APPENDIX A: TRACKS Model Documentation

Model Documentation

- Peer Review Letter enclosed

- Dunedin 2008 Transportation Model Model Update Report, prepared by Gabities Porter, April 2010 available upon Request

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Lisa Clifford
Acting Manager, Transportation Planning
Dunedin City Council
50 The Octagon
PO Box 5045, Moray Place
Dunedin 9058

28th April 2010

Dear Lisa

Dunedin 2008 Transportation Model Update Peer Review

I confirm that the 'version 3' Model Building Report (dated April 2010) adequately addresses the issues raised in my earlier peer review report (Dunedin Model Review v00.pdf, 9th April 2010).

Note that this review was not a full model audit (so it excludes detailed checking of all model coding and parameters), however some sensibility checks and other cross checks have been be performed to help identify any fundamental issues.

The model is generally consistent with those used elsewhere in New Zealand (and abroad) and appears to have been set up as a general purpose tool with a wide range of possible uses. Like all models, there are limitations. Most applications of the model will require further work (e.g. local area validation) to put these limitations into context for specific assessments, whereupon the model may be either enhanced or interpreted accordingly. This approach provides a very good compromise between overall usefulness, data availability, cost and timeframe (compared to alternative forms of assessment).

Much of the underlying data used in the model is outdated. It is recommended that a major data update is considered for the model. The next opportunity to update this data is either 2011 or 2016 (to coincide with a Census year). In the mean-time, a reasonably pragmatic approach to transport modelling/assessment in the Dunedin area will need to be taken.

The model is undoubtedly a very useful tool and so it is a matter of trying to identify and understand the limitations and then decide (on a case by case basis) how these might affect assessment of specific projects.

Yours faithfully,

John Falconer
Director
on behalf of
QTP Limited

APPENDIX B: Crash History

CRASH LIST DETAIL REPORT

Run on: 16 May 2011

Crash List: JP South Road Morington Ten Year (41 crashes)

Total Injury Crashes:	16
Total Non-Injury Crashes:	25
	41

Crash Type	Number	%
Overtaking Crashes:	7	17
Straight Road Lost Control/Head On:	0	0
Bend - Lost Control/Head On:	5	12
Rear End/Obstruction:	14	34
Crossing/Turning:	10	24
Pedestrian Crashes:	2	5
Miscellaneous Crashes:	3	7
TOTAL:	41	100 %

Location	Local road	%	St.Highway	%	Total	%
Urban	2	5	36	88	38	93
Open road	0	0	3	7	3	7
TOTAL:	2	5	39	95	41	100 %

Intersection/Midblock	Number	%
Intersection:	20	49
MidBlock:	21	51
TOTAL:	41	100 %

Environmental Factors	Number	%
Light/Overcast Crashes:	33	80
Dark/Twilight Crashes:	8	20
TOTAL:	41	100 %
Wet/Ice:	14	34
Dry:	27	66
TOTAL:	41	100 %

Day/Period	Number	%
Weekday	29	71
Weekend	12	29
TOTAL:	41	100 %

Vehicles	Number	%
Car	57	88
Van/Ute	6	15
Truck	5	12
Bus	0	0
Motorcycle	2	5
Bicycle	0	0
TOTAL:	70	120 %

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

Crash factors (*)	Number	%
Alcohol	4	10
Too fast	6	15
Failed Giveway/Stop	8	20
Overtaking	1	2
Incorrect Lane/posn	8	20
Poor handling	4	10
Poor Observation	16	39
Poor judgement	7	17
Disabled/old/ill	1	2
Pedestrian factors	2	5
Vehicle factors	1	2
Road factors	5	12
Weather	2	5
Other	7	17
TOTAL:	72	176 %
Crashes with a:		
Driver factor	55	135 %
Environmental factor	7	17 %

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

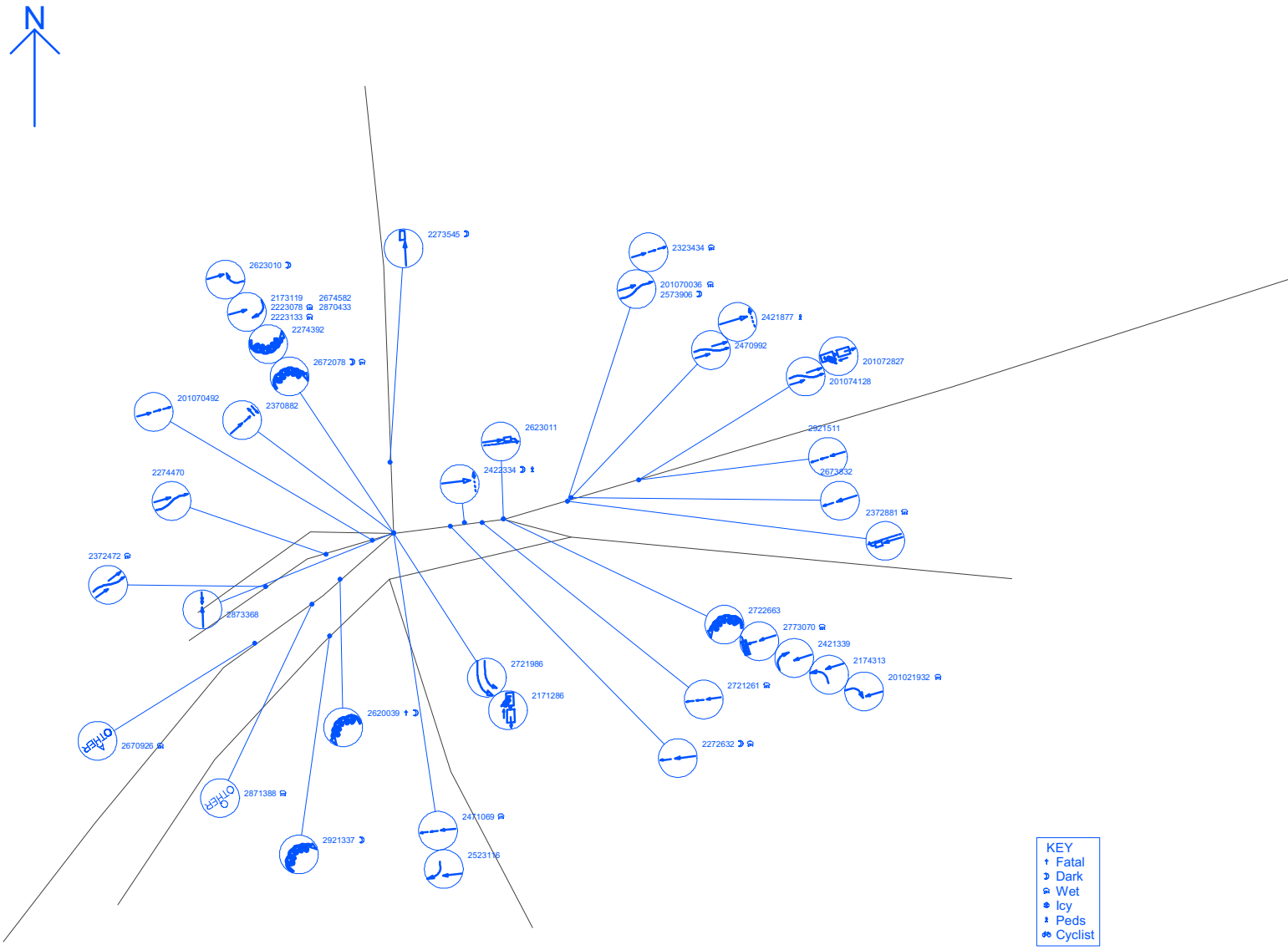
Note: Driver/vehicle factors are not available for non-injury crashes for Northland, Auckland, Waikato and Bay of Plenty before 2007. This will influence numbers and percentages.

Crashes with objects(s) struck	8	20 %

Object Struck	Number	%
Cliff Bank	1	2
Fence	2	5
Guard Rail	1	2
Traffic Island	2	5
Kerb	1	2
Parked Vehicle	1	2
Post Or Pole	2	5
Traffic Sign	3	7
TOTAL:	13	30 %

Crash Numbers

Year	Fatal	Serious	Minor	Non-Inj
2001	0	0	0	3
2002	0	0	2	4
2003	0	0	1	3
2004	0	1	2	2
2005	0	0	1	1
2006	1	2	0	4
2007	0	1	2	1
2008	0	0	0	3
2009	0	0	2	0
2010	0	1	0	4
TOTAL:	1	5	10	25


N
2273545
2623010
2173119
2674582
2223078
2870433
2223133
2274392
2672078
201070492
2370882
2623011
2423334
2274470
2372472
2873368
2323434
201070036
2573906
2421877
2470992
201072827
201074128
2821511
2673832
2372881
2722663
2773070
2421339
2174313
201021932
2721261
2272632
2721986
2171286
2620039
2670926
2871388
2471069
2921337
2523116
KEY
Fatal
Dark
Wet
Icy
Peds
Cyclist
0.05
0
0.05
0.1Km
0.15Km

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 F A T	Inj S E R	M I N
MORNINGTON ROAD	20	N	SH 1S	2273545	12/11/2002	Tue	0030	CAR1 NBD on MORNINGTON ROAD hit parked veh, CAR1 hit Parked Vehicle	CAR1 misjudged speed of own vehicle	Dry	Dark	Fine	Unknown	N/A			
SOUTH ROAD	200	W	RISELAW ROAD	2921337	07/02/2009	Sat	2130	CAR1 EBD on SOUTH ROAD lost control turning right, CAR1 hit Cliff Bank on right hand bend	CAR1 alcohol test above limit or test refused, too fast entering corner, new driver showed inexperience	Dry	Dark	Fine	Unknown	N/A			2
1S/709/0.996	40	E	SOUTH ROAD	201072827	22/08/2010	Sun	1340	load or trailer from CAR1 EBD on SH 1S	CAR1 inadequate tow coupling, vehicle being towed	Dry	Bright	Fine	Unknown	N/A			
1S/709/0.996	40	E	SOUTH ROAD	2921511	05/03/2009	Thu	1650	CAR1 WBD on SH 1S hit rear end of CAR2 stop/slow for queue	CAR1 following too closely, failed to notice car slowing	Dry	Overcast	Fine	Unknown	N/A			1
1S/709/0.996 CAVERSHAM VALLEY	40	E	SOUTH ROAD	201074128	09/12/2010	Thu	1247	VAN1 EBD on SH 1S CAVERSHAM VALLEY changing lanes/overtaking to right hit SUV2	VAN1 didnt see/look behind when changing lanes, position or direction	Dry	Bright	Fine	Unknown	N/A			
1S/709/1.016	20	E	SOUTH ROAD	2673832	07/11/2006	Tue	1805	VAN1 WBD on SH 1S hit rear end of SUV2 stopped/moving slowly	VAN1 following too closely SUV2 suddenly braked	Dry	Overcast	Fine	Unknown	N/A			
1S/709/1.016	20	E	SOUTH ROAD	2470992	11/03/2004	Thu	1520	CAR1 EBD on SH 1S changing lanes/overtaking to right hit CAR2	CAR1 didnt see/look behind when changing lanes, position or direction	Dry	Overcast	Fine	Unknown	N/A			
1S/709/1.016	20	E	SOUTH ROAD	2421877	27/02/2004	Fri	1430	CAR1 EBD on SH 1S hit PEDESTRIAN2 (Age 48) crossing road from right side	PEDESTRIAN2 crossing heedless of traffic	Dry	Bright	Fine	Unknown	N/A			1
1S/709/1.018	50	E	MORNINGTON ROAD	2573906	03/12/2005	Sat	2315	SUV1 NBD on SH 1S changing lanes to left hit CAR2 CAR2 hit Kerb	SUV1 cut in after overtaking CAR2 suddenly swerved to avoid vehicle	Dry	Dark	Fine	Unknown	N/A			
1S/709/1.018	50	E	MORNINGTON ROAD	2372881	05/09/2003	Fri	0850	VAN1 WBD on SH 1S hit rear of CAR2 turning right from centre line	VAN1 failed to notice car slowing, attention diverted by other traffic ENV: entering or leaving other commercial	Wet	Overcast	Fine	Driveway	N/A			
1S/709/1.018	50	E	MORNINGTON ROAD	2323434	05/09/2003	Fri	0918	CAR1 EBD on SH 1S hit rear end of CAR2 stop/slow for queue	CAR1 following too closely ENV: road slippery (rain)	Wet	Overcast	Fine	Unknown	N/A			1
1S/709/1.018	50	N	MORNINGTON ROAD	201070036	08/01/2010	Fri	1615	CAR1 EBD on SH 1S changing lanes to left hit TRUCK2	CAR1 incorrect merging/diverging manoeuvre, inattentive, misjudged speed, etc of vehicle coming from behind or alongside ENV: road surface under construction or maintenance	Wet	Overcast	Light Rain	Unknown	N/A			
1S/709/1.036		I	SOUTH ROAD	2174313	23/12/2001	Sun	1600	CAR1 WBD on SH 1S hit CAR2 merging from the left		Dry	Overcast	Fine	T Type Junction	Give Way Sign			
1S/709/1.036		I	SOUTH ROAD	2722663	21/05/2007	Mon	1410	CAR1 WBD on SH 1S lost control turning left, CAR1 hit Fence, Traffic Island, Traffic Sign	CAR1 too fast entering corner, lost control when turning	Dry	Bright	Fine	T Type Junction	Give Way Sign	1	1	1
1S/709/1.036		I	SOUTH ROAD	2421339	13/02/2004	Fri	1315	CAR1 WBD on SH 1S hit CAR2 turning right onto SH 1S 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, didnt see/look when visibility obstructed by other vehicles	Dry	Bright	Fine	T Type Junction	Give Way Sign			1
1S/709/1.036		I	SOUTH ROAD	2623011	11/08/2006	Fri	1200	CAR1 EBD on SH 1S hit rear of CAR2 turning right from centre line	CAR1 alcohol test result unknown, drugs proven	Dry	Bright	Fine	T Type Junction	Give Way Sign	1		
1S/709/1.036		I	SOUTH ROAD	2773070	30/08/2007	Thu	1000	SUV1 WBD on SH 1S hit rear end of CAR2 stop/slow for signals	SUV1 following too closely, failed to notice car slowing	Wet	Overcast	Light Rain	T Type Junction	Traffic Signal			
1S/709/1.036		I	SOUTH ROAD	201021932	23/05/2010	Sun	1345	SUV2 turning right hit by oncoming CAR1 WBD on SH 1S	SUV2 failed to give way when turning to non-turning traffic, attention diverted by driver dazzled by sun/lights, didnt see/look when required to give way to traffic from another direction ENV: dazzling sun	Wet	Overcast	Light Rain	T Type Junction	Stop Sign	2	1	

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
1S/709/1.043	25	E	MORNINGTON ROAD	2721261	25/01/2007	Thu	1608	CAR1 WBD on SH 1S hit rear end of CAR2 stop/slow for queue	CAR1 following too closely CAR2 suddenly braked ENV: road slippery (rain)	Wet	Overcast	Heavy Rain	Unknown	N/A			1
1S/709/1.048	20	E	MORNINGTON ROAD	2422334	16/07/2004	Fri	1730	CAR1 EBD on SH 1S hit PEDESTRIAN2 (Age 25) crossing road from right side	PEDESTRIAN2 illness and disability, crossing heedless of traffic	Dry	Twilight	Fine	Unknown	N/A	1		
1S/709/1.051	15	W	SOUTH ROAD	2272632	13/07/2002	Sat	2200	CAR1 WBD on SH 1S hit rear end of CAR2 stopped/moving slowly	CAR1 failed to notice car slowing	Wet	Dark	Light Rain	Unknown	N/A			
1S/709/1.065		I	MORNINGTON ROAD	2674582	22/12/2006	Fri	1740	CAR1 EBD on SH 1S hit CAR2 turning right onto SH 1S from the left	CAR1 too fast for conditions CAR2 failed to give way at give way sign, didnt see/look when required to give way to traffic from another direction ENV: visibility limited by crest or dip	Dry	Overcast	Fine	T Type Junction	Give Way Sign			
1S/709/1.065		I	MORNINGTON ROAD	2672078	24/06/2006	Sat	0440	CAR1 EBD on SH 1S lost control turning right, CAR1 hit Traffic Island, Traffic Sign on right hand bend	CAR1 too fast entering corner, lost control when turning	Wet	Dark	Fine	T Type Junction	Give Way Sign			
1S/709/1.065		I	MORNINGTON ROAD	2623010	14/09/2006	Thu	1938	SUV2 turning right hit by oncoming MOTOR CYCLE1 EBD on SH 1S	SUV2 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	Give Way Sign	1		
1S/709/1.065		I	MORNINGTON ROAD	2274392	29/08/2002	Thu	1710	CAR1 EBD on SH 1S lost control turning left, CAR1 hit Fence	CAR1 too fast entering corner, lost control when turning, suddenly turned left	Dry	Overcast	Fine	T Type Junction	Give Way Sign			
1S/709/1.065		I	MORNINGTON ROAD	2223133	21/11/2002	Thu	0840	CAR1 EBD on SH 1S hit CAR2 turning right onto SH 1S from the left	CAR2 alcohol test above limit or test refused, 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			1
1S/709/1.065		I	MORNINGTON ROAD	2223078	09/11/2002	Sat	1230	CAR1 EBD on SH 1S hit CAR2 turning right onto SH 1S 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 ENV: visibility limited by crest or dip	Wet	Overcast	Light Rain	T Type Junction	Give Way Sign			1
1S/709/1.065		I	MORNINGTON ROAD	2173119	11/08/2001	Sat	0825	CAR1 EBD on SH 1S hit CAR2 turning right onto SH 1S from the left		Dry	Overcast	Light Rain	T Type Junction	Give Way Sign			
1S/709/1.065		I	MORNINGTON ROAD	2870433	28/01/2008	Mon	1927	TRUCK1 EBD on SH 1S hit CAR2 turning right onto SH 1S from the left	CAR2 failed to give way at stop sign, misjudged intentions of another party	Dry	Bright	Fine	T Type Junction	Stop Sign			
MORNINGTON ROAD		I	CAVERSHAM VALLEY ROAD	2873368	25/09/2008	Thu	1500	CAR1 NBD on MORNINGTON ROAD hit CAR2 reversing along road	CAR1 emotionally upset/road rage, didnt see/look behind when reversing/manoeuvering	Dry	Bright	Fine	T Type Junction	Stop Sign			
1S/709/1.068		I	MORNINGTON ROAD	2171286	21/04/2001	Sat	1510	load or trailer from CAR1 SBD on MORNINGTON ROAD hit CAR2		Dry	Overcast	Light Rain	T Type Junction	Give Way Sign			
1S/709/1.068		I	MORNINGTON ROAD	2523116	07/10/2005	Fri	1300	VAN1 WBD on SH 1S hit MOTOR CYCLE2 merging from the right	MOTOR CYCLE2 failed to give way at give way sign, misjudged speed etc of vehicle coming from another dirn with right of way	Dry	Overcast	Fine	T Type Junction	Give Way Sign			1
1S/709/1.068		I	MORNINGTON ROAD	2471069	18/04/2004	Sun	1145	CAR1 WBD on SH 1S hit rear end of VAN2 stop/slow for queue	VAN2 suddenly braked	Wet	Overcast	Light Rain	T Type Junction	Give Way Sign			
1S/709/1.068		I	MORNINGTON ROAD	2721986	12/04/2007	Thu	0755	TRUCK1 and CAR2 both SBD on MORNINGTON ROAD and turning; collided	CAR2 misjudged intentions of another party	Dry	Bright	Fine	T Type Junction	Stop Sign			1

First Street	D	Second street / landmark	Crash Number	Date	Day	Time	Description of Events	Crash Factors	Road	Natural Light	Weather	Junction	Cntrl	Tot Inj F A T	S E R	M I N
Distance	I/R			DD/MM/YYYY	DDD	HHMM		(ENV = Environmental factors)								
1S/709/1.068	I	SOUTH ROAD	2370882	20/02/2003	Thu	1530	CAR1 NBD on SOUTH ROAD hit rear end of CAR2 stop/slow for cross traffic		Dry	Bright	Fine	T Type Junction	Give Way Sign			
1S/709/1.071	15S	MORNINGTON ROAD	201070492	19/02/2010	Fri	0826	CAR1 NBD on SH 1S hit rear end of SUV2 stop/slow for queue	CAR1 following too closely, failed to notice car slowing SUV2 following too closely, failed to notice car slowing	Dry	Overcast	Fine	Unknown	N/A			
1S/709/1.085	20W	MORNINGTON ROAD	2274470	21/12/2002	Sat	1430	CAR1 EBD on SH 1S changing lanes to left hit CAR2	CAR1 suddenly turned left, intentional collision	Dry	Bright	Fine	Unknown	N/A			
1S/709/1.088	20W	MORNINGTON ROAD	2620039	24/07/2006	Mon	2100	CAR1 WBD on SH 1S lost control turning left, CAR1 hit Guard Rail, Post Or Pole, Traffic Sign	CAR1 alcohol test below limit, drugs proven, too fast entering corner, lost control when turning, new driver showed inexperience, casualty thrown from vehicle	Dry	Dark	Fine	Unknown	N/A	1		
1S/709/1.098	30S	MORNINGTON ROAD	2871388	30/04/2008	Wed	0735	TRUCK1 SBD on SH 1S miscellaneous, TRUCK1 hit Post Or Pole	TRUCK1 too far left/right ENV: heavy rain	Wet	Overcast	Heavy Rain	Unknown	N/A			
1S/709/1.105	40W	MORNINGTON ROAD	2372472	16/06/2003	Mon	0820	CAR1 EBD on SH 1S changing lanes/overtaking to right hit TAXI2	CAR1 didnt see/look behind when changing lanes, position or direction, didnt see/look when required to give way to traffic from another direction	Wet	Overcast	Light Rain	Unknown	N/A			
1S/709/1.118	50S	MORNINGTON ROAD	2670926	28/03/2006	Tue	1450	TRUCK1 SBD on SH 1S overtaking CAR2		Wet	Overcast	Light Rain	Unknown	N/A			

