Ensuring our transport system helps New Zealand thrive

Infrastructure, Design and Planning
August 2018 | Prepared by the Reference Group Advisers
Purpose of pack

To provide the group with:

- An introduction to why infrastructure, planning, and design is an important Safe system pillar
- An overview of the problem in NZ
- What taking a Vision Zero approach would look like
- What international best practice looks like
- This will support the group to determine what key themes it wants to explore for further action.

Source: Ministry of Transport
Each part of the Infrastructure lifecycle can be influenced to deliver better liveability, safety, access, environment, economic & health outcomes.
Transport Outcomes Framework and the new direction for investment

**Inclusive access**
Enabling all people to participate in society through access to social and economic opportunities, such as work, education, and healthcare.

**Healthy and safe people**
Protecting people from transport-related injuries and harmful pollution, and making active travel an attractive option.

**Economic prosperity**
Supporting economic activity via local, regional, and international connections, with efficient movements of people and products.

**Environmental sustainability**
Transitioning to net zero carbon emissions, and maintaining or improving biodiversity, water quality, and air quality.

**Resilience and security**
Minimising and managing the risks from natural and human-made hazards, anticipating and adapting to emerging threats, and recovering effectively from disruptive events.

Source: Ministry of Transport
Safe & Sustainable Transport framework

Multiple Benefits
- Health, Safety, Economic, Emissions, Time, Social

Inclusive access
- Healthy & Safe People
- Environmental sustainability
- Resilience & security
- Economic productivity

Avoid
1. Land Use Planning
- Maximise access to goods, services & people
- Proximity of destinations and origins
- Land use design for density and mix of choices to fill all human needs (social, cultural, economic & environment)

Shift
2. Better Mobility Options
- Low harm modes (walking, cycling and PT)
- Higher efficiency modes (less vehicles as hazard)
- Lower momentum/low energy modes reduce hazard
- Design supports low harm modes as a priority

Improve
3. Design Safe Mobility
- Maximise safe mobility
- Minimise risk to all from remaining trips by car or heavy vehicles
- Design for safe impact speeds at failure and reduced conflict points

Safer Journeys
4 pillars
- Safe roads
- Safe speed
- Safe users
- Safe vehicles

Also...
- Post-crash care

Source: Auckland Transport
Why infrastructure, planning, and design is a pillar of the Safe System

All multi-modal travel involves risks. It follows that well-integrated and smart land use and transport planning that improves multi-modal accessibility while reducing the need to travel, can significantly reduce risk exposure rates. This approach also supports broader objectives to increase safe active transport, and create healthy, vibrant communities. (Victoria Transport Policy Institute, 2018)

► Investing in proven safety infrastructure improvements, like median barriers and rumble strips, plays a major role in creating a safe system that is forgiving when people make mistakes, greatly reducing the frequency of the most common serious crash types – head-on and run off road.

► Effective application of fit for purpose standards and guidelines helps ensure consistent and appropriate safety levels of service for all road users, and this includes allowing for flexibility in the system to encourage innovation.

► Planning and designing for vulnerable road users needs to be well-integrated throughout the system, including through investment, maintenance and speed management.

► The existing network has been based on incremental road safety improvements where safety has often been traded off against mobility and speed. Future improvements require a systemic step-change to create a Safe System that maximizes safe mobility.
Benefits of effective integration of infrastructure, design, and planning

- Effective integration of infrastructure, planning and design contributes to wider transport outcomes too.
- As streets become safer, healthier and more humane as a result of better design, reduced vehicle numbers and speed, and improved air quality, more people will feel comfortable walking, cycling and taking public transport.

This will contribute to ongoing reductions in vehicle kilometres of travel, further compounding the associated benefits.

Source: World Resources Institute 2018
Integrating Safety and Planning

► Land-use planning has a direct influence on the transport network, with the potential to influence the design of roads, how the road network is used, and what infrastructure safety investments are required in the future. Planning plays a critical role in providing a Safe System.

