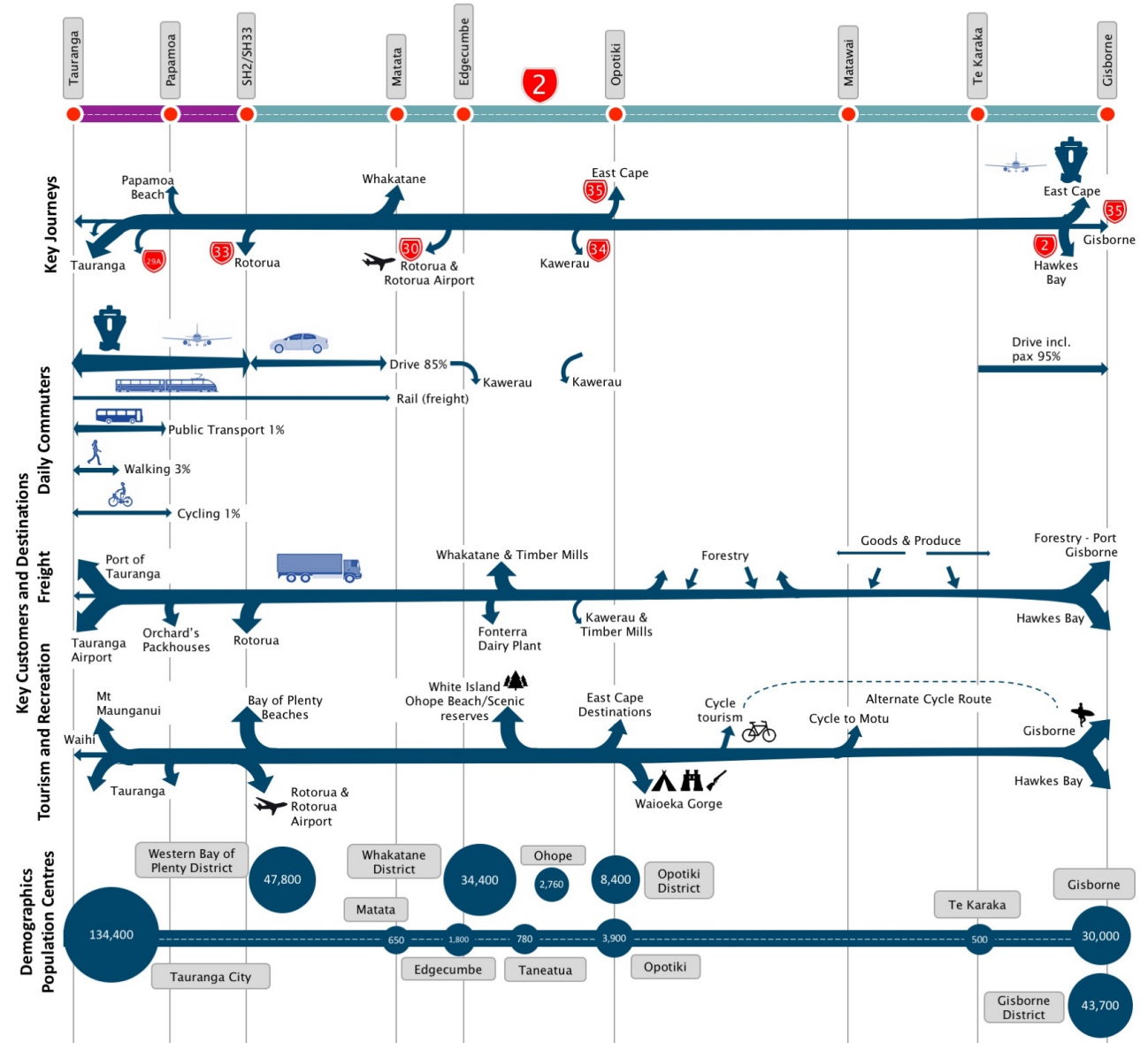
Daily commuters primarily use the corridor at both the eastern and western extremes of the corridor. The Mt Maunganui/ Tauranga area, commuters use the old Te Puke Highway and SH2 between Tasman Quay/Hewletts Road and Papamoa. The majority of commuting residents live to the north of the corridor along the BoP coast, where connections to SH2 are limited. There are some bus services in proximity to Tauranga servicing Papamoa and Papamoa East, along with an expanding cycling network which utilises the rail corridor and bridge to the city. There is limited modal choice further to the east. The Tauranga Eastern Link (TEL) provides a tolled alternative route to the Te Puke Highway, improving travel time and driver safety, and future development.

Road knowledge: Commuters are familiar with their route, and viable alternatives to avoid delay. Journey times are relatively predictable throughout the day and week.

Pain points: Delay and travel time unreliability through Maunganui Road and Hewletts Road at peak times with rat-running through neighbouring residential areas.

Commuters expect: Predictable journeys at peak times, accurate and up to date information about traffic (peak and off peak), weather, road conditions and hazards.

Figure 4 - Key customers, journeys, and destinations



Tourist and recreational users

Tourism contributed over \$800 million to BoP's economy in the year ending December 2016 (approximately 6.5% of regional GDP), with year-to-year growth of just under 10%. Meanwhile, tourism contributes around \$135 million to the Gisborne Region's economy (around 8% of regional GDP), with year-to-year growth in the order of 7%. The BoP and Gisborne Regions have a number of attractions, including scenic reserves, East Cape and Waioeka Gorge, as well as cycle tourism, surfing, camping, hunting and nature trails.

The corridor is a key tourist and recreational link connecting popular Tauranga, the BoP and East Coast tourist destinations, including Ohope Beach, Mount Maunganui, White Island and East Coast surf beaches. The corridor also provides a key connection to Tauranga Airport and Rotorua (via SH33).

Insights into tourist and recreational users are as follows:

Road use: High numbers of recreational users towing boats and caravans during weekends to and from their holiday and weekend break destination. International visitors also utilise the corridor as part of a longer journey around New Zealand. Some areas increase in population size adding day to day pressure on the corridor during the peak season.

Road knowledge: Many international visitors are unfamiliar with New Zealand roads and conditions, with the vehicles used often struggling with the weight of the vehicle and corridor topography, causing delays. Driver unfamiliarity with the vehicle and handling can also result in a more precautionary approach and lower speed. Domestic tourists are likely to be more familiar with the conditions but not familiar with the road. Local recreational users are more familiar with the road and their vehicle, travelling at quieter times and taking greater risks, including higher speed, reduced restraint use and drink/drug driving, at times conflicting with tourists and freight vehicles.

Pain points: Waioeka Gorge is the main travel time restriction for the tourist route from the BoP to the East Coast, with unfamiliar users being common, slowing and restricting more familiar and confident users.

Tourist and recreational users expect: There is an expectation that all journeys will be straightforward and relatively delay-free. A variety of travel options, including buses, taxis and car hire. Good directional signage of road names, tourist destinations, distances and urban centres. Places to stop for refreshments on long distance journeys.

“Rush-hour congestion [on Hewletts Road] is returning to levels not seen since the second Harbour Bridge opened”

Freight operators

Freight movements are in both directions depending on the commodity and its destination. Freight regularly utilises the coastal local road through Whakatane during quieter periods due to the minor travel time saving as journey time and reliability is particularly important for freight operators. There is a freight rail line running parallel along SH2 between Tauranga and Edgecumbe, a disused line up to Taneatua and a closed rail line from Matawai to Gisborne, providing for alternative distribution and potential expansion in future.

Insights into freight operators are as follows:

Road use: Petrol arrives in tankers at the Port of Tauranga and is distributed to the rest of the North Island, including along the corridor to Gisborne. There is some freight conflict with general traffic during the peak hours towards the Port. Forestry timber and logs from the Eastern BoP are sent to the Port of Tauranga and logs from the Gisborne Region is sent to Eastland Port. The logging trucks can complete up to four return journeys per day and rely on the corridor being available. Local fruit and agriculture produce from the corridor, including fruit from Matawai and Te Karaka is sent over to Opotiki for packing and on to the Port of Tauranga for international distribution.

Road knowledge: Knowledge of road conditions is generally high, with regular use and understanding of varying conditions. The occasional inexperienced driver and new user can cause delays to freight, causing frustration for other drivers.

Pain points: The alternative routes to the Waioeka Gorge in the event of a road closure is via SH35 to the north or SH5 to the south, both of which are significant detours. Waioeka Gorge is a constraint to the challenging topography, including winding road and steep inclines, as well as frequent closures and restrictions caused by land slips, rockfalls and black ice. The 400m long, single lane signalised Piketahi bridge near Taneatua can also be restricted at times, however an alternative route is available through Whakatane which is regularly used.

Freight operators expect: Infrastructure that maintains reliable travel times for service delivery. This includes forewarning of closures and potential delays with alternative routes that can safely cater for truck sizes. Safety measures at conflict points are also expected, including passing lanes.

“It's dangerous here [in the Waioeka Gorge] as soon as the temperature drops below one or two [degrees Celsius]”

How we deliver services along the corridor

Transport partners

The land transport system comprises more than state highways. Providing customers with a reliable and safe journey usually requires the use of two or more transport infrastructure provider's networks. As such, we work with other network providers to deliver a one network approach.

On the Tauranga to Gisborne corridor, we work with the territorial local authorities (TLAs) and regional councils, shown in Figure 5.

Collaboration along the corridor

Other transport partners include the Port of Tauranga, Eastland Port, KiwiRail, New Zealand Trucking Association, Department of conservation (DoC), Road Transport Association New Zealand (RTANZ), tourism New Zealand, New Zealand Automobile Association(AA), BoP Tourism, Tourism Eastland, and New Zealand Police.

Figure 5 - Map of associated local authorities



Network Outcomes Contracts approach

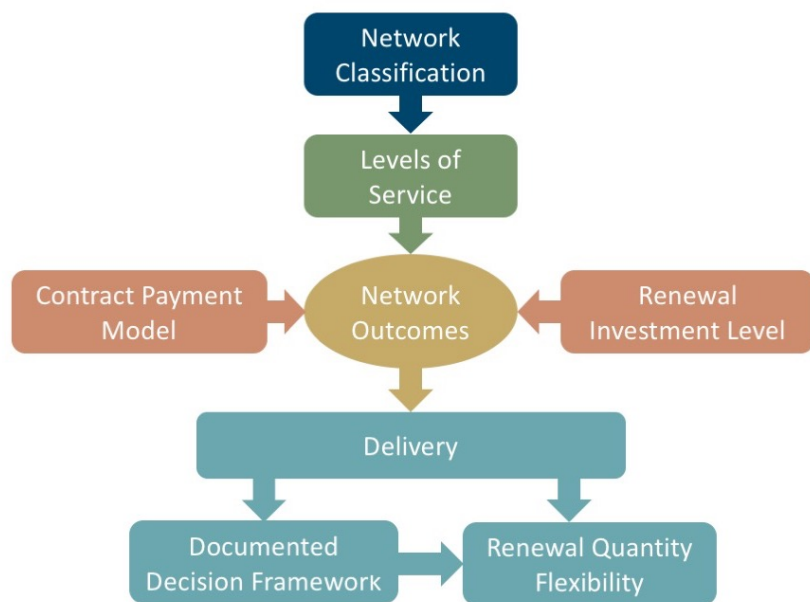
The Network Outcome Contracts (NOC) are aimed at improving the effectiveness of service delivery for maintenance and operations of the state highway network. Elements of previous procurement methodologies (PSMC, Hybrid and Traditional models) have been integrated into the NOC contract model that delivers services through a primary supplier incorporating both professional services and physical works for all key maintenance activities

To support this a central Governance and Management Group is in place to represent the interests of the Maintenance and Operations teams in the delivery of the NOCs. This group resolves issues, looks at opportunities for improvement, recommends changes to the national contract documentation, and ensures a consistent application, understanding and implementation of the NOC delivery model.

The core scope of work typically includes, but is not limited to maintenance, operations and renewals. The core scope of work typically **excludes** transport planning, ITS maintenance and management, capital works, emergency works reinstatement, Traffic Operation Centre activities, bridge and other structures management and repairs.

The contract process for the NOC's is shown below.

Figure 6 - NOC process



Collaborative delivery of services

The Tauranga and Gisborne corridor crosses over two NOC areas as outlined below. The BoP NOC extends past Opotiki, 14km west of Matawai, and the remaining section of corridor from Matawai to Gisborne covered by the Gisborne Northern and Western NOC.

Bay of Plenty Network Outcomes Contract

BoP NOC was awarded to a partnership led by Higgins, in conjunction with Beca and BoP contractors Waiotahi, known as Combined Roads and Traffic (CRTS). The contract commenced on 1 July 2014 and runs for seven years, with the potential for extension up to an additional 2 years.

Traffic signal maintenance - Signals/ITS are operated by the Tauranga (City) Transport Operations Centre. All street lighting is managed separately by Rotorua Lakes Council and Whakatane District Council.

Regional bridge and structures: There are separate BoP Regional Structures contracts (professional services and physical works managed separately).

Gisborne Northern and Western Network Outcomes Contract

The Gisborne NOC contract is run by Australia-based Services South East (SSE), who hold a five-year joint contract to manage both state highways and Gisborne District Council local roads. This contract began on 1 October 2015 and has a five-year duration with a performance-based option of a two-year extension (5+2).

Drivers for change

The Tauranga to Gisborne corridor caters for a variety of customers. The main driver for change is that demand for a reliable and resilient corridor is expected to grow into the future, driven by continued population growth in Tauranga and business expansion throughout the BoP. There is potential for further growth along this corridor in permanent population around Tauranga, rural business expansion and tourism with improved corridor operation.

Tauranga city growth

Tauranga has been one of New Zealand's fastest growing cities for 30 years and is one of the few still growing, and expected to continue to grow. It is predicted another 50,000 people will be living in Tauranga by 2043, an increase of over 40% from 2013. This growth is primarily to be accommodated within the existing urban land use boundary, with much of the increase in the over 65-year age groups. In response to this expected growth, SmartGrowth, a 50-year strategy developed in 2004, sets a framework to guide planning decisions in areas for development out to 2065.

With the framework of SmartGrowth, Tauranga City Council (TCC) has developed the 2015-2025 Long Term Plan (LTP) to 'Manage Tauranga's growth into the future'. The jointly developed Tauranga Transport Strategy 2012-2042, taking into consideration SmartGrowth, includes the completion of NZ Transport Agency projects including: the Tauranga Eastern Link (TEL), upgrade of Maunganui/Girven intersection, upgrade of the Te Maunga SH2/SH29 intersection, Hairini Link, the Tauranga Northern Link, and improvements at Tauriko. This is supported by local Capital Expenditure (CAPEX) of approximately \$40m per year rising to approximately \$60m per year by 2045.

The western section of SH2, including the TEL, has been expanded to accommodate Tauranga's growth, improve safety for commuters and connections to Rotorua and the Eastern BoP for freight. Further operational efficiency measures including intersection upgrades, rail separation and local improvements will be required to accommodate the continued growth in the area.

Regional growth and development

Bay of Plenty

SH2 through the Eastern BoP is a key link for freight to and from the Edgecumbe Fonterra Dairy factory, as well as for local agricultural producers of horticulture, dairy, grazing and sheep farming. Notable horticulture crops include kiwifruit, apples and avocados, which require a reliable corridor to deliver produce to market along with good connections for forestry products from Kawerau to the Port of Tauranga for international export.

The Ministry of Business, Innovation and Employment (MBIE) led the development of the 2015 Toi Moana BoP Growth Study which highlighted key components of the transport network, being the Port of Tauranga, rail network, road network and airports.

Logistics and the movement of freight play an important role in the BoP and provide support for key industries.

Focus areas

The Port of Tauranga is the largest export port in New Zealand handling 12.1m tonnes of exports in 2014 with an import volume of 3.8m tonnes, accounting for 32% and 18% respectively on total merchandise trade in the country. The growth outlook is favourable based on rising international trade with the Port planning to expand to a third berth, additional cranes and rail extensions, having identified 190 hectares for expansion.

SH2 forms the spinal highway route through the region and Local Authorities are committed to providing the required infrastructure for high volumes of freight traffic and to encourage business expansion in to higher value crops such as kiwifruit and avocados.

Implementation

Improvements to the transport network are continuing with the second tranche of HPMV investment on SH2 to include Edgecumbe to Opotiki, focussing on logging, kiwifruit and other agricultural traffic. A HPMV gap in the network will remain through Waioeka Gorge, limiting opportunities for the Eastland Region.

Eastland (Tairāwhiti) Region

SH2 is a vital link for supplies and economic activity between the BoP and Eastland Regions. Freight vehicles (including those carrying fuel, food, perishable goods and equipment supplies for the population and industry) rely on the corridor, which is subject to regular closures and disruption from rockfalls, slips and flooding. This impacts the reliability of the corridor as well as business and community resilience.

