FISCAL YEAR 2012/13
HIGHWAY SAFETY IMPROVEMENT PROGRAM
ANNUAL REPORT

Prepared by

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Division of Traffic Operations
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Introduction

Moving Ahead for Progress in the 21st Century Act or "MAP–21" (Pub. L. 112–141, 126 Stat. 405) was signed in to law July 6, 2012, and continued the Highway Safety Improvement Program (HSIP) as a core program under title 23 United States Code section 148 to reduce fatalities and injuries on all public roadways. Title 23 United States Code section 148(h) requires each state to submit an annual report to the Federal Highway Administration (FHWA) regarding its HSIP implementation and effectiveness and title 23 Code of Federal Regulations sections 924.15(a)(1) and 924.15(a)(2) specify that the report be submitted no later than August 31 of each year.

In accordance with title 23 Code of Federal Regulations sections 924.15(a)(1) and 924.15(a)(2), this annual report describes the progress being made to implement projects and the status of program evaluations for the HSIP as described in title 23 United States Code section 148, for railway-highway crossings, (23 U.S.C. § 130(g)), and for high-risk rural roads (HR3) (23 U.S.C. § 148(g)).

The California Department of Transportation's (Caltrans') Division of Traffic Operations provided information for this report for the State HSIP, the Division of Rail for the Railway-Highway At-Grade Crossings Program, and the Division of Local Assistance for the local HSIP and HR3 Program.

I. Highway Safety Improvement Program—State Highways

Overview

This section of the HSIP Annual Report provides a review of statewide collision data, fatality rate trends, and travel trends on the State Highway System (SHS) and a summary of awarded safety projects in State fiscal year (FY) 2012/13. Also included is an evaluation of the effectiveness of safety projects that were completed between July 1, 2008, and June 30, 2009, by analyzing three years of before-and-after collision history, including an assessment of the benefit-cost ratio of these projects.

The purpose of the HSIP is to reduce the number and severity of collisions and their associated costs. Caltrans implements the HSIP for State highways by programming and funding projects in the Collision Reduction Category, one of eight categories that make up the State Highway Operation and Protection Program (SHOPP). The Collision Reduction Category is further divided into two programs: Safety Improvement, and Collision Severity Reduction. The Safety Improvement Program is among Caltrans' top priorities in the SHOPP and as a result, all projects that meet the criteria for the Safety Improvement Program are funded. These criteria include a benefit-cost analysis that evaluates the safety benefit of these projects in terms of collision costs saved and the cost of constructing the improvement. The projects evaluated in this report include all projects funded by the Collision Reduction Category, which includes both federal HSIP and State highway funds.

In California, federal HSIP funding is shared between the State Highway System and the local roadway system, with State and local HSIPs receiving approximately $123 million and $65.6 million respectively in fiscal year 2012/13. The Railway-Highway At-Grade Crossings Program currently provides about $16 million each year in federal highway funds to improve eligible grade crossings. Under the Moving Ahead for Progress in the 21st Century Act or the "MAP–21" (Pub. L. 112–141, July 6, 2012; 126 Stat. 405), the High-Risk Rural Roads program was merged into the HSIP for safety improvements on public rural roadways that meet the functional classification requirements of title 23 United States Code section 148(a)(1). In addition to the above, in accordance with title 23 United States Code section 164 repeat intoxicated transfer funds, approximately $40 million was transferred to California Office of Traffic Safety for alcohol impaired driving countermeasures. These funds will be used to further support the California Strategic Highway Safety Plan. The remaining $28 million were allocated towards hazard elimination safety projects in accordance with MAP 21 guidelines.

