



# Understanding that a merge is like an old car, eventually it will breakdown.

By Luke Reeves

A merge can be regarded as a source of conflict, congestion and bottlenecks which can create delays. These issues occurred frequently along SH1 between the Memorial Avenue and Sawyers Arms Road roundabouts outside Christchurch International Airport during the PM peak period (4-6pm) when traffic volumes are at their greatest.

## THE PROBLEM

Traffic counts in 2012 indicated that the volume of traffic exiting left out of Mcleans Island Road and combined with the traffic heading north on SH1 are in excess of an empirically derived merge capacity of between 1200 and 1400vph. This high volume of traffic caused the merge at Mcleans Island Road to breakdown. This resulted in delays to northbound traffic, queuing of vehicles south and caused reverse priority at the Mcleans Island Road intersection to occur, this resulted in a vicious and compounding cycle throughout the PM peak period.



## THE TRIAL

The Transport Agency conducted an efficiency trial at the Mcleans Island Road intersection during a PM peak period (4-6pm) in October 2012. The trial has subsequently been repeated.

### Objectives

- 1) To confirm the source of the delays and understand the implications on road users.
- 2) To find a solution to minimise and/or eliminate the delays to road users.

The trial was also an opportunity to assess the possible effects of closing the Mcleans Island Road intersection temporarily during the Western Corridor 4-laning construction between the Harewood Road and Sawyers Arms Road roundabouts.

### Methodology

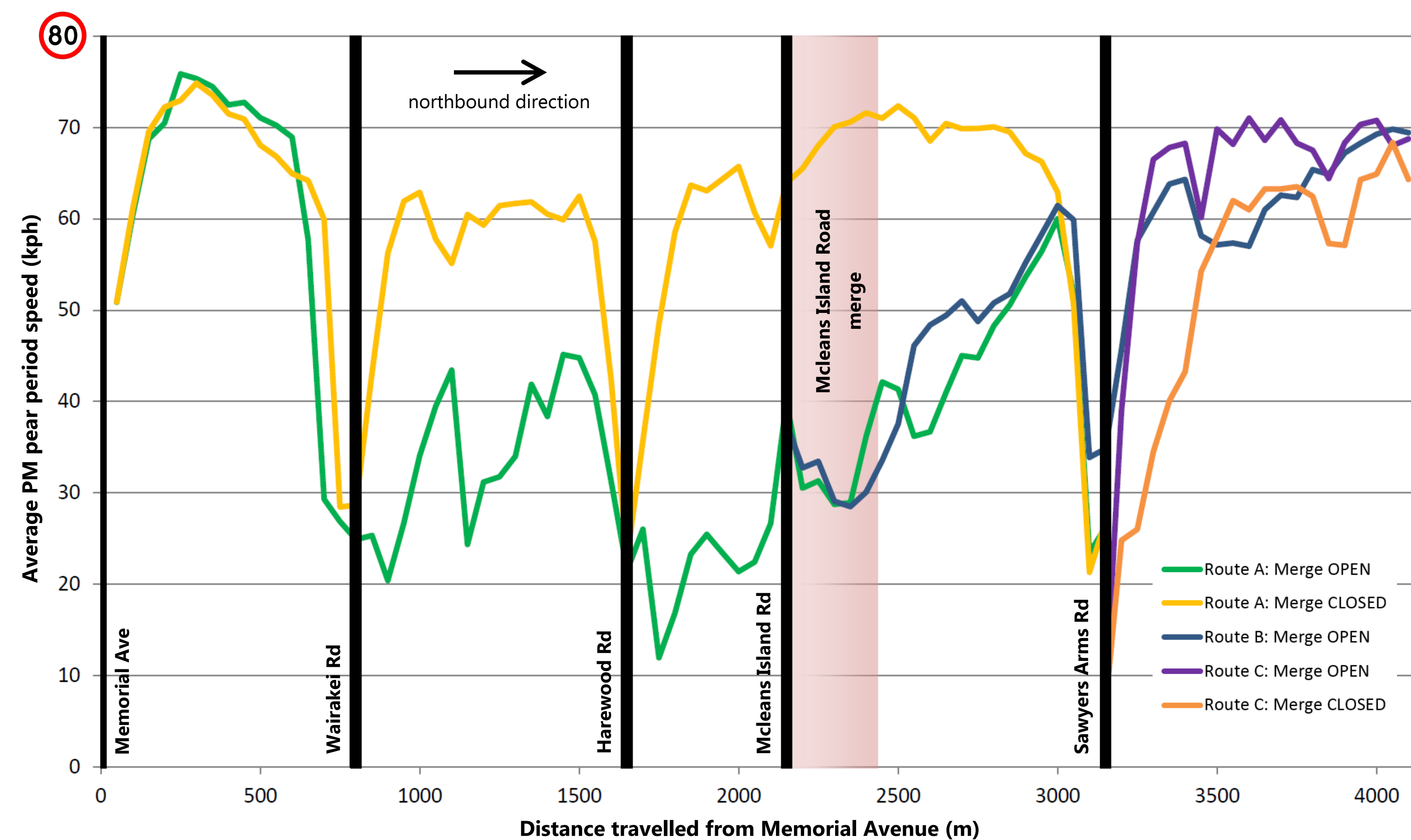
The safest, easiest and cheapest option was implemented. The merge, (the determined source of delays) was removed by closing Mcleans Island Road between Logistics Drive and SH1. This was done in such way that northbound traffic on SH1 was oblivious to the trial, so data collected was unaffected by Temporary Traffic Management and other factors such as right turning traffic.

Speed data was collected using two cars continuously driving 3 routes on the network each with a GPS unit.

- Route A: Northbound on SH1
- Route B: Northbound on SH1 via Mcleans Island Road merge
- Route C: Northbound on SH1 via Logistics Drive

Other options such as ramp metering and the banning of right turns were also considered.

## THE RESULTS



Average northbound travel time between Memorial Avenue and Sawyers Arms Road decreased by over 2 minutes during the trial. Detoured local road traffic on Logistics Drive experienced almost 4 minutes in additional travel time compared to prior to the trial. A high proportion of this traffic was using Mcleans Island Road to bypass SH1 through Hornby and past the airport. Overall, a total of 30 hours of travel time was saved during the PM peak hour as delays prior to the trial were partially redistributed to the local road network during the trial.



The Western Corridor (SH1) between the Memorial Avenue and Sawyers Arms Road roundabouts is 3.2km long and in 2012 was a single-lane carriageway with a posted speed limit of 80kph. This section incorporates four dual-lane roundabouts and a priority controlled T-intersection with Mcleans Island Road.

Conclusive evidence shows that a merge can easily breakdown, like an old car. This depends on location, type of merge and traffic volumes. Closing the Mcleans Island Road merge improved the average speed of northbound traffic on SH1 during the PM peak period by 40kph.