

## APPENDIX B Case Study Reports

**Table B-1. Roadside Improvement Project Case Study Summary**

<b>Case No.</b>	<b>Location</b>	<b>Project</b>	<b>Limits of Project</b>
CS-AZ-1	Phoenix, AZ	Bell Road	64th Street to Scottsdale Road
CS-AZ-2	Phoenix, AZ	Happy Valley Road	35th Avenue to I-17 to Black Canyon Fwy
CS-AZ-3	Phoenix, AZ	Union Hills Drive	32nd to Tatum
CS-CA-1	Sacramento, CA	Fruitridge Road	65 <sup>th</sup> St. to Power Inn Rd.
CS-CA-2	Sacramento, CA	Stockton Blvd.	Fruitridge Road to Broadway
CS-CA-3	Sacramento, CA	West El Camino Avenue	I-80 to Grasslands Dr.
CS-MN-1	Eden Prairie, MN	Pioneer Trail (County Hwy. 1)	Flying Cloud Dr. to Hennepin Town Rd.
CS-MT-1	Billings, MT	King Ave. East	Parkway Lane to South Billings Blvd.
CS-MT-2	Billings, MT	Montana Ave.	N 22 <sup>nd</sup> St. to N 30 <sup>th</sup> St.
CS-NC-1	Charlotte, NC	Central Ave.	Eastway Dr. to Holly Dr. (Phase I), Progress Lane to Sharon Amity Rd. (Phase II)
CS-NC-2	Charlotte, NC	Hickory Grove	Shamrock Dr. to Hickory Trace Dr.
CS-NC-3	Charlotte, NC	Monroe Ave. Intersection	Lanier Ave. to Glendova Dr.
CS-NC-4	Charlotte, NC	Pence Road	Highland Ave. to Harrisburg Rd.
CS-NC-5	Charlotte, NC	The Plaza Pedestrian Refuge	35 <sup>th</sup> St. to Dade St.
CS-NC-6	Charlotte, NC	Prosperity Church Road	Loganville Dr. to Mallard Creek Rd.
CS-NC-7	Charlotte, NC	Sharon Amity Intersection	Kelly St. to Lynnville Ave.
CS-OR-1	Bend, OR	The Dalles-California Hwy.	Grandview Drive to Nels Andersen Place
CS-OR-2	Bend, OR	Highway 20	10 <sup>th</sup> St. to Providence Dr.
CS-OR-3	Portland, OR	NE Alberta Street	NE 16 <sup>th</sup> Ave. to NE 33 <sup>rd</sup> Ave.
CS-OR-4	Portland, OR	Belmont-Morrison	SE 14 <sup>th</sup> Ave. to SE 25 <sup>th</sup> Ave.
CS-OR-5	Portland, OR	NE Martin Luther King Jr. Blvd.	Shaver Ave. to Fremont Ave.
CS-OR-6	Portland, OR	Tacoma Main Street	SE 6 <sup>th</sup> Ave. to SE 17 <sup>th</sup> Ave.
CS-OR-7	Portland, OR	SE Woodstock Blvd.	SE 39 <sup>th</sup> Ave. to SE 52 <sup>nd</sup> Ave.
CS-UT-1	Salt Lake City, UT	Guardsman Way	500 South to Sunnyside Dr.
CS-UT-2	Salt Lake City, UT	South Temple	<i>To Be Determined</i>
CS-UT-3	Salt Lake City, UT	1300 South	1700 East to Foothill Dr.
CS-UT-4	Salt Lake City, UT	2100 South	1700 East to 2300 East

**Case CS-AZ-1: Phoenix, Arizona – Bell Road**

**Table B-2. Bell Road Project Description**

Location:	Phoenix, AZ (Bell Rd.)	
Construction Period:	3/03/2003 to 11/03/2004	
Length of Segment:	5,094 ft	
Average Daily Traffic:	1993	30,600
	1996	35,000
	1999	36,800
	2002	44,000
	2005	33,000
Posted Speed:	45 mph	
Project Description:	Minor widening, sidewalks, landscape buffer, curb and gutter, median, retaining walls, landscaping and street trees, improved pedestrian access and ramps, convert roadside ditches to enclosed drainage system	
Supplemental Information:	Six lanes (3 per direction) plus medians and turn lanes as needed	

**Table B-3. Crash Type Summary, Bell Road, Phoenix, AZ**

<b>Crash Type</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>Total</b>
Angle/Broadside	0	5	16	13	24	14	14	7	2	1	1	97
Head-On	0	0	0	0	1	1	0	0	0	0	0	2
Pedestrian	0	0	1	0	0	0	1	0	0	0	0	2
Rear End	9	13	17	24	23	29	18	17	4	4	6	164
Sideswipe	3	2	2	5	12	6	1	2	0	5	3	41
Others (Total)												
Run-off-road/single veh.	5	1	2	3	1	0	4	0	1	1	4	22
Undefined Others	0	1	1	0	2	2	0	1	1	1	0	9
<b>Total Crashes</b>	<b>17</b>	<b>23</b>	<b>39</b>	<b>45</b>	<b>63</b>	<b>52</b>	<b>38</b>	<b>27</b>	<b>8</b>	<b>12</b>	<b>14</b>	<b>337</b>

Note: Shaded region reflects construction years

**Table B-4. Crash Severity Summary, Bell Road, Phoenix, AZ**

<b>Severity</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>Total</b>
No Injury	9(2)	9(1)	20	26(2)	34(1)	3(0)	17(3)	11(0)	4(1)	6(0)	7(3)	146(13)
Injury (Total)												
Possible Injury	3(0)	8(0)	14(2)	13(0)	22(0)	15(0)	12(0)	9(0)	1(0)	6(1)	0	103(3)
Non-Incapacitating	4(2)	3(0)	2(0)	4(0)	6(0)	4(0)	5(1)	2(0)	1(0)	0	5(1)	36(4)
Incapacitating	0	2(0)	3(0)	1(0)	1(0)	0	4(0)	5(0)	1(0)	0	1(0)	18(0)
Fatal	1(1)	0	0	0	0	0	0	0	0	0	0	1(1)
Unknown	0	0	0	1(1)	0	30	0	0	1(0)	0	1(0)	33(1)
<b>Total Crashes</b>	<b>17(5)</b>	<b>22(1)</b>	<b>39(2)</b>	<b>45(3)</b>	<b>63(1)</b>	<b>52(0)</b>	<b>38(4)</b>	<b>27(0)</b>	<b>8(1)</b>	<b>12(1)</b>	<b>14(4)</b>	<b>337(22)</b>

Note: Values shown in the format of Total (Single Vehicle Crash); Shaded region reflects construction years

**Table B-5. Before-After Crash Summary, Bell Road, Phoenix, AZ**

<b>Analysis Category</b>	<b>Before (1997-2000)</b>	<b>After (2003-2006)</b>	<b>Crash Reductions</b>	<b>Standard Deviation</b>
Crash Frequency (crashes per year)	39.6	13.0	26.6	7.3
Crash Rate (crashes per million vehicles)	2.95	1.08	1.87	2.0
Severe & Fatal Crash Frequency (crashes per year)	1.7	0.5	1.2	1.5
Single Vehicle Crash Frequency (crashes per year)	2.4	1.5	0.9	2.0
ADT (vehicles per day)	36,800	33,000	-	-

**Case CS-AZ-2: Phoenix, Arizona – Happy Valley Road**

**Table B-6. Happy Valley Road Project Description**

Location:	Phoenix, AZ (Happy Valley)	
Construction Period:	3/04/2002 to 5/21/2003	
Length of Segment:	5,401 ft	
Average Daily Traffic:	1996	5,000
	1999	8,300
	2002	9,100
	2005	8,800
Posted Speed:	45 mph (55 mph design speed)	
Width of Right-of-way:	80 ft	
Project Description:	Sidewalks, curb and gutter, landscaping buffers (between curb-attached sidewalk and parallel multi-use trail), curb extensions, utility pole relocation, bus bay	
Supplemental Information:	Variable lane configurations	

**Table B-7. Crash Type Summary, Happy Valley Road, Phoenix, AZ**

<b>Crash Type</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>Total</b>
Angle/Broadside	2	0	9	8	4	6	10	14	16	27	96
Head-On	0	0	0	0	0	0	0	1	0	0	1
Fixed Object / Single Veh.	2	3	6	2	8	12	8	4	11	9	65
Pedestrian	0	0	0	0	0	0	0	0	0	0	0
Rear End	2	2	4	4	0	0	5	5	3	13	38
Sideswipe	0	2	0	1	1	3	7	6	21	37	78
Others (Total)											
Undefined Others	1	0	2	0	0	0	2	1	3	0	9
<b>Total Crashes</b>	<b>7</b>	<b>7</b>	<b>21</b>	<b>15</b>	<b>13</b>	<b>21</b>	<b>32</b>	<b>31</b>	<b>54</b>	<b>86</b>	<b>287</b>

Note: Shaded region reflects construction years

**Table B-8. Crash Severity Summary, Happy Valley Road, Phoenix, AZ**

<b>Severity</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>Total</b>
No Injury	4(1)	6(3)	10(2)	8(2)	2(0)	12(6)	23(6)	24(3)	41(4)	73(5)	203(32)
Injury (Total)											
Possible Injury	3(1)	0	6(2)	6(0)	2(1)	5(3)	5(0)	2(0)	5(2)	8(1)	42(10)
Non-Incapacitating	0	1(0)	3(1)	1(0)	1(1)	2(2)	3(1)	4(1)	6(3)	4(2)	25(11)
Incapacitating	0	0	1(0)	0	2(1)	2(1)	0	1(0)	0	1(1)	7(3)
Fatal	0	0	0	0	1(1)	0	0	0	0	0	1(1)
Unknown	0	0	1(1)	0	5(4)	0	1(1)	0	2(2)	0	9(8)
<b>Total Crashes</b>	<b>7(2)</b>	<b>7(3)</b>	<b>21(6)</b>	<b>15(2)</b>	<b>13(8)</b>	<b>21(12)</b>	<b>32(8)</b>	<b>31(4)</b>	<b>54(11)</b>	<b>86(9)</b>	<b>287(65)</b>

Note: Values shown in the format of Total (Single Vehicle Crash); Shaded region reflects construction years

**Table B-9. Before-After Crash Summary, Happy Valley Road, Phoenix, AZ**

<b>Analysis Category</b>	<b>Before (1997-2001)</b>	<b>After (2004-2006)</b>	<b>Crash Reductions</b>	<b>Standard Deviation</b>
Crash Frequency (crashes per year)	12.6	57.0	-44.4	8.3
Crash Rate (crashes per million vehicles)	5.19	17.75	-12.55	4.8
Severe & Fatal Crash Frequency (crashes per year)	0.8	0.7	0.1	1.2
Single Vehicle Crash Frequency (crashes per year)	4.2	8.0	-3.8	3.5
ADT (vehicles per day)	6,650	8,800	-	-

**Case CS-AZ-3: Phoenix, Arizona – Union Hills Drive**

**Table B-10. Union Hills Drive Project Description**

Location:	Phoenix, AZ (Union Hills)	
Construction Period:	7/31/2001 to 2/26/2003	
Length of Segment:	7,931 ft	
Average Daily Traffic:	1993	24,800
	1996	33,900
	1999	33,900
	2002	32,700
	2005	29,800
Posted Speed:	45 mph	
Project Description:	Sidewalks, curb and gutter, landscaping buffers, curb extensions	
Supplemental Information:	Four lanes (2 per direction)	

**Table B-11. Crash Type Summary, Union Hills Drive, Phoenix, AZ**

<b>Crash Type</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>Total</b>
Angle/Broadside	36	33	35	24	27	21	23	23	31	29	29	311
Head-On	0	0	0	0	0	0	0	0	0	0	1	1
Fixed Object / Single Veh.	3	4	5	4	3	7	4	3	5	1	5	44
Pedestrian	1	0	1	1	0	0	1	1	0	1	1	7
Bicycle	0	2	1	1	0	1	0	1	1	2	0	9
Rear End	13	28	38	48	17	25	11	17	18	26	17	258
Sideswipe	4	7	3	12	2	7	0	3	3	4	5	50
Others (Total)												
Backing	0	2	0	1	2	1	0	0	0	0	0	6
Undefined Others	1	0	1	0	0	1	1	0	2	1	1	8
<b>Total Crashes</b>	<b>58</b>	<b>76</b>	<b>84</b>	<b>91</b>	<b>51</b>	<b>63</b>	<b>40</b>	<b>48</b>	<b>60</b>	<b>64</b>	<b>59</b>	<b>694</b>