► By applying Safe System principles early in the development process, transport and land-use planners may effectively contribute to the Safe System and address road user safety across all modes.

► Well-developed integration of land use and transport planning can balance many needs, including the community/stakeholder requirements, land-use imperatives, transport management, efficiency, safety and environmental considerations, resulting in outcomes that provide a high level of safety, access and amenity.

► Establish and communicate a clear hierarchy within functional transport routes, e.g. Link roads, collector roads and local access roads. ‘Self-explaining’ roads help users understand different kinds of road environment, what speeds are appropriate for different kinds of roads, and which transport modes have priority within each route.

Source: Austroads 2015, Safe System in the planning process
Integrating equity through infrastructure, design and planning

► Improving equity of road safety outcomes is an important cross-cutting issue

► Infrastructure, design and planning needs to address the following equity issues:
  • Equity across regions
  • Equity across open roads and urban roads
  • Equity across modes
  • Equity across population groups (e.g. elderly, disabled persons, children, inexperienced road users)
  • Equity between current and future generations.

Source: Austroads 2015, Safe System in the planning process
Environmental impacts from infrastructure, design and planning

- Road safety is one part of reducing the harm caused by the land transport system.
- It also includes reducing harm from environmental impacts such as noise and dust and poor air quality generated by the construction and operation of roads.
- All transport infrastructure and land use developments generate environmental impacts, but they can be avoided, remedied or mitigated through good design principles and best-practice environmental management planning throughout the infrastructure life-cycle.
- Good planning and design can reduce the need for private vehicle trips and encourage more active modes and PT, which helps to improve air quality, public health, road safety and livability.
The One Network Road Classification (ONRC) is a classification system, which divides New Zealand’s roads into eight categories based on how busy they are, whether they connect to important destinations, or are the only route available:

- **High volume National Strategic (Class 1)**
- **National Strategic (Class 2)**
- **Arterial (Class 2)**
- **Regional (Class 2)**
- **Primary collector (Class 3)**
- **Secondary collector (Class 3)**
- **Access (Class 4)**
- **Low-volume access (Class 4)**

The ONRC helps to guide decision-making around maintenance, renewals and improvements, as well as closely linking safe and appropriate speeds across the network that reflect the function, safety and use.

The framework opposite breaks down safe and appropriate speeds by road classification and helps to show where investment should occur to make roads safe at their current speed limits and where speed limits should reduce.

The ONRC was primarily designed for the movement of vehicles and goods. The following slides show how this movement function can be effectively integrated with place, or land use.
Integrating movement and place

- Roading corridors serve two primary roles for users, to facilitate the movement of people and goods, and/or to act as places for people.
- Establishing a clear hierarchy within functional transport routes, e.g. link roads, collector roads and local access roads, helps to determine appropriate levels of service for all users.
- ‘Self-explaining’ roads help users understand different kinds of road environment, what speeds are appropriate for different kinds of roads, and which transport modes have priority within each route.
- Roads can be made self-explanatory by investment in appropriate treatments to help manage speeds down to more safe and appropriate levels.

Integrating movement and place

► Not all roads are equal – establishing their existing and future function is a critical starting point.

► Begin with establishing the roads ‘place’ significance, ‘movement’ significance and modal priorities.
  
  ▶ E.g. Mixed Use Urban arterials currently try to serve all modes equally which is unrealistic and unsafe.

► Decisions are required on the priority of public transport, walking and cycling modes, and whether separation or design speed is used to address conflicts.

This diagram illustrates that the higher-cost, Safe System transformation improvements are best-targeted to high-risk, high-volume roads, where the greatest safety gains can be made.

For other risky roads, a range of lower-cost treatments, including speed management are appropriate interventions.

While the matrix primarily relates to vehicle traffic, it can be adapted to incorporate all road users.

