ŌTAKI TO NORTH OF LEVIN

Levin Bypass
Project Feasibility Report

Prepared for NZ Transport Agency

November 2013

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Executive Summary

This report is one of a number of reports being undertaken to determine the package of improvements that should be implemented in the short to medium term to improve the safety and efficiency of the highway between Ōtaki and north of Levin as part of the Wellington Northern Corridor Road of National Significance (RoNS).

The purpose of this report is to build upon the previous Levin Heavy Vehicle Bypass report (Report No. 6) by developing two of the previous options and assessing these in greater detail. This project feasibility report considers the opportunities for providing a bypass to remove, primarily, Heavy Commercial Vehicles (HCVs) from travelling through the main street of Levin, recognising that a bypass of sufficiently high standard may draw other non-HCV through traffic from central Levin if the route is sufficiently attractive. Presently State Highway 1 (SH1) travels directly through the urban and retail centre of the Levin township and significant numbers of HCVs travelling through Levin result in negative social and environmental effects.

A variety of options are considered, with the costs and benefits assessed to feasibility level for three main options. The costs, benefits and benefit cost ratios (BCR) have been determined, assuming that the SH1-SH57 connection is already in place:

Table 1-1: Option Assessment (40 year, 6%)

Option Description	Capital Cost	Net Benefits	Calculated BCR
Option B-1 Roslyn Road	$20.8m	-$18.8m	**-ve**
Option B-2A McDonald Extension	$24.8m	-$27.3m	**-ve**
Option B-2B McDonald Extension	$24.8m	-$29.5m	**-ve**
Option B-3 Heatherlea South	$34.4m	-$16.8	**-ve**

It is clear that the Levin Bypass is not a viable alternative based on the BCRs calculated for all three options. Broadly, the BCRs are poor due to the significant additional route length that is travelled using the proposed bypass, as opposed to the route directly through Levin.

Of the three bypass options considered in this assessment, Option B-3 is preferred. This is primarily because it is the option that takes the most traffic away from SH1 through central Levin. It is also because the intersection forms create less delay than in the other options, whilst higher speeds can also be accommodated.

Option B-3 is also preferred in terms of geometry due to the separation between the railway and the connection back into SH1, where 100km/h could be achieved. This is not possible with the other options. Property costs for Option B-3 are likely to be significant; however, the need to acquire existing dwellings should be limited.

It is therefore concluded that Option B-3 is the preferred option but due to its negative BCR, it is not recommended that it is progressed at this point. However, some type of planning mechanism should be considered to protect this route so that it can be implemented in the long term.

Consultation with the public and stakeholders is programmed and this will help the NZTA and HDC decide how to proceed.

NZ Transport Agency

Levin Bypass Project Feasibility Report

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1 Introduction and Background

Using the outcomes of the Ōtaki to North of Levin Expressway Scoping Report and Addendum, the NZTA decided that the most appropriate strategy for the highway between Ōtaki and north of Levin is to upgrade the existing highway as the first stage of a long term strategy. This allows the NZTA to realise important safety benefits in the short to medium term whilst deferring the need to construct four lanes for the time being.

This Project Feasibility Report (PFR) is a follow up to a number of reports being undertaken to determine the package of improvements that should be implemented to improve the safety and efficiency of the highway between Ōtaki and north of Levin as part of the Wellington Northern Corridor Road of National Significance (RoNS), as further defined below.

The objectives of the Wellington Northern Corridor RoNS, which runs from Wellington Airport to north of Levin, are:

- To enhance inter regional and national economic growth and productivity;
- To improve access to Wellington's CBD, key industrial and employment centres, port, airport and hospital;
- To provide relief from severe congestion on the state highway and local road networks;
- To improve the journey time reliability of travel on the section of SH1 between Levin and the Wellington Airport; and
- To improve the safety of travel on state highways.

For the Ōtaki to north of Levin section; the objectives are:

- To provide best value solutions which will progressively meet (via a staged approach) the long term RoNS goals for this corridor of achieving a high quality four lane route;
- To provide better Levels of Service, particularly for journey time and safety, between north of Ōtaki and north of Levin;
- To remove or improve at-grade intersections between north of Ōtaki and north of Levin;
- To engage effectively with key stakeholders; and
- To lodge Notices of Requirement and resource consents as appropriate with the relevant consent authorities for the first individual project by the 2013/14 financial year.

The projects that are being progressively developed to help meet these objectives are presented in Section 2.

In the Scoping work finalised in July 2012, the study team found that there was no need for four laning the Otaki to Levin corridor within the 30 year modelling horizon. While there is no foreseeable need for four laning on the corridor, traffic flows decline significantly north of the SH57 intersection and if four laning were ever required, this intersection is the natural place for four laning to terminate. This report considers the area to the north of the existing SH1/57 intersection and investigates the opportunities for providing improved connections north of the Levin township.

The purpose of this report is to expand upon the previous report that was completed in February 2013 on the opportunities for providing a bypass of Levin, primarily for Heavy Commercial Vehicle (HCV) traffic, by providing an alternative route for these vehicles to avoid using the section of State Highway 1 through central Levin.

The initial report (PFR No. 6) was a high level assessment of four options which concluded that none offered a completely viable solution in isolation. All involved a significant capital cost, limited benefits and the potential for consequential and negative effects (for residents and businesses). However, the report also recommended that the options utilising SH57 could provide benefits if combined with one of the SH1/SH57 bifurcation options to the south. To this end, the two options that utilise SH57 have been further refined and have been taken to a more detailed level of analysis in this report.

The geographical extent of this more detailed assessment project commences in the south from the SH1 / SH57 Kimberley Road intersection to approximately the intersection of SH1 and Koputaroa Road in the north. The study area therefore includes the town of Levin, the geographical areas to the north and south of Levin as well as approximately 7.5 km of SH1 and 6.2km of SH57. The main focus of this report is to investigate a suitable connection between SH1 and SH57 to the north of Levin which will contribute to a wider vehicle bypass of the town, when combined with the bifurcation of SH1/57.

The outcome of this report will be considered alongside the outcomes of the other PFRs and further scoping work being undertaken for the SH1-57 connection south of Levin.

2 Projects Currently Being Investigated

The projects that are currently being investigated to meet the short to medium term objectives of the Ōtaki to north of Levin RoNS project are presented in Figure 2-1:

Figure 2-1: Projects Currently Being Investigated

3 Description of Problem

3.1 Ōtaki to North of Levin

State Highway 1 and State Highway 57 through the study area have a number of deficiencies, resulting in a poor crash history and a number of locations where the free flow of vehicles is restricted by the tight physical characteristics of the highway.

State Highway 1 currently follows the historic route established in the late 19th and early 20th centuries. As a consequence it is constrained by a now substandard alignment, towns and settlements, narrow curved bridges and significant side friction caused by local roads, commercial frontages and property accesses for the entire stretch.

The SH1 route through the township of Levin includes a number of traffic signal controlled intersections.

3.2 HCVs using Levin

The major issues with HCVs using Levin are well documented and discussed in greater detail in the previous report (February 2013). A brief summary is provided below:

- HCVs not requiring access to Levin mix with other road users in the town, such as shoppers, workers, cyclists and other local vehicle traffic.
- An improved four lane solution through central Levin is not considered appropriate due to the severance effect and impact on the local environment. However, suitable alternatives for through traffic, particularly HCVs, do not exist.
- The crash history throughout Levin is concerning with a significant number of crashes involving HCVs.
- At present the over dimension (OD) vehicle route passes along SH1 through central Levin but is compromised due to existing physical restrictions.

4 Site Description

Generally, the project area consists of a 7.5 km length of SH1 (from RP967/9.94 to RP967/17.40) and its surrounds, running from the SH1/SH57 intersection in the south to the intersection of SH1/Koputaroa Road in the north. The SH57 section is 6.2km in length (from RP0/2.90 to RP0/9.10), from the SH57 intersection of Kimberley Road / Arapaepae Road to SH57 at the intersection with Heatherlea East Road.

Based on the outcomes of the previous report, this report assumes the presence of a bifurcation of SH1 and SH57 south of Kimberley Road. Accordingly, the primary focus is the area north of Levin itself in the area bounded by (and including) Heatherlea East Road, SH57, Roslyn Road and SH1. This area is the primary focus of the investigation to provide an improved connection between SH57 and SH1 to support a vehicle bypass.

Of fundamental importance, and the primary focus of this feasibility report, is the location of a new link road (between SH1 and SH57) including how this relates to property acquisition and severance. Additionally, consideration is given to the effect of the existing main trunk North Island rail alignment and the ability to cross the railway and safely connect back into SH1 due to the limited separation distance available.

The terrain throughout the entire site is primarily flat. There are a number of relatively minor horizontal curves throughout the Levin urban area and a long sweeping horizontal curve north of the township. In the area considered for a new road link, the terrain is generally flat, though some relatively minor undulations exist and the railway line is on a raised embankment.

To the north of Levin, SH1 is a two lane undivided highway with approximately 3.5 m lane widths. There is a lack of uniformity in shoulder width, though long sections do include a shoulder of between 1.5-2.0 m. Within the urban area of Levin a sealed shoulder is maintained for large lengths, though in sections the shoulder is taken up by turning bays or parking.

SH57 is also a two lane undivided highway, with 3.0 m - 3.5 m lane widths and shoulders between 0.5 m - 2.0 m. Presently at the southern end, SH57 goes through a 90 degree curve (<20 m radius) at the intersection of Kimberley Road and Arapaepae Road.

The study area is shown in **Figure 4-1** below:

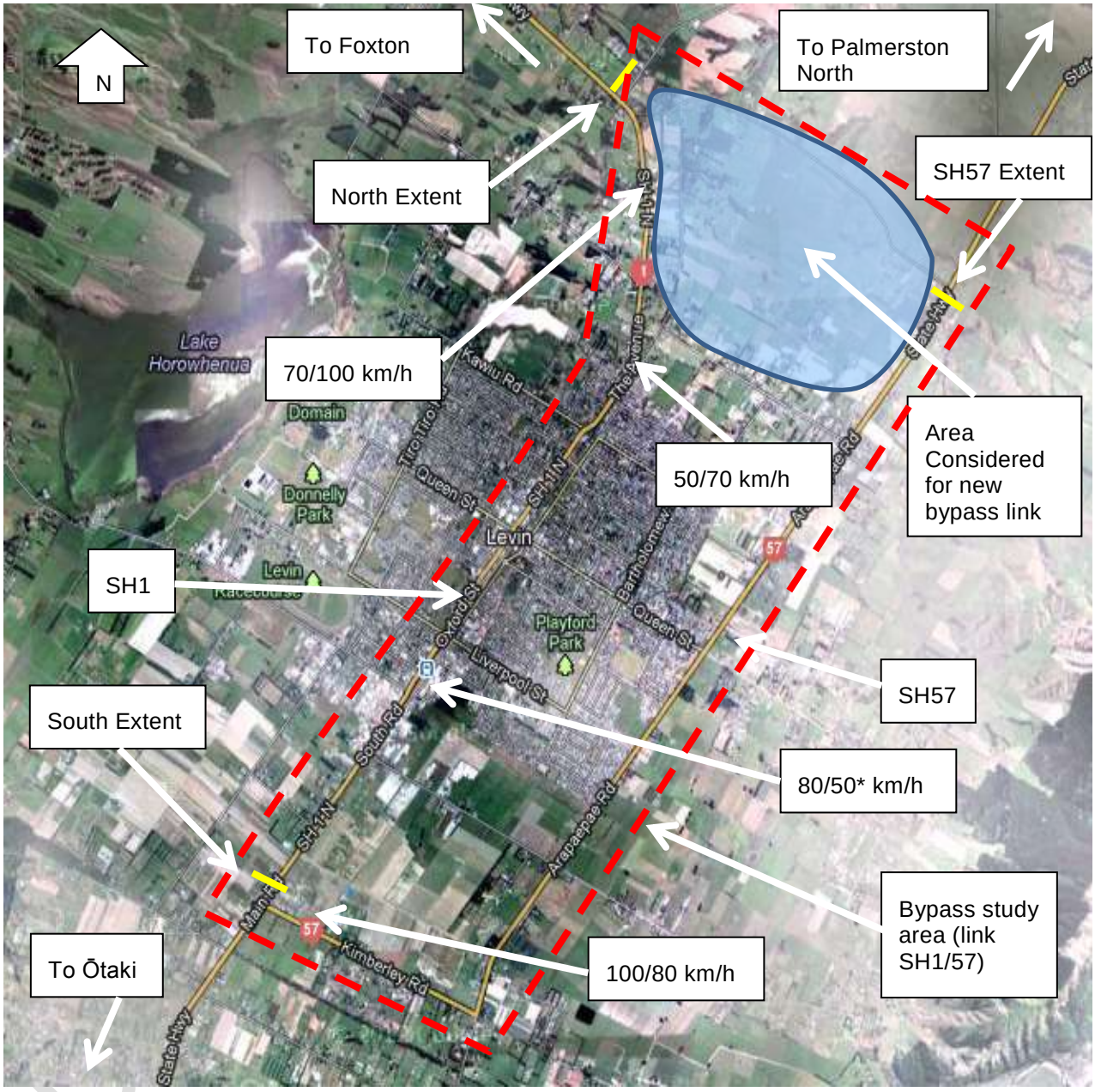


Figure 4-1: Study Area

*The 80km/h zone will be extended to south of Ohau

An over dimension (OD) route operates through central Levin on SH1. An alternative also exists using Mako Mako Road, Weraroa Road, York Street, with a further alternative OD route being Durham Street, Salisbury Street, Queens Street West, Bristol Street, Exeter Street, to avoid the overhead traffic signals along SH1 (see Appendix B).

The North Island Main Trunk (NIMT) railway line runs predominantly parallel to SH1 for a large section of the overall Ōtaki to Levin study area and this is true for almost the entirety of the study area covered by this report. From Roslyn Road northwards, SH1 and the railway begin to diverge, with the railway heading northeast toward SH57 and SH1 heading north. At the right angled curve on Roslyn Road, there

is approximately 200m separation between SH1 and the rail line, which gradually increases heading north and at the SH1 intersection with Heatherlea East Road there is approximately 450m separation.

Posted traffic speeds on SH1 throughout the study area vary, with incremental reductions approaching the centre of the town and greater development density. Travelling south to north along SH1 the speed changes take place at the following route positions:

- 80 km/h to 50 km/h at RP967/15.36
- 50 km/h to 70 km/h at RP967/12.61
- 70 km/h to 100 km/h at RP967/11.71

5 Traffic Statistics

Traffic statistics discussed below refer to existing traffic flows. In respect of a Levin bypass, it is important to recognise the potential for significant redistribution of vehicle flows dependent upon the attractiveness of the bypass. To determine the likely effects, the development of a robust traffic model will be essential for flow predictions (and therefore economic viability).

The Annual Average Daily Traffic (AADT) on SH1 within the study area for 2012, and the proportion of HCVs, is as follows:

- Levin, Kawiu Road / Gordon Place: 9,200 vehicles per day (vpd) with 11.3% HCVs.
- Levin, Oxford Street: 12,900 vehicles per day with 7.0% HCVs.
- Levin, south of town (north of SH57): 11,600 vehicles per day with 8.9% HCVs.

These figures are similar to the 2011 traffic statistics with no major fluctuations.

South of the study area at the Ohau telemetry site(Count Site ID: 01N00988), AADT flow was 14,300 vehicles per day (2012) with the proportion of Heavy Commercial Vehicles (HCVs) at 9.9% and traffic growth rate (calculated using 1993-2012 data) of 1.0%. Whilst this is south of the study area (and hence south of the SH57 intersection) it provides both a more accurate AADT figure (due to continuous counting at the telemetry site) and also a good indication of the level of traffic that is currently catered for on both SH1 and SH57.

The total traffic volumes (all vehicles) at the three Levin SH1 count sites have shown a general reducing trend during the last 5 years.

The AADT for SH57 in close proximity to the study area is as follows:

- Levin, Kimberley Road: 4,200 vehicles per day with 11.6% HCV
- Levin, Tavistock Road (north of Queen Street): 7,700 vehicles per day with 8.9% HCVs

Using the 2011 vehicle number plate survey information, it is possible to determine the proportions of heavy vehicles travelling straight through Levin and hence the number that could be diverted onto a bypass.

Table 5-1: Levin Through HCV Proportions

Time Period	HCV through-traffic volume	HCV access traffic[1] volume	Through traffic percentage
AM Peak	49	29	63%
Inter-peak	81	50	62%
PM Peak	47	17	73%

[1] Access traffic includes traffic which enters and leaves Levin through the same screen line, traffic which enters on SH1 and leaves on SH57 or which stays in Levin for more than 8 minutes (typical travel time through Levin is between 4 and 6 minutes)

Table 5-1 above shows that around two thirds of heavy vehicle traffic travels straight through Levin. Conversely this means that if a heavy vehicle bypass was implemented which attracted all through HCVs, a third of all heavy vehicle traffic would still use SH1 for at least some of its length.

Traffic modelling of the options is discussed in Section 11. Refer Appendix E further traffic data and modelling outputs.

6 Crash History

6.1 Crash Data

The crash assessment for this PFR has been updated to include all crashes within the study area cordon (as described in Section 4). The previous option assessment report considered only those crashes that involved a HCV.

A review of NZTA's CAS database over the five-year period from January 2008 to December 2012 revealed a total of 59 injury crashes and 113 non-injury crashes within the study area. The analysis considered 6.6 km of SH1 from Boulton Road (RP 967/16.7), through urban Levin, to Heatherlea East Road (RP 967/10.1)[2]. In addition, the analysis considered 6.2km of SH57 from 500 m south of Tararua Road[3] (RP 0/2.9) to Heatherlea East Road (RP 0/9.1).

The project area has also been assessed using both the High Risk Rural Roads Guide[4] (HRRRG) and the draft High Risk Intersections Guide[5] (HRIG).

The following tables provide a summary of the CAS output data for the study area:

Table 6-1: Annual Distribution of Crashes

Year	Fatal	Serious	Minor	Non-Injury	Total	DSI*
2008	-	2	12	26	**40**	3
2009	1	3	17	14	**35**	4
2010	-	2	8	24	**34**	3
2011	-	-	6	27	**33**	-
2012	1	1	6	22	**30**	3
Total	**2**	**8**	**49**	**113**	**172**	**13**

* Death and serious injury casualties

Table 6-2: Distribution of Crashes (2008-2012)

Year	Fatal	Serious	Minor	Non-Injury	Total	DSI*
Urban Levin	-	5	32	92	129	6
Rural[6]	2	3	17	21	43	7
Total	**2**	**8**	**49**	**113**	**172**	**13**

* Death and serious injury casualties

[2] This is a slightly reduced extent than the project description extent to exclude the intersection of SH1 and SH57 which is covered in the SH1-57 Connection report.
[3] As the indicative interface with SH1/57 project
[4] High Risk Rural Roads Guide (HRRRG), NZTA, September 2011
[5] High Risk Intersection Guide (HRIG), NZTA, Draft March 2012
[6] Defined as crashes occurring in posted speed limits of 80km/h or above

Table 6-3: CAS Crash Type (Urban)

Crash Type	Number of Reported Crashes	Percentage of Reported Crashes	Number of Injury Reported Crashes
Overtaking	7	5%	1
Straight Lost Control / Head	7	5%	3
Bend Lost Control / Head on	6	5%	3
Rear End / Obstruction	61	48%	10
Crossing / Turning	38	29%	11
Pedestrian Crashes	10	8%	9
Miscellaneous Crashes	-	-	-
Total	**129**	**100%**	**59**

Table 6-4: CAS Crash Type (Rural)

Crash Type	Number of Reported Crashes	Percentage of Reported Crashes	Number of Injury Reported Crashes
Overtaking	4	9%	1
Straight Lost Control / Head	10	23%	6
Bend Lost Control / Head on	3	7%	1
Rear End / Obstruction	10	23%	5
Crossing / Turning	15	35%	8
Pedestrian Crashes	1	2%	1
Miscellaneous Crashes	-	-	-
Total	**43**	**100%**	**22**

Table 6-5: High Risk Rural Roads Guide Crash Type

Crash Type	Number of Reported Crashes	DSI	Percentage of Reported Crashes
Head-on	3	2	7%
Run-off Road	12	-	28%
Intersection Crashes	15	4	35%
Other	13	1	30%
Total	**43**	**7**	**100%**

The crashes classified as 'Other' above include nine rear end crashes (slow vehicles and queuing), two hit object crashes, one overtaking crash and a single casualty fatal pedestrian vs. vehicle crash 200m north of Queen St East.

Table 6-6: Urban Environmental Factors

	Wet/Icy	Dry		Night	Day		Weekend (Fri 6:00PM to Monday 5:59AM)	Weekday
No.	23	105		26	103		34	95
%	18%	82%		20%	80%		26%	74%

Table 6-7: Rural Environmental Factors

	Wet/Icy	Dry		Night	Day		Weekend (Fri 6:00PM to Monday 5:59AM)	Weekday
No.	10	33		14	29		14	29
%	23%	77%		33%	67%		33%	67%

Table 6-8: Crash Causation Factors of Reported Injury Crashes

Causation	Urban Number of Reported Injury Crash Causation Factors	Rural Number of Reported Injury Crash Causation Factors
Weather (excl. animals)	-	1
Road factors	3	1
Vehicle factors	4	-
Cyclist factors	-	-
Pedestrian factors	5	1
Disabled /old / ill	4	3
Fatigue	1	2
Poor Judgement	2	1
Poor observation	19	10
Poor handling	4	3
Incorrect lanes/position	4	2
Overtaking	-	1
Failed to keep left	1	3
Failed to Give Way/Stop	10	7
Too fast	1	3
Alcohol / drugs observed	4	4
Other (enter/exit land use)	-	-
Other (all remaining)	-	1

Table 6-9: Reported Injury Hit Object Crashes

Causation	Urban Number of Reported Injury Crashes	Rural Number of Reported Injury Crashes
Bridge or Approach	-	-
Cliff /bank	-	-
Ditch	-	3
Fence	-	6
Overbank/Cliff	-	-
Utility post/pole	2	3
Tree	1	-
Guard/guide rail & median	-	-
Water/river	-	-
Other	3	2
Total	**6**	**14**

Of the crashes along SH1 through urban Levin:

- None were fatal, five were serious, 32 were minor and 92 were non-injury.
- Two of the five serious crashes involved elderly pedestrians (1 DSI each). The remaining serious injury crashes involved; one head-on (2 DSI), one loss of control off road (1 DSI) and one rear end crash (1 DSI).
- 'Rear end / obstruction' was the largest crash type with 48% of the crashes, however these accounted for only 10 injury crashes. This includes manoeuvring crashes, accessway crashes, rear-end crashes and hitting objects on the roadway.
- 'Crossing/Turning' crashes was the second largest crash type with 29% of the crashes, with 11 of these being injury crashes.
- 10 (8%) crashes involved pedestrians, with 90% resulting in injury, including 2 serious and seven minor injury crashes. Five of the minor injury pedestrian crashes occurred within 100m of Queen Street. Six crashes involved pedestrians over 70, including both of the serious crashes.
- 'Poor Observation' was a causal factor in 30% of crashes, with failing to Give Way/ Stop and poor judgement also a contributory factor in 13% of crashes (each).
- 6 (5%) crashes involved objects being struck; e.g. Parked cars, poles etc.
- 14 (11%) crashes involved HCVs, including two serious injury crashes (2 DSI) and three minor injury crashes.
    - 50% of these crashes were rear-end/obstruction, including one minor injury crash.
    - The serious injury crashes involved; one pedestrian vs. truck and one bend loss of control/head on.
    - Incorrect lanes/position was a causal factor in 25% of crashes, with poor judgement and poor observation also a contributing factor in 18% and 14% of the crashes respectively.

Of the crashes along the rural length SH1 and SH57:

- Two were fatal, three were serious, 17 were minor and 21 were non-injury.
- One fatal crash involved a head-on, loss of control on straight, crash between two northbound vehicles and one southbound vehicle near the intersection of SH57 and Waihou Road, resulting in a single fatality, one serious injury and five minor injuries. The second fatal crash involved a

33 year old intoxicated pedestrian (wearing dark clothing) being hit at night by a northbound vehicle, while walking along the highway 200 m north of Queen St East.

- 12 (28%) involved runoff road movements resulting in 5 minor injury crashes.
- 15 crashes (35%) involved intersection related crashes, resulting in three serious injury crashes (4 DSI), and a further six minor injury crashes.
- Throughout the five year analysis period of the project length, there were only three head-on crashes. These were severe in nature with one fatal injury crash, resulting in two DSI and two minor injury crashes.
- Crossing/Turning was the largest crash type with 35% of the crashes, including eight injury crashes. The second largest crash types were rear-end/obstruction and straight loss of control/head-on at 23%.
- 'Poor Observation' was a causal factor in 22% of the crashes; failing to Give Way/Stop or poor judgement was also a contributory factor in 13% and 7% of crashes respectively.
- 21 (49%) crashes involved objects being struck; e.g. Fence (8 crashes), ditches (9 crashes), tree etc.
- A single, serious injury HCV crash (1DSI) at the SH1/Lindsay Road intersection involving a southbound truck failing to notice car turning right at the centreline.

6.1.1 Crash Risk

The section of SH1 was analysed according to the High-Risk Rural Roads Guide (HRRRG) which identifies that crash risk can be generally defined in two ways:

- Actual Crash Risk; which is based on crashes reported in the last 5 years. This is separated into collective risk, which is also known as crash density, and personal risk, which is also known as crash rate.
- Predicted Crash Risk; which is based on KiwiRAP road protection score (RPS) and the KiwiRAP star rating.

In terms of crash risk the rural sections of the state highway under analysis (2.4km of SH1 & 6.5km of SH57) have:

- A collective risk of 0.12 high-severity (fatal and serious) crashes per km per year;
- A personal risk[7] of 3.99 high-severity crashes per 100 million vehicle km; and
- A KiwiRAP calculated star rating of:
    - SH1: 2.57, with an average RPS of 13.6.
    - SH57: 2.86, with an average RPS of 9.1.[8]

The collective risk metric is considered 'Medium-high' while the personal risk is 'Low-medium' for this section of SH1 and SH57. As a result of a medium-high collective crash risk, KiwiRAP star rating, RPS and fatal and serious injury crashes reported in the 5-year analysis period (5 in total), this section of SH1 and SH57 is therefore classified as a high-risk rural road. This is an expected result given the deficiencies identified.

The HRRRG treatment philosophy for the personal and collective risk is 'Safer Corridors', although when considering the full Otaki to north of Levin study length the treatment philosophy is a 'safe system transformation works'.

The following two intersections have been considered in greater detail due to the number of injury crashes that have taken place compared to other intersections within the study area.

[7] HRRRG personal risk has been calculated using a length weighted AADT from the rural sections of SH1 and SH57.
[8] It was noted that the KiwiRAP shoulder and lane widths held in the KiwiRAP Assessment Tool (KAT) (sourced from an ARRB 2008/9 video survey) were significantly higher than the link widths contained in RAMM. As a result, the star rating for this section of SH57 is likely over estimated.

6.1.2 Crash Risk: SH57/ Queen Street Intersection

In terms of collective crash risk for the intersection of SH57/Queen Street intersection, there are two methods of calculation:

- Reported F&S Crashes: Over the five year assessment period: there have been two F&S crashes reported within 250 m of the intersection, with two DSI.
- Estimated F&S Crashes: The second method involves the estimation of F&S crashes that have occurred at an intersection using all injury crashes that have occurred during the crash period. This method takes into account the crash movement type, intersection form and control, and collision speed on crash severity outcomes. The estimated collective crash risk is calculated at 2.01 F&S crashes for a 5-year period. This is presented in the table below:

Table 6-10: Estimation of F&S Collective Risk Using Severity Index SH57/Queen St Intersection

Crash Type	Number of Reported Injury Crashes	Adjusted F&S crashes / All injury crashes[9]	Estimated Number of F&S Injury Crashes
Crossing (no turns) (H Type)	2	0.34	0.68
Right turn against (L Type)	2	0.30	0.60
Pedestrian (other) (P Type)	1	0.73	0.73
Total	**5**		**2.01**

Therefore, according to HRIG[10] and using either method of calculation, this intersection is considered 'high' risk when quantifying collective risk (as there is greater than 1.6 F&S crashes).

When considering personal risk; a calculation is performed which considers the major and minor road traffic volumes to determine the product of flow to standardise the number of potential conflicts that could occur at an intersection. The SH57 / Queen Street intersection is calculated as having a personal risk value of 181. According to HRIG[11], this results in a 'High' personal risk level.

The Level of Safety Service (LoSS)[12] for this intersection has been calculated to be 3.5 which is category V[13] and demonstrates a poor safety performance on a five point scale.

As outlined above, this intersection has been classified as high-risk; the HRIG recommended safety improvement strategy is 'safe system transformation works'. This supports the larger cost infrastructure developments proposed by the Otaki to North of Levin RoNS.

