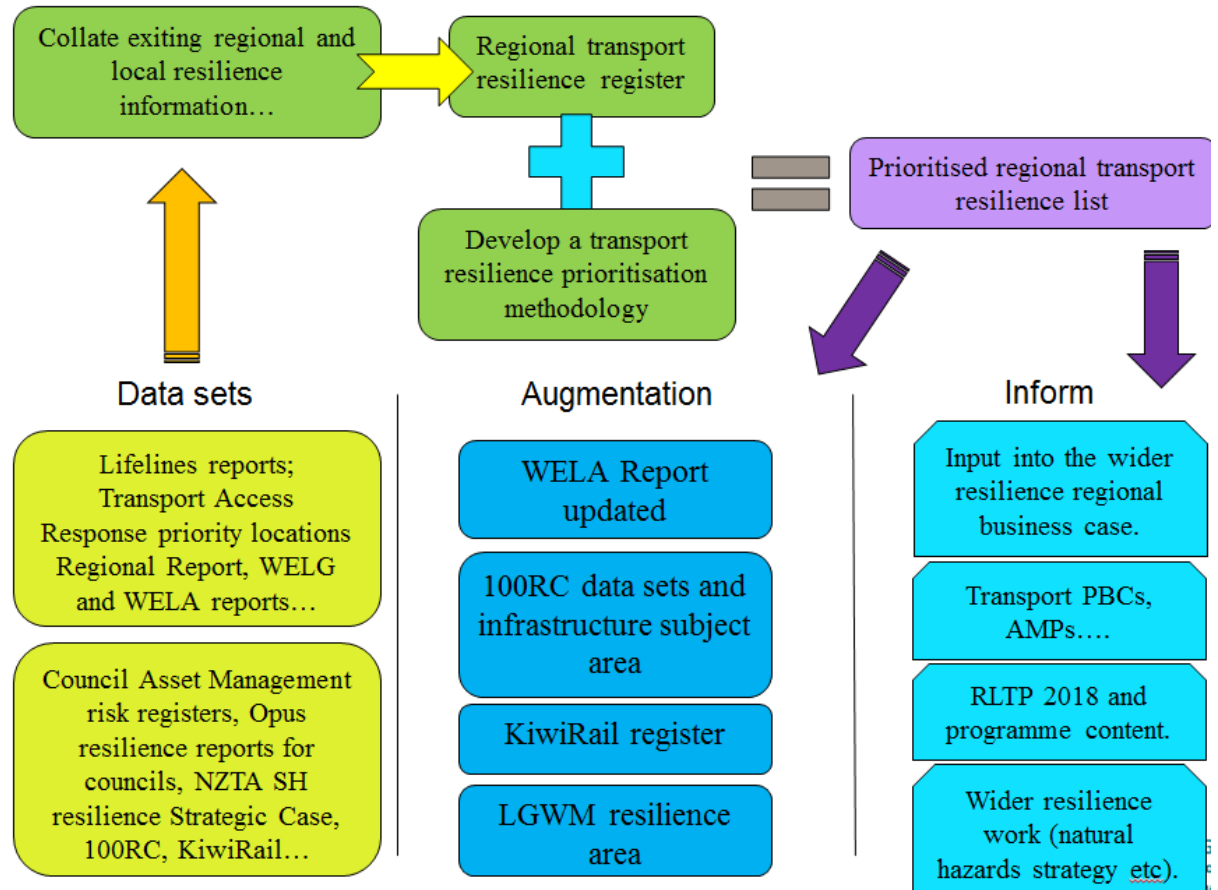


Regional Transport Prioritisation Programme Business Case- summary methodology

1. Project architecture and process

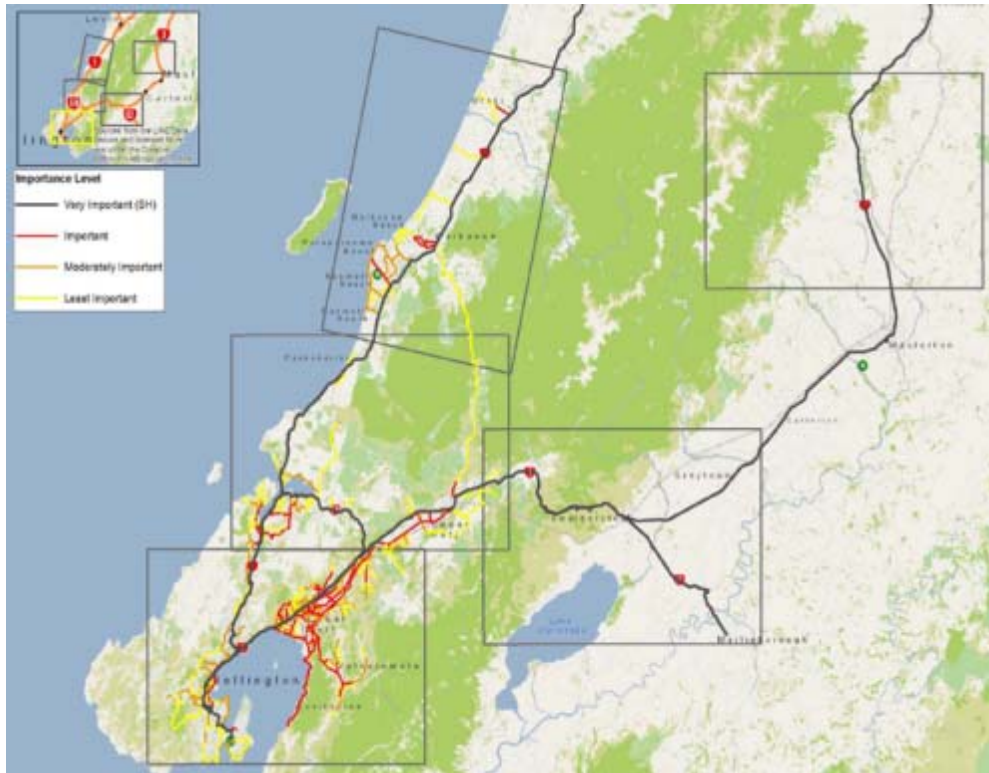


The methodology can be summarised as follows:

1. Collate and utilise existing datasets (these are list at the end of this summary). This importantly includes existing work undertaken on behalf of Councils by Opus International Consulting ltd to assess road transport network resiliency importance.
2. Combine the pre-existing “importance” assessment GIS layers for each council and the Agency. Some gaps are filled in KCDC, UHCC and Wairarapa. This creates a regional scale resiliency importance map.
3. 4 levels of importance were defined
 - Very important (generally state highway),
 - Important,
 - Moderate and
 - Least.

Importance takes account of the number of users, links to Lifeline response priority locations etc. The statement that “all” state highways were important was challenged (e.g. SH 53) and revised as a result.

The assessment and coverage looks something like the map illustration below.



4. The resilience availability status for the transport network is also already known and agreed for various event types (especially Tsunami and Seismic events) from previous work.
5. Combine this “availability” with the outage state (time and degree of outage, all lanes partially etc) to create a “Disruption state” as described in the table below.

Disruption State

Disruption State		Outage State				
		Open 1	< 3 days 2	3days -2wks 3	2wks - 3mos 4	>3 mos 5
