

SH1, Karo Drive Wellington Crash Reduction Study

A REPORT PREPARED FOR
New Zealand Transport Agency

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TABLE OF CONTENTS

- 1.0 INTRODUCTION..... 1**
 - 1.1 The Study 1
 - 1.2 The CRS team..... 2
 - 1.3 The study methodology 2
 - 1.4 Crash data 2
 - 1.5 Traffic volumes 3

- 2.0 Karo Drive/Victoria Street intersection 4**
 - 2.1 Site Description..... 4
 - 2.2 Crash history 5
 - 2.3 Issues observed 6
 - 2.4 Recommendations..... 9

- 3.0 Karo Drive/Willis Street/Abel Smith Street intersection..... 11**
 - 3.1 Site Description..... 11
 - 3.2 Crash history 11
 - 3.3 Issues observed 12
 - 3.4 Recommendations..... 13

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1.0 INTRODUCTION

1.1 The Study

As part of its ongoing commitment to improving safety on its roads, the New Zealand Transport Agency (NZTA) commissioned a crash reduction study (CRS) of two signalised intersections on the inner city section of SH1 on Karo Drive in Wellington that were known to have ongoing safety issues and a history of crashes, including ones involving fatalities.

The two intersections that were studied are:

- Karo Drive/Victoria Street
- Karo Drive/Willis Street/Abel Smith Street

Karo Drive is part of the westbound section of the SH1 Wellington inner city bypass and runs from Cuba Street to The Terrace Tunnel. It is one-way westbound whilst Victoria Street is one-way southbound and Willis Street is one-way northbound (see Figure 1). Abel Smith Street which is a fifth leg at the Karo Drive/Willis Street intersection is two-way and connects to The Terrace.

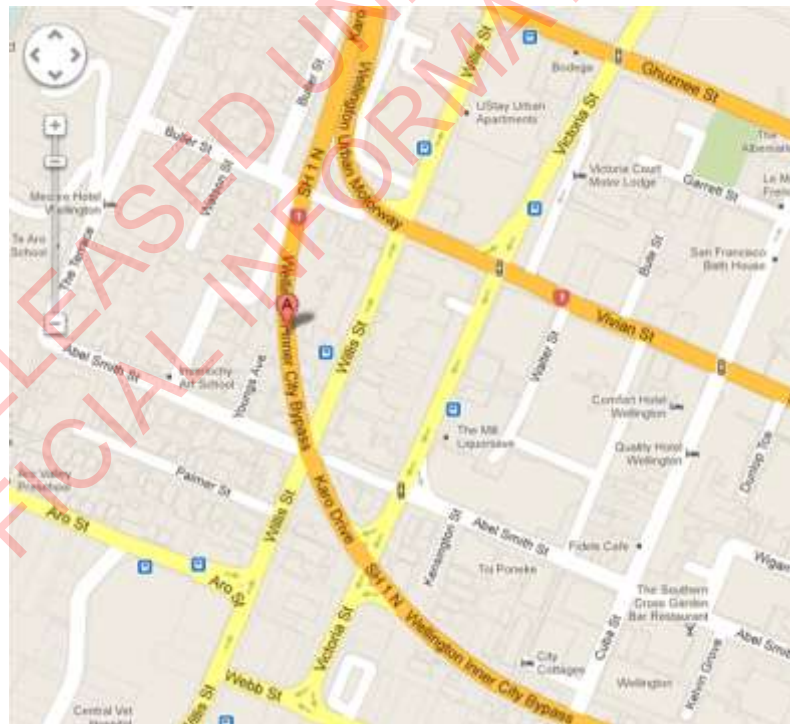


Figure 1

The object of the study was to identify possible road related causes of crashes and recommend measures to address the identified problems which, when implemented, would improve road safety. Sections 2 and 3 of the report detail the findings of the study, with each intersection discussed in turn and recommendations to improve safety are made.

No economic evaluation of the recommended measures has been undertaken as part of this study.

1.2 The CRS team

The study team comprised:

- Steve Reddish (Traffic Planning Consultants Ltd, Hawke's Bay) Team Leader
- Jeff Greenough (Traffic Signals/ITS, NZTA, Wellington)
- Richard Hocken (Senior Sergeant District Road Policing, NZ Police, Wellington)
- Steve James (Senior Safety Engineer, NZTA, Wellington)
- Tim Kirby (Project Manager – Traffic Signals, Wellington City Council)

1.3 The study methodology

A package of base information related to the study sections was prepared comprising:

- (1) The following outputs from the NZTA crash analysis system (CAS):
 - summary printout of the crash list (covering the time since Karo Drive was constructed in 2007 up to the present) – see Appendix.
 - crash diagram
- (2) Copies of the individual Traffic Crash Reports (TCRs) for crashes involving serious injury and death.
- (3) Aerial photos of the intersections.

Using the CAS outputs, a summary of the crash record was prepared for each intersection.

