

Post implementation reviews completed in 2011/12

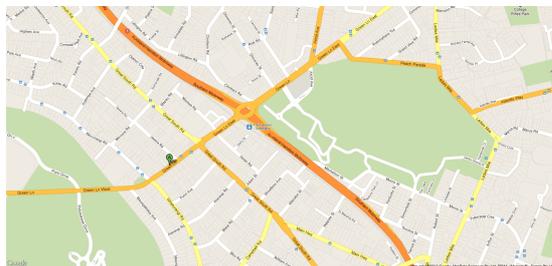
Reviews represent the views of independent consultants and are used by the NZTA to identify potential opportunities for improvements.

Greenlane East Interchange/Great South Road Improvements

Approved Organisation: NZTA (HNO) and Auckland Transport (Auckland City Council)

Description: Additional circulating lane to the Greenlane Interchange roundabout, slip lanes to the SH1 on ramps, widening of Greenlane East, Greenlane and Greenlane West, four laning of Great South Road. Construction contract varied to include installation of ramp metering signals

Purpose: Reduce Travel Time and vehicle operating costs



Construction funding approved	27 th October 2005
At a cost of	\$17.6 M
Construction completed	24 th October 2008
At a cost of	\$34.7 M
Predicted benefit	\$56.0 M
Of which accident savings were	\$0 M
Predicted BCR	3.5

Results (assessed 2010)

Accident savings were	\$12.6 M
Total benefits	\$29.4 M
BCR	1.1

Activity results (actual)

Project scope largely changed from that proposed in the request for construction funding approval by the installation of ramp metering signals (which were funded as a separate approval).

Large construction cost increases occurred on the Auckland City Council portion of the project. Costs increased from \$11.5M to \$26M (excluding cost of ramp metering signals), which significantly reduced the BCR. Land acquisition costs also increased from \$6.7M to \$8.7M. Total cost including land purchase increased from \$17.6M at construction funding approval to \$34.7M. The additional costs were due to hard rock being encountered, service cables being located higher than anticipated and construction being put on hold as a result of negotiations with affected businesses.

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Greenlane East Interchange/Great South Road Improvements (continued)

An unusual feature was that the cost increase included payments totalling \$1.28M to adjoining businesses for "Business Interruption". Part of the additional costs (approximately \$4M) were attributed to poor project management by Auckland City Council and were not subsidised by NZTA. Auckland City Council subsequently made some process changes to address the issues.

The predicted travel time savings on Greenlane West approaching the interchange in the AM peak were in excess of 400 secs per vehicle. The measured travel saving during the site visit of 1st May 2012 was 123 seconds during the AM peak. This underperformance of the predicted travel time benefits is probably due to the interchange throughput being reduced by the implementation of Ramp Metering. The realisation of interchange capacity improvement benefits was also constrained by limited northbound capacity on SH1 (Southern Motorway) between the site and Auckland CBD. Unexpected accident benefits are being delivered.

Predicted benefits associated with the Great South Road Improvements appear to be being delivered.

Process issues for action

The Land Transport NZ Board decision approving construction funding for Auckland CC land purchase for Greenlane/Great South Road Improvements (Board paper 05/10/1652) was conditional upon *"Transit NZ confirming to the Chief Executive of Land Transport NZ's satisfaction that Transit NZ's ramp metering proposal will not significantly affect the layout of the project"*.

NZTA Auckland regional office staff advice that funding was released without this condition having been satisfied. NZTA should consider whether their processes for monitoring satisfaction of Board conditions are adequate.

HNO's consultant advised that the tender documents did not adequately define who was responsible for risks which led to delays and additional costs. NZTA may wish to consider whether their tender documentation process adequately identifies risk during construction and where the contractual responsibility for risk will lie.

Accident risks do remain and were identified during the site visit as:

- Pedestrians crossing 6 lanes of traffic on Greenlane East to access the railway station;
- School child observed crossing 6 lanes of traffic on Greenlane East on the east side of the interchange to access the pedestrian underpass;
- Insufficient buffer between bus lanes and footpath on Great South Road (bus wing mirror overhanging the footpath);
- Very few lights working in the pedestrian underpass (this was due to a disagreement about responsibility for maintenance, and has since been resolved); and
- Inappropriate landscape plant selection at the Wairakei Road Great South Road Intersection has resulted in severely constrained pedestrian and motor vehicle driver sightlines.