Crash List: JP Caversham Highway (47 crashes)

Total Injury Crashes:	13
Total Non-Injury Crashes:	34
	47

Crash Type	Number	%
Overtaking Crashes:	7	15
Straight Road Lost Control/Head On:	2	4
Bend - Lost Control/Head On:	4	9
Rear End/Obstruction:	31	66
Crossing/Turning:	0	0
Pedestrian Crashes:	0	0
Miscellaneous Crashes:	3	6
TOTAL:	47	100 %

Location	Local road	%	St.Highway	%	Total	%
Urban	0	0	44	94	44	94
Open road	0	0	3	6	3	6
TOTAL:	0	0	47	100	47	100 %

Intersection/Midblock	Number	%
Intersection:	3	6
MidBlock:	44	94
TOTAL:	47	100 %

Environmental Factors	Number	%
Light/Overcast Crashes:	33	70
Dark/Twilight Crashes:	14	30
TOTAL:	47	100 %
Wet/Ice:	14	30
Dry:	33	70
TOTAL:	47	100 %

Day/Period	Number	%
Weekday	35	74
Weekend	12	26
TOTAL:	47	100 %

Vehicles	Number	%
Car	64	83
Van/Ute	9	17
Truck	18	36
Bus	1	2
Motorcycle	1	2
Bicycle	0	0
TOTAL:	93	140 %

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

Crash factors (*)	Number	%
Alcohol	4	9
Too fast	1	2
Failed Keep Left	1	2
Overtaking	1	2
Incorrect Lane/posn	18	38
Poor handling	7	15
Poor Observation	21	45
Poor judgement	4	9
Fatigue	1	2
Disabled/old/ill	1	2
Vehicle factors	6	13
Road factors	7	15
Other	7	15
TOTAL:	79	169 %
Crashes with a:		
Driver factor	59	126 %
Environmental factor	7	15 %

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

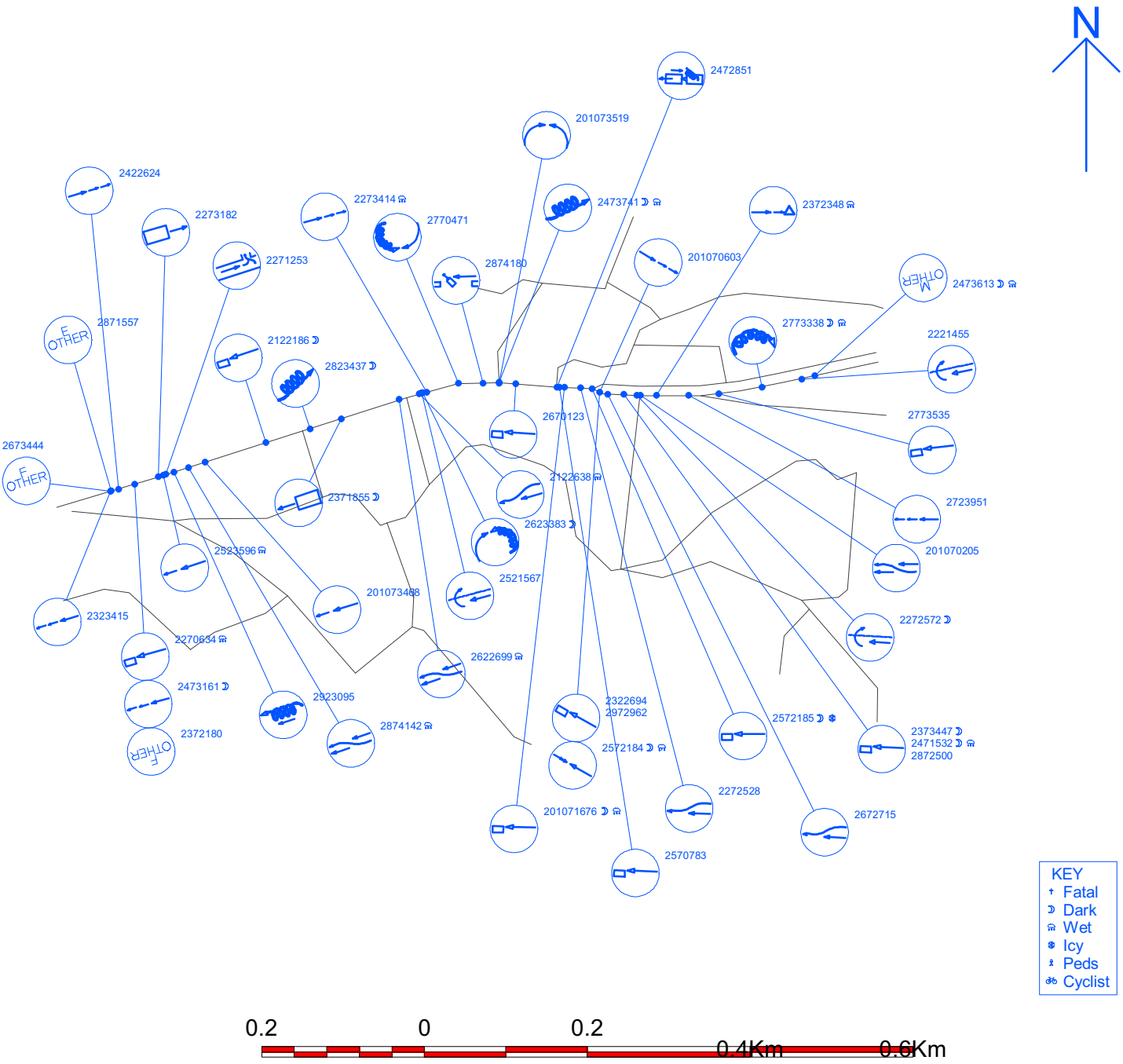
Note: Driver/vehicle factors are not available for non-injury crashes for Northland, Auckland, Waikato and Bay of Plenty before 2007. This will influence numbers and percentages.

Crashes with objects(s) struck	21	45 %

Object Struck	Number	%
Cliff Bank	2	4
Traffic Island	1	2
Phone Box Etc.	1	2
Parked Vehicle	14	30
Post Or Pole	2	4
Vehicle	2	4
Tree	1	2
TOTAL:	23	48 %

Crash Numbers

Year	Fatal	Serious	Minor	Non-Inj
2001	0	1	1	0
2002	0	0	1	6
2003	0	0	2	4
2004	0	0	1	5
2005	0	0	2	3
2006	0	1	1	3
2007	0	0	1	3
2008	0	0	1	4
2009	0	0	1	1
2010	0	0	0	5
TOTAL:	0	2	11	34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2373447
2471532
2872500
2372180
2874142
2572184
2272528
201071676
2672715
2570783
KEY
Fatal
Dark
Wet
Icy
Peds
Cyclist
0.2
0
0.2
0.4Km
0.6Km

First Street	Distance	Dir	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 S M A E I T R N
1S/709/0.08	80	W	BARNES DRIVE	2473613	30/10/2004	Sat	0305	CAR1 WBD on SH 1S hit Vehicle while manoeuvring	CAR1 intentional collision, evading enforcement	Wet	Dark	Fine	Unknown	N/A	
1S/709/0.096	200	E	BURNETT ST	2221455	04/03/2002	Mon	1800	CAR1 WBD on SH 1S hit CAR2 U-turning from same direction of travel	CAR2 didnt see/look behind when changing lanes, position or direction	Dry	Overcast	Fine	Unknown	N/A	1
1S/709/0.146	150	E	BURNETT ST	2773338	04/08/2007	Sat	2100	CAR1 EBD on SH 1S lost control turning right, CAR1 hit Parked Vehicle on right hand bend	CAR1 too far left/right ENV: road slippery (rain)	Wet	Dark	Light Rain	Unknown	N/A	
1S/709/0.2	200	W	BARNES DRIVE	2773535	18/09/2007	Tue	1200	TRUCK1 WBD on SH 1S hit parked veh, TRUCK1 hit Parked Vehicle	TRUCK1 too far left/right, inattentive ENV: road surface unusually narrow	Dry	Overcast	Fine	Unknown	N/A	
1S/709/0.236	800	E	SOUTH ROAD	2723951	12/11/2007	Mon	1700	CAR1 WBD on SH 1S hit rear end of CAR2 stop/slow for queue	CAR1 following too closely, failed to notice car slowing CAR2 following too closely	Dry	Overcast	Light Rain	Unknown	N/A	2
1S/709/0.276	20	E	BURNETT ST	2372348	26/07/2003	Sat	1015	CAR1 EBD on SH 1S hit rear end of CAR2 stop/slow for obstruction	CAR1 failed to notice car slowing CAR2 suddenly braked	Wet	Overcast	Fine	Unknown	N/A	
1S/709/0.296	1		BURNETT ST	201070205	09/01/2010	Sat	1245	TRUCK1 WBD on SH 1S changing lanes/overtaking to right hit CAR2	TRUCK1 inattentive, misjudged speed, etc of vehicle coming from behind or alongside, blind spot ENV: road surface under construction or maintenance	Dry	Overcast	Fine	T Type Junction	Give Way Sign	
1S/709/0.3	300	W	BARNES DRIVE	2272572	02/08/2002	Fri	1815	VAN1 WBD on SH 1S hit CAR2 U-turning from same direction of travel	CAR2 didnt see/look behind when changing lanes, position or direction	Dry	Dark	Fine	Unknown	N/A	
1S/709/0.316	20	W	BURNETT ST	2471532	24/05/2004	Mon	2000	CAR1 WBD on SH 1S hit parked veh, CAR1 hit Parked Vehicle	CAR1 too far left/right	Wet	Dark	Light Rain	Unknown	N/A	
1S/709/0.316	20	W	BURNETT ST	2373447	07/11/2003	Fri	2245	TRUCK1 WBD on SH 1S hit parked veh, TRUCK1 hit Parked Vehicle	TRUCK1 too far left/right, suddenly swerved to avoid vehicle	Dry	Dark	Fine	Unknown	N/A	
1S/709/0.316	20	W	BURNETT ST	2872500	10/07/2008	Thu	1520	TRUCK1 WBD on SH 1S hit parked veh, TRUCK1 hit Parked Vehicle	TRUCK1 too far left/right VAN2 parked or stopped not as close a practicable to side of road	Dry	Overcast	Fine	Unknown	N/A	
1S/709/0.336	40	W	BURNETT ST	2672715	13/06/2006	Tue	1430	TRUCK1 WBD on SH 1S changing lanes to left hit CAR2	TRUCK1 didnt see/look behind when changing lanes, position or direction	Dry	Bright	Fine	Unknown	N/A	
1S/709/0.346	50	W	BURNETT ST	201070603	09/03/2010	Tue	0750	CAR1 EBD on SH 1S hit rear end of CAR2 stop/slow for queue	CAR1 following too closely, failed to notice car slowing	Dry	Bright	Fine	Unknown	N/A	
1S/709/0.346	50	W	BURNETT ST	2972962	14/08/2009	Fri	1338	TRUCK1 WBD on SH 1S hit parked veh, TRUCK1 hit Parked Vehicle	TRUCK1 wandering or wobbling, inattentive	Dry	Bright	Fine	Unknown	N/A	
1S/709/0.346	50	W	BURNETT ST	2572184	20/07/2005	Wed	2255	CAR1 WBD on SH 1S hit CAR2 reversing along road, CAR1 hit Parked Vehicle	CAR1 alcohol test above limit or test refused	Wet	Dark	Fine	Unknown	N/A	
1S/709/0.346	50	W	BURNETT ST	2322694	05/09/2003	Fri	0820	CAR1 WBD on SH 1S hit parked veh, CAR1 hit Parked Vehicle	CAR1 too far left/right, attention diverted by cigarette etc	Dry	Bright	Fine	Unknown	N/A	1
1S/709/0.356	60	W	BURNETT ST	2572185	15/07/2005	Fri	0130	CAR1 WBD on SH 1S hit parked veh, CAR1 hit Parked Vehicle	CAR1 lost control, lost control under heavy braking ENV: road slippery (frost or ice)	Ice/ Snow	Dark	Fine	Unknown	N/A	
1S/709/0.371	100	E	ABERFELDY ST	2272528	19/07/2002	Fri	1130	TRUCK1 WBD on SH 1S changing lanes to left hit CAR2	TRUCK1 didnt see/look behind when changing lanes, position or direction	Dry	Overcast	Fine	Unknown	N/A	
1S/709/0.391	80	E	ABERFELDY ST	201071676	16/05/2010	Sun	0230	CAR1 WBD on SH 1S hit parked veh, CAR1 hit Parked Vehicle	CAR1 too far left/right, inattentive	Wet	Dark	Light Rain	Unknown	N/A	
1S/709/0.396	100	W	BURNETT ST	2570783	14/03/2005	Mon	1445	TRUCK1 WBD on SH 1S hit parked veh, TRUCK1 hit Vehicle	TRUCK1 misjudged speed of own vehicle	Dry	Bright	Fine	Unknown	N/A	
1S/709/0.4	400	W	BARNES DRIVE	2472851	02/07/2004	Fri	1130	load or trailer from TRUCK1 WBD on SH 1S hit CAR2	TRUCK1 load	Dry	Overcast	Fine	Unknown	N/A	

First Street	Distance	D| 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 S M A E I T R N
1S/709/0.451	20	E	ABERFELDY ST	2670123	24/01/2006	Tue	1800	TRUCK1 WBD on SH 1S hit parked veh, TRUCK1 hit Parked Vehicle	TRUCK1 too far left/right	Dry	Bright	Fine	Unknown	N/A	
1S/709/0.471	1		ABERFELDY ST	2473741	11/12/2004	Sat	0140	CAR1 EBD on SH 1S lost control; went off road to left, CAR1 hit Cliff Bank, Traffic Island	CAR1 fatigue (drowsy, tired, fell asleep)	Wet	Dark	Light Rain	T Type Junction	Give Way Sign	
1S/709/0.471	1		ABERFELDY ST	201073519	22/10/2010	Fri	1545	CAR1 WBD on SH 1S and/or VAN2 cut corner/swung wide and collided head on	VAN2 too far left/right, inattentive	Dry	Bright	Fine	T Type Junction	Give Way Sign	
1S/709/0.491	20	S	ABERFELDY ST	2874180	03/12/2008	Wed	1537	CAR1 SBD on SH 1S hit CAR2 parking/unparking	CAR2 didnt see/look behind when pulling out from parked position, new driver showed inexperience, blind spot	Dry	Bright	Fine	Unknown	N/A	
1S/709/0.521	50	W	ABERFELDY ST	2770471	10/02/2007	Sat	1850	CAR1 EBD on SH 1S lost control on curve and hit CAR2 head on	CAR1 alcohol test above limit or test refused, too fast entering corner, lost control when turning, lost control under heavy braking	Dry	Overcast	Fine	Unknown	N/A	
1S/709/0.561	90	W	ABERFELDY ST	2273414	17/10/2002	Thu	0751	CAR1 EBD on SH 1S hit rear end of CAR2 stop/slow for queue	CAR1 following too closely VAN3 following too closely	Wet	Overcast	Light Rain	Unknown	N/A	
1S/709/0.566	270	W	BURNETT ST	2623383	19/10/2006	Thu	2315	CAR1 WBD on SH 1S lost control on curve and hit TAXI 2 head on	CAR1 alcohol test above limit or test refused, evading enforcement	Dry	Dark	Fine	Unknown	N/A	3
1S/709/0.568	500	E	MORNINGTON ROAD	2521567	22/03/2005	Tue	1300	CAR1 WBD on SH 1S hit CAR2 U-turning from same direction of travel	CAR2 didnt see/look behind when changing lanes, position or direction	Dry	Overcast	Fine	Unknown	N/A	2
1S/709/0.571	100	W	ABERFELDY ST	2122638	21/10/2001	Sun	1445	CAR1 WBD on SH 1S changing lanes to left hit CAR2 CAR2 hit Cliff Bank	CAR1 didnt see/look behind when changing lanes, position or direction	Wet	Overcast	Fine	Unknown	N/A	1
1S/709/0.596	300	W	BURNETT ST	2622699	22/08/2006	Tue	1705	TRUCK1 WBD on SH 1S changing lanes/overtaking to right hit CAR2	TRUCK1 lost control under heavy braking ENV: visibility limited by curve	Wet	Overcast	Heavy Rain	Unknown	N/A	1
1S/709/0.671	200	W	ABERFELDY ST	2371855	18/05/2003	Sun	0220	parked CAR1 WBD on SH 1S ran away, CAR1 hit Post Or Pole	CAR1 parking brake failed	Dry	Dark	Fine	Unknown	N/A	
1S/709/0.711	240	W	ABERFELDY ST	2823437	12/12/2008	Fri	2215	CAR1 EBD on SH 1S lost control; went off road to left, CAR1 hit Phone Box Etc., Tree	CAR1 lost control, attention diverted by cigarette etc	Dry	Dark	Fine	Unknown	N/A	1
1S/709/0.768	300	E	MORNINGTON ROAD	2122186	06/08/2001	Mon	0025	CAR1 WBD on SH 1S hit parked veh, CAR1 hit Parked Vehicle, CAR2 hit Parked Vehicle, VAN3 hit Parked Vehicle	CAR1 alcohol test above limit or test refused, too far left/right	Dry	Dark	Fine	Unknown	N/A	1
1S/709/0.846	190	E	SOUTH ROAD	201073468	10/10/2010	Sun	1520	VAN1 WBD on SH 1S hit rear end of VAN2 stopped/moving slowly	VAN1 following too closely, failed to notice car slowing, attention diverted by cell phone	Dry	Bright	Fine	Unknown	N/A	
1S/709/0.868 CAVERSHAM VALLEY	200	E	MORNINGTON ROAD	2874142	08/08/2008	Fri	1525	SUV1 WBD on SH 1S CAVERSHAM VALLEY changing lanes/overtaking to right hit SUV2	SUV1 lost control, medical illness (not sudden eg flu)	Wet	Overcast	Heavy Rain	Unknown	N/A	
1S/709/0.886	150	N	SOUTH ROAD	2923095	18/10/2009	Sun	1315	VAN1 WBD on SH 1S lost control while overtaking, VAN1 hit Post Or Pole	VAN1 lost control under heavy acceleration, overtaking line of traffic or queue, inattentive	Dry	Bright	Fine	Unknown	N/A	1
1S/709/0.896	140	E	SOUTH ROAD	2271253	24/04/2002	Wed	1535	TRUCK1 EBD on SH 1S hit VAN2 doing driveway manoeuvre	VAN2 incorrect use of vehicle controls ENV: entering or leaving private house / farm	Dry	Bright	Fine	Driveway	Nil	
1S/709/0.9	900	W	BARNES DRIVE	2523596	23/12/2005	Fri	1155	SUV1 WBD on SH 1S hit rear end of TRUCK2 stopped/moving slowly	SUV1 lost control due to road conditions TRUCK2 lost control due to road conditions ENV: road slippery (rain), road slippery (oil/diesel/fuel)	Wet	Overcast	Heavy Rain	Unknown	N/A	1
1S/709/0.906	130	E	SOUTH ROAD	2273182	09/10/2002	Wed	1400	parked TRUCK1 EBD on SH 1S ran away	TRUCK1 parking brake failed	Dry	Bright	Fine	Unknown	N/A	

First Street	Distance	D| 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 S M A E I T R N
1S/709/0.936	100	E	SOUTH ROAD	2473161	02/10/2004	Sat	0022	CAR1 WBD on SH 1S hit rear end of CAR2 stop/slow for queue	CAR1 following too closely, failed to notice car slowing CAR2 following too closely, failed to notice car slowing CAR3 suddenly braked	Dry	Dark	Fine	Unknown	N/A	
1S/709/0.936	100	E	SOUTH ROAD	2372180	26/06/2003	Thu	1040	CAR1 WBD on SH 1S hit rear end of CAR2 stop/slow for obstruction	CAR1 following too closely CAR2 suddenly braked	Dry	Bright	Fine	Unknown	N/A	
1S/709/0.936	100	E	SOUTH ROAD	2270634	19/02/2002	Tue	1920	TRUCK1 WBD on SH 1S hit parked veh, TRUCK1 hit Parked Vehicle	TRUCK1 too far left/right	Wet	Overcast	Heavy Rain	Unknown	N/A	
1S/709/0.958	110	E	MORNINGTON ROAD	2422624	08/09/2004	Wed	0750	CAR1 EBD on SH 1S hit rear end of CAR2 stop/slow for queue	CAR1 following too closely CAR2 suddenly braked CAR3 suddenly braked	Dry	Bright	Fine	Unknown	N/A	1
1S/709/0.966	70	N	SOUTH ROAD	2871557	12/05/2008	Mon	1200	TRUCK1 EBD on SH 1S hit obstruction, TRUCK1 hit Parked Vehicle	TRUCK1 misjudged speed of own vehicle CAR2 misjudged speed of own vehicle ENV visibility limited by scrub or long grass, entering or leaving private house / farm	Dry	Bright	Fine	Driveway	Nil	
1S/709/0.968	100	E	MORNINGTON ROAD	2673444	24/08/2006	Thu	1130	BUS1 EBD on SH 1S hit rear end of TRUCK2 stop/slow for obstruction	BUS1 lost control due to vehicle fault, brakes	Dry	Bright	Fine	Unknown	N/A	
1S/709/0.968	100	E	MORNINGTON ROAD	2323415	24/12/2003	Wed	1740	MOTOR CYCLE1 WBD on SH 1S hit rear end of CAR2 stop/slow for queue	MOTOR CYCLE1 failed to notice car slowing	Dry	Bright	Fine	Unknown	N/A	1

Crash List: JP Barnes Drive (26 crashes)

Total Injury Crashes: 15
Total Non-Injury Crashes: 11
26

Crash Type	Number	%
Overtaking Crashes:	0	0
Straight Road Lost Control/Head On:	0	0
Bend - Lost Control/Head On:	0	0
Rear End/Obstruction:	6	23
Crossing/Turning:	20	77
Pedestrian Crashes:	0	0
Miscellaneous Crashes:	0	0
TOTAL:	26	100%

