OTHER ACTION AREAS
12. ROAD SAFETY

12.1 INTRODUCTION
Safety should be at the core of the regional transport system. Measures to improve road safety should target every element of the transport system including safe road use, safe speeds, safe roads and roadsides, and safe vehicles.

Investment in road safety is one element of the wider plan for improving transportation outcomes within the Wellington region. This chapter describes the current state of road safety, sets out the main challenges facing the region and outlines the strategic response.

This plan will be implemented by the organisations represented on the Regional Transport Committee in collaboration with NZ Police and the Accident Compensation Corporation (ACC).

12.2 ROAD SAFETY IN WELLINGTON
The number of fatal and serious injury casualties in the Wellington region between 2002 and 2013 is shown in Figure 35.

In 2013 there were 18 fatal and 115 reported serious injury casualties. Total fatal and serious injuries increased from 2002 to 2007. Since then there has been a generally decreasing trend to the lowest figure for a decade in 2013. This has occurred as both car ownership and car usage within the region has increased.

Despite this overall trend, the 18 fatalities in 2013 was the highest number killed since 2009 and significant effort is still required to move towards the Vision Zero outcome described in this plan.

Figure 36 shows total recorded minor, serious and fatal injuries across all road user types in the Wellington region by district for selected years between 2002 and 2013. The injuries per capita for 2012 and 2013, for each district, are also shown. The number of injuries was highest in Wellington City followed by Hutt City.

There is a much higher crash rate per capita in the Wairarapa than in other parts of the region. This may be due to the poorer design of roads and roadsides coupled with high speed limits, as reflected in the 2014 Communities at Risk register.

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1 Data extracted from the NZ Transport Agency Crash Analysis System (CAS)
12.3 THE NEED FOR INVESTMENT

This chapter highlights the road safety challenges facing the region and the expected benefits from investment in road safety measures.

Communities at risk: The NZ Transport Agency’s ‘Communities at Risk Register’ identifies communities that are over-represented in terms of road safety risk. The register ranks communities by local authority area and compares them against the national average. This allows resources to be better targeted to where they are most needed. The Communities at Risk Register focuses on personal risk – a measure of the crash rate per VKT or per hours travelled.

Wellington region has the first and second highest personal risk for motorcyclists and cyclists\(^1\) respectively indicating that safety for these modes is likely to be a region-wide problem.

The analysis also identifies patterns associated with different parts of the region:

- Wairarapa is over-represented in terms of crashes involving young drivers, alcohol, excessive speed, rural roads and restraint use.

- Wellington City is over-represented in terms of all vulnerable road users – i.e. pedestrians, cyclists and motorcyclists. Hutt City is also notable for high personal risk for motorcyclists.

- Wellington City is also notable for having a higher risk of crashes at intersections overall, and Carterton and Upper Hutt are identified as being of high and medium concern respectively for rural intersections.

- Kapiti Coast is over-represented in terms of crashes involving older road users.

\(^1\) It is important to note that the Communities at Risk Register is based on analysis of data from the Crash Analysis System (CAS) and does not include crashes that occur without involvement of a motor vehicle. This means that two-thirds of serious cyclist crashes, due to loss of control for example, are not captured in this analysis.

State highways - The New Zealand Road Assessment Programme, KiwiRAP, assesses the road safety of the state highway network. KiwiRAP analysis of the regional state highway network identifies that for most of the region, the overall personal risk is low with the exception of:

- SH2 between Upper Hutt and Featherston where personal risk is high

- Along SH53 and SH58 which have medium to low personal risk.

Analysis for the Wellington region shows the collective risk is high or high to medium for most of the region’s state highways as shown Figure 37. The highest collective risk is:

- SH2 between Upper Hutt and Featherston

- Along SH58

- SH1 through Kapiti.

Collective Risk vs Personal Risk

Collective risk is a measure of the total number of fatal and serious injury crashes per kilometre over a section of road. On average, the higher the traffic volumes, the higher the collective risk.

Understanding collective risk can help us understand where the greatest numbers of crash reductions can be achieved through infrastructure improvement and enforcement.

Personal risk is a measure of the risk to each individual using the state highway being assessed. It takes into account the traffic volumes on each section of state highway.

Personal risk is often highest on lower volume, lower standard, mountainous roads.
Figure 37. Wellington Region KiwiRAP Collective Risk Map

Key
- High collective risk
- Medium high collective risk
- Medium collective risk
- Low collective risk
- Airport
12.4 BENEFITS OF INVESTMENT
In addition to the unacceptable numbers of people killed and seriously injured on our roads, there are significant impacts of road crashes on families, the wider community and the health system. Most crashes are preventable and all make an economic impact. Nationally the social cost of crashes is estimated to be $3.8 billion each year. The ultimate benefit of investment will be a safer road system on which no one is killed and that is increasingly free of serious injury.

12.5 STRATEGIC RESPONSE
A system wide approach will be used to address safety issues. This involves targeting:

- Safe roads and roadsides
- Safe speeds
- Safe vehicles
- Safe road use

This approach is aligned with the national ‘Safer Journeys’ strategy1 and a ‘Vision Zero’ philosophy.

Vision Zero is a Swedish approach to road safety based on the principle that no loss of life is acceptable. This approach seeks to reinforce the need for an ongoing reduction in serious and fatal crashes until the ultimate goal of no fatalities is achieved.

Safer Journeys, the national strategy guiding road safety improvements, seeks to establish the safe system approach within New Zealand. This works on the principle that it is unacceptable for a road user to be killed or seriously injured if they make a mistake. The safe system approach aims to create a forgiving transport system based on the recognition that:

- people make mistakes and some crashes are inevitable
- people are vulnerable and our bodies have limited ability to withstand crash forces
- we need to share responsibility between system designers, system maintainers and the people who use roads
- all parts of the system need to be strengthened including roads and roadsides, speeds, vehicles, and road use so that if one part fails, other parts will protect.