The team met in NZTA Wellington regional offices on the morning of Friday 23rd November 2012 to go through the available information and consider issues. The site inspection was also undertaken that day, followed by a run through of the study findings and general agreement on the safety improvement measures to be recommended.

The site inspections were carried out by initially driving along all approaches to both intersections, including using different traffic lanes, and then the team studied each intersection on foot.

1.4 Crash data

A summary of the crash data is provided for each intersection in the relevant sections of the report. However, as a general comment the team noted that

- (a) the number of crashes at the Karo Drive/Victoria Street intersection due to red light running is noticeably higher than would normally be expected at a busy urban signalised intersection, whilst
- (b) the recorded crashes at the Karo Drive/Willis Street intersection were atypically low for an urban signalised intersection.

1.5 Traffic volumes

Karo Drive carries in the order of 25,000 vehicles per day (vpd) at the intersection with Victoria Street and 28,000 vpd at the intersection with Willis Street.

Victoria Street approaching Karo Drive carries approximately 13,000 vpd and Willis Street approaching Karo Drive carries approximately 11,000 vpd.

Both intersections are also busy pedestrian routes into the city.

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2.0 Karo Drive/Victoria Street intersection

2.1 Site Description

As noted in section 1.1, Karo Drive is one-way westbound whilst Victoria Street is one-way southbound. The two roads do not intersect at 90° due to the curvature of Karo Drive (see **Figure 2**). The current intersection layout can clearly be seen in **Figure 3**, with three westbound through lanes on Karo Drive and two southbound through lanes on Victoria Street. The double right turn lane from Victoria Street is signalised whilst the left turn lane from Karo Drive is priority controlled (Give Way).

There are signalised pedestrian crossings on all signal controlled legs of the intersection and these operate in parallel with the relevant vehicle phases. A zebra crossing is provided across the Karo Drive left turn slip lane. The Victoria Street through and right turn approaches operate on the same phase of the traffic signals. Both these Victoria Street movements start simultaneously.



Figure 2



Figure 3

2.2 Crash history

1 fatal crash April 2011 – motorcyclist westbound on Karo Drive went through red light at 4pm on a Saturday – hit a car southbound on Victoria Street – weather fine, dry road.

1 serious injury crash June 2009 – bus southbound on Victoria Street went through red light at 10am on a Monday – hit a car westbound on Karo Drive – weather fine, dry road.

A total of 44 crashes have been recorded at the intersection (1 fatality, 2 serious injury casualties, 28 minor injury casualties):

- 32 crashes were side impact: 18 where Karo Drive driver failed to stop for red
14 where Victoria Street driver failed to stop for red
- 8 rear end crashes
- 0 pedestrian crashes
- 2 crashes due to changing lanes

Note:

- All but 4 of the minor injury casualties were involved in the side impact crashes
- 17 (53%) of the 32 side impact crashes involved injury

- 18 (56%) of the 32 (56%) side impact crashes were at night during times of low traffic flow (9 were where the at fault driver was exiting Karo Drive, 9 with them exiting Victoria Street)

2.3 Issues observed

1. Significant red light running from both Karo Drive and Victoria Street approaches is evidenced by the crash data.
2. The curvature of the Karo Drive approach coupled with buildings on the inside of the curve and the open area on the outside of the curve mean that the intersection at Victoria Street is not easily definable as an intersection in advance, compared to seeing the Cuba Street intersection, for example, when proceeding along Karo Drive (see **Photo 1**). When leaving the Cuba Street intersection westbound on Karo Drive, the Victoria Street intersection is not visible (see **Photo 2**) and neither the full array of signals nor the layout of the intersection can be seen from half way between Cuba Street and Victoria Street (see **Photo 3**). In addition, the limit line on Karo Drive cannot be seen in advance due to a slight vertical curvature in the carriageway. If some drivers do not “register” the signalised intersection ahead, there is the risk of them proceeding through a red signal display.
3. In addition to the curvature of Karo Drive affecting advance visibility and recognition of the intersection ahead, the building and infrastructure at the northeast corner of the intersection mean that drivers do not see the northern leg of Victoria Street or the traffic on it (see **Photos 4 and 5**). This can exacerbate the perception of the intersection and also means that drivers on either the Karo Drive or Victoria Street approaches would not get an early view of any vehicle proceeding through a red signal on the conflicting approach.
4. The positioning of the limit line for the double right turn from Victoria Street into Karo Drive means that the driver of the vehicle in the right hand lane of the two right turn lanes will often not be able to see any vehicle on Karo Drive that may have proceeded late or through a red signal through at the intersection due to his/her visibility being blocked by a vehicle in the left hand lane of the two right turn lanes. Equally the driver on Karo Drive would not see the vehicle in the right hand lane of the two right turn lanes.
5. On Victoria Street, only 60m separates the signalised intersections of Abel Smith Street and then Karo Drive (see **Figure 3 and Photo 6**). It would normally be expected that the linking of the signals would be that Abel Smith Street goes red before Karo Drive, giving drivers green signal progression through these two sets of

signals. Observation was that Karo Drive sometimes displayed red before or concurrently with Abel Smith Street – this can generate the risk of drivers expecting progression and proceeding though a red signal display at Karo Drive.