Location	Local road	%	St Highway	%	Total	%
Urban	0	0	26	100	26	100
Open road	0	0	0	0	0	0
TOTAL:	0	0	26	100	26	100%

Intersection/Midblock	Number	%
Intersection:	26	100
Mid Block:	0	0
TOTAL:	26	100%

Environmental Factors	Number	%
Light/Overcast Crashes:	24	92
Dark/Twilight Crashes:	2	8
TOTAL:	26	100%
Wet/Ice:	6	23
Dry:	20	77
TOTAL:	26	100%

Day/Period	Number	%
Weekday	18	69
Weekend	8	31
TOTAL:	26	100%

Vehicles	Number	%
Car	47	96
Van/Ute	6	23
Truck	5	19
Bus	0	0
Motorcycle	1	4
Bicycle	0	0
TOTAL:	59	142%

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

Crash factors (*)	Number	%
Too fast	1	4
Failed Giveway/Stop	18	69
Incorrect Lane/posn	2	8
Poor Observation	17	65
Poor judgement	7	27
Disabled/old/ill	2	8
Road factors	2	8
Other	1	4
TOTAL:	50	193%
Crashes with a:		
Driver factor	47	181%
Environmental factor	2	8%

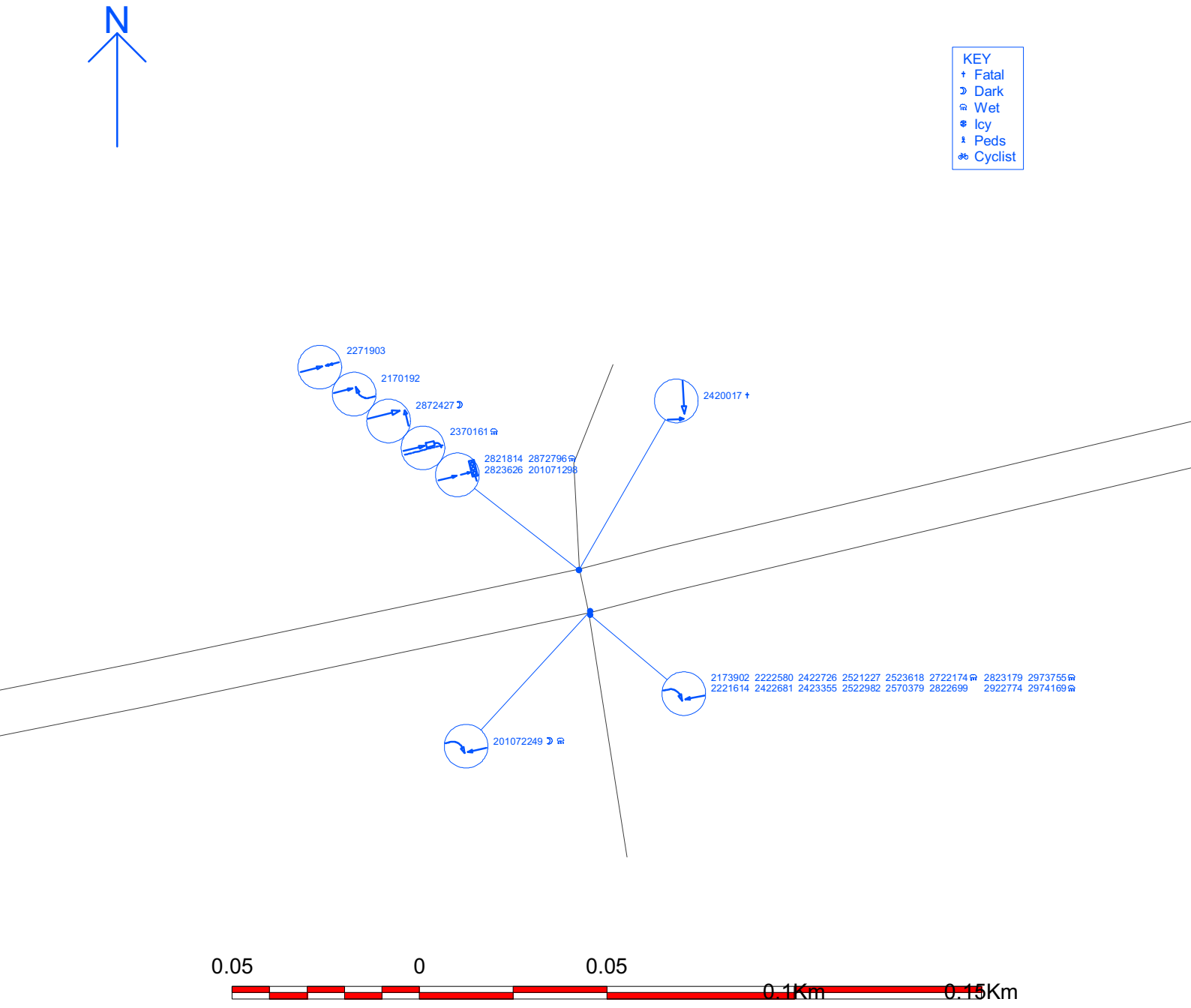
(*) factors are counted once against a crash - ie two fatigued drivers count as one fatigue crash factor.

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	0	0
Object Struck	Number	%
No objects		
TOTAL:	0	0

Crash Numbers

Year	Fatal	Serious	Minor	Non-Inj
2001	0	0	0	2
2002	0	1	1	1
2003	0	0	0	1
2004	1	0	3	0
2005	0	0	3	1
2007	0	0	1	0
2008	0	0	4	2
2009	0	0	1	2
2010	0	0	0	2
TOTAL:	1	1	13	11


N
KEY
Fatal
Dark
Wet
Icy
Peds
Cyclist
2271903
2170192
2872427
2370161
2821814 2872796
2823626 201071298
2420017
2173902 2222580 2422726 2521227 2523618 2722174 2823179 2973755
2221614 2422681 2423355 2522982 2570379 2822699 2922774 2974169
201072249
0.05
0
0.05
0.1Km
0.15Km

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	S A	M E	I R	N
1S/707/2.081	I	BARNES DRIVE	2821814	29/02/2008	Fri	1320	VAN1 EBD on SH 1S hit rear end of CAR2 stop/slow for signals	VAN1 following too closely, failed to notice car slowing	Dry	Overcast	Fine	X Type Junction	Traffic Signal					1
1S/707/2.081	I	BARNES DRIVE	201071298	01/05/2010	Sat	1525	CAR1 EBD on SH 1S hit rear end of VAN2 stop/slow for signals	CAR1 failed to notice car slowing, attention diverted by scenery or persons outside vehicle	Dry	Overcast	Fine	X Type Junction	Traffic Signal					
1S/707/2.081	I	BARNES DRIVE	2271903	16/06/2002	Sun	1415	MOTOR CYCLE1 EBD on SH 1S hit CAR2 reversing along road		Dry	Bright	Fine	X Type Junction	Traffic Signal					
1S/707/2.081	I	BARNES DRIVE	2872796	09/08/2008	Sat	1550	CAR1 EBD on SH 1S hit rear end of CAR2 stop/slow for signals	CAR1 following too closely, failed to notice car slowing, new driver showed inexperience ENV: road slippery (rain)	Wet	Overcast	Light Rain	X Type Junction	Traffic Signal					
1S/707/2.081	I	BARNES DRIVE	2370161	04/01/2003	Sat	1240	CAR1 EBD on SH 1S hit rear of VAN2 turning right from centre line		Wet	Overcast	Light Rain	X Type Junction	Traffic Signal					
1S/707/2.081	I	BARNES DRIVE	2872427	24/04/2008	Thu	1825	CAR1 EBD on SH 1S hit CAR2 crossing at right angle from right	CAR1 did not stop at steady red light	Dry	Dark	Fine	X Type Junction	Traffic Signal					
1S/707/2.081	I	BARNES DRIVE	2823626	05/11/2008	Wed	1535	TRUCK1 EBD on SH 1S hit rear end of CAR2 stop/slow for signals	TRUCK1 misjudged intentions of another party CAR2 suddenly braked, interferred with driver	Dry	Overcast	Fine	X Type Junction	Traffic Signal					2
1S/707/2.081	I	BARNES DRIVE	2420017	11/03/2004	Thu	1008	CAR1 SBD on BARNES DRIVE hit TRUCK2 crossing at right angle from right	TRUCK2 did not stop at steady red light	Dry	Overcast	Fine	X Type Junction	Traffic Signal	1				
1S/707/2.081	I	BARNES DRIVE	2170192	28/01/2001	Sun	1310	CAR2 turning right hit by oncoming CAR1 EBD on SH 1S		Dry	Bright	Fine	X Type Junction	Traffic Signal					
1S/709/0	I	BARNES DRIVE	2722174	31/05/2007	Thu	1630	CAR2 turning right hit by oncoming CAR1 WBD on SH 1S	CAR2 failed to give way when turning to non-turning traffic, didnt see/look when required to give way to traffic from another direction, misjudged speed etc of vehicle coming from another dirn with right of way, impared ability due to old age ENV: road slippery (rain)	Wet	Overcast	Light Rain	X Type Junction	Traffic Signal					2
1S/709/0	I	BARNES DRIVE	2822699	01/09/2008	Mon	0836	CAR2 turning right hit by oncoming CAR1 WBD on SH 1S	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	Overcast	Fine	X Type Junction	Traffic Signal					1
1S/709/0	I	BARNES DRIVE	2823179	16/10/2008	Thu	0900	CAR2 turning right hit by oncoming CAR1 WBD on SH 1S	CAR2 failed to give way when turning to non-turning traffic, misjudged speed etc of vehicle coming from another dirn with right of way	Dry	Overcast	Fine	X Type Junction	Traffic Signal					2
1S/709/0	I	BARNES DRIVE	2922774	27/08/2009	Thu	0900	TRUCK2 turning right hit by oncoming CAR1 WBD on SH 1S	TRUCK2 failed to give way when turning to non-turning traffic, inattentive, inexperienced at towing trailer / other vehicle	Dry	Overcast	Fine	X Type Junction	Traffic Signal					1
1S/709/0	I	BARNES DRIVE	2973755	27/10/2009	Tue	0638	VAN2 turning right hit by oncoming CAR1 WBD on SH 1S	VAN2 failed to give way when turning to non-turning traffic, inattentive	Wet	Overcast	Mist	X Type Junction	Traffic Signal					
1S/709/0	I	BARNES DRIVE	2974169	14/10/2009	Wed	1110	CAR2 turning right hit by oncoming TRUCK1 WBD on SH 1S	CAR2 failed to give way when turning to non-turning traffic, inattentive, misjudged intentions of another party	Wet	Overcast	Light Rain	X Type Junction	Traffic Signal					
1S/709/0	I	BARNES DRIVE	201072249	08/07/2010	Thu	2119	CAR2 turning right hit by oncoming CAR1 WBD on SH 1S	CAR2 failed to give way when turning to non-turning traffic, inattentive	Wet	Dark	Light Rain	X Type Junction	Traffic Signal					

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	S A	M E	I T	R	N
1S/709/0	I	BARNES DRIVE	2570379	11/02/2005	Fri	1205	CAR2 turning right hit by oncoming CAR1 WBD on SH 1S	CAR2 failed to give way when turning to non-turning traffic, didnt see/look when required to give way to traffic from another direction, misjudged intentions of another party	Dry	Overcast	Fine	X Type Junction	Traffic Signal						
1S/709/0	I	BARNES DRIVE	2523618	26/11/2005	Sat	1235	CAR2 turning right hit by oncoming CAR1 WBD on SH 1S	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	X Type Junction	Traffic Signal				1		
1S/709/0	I	BARNES DRIVE	2522982	29/09/2005	Thu	1441	CAR2 turning right hit by oncoming CAR1 WBD on SH 1S	CAR2 did not stop at steady red arrow, impared ability due to old age	Dry	Bright	Fine	X Type Junction	Traffic Signal				1		
1S/709/0	I	BARNES DRIVE	2521227	17/02/2005	Thu	1145	CAR2 turning right hit by oncoming CAR1 WBD on SH 1S	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	X Type Junction	Traffic Signal				2		
1S/709/0	I	BARNES DRIVE	2423355	27/02/2004	Fri	1423	CAR2 turning right hit by oncoming CAR1 WBD on SH 1S	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	Overcast	Fine	X Type Junction	Traffic Signal				1		
1S/709/0	I	BARNES DRIVE	2422726	12/10/2004	Tue	1442	CAR2 turning right hit by oncoming CAR1 WBD on SH 1S	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	Overcast	Fine	X Type Junction	Traffic Signal				1		
1S/709/0	I	BARNES DRIVE	2422681	26/09/2004	Sun	1512	CAR2 turning right hit by oncoming CAR1 WBD on SH 1S	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	X Type Junction	Traffic Signal				2		
1S/709/0	I	BARNES DRIVE	2222580	03/09/2002	Tue	1220	CAR2 turning right hit by oncoming CAR1 WBD on SH 1S	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	X Type Junction	Traffic Signal		1		1		
1S/709/0	I	BARNES DRIVE	2221614	16/02/2002	Sat	1325	CAR2 turning right hit by oncoming VAN1 WBD on SH 1S	VAN1 too fast on straight 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	Overcast	Fine	X Type Junction	Traffic Signal				1		
1S/709/0	I	BARNES DRIVE	2173902	12/11/2001	Mon	1855	TRUCK2 turning right hit by oncoming VAN1 WBD on SH 1S		Dry	Overcast	Fine	X Type Junction	Traffic Signal						

APPENDIX C: Base Option Plans

SPECIMEN DESIGN

Revision	Amendment	Approved	Revision Date

NZ TRANSPORT AGENCY
WAKA KOTAHI

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Dunedin 9016, New Zealand
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Drawn	Designed	Approved	Revision Date
R Underwood	D Eaton		08/10

Project No.	Scale
6CM015.02	1:500

Project
CAVERSHAM HIGHWAY IMPROVEMENTS PROJECT
SECTION B: CAVERSHAM VALLEY ROAD

Sheet
ROAD GEOMETRICS PLAN

Drawing No.	Sheet. No.	Revision
7/821/2/6704	GM?	R0

Original Sheet Size A1 [841x594] Plot Date 19/05/11 @ 08:34 \\wesv01\groupdata\transport\nzta\proj\caversham valley rd intersection\integrated transport assessment\drawings & plans\stage 2 specimen design-model model 13 lop marking change.dwg

SPECIMEN DESIGN

Revision	Amendment	Approved	Revision Date

NZ TRANSPORT AGENCY
WAKA KOTAHI

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SECTION B: CAVERSHAM VALLEY ROAD

Sheet
ROAD GEOMETRICS PLAN

Drawn	Designed	Approved	Revision Date
R Underwood	D Eaton		08/10

Project No.	Scale	Drawing No.	Sheet. No.	Revision
6CM015.02	1:500	7/821/2/6704	GM?	R0

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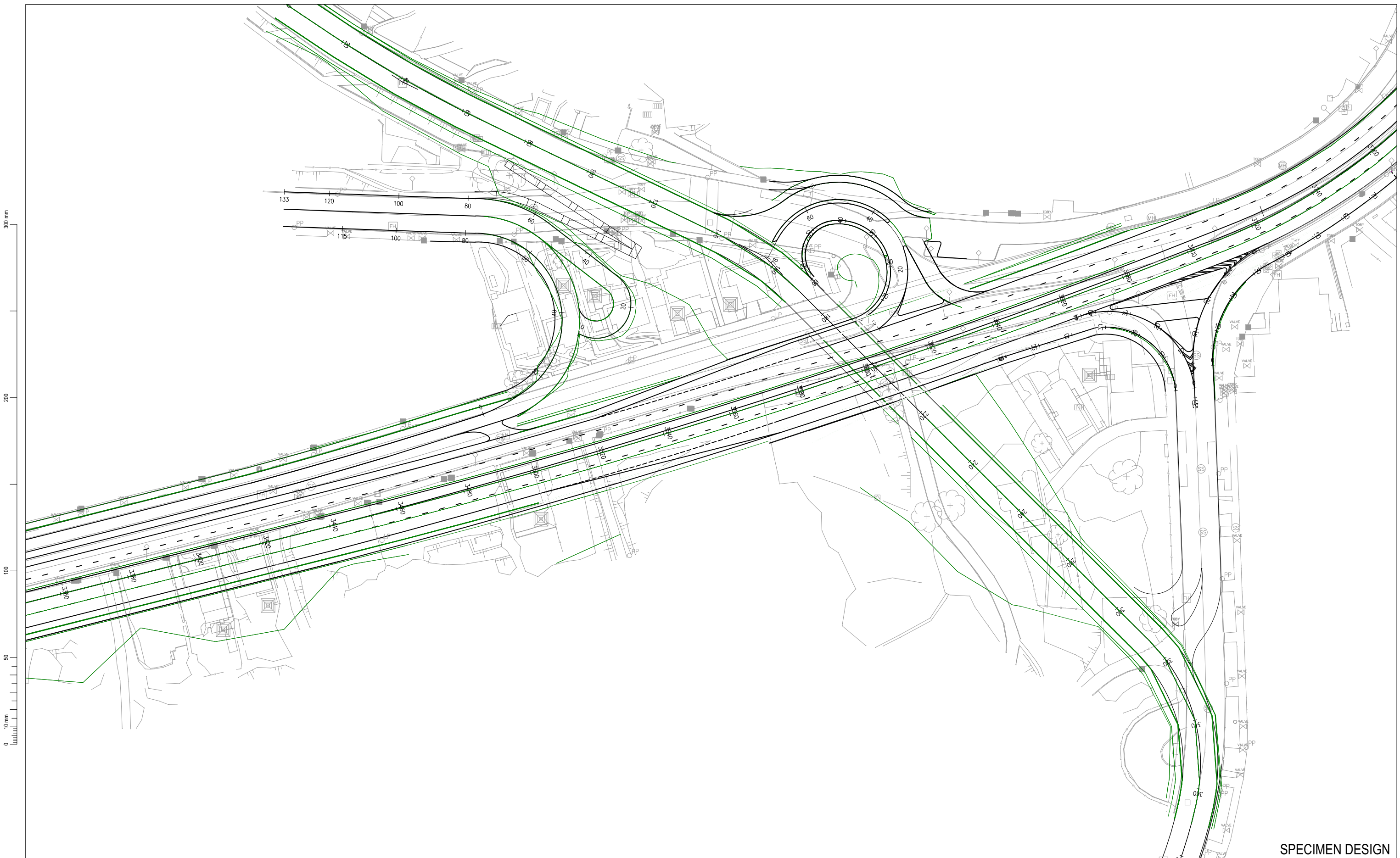

SPECIMEN DESIGN

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NZ TRANSPORT AGENCY
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Drawn	Designed	Approved	Revision Date
R Underwood	D Eaton		08/10

Project No.	Scale
6CM015.02	1:500

Project
CAVERSHAM HIGHWAY IMPROVEMENTS PROJECT
SECTION B: CAVERSHAM VALLEY ROAD

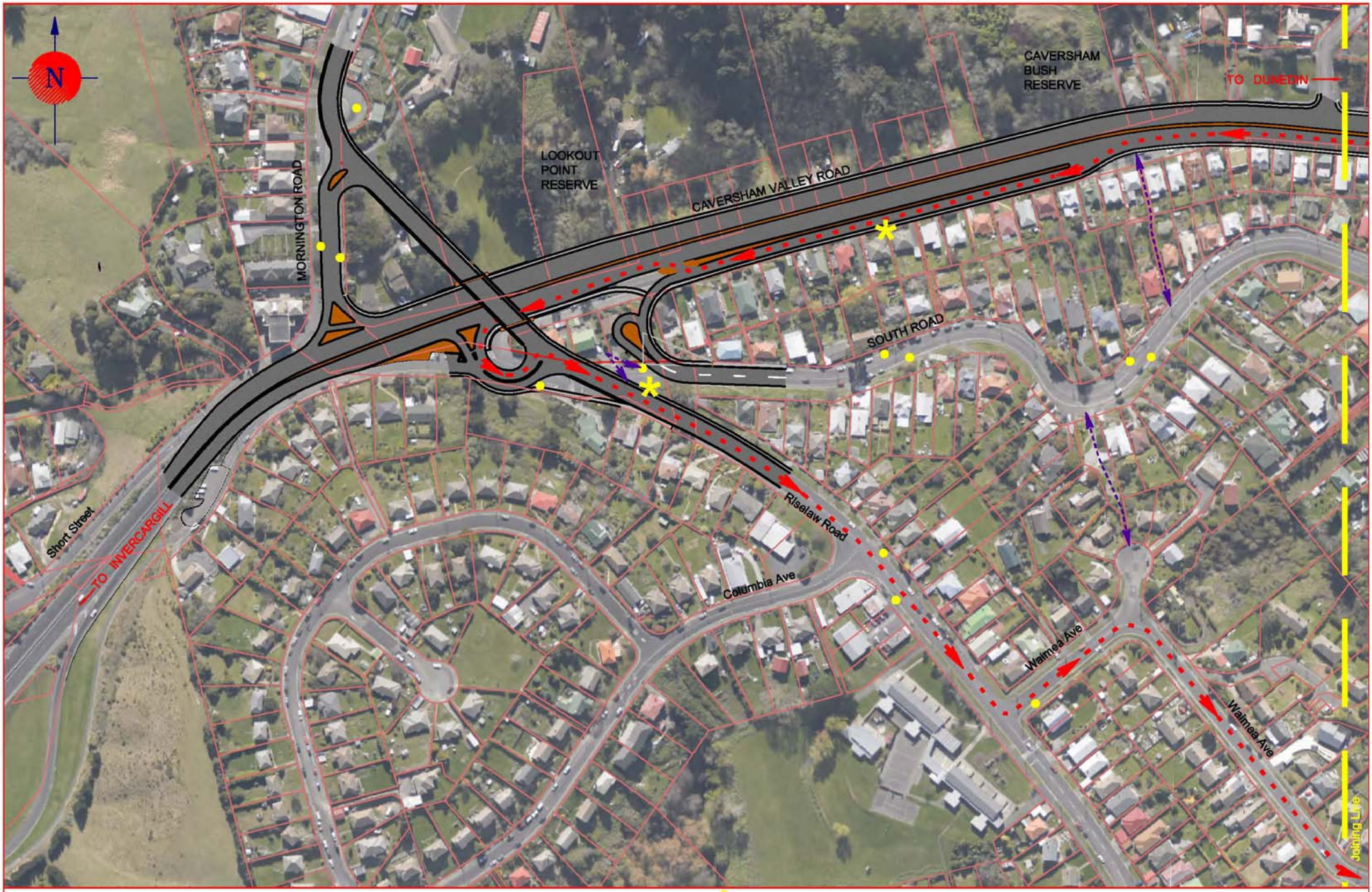
Sheet
ROAD GEOMETRICS PLAN

Drawing No.	Sheet. No.	Revision
7/821/2/6704	GM?	R0

1:500 @ A1 — 0 5 10 15 20 25 30 35 40 45 50 m

Original Sheet Size A1 [841x594] Plot Date 19/05/11 @ 08:34 \\wesv01\grouplib\transport\nzta\proj\caversham valley rd intersection\integrated transport assessment\drawings & plans\stage 2 specimen design-model model 13 lop marking change.dwg