With a generally aging population and decline of local residents, no significant change in demand for, or use of, the network is expected. The Regional Growth Programme was included in the East Coast Economic Potential Study released in 2014, with the main drive being to maintain an affordable road network in to the future, containing the asset base and looking to make operational efficiencies and cost reductions where possible. However, improved connections between suppliers and markets, corridor reliability and access to improved freight distribution may unlock existing corridor capacity, opening investment opportunities and potentially increase region wide opportunities.

Understanding customer levels of service on the corridor

Current levels of service performance

The One Network Road Classification (ONRC) is a framework that categorises roads throughout the country depending on what purpose they serve. Importantly it will also help New Zealand to plan, invest in, maintain, and operate the road network in a more strategic, consistent and affordable way throughout the country.

Over time all roads in a particular category should offer an increasingly consistent and fit for purpose customer Levels of Service (CLOS) for road users. With the knowledge of current CLOS experienced by customers, we can better target investment to meet future intended service levels.

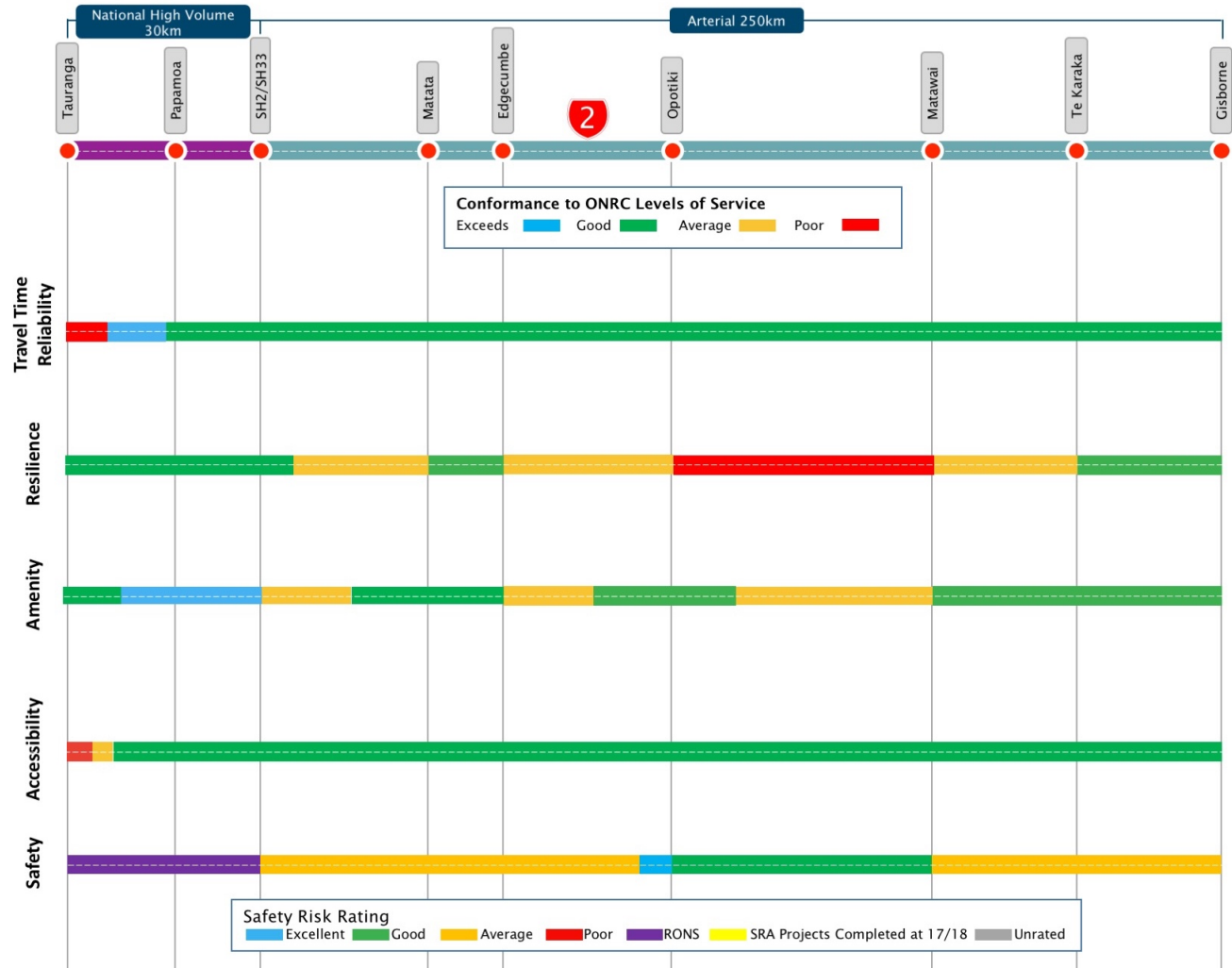
Overall, customers will be provided with the right level of road transport infrastructure where it is needed, determined by a robust, impartial, nationally consistent tool - the ONRC.

Road classification

The corridor from Tauranga to the SH2/SH33 intersection is classified as National High Volume, while from the SH2/SH33 intersection east to Gisborne is classified as Arterial.

Overleaf provides additional context to explain the current levels of service along the corridor based on the road classification.

Figure 7 - Current ONRC levels of service performance







Summary of current performance

Figure 7 shows how the Tauranga to Gisborne corridor is performing against the ONRC Levels of Service, as they relate to each of the three current classifications.

Levels of service performance has been determined by workshop participants in the development of this corridor plan and is therefore not solely based upon consolidated evidence from the ONRC technical measures.

A simple four-point assessment has been utilised as follows:

	Exceeds	The level of service provided by the section of corridor for the activity under consideration exceeds what is required for a highway of that classification
	Good	The section of corridor generally meets the LOS requirements for the activity and ONRC
	Average	The section of corridor meets some but not all of the LOS requirements for the activity and ONRC classification
	Poor	The section of corridor generally fails the LOS requirements for the activity and ONRC classification, or there is a significant gap in the LOS for some aspects of the activity.

Travel time reliability

The vast majority of the corridor is relatively free flowing and has low volumes of traffic. Levels of service deteriorate along the more congested sections on approach to Tauranga due to higher vehicle volumes, more intersections (including roundabouts), and signalised intersections. These are likely to continue to limit LOS when compared to the rest of the corridor.

Resilience

The section of corridor through the Waioeka Gorge has a high level of risk. There are only lengthy alternative routes available should critical assets such as retaining walls along the Waioeka River fail, or a major blockage occur due to flooding, slips or landslides. The alternative routes through the area are via SH35 to the north or SH5 to the south, both significant detours.

Amenity

The corridor condition is generally 'average' to 'good' throughout the corridor, with an acceptable surface condition and good access to shops, cafes and stopping areas in the small towns. The corridor is in a poorer condition from Matata to Wainui Road, west of Opotiki with surface cracking, rutting and reduced grip through corners. The road surface condition through the Waioeka Gorge through to Matawai is relatively good, however there are only a few isolated stopping areas.

Accessibility

Sections of the corridor have very limited side access due to the nature of the road, being a four-lane divided arrangement through the TEL and the topography through the Waioeka Gorge. The majority of the remaining sections of the corridor are through rural areas with minor road connections, alternative routes and farm access tracks throughout. Accessibility is difficult along Hewletts Road and between Bayfair and Bay Park.

Safety

The majority of the corridor is KiwiRAP 3-star rated. A large section between Edgecumbe and Opotiki on the approach to Taneatua, as well as a number of locations between Opotiki to Gisborne (through the Waioeka Gorge) are 2-star rated due to roadside hazards, narrow width, and winding, steep geometry. Areas of high risk are partly attributed to the steep and winding topography sections of corridor which can cause driver pressure and potential for error, and the vulnerability of the areas to slips and rockfall. The greatest concentration of crashes are towards the urban centres of Tauranga, Opotiki and Gisborne. There are multiple high personal risk sections between Opotiki and Gisborne on SH2. The star rating along the corridor, of either 2 or 3-star, falls below the targeted safety rating of 3-star equivalent or better. There is one high risk intersection along the corridor on SH2 between Tauranga and Papamoa.

Pressures on the corridor include tortuous road geometry and poor sightlines. There are limited passing opportunities along constrained areas, 100km/h speed limits are not attainable in some sections especially in close proximity to schools.

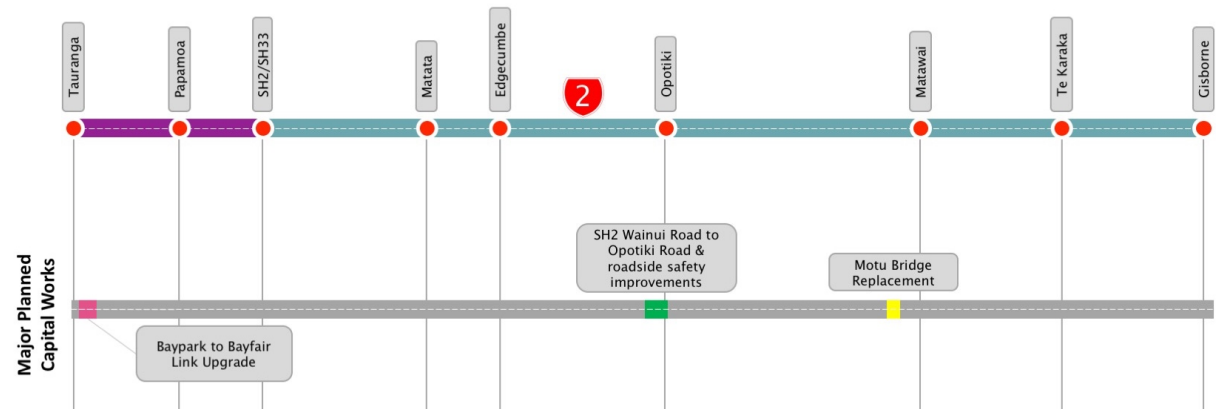
Improving the customer experience

In responding to Customer Levels of Service it is important to acknowledge that significant improvements to the corridor are planned or underway Figure 8 shows the planned improvements in the corridor.

Proposed improvements include Baypark to Bayfair Link Upgrade, Motu Bridge replacement to improve corridor resilience, and Wainui Road to Opotiki Road roadside safety improvements.

Planned improvements are discussed in greater detail later in this document.

Figure 8 – Significant corridor planned improvements



Access

Carriageway configuration

The majority of the SH2 corridor is a two-lane opposing road with few passing lanes. There are some areas with passing bays east of Opotiki and Matawai, along with a section of passing lane. There is also a short central flush median on approach to the SH35 intersection in Opotiki. Between Tauranga and SH2/SH33 intersection the TEL has increased the corridor to a four-lane median divided road. The section on Hewletts Road from Tasman Quay to Mount Maunganui Road is four-lane opposing, where turning movements are restricted to signalised intersections.

Speed limits

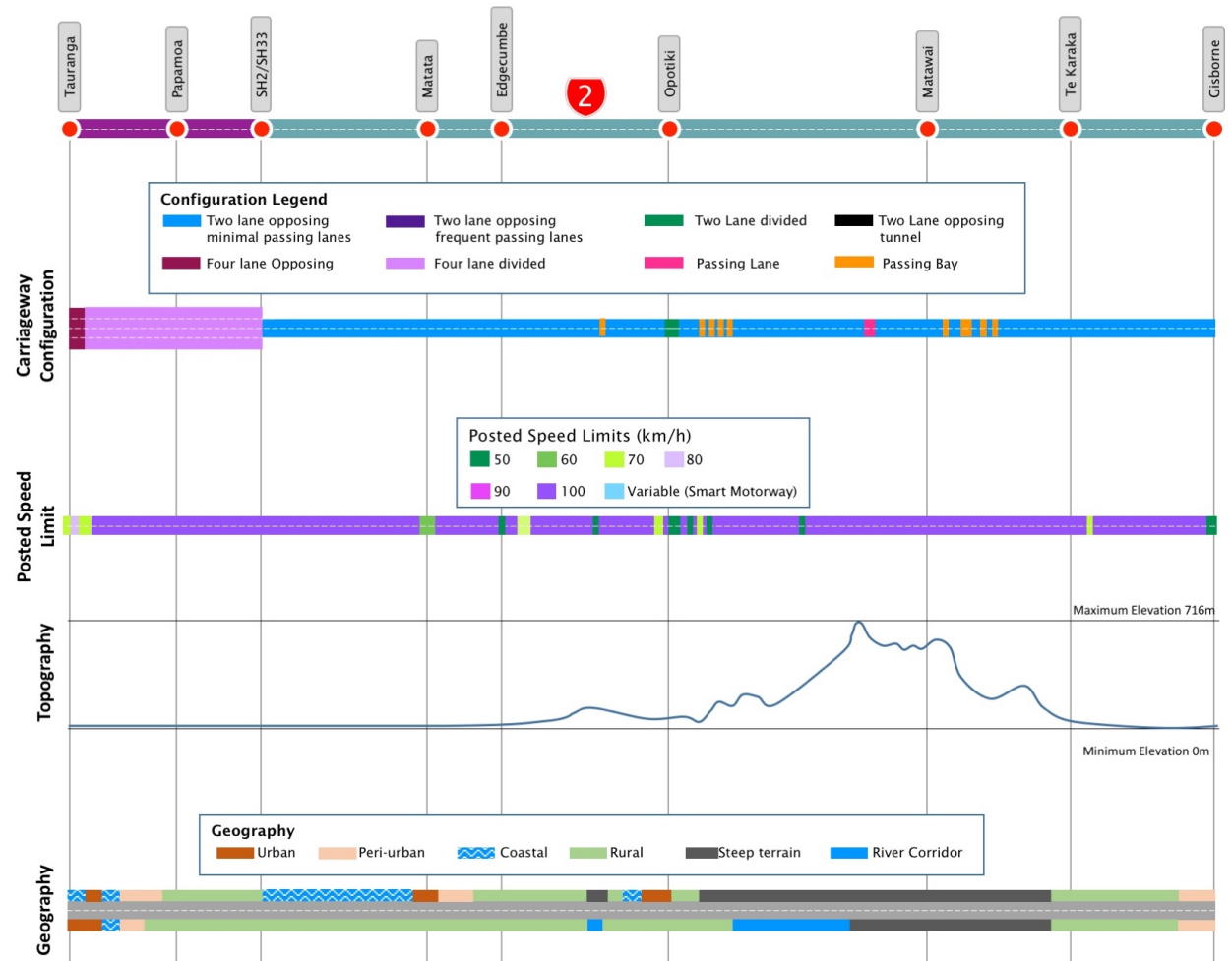
The majority of the corridor is 100km/h with small sections of between 50km/h and 70km/h through rural settlements along the corridor, including Awakeri, Taneatua, Kutarere and Waitohi. The Tauranga end of the corridor, including Hewletts Road and Maunganui Road, ranges between 70km/h and 80km/h.

Topography/geography

The topography of the route is varied with steep climbs and falls through the Waioeka Gorge. There is a gradual steep gradient between Opotiki and Matawai reaching the highest point on the corridor at 716m before the steep gradient to Te Karaka. Both of these gradients are punctuated with many 'out of context' curves, adding to the difficult driving conditions.

The surrounding geography of the corridor also varies with large sections of flat rural pasture, coastal sections and peri-urban/urban areas. The section between Opotiki and east of Matawai is generally steep terrain following the Waioeka River corridor. The corridor is urban around Tauranga and Gisborne with sporadic sections of peri-urban and rural areas along the remaining corridor.

Figure 9 - Corridor characteristics

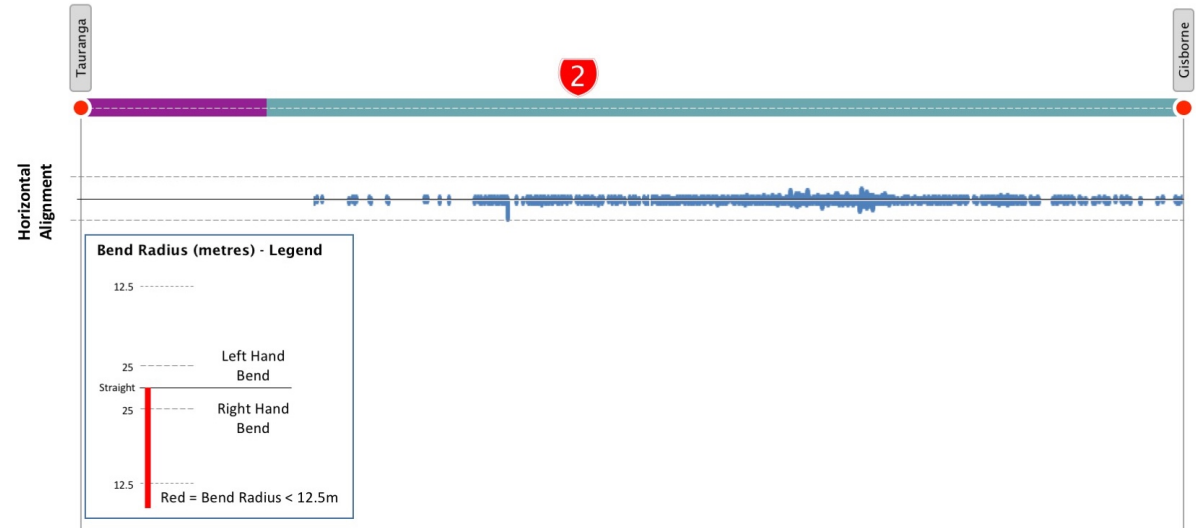


Horizontal alignment

The infographic shows the location and extent of the out of context curves along the corridor. The height of the bar is an indication of the severity of the curve calculated as $\frac{1}{radius^2}$, meaning the taller the bar, the smaller the radius of the curve. Note: Unlike other infographics, the horizontal alignment infographics are drawn in proportion to the length along the corridor. As such they are not shown in context with the intermediate points which have been excluded.