6.1.3 Crash Risk: SH1 / Lindsay Road Intersection

For Collective Crash Risk:

- Reported F&S Crashes: Over the 5 year assessment period, there has been one F&S crash.
- Estimated F&S Crashes: The estimated collective crash risk is calculated at 0.99 F&S crashes for a 5 year period. This is presented is the table below:

[9] HRIG, Table 8.10
[10] HRIG, Table 4-1
[11] HRIG, Table 4-2
[12] Level of Safety Service, as defined by HRIG, is a method of categorising the safety performance of an intersection compared to other intersections of that type.
[13] LoSS categories range from I (one) to V (five) where intersections classified as LoSS I have a safety performance that is better than other intersections of that type, in the same speed environment and with similar traffic flows. For intersections of Category V, the converse is true. Category V have LoSS values greater than 3.

Table 6-11: Estimation of F&S Collective Risk Using Severity Index SH1/Lindsay Road Intersection

Crash Type	Number of Reported Injury Crashes	Adjusted F&S crashes / All injury crashes	Estimated Number of F&S Injury Crashes
Overtaking and lane change (A Type)	1	0.32	0.32
Head-on (B Type)	1	0.35	0.35
Rear end (F Type)	1	0.08	0.08
Loss Control Bend (G Type)	1	0.24	0.24
Total	**4**		**0.99**

Therefore, according to HRIG, using F&S injury estimation method the intersection is medium risk.

The SH1 / Lindsay Road intersection is calculated as having a personal risk value of 134; according to HRIG, this results in a high personal risk level.

The Level of Safety Service (LoSS) for this intersection has been calculated to be 13.4 which is category V and demonstrates a poor safety performance on a five point scale.

This intersection has been classified as having a medium collective risk and a high personal risk, the HRIG recommended safety improvement strategy is 'safe system transformation works' or Safety Management'. This supports the larger cost infrastructure developments proposed by the Otaki to North of Levin RoNS.

Finally, it should be noted that crash patterns will substantially alter with the provision of a bypass as HCV and (possibly) other vehicles will divert, changing crash distribution and risk. Furthermore, each particular option will have a consequential effect on crashes and risk – for example changing the intersection form at SH1/ Lindsay Road, as considered in Option 1, would fundamentally alter the type, number and severity of crashes that occur at the intersection.

Further Crash Data can be found in **Appendix C.**

7 Options Considered

7.1 Introduction

Numerous investigations into a Levin Bypass have been undertaken the past. The Otaki to North of Levin Scoping Report (MWH, July 2012) included a discussion around those reports.

Most of the early reports focussed on a western bypass as this would the most beneficial in terms of distance travelled and overall travel time. However, later reports determined that any path to the west is fraught with environmental, social and cultural issues. This change in preference over time was likely due to both increased awareness of these issues and an increase in the development of the land between Levin and Lake Horowhenua. SH57 has also grown in importance since that time as it connects to the distribution centres which have developed in Palmerston North.

7.1.1 Otaki to North of Levin Expressway Scoping Report (July 2012)

Corridors for the potential expressway were identified both east and west of Levin. A total of 81 routes were investigated and short listed down to 13, three of which traversed west of Levin and ten which were located between Levin and Lake Horowhenua. Whislt those routes which ran west of Levin provided the best model outputs for travel time and vehicle operating costs they were also the most expensive to construct and scored very poorly in the Multi Criteria Analysis. Overall, the scoping report determined that the eastern options were more appropriate, should an expressway be pursued.

7.1.2 Heavy Vehicle Bypass Report (February 2013)

As the NZTA decided not to pursue a full expressway, lower cost options were considered for providing a heavy vehicle bypass both east and west of Levin primarily using existing roads.

A total of nine options were originally considered, with five being discarded early in the investigation for various resons. The four that were considered in more detail are described below:

Option 6-1 One-way Pairs - This option involves the provision of separate northbound and southbound HCV routes either side of the central urban area.

Option 6-2 Roslyn Road – This option would involve utilising SH57 and Roslyn Road to bypass Levin. It would require a significant upgrade to the existing Roslyn Road together with improved connections to SH1 and SH57.

Option 6-3 Greenfields Heatherlea East – This option has a number of similarities to Option 6-2, however, instead of upgrading Roslyn Road, a new greenfield road is proposed (two alignment possibilities) that would link SH1 (near to Heatherlea East Road) to SH57 approximately 500 m - 700 m north of Roslyn Road.

Option 6-4 Tiro Tiro Road Extension – This option would require a 2.4 km extension to Tiro Tiro Road on the western side of Levin through to SH1, allowing heavy vehicles to bypass the main street.

Since the completion of the February 2013 report, the NZTA has requested that further consideration should be given to a bypass option that requires a new or upgraded link north of Levin (between SH1 and SH57), effectively building on Options 6-2 and 6-3, as these would tie into the SH1-SH57 connection currently being investigated south of Levin. To that end, three options are considered in greater detail and are described later in this section (plans are provided in Appendix C).

7.2 Relationship to Adjacent Projects

The options discussion below considers the new or upgraded link between SH1 and SH57 north of Levin, together with the intersection forms of the connections and other geometric and noteworthy features. The options discussion does not consider the wider bypass in detail because all other elements remain the same between the options.

As per the recommendations of the earlier report, any bypass option would not be progressed without the SH1-SH57 connection to the south. Therefore the economic evaluation has assumed that the SH1-SH57 connection is part of the Do Minimum.

For the bypass to be a viable option, then the route speed and delay at intersections along the SH57 length of the bypass route will need to be improved, in combination with other downstream improvements to make the combined length more contiguous and commodious. Whilst a local bylaw could prevent HCVs using a section of SH1 through the centre of Levin, there needs to be a good alternative provided, otherwise there is a risk of industry backlash, bad publicity and HCVs diverting onto other, less appropriate, local roads (and hence enforcement challenges and new safety concerns).

It is highly likely that the bypass (and associated projects in combination) will attract some non-HCV through traffic to divert onto the new route rather than using central Levin. This may lead to consideration of the bypass becoming the predominant north-south route with the SH1/57 bifurcation changing in terms of the dominant leg. This is flagged as a consideration for the next stage of investigations.

7.3 Option Description

For all of the options discussed below, there is commonality as follows:

- All would require some method of traversing the existing rail alignment. At this stage of the investigation a simple multi-plate arch structure along the railway has been assumed, with the road passing over the railway[14]

[14] A further consideration at Scheme stage will be whether it is feasible to relocate the rail alignment away from the existing alignment of SH1, providing a greater degree of separation to facilitate improved geometry.

- All may require a bylaw requiring that HCVs which do not have legitimate access requirements in Levin, are forced to use the bypass (noting that if the bypass route is sufficiently attractive then a bylaw may not be required). This has not been included in the options or traffic modelling at this stage.

Drawings of all options are presented in Appendix C.

7.3.1 Option B-1: Roslyn Road

Under this option, the bypass would utilise a substantial length of Roslyn Road, between SH57 and the ninety degree turn near the rail line. It would be necessary to cross the rail alignment to provide a more direct connection into SH1.

For Roslyn Road to be suitable for high volumes of two-way HCV usage, an upgrade would be required. Widening of the seal to 11 m is proposed (two 3.5 m traffic lanes and two 2.0 m sealed shoulders), together with swale drainage. The existing pavement design is likely to be unsuitable for the significant volumes of HCVs and therefore strengthening has been allowed for in the rough order cost estimate.

The existing Roslyn Road reserve is approximately 20 m and therefore (significant) property acquisition to achieve the widening is likely to prove unnecessary. Services may require relocation, but this is yet to be determined. The existing posted speed on Roslyn Road is 70 km/h – ideally this would be increased to maximise journey time gains and to offset the effect of the route through central Levin being shorter. However, increasing the posted limit may be difficult given the number of residential properties directly accessing Roslyn Road. Unless a service road was provided for direct frontage access, then it is unlikely that the 70km/h speed could be increased.

Presently at the north-western end of Roslyn Road, a 90 degree curve exists at the railway line before a further 90 degree curve takes the road across the rail at grade (level crossing) and forms a left in / left out intersection with SH1. As this would be unsuitable for HCVs, a new link is proposed connecting Roslyn Road to SH1, avoiding the two 90 degree curves and circuitous route. Grade separation would be required and at this stage it has been assumed that the road would pass over the rail (see further discussion below) To enable safe sight distances and suitable geometry, a minimum separation of approximately 250m is needed between the proposed overbridge (arch with road over rail) and the proposed roundabout[15] for sight distance (based on the limited topographical information available). Therefore the new link would need to be located north of Rosyln Road at the western end, as shown on the attached plans in Appendix C.

The proposed link would be connected to SH1 with a proposed roundabout intersection located at the existing SH1 / Lindsay Road intersection, forming a 4-arm roundabout. A 48m central island diameter roundabout has been assumed at this stage, given the existing 100km/h speed environment.

The bypass traversing over the railway may be preferable[16] in geometric terms given the close proximity of the rail and SH1, to provide sight lines (and K value for vertical crest curves) to a new 4-arm roundabout intersection at SH1 / Lindsay Road. The required vertical profile (K value) appears to be just achievable in the separation available[17], though this would be subject to survey and preliminary design. However the approach to the roundabout in terms of truck Approach Sight Distance (ASD) to the likely position of the new roundabout limit line would not support a 100km/h legal speed and the approach would need to be 80km/h[18].

The existing 4 way priority controlled (crossroad) intersection of Roslyn Road, Waihou Road and SH57 is also proposed to be upgraded to a roundabout to better provide for all movements. However, the

[15] All options propose new roundabouts which would necessitate further consideration in the Detailed Business Case in terms of the impact and safety of cyclists.

[16] It is possible that a rail underpass could be more advantageous as the rail is currently elevated on an earth terrace at this point. This may merit further consideration in the Detailed Business Case when accurate topographical survey information is available, though would inevitably result in drainage issues. For the road under rail option, a minimum of 6m clearance would be required from the soffit of the rail structure to the surface of the road. Maintaining sight distance to the limit line could be problematic.

[17] Further information is contained within the design statement

[18] Approach Sight Distance for trucks has been calculated as 275m for 110km/h which is not achievable. At 90km/h (design speed), ASD of 195m would be required which should be attainable. With the approximate topographical information sourced, to achieve an acceptable vertical profile between the rail and proposed intersection to SH1, separation of 243m would be required.

effect of a roundabout on travel times for SH57 traffic was previously noted in PFR No. 10 (regarding the roundabout option at Queen Street / SH57) and can create significant travel time disbenefits.

As part of the roundabout, a left turn slip lane from SH57 turning into Roslyn Road could also be provided to improve travel times and reduce the intersection delay created by the roundabout. Two options of slip lane curve radii have been considered; 200m and 400m (plus merge & diverge).

This option is likely to be highly unpopular with Roslyn Road residents. Furthermore, increasing the speed (to 80km/h) and adding significant extra volumes of traffic (including high numbers of HCVs) is unlikely to be supported by residents, due to safety perceptions and noise, vibration and general nuisance.

Property would be required as follows:

- To construct the Roslyn Road / SH57 roundabout. Reasonable space on the highway and the adjacent quadrants already exists however it is likely that the roundabout would impact on at least two existing dwellings.
- The left turn slip lane from SH57 into Roslyn Road. Either radius (200m or 400m) would have a severance effect on property and will require some property purchase.
- Roslyn Road widening. Whilst the existing road corridor is reasonably wide at 20m, some widening would be expected, for example to accommodate turning provision to Fairfield Road (where right turn bays would be required).
- New connection Roslyn Road to Lindsay Road/SH1. This would affect a number (around 10) of existing properties (either requiring demolition of dwellings or land take for construction with additional effects of the new highway in close proximity to dwellings).
- New roundabout at Lindsay Road / SH1. This would directly affect a number of properties and due to proximity of the roundabout to existing dwellings could require full acquisition of at least two properties.
- Service lanes to restrict direct access would require significant property acquisitionalong one side has not been pursued given the other options related merits in this respect.

7.3.2 Option B-2: McDonald Extension

This option proposes the creation of a new greenfield road parallel to Roslyn Road. The proposed link would connect with the existing McDonald Road east of SH57 running approximately 2km to the rail, with the road traversing over the rail and a further greenfield link from the rail overbridge to tie back into SH1, just south of Avenue North Road.

Different variants have been considered to determine the most suitable method of connecting back into SH1 and these are discussed below.

The first option (2A) for connecting back into SH1 would involve a 950m radius horizontal curve, which connects back to SH1 close to Avenue North Road (proposed to be closed) forming a 3 arm roundabout intersection. The proposed roundabout is considered safer and more functional if Avenue North Road is closed, due in part to the approach angle. As a result, it is necessary to close off Avenue North Road at SH1[19]. The separation between the railway and the proposed roundabout intersection is considered to be sufficient at approximately 350-400m, to ensure sight lines from the crest over the railway to the roundabout limit line can be maintained (subject to topographical survey). However, with this option there is a requirement for a significant horizontal curve deviation away from property boundaries to enable the new bypass link to connect into the new SH1 roundabout at an appropriate approach angle. This seriously compromises this option as a solution. No cost estimation has been undertaken for this sub-option. This is shown in the drawings as Option 2A.

A second option (2B) has also been considered which is likely to be preferable where the proposed link over the rail connects into a realigned section of SH1, thereby forming a 3-arm roundabout[20]. This option would be combined with a closure of the intersection that exists between SH1 and Avenue North Road. Avenue North Road is still accessible from further north on SH1 and so no alternative access provision is proposed at this stage. This sub option appears to be just achievable in terms of the separation from

[19] Avenue North Road is still accessible further north from SH1 and so no further works to provide access are shown on the drawings.
[20] A southbound slip lane could be provided for SH1 southbound traffic onto the new bypass but is not shown on the drawings.

the roundabout limit line to the vertical crest at 80km/h where ASD of 195m is required. However given the preliminary design is not based on Lidar or ground based topographical survey this will need to be fully tested at Detailed Business Case stage. This is shown in the drawings as Option 2B.

The connection between SH57 and the greenfield link is proposed as an at-grade 4-arm roundabout between SH57, McDonald Road and the new greenfield link. A left turn slip from SH57 onto the new greenfield link has been investigated to reduce delay and maintain speeds of vehicles travelling between SH57 and the new greenfield link.

The new connection between the rail and McDonald Road could feasibly accommodate a 50m road corridor to incorporate passing lanes in both directions which would be beneficial to provide passing opportunities between both proposed roundabouts. However this has not been included in the options at this stage and, if considered worthwhile, should be considered against the overall passing lane strategy.

A new intersection would be required at Fairfield Road where simple priority control is proposed, with the provision of right turn bays. However, it is noted that no connection to Fairfield Road is preferable and thus is recommended for further investigation in the Detailed Business Case if this option proceeds.

Property would be required as follows:

- Proposed greenfield link. The majority of the new link between McDonald and the railway alignment would be through undeveloped farm paddock. However a number of dwellings would be affected either directly (requiring demolition) or due to the proximity of the bypass.
- Proposed connection SH1 to rail. This could potentially require property demolition of 1-3 dwellings (dependent on which option is progressed) with land requirement from other landowners also.
- Proposed roundabout at SH1 / Avenue North Road would require additional land around this existing intersection.
- McDonald Road / SH57 Bypass Connection. This would require land for the provision of a roundabout. In addition, land would be required for the left turn slip options from SH57 onto the proposed link.
- SH1 slip lane, should one be required, may require additional land (note in Option 2B, the existing SH1 carriageway could be utilised).

7.3.3 Option B-3: Heatherlea South

This option would result in a proposed greenfield link between SH57 and SH1 to the south of Heatherlea East Road. The new link would form an intersection with SH57 approximately 500m northeast of the SH57 / McDonald Road intersection.

As with the other options the main bypass intersection with SH57 would take the form of an at-grade roundabout. In addition to the roundabout, a left turn slip lane from SH57 turning into the new greenfield link could also be provided to improve travel times and reduce the intersection delay created by the roundabout. Two options of slip lane curve radii have been considered; 200 m and 400 m. Similarly, to remove the disbenefit for southbound SH57 traffic that would be delayed by the proposed SH57 roundabout, a southbound slip lane is also proposed which would reduce delay for this movement.

A proposed link would then be provided up to the railway alignment with a 950 m radius horizontal curve passing over the rail alignment and then dropping back down to existing ground level to connect into an at-grade roundabout. To minimise cost, the structure spanning the rail would need to be perpendicular to the rail line. Whilst this is not possible in this instance, the angle is not particularly acute and should be adequately treated with a rail arch structure without major additional cost.

This connection would be a four arm roundabout, with the north and south arms being the realigned SH1 north and south connections, and the fourth arm being a new connection into the local road network joining into Heatherlea East Road.

The new at-grade roundabout needs to be located so as to provide the greatest amount of separation between the rail and roundabout limit lines, with the additional benefit that any new build construction to realign SH1 would be relatively short lengths (approximately 250 m in both cases). The new link to Heatherlea Road east would be approximately 350 m. With this option it is possible for the vertical

alignment over the railway to support a design speed of 100km/h, which is a significant improvement on the other options.

To further support this option it is considered feasible to close off the existing 4-arm cross road intersection of Koputaroa Road and Avenue North Road with SH1 (for safety gains). To maintain access to affected properties, it will be necessary to investigate additional local road links. In the case of Koputaroa Road, a proposed link would need to connect onto Heatherlea East Road. New roundabout and southbound slip at SH57 would require land, all of which is currently rural paddock.

Property would be required as follows:

- Proposed greenfield link between SH57 and the rail line. The majority of this is undeveloped paddock. Along the proposed 950 m radius horizontal curve is developed the new link would become closer to two residential properties. The proximity to one in particular may necessitate full acquisition.
- Railway line to new SH1 roundabout. This proposed link could be located in farm paddock in its entirety.
- Proposed SH1 roundabout. It is proposed that the roundabout to be located on farm paddock.
- Realigned SH1 southern arm: This would be primarily within farm paddock though may be in reasonable proximity to an existing dwelling.
- Realigned SH1 northern arm: Some of this link would be greenfield construction through farm paddock requiring the acquisition of at least one existing dwelling.
- Heatherlea East Road eastern arm: This new link could be accommodated in farm paddock in its entirety.
- Heatherlea East Road to Koputaroa Road link: This local road link could be located on farm paddock.

The alignment has been proposed primarily along property boundaries to minimise land parcel severance, though land ownership is yet to be established.

7.4 Option Comparison Table

Table 7-1: Option Comparison Table

Design Feature	Option B-1	Option B-2B	Option B-3
Route Length*	8.05km	8.27km	8.36km
Property Impact	**Medium-High** land take required and a high number of dwellings affected	**Low-Medium** less land required and impact on dwelling numbers reduced	**Medium-High** large land requirements and impact on numerous properties but reduced dwellings affected
Effect on Access	**Low-Medium** depending on final treatment of Roslyn Road	**Low** generally following property boundaries	**Low** generally following property boundaries
Geometric Standard	**Medium** 80km/h posted speed only may be feasible	**Medium** 80km/h posted speed only may be feasible	**High** 100km/h possible

Design Feature	Option B-1	Option B-2B	Option B-3
Intersection Standard	**High** at-grade roundabouts with slip lanes	**High** at-grade roundabouts with slip lanes	**High** at-grade roundabouts with slip lanes
Community Impact	**High** significant increases in heavy (possibly all) vehicles to Roslyn Road	**Medium** some effect on existing roads	**Low** entirely greenfield and away from existing roads

*Measured from Koputaroa Road in the North to 500m south of Tararua Road in the South

Note the information presented above has been categorised based on known information – however it is recognised that this is a subjective process

7.5 Upgrade of SH57

To further support the bypass, there would be merit in improving the current SH57 between the SH1-SH57 connection and the Levin bypass.

At present this section of SH57 benefits from a good horizontal and vertical alignment with limited vertical or horizontal curvature. However, the road cross section is substandard and should be improved. The traffic lane widths of 3.3m to 3.4m are generally acceptable though would benefit from 3.5m lanes consistent throughout. The existing sealed shoulder of generally 0.5m both sides is substandard for a state highway.

Therefore, there are likely to be crash benefits in upgrading SH57 by providing wider sealed shoulders of preferably 2.0m on both sides[21]. A section of unsealed shoulder of 0.5m should also be provided as part of the carriageway either side.

In addition to an improved cross section with wider shoulders, this part of SH57 would also benefit from the removal of a number of road side hazards, including drainage ditches, to comply with the Safe System Philosophy.

It is also recognised that Horowhenua District Council (HDC) have requested consideration of facilities at Queen Street / SH57 to ensure pedestrians are able to safely cross the state highway. This requested has been noted and should be investigated in further detail at the next stage of investigations.

7.6 Typical Cross Section

The typical cross section is considered to be two 3.5 m traffic lanes, two 2.0 m sealed shoulders and 0.5m unsealed shoulder on both sides and associated swale drain provision. The road condition and pavement design should be considered at the detailed business case stage to determine the strengthening works required. A conservative approach has been taken allowing for subbase, basecourse and noise reducing asphalt surface.

Safety barriers have not been considered other than to protect against collision with hazards or structures.

It is however feasible that additional edge protection could be required particularly where proposed road lengths are proposed through greenfield locations as it would be beneficial on these routes to provide for higher speeds.

[21] Austroads Guide to Road Design Part 3 states a minimum sealed shoulder width of 1.5m for single carriageway rural roads carrying over 3,000 vpd. However the TNZ Austroads Supplement Part 14 states a shoulder width of 2.0m to allow for cycling and is therefore considered the more appropriate standard.

Typical section detail:

- Two 3.5 m traffic lanes (undivided)
- Two 2.0 m sealed shoulders
- Two 0.5 m unsealed shoulders
- Two feathered edge and swale drains (nominally 4.0 m width dependent on topography, pavement depth and cut and fill requirements)
- Clear zone provision to be determined
- Width for cut and fill batters to be determined

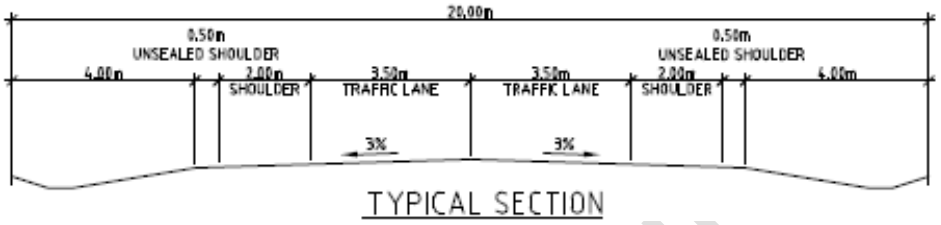


Figure 7-1: Typical Cross Section

7.7 Potential for Future Upgrade

This feasibility study has considered the bypass as a single lane in each direction. However, should the bypass proceed, it would be beneficial to acquire sufficient land to allow for the designation of a 50 m wide corridor. This would allow the future upgrade to four lanes if required without the need to acquire additional land.

The possibility of providing a four lane bypass was considered initially as part of this PFR, which would allow good passing opportunities between the proposed SH1/bypass and SH57/bypass intersections. However, this was not deemed appropriate as passing opportunities need to be coordinated across the full project length (as per the overall passing lane strategy being developed). In addition, modelling indicates there will be no need for four laning in this area within the 30 year modelling horizon (see Addendum Scoping Options Report).

8 Design Statement

This project is at project feasibility stage, and therefore several assumptions have been made in the design and cost estimates.

The design and cost assumptions include the following:

- The cost estimate has been based on the judgement of an engineer who has knowledge of the site using sketch plans.
- The cost estimate has been based on the assumption that the project can be built using proven technology.
- No adverse ground conditions are encountered (e.g. soft subgrade or contaminated material). Geotechnical testing will be a requirement at the next stage.
- For the structures element, an initial concept assessment has been undertaken. A full structural assessment should be undertaken at scheme stage, particularly given the lack of topographical and geotechnical information.
- For the vertical profile crossing the rail alignment, the K values have been calculated based on initially 100km/h. Where an acceptable K value is not achievable due to the separation between SH1 and the rail, then a reduced design speed of 80km/h has been used. However, as very limited topographical survey data was available there is a risk that more extensive works would be required when actual levels are known accurately.

- Where existing roads are retained, strengthening will be required (pavement design to be determined).
- A conservative pavement design of 450 mm sub-base & 170 mm M4 type basecourse has been assumed for all strengthening and new road construction due to variable subgrade within this area. Surfacing varies dependent on location (varying between chipseal, SMA or structural AC). For upgrades to existing highway, full depth construction of shoulders has been assumed together with 150mm seal overlay.
- Drainage provision has been included (culverts & headwalls) within the cost estimation but this is estimated based purely on the judgement of a drainage engineer.
- Clear zones or safety barriers have not been incorporated into the design.
- Earthwork extents have been estimated as no topographical survey data is available.

9 Option Discussion

One key issue in considering the options is the attractiveness of them as a HCV bypass. Freight movement is a key economic activity and any solution proposed by the NZTA needs to be reasonably attractive to HCV operators or risks imposing unnecessary costs on freight movement and will not be defensible. In this regard, route length and journey time are particularly important.

9.1 Non-HCV Traffic

The primary purpose of the bypass is to offer a viable alternative for HCV through traffic to avoid central Levin given the disproportionate number of crashes involving an HCV whilst also aiming to offer environmental enhancements by reducing such extraneous traffic.

However, in combination with the adjacent improvement projects, it could be feasible to offer a realistic bypass solution for all traffic, not just HCVs, if the combined improvements are of sufficiently high standard to attract vehicles from the Levin route. The higher standard of the route would be needed to ensure travel times and route reliability were an improvement on the current route from the same start and end points.

To support the new route becoming more attractive, journey speeds would need to be as high as possible together with ensuring intersection delays are reduced as far as practicable. Furthermore, the route would benefit from passing opportunities and reduced or eliminated side friction, for example by introducing Limited Access Road provisions.

There are a number of options in terms of classification of the bypass and this will ultimately depend on where the route links into and how attractive the route becomes. For example should the route become a full (rather than HCV only) bypass of Levin, at a new bifurcation south of the Ohau River then the new connection to SH57 (Arapaepae Road), SH57 and the new (or upgraded) link between the existing SH57 and current SH1 could all be reclassified as the new SH1, with the route through Levin downgraded to local road status. In this scenario, the SH1/57 bifurcation to the south would reverse dominance.

Alternatively, it could be that the SH1 and SH57 are both retained in their current forms and the new connection for the bypass link north of Levin is also categorised as some form of highway.

This consideration would also influence whether the bypass options should be designated as Limited Access Road(s) to prevent future frontage activity.

9.2 Legitimate Access & Enforcement

At this stage of the investigation the final form and use of the bypass requires deeper consideration (e.g. where it will connect into). As such is it not clear whether it would become the natural route choice for through traffic or whether the bypass would require some form of bylaw stipulating use.

If a bylaw was required then legitimate access to Levin would need to be maintained (previous analysis determined approximately one third of HCVs currently using Levin have legitimate access requirements).

Enforcing a system where some HCVs are permitted to use central Levin (for legitimate access purposes) and through vehicles are not, is likely to prove extremely difficult to enforce as well as being

labour intensive. Therefore, the best outcome is that the route is attractive and enforcement is not needed.

9.3 Business Impact

The economic viability of the bypass is reliant on the route becoming attractive to HCVs and also general through traffic.

However, this potentially creates a dichotomy for Levin – as the social and environmental improvements secured through the creation of a viable bypass are potentially offset by the negative economic impact for the town as vehicular through traffic no longer passes the central retail area. The effect of this on the Levin township would not be adequately considered in a standard NZTA Economic Evaluation. More investigation is required, but it is noted that high standard access into Levin is proposed.

9.4 Willingness to Pay Approach

A key consideration could be the Willingness To Pay (WTP) approach to supplement the standard economic evaluation. Whilst this approach is not currently incorporated into the Economic Evaluation Manual, it is considered to be worth further investigation for a project such as this where the traditional benefit cost ratio (BCR) approach may not adequately represent all of the relevant considerations.

The normal approach in calculating a BCR concentrates on social costs where a measure of the resources used and the benefits arising from a project are combined to provide a ratio figure for benefits to costs.

However, the WTP approach allows a more comprehensive picture of a project to be presented. The WTP approach considers the effects of a project on differing groups of society (such as tax payers, car users, residents and businesses) and these are identified separately. The extent of true financial impacts against non-financial implications that are monetised for comparison can also be identified more readily.

In the United Kingdom, the Department for Transport[22] defines the WTP approach as '*…to arrive at a money measure of the net welfare change for each individual that is brought about by the project under consideration, and then to sum these'.*

The welfare change for any individual is measured by the compensating variation**,** which is defined as the individual's WTP for benefits or the negative of his/her willingness to accept compensation for disbenefits. In summary, the WTP approach takes account of all the ways in which a project affects people regardless of whether the effects are defined as conventional financial impacts.

WTP has not been progressed at this stage, but is strongly recommended to be considered at the next stage of investigation to add to a robust outcome.

10 Cost Estimates

The expected and 95th percentile estimates for the options are detailed in Table 10-1 below.

Table 10-1: Cost Estimates

Option Description	Expected Estimate ($M)	95th Percentile Estimate ($M)
Option B-1 Roslyn Road	23.4	30.3
Option B-2B McDonald Extension	28.2	36.4
Option B-3 Heatherlea South	39.4	50.9

The cost estimates for the options have been calculated using concept layouts of the options (with no survey data) and are based on the design statement assumptions as listed in Section 8, including a contingency allowance (of approximately 20%). The cost estimates for the options are given in Appendix D.