APPENDIX D: Proposed Bus Routes



LEGEND: Pedestrian Walkways | Public Transport Route | Existing Bus Stops | Proposed Bus Stops

Scales:
A1 1:1000 0 10 20 30 40 50 60 70 80 90 100 m
A3

NZ TRANSPORT AGENCY WAKA KOTAHI

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PROPOSED BUS ROUTE PLAN - OPTION A

Sheet 1

LEGEND: Pedestrian Walkways | Public Transport Routes | Existing Bus Stops | Proposed Bus Stops

Scales:
A1 1:1000 0 10 20 30 40 50 60 70 80 90 100 m
A3

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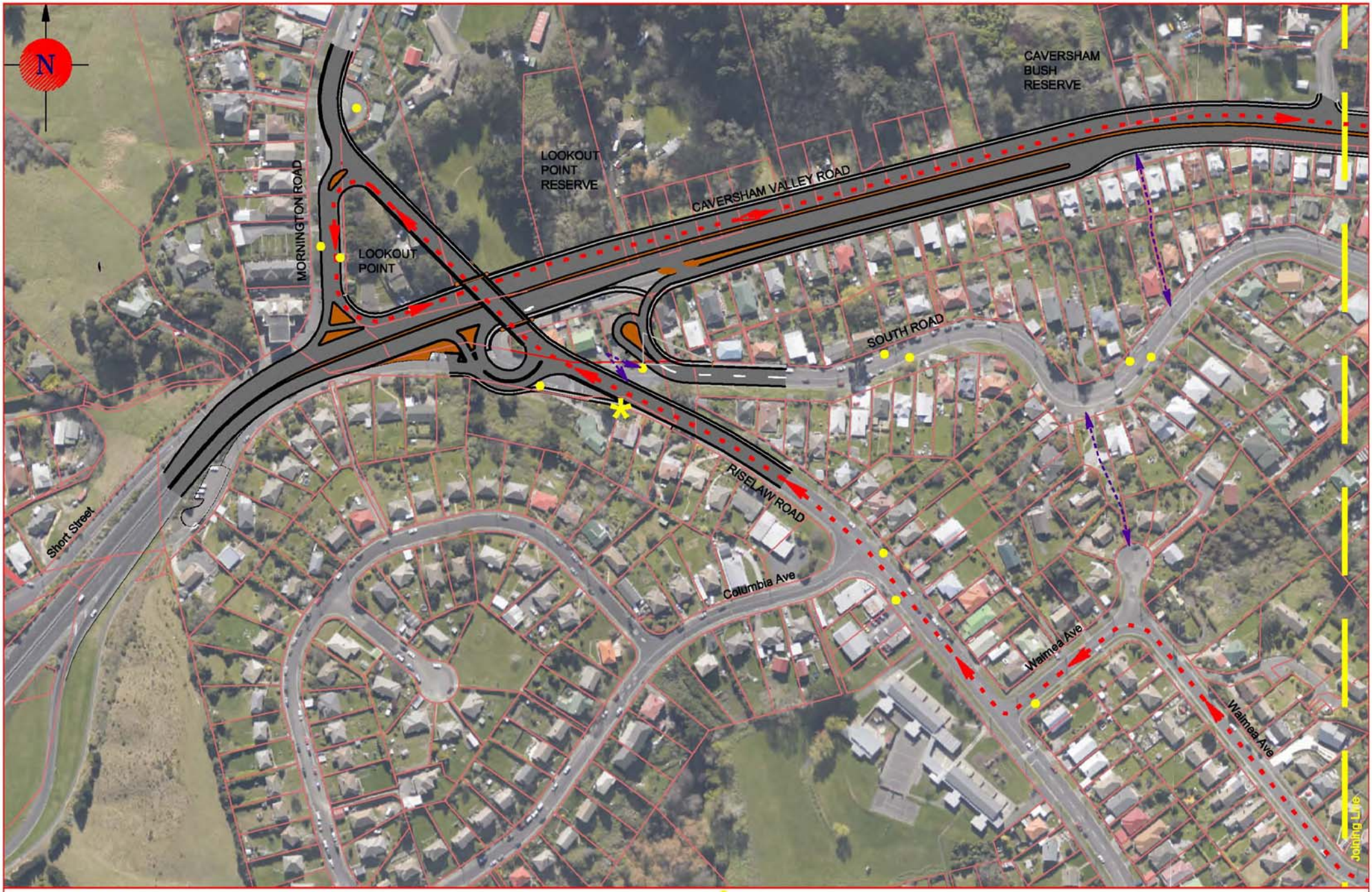
PROPOSED BUS ROUTE PLAN - OPTION A

Sheet 2


N
CAVERSHAM BUSH RESERVE
LOOKOUT POINT RESERVE
CAVERSHAM VALLEY ROAD
MORNINGTON ROAD
LOOKOUT POINT
SOUTH ROAD
RISELAW ROAD
Short Street
Columbia Ave
Waimea Ave
Waimea Ave
LEGEND:
Pedestrian Walkways
Public Transport Route
Existing Bus Stops
Proposed Bus Stops
Scales:
A1 1:1000
A3
NZ TRANSPORT AGENCY
WAKA KOTAHI
OPUS
Dunedin Office
Private Bag 1913
Dunedin 9016, New Zealand
+ 64 3 471 5500
PROPOSED BUS ROUTE PLAN - OPTION B
Sheet 1

LEGEND: Pedestrian Walkways | Public Transport Routes | Existing Bus Stops | Proposed Bus Stops

Scales:
A1 1:1000 0 10 20 30 40 50 60 70 80 90 100 m
A3

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PROPOSED BUS ROUTE PLAN - OPTION B

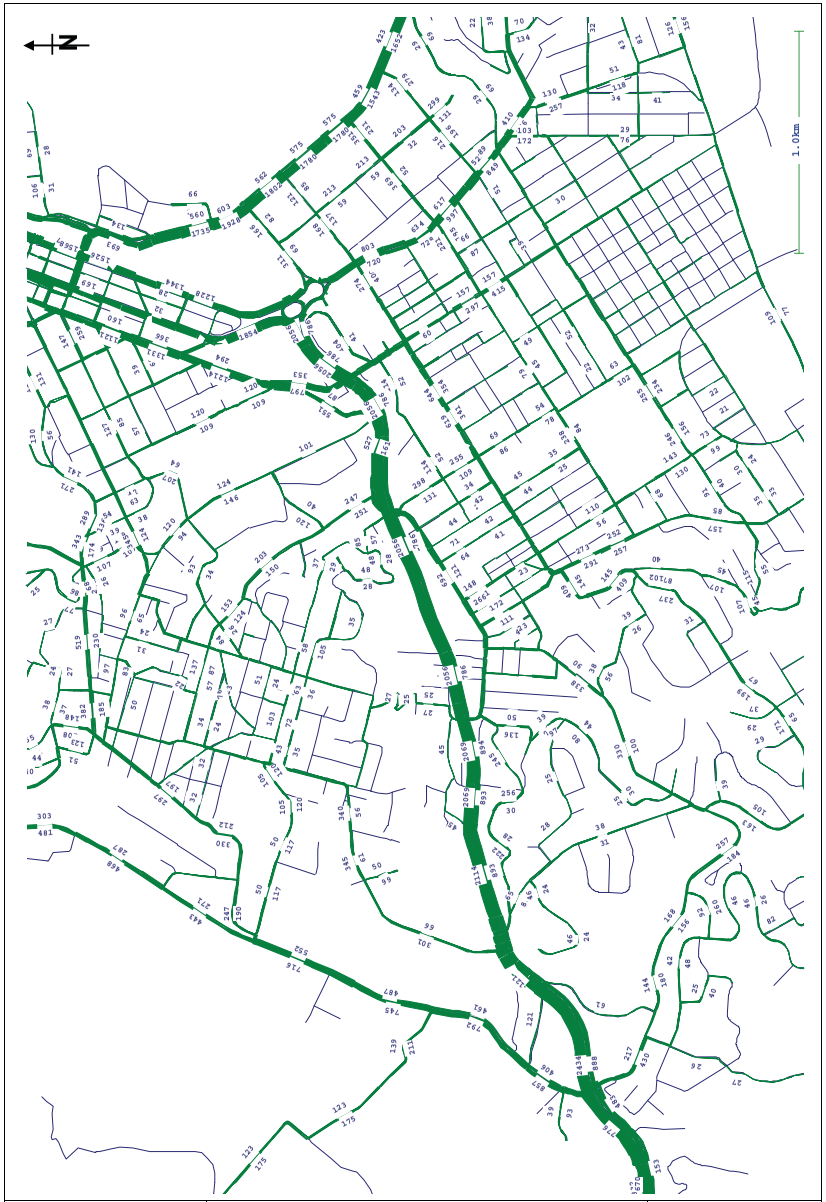
Sheet 2

APPENDIX E: Network Demand and LOS Plots

Demand and LOS Plots

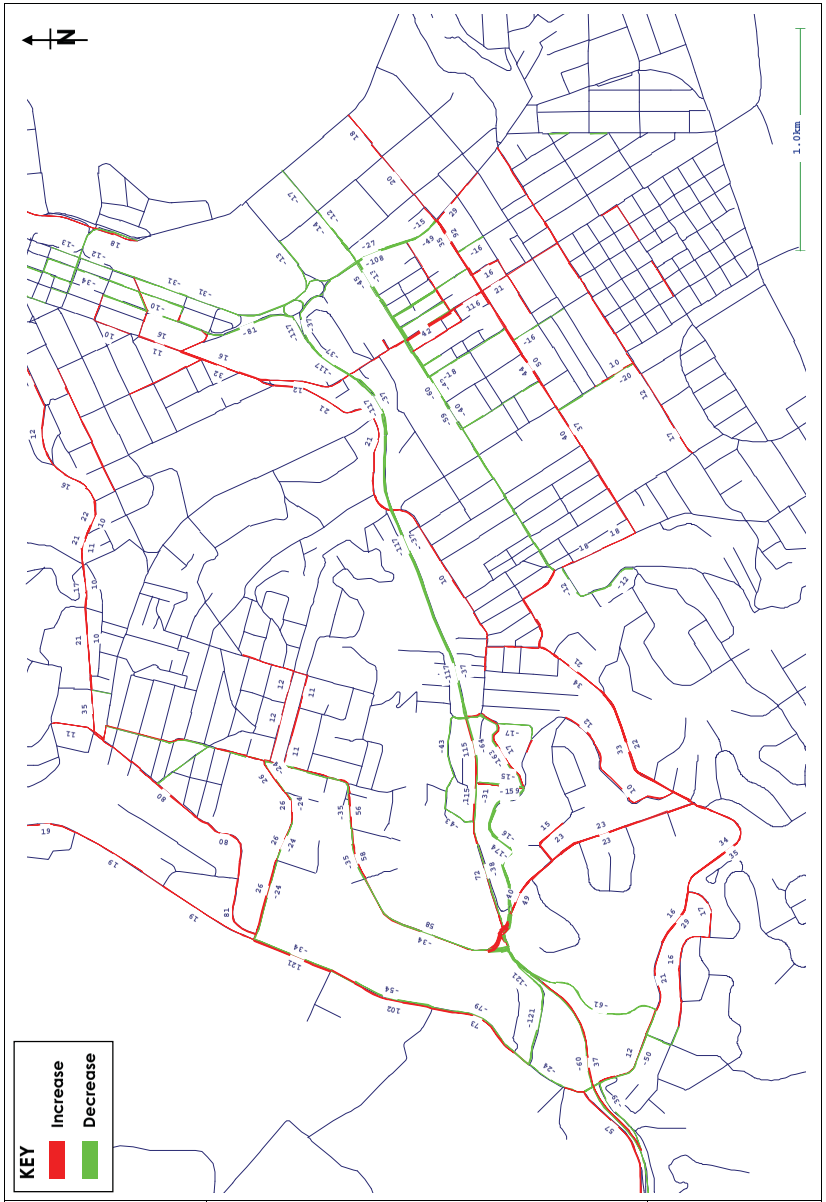
Scenario 1 corresponds to the Existing Layout Scenario

Scenario 6 corresponds to the Base Option with grade separation at Lookout Point



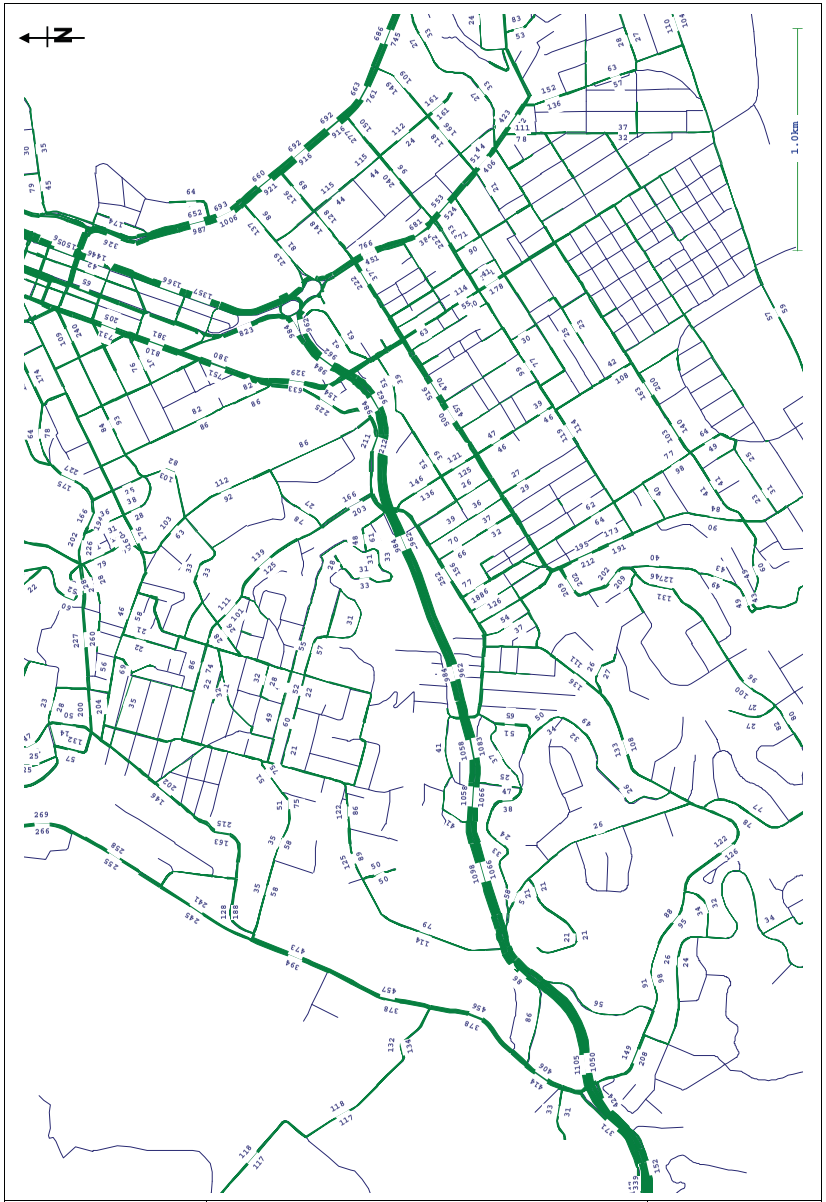
Dunedin Transportation Study	**2008 AM Peak Traffic Volume Base (Scenario 1)**	**Figure 1**
Gabites Porter		

Dunedin Transportation Study	**2008 AM Peak Levels of Service Base (Scenario 1)**	**Figure 2**
Gabites Porter		



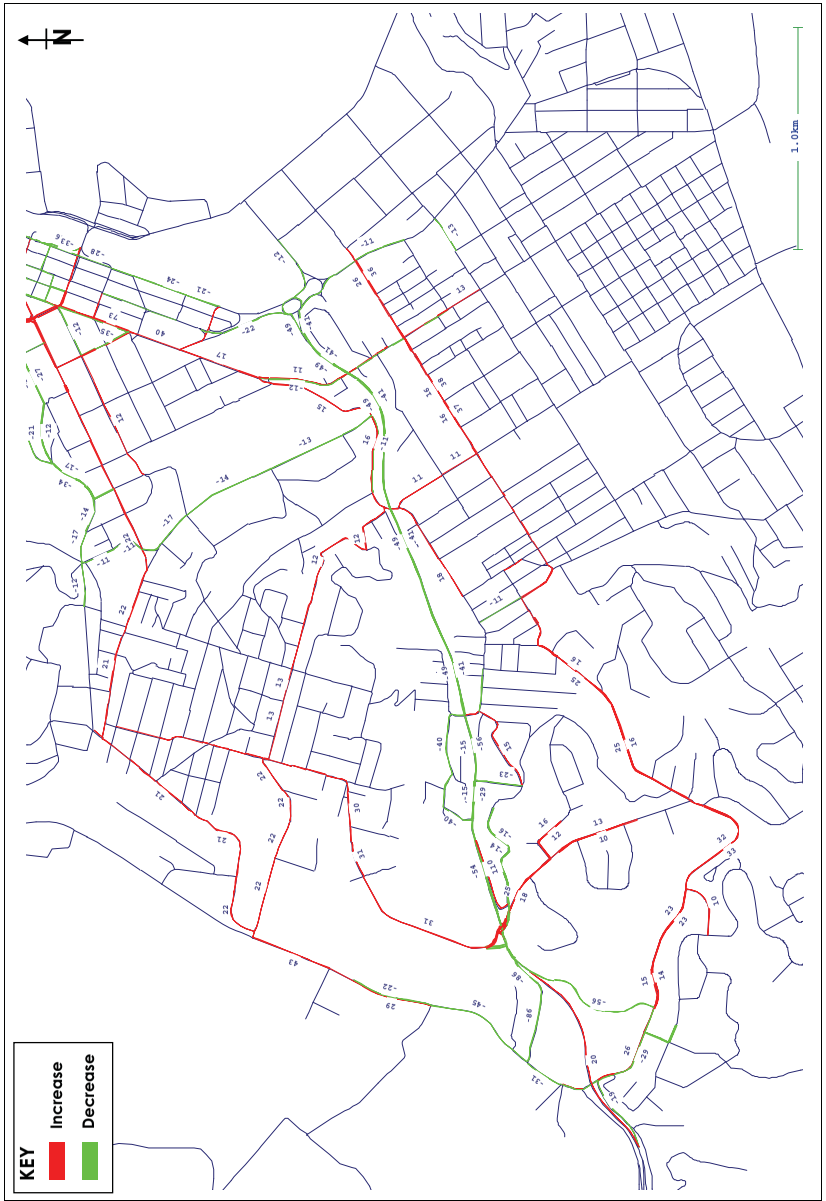
Dunedin Transportation Study	**2008 AM Peak Change in Traffic Volume Finalised Lookout Pt Layout (Scenario 6)**	**Figure 3**
Gabites Porter		

Dunedin Transportation Study	**2008 AM Peak Levels of Service Finalised Lookout Pt Layout (Scenario 6)**	**Figure 4**
Gabites Porter		



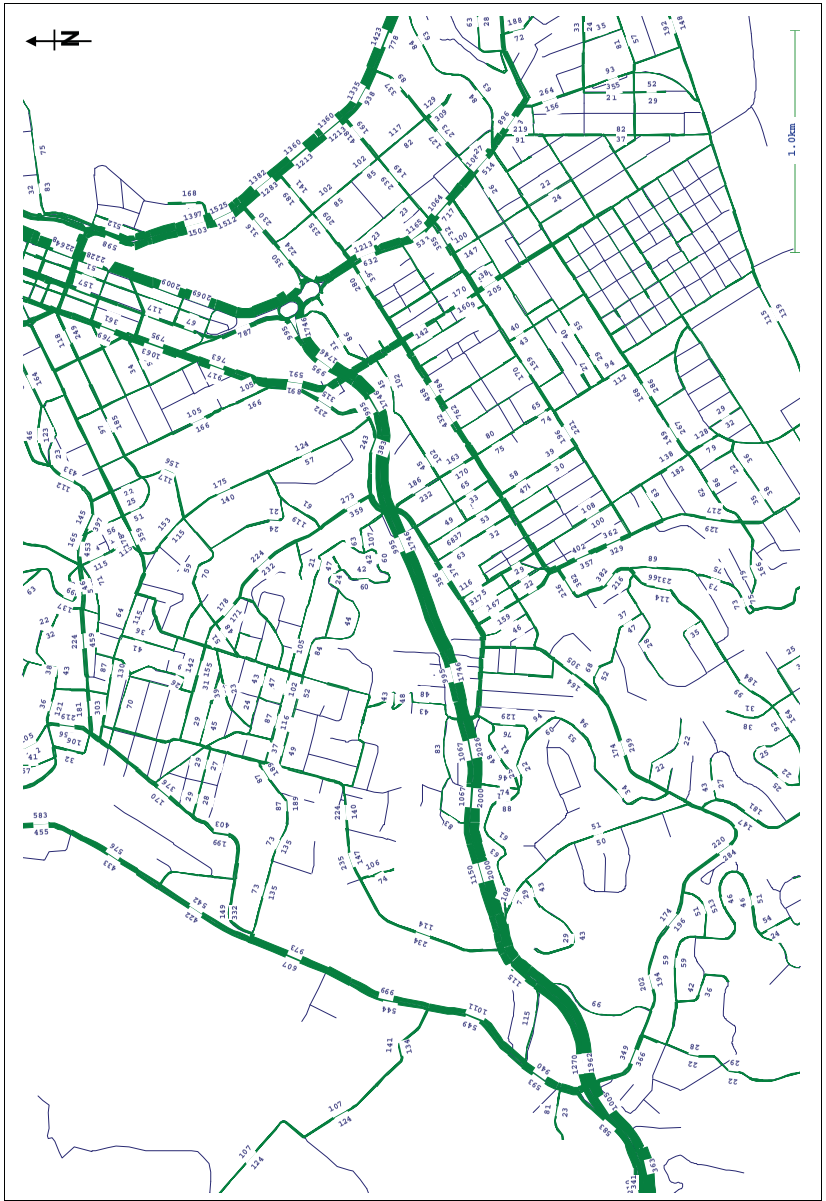
Dunedin Transportation Study	**2008 Inter Peak Traffic Volume Base (Scenario 1)**	**Figure 5**
Gabites Porter		