Note: Shaded region reflects construction years

**Table B-12. Crash Severity Summary, Union Hills Drive, Phoenix, AZ**

<b>Severity</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>Total</b>
No Injury	25(1)	43(2)	51(5)	58(3)	26(1)	7(0)	19(2)	22(1)	33(4)	33(1)	34(3)	351(23)
Injury (Total)												
Possible Injury	21(1)	19(1)	21(0)	21(0)	15(1)	8(0)	11(2)	10	13(1)	14(0)	9(0)	162(6)
Non-Incapacitating	8(1)	11(1)	8(0)	9(0)	8(0)	11(1)	4(0)	8(0)	11(0)	10	13(1)	101(4)
Incapacitating	3(0)	3(0)	4(0)	3(1)	1(0)	5(1)	5(0)	6(0)	2(0)	7(0)	3(1)	42(3)
Fatal	0	0	0	0	0	0	1(0)	0	1(0)	0	0	2(0)
Unknown	1(0)	0	0	0	1(1)	32(5)	0	2(2)	0	0	0	36(8)
<b>Total Crashes</b>	<b>58(3)</b>	<b>76(4)</b>	<b>84(5)</b>	<b>91(4)</b>	<b>51(3)</b>	<b>63(7)</b>	<b>40(4)</b>	<b>48(3)</b>	<b>60(5)</b>	<b>64(1)</b>	<b>59(5)</b>	<b>694(44)</b>

Note: Values shown in the format of Total (Single Vehicle Crash); Shaded region reflects construction years

**Table B-13. Before-After Crash Summary, Union Hills Drive, Phoenix, AZ**

<b>Analysis Category</b>	<b>Before (1996-2000)</b>	<b>After (2004-2006)</b>	<b>Crash Reductions</b>	<b>Standard Deviation</b>
Crash Frequency (crashes per year)	72.0	61.0	11.0	11.5
Crash Rate (crashes per million vehicles)	5.8	5.6	0.2	3.4
Severe & Fatal Crash Frequency (crashes per year)	2.8	4.3	-1.5	2.7
Single Vehicle Crash Frequency (crashes per year)	3.8	3.7	0.1	2.7
ADT (vehicles per day)	33,900	29,800	-	-

**Case CS-CA-1: Sacramento, California – Fruitridge Road Case Study**

**Table B-14. Fruitridge Road Project Description**

Location:	Sacramento, CA (Fruitridge Road)			
Construction Period:	6/21/01 to 5/22/02			
Length of Segment:	3160 ft			
Average Daily Traffic:	1993	21,871 (west end)	---	16,280 (east end)
	1994	---	18,555 (mid-point)	16,262 (east end)
	1996	---	---	16,312 (east end)
	2002	24,186 (west end)	---	---
	2003	---	22,329 (mid-point)	---
	2004	---	---	20,958 (beyond east)
	2005	---	---	18,599 (east end)
Posted Speed:	40 mph			
Width of Right-of-way:	70 ft			
Project Description:	Added bike lanes, landscape buffer (3 to 4 ft wide), shifted curb in some locations, periodic tree wells, sidewalks, improved street lighting, and landscaping with street trees			
Supplemental Information:	Road has two travel lanes in each direction and a median/TWLTL			



**Table B-15. Crash Type Summary, Fruitridge Rd., Sacramento, CA**

<b>Crash Type</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>Total</b>
Angle/Broadside	0	1	1	1	1	1	6	1	0	2	14
Head-On	0	1	0	0	1	1	1	0	1	0	5
Fixed Object	2	1	0	0	3	0	2	3	1	1	13
Pedestrian	0	1	0	1	0	0	0	1	0	0	3
Rear End	1	2	1	0	3	0	1	4	2	4	18
Sideswipe	0	0	0	0	0	2	2	0	3	1	8
Others (Total)											
Overturned	0	0	0	0	0	0	0	0	0	0	0
Undefined Others	1	0	2	0	0	0	1	0	0	0	4
<b>Total Crashes</b>	<b>4</b>	<b>6</b>	<b>4</b>	<b>2</b>	<b>8</b>	<b>4</b>	<b>13</b>	<b>9</b>	<b>7</b>	<b>8</b>	<b>65</b>

Note: Shaded region reflects construction years

**Table B-16. Crash Severity Summary, Fruitridge Road, Sacramento, CA**

<b>Severity</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>Total</b>
No Injury	1(1)	4(1)	1(0)	0	3(2)	3(2)	7(2)	4(1)	5(1)	6(1)	34(11)
Injury	3(1)	2(1)	3(0)	1(0)	5(1)	1(0)	6(1)	4(2)	2(2)	2(0)	29(8)
Fatal	0	0	0	1(1)	0	0	0	1(1)	0	0	2(2)
<b>Total Crashes</b>	<b>4(2)</b>	<b>6(2)</b>	<b>4(0)</b>	<b>2(1)</b>	<b>8(3)</b>	<b>4(2)</b>	<b>13(3)</b>	<b>9(4)</b>	<b>7(3)</b>	<b>8(1)</b>	<b>65(21)</b>

Note: Values shown in the format of Total (Single Vehicle Crash); Shaded region reflects construction years

**Table B-17. Before-After Crash Summary, Fruitridge Road, Sacramento, CA**

<b>Analysis Category</b>	<b>Before (1997-2000)</b>	<b>After (2003-2006)</b>	<b>Crash Reductions</b>	<b>Standard Deviation</b>
Crash Frequency (crashes per year)	4.0	11.8	-7.8	4.0
Crash Rate (crashes per million vehicles)	0.67	1.63	-0.96	1.5
Severe & Fatal Crash Frequency (crashes per year)	0.3	0.3	0.0	0.7
Single Vehicle Crash Frequency (crashes per year)	1.25	2.75	-1.5	2.0
ADT (vehicles per day)	16,315	19,780	-	-

**Case CS-CA-2: Sacramento, California – Stockton Blvd. Case Study**

**Table B-18. Stockton Blvd. Project Description**

Location:	Sacramento, CA (Stockton Blvd)	
Construction Period:	4/29/2002 to 10/11/2002	
Length of Segment:	5,136 ft	
Average Daily Traffic:	1993	24,364
	1999	27,214
	2002	26,405
	2003	28,014
	2005	27,649
	2007	28,003
Posted Speed:	35 mph	
Project Description:	Sidewalk, curb and gutter, landscaped median, replace ditches with enclosed storm drain system, add roadside landscaping	
Supplemental Information:	Beautification project to revitalize an aging commercial area. Road has four lanes (two per direction) plus a raised median. Prior to construction a short length of median existed and this median was extended.	

**Table B-19. Crash Type Summary, Stockton Blvd., Sacramento, CA**

<b>Crash Type</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>Total</b>
Angle/Broadside	2	3	5	7	12	6	6	3	7	51
Head-On	0	0	1	0	2	1	0	1	0	5
Fixed Object	1	1	2	2	0	0	2	2	1	11
Pedestrian	1	7	3	1	6	4	3	4	2	31
Bicycle	1	0	1	1	2	0	2	0	0	7
Rear End	15	8	13	13	25	12	11	7	7	111
Sideswipe	1	1	2	3	1	9	4	3	2	26
Others (Total)										
Overturned	0	0	0	0	0	1	0	0	0	1
<b>Total Crashes</b>	<b>21</b>	<b>20</b>	<b>27</b>	<b>27</b>	<b>48</b>	<b>33</b>	<b>28</b>	<b>20</b>	<b>19</b>	<b>243</b>

Note: Shaded region reflects construction years

**Table B-20. Crash Severity Summary, Stockton Blvd., Sacramento, CA**

<b>Severity</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>Total</b>
No Injury	7(1)	3(1)	3(0)	9(2)	20(1)	16(1)	11(1)	9(2)	11(2)	89(11)
Injury	14(1)	17(7)	24(5)	18(1)	27(4)	17(3)	17(3)	11(3)	8(2)	153(29)
Fatal	0	0	0	0	1(1)	0	0	0	0	1(1)
<b>Total Crashes</b>	<b>21(2)</b>	<b>20(8)</b>	<b>27(5)</b>	<b>27(3)</b>	<b>48(6)</b>	<b>33(4)</b>	<b>28(4)</b>	<b>20(5)</b>	<b>19(4)</b>	<b>243(41)</b>

Note: Values shown in the format of Total (Single Vehicle Crash); Shaded region reflects construction years

**Table B-21. Before-After Crash Summary, Stockton Blvd., Sacramento, CA**

<b>Analysis Category</b>	<b>Before (1998-2001)</b>	<b>After (2003-2006)</b>	<b>Crash Reductions</b>	<b>Standard Deviation</b>
Crash Frequency (crashes per year)	23.8	25.0	-1.3	7.0
Crash Rate (crashes per million vehicles)	2.39	2.46	-0.07	2.2
Severe & Fatal Crash Frequency (crashes per year)	0.0	0.0	0.0	0.0
Single Vehicle Crash Frequency (crashes per year)	4.5	4.3	0.2	3.0
ADT (vehicles per day)	27,215	27,830	-	-

**Case CS-CA-3: Sacramento, California – West El Camino Ave. Case Study**

**Table B-22. West El Camino Ave. Project Description**

Location:	Sacramento, CA (West El Camino Ave.)	
Construction Period:	9/17/03 to 6/3/05	
Length of Segment:	4,155 ft	
Average Daily Traffic:	1998	129,000
	1999	137,000
	2001	149,000
	2003	158,000
	2005	175,000
Posted Speed:	45 mph	
Functional Classification:	Principal Arterial	
Project Description:	Landscaped median, landscape buffer, sidewalks, curb & gutter, street lights, underground utilities, added lanes	
Supplemental Information:	Four lanes (2 per direction) plus landscaped median. Prior to construction, this road was only a 2 lane road.	

**Table B-23. Crash Type Summary, West El Camino Ave., Sacramento, CA**

<b>Crash Type</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>Total</b>
Angle/Broadside	0	0	0	0	0	0	0	0	0	0
Head-On	0	0	0	0	0	0	0	0	0	0
Fixed Object	0	1	0	0	1	0	0	0	0	2
Pedestrian	0	0	0	1	0	1	1	0	0	3
Rear End	0	1	0	0	1	0	0	0	0	2
Sideswipe (Total)										
Same Direction	0	0	0	2	0	0	0	0	0	2
Opposing Direction	0	0	0	0	0	0	0	0	0	0
Others (Total)										
Undefined Others	1	0	0	0	0	0	0	0	0	1
<b>Total Crashes</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>10</b>

Note: Shaded region reflects construction years

**Table B-24. Crash Severity Summary, West El Camino Ave., Sacramento, CA**

<b>Severity</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>Total</b>
No Injury	0	0	0	1(0)	1(0)	0	0	0	0	2(0)
Injury	1(0)	2(1)	0	2(1)	1(0)	0	1(1)	0	0	7(3)
Fatal	0	0	0	0	0	1(1)	0	0	0	1(1)
<b>Total Crashes</b>	<b>1(0)</b>	<b>2(1)</b>	<b>0</b>	<b>3(1)</b>	<b>2(0)</b>	<b>1(1)</b>	<b>1(1)</b>	<b>0</b>	<b>0</b>	<b>10(4)</b>

Note: Values shown in the format of Total (Single Vehicle Crash); Shaded region reflects construction years

**Table B-25. Before-After Crash Summary, West El Camino Ave., Sacramento, CA**

<b>Analysis Category</b>	<b>Before (1998-2003)</b>	<b>After (2006)</b>	<b>Crash Reductions</b>	<b>Standard Deviation</b>
Crash Frequency (crashes per year)	1.5	0.0	1.5	1.2
Crash Rate (crashes per million vehicles)	0.029	0.0	0.029	0.2
Severe & Fatal Crash Frequency (crashes per year)	0.2	0.0	0.2	0.4
Single Vehicle Crash Frequency (crashes per year)	0.4	0.0	0.4	0.6
ADT (vehicles per day)	143,250	175,000	-	-

**Case CS-MN-1: Eden Prairie, Minnesota – Pioneer Trail**

**Table B-26. Pioneer Trail Project Description**

Location:	Eden Prairie, MN (Pioneer Trail)		
Construction Period:	2000 to 2002		
Length of Segment:	12,830 ft		
Average Daily Traffic:	East	West	Total
1998	11,200		
2000	11,400	12,300	23,700
2002	11,400	12,300	23,700
2003	11,800	13,400	25,200
2006	9,050	12,600	21,650
2018			20,500 (Projected)
Posted Speed:	40 mph		
Functional Classification:	Minor Arterial		
Project Description:	Sidewalks, landscape buffers, curb and gutter, median, roadside landscaping, additional travel lanes		
Supplemental Information:	Four lane road plus median. Prior to construction this was a 2 lane road.		