Adopting a safe system approach does not remove road user responsibility for road safety. It seeks to ensure that a combination of interventions are implemented that take account of human fallibility.

The key areas of intervention that will be used to address road safety issues in the region are as follows.

1 http://www.saferjourneys.govt.nz/
**Safer speeds**
Managing speed on the roading network to safe levels is crucial to reducing deaths and serious injuries because the outcome of all crashes is strongly influenced by impact speed.

Evidence shows a strong correlation between collision speed and risk of death or serious injury. This risk is elevated where an elderly person or heavy vehicle is involved. This relationship is shown in Figure 39 below.

Safer speeds will be achieved through a combination of engineering enhancements, education and enforcement.

- **Engineering** - delivering safer speeds will involve measures to provide self-explaining roads through a combination of signage, road markings, road widths and street layouts. In some locations, such as around schools and through city or local centres, traffic calming or reduced speed limits will be more appropriate. It is important that the posted speed limit matches the road environment or risk.

- **Education and awareness** - consistent messages will be developed highlighting the importance of safe speeds and appropriate speed for different routes and road conditions. These messages will be communicated through road safety promotion and education campaigns including the provision of information/signage at locations with a history of speed-related crashes.

- **Enforcement** - use of speed camera enforcement at the most dangerous crash locations and targeted enforcement campaigns will be used to support speed awareness and education programmes.

**Safer roads and roadsides**
Much of the region’s road network was built when there were fewer vehicles on the roads, travelling at lower speeds and existing road infrastructure needs improving to provide safety for higher volumes of vehicles travelling at faster speeds. Measures to achieve safer roads and roadsides will vary in scale according to the size of the problem and the assessed risk of death and serious injury. The design of engineering measures should take all road users, including pedestrians and cyclists, into account and consider the role and function of a road in the network hierarchy.

- **Road maintenance** - the importance of maintenance and operations in creating a safe road environment should not be overlooked. Maintenance is important in terms of ensuring smooth road surfaces, adequate surface friction, visibility of road signs and markings as well as the integrity of barriers and other road safety systems. Maintenance programmes may also be optimised to include low-cost safety improvements.

![Collision Speed vs. Risk of Death](image-url)
- **Forgiving road design** – continual enhancements are needed to make our roads and roadsides more forgiving. This may involve measures such as curve re-alignments, adequate shoulder widths, median barriers, safe passing lanes, relocation of roadside poles/lamp posts. These improvements will be important on those parts of the existing strategic network where current road design (narrow, sharp bends, no median barrier) contributes to the greater likelihood of more head-on crashes or run-off road crashes – e.g. along SH58 and along SH2 between Upper Hutt and Featherston.

- **Safer intersections** - there is a need to continually improve safety at urban and rural intersections. Measures will seek to improve the safety of all road users, including cyclists and pedestrians.

- **Rail level crossings** - improving the safety of rail level crossing to reduce the risk of conflict between road vehicles and trains by identifying level crossings in the region that require alarm system upgrades or other safety improvements.

- **Intelligent transport systems** – these are a range of tools and systems that use technology to manage travel speeds on high-volume networks and provide drivers with live information about driving conditions, accidents and incidents affecting the transport network. Examples include variable speed signs or message boards, or ‘ramp metering’ which controls the rate at which traffic can enter a motorway from on-ramps.

### Safe road use

As highlighted in the principles of a safe system approach above, people are fallible and will inevitably make mistakes when using the transport system, sometimes resulting in crashes. However, a combination of education and awareness programmes and enforcement tools will assist in minimising those mistakes and will encourage safe road use.

- **Road safety education and awareness** - education and awareness campaigns are needed as part of a package of measures to change attitudes and driver behaviour. These are normally targeted at a particular factor that causes crashes or leads to greater injury severity when a crash occurs. For example - drink/drug driving, distraction, giving way, speed, seatbelts, driver fatigue, visibility, and awareness of other road users.

Whilst the NZ Police, the NZ Transport Agency and ACC will continue to deliver national campaigns, there is a need to complement these through appropriate delivery of local education and promotion campaigns. Efficient and cost-effective delivery of local campaigns is dependent on continued collaboration between Road Safety Co-ordinators across the region. Regular meetings and communications that ensure cross-pollination of ideas, sharing success and consistent messaging across the region, need to be adequately resourced.

- **Enforcement** – enforcement is a crucial part of improving compliance with driving rules and speed limits that are aimed at reducing death and serious injury. It is an important tool to reinforce appropriate behaviour alongside driver awareness and education programmes.

Key enforcement focus areas include speed compliance, blood alcohol limits, traffic signal compliance (e.g. red light cameras) and illegal parking (particularly where this will enhance the safety of pedestrians or cyclists). The police are the primary agency responsible for enforcement. They are granted powers to enforce moving traffic offences. Territorial authorities are able to enforce stationary (parking) offences.

### Safe vehicles

Another important element in a safe system approach is improving the safety of vehicles using the transport network. Improved safety features in vehicles help to reduce the likelihood of crashes and to reduce death and serious injury when crashes do happen. Examples of safety features present in modern vehicles include air-bags (driver, passenger, side/curtain), electronic stability control, autonomous emergency braking, lane departure warning, and motorcycle anti-lock braking systems.

- **Age of the vehicle fleet** - new light vehicles entering the New Zealand fleet with a five-star Australasian New Car Assessment Program (ANCAP) safety rating have increased from about 51% in 2009 to 71% in 2012. This highlights a rapid improvement in vehicle safety technology. However, the proportion of new vehicles in the total fleet is very low and the average age of New Zealand’s vehicle fleet has increased from 12.5 years in 2009 to 13.2 years in 2011.