Dunedin Transportation Study	**2008 Inter Peak Levels of Service Base (Scenario 1)**	**Figure 6**
Gabites Porter		



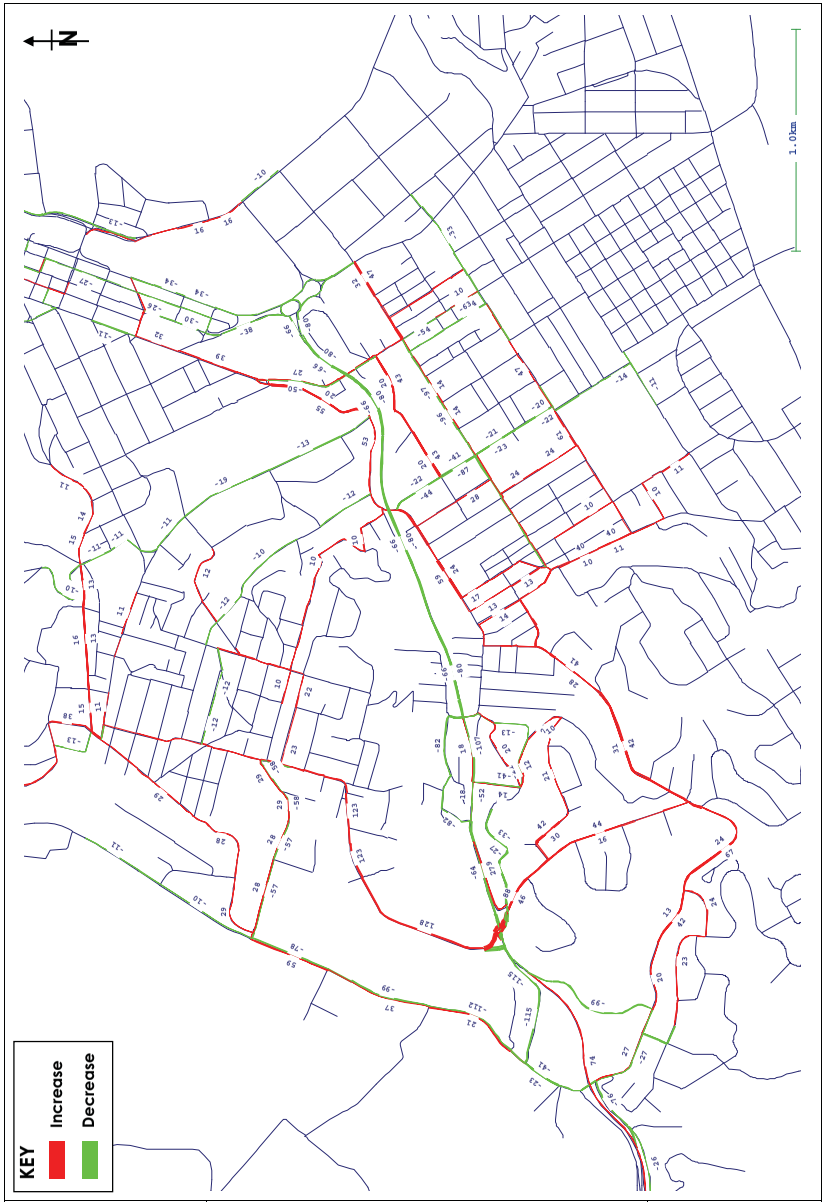
Dunedin Transportation Study	**2008 Inter Peak Change in Traffic Volume Finalised Lookout Pt Layout (Scenario 6)**	**Figure 7**
Gabites Porter		

Dunedin Transportation Study	**2008 Inter Peak Levels of Service Finalised Lookout Pt Layout (Scenario 6)**	**Figure 8**
Gabites Porter		



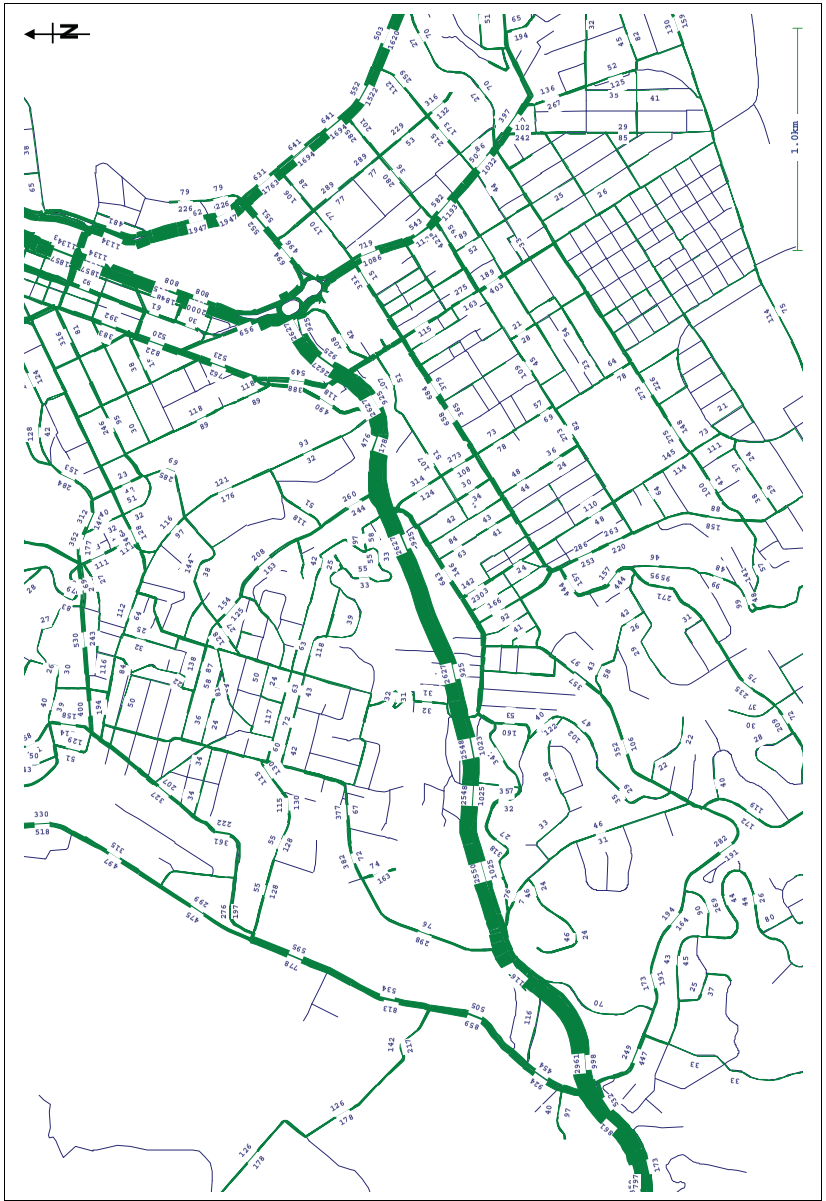
Dunedin Transportation Study	**2008 PM Peak Traffic Volume Base (Scenario 1)**	**Figure 9**
Gabites Porter		

Dunedin Transportation Study	**2008 PM Peak Levels of Service Base (Scenario 1)**	**Figure 10**
Gabites Porter		

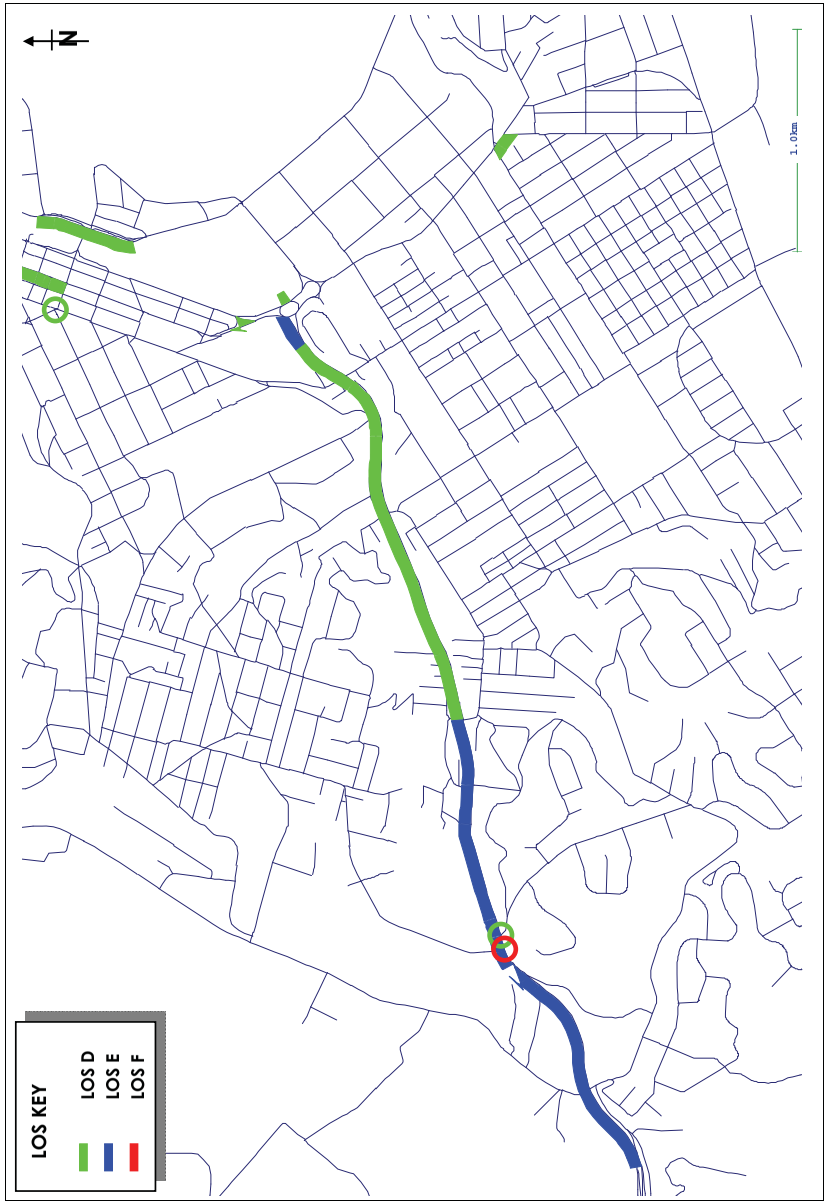


Dunedin Transportation Study	**2008 PM Peak Change in Traffic Volume Finalised Lookout Pt Layout (Scenario 6)**	**Figure 11**
Gabites Porter		

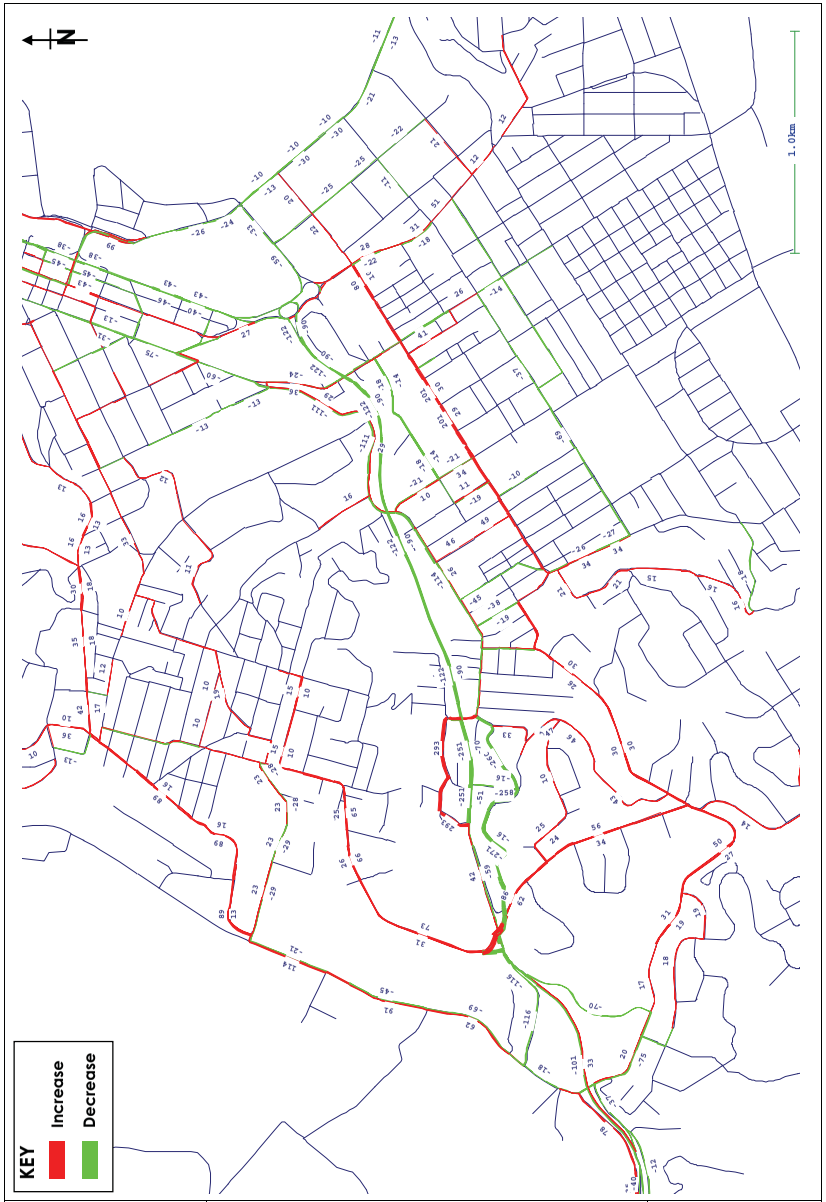
Dunedin Transportation Study	**2008 PM Peak Levels of Service Finalised Lookout Pt Layout (Scenario 6)**	**Figure 12**
Gabites Porter		



Dunedin Transportation Study	**2021 AM Peak Traffic Volume Base (Scenario 1)**	**Figure 13**
Gabites Porter		

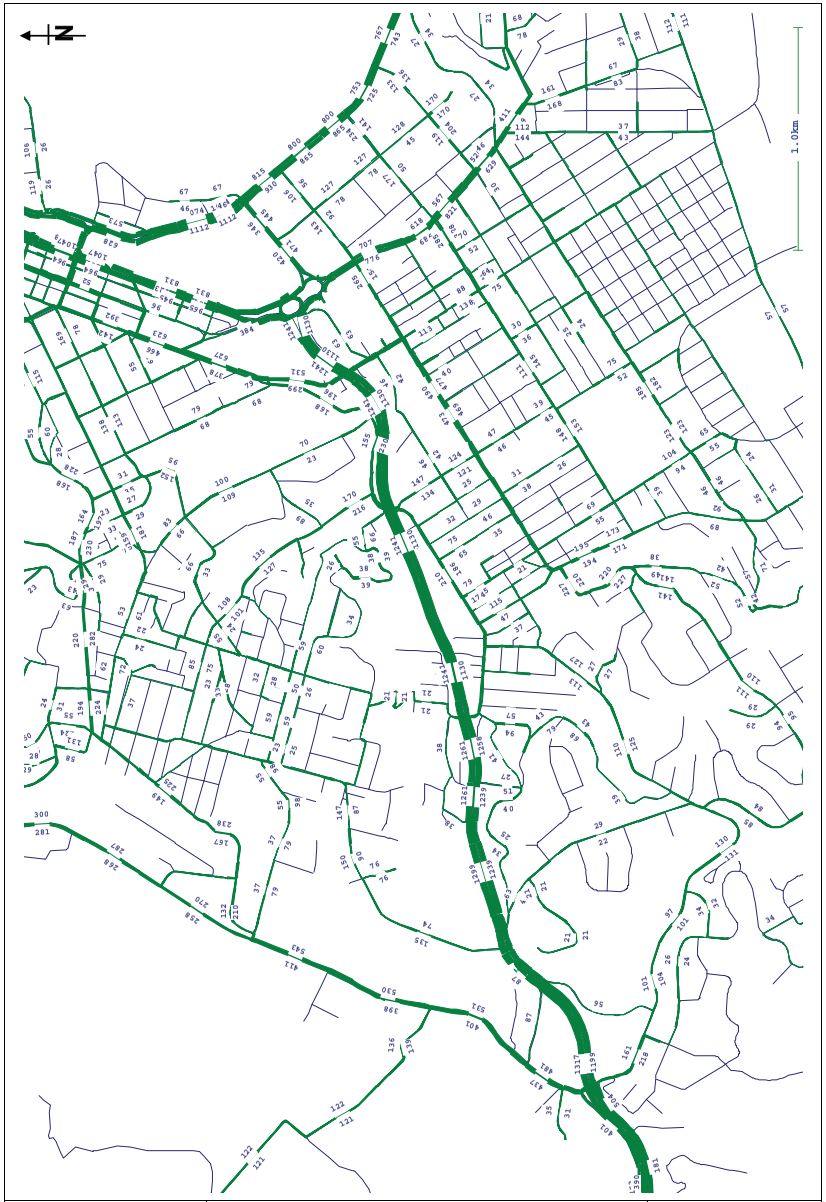


Dunedin Transportation Study	**2021 AM Peak Levels of Service Base (Scenario 1)**	**Figure 14**
Gabites Porter		



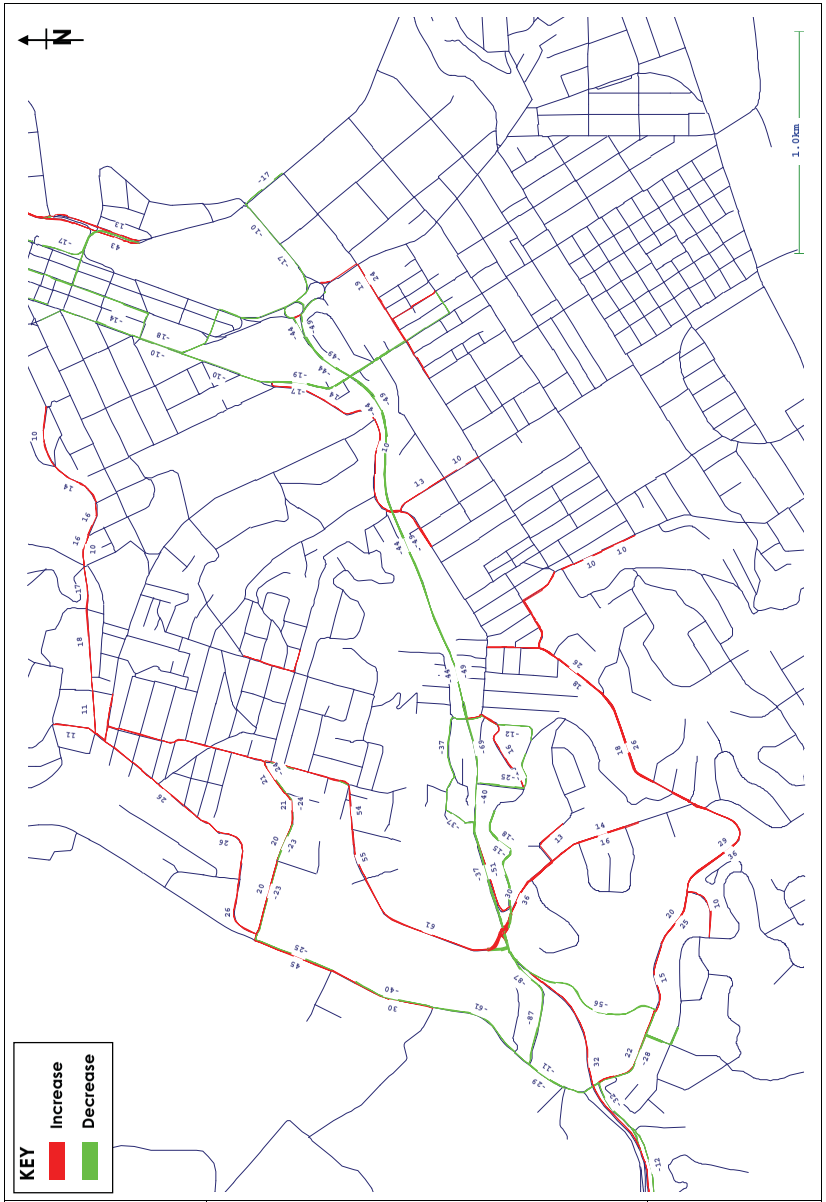
Dunedin Transportation Study	**2021 AM Peak Change in Traffic Volume Finalised Lookout Pt Layout (Scenario 6)**	**Figure 15**
Gabites Porter		