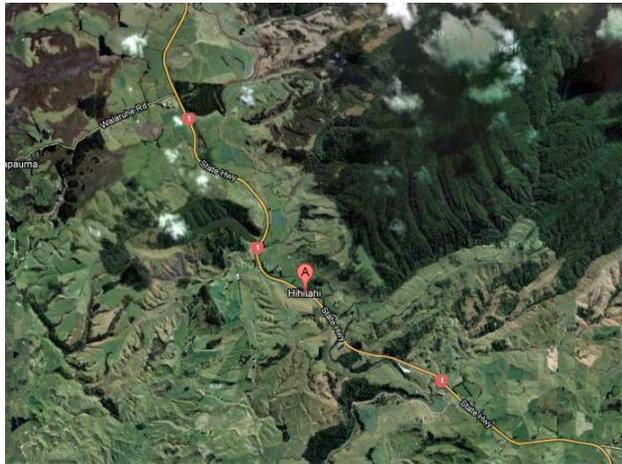
NZTA and/or Auckland Transport as appropriate need to consider the remaining safety issues relating to this activity and whether any low cost measures can be taken to mitigate the risks.

SH1 Hihitahi Bluffs Realignment

Approved Organisation: NZTA HNO Wanganui

Description: Section of SH1 approx. 13 km south of Waiouru with tight 55km/h curves, shaded winter with ice formation. Loss of control crashes occurred on a regular basis. Permanent reinstatement of old dropout is also required.

Purpose: Reconstruct highway to consistent standard and minimise shading effects from topography. Realign to 100 km/h design standard.



Construction funding approved	August 2004
At a cost of	\$17.98 M
Construction completed	December 2006
At a cost of	\$20.15 M
Predicted benefit	\$20.17 M
Of which accident savings were	\$11.70 M
Predicted BCR	1.6

Results (assessed 2010)

Accident savings were	\$3.20 M
Total benefits	\$10.16 M
BCR	0.8

Activity results (actual)

The project's predicted crash benefit was not achieved as there was a fatal accident on this stretch of road the year after the project was completed. However the accident was caused by fatigue and not as a result of the new road alignment. Apart from this accident there has been a considerable reduction in the number of accidents at the site. (16 injury accidents in the five years prior to one injury accident in the five years after). A sensitivity test of the BCR discounting the single fatal accident in five years (as per EEM guidelines for accident by accident analysis) gives a BCR of 1.3

Traffic growth rates at the site have been flat over the past ten years rather than the 2.3% growth rate assumed in the economics. As a result benefits related to travel time savings and to reduction in driver frustration (from the new passing lane) are both estimated to be 18% lower than forecast.

Despite an increase in actual cost, the project cost when the economic evaluation was done has stayed the same once inflation effects were removed.

Process issues for action

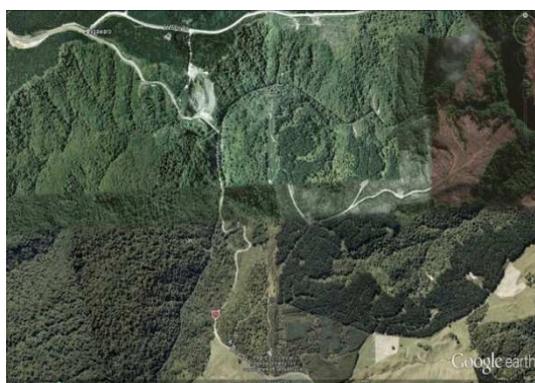
None

Mangorewa Stream North & South Bridge Widening (Bridge Replacement)

Approved Organisation: Rotorua District Council (RDC manage State Highways in the area on behalf of HNO)

Description: Bridge widening (including replacement of existing decks) of two crossings of the Mangorewa stream and widening of the road between and both sides of the bridges for a total project length of approximately 900m.

Purpose: Reduce Travel Time, Vehicle Operating Costs and Accident Costs that were anticipated to arise from diversion of traffic from the alternative SH36 route.



Construction funding approved	July 2008
At a cost of	\$4.26 M
Construction completed	June 2010
At a cost of	\$6.173 M
Predicted benefit	\$20.50 M
Of which accident savings were	\$4.600 M
Predicted BCR	5.8
Results (assessed 2010)	
Accident savings were	\$0.326M
Total benefits	\$23.127M
BCR	4.5

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Mangorewa Stream North & South Bridge Widening (continued)

Activity results (actual)

Generally, this project was a success. The main predicted benefits arose primarily from diversion of traffic travelling between Rotorua and Tauranga from the significantly longer SH33 route to the shorter SH36 route. Greater than predicted diversion has been achieved. Some of the traffic diversion currently being experienced may be due to construction works adjacent to the Tauranga end of SH33 causing a reduced speed limit on SH33 and making that route less attractive at present. For the purposes of this PIR all the diversion has been assumed to be a result of the project works.

