1.1.3 Deaths and serious injuries

We provide these methodologies and tools to help you in forecasting benefits measures from the Land Transport Benefits Framework. We are developing and refining them over time, and you can provide feedback by emailing us at investment.benefits@nzta.govt.nz.

Before using this forecasting methodology, read the information about this benefit measure in the Land Transport Benefits Framework measures manual.

Cumulative forecasts

Due to the nature of deaths and serious injury data and crash occurrences, the forecasts and the monitored data will be provided as a five-year cumulative number (rather than a single year of data).

Monitoring period

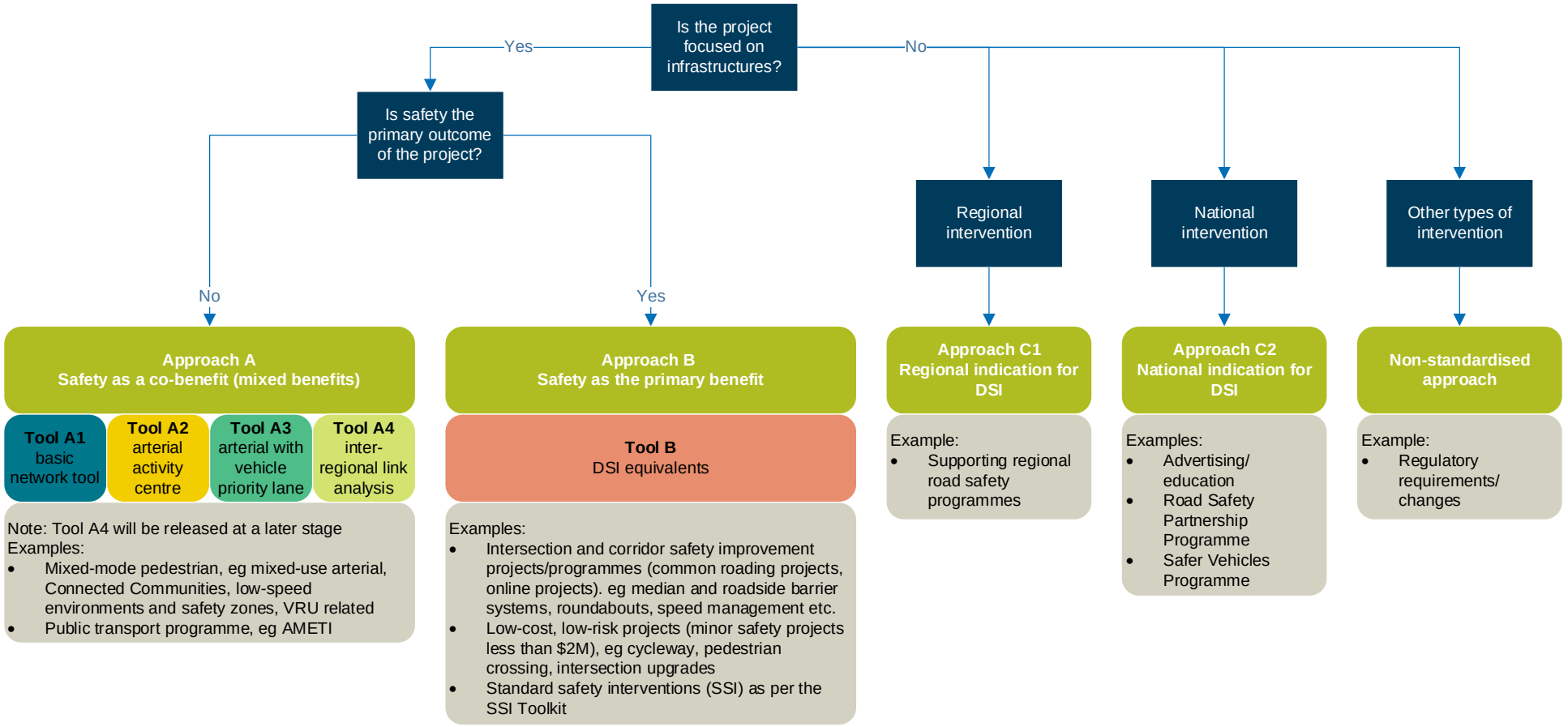
Due to the use of a cumulative number, the monitoring period selected for the DSI measure must be a length of at least five years.

Deciding which forecasting method to use

There are a number of potential tools that can be used to forecast deaths and serious injuries. A forecasting decision tree is provided below.

The key decisions to be made involve whether safety is the primary outcome, whether the investment is about infrastructure, and whether it is a national or regional intervention.

Please note that instructions are provided to assist with tools A1, A2, A3 and B. There are not currently any tools provided centrally for A4, C1, C2 and non-standardised approaches. In these instances, please use an accepted local alternative for forecasting the impact of the investment.


Is the project focused on infrastructures?
Yes
No
Is safety the primary outcome of the project?
No
Yes
Regional intervention
National intervention
Other types of intervention
Approach A
Safety as a co-benefit (mixed benefits)
Tool A1 basic network tool
Tool A2 arterial activity centre
Tool A3 arterial with vehicle priority lane
Tool A4 inter-regional link analysis
Note: Tool A4 will be released at a later stage
Examples:
• Mixed-mode pedestrian, eg mixed-use arterial, Connected Communities, low-speed environments and safety zones, VRU related
• Public transport programme, eg AMETI
Approach B
Safety as the primary benefit
Tool B
DSI equivalents
Examples:
• Intersection and corridor safety improvement projects/programmes (common roading projects, online projects). eg median and roadside barrier systems, roundabouts, speed management etc.
• Low-cost, low-risk projects (minor safety projects less than $2M), eg cycleway, pedestrian crossing, intersection upgrades
• Standard safety interventions (SSI) as per the SSI Toolkit
Approach C1
Regional indication for DSI
Example:
• Supporting regional road safety programmes
Approach C2
National indication for DSI
Examples:
• Advertising/ education
• Road Safety Partnership Programme
• Safer Vehicles Programme
Non-standardised approach
Example:
• Regulatory requirements/ changes

The tools and how to use them

After determining which tool will be best suited to your investment, open the appropriate tool through the links provided in the 'Tools and resources' section of the Land Transport Benefits Framework measures manual page on our website.