Caltrans uses the Transportation System Network database to identify locations with significantly high collision concentrations. The identified locations are systematically investigated to determine probable causes of the collisions in order to implement effective countermeasures to improve safety. Other locations identified for investigation and possible implementation of countermeasures are generated from three Monitoring Programs: Cross Median Collision, Two and Three Lane Cross Centerline Collision, and Wrong Way Collision. As of February 2012, Caltrans has implemented a 5-year "California Roadway Departure Safety Implementation Plan" which identified over 7,000 locations for possible low cost countermeasures to systematically implement on many state highways in an effort to reduce roadway departure crashes. Nearly 2,900 traffic safety investigations were processed in FY 2012/13. Each investigation consists of a detailed analysis of collision history, a collision diagram, a field investigation, and a review of roadway geometrics. Each investigation has a recommendation, which is either a specific safety action or a determination of no further action. Improvements can range from maintenance work orders or sign installation orders to Major or Minor improvement projects.[1] Each recommendation is monitored to ensure implementation.

[1] Major projects have an estimated project cost of $1,000,000 or more. Minor A projects have an estimated cost from $270,001 to $999,999, and Minor B projects cost $270,000 or less.

Statewide Collision Data, Fatality Rates, Older Driver and Older Pedestrian Rates and Travel Trends

During the 2011 calendar year, 1,059 fatal collisions, 46,656 injury collisions, and 85,062 property-damage-only (PDO) collisions were reported on the SHS. Caltrans estimates that these collisions resulted in losses of approximately $9.034 billion.[2]

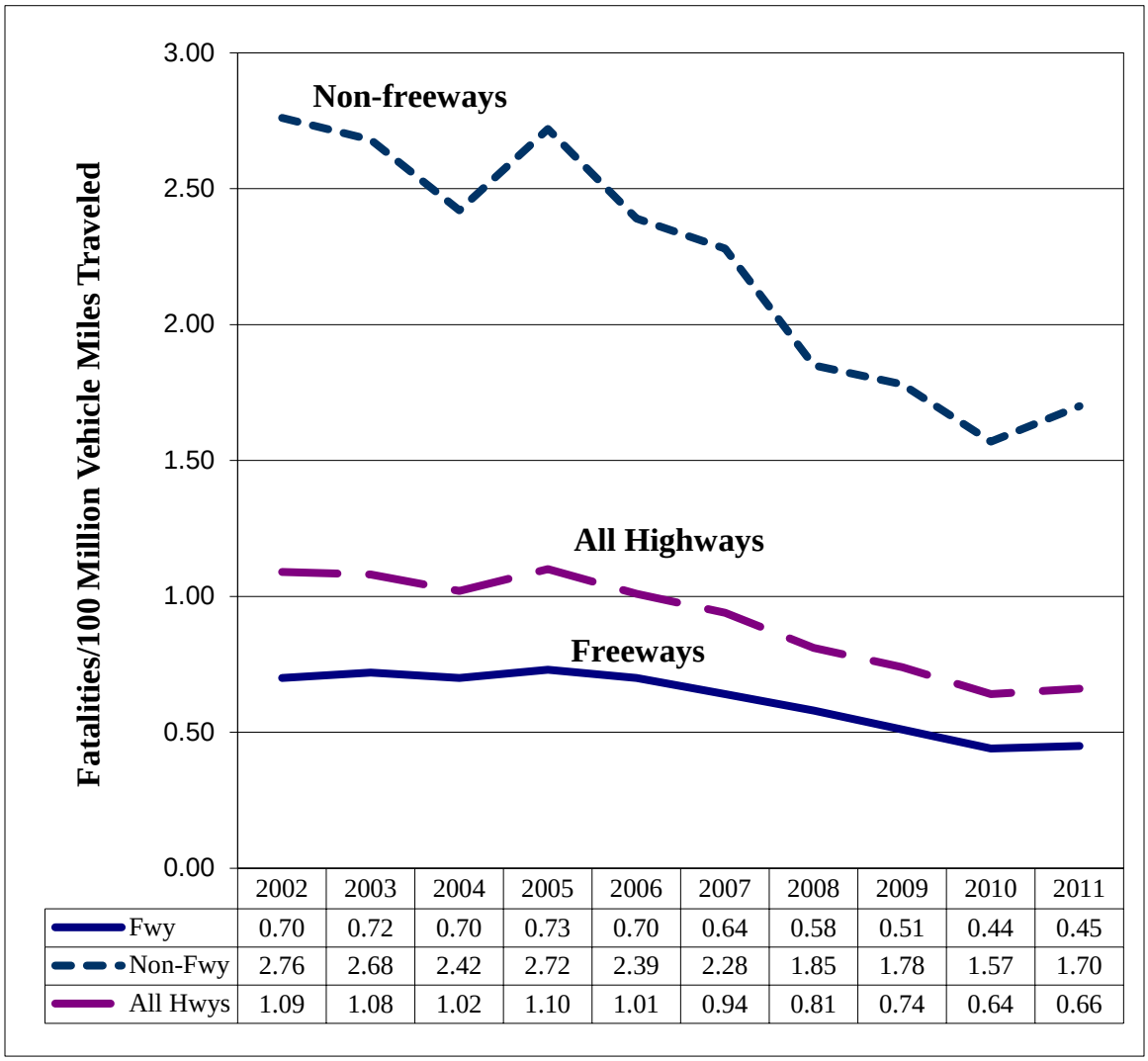
Over the past ten years, the HSIP and other State programs have made highways safer through the implementation of highway safety projects. This fact is evident from the fatality rate trends shown in Figure 1. In the ten-year period between 2002 and 2011, the fatality rate on all State highways has decreased 39 percent (from 1.09 to 0.66 fatalities per 100 million vehicle miles). For the same period, the fatality rate on freeways decreased 36 percent (from 0.70 to 0.45 fatalities per 100 million vehicle miles) and on non-freeways it decreased 38 percent (from 2.76 to 1.70 fatalities per 100 million vehicle miles).