- **Whole-of-vehicle life cycle approach** – the national approach described under the Safer Journeys strategy is to adopt a whole-of-vehicle life cycle approach to address this issue. This is because safer vehicle choices are made by buyers, and a number of factors influence buying and maintenance decisions over the life cycle of a vehicle. This approach will involve:
  - Removing less safe vehicles from circulation – for example, incentivising scrapping old and/or unsafe vehicles
  - Improving the safety of vehicles coming into the country – for example, by using vehicle import standards to control the safety standards and features of new vehicles entering the fleet
  - Improving the safety of the existing vehicle fleet – for example, through warrant standards and processes, point of sale labelling and information, removing barriers to new technology uptake, incentivising and promoting safety retro-fits
  - Encouraging people to buy the safest vehicle they can afford.
• **Bicycle lights** – bicycles are also a type of vehicle and the key focus for improving the safety of cyclists from this perspective is promoting the use of high quality bicycle lights and considering the development of bicycle light standards.

The mechanisms that can influence the uptake of vehicle safety technology and the age of the vehicle fleet are generally at the national level. The role of the organisations represented on the Regional Transport Committee in relation to safer vehicles is to support the national level initiatives to improve the New Zealand vehicle fleet and to improve safety within vehicle fleets under their influence – for example, an organisation’s own vehicle fleet and public transport vehicles that make up the region’s public transport fleet.

### 12.6 PRIORITY ACTION AREAS

GWRC, local councils and the NZ Transport Agency will work with NZ Police, ACC and other agencies to deliver coordinated and integrated road safety programmes and campaigns using a combination of engineering, education and enforcement.

The use of road safety action planning and risk-targeting programmes and models will be used to develop local road safety activities and packages that address areas of key concern nationally and regionally.

#### High national priority

The government’s ‘Safer Journeys 2013-15 Action Plan’ identifies a number of areas of ‘high strategic priority’. These areas are set out below:

- Reducing alcohol/drug impaired driving
- Increasing the safety of young drivers
- Safe roads and roadsides
- Safe speeds
- Increasing the safety of motorcycling

In the Wellington region, road safety programmes and campaigns will be aligned with these key national priority areas, which are also important safety issues for the region.

In recent years the government has raised the driving age and changed legislation relating to the blood alcohol concentration (BAC) levels for people in control of a car. While the number of alcohol/drug-related fatal and serious injury crashes, especially for youth, has declined the problem remains a significant one. Messages relating to the impact of drink/drug driving will continue to be communicated nationally and across the region. This will involve road safety partners working closely with the police. In future drink/drug driving messages and campaigns should be more strongly targeted at communities where impairment is a greater issue. For example, in the Wellington region, Wairarapa is over-represented with crashes involving young people and/or those impaired by drink or drugs.

High risk intersections and high risk rural roads are the sub-set of ‘Safe roads and roadsides’ that are identified as a priority area in Safer Journeys. In the region, Wellington City has the highest personal risk level at urban intersections and a rating of medium concern nationally. Carterton and Upper Hutt have the highest personal risk level in the region for rural intersections, and are nationally identified as being of high and medium concern respectively. In terms of loss of control and head-on crashes on rural roads, Masterton and South Wairarapa have the highest personal risk and rate as medium concern nationally. Road safety measures will be focused on improving the identified high risk intersections (urban and rural) and high risk rural roads in the region. Improving urban intersections will also benefit pedestrians and cyclists.

Managing speed on the road network is an important issue nationally and for the Wellington region. Our rural communities of Masterton, Carterton and South Wairarapa are among the areas of high concern nationally for speed. In our urban areas, speeds have a particularly significant impact at intersections and in areas with high densities of pedestrian and cyclist use. There is a strong correlation between the speed at impact and crash severity. Messages relating to safe speeds will therefore continue to be a focus of both national and local campaigns.

Improving the safety of motorcycling is an important region-wide issue, with the Wellington region having the highest level of personal risk for motorcyclists in the country. An increasing number of people in the region’s urban centres, including Wellington City, are using motorcycles and mopeds to travel to work and education. Motorcyclist safety is recognised as an important issue for the Wairarapa Corridor, particularly on SH2 Rimutaka Hill road and on other parts of the road network through Wairarapa as a result of the increasing popularity of recreational trips by motorbike. Motorcyclists are particularly sensitive to road surface, surface friction, and are more vulnerable to collision with other traffic or roadside objects. The specific needs and vulnerabilities of motorcyclists should be actively considered when designing improvements to roads and roadsides and in relation to road maintenance programmes. Ongoing training and education is also very important to develop safe motorcycling skills.

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High regional priority

An additional area of high priority for the region that is not covered by the high strategic priorities at the national level is:

- Improving cyclist safety

In the Wellington region, cyclists have a high level of personal risk, second only to the Auckland region. Road safety programmes and campaigns will seek to address this important regional safety issue. Addressing cycling safety in Wellington City will be a key focus given the high level of personal risk and growing number of cyclists. However, improving safety in other parts of the region will also be important to encourage more people to cycle.

Measures will include infrastructure improvements and education, awareness and skills training. Priorities for improving the safety of cycling are also highlighted in the cycling chapter of this network plan.

Safety on the Wellington RoNS

One objective of the Wellington RoNS project is to improve road safety. The construction of a new median divided expressway through the region - from Linden in the south to Otaki in the north - provides an important opportunity to significantly improve road safety in the Wellington region.

The design standards of the new road will almost eliminate the possibility of head-on crashes and run-off road crashes on SH1 between Wellington and Otaki. The new road is being constructed to have a four-star (out of five-stars) KiwiRAP rating. In addition, there will also be opportunities to address wider safety issues such as driver fatigue (through provision of additional rest and stopping facilities), and the appropriate separation of pedestrians and cyclists from fast moving traffic.