While the main benefits were achieved, the project's predicted crash benefit was not achievable due to an error in the economic analysis. The error had resulted in substantially over estimating the predicted crash benefit. As crash benefits were not the main benefits intended from this project, this error did not impact on the assessment profile.

Process issues for action

Under the funding criteria existing in 2008, when the project was assessed for funding, this project should not have been funded. There were two errors in developing the funding profile. One related to strategic fit, which should have been "low" rather than "medium", as less than 50% of benefits were accident related.

The other was due to the incorrect calculation of accident cost savings. The project profile recorded in Proman is MMH (Priority 4). The correct profile at the time was LMH (priority 7). A priority 7 project would not have met funding criteria in 2008.

Improved activity screening by NZTA staff prior to construction funding approval is required to improve the quality of NZTA's investments.

SH1 One Tree Point Road Intersection

Approved Organisation: NZTA HNO Northland

Description: Upgrade intersection due to increase in traffic volume and to reduce accidents.

Purpose: Reduce high accident (injury crash) rate. Cater for high traffic growth.



Construction funding approved	November 2007
At a cost of	\$3.79 M
Construction completed	July 2009
At a cost of	\$5.47 M
Predicted benefit	\$26.60 M
Of which accident savings were	\$23.96 M
Predicted BCR	9.0
Results (assessed 2010)	
Accident savings were	\$2.94 M
Total benefits	\$5.16 M
BCR	1.3

Activity results (actual)

Accident benefits in the economic evaluation used a non-standard approach that did not comply with the EEM at the time; additionally the evaluation was not updated to include accident data for the five years prior to the 2007 construction start date. The Do Minimum accident costs were significantly overstated at \$32.7M. As a result the actual accident benefits were far lower than forecast.

However a roundabout solution is probably the best solution to deal with the high volume of HCVs accessing the new Marsden Point Port from State Highway 1. A signalised intersection would have caused delays to both through traffic on SH1 and traffic turning onto SH1 from the new port. Nevertheless the two lane roundabout appears to be oversized for the current traffic volume and only one lane around the roundabout is currently in use.

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SH1 One Tree Point Road Intersection (continued)

Traffic volumes and traffic growth are lower than forecast. Once the old port in Whangarei was transferred to Marsden Point traffic was forecast to grow at 19% per annum in the first 4 years and 5% per annum in the next nine years. Actual traffic growth has averaged 3%. This has led to a reduction in actual travel time benefits.

The cost of the project increased significantly from \$2.94M to \$5.16M due to poor ground conditions and the need for additional excavation. The NZTA construction project manager suggested the lower value may have been used during the funding process to keep the estimate under the block project limit.

The combined effect of lower than predicted benefits and higher cost have led to a significant downward revision in the BCR from 9.0 to 1.4.

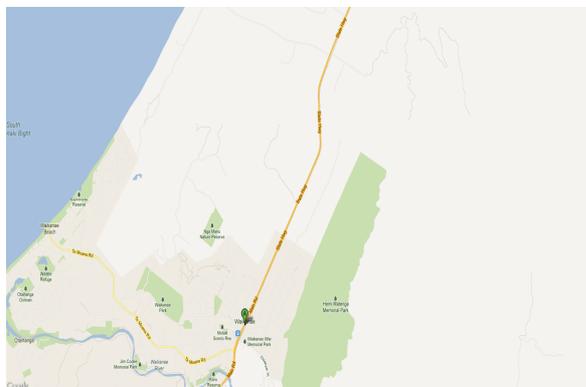
Process issues for action

The use of a non-standard accident evaluation should be avoided in future unless approved by the NZTA EEM team. The EEM now contains accident cost prediction models which were not available at the time. However there appears to have been a failure to carry out adequate checks and peer reviews which should have picked up that the predicted benefits were significantly overstated.

The cost estimates on the project significantly under-estimated project costs to keep the project below the block project threshold. NZTA needs to ensure that adequate checks are carried out on cost estimates to reduce the occurrence of this in future.