Availability	Full (1)	1	1	1	1	1
	Poor (2)	1	2	2	3	4
	Single Lane (3)	1	2	3	4	5
	Difficult (4)	1	3	3	4	5
	Closed (5)	1	3	4	5	6

6. Combine these two GIS layers (importance + disruption). This gives you basic “Criticality” for the transport network (see below)

Criticality

Criticality		Importance Level			
		Least Important (1)	Moderately Important (2)	Important (3)	Very Important (4)
Disruption State	1-None	1	2	3	4
	2 Limited	2	4	6	8
	3 Moderate	3	6	9	12
	4 High	4	8	12	16
	5 Severe	5	10	15	20
	6 Extreme	6	12	18	24

7. This assessment process is undertaken for each hazard type (Seismic, Tsunami).
8. Each hazard layer is combined in order to reflect locations at vulnerable to multiple hazards.
9. There is a need to recognise and consider other elements such as multi modal impacts (alternative routes, multiple impacts on numerous modes and networks etc), the combined effect on utilities (water, electricity, gas) in the same corridor. These factors are added to the basic “criticality” rating for all hazards
10. Once these factors are added to the basic criticality it illustrates overall vulnerability and priority locations based on multiple exposure, criticality and effects on utilities, multiple modes etc.
11. The priority list takes the maps that display overall criticality by severity and tabulates them from extreme, then severe through high to moderate and onwards.
12. Each segment of the transport network or specific location is displayed by its overall criticality. Below is a segmented network map then detailed location map for comparison.