When existing sections of SH1 are revoked and become local roads, improving safety should be an important objective. This may include, for example, consideration of appropriate speeds to reflect the new role of the road, re-allocation of road space to provide enhanced walking and cycling facilities, and improved priority for pedestrians at signalised crossings and new crossing facilities. Through the Kapiti Coast, which is over-represented with crashes involving older people, there may be opportunities to reduce speed limits and to enhance the design of intersections on the revoked state highway route to make this a safer local link route option for older drivers.
13. NETWORK RESILIENCE

13.1 INTRODUCTION

The transport network can be vulnerable to a range of different unplanned events, leading to delays and disruption to access and mobility to and within the region. This plan describes the strategic approach for addressing the significant resilience issues facing the Wellington region’s transport network.

Improving the resilience of the transport network to these unplanned events will allow access to be restored sooner and disruption to be minimised. All organisations responsible for planning, managing and operating the region’s land transport network will work together to identify key vulnerabilities in the transport network that may affect the ability of the wider network to resume service after disruption caused by an incident or event.

13.2 WHAT IS TRANSPORT NETWORK RESILIENCE?

A resilient transport network is one which is designed, developed and maintained to recover quickly from unplanned events.

A transport network may be affected by both ‘High Impact Low Probability’ events and ‘Low Impact High Probability’ events. These may be natural hazard events ranging from a slip or surface flooding, through to a major earthquake or tsunami. Crashes that occur on the road network may also result in disruptions as a result of lane closures or an entire corridor being temporarily out of use.

Another aspect of transport network resilience is the need to be adaptable to potential future changes in climate patterns, sea levels, travel demands, technologies, fuel types, and lifestyles.

**Low Impact High Probability**

- Natural hazard events such as landslips, storms, floods and incremental sea level rise
- Transport related events such as road traffic crashes and other unplanned events and potential future trends such as fuel price shocks

**High Impact Low Probability**

- Significant magnitude earthquake (7+), major volcanic eruption or a tsunami

13.3 THE NEED FOR INVESTMENT

The key resilience problem for Wellington’s regional transport network can be described as:

**Regional infrastructure that is vulnerable to disruption by unplanned events is potentially resulting in an unacceptable cost of severance and restricted ability to recover over time.**

Wellington’s topography and resultant relatively narrow corridors of development, infrastructure and transport across the region makes it relatively susceptible to disruption from natural hazards events and traffic crashes.

Only four roads connect the Wellington metropolitan area with the remainder of the North Island. These are:

- SH1
- SH2
- Paekakariki Hill Road
- Akatarawa Road

Each of these four roads, including the state highways, has sections that are both seismically vulnerable and at risk from more common events such as slips or flooding. The SH1 and rail corridor between Pukerua Bay and Paekakariki is very narrow and wedged between the hills and the sea. The SH2 and railway corridor between Petone and Ngauranga have similar characteristics. SH2 Rimutaka Hill road traverses steep terrain between the Wellington metropolitan area and Wairarapa. Sections of SH58 and Grays Road, which provide a strategic east-west link within the region, are also low lying and vulnerable to slips and flooding.

In addition to being vulnerable to being cut off as a result of landslips following earthquakes or weather related events, a road traffic crash or incident on these parts of the road network may result in the closure of traffic lanes in one or both directions. In addition, the lack of alternative north-south routes and limited east-west connectivity means that even a relatively minor incident often results in severe delays and disruption to the wider network.

In the longer term, the low lying parts of these corridors will also be increasingly vulnerable to the impacts of sea level rise.
Low impact, high probability events

Examples:
- landslips
- major storms, flooding
- traffic incident
- long term sea level rise

Likely outcome:
- Numerous transport links are vulnerable to low impact high probability events resulting in disruption and potential community severance

Local areas/suburbs that are served by single (or effectively single) roads are particularly at risk.

Major strategic transport corridors in the region are also very susceptible. The presence of both road and rail infrastructure in close proximity also represents a risk.

- An example is the storm event of June 2013 in Wellington that washed out rail lines between Petone and Ngauranga resulting in a significant increase in congestion and delays on the adjacent state highway network. The Ministry of Transport estimated that the economic impact of the event was between $12 and $43 million, including a $5.3 million cost to government agencies.

- A significant flood event in the vicinity of Melling Bridge would affect road and rail networks, and sever access to Hutt City at that point, creating additional pressure on the surrounding network.

The 2011 landslip on SH3 Manawatu Gorge (the largest road slip in New Zealand history) is another example from just outside the region of the potentially significant impact a localised event can have when there are limited alternatives.

The cost of long delays as a result of closing one or more traffic lanes on the state highways or mechanical breakdowns on the rail network can also be significant due to loss of workforce productivity and missed flights or meetings.

High impact, low probability event

Examples:
- Major earthquake
- Major tsunami

Likely outcome:
- Fragmentation of the regional transport network, disrupting distribution of essential supplies and delaying recovery
- Routes in and out of the Wellington metropolitan area severed, resulting in up to four months isolation of the population

In 2013, Wellington Lifelines Group (WeLG) and the Wellington Region Emergency Management Office (WREMO) developed a lifelines report titled “Restoring Wellington’s transport links after a major earthquake”. The report identifies a number of key lifeline locations that are critical to enable recovery after a major event. These are described in Figure 40 below and shown on the map in Figure 41.

CentrePort is located at a critical point in Wellington’s lifeline network and will play a vital role in any post-event recovery effort. However, the poor quality of the Hutt Road over-bridge and Aotea Quay off-ramp present a significant resilience risk that is likely to affect access to the port after an event. This amplifies the likely issues such as transport network vulnerability to slips and liquefaction between Ngauranga and Thorndon – which the lifelines report identified as the ‘Thorndon Critical Area’.

Recovery time after an event is driven by the ability to access these critical locations and use them to drive recovery. The region will need to continually address current risks with the long term goal of re-opening critical transport links to key lifeline recovery sites within two days, and establishing core access to and within the region within seven days.