6. The mast arm outreach lantern is aimed well left of the optimum location although it is still fully visible from the safe stopping distance.



Photo 1 – Karo Drive approaching Cuba Street



Photo 2 – Karo Drive leaving Cuba Street



Photo 3 – Karo Drive approaching Victoria Street



Photo 4 – Karo Drive approaching Victoria Street (1)



Photo 5 – Karo Drive approaching Victoria Street (2)



Photo 6 – Victoria Street approaching Abel Smith Street

2.4 Recommendations

- a. Install red light cameras on both the Karo Drive and the Victoria Street approaches to the intersection together with associated warning signage.
- b. Consider the installation of alternative technology for warning motorists on Karo Drive of the traffic signals ahead, such as electronic advance warning signs that convey the message “Prepare to Stop” prior to the signals changing to red (NB at other times the signs are blank).
- c. Improve the awareness for drivers on Karo Drive of the upcoming intersection at Victoria Street by:
 - (1) installing an additional mast arm signal display on the right hand side at the primary signal pole position;
 - (2) installing coloured surfacing on the carriageway containing “signals ahead” message;
 - (3) using calcined bauxite on the approach to the intersection to both highlight the intersection and improve stopping ability;
 - (4) positioning and improving the limit line so that it can be clearly seen;
 - (5) realigning & tilting down the existing overhead signal lantern so it faces the road centreline at 100m from the limit line and is more conspicuous to a driver at that location¹.

¹ This has now been actioned by Wellington City Council

- d. In conjunction with Wellington Inner City Bypass works improve the visibility of the full intersection on the Karo Drive approach; in particular improve visibility at the NE corner so that drivers on both the Karo Drive and Victoria Street approaches can see each other as well as the intersection being more obvious.
- e. Stagger the limit lines for the two lanes of the double right turn from Victoria Street onto Karo Drive to improve the intervisibility between vehicles on Karo Drive and the double right turn from Victoria Street.
- f. For periods when traffic flows are low (eg night time) and there is no demand registered at the signals, consider implementing a rest on red condition.
- g. Review the phasing of the linking on Victoria Street from Abel Smith Street through Karo Drive to minimise the risk of Victoria Street drivers continuing thorough Karo Drive on a red signal after crossing Abel Smith Street on a green signal².
- h. Add horizontal louvres to the overhead signal lantern (green aspect only) at the downstream intersection of Karo Drive/ Willis Street to minimise the likelihood of drivers mistaking this lantern as being part of the preceding set of signals. Tilt down the same outreach lantern for the same reason.

² The co-ordination along Victoria Street has since been revised by Wellington city Council.

3.0 Karo Drive/Willis Street/Abel Smith Street intersection

3.1 Site Description

As noted in section 1.1, Karo Drive is one-way westbound whilst Willis Street is one-way northbound and the fifth leg at the intersection, Abel Smith Street, is two-way. The current intersection layout can be seen in Figure 4, with two westbound through lanes on Karo Drive to The Terrace Tunnel (the left hand lane is also shared for access to Abel Smith Street) and a dedicated right turn lane into Willis Street. On Willis Street there are three lanes at the Karo Drive intersection: a dedicated left turn lane for the shared movement to Abel Smith Street and The Terrace Tunnel, a shared through and left turn (to The Terrace Tunnel) lane and a second through lane. Traffic from Abel Smith Street can turn left to The Terrace Tunnel or Willis Street, though the former movement is difficult to undertake and only suitable for smaller vehicles.

There are signalised pedestrian crossings on all legs of the intersection and these operate in parallel with the relevant vehicle phases. Each of the three vehicular approaches operates on a separate phase of the traffic signals.



Figure 4

3.2 Crash history

1 fatal crash October 2007 – driver went the wrong way down Willis Street (ie from the north) and into the Karo Drive intersection at midnight on a Wednesday – hit a car westbound on Karo Drive – weather fine, dry road.

1 serious injury crash July 2008 – intoxicated driver lost control northbound on Willis Street prior to Karo Drive and hit a power pole in Willis Street.

A total of 17 crashes have been recorded at the intersection (1 fatality, 1 serious injury, 6 minor injury casualties):

- 4 crashes were side impact: 2 where Karo Drive driver failed to stop for red
2 where Willis Street driver failed to stop for red
- 3 rear end crashes
- 3 pedestrian crashes
- 4 crashes due to changing lanes or turning from the wrong lane (to access Abel Smith Street)

3.3 Issues observed

1. The 5-leg intersection layout is confusing for some users and lane guidance through the intersection is poor (see **Photo 7**).
2. The speed limit signs on the Terrace Tunnel gantry at the intersection can encourage higher speeds on Karo Drive prior to and through the intersection which in turn can lead to red light running and/or rear end crashes (see **Photo 8**).