[22] http://www.dft.gov.uk/webtag/documents/expert/pdf/u3_5_4-cost-benefit-analysis-020723.pdf

The cross section upgrade on SH57 is also included in the cost estimation. However the HDC request for an underpass (for pedestrian and cyclist movements) at Queen Street is not included in the cost estimation at this stage as further investigation is first required.

Property costs have been included in the options cost estimation based upon information provided by NZTA to MWH in 2011[23]. These figures are calculated considering land use and zoning and applying a broad land value rate to the areas required for the improvements.

11 Traffic Modelling

Traffic modelling was undertaken using the Otaki to north of Levin SATURN model for:

- the current road network (the Do Minimum for the SH1/57 Connection options), and;
- SH1/SH57 connection Options 4A and 5A (adopted as the Do Minimum for this project)
- Options B-1 to B-3 with SH1/SH57 connection Option 4A as the option base.
- Options B-1 to B-3 with SH1/SH57 connection Option 5A as the option base.

The modelling involved assessing the morning peak, evening peak and inter-peak periods for the years 2011, 2016, 2026 and 2041.

Further information outlining the SATURN do-minimum network and validation are outlined in the following reports:

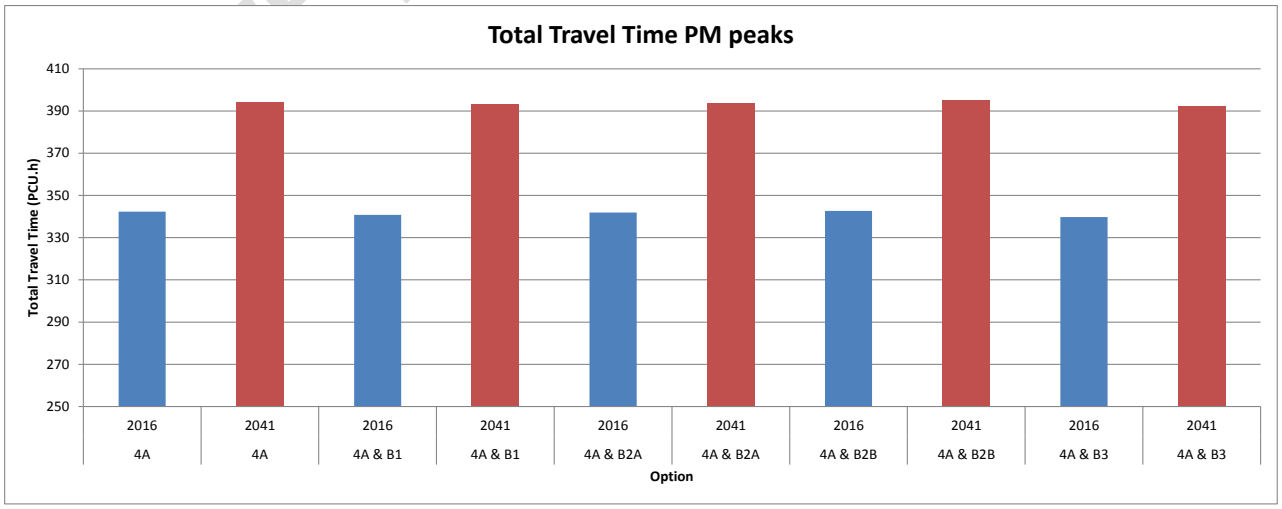
- Otaki to North of Levin Scoping Report – July 2012
- Otaki to North of Levin Validation Report – September 2013

Only the runs with Option 4A as the Do Minimum are presented below. This is because the results with Option 5A as the Do Minimum were almost identical and the results did not need to be presented twice.

Refer Appendix E for GIS based Level of Serice (LoS) diagrams for both the Do Minimum and bypass options.

11.1 Network Statistics

The evening peak results for 2016 and 2041 (as the heaviest demands on the network) for the bypass options along with the Option 4A Do Minimum are presented in the graphs below. Results for 2016 rather than 2011 are presented, because no option runs were undertaken for 2011 as the options were not likely to be constructed until at least 2016. It is these results for distance travelled and travel times which are key inputs to the economic evaluation, along with other inputs such as crash analyses which also use model results for volumes on various road links.



[23] Email provided from Mitchell Cocking (NZTA) to Marten Oppenhuis (MWH) on 12 August 2011

Figure 11-1: Total Travel Time – PM peak

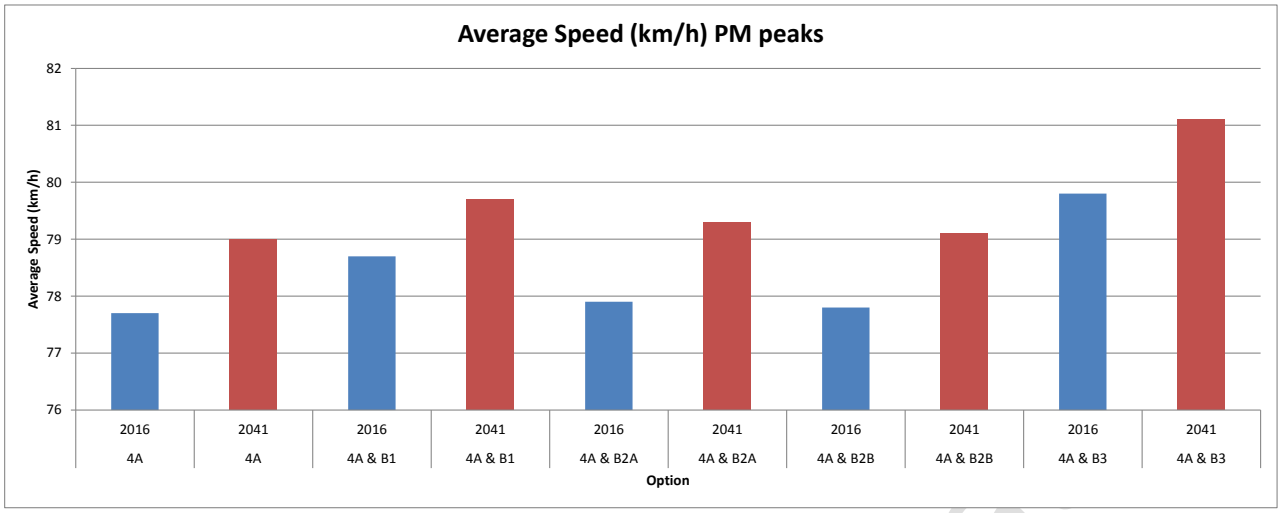


Figure 11-2: Average Speed – PM Peak

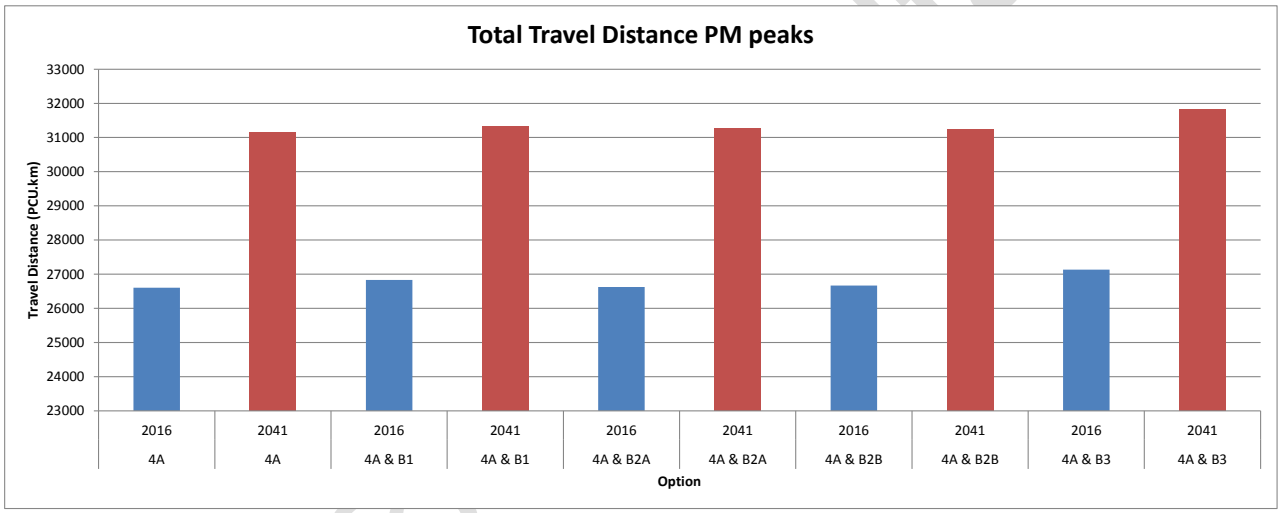


Figure 11-3: Total Distance Travelled – PM Peak

The results from the modelling show very similar outputs for all the bypass options when compared to the Base (Option 4A) due to the broadly similar network lengths and connectivity. However, Option B-3 shows reduced travel time (due to the increased average speed) and slightly longer total travel distance.

The network performance of Options B1 to B2B is similar across both total travel time and total travel distance. Although Option B1 has a slightly higher average network speed this is not substantial.

11.2 Route Travel Times

Whilst the above presents a network view of the proposed options, the model was also interrogated to determine the travel times that would be expected for key trips once the bypass was constructed. This is presented in the table below for the Do Minimum (Option 4a) and the four bypass options. The absolute travel times are shown for the Do Minimum but the difference in travel time between the options and the Do Minimum is shown for each of the options.

Table 11-1: Route Travel Time Differences

			Travel Time or Travel Time Difference (seconds)	
Option	**Route**	**Direction**	**2016 PM**	**2041 PM**
Do Minimum (Option 4A)	Route 1	Northbound	1,353	1,358
	Route 2	Northbound	816	821
	Route 3	Northbound	1,025	1,032
4A + B1	Route 1	Northbound	2	4
	Route 2	Northbound	-5	-4
	Route 3	Northbound	6	5
4A + B2A	Route 1	Northbound	4	9
	Route 2	Northbound	0	-2
	Route 3	Northbound	4	4
4A + B2B	Route 1	Northbound	3	5
	Route 2	Northbound	-2	1
	Route 3	Northbound	3	3
4A + B3	Route 1	Northbound	5	4
	Route 2	Northbound	-4	-5
	Route 3	Northbound	5	7

Route 1: Taylors Road (SH1) to Manawatu River (SH1)

Route 2: Taylors Road (SH1) to Queen Street, Levin (SH1)

Route 3: Taylors Road (SH1) to Potts Hill (SH57)

Shaded cells indicate savings in travel times compared to the Do Min network

The table above shows that in 2016 all options have slight travel time savings for route 2 (SH1 Taylors Road to Queen Street in Levin). However, this is largely offset by slight increases in travel time for SH57 Traffic (route 3 – SH1 Taylors Road to SH57 Potts Hill).

Overall, the differences in route travel time for SH1 and SH57 are minimal and likely to be within the bounds of uncertainty of the model; it is likely that the BCR will be determined largely by the both the option costs and crash costs.

The modelling results show that further work needs to be undertaken during the detailed business case phase to improve the attractiveness of the new connection and reduce the travel distance needed to access key destinations. This will include investigation of different intersection locations, layouts and the minimisation of local re-routing.

11.3 Bypass Traffic Volumes

One of the main purposes of the bypass is attract HCVs away from SH1 through Levin. Unfortunately the traffic model does not distinguish in route choice between HCVs and light vehicles. Nevertheless the volume of traffic attracted by the bypass, the reduction in traffic volumes on the main highway through Levin and the changes in traffic movements on the local roads has been determined from the model runs and is presented in the table below.

Table 11-2: Bypass Traffic Volumes – 2016 PM peak two-way hourly flow

Location	Option 4A	4A+B1	4A+B2A[24]	4A+B3
Two-way flow along SH1 south of SH1/SH57 Bifurcation	1,520	1,520	1,520	1,520
SH1 Muhunoa Rd to Tararua Rd	1,080	930	1,080	780
SH57 Muhunoa Rd to Tararua Rd	700	850	700	1,020
SH1 Tararua Rd to Queens St	890	630	890	490
SH57 Tararua Rd to Queen St	670	830	670	1000
Queens St (two-way flow travelling east of SH1)	990	990	960	1,010
Queens St (two-way flow travelling west of SH57)	390	370	330	390
SH1 Queens St to Roslyn Rd	608	500	740	310
SH57 Queens St to Roslyn Rd	920	1090	870	1,250
Roslyn Road (two way flow west of SH57 / east of SH1)	230 / 60	420 / 250	160 / 20	220 / 60
New bypass link between SH1 and SH57 two-way flow	–	250	170	400
Two-way flow along SH57 north of the bypass/ Heatherlea East Rd	850	820	840	820
Two-way flow along SH1 north of the bypass/ Heatherlea East Rd	590	620	610	600

A number of interesting aspects can be concluded from the table above.

- The options attract varying amounts of traffic in the PM peak ranging from 170 vehicles for Option B2 to 400 vehicles per hour for Option B3.
- However, Options B1, B2A and B2B do not result in a significant shift of traffic of SH1 through Levin.
- Option B3 does result in a large decrease of traffic on SH1 in Levin, up to 400 vehicles per hour.
- Option B1 encourages southbound SH57 traffic to access Levin via Roslyn Road and Fairfield Avenue (and vice versa)
- No significant changes in volume occur on Queen Street.

[24] Note Option B-2A flows are similar to B-2B

In summary, it appears as though only Option 3B is attractive enough to move traffic away from SH1 and onto the bypass route. However, this benefit is obviously very small as although a substantial amount (400 vph in the afternoon peak) of traffic moves, no significant improvement in network travel time is achieved.

The amount of traffic attracted by Option 3 is consistent with the volumes of through traffic ascertained by the number plate survey undertaken at the beginning of the wider Otaki to north of Levin project. This determined that the percentage of vehicels passing through Levin without stopping or stopping for less than a few minutes were:

- The light vehicles 36% northbound and 46% southbound.
- For heavy vehicles was 61% northbound and 70% southbound.

12 Economic Assessment and Risk Assessment

12.1 Basis of Economic Analysis

Economic analysis was carried out in accordance with the 2010 version of the NZTA's Economic Evaluation Manual (EEM) using the outcomes of the SATURN transportation model.

The do-minimum and options assessed were:

- Do Minimum (SH1/SH57 connection Option 4A)[25]
- Option B-1: Roslyn Road
- Option B-2B: McDonald Extension
- Option B-3: Heatherlea South

All options outlined above were evaluated with the SH1/SH57 Option 4a (bifurcation south of Ohau) as the base, therefore the benefits and costs in the following tables relate to the incremental costs and benefits of the bypass options in relation to Option 4a. Using Option 5a would make no distinguishable difference to the results.

The extent of the economic evaluation started immediately north of the SH1 / SH57 intersection (in the south) to Koputaroa Road on SH1 (north of Levin), and 1.23km north of Roslyn Road on SH57.

Each option consists of:

- Roundabout controlled intersections between the new bypass and SH1 and SH57.
- Widening of Kimberley Road to two 3.5 m traffic lanes and two 2.0 m sealed shoulders.
- Existing traffic signal timings on SH1 are retained.

The following assumptions have been made in the calculation of the Benefit Cost Ratio:

1. The base year is 2011 (given date of traffic counts) and time zero is 2013, with the start of benefits in 2017.
2. A 30 year analysis period and 8% discount rate has been used and reported. However, the BCR of a 40 year analysis with a 6% discount rate has also been calculated to reflect this major change in the 2013 release of the EEM.
3. The crash analysis has been undertaken for the five calendar year period January 2008 – December 2012 and considers the following:
    a. Crash Rate for the Do-Minimum (Option 4a) and for the Options (Method B) given there will be a fundamental change to the project area.

[25] Note the Do-Minimum (maintenance only) was also assessed, however since a bypass alone was determined to be infeasible (negative BCRs) SH1/SH57 Connection Option 4A was adopted as the base for comparison.

b. The AADTs used in the accident analysis were estimated by applying factors of 2, 11.4 and 2 to the AM Peak, Inter-peak and PM Peak hour SATURN movement volumes, respectively. This is consistent with the figures used in the Opus Peka Peka to Otaki model.

4. The travel time and vehicle operating costs have been calculated from the SATURN transportation modelling. The travel time benefits were determined by using the queuing delays and link cruise times, and the vehicle operating cost benefits determined from the fuel use output.

5. As presented earlier in this report, the model was run for the years 2011, 2016, 2026 and 2041 and for the AM, Interpeak and PM periods. The daily benefits were calculated by using an assessed number of hours per day for each time period. Annual costs were linearly interpolated between modelled years.

6. Travel time benefits have been based on the uncongested and congested (queuing) value of time pertaining to Rural Strategic and Urban Arterial values, with a weighted average applied.

7. The Vehicle Operating Costs (VOC) were derived by applying the ratio of fuel to operating costs as given in the EEM for Rural Strategic. The CO2 costs have been assessed as a percentage of VOC, based on the vehicle traffic composition.

8. No benefits associated with walking and cycling facilities, congestion reduction or driver frustration has been claimed at this stage. Furthermore, no wider economic benefits have been considered as these are being evaluated on the entire RoNS corridor.

12.2 Travel Time Costs

The SATURN model outputs were used to determine the overall travel time values for the Do-Minimum (Option 4A) and each of the short listed options. The travel time costs for each option, when compared to Option 4A are shown below

Table 12-1: Travel Time Benefits

Option	Travel Time Cost (PV)	Travel Time Savings (NPV)
Do Minimum (Option 4A)	$ 359,770,000	-
Option B-1: Roslyn Road	$ 359,880,000	-$115,000
Option B-2A: McDonald Extension	$ 359,270,000	$495,000
Option B-2B: McDonald Extension	$ 360,350,000	-$580,000
Option B-3: Heatherlea South	$ 357,730,000	$2,040,000

The results show that the bypass options B-1 and B-2B result in travel time disbenefits due to the slightly longer travel distance and 80 km/h design speed[26]. Option B-2A shows travel time differences due to the different intersection layout when compared with Option B-2B. Option B-3 shows travel time savings due to the 100 km/h alignment, offsetting the increased route length (approximately 400m longer than the other options) and attracting vehicles away from the existing SH1.

[26] It is noted that shoulder widening may increase the free flow speeds and link capacity; resulting in small travel time savings compared to the Do-Minimum. However, in this case, these savings are outweighed by the increased travel distance.

12.3 Vehicle Operating Cost

The SATURN model fuel usage outputs were used to determine the vehicle operating cost savings for each option, when compared to the Do-Minimum, and these are shown below.

An allowance has also been made for an improvement in roughness as part of the new pavement construction (assumed existing situation has a roughness of 85 NASRA and the new construction would be 65 NASRA). Carbon dioxide emission savings are also calculated using the VOC data.

The expected vehicle operation costs are presented in Table 12-2 below.

Table 12-2: Vehicle Operating Cost Benefits

Option	VOC and CO^2 (PV)	VOC and CO^2 Savings (NPV)
Do Minimum (Option 4A)	$221,930,000	-
Option B-1: Roslyn Road	$221,490,000	$445,000
Option B-2A: McDonald Extension	$221,090,000	$850,000
Option B-2B: McDonald Extension	$221,600,000	$335,000
Option B-3: Heatherlea South	$224,280,000	-$2,350,000

The results show that all bypass options, with the exception of Option B-3, have positive vehicle operating cost savings when compared to the Do-Minimum. This is due to all three of these options having a reduced travel speed of 80km/h, which results in lower fuel usage. In contrast, Option B-3, with a higher travel speed of 100 km/h and increased travel distance (and therefore increased fuel usage), results in negative vehicle operating cost savings.

12.4 Crash Benefits

The do-minimum (Option 4A) crash cost, along with the option crash costs, are based on the crash rate was derived using the EEM crash rate models for mid-blocks and intersections.

Widening of the shoulders on SH57 provide crash benefits, however the bypass routes are longer and with the two new intersections (roundabouts at SH1 and SH57) the overall crash costs are higher for all options compared to the do-minimum.

The expected crash costs are presented in Table 12-3.

Table 12-3: Crash Cost Benefits

Option	Crash Cost (PV)	Crash Savings (NPV)
Do Minimum (Option 4A)	$85,670,000	-
Option B-1: Roslyn Road	$101,250,000	-$15,580,000
Option B-2A: McDonald Extension	$109,580,000	-$23,910,000
Option B-2B: McDonald Extension	$109,580,000	-$23,910,000
Option B-3: Heatherlea South	$97,330,000	-$11,660,000

The crash costs for the three main bypass options differ primarily due to the traffic split between SH1 and SH57 and the amount of traffic using the bypass.

Option B-3 has a lower crash cost due to attracting a larger amount of traffic off SH1 onto SH57. As SH1 has more conflict points (intersections and side friction) than SH57, the crash costs reduce when traffic is moved away from SH1.

12.5 Maintenance Costs

The maintenance costs are similar for the Do Minimum (SH1-SH57 Connection Option 4A) and the options, with the difference being a direct result of the additional route lengths. The additional carriageway costs have been based on $5.50 /m^2 for chip seal surfacing.

12.6 Benefit Cost Ratio Results

The benefit cost ratio results are outlined in Table 12-4.

Table 12-4: Economic Analysis Summary

Option Description	Total Cost (NPV)	Total Benefits (NPV)	BCR
Option B-1: Roslyn Road	$19.6m	-$15.3m	**-0.8**
Option B-2A McDonald Extension[27]	$23.7m	-$22.6m	**-1.0**
Option B-2B: McDonald Extension	$23.7m	-$24.2m	**-1.0**
Option B-3: Heatherlea South	$33.5m	-$12.0	**-0.4**

See Appendix F for economic evaluation cover sheets.

All options have a negative BCR due to the route being longer and having higher overall crash costs compared to the Do-Minimum (Option 4a).

Option B-3 has the highest BCR, with Option B-1, Option B-2A, and Option B-2B similar to each other.

The options have also been considered in terms of incremental BCR, where it is demonstrated that Option B-1 Roslyn Road is the preferred option, primarily because it has the lowest cost.

Table 12-5: Incremental BCR of Project Options (Target of 1.0)

Option Description	Next Higher Cost	Incremental BCR	Base for Next Step
Option B-1	Option B-2A	-1.8	Option B-1
Option B-1	Option B-2B	-2.2	Option B-1
Option B-1	Option B-3	0.2	Option B-1
Option B-1			

The analysis shows that Option B-1 is the preferred option, with the cost differential between B-3 and B-1 outweighing the increase in benefits.

12.7 Sensitivity Test

The BCRs were also calculated for a 40 year analysis period and 6% discounting to reflect this major change in the 2013 release of the EEM. Table 9-10 presents the results.

Table 12-3: Economic Analysis Summary – 40year period and 6% discounting

Option Description	Total Cost (NPV)	Total Benefits (NPV)	BCR
Option B-1: Roslyn Road	$19.6m	-$18.8m	**-1.0**

[27] Note, ignoring the negative crash costs, Option B-2A has the highest BCR at 0.1.

Option Description	Total Cost (NPV)	Total Benefits (NPV)	BCR
Option B-2A McDonald Extension	$23.7m	-$27.3m	**-1.2**
Option B-2B: McDonald Extension	$23.7m	-$29.5m	**-1.2**
Option B-3: Heatherlea South	$33.6m	-$16.8	**-0.5**

The sensitivity test shows that when considering a longer time frame the BCR of all the options decreases. This is due largely to higher crash costs of the options compared to the Do-Minimum.

12.8 Risk Assessment

The risks to the project have been assessed using the General Approach as determined in the NZTA Risk Management Process Manual (AC/Man/1).

The major potential risks associated with the Levin Bypass project are considered to be:

- Project unable to get funding due to constrained funding environment.
- Inaccurate cost estimate due to level of available data at this feasibility state, including utility information and assumptions in regards to topography and land value / use.
- Conceptual structures type / position are not achievable due to surrounding properties / land uses / other constraints.
- Traffic delays during construction.
- Environmental effects during construction.
- Impacts on existing services.
- Land acquisition difficulties
- Difficulties in obtaining resource consents and/or alteration to designation
- Opposition from local iwi
- Additional landowner accommodation works required
- Railway crossing bridge detail and agreement with KiwiRail.
- Volume of traffic attracted to the Bypass could be less than expected

13 Social and Environmental Assessment

The Scoping Report phase of the Ōtaki to Levin RoNS identified a number of social and environmental factors which provide an overview to some of the issues that will need to be assessed during the detailed business case. The four options being investigated (including the Do-minimum option) have been considered against social and environmental issues and these include:

- Notable trees that require protection on Arapaepae Road, Roslyn Road and Heatherlea East Road;
- Listed contaminated sites in the vicinity of proposed works in Arapaepae Road; and
- Existing lifestyle subdivision patters.

13.1 Consultation

A Consultation Plan for the entire Ōtaki to north of Levin project has been prepared and consultation is being undertaken in accordance with the plan. The purpose of the plan is to:

- Provide a documented process for intended engagement with the community, including the project context, the parties involved, and desired outcomes;
- Maximise effective and efficient engagement of community within generally tight time constraints;
- Provide the specifics of consultation to be undertaken, including timeframes;
- Help the project team to proactively manage risks to the project/project future from inappropriate or inadequate community engagement; and
- Help the project team to constructively manage community expectations.

The area as a whole is identified as being of cultural importance to the iwi of Rangitane o te Whanganui a Tara, Ngati Raukawa ki te Tonga and Ngati Toa Rangitira.

The most recent consultation for the entire Otaki to Levin project (Consultation Stage 3) was undertaken between April 2013 and July 2013.

Stage 3 involved the release of preferred options for specific project areas that had been identified earlier. A Consultation Report on the consultation that has been undertaken to date has been prepared (to be available at the end of August 2013). The report includes a summary of comments received on the Levin area and the need for a bypass, and this PFR, in part, is a response to some of the feedback received.

The following comments were received in relation to the bypass:

- Desire for a Levin Bypass particularly for heavy vehicles.
- Strong support to protect a bypass route in the vicinity of Roslyn Road for the long term.
- Many would like the SH57 bypass option to be considered now.
- Suggestion of turning parking from angle to parallel in Levin High Street to allow space for four lanes in order to facilitate a crawler/parker lane separate from through traffic
- Trucks turning at Queen Street and Bath Street take over two lanes and are intimidating for other traffic.

Given that the proposed options for the bypass will have significant consequences for various parties (such as landowners and business operators) on-going consultation will be an important component of the project.

Consultation with the public and stakeholders is programmed and this will help the NZTA and HDC decide how to proceed.

14 Resource Management Issues

The project must meet all statutory requirements. There are a number of documents (both statutory and non-statutory) that must be considered when planning for the state highway improvements. In particular, the requirements of the Resource Management Act, the operative Horowhenua District Plan and the Horizons Regional Plan (proposed One Plan) will be assessed to ensure that the proposed project meets the plan provisions and follows the statutory process.

14.1 District Plan Provisions

14.1.1 Zoning

14.1.2 Designations

SH1 and SH57 are designated under the Horowhenua District Plan for “state highway purposes” (D2) and (D3) respectively. A section of Oxford Road/SH1 is also designated (D5) (Map 23) as “proposed road widening purposes” with NZTA the requiring authority. The existing designations are narrow in places and may need to be altered to accommodate the road improvements. Options requiring a realignment of sections of the highway will require a new designation, and sections of road that are not currently designated will need to be designated. The option of revoking the status of the surplus highway

to a local road will be investigated in the Detailed Business Case. Should these roads remain "state highway", NZTA will be required to give notice to the Council of its requirement to alter the designation (NOR). An outline plan would also be required to indicate the scale of the proposed works within the designation. Alternatively, NZTA could apply for a resource consent (land use consent) to carry out the proposed works outside the designation.

Sections of SH1 run alongside the railway line. The railway corridor is designated (D1) under the District Plan.

14.1.3 Heritage Issues

Schedule 2 of the District Plan identifies heritage structures. There are no historic buildings noted in the vicinity of the proposed options:

The following notable trees are identified in the District Plan:

- Various trees located at 307 Heatherlea East Road (Map 8);
- Oak at 191 Roslyn Road, Levin (Map 8);
- Copper Beech at 'Annandale' Arapaepae Road (Map 8); and

14.1.4 Proposed Gladstone Greenbelt Structure Plan

The proposed Horowhenua District Plan includes the proposed Gladstone Greenbelt Residential Area Structure Plan which is a non-statutory plan. The operative District Plan is under review and is currently open to submissions.

The structure plan area covers a large block of farmland bordered by SH57, Queen Street East, Tararua Road and Gladstone Road. The structure plan recognises that SH57 is a potential Levin bypass route and a 100 m corridor has been identified alongside the existing road to provide sufficient width to cater for future upgrades.

14.2 Regional Plan Provisions

The final designs and construction plans will determine what regional consents are required. Depending on the selected option, the following resource consents are likely to be required under the proposed One Plan administered by the Horizon's Regional Council:

- Land use consents for the placement/extension of structures in the riverbed;
- Bore permit for geotechnical investigation;
- Stormwater discharges from bulk earthworks;
- Soil and vegetation disturbance;
- Discharges of contaminants to land; and
- Discharge of contaminants to air from road construction.

14.3 Other Provisions

Depending on the options pursued, the proposed works may involve earthworks that have the potential to unearth Maori and early European artefacts (pre-1900). Current information does not identify any known sites but an archaeological authority may be required should a site be discovered.