The framework helps to guide investment decision-making and interventions that will make the most effective contribution to reducing deaths and serious injuries.
## Safe System intervention hierarchy

<table>
<thead>
<tr>
<th>Treatment type</th>
<th>Description</th>
<th>Estimated DSI savings</th>
<th>Illustration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Safe System Transformation</strong></td>
<td>A high level of primary and roadside and median barriers, roundabouts or grade separation, or speed managed to Safe System limits. Generally applied only to higher risk, higher exposure sites on the network. Are the most expensive treatments and not cost effective everywhere, but offer the greatest DSI potential.</td>
<td>60-80% on high risk corridors and intersections.</td>
<td><img src="image1" alt="Image" /></td>
</tr>
<tr>
<td><strong>Safety corridors and intersections</strong></td>
<td>Partial roadside and median barriers, supplemented with supporting Safe System treatments such as wide centerlines, speed management, intersection chanelisation and/or movement restrictions. Typically implemented on moderate volume and moderate risk roads.</td>
<td>30-50% depending on extent of treatment.</td>
<td><img src="image2" alt="Image" /></td>
</tr>
<tr>
<td><strong>Safety Management</strong></td>
<td>Lower cost, widespread treatments such as improved lines and markings, rumble strips, roadside barriers at isolated locations, and speed management. Typically implemented on lower volume, lower risk roads.</td>
<td>10-25% depending on extent of treatment.</td>
<td><img src="image3" alt="Image" /></td>
</tr>
<tr>
<td><strong>Safety Maintenance</strong></td>
<td>This involves maintenance of existing safety features, such as skid resistance, signs and markings, lighting and electronic warning systems.</td>
<td></td>
<td><img src="image4" alt="Image" /></td>
</tr>
</tbody>
</table>

Source: NZ Transport Agency
## Safety treatments for cycling

<table>
<thead>
<tr>
<th>Hierarchy</th>
<th>Treatment</th>
<th>Influence (E=exposure, L=likelihood, S=severity)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Safe System options</strong> (primary or transformational treatments)</td>
<td>Separation (separate cycle path)</td>
<td>E, L, S</td>
</tr>
<tr>
<td></td>
<td>Safe speed environment, especially at intersections</td>
<td></td>
</tr>
<tr>
<td><strong>Supporting treatments</strong> (compatible with future implementation of Safe System options)</td>
<td>Shared pedestrian/cycle path</td>
<td>E, L, S</td>
</tr>
<tr>
<td></td>
<td>Cycle lanes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reduce traffic volume</td>
<td>E, L, S</td>
</tr>
<tr>
<td><strong>Supporting treatments</strong> (does not affect implementation of future Safe System options)</td>
<td>Separate cycle signals at intersections</td>
<td>E, L, S</td>
</tr>
<tr>
<td></td>
<td>Cyclist advanced stop box at intersections</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Skid resistance improvements</td>
<td>E, L, S</td>
</tr>
<tr>
<td><strong>Other considerations</strong></td>
<td>Speed enforcement</td>
<td>L, S</td>
</tr>
</tbody>
</table>

Source: Austroads 2016 Safe System Assessment Framework; NZTA Cycle Network Guidance

Note: This diagram is to be applied to urban roads and is not appropriate for rural or non-urban roads.
Safety treatments for walking

<table>
<thead>
<tr>
<th>Hierarchy</th>
<th>Treatment</th>
<th>Influence (E=exposure L=likelihood S=severity)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safe System options (primary or transformational treatments)</td>
<td>Separation (footpath or crossing) Safe speed environment, especially at intersections and crossings</td>
<td>E L L,S</td>
</tr>
<tr>
<td>Supporting treatments (compatible with future implementation of Safe System options)</td>
<td>Reduce speed environment / speed limit Pedestrian refuge Reduce traffic volume</td>
<td>L S L L,E,L</td>
</tr>
<tr>
<td>Supporting treatments (does not affect implementation of future Safe System options)</td>
<td>Pedestrian signals Skid resistance improvements Improved sight distance to pedestrians Improved lighting Rest-on-red signals</td>
<td>L L L L,L,S</td>
</tr>
<tr>
<td>Other considerations</td>
<td>Speed enforcement</td>
<td>L,S</td>
</tr>
</tbody>
</table>