Sections of the corridor between Tauranga and Opotiki are generally quite straight and flat. Te Karaka to Gisborne (Matawhero) is also relatively flat, however there are a number of 'out of context' curves between the straight sections of road. The highest concentration of out of context curves occurs through the Waioeka gorge.

Figure 10 - Horizontal alignment



SH2 Makaraka intersection - turning long-stem trucks are a significant presence along the corridor

Volumes

Traffic volumes are relatively low throughout the corridor with concentrations of general traffic between 500-1000 vehicles per day (vpd) per lane through the Waioeka Gorge, up to 2000vpd per lane west of Opotiki to Matata, and up to 3000vpd per lane west of Matata to SH33, and Te Karaka to Gisborne. There is greater traffic flow along with 4-lane road capacity between Tauranga and SH2/SH33 intersection, where large residential populations enter the corridor. The highest concentrations and greatest volumes of traffic are centred between Tauranga and Papamoa, with 40,000 vehicles per day, 8% of which are HCVs.

HPMV routes

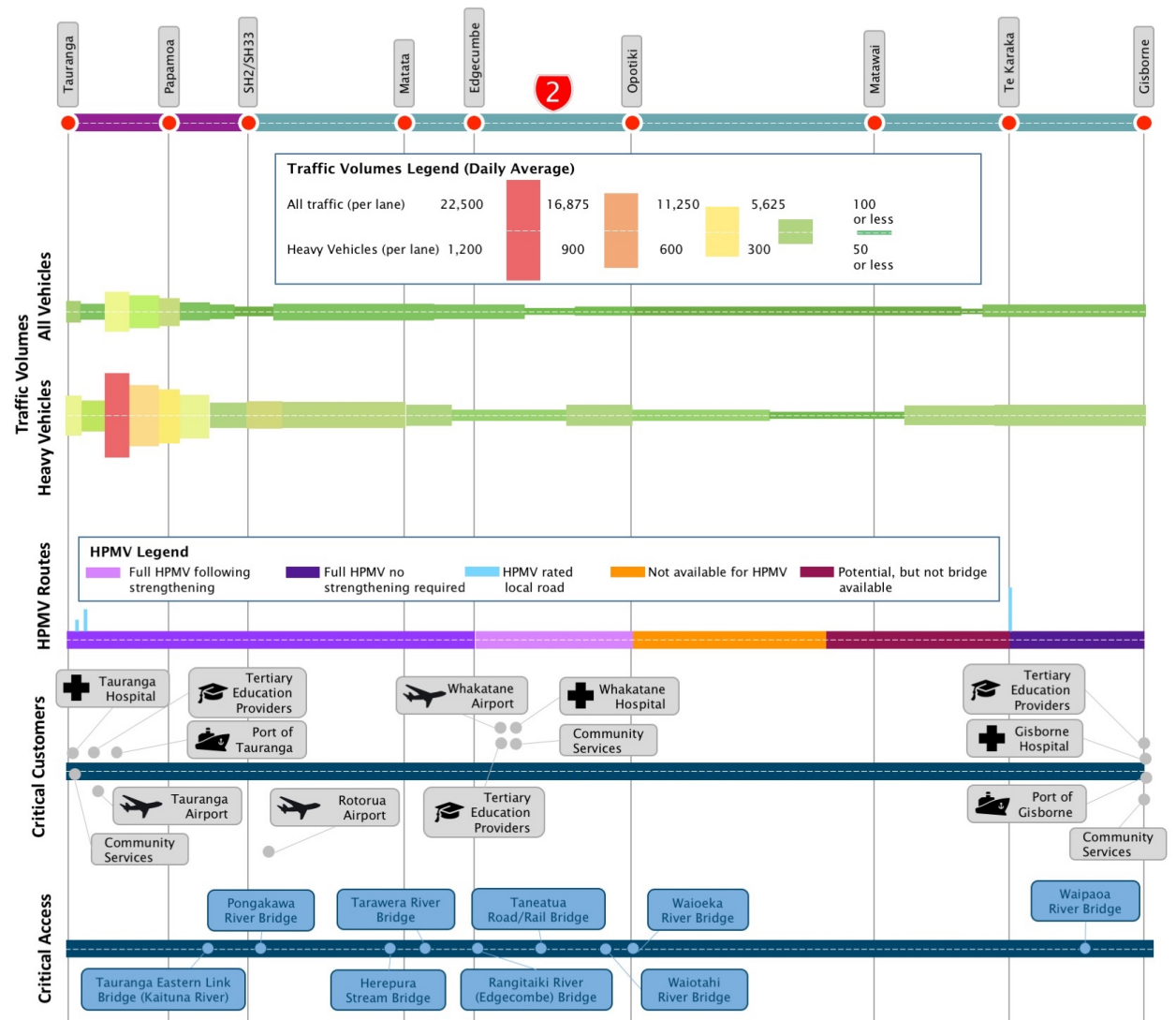
The main section of the corridor not suitable as an HMPV route is between Opotiki and Te Karaka. The section not available, highlighted in orange through Waioeka Gorge, has some steep road surface gradient, winding topography and retained areas adjacent to Waioeka River, which limit opportunities for improvement. However, the section of corridor to the east (dark-red) within the Eastland Region has potential for full HMPV status. This is not available due to the Waioeka Gorge. There are several local roads rated HPMV providing an additional route when necessary, two near Tauranga and one at Te Karaka.

Critical customers and assets

There are a number of critical customers adjacent to, or near the corridor. They rely on the corridor to be fully operational particularly through Waioeka Gorge, and are vulnerable to interruptions which impact productivity. These include Tauranga Hospital, Whakatane Hospital and Gisborne Hospital, as well as the airports and Port of Tauranga. Tourists are also critical customers throughout the Eastern BoP region as they are a key source of economic activity, employment and income. Other key customers include the Port of Tauranga at the western end of the corridor, Tauranga Airport south of Hewletts Road, and ASB Baypark Stadium at the intersection with SH29A.

There are critical assets along the corridor which need an enhanced maintenance focus to ensure they do not fail or significantly interrupt services. Several rail and road bridges are vital, specifically the Waioeka River Bridge in Opotiki as it is the only river crossing and the 400m long, single-lane signalised Piketahi bridge near Taneatua, which is critical for freight distribution.

Figure 11 - Corridor capacity



Pressures

The pressures on the corridor that are resulting in increased demand or a reduction in levels of service for **Access** are the following:

- **Physical constraints:** these can limit HPMV and over dimension access, impacting journey times particularly between Opotiki and Te Karaka. At present, this is constrained by topography (steep and winding, with 'out of context' curves) and geological stability (rockfalls and slips). This can block access for key supplies and impact the movement of fresh produce to market.
- **Conflict points:** carriageway configurations can create conflict points which impact journey times. The four-lane divided Hewletts Road section of the corridor in Tauranga can cause problems and delays, resulting in considerable congestion and queuing on both the local and state highway network. This section of the corridor also has the highest volume of heavy vehicles accessing the Port of Tauranga.
- **Tourism demand:** the corridor and its neighbouring infrastructure, including road side parking and street furniture is affected by tourist traffic through increased use. Traffic brings delays to freight and other key services, particularly on the winding sections (Waioeke Gorge), as well as reduced travel times through lower speeds, less familiarity and lower confidence levels.
- **Event management:** Visitors to the ASB Baypark Stadium create delays on the corridor. In particular, management of the Aims Games (a week-long event with up to 20,000 people during September) includes a number of closures of part of the corridor during this time, resulting in lengthy disruptions and a large detour for general traffic. Free public transport is provided to encourage people to park and ride to the event.
- **TEL operating system:** Feedback from customers indicates the current toll system may be confusing and unreliable, with some customers thinking they have paid and later receiving a bill. This is likely to be discouraging use of the toll road, contributing to the lower than anticipated traffic volumes on this section of the corridor.
- **Limited alternative routes:** There are two alternative options via SH35 from Opotiki to Gisborne via the East Cape or from via SH36/SH5/SH2 from Tauranga to Gisborne via Rotorua to the south, however these detours would be undesirable for any user to take in the event of a closure due to the considerable distance.
- **Critical bridges:** There is a dependence on the corridor and its critical assets, including the Waioeke River Bridge, for the movement of timber, dairy, and market produce; and access to essential services. Fruit growers also want a smooth road surface to limit bruising and damage to produce.

Future considerations

The future considerations relating to corridor pressures, intervention triggers and appropriate levels of investment related to **Access** are as follows:

- **Balanced investment:** Balancing short-term approaches with long-term plans and considering greater investment in higher quality assets will raise short-term costs but may reduce costs over the long-term. More consideration of the longer-term and potential of existing infrastructure may increase the value of existing maintenance investment and unlock opportunities in the eastern section of the corridor.
- **Strategic maintenance strategy:** There are limited access opportunities for maintenance works due to the topography (Waioeke Gorge) which dictate that more robust treatments are applied to ensure a continuity of service. A strategy is required for treatments and/or management, and in the way that they are applied – programmed full closure of a portion, rolling partial closures, noise reducing surfacing, longer life treatments, or less maintenance and acceptance of lower quality/more faults during the lifecycle.
- **Improve HPMV capability and future proofing:** A corridor upgrade for HPMV between Opotiki and Te Karaka will allow for the movement of greater quantities and quality of goods between the BoP and Gisborne Regions. No investment is currently planned in this area, limiting the possibilities and performance of freight throughout.
- **Improved passing lanes and one lane bridge replacement:** Further investment in passing and overtaking lanes, replacement of single lane bridges and alternative routes will improve operations and experience of all users, including catering to the demand from an increase of tourists to the region is expected.
- **Strategy for forestry:** A forestry clearance programme will provide information for local maintenance and help develop a more efficient forward plan for upgrades. It is acknowledged there is risk as programmes can change when the market price of timber fluctuates.
- **Communication:** New and improved warning measures including Real Time Information allow for improved journey planning.
- **Emergency response planning:** Strategies could be formulated for lengthy closures, including identification of helicopter landing sites to improve emergency response and improve response times.

Resilience

The SH2 corridor is the key route between the BoP and Gisborne Regions via Waioeka Gorge. There are no minor route alternatives and the detour distances are considerable, either via SH35 to the north or SH30 and SH5 via Rotorua to the south. The distance to travel on both of these routes is more than double SH2 from Opotiki to Gisborne.

Vulnerabilities

The corridor is most susceptible to ongoing weather induced hazards and incidents, particularly from Opotiki to Gisborne. The area is prone to flooding, slips, rockfalls, black ice and high winds, all of which can cause temporary restrictions and/or closures. The winding and steep gradients through this area place additional pressures on drivers and increase potential for error.

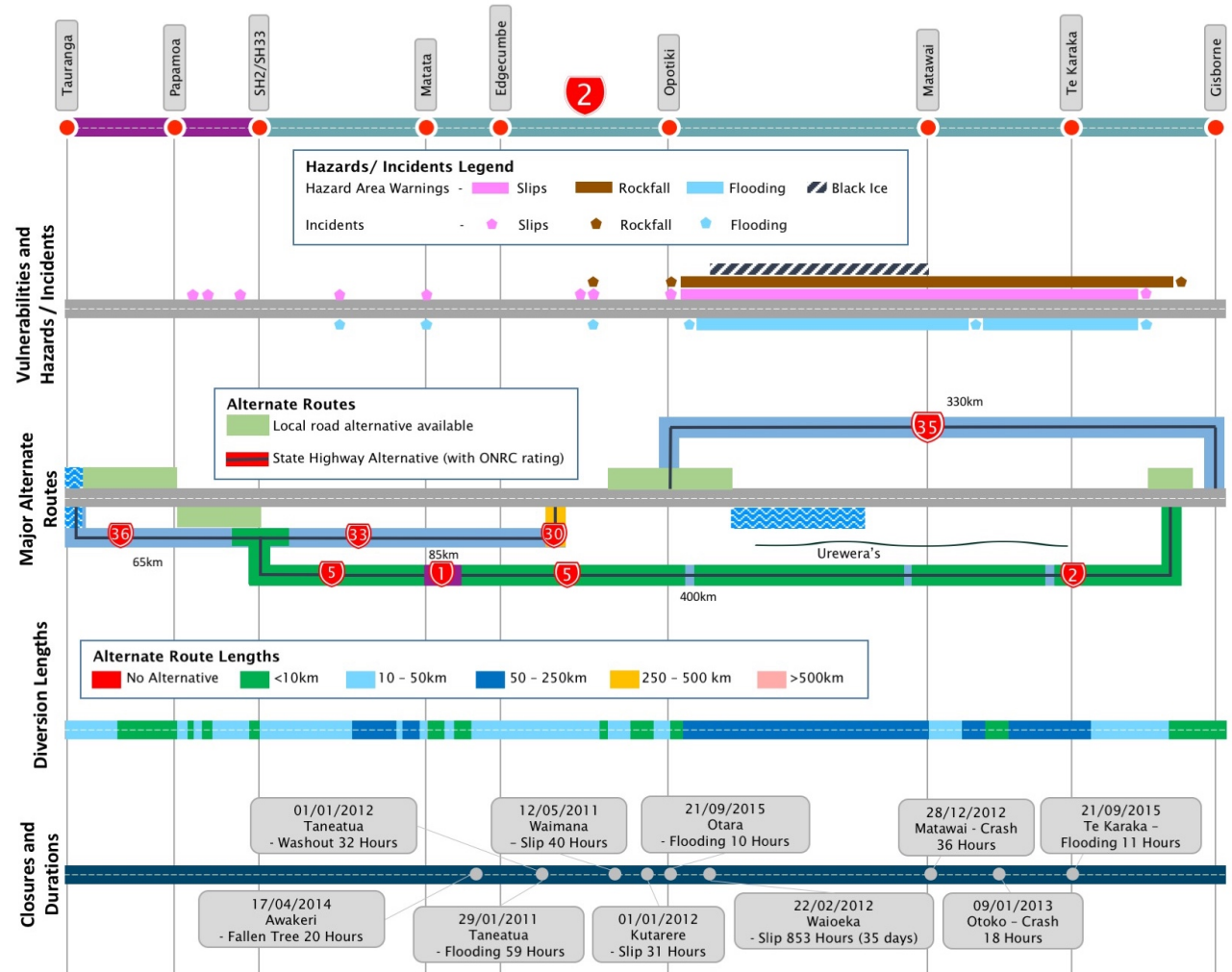
Alternative routes and diversion lengths

There are limited minor road detours available in the case of road closures, with only long alternative routes for some sections of the corridor, and no alternative routes between Opotiki and Te Karaka. It is approximately 140km between Opotiki and Gisborne on SH2. The shortest alternative is 330km via SH35 around the East Cape. The longer alternative via SH5 and SH30 through Rotorua and Taupo, is approximately 540km. The longer alternative becomes more feasible the closer the destination is to Tauranga. For example, it is approximately 260km and three and a half hours from Tauranga to Gisborne via SH2, and 470km and six hours via SH5, SH30 and SH33. These travel times are optimistic as they are for a private vehicle, which is more capable of handling the winding detour routes.

Closures and duration

Over the past five years, there has been one significant closure of 35 days due to a land slip blocking the corridor. There have been several other closures over 10 hours, caused by crashes, slips and flooding. These have a fairly even distribution across the corridor. In addition to those shown in Figure 10, there were 18 closures between one and 10 hours duration.

Figure 12 - Resilience



Pressures

The pressures on the corridor that are resulting in increased demand or a reduction in levels of service for **Resilience** are as follows:

- **Weather induced events:** Flooding, slips, rockfalls, fallen trees and black ice, particularly between Opotiki and Gisborne, bring temporary restrictions and/or closures.
- **Topography:** The steep and winding topography of the corridor, particularly in sections of the Waioeka Gorge and Waimana Gorge, makes access difficult and can increase the time it takes to clear slips and rockfalls.
- **Limited alternative routes:** Between Opotiki and Gisborne the alternative options are very long and not viable for most customers because of the length of the alternative and time required to travel it. Often, it can be quicker to wait for the corridor to re-open.
- **Seismic risk:** There are several fault lines crossing the corridor, including Waiohau Fault, Whakatane Fault and the Waimana Fault. Each of these will move at some point in the future, which will likely cause damage to the corridor and neighbouring detour roads;
- **Increasing urban development:** Demand for maintaining or developing a higher quality asset with greater resilience, longer life, and lower maintenance requirements is likely to grow. With the expansion of the population in to the regions and growth of Tauranga over time, ensuring the existing capacity is sufficient and maintenance requirements are minimised, to reduce traffic delays, particularly during the peak hours is key.
- **Mobile phone coverage:** Mobile coverage is poor through the Waioeka Gorge often resulting in delays to emergency responses.