15 Geotechnical Requirements

A preliminary geotechnical appraisal report was prepared by MWH in 2011. This report outlined that beach deposits (Ōtaki Sandstone) lie beneath the majority of the stretch of the highway. To investigate the subsurface conditions along the alignment which includes the Heavy Vehicles Bypass study area, MWH recommended field investigations consisting of hand-auger bores, boreholes and test pits.

The preliminary geotechnical appraisal report for the Ōtaki to Levin RoNS noted the following aspects in regards to the subject study area:

- It has moderate settlement potential;
- It has a seismic potential due to the proximity of the active Northern Ohariu Fault;
- It has low susceptibility to liquefaction; and
- It is not located within a tsunami influence zone.

16 Land Requirements

Land requirement has been included in the concept development and cost estimation as follows:

- Option B-1 requires 250,000m^2 of land (affecting 20 individual property appellations)
- Option B-2B requires 142,000m^2 of land (affecting 18 individual property appellations)
- Option B-3 requires 300,000m^2 of land (affecting 32 individual property appellations)

The land calculations are based on that required for the construction of the road using aerial plan areas and includes assumptions where entire properties would require acquisition if the alignment would result in the demolition of an existing dwelling, or where the road would result in the land becoming land locked. It is entirely feasible that these areas will change when a more thorough assessment of land requirement is undertaken.

17 Maintenance Issues

The current proposals would result in three specific changes to the maintenance regime:

- maintenance and repair of proposed bridge or arch structures where grade separation for the rail is required.
- maintenance of additional / proposed links sections of road either by the NZTA or Council.
- There would be increased maintenance requirements for the bypass itself and additional further maintenance responsibilities for HDC should new local road connections be constructed.

18 Conclusions and Recommendations

From the assessment undertaken, it is clear that no single option represents a suitable way forward in the short to medium term. Broadly, the BCRs are low due to the additional route length that is travelled using the proposed bypass, as opposed to the route directly through Levin.

Of the three bypass options considered in this assessment, Option B-3 is preferred. This is primarily because it is the option that takes the most traffic away from SH1 through central Levin. It is also because the intersection forms create less delay than in the other options, whilst higher speeds can also be accommodated.

Option B-3 is also preferred in terms of geometry due to the separation between the railway and the connection back into SH1, where 100km/h could be achieved which is not possible with the other options. Property costs for Option B-3 are likely to be significant; however, the need to acquire existing dwellings should be limited.

It is therefore concluded that Option B-3 is the preferred option but due to its negative BCR, it is not recommended that it is progressed at this point. However, planning mechanisms should be considered to protect this route so that it can be implemented in the long term.

Consultation with the public and stakeholders is programmed and this will help the NZTA and HDC decide how to proceed.

Appendix A Photographs

HCVs using central Levin (1)

HCVs using central Levin (2)

Appendix B Crash Data

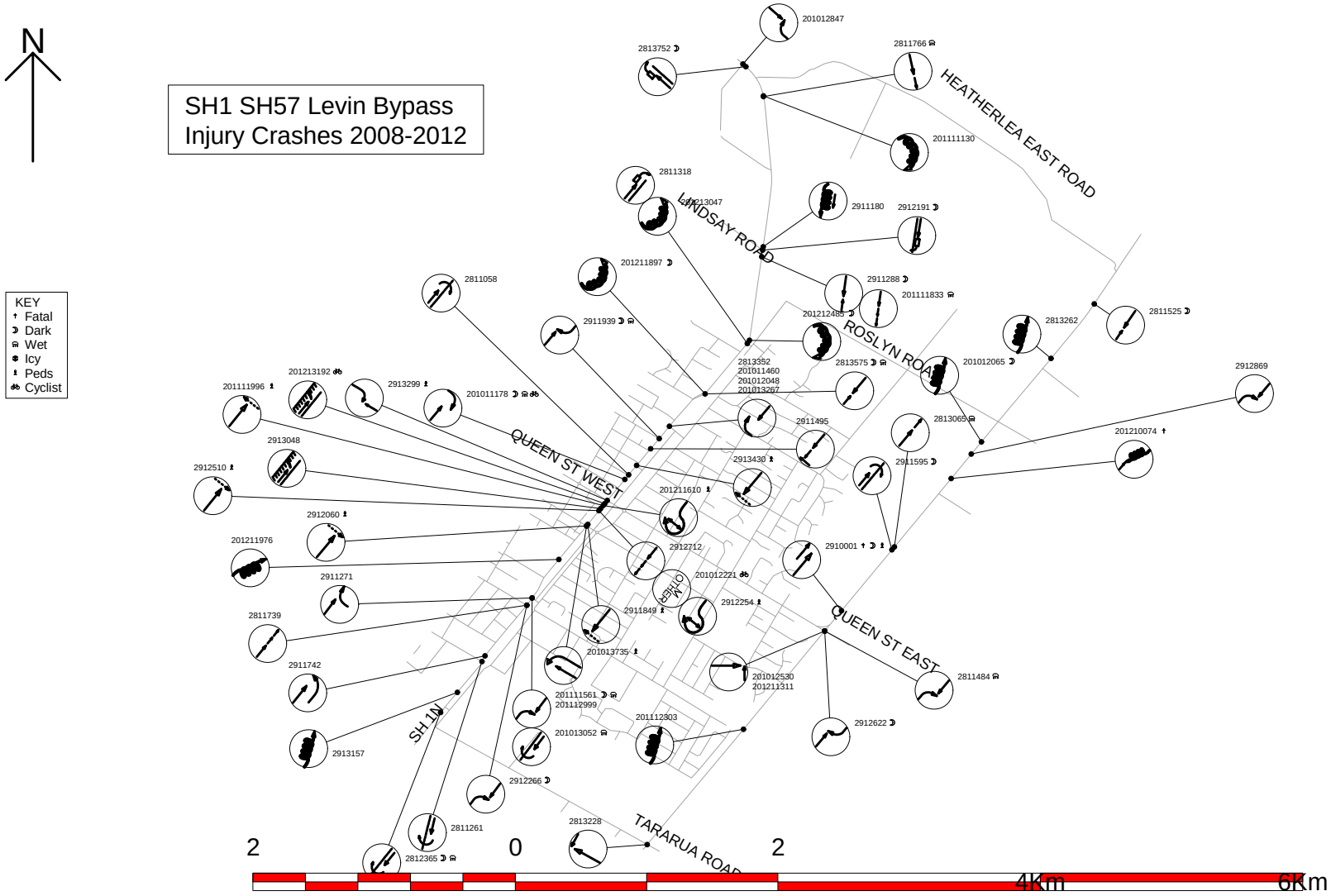
First Street	Distance	D I R	Second street or landmark	Crash Number	Date DD/MM/YYYY	Day DDD	Time HHMM	M V T	D R VN 1	VVV 234	Factors and Roles A is for vehicle 1 B is for veh 2 etc	O B J E C T	C U R V E H	W E T N H E	L I G H T S	W E U T H E R	J U N C T	C O N R L	M A R K S	S P D M	Total Inj F A T	S E R	M I N	P E D a g e	C Y C a g e
1N/967/14.696		I	SOUTH LANE	2850015	01/01/2008	Tue	2005	LB	CS	1C	303B 402B 410B		R	D	O	F	T	G	C	050					
1N/967/15.393		80S	HOKIO BEACH ROAD	2850008	03/01/2008	Thu	0840	CC	CN	1	410A	P	R	D	O	F		N	P	070					
1N/967/13.333		50N	DEVON ST	2852913	04/01/2008	Fri	1530	FD	CS	1C	181A 402A		R	D	B	F		N	C	050					
1N/967/12.744	OXFORD	I	KAWIU ROAD	2850296	15/01/2008	Tue	1545	JA	CN	1C	302B 375B		R	D	B	F	T	G	R	050					
1N/967/13.5		5N	EXETER ST	2811058	23/01/2008	Wed	0911	MC	CN	1C	372B		R	D	O	F	T	N	C	050	1				
1N/967/13.405		100N	EXETER ST	2850425	28/01/2008	Mon	0240	KB	CE	1M	330B 927		R	D	B	F	D	N	C	050					
1N/967/15.313		I	HOKIO BEACH ROAD	2811261	29/01/2008	Tue	1300	MC	CS	1C	372B 817		R	D	B	F	T	G	C	050	1				
1N/967/13.383		I	DEVON ST	2850474	06/02/2008	Wed	1908	GE	CN	1C	160A 926		R	D	B	F	T	N	P	050					
1N/967/15.759		I	TARARUA ROAD RAILWAY CROS	2850515	16/02/2008	Sat	0839	FA	CN	1C	331A		R	W	O	F	T	N	C	070					
1N/967/12.145		I	ROSLYN ROAD	2811318	20/02/2008	Wed	0746	GC	MN	1C	202B 372B		E	D	B	F	T	G	R	070	1				
57/0/5.581		I	QUEEN ST EAST	2850657	20/02/2008	Wed	1703	HA	CW	2C	301A 382A		R	D	B	F	X	S	C	100					
57/0/5.581		I	QUEEN ST EAST	2811484	05/03/2008	Wed	1000	LB	CS	1C	303B		R	W	O	L	X	S	R	100	1				
1N/967/13.505		I	EXETER ST	2851136	10/03/2008	Mon	1420	GD	CS	1C	331A 358A 402A		R	D	B	F	T	G	C	050					
1N/967/13.505		I	EXETER ST	2851080	16/03/2008	Sun	1852	KA	VN	1C	302B 375B		R	D	B	F	T	G	C	050					
1N/967/13.251		10N	ESSEX ST	2850909	20/03/2008	Thu	1311	FD	CN	1C	331A 355A		R	D	O	F	T	N	P	050					
1N/967/16.528		150N	BOULTON ROAD	2851732	24/03/2008	Mon	1502	FD	CS	1C4	331A		R	D	B	F		N	L	100					
57/0/8.81		300S	HEATHERLEA EAST ROAD	2811525	28/03/2008	Fri	2000	BA	CS	1V	103A 125A		R	D	DN	F		N	C	100	1				
1N/967/14.764		I	MAKO MAKO ROAD	2811739	14/04/2008	Mon	1203	FD	CN	1M	181A		R	D	O	F	T	G	C	050		1			
1N/967/10.247		300S	AVENUE NORTH ROAD	2811766	21/04/2008	Mon	1600	FA	CS	1C	112A 181A	FS	R	W	O	F		N	C	100	1				
1N/967/14.864		100S	MAKO MAKO ROAD	2851969	29/04/2008	Tue	1037	AC	TN	1V	159A		R	D	O	F		N	C	070					
1N/967/15.463		150S	HOKIO BEACH ROAD	2852165	06/05/2008	Tue	1025	FD	4N	1C	181A		R	D	B	F		N	C	070					
1N/967/14.004		I	BATH ST	2852127	06/05/2008	Tue	1100	HA	CE	2C	322A		R	D	B	F	X	T	C	050					
1N/967/15.413		100S	HOKIO BEACH ROAD	2852281	14/05/2008	Wed	1130	AC	VN	1C	372B		R	D	B	F		N	C	070					
MAKO MAKO ROAD		I	1N/967/14.764	2853602	24/06/2008	Tue	1210	KA	SN	1C	100A 129A 370A		R	D	B	F	T	G	C	050					
1N/967/15.813		500S	HOKIO BEACH ROAD	2812365	04/07/2008	Fri	2120	MC	MS	1C	372B		R	W	DO	L		N	L	070	1				
1N/967/13.994		10N	BATH ST	2854707	05/08/2008	Tue	1055	MO	TN	1V	386A 440B 817		R	D	B	F	X	S	N	050					
57/0/6.411		830N	QUEEN ST EAST	2813065	23/08/2008	Sat	1600	FA	4N	1C	331A	P	R	W	O	L		N	C	100	3				
1N/967/13.934		70N	BATH ST	2856652	31/08/2008	Sun	2030	MF	CN	14	371B		R	D	DO	F		N	C	050					
1N/967/15.313		I	HOKIO BEACH ROAD	2854708	02/09/2008	Tue	0949	LB	CN	1CV	303B 375B		R	D	B	F	T	G	R	050					
1N/967/14.423		90N	STUCKEY ST	2854760	08/09/2008	Mon	0830	MA	VS	1V	373B 671B		R	D	O	F		N	R	050					
1N/967/13.019		I	TYNE ST	2813352	09/10/2008	Thu	1255	JA	CS	1C	302B 375B		R	D	B	F	T	G	C	050	1				
1N/967/14.313		200N	STUCKEY ST	2855332	10/10/2008	Fri	1715	FD	CN	1CCC	331A 352A		R	D	B	F		N	R	050					
1N/967/13.855		100S	QUEEN ST WEST	2855550	16/10/2008	Thu	1350	MO	VN	14	386A	M	R	D	O	F		N	N	050					
57/0/3.473		I	TARARUA ROAD	2813228	17/10/2008	Fri	1745	HA	CW	2C	301A 375A 501A		R	D	B	F	X	S	L	100	1				
1N/967/14.764		I	MAKO MAKO ROAD	2855941	24/10/2008	Fri	1501	JA	4N	1C	302B 386B		R	D	B	F	T	G	C	050					
57/0/8.28		100N	MCDONALD ROAD	2813262	26/10/2008	Sun	1705	CB	CN	1	134A 358A 400A	FV	R	D	B	F		N	C	100	1				
1N/967/12.644		100N	KAWIU ROAD	2813575	01/11/2008	Sat	2330	BA	CS	1C	103A 125A		R	W	DO	L		N	P	100	2				

First Street	Distance	D I R	Second street or landmark	Crash Number	Date DD/MM/YYYY	Day	Time HHMM	M V T	D R VN 1	VVV 234	Factors and Roles A is for vehicle 1 B is for veh 2 etc	O B J E C T	C U R V E T	W E T N E S	L I G H T	W E A T R	J U N C T	C O N D	M A P R O	S P D L M	Total Inj F A T	S E R	M I N	P E D a g e	C Y C a g e
57/0/8.44	260N		MCDONALD ROAD	2856102	18/11/2008	Tue	1040	CA	VN1		680A	FV	R	W	O	L		N	C	100					
1N/967/14.004		I	BATH ST	2856913	28/11/2008	Fri	1635	FD	CN1C		181A 352A 817		R	D	B	F	X	T	C	050					
1N/967/9.977	30E		KOPUTAROA ROAD	2813752	16/12/2008	Tue	2325	GC	CW1C		372B 377B 927	FF	R	D	DN	F	D	N	C	100		1			
57/0/5.786	200N		QUEEN ST EAST	2910001	01/01/2009	Thu	0130	PA	CN1E		105B 702B 724B		R	D	DN	F		N	C	100	1			33	
1N/967/13.755		I	QUEEN ST WEST	2950184	03/01/2009	Sat	1930	FE	TN1C		181A 387A		R	D	B	F	X	T	C	050					
1N/967/14.004		I	BATH ST	2950142	05/01/2009	Mon	1012	FE	VS1VC		181A		R	D	O	F	X	T	C	050					
1N/967/11.472	50S		LINDSAY ROAD	2911288	15/01/2009	Thu	2150	BA	CS1C		101A 205A	P	R	D	DO	F		N	C	100		2			
1N/967/14.004		I	BATH ST	2950653	09/02/2009	Mon	0543	EC	CS1		377A 901	IP	R	W	DO	H	X	T	R	050					
1N/967/11.397	25N		LINDSAY ROAD	2911180	17/02/2009	Tue	1615	AD	CS1		112A 137A 153A	FP	R	D	B	F		N	C	100		3			
1N/967/14.696		I	LIVERPOOL RAILWAY CROSSIN	2911271	23/02/2009	Mon	1700	KB	TN1P		372B 507B		R	D	B	F	T	G	P	050		1			
1N/967/15.463	150S		HOKIO BEACH ROAD	2951367	03/03/2009	Tue	0700	GD	CS14		181A 387A 193B 928		R	D	O	F	D	N	P	050					
1N/967/13.241	20N		ESSEX ST	2911495	14/03/2009	Sat	1126	FC	CS1C		331A 352A		R	D	B	F		N	X	050		1			
1N/967/15.033	30S		RINA ST	2951449	21/03/2009	Sat	1230	EA	CN14		350A 370A	M	R	D	B	F		N	C	050					
57/0/6.381	800N		QUEEN ST EAST	2911595	13/04/2009	Mon	1730	MC	CN1V		372B		R	D	TF			N	C	100		1			
1N/967/15.263	50N		HOKIO BEACH ROAD	2911742	15/04/2009	Wed	1330	GB	CN1T		181A 929		R	D	B	F	D	N	L	100		1			
1N/967/13.989	15N		BATH ST	2911849	01/05/2009	Fri	1025	NA	CS1E		711B 712B		R	D	B	F	X	T	R	050		1	41		
1N/967/14.696		I	LIVERPOOL RAILWAY CROSSIN	2954321	02/05/2009	Sat	1100	NA	CW2		353A 402A 387B		R	D	B	F	T	G	C	050					
1N/967/14.764		I	MAKO MAKO ROAD	2912266	12/05/2009	Tue	2029	LB	4S1C		101B 303B		R	D	DO	F	T	G	P	050		2			
1N/967/13.141		I	YORK ST	2911939	18/05/2009	Mon	1645	LB	CN1C		303B		R	W	TO	L	T	N	C	050		1			
1N/967/12.744 OXFORD		I	KAWIU ROAD	2952595	18/05/2009	Mon	2320	DC	CE2		101A 113A 514A	ET	R	W	DO	F	T	G	R	050					
1N/967/14.004		I	BATH ST	2912060	21/05/2009	Thu	1549	NA	VN1		322A		R	D	B	F	X	T	C	050		1	73		
1N/967/11.422		I	LINDSAY ROAD	2912191	08/06/2009	Mon	1810	GD	CS1T		331A 507A		R	D	DO	F	T	G	C	100	1	1			
1N/967/13.855	100S		QUEEN ST WEST	2912254	24/06/2009	Wed	1255	NG	CS1E		730B		R	D	B	F		N	C	050		1	89		
1N/967/11.422		I	LINDSAY ROAD	2953181	27/06/2009	Sat	1659	CB	VN14		353B 440B	F	R	D	O	F	T	G	C	100					
1N/967/16.163	850S		HOKIO BEACH ROAD	2953152	01/07/2009	Wed	2225	EC	CS1C		370A 341B	D	R	D	DN	F		N	C	100					
1N/967/13.855	100S		QUEEN ST WEST	2912510	26/07/2009	Sun	1232	NA	CN1E		711B		R	D	B	F		N	C	050		1	23		
1N/967/16.259	500S		TARARUA ROAD RAILWAY CROS	2954135	06/08/2009	Thu	1402	LB	CN1C		303B 375B 920		R	D	B	F	D	N	C	070					
57/0/5.581		I	QUEEN ST EAST	2912622	21/08/2009	Fri	1850	LB	MN1C		303B 375B		R	D	DO	F	X	S	R	100	1				
1N/967/13.855	100S		QUEEN ST EAST	2912712	26/08/2009	Wed	1655	FD	CS1CCC		331A		R	D	O	F		N	C	050		1			
57/0/7.327	320S		ROSLYN ROAD	2912869	23/09/2009	Wed	1638	LB	CS1C		303B 929		E	D	O	F	D	N	C	100		1			
1N/967/13.835	80S		QUEEN ST EAST	2913048	29/09/2009	Tue	1200	MF	CN1T		381A		R	D	B	F		N	P	050		1			
1N/967/13.755		I	QUEEN ST EAST	2955642	24/10/2009	Sat	0645	LB	CS1C		303B 375B		R	D	TF	F	X	T	R	050					
1N/967/15.613	300S		HOKIO BEACH ROAD	2913157	25/10/2009	Sun	1125	CB	CN1		129A 501A	P	R	D	B	F		N	L	070		1			
1N/967/11.322	100N		LINDSAY ROAD	2956353	12/11/2009	Thu	0240	EC	CN1		370A 912	W	R	D	DN	F		N	C	100					
1N/967/13.757		I	QUEEN ST WEST	2913299	13/11/2009	Fri	1100	NF	CE2E		307A 353A		R	D	O	F	X	T	R	050		1	84		
1N/967/13.408	25S		DEVON ST	2913430	26/11/2009	Thu	1300	NA	CS1E		711B		R	D	O	F		N	C	050	1		84		
1N/967/13.485	20N		EXETER ST	2956418	26/11/2009	Thu	1630	MF	CS1C		372A 371B		R	D	B	F		N	C	050					

First Street	Distance	D I R	Second street or landmark	Crash Number	Date DD/MM/YYYY	Day	Time HHMM	M V T	D R VN 1	VVV 234	Factors and Roles A is for vehicle 1 B is for veh 2 etc	O B J E C T	C U R V E H	W E T N H E	L I G H T	W E U T	J N C T	C O N R L	M A R K	S P D L M T	Total Inj F A T	S E R	M I N	P E D a g e	C Y C a g e
1N/967/15.063	60	S	RINA ST	2956827	18/12/2009	Fri	1220	MC	CS	1C	372B 671B		R	D	O	F		N	C	050					
1N/967/13.018		I	TYNE ST	201050091	09/01/2010	Sat	2140	LB	4S	1C	145A 303B 387B		R	D	DO	F	T	G	C	050					
1N/967/13.545	40	S	EXETER ST	201011178	23/01/2010	Sat	2138	JA	CN	1S	105B 308B 602B 929		R	W	DO	F	D	N	C	050	1			54	
1N/967/14.146		I	DURHAM ST	201050508	08/02/2010	Mon	1150	LB	CN	1C	303B 387B		R	D	B	F	T	G	C	050					
1N/967/13.505		I	EXETER ST	201050484	19/02/2010	Fri	1923	LB	CN	1CC	303B		R	D	TF	F	T	G	C	050					
1N/967/10.9	90	S	AVENUE NORTH ROAD	201051142	19/03/2010	Fri	2338	AD	4S	1	137A 410A	V	E	W	DN	L		N	N	100					
1N/967/13.018		I	TYNE ST	201011460	22/03/2010	Mon	1639	JA	CS	1C	302B 375B		R	D	O	F	T	G	C	050	1				
1N/967/13.02 OXFORD		I	TYNE ST	201012048	19/05/2010	Wed	0750	JA	CS	1C	302B 377B 810		M	D	O	F	T	G	C	050	1				
1N/967/12.067	80	N	ROSLYN ROAD	201052089	19/05/2010	Wed	1600	MC	CN	1C	372B 402B		M	W	O	F		N	C	070					
1N/967/13.435	50	S	DEVON ST	201052200	21/05/2010	Fri	1750	MF	CS	1CC	371B 377B 839	M	R	W	DO	L		N	C	050					
57/0/7.449	200	S	WAIHOU ROAD	201012065	29/05/2010	Sat	0100	CB	CN	1	103A	V	R	D	DN	F		N	C	100	1				
1N/967/13.63		I	STANLEY ST	201053112	04/06/2010	Fri	1640	FD	CS	1C	331A 352A		R	D	TF	F	T	N	C	050					
1N/967/14.764		I	LIVERPOOL ST	201052816	11/06/2010	Fri	1610	KA	CW	1C	302B 375B		R	W	O	L	T	G	C	050					
57/0/4.541	530	S	MEADOWVALE DRIVE	201052782	15/06/2010	Tue	1507	GB	CS	1C4	157A 158A 387A 927	M	R	D	B	F	D	N	C	100					
1N/967/13.857	100	S	QUEEN ST WEST	201012221	22/06/2010	Tue	1258	MO	CS	1S	372A 671A		R	D	B	F		N	C	050	1			33	
57/0/6.638	300	S	WAIHOU ROAD	201053517	25/07/2010	Sun	0650	GC	CN	1C	333A 174B 929	V	R	D	TN	F	D	N	C	100					
1N/967/12.278	50	S	GORDON PLACE	201053537	25/07/2010	Sun	1855	BA	4S	1C	125A 411A 137B		R	D	DO	F		N	C	070					
57/0/5.586		I	QUEEN ST EAST	201012530	27/07/2010	Tue	1541	HA	CE	2C	301A 375A		R	D	O	F	X	S	C	100	1				
1N/967/15.133		I	KEEPA ST	201054078	30/07/2010	Fri	1550	MC	CN	1C	333A 372B		R	D	O	F	T	G	R	050					
1N/967/9.948		I	KOPUTAROA ROAD	201012847	03/08/2010	Tue	0750	LB	CE	1CV	303B	Q	R	D	B	F	T	S	C	100	2				
1N/967/12.506	240	N	KAWIU ROAD	201054956	06/08/2010	Fri	1630	MO	CN	1C	330A 358A	M	R	D	B	F		N	C	070					
1N/967/13.41		I	SERVICE LANE	201054484	10/08/2010	Tue	1725	GE	CN	14	160A 387A 381B		R	D	O	F	T	N	C	050					
1N/967/13.63		I	STANLEY ST	201054369	18/08/2010	Wed	1205	FD	OS	1T	181A 386A		R	D	O	F	T	N	C	050					
1N/967/13.527	20	S	EXETER ST	201053850	18/08/2010	Wed	1348	MC	CS	1C	372B 386B		R	W	O	L		N	C	050					
1N/967/13.385 OXFORD		I	DEVON ST	201054037	26/08/2010	Thu	1710	JA	CS	1C	302B 375B		R	D	B	F	T	G	C	050					
1N/967/12.278	50	S	GORDON PLACE	201054367	13/09/2010	Mon	1726	EA	VN	14	353A 402A	M	R	W	TF	L		N	C	070					
1N/967/14.026	20	S	BATH ST	201054884	05/10/2010	Tue	1240	JA	CN	1C	205A 308B 314B 925		R	D	B	F	D	N	P	050					
1N/967/14.696		I	LIVERPOOL RAILWAY CROSSIN	201013052	16/10/2010	Sat	0920	MC	VS	1V	330B 372B		R	W	O	L	T	G	C	050	2				
1N/967/13.02 OXFORD		I	TYNE ST	201013267	31/10/2010	Sun	1110	JA	MS	1C	302B 377B 830		R	D	B	F	T	G	C	050	1				
1N/967/13.507		I	EXETER ST	201055705	10/11/2010	Wed	1548	GC	CS	1C	174B 381B		R	D	B	F	T	G	C	050					
1N/967/13.976	30	N	BATH ST	201055673	12/11/2010	Fri	1530	FD	4S	1CCC	331A 402A		R	D	B	F		T	C	050					
1N/967/10.293	200	S	HEATHERLEA EAST ROAD	201055610	13/11/2010	Sat	0320	DA	4S	1	410A	FTV	E	D	DN	F		N	C	100					
1N/967/14.006		I	BATH ST	201013735	09/12/2010	Thu	1242	NC	TW	2E	378A 671A 718B		R	D	B	F	X	T	R	050	1		83		
1N/967/13.757		I	QUEEN ST EAST	201056337	18/12/2010	Sat	1205	FE	TN	14	181A		R	W	O	L	X	T	R	050					
1N/967/14.764		I	MAKO MAKO ROAD	201056636	30/12/2010	Thu	1210	KB	CS	1C	302B		R	D	B	F	T	G	C	050					
1N/967/12.147		I	ROSLYN ROAD	201150248	18/01/2011	Tue	1150	DA	TS	1	650A		E	W	O	F	T	G	R	070					
1N/967/10.243	150	S	HEATHERLEA EAST ROAD	201111130	21/01/2011	Fri	1425	DA	CS	1	410A	V	E	D	B	F		N	C	100	4				