- Facilities outside of the road corridors should be designed to be forgiving with minimal hazards.
- A Safe System approach ideally removes conflicts between motor vehicles and pedestrians. For example, an underpass provides an alternative crossing of a busy road.
- Where conflict between motor vehicles and pedestrians cannot be avoided, then it needs to be managed (including speed management) to reduce the incidence and severity of crashes, should they occur.
- Footpaths need to be well-maintained to improve levels of service and reduce the risk of trips, falls and stumbles.
- Pedestrian desire lines and accessibility needs to be factored in to roading design, including safe crossing points.
## Safety treatments for motorcycling

<table>
<thead>
<tr>
<th>Hierarchy</th>
<th>Treatment</th>
<th>Influence (E=exposure, L=likelihood, S=severity)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Safe System options (primary or transformational treatments)</strong></td>
<td>Incorporate motorcycle-friendly treatments into Safe system Transformation works</td>
<td>E</td>
</tr>
<tr>
<td><strong>Supporting treatments (compatible with future implementation of Safe System options)</strong></td>
<td>Incorporate motorcycle-friendly treatments into safety corridor improvements Shared motorcycle/bus/taxi lanes</td>
<td>L,S</td>
</tr>
<tr>
<td><strong>Supporting treatments (does not affect implementation of future Safe System options)</strong></td>
<td>Consistent design along the route (ie no unsigned out-of-context curves) Consistent delineation for route Skid resistance improvements Motorcycle-friendly barrier protection systems</td>
<td>L, L, L, S</td>
</tr>
<tr>
<td><strong>Other considerations</strong></td>
<td>Speed enforcement</td>
<td>L,S</td>
</tr>
</tbody>
</table>

Source: adapted from Austroads 2016 Safe System Assessment Framework
Safe System principles for maintenance

- Maintenance is a key component of the infrastructure lifecycle.
- Standards for maintenance of roads and footpaths should reflect safe system principles for all road users.
- Well-maintained roads and roadsides can reduce the risk of loss-of-control crashes, particularly those attributable to slippery surfaces, loss of seal, gravel and potholes.
- Well-maintained footpaths can reduce the incidence of trips, falls and stumbles, particularly for the elderly and people with disabilities.
- Well-maintained footpaths and cycleways encourage greater active mode use and demonstrate that the assets are valued.
Lighting and personal safety

Before and after studies show reductions in crashes of around 30% where lighting has been improved.

A comprehensive study in Auckland showed reductions in night-time crashes of:

- 33% overall
- 42% injury, and
- 67% serious and fatal.
Emerging techniques and technologies

There are a wide variety of new techniques and technologies emerging that are making road travel safer and more efficient. These include relatively simple interventions such as:

- Lane departure warning systems
- Changing traffic lights to “rest in red” at night
- Rural intersection automated warning signs
- Real time network management
- Network wide cellphone emergency response
- LED road studs for pedestrian safety
- GIS mapping of walking and cycling routes.

Longer term we can expect more advanced technologies, including:

- Connected vehicle technology that enables vehicle-to-vehicle and vehicle-to-infrastructure communications
- Autonomous emergency contact systems (eCall) which automatically dial 111 and provide digital advice such as location and vehicle occupancy after a crash
- Fatigue warning systems with camera technology to identify when a driver is tired.

Source: Ministry of Transport
What are the main risks on the network?

**Open roads**

- Impact speeds are higher so crashes more likely to be serious
- Many New Zealand roads and roadsides are unprotected so high risk of head-on or run-off road crashes, and also less reaction time and stopping distance at higher speeds
- Pedestrian and cyclist crashes more likely to be fatal
- Motorcyclist crashes are more likely to be fatal
- Many rural schools are located on open roads

**Urban roads**

- Intersection crashes
- High active mode activity, including children and elderly on roads with a 50km/h speed limit or higher.
- High interaction with land use (link and place), e.g. CBDs, residential streets, mixed-use arterials.
- High travel speeds do not align well in safe, equitable, liveable and accessible cities, where walking and cycling is safe and attractive.
- It is the Government’s objective to improve urban safety both at the school gate and on the journey to school to encourage more walking and cycling.