Photo 7 – Lack of tracking/continuity lines within Karo Drive/Willis Street intersection



Photo 8 – Speed limit signs on gantry

3.4 Recommendations

- a. Install additional lane continuity (tracking) lines through the intersection for movements from both Willis Street and Karo Drive.
- b. Default the speed limit signs on The Terrace Tunnel gantry at Willis Street to a blank display unless the tunnel speed limit is to be 50 km/h or less.
- c. Install a red light camera on the Karo Drive approach to the intersection together with associated warning signage.

APPENDIX

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First Street	(D) Second street (I) or landmark Distance (R)	Crash Number	Date [DD/MM/YYYY]	Day Time [DD HHMM]	Description of Events	Crash Factors (ENV - Environmental factors)	Road	Natural Light	Weather	Junction	Cntrl	Tot Inj F S N A R T T R N
ABEL SMITH ST	50W WILLIS ST	2955050	06/11/2009	Fri	CAR1 NRD on ABEL SMITH ST hit CAR2 manoeuvring	CAR1 attention diverted, didnt see/look behind when reversing/manoeuvring, blind spot ENV: entering or leaving private house / farm	Dry	Bright	Fine	Driveway	Nll	
VICTORIA ST	25N KARO DRIVE	2750553	14/01/2007	Sun 2340	CAR1 SRD on VICTORIA ST changing lanes/overtaking to right hit CAR2	CAR1 didnt see/look behind when changing lanes, position or direction	Dry	Dark	Fine	Unknown	Nll	
VICTORIA ST	40S KARO DRIVE	2854396	29/07/2008	Tue 0631	TRUCK1 SRD on VICTORIA ST changing lanes/overtaking to right hit TAXI2	TRUCK1 didnt see/look behind when changing lanes, position or direction, blind spot	Wet	Dark	Fine	Unknown	Nll	
WILLIS ST	15N ABEL SMITH ST	2856492	08/10/2008	Wed 1325	SUV1 NRD on WILLIS ST changing lanes to left hit CAR2	SUV1 didnt see/look behind when changing lanes, position or direction	Dry	Bright	Fine	Unknown	Nll	
WILLIS ST	50S KARO DRIVE	2812862	13/07/2008	Sun 0200	CAR1 NRD on WILLIS ST lost control but did not leave the road, CAR1 hit Post Or Pole	CAR1 alcohol test above limit or test refused	Dry	Dark	Fine	Unknown	Nll	1 1
WILLIS ST	15N SE IN KARO	2855402	30/09/2008	Tue 1620	CAR1 NRD on WILLIS ST changing lanes to left hit TAXI2	CAR1 attention diverted by passengers, did not see or look for other party until too late	Dry	Overcast	Fine	Unknown	Nll	
IN//O KARO	I VICTORIA ST	201056473	07/10/2010	Thu 1600	CAR1 SRD on VICTORIA ST hit rear end of CAR2 stop/slow for signals	CAR1 failed to notice car slowing	Dry	Bright	Fine	X Type Junction	Traffic Signal	
VICTORIA ST	I IN//O	201012961	03/10/2010	Sun 2210	CAR1 NRD on SE IN KARO hit CAR2 crossing at right angle from right, CAR1 hit Post Or Pole	CAR2 too fast on straight, did not stop at steady amber light, misjudged speed of own vehicle	Dry	Dark	Fine	X Type Junction	Traffic Signal	2
IN/1075/0.431	I ABEL SMITH ST	201013149	09/10/2010	Sat 1140	CAR1 NRD on SE IN hit PEDESTRIAN2 (Age 6) crossing road from left side	PEDESTRIAN2 crossing road not complying with traffic signal or school patrol, pedestrian unsupervised child	Dry	Overcast	Fine	Multi Rd Join	Traffic Signal	2
IN/1075/0.431	I WILLIS ST	201150462	09/02/2011	Wed 1320	load or trailer from RUS1 NRD on SE IN RUS1 hit Traffic Sign	RUS1 load	Dry	Bright	Fine	Multi Rd Join	Traffic Signal	
IN/1075/0.431	I WILLIS ST	2956025	05/09/2009	Sat 2102	CAR1 NRD on SE IN hit SUV2 crossing at right angle from right.	CAR1 did not stop at steady red light	Dry	Dark	Fine	Multi Rd Join	Traffic Signal	
IN/1075/0.431 KARO	I ABEL SMITH ST	2757956	14/12/2007	Fri 1715	CAR1 NRD on SE IN KARO hit turning CAR2	CAR1 turned left from incorrect lane	Dry	Overcast	Fine	Multi Rd Join	Traffic Signal	
IN/1075/0.431 KARO	I ABEL SMITH ST	2956045	09/09/2009	Wed 1358	CAR1 NRD on SE IN KARO sideswiped by CAR2 turning left	CAR2 turned left from incorrect lane, didnt see/look behind when changing lanes, position or direction	Dry	Bright	Fine	Multi Rd Join	Traffic Signal	
IN/1075/0.431 KARO	I WILLIS ST	2911470	03/03/2009	Tue 1732	VAN1 NRD on SE IN KARO hit PEDESTRIAN2 (Age 68) crossing road from right side	PEDESTRIAN2 crossing headless of traffic, overseas pedestrian	Dry	Bright	Fine	X Type Junction	Traffic Signal	1
IN/1075/0.431 KARO	I WILLIS ST	2813417	19/10/2008	Sun 0300	CAR1 NRD on SE IN KARO lost control turning right, CAR1 hit House Or Bldg, Phone Box Etc. on right hand bend	CAR1 alcohol test above limit or test refused, lost control due to vehicle fault, puncture or blowout	Dry	Dark	Fine	X Type Junction	Traffic Signal	1
IN/1075/0.431 KARO	I WILLIS ST	2710088	31/10/2007	Wed 0009	CAR1 NRD on SE IN KARO hit CAR2 crossing at right angle from right	CAR1 alcohol not suspected, tested and -ve (NOT use only) CAR2 alcohol test above limit or test refused, wrong way in one way street	Dry	Dark	Fine	Multi Rd Join	Traffic Signal	1 1
IN/1075/0.431 KARO	I WILLIS ST	201011096	23/01/2010	Sat 1100	CAR1 NRD on SE IN KARO hit rear end of CAR2 stop/slow for cross traffic	CAR1 following too closely CAR2 avoiding approaching emergency vehicle	Wet	Overcast	Heavy Rain	X Type Junction	Traffic Signal	1
IN/1075/0.431 KARO	I WILLIS ST	2853999	03/08/2008	Sun 1425	CAR1 NRD on SE IN KARO hit rear end of CAR2 stop/slow for queue	CAR1 following too closely	Dry	Overcast	Fine	Multi Rd Join	Traffic Signal	