The latest ten-year travel trend on the SHS is shown in Figure 2. Between 2002 and 2011, annual travel on all highways increased 1.9 percent (from 172.6 to 175.8 billion vehicle miles). During the same period, annual travel on freeways increased 6.7 percent (from 140.4 to 145.5 billion vehicle miles) and on non-freeways it decreased 5.9 percent (from 32.2 to 30.3 billion vehicle miles). Freeway travel accounts for 82.8 percent of travel on the SHS even though freeway road miles account for only 28.9 percent of the SHS. MAP-21 is putting focus in certain areas; accordingly, older driver and pedestrian rates per capita are shown in Table 1 and Table 2. In both performance measures, the 5 year moving average for fatal, injury and fatal + injury from 2008 to 2010 are trending downward and therefore the implementation of the special rule as set by MAP 21 does not apply at this time. These numbers are from all roadways in the state, not just state highways. Although there was a slight increase in the fatality rate between 2010 and 2011, one year of increase is not a true indicator that fatality rate will continue to trend upward.

[2] Collision costs used by Caltrans are based on the Comprehensive Cost Method. In addition to accounting for the monetary effects of a collision, the Comprehensive Cost Method also considers the effects of a collision on a person's whole life, including loss of household production, loss of quality of life, and vocational rehabilitation. Current costs for collisions on California roadways are $4,779,300 for fatal collisions, $75,900 for injury collisions, and $5,100 for PDO collisions. Fatal: $4,779,300 * 1,059 Fatal = $5.06B, Injury: $75,900 * 46,656 Injuries = $3.54B, PDO: $5,100 * 85,062 PDO = $0.434B