Future considerations

The future considerations relating to corridor pressures, intervention triggers and appropriate levels of investment related to **Resilience** are as follows:

- **Protecting vulnerable areas:** Rockfall protection netting in vulnerable areas, investment in drainage maintenance in areas susceptible to flooding, and a higher level of monitoring of the neighbouring environment to provide earlier warning of possible events, could all improve resilience.
- **Improved communication:** Investment in improved communications will help provide real-time information or staged investment in readiness of first responder personnel and equipment may be more feasible, focussing on the most vulnerable areas at the most critical times. It will also facilitate the ability to provide customers with real-time information allowing decision making about journeys.
- **Developing a rail alternative:** There is an existing freight rail line through to Gisborne. Maintaining and improving the rail corridor access will provide alternatives for freight movement and possible passenger, tourism improvements.
- **HPMV improvements:** Upgrading the corridor to full HPMV capability will open opportunities at Gisborne Port and improve connections to the Port of Tauranga, with increased national and international trade, providing an alternative to Napier. This will also improve resilience in NZ's coasting shipping network.
- **Disaster management planning:** The likelihood of a seismic event is increasing along with demand and reliance on the corridor. Investment in alternative routes, improved and new assets on the corridor capable of withstanding an event will help minimise the impacts.

Reliability and efficiency

Efficiency

The majority of the corridor performs very well with large sections at a LOS B and A. Some sections around the urban centres, out of context curves and single-lane bridges reduce the LOS, particularly around Papamoa and towards Matawai through Waioeka Gorge.

The western section of the corridor is the primary access to the Tauranga CBD and has been expanded to accommodate Tauranga's growth. Tauranga Airport is a significant traffic generator along with the Port resulting in high freight and general traffic demand. There is rat-running through local roads to avoid Bayfair roundabout and occasional congestion caused by the level rail-crossing. There are long distances between pedestrian crossing opportunities along Hewletts Road and regular near misses and crashes at both the Girven Road and SH29A roundabouts. A longer route is available via SH29A on to SH2A to access the southern end of Tauranga CBD and an alternative route to SH2 through the area during more congested times.

Variability

The section of corridor between Hewletts Road to Papamoa on Mount Maunganui Road performs relatively well, with low variability. Based on discussions at the workshops held as part of the CMP development, it is likely that the majority of the corridor has a very low vulnerability rating, with medium in sections (mainly between Opotiki and Matawai).

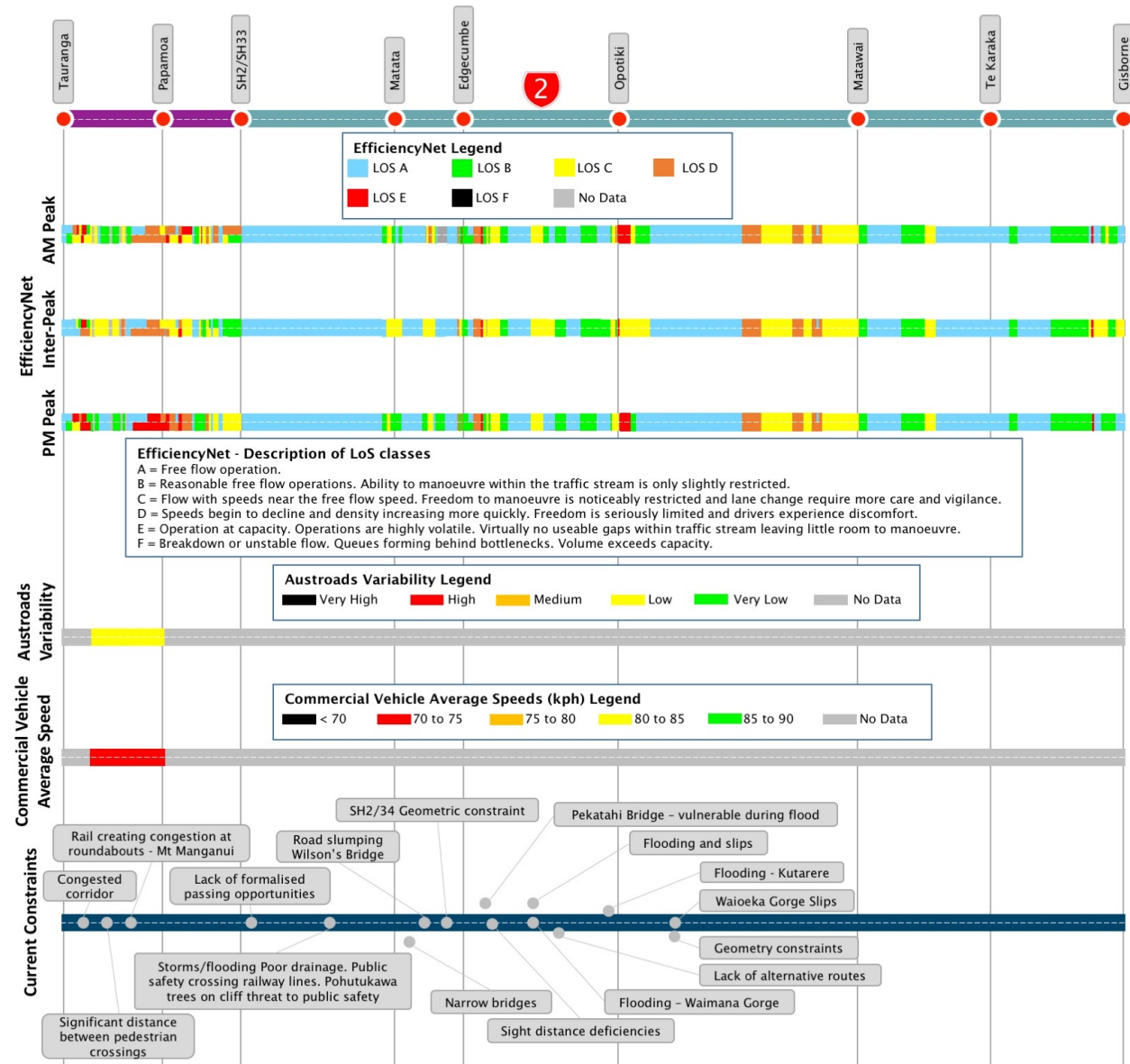
Commercial vehicle average speed

Data is limited to the section between Hewletts Road and Papamoa on Mount Maunganui Road, with a less than desirable speed of 70-75kph. This is expected with more congestion and higher traffic flows near the Port of Tauranga and Tauranga Airport. Based on discussions at the workshops, average speed is likely to be higher for the remainder of the corridor, with slower speeds between Opotiki and Matawai.

Current constraints

The major constraints on the network affecting journey reliability and efficiency tend to be due to topography (steep and winding) and weather induced events, such as flooding, rockfalls, slips, tree falls, and black ice.

Figure 13 - Reliability and efficiency



Pressures

The pressures on the corridor that are resulting in increased demand or a reduction in levels of service for **Reliability and Efficiency** are as follows:

- **Road capacity:** The four-lane divided section of the corridor in Tauranga (Hewletts Road) is at or near capacity during peak periods and is delivering poor levels of service at these times. Morning peak periods at the Tauranga end are reliant on the rate at which the city can absorb the arriving traffic. The off-ramps at Dive Crescent, Chapel Street and Waihi Road are constrained by traffic signals and are prone to queuing along the motorway.
- **Speed restrictions:** Rural towns generally require an appropriate reduction in travel speed to suit the surrounding environment and users. This speed change results in travel time delay, but increases general safety for pedestrians and drivers.
- **Single-lane bridges:** Bridges such as the 400m long traffic signal controlled Pekatahi Bridge near Taneatua impact corridor efficiency.
- **Weather induced events:** Flooding, slips, rockfalls, fallen trees and black ice, particularly between Opotiki and Matawai, bring temporary restrictions and/or closures affecting the reliability and efficiency of the corridor.
- **Topography:** The steep and winding topography of the corridor limits certain vehicles to lower speeds that posted or capable by other drivers and vehicles. With limited overtaking and passing opportunities, the efficiency of the corridor is compromised through the Ureweras.

Future considerations

The future considerations relating to corridor pressures, intervention triggers and appropriate levels of investment related to **Reliability and Efficiency** are as follows:

- **Incident response management:** Being able to respond quickly and efficiently to incidents on the network is important to maintain reliable and efficient journeys for customers. This requires a higher level of investment to improve response times.
- **ITS infrastructure:** The use of ITS to manage flow is increasing. Reliance on real-time information dissemination to customers will become more important as traffic volumes continue to grow. The supporting infrastructure will need to be maintained and grow with public acceptance and increasing expectations, in areas of higher volumes of traffic (Tauranga) and those more prone to closure (Ureweras).
- **Multi-modal investment:** The Port of Tauranga is committed to further growth and Tauranga is expected to increase by over 40% (50,000) by 2043. There is also expected to be ongoing growth of tourism. The TEL provides for growth to the east of Tauranga, however connections to the city and key destinations are already reaching capacity at peak times. Consideration and investment in Park and Ride facilities, encouraging use of existing infrastructure more efficiently, including buses and rail, as well as capacity improvements and bottleneck reduction investment, are all required to ensure future corridor reliability and efficiency.



Slip after heavy rain on the Matata Straight near Murphy's Holiday Camp.

Safety

Collective risk

The collective risk rating along the corridor is varied. SH2, from Matata to Gisborne is mostly rated low or medium-low with two segments of medium risk. There is a section of SH2 north of Tauranga which is rated high and north of the SH2/SH33 intersection it is rated medium-high.

Personal risk

Between Opotiki and Matawai on SH2 there are two high personal risk sections and the corridor either side of Te Karaka is also rated high. There are three medium-high sections between Edgecumbe and Opotiki. There is one medium-high section from SH2/SH33 halfway to Matata.

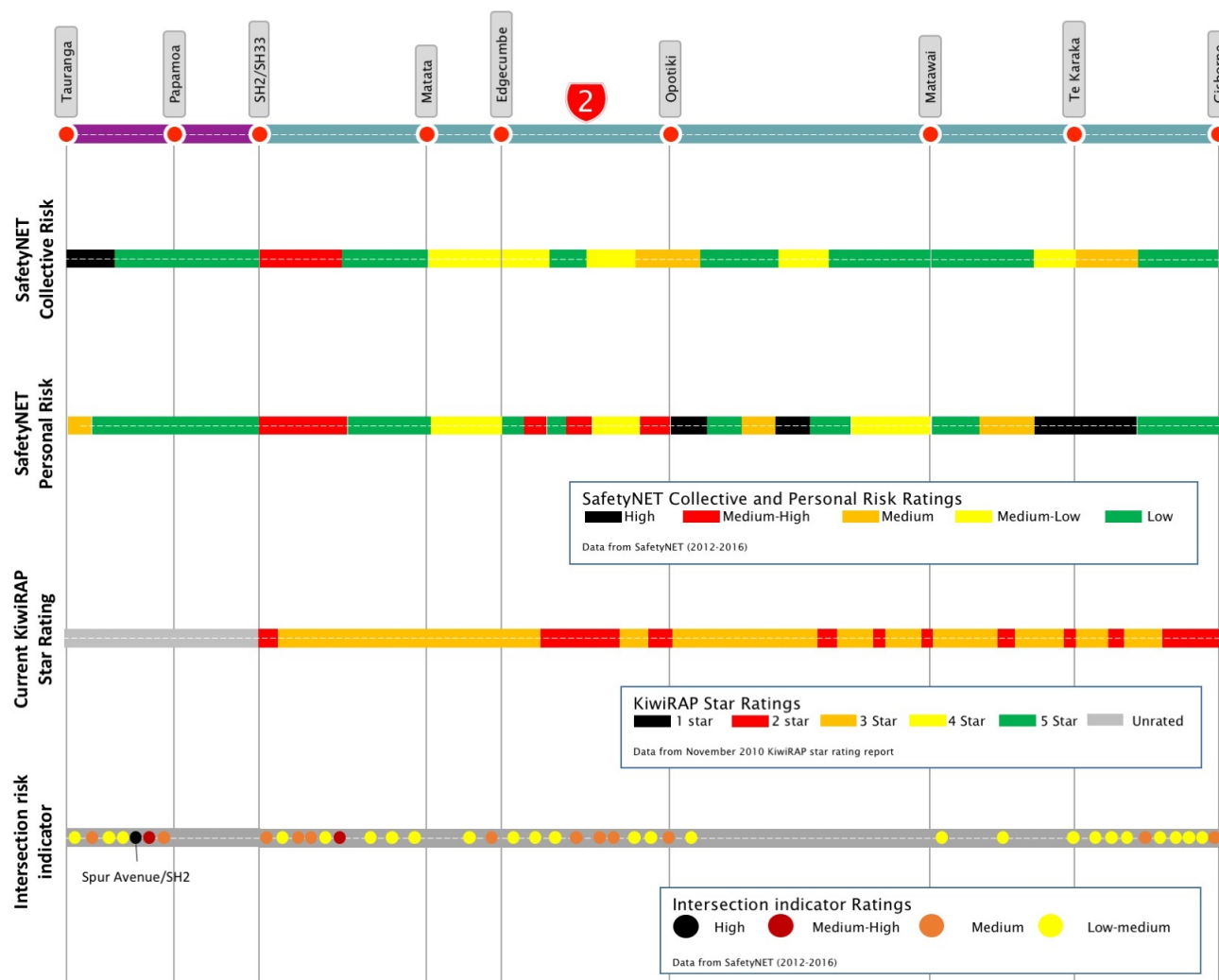
Star rating

There is no star rating on the National high-volume section of the corridor between Tauranga and SH33. The star rating along the corridor, being either 2 or 3-star, falls below the targeted safety rating of 3 star equivalent or better. SH2 between Matata and Edgecumbe is rated 3-star.

Intersection risk indicators

There is one high risk intersection along the corridor on SH2 between Tauranga and Papamoa. Between Papamoa and SH2/SH33 and Opotiki and Matawai there are no intersections with a risk rating. There is one medium-high intersection between SH2/SH33 and Matata, and another immediately before Papamoa.

Figure 14 - Safety



Pressures

The pressures on the corridor that are resulting in increased demand or a reduction in levels of service for **Safety** are as follows:

- **Topography and geometry:** While the Waioeka Gorge is a general safety concern with the geometry of the road winding and difficult, the section of greater safety concern is between Matata and Opotiki which has long straights followed by sporadic winding sections. The natural undulating and rural highway landscapes provide a sense of freedom and enjoyment for drivers, with low vehicle volumes and winding roads that may encourage some to take a more comfortable driving trajectory, i.e. cutting corners, taking racing lines and overtaking with restricted visibility.
- **Lack of safety based assets:** There is limited use of 'safe systems' design features including wire rope barriers, improved visibility at intersections and turning lanes.
- **Speed limits:** Adjoining 100km/h speed limit areas for schools and maraes create safety concerns for local communities accessing the high-speed corridor.
- **Driver fatigue:** As the corridor is a key freight route with tourist and recreational users, drivers typically drive the entire length of the corridor from Tauranga or Opotiki to Gisborne, which puts them at risk of fatigue. Sometimes the corridor is part of a longer journey as well, e.g. Auckland to Gisborne for events.
- **Speed related crashes:** There has been discussion regarding increasing the speed limit on Tauranga Eastern Link. The recent improvements allow for higher speeds, however there may be a spread of higher speeds to neighbouring roads and the extended corridor, resulting a spread of crashes to less safety features and possible higher severity crashes.
- **Community attitudes:** Regional areas have some driver behaviour issues including drink/drug driving, driving without a license, unroadworthy vehicles and speeding.
- **Limited passing opportunities:** Short passing/slow vehicle lanes and long winding sections of road lead to vehicle platoons that cause driver frustration. There are potential safety issues with drivers taking more risks and passing in undesirable locations, particularly in the summer months with higher numbers of tourists and recreational visitors.

Future considerations

The future considerations relating to corridor pressures, intervention triggers and appropriate levels of investment related to **Safety** are as follows:

- **Safety improvement strategy:** Providing a more consistent journey experience for customers could include improvements to high risk areas such as road realignment in crash hot spots such as the out of context curves between Opotiki and Te Karaka, Variable Message Signs (VMS) before high risk areas to warn motorists on approach to intersections such as SH30 and White Pine Bush Road (SH2) area, speed management outside schools and maraes, and the Safe Roads improvements project, proposed between SH2 Wainui Road intersections to Opotiki. Extending and adding new passing lanes/slow vehicle lanes, particularly on the sections of the corridor between Matata to Opotiki as well as Waioeka to Matawai where driver frustration is higher will help minimise unsafe passing manoeuvres.
- **Stopping places strategy:** Consider providing stopping areas for drivers, including encouragement of refreshment businesses where possible for a more positive user experience along the corridor. Encourage and work with other agencies when events are on in Gisborne and Tauranga to promote driver stops and promotion of places to do so;
- **Community strategy:** Partner with other agencies to address community attitudes to road safety, including restraint harness use and drink and drug driving, through a holistic approach. With improved network connections for business expansion, there may also be increased employment opportunities, greater links to other employment centres, as well as assistance, training and education programmes for residents, and incentives to drive behaviour change.
- **Review of speed limits:** Speed limits adjoining schools and maraes should be reviewed to ensure they are consistent along the entire corridor, reinforcing driver behaviour in these areas and improving safety for communities.