**Table B-27. Crash Type Summary, Pioneer Trail, Eden Prairie, MN**

<b>Crash Type</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>Total</b>
Angle/Broadside	8	13	6	12	9	-	5	6	59
Head-On	0	0	0	1	0	-	0	0	1
Hit Object (Total)									
Fixed Object	2	1	2	2	7	-	2	2	18
Animal	4	0	2	0	0	-	1	0	7
Pedestrian	0	0	0	0	1	-	1	0	2
Bicycle	0	1	0	0	0	-	0	0	1
Rear End	12	20	19	15	3	-	8	6	83
Sideswipe									
Same Direction	1	0	4	0	1	-	0	0	6
Opposing Direction	1	2	5	1	1	-	3	3	16
Others (Total)									
Backing	0	0	0	0	0	-	0	0	0
Non-collision	0	0	0	0	0	-	0	0	0
Run-off-road/single veh.	7	3	6	1	7	-	5	2	31
Parking Maneuver	0	0	0	0	0	-	0	0	0
Overturned	0	0	1	1	0	-	1	0	3
Undefined Others	0	0	0	0	0	-	0	0	0
<b>Total Crashes</b>	<b>35</b>	<b>40</b>	<b>45</b>	<b>33</b>	<b>29</b>	<b>-</b>	<b>26</b>	<b>19</b>	<b>227</b>

Note: Year 2003 data not available; Shaded region reflects construction years

**Table B-28. Crash Severity Summary, Pioneer Trail, Eden Prairie, MN**

<b>Severity</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>Total</b>
No Injury	28(7)	31(1)	33(5)	21(0)	21(4)	-	21(3)	13(1)	168(21)
Injury (Total)						-			
Possible Injury	0	0	1(1)	2(0)	1(0)		1(0)	0	5(1)
Non-Incapacitating	2(0)	2(2)	5(0)	4(0)	6(2)		1(0)	2(1)	22(5)
Incapacitating	5(0)	7(0)	6(0)	5(0)	1(1)		3(2)	4(0)	31(3)
Fatal	0	0	0	1(1)	0	-	0	0	1(1)
<b>Total Crashes</b>	<b>35(7)</b>	<b>40(3)</b>	<b>45(6)</b>	<b>33(1)</b>	<b>29(7)</b>	<b>-</b>	<b>26(5)</b>	<b>19(2)</b>	<b>227(31)</b>

Note: Values shown in the format of Total (Single Vehicle Crash); Shaded region reflects construction years; Data not available for Year 2003

**Table B-29. Before-After Crash Summary, Pioneer Trail, Eden Prairie, MN**

<b>Analysis Category</b>	<b>Before (1998-1999)</b>	<b>After (2004-2005)</b>	<b>Crash Reductions</b>	<b>Standard Deviation</b>
Crash Frequency (crashes per year)	32.5	19.0	13.5	7.2
Crash Rate (crashes per million vehicles)	3.76	2.22	1.53	2.4
Severe & Fatal Crash Frequency (crashes per year)	0.0	0.5	-0.5	0.7
Single Vehicle Crash Frequency (crashes per year)	5.0	3.5	1.5	2.9
ADT (vehicles per day)	23,700	23,425	-	-



**Case CS-MT-1: Billings, Montana – King Ave. Case Study**

**Table B-30. King Ave. Project Description**

Location:	Billings, MT (King Ave. East.)	
Construction Period:	October 2002 to October 2003	
Length of Segment:	3,801 ft	
Average Daily Traffic:	1994	4,638
	1996	3,704
	2005	4,030
Posted Speed:	35 mph	
Functional Classification:	Minor Arterial	
Project Description:	Curb and gutter, sidewalk, culvert and ditch removal, landscape buffer (5 to 6' wide on north side of road only)	
Supplemental Information:	Two lane road (1 lane per direction) plus supplemental right-turn, left-turn (sometimes TWLTL), and narrow raised median for access control (only occurs for a short distance). There is a shared use path parallel to the south but separated by a considerable buffer area so the sidewalk at this site is only located on the north edge. This project included only minor changes to the entire road with generally a slight narrowing where changed.	

**Table B-31. Crash Type Summary, King Ave., Billings, MT**

<b>Crash Type</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>Total</b>
Angle/Broadside	1	3	1	1	1	3	1	1	3	15
Head-On	0	0	1	0	0	0	0	0	0	1
Fixed Object	0	1	0	2	0	1	1	0	2	7
Pedestrian	0	0	1	0	0	0	0	0	0	1
Rear End	1	0	0	5	1	0	2	4	3	16
Sideswipe										
Same Direction	0	0	0	0	0	0	1	0	0	1
Opposing Direction	0	0	0	0	0	0	0	0	0	0
Others (Total)										
Undefined Others	0	0	0	1	0	0	0	0	1	2
<b>Total Crashes</b>	<b>2</b>	<b>4</b>	<b>3</b>	<b>9</b>	<b>2</b>	<b>4</b>	<b>5</b>	<b>5</b>	<b>9</b>	<b>43</b>

Note: Shaded region reflects construction years

**Table B-32. Crash Severity Summary, King Ave., Billings, MT**

<b>Severity</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>Total</b>
No Injury	1(0)	1(0)	1(0)	9(1)	1(0)	4(1)	2(0)	2(0)	6(1)	27(3)
Injury	1(0)	3(0)	1(0)	0	1(0)	0	3(1)	3(0)	3(0)	15(1)
Fatal	0	0	1(1)	0	0	0	0	0	0	1(1)
<b>Total Crashes</b>	<b>2(0)</b>	<b>4(0)</b>	<b>3(1)</b>	<b>9(1)</b>	<b>2(0)</b>	<b>4(1)</b>	<b>5(1)</b>	<b>5(0)</b>	<b>9(1)</b>	<b>43(5)</b>

Note: Values shown in the format of Total (Single Vehicle Crash); Shaded region reflects construction years

**Table B-33. Before-After Crash Summary, King Ave., Billings, MT**

<b>Analysis Category</b>	<b>Before (1997-2001)</b>	<b>After (2004-2006)</b>	<b>Crash Reductions</b>	<b>Standard Deviation</b>
Crash Frequency (crashes per year)	4.5	6.3	-1.8	3.3
Crash Rate (crashes per million vehicles)	3.24	4.31	-1.06	2.7
Severe & Fatal Crash Frequency (crashes per year)	0.3	0.0	0.3	0.5
Single Vehicle Crash Frequency (crashes per year)	0.5	0.7	-0.2	1.1
ADT (vehicles per day)	3,800	4,030	-	-

**Case CS-MT-2: Billings, Montana – Montana Ave. Case Study**

**Table B-34. Montana Ave. Project Description**

Location:	Billings, MT (Montana Ave.)	
Construction Period:	12/1/1998 to 10/7/1999	
Length of Segment:	3,150 ft	
Average Daily Traffic:	1997	15,400
	2003	13,325
	2006	10,400
Posted Speed:	25 mph	
Functional Classification:	Principal Arterial	
Project Description:	Street trees, curb extensions, improved pedestrian crossings, curb and gutter, sidewalks that is curb-attached with tree wells	
Supplemental Information:	One-way street with on-street parking. This project was a historic streetscape project and incorporated original brick material from the road.	

**Table B-35. Crash Type Summary, Montana Ave., Billings, MT**

<b>Crash Type</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>Total</b>
Angle/Broadside	4	8	7	9	3	10	10	11	10	7	12	17	108
Head-On	0	0	0	0	1	0	1	0	0	2	0	1	5
Fixed Object	1	0	0	5	11	6	11	10	6	6	11	16	83
Pedestrian	0	2	0	0	1	0	1	1	1	1	1	0	8
Rear End	4	5	11	11	3	5	12	15	10	17	27	11	131
Sideswipe													
Same Direction	2	5	3	4	4	4	5	8	11	10	13	12	81
Opposing Direction	0	0	0	1	0	0	0	2	2	0	0	0	5
Others (Total)													
Non-collision	0	0	0	0	0	0	1	1	0	0	0	0	2
Undefined Others	6	1	6	3	1	2	9	6	6	8	5	7	60
<b>Total Crashes</b>	<b>17</b>	<b>22</b>	<b>27</b>	<b>33</b>	<b>24</b>	<b>27</b>	<b>50</b>	<b>54</b>	<b>46</b>	<b>51</b>	<b>69</b>	<b>64</b>	<b>484</b>

Note: Shaded region reflects construction years

**Table B-36. Crash Severity Summary, Montana Ave., Billings, MT**

<b>Severity</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>Total</b>
No Injury	15(1)	14(1)	13(0)	22(3)	14(6)	18(3)	38(11)	40(8)	32(1)	40(6)	59(12)	45(11)	350(63)
Injury	2(0)	8(1)	14(0)	11(2)	10(6)	9(3)	12(3)	13(3)	14(6)	11(2)	10(1)	19(6)	133(33)
Fatal	0	0	0	0	0	0	0	1(1)	0	0	0	0	1(1)
<b>Total Crashes</b>	<b>17(1)</b>	<b>22(2)</b>	<b>27(0)</b>	<b>33(5)</b>	<b>24(12)</b>	<b>27(6)</b>	<b>50(14)</b>	<b>54(12)</b>	<b>46(7)</b>	<b>51(8)</b>	<b>69(13)</b>	<b>64(17)</b>	<b>484(97)</b>

Note: Values shown in the format of Total (Single Vehicle Crash); Shaded region reflects construction years

**Table B-37. Before-After Crash Summary, Montana Ave., Billings, MT**

<b>Analysis Category</b>	<b>Before (1995-1997)</b>	<b>After (2000-2006)</b>	<b>Crash Reductions</b>	<b>Standard Deviation</b>
Crash Frequency (crashes per year)	22.0	51.6	-29.6	8.6
Crash Rate (crashes per million vehicles)	3.91	11.91	-8.00	4.0
Severe & Fatal Crash Frequency (crashes per year)	0.0	0.1	-0.1	0.4
Single Vehicle Crash Frequency (crashes per year)	1.0	11.0	-10.0	3.5
ADT (vehicles per day)	15,400	11,860	-	-

**Case CS-NC-1: Charlotte, NC – Central Ave. Case Study**

**Table B-38. Central Ave. Project Description**

Location:	Charlotte, NC (Central Ave.)	
Construction Period:	5/6/02 to 7/11/03	
Length of Segment:	5,808 ft	
Average Daily Traffic:	1999	33,000
	2000	34,000
	2002	31,000
	2004	30,000
	2020	43,000 (Projected)
Posted Speed:	45 mph	
Functional Classification:	Major Arterial	
Project Description:	Raised medians (only a portion of the corridor), curb and gutter, landscape buffers, sidewalks, landscaping	
Supplemental Information:	Four lanes (2 per direction) plus medians and turn lanes where needed	