First Street	Distance / DIR	Second street or landmark	Crash Number	Date DD/MM/YYYY	Day DDD	Time HHMM	MVMT	VVV 1 234	Factors and Roles (A is for vehicle 1, B is for veh 2 etc)	OBJECT	CURVE	WETNES	LIGHT	WTHER	JUNCT	CONTRL	MARKS	SPDLMT	Total Inj F	Total Inj S	Total Inj M	PED age	CYC age
1N/967/16.299	380N	BOULTON ROAD	201150925	23/01/2011	Sun	1620	GC	VS1C	330B 372B 404B 801 927		R	W	O	L	D	N	C	100					
57/0/3.473	I	TARARUA ROAD	201150424	10/02/2011	Thu	0940	HA	CE2C	101A 301A 375A		R	W	O	L	X	S	N	100					
1N/967/13.123	20N	YORK ST	201151493	17/02/2011	Thu	1055	GD	TN1CC	331A 181B 922		R	D	B	F	D	N	C	050					
1N/967/13.707	50N	QUEEN ST EAST	201150778	20/02/2011	Sun	1207	FD	CS1C	331A 358A		R	D	B	F		N	P	050					
BATH ST	I	OXFORD ST	201150609	28/02/2011	Mon	1708	AC	VW14	159A 172A		R	D	B	F	X	T	L	050					
57/0/5.086	500S	QUEEN ST EAST	201150741	09/03/2011	Wed	0946	MC	CS1C	303B 407B		R	D	B	F		N	C	100					
1N/967/13.123 OXFORD	20N	YORK ST	201150777	10/03/2011	Thu	2230	MO	CS1C	103A 410A 922		E	D	DO	F	D	N	N	050					
1N/967/14.006	I	BATH ST	201151525	25/04/2011	Mon	1102	GO	TW1C	175A 179A 372A 333B		R	W	O	L	X	T	L	050					
1N/967/11.474	50S	LINDSAY ROAD	201111833	25/04/2011	Mon	1437	FD	CS1C4C	112A 181A 331A 112C 181C 800 901		R	W	O	H		N	C	100			1		
1N/967/11.624	200S	LINDSAY ROAD	201152113	25/04/2011	Mon	1540	FD	CS1C	331A 353A 901		R	W	O	H		N	C	070					
1N/967/14.366	150N	STUCKEY ST	201151844	27/04/2011	Wed	1035	MO	CS1CC	423A	MM	R	W	O	L		N	R	050					
1N/967/14.696	I	SOUTH LANE	201111561	04/05/2011	Wed	1855	LB	CS1C	382B 387B		R	W	DO	L	T	G	C	050			2		
1N/967/13.737	20N	QUEEN ST WEST	201152153	02/06/2011	Thu	1715	FD	VS14	386A 402A		E	D	DO	F	X	T	R	050					
1N/967/13.807 OXFORD	50S	QUEEN ST EAST	201111996	03/06/2011	Fri	1617	NB	MN1E	112A 376A		R	D	O	F		N	P	050			1	56	
1N/967/13.757	I	QUEEN ST WEST	201152335	29/06/2011	Wed	1330	EC	CN14	374B	Q	R	D	B	F	X	T	R	050					
57/0/4.615	460S	MEADOWVALE DRIVE	201112303	31/07/2011	Sun	1310	CB	CN1	410A		R	D	B	F		N	C	100			1		
1N/967/14.556 OXFORD	40S	STUCKEY ST	201153717	07/08/2011	Sun	1345	MO	PS1	130A 411A 428A	F	R	D	B	F		N	R	050					
1N/967/14.006 OXFORD	I	BATH ST	201153855	11/08/2011	Thu	1635	FE	CN1C	181A 427A		R	D	B	F	X	T	R	050					
1N/967/13.143 OXFORD	I	YORK ST	201153224	15/08/2011	Mon	1530	KB	VS1C	302B 375B 802 803 830 +		R	I	O	S	T	G	P	050					
QUEEN ST EAST	I	OXFORD ST	201153676	30/08/2011	Tue	1118	LB	CS1C	157A 330A 357A		R	D	B	F	X	T	R	050					
1N/967/14.086	80S	BATH ST	201154650	22/09/2011	Thu	1150	JA	CN1C	308B 375B 925		R	W	O	F	D	N	P	050					
57/0/7.653	I	ROSLYN ROAD	201154013	12/10/2011	Wed	1000	DA	CS1	111A 132A 514A 801 901	EF	R	W	O	H	X	G	P	100					
1N/967/14.006	I	BATH ST	201154581	17/10/2011	Mon	1158	JB	CN14	129B 386B		R	D	O	F	X	T	R	050					
1N/967/14.278	130S	DURHAM ST	201155079	21/10/2011	Fri	1605	FD	CN1C	181A 331A		R	D	O	F		N	R	050					
1N/967/15.759 SOUTH ROAD	I	TARARUA ROAD RAILWAY CROS	201154845	11/11/2011	Fri	1825	LB	CS1C	303B 375B		E	D	B	F	T	G	C	050					
1N/967/14.696	I	LIVERPOOL RAILWAY CROSSIN	201112999	17/11/2011	Thu	1635	LB	CS1C	303B		R	D	O	F	T	G	C	050			1		
1N/967/14.006	I	BATH ST	201155072	09/12/2011	Fri	0930	DA	TN2C	130A 386A 818	M	R	D	B	F	X	T	C	050					
57/0/6.943	I	WAIHOU ROAD S	201155605	22/12/2011	Thu	1411	LB	CS1V	303B 330B 832		R	D	B	F	T	S	C	100					
QUEEN ST EAST	I	1N/967/13.757	201155551	29/12/2011	Thu	1650	KC	CS1C	305A 330A 402A		S	D	O	F	X	T	R	050					
1N/967/14.318 OXFORD	170S	DURHAM ST	201155557	30/12/2011	Fri	1129	FD	4N1CC	331A 350A		R	W	O	F		N	R	050					
1N/967/14.366 OXFORD	150N	STUCKEY ST	201155556	30/12/2011	Fri	1330	FD	CN1CC	331A		R	W	O	L		N	R	050					
1N/967/13.405 OXFORD	20S	DEVON ST	201250151	12/01/2012	Thu	1445	JO	VS1C	124A 330A 402A 924		R	D	B	F	D	N	C	050					
1N/967/15.213 OXFORD	100N	HOKIO BEACH ROAD	201250432	05/02/2012	Sun	1410	LB	CN1C	303B 375B 922		R	D	B	F	D	N	C	050					
57/0/5.786	200N	QUEEN ST EAST	201250295	15/02/2012	Wed	1220	GE	CS14	160A 387A 402A 927		R	D	B	F	D	N	C	080					
57/0/5.586	I	QUEEN ST EAST	201211311	27/02/2012	Mon	1605	HA	CE2C	301A 375A		R	D	B	F	X	S	C	100			1		
1N/967/13.797 OXFORD	40S	QUEEN ST EAST	201250528	05/03/2012	Mon	1521	MO	CS1V	372B 671B		R	D	B	F		N	C	050					
1N/967/13.966 OXFORD	40N	BATH ST	201250640	09/03/2012	Fri	1610	MC	CN1C	191A 330B 372B		R	D	B	F		N	C	050					

First Street	Distance	D I R	Second street or landmark	Crash Number	Date DD/MM/YYYY	Day	Time HHMM	M V T	D R VN 1	VVV 234	Factors and Roles A is for vehicle 1 B is for veh 2 etc	O B J E C T	C U R V E H	W E T N E T	L I G H T S	W E H T R	J U N C T	C O N T R L	M A K E	S P D L M T	Total Inj F A T	S E R	M I N	P E D a g e	C Y C a g e
1N/967/14.884	I	WARD ST	201251235	27/03/2012	Tue	1940	LB	VN	1C	303B 375B		R	D	DO	F	T	N	C	050					
1N/967/14.148	I	DURHAM ST	201251163	30/03/2012	Fri	1500	FD	CN	1C	102A 331A 402A 102B		R	D	B	F	T	G	C	050					
1N/967/14.764	I	MAKO MAKO ROAD	201250999	31/03/2012	Sat	1026	AO	MN	1C	158A 205A 404A		R	D	B	F	T	G	C	050					
1N/967/13.223	40	N ESSEX ST	201251061	31/03/2012	Sat	1750	FA	CS	1C	181A 331A 402A		R	D	OF	F		N	C	050					
1N/967/14.006 OXFORD	I	BATH ST	201251148	07/04/2012	Sat	1120	FA	VN	14	181A 331A 402A		R	D	B	F	X	T	P	050					
57/0/5.686	100	N QUEEN ST EAST	201251155	07/04/2012	Sat	1250	CB	CN	1	130A 402A 688A 812 817	V	R	D	B	F		N	C	080					
1N/967/14.784	20	S MAKO MAKO ROAD	201251236	15/04/2012	Sun	2356	CB	CS	1	129A 411A	T	R	D	DO	F		N	C	050					
1N/967/13.807 OXFORD	50	S QUEEN ST WEST	201211610	21/04/2012	Sat	1010	NG	CW	1E	371A 427A		R	D	B	F		N	C	050	1	77			
57/0/6.086	500	N QUEEN ST EAST	201251616	27/04/2012	Fri	2110	CB	CN	1	112A 130A 339A 645A 814 817	V	R	W	DN	F		N	N	080					
1N/967/12.646 THE AVENUE	100	N KAWIU ROAD	201211897	07/05/2012	Mon	1809	DB	TE	1C	131A 412A		E	D	DO	F		N	C	070	1	1			
1N/967/13.143 OXFORD	I	YORK ST	201251683	20/05/2012	Sun	1713	MC	CN	1C	372B 402B 671B		R	D	TF	F	T	G	C	050					
1N/967/15.859	100	S TARARUA ROAD RAILWAY CROS	201251765	01/06/2012	Fri	0805	FA	VN	1C	331A 363A 902		R	D	B	F		N	C	080					
1N/967/14.336	330	S BATH ST	201211976	07/06/2012	Thu	1330	CC	CN	1	130A 501A 692A	T	R	D	O	F		N	C	080	1				
1N/967/14.006	I	BATH ST	201252438	12/07/2012	Thu	1720	CA	4S	1	129A 130A 817	P	R	D	TO	F	X	T	C	050					
1N/967/15.103	30	N KEEPA ST	201252860	10/08/2012	Fri	2000	MO	4N	1C	371A 403A 830	M	R	D	DO	F		N	C	050					
1N/967/12.117 THE AVENUE	30	N ROSLYN ROAD	201212485	01/09/2012	Sat	2310	DA	CS	1	103A 332A	IP	E	D	DO	F	Y	G	R	070	1				
1N/967/13.507 OXFORD	I	EXETER ST	201253662	14/09/2012	Fri	1350	KB	CS	1C	302B 500B 507B		R	D	B	F	T	G	C	050					
1N/967/13.807 OXFORD ST	50	S QUEEN ST WEST	201253801	29/10/2012	Mon	1040	ME	4N	14	372A 371B		R	D	B	F		N	C	050					
1N/967/10.093 THE AVENUE	I	HEATHERLEA EAST ROAD	201254334	03/12/2012	Mon	1543	KB	CN	1C	302B 375B		M	D	B	F	T	G	C	100					
57/0/7.093	150	N WAIHOU ROAD S	201210074	16/12/2012	Sun	1700	BE	4S	1CC	125A 503A 137C	F	R	D	B	F		N	C	100	1	1	5		
1N/967/13.557 OXFORD ST	50	S EXETER ST	201254963	19/12/2012	Wed	2100	MC	4N	1C	372B 381B		R	D	TF	F		N	C	050					
1N/967/14.001 OXFORD ST	5	N BATH ST	201254751	22/12/2012	Sat	1535	FE	CN	1C	181A 331A 402A		R	D	B	F	X	T	R	050					
1N/967/12.147	I	ROSLYN ROAD	201213047	26/12/2012	Wed	0920	DB	CN	1	131A 504A	X	E	D	O	F	T	G	R	070	4				
1N/967/13.787	30	S QUEEN ST WEST	201213192	27/12/2012	Thu	1615	MF	SN	1C	333A 353B 370B	M	R	D	O	F		N	C	050	1				


N
SH1 SH57 Levin Bypass
Injury Crashes 2008-2012
KEY
Fatal
Dark
Wet
Icy
Peds
Cyclist
HEATHERLEA EAST ROAD
LINDSAY ROAD
ROSLYN ROAD
QUEEN ST WEST
QUEEN ST EAST
OXFORD
SH1N
TARARUA ROAD
201012847
2813752
2811766
201111130
2811318
2913047
2911180
2912191
201211897
2811058
2911288
201111833
2911939
201212485
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2811525
2813352
201011460
201012048
201013267
2813575
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2912869
201213192
201111996
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2912510
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2811739
201013735
201012530
201211311
2811484
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2912622
2913157
2912266
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2813228
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First Street	Distance	D/I/R	Second street or landmark	Crash Number	Date DD/MM/YYYY	Day	Time HHMM	Description of Events	Crash Factors (ENV = Environmental factors)	Road	Natural Light	Weather	Junction	Cntrl	Tot Inj F A T	S E R	M I N	Map Coordinates Easting	Northing
1N/967/9.948		I	KOPUTAROA ROAD	201012847	03/08/2010	Tue	0750	CAR2 turning right hit by oncoming CAR1 EBD on SH 1N CAR2 hit Vehicle	CAR2 failed to give way when turning to non-turning traffic	Dry	Bright	Fine	T Type Junction	Stop Sign	2			1794443	5504028
1N/967/9.977	30	E	KOPUTAROA ROAD	2813752	16/12/2008	Tue	2325	CAR1 WBD on SH 1N hit rear of CAR2 turning right from left side, CAR1 hit Fence, CAR2 hit Fence	CAR2 didnt see/look behind when changing lanes, position or direction, didnt see/look when visibility obstructed by other vehicles ENV: entering or leaving other commercial	Dry	Dark	Fine	Driveway	Nil			1	1794465	5504008
1N/967/10.093 THE AVENUE		I	HEATHERLEA EAST ROAD	201254334	03/12/2012	Mon	1543	CAR1 NBD on SH 1N THE AVENUE hit CAR2 merging from the right	CAR2 failed to give way at give way sign, didnt see/look when required to give way to traffic from another direction	Dry	Bright	Fine	T Type Junction	Give Way Sign				1794542	5503922
1N/967/10.243	150	S	HEATHERLEA EAST ROAD	201111130	21/01/2011	Fri	1425	CAR1 SBD on SH 1N lost control turning right, CAR1 hit Ditch on right hand bend	CAR1 fatigue (drowsy, tired, fell asleep)	Dry	Bright	Fine	Unknown	Nil			4	1794599	5503785
1N/967/10.247	300	S	AVENUE NORTH ROAD	2811766	21/04/2008	Mon	1600	CAR1 SBD on SH 1N hit rear end of CAR2 stopped/moving slowly, CAR2 hit Fence, Traffic Sign	CAR1 too fast on straight, following too closely	Wet	Overcast	Fine	Unknown	Nil			1	1794599	5503780
1N/967/10.293	200	S	HEATHERLEA EAST ROAD	201055610	13/11/2010	Sat	0320	SUV1 SBD on SH 1N lost control turning right, SUV1 hit Fence, Tree, Ditch on right hand bend	SUV1 fatigue (drowsy, tired, fell asleep)	Dry	Dark	Fine	Unknown	Nil				1794608	5503736
1N/967/10.9	90	S	AVENUE NORTH ROAD	201051142	19/03/2010	Fri	2338	SUV1 SBD on SH 1N lost control while overtaking, SUV1 hit Ditch	SUV1 lost control avoiding another vehicle, fatigue (drowsy, tired, fell asleep)	Wet	Dark	Light Rain	Unknown	Nil				1794661	5503130
1N/967/11.322	100	N	LINDSAY ROAD	2956353	12/11/2009	Thu	0240	CAR1 NBD on SH 1N hit obstruction, CAR1 hit Stray Animal	CAR1 did not see or look for other party until too late ENV: farm animal straying	Dry	Dark	Fine	Unknown	Nil				1794608	5502711
1N/967/11.397	25	N	LINDSAY ROAD	2911180	17/02/2009	Tue	1615	CAR1 SBD on SH 1N lost control while overtaking, CAR1 hit Fence, Post Or Pole	CAR1 too fast on straight, lost control avoiding another vehicle, failed to notice oncoming traffic	Dry	Bright	Fine	Unknown	Nil			3	1794597	5502637
1N/967/11.422		I	LINDSAY ROAD	2912191	08/06/2009	Mon	1810	CAR1 SBD on SH 1N hit rear of TRUCK2 turning right from centre line	CAR1 failed to notice car slowing, impared ability due to old age	Dry	Dark	Fine	T Type Junction	Give Way Sign	1	1		1794593	5502612
1N/967/11.422		I	LINDSAY ROAD	2953181	27/06/2009	Sat	1659	VAN1 NBD on SH 1N lost control; went off road to left, VAN1 hit Fence	SUV2 attention diverted by other traffic, parked or stopped	Dry	Overcast	Fine	T Type Junction	Give Way Sign				1794593	5502612
1N/967/11.472	50	S	LINDSAY ROAD	2911288	15/01/2009	Thu	2150	CAR1 SBD on SH 1N hit CAR2 headon on straight, CAR1 hit Post Or Pole	CAR1 alcohol suspected, on incorrect side of the island or median	Dry	Dark	Fine	Unknown	Nil			2	1794586	5502562
1N/967/11.474	50	S	LINDSAY ROAD	201111833	25/04/2011	Mon	1437	CAR1 SBD on SH 1N hit rear end of CAR2 stop/slow for queue	CAR1 too fast on straight, following too closely, failed to notice car slowing SUV3 too fast on straight, following too closely ENV: slippery, heavy rain	Wet	Overcast	Heavy Rain	Unknown	Nil			1	1794586	5502562
1N/967/11.624	200	S	LINDSAY ROAD	201152113	25/04/2011	Mon	1540	CAR1 SBD on SH 1N hit rear end of CAR2 stop/slow for queue	CAR1 failed to notice car slowing, attention diverted by other traffic ENV: heavy rain	Wet	Overcast	Heavy Rain	Unknown	Nil				1794564	5502414
1N/967/12.067	80	N	ROSLYN ROAD	201052089	19/05/2010	Wed	1600	CAR1 NBD on SH 1N hit CAR2 U-turning from same direction of travel	CAR2 didnt see/look behind when changing lanes, position or direction, new driver showed inexperience	Wet	Overcast	Fine	Unknown	Nil				1794500	5501976

First Street	Distance	D/I/R	Second street or landmark	Crash Number	Date DD/MM/YYYY	Day DDD	Time HHMM	Description of Events	Crash Factors (ENV = Environmental factors)	Road	Natural Light	Weather	Junction	Cntrl	Tot Inj F A T	S E R	M I N	Map Coordinates Easting	Northing
1N/967/12.117 THE AVENUE	30N	R	ROSLYN ROAD	201212485	01/09/2012	Sat	2310	CAR1 SBD on SH 1N THE AVENUE lost control turning right, CAR1 hit Traffic Island, Post Or Pole on right hand bend	CAR1 alcohol test above limit or test refused, failed to notice bend in road	Dry	Dark	Fine	Y Type Junction	Give Way Sign		1		1794493	5501926
1N/967/12.145	I		ROSLYN ROAD	2811318	20/02/2008	Wed	0746	MOTOR CYCLE1 NBD on SH 1N hit rear of CAR2 turning right from left side	CAR2 when turning or u turning contrary to a sign, didnt see/look behind when changing lanes, position or direction	Dry	Bright	Fine	T Type Junction	Give Way Sign		1		1794476	5501902
1N/967/12.147	I		ROSLYN ROAD	201213047	26/12/2012	Wed	0920	CAR1 NBD on SH 1N lost control turning left, CAR1 hit Other	CAR1 lost control when turning, medical illness (not sudden eg flu)	Dry	Overcast	Fine	T Type Junction	Give Way Sign		4		1794476	5501902
1N/967/12.147	I		ROSLYN ROAD	201150248	18/01/2011	Tue	1150	TRUCK1 SBD on SH 1N lost control turning right on right hand bend	TRUCK1 mechanical	Wet	Overcast	Fine	T Type Junction	Give Way Sign				1794476	5501902
1N/967/12.278	50S		GORDON PLACE	201053537	25/07/2010	Sun	1855	SUV1 SBD on SH 1N hit CAR2 headon on straight	SUV1 failed to keep left on straight, fatigue due to long trip CAR2 lost control avoiding another vehicle	Dry	Dark	Fine	Unknown	Nil				1794391	5501801
1N/967/12.278	50S		GORDON PLACE	201054367	13/09/2010	Mon	1726	VAN1 NBD on SH 1N hit parked veh, VAN1 hit Parked Vehicle	VAN1 attention diverted by other traffic, new driver showed inexperience	Wet	Twilight	Light Rain	Unknown	Nil				1794391	5501801
1N/967/12.506	240N		KAWIU ROAD	201054956	06/08/2010	Fri	1630	CAR1 NBD on SH 1N hit Parked Vehicle while manoeuvring	CAR1 inattentive, attention diverted by cigarette etc	Dry	Bright	Fine	Unknown	Nil				1794245	5501627
1N/967/12.644	100N		KAWIU ROAD	2813575	01/11/2008	Sat	2330	CAR1 SBD on SH 1N hit CAR2 headon on straight	CAR1 alcohol test above limit or test refused, failed to keep left on straight	Wet	Dark	Light Rain	Unknown	Nil		2		1794155	5501519
1N/967/12.646 THE AVENUE	100N		KAWIU ROAD	201211897	07/05/2012	Mon	1809	TRUCK1 EBD on SH 1N THE AVENUE lost control turning left	TRUCK1 lost control when turning, fatigue due to lack of sleep	Dry	Dark	Fine	Unknown	Nil		1	1	1794155	5501519
1N/967/12.744 OXFORD	I		KAWIU ROAD	2952595	18/05/2009	Mon	2320	CAR1 EBD on KAWIU ROAD missed inters or end of road, CAR1 went Over Bank, Tree	CAR1 alcohol suspected, too fast to give way at intersection, evading enforcement	Wet	Dark	Fine	T Type Junction	Give Way Sign				1794064	5501479
1N/967/12.744 OXFORD	I		KAWIU ROAD	2850296	15/01/2008	Tue	1545	CAR1 NBD on SH 1N OXFORD hit CAR2 turning right onto SH 1N OXFORD from the left	CAR2 failed to give way at give way sign, didnt see/look when required to give way to traffic from another direction	Dry	Bright	Fine	T Type Junction	Give Way Sign				1794064	5501479
1N/967/13.018	I		TYNE ST	201050091	09/01/2010	Sat	2140	CAR2 turning right hit by oncoming SUV1 SBD on SH 1N	SUV1 didn't signal in time incorrect signal CAR2 failed to give way when turning to non-turning traffic, misjudged intentions of another party	Dry	Dark	Fine	T Type Junction	Give Way Sign				1793884	5501272
1N/967/13.018	I		TYNE ST	201011460	22/03/2010	Mon	1639	CAR1 SBD on SH 1N hit CAR2 turning right onto SH 1N from the left	CAR2 failed to give way at give way sign, didnt see/look when required to give way to traffic from another direction	Dry	Overcast	Fine	T Type Junction	Give Way Sign		1		1793884	5501272
1N/967/13.019	I		TYNE ST	2813352	09/10/2008	Thu	1255	CAR1 SBD on SH 1N hit CAR2 turning right onto SH 1N from the left	CAR2 failed to give way at give way sign, didnt see/look when required to give way to traffic from another direction	Dry	Bright	Fine	T Type Junction	Give Way Sign		1		1793884	5501272
1N/967/13.02 OXFORD	I		TYNE ST	201012048	19/05/2010	Wed	0750	CAR1 SBD on SH 1N OXFORD hit CAR2 turning right onto SH 1N OXFORD from the left	CAR2 failed to give way at give way sign, didnt see/look when visibility obstructed by other vehicles ENV: surface	Dry	Overcast	Fine	T Type Junction	Give Way Sign		1		1793884	5501272

First Street	D/I/R	Second street or landmark	Crash Number	Date DD/MM/YYYY	Day	Time HHMM	Description of Events	Crash Factors (ENV = Environmental factors)	Road	Natural Light	Weather	Junction	Cntrl	Tot Inj F A T	S E R	M I N	Map Coordinates Easting	Northing
1N/967/13.02 OXFORD	I	TYNE ST	201013267	31/10/2010	Sun	1110	MOTOR CYCLE1 SBD on SH 1N OXFORD hit CAR2 turning right onto SH 1N OXFORD from the left	CAR2 failed to give way at give way sign, didnt see/look when visibility obstructed by other vehicles ENV: visibility limited	Dry	Bright	Fine	T Type Junction	Give Way Sign		1		1793884	5501272
1N/967/13.123	20N	YORK ST	201151493	17/02/2011	Thu	1055	TRUCK1 NBD on SH 1N hit rear of CAR2 turning right from centre line	TRUCK1 failed to notice car slowing CAR2 following too closely ENV: entering or leaving service station	Dry	Bright	Fine	Driveway	Nil				1793819	5501193
1N/967/13.123 OXFORD	20N	YORK ST	201150777	10/03/2011	Thu	2230	CAR1 SBD on SH 1N OXFORD hit CAR2 manoeuvring	CAR1 alcohol test above limit or test refused, fatigue (drowsy, tired, fell asleep) ENV: entering or leaving service station	Dry	Dark	Fine	Driveway	Nil				1793819	5501193
1N/967/13.141	I	YORK ST	2911939	18/05/2009	Mon	1645	CAR2 turning right hit by oncoming CAR1 NBD on SH 1N	CAR2 failed to give way when turning to non-turning traffic	Wet	Twilight	Light Rain	T Type Junction	Nil		1		1793806	5501178
1N/967/13.143 OXFORD	I	YORK ST	201251683	20/05/2012	Sun	1713	CAR1 NBD on SH 1N OXFORD hit CAR2 U-turning from same direction of travel	CAR2 didnt see/look behind when changing lanes, position or direction, new driver showed inexperience, blind spot	Dry	Twilight	Fine	T Type Junction	Give Way Sign				1793806	5501178
1N/967/13.143 OXFORD	I	YORK ST	201153224	15/08/2011	Mon	1530	VAN1 SBD on SH 1N OXFORD hit CAR2 merging from the right	CAR2 failed to give way at give way sign, didnt see/look when required to give way to traffic from another direction ENV: road slippery (frost or ice), road slippery (snow or hail), visibility limited, snow	Ice/ Snow	Overcast	Snow	T Type Junction	Give Way Sign				1793806	5501178
1N/967/13.223	40N	ESSEX ST	201251061	31/03/2012	Sat	1750	CAR1 SBD on SH 1N hit rear end of CAR2 stopped/moving slowly	CAR1 following too closely, failed to notice car slowing, new driver showed inexperience	Dry	Overcast	Fine	Unknown	Nil				1793754	5501116
1N/967/13.241	20N	ESSEX ST	2911495	14/03/2009	Sat	1126	CAR1 SBD on SH 1N hit rear end of CAR2 stop/slow for PEDESTRIAN	CAR1 failed to notice car slowing, attention diverted by scenery or persons outside vehicle	Dry	Bright	Fine	Unknown	Nil		1		1793741	5501101
1N/967/13.251	10N	ESSEX ST	2850909	20/03/2008	Thu	1311	CAR1 NBD on SH 1N hit rear end of CAR2 stop/slow for queue	CAR1 failed to notice car slowing, attention diverted while trying to find intersection	Dry	Overcast	Fine	T Type Junction	Nil				1793734	5501094
1N/967/13.333	50N	DEVON ST	2852913	04/01/2008	Fri	1530	CAR1 SBD on SH 1N hit rear end of CAR2 stop/slow for queue	CAR1 following too closely, new driver showed inexperience	Dry	Bright	Fine	Unknown	Nil				1793682	5501031
1N/967/13.383	I	DEVON ST	2850474	06/02/2008	Wed	1908	CAR1 NBD on SH 1N overtaking hit CAR2 turning right	CAR1 overtaking vehicle signaling right turn ENV: entering or leaving car parking building / area	Dry	Bright	Fine	T Type Junction	Nil				1793650	5500993
1N/967/13.385 OXFORD	I	DEVON ST	201054037	26/08/2010	Thu	1710	CAR1 SBD on SH 1N OXFORD hit CAR2 turning right onto SH 1N OXFORD from the left	CAR2 failed to give way at give way sign, didnt see/look when required to give way to traffic from another direction	Dry	Bright	Fine	T Type Junction	Give Way Sign				1793650	5500993
1N/967/13.405	100N	EXETER ST	2850425	28/01/2008	Mon	0240	CAR1 EBD on SH 1N hit MOTOR CYCLE2 merging from the right	MOTOR CYCLE2 inattentive ENV: entering or leaving other commercial	Dry	Bright	Fine	Driveway	Nil				1793635	5500976