People, places and environment

Natural environment

The key natural environment features are the coastal landscape section of the corridor between Otamarakau and Matata providing exceptional ocean views, and the Waioeka Gorge. Other areas of interest include parks, reserves and areas of significance to mana whenua concentrated between Edgumbe and Opotiki.

From Opotiki to Te Karaka, the Waioeka Gorge is a DoC conservation area with ecological significance. Permission is required from DoC to remove trees on the reserve land, which may overhang or at times impede the corridor.

Noise, vibration and air quality

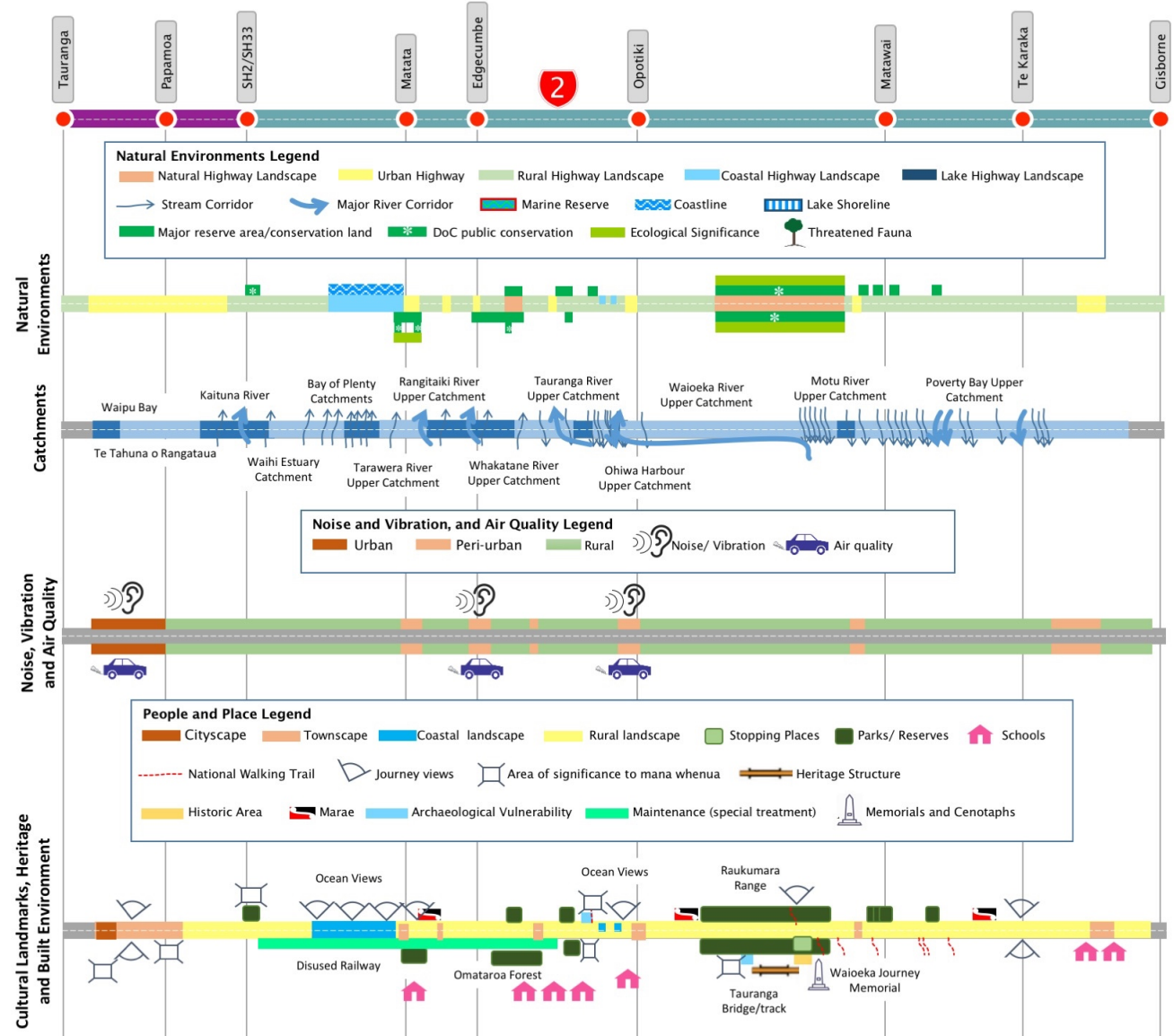
Residential development abuts the corridor within the townships of Matata, Edgumbe, Taneatua, Opotiki, and Matawai, making these areas more sensitive to noise and vibration, and air quality issues. Tauranga has the highest concentration of noise and air quality issues due to the higher volumes of traffic. In future, there is likely to be a change in vehicle towards electric propulsion. Electric vehicles will help reduce noise, vibration and air quality concerns.

Cultural landmarks, heritage and built environment

The scenery of the corridor creates vitality and attractiveness to journeys, with a range of urban and rural areas, areas of cityscape, townscape, coastal landscapes, and parks/reserves.

The section of the corridor between Opotiki and Matawai has a high concentration of cultural and heritage features, such as the Tauranga Bridge and Waioeka Journey Memorial in the Waioeka Gorge. A number of schools are located along the corridor, some of which adjoin 100km/h speed zones. Several marae are also located along the corridor, some of which are located adjoining 100km/h posted speed limit areas, including Ngati Umutahi Marae near Matata. This is a safety concern for vehicles accessing the site on and off a high-speed corridor.

Figure 15 - People, places and environment



Pressures

The pressures on the corridor that are resulting in increased demand or a reduction in levels of service for **People, Places and Environment** are as follows:

- **Increasing frequency and severity of weather events:** There is an increasing risk of erosion, subsidence and degradation of rocks, soils and slopes within and alongside the corridor, particularly in already susceptible sections. The frequency and intensity of flooding could also increase. The management of these risks may require engineering controls and the use of vegetation, particularly in highly exposed coastal areas.
- **Vegetation management:** Ecological connectivity across the corridor between habitat areas is an outcome increasingly sought by councils and DoC to assist in biodiversity maintenance. Plant pest removal is also growing in importance, requiring collaboration with charities, volunteers and other national groups. Replanting of areas raises issues for maintenance and general safety for workers involved. DoC areas require that materials such as grit are free of pest plant seeds. Native trees are not permitted to be removed without DoC involvement.
- **Urban growth:** As the number vehicle movements increases along the corridor, the need to manage impacts in Tauranga, Edgecombe and Opotiki will increase. Receptors closest to the state highway are more likely to be potentially impacted, nominally within 40m of the state highway for vibration, and within 100m for air quality and noise. Mitigation can include separation of the state highway from receptors maintaining free-flowing traffic and appropriate road surface conditions.
- **Management of significant sites:** The complex range of cultural heritage places and landmarks in the Waioeka Gorge are subject to incremental damage through both corridor management activities and environmental changes. Some of these places and landmarks may require management plans with ongoing compliance obligations, such as in Gisborne. Additional investigations and management of impacts on these features may be required.
- **Relationships:** Acknowledgement of iwi/mana whenua relationships is increasing along with their input to the management of heritage assets and landscapes. The number of features and locations of importance to iwi along the corridor is expected to increase and these will need to be considered in corridor management and development opportunities.
- **Increasing tourism:** Greater numbers of visitors to landmarks and heritage areas may increase parking on the roadside where off-street parking is unavailable. Damage to the local environment from vehicles and walkers, strategies and improvements to accommodate growth need developing prior to the growth occurring.

Future considerations

The future considerations relating to corridor pressures, intervention triggers and appropriate levels of investment related to **People, Places and Environment** are as follows:

- **Improved stormwater management:** Improved management of road run-off in to the local water courses will result in greater expense to update existing infrastructure and install new measures to meet requirements.
- **Electric infrastructure:** The increase of electric vehicles requiring infrastructure for charging at key locations and popular destinations including cultural landmarks and the built environment on the corridor. A strategy for investment in charging infrastructure may be necessary to ensure customer needs are being met.
- **Strategy for stopping places:** There are opportunities to improve the user experience along the corridor with stopping places, cafes and services, particularly at landmarks and tourist attractions. Review existing stopping places to ensure they are in the right places and have the right facilities.

Understanding the infrastructure assets

The following sections contain information about the condition and performance of the state highway assets within the corridor. This information is necessarily complex and therefore challenging to communicate simply. Every effort has been made to explain the base data inputs and what the information is describing in as simple terms as possible, however full comprehension does require some technical knowledge of the terms used.

Corridor asset base

The state highway system is a significant national asset, made up of 11,412km of roads and associated assets. This corridor contributes approximately 304km of road network which reflects 2.7% nationally. The total value of the assets along the corridor is \$520M (excluding ITS, and, heritage and green assets).

The corridor assets have been divided into eight groups as shown in Figure 16 which directly supports the access and resilience safety, reliability and efficiency and people, places and environment outcomes on the network.

Asset condition and performance summary

The infographic shows the summary score the entire corridor achieves for each of the eight measures used in this document to assess the condition and performance of the assets. These measures are assessed in more detail along the corridor in the following sections of the document.

Figure 16 – Corridor asset base

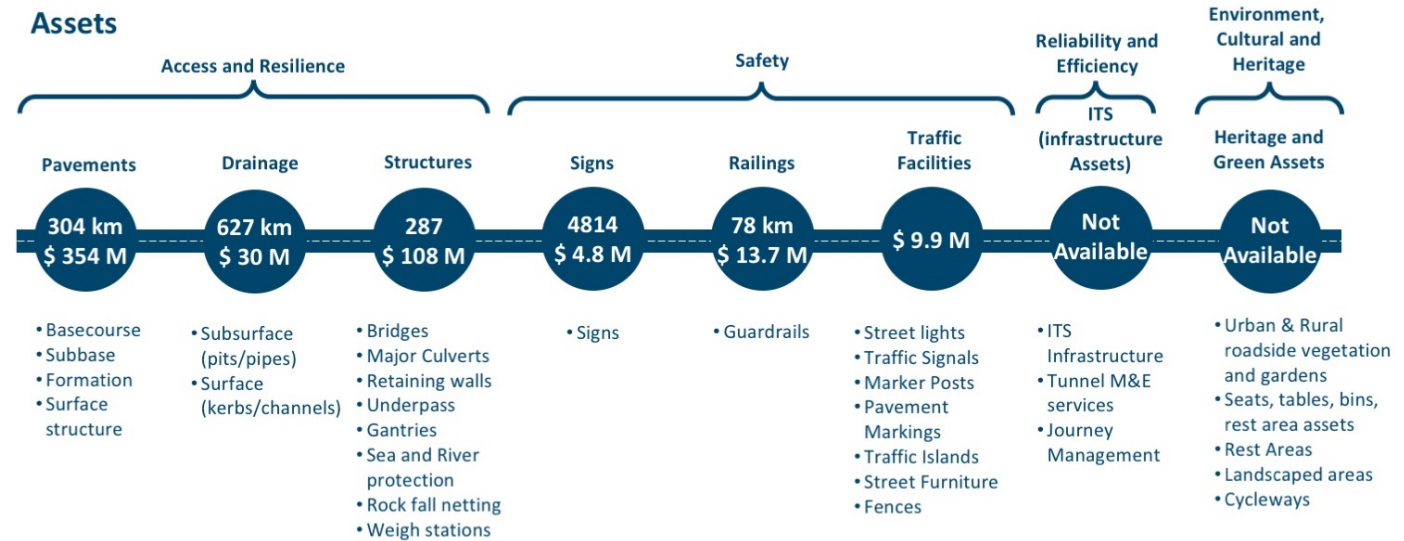


Figure 17 - Asset condition and performance



Asset condition and performance

Surface skid resistance

The infographic shows the proportion of the Route Section, as a percentage, that falls within the two levels of either threshold limit or investigation level. The change in Surface Skid Resistance infographic shows the change in the levels from the 2014 survey to the 2016 survey, as either an improvement or degradation.

The information is derived from inspection data that records a value every 10m in each direction. Each 10m length is rated as to whether it is within one of the bands: below threshold limit; within investigation limits; or above Investigation limits. The proportion is then the number of 10m lengths in that section as a percentage of all 10m lengths in that section.

Section 2/157, within the urban environment of Mt Maunganui, is of most concern, with both TL and IL increasing over the last 3 years, and this section showing a significant amount of surface skid resistance below the threshold limit. The length of corridor from Awakeri to Opoitiki, while showing reasonable improvement in surface skid resistance over the last 3 years still has significant levels within IL. This pattern is repeated for the section of corridor through the Waioeka gorge.

Data Gaps relate to the newly opened Tauranga Eastern Link alignment that has not yet been surveyed.

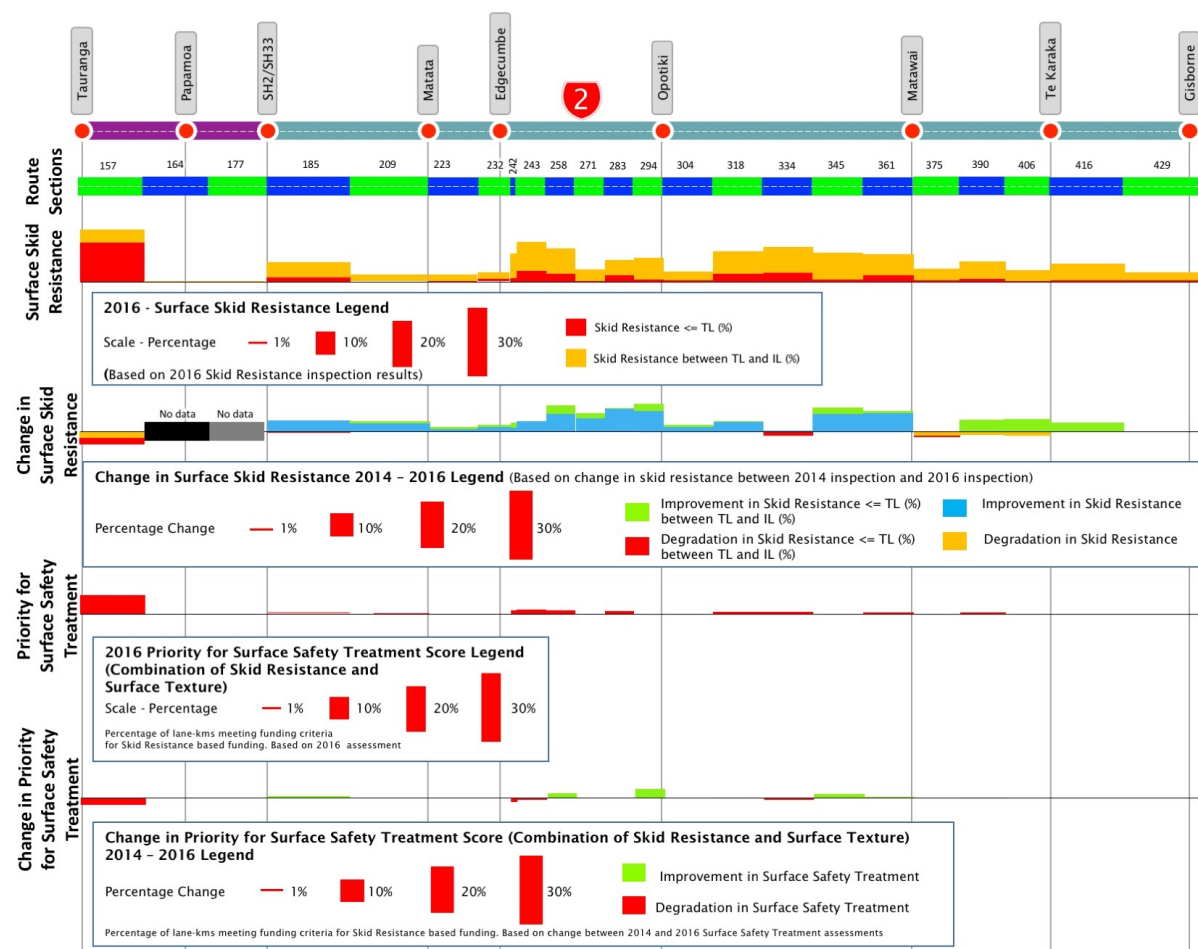
Priority for surface safety treatment

The infographics show the proportion of the Route Section that has a Priority for Surface Safety Treatment (Skid Assessment Length) that would qualify for funding, i.e. a score >140. The second infographic shows the change in these levels from the 2014 survey to the 2016 survey, as either an improvement or degradation.