First Street	(Second street (I) or landmark Distance (R))	Crash Number	Date (DD/MM/YYYY)	Day Time (DD HHMM)	Description of Events	Crash Factors (ENV = Environmental factors)	Road Light	Natural Light	Weather Junction	Ctrl	Tot Inj P S M A R I T R N
1N/1075/0.434	20N MILLIS ST	201024758	12/09/2010	Sun 1950	CAR1 NRD on SR 1N changing lanes to left hit CAR2	CAR1 travelled straight ahead from turning lane or flush median, didnt see/look behind when changing lanes, position or direction	Wet	Dark	Light Rain	Unknown	Nil
1N/1075/0.454 NARO	I MILLIS ST	201250870	27/01/2012	Fri 1016	CAR1 NRD on SR 1N NARO hit CAR2 merging from the right	CAR1 did not stop at steady red light, failed to notice traffic lights	Wet	Bright	Fine	X Type Junction	Traffic Signal
1N/1075/0.454 NARO	I MILLIS ST	2756647	24/09/2007	Mon 1155	CAR1 NRD on WILLIS ST hit rear end of CAR2 stop/slow for signals	CAR1 failed to notice car slowing	Dry	Overcast	Fine	Multi Rd Join	Traffic Signal
1N/1075/0.454 NARO	I MILLIS ST	2755721	04/09/2007	Tue 2310	TAXI1 NRD on MILLIS ST hit CAR2 crossing at right angle from right	TAXI1 failed to give way to traffic approaching/crossing from the right	Dry	Dark	Fine	Multi Rd Join	Traffic Signal
1N/1075/0.454 NARO	I MILLIS ST	2754896	07/08/2007	Tue 0540	TRUCK1 NRD on WILLIS ST hit VAN2 crossing at right angle from right	TRUCK1 did not stop at steady red light, failed to notice traffic lights, attention diverted	Dry	Twilight	Fine	X Type Junction	Traffic Signal
1N/1075/0.454 NARO	I MILLIS ST	2857014	16/11/2008	Wed 0825	CAR1 NRD on WILLIS ST changing lanes/overtaking to right hit TRUCK2	CAR1 didnt see/look behind when changing lanes, position or direction, new driver showed inexperience TRUCK2 blind spot	Dry	Overcast	Fine	Multi Rd Join	Traffic Signal
1N/1075/0.454 NARO	I MILLIS ST	201212038	15/06/2012	Fri 2328	CAR1 NRD on SR 1N NARO hit PEDESTRIAN2 (Age 19) crossing road from left side	CAR1 failed to give way to ped on a zing, did not stop at steady red light, didnt see/look when required to give way to ped ENV: heavy rain	Wet	Dark	Heavy Rain	X Type Junction	Traffic Signal 1
1N/1075/0.474 NARO	50N VICTORIA ST	2953719	17/07/2009	Fri 1115	CAR1 NRD on SR 1N NARO changing lanes/overtaking to right hit CAR2	CAR1 didnt see/look behind when changing lanes, position or direction	Dry	Overcast	Fine	Unknown	Nil
1N/1075/0.524	I VICTORIA ST	2911444	25/03/2009	Wed 0630	CAR1 NRD on SR 1N hit rear end of CAR2 stop/slow for signals	CAR1 failed to notice car slowing	Dry	Dark	Fine	X Type Junction	Traffic Signal 1
1N/1075/0.524	I VICTORIA ST	201053270	28/08/2010	Sat 2140	CAR1 NRD on SR 1N hit CAR2 crossing at right angle from right	CAR1 did not stop at steady red light	Dry	Dark	Fine	X Type Junction	Traffic Signal
1N/1075/0.524	I VICTORIA ST	201112684	07/09/2011	Wed 2041	CAR1 NRD on SR 1N hit TAXI2 crossing at right angle from right	CAR1 did not stop at steady red light ENV: road surface under construction or maintenance	Dry	Dark	Fine	X Type Junction	Traffic Signal 2
1N/1075/0.524	I VICTORIA ST	201112683	27/07/2011	Wed 2128	CAR1 NRD on SR 1N hit CAR2 crossing at right angle from right	CAR2 did not stop at steady red light, inattentive	Dry	Dark	Fine	X Type Junction	Traffic Signal 1
1N/1075/0.524 NARO	I VICTORIA ST	201152283	26/06/2011	Sun 2155	CAR1 NRD on SR 1N NARO hit CAR2 crossing at right angle from right	CAR1 did not stop at steady amber light, overseas/migrant driver failed to adjust to NZ road rules and road conditions	Wet	Dark	Fine	X Type Junction	Traffic Signal
1N/1075/0.524 NARO	I VICTORIA ST	201110024	23/04/2011	Sat 1555	MOTOR CYCLE1 NRD on SR 1N NARO hit CAR2 crossing at right angle from right, CAR2 hit Traffic Sign	MOTOR CYCLE1 did not stop at steady red light	Dry	Overcast	Fine	X Type Junction	Traffic Signal 1
1N/1075/0.524 NARO	I VICTORIA ST	2713938	24/12/2007	Mon 0719	CAR1 NRD on SR 1N NARO hit CAR2 crossing at right angle from right	CAR2 did not stop at steady red light	Dry	Overcast	Fine	X Type Junction	Traffic Signal 2
1N/1075/0.524 NARO	I VICTORIA ST	2750820	09/02/2007	Fri 2348	CAR1 NRD on SR 1N NARO hit CAR2 crossing at right angle from right	CAR2 did not stop at steady red light	Dry	Dark	Fine	X Type Junction	Traffic Signal
1N/1075/0.524 NARO	I VICTORIA ST	201151625	05/05/2011	Thu 0613	CAR1 NRD on SR 1N NARO hit VAN2 crossing at right angle from right, VAN2 hit Post Or Pole	CAR1 did not stop at steady red light, failed to notice traffic lights	Wet	Dark	Mist	X Type Junction	Traffic Signal
1N/1075/0.524 NARO	I VICTORIA ST	201150651	11/01/2011	Mon 2235	CAR1 NRD on SR 1N NARO hit VAN2 crossing at right angle from right	CAR1 did not stop at steady red light, attention diverted by passengers	Dry	Dark	Fine	X Type Junction	Traffic Signal
1N/1075/0.524 NARO	I VICTORIA ST	2753428	13/04/2007	Wed 1121	CAR1 NRD on SR 1N NARO hit rear end of CAR2 stop/slow for cross traffic	CAR1 following too closely CAR2 suddenly braked CAR2 did not stop at steady red light, emergency vehicle attending emergency	Dry	Bright	Fine	X Type Junction	Traffic Signal
1N/1075/0.524 NARO	I VICTORIA ST	2756166	21/10/2007	Sun 0837	SUV1 NRD on SR 1N NARO hit CAR2 crossing at right angle from right	CAR2 did not stop at steady red light	Dry	Bright	Fine	X Type Junction	Traffic Signal