Figure 1

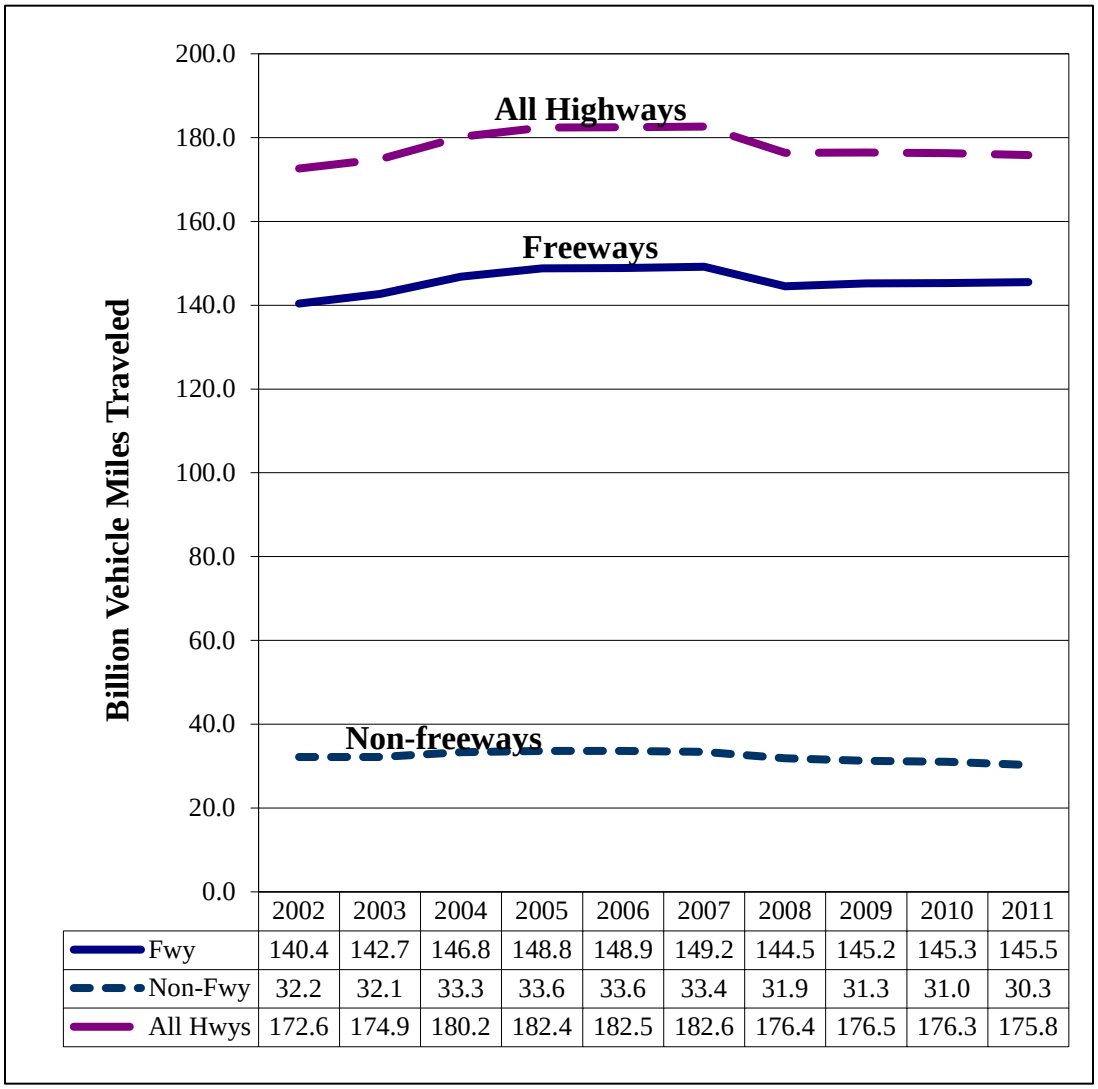
STATEWIDE FATALITY RATE TRENDS ON CALIFORNIA STATE HIGHWAYS FROM 2002 THROUGH 2011 (CALENDAR YEAR)



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Fwy	0.70	0.72	0.70	0.73	0.70	0.64	0.58	0.51	0.44	0.45
Non-Fwy	2.76	2.68	2.42	2.72	2.39	2.28	1.85	1.78	1.57	1.70
All Hwys	1.09	1.08	1.02	1.10	1.01	0.94	0.81	0.74	0.64	0.66

Figure 2

**STATEWIDE TRAVEL TRENDS ON CALIFORNIA STATE HIGHWAYS
FROM 2002 THROUGH 2011
(CALENDAR YEAR)**



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Fwy	140.4	142.7	146.8	148.8	148.9	149.2	144.5	145.2	145.3	145.5
Non-Fwy	32.2	32.1	33.3	33.6	33.6	33.4	31.9	31.3	31.0	30.3
All Hwys	172.6	174.9	180.2	182.4	182.5	182.6	176.4	176.5	176.3	175.8