Source: Ministry of Transport
What is the scale of the problem in NZ?

- Our road network is long and stringy, our population is relatively low and dispersed and our natural geography is challenging. This makes our road network more difficult to maintain and improve.
- There are 94,000 kms of roads on the network (11,000 kms of State Highways and 83,000 kms of local roads)
- Most open roads have a speed limit of 100km/h, and many offer little protection if road users make a mistake.
- We have assessed the entire network using a new method called Infrastructure Risk Rating (IRR). This assesses a road’s risk based on its current form (eg, its width, curvature, roadside hazards, safety infrastructure, etc).
- This assessment shows that 55% of the rural network and almost 47% of the urban network are rated a high or medium-high risk (table below)

<table>
<thead>
<tr>
<th>Land Use</th>
<th>High</th>
<th>Medium High</th>
<th>Medium</th>
<th>Low Medium</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>32.9%</td>
<td>23.3%</td>
<td>37.1%</td>
<td>5.6%</td>
<td>1.0%</td>
</tr>
<tr>
<td>Urban</td>
<td>1.1%</td>
<td>13.4%</td>
<td>40.8%</td>
<td>39.1%</td>
<td>5.6%</td>
</tr>
<tr>
<td>All</td>
<td>25.6%</td>
<td>21.0%</td>
<td>38.0%</td>
<td>13.3%</td>
<td>5.0%</td>
</tr>
</tbody>
</table>
What is the scale of the problem on New Zealand’s road network overall?

- 12% of the network accounted for 50% of the travel (VKT) and 52% of the DSIs in 2017.
- The State Highway network has a far higher rate of deaths per km of network and the crash problem is primarily rural mid-block.
- The local road network has the greater proportion of serious injuries and the crash problem is largely urban with greater proportions of intersection and vulnerable road users.

<table>
<thead>
<tr>
<th>Factor</th>
<th>State Highway</th>
<th>Local Road</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of Network</td>
<td>12% (11800 km)</td>
<td>88% (84000 km)</td>
</tr>
<tr>
<td>Travel (vkt)</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td>Deaths</td>
<td>52%</td>
<td>48%</td>
</tr>
<tr>
<td>Serious Injuries</td>
<td>36%</td>
<td>64%</td>
</tr>
<tr>
<td>Urban / Rural split (Deaths and Serious Injuries)</td>
<td>19% / 81%</td>
<td>65% / 35%</td>
</tr>
<tr>
<td>Intersections / Midblock (DSI)</td>
<td>22% / 78%</td>
<td>31% / 69%</td>
</tr>
<tr>
<td>Pedestrians &amp; Cyclists, &amp; Motorcyclists (DSI)</td>
<td>9% &amp; 19%</td>
<td>26% &amp; 22%</td>
</tr>
<tr>
<td>Rural Head On / Run off road / Other (DSI)</td>
<td>17% / 33% / 18%</td>
<td>4% / 20% / 5%</td>
</tr>
<tr>
<td>Urban / Rural Intersections (DSI)</td>
<td>9% / 13%</td>
<td>25% / 6%</td>
</tr>
</tbody>
</table>

Source: NZ Transport Agency, 2017
Head on and loss of control crashes account for over two-thirds of all fatal crashes and 41% of all injury crashes.
Cycling crashes

- Approximately nine in every ten reported cyclist casualties occurred on urban roads (roads with a speed limit of 70km/h or less).
- Furthermore, over half of all cyclist casualties occur on major urban roads (typically busy arterials), rather than on the minor urban roads that usually provide access to adjacent properties.
- While most cyclist injuries occur on urban roads, just over 1 in 3 (35 percent) cyclist deaths occur on the open road, due to the higher impact speeds associated with crashes on these roads.
Pedestrian crashes

► More than nine in every 10 reported pedestrian casualties occurred on urban roads (those with a speed limit of 70km/h or less).