First Street / Distance	D/I/R	Second street or landmark	Crash Number	Date DD/MM/YYYY	Day	Time HHMM	Description of Events	Crash Factors (ENV = Environmental factors)	Road	Natural Light	Weather	Junction	Cntrl	Tot Inj F A T	S E R	M I N	Map Coordinates Easting	Northing
1N/967/13.405 OXFORD	20S	DEVON ST	201250151	12/01/2012	Thu	1445	VAN1 SBD on SH 1N OXFORD hit turning CAR2	VAN1 cutting corner at intersection, inattentive, new driver showed inexperience ENV: entering or leaving take away foods	Dry	Bright	Fine	Driveway	Nil				1793637	5500977
1N/967/13.408	25S	DEVON ST	2913430	26/11/2009	Thu	1300	CAR1 SBD on SH 1N hit PEDESTRIAN2 (Age 84) crossing road from left side	PEDESTRIAN2 crossing heedless of traffic	Dry	Overcast	Fine	Unknown	Nil	1			1793634	5500974
1N/967/13.41	I	SERVICE LANE	201054484	10/08/2010	Tue	1725	CAR1 NBD on SH 1N overtaking hit SUV2 turning right	CAR1 overtaking vehicle signaling right turn, misjudged intentions of another party SUV2 misjudged speed, etc of vehicle coming from behind or alongside	Dry	Overcast	Fine	T Type Junction	Nil				1793634	5500973
1N/967/13.435	50S	DEVON ST	201052200	21/05/2010	Fri	1750	CAR1 SBD on SH 1N hit CAR2 angle parking, CAR2 hit Parked Vehicle	CAR2 didnt see/look behind when reversing/manoeuvering, didnt see/look when visibility obstructed by other vehicles ENV: visibility limited by parked vehicle	Wet	Dark	Light Rain	Unknown	Nil				1793618	5500954
1N/967/13.485	20N	EXETER ST	2956418	26/11/2009	Thu	1630	CAR1 SBD on SH 1N hit CAR2 angle parking	CAR1 didnt see/look behind when changing lanes, position or direction CAR2 didnt see/look behind when reversing/manoeuvering	Dry	Bright	Fine	Unknown	Nil				1793584	5500914
1N/967/13.5	5N	EXETER ST	2811058	23/01/2008	Wed	0911	CAR1 NBD on SH 1N hit CAR2 U-turning from same direction of travel	CAR2 didnt see/look behind when changing lanes, position or direction	Dry	Overcast	Fine	T Type Junction	Nil		1		1793574	5500903
1N/967/13.505	I	EXETER ST	2851136	10/03/2008	Mon	1420	CAR1 SBD on SH 1N hit rear of CAR2 turning right from centre line	CAR1 failed to notice car slowing, attention diverted by cigarette etc, new driver showed inexperience	Dry	Bright	Fine	T Type Junction	Give Way Sign				1793571	5500899
1N/967/13.505	I	EXETER ST	201050484	19/02/2010	Fri	1923	CAR2 turning right hit by oncoming CAR1 NBD on SH 1N	CAR2 failed to give way when turning to non-turning traffic	Dry	Twilight	Fine	T Type Junction	Give Way Sign				1793571	5500899
1N/967/13.505	I	EXETER ST	2851080	16/03/2008	Sun	1852	VAN1 NBD on SH 1N hit CAR2 merging from the left	CAR2 failed to give way at give way sign, didnt see/look when required to give way to traffic from another direction	Dry	Bright	Fine	T Type Junction	Give Way Sign				1793571	5500899
1N/967/13.507	I	EXETER ST	201055705	10/11/2010	Wed	1548	CAR1 SBD on SH 1N hit rear of CAR2 turning right from left side	CAR2 turned right from left side of road, misjudged speed, etc of vehicle coming from behind or alongside	Dry	Bright	Fine	T Type Junction	Give Way Sign				1793571	5500899
1N/967/13.507 OXFORD	I	EXETER ST	201253662	14/09/2012	Fri	1350	CAR1 SBD on SH 1N OXFORD hit CAR2 merging from the right	CAR2 failed to give way at give way sign, illness and disability, impared ability due to old age	Dry	Bright	Fine	T Type Junction	Give Way Sign				1793571	5500899
1N/967/13.527	20S	EXETER ST	201053850	18/08/2010	Wed	1348	CAR1 SBD on SH 1N hit CAR2 U-turning from same direction of travel	CAR2 didnt see/look behind when changing lanes, position or direction, misjudged speed of own vehicle	Wet	Overcast	Light Rain	Unknown	Nil				1793558	5500883
1N/967/13.545	40S	EXETER ST	201011178	23/01/2010	Sat	2138	CAR1 NBD on SH 1N hit CYCLIST2 (Age 54) turning right onto SH 1N from the left	CYCLIST2 Intoxicated non-driver, failed to give way at driveway, headlights inadequate or no headlights ENV: entering or leaving private house / farm	Wet	Dark	Fine	Driveway	Nil		1		1793545	5500868

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1N/967/13.557 OXFORD ST	50S	EXETER ST		201254963	19/12/2012	Wed	2100	SUV1 NBD on SH 1N OXFORD ST hit CAR2 U-turning from same direction of travel	CAR2 didnt see/look behind when changing lanes, position or direction, misjudged speed, etc of vehicle coming from behind or alongside	Dry	Twilight	Fine	Unknown	Nil				1793539	5500860
1N/967/13.63	I	STANLEY ST		201053112	04/06/2010	Fri	1640	CAR1 SBD on SH 1N hit rear end of CAR2 stop/slow for queue	CAR1 failed to notice car slowing, attention diverted by scenery or persons outside vehicle	Dry	Twilight	Fine	T Type Junction	Nil				1793493	5500805
1N/967/13.63	I	STANLEY ST		201054369	18/08/2010	Wed	1205	OTHER1 SBD on SH 1N hit rear end of TRUCK2 stop/slow for queue	OTHER1 following too closely, misjudged speed of own vehicle	Dry	Overcast	Fine	T Type Junction	Nil				1793493	5500805
1N/967/13.707	50N	QUEEN ST EAST		201150778	20/02/2011	Sun	1207	CAR1 SBD on SH 1N hit rear end of CAR2 stop/slow for queue	CAR1 failed to notice car slowing, attention diverted by cigarette etc	Dry	Bright	Fine	Unknown	Nil				1793443	5500746
1N/967/13.737	20N	QUEEN ST WEST		201152153	02/06/2011	Thu	1715	VAN1 SBD on SH 1N hit rear end of SUV2 stop/slow for queue	VAN1 misjudged speed of own vehicle, new driver showed inexperience	Dry	Dark	Fine	X Type Junction	Traffic Signal				1793424	5500723
1N/967/13.755	I	QUEEN ST EAST		2955642	24/10/2009	Sat	0645	CAR2 turning right hit by oncoming CAR1 SBD on SH 1N	CAR2 failed to give way when turning to non-turning traffic, didnt see/look when required to give way to traffic from another direction	Dry	Twilight	Fine	X Type Junction	Traffic Signal				1793411	5500708
1N/967/13.755	I	QUEEN ST WEST		2950184	03/01/2009	Sat	1930	TRUCK1 NBD on SH 1N hit rear end of CAR2 stop/slow for signals	TRUCK1 following too closely, misjudged intentions of another party	Dry	Bright	Fine	X Type Junction	Traffic Signal				1793411	5500708
QUEEN ST EAST	I	OXFORD ST		201153676	30/08/2011	Tue	1118	CAR2 turning right hit by oncoming CAR1 SBD on QUEEN ST EAST	CAR1 overtaking at an intersection, inattentive, emotionally upset/road rage	Dry	Bright	Fine	X Type Junction	Traffic Signal				1793411	5500708
QUEEN ST EAST	I	1N/967/13.757		201155551	29/12/2011	Thu	1650	CAR1 SBD on QUEEN ST EAST merging hit CAR2 also merging	CAR1 failed to give way when turning left, inattentive, new driver showed inexperience	Dry	Overcast	Fine	X Type Junction	Traffic Signal				1793411	5500708
1N/967/13.757	I	QUEEN ST EAST		201056337	18/12/2010	Sat	1205	TRUCK1 NBD on SH 1N hit rear end of SUV2 stop/slow for signals	TRUCK1 following too closely	Wet	Overcast	Light Rain	X Type Junction	Traffic Signal				1793411	5500708
1N/967/13.757	I	QUEEN ST WEST		201152335	29/06/2011	Wed	1330	CAR1 NBD on SH 1N hit obstruction, CAR1 hit Vehicle	SUV2 didnt see/look behind when opening door or leaving vehicle	Dry	Bright	Fine	X Type Junction	Traffic Signal				1793411	5500708
1N/967/13.757	I	QUEEN ST WEST		2913299	13/11/2009	Fri	1100	CAR1 EBD on QUEEN ST WEST turning right hit PEDESTRIAN2 (Age 84) crossing SH 1N from left	CAR1 failed to give way when turning at signals to ped, attention diverted by other traffic	Dry	Overcast	Fine	X Type Junction	Traffic Signal		1		1793411	5500708
1N/967/13.787	30S	QUEEN ST WEST		201213192	27/12/2012	Thu	1615	CYCLIST1 NBD on SH 1N hit CAR2 angle parking, CYCLIST1 hit Parked Vehicle	CYCLIST1 failed to notice indication of vehicle in front CAR2 attention diverted by other traffic, did not see or look for other party until too late	Dry	Overcast	Fine	Unknown	Nil		1		1793392	5500684
1N/967/13.797 OXFORD	40S	QUEEN ST EAST		201250528	05/03/2012	Mon	1521	CAR1 SBD on SH 1N OXFORD hit VAN2 manoeuvring	VAN2 didnt see/look behind when changing lanes, position or direction, blind spot	Dry	Bright	Fine	Unknown	Nil				1793386	5500676
1N/967/13.807 OXFORD	50S	QUEEN ST EAST		201111996	03/06/2011	Fri	1617	MOTOR CYCLE1 NBD on SH 1N OXFORD hit PEDESTRIAN2 (Age 56) crossing road from right side	MOTOR CYCLE1 too fast on straight, didnt see/look when required to give way to ped	Dry	Overcast	Fine	Unknown	Nil		1		1793380	5500669

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1N/967/13.807 OXFORD	50	S	QUEEN ST WEST	201211610	21/04/2012	Sat	1010	CAR1 WBD on SH 1N OXFORD while manoeuvring hit PEDESTRIAN2 (Age 77) crossing road	CAR1 didnt see/look behind when reversing/manoeuvering, foot slipped or got caught under pedal	Dry	Bright	Fine	Unknown	Nil			1	1793380	5500669
1N/967/13.807 OXFORD ST	50	S	QUEEN ST WEST	201253801	29/10/2012	Mon	1040	SUV1 NBD on SH 1N OXFORD ST hit SUV2 turning into angle park	SUV1 didnt see/look behind when changing lanes, position or direction SUV2 didnt see/look behind when reversing/manoeuvering	Dry	Bright	Fine	Unknown	Nil				1793380	5500669
1N/967/13.835	80	S	QUEEN ST EAST	2913048	29/09/2009	Tue	1200	CAR1 NBD on SH 1N hit TRUCK2 angle parking	CAR1 misjudged speed, etc of vehicle coming from behind or alongside	Dry	Bright	Fine	Unknown	Nil			1	1793361	5500646
1N/967/13.855	100	S	QUEEN ST EAST	2912712	26/08/2009	Wed	1655	CAR1 SBD on SH 1N hit rear end of CAR2 stop/slow for queue	CAR1 failed to notice car slowing	Dry	Overcast	Fine	Unknown	Nil			1	1793348	5500630
1N/967/13.855	100	S	QUEEN ST WEST	2855550	16/10/2008	Thu	1350	VAN1 NBD on SH 1N hit Parked Vehicle while manoeuvring	VAN1 misjudged speed of own vehicle	Dry	Overcast	Fine	Unknown	Nil				1793348	5500630
1N/967/13.855	100	S	QUEEN ST WEST	2912254	24/06/2009	Wed	1255	CAR1 SBD on SH 1N while manoeuvring hit PEDESTRIAN2 (Age 89) crossing road	PEDESTRIAN2 pedestrian behind reversing/manoeuvering vehicle	Dry	Bright	Fine	Unknown	Nil			1	1793348	5500630
1N/967/13.855	100	S	QUEEN ST WEST	2912510	26/07/2009	Sun	1232	CAR1 NBD on SH 1N hit PEDESTRIAN2 (Age 23) crossing road from left side	PEDESTRIAN2 crossing heedless of traffic	Dry	Bright	Fine	Unknown	Nil			1	1793348	5500630
1N/967/13.857	100	S	QUEEN ST WEST	201012221	22/06/2010	Tue	1258	CAR1 SBD on SH 1N hit CYCLIST2 (Age 33) manoeuvring	CAR1 didnt see/look behind when changing lanes, position or direction, blind spot	Dry	Bright	Fine	Unknown	Nil			1	1793348	5500630
1N/967/13.934	70	N	BATH ST	2856652	31/08/2008	Sun	2030	CAR1 NBD on SH 1N hit SUV2 angle parking	SUV2 didnt see/look behind when reversing/manoeuvering	Dry	Dark	Fine	Unknown	Nil				1793298	5500568
1N/967/13.966 OXFORD	40	N	BATH ST	201250640	09/03/2012	Fri	1610	CAR1 NBD on SH 1N OXFORD hit CAR2 U-turning from same direction of travel	CAR1 suddenly braked CAR2 inattentive, didnt see/look behind when changing lanes, position or direction	Dry	Bright	Fine	Unknown	Nil				1793279	5500545
1N/967/13.976	30	N	BATH ST	201055673	12/11/2010	Fri	1530	SUV1 SBD on SH 1N hit rear end of CAR2 stop/slow for queue	SUV1 failed to notice car slowing, new driver showed inexperience	Dry	Bright	Fine	Unknown	Traffic Signal				1793273	5500537
1N/967/13.989	15	N	BATH ST	2911849	01/05/2009	Fri	1025	CAR1 SBD on SH 1N hit PEDESTRIAN2 (Age 41) crossing road from left side	PEDESTRIAN2 crossing heedless of traffic, stepped out from behind vehicle	Dry	Bright	Fine	X Type Junction	Traffic Signal			1	1793263	5500526
1N/967/13.994	10	N	BATH ST	2854707	05/08/2008	Tue	1055	TRUCK1 NBD on SH 1N hit VAN2 manoeuvring	TRUCK1 misjudged speed of own vehicle VAN2 parked or stopped ENV: road surface under construction or maintenance	Dry	Bright	Fine	X Type Junction	Stop Sign				1793260	5500522
1N/967/14.001 OXFORD ST	5	N	BATH ST	201254751	22/12/2012	Sat	1535	CAR1 NBD on SH 1N OXFORD ST hit rear end of CAR2 stop/slow for signals	CAR1 following too closely, failed to notice car slowing, new driver showed inexperience	Dry	Bright	Fine	X Type Junction	Traffic Signal				1793257	5500517
1N/967/14.004		I	BATH ST	2912060	21/05/2009	Thu	1549	VAN1 NBD on SH 1N hit WHEELED PEDESTRIAN2 (Age 73) crossing road from left side	VAN1 did not stop at steady red light	Dry	Bright	Fine	X Type Junction	Traffic Signal			1	1793254	5500514
1N/967/14.004		I	BATH ST	2950142	05/01/2009	Mon	1012	VAN1 SBD on SH 1N hit rear end of VAN2 stop/slow for signals	VAN1 following too closely	Dry	Overcast	Fine	X Type Junction	Traffic Signal				1793254	5500514

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1N/967/14.004		I	BATH ST	2856913	28/11/2008	Fri	1635	CAR1 NBD on SH 1N hit rear end of CAR2 stop/slow for queue	CAR1 following too closely, attention diverted by scenery or persons outside vehicle ENV: road surface under construction or maintenance	Dry	Bright	Fine	X Type Junction	Traffic Signal				1793254	5500514
1N/967/14.004		I	BATH ST	2950653	09/02/2009	Mon	0543	CAR1 SBD on SH 1N hit obstruction, CAR1 hit Traffic Island, Post Or Pole	CAR1 didnt see/look when visibility obstructed by other vehicles ENV: heavy rain	Wet	Dark	Heavy Rain	X Type Junction	Traffic Signal				1793254	5500514
1N/967/14.004		I	BATH ST	2852127	06/05/2008	Tue	1100	CAR1 EBD on BATH ST hit CAR2 crossing at right angle from right	CAR1 did not stop at steady red light	Dry	Bright	Fine	X Type Junction	Traffic Signal				1793254	5500514
BATH ST		I	OXFORD ST	201150609	28/02/2011	Mon	1708	VAN1 WBD on BATH ST changing lanes to left hit SUV2	VAN1 cut in after overtaking, turned left from incorrect lane	Dry	Bright	Fine	X Type Junction	Traffic Signal				1793254	5500513
1N/967/14.006		I	BATH ST	201013735	09/12/2010	Thu	1242	TRUCK1 WBD on BATH ST turning left hit PEDESTRIAN2 (Age 83) crossing SH 1N from left	TRUCK1 didnt see/look when visibility limited by roadside features, blind spot PEDESTRIAN2 crossing road not complying with traffic signal or school patrol	Dry	Bright	Fine	X Type Junction	Traffic Signal	1			1793254	5500513
1N/967/14.006		I	BATH ST	201154581	17/10/2011	Mon	1158	CAR1 NBD on SH 1N turning right hit SUV2 also turning right from opposite direction	SUV2 too far left/right, misjudged speed of own vehicle	Dry	Overcast	Fine	X Type Junction	Traffic Signal				1793254	5500513
1N/967/14.006		I	BATH ST	201155072	09/12/2011	Fri	0930	TRUCK1 NBD on BATH ST lost control turning right, TRUCK1 hit Parked Vehicle on right hand bend	TRUCK1 lost control, misjudged speed of own vehicle ENV: road surface unusually narrow	Dry	Bright	Fine	X Type Junction	Traffic Signal				1793254	5500513
1N/967/14.006		I	BATH ST	201252438	12/07/2012	Thu	1720	SUV1 SBD on SH 1N lost control but did not leave the road, SUV1 hit Post Or Pole	SUV1 too far left/right, lost control ENV: road surface under construction or maintenance	Dry	Twilight	Fine	X Type Junction	Traffic Signal				1793254	5500513
1N/967/14.006		I	BATH ST	201151525	25/04/2011	Mon	1102	TRUCK1 WBD on SH 1N hit turning CAR2	TRUCK1 turned left from near centre line, long vehicle tracked outside lane, didnt see/look behind when changing lanes, position or direction CAR2 failed to notice indication of vehicle in front	Wet	Overcast	Light Rain	X Type Junction	Traffic Signal				1793254	5500513
1N/967/14.006 OXFORD		I	BATH ST	201153855	11/08/2011	Thu	1635	CAR1 NBD on SH 1N OXFORD hit rear end of CAR2 stop/slow for signals	CAR1 following too closely, foot slipped or got caught under pedal	Dry	Bright	Fine	X Type Junction	Traffic Signal				1793254	5500513
1N/967/14.006 OXFORD		I	BATH ST	201251148	07/04/2012	Sat	1120	VAN1 NBD on SH 1N OXFORD hit rear end of SUV2 stopped/moving slowly	VAN1 following too closely, failed to notice car slowing, new driver showed inexperience	Dry	Bright	Fine	X Type Junction	Traffic Signal				1793254	5500513
1N/967/14.026	20	S	BATH ST	201054884	05/10/2010	Tue	1240	CAR1 NBD on SH 1N hit CAR2 turning right onto SH 1N from the left	CAR1 on incorrect side of the island or median CAR2 failed to give way at driveway, failed to give way when waved through by other driver ENV: entering or leaving shopping complex	Dry	Bright	Fine	Driveway	Nil				1793241	5500498
1N/967/14.086	80	S	BATH ST	201154650	22/09/2011	Thu	1150	CAR1 NBD on SH 1N hit CAR2 turning right onto SH 1N from the left	CAR2 failed to give way at driveway, didnt see/look when required to give way to traffic from another direction ENV: entering or leaving shopping complex	Wet	Overcast	Fine	Driveway	Nil				1793203	5500452

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1N/967/14.146		I	DURHAM ST	201050508	08/02/2010	Mon	1150	CAR2 turning right hit by oncoming CAR1 NBD on SH 1N	CAR2 failed to give way when turning to non-turning traffic, misjudged intentions of another party	Dry	Bright	Fine	T Type Junction	Give Way Sign				1793164	5500405
1N/967/14.148		I	DURHAM ST	201251163	30/03/2012	Fri	1500	CAR1 NBD on SH 1N hit rear end of CAR2 stop/slow for queue	CAR1 alcohol test below limit, failed to notice car slowing, new driver showed inexperience CAR2 alcohol test below limit	Dry	Bright	Fine	T Type Junction	Give Way Sign				1793164	5500404
1N/967/14.278	130	S	DURHAM ST	201155079	21/10/2011	Fri	1605	CAR1 NBD on SH 1N hit rear end of CAR2 stop/slow for queue	CAR1 following too closely, failed to notice car slowing	Dry	Overcast	Fine	Unknown	Nil				1793081	5500304
1N/967/14.313	200	N	STUCKEY ST	2855332	10/10/2008	Fri	1715	CAR1 NBD on SH 1N hit rear end of CAR2 stop/slow for queue	CAR1 failed to notice car slowing, attention diverted by scenery or persons outside vehicle	Dry	Bright	Fine	Unknown	Nil				1793057	5500275
1N/967/14.318 OXFORD	170	S	DURHAM ST	201155557	30/12/2011	Fri	1129	SUV1 NBD on SH 1N OXFORD hit rear end of CAR2 stop/slow for queue	SUV1 failed to notice car slowing, attention diverted	Wet	Overcast	Fine	Unknown	Nil				1793055	5500274
1N/967/14.336	330	S	BATH ST	201211976	07/06/2012	Thu	1330	CAR1 NBD on SH 1N lost control; went off road to right, CAR1 hit Tree	CAR1 lost control, illness with no warning (eg heart attack), vehicle caught fire	Dry	Overcast	Fine	Unknown	Nil		1		1793043	5500259
1N/967/14.366	150	N	STUCKEY ST	201151844	27/04/2011	Wed	1035	CAR1 SBD on SH 1N hit Parked Vehicle while manoeuvring, CAR2 hit Parked Vehicle	CAR1 wrong pedal	Wet	Overcast	Light Rain	Unknown	Nil				1793025	5500237
1N/967/14.366 OXFORD	150	N	STUCKEY ST	201155556	30/12/2011	Fri	1330	CAR1 NBD on SH 1N OXFORD hit rear end of CAR2 stop/slow for queue	CAR1 failed to notice car slowing	Wet	Overcast	Light Rain	Unknown	Nil				1793025	5500237
1N/967/14.423	90	N	STUCKEY ST	2854760	08/09/2008	Mon	0830	VAN1 SBD on SH 1N hit VAN2 parking/unparking	VAN2 didnt see/look behind when pulling out from parked position, blind spot	Dry	Overcast	Fine	Unknown	Nil				1792987	5500190
1N/967/14.556 OXFORD	40	S	STUCKEY ST	201153717	07/08/2011	Sun	1345	MOPED1 SBD on SH 1N OXFORD hit VEHB manoeuvring, MOPED1 hit Fence	MOPED1 lost control, fatigue due to long trip, parking brake not fully applied	Dry	Bright	Fine	Unknown	Nil				1792912	5500085
1N/967/14.696		I	LIVERPOOL RAILWAY CROSSIN	2954321	02/05/2009	Sat	1100	CAR1 WBD on LIVERPOOL RAILWAY CROSSIN hit WHEELED PEDESTRIAN2 crossing road from left side	CAR1 attention diverted by other traffic, new driver showed inexperience WHEELED PEDESTRIAN2 misjudged intentions of another party	Dry	Bright	Fine	T Type Junction	Give Way Sign				1792840	5499966
1N/967/14.696		I	LIVERPOOL RAILWAY CROSSIN	201112999	17/11/2011	Thu	1635	CAR2 turning right hit by oncoming CAR1 SBD on SH 1N	CAR2 failed to give way when turning to non-turning traffic	Dry	Overcast	Fine	T Type Junction	Give Way Sign		1		1792840	5499966
1N/967/14.696		I	LIVERPOOL RAILWAY CROSSIN	2911271	23/02/2009	Mon	1700	TRUCK1 NBD on SH 1N hit MOPED2 merging from the right	MOPED2 didnt see/look behind when changing lanes, position or direction, impared ability due to old age	Dry	Bright	Fine	T Type Junction	Give Way Sign		1		1792840	5499966
1N/967/14.696		I	LIVERPOOL RAILWAY CROSSIN	201013052	16/10/2010	Sat	0920	VAN1 SBD on SH 1N hit VAN2 U-turning from same direction of travel	VAN2 inattentive, didnt see/look behind when changing lanes, position or direction	Wet	Overcast	Light Rain	T Type Junction	Give Way Sign		2		1792840	5499966
1N/967/14.696		I	SOUTH LANE	201111561	04/05/2011	Wed	1855	CAR2 turning right hit by oncoming CAR1 SBD on SH 1N	CAR2 misjudged speed etc of vehicle coming from another dirn with right of way, misjudged intentions of another party	Wet	Dark	Light Rain	T Type Junction	Give Way Sign		2		1792840	5499966
1N/967/14.696		I	SOUTH LANE	2850015	01/01/2008	Tue	2005	CAR2 turning right hit by oncoming CAR1 SBD on SH 1N	CAR2 failed to give way when turning to non-turning traffic, new driver showed inexperience, fatigue (drowsy, tired, fell asleep)	Dry	Overcast	Fine	T Type Junction	Give Way Sign				1792840	5499966

First Street	Distance	D/I/R	Second street or landmark	Crash Number	Date DD/MM/YYYY	Day	Time HHMM	Description of Events	Crash Factors (ENV = Environmental factors)	Road	Natural Light	Weather	Junction	Cntrl	Tot Inj F A T	S E R	M I N	Map Coordinates Easting	Northing
MAKO MAKO ROAD		I	1N/967/14.764	2853602	24/06/2008	Tue	1210	CYCLIST1 NBD on MAKO MAKO ROAD hit CAR2 merging from the left	CYCLIST1 alcohol or drugs, too far left/right, did not see or look for other party until too late	Dry	Bright	Fine	T Type Junction	Give Way Sign				1792799	5499911
1N/967/14.764		I	LIVERPOOL ST	201052816	11/06/2010	Fri	1610	CAR1 WBD on SH 1N hit CAR2 merging from the left	CAR2 failed to give way at give way sign, didnt see/look when required to give way to traffic from another direction	Wet	Overcast	Light Rain	T Type Junction	Give Way Sign				1792799	5499911
1N/967/14.764		I	MAKO MAKO ROAD	2855941	24/10/2008	Fri	1501	SUV1 NBD on SH 1N hit CAR2 turning right onto SH 1N from the left	CAR2 failed to give way at give way sign, misjudged speed of own vehicle	Dry	Bright	Fine	T Type Junction	Give Way Sign				1792799	5499911
1N/967/14.764		I	MAKO MAKO ROAD	2912266	12/05/2009	Tue	2029	CAR2 turning right hit by oncoming SUV1 SBD on SH 1N	CAR2 alcohol suspected, failed to give way when turning to non-turning traffic	Dry	Dark	Fine	T Type Junction	Give Way Sign		2		1792799	5499911
1N/967/14.764		I	MAKO MAKO ROAD	2811739	14/04/2008	Mon	1203	CAR1 NBD on SH 1N hit rear end of MOTOR CYCLE2 stop/slow for queue	CAR1 following too closely	Dry	Overcast	Fine	T Type Junction	Give Way Sign		1		1792799	5499911
1N/967/14.764		I	MAKO MAKO ROAD	201056636	30/12/2010	Thu	1210	CAR1 SBD on SH 1N hit CAR2 merging from the right	CAR2 failed to give way at give way sign	Dry	Bright	Fine	T Type Junction	Give Way Sign				1792799	5499911
1N/967/14.764		I	MAKO MAKO ROAD	201250999	31/03/2012	Sat	1026	MOTOR CYCLE1 NBD on SH 1N overtaking CAR2	MOTOR CYCLE1 overtaking on left, on incorrect side of the island or median, overseas/migrant driver failed to adjust to NZ road rules and road conditions	Dry	Bright	Fine	T Type Junction	Give Way Sign				1792799	5499911
1N/967/14.784	20	S	MAKO MAKO ROAD	201251236	15/04/2012	Sun	2356	CAR1 SBD on SH 1N lost control; went off road to left, CAR1 hit Tree	CAR1 too far left/right, fatigue due to long trip	Dry	Dark	Fine	Unknown	Nil				1792786	5499895
1N/967/14.864	100	S	MAKO MAKO ROAD	2851969	29/04/2008	Tue	1037	TRUCK1 NBD on SH 1N changing lanes to left hit VAN2	TRUCK1 cut in after overtaking	Dry	Overcast	Fine	Unknown	Nil				1792735	5499834
1N/967/14.884		I	WARD ST	201251235	27/03/2012	Tue	1940	CAR2 turning right hit by oncoming VAN1 NBD on SH 1N	CAR2 failed to give way when turning to non-turning traffic, didnt see/look when required to give way to traffic from another direction	Dry	Dark	Fine	T Type Junction	Nil				1792723	5499819
1N/967/15.033	30	S	RINA ST	2951449	21/03/2009	Sat	1230	CAR1 NBD on SH 1N hit parked veh, CAR1 hit Parked Vehicle	CAR1 attention diverted, did not see or look for other party until too late	Dry	Bright	Fine	Unknown	Nil				1792626	5499703
1N/967/15.063	60	S	RINA ST	2956827	18/12/2009	Fri	1220	CAR1 SBD on SH 1N hit CAR2 U-turning from same direction of travel	CAR2 didnt see/look behind when changing lanes, position or direction, blind spot	Dry	Overcast	Fine	Unknown	Nil				1792607	5499680
1N/967/15.103	30	N	KEEPA ST	201252860	10/08/2012	Fri	2000	SUV1 NBD on SH 1N hit Parked Vehicle while manoeuvring	SUV1 didnt see/look behind when reversing/manoeuvering, driving unfamiliar vehicle ENV: visibility limited	Dry	Dark	Fine	Unknown	Nil				1792582	5499650
1N/967/15.133		I	KEEPA ST	201054078	30/07/2010	Fri	1550	CAR1 NBD on SH 1N hit CAR2 U-turning from same direction of travel	CAR1 failed to notice indication of vehicle in front CAR2 didnt see/look behind when changing lanes, position or direction	Dry	Overcast	Fine	T Type Junction	Give Way Sign				1792563	5499627