The map above shows how the segments of the transport network (e.g SH1 Ngauranga Gorge) might be rated as critical (red) yet in reality as the more detailed map below illustrates the vulnerability is in only two isolated locations (red). It is important that the maps are used together in this fashion with the priority list to be able to identify the correct intervention.



Base data sets, agreed evidence – details of some of the data sets used includes:

DOCUMENT	AUTHOR	OWNER	NOTES
WELA Project report - "Risk to Lifelines from Natural Hazard," (2003)	Lifelines	Lifelines / WELA / WeLG / WREMO	Wairarapa lifelines report, largely Seismic related but not limited to this and discusses a range of natural hazards.
Tsunami Impacts to Lifelines draft	Lifelines	Lifelines / WELA / WeLG / WREMO	Also associated damage tables.
WeLG project - priority road routes in an emergency	Lifelines	Lifelines / WELA / WeLG / WREMO	Recent work seeking to discuss how and if to provide access to key regional recover locations.
Project report - 'Telecommunications sites recovery'	Lifelines	Lifelines / WELA / WeLG / WREMO	
Restoring Wellington's transport links after a major earthquake	Lifelines	Lifelines / WELA / WeLG / WREMO	March 2013
Wellington Lifelines Group 'Restoration	Lifelines	Lifelines / WELA / WeLG /	Nov 2012

Times' report – November 2012		WREMO	
Wellington Region Road Network Earthquake Resilience Study	Opus	NZTA, Kapiti Coast District Council, Upper Hutt City Council, Porirua City Council, Hutt City Council, and Wellington City Council	Opus has produced a series of local council specific reports and maps as a subset of this main report.
Wellington Region Natural Hazards Management Strategy (DRAFT)	GWRC	GWRC	Draft status and in development.
Regional Land Transport Plan 2015	GWRC	GWRC	Sets the regional strategic case and issues for transport resilience
State Highway Resilience Strategic Case	NZTA	NZTA	
State Highway Network Resilience National Programme Business Case	NZTA	NZTA	
Local Road Asset Management Plans	Councils	Councils	Road Controlling Authorities AMPs across the region.
SHAMP	NZTA	NZTA	NZTA state highway AMP across for the region.
Stability of Land in Dynamic Environments (draft)	GNS	GNS	Draft research project in its early stages
GIS layers by district, council and region. This has been combined into the "WAGGIS List" and represents Hazards GIS data for WELG.	various	GWRC NZTA	GWRC have acquired numerous GIS mapping layers for various event types including seismic, tsunami, flood, Sea Level rise, liquefaction, slips / slopes. Mapped locations of faults, slopes etc Mapped infrastructure networks and recovery locations NZTA has GIS layers for the following: ONRC classifications for local roads and state highways State highway bridges and structures

			<p>Resiliency routes</p> <p>Hazard incidents and warning areas from TREIS</p> <p>Travel detour information</p> <p>Kiwirail assets</p> <p>Resilience costs for maintenance on state highways</p> <p>There are also other layers that NZTA holds that may assist this project</p>
100 Resilient Cities (draft work to date)	100 RC	100 RC - Mike Mendoca	Early draft and finds of various workshops to date. Identifies, issues, subject areas of concern etc.
KiwiRail - internal risk register	KiwiRail	KiwiRail	Contact - Michael McKeown Michael.McKeon@kiwirail.co.nz
Measuring the resilience of transport infrastructure	JF Hughes and K Healy AECOM New Zealand Ltd	NZTA	NZTA research report 546 February 2014.