Dunedin Transportation Study	**2021 AM Peak Levels of Service Finalised Lookout Pt Layout (Scenario 6)**	**Figure 16**
Gabites Porter		



Dunedin Transportation Study	**2021 Inter Peak Traffic Volume Base (Scenario 1)**	**Figure 17**
Gabites Porter		

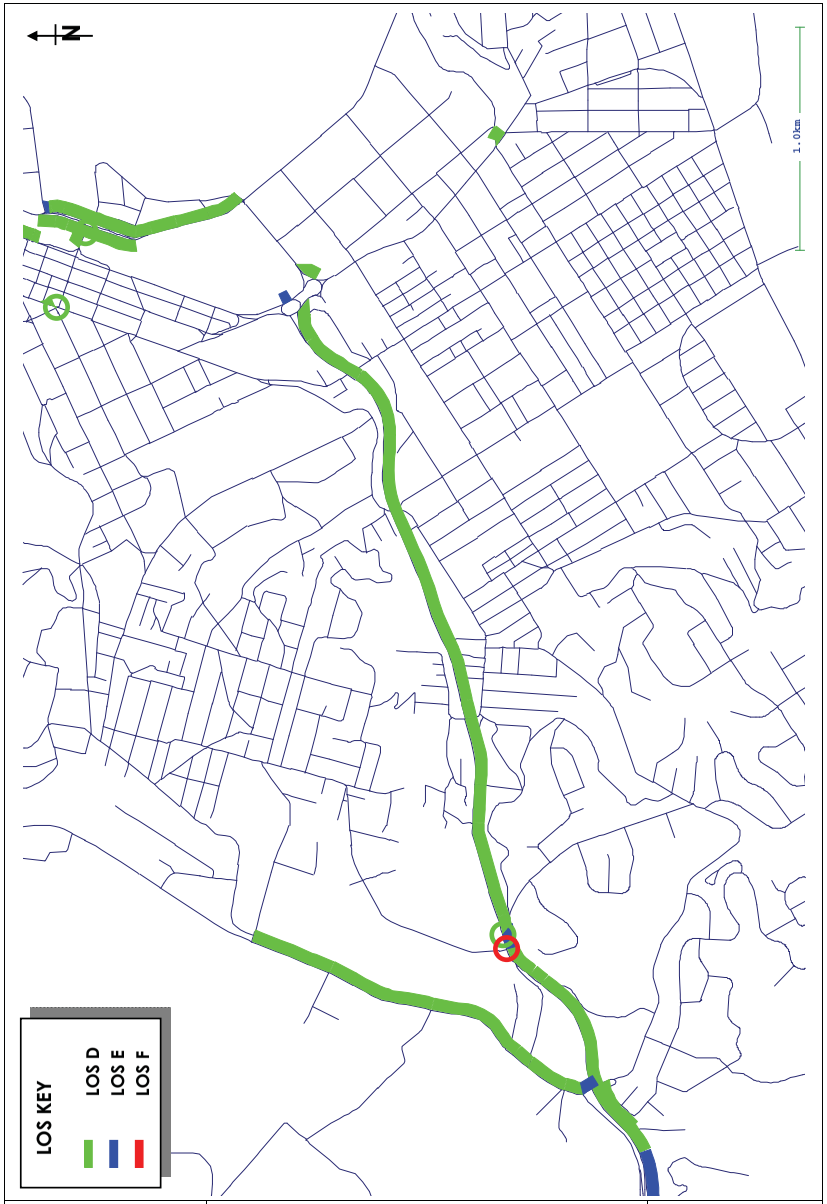
Dunedin Transportation Study	**2021 Inter Peak Levels of Service Base (Scenario 1)**	**Figure 18**
Gabites Porter		



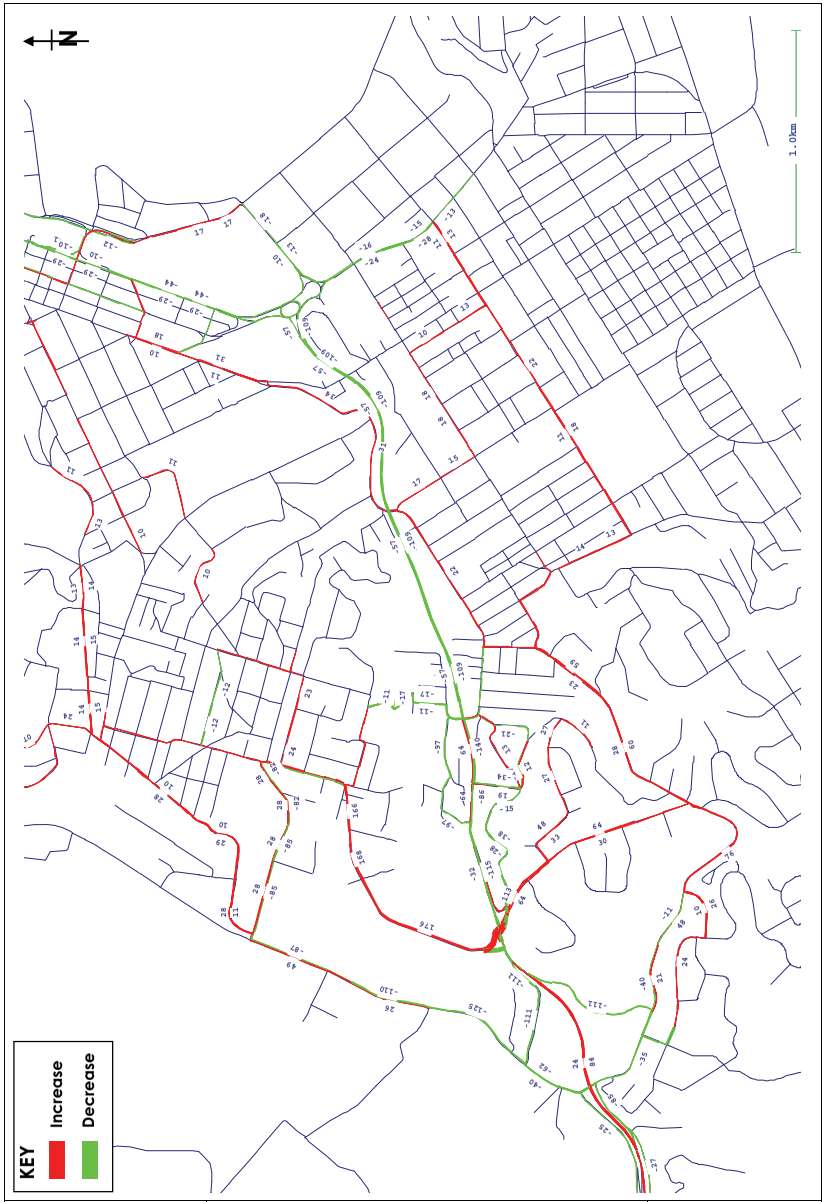
Dunedin Transportation Study	**2021 Inter Peak Change in Traffic Volume Finalised Lookout Pt Layout (Scenario 6)**	**Figure 19**
Gabites Porter		

Dunedin Transportation Study	**2021 Inter Peak Levels of Service Finalised Lookout Pt Layout (Scenario 6)**	**Figure 20**
Gabites Porter		

Dunedin Transportation Study	**2021 PM Peak Traffic Volume Base (Scenario 1)**	**Figure 21**
Gabites Porter		

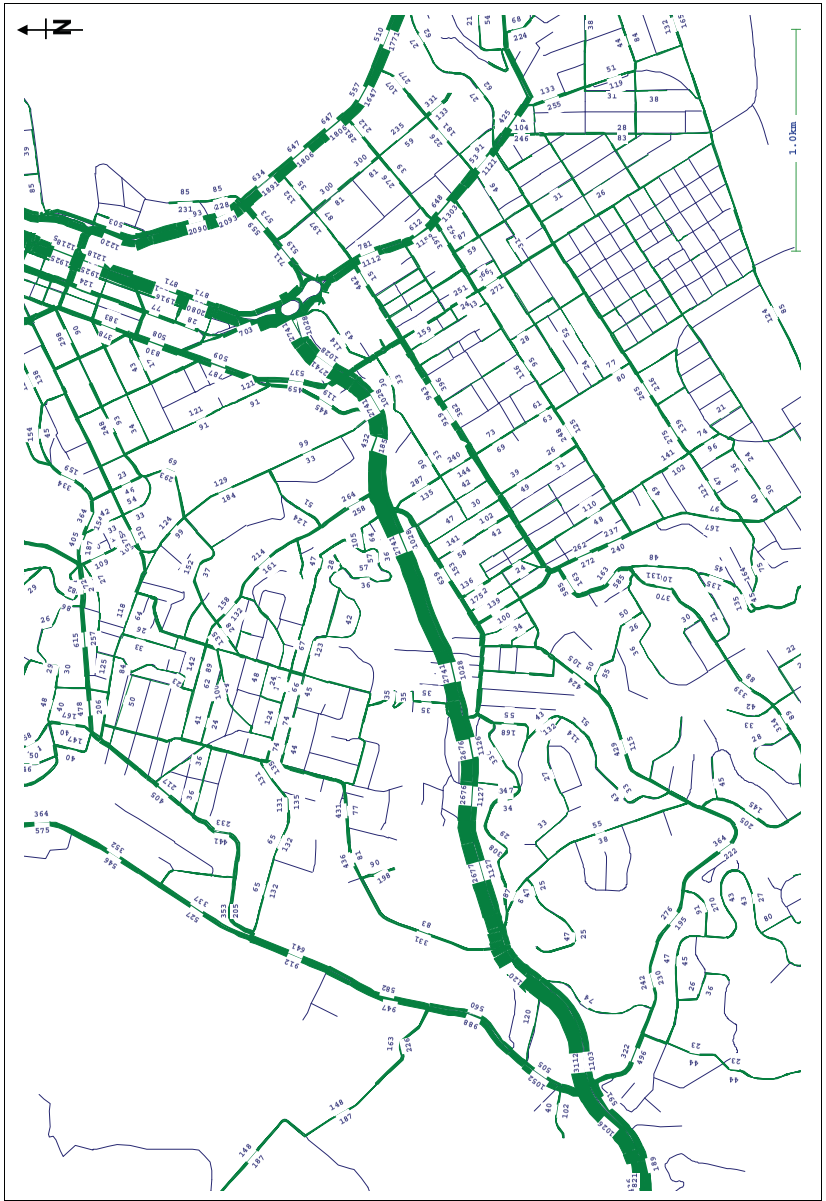


Dunedin Transportation Study	**2021 PM Peak Levels of Service Base (Scenario 1)**	**Figure 22**
Gabites Porter		



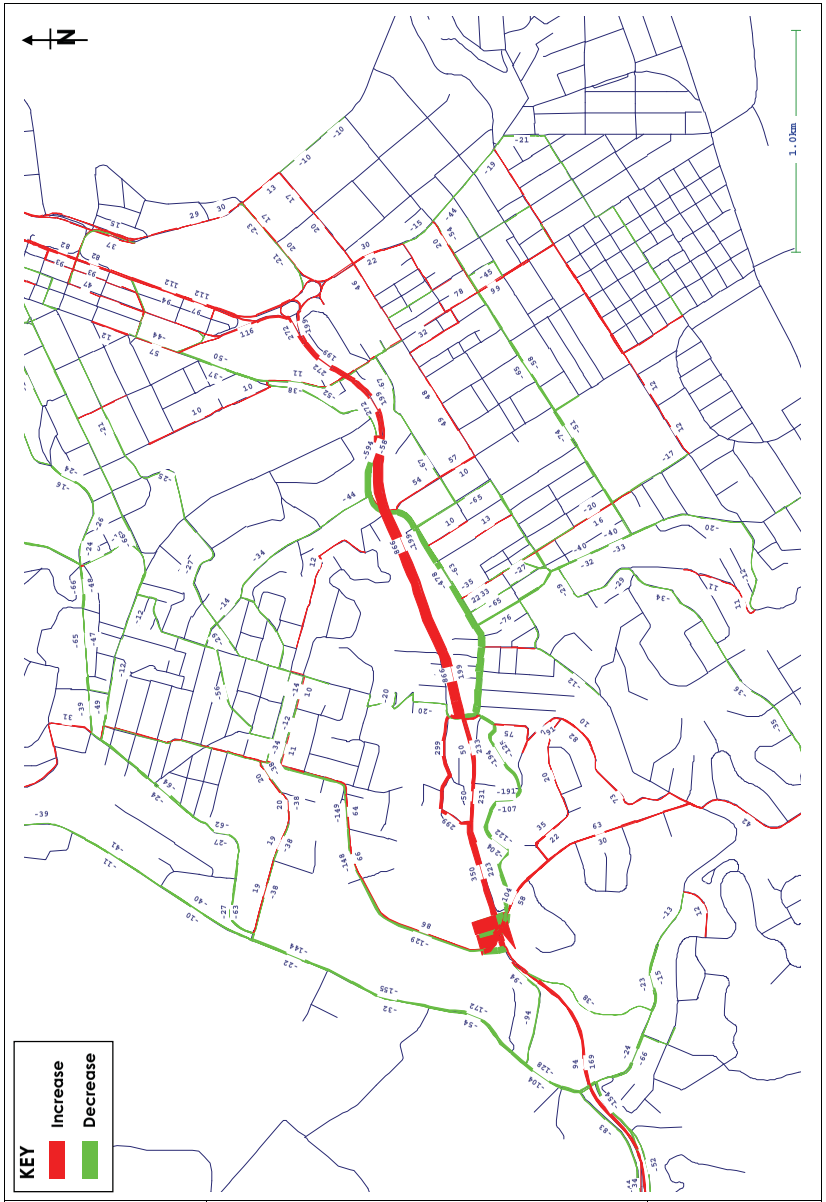
Dunedin Transportation Study	**2021 PM Peak Change in Traffic Volume Finalised Lookout Pt Layout (Scenario 6)**	**Figure 23**
Gabites Porter		

Dunedin Transportation Study	**2021 PM Peak Levels of Service Finalised Lookout Pt Layout (Scenario 6)**	**Figure 24**
Gabites Porter		

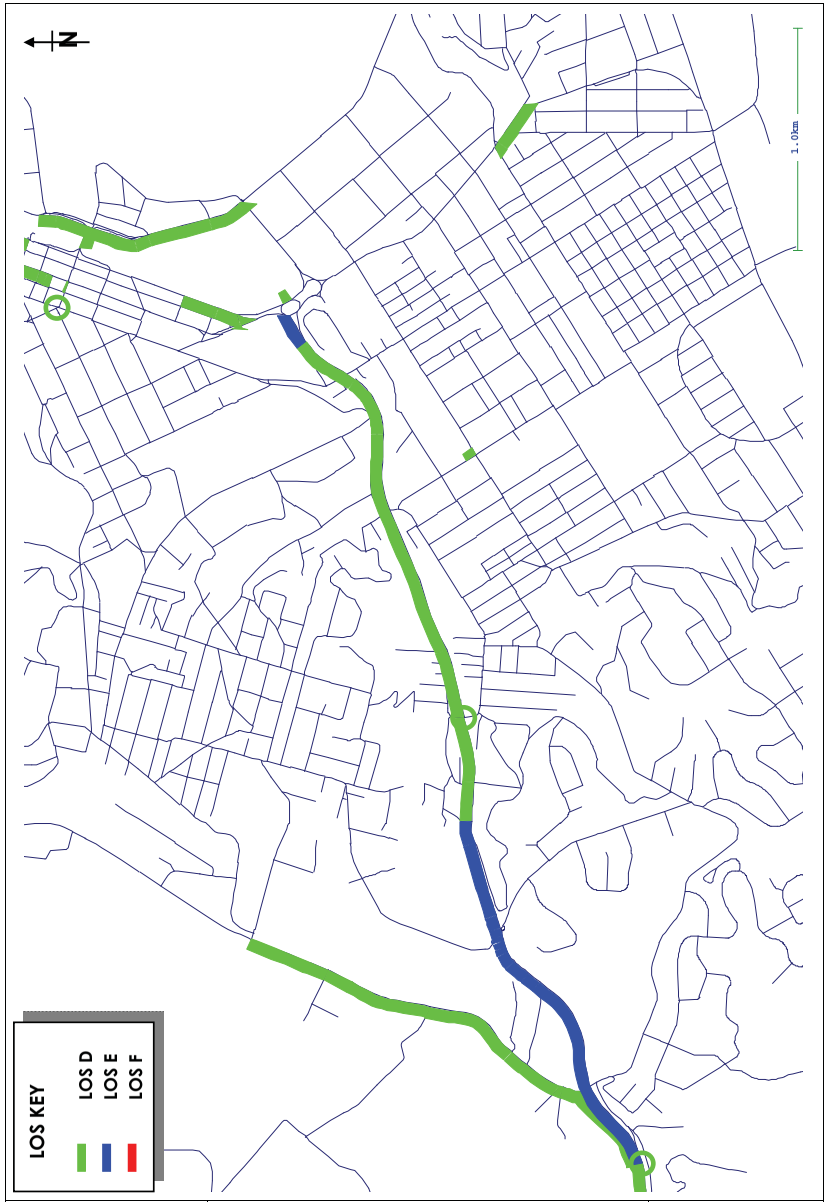


Dunedin Transportation Study	**2041 AM Peak Traffic Volume Base (Scenario 1)**	**Figure 25**
Gabites Porter		

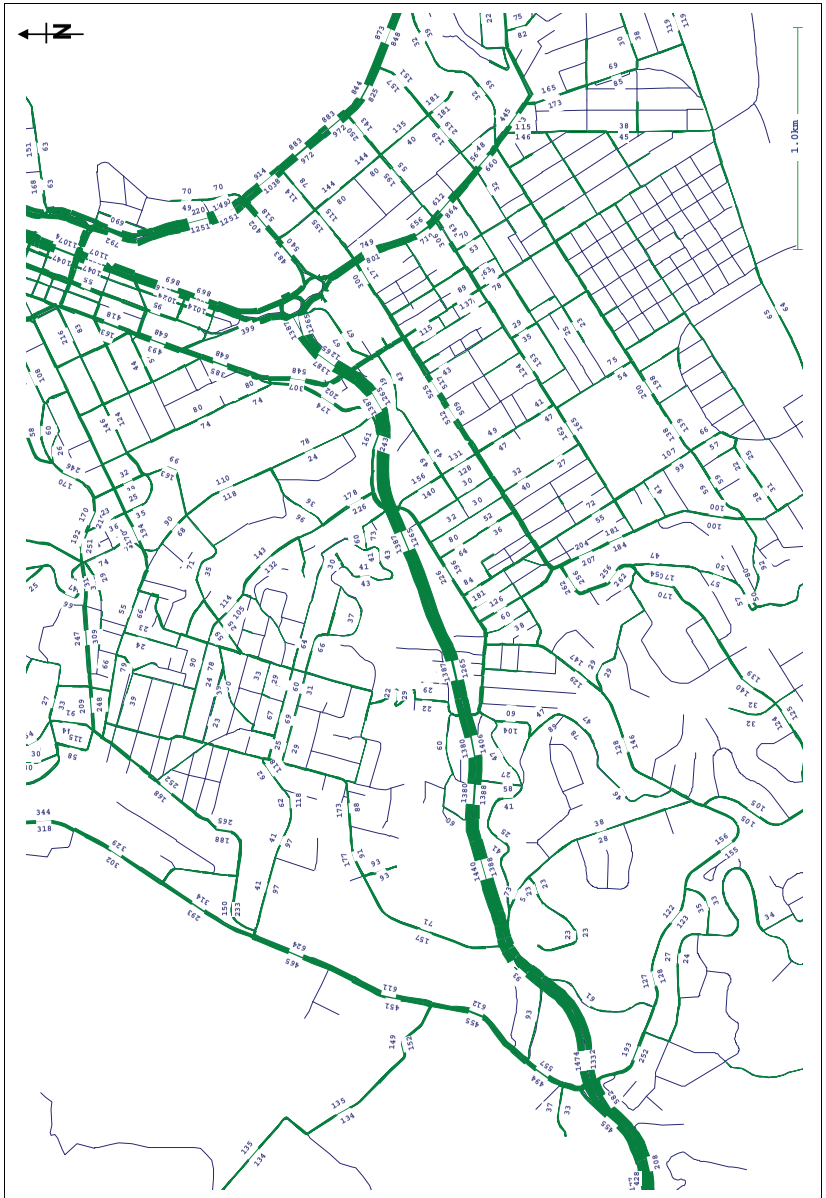
Dunedin Transportation Study	**2041 AM Peak Levels of Service Base (Scenario 1)**	**Figure 26**
Gabites Porter		



Dunedin Transportation Study	**2041 AM Peak Change in Traffic Volume Finalised Lookout Pt Layout (Scenario 6)**	**Figure 27**
Gabites Porter		

