

Resilience insights for strategic and programme business cases

July 2017

Useful guides have been produced for those developing strategic and programme business cases with resilience issues.

The guides, developed after reviewing many strategic and business cases and guides, include resilience-focused insights and examples. They are provided to assist anyone developing a strategic or programme business case that has resilience issues to incorporate. You can find them in the Resilience - getting through section of the Transport Agency's Highways Information Portal website, in the tools page.

Strategic business cases

GOOD PROBLEM STATEMENTS ARE VITAL

If there is a resilience problem on the corridor, it is critical that it is captured correctly in the problem statement. If resilience is not captured in the problem statement, it will be difficult to add it later in the process, or to invest in resilience. The problem statement informs the benefits, investment objectives, and the performance measures. Problem statements are developed by considering cause and effect and should be specific to the project. Some examples are shown in the table below:

What is resilience

When talking about resilience it is important to define what is meant by resilience, as it can mean different things to different people. We define resilience as 'the availability and restoration of road function when there is an unplanned disruptive natural environment or emergency event (eg crashes), including whether there is an alternative available and road user information is provided'. Or 'keeping roads open (as much as possible) during an unplanned disruptive event so people and businesses can make the trips they need'. Resilience is not about managing congestion or traffic jams.



Flooding in Dunedin

CAUSE	CONSEQUENCES
<p>SH1 has sections that are prone to closure from natural events (extreme rainfall, sea surge, earthquakes).</p> <p>The remoteness and mountainous terrain of some sections of the state highway is such that it is particularly vulnerable to closure from slips, snow/ice and road crashes (eg lack of alternative routes, topography, bridge pinch points, poor alignment and narrow width, and slow response times to move larger vehicles).</p> <p>Lack of practical alternative routes when main route is unavailable.</p>	<p>Adverse economic impacts for local businesses.</p> <p>Disruptions to freight and visitor traffic.</p> <p>Negative effects on emergency services access and response.</p> <p>Community severance - disruptions to telephone and other infrastructure network leading to loss of local communications and connectedness.</p>

BENEFIT STATEMENTS MUST HIGHLIGHT VALUE OF ACTING

The guidance for developing any benefit statements suggests considering the following questions:

- Are the benefits of high value to the organisation (furthering its objectives)?
- Have the benefits that will result from fixing the problem been adequately defined?
- Will the performance measures (KPIs) that have been specified provide reasonable evidence that the benefits have been delivered?
- Is there a logical connection between the effect of the problem and the benefits, and their KPIs?

Examples of benefit statements

The following are examples from recent strategic cases. Benefit statements are rather brief, value focused and should be tangible, achievable and related to the problem statements. Resilience examples include:

- Improve route availability enables economic growth.
- Reduced economic impact of road closure.
- Minimised economic impact of closures from high impact/low probability events.
- Improved regional resilience gives wider network availability.

EARLY EVIDENCE BASE FOR DISCUSSION

The purpose of the evidence base is to inform the development and assess the robustness of the problem and benefit statements from current information and stakeholder knowledge. It is not expected to be complete but should acknowledge the gaps and identify areas of focus for future information needs, should the business case progress. There is a range of useful information and evidence available on the Transport Agency's HIP resilience site.

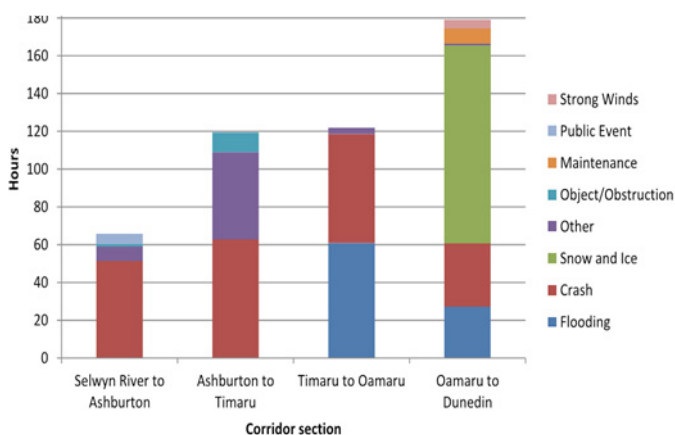
In developing the evidence base, the following points should be considered:

One Network Road Classification (ONRC): It gives an indication of the importance/criticality of the road and some initial descriptive customer levels of service expectations.

Recent history: The Traffic Road Event Information System (TREIS) is a useful source of information for road closures and disruptions, although the data will usually need cleaning before it can be used. Extract at least 5 years of data on the type of events, duration of outage, and if possible estimated frequency or return period. Local flooding registers are often held by regional councils which can be useful.

EXAMPLE OF EVIDENCE BASE INFORMATION

30 November 2010–30 November 2015 (TREIS)



Low frequency events: For low probability, high impact events consider how probable various magnitude events will be – and what duration the outage could be (see HIP site for hazard exposure maps and case study).



Major slip (#8) near Waipapa, north Kaikōura coast

Community sources: Engaging with the public and key stakeholders can provide good local information on the impact of an event – media reports can provide useful information on road outages.