Table 1

65 AND OLDER PEDESTRIAN PERFORMANCE MEASURE
(per million people)

	2004	2005	2006	2007	2008	2009	2010
Fatality Rate	4.45	4.43	4.25	4.81	3.55	4.01	4.17
Injury Rate*	34.95	35.27	35.15	35.49	35.25	36.21	32.82
Fatality and Injury Rate*	39.4	39.7	39.39	39.95	38.08	39.14	37.11

Table 2

65 AND OLDER DRIVER PERFORMANCE MEASURE
(per million people)

	2004	2005	2006	2007	2008	2009	2010
Fatality Rate	13.12	12.21	12.31	12.34	10.88	10.32	10.10
Injury Rate*	673.15	634.84	615.42	604.88	570.19	572.55	594.45
Fatality and Injury Rate*	686.27	647.05	627.73	617.21	581.07	582.87	604.55

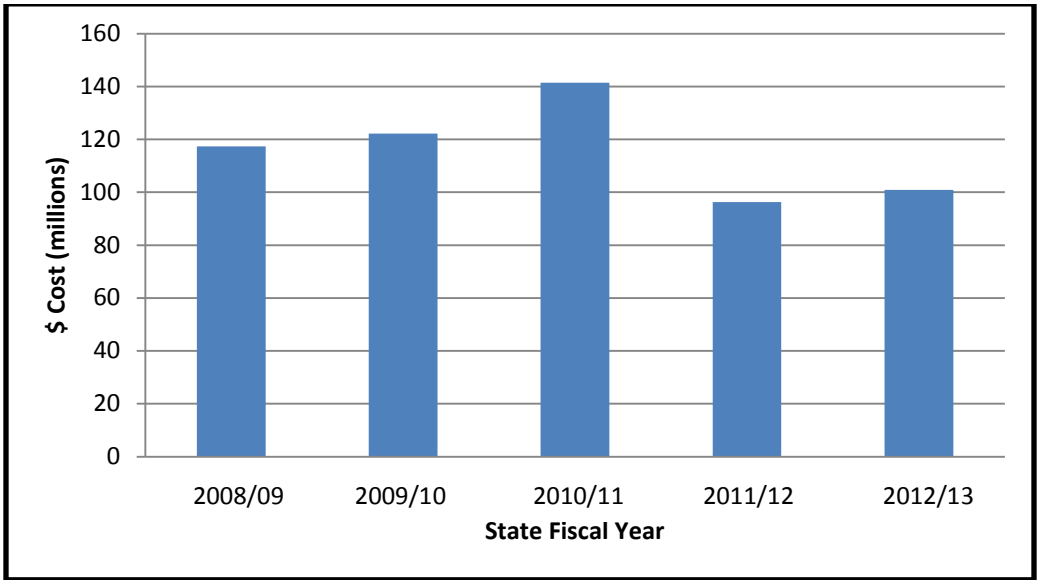
*Includes all levels of injury

Summary of Projects Awarded in Fiscal Year 2012/13

The reductions in fatality rates have been accomplished by implementing safety projects. Many other improvements such as tree trimming, restriping, or installing warning signs that were requested by Traffic Operations staff and performed by Maintenance staff in the districts also contributed to improved safety. During FY 2012/13, there were 55 Major and Minor A safety projects awarded at a cost of $100.9 million. The total cost of awarded Major and Minor A safety projects for the past five years is shown in Figure 3.

Figure 3

TOTAL COSTS OF AWARDED MAJOR AND MINOR A SAFETY PROJECTS ON CALIFORNIA STATE HIGHWAYS FROM FY 2008/09 THROUGH FY 2012/13



Projects awarded in FY 2012/13 range from spot improvements such as new or modified signal installations or curve improvement to statewide systematic improvements such as the Clean-Up-the-Roadside Environment Program, the Cross Median Collision Monitoring Program, and the Two and Three Lane Cross Centerline Collision Monitoring Program. All of these project types are consistent with one or more of the 17 challenge areas identified in California's Strategic Highway Safety Plan (SHSP), specifically:

- Challenge Area 2: Reduce the occurrence and consequence of leaving the roadway and head-on collisions.
- Challenge Area 5: Improve driver decisions about rights-of-way and turning.
- Challenge Area 7: Improve intersection and interchange safety for roadway users.
- Challenge Area 8: Make walking and street crossing safer.
- Challenge Area 9: Improve safety for older roadway users.
- Challenge Area 11: Improve commercial vehicle safety.
- Challenge Area 12: Improve motorcycle safety.
- Challenge Area 13: Improve bicycling safety.