Taken from inspection data that is normally recorded every 100m in each direction. Each 100m assessment length is rated and if it achieves a score over 140 it qualifies for funding. The proportion is then the length of route section that qualifies for funding as a percentage of the total length of that section.

A very low percentage (0.47 %) of the corridor achieved Skid Assessment Length that qualifies for funding. This equates to only 2.6 lane-km of the 613 total lane-km of the corridor. Section 2/157 in the industrial district of Mt Maunganui accounts for a significant amount of the priority for surface safety treatment funding with the largest increase in priority, along with sections 2/243 and 2/258 around Taneatua.

Figure 18 - Asset condition



Surface defects

The infographics show the proportion of the Route Section that has a Surface Defects (100m Priority) score that would signal the need for further investigation, i.e. a score >20. The second infographic shows the change in these levels from the 2014 survey to the 2016 survey, as either an improvement or degradation, as well as the three-year trend.

The Surface Defects score is made up of a number of measures which all contribute to the overall score including: roughness, rutting, shoving, flushing, and design life. Any 100m section achieving a score over a total of 20 rates as flagged for inspection. The proportion is then the length of corridor that is flagged for inspection as a percentage of the total length of that section.

Overall, 17% of the corridor achieves a score above which inspection is required. This is most prevalent in the sections through the Waioeka Gorge south to Te Karaka.

Surface age

The infographic shows the weighted average age of road surface, and the proportions of surface age that fall within the three age bands.

The base data is all the seal lengths and their age from RAMM. Then a weighted average is then calculated. Overall, all sections add up to 100%. The proportion is the length of corridor in a particular age band as a percentage of the total length of that section.

The sections of corridor with the oldest age profile are 2/157 Hewletts Road, 2/185 east of Paengaroa, and 2/242 through Awakeri.

Service life of prior surface

The infographic shows the weighted average age achieved for the sections of road surface that were resurfaced in the last financial year (2015-16). The infographic only shows sections where re-surfacing work was undertaken in the 2015/16 season. The value is derived from the weighted average age of the sections of seal that were overlaid by a new first coat seal. This is a standard ONRC measure.

Generally, an average service life of around 10 years or greater was achieved for most sections that were resealed in the last year.

Figure 19 - Asset condition 2



Resurfacing

The infographics show the proportion of Route Sections planned for resurfacing in the 2016/17 and 2017/18 approved annual plans, confirmed through the RAPT tour, as an indication of the response to the surface condition described previously, and current surface condition.

The major resurfacing works are planned for the section through the Waioeka Gorge, between Te Puke and Awakeri and south of Taneatua.

Proportion of travel on smooth roads

The infographic shows whether the route section passes the ONRC standard for Proportion of Travel on Smooth Roads (Smooth Travel Exposure). 97% is the ONRC target for proportion of travel on smooth roads. The infographic simply show whether the route section achieves this level or not.

There are four “rough” areas along the corridor. Two are at either end where there is more traffic, RS 157 and 429. Two other areas align with Awakeri to Taneatua, RS243, and the Motu Hill area, RS345, where there are out of context curves in steep terrain.

Pavement strength

Recommended deflection constraints for thin asphaltic surfaces is used as a measure of pavement strength. The infographic shows the proportion of the Route Section that fails to achieve the recommended deflection constraint for the classification of road, based on lane-km.

The sections of corridor with the highest proportion of pavement failing to meet the deflection constraints occur in the section of corridor between the SH33 junction and Taneatua.

Figure 20 – Asset condition 3



Asset condition and performance pressures

The pressures on the corridor that are resulting in increased demand or a reduction in levels of service for **Asset Condition and Performance** are as follows:

Flooding: Edgecombe and Matata – sections of road often go underwater and can be submerged for long periods of time. These sites require ongoing monitoring for accelerated deterioration.

Drainage: outlets on Matata straights are problematic as they are low lying surrounding areas close to the coast and it is hard to get water away. Drainage issue Kaikokopu Canal, Pongakawa, feeding into Waihi Estuary. Contractor prioritised list of assets that have significant drainage defects...

Swampy ground: Pongakawa SH2/RS185 east – gully erosion, weak pavement, slumping, lateral spread and potential for sudden appearance of tomos – requires ongoing monitoring.

Bridge Scour: Herepuru (Matata straight, RS209) – water not getting away from this coastal pinch point.

Waioeka Gorge: is a high-risk location that is difficult to maintain. It has narrow alignment, low radius high stress curve area, icy and slippery surfaces, prone to rock fall and crashes. Requires winter use of CMA for road holding, rock scaling for clearance of vegetation, rocks and loose debris, rock fencing (and ongoing clearance) for protection of roadway. Maintenance of temporary rock wall installations that now require upgrade to more permanent structures. Limited communication options requiring contractor to secure and maintain a hard landline for staff contact in this high-risk location.

Land stability: fragile along entire corridor. Becomes a driver for corridor roughness and there is increasing use of cement stabilisation to slow or minimise movement.

Otoko Hill retaining wall is moving (30m long and supports the road) – monitoring and six-monthly surveys to understand extent of movement (between Matawai and Te Karaka, SH2/390/3.77).

Parihohonu Culvert has large movement upstream and requires regular monitoring, currently with drone survey (also known as Farams Farm culvert, SH2/390/0.62)

Asset condition and performance future considerations

The future considerations relating to corridor pressures, intervention triggers and appropriate levels of investment related to **Asset Condition and Performance** are as follows:

Future traffic volumes: There is some uncertainty to predicting future traffic volumes with any accuracy. Future consideration will be required of change in traffic volumes and usage of route - Potential sources include an Increase in forestry traffic and wood processing around Kawerau, a bottling plant in Otakiri increasing freight movements near Edgecumbe.

Waioeka Gorge: Improved safety and resilience of the Waioeka Gorge.

Information: Accuracy of RAMM Asset Database and implications for maintenance planning and prioritisation - to better define and predict network needs. E.g. for side-drains and surface water channels was inaccurate and incorrect to point that skewed maintenance programme that is now in "catching-up" phase.

Drainage: Drainage and role in preventing/reducing rutting, flushing and other pavement faults, particularly activities that aid rapid removal of increasingly heavy rainfall events, such as high lip removal and creation or reforming of adequate surface water channels.

Improved communication options: timely advice of delays, incidents and closures, such as snow on Traffords Hill, north end of RS361, or truck crashes at Otoko Hill.

Investing in the corridor

The **Customer Levels of Service** shapes our response to our investment in maintenance, renewals and improvements. The NZ Transport Agency must consider the impact we have on our customers, the environment, communities, iwi, and the NZ economy in everything we do.

Decisions must be evidence based, informed and transparent with investment targeted to the right treatment, in the right place, at the right time while considering a range of competing priorities for investment. This requires significant analysis of various alternatives and options and expertise in applying appropriate judgement in collaboration with our service delivery partners.

Right treatment, right place, right time

A range of factors have been considered to determine the best point at which to intervene with maintenance and/or renewal treatments and improvements along the corridor.

Intervention works will be programmed to ensure:

- The right treatment,
- At the right place, and,
- At the right time.

Interventions will:

- Be based on minimising whole of life, whole of system costs and be underpinned by facts derived from enhanced asset information and modelling
- Define the most appropriate approach to asset maintenance, inspection and renewal, supported by reliability, availability, maintainability and safety specifications
- Use a risk-based approach to be determining intervention requirements to specified levels of reliability
- Use resilience requirements to a specified range of weather conditions, considering climate change
- Define how sustainable development requirements are to be addressed.

Summary investment

The proposed investment in the corridor is as follows:

Table 1- Summary corridor investment (\$000)

Outcome	Expenditure Category	2018-2021	2021-2024	2024-2028
Access and Resilience	Maintenance and Operations	\$5,120	\$5,965	\$9,273
	Renewals	\$9,378	\$14,256	\$16,013
	Improvements	\$107,800	\$0	\$9,864
Reliability and Efficiency	Maintenance and Operations	\$2,187	\$2,428	\$3,667
	Renewals	\$204	\$227	\$1,807
	Improvements	\$69,526	\$0	\$0
Safety	Maintenance and Operations	\$4,710	\$5,947	\$9,530
	Renewals	\$1,765	\$1,803	\$2,713
	Improvements	\$12,729	\$0	\$6,569
People, places and Environment	Maintenance and Operations	\$2,145	\$2,348	\$3,546
	Renewals	\$84	\$121	\$181
	Improvements	\$0	\$0	\$0
Total		\$215,646	\$33,094	\$63,164

Figure 21 - Corridor investment

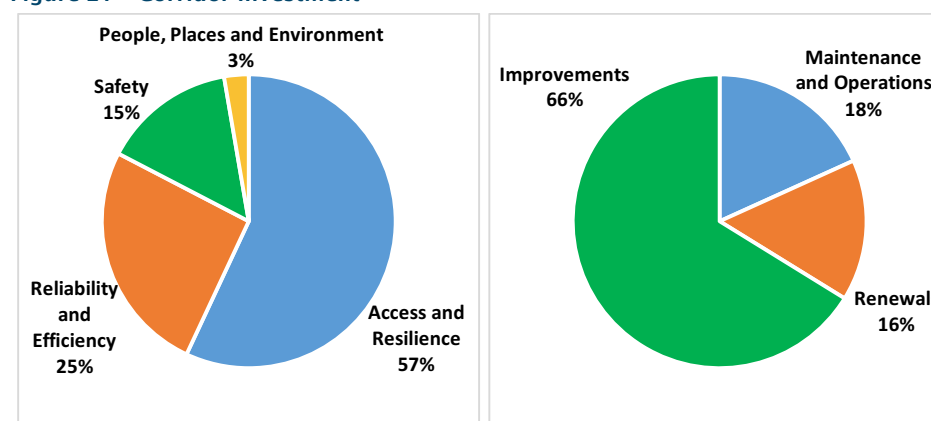


Table 2- Summary investment by work category (\$000)

Outcome	Work Category	2018-2021	2021-2024	2024-2028
Access and Resilience	111 Sealed Pavement Maintenance	\$1,167	\$1,561	\$2,589
	112 Unsealed Roads	\$0	\$0	\$0
	113 Drainage Maintenance	\$376	\$435	\$659
	114 Structures Maintenance	\$1,101	\$1,126	\$1,745
	121 Environmental Maintenance	\$695	\$720	\$1,090
	122 Traffic Services Maintenance	\$37	\$61	\$92
	124 Cycle Path Maintenance	\$32	\$36	\$54
	151 Network & Asset Management	\$1,375	\$1,628	\$2,445
	161 Property	\$338	\$400	\$601
	211 Unsealed Road Metalling	\$0	\$0	\$0
	212 Sealed Road Resurfacing (excl. surface skid resistance)	\$5,063	\$6,244	\$5,893
	213 Drainage Renewals	\$275	\$320	\$497
	214 Pavement Rehabilitation	\$3,223	\$6,600	\$7,947
	215 Structures Component Replacements	\$795	\$1,055	\$1,621
222 Traffic Services Renewals	\$22	\$37	\$55	
321 - 341 Improvements	\$107,800	\$0	\$9,864	
Reliability and Efficiency	121 Environmental Maintenance	\$429	\$475	\$718
	123 Operational Traffic Management	\$1,262	\$1,393	\$2,104
	151 Network & Asset Management	\$435	\$488	\$736
	161 Property	\$62	\$73	\$109
	222 Traffic Services Renewals	\$204	\$227	\$1,807
	321 - 341 Improvements	\$69,526	\$0	\$0
Safety	111 Sealed Pavement Maintenance	\$1,386	\$1,780	\$2,919

Outcome	Work Category	2018-2021	2021-2024	2024-2028
	112 Unsealed Roads	\$0	\$0	\$0
	113 Drainage Maintenance	\$132	\$152	\$230
	114 Structures Maintenance	\$344	\$770	\$1,496
	121 Environmental Maintenance	\$102	\$131	\$197
	122 Traffic Services Maintenance	\$1,574	\$1,747	\$2,645
	124 Cycle Path Maintenance	\$8	\$10	\$15
	151 Network & Asset Management	\$1,019	\$1,182	\$1,765
	161 Property	\$145	\$175	\$263
	212 Surface Skid Resistance	\$1,019	\$1,132	\$1,700
	214 Pavement Rehabilitation	\$13	\$25	\$38
	215 Structures Component Replacements	\$94	\$115	\$176
	222 Traffic Services Renewals	\$638	\$531	\$799
	321 - 341 Improvements	\$12,729	\$0	\$6,569
	People, places and Environment	111 Sealed Pavement Maintenance	\$199	\$225
121 Environmental Maintenance		\$1,763	\$1,907	\$2,883
151 Network & Asset Management		\$147	\$173	\$260
161 Property		\$36	\$43	\$64
221 Environmental Renewals		\$84	\$121	\$181
321 - 341 Improvements		\$0	\$0	\$0
	Total	\$215,646	\$33,094	\$63,164

To be confirmed through the RLTP

Investing in access and resilience

Operations and maintenance

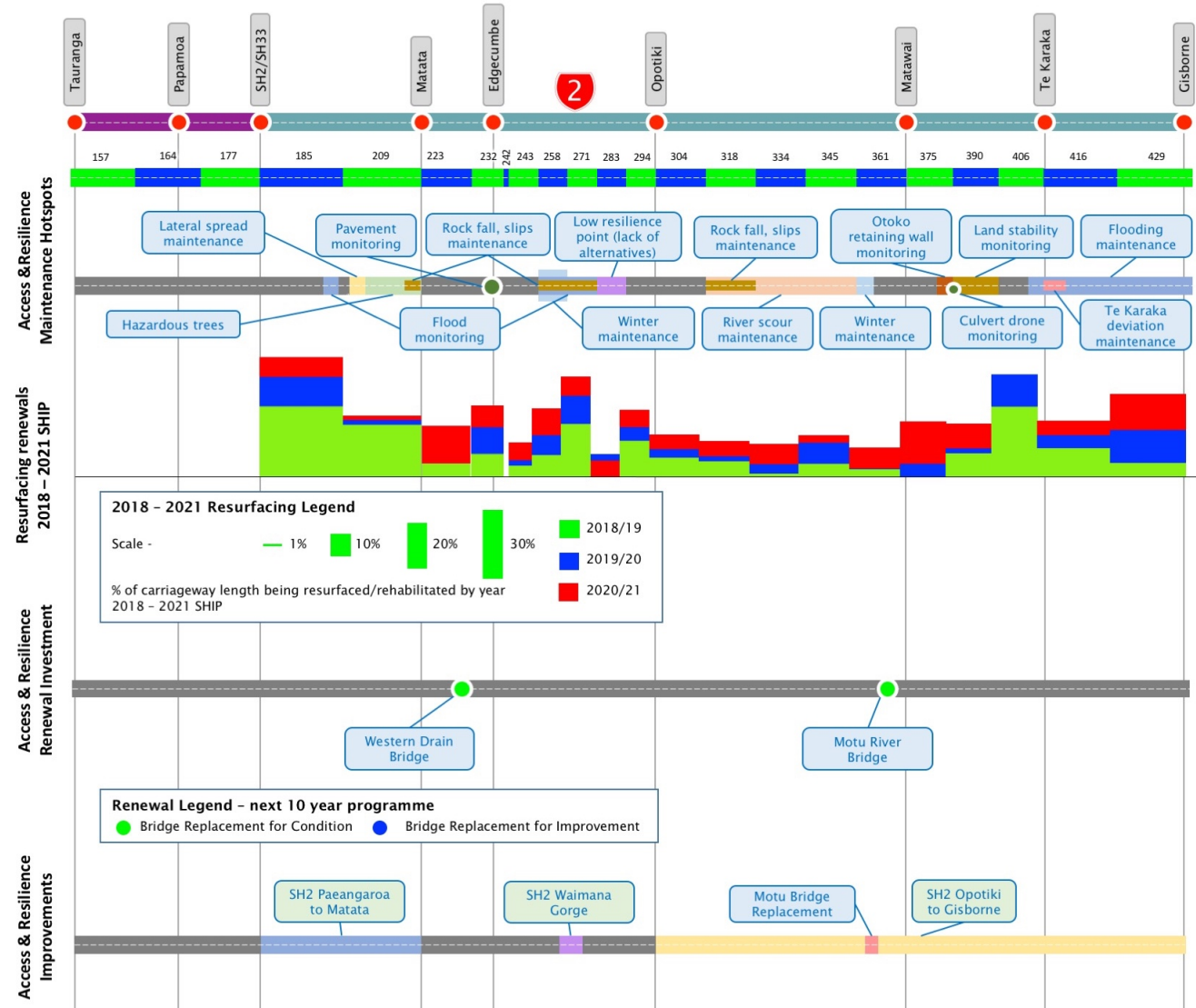
The main areas of investment to provide and preserve reliability and efficiency are environmental maintenance through keeping potential obstructions clear of the highway, wayfinding signage, and operational traffic management.