First Street	D/I/R	Second street or landmark	Crash Number	Date DD/MM/YYYY	Day	Time HHMM	Description of Events	Crash Factors (ENV = Environmental factors)	Road	Natural Light	Weather	Junction	Cntrl	Tot Inj F A T	S E R	M I N	Map Coordinates Easting	Northing
1N/967/15.213 OXFORD	100N	HOKIO BEACH ROAD	201250432	05/02/2012	Sun	1410	CAR2 turning right hit by oncoming CAR1 NBD on SH 1N OXFORD	CAR2 failed to give way when turning to non-turning traffic, didnt see/look when required to give way to traffic from another direction ENV: entering or leaving service station	Dry	Bright	Fine	Driveway	Nil				1792512	5499565
1N/967/15.263	50N	HOKIO BEACH ROAD	2911742	15/04/2009	Wed	1330	CAR1 NBD on SH 1N sideswiped by TRUCK2 turning left	CAR1 following too closely ENV: entering or leaving private house / farm	Dry	Bright	Fine	Driveway	Nil	1			1792481	5499526
1N/967/15.313	I	HOKIO BEACH ROAD	2854708	02/09/2008	Tue	0949	CAR2 turning right hit by oncoming CAR1 NBD on SH 1N	CAR2 failed to give way when turning to non-turning traffic, didnt see/look when required to give way to traffic from another direction	Dry	Bright	Fine	T Type Junction	Give Way Sign				1792458	5499482
1N/967/15.313	I	HOKIO BEACH ROAD	2811261	29/01/2008	Tue	1300	CAR1 SBD on SH 1N hit CAR2 U-turning from same direction of travel	CAR2 didnt see/look behind when changing lanes, position or direction ENV: road surface under construction or maintenance	Dry	Bright	Fine	T Type Junction	Give Way Sign	1			1792458	5499482
1N/967/15.393	80S	HOKIO BEACH ROAD	2850008	03/01/2008	Thu	0840	CAR1 NBD on SH 1N lost control; went off road to right, CAR1 hit Post Or Pole	CAR1 fatigue (drowsy, tired, fell asleep)	Dry	Overcast	Fine	Unknown	Nil				1792413	5499417
1N/967/15.413	100S	HOKIO BEACH ROAD	2852281	14/05/2008	Wed	1130	VAN1 NBD on SH 1N changing lanes to left hit CAR2	CAR2 didnt see/look behind when changing lanes, position or direction	Dry	Bright	Fine	Unknown	Nil				1792400	5499401
1N/967/15.463	150S	HOKIO BEACH ROAD	2951367	03/03/2009	Tue	0700	CAR1 SBD on SH 1N hit rear of SUV2 turning right from centre line	CAR1 following too closely, misjudged intentions of another party SUV2 suddenly turned right ENV: entering or leaving industrial site	Dry	Overcast	Fine	Driveway	Nil				1792368	5499363
1N/967/15.463	150S	HOKIO BEACH ROAD	2852165	06/05/2008	Tue	1025	SUV1 NBD on SH 1N hit rear end of CAR2 stop/slow for queue	SUV1 following too closely	Dry	Bright	Fine	Unknown	Nil				1792368	5499363
1N/967/15.613	300S	HOKIO BEACH ROAD	2913157	25/10/2009	Sun	1125	CAR1 NBD on SH 1N lost control; went off road to left, CAR1 hit Post Or Pole	CAR1 too far left/right, illness with no warning (eg heart attack)	Dry	Bright	Fine	Unknown	Nil	1			1792271	5499248
1N/967/15.759	I	TARARUA ROAD RAILWAY CROS	2850515	16/02/2008	Sat	0839	CAR1 NBD on SH 1N hit rear end of CAR2 stopped/moving slowly	CAR1 failed to notice car slowing	Wet	Overcast	Fine	T Type Junction	Nil				1792178	5499137
1N/967/15.759 SOUTH ROAD	I	TARARUA ROAD RAILWAY CROS	201154845	11/11/2011	Fri	1825	CAR2 turning right hit by oncoming CAR1 SBD on SH 1N SOUTH ROAD	CAR2 failed to give way when turning to non-turning traffic, didnt see/look when required to give way to traffic from another direction	Dry	Bright	Fine	T Type Junction	Give Way Sign				1792178	5499137
1N/967/15.813	500S	HOKIO BEACH ROAD	2812365	04/07/2008	Fri	2120	MOTOR CYCLE1 SBD on SH 1N hit CAR2 U-turning from same direction of travel	CAR2 didnt see/look behind when changing lanes, position or direction	Wet	Dark	Light Rain	Unknown	Nil	1			1792143	5499095
1N/967/15.859	100S	TARARUA ROAD RAILWAY CROS	201251765	01/06/2012	Fri	0805	VAN1 NBD on SH 1N hit rear end of CAR2 stopped/moving slowly	VAN1 failed to notice car slowing, attention diverted by driver dazzled by sun/lights ENV: dazzling sun	Dry	Bright	Fine	Unknown	Nil				1792114	5499060
1N/967/16.163	850S	HOKIO BEACH ROAD	2953152	01/07/2009	Wed	2225	CAR1 SBD on SH 1N hit obstruction, CAR1 hit Debris	CAR1 did not see or look for other party until too late CAR2 obstruction on roadway	Dry	Dark	Fine	Unknown	Nil				1791923	5498822

First Street	D/I/R	Second street or landmark	Crash Number	Date DD/MM/YYYY	Day	Time HHMM	Description of Events	Crash Factors (ENV = Environmental factors)	Road	Natural Light	Weather	Junction	Cntrl	Tot Inj F A T	S E R	M I N	Map Coordinates Easting	Northing
Distance																		
1N/967/16.259	500S	TARARUA ROAD RAILWAY CROS	2954135	06/08/2009	Thu	1402	CAR2 turning right hit by oncoming CAR1 NBD on SH 1N	CAR2 failed to give way when turning to non-turning traffic, didnt see/look when required to give way to traffic from another direction ENV: entering or leaving land use	Dry	Bright	Fine	Driveway	Nil				1791863	5498749
1N/967/16.299	380N	BOULTON ROAD	201150925	23/01/2011	Sun	1620	VAN1 SBD on SH 1N hit rear of CAR2 turning right from left side	CAR2 inattentive, didnt see/look behind when changing lanes, position or direction, overseas/migrant driver failed to adjust to NZ road rules and road conditions ENV: road slippery (rain), entering or leaving other commercial	Wet	Overcast	Light Rain	Driveway	Nil				1791838	5498718
1N/967/16.528	150N	BOULTON ROAD	2851732	24/03/2008	Mon	1502	CAR1 SBD on SH 1N hit rear end of CAR2 stop/slow for queue	CAR1 failed to notice car slowing	Dry	Bright	Fine	Unknown	Nil				1791691	5498541
57/0/3.473	I	TARARUA ROAD	2813228	17/10/2008	Fri	1745	CAR1 WBD on TARARUA ROAD hit CAR2 crossing at right angle from right	CAR1 failed to give way at stop sign, didnt see/look when required to give way to traffic from another direction, illness with no warning (eg heart attack)	Dry	Bright	Fine	X Type Junction	Stop Sign		1		1793715	5498090
57/0/3.473	I	TARARUA ROAD	201150424	10/02/2011	Thu	0940	CAR1 EBD on TARARUA ROAD hit CAR2 crossing at right angle from right	CAR1 alcohol suspected, failed to give way at stop sign, didnt see/look when required to give way to traffic from another direction	Wet	Overcast	Light Rain	X Type Junction	Stop Sign				1793715	5498090
57/0/4.541	530S	MEADOWVALE DRIVE	201052782	15/06/2010	Tue	1507	CAR1 SBD on SH 57 sideswiped by CAR2 turning left, CAR1 hit Parked Vehicle	CAR1 overtaking at an intersection, overtaking on left, misjudged intentions of another party ENV: entering or leaving other commercial	Dry	Bright	Fine	Driveway	Nil				1794403	5498913
57/0/4.615	460S	MEADOWVALE DRIVE	201112303	31/07/2011	Sun	1310	CAR1 NBD on SH 57 lost control; went off road to left	CAR1 fatigue (drowsy, tired, fell asleep)	Dry	Bright	Fine	Unknown	Nil		1		1794447	5498967
57/0/5.086	500S	QUEEN ST EAST	201150741	09/03/2011	Wed	0946	CAR1 SBD on SH 57 hit CAR2 U-turning from same direction of travel	CAR2 failed to give way when turning to non-turning traffic, driver over-reacted	Dry	Bright	Fine	Unknown	Nil				1794747	5499330
57/0/5.581	I	QUEEN ST EAST	2850657	20/02/2008	Wed	1703	CAR1 WBD on QUEEN ST EAST hit CAR2 crossing at right angle from right	CAR1 failed to give way at stop sign, misjudged speed etc of vehicle coming from another dirn with right of way	Dry	Bright	Fine	X Type Junction	Stop Sign				1795065	5499715
57/0/5.581	I	QUEEN ST EAST	2912622	21/08/2009	Fri	1850	CAR2 turning right hit by oncoming MOTOR CYCLE1 NBD on SH 57	CAR2 failed to give way when turning to non-turning traffic, didnt see/look when required to give way to traffic from another direction	Dry	Dark	Fine	X Type Junction	Stop Sign	1			1795065	5499715
57/0/5.581	I	QUEEN ST EAST	2811484	05/03/2008	Wed	1000	CAR2 turning right hit by oncoming CAR1 SBD on SH 57	CAR2 failed to give way when turning to non-turning traffic	Wet	Overcast	Light Rain	X Type Junction	Stop Sign		1		1795065	5499715
57/0/5.586	I	QUEEN ST EAST	201211311	27/02/2012	Mon	1605	CAR1 EBD on QUEEN ST EAST hit CAR2 crossing at right angle from right	CAR1 failed to give way at stop sign, didnt see/look when required to give way to traffic from another direction	Dry	Bright	Fine	X Type Junction	Stop Sign		1		1795065	5499715

First Street	D/I/R	Second street or landmark	Crash Number	Date DD/MM/YYYY	Day	Time HHMM	Description of Events	Crash Factors (ENV = Environmental factors)	Road	Natural Light	Weather	Junction	Cntrl	Tot Inj F A T	S E R	M I N	Map Coordinates Easting	Northing
57/0/5.586	I	QUEEN ST EAST	201012530	27/07/2010	Tue	1541	CAR1 EBD on QUEEN ST EAST hit CAR2 crossing at right angle from right	CAR1 failed to give way at stop sign, didnt see/look when required to give way to traffic from another direction	Dry	Overcast	Fine	X Type Junction	Stop Sign			1	1795065	5499715
57/0/5.686	100N	QUEEN ST EAST	201251155	07/04/2012	Sat	1250	CAR1 NBD on SH 57 lost control; went off road to left, CAR1 hit Ditch	CAR1 lost control, new driver showed inexperience, towed vehicle or trailer too heavy or incompatible ENV: road surface (uneven), road surface under construction or maintenance	Dry	Bright	Fine	Unknown	Nil				1795129	5499792
57/0/5.786	200N	QUEEN ST EAST	2910001	01/01/2009	Thu	0130	CAR1 NBD on SH 57 hit PEDESTRIAN2 (Age 33) walking with traffic	PEDESTRIAN2 Intoxicated non-driver, walking along road not keeping to side of rd, pedestrian wearing dark clothing	Dry	Dark	Fine	Unknown	Nil	1			1795193	5499869
57/0/5.786	200N	QUEEN ST EAST	201250295	15/02/2012	Wed	1220	CAR1 SBD on SH 57 overtaking hit SUV2 turning right	CAR1 overtaking vehicle signaling right turn, misjudged intentions of another party, new driver showed inexperience ENV: entering or leaving other commercial	Dry	Bright	Fine	Driveway	Nil				1795193	5499869
57/0/6.086	500N	QUEEN ST EAST	201251616	27/04/2012	Fri	2110	CAR1 NBD on SH 57 lost control; went off road to left, CAR1 hit Ditch	CAR1 too fast on straight, lost control, failed to notice roadworks signs, windscreen or rear window misted/frosted ENV: road surface high crown, road surface under construction or maintenance	Wet	Dark	Fine	Unknown	Nil				1795385	5500100
57/0/6.381	800N	QUEEN ST EAST	2911595	13/04/2009	Mon	1730	CAR1 NBD on SH 57 hit VAN2 U-turning from same direction of travel	VAN2 didnt see/look behind when changing lanes, position or direction	Dry	Twilight	Unknow	Unknown	Nil			1	1795576	5500332
57/0/6.411	830N	QUEEN ST EAST	2813065	23/08/2008	Sat	1600	SUV1 NBD on SH 57 hit rear end of CAR2 stopped/moving slowly, SUV1 hit Post Or Pole	SUV1 failed to notice car slowing	Wet	Overcast	Light Rain	Unknown	Nil			3	1795595	5500355
57/0/6.638	300S	WAIHOU ROAD	201053517	25/07/2010	Sun	0650	CAR1 NBD on SH 57 hit rear of CAR2 turning right from left side, CAR1 hit Ditch	CAR1 failed to notice indication of vehicle in front CAR2 turned right from left side of road ENV: entering or leaving private house / farm	Dry	Twilight	Fine	Driveway	Nil				1795740	5500528
57/0/6.943	I	WAIHOU ROAD S	201155605	22/12/2011	Thu	1411	VAN2 turning right hit by oncoming CAR1 SBD on SH 57	VAN2 failed to give way when turning to non-turning traffic, inattentive ENV: visibility limited by crest or dip	Dry	Bright	Fine	T Type Junction	Stop Sign				1795932	5500759
57/0/7.093	150N	WAIHOU ROAD S	201210074	16/12/2012	Sun	1700	SUV1 SBD on SH 57 lost control on straight and hit CAR2 head on, SUV1 hit Fence	SUV1 failed to keep left on straight, defective vision CAR3 lost control avoiding another vehicle	Dry	Bright	Fine	Unknown	Nil	1	1	5	1796027	5500875
57/0/7.327	320S	ROSLYN ROAD	2912869	23/09/2009	Wed	1638	CAR2 turning right hit by oncoming CAR1 SBD on SH 57	CAR2 failed to give way when turning to non-turning traffic ENV: entering or leaving private house / farm	Dry	Overcast	Fine	Driveway	Nil			1	1796180	5501061
57/0/7.449	200S	WAIHOU ROAD	201012065	29/05/2010	Sat	0100	CAR1 NBD on SH 57 lost control; went off road to left, CAR1 hit Ditch	CAR1 alcohol test above limit or test refused	Dry	Dark	Fine	Unknown	Nil			1	1796257	5501153

First Street	Distance	D/I/R	Second street or landmark	Crash Number	Date DD/MM/YYYY	Day	Time HHMM	Description of Events	Crash Factors (ENV = Environmental factors)	Road	Natural Light	Weather	Junction	Cntrl	Tot Inj F A T	S E R	M I N	Map Coordinates Easting	Northing
57/0/7.653		I	ROSLYN ROAD	201154013	12/10/2011	Wed	1000	CAR1 SBD on SH 57 lost control turning right, CAR1 went Over Bank, Fence on right hand bend	CAR1 too fast entering corner, lost control under heavy braking, evading enforcement ENV: road slippery (rain), heavy rain	Wet	Overcast	Heavy Rain	X Type Junction	Give Way Sign				1796384	5501307
57/0/8.28	100	N	MCDONALD ROAD	2813262	26/10/2008	Sun	1705	CAR1 NBD on SH 57 lost control; went off road to left, CAR1 hit Fence, Ditch	CAR1 lost control while returning to seal from unsealed shoulder, attention diverted by cigarette etc, inexperience	Dry	Bright	Fine	Unknown	Nil		1		1796786	5501788
57/0/8.44	260	N	MCDONALD ROAD	2856102	18/11/2008	Tue	1040	VAN1 NBD on SH 57 lost control but did not leave the road, VAN1 hit Fence, Ditch	VAN1 load	Wet	Overcast	Light Rain	Unknown	Nil				1796889	5501911
57/0/8.81	300	S	HEATHERLEA EAST ROAD	2811525	28/03/2008	Fri	2000	CAR1 SBD on SH 57 hit VAN2 headon on straight	CAR1 alcohol test above limit or test refused, failed to keep left on straight	Dry	Dark	Fine	Unknown	Nil		1		1797115	5502203

High Risk Rural Roads Guide		Length	Vkt	FS Crashes	Value		Length	AADT	
	Personal Risk	8.6	1.23	5	4.06	SH1	0.8	11600	0.00001825
	Collective Risk	8.6		5	0.12	SH57	1.6	9200	0.00001825
							6.2	7023	0.00001825

High Risk Intersection Guide		Rural T-Junction		
		SH1/ Lindsay Road		
		<>M		
		<>N		
	TYPE	**Adjusted FS Rate**	**Injury**	**Adjusted FS Rate**
Overtaking/lane change	A	0.32	1	0.32
Head-on	B	0.35	1	0.35
Loss of control or off road (straight)	C	0.25	0	0
Cornering	D	0.27	0	0
Hit Object	E	0.31	0	0
Rear-end	F	0.08	1	0.08
Turning versus same direction	G	0.24	1	0.24
Crossing (no turning)	H	0.19	0	0
Crossing (turning)	J	0.28	0	0
Merging	K	0.26	0	0
Right turn against	L	0.29	0	0
Manoeuvring	M	0.28	0	0
Pedestrian crossing road	N	0.73	0	0
Pedestrian other	P	0.73	0	0
Misc	Q	0.5	0	0
Estimated FS Crashes/Collective Risk		Total	**4**	**0.99**
Actual FS Crashes				1
Collective Risk Band				**Medium**
Qmajor				9600
Qminor				349
				407
	EEM high speed priority T junction model			743535
Predicted Injury Crashes	B0	B1	B2	
Per year	0.000407	0.18	0.57	0.06
Personal Risk Metric				134
Personal Risk Band				**High**
Injury Crashes Per Year				0.80
LoSS Value				13.4
LoSS Band				**V**

High Risk Intersection Guide		Rural X roads		
		SH57/Queen St East		
		<>M		
	Rural T Junction	<>N		
	TYPE	**Adjusted FS Rate**	**Injury**	**Adjusted FS Rate**
Overtaking/lane change	A	0.32	0	0
Head-on	B	0.35	0	0
Loss of control or off road (straight)	C	0.25	0	0
Cornering	D	0.24	0	0
Hit Object	E	0.31	0	0
Rear-end	F	0.08	0	0
Turning versus same direction	G	0.22	0	0
Crossing (no turning)	H	0.34	2	0.68
Crossing (turning)	J	0.33	0	0
Merging	K	0.23	0	0
Right turn against	L	0.3	2	0.6
Manoeuvring	M	0.28	0	0
Pedestrian crossing road	N	0.73	0	0
Pedestrian other	P	0.73	1	0.73
Misc	Q	0.5	0	0
Estimated FS Crashes/Collective Risk		Total	**5**	**2.01**
Actual FS Crashes				**0**
Collective Risk Band				**High**
Qmajor				7776
Qminor				1175
				609
	EEM high speed priority X road model			1110658
Predicted Injury Crashes	B0	B1	B2	
Per year	0.000432	0.39	0.5	0.49
Personal Risk Metric				181
Personal Risk Band				**High**
Injury Crashes Per Year				1.00
LoSS Value				2.05
LoSS Band				**IV**

CRASH LIST DETAIL REPORT

Run on: 17 Aug 2013

Crash List: Bypass Northern (172 crashes)

Total Injury Crashes:	59
Total Non-Injury Crashes:	113
	172

Crash Type	Number	%
Overtaking Crashes:	11	6
Straight Road Lost Control/Head On:	17	10
Bend - Lost Control/Head On:	9	5
Rear End/Obstruction:	71	41
Crossing/Turning:	53	31
Pedestrian Crashes:	11	6
Miscellaneous Crashes:	0	0
TOTAL:	172	100 %

Location	Local road	%	St.Highway	%	Total	%
Urban	0	0	127	74	127	74
Open road	0	0	45	26	45	26
TOTAL:	0	0	172	100	172	100 %

Intersection/Midblock	Number	%
Intersection:	81	47
MidBlock:	91	53
TOTAL:	172	100 %

Environmental Factors	Number	%
Light/Overcast Crashes:	132	77
Dark/Twilight Crashes:	40	23
TOTAL:	172	100 %
Wet/Ice:	33	19
Dry:	139	81
TOTAL:	172	100 %

Day/Period	Number	%
Weekday	134	78
Weekend	38	22
TOTAL:	172	100 %

Vehicles	Number	%
Car	238	87
Van/Ute	29	15
Truck	15	9
Bus	0	0
Motorcycle	10	6
Bicycle	4	2
TOTAL:	296	119 %

Note: Percentages represent the % of crashes in which the vehicle, cause or object appears.

Crash factors (*)	Number	%
Alcohol	12	7
Too fast	7	4
Failed Giveway/Stop	44	26
Failed Keep Left	8	5
Overtaking	9	5
Incorrect Lane/posn	30	17
Poor handling	18	10
Poor Observation	96	56
Poor judgement	40	23
Fatigue	11	6
Disabled/old/ill	8	5
Pedestrian factors	6	3
Vehicle factors	11	6
Road factors	16	9
Weather	6	3
Other	5	3
TOTAL:	327	188 %
Crashes with a:		
Driver factor	283	164 %
Environmental factor	22	12 %

(*) factors are counted once against a crash - ie two fatigued drivers count as one fatigue crash factor.

Note: Driver/vehicle factors are not available for non-injury crashes for Northland, Auckland, Waikato and Bay of Plenty before 2007. This will influence numbers and percentages.

Crashes with objects(s) struck	41	24 %

Object Struck	Number	%
Debris	1	1
Over Bank	2	1
Fence	10	6
Traffic Island	2	1
Parked Vehicle	10	6
Post Or Pole	8	5
Vehicle	2	1
Traffic Sign	1	1
Tree	4	2
Ditch	9	5
Stray Animal	1	1
Other	1	1
TOTAL:	51	31 %

Crash Numbers

Year	Fatal	Serious	Minor	Non-Inj
2008	0	2	12	26
2009	1	3	17	14
2010	0	2	8	24
2011	0	0	6	27
2012	1	1	6	22
TOTAL:	2	8	49	113

Appendix C Outline Plans

DO NOT SCALE - IF IN DOUBT, ASK

ORIGINAL SIZE A1

RAILWAY LINE RELOCATION TO BE CONSIDERED IN 'SAR' PHASE.

SH OVER RAILWAY. VERTICAL ALIGNMENT OF OVERBRIDGE IS TO 80km/h.

ROUNDABOUT

LINDSAY RD

TO FOXTON

SH1

NI MT RAILWAY

LEVIN

FAIRFIELD RD

ROSLYN RD

TO PALMERSTON NORTH

WAIHOU RD

SH57

SHOULDER WIDENING OF SH57 TO CONTINUE TO KIMBERLEY ROAD INTERSECTION.

CURVE DATA	
DESIGN SPEED	90km/h
RADIUS	470m
SUPERELEVATION	5%

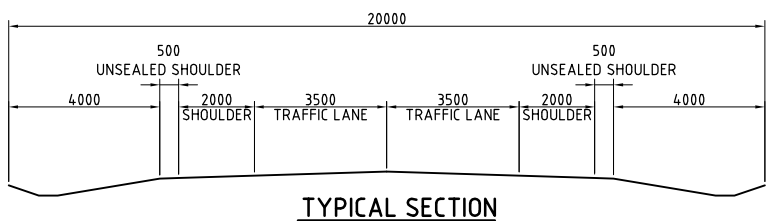
CURVE DATA	
DESIGN SPEED	00km/h
RADIUS	470m
SUPERELEVATION	5%

CURVE DATA	
DESIGN SPEED	60km/h
RADIUS	200m
SUPERELEVATION	4%

CURVE DATA	
DESIGN SPEED	80km/h
RADIUS	400m
SUPERELEVATION	4%

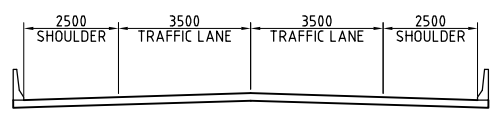
LEGEND

- ROAD CENTRELINE
- WIDENING OF EXISTING CARRIAGEWAY
- GREENFIELDS CARRIAGEWAY
- INDICATIVE GRADE SEPARATION
- INDICATIVE LAND REQUIREMENT



TYPICAL SECTION

SCALE 1 : 100



TYPICAL SECTION ON 2 LANE BRIDGE (OR ARCH)

SCALE 1 : 100

NOT FOR CONSTRUCTION

REV	REVISIONS	DRN	CHK	APP	DATE
B	FOR CLIENT REVIEW	PJC	PP	MO	26/08/13
A	PRELIMINARY	PJC			16/08/13

SURVEYED		
DESIGNED	B. Browne	08/13
DRAWN	PJ Cook	08/13
CAD REVIEW	B Timblick	08/13
DESIGN CHECK	P Peet	08/13
DESIGN REVIEW	M Oppenhuis	08/13
APPROVED	-	-
PROF REGISTRATION:	-	

MWH

Client: NZ TRANSPORT AGENCY WAKA KOTAHI

NZ TRANSPORT AGENCY
OTAKI TO LEVIN PFRs

OPTION B1
LEVIN BYPASS - NORTHERN CONNECTION

Status Stamp: FOR CLIENT REVIEW

Date Stamp: 26/08/2013

Scales: 1:5000

Drawing No.: 80500902-06-001-C001

Rev.: B

DO NOT SCALE - IF IN DOUBT, ASK

ORIGINAL SIZE A1

N

TO FOXTON

RAILWAY LINE RELOCATION TO BE CONSIDERED IN 'SAR' PHASE.

AVENUE NORTH RD

CLOSE ROAD

ROUNDABOUT

POSSIBLE SLIP LANE

SH OVER RAILWAY. VERTICAL ALIGNMENT OF OVERBRIDGE IS TO 80km/h.

NI MT RAILWAY

SH1

LINDSAY RD

HEATHERLEA EAST RD

TO PALMERSTON NORTH

SH57

ROSLYN RD

FAIRFIELD RD

McDONALD RD

WAIHOU RD

LEVIN

SHOULDER WIDENING OF SH57 TO CONTINUE TO KIMBERLEY ROAD INTERSECTION.

CURVE DATA	
DESIGN SPEED	100km/h
RADIUS	950m
SUPERELEVATION	4%

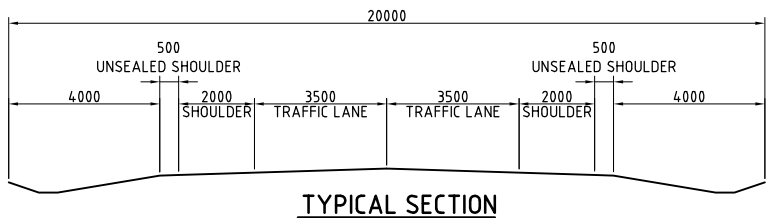
CURVE DATA	
DESIGN SPEED	100km/h
RADIUS	950m
SUPERELEVATION	4%

CURVE DATA	
DESIGN SPEED	60km/h
RADIUS	200m
SUPERELEVATION	4%

CURVE DATA	
DESIGN SPEED	80km/h
RADIUS	400m
SUPERELEVATION	4%

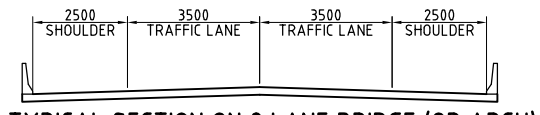
LEGEND

- ROAD CENTRELINE
- WIDENING OF EXISTING CARRIAGEWAY
- GREENFIELDS CARRIAGEWAY
- INDICATIVE GRADE SEPARATION
- INDICATIVE LAND REQUIREMENT



TYPICAL SECTION

SCALE 1 : 100



TYPICAL SECTION ON 2 LANE BRIDGE (OR ARCH)

SCALE 1 : 100

NOT FOR CONSTRUCTION

REV	REVISIONS	DRN	CHK	APP	DATE
B	FOR CLIENT REVIEW	PJC	PP	MO	26/08/13
A	PRELIMINARY	PJC			16/08/13

SURVEYED		
DESIGNED	B. Browne	08/13
DRAWN	PJ Cook	08/13
CAD REVIEW	B Timblick	08/13
DESIGN CHECK	P Peet	08/13
DESIGN REVIEW	M Oppenhuis	08/13
APPROVED	-	-
PROF REGISTRATION:	-	

MWH

Client: NZ TRANSPORT AGENCY WAKA KOTAHI

NZ TRANSPORT AGENCY
OTAKI TO LEVIN PFRs

OPTION B2A
LEVIN BYPASS - NORTHERN CONNECTION

Status Stamp: FOR CLIENT REVIEW

Date Stamp: 26/08/2013

Scales: 1:5000

Drawing No.: 80500902-06-001-C002

Rev.: B

DO NOT SCALE – IF IN DOUBT, ASK

ORIGINAL SIZE A1

TO FOXTON

NI MT RAILWAY

RAILWAY LINE RELOCATION TO BE CONSIDERED IN 'SAR' PHASE.

N

AVENUE NORTH RD

CURVE DATA	
DESIGN SPEED	90km/h
RADIUS	800m
SUPERELEVATION	3%

POSSIBLE SH1 TO BYPASS SLIP LANE

CLOSE ROAD

ROUNDABOUT

POSSIBLE EXISTING SH1 SLIP LANE

SH OVER RAILWAY. VERTICAL ALIGNMENT OF OVERBRIDGE IS TO 80km/h.