The following narrative describes the safety improvement projects that were awarded in FY 2012/13. Table 3 provides a summary of the improvement types and project costs.

Intersection Improvements. Projects include left channelization, intersection lighting, and new or modify traffic signal installation. There were 14 intersection improvement projects awarded for a cost of $7.6 million. These projects are consistent with SHSP challenge areas 5, 7, 8, and 13.

Roadway/Structure Improvements. Projects include curve improvements, shoulder and centerline rumble strips, shoulder widening, and wet pavement improvements (high friction surface treatment, open-graded asphalt concrete and drainage improvements). There were 14 projects awarded for a cost of $25.2 million. These projects are consistent with SHSP challenge areas 2, 5, 9, 11, 12, and 13.

Roadside Improvements. Projects include new metal beam guardrail, rockfall mitigation, crash cushion and guardrail end treatment upgrades, and windscreens. There were 14 projects awarded for a cost of $33.2 million. These projects fall under the Collision Severity Reduction Program. These projects are consistent with SHSP challenge area 2.

Two- and Three-Lane Cross Centerline Collision Monitoring Program. Projects include centerline and shoulder rumble strips. There were five projects awarded for a cost of $26.4 million over 45 miles. These projects are consistent with SHSP challenge area 2.

Cross Median Collision Monitoring Program. Projects include installation of thrie beam, and concrete median barriers. There were eight median barrier projects awarded for a cost of $8.5 million. The mileage breakdown for new median barriers is 9.4 miles of thrie beam and 6.0 miles of concrete. These projects are consistent with SHSP challenge area 2.

Table 3

SUMMARY OF PROJECTS AWARDED IN FY 2012/13

Improvement Category	No. of Projects	Cost ($million)
Intersection Improvements	14	7.6
Roadway/Structure Improvements	14	25.2
Roadside Improvements	14	33.2
Two- and Three-Lane Cross Centerline Collision Monitoring Program	5	26.4
Cross Median Collision Monitoring Program	8	8.5
Total	55	100.9

Program Evaluation of Completed Projects

The effectiveness of the HSIP was measured by comparing collision data before and after the improvements were completed. Three years of collision data before the improvements was compared with three years of collision data after the improvements. A total of 111 projects, provided in Appendix A, Table A1, were considered in the evaluation. Analysis of collision data was based on 157 highway locations, provided in Appendix A, Table A2, as some of the 111 projects contained more than one highway location. The cost of implementing improvement for the 157 highway locations was $215.3 million. The annual savings, in terms of reductions in collision frequency and severity, was estimated at $149.6 million. This translates to an average savings of $2.99 billion or a benefit-cost ratio of 13.8 to 1, assuming a project life of 20 years. Corresponding collision data for the highway locations is provided in Appendix A, Table A3.

A statistical analysis of the before-and-after collision data for the 157 highway locations shows a 18.4 percent reduction of fatal collisions, a 1.3 percent increase of injury collisions, and a 0.4 percent increase of PDO collisions. Fatalities were reduced by 21.7 percent and there were no changes in the number of persons injured. The increases in PDO and injury collisions were not statistically significant. The percent changes and the corresponding statistical significance are summarized in Table 4.

Table 4

PERCENT CHANGE IN COLLISIONS ON HIGHWAY LOCATIONS

Collision Type	% Increase: (+) % Reduction: (-)	Standard Deviation	Statistically Significant*	t-statistics
Fatal Collisions	-18.4	±7.0%	Yes	2.64
Injury Collisions	+1.3	±1.4%	No	0.99
PDO	+0.4	±1.0%	No	0.37
Fatalities	-21.7	±6.4%	Yes	3.40
Persons Injured	0.0	±1.1%	No	0.00

* Test of statistical significance determines the probability that the result in question has occurred at a specified level of confidence and not by chance alone.