**Table B-39. Crash Type Summary, Central Ave., Charlotte, NC**

<b>Crash Type</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>Total</b>
Angle/Broadside	49	98	86	67	72	63	72	507
Head-On	0	3	1	0	1	2	1	8
Hit Objects (Total)								
Fixed Object	0	2	1	6	2	3	3	17
Movable Object	0	0	0	1	6	1	1	9
Animal	0	0	0	0	0	1	0	1
Parked Vehicle	0	0	0	3	0	1	1	5
Pedestrian	5	7	7	5	6	5	8	43
Bicycle	2	0	2	0	2	0	2	8
Rear End	121	263	250	174	136	117	121	1182
Sideswipe (Total)								
Same Direction	25	55	50	58	43	48	35	314
Opposing Direction	0	1	1	2	2	1	2	9
Others (Total)								
Backing	6	5	5	5	8	3	4	36
Non-collision	0	1	1	2	0	1	0	5
Run-off-road	4	6	4	9	3	1	3	30
Jackknife	0	0	0	0	0	0	1	1
Overturned	0	0	0	0	1	0	0	1
Undefined Others	0	3	1	3	0	2	6	15
<b>Total Crashes</b>	<b>212</b>	<b>444</b>	<b>409</b>	<b>335</b>	<b>282</b>	<b>249</b>	<b>260</b>	<b>2191</b>

Note: 1999 data starts in May, 2005 data ends in July; Shaded region reflects construction years

**Table B-40. Crash Severity Summary, Central Ave., Charlotte, NC**

<b>Severity</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>Total</b>
No Injury	131(3)	279(4)	276(2)	231(12)	175(10)	170(4)	167(6)	1429(41)
Injury (Total)								
Possible Injury	66(2)	133(6)	106(4)	84(5)	81(3)	61(3)	80(3)	611(26)
Non-Incapacitating	14(4)	26(5)	17(2)	12(3)	20(3)	11(2)	10(5)	110(24)
Incapacitating	1(0)	0	2(0)	2(1)	1(0)	2(1)	0	8(2)
Fatal	0	1(0)	0	1(0)	0	0	1(1)	3(1)
Unknown	0	5(0)	8(0)	5(2)	5(0)	5(2)	2(1)	30(5)
<b>Total Crashes</b>	212(9)	444(15)	409(8)	335(23)	282(16)	249(12)	260(16)	2191(99)

Note: Values shown in the format of Total (Single Vehicle Crash); 1999 data starts in May, 2005 data ends in July; Shaded region reflects construction years

**Table B-41. Before-After Crash Summary, Central Ave., Charlotte, NC**

<b>Analysis Category</b>	<b>Before (1999-2001)</b>	<b>After (2004-2005)</b>	<b>Crash Reductions</b>	<b>Standard Deviation</b>
Crash Frequency (crashes per year)	399.4	321.5	77.9	26.8
Crash Rate (crashes per million vehicles)	32.66	29.36	3.30	7.9
Severe & Fatal Crash Frequency (crashes per year)	1.5	1.9	-0.4	1.8
Single Vehicle Crash Frequency (crashes per year)	12.0	17.7	-5.7	5.4
ADT (vehicles per day)	33,500	30,000	-	-

Note: 1999 data starts in May, 2005 data ends in July so before and after data distributed proportionally

**Case CS-NC-2: Charlotte, NC – Hickory Grove Case Study**

**Table B-42. Hickory Grove Project Description**

Location:	Charlotte, NC (Hickory Grove)	
Construction Period:	1/15/2004 - 7/15/2005	
Length of Segment:	8,290 ft	
Average Daily Traffic:	1998	18,400
	2003	18,300
	2020	25,400 (Projected)
Posted Speed:	35 mph (Shamrock to Harris) & 30 mph (Harris to Highland)	
Functional Classification:	Minor Thoroughfare	
Project Description:	Minor roadway widening, sidewalks (ranges from curb-attached to separated by buffer), curb and gutter, bicycle lanes, landscape buffer (partial length), relocated utility poles, landscaping, concrete median (limited length). Large trees next to the roadway were removed.	
Supplemental Information:	Four lanes (2 per direction of travel) with widening at least 12 ft or more for length of project.	



**Table B-43. Crash Type Summary, Hickory Grove, Charlotte, NC**

<b>Crash Type</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>Total</b>
Angle/Broadside	20	20	26	20	13	7	106
Head-On	0	0	1	0	3	0	4
Hit Objects (Total)							
Fixed Object	1	1	1	2	0	0	5
Movable Object	0	0	0	0	0	0	0
Animal	0	0	0	0	0	0	0
Parked Vehicle	0	0	0	0	1	0	1
Pedestrian	0	1	2	0	0	0	3
Bicycle	0	1	0	0	1	0	2
Rear End	50	59	69	40	34	19	271
Sideswipe (Total)							
Same Direction	3	3	6	7	9	2	30
Opposing Direction	1	1	0	0	2	0	4
Others (Total)							
Backing	1	1	1	2	0	0	5
Non-collision	1	1	0	0	1	1	4
Run-off-road	2	6	4	1	2	1	16
Jackknife	0	0	0	0	0	0	0
Overturned	0	0	0	0	0	0	0
Undefined Others	0	0	2	1	0	1	4
<b>Total Crashes</b>	<b>79</b>	<b>94</b>	<b>112</b>	<b>73</b>	<b>66</b>	<b>31</b>	<b>455</b>

Note: Shaded region reflects construction years

**Table B-44. Crash Severity Summary, Hickory Grove, Charlotte, NC**

<b>Severity</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>Total</b>
No Injury	57(3)	65(2)	78(2)	48(1)	40(2)	20(1)	308(11)
Injury (Total)							
Possible Injury	20	16(1)	29(2)	21(0)	19(0)	10(0)	115(3)
Non-Incapacitating	2(0)	9(2)	4(2)	2(0)	7(1)	1(0)	25(5)
Incapacitating	0	2(1)	1(1)	0	0	0	3(2)
Fatal	0	1(1)	0	0	0	0	1(1)
Unknown	0	1(1)	0	2(2)	0	0	3(3)
<b>Total Crashes</b>	<b>79(3)</b>	<b>94(8)</b>	<b>112(7)</b>	<b>73(3)</b>	<b>66(3)</b>	<b>31(1)</b>	<b>455(25)</b>

Note: Values shown in the format of Total (Single Vehicle Crash); Shaded region reflects construction years

**Table B-45. Before-After Crash Summary, Hickory Grove, Charlotte, NC**

<b>Analysis Category</b>	<b>Before (1998-2003)</b>	<b>After (2006)</b>	<b>Crash Reductions</b>	<b>Standard Deviation</b>
Crash Frequency (crashes per year)	95.0	31.0	64.0	11.2
Crash Rate (crashes per million vehicles)	14.18	4.6	9.6	4.3
Severe & Fatal Crash Frequency (crashes per year)	1.3	0.0	1.3	1.2
Single Vehicle Crash Frequency (crashes per year)	6.0	1.0	5.0	2.6
ADT (vehicles per day)	18,350	18,350	-	-

Note: Summary includes only one year of “After” data, so results may differ from expected multi-year values.

**Case CS-NC-3: Charlotte, NC – Monroe Ave. Case Study**

**Table B-46. Monroe Ave. Project Description**

Location:	Charlotte, NC (Monroe Ave.)	
Construction Period:	11/01/2001 to 3/01/2003	
Length of Segment:	977 ft	
Average Daily Traffic:	1999	28,000
	2000	30,000
	2002	27,000
	2004	26,000
Posted Speed:	45 mph	
Functional Classification:	Major Arterial	
Project Description:	Concrete median (for access management purposes and only extends a short length), curb and gutter, sidewalk (curb-attached)	
Supplemental Information:	Primarily an intersection improvement project for corridor length	

**Table B-47. Crash Type Summary, Monroe Ave., Charlotte, NC**

<b>Crash Type</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>Total</b>
Angle/Broadside	16	9	25	16	15	11	8	16	116
Head-On	0	1	0	1	0	1	0	0	3
Hit Objects (Total)									
Fixed Object	2	1	0	0	1	0	0	1	5
Movable Object	0	0	0	1	2	0	0	0	3
Animal	0	0	0	1	0	1	0	1	3
Parked Vehicle	0	0	0	0	0	0	1	0	1
Pedestrian	0	1	0	0	0	1	0	2	4
Bicycle	0	0	0	0	0	0	1	0	1
Rear End	34	45	49	41	32	50	29	17	297
Sideswipe (Total)									
Same Direction	8	12	11	20	15	12	8	6	92
Opposing Direction	0	0	0	0	0	0	0	0	0
Others (Total)									
Backing	2	2	1	0	1	2	0	1	9
Non-collision	0	0	0	0	1	0	1	2	4
Run-off-road	0	2	0	2	0	0	0	1	5
Undefined Others	0	0	0	1	0	0	2	0	3
<b>Total Crashes</b>	<b>62</b>	<b>73</b>	<b>86</b>	<b>83</b>	<b>67</b>	<b>78</b>	<b>50</b>	<b>47</b>	<b>546</b>

Note: Shaded region reflects construction years

**Table B-48. Crash Severity Summary, Monroe Ave., Charlotte, NC**

<b>Severity</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>Total</b>
No Injury	36(1)	42(2)	61(0)	67(2)	51(3)	49(0)	38(1)	29(3)	373(12)
Injury (Total)									
Possible Injury	23(0)	20(0)	23(0)	12(0)	14(0)	25(0)	7(1)	15(2)	139(3)
Non-Incapacitating	3(1)	6(1)	2(0)	3(0)	0	2(1)	3(0)	1(0)	20(3)
Incapacitating	0	4(0)	0	1(0)	0	0	1(0)	0	6(0)
Fatal	0	1(1)	0	0	0	0	0	0	1(1)
Unknown	0	0	0	0	2(0)	2(1)	1(0)	2(0)	7(1)
<b>Total Crashes</b>	<b>62(2)</b>	<b>73(4)</b>	<b>86(0)</b>	<b>83(2)</b>	<b>67(3)</b>	<b>78(2)</b>	<b>50(2)</b>	<b>47(5)</b>	<b>546(20)</b>

Note: Values shown in the format of Total (Single Vehicle Crash); Shaded region reflects construction years

**Table B-49. Before-After Crash Summary, Monroe Ave., Charlotte, NC**

<b>Analysis Category</b>	<b>Before (1998-2001)</b>	<b>After (2003-2005)</b>	<b>Crash Reductions</b>	<b>Standard Deviation</b>
Crash Frequency (crashes per year)	76.0	58.3	17.7	11.6
Crash Rate (crashes per million vehicles)	7.18	6.15	1.03	3.7
Severe & Fatal Crash Frequency (crashes per year)	1.5	0.0	1.5	1.2
Single Vehicle Crash Frequency (crashes per year)	2.0	3.5	-1.5	2.3
ADT (vehicles per day)	29,000	26,000	-	-

**Case CS-NC-4: Charlotte, NC – Pence Rd. Case Study**

**Table B-50. Pence Rd. Project Description**

Location:	Charlotte, NC (Pence Rd.)	
Construction Period:	6/16/2003 to 11/01/2004	
Length of Segment:	11,072 ft	
Average Daily Traffic:	1999	20,000
	2000	16,000
	2002	20,000
	2006	16,000
Posted Speed:	45 mph (Harrisburg to Montezuma Trail) & 35mph (Montezuma to Highland)	
Project Description:	Minor road widening, sidewalks, bicycle lanes, landscape buffers, tree removal or relocation, street lighting, utility pole relocation	
Supplemental Information:	Project is essentially two different conditions. From Highland Ave. to Holly Hill Rd. the above referenced streetscape features were implemented. From Holly Hill Rd. to Harrisburg Rd. only a sidewalk was constructed for this project.	