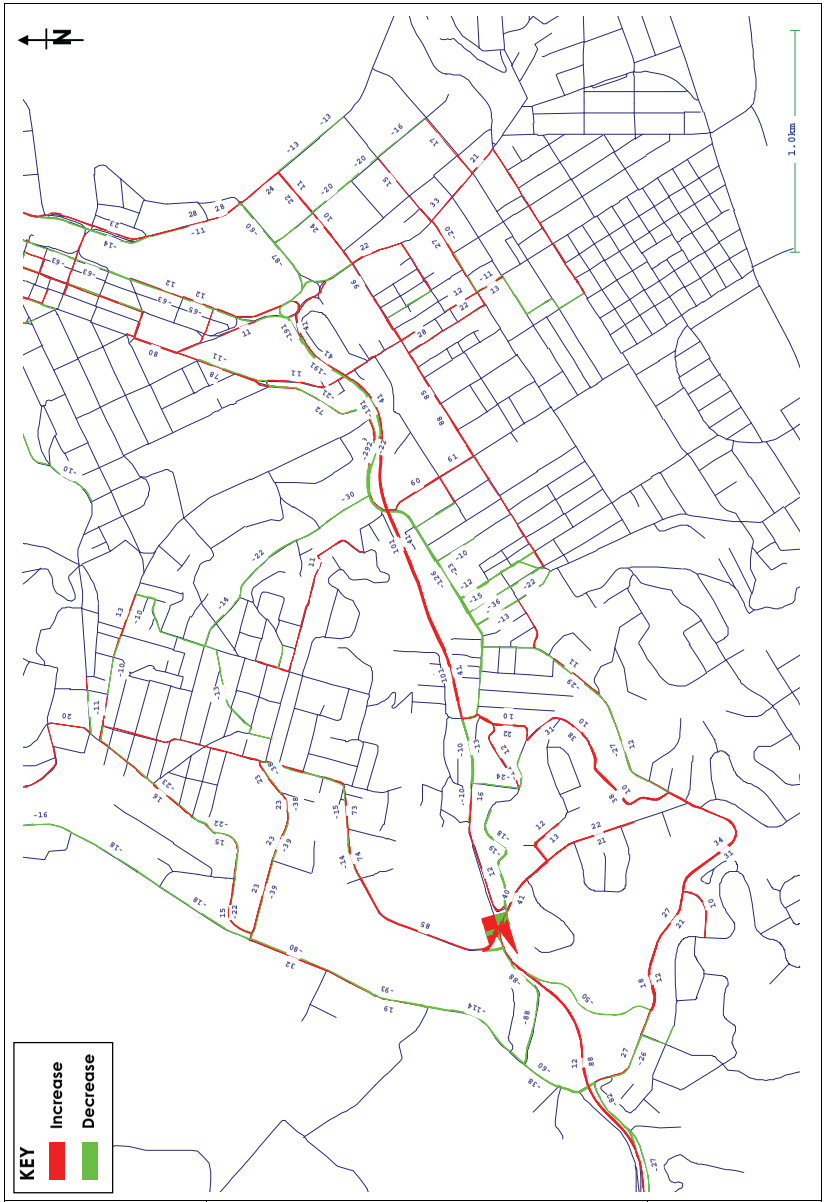


Dunedin Transportation Study	**2041 AM Peak Levels of Service Finalised Lookout Pt Layout (Scenario 6)**	**Figure 28**
Gabites Porter		



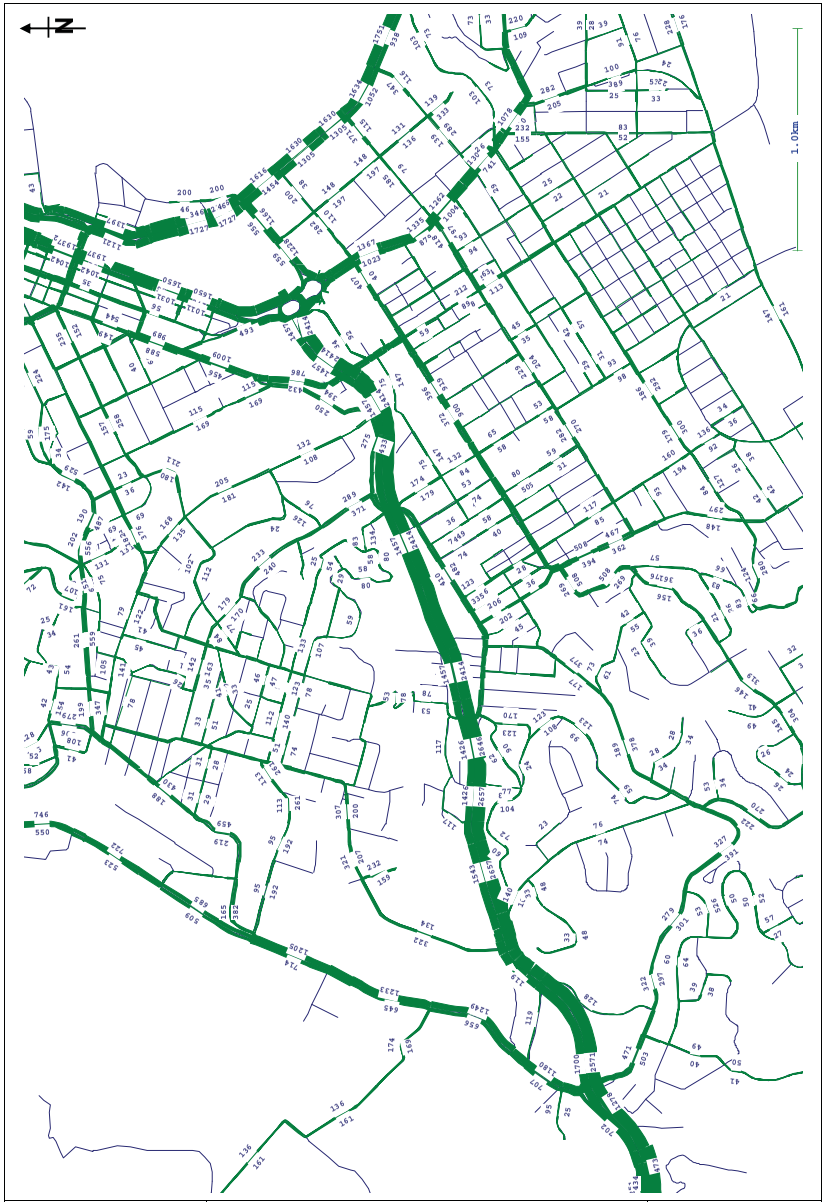
Dunedin Transportation Study	**2041 Inter Peak Traffic Volume Base (Scenario 1)**	**Figure 29**
Gabites Porter		

Dunedin Transportation Study	**2041 Inter Peak Levels of Service Base (Scenario 1)**	**Figure 30**
Gabites Porter		

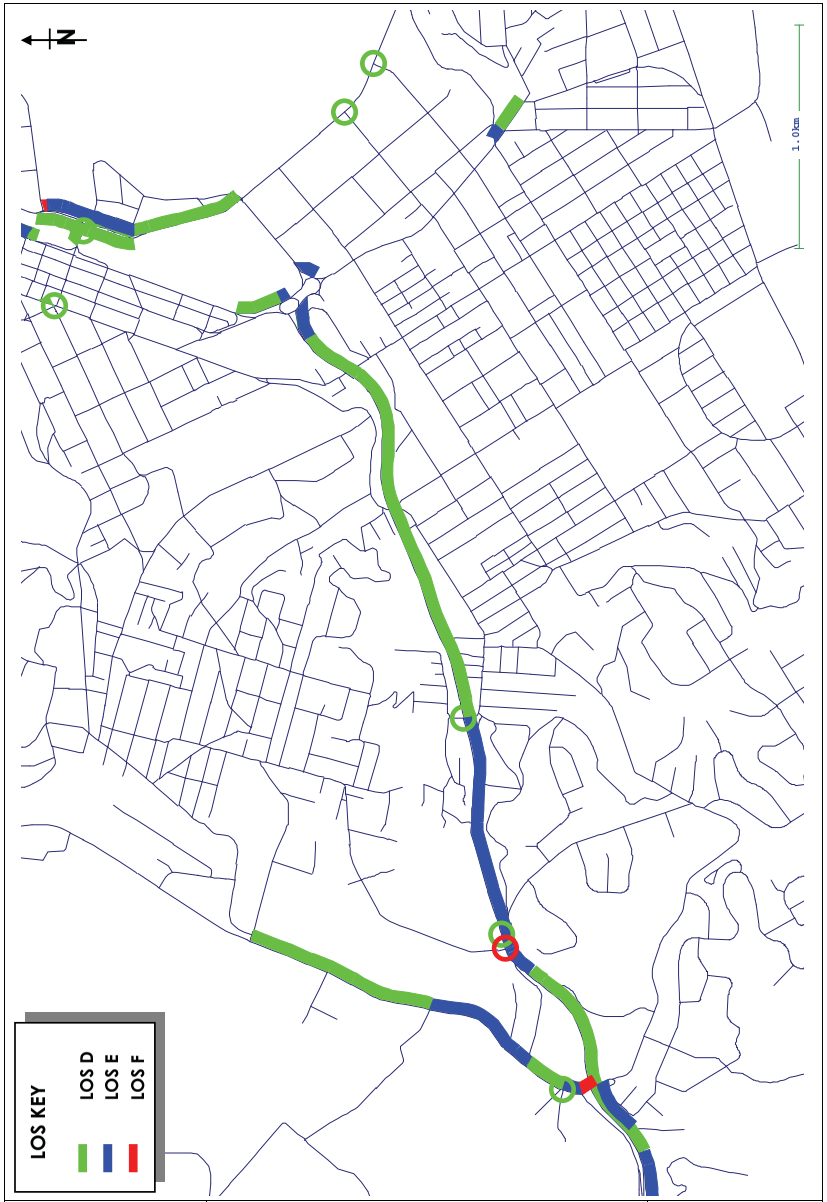


Dunedin Transportation Study	**2041 Inter Peak Change in Traffic Volume Finalised Lookout Pt Layout (Scenario 6)**	**Figure 31**
Gabites Porter		

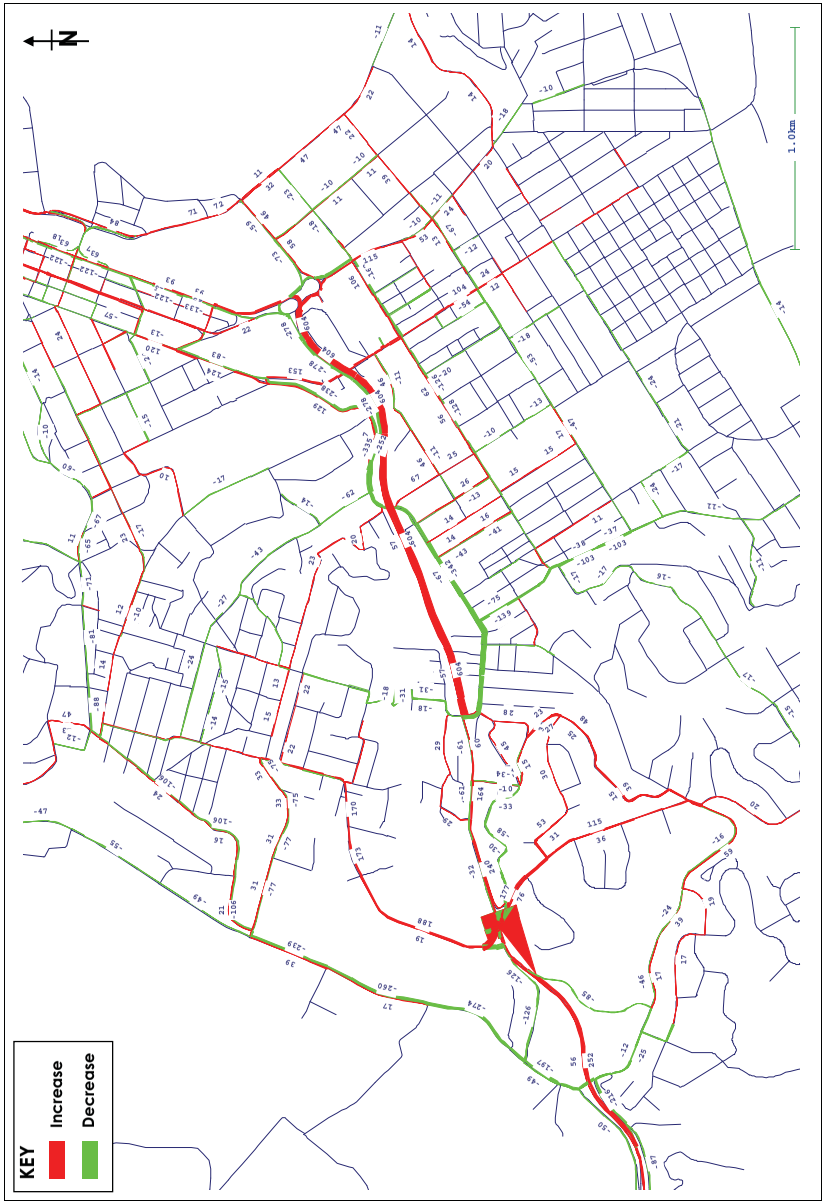
Dunedin Transportation Study	**2041 Inter Peak Levels of Service Finalised Lookout Pt Layout (Scenario 6)**	**Figure 32**
Gabites Porter		



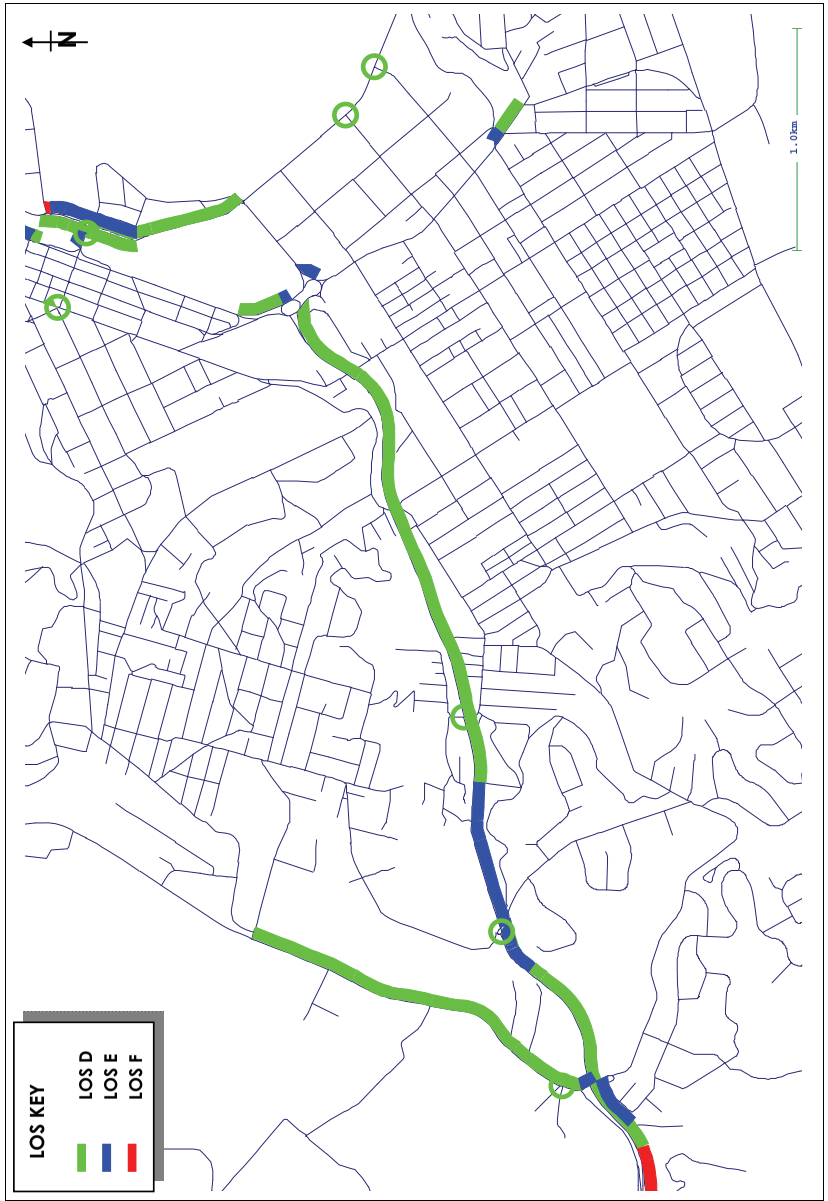
Dunedin Transportation Study	**2041 PM Peak Traffic Volume Base (Scenario 1)**	**Figure 33**
Gabites Porter		



Dunedin Transportation Study	**2041 PM Peak Levels of Service Base (Scenario 1)**	**Figure 34**
Gabites Porter		



Dunedin Transportation Study	**2041 PM Peak Change in Traffic Volume Finalised Lookout Pt Layout (Scenario 6)**	**Figure 35**
Gabites Porter		



Dunedin Transportation Study	**2041 PM Peak Levels of Service Finalised Lookout Pt Layout (Scenario 6)**	**Figure 36**
Gabites Porter		

APPENDIX F: Barnes Drive Intersection SIDRA

MOVEMENT SUMMARY

Site: Existing Layout (Sc1) AM -no Peds -adjusted flows

Barnes Dr
2021 AM Peak Existing Layout (Sc1) -No Peds
Signals - Fixed Time Cycle Time = 65 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Rd											
1	L	158	0.0	0.170	14.2	LOS B	2.5	17.6	0.58	0.72	37.2
2	T	28	0.0	0.946	33.0	LOS C	6.8	47.5	1.00	0.81	25.9
3	R	171	0.0	0.946	39.1	LOS D	6.8	47.5	1.00	0.81	25.9
Approach		357	0.0	0.946	27.6	LOS C	6.8	47.5	0.81	0.77	29.9
East: Caversham Bypass											
4	L	51	17.7	0.126	26.0	LOS C	1.2	9.9	0.78	0.72	31.0
5	T	899	17.7	0.919	41.5	LOS D	19.0	153.4	1.00	1.25	24.1
6	R	18	17.7	0.164	38.2	LOS D	0.6	4.6	0.94	0.71	26.2
Approach		969	17.7	0.919	40.6	LOS D	19.0	153.4	0.99	1.21	24.4
North: Barnes Dr											
7	L	39	0.0	0.358	37.6	LOS D	1.2	8.5	0.96	0.71	26.2
8	T	21	0.0	0.177	29.2	LOS C	1.1	7.5	0.93	0.68	27.7
9	R	15	0.0	0.177	35.5	LOS D	1.1	7.5	0.93	0.73	27.6
Approach		74	0.0	0.358	34.8	LOS C	1.2	8.5	0.94	0.71	26.9
West: Caversham Valley Rd											
10	L	13	11.3	0.960	46.5	LOS D	55.2	423.5	0.98	1.34	24.5
11	T	2544	11.3	0.960	39.5	LOS D	62.5	479.9	0.98	1.31	24.6
12	R	116	11.3	0.154	13.4	LOS B	1.3	10.2	0.65	0.72	38.0
Approach		2673	11.3	0.960	38.4	LOS D	62.5	479.9	0.97	1.28	25.0
All Vehicles		4073	11.6	0.960	37.9	LOS D	62.5	479.9	0.96	1.21	25.3

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

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MOVEMENT SUMMARY

Site: Existing Layout (Sc1) PM -no Peds -adjusted flows

Barnes Dr
2021 PM Peak Existing Layout (Sc1)-No peds
Signals - Fixed Time Cycle Time = 58 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Rd											
1	L	398	0.0	1.155	188.3	LOS F	36.8	257.5	1.00	2.10	9.0
2	T	46	0.0	0.756	27.5	LOS C	5.0	34.8	0.95	0.90	28.1
3	R	123	0.0	0.756	33.5	LOS C	5.0	34.8	0.95	0.93	28.0
Approach		566	0.0	1.155	141.8	LOS F	36.8	257.5	0.99	1.75	11.3
East: Caversham Bypass											
4	L	146	4.7	0.187	11.8	LOS B	1.8	13.0	0.53	0.71	38.9
5	T	2061	4.7	0.845	15.0	LOS B	28.2	205.1	0.85	0.89	35.1
6	R	37	4.7	0.099	14.7	LOS B	0.4	3.0	0.74	0.70	37.1
Approach		2243	4.7	0.845	14.7	LOS B	28.2	205.1	0.83	0.88	35.4
North: Barnes Dr											
7	L	27	3.6	0.168	20.2	LOS C	0.5	3.8	0.76	0.69	33.6
8	T	40	3.6	0.238	22.6	LOS C	1.8	13.3	0.89	0.68	30.5
9	R	33	3.6	0.238	28.9	LOS C	1.8	13.3	0.89	0.77	30.1
Approach		100	3.6	0.238	24.0	LOS C	1.8	13.3	0.85	0.71	31.1
West: Caversham Valley Rd											
10	L	11	9.0	0.715	21.7	LOS C	14.3	108.2	0.87	0.92	34.5
11	T	1185	9.0	0.715	15.0	LOS B	14.5	109.5	0.87	0.80	35.0
12	R	209	9.0	1.262	289.1	LOS F	26.0	195.8	1.00	2.45	6.3
Approach		1405	9.0	1.262	55.8	LOS E	26.0	195.8	0.89	1.04	20.8
All Vehicles		4314	5.4	1.262	45.0	LOS D	36.8	257.5	0.87	1.04	23.4

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

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MOVEMENT SUMMARY

Site: Base (Sc6) AM -no Peds - adjusted flows -dedicated LT

Barnes Dr
2021 AM Peak Base Option (Sc6) -No Peds
Signals - Fixed Time Cycle Time = 53 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Rd											
1	L	206	0.0	0.282	16.3	LOS B	3.4	23.6	0.73	0.76	36.0
2	T	10	0.0	1.000[3]	29.7	LOS C	6.3	44.1	1.00	0.86	26.9
3	R	202	0.0	1.000[3]	35.8	LOS D	6.3	44.1	1.00	0.86	26.9
Approach		418	0.0	1.000	26.0	LOS C	6.3	44.1	0.87	0.81	30.7
East: Caversham Bypass											
4	L	51	17.7	0.107	20.8	LOS C	1.0	7.7	0.73	0.72	33.6
5	T	808	17.7	0.673	17.4	LOS B	9.5	76.8	0.91	0.82	33.6
6	R	17	17.7	0.127	34.8	LOS C	0.4	3.6	0.98	0.68	27.4
Approach		876	17.7	0.673	17.9	LOS B	9.5	76.8	0.90	0.81	33.5
North: Barnes Dr											
7	L	1	0.0	0.008	29.4	LOS C	0.0	0.2	0.90	0.58	29.2
8	T	60	0.0	0.292	24.0	LOS C	1.7	12.1	0.94	0.71	30.2
9	R	9	0.0	0.292	30.1	LOS C	1.7	12.1	0.94	0.76	30.0
Approach		70	0.0	0.292	24.9	LOS C	1.7	12.1	0.94	0.72	30.1
West: Caversham Valley Rd											
10	L	7	11.3	0.009	10.0	LOS A	0.1	0.5	0.43	0.64	40.4
11	T	2423	11.3	0.972	44.1	LOS D	56.1	430.6	1.00	1.47	23.4
12	R	282	11.3	0.456	13.6	LOS B	3.0	22.7	0.79	0.79	37.9
Approach		2713	11.3	0.972	40.8	LOS D	56.1	430.6	0.98	1.39	24.4
All Vehicles		4065	11.3	1.000	34.2	LOS C	56.1	430.6	0.95	1.20	26.6

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

3 x = 1.00 due to short lane. Refer to the Lane Summary report for information about excess flow and related conditions.