Detour routes: Check what the (extra) distance and duration are, and what risks or limitations do the detour route face including possible concurrent disruption to the main route, can all modes of travel use it, does it have capacity.

Disruption impact: Information on the social, economic and safety impacts of a disruption can be found on MapHUB. What type of freight relies on the corridor, is the freight sensitive (perishable), can it use other routes, can high productivity motor vehicles use the detour routes? What are tourist numbers, how would they change, what would the impact be (MBIE, Statistics NZ or TLA websites).

Customer information: Are customers able to be informed before, during and after an event?

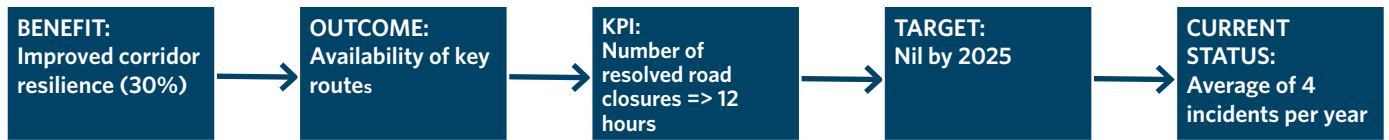
Potential asset damage: Consider impacts on the road infrastructure, including undermining the road foundation or loss of sealed surface and sediment blocking streams or culverts.

Criticality and interdependence: Are there life lines networks along the corridor; does the corridor access hospitals or other key emergency or essential community services.

PERFORMANCE MEASURES

The performance measures (KPIs) are to later assess whether or not the expected benefits have been achieved, and the level of return on the investment. The links between the problem, benefit, key performance indicator and the selected intervention must be clear:

This will require baseline information for each KPI, so that it can illustrate the impact of the investment over time.



Examples of KPIs and measures

- Number of resolved road closures >2 hours, and >12 hours.
- Number and duration of closures.
- Projected isolated time.
- Projected time to reopen route.
- Improved recovery timeframes.

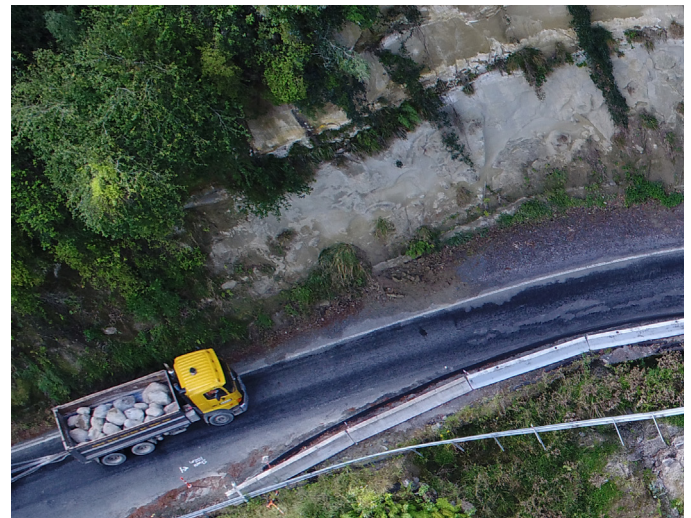
Programme business cases

BUILDING ON THE EARLY EVIDENCE BASE

Availability profile: Outage statistics should be reported along the lines of the ONRC metrics, but also extend to report on distribution of outage durations. It is noted that there are few useful targets or acceptable thresholds defined in the ONRC for its metrics, and only relative comparison is encouraged. Note that the resilience project has also provided further definition of level of service and the thresholds of when particular levels of interventions are reasonable.

Digging deeper: As well as greater investigation of the high frequency disruptive events, you particularly need to consider low frequency/high impact events in more detail, considering a wider range of return periods and magnitudes and mechanisms of failure causing the network outage. Also detail regarding the variety and combinations of the disruptive events need assessing. You also need to discuss the extent of the outage for the scenarios you are assessing: does it affect all of the traffic lanes, are all vehicle types disrupted.

Interdependency: Consider the interdependency of other infrastructure services, particularly Lifelines networks. Do industries such as telecommunications, water and electricity or emergency services rely on access to their



Slip on SH4, June 2015

facilities via your route to help in the recovery following an event? What are the priorities for re-opening to facilitate multi-front or key services response activities.

Detour routes: You need to consider whether there are viable detour routes to the corridor (or section of the corridor) that you are considering. 'Viable' should include considering the length and travel time of the detour, whether it has capacity for the additional demand, and whether all vehicles are able to use the route, and whether it is susceptible to the same event closing the main corridor.

One Network Road Classification

The One Network Road Classification (ONRC) is a classification system, which divides New Zealand's roads into categories based on how busy they are, whether they connect to important destinations, or are the only route available:

High Volume	Primary collector
National	Secondary collector
Regional	Access
Arterial	Low volume

For more information see the [ONRC web page](#)

Local road ONRC will appear when you zoom in.