Please note that examples are provided in each of the tools that will need to be overwritten.

Please save a new copy of the tool to your desktop each time you use it for a new investment.

A1 – Basic network tool

This tool is a spreadsheet in which you enter a number of variables in the 'Do Minimum & Options' tab to determine the forecasting outputs.

This forecasting tool has been developed to estimate DSI and DSI savings for a small urban road network. The tool can be used to estimate DSI savings expected from network level safety treatments such as speed limit reduction, traffic calming devices or introducing pedestrian and cycle facilities. The road network has been grouped by One Network Road Classification (ONRC) and can include residential and commercial roads. Default ONRC road characteristics are provided in Table 1. Where possible, aerial imagery or google maps should be used to inform the network characteristics and inserted as the network map. Roads with similar characteristics can be grouped together. For example, if all access roads in the network have the same land use/speeds then they should be grouped together.

User instructions are included in the tool.

You will need to enter the following information:

- total length of the road in each ONRC category
- road user volume estimates
- treatment option(s)
- local government area
- year when project is effective
- monitoring period.

A2 – Arterial activity centre

This tool is a spreadsheet in which you enter a number of variables in the 'Do Minimum Assessment' and 'Options Assessment' tabs to determine forecasting outputs, which are summarised in the 'Summary' tab.

This forecasting tool has been developed to predict DSI and DSI savings for arterial activity centre corridors. The tool can be used to estimate do minimum DSI and DSI savings expected from corridor level safety treatments such as speed limit reduction, traffic calming devices or introducing pedestrian and cycle facilities. A corridor can be segmented by intersection and links to predict injury crashes more accurately.

Note: The workbook assumes that the average operating speed across the selected road network is similar to the national average operating speed (approximately 42km/h) on all urban roads nationally. Where there is a lot of variability in the operating speeds across the network, due to varying cross-sections or congestion, this is acceptable as long as the overall average network speed is consistent with the national average. Where all the roads in the network are narrow, wide or congested then the overall average network operating speeds may be considerably above or below the national average and the predicted DSI values (and applied severity factors) may not be appropriate. In this case care must be taken when using the DSI predictions, as the risk may be

higher or lower due to the operating speeds. Furthermore, if high-occupancy lanes or bus Lanes are considered then the A3 tool should be used.

User instructions are included in the tool.

You will need to enter the following information:

- road segment/intersection data
- crash prediction model type
- speed limit
- vehicle, pedestrian and/or cycle volumes
- treatment option(s).

A3 – Arterial with vehicle priority lane

This tool is a spreadsheet in which you enter a number of variables in the 'Do Minimum Assessment' and 'Options Assessment' tabs to determine forecasting outputs, which are summarised in the 'Summary' tab.

This forecasting tool has been developed to predict DSI and DSI savings for arterial activity centre corridors with high occupancy vehicle (HOV) or bus lanes. The tool can be used to estimate do-minimum DSI and DSI savings expected from corridor level safety treatments such as speed limit reduction, traffic calming devices or introducing pedestrian and cycle facilities. A corridor can be segmented by intersection and links to predict injury crashes more accurately.

Note: Research on the safety impact of special purpose lanes (bus lanes and T2/T3 lanes) is limited locally and internationally. Generally, the research shows an increase in crashes. The level of increase depends on a number of factors, including level of road-side development (such as turning movements across lane), number of vulnerable road users and travel speeds by buses and cars using such lanes. Ideally New Zealand based safety analysis should be used to supplement the overseas crash modifying factors.

User instructions are included in the tool.

You will need to enter the following information:

- road segment/intersection data
- crash prediction model type
- speed limit
- vehicle, pedestrian and/or cycle volumes
- treatment option(s).

B – DSI equivalents

This tool is a spreadsheet to determine DSI equivalents based on crash data held in the Crash Analysis System (CAS), and forecasts of changes in injury crashes as a result of interventions. The DSI equivalents are summarised at the bottom of the 'Intervention Forecast Assessment' tab. The tool also derives the Infrastructure Risk Rating (IRR) for the corridor or intersection.

DSI severity indices are embedded in road safety practices throughout New Zealand. Using the DSI severity indices risk estimation approach is industry-accepted best practice method for estimating the likelihood of future DSIs. The severity indices are documented in national guidance, utilised in identifying road safety risk on the network and are often used in determining the crash cost savings associated with implementing road safety interventions.

DSI severity indices represent the average number of people killed and seriously injured for every reported injury crash. Severity indices are commonly calculated for different speed environments, intersection and midblock locations, different intersection controls, different road user groups and

for different crash movement types. For the latter, the severity indices are associated with the primary CAS movement code – the first letter of the two-letter crash movement code.

User instructions are included in the tool.

You will need to enter the following information:

- Crash Analysis System (CAS) data for the last 5 or 10 years
- traffic volume information (AADT – annual average daily traffic)
- corridor length measurement for the section under consideration
- details of proposed intervention
- crash analysis period
- forecast year when intervention is effective
- monitoring period.