**Table B-51. Crash Type Summary, Pence Rd., Charlotte, NC**

<b>Crash Type</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>Total</b>
Angle/Broadside	6	7	11	8	6	9	47
Head-On	0	0	0	2	0	0	2
Hit Objects (Total)							0
Fixed Object	0	0	0	0	1	2	3
Movable Object	1	0	1	0	1	0	3
Animal	0	0	0	1	0	0	1
Parked Vehicle	0	1	0	0	0	0	1
Pedestrian	0	0	1	0	0	0	1
Rear End	4	3	14	15	7	7	50
Sideswipe (Total)							0
Same Direction	1	1	2	1	0	1	6
Opposing Direction	0	0	0	0	0	0	0
Others (Total)							0
Backing	0	1	0	0	0	0	1
Non-collision	0	0	0	0	0	1	1
Run-off-road	3	5	4	3	5	3	23
Overturned	1	0	0	0	0	0	1
Undefined Others	0	0	0	1	1	0	2
<b>Total Crashes</b>	<b>16</b>	<b>18</b>	<b>33</b>	<b>31</b>	<b>21</b>	<b>23</b>	<b>142</b>

Note: Shaded region reflects construction years

**Table B-52. Crash Severity Summary, Pence Rd., Charlotte, NC**

<b>Severity</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>Total</b>
No Injury	9(1)	11(2)	23(4)	21(3)	15(5)	13(4)	92(19)
Injury (Total)							
Possible Injury	3(1)	4(2)	6(0)	6(0)	6(2)	8(1)	33(6)
Non-Incapacitating	3(2)	2(1)	3(2)	4(1)	0	1(1)	13(7)
Incapacitating	0	1(1)	1(0)	0	0	1(0)	3(1)
Fatal	0	0	0	0	0	0	0
Unknown	1(1)	0	0	0	0	0	1(1)
<b>Total Crashes</b>	16(5)	18(6)	33(6)	31(4)	21(7)	23(6)	142(34)

Note: Values shown in the format of Total (Single Vehicle Crash); Shaded region reflects construction years

**Table B-53. Before-After Crash Summary, Pence Rd., Charlotte, NC**

<b>Analysis Category</b>	<b>Before (2000-2002)</b>	<b>After (2004-2005)</b>	<b>Crash Reductions</b>	<b>Standard Deviation</b>
Crash Frequency (crashes per year)	25.9	23.0	2.9	7.0
Crash Rate (crashes per million vehicles)	3.9	3.9	0.0	2.8
Severe & Fatal Crash Frequency (crashes per year)	0.8	1.0	-0.2	1.3
Single Vehicle Crash Frequency (crashes per year)	5.7	6.0	-0.3	3.4
ADT (vehicles per day)	18,000	16,000	-	-



**Case CS-NC-5: Charlotte, NC – Plaza Pedestrian Refuge Median Case Study**

**Table B-55. Plaza Pedestrian Refuge Median Project Description**

Location:	Charlotte, NC (The Plaza)	
Construction Period:	1/15/2003 to 7/15/2003	
Length of Segment:	2,217 ft	
Average Daily Traffic:	2003	24,200
	2005	25,600
	2006	23,400
	2020	37,100 (Projected)
Posted Speed:	35 mph	
Functional Classification:	Minor Thoroughfare	
Project Description:	Minor widening, sidewalks, curb and gutter, landscaped median, landscape buffer (2' to 4' wide), landscaping and street trees	
Supplemental Information:	Designed to provide a pedestrian refuge median. Road has 4 lanes (2 per direction of travel) with median and turn lanes as needed.	

**Table B-56. Crash Type Summary, Plaza Pedestrian Refuge Median, Charlotte, NC**

<b>Crash Type</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>Total</b>
Angle/Broadside	18	21	18	5	6	7	75
Head-On	0	0	0	0	0	0	0
Hit Objects (Total)							
Fixed Object	0	0	1	1	0	0	2
Movable Object	0	0	0	0	0	0	0
Animal	0	0	0	0	0	0	0
Parked Vehicle	0	0	0	0	0	0	0
Pedestrian	0	0	1	1	0	2	4
Bicycle	0	0	0	0	0	1	1
Rear End	11	20	13	21	8	9	82
Sideswipe (Total)							
Same Direction	5	3	3	10	3	2	26
Opposing Direction	0	0	0	0	0	0	0
Others (Total)							
Backing	1	3	0	2	1	0	7
Non-collision	0	1	0	0	0	0	1
Run-off-road	0	2	0	2	0	1	5
Undefined Others	0	1	0	0	0	0	1
<b>Total Crashes</b>	<b>35</b>	<b>51</b>	<b>36</b>	<b>42</b>	<b>18</b>	<b>22</b>	<b>204</b>

Note: Shaded region reflects construction years

**Table B-57. Crash Severity Summary, Plaza Pedestrian Refuge Median, Charlotte, NC**

<b>Severity</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>Total</b>
No Injury	19(0)	27(1)	16(0)	30(2)	13(0)	14(0)	119(3)
Injury (Total)							
Possible Injury	12(0)	15(0)	14(0)	11(1)	5(0)	4(1)	61(2)
Non-Incapacitating	3(0)	7(0)	3(2)	0	0	2(0)	15(2)
Incapacitating	1(0)	0	0	1(1)	0	2(2)	4(3)
Fatal	0	0	0	0	0	0	0
Unknown	0	2(1)	3(0)	0	0	0	5(1)
<b>Total Crashes</b>	<b>35(0)</b>	<b>51(2)</b>	<b>36(2)</b>	<b>42(4)</b>	<b>18(0)</b>	<b>22(3)</b>	<b>204(11)</b>

Note: Values shown in the format of Total (Single Vehicle Crash); Shaded region reflects construction years

**Table B-58. Before-After Crash Summary, Plaza Pedestrian Refuge Median, Charlotte, NC**

<b>Analysis Category</b>	<b>Before (2000-2002)</b>	<b>After (2004-2005)</b>	<b>Crash Reductions</b>	<b>Standard Deviation</b>
Crash Frequency (crashes per year)	40.7	20.0	20.7	7.8
Crash Rate (crashes per million vehicles)	4.60	2.14	2.46	2.6
Severe & Fatal Crash Frequency (crashes per year)	0.3	1.0	-0.7	1.2
Single Vehicle Crash Frequency (crashes per year)	1.3	1.5	-0.2	1.7
ADT (vehicles per day)	24,200	25,600	-	-

**Case CS-NC-6: Charlotte, NC – Prosperity Church Rd. Case Study**

**Table B-59. Prosperity Church Rd. Project Description**

Location:	Charlotte, NC (Prosperity Church Rd.)	
Construction Period:	5/22/2002 to 10/30/2003	
Length of Segment:	8,870 ft	
Average Daily Traffic:	1999	15,000
	2000	22,000
	2002	21,000
	2004	24,000
Posted Speed:	45 mph	
Functional Classification:	Major Arterial	
Project Description:	Sidewalks, bicycle lanes, landscape buffers with landscaping, landscaped median, added travel lanes	
Supplemental Information:	Widened from 2 lanes (1 lane per direction) to 4 lanes (2 per direction of travel) with median and turn lanes as needed.	

**Table B-60. Crash Type Summary, Prosperity Church Rd., Charlotte, NC**

<b>Crash Type</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>Total</b>
Angle/Broadside	5	9	13	11	14	12	9	73
Head-On	0	0	0	1	0	0	0	1
Hit Objects (Total)								
Fixed Object	0	0	0	1	1	1	0	3
Movable Object	0	1	0	0	1	0	0	2
Animal	0	1	0	0	0	0	0	1
Rear End	23	26	30	32	38	30	11	190
Sideswipe (Total)								
Same Direction	2	4	4	4	3	3	2	22
Opposing Direction	0	1	3	4	5	1	0	14
Others (Total)								
Backing	0	0	2	0	2	0	2	6
Non-collision	0	0	0	0	2	0	0	2
Run-off-road	8	4	8	11	1	0	1	33
Overturned	0	0	1	0	1	0	0	2
Undefined Others	0	1	0	1	0	0	0	2
<b>Total Crashes</b>	<b>38</b>	<b>47</b>	<b>61</b>	<b>65</b>	<b>68</b>	<b>47</b>	<b>25</b>	<b>351</b>

Note: Shaded region reflects construction years

**Table B-61. Crash Severity Summary, Prosperity Church Rd., Charlotte, NC**

<b>Severity</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>Total</b>
No Injury	22(7)	36(3)	38(5)	41(5)	49(3)	38(0)	22(1)	246(24)
Injury (Total)								
Possible Injury	13(1)	6(1)	21(3)	16(0)	17(0)	8(1)	1(0)	82(6)
Non-Incapacitating	2(0)	4(2)	1(0)	4(3)	2(1)	1(0)	1(0)	15(6)
Incapacitating	1(0)	1(0)	0	0	0	0	1(0)	3(0)
Fatal	0	0	0	1(1)	0	0	0	1(1)
Unknown	0	0	1(1)	3(3)	0	0	0	4(4)
<b>Total Crashes</b>	<b>38(8)</b>	<b>47(6)</b>	<b>61(9)</b>	<b>65(12)</b>	<b>68(4)</b>	<b>47(1)</b>	<b>25(1)</b>	<b>351(41)</b>

Note: Values shown in the format of Total (Single Vehicle Crash); Shaded region reflects construction years

**Table B-62. Before-After Crash Summary, Prosperity Church Rd., Charlotte, NC**

<b>Analysis Category</b>	<b>Before (1999-2001)</b>	<b>After (2004-2005)</b>	<b>Crash Reductions</b>	<b>Standard Deviation</b>
Crash Frequency (crashes per year)	48.7	36.0	12.7	9.2
Crash Rate (crashes per million vehicles)	6.06	4.11	1.95	3.2
Severe & Fatal Crash Frequency (crashes per year)	0.7	0.5	0.2	1.1
Single Vehicle Crash Frequency (crashes per year)	7.7	1.0	6.7	2.9
ADT (vehicles per day)	22,000	24,000	-	-

**Case CS-NC-7: Charlotte, NC – Sharon Amity Road Case Study**

**Table B-63. Sharon Amity Road Project Description**

Location:	Charlotte, NC (Sharon Amity Rd.)	
Construction Period:	11/01/2001 to 3/01/2003	
Length of Segment:	740 ft	
Average Daily Traffic:	1999	31,000
	2000	30,000
	2002	34,000
	2004	21,000
Posted Speed:	35 mph	
Functional Classification:	Major Arterial	
Project Description:	Raised concrete median (limited length), sidewalk (curb-attached) curb and gutter	
Supplemental Information:	Project primarily to improve intersections. Four lanes (2 per direction) plus turn lanes as needed. There is a raised median for the northbound approach to Monroe Rd. intersection only.	

**Table B-64. Crash Type Summary, Sharon Amity Rd., Charlotte, NC**

<b>Crash Type</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>Total</b>
Angle/Broadside	10	6	12	7	12	9	6	12	74
Head-On	0	0	0	0	0	1	0	1	2
Hit Objects (Total)									
Fixed Object	2	1	2	0	0	1	1	0	7
Movable Object	0	0	0	0	1	0	0	0	1
Parked Vehicle	0	0	0	0	2	0	1	0	3
Pedestrian	0	1	0	0	0	1	0	0	2
Bicycle	1	0	0	0	0	0	1	0	2
Rear End	29	32	32	26	27	39	23	13	221
Sideswipe (Total)									
Same Direction	7	10	5	14	10	11	7	6	70
Opposing Direction	0	0	0	1	0	0	0	0	1
Others (Total)									
Backing	1	2	0	0	1	1	1	1	7
Non-collision	0	0	0	0	1	0	1	0	2
Run-off-road	2	2	0	0	0	1	1	0	6
Undefined Others	0	0	1	1	0	0	3	0	5
<b>Total Crashes</b>	<b>52</b>	<b>54</b>	<b>52</b>	<b>49</b>	<b>54</b>	<b>64</b>	<b>45</b>	<b>33</b>	<b>403</b>

Note: Shaded region reflects construction years



**Table B-65. Crash Severity Summary, Sharon Amity Rd., Charlotte, NC**

<b>Severity</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>Total</b>
No Injury	34(3)	33(1)	39(2)	40	42(3)	40(1)	35(2)	25(0)	1(1)
Injury (Total)									
Possible Injury	14(0)	13(0)	13(0)	8(0)	12(1)	19(1)	8(0)	6(0)	2(0)
Non-Incapacitating	4(1)	6(2)	0	1(0)	0	3(0)	0	1(0)	15(3)
Incapacitating	0	1(0)	0	0	0	0	1(0)	0	93(2)
Fatal	0	1(1)	0	0	0	0	0	0	288(12)
Unknown	0	0	0	0	0	0	1(0)	1(0)	4(0)
<b>Total Crashes</b>	<b>52(4)</b>	<b>54(4)</b>	<b>52(2)</b>	<b>49(0)</b>	<b>54(4)</b>	<b>64(2)</b>	<b>45(2)</b>	<b>33(0)</b>	<b>403(18)</b>