Maintenance hot spots

The following maintenance ‘hotspots’ require additional monitoring or cause an increased maintenance burden along the corridor:

- **Edgcumbe:** Following the 2017 Edgcumbe flood event, the township now becomes a pavement monitoring site.
- **Kaikopuku canal** - In severe weather events, flooding across road, that requires signage and debris clearance once cleared.
- **Matata straight** This section is susceptible to slips and Trees ingress (pohutukawa), especially where the highway passes below bluffs.
- **Waimana Gorge** (SH2/271 & SH2/283, south of Taneatua) - The highway and the Nukuhou River weave together through this area creating an area of low resilience. It is prone to flooding, crashes and slips, and requires winter maintenance for ice.
- **Waioka Gorge** - This section of corridor is prone to rockfalls, the occasional big slip, river/bridge scour, and is an area of low resilience.
- **Bridge abutments** are vulnerable through some of the coastal areas, such as severe slumping at due to soft underlying ground conditions recently Wilson’s Bridge on SH2 between Edgcumbe and Matata. Multiple canals for water management are a feature of this part of the corridor.
- **Hazardous tree removal** is an ongoing resilience challenge through the area of SH2/361 to SH2/416, Matawai to Te Karaka.

Figure 22 – Access and resilience investment



Renewals

Resurfacing

The infographic shows the proportion of route section by carriageway length planned for resurfacing within the period 2018/19 to 2020/21, the three-year span of the SHIP. This is also broken down in to the individual years to indicate the timing of expenditure over the three-year period.

Significant investment in resurfacing is planned for sections: 2/185 east of Paengaroa, 2/271 north of Waimana, 2/406 north of Te Karaka, and, 2/429 on the western outskirts of Gisborne.

Structure Renewal

The renewal investment infographic shows the planned bridge replacements along the corridor. Two bridges are planned for replacement due to asset condition, at a total estimated cost of \$6.65 M.

Other structural considerations along this corridor include bridge coatings and corrosion (Motu Bridge), reinstating voids in backfill and shoring up bridge abutments, rock wall retention fencing and rock-catch structures, height adjustment of historic guardrail (non-bridge) and replacement of Armco culverts.



The Motu Bridge is a narrow, one-lane bridge with poor alignment on its approaches.

Improvements

Planned

The following projects are planned and underway. Details of the project progress can be found on the Transport Agency website at: <https://www.nzta.govt.nz/projects/>

SH2/361 - Motu Bridge

Description: The Motu Bridge is a narrow, one-lane bridge with poor alignment on its approaches. The project involves replacing the existing bridge with a new two-lane structure and improving the road alignment on the approaches to the bridge.

Draft Regional Land Transport Programme considered for the SHIP

The following table shows the list of projects being considered through the Draft Regional Land Transport Programme through the SHIP, and cover the next 10 years.

Table 3- Draft regional programme considered for SHIP

Project	Funding Status	Description
SH2 Paengaroa to Matata		Measures to protect rail and road links along Matata Straights between Eastern Bay of Plenty and the Port of Tauranga from various environmental risks. Safer corridor treatments - Timing 4-6 years.
SH2 Waimana Gorge		Measures to protect road link between Eastern Bay of Plenty and Tauranga from flooding and safety improvements - Timing - 7-10 Years.
SH2 Opotiki to Gisborne		Measures to protect road link from various environmental risks & safety maintenance level treatments - Timing 4-6 Years.
REDS: SH2 Inter-Regional Connections Opotiki to Napier		REDS: Identified the need to upgrade SH2 from the Bay of Plenty through Tairāwhiti to Hawkes Bay regions for freight and tourism growth.

Investing in reliability and efficiency

Operations and maintenance

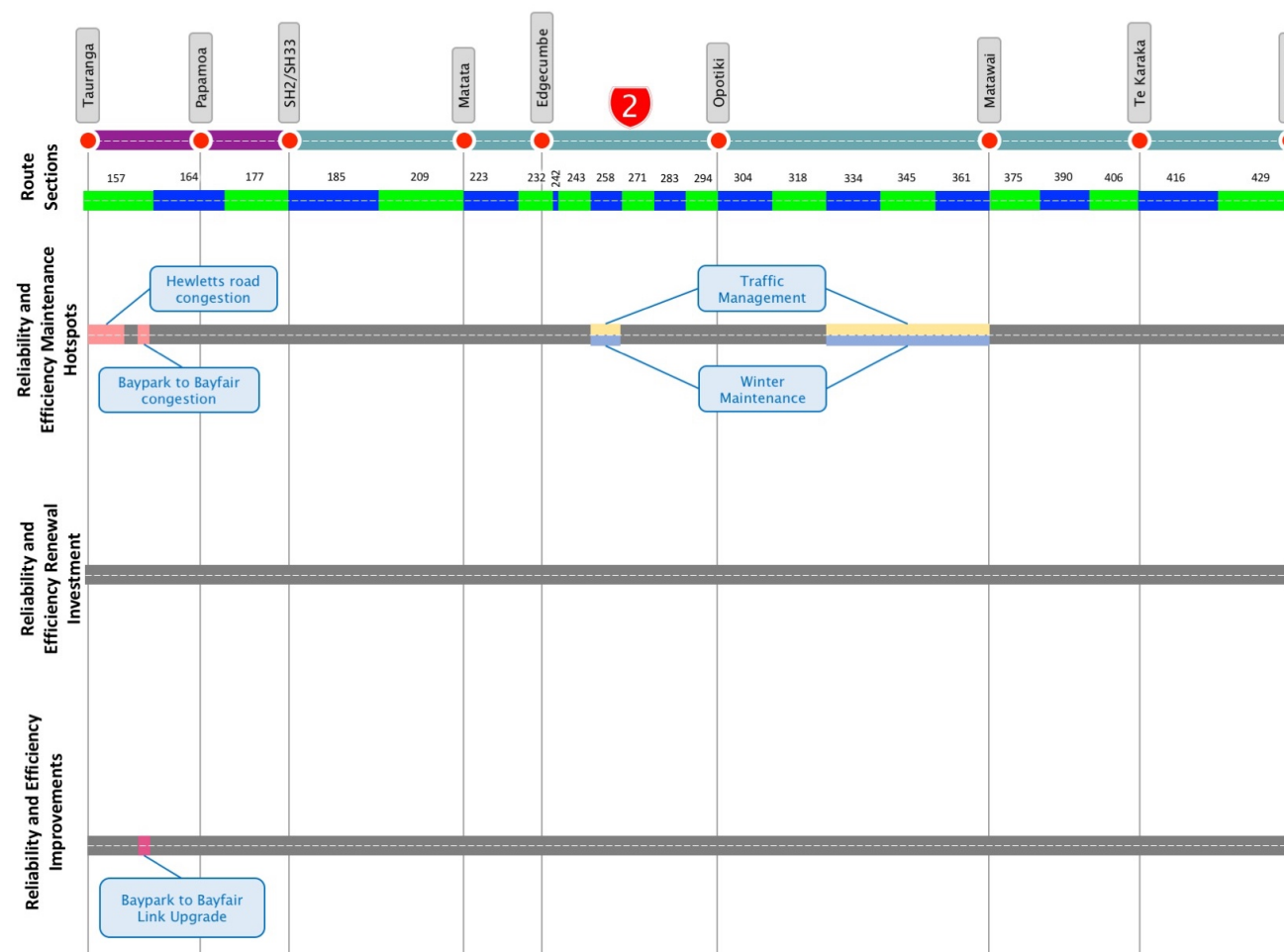
The main areas of investment to provide and preserve reliability and efficiency are environmental maintenance through keeping potential obstructions clear of the highway, wayfinding signage, and operational traffic management.

Maintenance hot spots

The following maintenance ‘hotspots’ require additional monitoring or cause an increased maintenance burden along the corridor:

- **Proactive rock scaling:** This allows for programming intervention to minimise delays to corridor users.
- **Congestion:** - Hewletts Road (Tauranga) is a length of highway servicing the industrial area, including Tauranga Airport and Port of Tauranga, and features multiple traffic signal controlled intersections and the consequential delays during peak periods.
- **Congestion:** Bayfair to BayPark (B2B), this section is constrained by close proximity to the rail, meaning that there can be long delays and subsequent queues at intersections. This is to be addressed by the B2B capital project underway and due for completion in 2020.
- **Traffic management** and advice of incidents and delays such as through Waimana Gorge, Waioeka Gorge or during the recent extensive re-decking of the long single lane Pekatahi Bridge.
- **Winter Maintenance** protocols through gorges for ice and in some instances snow, including application of CMA and gritting.

Figure 23 – Reliability and efficiency investment



Renewals

There are no, reliability and efficiency related renewals planned for the corridor.

Improvements

Planned

The following projects are planned and underway. Details of the project progress can be found on the Transport Agency website at: <https://www.nzta.govt.nz/projects/>

SH2/157 - Baypark to Bayfair link upgrade

Description: The purpose of the project is to provide the best long-term solution to improve congestion, travel time and safety for all road users along State Highway 2 between Bayfair and Baypark (B2B). Once open B2B will connect to the Tauranga Eastern Link and complete the Bay of Plenty Eastern Corridor providing an efficient and safe route to the Port of Tauranga.



Draft Regional Land Transport Programme considered for the SHIP

The following table shows the list of projects being considered through the Draft Regional Land Transport Programme through the SHIP, and cover the next 10 years.

Table 4- Draft regional programme considered for SHIP

Project	Funding Status	Description
REDS: Integrated Transport Priority Plan		REDS: Integrated Transport Priority Plan to identify efficient roading outcomes within the Gisborne region, precursor/input into the scope of the regional PBCs

Investing in safety

Operations and maintenance

Safer Journeys Goal 2016 to 2020 is to reduce the likelihood of crashes occurring and to minimise the consequences. The main areas of investment into ensuring safer journeys include: specialist pavement treatments, road marking including audio-tactile markings (ATP), signage, edge markers, safety barriers, speed limits, roadside vegetation control, and, street lighting.

Maintenance hot spots

The following maintenance ‘hotspots’ require additional monitoring or cause an increased maintenance burden along the corridor:

- Truck rollovers:** A recent increase in non-injury truck rollover crashes through Otoko Hill, a known area of land instability is currently requiring monitoring of the site but may need improved advance warning signage.

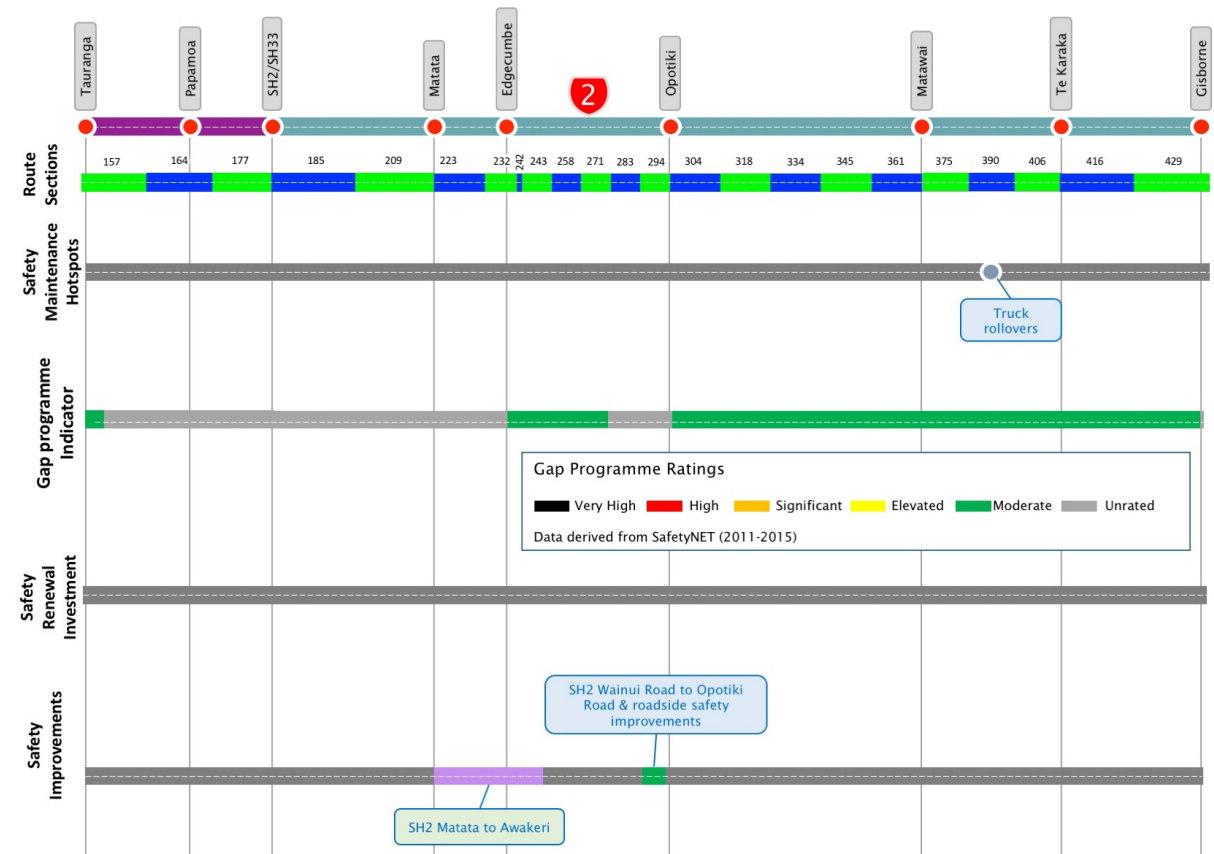
Gap programme indicators

The potential for reducing fatal and serious injuries across the corridor has been assessed under the Gap programme. The Gap programme looks at the collective risk rating, likely level of intervention and the potential reduction in death and serious injury that may be achieved to determine a possible treatment approach. For instance, a road segment rated ‘Very High’ could potentially achieve a 50-70% reduction in fatal and serious injuries with the application of high cost improvements. Alternatively, if the risk level is ‘Elevated’ a 10-20% reduction may be realised through targeted low cost, high coverage treatment improvements.

There is a moderate potential for reducing fatal and serious injuries in the section between Opotiki and Gisborne, the section north of Tauranga, and between Edgecumbe and Opotiki. These sections would benefit from targeted low cost, high coverage, improvements.

The unrated segments are either areas where potential crash savings are low or are being addressed under other existing programmes.

Figure 24 – Safety investment



Renewals

The following describes the approach to asset renewals related to safety, for assets at or near the end of their useful life.

Guardrail and wire rope installations continue to be an effective response to the runoff road risks along this corridor.

Other renewals considerations are the reinstatement of traffic safety features when aged or after wider maintenance or improvement works such as the reinstatement of ATP after resealing works. (This may include historic reseal and rehabilitation sites.)

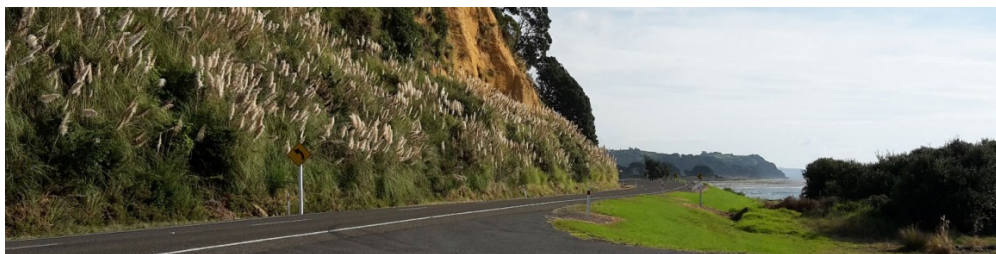
Improvements

Planned

The following projects are planned and underway. Details of the project progress can be found on the Transport Agency website at: <https://www.nzta.govt.nz/projects/>

SH2/283 - Wainui Road to Opotiki safety improvements

Description: Road and roadside safety improvements are proposed from the outskirts of Ohope, along Wainui Road and SH 2 to near Ōpōtiki. This section of corridor has been identified as a high risk rural road, and these safety improvements are part of the nationwide Safe Roads programme. The section of corridor has a high rate of death and serious injury crashes - there have been 46 in the past 10 years. These have primarily arisen from head on and run off road crashes.



Wainui Road and SH2 to near Ōpōtiki has been identified as a high risk rural road

Draft Regional Land Transport Programme considered for the SHIP

The following table shows the list of projects being considered through the Draft Regional Land Transport Programme through the SHIP, and cover the next 10 years.

Table 5- Draft regional programme considered for SHIP

Project	Funding Status	Description
SH2 Matata to Awakeri		Measures to protect rail and road links along Matata Straights between Eastern Bay of Plenty and the Port of Tauranga from various environmental risks. Safer corridor treatments - Timing 4-6 years
Weigh Right Regional Construction		Improve weigh pits to improve overweight detection and to meet new vehicle and safety standards.
Speed Management Implementation		Transport planning activity to enable development of Regional Speed Management Plan in conjunction with partner Road Controlling Authorities
Minor Improvements 18/21		Activities will be targeted to low cost safety, optimisation and resilience activities which contribute to the Transport Agency's goals of either reduce the level of deaths and serious injuries, improve urban network capacity in our major centres or to reduce the resilience risk on our key routes through preventative maintenance activities.
Accelerated LED Renewals for SH Street Lighting		To replace all street lights with more cost-effective LEDs to save costs on power and maintenance.