Risk types and locations are identified in Figure 41. This illustrates by location types of high impact low probability or low impact high probability hazards and the key lifeline priority locations.

### Figure 40. Key Lifelines Locations

<table>
<thead>
<tr>
<th>Location</th>
<th>Purpose</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kapiti Coast Airport and Paekakariki earthmoving operation</td>
<td>National assembly area and vehicle and plant storage site for the earthmoving operation</td>
<td>Emergency response logistics site in the event of a major event. Earthmoving operation in order to restore transport access from the north.</td>
</tr>
<tr>
<td>Titahi Bay beach</td>
<td>Temporary supply logistics location</td>
<td>Temporary beach landing site and barge access point should access to and within central Wellington be extremely limited by road/rail.</td>
</tr>
<tr>
<td>Seaview Marina and Petone foreshore</td>
<td>Primary and secondary landing logistics locations</td>
<td>Fuel landing point and barge and landing sites to move supplies to/from CentrePort.</td>
</tr>
<tr>
<td>Wellington CentrePort</td>
<td>Primary supply logistics location</td>
<td>Barge traffic to/from the Hutt Valley and road based distribution of supplies to the suburbs / regions from the port.</td>
</tr>
<tr>
<td>Wellington Hospital</td>
<td>Central medical HQ</td>
<td>Main medical triage and casualty treatment site. Medical coordination HQ.</td>
</tr>
<tr>
<td>Wellington Airport</td>
<td>Primary supply logistics location</td>
<td>Helicopter distribution and aircraft supply site to the rest of the region.</td>
</tr>
</tbody>
</table>
Other action areas

- Kapiti Coast Airport and Paekakariki earthmoving operation
  - National assembly area and vehicle and plant storage site for the earthmoving operation
  - Emergency response logistics site in the event of a major event.
  - Earthmoving operation in order to restore transport access from the north.

- Titahi Bay beach
  - Temporary supply logistics location
  - Temporary beach landing site and barge access point should access to and within central Wellington be extremely limited by road/rail.

- Seaview Marina and Petone foreshore
  - Primary and secondary landing logistics locations
  - Fuel landing point and barge and landing sites to move supplies to/from CentrePort.

- Wellington CentrePort
  - Primary supply logistics location
  - Barge traffic to/from the Hutt Valley and road-based distribution of supplies to the suburbs/regions from the port.

- Wellington Hospital
  - Central medical HQ
  - Main medical triage and casualty treatment site. Medical coordination HQ.

- Wellington Airport
  - Primary supply logistics location
  - Helicopter distribution and aircraft supply site to the rest of the region.
13.4 BENEFITS OF INVESTMENT

If a major event were to occur in the region today or in the foreseeable future then the region’s communities and infrastructure would be significantly affected. The region would be heavily reliant on the existing restoration and emergency plan(s) in order to recover. Increasing the resilience of transport infrastructure and networks over time will mean less reliance on restoration and emergency plans.

Increasing route security and providing route alternatives will mean emergency services, supplies and residents will have better access to the transport network and key locations after a major event and the network will be increasingly less susceptible to disruption as a result of the smaller, more frequent events. This will also reduce the social and economic impact upon the region from the unplanned event.

By ensuring that planning and investment in the transport network takes account of potential future scenarios (such as climate change, fuel price, technology and lifestyle trends) that affect travel patterns and the transport network, the region will be better future proofed itself and insulated against the impacts of those changes.

13.5 STRATEGIC RESPONSE

The following action areas are proposed to address the transport resilience problem described in the above sections of the plan.

Improving the security of existing strategic corridors and routes

Future investment in the transport network will need to ensure existing strategic routes are less vulnerable to disruption and delay as a result of unplanned events. The long term aspiration is to prioritise and address known resilience risks and vulnerabilities to create a robust resilient transport network and community. This will include both new infrastructure to protect existing routes and ongoing preventative maintenance.

An example of proposed new infrastructure is potential land reclamation alongside the existing SH2 and rail corridor between Ngauranga and Petone. This could offer route protection for this strategic road and rail corridor, and a significantly improved level of service for cyclists and pedestrians (providing improved travel options), both for low impact high probability and high impact low probability events.

Ongoing preventative maintenance and seismic strengthening of the transport network and its infrastructure is crucial to improved resilience. Such work enables the transport network to evolve in order to cope with ongoing low impact high probability events and enhances the ability of the network to function and support recovery in the event of a high impact low probability occurrence. This will be particularly important in the shorter term prior to new alternative routes being completed.
**Provision of good route options and alternatives**

Development of the future transport network will need to include projects that provide alternative strategic routes to contribute to overall network resilience and allow quicker recovery and access to and through the region in both low impact high probability and high impact low probability events.

Key future projects include construction of the Kapiti Expressway, Transmission Gully, and a new east-west link between SH2 and SH1 (Petone to Grenada Link Road) to improve network reliability and provide alternative routes. The completion of these regional roading projects is expected to result in a significant reduction in the time to recover access to and through the region following a major event from 120 days to around 40 days.  

**Increasing travel choices within the transport network**

Providing good modal choice will enhance the transport network’s resilience. If people have different choices for making a trip, they will have greater flexibility when disruption occurs to one mode of travel and may still be able to complete their journey.

Walking and cycling provide a good level of personal mobility when major unplanned events occur and offer realistic alternatives for localised low impact high probability events. Equally the rail network functions independently of the road infrastructure meaning that should the road network be affected by an unplanned event, then rail can offer a travel alternative. Ensuring more of the population is located so that they live and work in areas with good travel options is an important aspect of resilience.

**Continually improve network safety performance and standards**

Improving road safety performance in the region is an important component of resilience because disruption and delays as a result of crashes can have a significant effect on numerous users of the transport system. The region’s key road safety challenges and strategic response is set out in the Road Safety chapter of this plan.