Note: Values shown in the format of Total (Single Vehicle Crash); Shaded region reflects construction years

**Table B-66. Before-After Crash Summary, Sharon Amity Rd., Charlotte, NC**

<b>Analysis Category</b>	<b>Before (1998-2001)</b>	<b>After (2003-2006)</b>	<b>Crash Reductions</b>	<b>Standard Deviation</b>
Crash Frequency (crashes per year)	51.8	39.0	12.8	9.5
Crash Rate (crashes per million vehicles)	4.50	5.09	-0.59	3.1
Severe & Fatal Crash Frequency (crashes per year)	0.5	0.3	0.2	0.9
Single Vehicle Crash Frequency (crashes per year)	2.5	1.0	1.5	1.9
ADT (vehicles per day)	31,500	21,000	-	-

**Case CS-OR-1: Bend, OR – The Dalles-California Highway Case Study**

**Table B-67. The Dalles-California Highway Project Description**

Location:	Bend , OR (The Dalles-California Highway)	
Construction Period:	7/24/2003 to 7/31/2004	
Length of Segment:	5,966 ft	
Average Daily Traffic:	1997	24,400
	1998	25,900
	1999	29,400
	2000	30,200
	2001	31,000
	2002	32,200
	2003	33,100
	2004	34,800
	2005	35,800
	2006	37,800
Posted Speed:	45 mph	
Project Description:	Curb and gutter, sidewalk (transitions from curb-attached to separated with a buffer that is 5' to 7' wide), raised concrete mountable median, and drainage utility adjustment/relocation	
Supplemental Information:	Four lanes (2 per direction of travel) and median or turn lanes as needed.	

**Table B-68. Crash Type Summary, The Dalles-California Highway, Bend, OR**

<b>Crash Type</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>Total</b>
Angle/Broadside	1	3	2	0	0	7	3	5	3	2	26
Head-On	0	0	0	0	0	0	0	0	0	0	0
Fixed Object	0	2	0	0	0	1	0	1	1	2	7
Pedestrian	0	0	0	0	0	0	1	0	0	0	1
Rear End	2	6	3	8	4	21	13	18	22	17	114
Sideswipe (Total)											
Same Direction	0	0	0	0	0	0	1	0	1	0	2
Opposing Direction	2	0	1	1	0	2	4	1	1	2	14
Others (Total)											
Backing	0	0	0	0	0	1	0	1	0	2	4
Non-Collision	0	0	0	0	0	0	0	0	0	0	0
Parking Maneuver	0	0	0	0	0	0	0	0	0	0	0
Undefined Others	0	0	0	0	0	0	0	1	0	0	1
<b>Total Crashes</b>	<b>5</b>	<b>11</b>	<b>6</b>	<b>9</b>	<b>4</b>	<b>32</b>	<b>22</b>	<b>27</b>	<b>28</b>	<b>25</b>	<b>169</b>

Note: Shaded region reflects construction years

**Table B-69. Crash Severity Summary, The Dalles-California Highway, Bend, OR**

<b>Severity</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>Total</b>
No Injury	3(0)	6(0)	1(0)	0	3(0)	20(1)	13(0)	8(1)	10(1)	12(0)	76(3)
Injury (Total)											
Possible Injury	2(0)	1(1)	2(0)	5(0)	0	11(0)	5(0)	12(1)	11(0)	7(0)	56(2)
Non-Incapacitating	0	3(0)	3(0)	4(0)	1(0)	1(0)	4(1)	6(1)	6(0)	3(0)	31(2)
Incapacitating	0	0	0	0	0	0	0	1(0)	1(0)	2(2)	4(2)
Fatal	0	1(1)	0	0	0	0	0	0	0	1(0)	2(1)
<b>Total Crashes</b>	<b>5(0)</b>	<b>11(2)</b>	<b>6(0)</b>	<b>9(0)</b>	<b>4(0)</b>	<b>32(1)</b>	<b>22(1)</b>	<b>27(3)</b>	<b>28(1)</b>	<b>25(2)</b>	<b>169(10)</b>

Note: Values shown in the format of Total (Single Vehicle Crash); Shaded region reflects construction years

**Table B-70. Before-After Crash Summary, The Dalles-California Highway, Bend, OR**

<b>Analysis Category</b>	<b>Before (1997-2002)</b>	<b>After (2005-2006)</b>	<b>Crash Reductions</b>	<b>Standard Deviation</b>
Crash Frequency (crashes per year)	11.2	26.5	-15.3	6.1
Crash Rate (crashes per million vehicles)	1.06	1.97	-0.91	1.7
Severe & Fatal Crash Frequency (crashes per year)	0.2	2.0	-1.8	1.5
Single Vehicle Crash Frequency (crashes per year)	0.5	1.5	-1.0	1.4
ADT (vehicles per day)	28,850	36,800	-	-

**Case CS-OR-2: Bend, OR – Highway 20 Case Study**

**Table B-71. Highway 20 Project Description**

Location:	Bend , OR (Highway 20)	
Construction Period:	9/26/2002 to 10/31/2003	
Length of Segment:	6,389 ft	
Average Daily Traffic:	1998	18,400
	1999	19,000
	2000	20,000
	2001	20,500
	2002	21,100
	2003	22,200
	2004	22,500
	2005	23,400
	2006	24,000
Posted Speed:	45 mph	
Project Description:	Curb and gutter, sidewalk (varies between curb-attached and separated), landscape buffer (3.5' to 6' wide), raised concrete medians, utility pole relocation, street trees, enhance pedestrian crossing (including creating an under-crossing at one location)	
Supplemental Information:	Project included realignment at one horizontal curve location. The road has 4 lanes (2 per direction or travel) plus a median. The construction plans did not show any left-turn lanes noted within the study corridor.	

**Table B-72. Crash Type Summary, Highway 20, Bend, OR**

<b>Crash Type</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>Total</b>
Angle/Broadside	8	4	5	4	8	4	6	1	10	13	63
Head-On	0	0	0	0	0	0	0	0	1	0	1
Fixed Object	0	0	0	0	0	0	3	0	3	0	6
Pedestrian	0	0	0	0	1	1	0	0	1	0	3
Rear End	4	5	2	6	7	2	21	4	11	8	70
Sideswipe (Total)											
Same Direction	0	0	0	0	1	0	0	0	0	1	2
Opposing Direction	1	0	0	0	0	0	1	1	1	1	5
Others (Total)											
Backing	0	0	0	0	0	0	0	0	0	0	0
Non-Collision	0	0	0	0	0	0	0	0	0	0	0
Parking Maneuver	0	0	0	0	0	0	0	0	0	0	0
Undefined Others	0	0	0	1	1	1	0	0	0	0	3
<b>Total Crashes</b>	<b>13</b>	<b>9</b>	<b>7</b>	<b>11</b>	<b>18</b>	<b>8</b>	<b>31</b>	<b>6</b>	<b>27</b>	<b>23</b>	<b>153</b>

Note: Shaded region reflects construction years

**Table B-73. Crash Severity Summary, Highway 20, Bend, OR**

<b>Severity</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>Total</b>
No Injury	6(0)	5(0)	6(0)	7(1)	6(0)	4(1)	18(2)	3(0)	11(2)	14(0)	80(6)
Injury (Total)											
Possible Injury	3(0)	4(0)	1(0)	4(0)	6(0)	1(0)	11(1)	3(0)	7(0)	4(0)	44(1)
Non-Incapacitating	4(0)	0	0	0	5(1)	2(0)	2(0)	0	6(1)	3(0)	22(2)
Incapacitating	0	0	0	0	1(0)	1(1)	0	0	3(1)	2(0)	7(2)
Fatal	0	0	0	0	0	0	0	0	0	0	0
<b>Total Crashes</b>	13(0)	9(0)	7(0)	11(1)	18(1)	8(2)	31(3)	6(0)	27(4)	23(0)	153(11)

Note: Values shown in the format of Total (Single Vehicle Crash); Shaded region reflects construction years

**Table B-74. Before-After Crash Summary, Highway 20, Bend, OR**

<b>Analysis Category</b>	<b>Before (1998-2001)</b>	<b>After (2004-2006)</b>	<b>Crash Reductions</b>	<b>Standard Deviation</b>
Crash Frequency (crashes per year)	11.6	18.7	-7.1	5.5
Crash Rate (crashes per million vehicles)	1.63	2.19	-0.56	2.0
Severe & Fatal Crash Frequency (crashes per year)	0.2	1.7	-1.5	1.4
Single Vehicle Crash Frequency (crashes per year)	0.4	1.3	-0.9	1.3
ADT (vehicles per day)	19,475	23,300	-	-

**Case CS-OR-3: Portland, OR – NE Alberta St. Case Study**

**Table B-75. NE Alberta St. Project Description**

Location:	Portland, OR (NE Alberta St.)			
Construction Period:	6/02/2002 to 3/2004			
Length of Segment:	1,278 ft			
Average Daily Traffic:		Eastbound	Westbound	Total
	1998	3,721	3,045	6,766
	2002	4,527	3,806	8,333
	2006 (Projected)	5,500	4,760	10,260
Posted Speed:	25 mph			
Project Description:	Street trees, curb extensions, improved pedestrian crossings, ornamental street lights			
Supplemental Information:	Project was an intersection improvement project (mid-block locations were not modified)			



**Table B-76. Crash Type Summary, NE Alberta St., Portland, OR**

<b>Crash Type</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>Total</b>
Angle/Broadside	14	9	14	10	13	6	9	9	13	5	102
Head-On	0	0	0	0	0	0	0	0	1	0	1
Fixed Object	0	0	0	0	0	1	1	0	0	1	3
Pedestrian	0	0	0	0	0	0	1	1	2	0	4
Rear End	4	3	6	2	1	2	2	5	3	4	32
Sideswipe (Total)											
Same Direction	1	0	2	2	1	1	2	1	1	3	14
Opposing Direction	0	0	0	0	0	0	0	0	0	0	0
Others (Total)											
Backing	2	0	0	0	0	1	3	0	0	0	6
Non-Collision	0	1	0	0	1	0	0	0	0	0	2
Parking Maneuver	0	1	2	1	0	1	1	0	0	0	6
Undefined Others	0	0	0	0	0	0	0	0	0	0	0
<b>Total Crashes</b>	<b>21</b>	<b>14</b>	<b>24</b>	<b>15</b>	<b>16</b>	<b>12</b>	<b>19</b>	<b>16</b>	<b>20</b>	<b>13</b>	<b>170</b>

Note: Shaded region reflects construction years

**Table B-77. Crash Severity Summary, NE Alberta St., Portland, OR**

<b>Severity</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>Total</b>
No Injury	13(3)	8(2)	17(4)	8(2)	10(2)	8(2)	13(4)	7(1)	16(3)	10(3)	110(26)
Injury (Total)											
Possible Injury	8(0)	6(0)	7(1)	7(2)	6(0)	4(0)	6(1)	9(1)	4(2)	3(0)	60(6)
Non-Incapacitating	0	0	0	0	0	0	0	0	0	0	0
Incapacitating	0	0	0	0	0	0	0	0	0	0	0
Fatal	0	0	0	0	0	0	0	0	0	0	0
<b>Total Crashes</b>	21(3)	14(2)	24(5)	15(4)	16(2)	12(2)	19(5)	16(2)	20(5)	13(3)	170(32)

Note: Values shown in the format of Total (Single Vehicle Crash); Shaded region reflects construction years

**Table B-78. Before-After Crash Summary, NE Alberta St., Portland, OR**

<b>Analysis Category</b>	<b>Before (1997-2001)</b>	<b>After (2005-2006)</b>	<b>Crash Reductions</b>	<b>Standard Deviation</b>
Crash Frequency (crashes per year)	17.8	16.5	1.3	5.9
Crash Rate (crashes per million vehicles)	7.28	4.41	2.88	3.4
Severe & Fatal Crash Frequency (crashes per year)	0.0	0.0	0.0	0.0
Single Vehicle Crash Frequency (crashes per year)	3.2	4.0	-0.8	2.7
ADT (vehicles per day)	6,770	10,260	-	-