Otaki to Waikanae Southbound Passing Lane

Approved Organisation: NZTA (HNO Wellington)
Description: Southbound Passing Lane on SH1 between Pekapeka Road and Greenhill Road (south of Otaki and north of Waikanae).
Purpose: Reduce Travel Time, and Accident Costs



Construction funding approved	July 2008
At a cost of	\$4.216 M
Construction completed	March 2010
At a cost of	\$4.561 M
Predicted benefit	\$6.792 M
Of which accident savings were	\$3.434 M
Predicted BCR	1.8

Results (assessed 2010)

Accident savings were	\$2.391M
Total benefits	\$5.571M
BCR	1.3

Activity results (actual)

In the 24 months since project completion there have been very high social costs due to two crashes (one serious injury and crash and one fatal crash). These crashes occurred outside the project length but within the area considered in the economic analysis, just downstream of the passing lane merge. The fatal crash involved an intoxicated pedestrian hit by a north bound vehicle. This crash has been included in the Post Implementation calculation of accident costs, but has not been projected forward as it is not considered to be project related.

There has been a 30% (approximate) reduction in the crash rate, offset by a significant increase in the crash cost and severity.

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Otaki to Waikanae Southbound Passing Lane (continued)

Process issues for action

The economic evaluation for this project was undertaken using the Simplified Procedure for Passing lanes, which assumes a 12 month construction period. The project scope was such that it was unlikely to be completed within 12 months. THE EEM (Amendment 9 Effective 1 October 2005) states that the Simplified Procedure is not appropriate for passing lanes with significant cost. It lists average passing lane costs of between \$250,000 and \$800,000. This project had an Expected Estimate of \$2,485,803. It clearly had significant costs and use of the Simplified Procedures was not appropriate

The project was incorrectly given a profile of MMH. PPFM page G4-9 shows that it should have been rated H for strategic fit. The project was put forward for funding with a BCR of 1.8. The H profile for efficiency was not appropriate, an L profile was warranted. Correct profiling (HML) would have reduced the project's funding priority from priority 4 to priority 5. The funding cut-off for construction in 2008 was within priority 5. It is not clear whether this project should have been funded, however it is clear that it was marginal for funding and should have received additional scrutiny.

Wellington Hospital Access

Approved Organisation: Wellington City Council

Description: The new hospital's main entrance is to be controlled by traffic signals to improve accessibility and safety. In addition, the existing signalised pedestrian crossing will be relocated to better serve public transport stops.

Purpose: To improve access to Wellington Regional Hospital by widening Riddiford Street. A second south bound lane is proposed from the new hospital entrance south of John St through to Mein Street. The widening will also allow emergency vehicles to use a median to turn into and out of the hospital site.



Construction funding approved	July 2008
At a cost of	\$2.00 M
Construction completed	February 2009
At a cost of	\$2.58 M (including land)
Predicted benefit	\$8.51 M
Of which accident savings were	\$0.96 M
Predicted BCR	4.7
Results (assessed 2010)	
Accident savings were	\$2.08 M
Total benefits	\$5.47 M
BCR	2.4

Continued over

Wellington Hospital Access (continued)

Activity results (actual)

Traffic growth of 2% was assumed in the economics which is the default EEM rate. Traffic volumes on SH1 at the Basin Reserve have, though, not shown growth in the past five years. However with the construction of a new supermarket at the Riddiford St/John St intersection, the predicted growth in traffic volumes on Riddiford St is likely to occur in the future.

The project's travel time benefits are being achieved with cars exiting the hospital now able to do so safely and without excessive delays compared to when no lights were present.

Northbound traffic sometimes queues across the intersection and may cause safety issues. It is recommended this issue be further investigated to see whether hatch markings across the intersection would improve the situation. Optimising the linkage between the Hospital access traffic signals and the John Street intersection traffic signals is something that could also be looked at to see whether this would improve the situation.

The cost of the project has been increased in the PIR to take account of the land need for the road widening as required by the EEM. This issue was also raised in a Post Approval Review.

The combined effect of lower than predicted benefits and higher costs have led to a downward revision in the BCR from 4.7 to 2.4.

Process issues for action

The EEM requires that land costs be included in the BCR whether or not the land was already owned by an RCA or as in this case the subject of a land swap. This is because land is not considered a "sunk cost" as it could be resold at a later date. AOs should be reminded of this when it is an issue in an evaluation.

The benefits from a signalised intersection are derived using a computer programme and are relatively complex to measure once the project is complete. The method of measuring benefits post implementation should be considered at the time of the original evaluation and a benefits management plan drawn up prior to funding to ensure that a PIR can be undertaken efficiently.