**Future proofing the transport network**

Planning and investing in the transport network will need to consider a range of future scenarios to ensure that we are resilient to different futures and can adapt our network to respond to changes in climate, land use, trip demands, technologies, lifestyle, fuel types and energy availability.

Often the slower incremental threats to the network are overlooked. It is critical that these be factored into our planning. Facilitating and accommodating population growth should be done without putting communities at risk and it is important that land use planning and transport planning are well integrated.

Energy resilience is a long term and incremental area of resilience that is recognised in policies such as the New Zealand Energy Strategy 2011-21 and the New Zealand Energy Efficiency and Conservation Strategy 2011-16. These strategies promote the need for New Zealand to develop its own petroleum and mineral fuel resources whilst also embracing new technologies, against a background of increasing costs related to greenhouse gas emissions, increasing oil price rises, oil supply volatility and the need for renewable energy sources. Regional energy resilience will be guided by the national approach in this area.

### 13.6 PRIORITY ACTION AREAS

The development of business cases in relation to the region’s resilience issues will help to determine the best resilience solutions and packages and will help to guide the priority order in which projects should be undertaken.

Consideration of the key recommendations from the lifelines report will also provide valuable guidance on priorities for addressing transport network resilience.

The key priorities for the Wellington region are as follows:

- **Improving the security of existing strategic corridors and routes**
  - Establish an agreed risk register, develop and apply an agreed prioritisation methodology with which to influence project programming in order to deliver future transport network resilience.
  - Improve the resilience of the key transport and lifelines corridor between Ngauranga and Petone
  - Carry out seismic strengthening of road/rail bridges, tunnels, and embankments/cuttings on key strategic routes throughout the region
- **Provision of good route options and alternatives**
  - Develop alternative north-south and east-west strategic routes through the region
  - Improve levels of access to/from lifelines key locations (port, airport, hospital, etc.)
- **Planning for recovery of transport network access following a major event**
  - Develop and adopt a comprehensive regional restoration and emergency plan

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1 Wellington Lifelines Group (WeLG) and the Wellington Region Emergency Management Office (WREMO) ‘Restoring Wellington’s transport links after a major earthquake’, 2013.
• **Increasing travel choices within the transport network**
  - Ensure that the planning of the region’s land use and transport network are well integrated and support good travel options
  - Develop strategies for restoring access to suburbs given some communities may face particular access restoration issues

• **Continually improving network safety performance and standard**
  - Continuously improve road safety infrastructure standards along strategic routes to reduce the level of disruption from road crash incidents

• **Future proofing the transport network**
  - Ensure that future scenarios are considered as part of our regional transport planning so that the network is adaptable to future changes.
14. TRAVEL DEMAND MANAGEMENT

14.1 INTRODUCTION
The purpose of the Land Transport Management Act is to contribute to an effective, efficient, and safe land transport system. Travel demand measures are critical to this goal as they collectively help to create a more economical and resource efficient transport system.

The effective movement of people and freight is critical to economic development. Congestion and unreliable journey times on the road network adversely affect the efficiency of the transport network. Optimising the use of the existing network can help to address these issues, recognising that building additional road capacity may not always be affordable, desirable or sustainable.

Investing in a range of travel demand management areas alongside investment in other aspects, contributes towards achieving an overall efficient transport system. This chapter describes the strategic approach for managing travel demand on the region’s transport network.

14.2 WHAT IS TRAVEL DEMAND MANAGEMENT?
Travel demand management is a collection of measures used to:

- maximise the use of the existing network
- reduce the demand for travel, particularly by single occupancy vehicles
- influence use of efficient and sustainable travel options

Achieving an optimised and efficient transport system will involve a combination of both ‘supply-side’ measures and ‘demand-side’ measures as shown in the diagram below.

This chapter focuses on the demand-side measures including network management tools, promoting behaviour change, economic pricing measures and appropriate land use policies. Other parts of this plan discuss the strategy for providing good travel options, including high quality, safe, attractive public transport, walking and cycling.

14.3 THE NEED FOR INVESTMENT
The challenges facing the Wellington transport system are described at the beginning of this plan and include issues such as traffic congestion, unreliable travel times, road safety issues, and impacts of transport on communities and the environment.

The transport network experiences very high demand at peak times, particularly to/from the Wellington City CBD.

- 24% of all region-wide trips (car and public transport combined) are made during the morning and evening peak.
- 14% of all region-wide trips (car and public transport combined) are trips to the Wellington City CBD.
- 30% of rail passengers arriving at Wellington Railway Station in the morning peak period do so within a 15 minute window.
It is not practical or affordable for the region to continue to provide unlimited additional capacity to meet these peak demands. Travel demand management measures will be needed to look for ways to reduce the demand on the transport network at peak times.

Trips made by a single occupant in a car during peak periods, where active modes or public transport are feasible options (e.g. short trip distances or where there is good access to public transport services) contribute unnecessarily to congestion and unreliable travel times on the road network for freight and other trip types for which there are no practical alternatives.

A lack of awareness in the community about travel choices and the benefits of different travel options can contribute to inefficient trip choices. Concerns about safety and other barriers (perceived or actual) can also constrain the uptake of the most efficient travel choice for a particular trip.

14.4 BENEFITS OF INVESTMENT

Travel demand management measures contribute to the improved operation of the transport network including through reduced traffic congestion, more reliable journeys, and enhanced resilience as a result of more transport choices.

Safety benefits are often associated with travel demand management programmes – for example road safety skills and education as part of school travel programmes, and improved ‘live’ information for road users warning of poor driving conditions, hidden queues or an accident ahead.

More efficient travel patterns and travel behaviours can also have affordability, environmental, health and community benefits by reducing the cost of travel, reducing climate change and air pollution impacts, and supporting more active lifestyles.