► Over half (52 percent) of all pedestrian casualties occurred on major urban roads (typically busy arterials).

► Forty-one percent happened on minor urban roads and 7 percent on roads with speed limits of over 70km/h.

► The majority (84 percent) of reported pedestrian casualties on urban roads occurred when the pedestrian involved was crossing the road.

► About two-thirds (64 percent) of these casualties occurred when the pedestrian was crossing the road in an uncontrolled area (for example, not at a pedestrian crossing or traffic lights).

Source: Ministry of Transport
The rider losing control of the vehicle is a major feature in open road motorcycle crashes.

31 percent of head-on crashes result from a rider losing control of the motorcycle.

Just over half (52 percent) of all motorcycle road deaths & serious injuries occur on urban (speed limit of 70km/h or less) roads, but three quarters (75 percent) of fatal crashes are on the open road.
Rail level crossing incidents are increasing

Snapshot of level crossings in and around Palmerston North

Level crossing rail incidents (2012–17)

Death and serious injury in rail incidents (2009–17)
What is the scale of the problem - maintenance?

- Poorly maintained roads increases the risk of loss of control crashes, notably for motorcyclists.

- Investment in maintenance over the last ten years has been decreasing.

- There is limited monitoring data for footpaths and roads

Source: Ministry of Transport
Comparison of existing speed limits and safe and appropriate speeds

- Many New Zealand speed limits are not safe and appropriate. Safe and appropriate speeds are defined as travel speeds that suit the function, use and level of safety on a road.
- Many higher speed roads do not have median barriers or side barriers to prevent head-on or run off road crashes.
- Most urban roads have a speed limit of 50km/h, which is not a safe system speed for vulnerable road users.
- 87.7% of the total network is out of alignment with safe and appropriate speeds.

**Key:** Black = 100km/h, Red = 80km/h, Orange = 60km/h, Green = 50km/h, Blue = 40km/h
Source: Ministry of Transport
How does the misalignment affect road safety outcomes?

Half of all injury crashes occurred on roads where the posted speed limit was higher than the safe and appropriate speed (SAAS). Many people travel too fast for the conditions, because the posted speed limit does not reflect the level of risk.

<table>
<thead>
<tr>
<th>SAAS compared to Speed Limit</th>
<th>Proportion of Injury Crashes</th>
<th>Proportion by Network Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAAS is lower than speed limit</td>
<td>50.7%</td>
<td>86.3%</td>
</tr>
<tr>
<td>Same</td>
<td>45.7%</td>
<td>12.3%</td>
</tr>
<tr>
<td>SAAS is higher than speed limit</td>
<td>3.6%</td>
<td>1.4%</td>
</tr>
</tbody>
</table>

In 2016, travelling too fast for the conditions was the second highest contributing factor to fatal and serious injury crashes in New Zealand. It was a contributing factor in 79 fatal crashes, 406 serious injury crashes and 1,234 minor injury crashes. These crashes resulted in 93 deaths, 512 serious injuries and 1,759 minor injuries.

The total social cost of crashes involving drivers travelling too fast for the conditions was about $879 million, which is approximately 22% of the social cost associated with all injury crashes.

The greatest responsibility for addressing the misalignment of design speeds sits with land use planners, designers, transport engineers and network operators.
We have a range of standards and guidelines that are evolving...

Source: NZ Transport Agency
How are these standards and guidelines applied?

- Standards and guidelines aim to achieve national consistency so road users know what to expect in different road environments.
- Even with good application of design guidelines, road safety projects can be difficult to implement due to their complexity, adjacent land use, other competing road functions, and designs can be compromised.
- Best-practice design can also be compromised if planning and investment processes are not well-aligned.
- Organisational and socio-political factors can also prevent safe system innovation from occurring. Therefore, ongoing research and development needs to be enabled within transport organisations to test and reflect latest best-practice approaches, and feed into existing standards and guidelines.
- New Zealand’s relatively small market makes it more difficult to attract new innovative safety products that may not comply with our current standards. This can be compounded if vendors have to follow rigorous and expensive certification procedures.