First Street	ID Second street (I) or landmark	Crash Number	Date	Day Time	Description of Events	Crash Factors	Road	Natural Light	Weather	Junction	Ctrl	Tot Inj
	Distance (R)		[DD/MM/YYYY]	[DD HHMM]		[RNW = Environmental factors]						P S M A E I T R N
1N/1075/0.524 KARO	I VICTORIA ST	2757082	01/12/2007	Sat 0115	CAR1 WRD on SR 1N KARO hit CAR2 crossing at right angle from right	CAR2 did not stop at steady red light, failed to notice traffic lights	Dry	Dark	Fine	X Type Junction	Traffic Signal	
1N/1075/0.524 KARO	I VICTORIA ST	201150192	06/02/2011	Sun 0614	SUV1 WRD on SR 1N KARO hit TAXI2 crossing at right angle from right	SUV1 did not stop at steady red light	Wet	Overcast	Light Rain	X Type Junction	Traffic Signal	
1N/1075/0.524 KARO	I VICTORIA ST	201112203	15/05/2011	Sun 1700	CAR1 WRD on SR 1N KARO hit CAR2 crossing at right angle from right, CAR1 hit Traffic Sign	CAR1 did not stop at steady red light	Dry	Bright	Fine	X Type Junction	Traffic Signal	2
1N/1075/0.524 KARO	I VICTORIA ST	2911309	06/02/2009	Fri 0009	CAR1 WRD on SR 1N KARO hit MOTOR CYCLE2 crossing at right angle from right	MOTOR CYCLE2 did not stop at steady red light, attention diverted by passengers	Dry	Dark	Fine	X Type Junction	Traffic Signal	1
1N/1075/0.524 KARO	I VICTORIA ST	2912054	15/05/2009	Fri 0700	CAR1 WRD on SR 1N KARO hit CAR2 crossing at right angle from right	CAR2 did not stop at steady red light, attention diverted	Wet	Overcast	Light Rain	X Type Junction	Traffic Signal	2
1N/1075/0.524 KARO	I VICTORIA ST	201111610	08/02/2011	Tue 2250	CAR1 WRD on SR 1N KARO hit SUV2 crossing at right angle from right	CAR1 did not stop at steady red light, attention diverted by cigarette etc RNW: road surface under construction or maintenance	Dry	Dark	Fine	X Type Junction	Traffic Signal	2
1N/1075/0.524 KARO	I VICTORIA ST	2952158	08/04/2009	Wed 2112	CAR1 WRD on SR 1N KARO hit rear end of CAR2 stop/slow for signals	CAR1 failed to notice car slowing	Wet	Dark	Light Rain	X Type Junction	Traffic Signal	
1N/1075/0.524 KARO	I VICTORIA ST	2956944	27/12/2009	Sun 0824	CAR1 WRD on SR 1N KARO hit CAR2 crossing at right angle from right, CAR1 hit Traffic Sign	CAR2 did not stop at steady red light, fatigue (drowsy, tired, fell asleep)	Wet	Overcast	Light Rain	X Type Junction	Traffic Signal	
1N/1075/0.524 KARO	I VICTORIA ST	201011227	12/02/2010	Fri 2350	CAR1 WRD on SR 1N KARO hit VAN2 crossing at right angle from right	VAN2 did not stop at steady red light	Dry	Dark	Fine	X Type Junction	Traffic Signal	1
1N/1075/0.524 KARO	I VICTORIA ST	201011424	07/02/2010	Sun 0235	CAR1 WRD on VICTORIA ST hit CAR2 crossing at right angle from right, CAR2 hit Traffic Sign	CAR2 failed to notice traffic lights, attention diverted by passengers	Dry	Dark	Fine	X Type Junction	Traffic Signal	3