Note, some roads are missing or are incomplete and will appear over time as data becomes available. ONRC displayed in this map represents the regional

INVESTMENT OBJECTIVES - THE PROMISE TO OUR CUSTOMERS

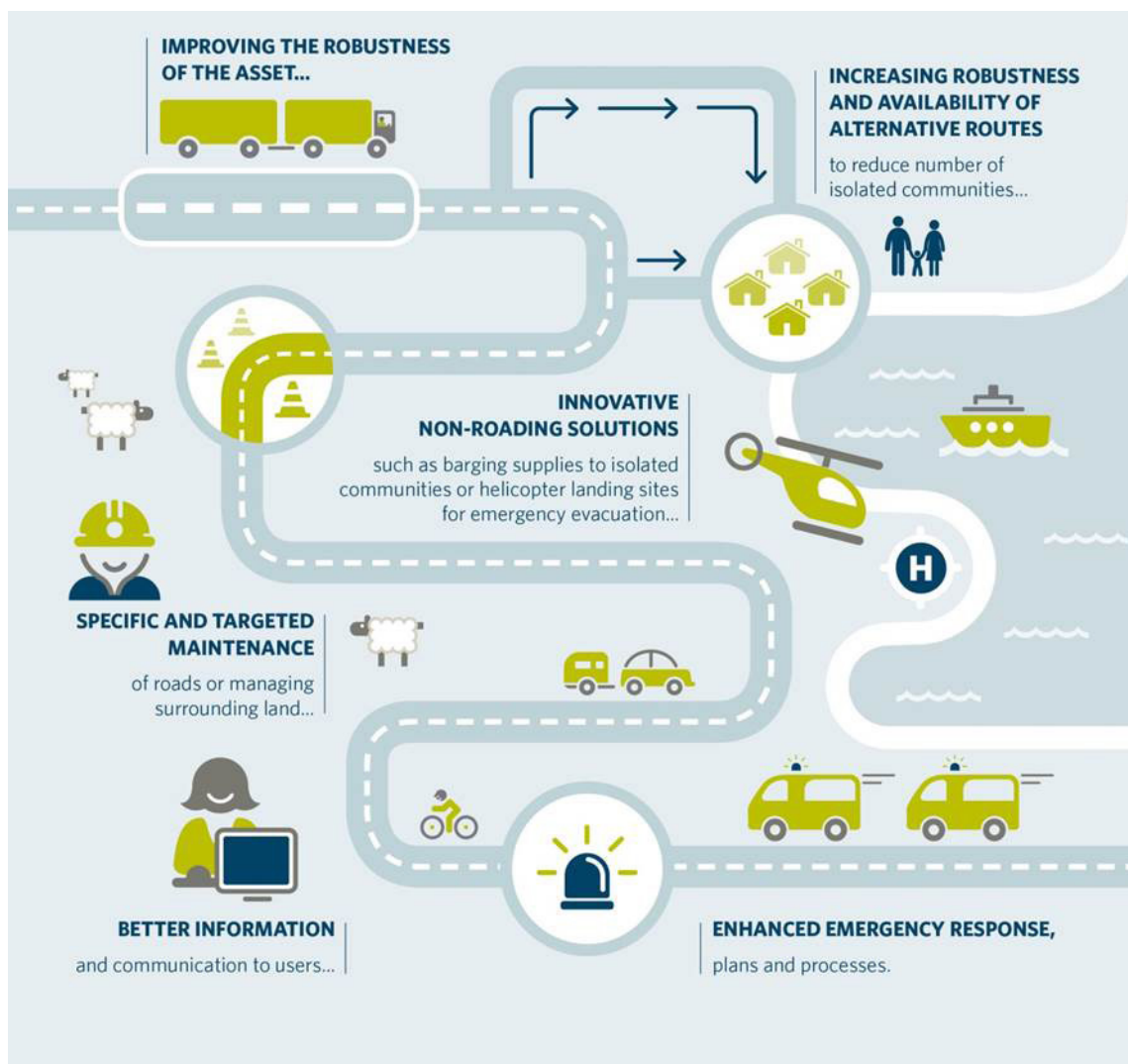
The investment objective will guide what the recommended programme will look like. It should therefore be specific and measurable. A good example of an investment objective is - we will steadily reduce the number (and duration) of unplanned incidents on the route so that it has no full closures resulting in a delay of more than 2 hours by 2030.

FINDING THE BEST VALUE RESPONSES

When considering responses, within a programme business case, be sure to consider the whole range of options based on a hierarchy of interventions. This could include improved maintenance, operational changes, signage, alternative modes (including rail), traveller information, strategic land

use planning and emergency response plans, as well as capital improvements. There are many times when the most pragmatic and efficient response is not a capital improvement.

Assessment of reduction of network disruptions (numbers and durations) needs to be explicit in terms of which and how a cause is targeted and the expected (justified) effect of the intervention, including consideration and recommendations on the residual risk of future disruption.



For further information visit the NZ Transport Agency website
www.nzta.govt.nz/roads-and-rail/highways-information-portal/technical-disciplines/resilience-project/
or email resilience-infrastructureplanning@nzta.govt.nz.