CURVE DATA	
DESIGN SPEED	80km/h
RADIUS	500m
SUPERELEVATION	3%

CURVE DATA	
DESIGN SPEED	100km/h
RADIUS	900m
SUPERELEVATION	4%

SH1

LINDSAY RD

HEATHERLEA EAST RD

TO PALMERSTON NORTH

SH57

ROSLYN RD

FAIRFIELD RD

CURVE DATA	
DESIGN SPEED	60km/h
RADIUS	200m
SUPERELEVATION	4%

ROUNDABOUT

McDONALD RD

CURVE DATA	
DESIGN SPEED	80km/h
RADIUS	400m
SUPERELEVATION	4%

WAIHOU RD

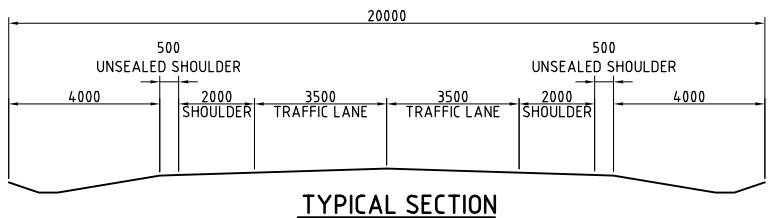
SH57

LEVIN

SHOULDER WIDENING OF SH57 TO CONTINUE TO KIMBERLEY ROAD INTERSECTION.

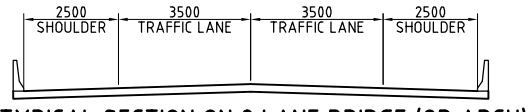
LEGEND

- ROAD CENTRELINE
- WIDENING OF EXISTING CARRIAGEWAY
- GREENFIELDS CARRIAGEWAY
- INDICATIVE GRADE SEPARATION
- INDICATIVE LAND REQUIREMENT



TYPICAL SECTION

SCALE 1 : 100



TYPICAL SECTION ON 2 LANE BRIDGE (OR ARCH)

SCALE 1 : 100

NOT FOR CONSTRUCTION

REV	REVISIONS	DRN	CHK	APP	DATE
B	FOR CLIENT REVIEW	PJC	PP	MO	26/08/13
A	PRELIMINARY	PJC			16/08/13

SURVEYED		
DESIGNED	B. Browne	08/13
DRAWN	PJ Cook	08/13
CAD REVIEW	B Timblick	08/13
DESIGN CHECK	P Peet	08/13
DESIGN REVIEW	M Oppenhuis	08/13
APPROVED	-	-
PROF REGISTRATION:	-	

MWH

Client: NZ TRANSPORT AGENCY WAKA KOTAHI

NZ TRANSPORT AGENCY
OTAKI TO LEVIN PFRs

OPTION B2B
LEVIN BYPASS – NORTHERN CONNECTION

Status Stamp: FOR CLIENT REVIEW

Date Stamp: 26/08/2013

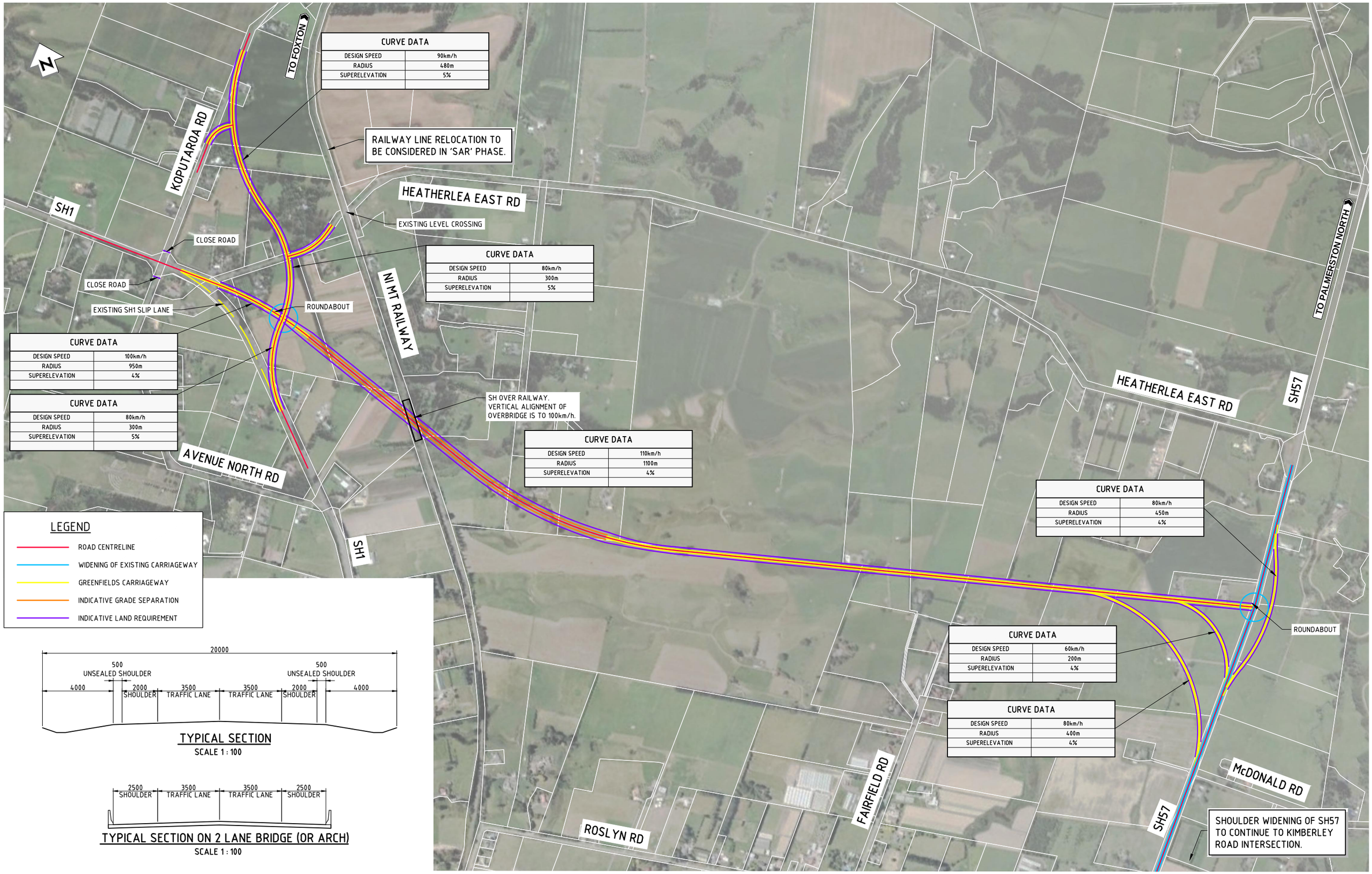
Scales: 1:5000

Drawing No.: 80500902-06-001-C003

Rev.: B

DO NOT SCALE – IF IN DOUBT, ASK

ORIGINAL SIZE A1



CURVE DATA	
DESIGN SPEED	90km/h
RADIUS	480m
SUPERELEVATION	5%

CURVE DATA	
DESIGN SPEED	80km/h
RADIUS	300m
SUPERELEVATION	5%

CURVE DATA	
DESIGN SPEED	100km/h
RADIUS	950m
SUPERELEVATION	4%

CURVE DATA	
DESIGN SPEED	80km/h
RADIUS	300m
SUPERELEVATION	5%

CURVE DATA	
DESIGN SPEED	110km/h
RADIUS	1100m
SUPERELEVATION	4%

CURVE DATA	
DESIGN SPEED	80km/h
RADIUS	450m
SUPERELEVATION	4%

CURVE DATA	
DESIGN SPEED	60km/h
RADIUS	200m
SUPERELEVATION	4%

CURVE DATA	
DESIGN SPEED	80km/h
RADIUS	400m
SUPERELEVATION	4%

LEGEND

- ROAD CENTRELINE
- WIDENING OF EXISTING CARRIAGEWAY
- GREENFIELDS CARRIAGEWAY
- INDICATIVE GRADE SEPARATION
- INDICATIVE LAND REQUIREMENT

TYPICAL SECTION

SCALE 1 : 100

TYPICAL SECTION ON 2 LANE BRIDGE (OR ARCH)

SCALE 1 : 100

NOT FOR CONSTRUCTION

REV	REVISIONS	DRN	CHK	APP	DATE
C	FOR APPROVAL - HEATHERLEA EAST ROAD AND BYPASS ROAD AMENDED	PJC	PP	MO	16/10/13
B	FOR CLIENT REVIEW	PJC	PP	MO	26/08/13
A	PRELIMINARY	PJC			16/08/13

SURVEYED		
DESIGNED	B. Browne	08/13
DRAWN	PJ Cook	08/13
CAD REVIEW	B Timblick	08/13
DESIGN CHECK	P Peet	08/13
DESIGN REVIEW	M Oppenhuis	08/13
APPROVED	-	-
PROF REGISTRATION:	-	

MWH

Client: NZ TRANSPORT AGENCY WAKA KOTAHI

NZ TRANSPORT AGENCY
OTAKI TO LEVIN PFRs

OPTION B3
LEVIN BYPASS - NORTHERN CONNECTION

Status Stamp: FOR CLIENT REVIEW

Date Stamp: 16/10/2013

Scales: 1:5000

Drawing No.: 80500902-06-001-C004

Rev.: C

Appendix D Cost Estimates

Project Estimate - Form A

Project Name: Levin Bypass Study
Option 1

FE
Feasibility Estimate

Item	Description	Base Estimate	Contingency	Funding Risk
A	**Nett Project Property Cost**	**4,700,000**	**940,000**	**1,551,000**
	Investigation and Reporting			
	- Consultancy Fees	**414,211**	**82,840**	**136,700**
	- NZTA-Managed Costs	**0**	**0**	**0**
B	**Total Investigation and Reporting**	**414,211**	**82,840**	**136,700**
	Design and Project Documentation			
	- Consultancy Fees	**674,207**	**134,840**	**222,500**
	- NZTA-Managed Costs	**0**	**0**	**0**
C	**Total Design and Project Documentation**	**674,207**	**134,840**	**222,500**
	Construction			
	MSQA			
	- Consultancy Fees	**720,089**	**144,020**	**237,600**
	- NZTA-Managed Costs	**0**	**0**	**0**
	- Consent Monitoring Fees	**0**	**0**	**0**
	Sub Total Base MSQA	**720,089**	**144,020**	**237,600**
	Physical Works			
D1	Environmental Compliance	700,000	140,000	231,000
D2	Earthworks	3,221,253	966,400	1,610,600
D3	Ground Improvements	0	0	0
D4	Drainage	917,670	183,500	302,800
D5	Pavement and Surfacing	3,235,503	647,100	1,067,700
D6	Bridges / Structures	1,024,650	204,900	338,100
D7	Retaining Walls	0	0	0
D8	Traffic Services	487,300	97,500	160,800
D9	Service Relocations	360,000	72,000	118,800
D10	Landscaping	1,033,563	206,700	341,100
D11	Traffic Management and Temporary Works	390,000	78,000	128,700
D12	Preliminary and General	1,375,000	275,000	453,800
D13	Extraordinary Construction Costs	0	0	0
	Sub Total Base Physical Works	**12,744,939**	**2,871,100**	**4,753,400**
D	**Total Construction & MSQA**	**13,465,028**	**3,015,120**	**4,991,000**
E	**Project Base Estimate** (A+B+C+D)	**19,253,445**		
F	**Contingency** (Assessed / Analysed) (A+B+C+D)		**4,172,800**	
G	**Project Expected Estimate** (E+F)		**23,426,245**	
	Project Property Cost Expected Estimate		**5,640,000**	
	Investigation and Reporting Expected Estimate		**497,051**	
	Design and Project Documentation Expected Estimate		**809,047**	
	Construction Expected Estimate		**16,480,148**	
H	**Funding Risk** (Assessed / Analysed) (A+B+C+D)			**6,901,200**
I	**95th Percentile Project Estimate** (G+H)			**30,327,445**
	Project Property Cost 95th Percentile Estimate			**7,191,000**
	Investigation and Reporting 95th Percentile Estimate			**633,751**
	Design and Project Documentation 95th Percentile Estimate			**1,031,547**
	Construction 95th Percentile Estimate			**21,471,148**

Base Date of Estimate	**23 Aug 2013**	**Cost Index**
Estimate prepared by:	**Martin Hoffman**	**Signed**
Estimate internal peer review by:	**Nigel Lister**	**Signed**
Estimate external peer review by:		**Signed**
Estimate approved by NZTA Project Manager:		**Signed**

Note: (1) These estimates are exclusive of escalation and GST.

Project Estimate - Form A

Project Name: Levin Bypass Study
Option 2B

FE
Feasibility Estimate

Item	Description	Base Estimate	Contingency	Funding Risk
A	**Nett Project Property Cost**	**3,500,000**	**700,000**	**1,155,000**
	Investigation and Reporting			
	- Consultancy Fees	**562,759**	**112,550**	**185,700**
	- NZTA-Managed Costs	**0**	**0**	**0**
B	**Total Investigation and Reporting**	**562,759**	**112,550**	**185,700**
	Design and Project Documentation			
	- Consultancy Fees	**915,998**	**183,200**	**302,300**
	- NZTA-Managed Costs	**0**	**0**	**0**
C	**Total Design and Project Documentation**	**915,998**	**183,200**	**302,300**
	Construction			
	MSQA			
	- Consultancy Fees	**978,334**	**195,670**	**322,900**
	- NZTA-Managed Costs	**0**	**0**	**0**
	- Consent Monitoring Fees	**0**	**0**	**0**
	Sub Total Base MSQA	**978,334**	**195,670**	**322,900**
	Physical Works			
D1	Environmental Compliance	800,000	160,000	264,000
D2	Earthworks	2,795,874	838,800	1,397,900
D3	Ground Improvements	0	0	0
D4	Drainage	979,578	195,900	323,300
D5	Pavement and Surfacing	3,927,518	785,500	1,296,100
D6	Bridges / Structures	4,950,000	990,000	1,633,500
D7	Retaining Walls	0	0	0
D8	Traffic Services	366,624	73,300	121,000
D9	Service Relocations	157,500	31,500	52,000
D10	Landscaping	1,288,557	257,700	425,200
D11	Traffic Management and Temporary Works	150,000	30,000	49,500
D12	Preliminary and General	1,900,000	380,000	627,000
D13	Extraordinary Construction Costs	0	0	0
	Sub Total Base Physical Works	**17,315,650**	**3,742,700**	**6,189,500**
D	**Total Construction & MSQA**	**18,293,985**	**3,938,370**	**6,512,400**
E	**Project Base Estimate** (A+B+C+D)	**23,272,741**		
F	**Contingency** (Assessed / Analysed) (A+B+C+D)		**4,934,120**	
G	**Project Expected Estimate** (E+F)		**28,206,861**	
	Project Property Cost Expected Estimate		**4,200,000**	
	Investigation and Reporting Expected Estimate		**675,309**	
	Design and Project Documentation Expected Estimate		**1,099,198**	
	Construction Expected Estimate		**22,232,355**	
H	**Funding Risk** (Assessed / Analysed) (A+B+C+D)			**8,155,400**
I	**95th Percentile Project Estimate** (G+H)			**36,362,261**
	Project Property Cost 95th Percentile Estimate			**5,355,000**
	Investigation and Reporting 95th Percentile Estimate			**861,009**
	Design and Project Documentation 95th Percentile Estimate			**1,401,498**
	Construction 95th Percentile Estimate			**28,744,755**

Base Date of Estimate	**23 Aug 2013**	**Cost Index**
Estimate prepared by:	**Martin Hoffman**	**Signed**
Estimate internal peer review by:	**Nigel Lister**	**Signed**
Estimate external peer review by:		**Signed**
Estimate approved by NZTA Project Manager:		**Signed**

Note: (1) These estimates are exclusive of escalation and GST.

Project Estimate - Form A

Project Name: Levin Bypass Study
Option 3

FE
Feasibility Estimate

Item	Description	Base Estimate	Contingency	Funding Risk
A	**Nett Project Property Cost**	**6,200,000**	**1,240,000**	**2,046,000**
	Investigation and Reporting			
	- Consultancy Fees	**749,623**	**149,920**	**247,400**
	- NZTA-Managed Costs	**0**	**0**	**0**
B	**Total Investigation and Reporting**	**749,623**	**149,920**	**247,400**
	Design and Project Documentation			
	- Consultancy Fees	**1,220,156**	**244,030**	**402,700**
	- NZTA-Managed Costs	**0**	**0**	**0**
C	**Total Design and Project Documentation**	**1,220,156**	**244,030**	**402,700**
	Construction			
	MSQA			
	- Consultancy Fees	**1,303,191**	**260,640**	**430,100**
	- NZTA-Managed Costs	**0**	**0**	**0**
	- Consent Monitoring Fees	**0**	**0**	**0**
	Sub Total Base MSQA	**1,303,191**	**260,640**	**430,100**
	Physical Works			
D1	Environmental Compliance	1,000,000	200,000	330,000
D2	Earthworks	4,014,527	1,204,400	2,007,300
D3	Ground Improvements	0	0	0
D4	Drainage	1,211,319	242,300	399,700
D5	Pavement and Surfacing	4,940,472	988,100	1,630,400
D6	Bridges / Structures	6,930,000	1,386,000	2,286,900
D7	Retaining Walls	0	0	0
D8	Traffic Services	459,727	91,900	151,700
D9	Service Relocations	180,000	36,000	59,400
D10	Landscaping	1,676,288	335,300	553,200
D11	Traffic Management and Temporary Works	153,000	30,600	50,500
D12	Preliminary and General	2,500,000	500,000	825,000
D13	Extraordinary Construction Costs	0	0	0
	Sub Total Base Physical Works	**23,065,332**	**5,014,600**	**8,294,100**
D	**Total Construction & MSQA**	**24,368,524**	**5,275,240**	**8,724,200**
E	**Project Base Estimate** (A+B+C+D)	**32,538,303**		
F	**Contingency** (Assessed / Analysed) (A+B+C+D)		**6,909,190**	
G	**Project Expected Estimate** (E+F)		**39,447,493**	
	Project Property Cost Expected Estimate		**7,440,000**	
	Investigation and Reporting Expected Estimate		**899,543**	
	Design and Project Documentation Expected Estimate		**1,464,186**	
	Construction Expected Estimate		**29,643,764**	
H	**Funding Risk** (Assessed / Analysed) (A+B+C+D)			**11,420,300**
I	**95th Percentile Project Estimate** (G+H)			**50,867,793**
	Project Property Cost 95th Percentile Estimate			**9,486,000**
	Investigation and Reporting 95th Percentile Estimate			**1,146,943**
	Design and Project Documentation 95th Percentile Estimate			**1,866,886**
	Construction 95th Percentile Estimate			**38,367,964**

Base Date of Estimate	**23 Aug 2013**	**Cost Index**
Estimate prepared by:	**Martin Hoffman**	**Signed**
Estimate internal peer review by:	**Nigel Lister**	**Signed**
Estimate external peer review by:		**Signed**
Estimate approved by NZTA Project Manager:		**Signed**

Note: (1) These estimates are exclusive of escalation and GST.

Appendix E Traffic Data and Modelling Ouputs

Appendix F Economic Evaluation Worksheets

Otaki to North of Levin: Levin Bypass
EVALUATION SUMMARY — WORKSHEET 1

1 Evaluator(s) Oliver Brown
Reviewer(s) David Wanty

2 Project / Package Details

Approved Organisation Name	NZTA
Project / Package Name	Otaki to Levin: Levin Bypass
Your Reference	80500902
Project Description	Bypass of Levin
Describe the problem to be addressed	HCV traffic through levin

3 Location

Brief description of location: From the SH1/SH57 Kimberley Road intersection to approximately the intersection of SH1 and Koputaroa Road in the north. The study area therefore includes the township of Levin, the geographical areas to the north and south of Levin as well as approximately 7.5 km of SH1 and 6.2km of SH57.

4 Alternatives and Options

Describe the Do Minimum	The SH1-SH57 connection is already in place (Option 4a)
Summarise the option assessed	Option B-1 - Roslyn Road The bypass would utilise a substantial length of Roslyn Road, between SH57 and the ninety degree turn near the rail line.

5 Timing

Time Zero	1 July 2013
Expected duration of construction (years)	2.00
End construction	1 July 2017

6 Economic Efficiency

Analysis Period and Discount Rate	40 years, 6%
Date economic evaluation completed (mm/yyyy)	Oct-13
Base date for costs	1 July 2013
AADT at Time Zero	14,500
Adopted Traffic Growth Rate at Time Zero (%)	1.0%

Existing Roughness	3.20	IRI or NAASRA	Existing Traffic Speed	50-100	km/hr (surv/est)
Predicted Roughness	2.60	IRI or NAASRA	Predicted Traffic Speed	50-100	km/hr
Length of Bypass (new construction)	2.30	km	Posted Speed Limit	50-100	km/hr
			Road Type	Rural Strategic	
			Gradient Before Improvements	0- 3%	
			Gradient After Improvements	0- 3%	

7 PV Cost of Do Minimum — **Cost $** $3,390,384 — **A**

8 PV Cost of the Option — **Cost $** $22,966,763 — **B**

9 Benefit values from Worksheet 4, 5 or 6

PV Travel Time Savings	$	-$142,819	C	x Update Factor^{TT}	1.40	= $	-$199,946	W
PV VOC & CO2 savings:	$	$632,426	D	x Update Factor^{VOC}	1.06	= $	$670,371	Y
PV Accident Cost savings:	$	-$15,785,165	E	x Update Factor^{AC}	1.22	= $	-$19,257,901	Z

10 B/C Ratio = $\frac{W + Y + Z}{B - A}$ = $\frac{\text{BENEFITS}}{\text{COSTS}}$ = $\frac{-199,946 + 670,371 + -19,257,901}{22,966,763 - 3,390,384}$ = **-1.0**

Otaki to North of Levin: Levin Bypass
EVALUATION SUMMARY — WORKSHEET 1

1 Evaluator(s) Oliver Brown
Reviewer(s) Nigel Lister

2 Project / Package Details

Approved Organisation Name	NZTA
Project / Package Name	Otaki to Levin: Levin Bypass
Your Reference	80500902
Project Description	Bypass of Levin
Describe the problem to be addressed	HCV traffic through levin

3 Location

Brief description of location: From the SH1/SH57 Kimberley Road intersection to approximately the intersection of SH1 and Koputaroa Road in the north. The study area therefore includes the township of Levin, the geographical areas to the north and south of Levin as well as approximately 7.5 km of SH1 and 6.2km of SH57.

4 Alternatives and Options

Describe the Do Minimum	The SH1-SH57 connection is already in place (Option 4a)
Summarise the option assessed	Option B-2A - McDonald Extension This option proposes the creation of a new greenfield road parallel to Roslyn Road.

5 Timing

Time Zero	1 July 2013
Expected duration of construction (years)	2.00
End construction	1 July 2017

6 Economic Efficiency

Analysis Period and Discount Rate	40 years, 6%
Date economic evaluation completed (mm/yyyy)	Oct-13
Base date for costs	1 July 2013
AADT at Time Zero	14,500
Adopted Traffic Growth Rate at Time Zero (%)	1.0%

Existing Roughness	3.20 IRI or NAASRA		Existing Traffic Speed	50-100 km/hr	(surv/est)
Predicted Roughness	2.60 IRI or NAASRA		Predicted Traffic Speed	50-100 km/hr	
Length of Bypass (new construction)	2.60 km		Posted Speed Limit	50-100 km/hr	
			Road Type	Rural Strategic	
			Gradient Before Improvements	0- 3%	
			Gradient After Improvements	0- 3%	

7 PV Cost of Do Minimum — **Cost $** $3,390,384 **A**

8 PV Cost of the Option — **Cost $** $27,090,989 **B**

9 Benefit values from Worksheet 4, 5 or 6

PV Travel Time Savings	$	$468,772	C	x Update Factor^{TT}	1.40	= $	$656,281	W
PV VOC & CO2 savings:	$	$1,131,278	D	x Update Factor^{VOC}	1.06	= $	$1,199,154	Y
PV Accident Cost savings:	$	-$23,905,313	E	x Update Factor^{AC}	1.22	= $	-$29,164,482	Z

10 B/C Ratio = $\frac{W + Y + Z}{B - A}$ = $\frac{\text{BENEFITS}}{\text{COSTS}}$ = $\frac{656,281 + 1,199,154 + -29,164,482}{27,090,989 - 3,390,384}$ = **-1.2**

Otaki to North of Levin: Levin Bypass
EVALUATION SUMMARY — WORKSHEET 1

1 Evaluator(s) Oliver Brown
Reviewer(s) Nigel Lister

2 Project / Package Details

Approved Organisation Name	NZTA
Project / Package Name	Otaki to Levin: Levin Bypass
Your Reference	80500902
Project Description	Bypass of Levin
Describe the problem to be addressed	HCV traffic through levin

3 Location

Brief description of location: From the SH1/SH57 Kimberley Road intersection to approximately the intersection of SH1 and Koputaroa Road in the north. The study area therefore includes the township of Levin, the geographical areas to the north and south of Levin as well as approximately 7.5 km of SH1 and 6.2km of SH57.

4 Alternatives and Options

Describe the Do Minimum	The SH1-SH57 connection is already in place (Option 4a)
Summarise the option assessed	Option B-2B - McDonald Extension This option proposes the creation of a new greenfield road parallel to Roslyn Road. This option includes an intersection variation compared to B-2A.

5 Timing

Time Zero	1 July 2013
Expected duration of construction (years)	2.00
End construction	1 July 2017

6 Economic Efficiency

Analysis Period and Discount Rate	40 years, 6%
Date economic evaluation completed (mm/yyyy)	Oct-13
Base date for costs	1 July 2013
AADT at Time Zero	14,500
Adopted Traffic Growth Rate at Time Zero (%)	1.0%

Existing Roughness	3.20	IRI or NAASRA	Existing Traffic Speed	50-100	km/hr (surv/est)
Predicted Roughness	2.60	IRI or NAASRA	Predicted Traffic Speed	50-100	km/hr
Length of Bypass (new construction)	2.60	km	Posted Speed Limit	50-100	km/hr
			Road Type	Rural Strategic	
			Gradient Before Improvements	0- 3%	
			Gradient After Improvements	0- 3%	

7 PV Cost of Do Minimum — **Cost $** $3,390,384 — **A**

8 PV Cost of the Option — **Cost $** $27,090,989 — **B**

9 Benefit values from Worksheet 4, 5 or 6

PV Travel Time Savings	$	-$626,176	C	x Update Factor^{TT}	1.40	= $	-$876,647	W
PV VOC & CO2 savings:	$	$474,215	D	x Update Factor^{VOC}	1.06	= $	$502,668	Y
PV Accident Cost savings:	$	-$23,905,313	E	x Update Factor^{AC}	1.22	= $	-$29,164,482	Z

10 B/C Ratio = $\frac{W + Y + Z}{B - A} = \frac{\text{BENEFITS}}{\text{COSTS}} = \frac{-876,647 + 502,668 + -29,164,482}{27,090,989 - 3,390,384} =$ **-1.2**

Otaki to North of Levin: Levin Bypass
EVALUATION SUMMARY — WORKSHEET 1

1 Evaluator(s) Oliver Brown
Reviewer(s) Nigel Lister

2 Project / Package Details

Approved Organisation Name	NZTA
Project / Package Name	Otaki to Levin: Levin Bypass
Your Reference	80500902
Project Description	Bypass of Levin
Describe the problem to be addressed	HCV traffic through levin

3 Location

Brief description of location: From the SH1/SH57 Kimberley Road intersection to approximately the intersection of SH1 and Koputaroa Road in the north. The study area therefore includes the township of Levin, the geographical areas to the north and south of Levin as well as approximately 7.5 km of SH1 and 6.2km of SH57.

4 Alternatives and Options

Describe the Do Minimum	The SH1-SH57 connection is already in place (Option 4a)
Summarise the option assessed	Option B-3 - Heatherlea South This option would result in a proposed greenfield link between SH57 and SH1 to the south of Heatherlea East Road. The new link would form an intersection with SH57 approximately 500m northeast of the SH57 / McDonald Road intersection.

5 Timing

Time Zero	1 July 2013
Expected duration of construction (years)	2.00
End construction	1 July 2017

6 Economic Efficiency

Analysis Period and Discount Rate	40 years, 6%
Date economic evaluation completed (mm/yyyy)	Oct-13
Base date for costs	1 July 2013
AADT at Time Zero	14,500
Adopted Traffic Growth Rate at Time Zero (%)	1.0%

Existing Roughness	3.20	IRI or NAASRA	Existing Traffic Speed	50-100 km/hr	(surv/est)
Predicted Roughness	2.60	IRI or NAASRA	Predicted Traffic Speed	50-100 km/hr	
Length of Bypass (new construction)	3.00	km	Posted Speed Limit	50-100 km/hr	
			Road Type	Rural Strategic	
			Gradient Before Improvements	0- 3%	
			Gradient After Improvements	0- 3%	

7 PV Cost of Do Minimum — **Cost $** $3,390,384 **A**

8 PV Cost of the Option — **Cost $** $36,938,322 **B**

9 Benefit values from Worksheet 4, 5 or 6

PV Travel Time Savings	$	$2,102,684	**C**	x Update Factor^{TT}	1.40	= $	$2,943,757	**W**
PV VOC & CO2 savings:	$	-$3,217,383	**D**	x Update Factor^{VOC}	1.06	= $	-$3,410,426	**Y**
PV Accident Cost savings:	$	-$13,400,183	**E**	x Update Factor^{AC}	1.22	= $	-$16,348,223	**Z**

10 B/C Ratio = $\frac{W + Y + Z}{B - A}$ = $\frac{\text{BENEFITS}}{\text{COSTS}}$ = $\frac{2,943,757 + -3,410,426 + -16,348,223}{36,938,322 - 3,390,384}$ = **-0.5**