Source: Ministry of Transport
Greenfield/Brownfield challenges – integration of land use and infrastructure planning

**Greenfield and brownfield developments**

Good integration of safety at the planning stage can minimize the risks to be managed and encourage more active travel and public transport. Standards such as NZ4404 should be used more widely in new land use developments. There is evidence this is not occurring.

**Intensification**

Land use intensification should be based on smart growth principles and integrated with the provision of active mode infrastructure and PT services.

Urgent housing growth is not addressing safety considerations across Council, Developers & Government Agencies. Recommend introducing Road Safety Impact (RSI) assessments and improved consenting.

**Example:** South Auckland school on a busy 70km road opposite peri-urban subdivision with no walking facilities – lack of cross-agency integration.
What have we done during Safer Journeys?

► Implemented a targeted programme of improvements on high risk intersections and high risk rural roads.
► Extended the coverage of risk-mapping tools such as high risk motorcycle routes, high risk (out-of-context) curves and Urban KiwiRap.
► Broadened the scope and integration of geospatial risk assessment tools to better target safety improvements for all road users.
► Released a range of Guides addressing particular road safety issues.
► Demonstrated Safe System projects: e.g. Te Ara Mua/ Mangere Future Streets - urban walking & cycling improvements; Visiting Drivers - rural tourist route safety project; Coromandel Loop - motorcycle safety roading improvements, perceptual countermeasures research, rider behaviour research on high risk route.

How are we aligning our investment framework?

► The NZTA’s current way of evaluating projects can result in some worthy safety projects being assessed with a very low priority.

► The new GPS provides greater flexibility to the NZTA in its investment decision making and how it applies cost benefit appraisals. It allows for programme level evaluations. This is to ensure that the best investment decisions can be made in infrastructure, maintenance and renewals to deliver the Government’s priorities, such as improved safety and access.

► The NZTA’s new investment assessment methodology enables programmes of safety projects to be included in the 2018-21 National Land Transport Programme (NLTP) to deliver the outcomes in the new GPS.
# What infrastructure are we investing in?

<table>
<thead>
<tr>
<th>Programme</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Safer Networks</strong></td>
<td>An integrated programme is underway covering:</td>
</tr>
<tr>
<td></td>
<td>• High risk roads and roadsides improvements</td>
</tr>
<tr>
<td></td>
<td>• High risk intersections</td>
</tr>
<tr>
<td></td>
<td>• High risk motorcycle routes</td>
</tr>
<tr>
<td></td>
<td>• Speed management opportunities</td>
</tr>
<tr>
<td></td>
<td>• Level crossing safety improvements</td>
</tr>
<tr>
<td><strong>Safe Roads</strong></td>
<td>A mix of Safe System transformation works, safety corridors and safety management on high risk rural state highways.</td>
</tr>
<tr>
<td><strong>Safety Boost</strong></td>
<td>Mainly safety corridors and safety management lower-cost improvements on lower-volume regional state highways.</td>
</tr>
<tr>
<td><strong>High volume national strategic road improvements</strong></td>
<td>Mainly Safe System transformation works on high-volume state highways</td>
</tr>
<tr>
<td><strong>Top 100 high-risk intersections</strong></td>
<td>A targeted safety improvement programme over a number of years.</td>
</tr>
<tr>
<td><strong>Local roads</strong></td>
<td>A targeted programme addressing high risk intersections, high risk corridors, and high risk urban arterials.</td>
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<tr>
<td><strong>Urban Cycleway Fund</strong></td>
<td>An investment programme in safe cycle networks in main urban centres.</td>
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How are we designing and planning for communities?


Future Streets, Auckland – integrated community-led retrofitting pilot project to allow for safer walking and cycling, initial results show speeds have reduced and walking/cycling increased.