1N/1075/0.524 KARO	I VICTORIA ST	201012539	23/07/2010	Fri 1006	TRUCK1 WRD on SR 1N KARO hit VAN2 crossing at right angle from right	TRUCK1 did not stop at steady red light	Wet	Overcast	Light Rain	X Type Junction	Traffic Signal	1
1N/1075/0.524 KARO	I VICTORIA ST	2912333	08/06/2009	Mon 1052	CAR1 WRD on SR 1N KARO hit BUS2 crossing at right angle from right	CAR1 did not stop at steady red light, failed to notice traffic lights	Dry	Bright	Fine	X Type Junction	Traffic Signal	2 1
1N/1075/0.524 KARO	I VICTORIA ST	201051499	26/03/2010	Fri 1426	VAN1 WRD on SR 1N KARO hit rear end of VAN2 stop/slow for cross traffic	VAN1 failed to notice car slowing, attention diverted by other traffic	Dry	Bright	Fine	X Type Junction	Traffic Signal	
1N/1075/0.524 KARO	I VICTORIA ST	201056079	13/12/2010	Mon 1030	TRUCK1 WRD on SR 1N KARO hit rear end of CAR2 stop/slow for cross traffic	TRUCK1 following too closely CAR2 avoiding approaching emergency vehicle	Wet	Overcast	Light Rain	X Type Junction	Traffic Signal	
1N/1075/0.524 KARO	I VICTORIA ST	2713175	10/08/2007	Fri 2000	CAR1 WRD on SR 1N KARO hit CAR2 crossing at right angle from right	CAR1 did not stop at steady red light	Dry	Twilight	Fine	X Type Junction	Traffic Signal	1
1N/1075/0.524 KARO DRIVE	I VICTORIA ST	201050554	12/02/2010	Fri 2238	CAR1 WRD on SR 1N KARO DRIVE hit CAR2 crossing at right angle from right	CAR2 did not stop at steady red light, attention diverted by passengers	Dry	Dark	Fine	X Type Junction	Traffic Signal	
VICTORIA ST	I 1N/1075/0.524	2912686	03/07/2009	Fri 1832	MOPED1 SRD on VICTORIA ST hit rear end of CAR2 stop/slow for signals	MOPED1 failed to notice car slowing	Dry	Twilight	Fine	X Type Junction	Traffic Signal	1
VICTORIA ST	I 1N/1075/0.524	2013193	21/09/2008	Sun 1214	CAR1 SRD on VICTORIA ST lost control turning right on right hand bend	CAR1 alcohol test below limit, lost control when turning, illness with no warning (eg heart attack)	Dry	Overcast	Fine	X Type Junction	Traffic Signal	1
1N/1075/0.531 KARO	1008 WILLIS ST	2750943	15/02/2007	Thu 1845	SUV1 WRD on SR 1N KARO changing lanes/overtaking to right hit CAR2	SUV1 misjudged speed of own vehicle	Dry	Bright	Fine	Unknown	Nil	
1N/1075/0.547	I VICTORIA ST	2711140	21/01/2007	Sun 0240	CAR1 WRD on SR 1N hit CAR2 crossing at right angle from right	CAR2 did not stop at steady red light	Dry	Dark	Fine	X Type Junction	Traffic Signal	1
1N/1075/0.547 KARO	I VICTORIA ST	201211478	13/03/2012	Tue 2032	CAR1 WRD on SR 1N KARO hit CAR2 crossing at right angle from right	CAR1 did not stop at steady red light, inattentive	Dry	Dark	Fine	X Type Junction	Traffic Signal	3