Investing in people, places and environment

Operations and maintenance

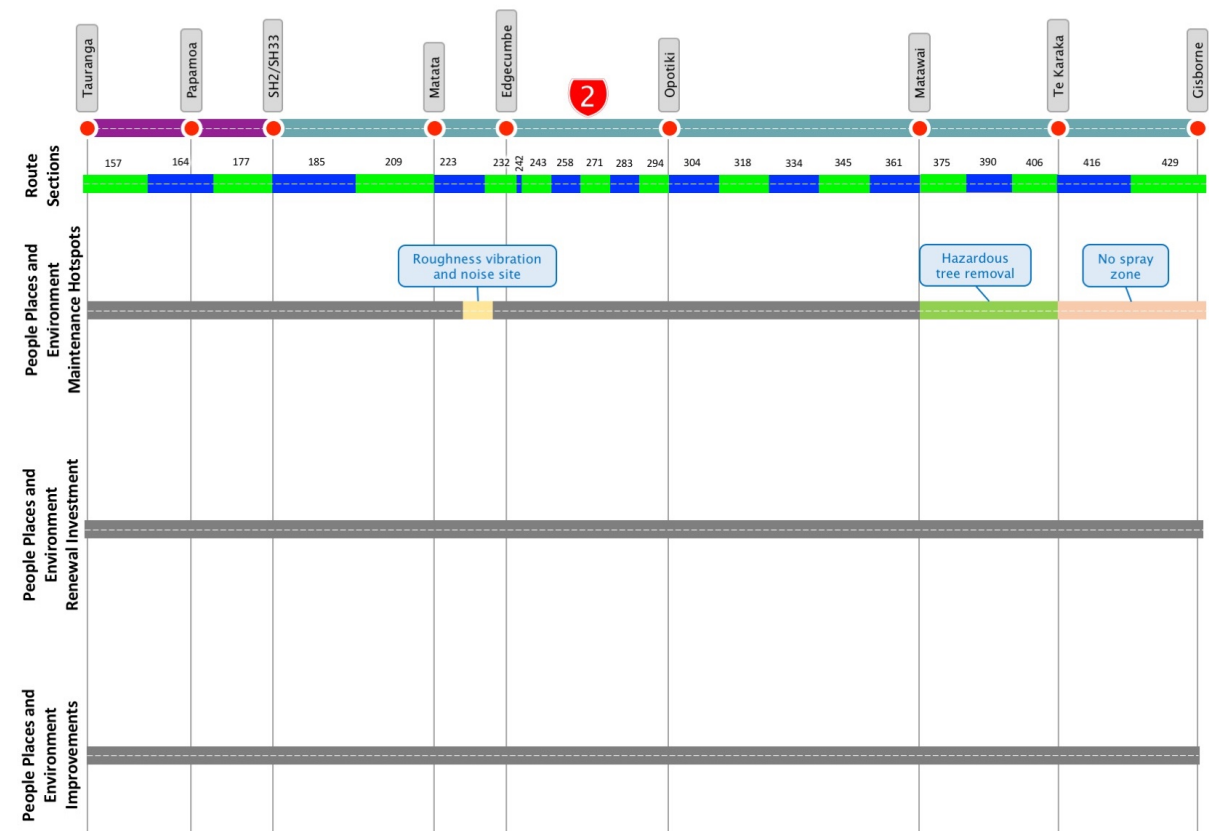
The main areas of investment into people, places and environment are: pavement rehabilitation to ensure a high proportion of travel on smooth roads, control of litter, provision of rest areas and stopping points, landscaped areas maintenance, and, environmental compliance.

Maintenance hot spots

The following maintenance ‘hotspots’ require additional monitoring or cause an increased maintenance burden along the corridor:

- **Noise and Vibration:** Public perception and noise complaints can differ from ONRC required levels of service. This is an area that is being actively monitored across the corridor.
- **Hazardous tree removal:** is frequently required through the Matawai to Te Karaka portions of the corridor, with removal of poplar, pine and willow.
- **No spray zone:** A no spray zone is in force in the section of corridor between Te Karaka and Gisborne.

Figure 25 – People, places and environment investment



Renewals

The following describes the approach to asset renewals related to people, places and environment, for assets at or near the end of their useful life.

Often culverts become an obstruction or pinch point for migrating fish, native fish species, eels or trout. In response to increased requirements by the regional councils, there are 30 highway culverts within the Waioeka Gorge (SH2) that require some form of fish passage improvement. And five within the Rangitāiki catchment (SH2 & SH5).

Steel River Groynes (subject to consent conditions) in the Waioeka River to protect undercut of the highway require replacement.

Rockfall fencing through Waioeka Gorge was originally a temporary response and now requires upgrading to something more structurally capable.

Improvements

There are no currently planned people, places and environment related improvements underway on this corridor.



Investment pressures

Access and resilience

The following concerns excerpt pressure on the investment in **Access and resilience** on the corridor.

- **Strategic maintenance strategy:** There are limited access opportunities for maintenance works due to the topography (Waioeka Gorge) which dictate that more robust treatments are applied to ensure a continuity of service. A strategy is required for treatments and/or management, and in the way that they are applied – programmed full closure of a portion, rolling partial closures, noise reducing surfacing, longer life treatments, or less maintenance and acceptance of lower quality/more faults during the lifecycle.
- **Preserve access and resilience:** The main areas of investment to provide and preserve access and resilience are drainage renewals, sealed road resurfacing and structural component replacements. A key focus is to realign the base preservation quantities toward increased preventative maintenance and to slow pavement deterioration specifically through improved drainage.
- **Ageing infrastructure:** Reliant upon weather stations, now aged and some inoperable and unreliable, for maintenance and operation decisions through remote and isolated areas such as Waioeka Gorge.
- **Drainage:** Is a large investment and is both the challenge on this corridor and also the key to preserving the pavements. Poor historic asset capture means there is an element of “catch-up” to the programme and realignment towards a more practical preventative approach.

Reliability and efficiency

The following concerns excerpt pressure on the investment in **Reliability and efficiency** on the corridor.

- **Congestion along Hewletts Road:** SH2 Tauranga, relies on the effective operation of the traffic signal network managed by the Tauranga Traffic Operations Centre (TTOC).
- **ITS management and journey time monitoring:** Undertaken by the TTOC, for Bay of Plenty portion of this corridor. They currently operate some bliptrack monitoring sites that enable monitoring of the performance of key parts of the corridor.

Safety

The following concerns excerpt pressure on the investment in **Safety** on the corridor.

- **Safety Investment:** Prioritising improvements to skid resistance, electronic curve warning signs, audio-tactile markings (ATP), variable speed signs and safety barriers, all of which may carry increased operational and maintenance costs and may result in reduced efficiency or require a different maintenance approach.
- **Wire rope barriers:** In constrained areas, such as the Waimana or Waioeka Gorges, the installation of wire rope and barriers protects steep drop offs and deep drains, but can limit maintenance operations such as disposal of slip debris or snow and working space clear of the live lane. More guardrail and wire rope is proposed where the installation is practical.
- **Replacement of historic or obsolete installations,** such as low height guardrail and culvert headwall and entry protection. There are 7 high risk guardrail sites that need height adjustment.

People, places and environment

The following concerns excerpt pressure on the investment in **People, places and environment** on the corridor.

- **Asset growth:** Significant capital works has increased environmental maintenance requirements such as litter, gardening and mowing as well as the associated traffic management.
- **Noise and vibration:** There are on-going noise and vibration issues through the small townships along the corridor, such as Edgecumbe. Specific concerns include noise from trucks at night and vibration damage to homes and buildings.
- **Litter & detritus:** Requires continuous attention, especially from garden areas, gateway entry points and trapped at structures.
- **Fish passage:** There is a need to manage water quality and fish passage at existing and redeveloped sites, such as through Waioeka Gorge. DoC provides a prioritised list of stream structures for remediation and each of Bay of Plenty and Gisborne Councils have fish passage requirements in their regulatory plans.
- **Water quality management:** There are sensitive receiving environments that require attention to highway runoff volumes, quality, siltation and sump clearing, such as spawning and hatchery areas along the Motu River.

Investment future considerations

Consideration of investment in the corridor in future should take account of the following:

- **Keeping the route open to traffic** – providing a more forgiving and resilient route that tolerates inundation and is more readily returned to traffic.
- **Drainage** - Investment along this corridor has been realigned towards improved drainage and continues to be in “catch-up” mode. This has meant a significant shift in funding from other areas into preventative drainage improvements.
- **Waioeka Gorge** - Is both a pinch point and weak spot along the corridor that requires ongoing attention and investment, whether that is in safety improvements, surface skid resistance, maintaining accessibility or providing reliable and timely information and warning of road conditions.
- **Maintaining Levels of Service** - Bridging the gap between customer expectations and the ONRC classification such as amenity values like litter control and grass length or speed management through residential or high-risk safety areas.
- **Monitoring** – accurate RAMM database, reliable weather stations, corridor eyes-on to inform forward programme and corridor decision making as well as provide real time responses for customers. Requires investment and decisions about limping along with old and inherited or investing in new and more effective solutions.
- **Asset growth** and accurately defining the ongoing maintenance and operations costs is a pressure on this corridor.

- **Noise & vibration** – is an issue where high truck numbers and homes are close together. Public perception and noise complaints can differ from required levels of service. This is an area that is being actively monitored – requires a lot of staff time, but limited options for resolution. Low noise surface treatments are applied in some locations, are costlier and of only short term to limited benefit.
- **Environmental responsibility** – doing things right comes at a cost, Guidance is required for the long term sustainable management of fish passage and watercourse responsibilities, within the area of influence of the highway.
- **Heavy Vehicle volumes:** Consideration of investment in the corridor in future should take account of the following: Impact of greater truck volumes on adjacent small-town communities, including when they choose or are diverted to alternatives to the state highway.



Dangerous tree on Matata straight

Appendix A – Information sources

Section	Infographic	Information Source	Date
Introduction	Corridor Overview Map	The Road Efficiency Group https://www.nzta.govt.nz/roads-and-rail/road-efficiency-group/onrc/	2013
Understanding our Customers			
Key Customers	Key journeys	Network Manager and Regional Staff	2016
	Daily commuters	Network Manager and Regional Staff	2016
	Freight	Network Manager and Regional Staff	2016
	Tourism and recreation	Network Manager and Regional Staff	2016
	Demographics and population centres	MBIE Regional Economic Activity Report Web Tool http://www.mbie.govt.nz/info-services/business/business-growth-agenda/regions	2015
Understanding Customer Levels of Service on the Corridor			
Customer Levels of Service	Corridor classifications	The Road Efficiency Group ONRC -right-road-right-value-right-time-combined-poster.pdf https://www.nzta.govt.nz/roads-and-rail/road-efficiency-group/onrc/	2015
Current Levels of Service Performance	Current ONRC Levels of Service Performance	Network Manager and Regional Staff	2016
Improving the Customer Experience	Significant planned improvements	Network Manager and Regional Staff NZTA Projects web page: https://www.nzta.govt.nz/projects/ NZTA Safe Roads web page: https://www.nzta.govt.nz/safety/our-vision-vision-of-a-safe-road-system/safe-roads/ Submitted Regional SHIP programmes	2017

Section	Infographic	Information Source	Date
Access	ONRC classification	The Road Efficiency Group https://www.nzta.govt.nz/roads-and-rail/road-efficiency-group/onrc/	2013
	Carriageway configuration	Network Manager and Regional Staff Corridor drive-over Highway information Sheets	2016
	Posted speed limit	NZTA – MapHub Speed Limits on NZ Road Network	2016
	Topography	Elevations derived from Google Earth™	2016
	Geography	Network Manager and Regional Staff Corridor drive-over	2016
	Traffic volumes – heavy vehicles	RAMM Carriageway Table – December Traffic Estimates	2015
	Traffic volumes – all vehicles	RAMM Carriageway Table – December Traffic Estimates	2015
	HPMV routes	NZTA – MapHub High Productivity Freight Network	2016
	Critical Customers	Network Manager and Regional Staff	2016
	Critical Assets	Network Manager and Regional Staff	2016
Resilience	Vulnerabilities	NZTA – MapHub Hazard Incidents and Area Warnings	2016
	Major Alternate Routes	Network Manager and Regional Staff Desktop analysis Corridor drive-over	2016
	Diversion Lengths	NZTA StateHighways.pptx Diversion Routes	Unknown

Section	Infographic	Information Source	Date
	Closures	NZTA 2011-2015_Treis_incidents_by_region.xlsx	2015
Reliability and efficiency	Efficiency	NZTA – MapHub EfficiencyNet	2016
	Variability	NZTA / Beca Dwg No. GIS-3391515-500-4 Network Performance - Attachments.pdf March 2012 eRUC Commercial Vehicle Data – State Highway Austroads Variability Assessment	2012
	Commercial Vehicle Average Speed	NZTA / Beca Dwg No. GIS-3391515-500-5 Network Performance - Attachments.pdf March 2012 eRUC Commercial Vehicle Data – State Highway Average Speeds	2012
	Current Constraints	Network Manager and Regional Staff Corridor drive-over	2016
Safety	KiwiRAP Collective Risk	https://nzta.abley.com/SafetyNET_2017 SafetyNET	2016
	KiwiRAP Personal Risk	https://nzta.abley.com/SafetyNET_2017/ SafetyNET	2016
	KiwiRAP Star Rating	http://www.kiwirap.org.nz From 2010 KiwiRAP star rating report.	2010
	Intersection Risk Indicator	https://nzta.abley.com/SafetyNET_2017/ SafetyNET	2016
	Gap Programme Rating	https://nzta.abley.com/SafetyNET_2017/ SafetyNET	2015
Environment Culture and Heritage	Natural Environment	NZTA - Environment and Urban Design Team	2016
	People and Place: Journeys	NZTA - Environment and Urban Design Team	2016
	People and Place: Landmarks and Heritage Places	NZTA - Environment and Urban Design Team	2016

Section	Infographic	Information Source	Date
	Noise and Vibration	NZTA - Environment and Urban Design Team	2016
	Drainage Catchments	NZTA - Environment and Urban Design Team	2016
Understanding the Infrastructure Assets			
Overview	Corridor Asset Base	NZTA_ 2017 Values by Corridor.xlsx compiled by Opus International Consultants from RAMM and other asset information sources	
	Asset Condition and Performance	Summarised from the data sets described below	
Asset condition and performance	Surface Skid Resistance	SCRIM data derived from RAMM by NZTA Data Quality and Access team	2016
	Surface Safety Treatment	SAL data derived from RAMM by NZTA Data Quality and Access team	2016
	Surface Defects	100m Priority data derived from RAMM by NZTA Data Quality and Access team	2016
	Surface Age	Surface Age data derived from RAMM by NZTA Data Quality and Access team	2016
	Service life of Prior Surface	Surface Age data derived from RAMM by NZTA Data Quality and Access team	2016
	Resurfacing	Resurface data derived from forward works programme	2016
	Proportion of Travel on Smooth Roads	STE data derived from RAMM by NZTA Data Quality and Access team	2016
	Pavement Strength	Deflection data derived from RAMM by NZTA Data Quality and Access team	2016
Investing in the Corridor			
Summary Investment	Summary Corridor Investment	2028-21 SHIP programme funding requests 2017/18 Annual Plans	2017
	Summary investment by work category	2028-21 SHIP programme funding requests 2017/18 Annual Plans	2017
Investing in access and resilience			
	Maintenance Hot Spots	Network Manager and Regional Staff	2017

Section	Infographic	Information Source	Date
Investing in access and resilience	Resurfacing 2018 - 2021	Resurface data derived from forward works programme	
	Renewal Investment	National Bridge Replacement Programme National bridge replacement programme 2017 LCMP data.xlsx	
	Improvements	Network Manager and Regional Staff NZTA Projects web page: https://www.nzta.govt.nz/projects/ Submitted Regional SHIP programmes	
Investing in reliability and efficiency	Maintenance Hot Spots	Network Manager and Regional Staff	2017
	Renewal Investment		
	Improvements	Network Manager and Regional Staff NZTA Projects web page: https://www.nzta.govt.nz/projects/ Submitted Regional SHIP programmes	
Investing in safety	Maintenance Hot Spots	Network Manager and Regional Staff	2017
	Renewal Investment		
	Improvements	Network Manager and Regional Staff NZTA Projects web page: https://www.nzta.govt.nz/projects/ NZTA Safe Roads web page: https://www.nzta.govt.nz/safety/our-vision-vision-of-a-safe-road-system/safe-roads/ Submitted Regional SHIP programmes	
Investing in people places and environment	Maintenance Hot Spots	Network Manager and Regional Staff	2017
	Renewal Investment		

Section	Infographic	Information Source	Date
	Improvements	Network Manager and Regional Staff NZTA Projects web page: https://www.nzta.govt.nz/projects/ Submitted Regional SHIP programmes	



If you have any further queries, call our contact centre on 0800 699 000 or write to us:

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