New Regent St, Christchurch – shared slow street for trams, pedestrians and cyclists with outdoor café areas and street seating.

Source: Future Streets – Te Ara Mua, Pt England, Auckland, and Christchurch CC
How are we designing and planning for pedestrians?

Raised intersection & pedestrian crossing platform
Case study – State Highway 1 (Centennial Highway)

A 3.5 km long median safety barrier was installed on State Highway 1 Centennial Highway, just north of Wellington, in 2005. This was a particularly treacherous piece of road – in the 4 years to 2000 it recorded 8 fatalities, 2 serious injuries and 7 minor crashes. Between 2001-2004, the passing lanes were removed and road markings, reflectors and signs were increased, yet it still saw 4 fatalities, 2 serious injuries and 2 minor injury crashes.

In the 13 years from 2005 to 2017, following the installation of a flexible median safety barrier and lowering the speed limit to 80 km/h, there were no fatal crashes, and only 3 serious and 13 minor injuries on the road.

Case study: Federal Street Polka Dots Slow Drivers

- Tactical urbanism is a low cost way of creating a slower, safer city street environment.
- The painted Polka Dots stand out against the bland road surface grabbing drivers’ attention, heightening their awareness of cyclists and pedestrians, and causing them to slow down.
International case study: Sweden

2+1 roads

- First built in 1998
- Built on existing 13m wide roads
- Around 80% reduction in fatalities
- Popular among road users

Widespread investment in wire rope barriers was the main intervention that made a difference

International case study: New York City

Examples of NYC streets transformations from 2007-2013 under the leadership of Janette Sadiq-Khan.

- The volume of pedestrians in Times Square increased by 11 percent, with 63 percent fewer injuries for car riders and 35 percent fewer injuries for pedestrians.

Source: https://www.pbs.org/newshour/nation/urban-designers-transformed-these-five-plazas-into-pedestrian-paradise
Melbourne has the largest surface Light Rail network in the world – its 250km tram network carried 204m passengers in 2015/16, compared to 233m on the 830km train network and Buses moved 122m.

Its low speed surface placement creates a perfect mix between pedestrians and big Light Rail vehicles which defies the scale imbalance.

An excellent example of Safe Mobility, increasing both Place & Movement for high streets.
International case study: Seoul, Korea

1970

2005
International case study: Barcelona, Spain

Road hierarchy in a Superblock model

CURRENT SITUATION

SUPERBLOCK

Source: https://citiesofthefuture.eu/superblocks-barcelona-answer-to-car-centric-city-f42522bd83ff
What have we learned?

- We know what works. Investment in proven safety treatments plays a critical Safe System role in lessening the impacts when people make mistakes. However, current road trauma statistics suggest we are not investing enough to make a step change.

- New guidelines & demonstrations have been developed, but we need to upscale capacity and capability, particularly for speed management and vulnerable road users.

- New risk-mapping tools have been developed, but there is a need for ongoing evaluation and performance measurement tools.

- There are opportunities to better integrate Infrastructure, design, planning and maintenance to improve safety and mobility outcomes.

- We can still improve how we assess investment proposals and how we plan and deliver road safety at the regional level.

- Greater short-term progress can be made by allowing agile technology & low cost innovation.

- While high-level Safe System principles have gained support, the detail of what this requires planners, designers, engineers and operators to do differently at a street level is less well understood. The transport profession will be the most influential determinant of Safe System success and therefore require permission and courage to gain confidence in its application, including making and learning from mistakes, and collaborating with other sectors.
If we want to adopt Vision Zero we must tackle....
References

- Field, Davies, King, McKegg (2018) Signature Programme Evaluation – Reflections to 2018
References

- OECD/ITF (2016) Zero Road Deaths & Serious Injuries, Leading a Paradigm Shift to A Safe System
- United Nations (2013) Creating universal access to safe, clean and affordable transport
- Austroads (2017) Safe System Infrastructure on Mixed-Use Arterials
- Austroads (2016) Safe System Assessment Framework