First Street	(D) Second street (I) or landmark Distance (R)	Crash Number	Date (DD/MM/YYYY)	Day Time DOD HMM	Description of Events	Crash Factors (RMV - Environmental factors)	Road Light	Natural Light	Weather	Junction	Cntrl	Tot Inj F S M A R I T R N
1H/1075/0.547 KARO	I VICTORIA ST	201213711	12/04/2012	Thu 0719	SUV1 NSD on SR 1N KARO hit CAR2 crossing at right angle from right	SUV1 did not stop at steady red light, new driver showed inexperience RMV: road obstructed (flood waters), heavy rain	Met	Overcast	Heavy Rain	X Type Junction	Traffic Signal	2
1H/1075/0.547 KARO	I VICTORIA ST	201155726	30/06/2011	Tue 2108	CAR1 NSD on SR 1N KARO hit CAR2 crossing at right angle from right	CAR1 did not stop at steady red light, inattentive	Met	Dart	Light Rain	X Type Junction	Traffic Signal	
1H/1075/0.547 KARO	I VICTORIA ST	201154641	06/06/2011	Mon 1359	CAR1 NSD on SR 1N KARO hit BUS2 crossing at right angle from right	CAR1 did not stop at steady red light, didn't see/look when required to give way to traffic from another direction	Dry	Bright	Fine	X Type Junction	Traffic Signal	
1H/1075/0.547 KARO	I VICTORIA ST	2752315	04/04/2007	Wed 1650	CAR1 NSD on SR 1N KARO hit CAR2 merging from the right	CAR1 misjudged speed of onst. vehicle, intimidating driving	Met	Overcast	Light Rain	X Type Junction	Traffic Signal	
1H/1075/0.547 KARO	I VICTORIA ST	201111135	25/01/2011	Tue 2018	CAR1 NSD on SR 1N KARO hit CAR2 crossing at right angle from right	CAR1 did not stop at steady red light, attention diverted by other traffic	Dry	Bright	Fine	X Type Junction	Traffic Signal	1
1H/1075/0.547 KARO	I VICTORIA ST	2853863	23/07/2008	Wed 1452	TRUCK1 SRD on VICTORIA ST hit rear end of CAR2 stop/slow for signals	TRUCK1 following too closely	Met	Overcast	Heavy Rain	X Type Junction	Traffic Signal	
1H/1075/0.547 KARO DRIVE	I VICTORIA ST	201252143	22/04/2012	Fri 2040	TAXI1 NSD on SR 1N KARO DRIVE hit CAR2 crossing at right angle from right	CAR2 did not stop at steady red light, inattentive	Dry	Dart	Fine	X Type Junction	Traffic Signal	
1H/1075/0.547 KARO DRIVE	I VICTORIA ST	201252178	25/04/2012	Mon 1556	SUV1 NSD on SR 1N KARO DRIVE hit CAR2 crossing at right angle from right	SUV1 did not stop at steady red light, attention diverted	Met	Overcast	Light Rain	X Type Junction	Traffic Signal	
1H/1075/0.547 KARO DRIVE	I VICTORIA ST	201233572	26/09/2012	Fri 1305	CAR1 NSD on SR 1N KARO DRIVE hit TAXI2 crossing at right angle from right	CAR1 did not stop at steady red light, failed to notice traffic lights	Dry	Bright	Fine	X Type Junction	Traffic Signal	
1H/1075/0.547 KARO DRIVE	I VICTORIA ST	201250045	20/01/2012	Fri 2027	CAR1 NSD on SR 1N KARO DRIVE hit rear end of CAR2 stop/slow for signals	CAR1 lost control due to road conditions, failed to notice car slowing, new driver showed inexperience CAR2 avoiding approaching emergency vehicle	Dry	Twilight	Fine	X Type Junction	Traffic Signal	

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