**Case CS-OR-4: Portland, OR – Belmont St. / Morrison St. Case Study**

**Table B-79. Belmont St. & Morrison St. Project Description**

Location:	Portland, OR (Belmont-Morrison Project)	
Construction Period:	April 2001 to June 2001	
Length of Segment:	3,696 ft (One-Way)	
Average Daily Traffic:	1998	12,351
	1999	12,668
	2001	10,655
Posted Speed:	25mph	
Project Description:	Pedestrian islands and enhanced pedestrian crossing, curb extensions, landscaping	
Supplemental Information:	One Way Street – Intersection Improvements	

**Table B-80. Crash Type Summary, Belmont St. & Morrison St., Portland, OR**

<b>Crash Type</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>Total</b>
Angle/Broadside	16	11	8	12	15	14	11	4	3	3	97
Head-On	0	0	0	0	0	0	0	0	0	1	1
Fixed Object	0	0	0	1	0	1	0	0	1	1	4
Pedestrian	0	0	0	0	1	0	1	0	0	1	3
Rear End	8	7	0	3	3	4	8	3	2	4	42
Sideswipe (Total)											
Same Direction	1	1	2	1	2	4	3	0	0	1	15
Opposing Direction	0	0	0	0	0	0	0	0	0	0	0
Others (Total)											
Backing	3	0	0	0	0	1	0	0	0	0	4
Non-Collision	0	0	0	0	0	0	0	0	0	0	0
Parking Maneuver	0	1	0	1	0	0	0	0	0	1	3
<b>Total Crashes</b>	<b>28</b>	<b>20</b>	<b>10</b>	<b>18</b>	<b>21</b>	<b>24</b>	<b>23</b>	<b>7</b>	<b>6</b>	<b>12</b>	<b>169</b>

Note: Shaded region reflects construction years

**Table B-81. Crash Severity Summary, Belmont St. & Morrison St., Portland, OR**

<b>Severity</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>Total</b>
No Injury	13(0)	8(0)	3(0)	8(0)	13(2)	14(2)	13(1)	3(0)	3(0)	7(3)	85(8)
Injury (Total)											
Possible Injury	15(1)	12(0)	7(0)	10(1)	8(1)	10(1)	10(2)	4(0)	3(1)	5(2)	84(9)
Non-Incapacitating	0	0	0	0	0	0	0	0	0	0	0
Incapacitating	0	0	0	0	0	0	0	0	0	0	0
Fatal	0	0	0	0	0	0	0	0	0	0	0
<b>Total Crashes</b>	<b>28(1)</b>	<b>20(0)</b>	<b>10(0)</b>	<b>18(1)</b>	<b>21(3)</b>	<b>24(3)</b>	<b>23(3)</b>	<b>7(0)</b>	<b>6(1)</b>	<b>12(5)</b>	<b>169(17)</b>

Note: Values shown in the format of Total (Single Vehicle Crash); Shaded region reflects construction years

**Table B-82. Before-After Crash Summary, Belmont St. & Morrison St., Portland, OR**

<b>Analysis Category</b>	<b>Before (1997-2000)</b>	<b>After (2002-2006)</b>	<b>Crash Reductions</b>	<b>Standard Deviation</b>
Crash Frequency (crashes per year)	19.0	14.4	4.6	5.8
Crash Rate (crashes per million vehicles)	4.16	3.70	0.46	2.8
Severe & Fatal Crash Frequency (crashes per year)	0.0	0.0	0.0	0.0
Single Vehicle Crash Frequency (crashes per year)	0.5	2.4	-1.9	1.7
ADT (vehicles per day)	12,510	10,655	-	-

**Case CS-OR-5: Portland, OR – NE Martin Luther King Jr. Blvd. Case Study**

**Table B-83. NE Martin Luther King Jr. Blvd. Project Description**

Location:	Portland, OR (Martin Luther King Jr. Blvd. from Shaver to Fremont)	
Construction Period:	2001 to 2002	
Length of Segment:	370 ft	
Average Daily Traffic:	2000	27,500
	2001	27,700
	2002	28,200
	2004	28,540
Functional Classification:	Major Arterial	
Project Description:	Curb extensions, widen sidewalk, street trees, street lighting, concrete median, curb and gutter	
Supplemental Information:	Not applicable	

**Table B-84. Crash Type Summary, NE Martin Luther King Jr. Blvd., Portland, OR**

<b>Crash Type</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>Total</b>
Angle/Broadside	2	11	3	3	1	9	10	9	10	8	66
Head-On	0	0	0	0	0	0	0	0	0	0	0
Fixed Object	0	0	0	0	0	0	0	0	0	0	0
Pedestrian	1	0	2	1	1	1	1	0	2	0	9
Rear End	15	9	14	13	11	4	17	9	7	10	109
Sideswipe (Total)											
Same Direction	4	1	8	3	3	1	1	0	1	1	23
Opposing Direction	0	0	0	0	0	0	0	0	0	0	0
Others (Total)											
Backing	1	0	0	1	0	0	1	0	0	0	3
Non-Collision	0	0	0	0	0	0	0	0	0	0	0
Parking Maneuver	0	0	1	0	1	0	0	0	0	0	2
Undefined Others	0	0	0	0	0	0	0	0	0	0	0
<b>Total Crashes</b>	<b>23</b>	<b>21</b>	<b>28</b>	<b>21</b>	<b>17</b>	<b>15</b>	<b>30</b>	<b>18</b>	<b>20</b>	<b>19</b>	<b>212</b>

Note: Shaded region reflects construction years

**Table B-85. Crash Severity Summary, NE Martin Luther King Jr. Blvd., Portland, OR**

<b>Severity</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>Total</b>
No Injury	15(0)	14(0)	18(0)	16(0)	12(0)	8(0)	16(0)	5(0)	11	10(0)	125(0)
Injury (Total)											
Possible Injury	8(1)	6(0)	10(2)	5(1)	5(1)	7(1)	14(1)	13(0)	9(2)	9(0)	86(9)
Non-Incapacitating	0	0	0	0	0	0	0	0	0	0	0
Incapacitating	0	1(0)	0	0	0	0	0	0	0	0	1(0)
Fatal	0	0	0	0	0	0	0	0	0	0	0
<b>Total Crashes</b>	<b>23(1)</b>	<b>21(0)</b>	<b>28(2)</b>	<b>21(1)</b>	<b>17(1)</b>	<b>15(1)</b>	<b>30(1)</b>	<b>18(0)</b>	<b>20(2)</b>	<b>19(0)</b>	<b>212(9)</b>

Note: Values shown in the format of Total (Single Vehicle Crash); Shaded region reflects construction years

**Table B-86. Before-After Crash Summary, NE Martin Luther King Jr. Blvd., Portland, OR**

<b>Analysis Category</b>	<b>Before (1997-2000)</b>	<b>After (2003-2006)</b>	<b>Crash Reductions</b>	<b>Standard Deviation</b>
Crash Frequency (crashes per year)	23.3	21.8	1.5	6.7
Crash Rate (crashes per million vehicles)	2.32	2.09	0.23	2.1
Severe & Fatal Crash Frequency (crashes per year)	0.3	0.0	0.3	0.5
Single Vehicle Crash Frequency (crashes per year)	1.0	0.8	0.3	1.3
ADT (vehicles per day)	27,500	28,540	-	-



**Case CS-OR-6: Portland, OR – Tacoma Main St. Case Study**

**Table B-87. Tacoma Main St. Project Description**

Location:	Portland, OR (Tacoma Main St.)			
Construction Period:	Striping performed 9/02 Construction Spring 2004 to Completed 10/31/2004			
Length of Segment:	2,698 ft			
Average Daily Traffic:		Eastbound	Westbound	Total
	1996	11,823	11,266	23,089
	1997	11,350	10,726	22,076
	1999	12,247	61,54	21,104
	2002	14,737	14,737	29,474
	2004	13,206	13,297	26,450
	2007	11,419	10,959	22,378
Posted Speed:	35 mph			
Project Description:	Curb extensions, wider sidewalks, landscaping, improvements to pedestrian access and safety			
Supplemental Information:	Intersection Improvement Project			

**Table B-88. Crash Type Summary, Tacoma Main St., Portland, OR**

<b>Crash Type</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>Total</b>
Angle/Broadside	16	25	14	31	30	16	19	21	15	15	202
Head-On	0	1	0	0	1	0	0	0	1	0	3
Hit Object (Total)											
Fixed Object	2	1	1	2	0	1	1	0	0	0	8
Parked Vehicle	0	0	0	0	0	0	0	0	0	0	0
Pedestrian	0	0	0	2	1	3	0	1	0	1	8
Rear End	34	29	22	15	13	11	14	3	10	9	160
Sideswipe (Total)											
Same Direction	9	8	2	2	4	4	2	1	4	2	38
Opposing Direction	0	0	0	0	0	0	0	0	0	0	0
Others (Total)											
Backing	0	2	2	1	0	0	0	0	0	0	5
Non-Collision	0	0	0	0	0	1	0	0	0	0	1
Parking Maneuver	1	1	0	0	0	0	0	0	0	0	2
Undefined Others	1	0	0	0	0	0	0	0	0	0	1
<b>Total Crashes</b>	<b>63</b>	<b>67</b>	<b>41</b>	<b>53</b>	<b>49</b>	<b>36</b>	<b>36</b>	<b>26</b>	<b>30</b>	<b>27</b>	<b>428</b>

Note: Shaded region reflects construction years

**Table B-89. Crash Severity Summary, Tacoma Main St., Portland, OR**

<b>Severity</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>Total</b>
No Injury	42(3)	53(7)	26(2)	26(2)	31(4)	27(1)	19(1)	15(0)	20	16(1)	275(21)
Injury (Total)											
Possible Injury	21(0)	14(1)	15(0)	27(3)	18(1)	9(3)	17(0)	10(1)	10	11(1)	152(10)
Non-Incapacitating	0	0	0	0	0	0	0	0	0	0	0
Incapacitating	0	0	0	0	0	0	0	1(0)	0	0	1(0)
Fatal	0	0	0	0	0	0	0	0	0	0	0
<b>Total Crashes</b>	<b>63(3)</b>	<b>67(8)</b>	<b>41(2)</b>	<b>53(5)</b>	<b>49(5)</b>	<b>36(4)</b>	<b>36(1)</b>	<b>26(1)</b>	<b>30</b>	<b>27(2)</b>	<b>428(31)</b>

Note: Values shown in the format of Total (Single Vehicle Crash); Shaded region reflects construction years

**Table B-90. Before-After Crash Summary, Tacoma Main St., Portland, OR**

<b>Analysis Category</b>	<b>Before (1997-2001)</b>	<b>After (2005-2006)</b>	<b>Crash Reductions</b>	<b>Standard Deviation</b>
Crash Frequency (crashes per year)	54.6	28.5	26.1	9.1
Crash Rate (crashes per million vehicles)	6.18	3.20	2.98	3.1
Severe & Fatal Crash Frequency (crashes per year)	0.0	0.0	0.0	0.0
Single Vehicle Crash Frequency (crashes per year)	4.6	1.0	3.6	2.4
ADT (vehicles per day)	24,220	24,420	-	-

**Case CS-OR-7: Portland, OR – Woodstock Blvd. Case Study**

**Table B-91. Woodstock Blvd. Project Description**

Location:	Portland, OR (Woodstock Blvd.)			
Construction Period:	10/27/1999 to 4/26/2000			
Length of Segment:	1,065 ft			
Average Daily Traffic:		Eastbound	Westbound	Total
	1996	7,525	6,811	14,336
	1997	8,183	7,931	16,114
	1998	8,190	8,327	16,516
	2000	8,750	8,219	16,971
	2004	6,664	5,822	12,486
	2006	7,982	7,493	15,475
Posted Speed:	25 mph			
Project Description:	Bicycle lanes, bus stops, landscaping, improvements to pedestrian access and safety, and curb extensions			
Supplemental Information:	Intersection improvement project			