Optimising the region’s transport system will also provide opportunities to minimise the transport ‘footprint’ on our urban environment, making our towns and cities more attractive environments in which to live, work and play.
The effect of some travel demand management initiatives, particularly network management and pricing tools, can be measured by improvements in journey times or vehicle occupancy levels. However, in general, it can be difficult to isolate the effect of a particular travel demand management measure from some of the wider external factors.

The potential for different demand management interventions to influence mode choice is illustrated in the next section.

14.5 STRATEGIC RESPONSE

There are a number of key strategic interventions that can be used to influence more efficient and sustainable travel choices.

Influencing travel behaviour

Travel behaviour change programmes seek to provide an environment where the most efficient and sustainable travel choices are made as attractive as possible and people are made aware of those choices. These programmes are generally focused around four key areas:

• Motivation – encouraging change through goals, challenges, incentives and support
• Social norms – making sustainable transport an everyday activity
• Targeted information – providing knowledge to act
• Ability to act – removing the barriers to change

An example is programmes to encourage more children to walk, cycle, or travel by scooter to school as part of a school travel programme. These programmes include both promoting the benefits of active transport and addressing barriers that may affect travel choices.

Another example is tools that encourage more efficient and sustainable travel for workplaces – both in terms of the employee commute and wider business travel practices. This may involve a comprehensive travel programme within a workplace, looking at how efficient travel behaviour can be incentivised and supported, or may involve individual initiatives within a workplace such as providing good cycle storage facilities or promoting a carpool programme.

Behaviour change programmes such as school travel plans and workplace travel programmes have had good uptake and have resulted in positive behaviour change. A 2011 report on the implementation of workplace travel plans in a number of large organisations in the Wellington region suggested the following percentage change in mode share for journeys to work among participating organisations and businesses (before and after travel plans were implemented): a 18% change in public transport mode share, a 20% change in cycling mode share and a 11% change in single occupant car mode share.1

Community-wide travel awareness communications are used for ongoing promotion of behaviour change initiatives, including regular events, and promoting new technology and innovations with the potential to reduce travel demand.

A regional programme to coordinate and deliver travel behaviour change programmes and promote efficient and sustainable transport, has been in place since late 2006. GWRC leads this area of work to minimise duplication of effort and resources among individual local councils and ensure consistency of campaigns and messaging across the region. This approach ensures better value for money for investment in travel behaviour programmes. Local councils have a lead role in relation to school travel programmes and a partnership role in wider travel behaviour change initiatives. Other organisations such as schools, workplaces, police and health agencies are also important partners in delivering these activities.

Network management

Traffic management and technology-based tools can be used to maximise existing network capacity, improve traveller information, improve journey reliability, smooth traffic flows, support safer journeys, and enable more efficient freight supply chains.

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1 Greater Wellington Regional Council, 2011, Sustainable Transport Annual Achievement Report 2010-2011
Tidal flow traffic lanes to add capacity in peak directions or high occupancy vehicle lanes (for buses, multiple occupancy vehicles, freight vehicles, or a combination of these) are good examples of tools that can be used to encourage more efficient use of the road network. Simple improvements to the design and phasing of an individual intersection or set of intersections, including priority phasing for particular modes, can also be effective.

Intelligent transport systems can improve the transport network’s operation by applying information and communication technologies that support and optimise all modes of transport. These technologies allow transport systems to be responsive to changing traffic conditions through interventions such as adjustments to traffic signal phasing, variable speed and message signs, and ramp metering.

Ramp metering is used to control the flow of traffic entering the motorway or designated road from its on-ramps to ensure more efficient merging. Technology that provides real time information is used to warn drivers in advance about things like traffic queues, traffic incidents or poor road conditions. Live information can also be provided to public transport users about the running of services and any delays.

Intelligent transport systems also assist with collection of better quality data to drive better operations, planning and investment. They help to promote smarter transport choices by improving traveller information, and provide mechanisms that enable new options for payment of tolls and future road pricing schemes.

Economic pricing measures

Pricing measures are economic tools that can be used to influence travel choices. These can involve network wide charges (such as fuel levies or distance based charges) or can target certain trips, for example by placing a toll on a new road or a charge on using the existing road network at peak times and at certain locations (congestion or cordon charges). Targeted pricing is most likely to be successful where good alternatives are available, and where the revenue generated by pricing schemes is fed back into the alternative options to make them more attractive.

Evidence suggests that road pricing tools could be extremely effective in influencing travel behaviour. Traffic volumes and congestion levels can be significantly reduced as a result of mode shift to public transport, walking and cycling, trip re-timing, ride-sharing, and some trips not being made at all.

Analysis undertaken as part of the work to develop this plan suggests that by applying a cordon charge to the regional network, a significant increase in public transport trips to the CBD (around 3 million extra annual PT trips in the AM peak – a 25% increase compared with an expected future scenario without a cordon charge) could be achieved. Of course, any road pricing scheme must be carefully designed to take account of the potential economic, social and equity implications.

Current legislation in New Zealand does not currently allow for road pricing schemes to be implemented on existing roads. However, applying a toll to new roads is legal, and analysis suggests applying a toll (for example, on the new Transmission Gully motorway and the proposed Petone to Grenada Link Road) would have some positive impact on managing the demand for car use.

Parking policies

Parking supply, management and cost can have a significant influence on the demand for car use. Analysis suggests that the application of increased parking charges could have a significant positive influence on reducing demand for car use.

While most long-stay commuter parking, particularly in Wellington City CBD, is privately owned there are measures to manage demand and encourage mode shift - for example by applying a parking levy or differential rating. In addition to demand management benefits, this would allow revenue generated to be fed into public transport improvements. However, it would be important that any such tool was targeted at long-stay commuter parking rather than short-stay parking.