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MOVEMENT SUMMARY

Site: Base (Sc6) PM -no Peds - adjusted flows -dedicated LT

Barnes Dr
2021 PM Peak Base Option (Sc6) -No peds
Signals - Fixed Time Cycle Time = 47 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Rd											
1	L	398	0.0	1.087	125.2	LOS F	26.5	185.4	1.00	1.97	12.4
2	T	32	0.0	0.508	19.3	LOS B	2.9	20.5	0.92	0.73	31.7
3	R	102	0.0	0.508	25.2	LOS C	2.9	20.5	0.92	0.78	31.4
Approach		532	0.0	1.087	99.5	LOS F	26.5	185.4	0.98	1.67	14.7
East: Caversham Bypass											
4	L	156	4.7	0.182	12.0	LOS B	1.7	12.6	0.61	0.73	38.8
5	T	1930	4.7	0.847	15.2	LOS B	23.5	170.8	0.88	0.97	34.9
6	R	38	4.7	0.092	15.0	LOS B	0.4	2.8	0.83	0.70	36.8
Approach		2124	4.7	0.847	14.9	LOS B	23.5	170.8	0.86	0.95	35.2
North: Barnes Dr											
7	L	22	3.6	0.105	16.3	LOS B	0.3	2.3	0.73	0.67	35.9
8	T	39	3.6	0.183	18.2	LOS B	1.2	8.5	0.87	0.66	32.8
9	R	19	3.6	0.183	24.4	LOS C	1.2	8.5	0.87	0.75	32.4
Approach		80	3.6	0.183	19.1	LOS B	1.2	8.5	0.83	0.69	33.5
West: Caversham Valley Rd											
10	L	8	9.0	0.015	17.0	LOS B	0.1	0.9	0.66	0.65	35.6
11	T	1134	9.0	0.842	21.6	LOS C	15.0	113.1	0.98	1.07	31.4
12	R	230	9.0	1.214	237.7	LOS F	24.0	181.1	1.00	2.49	7.4
Approach		1372	9.0	1.214	57.9	LOS E	24.0	181.1	0.98	1.31	20.4
All Vehicles		4109	5.5	1.214	40.3	LOS D	26.5	185.4	0.92	1.15	24.7

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

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MOVEMENT SUMMARY

Site: Alt 1 (Sc4) AM -no Peds - adjusted flows -dedicated LT

Barnes Dr
2021 AM Peak Alternative 1(Sc4) -No Peds
Signals - Fixed Time Cycle Time = 48 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Rd											
1	L	228	0.0	0.301	14.6	LOS B	3.2	22.7	0.72	0.77	37.2
2	T	6	0.0	1.000[3]	23.6	LOS C	6.8	47.3	1.00	0.83	29.3
3	R	258	0.0	1.000[3]	29.7	LOS C	6.8	47.3	1.00	0.83	29.3
Approach		491	0.0	1.000	22.6	LOS C	6.8	47.3	0.87	0.80	32.5
East: Caversham Bypass											
4	L	62	17.7	0.123	20.8	LOS C	1.1	8.9	0.77	0.73	33.6
5	T	782	17.7	0.759	20.0	LOS C	9.5	76.9	0.97	0.94	32.2
6	R	23	17.7	0.158	32.0	LOS C	0.6	4.5	0.97	0.69	28.4
Approach		867	17.7	0.759	20.4	LOS C	9.5	76.9	0.95	0.92	32.2
North: Barnes Dr											
7	L	6	0.0	0.041	27.1	LOS C	0.1	0.9	0.90	0.64	30.3
8	T	64	0.0	0.244	19.9	LOS B	1.6	11.1	0.91	0.69	32.1
9	R	9	0.0	0.244	26.0	LOS C	1.6	11.1	0.91	0.77	31.8
Approach		80	0.0	0.244	21.2	LOS C	1.6	11.1	0.90	0.70	32.0
West: Caversham Valley Rd											
10	L	7	11.3	0.009	10.7	LOS B	0.1	0.5	0.49	0.64	39.8
11	T	2364	11.3	1.030	76.5	LOS E	68.8	527.8	1.00	2.00	17.1
12	R	290	11.3	0.509	14.3	LOS B	3.3	25.0	0.85	0.80	37.4
Approach		2661	11.3	1.030	69.5	LOS E	68.8	527.8	0.98	1.87	18.2
All Vehicles		4073	11.1	1.030	52.9	LOS D	68.8	527.8	0.97	1.53	21.5

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

3 x = 1.00 due to short lane. Refer to the Lane Summary report for information about excess flow and related conditions.

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MOVEMENT SUMMARY

Site: Alt 1 (Sc4) PM -no Peds - adjusted flows -dedicated LT

Barnes Dr
2021 PM Peak Alternative 1 (Sc4) -No peds
Signals - Fixed Time Cycle Time = 45 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Rd											
1	L	389	0.0	1.015	72.4	LOS E	17.8	124.9	1.00	1.60	18.2
2	T	32	0.0	0.576	18.8	LOS B	3.4	23.7	0.93	0.78	31.9
3	R	127	0.0	0.576	24.7	LOS C	3.4	23.7	0.93	0.82	31.7
Approach		549	0.0	1.015	58.2	LOS E	17.8	124.9	0.98	1.37	20.8
East: Caversham Bypass											
4	L	198	4.7	0.238	12.4	LOS B	2.3	16.5	0.65	0.74	38.5
5	T	1865	4.7	0.844	15.1	LOS B	21.9	159.8	0.89	0.98	35.0
6	R	57	4.7	0.136	15.1	LOS B	0.6	4.3	0.85	0.72	36.8
Approach		2120	4.7	0.844	14.8	LOS B	21.9	159.8	0.87	0.95	35.3
North: Barnes Dr											
7	L	33	3.6	0.149	15.5	LOS B	0.5	3.3	0.73	0.69	36.4
8	T	45	3.6	0.189	17.1	LOS B	1.2	8.8	0.87	0.66	33.5
9	R	18	3.6	0.189	23.3	LOS C	1.2	8.8	0.87	0.76	33.0
Approach		96	3.6	0.189	17.7	LOS B	1.2	8.8	0.82	0.69	34.3
West: Caversham Valley Rd											
10	L	8	9.0	0.015	17.5	LOS B	0.1	0.9	0.69	0.65	35.3
11	T	1090	9.0	0.879	25.0	LOS C	15.2	114.7	1.00	1.17	29.8
12	R	219	9.0	1.135	167.3	LOS F	17.7	133.6	1.00	2.15	10.0
Approach		1317	9.0	1.135	48.7	LOS D	17.7	133.6	1.00	1.33	22.4
All Vehicles		4082	5.4	1.135	31.6	LOS C	21.9	159.8	0.92	1.12	27.6

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

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MOVEMENT SUMMARY

Site: Alt 2 (Sc2B) AM -no Peds - adjusted flows -dedicated LT

Barnes Dr
2021 AM Peak Alternative 2 (Sc2B) -No Peds
Signals - Fixed Time Cycle Time = 64 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Rd											
1	L	158	0.0	0.499	27.1	LOS C	5.2	36.5	0.91	0.79	30.4
2	T	40	0.0	0.499	20.7	LOS C	5.2	36.5	0.91	0.72	30.6
3	R	174	0.0	0.907	43.5	LOS D	6.3	44.1	1.00	0.95	24.5
Approach		372	0.0	0.907	34.1	LOS C	6.3	44.1	0.95	0.86	27.3
East: Caversham Bypass											
4	L	51	17.7	0.109	18.2	LOS B	0.9	7.6	0.61	0.71	35.0
5	T	894	17.7	0.578	14.8	LOS B	10.7	86.1	0.81	0.70	35.3
6	R	23	17.7	0.206	35.1	LOS D	0.7	5.6	0.90	0.73	27.2
Approach		969	17.7	0.578	15.5	LOS B	10.7	86.1	0.80	0.70	35.0
North: Barnes Dr											
7	L	39	0.0	0.587	37.6	LOS D	2.0	14.2	0.96	0.80	26.6
8	T	25	0.0	0.587	31.2	LOS C	2.0	14.2	0.96	0.77	26.7
9	R	18	0.0	0.096	36.3	LOS D	0.5	3.8	0.94	0.69	26.7
Approach		82	0.0	0.587	35.4	LOS D	2.0	14.2	0.96	0.77	26.7
West: Caversham Valley Rd											
10	L	12	11.3	0.015	9.4	LOS A	0.1	0.8	0.36	0.64	40.9
11	T	2527	11.3	0.937	30.5	LOS C	53.6	411.5	0.93	1.15	27.7
12	R	160	11.3	0.266	12.6	LOS B	1.8	13.5	0.65	0.74	38.6
Approach		2699	11.3	0.937	29.4	LOS C	53.6	411.5	0.91	1.12	28.2
All Vehicles		4122	11.5	0.937	26.7	LOS C	53.6	411.5	0.89	0.99	29.4

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

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MOVEMENT SUMMARY

Site: Alt 2 (Sc2B) PM -no Peds - adjusted flows -dedicated LT

Barnes Dr
2021 PM Peak Alternative 2 (Sc2B) -No peds
Signals - Fixed Time Cycle Time = 50 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Rd											
1	L	391	0.0	1.250	266.0	LOS F	52.5	367.6	1.00	2.99	6.8
2	T	73	0.0	1.250	259.6	LOS F	52.5	367.6	1.00	2.99	6.7
3	R	129	0.0	0.504	25.8	LOS C	2.9	20.3	0.91	0.77	30.9
Approach		593	0.0	1.250	213.1	LOS F	52.5	367.6	0.98	2.51	8.1
East: Caversham Bypass											
4	L	139	4.7	0.169	12.1	LOS B	1.6	11.7	0.59	0.72	38.7
5	T	2048	4.7	0.892	21.4	LOS C	30.9	224.8	0.93	1.10	31.5
6	R	55	4.7	0.141	15.6	LOS B	0.6	4.3	0.84	0.72	36.5
Approach		2241	4.7	0.892	20.7	LOS C	30.9	224.8	0.91	1.07	32.0
North: Barnes Dr											
7	L	27	3.6	0.376	19.8	LOS B	1.2	8.6	0.83	0.75	34.7
8	T	40	3.6	0.376	13.3	LOS B	1.2	8.6	0.83	0.61	35.2
9	R	41	3.6	0.135	25.8	LOS C	0.9	6.3	0.87	0.72	31.0
Approach		108	3.6	0.376	19.6	LOS B	1.2	8.6	0.84	0.69	33.4
West: Caversham Valley Rd											
10	L	11	9.0	0.022	17.1	LOS B	0.2	1.3	0.64	0.66	35.6
11	T	1161	9.0	0.821	20.5	LOS C	15.4	116.2	0.96	1.01	31.9
12	R	224	9.0	1.319	330.1	LOS F	29.2	220.0	1.00	2.76	5.6
Approach		1397	9.0	1.319	70.2	LOS E	29.2	220.0	0.97	1.29	18.2
All Vehicles		4339	5.4	1.319	62.9	LOS E	52.5	367.6	0.94	1.33	19.4

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

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APPENDIX G: Lookout Pt Ramp Connection SIDRA

MOVEMENT SUMMARY

Site: Sc6 NB on/off ramp 2021 AM

Riselaw Rd and NB on/off ramp -Base (Sc6)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Riselaw Rd (south)											
1	L	41	0.0	0.082	6.5	LOS A	0.4	3.0	0.10	0.75	43.2
2	T	103	0.0	0.082	0.1	LOS A	0.4	3.0	0.10	0.00	48.6
Approach		144	0.0	0.082	1.9	NA	0.4	3.0	0.10	0.21	46.9
North: Riselaw Rd (north)											
8	T	131	0.0	0.087	0.4	LOS A	0.5	3.5	0.23	0.00	47.0
9	R	26	0.0	0.087	6.7	LOS A	0.5	3.5	0.23	0.74	43.1
Approach		157	0.0	0.087	1.5	NA	0.5	3.5	0.23	0.12	46.3
West: NB on/off ramp											
10	L	243	0.0	0.410	8.5	LOS A	2.2	15.6	0.37	0.62	41.5
12	R	106	0.0	0.410	8.5	LOS A	2.2	15.6	0.37	0.72	41.5
Approach		349	0.0	0.410	8.5	LOS A	2.2	15.6	0.37	0.65	41.5
All Vehicles		651	0.0	0.410	5.4	NA	2.2	15.6	0.28	0.43	43.7

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

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MOVEMENT SUMMARY

Site: Sc6 NB on/off ramp 2021 PM

Riselaw Rd and NB on/off ramp -Base (Sc6)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Riselaw Rd (south)											
1	L	28	0.0	0.091	6.5	LOS A	0.5	3.5	0.11	0.78	43.2
2	T	138	0.0	0.091	0.1	LOS A	0.5	3.5	0.11	0.00	48.6
Approach		166	0.0	0.091	1.2	NA	0.5	3.5	0.11	0.13	47.5
North: Riselaw Rd (north)											
8	T	282	0.0	0.167	0.6	LOS A	1.1	7.7	0.30	0.00	46.3
9	R	28	0.0	0.167	7.0	LOS A	1.1	7.7	0.30	0.76	43.1
Approach		311	0.0	0.167	1.2	NA	1.1	7.7	0.30	0.07	46.0
West: NB on/off ramp											
10	L	167	0.0	0.398	10.8	LOS B	2.3	15.8	0.44	0.68	39.7
12	R	101	0.0	0.398	10.7	LOS B	2.3	15.8	0.44	0.81	39.7
Approach		268	0.0	0.398	10.8	LOS B	2.3	15.8	0.44	0.73	39.7
All Vehicles		745	0.0	0.398	4.6	NA	2.3	15.8	0.31	0.32	43.8

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

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MOVEMENT SUMMARY

Site: Sc6 SB on/off ramp 2021 AM

Riselaw Rd and SB on/off ramp -Base (Sc6)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Riselaw Rd (south)											
1	L	24	0.0	0.080	6.7	LOS A	0.5	3.2	0.21	0.76	43.1
2	T	121	0.0	0.080	0.3	LOS A	0.5	3.2	0.21	0.00	47.3
Approach		145	0.0	0.080	1.4	NA	0.5	3.2	0.21	0.13	46.6
North: Riselaw Rd (north)											
8	T	152	0.0	0.144	0.5	LOS A	0.8	5.7	0.26	0.00	46.5
9	R	85	0.0	0.144	6.9	LOS A	0.8	5.7	0.26	0.70	42.9
Approach		237	0.0	0.144	2.8	NA	0.8	5.7	0.26	0.25	45.2
West: SB on/off ramp											
10	L	23	0.0	0.057	8.6	LOS A	0.2	1.5	0.33	0.58	41.4
12	R	18	0.0	0.057	8.6	LOS A	0.2	1.5	0.33	0.68	41.4
Approach		41	0.0	0.057	8.6	LOS A	0.2	1.5	0.33	0.62	41.4
All Vehicles		423	0.0	0.144	2.9	NA	0.8	5.7	0.25	0.24	45.2

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

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MOVEMENT SUMMARY

Site: Sc6 SB on/off ramp 2021 PM

Riselaw Rd and SB on/off ramp -Base (Sc6)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Riselaw Rd (south)											
1	L	41	0.0	0.093	7.2	LOS A	0.5	3.7	0.32	0.73	42.9
2	T	115	0.0	0.093	0.8	LOS A	0.5	3.7	0.32	0.00	45.9
Approach		156	0.0	0.093	2.5	NA	0.5	3.7	0.32	0.19	45.1
North: Riselaw Rd (north)											
8	T	201	0.0	0.244	0.6	LOS A	1.5	10.3	0.28	0.00	46.2
9	R	182	0.0	0.244	6.9	LOS A	1.5	10.3	0.28	0.67	42.8
Approach		383	0.0	0.244	3.6	NA	1.5	10.3	0.28	0.32	44.5
West: SB on/off ramp											
10	L	51	0.0	0.184	10.7	LOS B	0.7	4.9	0.40	0.60	39.7
12	R	53	0.0	0.184	10.7	LOS B	0.7	4.9	0.40	0.76	39.8
Approach		103	0.0	0.184	10.7	LOS B	0.7	4.9	0.40	0.68	39.8
All Vehicles		642	0.0	0.244	4.5	NA	1.5	10.3	0.31	0.35	43.8

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

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MOVEMENT SUMMARY

Site: Sc4 NB on/off ramp 2021 AM

Riselaw Rd and NB on/off ramp -Alt 1 (Sc4)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Riselaw Rd (south)											
1	L	1	0.0	0.044	6.4	LOS A	0.2	1.7	0.01	0.90	43.3
2	T	85	0.0	0.044	0.0	LOS A	0.2	1.7	0.01	0.00	49.8
Approach		86	0.0	0.044	0.1	NA	0.2	1.7	0.01	0.01	49.7
North: Riselaw Rd (north)											
8	T	126	0.0	0.066	0.3	LOS A	0.4	2.7	0.21	0.00	47.4
9	R	1	0.0	0.066	6.7	LOS A	0.4	2.7	0.21	0.79	43.2
Approach		127	0.0	0.066	0.4	NA	0.4	2.7	0.21	0.01	47.4
West: NB on/off ramp											
10	L	266	0.0	0.322	7.4	LOS A	1.5	10.7	0.26	0.59	42.4
12	R	53	0.0	0.322	7.3	LOS A	1.5	10.7	0.26	0.65	42.4
Approach		319	0.0	0.322	7.4	LOS A	1.5	10.7	0.26	0.60	42.4
All Vehicles		533	0.0	0.322	4.5	NA	1.5	10.7	0.21	0.36	44.6

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

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MOVEMENT SUMMARY

Site: Sc4 NB on/off ramp 2021 PM

Riselaw Rd and NB on/off ramp -Alt 1 (Sc4)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Riselaw Rd (south)											
1	L	1	0.0	0.048	6.4	LOS A	0.3	1.8	0.01	0.90	43.3
2	T	93	0.0	0.048	0.0	LOS A	0.3	1.8	0.01	0.00	49.8
Approach		94	0.0	0.048	0.1	NA	0.3	1.8	0.01	0.01	49.7
North: Riselaw Rd (north)											
8	T	262	0.0	0.135	0.4	LOS A	0.9	6.0	0.24	0.00	47.1
9	R	1	0.0	0.135	6.7	LOS A	0.9	6.0	0.24	0.79	43.2
Approach		263	0.0	0.135	0.4	NA	0.9	6.0	0.24	0.00	47.1
West: NB on/off ramp											
10	L	171	0.0	0.320	8.6	LOS A	1.4	10.1	0.30	0.59	41.4
12	R	85	0.0	0.320	8.5	LOS A	1.4	10.1	0.30	0.71	41.5
Approach		256	0.0	0.320	8.6	LOS A	1.4	10.1	0.30	0.63	41.4
All Vehicles		613	0.0	0.320	3.8	NA	1.4	10.1	0.23	0.27	44.9

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
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MOVEMENT SUMMARY

Site: Sc4 SB on/off ramp 2021 AM

Riselaw Rd and SB on/off ramp -Alt 1 (Sc4)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Riselaw Rd (south)											
1	L	31	0.0	0.066	6.7	LOS A	0.4	2.5	0.19	0.73	43.1
2	T	85	0.0	0.066	0.3	LOS A	0.4	2.5	0.19	0.00	47.5
Approach		116	0.0	0.066	2.0	NA	0.4	2.5	0.19	0.19	46.2
North: Riselaw Rd (north)											
8	T	102	0.0	0.110	0.3	LOS A	0.6	4.0	0.20	0.00	47.2
9	R	77	0.0	0.110	6.7	LOS A	0.6	4.0	0.20	0.68	43.0
Approach		179	0.0	0.110	3.1	NA	0.6	4.0	0.20	0.29	45.3
West: SB on/off ramp											
10	L	1	0.0	0.003	8.0	LOS A	0.0	0.1	0.27	0.54	42.0
12	R	1	0.0	0.003	7.9	LOS A	0.0	0.1	0.27	0.59	42.0
Approach		2	0.0	0.003	7.9	LOS A	0.0	0.1	0.27	0.56	42.0
All Vehicles		297	0.0	0.110	2.7	NA	0.6	4.0	0.20	0.25	45.6

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
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MOVEMENT SUMMARY

Site: Sc4 SB on/off ramp 2021 PM

Riselaw Rd and SB on/off ramp -Alt 1 (Sc4)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Riselaw Rd (south)											
1	L	48	0.0	0.087	7.1	LOS A	0.5	3.3	0.28	0.71	42.8
2	T	93	0.0	0.087	0.6	LOS A	0.5	3.3	0.28	0.00	46.2
Approach		141	0.0	0.087	2.9	NA	0.5	3.3	0.28	0.24	45.0
North: Riselaw Rd (north)											
8	T	189	0.0	0.217	0.4	LOS A	1.3	8.8	0.24	0.00	46.7
9	R	158	0.0	0.217	6.8	LOS A	1.3	8.8	0.24	0.67	42.9
Approach		347	0.0	0.217	3.3	NA	1.3	8.8	0.24	0.31	44.9
West: SB on/off ramp											
10	L	1	0.0	0.003	9.3	LOS A	0.0	0.1	0.33	0.53	40.8
12	R	1	0.0	0.003	9.3	LOS A	0.0	0.1	0.33	0.63	40.8
Approach		2	0.0	0.003	9.3	LOS A	0.0	0.1	0.33	0.58	40.8
All Vehicles		491	0.0	0.217	3.2	NA	1.3	8.8	0.25	0.29	44.9

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
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