

## Land transport Benefits Framework measures forecasting methodologies

# Travel time and travel time delay measures

This forecasting methodology covers:

- 5.1.3 Travel time delay
- 10.1.2 Pedestrian delay
- 10.1.9 Travel time

These three measures are based on the forecasting of travel time and so have been grouped together as the methodologies are similar.

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](mailto: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](#).

## Model assumptions

The models provided are reasonably simple to apply and can produce an order of magnitude effect while simultaneously placing the results within some sort of error margin or confidence interval. They are suitable for more generic projects or even of a quick assessment of travel time benefits.

Estimating benefits for large and complex projects where travel time benefits constitute a large proportion of the project's benefits requires detailed models that are tailored to the specific characteristics of the project.

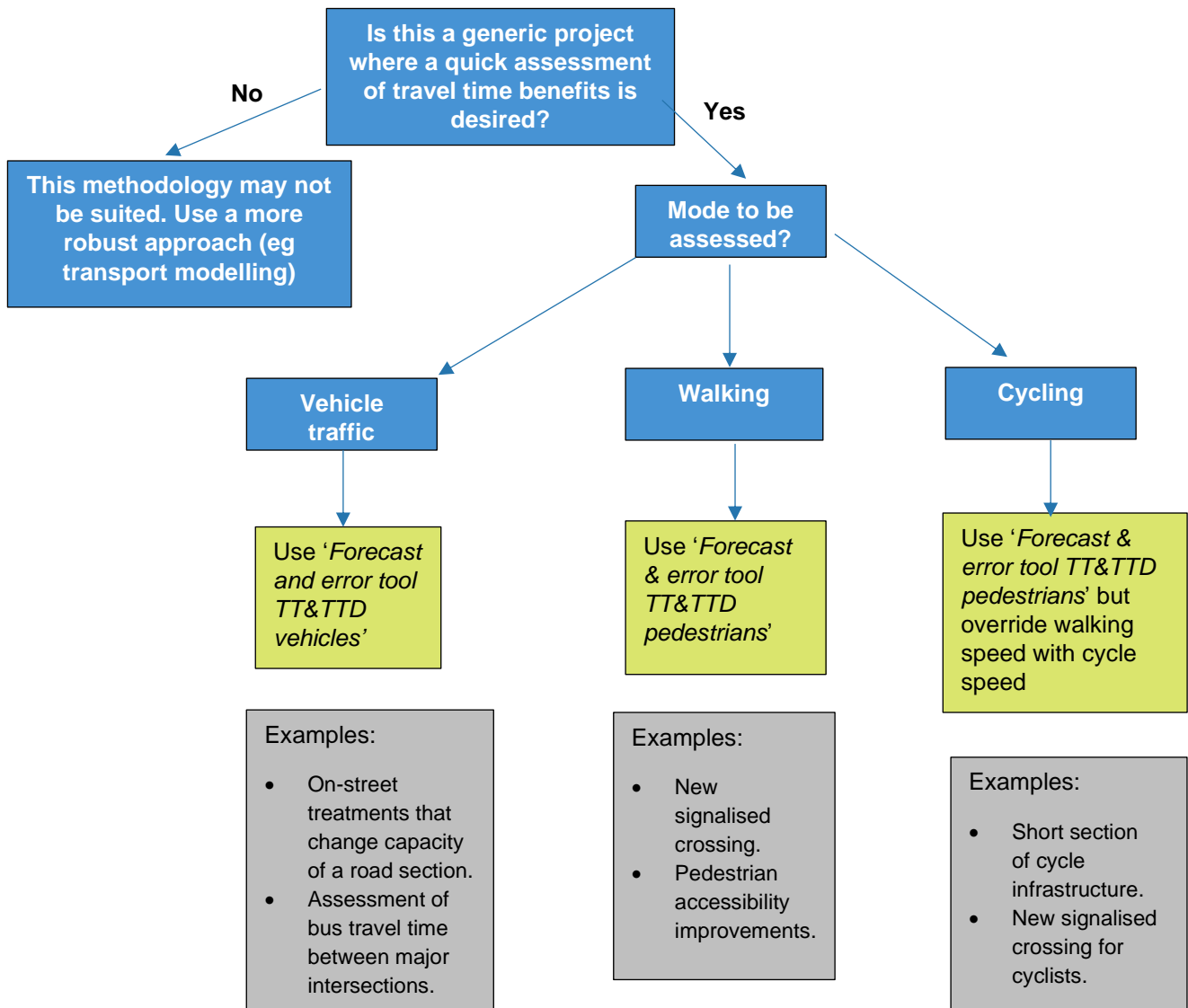
There are various assumptions that underpin the volume-capacity and pedestrian-cyclist model. Further information on these assumptions is given in '[Modelling travel time and travel time delay](#)' by Infometrics.

## Deciding which forecasting method to use

There are a number of potential tools that can be used to forecast travel time delay. You can use the decision tree below to help you decide which is right for your project.

The key decisions to be made involve whether travel time delay is the primary outcome of the project, and the mode type.

Note that instructions are provided to assist with the volume-capacity model and pedestrian-cyclist model. There are not currently any tools provided centrally for non-standardised approaches. In these instances, please use an accepted local alternative for forecasting the impact of the investment.



## 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.**

For more generic projects or even if a quick assessment of travel time benefits is desired, it is efficient to be able to apply reasonably simple models that can produce an order of magnitude effect while simultaneously placing the results within some sort of error margin or confidence interval.

The tools described below have been established to do this for:

- road vehicles (Forecast and error tool TT&TTD vehicles)
- pedestrians and cyclists (Forecast and error tool TT&TTD pedestrians).

## Forecast and error tool TT&TTD vehicles

This tool uses the relatively simple standard Bureau of Public Roads (BPR) function that relates travel time to traffic flow.

User instructions are included in the tool.

You will need to enter the following information:

- road or lane capacity flow ( $Q_c$ ) veh/hr/lane
- base year actual Flow ( $Q$ ) veh/hr/lane
- base year and forecast year (the difference between these is used to estimate forecast traffic flow)
- distance of road segment (km)
- mean speed (km/hr)
- road type (there is a drop-down list in the tool; this determines the BPR parameters)
- intervention road or lane capacity flow ( $Q_c$ ) veh/hr/lane
- intervention estimated flow ( $Q$ ) veh/hr/lane.

Outputs provided are:

- the difference between travel time in the forecast year and travel time in the base year – each relative to free flow travel time
- the change in travel time delay – the change in delay resulting from the proposed intervention, that is the change between the do-minimum and intervention scenarios
- error margins.

## Forecast and error tool TT&TTD pedestrians

This model includes the two factors that have the largest effect on pedestrian travel time, namely individual walking speed and delays caused by having to wait to cross a road or intersection.

This tool may also be applied for cycling, by changing the walk speed input to an appropriate cycle speed.

User instructions are included in the tool.

You will need to enter the following information:

- local authority/geographic area
- forecast year
- monitoring period.

For both the do-minimum and intervention:

- length of segment (metres) (note that data can be added for multiple segments)
- walking speed (metres/minute)
- adjustment factor for congestion
- signalised intersection data
  - total signal cycle length (seconds)
  - signal red 'do not cross' time (seconds)
- unsignalised intersection data
  - critical time needed to cross (seconds)
  - mean number of conflicting vehicles passing the crossing point per second.

The output provided is the difference in delay between the do-minimum and the intervention scenarios in the forecast year, including error margins. This assumes:

- there is no capacity constraint for the arrival rate of pedestrians at the crossing point at signalised crossings
- there is no change to signal cycle times at signalised crossings.