An efficiently managed supply of short-stay parking (for shoppers or visitors) is important to a competitive economy within our region’s centres. The allocation of on-street parking also needs to be balanced with other needs such as road space for bus priority lanes, cycle lanes or wider footpaths which are all important aspects of network management.

Removing minimum parking standards in district plans, particularly in relation to developments located within close proximity to local centres or public transport, is also an important intervention to influence car ownership and car use.

Land use policies

Land use patterns and the degree to which they are integrated with transport networks have a significant influence on travel demand, and appropriate land use policies are crucial to support an efficient and sustainable transport network.

Urban sprawl is not easily served by public transport and...
longer travel distances limit opportunities to make trips by walking or cycling. A compact urban form and higher densities in or around centres and along transport corridors support public transport services and encourage walking and cycling. Comprehensive, mixed use developments provide opportunities for local employment and access to local shops and amenities, reducing travel distances and making active modes more feasible.

Structure plans and other local area planning tools can be used to encourage comprehensive and integrated new developments, rather than ad hoc urban sprawl.

The provision of quality pedestrian and cycle facilities within new developments that are well connected to adjacent networks and local centres will also support the use of walking and cycling for shorter trips.

**Supporting new technologies and innovation**

Evolving technologies and lifestyle trends are expected to influence travel demand and the way we access services in future. New technologies often improve travel efficiency and reduce the need for travel. For example - access to services and information through internet and smartphone technology; ‘face to face’ meetings carried out using Skype, Face Time, or video-conferencing; and access to goods through home deliveries or 3-D printing. Supporting the uptake of new technologies is another important component of travel demand management.

Car share schemes are a good example of an innovative concept that supports an optimised transport network. An increase in inner city living in the Wellington region, particularly Wellington City, provides a significant opportunity to use cars more efficiently. There are rising numbers of people who only require occasional access to a motor vehicle and do not wish to purchase a car. Car sharing schemes allow a single vehicle to be shared among a group of people, maximising its use and minimising space required for parking. At full capacity, one car share vehicle can replace up to 13 conventional cars. These schemes have a number of benefits to individuals and the community.

1 http://www.vtpi.org/tdm/tdm7.htm

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14.6 **PRIORITY ACTION AREAS**

Behaviour change tools need ongoing support and promotion. This is the case in the short term to ensure that a critical mass is reached so that the tools are effective and in the longer term to ensure that behavioural change is sustained over time. Land use and parking policies adopted in the short term will have a significant impact on land use and travel patterns in the longer term. Technology changes will occur over time and longer term are expected to influence both travel patterns and the efficient operation of the transport network.

The following action areas will be progressed over the short to medium term and will support longer term outcomes:

- **Promote and facilitate active and safe school travel through school travel programmes and activities**
  This will involve GWRC and local councils working together to identify opportunities and to provide resources, training, advice, and monitoring/data collection. Local councils will also carry out physical infrastructure improvements to address barriers.

- **Promote the uptake of efficient and sustainable commuting and business travel within workplaces, organisations and the wider community**
  This may include for example tools, programmes and activities such as carpool programmes, car sharing, flexible work hours, video conferencing, cycle parking and shower facilities, cycle skills training, encouraging commuting trips by active modes and public transport, and vehicle fleet policies.

It will also include encouraging the development of new tools and programmes to facilitate more efficient travel and to support better travel choices – such as a fully integrated and centralised online journey planner site for all modes, including carpooling.
• **Carry out travel awareness activities, events and campaigns**
  This will include ongoing support for and promotion of: available tools (e.g. carpool programmes, journey planning tools); travel choices (e.g. walking, cycling, travel by scooter, public transport); new technology and innovation (e.g. video conferencing, car-share schemes, smartphone apps); and supporting infrastructure (e.g. priority car parking spaces for carpools).

  It will also involve identifying opportunities to promote efficient and sustainable travel choices through annual or more frequent events and campaigns (e.g. Walk to Work Day, Active a2b, Spring to the Street).

• **Optimise the use of the existing transport network through the use of network efficiency tools, intelligent transport systems and other tools**
  Managers of the state highway, local roads, and public transport networks will work together to identify opportunities for implementing measures that will allow best use to be made of the existing network and to enable people to make smart travel decisions.

  This may include, for example, intersection upgrades, ramp metering, tidal lanes or peak only lanes, variable message signs, real-time information, integrated ticketing, and traffic light phasing and priority.

  Other transport network optimisation tools and concepts will be supported, including car share schemes, priority parking for carpoolers and new technologies that reduce the need for travel.

• **Investigate and advocate for the use of road pricing tools to influence travel demand**
  Advocating for the ability to consider and implement pricing schemes for the existing road network, such as a congestion charge for trips along key routes during peak times.

  The use of tolling will be considered to manage the demand in relation to new roads. Consideration will be given to availability of alternative routes and modes, and wider social equity implications of each case.

  The availability and cost of parking (long-stay commuter parking in particular) will be regularly reviewed by local councils with particular consideration given to the demand management benefits.

  Parking requirements within new developments will be regularly reviewed as part of district plan reviews, with particular consideration given to maximum rather than minimum parking standards in appropriate locations.

• **Promote and encourage integrated land use and transport planning**
  Appropriate provisions will be included in the relevant land use policy documents – such as the Regional Policy Statement and district plans – to ensure future land development follows the principles of compact urban form that is well integrated with transport infrastructure.

• **Continued monitoring, data collection and information sharing**
  Understanding how people travel and why they make particular travel choices and decisions is critical to managing demand and finding ways to use our transport network more efficiently.

  Ongoing data collection through travel surveys and monitoring programmes will therefore be an important action in this area. Forums for sharing information, ideas and success stories will also be an ongoing initiative.
SOUTH MAKARA ROAD

NEXT 6 km

SCHOOL BUS ROUTE

Narrow Road
Please Drive Carefully