**Table B-92. Crash Type Summary, Woodstock Blvd., Portland, OR**

<b>Crash Type</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>Total</b>
Angle/Broadside	15	21	15	9	5	14	17	10	6	5	117
Head-On	0	0	0	0	0	1	0	0	0	0	1
Fixed Object	0	1	0	0	0	1	0	1	3	0	6
Pedestrian	1	0	1	1	7	2	0	0	0	1	13
Rear End	13	13	8	6	13	6	17	3	9	8	96
Sideswipe (Total)											
Same Direction	1	2	2	3	2	0	1	0	3	0	14
Opposing Direction	0	0	0	0	0	0	1	1	0	0	2
Others (Total)											
Backing	1	0	0	0	0	0	4	0	4	3	12
Non-Collision	0	0	0	0	0	0	0	0	0	0	0
Parking Maneuver	2	1	0	5	2	1	0	0	3	0	14
Undefined Others	0	0	0	0	0	0	1	0	0	0	1
<b>Total Crashes</b>	<b>33</b>	<b>38</b>	<b>26</b>	<b>24</b>	<b>29</b>	<b>25</b>	<b>41</b>	<b>15</b>	<b>28</b>	<b>17</b>	<b>276</b>

Note: Shaded region reflects construction years

**Table B-93. Crash Severity Summary, Woodstock Blvd., Portland, OR**

<b>Severity</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>Total</b>
No Injury	27(0)	25(2)	15(1)	18(3)	15(2)	17(4)	26(1)	9(1)	20(9)	9(5)	181(28)
Injury (Total)											
Possible Injury	6(1)	13(0)	11(1)	6(1)	14(7)	8(2)	15(0)	6(0)	8(1)	8(1)	95(14)
Non-Incapacitating	0	0	0	0	0	0	0	0	0	0	0
Incapacitating	0	0	0	0	0	0	0	0	0	0	0
Fatal	0	0	0	0	0	0	0	0	0	0	0
<b>Total Crashes</b>	<b>33(1)</b>	<b>38(2)</b>	<b>26(2)</b>	<b>24(4)</b>	<b>29(9)</b>	<b>25(6)</b>	<b>41(1)</b>	<b>15(1)</b>	<b>28(10)</b>	<b>17(6)</b>	<b>276(42)</b>

Note: Values shown in the format of Total (Single Vehicle Crash); Shaded region reflects construction years

**Table B-94. Before-After Crash Summary, Woodstock Blvd., Portland, OR**

<b>Analysis Category</b>	<b>Before (1997-1998)</b>	<b>After (2001-2006)</b>	<b>Crash Reductions</b>	<b>Standard Deviation</b>
Crash Frequency (crashes per year)	35.5	25.8	9.7	7.8
Crash Rate (crashes per million vehicles)	5.96	4.72	1.24	3.3
Severe & Fatal Crash Frequency (crashes per year)	0.0	0.0	0.0	0.0
Single Vehicle Crash Frequency (crashes per year)	1.5	5.5	-4.0	2.6
ADT (vehicles per day)	16,315	15,000	-	-

**Case CS-UT-1: Salt Lake City, UT – Guardsman Way Case Study**

**Table B-95. Guardsman Way Project Description**

Location:	Salt Lake City, UT (Guardsman Way)	
Construction Period:	March 2003 to September 2003	
Length of Segment:	2,797 ft	
Average Daily Traffic:	1998	13,280
	2000	14,260
	2001	14,355
	2002	15,325
	2003	15,325
	2004	15,420
	2005	15,370
Project Description:	Curb extensions, enhanced pedestrian crossing, sidewalk	
Supplemental Information:	Intersection improvement project	

Crash type information is not available for the Salt Lake City case studies (due to crash reporting database issues).

**Table B-96. Crash Severity Summary, Guardsman Way, Salt Lake City, UT**

<b>Severity</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>Total</b>
No Injury	9(0)	8(1)	8(1)	11(0)	11(1)	-	8(1)	8(2)	3(0)	66(6)
Injury (Total)										
Possible Injury	0	4(0)	0	3(0)	2(0)	-	1(0)	1(0)	2(0)	13(0)
Non-Incapacitating	0	0	0	2(0)	0	-	0	0	2(0)	4(0)
Incapacitating	1(1)	0	0	0	0	-	1(1)	0	1(0)	3(2)
Fatal	0	0	0	0	0	-	0	0	0	0
<b>Total Crashes</b>	10(1)	12(1)	8(1)	16(0)	13(1)	-	10(2)	9(2)	8(0)	86(8)

Note: Values shown in the format of Total (Single Vehicle Crash); Shaded region reflects construction years

**Table B-97. Before-After Crash Summary, Guardsman Way, Salt Lake City UT**

<b>Analysis Category</b>	<b>Before (1998-2002)</b>	<b>After (2005-2006)</b>	<b>Crash Reductions</b>	<b>Standard Deviation</b>
Crash Frequency (crashes per year)	11.8	9.0	2.8	4.6
Crash Rate (crashes per million vehicles)	2.3	1.6	0.7	2.0
Severe & Fatal Crash Frequency (crashes per year)	0.2	0.7	-0.5	0.9
Single Vehicle Crash Frequency (crashes per year)	0.8	1.3	-0.5	1.5
ADT (vehicles per day)	14,305	15,395	-	-



**Case CS-UT-2: Salt Lake City, UT – South Temple Case Study**

**Table B-98. South Temple Project Description**

Location:	Salt Lake City, UT (South Temple)	
Construction Period:	2003 to 2004	
Length of Segment:	10,824 ft	
Average Daily Traffic:	1998	17,690
	2000	19,696
	2002	20,813
	2003	20,823
	2005	18,113
	2006	17,509
Project Description:	Street reconstruction including curb and gutter replacement, sidewalk replacement, access ramp installation, bus stop facilities, street lighting, traffic signal upgrades, crosswalks with pavers	
Supplemental Information:	Not Applicable	

Crash type information is not available for the Salt Lake City case studies (due to crash reporting database issues).

**Table B-99. Crash Severity Summary, South Temple, Salt Lake City, UT**

<b>Severity</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>Total</b>
No Injury	145(12)	114(4)	98(13)	126(7)	119(8)	65(7)	102(6)	87(3)	113(10)	969(70)
Injury (Total)										
Possible Injury	16(2)	24(3)	22(3)	23(2)	19(3)	10(1)	24(4)	14(2)	17(6)	169(26)
Non-Incapacitating	9(3)	5(2)	4(1)	10(3)	6(3)	3(1)	12(7)	9(3)	4(2)	62(25)
Incapacitating	4(1)	5(2)	3(1)	4(1)	2(1)	1(1)	2(1)	2(1)	3(1)	26(10)
Fatal	0	0	0	0	0	0	0	0	0	0
<b>Total Crashes</b>	<b>174(18)</b>	<b>148(11)</b>	<b>127(18)</b>	<b>163(13)</b>	<b>146(15)</b>	<b>79(10)</b>	<b>140(18)</b>	<b>112(9)</b>	<b>137(19)</b>	<b>1226(131)</b>

Note: Values shown in the format of Total (Single Vehicle Crash); Shaded region reflects construction years

**Table B-100. Before-After Crash Summary, South Temple, Salt Lake City UT**

<b>Analysis Category</b>	<b>Before (1998-2002)</b>	<b>After (2005-2006)</b>	<b>Crash Reductions</b>	<b>Standard Deviation</b>
Crash Frequency (crashes per year)	151.6	124.5	27.1	16.6
Crash Rate (crashes per million vehicles)	21.41	19.14	2.27	6.4
Severe & Fatal Crash Frequency (crashes per year)	3.6	2.5	1.1	2.5
Single Vehicle Crash Frequency (crashes per year)	11.6	14.0	-2.4	5.1
ADT (vehicles per day)	19,400	17,820	-	-

**Case CS-UT-3: Salt Lake City, UT – 1300 South Case Study**

**Table B-101. 1300 South Project Description**

Location:	Salt Lake City, UT (1300 South)	
Construction Period:	March 2003 to June 2004	
Length of Segment:	4,153 ft	
Average Daily Traffic:	1998	6,905
	2000	7,488
	2001	7,540
	2002	8,415
	2004	6,740
	2005	6,683
	2006	6,980
Project Description:	Curb and gutter, sidewalk, and access ramp installation	
Supplemental Information:	Not Applicable	

Crash type information is not available for the Salt Lake City case studies (due to crash reporting database issues).

**Table B-102. Crash Severity Summary, 1300 South, Salt Lake City, UT**

<b>Severity</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>Total</b>
No Injury	54(6)	42(1)	39(1)	41(4)	28(1)	45(2)	52(3)	28(2)	37(0)	366(20)
Injury (Total)										
Possible Injury	9(2)	7(2)	8(0)	6(1)	4(0)	10(1)	9(2)	7(0)	4(1)	64(9)
Non-Incapacitating	2(0)	2(2)	4(0)	4(0)	1(0)	3(0)	4(0)	4(1)	2(1)	26(4)
Incapacitating	0	2(1)	1(1)	1(0)	0	1(0)	1(0)	0	3(0)	9(2)
Fatal	0	0	0	0	0	0	0	0	0	0
<b>Total Crashes</b>	<b>65(8)</b>	<b>53(6)</b>	<b>52(2)</b>	<b>52(5)</b>	<b>33(1)</b>	<b>59(3)</b>	<b>66(5)</b>	<b>39(3)</b>	<b>46(2)</b>	<b>465(35)</b>

Note: Values shown in the format of Total (Single Vehicle Crash); Shaded region reflects construction years

**Table B-103. Before-After Crash Summary, 1300 South, Salt Lake City UT**

<b>Analysis Category</b>	<b>Before (1998-2002)</b>	<b>After (2005-2006)</b>	<b>Crash Reductions</b>	<b>Standard Deviation</b>
Crash Frequency (crashes per year)	51.0	42.5	8.5	9.7
Crash Rate (crashes per million vehicles)	18.58	17.04	1.54	6.0
Severe & Fatal Crash Frequency (crashes per year)	0.8	1.5	-0.7	1.5
Single Vehicle Crash Frequency (crashes per year)	4.4	2.5	1.9	2.6
ADT (vehicles per day)	7,520	6,835	-	-

**Case CS-UT-4: Salt Lake City, UT – 2100 South Case Study**

**Table B-104. 2100 South Project Description**

Location:	Salt Lake City, UT (2100 South)	
Construction Period:	April 1998 to December 1998	
Length of Segment:	1605 ft	
Average Daily Traffic:	1998	29,505
	2001	28,328
	2004	27,708
Project Description:	Curb and gutter, sidewalk replacement, pedestrian access ramp installation, turn lanes, traffic signal upgrade	
Supplemental Information:	Not Applicable	

Crash type information is not available for the Salt Lake City case studies (due to crash reporting database issues).

**Table B-105. Crash Severity Summary, 2100 South, Salt Lake City, UT**

<b>Severity</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>
No Injury	36(3)	41(4)	45(2)	46(2)	36(2)
Injury (Total)					
Possible Injury	9(0)	6(1)	10(1)	10(1)	11(0)
Non-Incapacitating	6(0)	2(0)	6(1)	6(1)	5(1)
Incapacitating	2(0)	0	5(1)	2(0)	2(0)
Fatal	0	0	0	0	0
<b>Total Crashes</b>	<b>53(3)</b>	<b>49(5)</b>	<b>66(5)</b>	<b>64(4)</b>	<b>54(3)</b>

Note: Values shown in the format of Total (Single Vehicle Crash); Shaded region reflects construction years

**Table B-106. Before-After Crash Summary, 2100 South, Salt Lake City UT**

<b>Analysis Category</b>	<b>Before (1997)</b>	<b>After (1999-2001)</b>	<b>Crash Reductions</b>	<b>Standard Deviation</b>
Crash Frequency (crashes per year)	53.0	61.3	-8.3	10.7
Crash Rate (crashes per million vehicles)	4.92	5.93	-1.01	3.3
Severe & Fatal Crash Frequency (crashes per year)	2.0	3.0	-1.0	2.2
Single Vehicle Crash Frequency (crashes per year)	3.0	4.0	-1.0	2.6
ADT (vehicles per day)	29,505	28,330	-	-