II. Highway Safety Improvement Program—Local Roadways

Overview

In California, HSIP funding is split between the State Highway System and the local roadway system. In the 2013 Federal Fiscal Year (FFY), the local HSIP received approximately $67 million for HSIP and High-Risk Rural Road (HR3) eligible projects. (See section IV "High Risk Rural Roads Program" for more details.) Caltrans' Division of Local Assistance (DLA) staff manages the local agency share of HSIP funds. In conjunction with its local agency partners, the division prepares HSIP guidelines and solicits project applications from local agencies every one to two years.

Working with the University of California Berkeley (UCB)–Safe Transportation Research and Education Center, the DLA developed an HSIP application benefit-cost tool to provide a better and more consistent method for ranking project applications on a statewide basis. This new application tool compares project cost to collision cost savings. Between 2008 and 2012, the Division of Local Assistance (DLA) worked closely with UCB and FHWA to make significant improvements to the overall effectiveness of the local-HSIP. These program improvements include the new benefit-cost tool, the development of the new Local Roadway Safety Manual for California Local Road Owners, and the direct incorporation of the UCB Transportation Injury Mapping System website. These improvements focused on encouraging local agencies to: proactively analyze their roadway networks for the highest crash locations; and develop and submit applications with greatest chance of reducing fatalities and serious injuries. These improvements allow the DLA to fairly evaluate applications and select projects based on a non-subjective, data driven process. With these program improvements in place, DLA is now focusing on improving the program obligation rates and overall delivery.

Project Summary

Caltrans has completed five cycles of project solicitation, review, prioritization, and selection. The sixth project solicitation began on April 29, 2013 with applications due July 26, 2013 and the final selection of projects expected by October 2013. All federal HSIP funds apportioned to the State and directed to local agency roadways have been or will be assigned to projects from one of these six cycles. All projects in the first five cycles have been programmed in each agency's respective Federal Transportation Improvement Program (FTIP). Projects in Cycle 6 are expected to include approximately $150 million in HSIP funding, which will be amended into the 2013 FTIP. A summary of current HSIP projects is shown in Table 5. Links to the complete list of approved projects, along with the delivery status of each project are available on the Internet at <http://www.dot.ca.gov/hq/LocalPrograms/hsip.htm>.

Table 5

HSIP PROJECT SUMMARY*

	Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5	Total
Program Release Date	6/21/2007	7/17/2008	1/26/2010	2/23/2011	10/19/2012	
Number of Approved Projects	91	156	113	167	221	748
Program Plan ($millions)	28.4	60.1	48.3	73.1	110.3	320
Federal Funds Obligated ($millions)	25.0	45.2	23.1	32.1	1.8	118
FTIP Amendment Completed	89	156	112	166	184	707
Preliminary Engineering Authorization Completed	88	154	110	163	12	527
Construction Authorization Completed	80	124	70	55	0	329
Project Closed Out and Completed	55	59	10	3	0	127

* Data as of 3/31/2013.

Program Evaluation

Individual project evaluations will not occur until a project has been exposed to routine traffic for a minimum of two years after construction has been completed. The DLA will conduct project evaluations as required by the FHWA and anticipates completing the program evaluation requirements per FHWA's new Online Reporting Tool that is being rolled out and is eventually expected to be used nation-wide annual reports.

III. High-Risk Rural Roads Program

Overview

The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) introduced a set-aside provision called the High Risk Rural Road (HR3) Program to correct or improve hazardous road locations and features. The High Risk Rural Roads program's funding set- aside was eliminated in MAP–21, and now requires High Risk Rural Roads program–eligible projects to be funded through the HSIP.

Section 1112 of MAP-21 changed the definition of a "high risk rural road" in Title 23 United States Code section 148(a)(1) to: "any roadway functionally classified as a rural major or minor collector or a rural local road with significant safety risks, as defined by a State in accordance with an updated State Strategic Highway Safety Plan." MAP-21 also established a special rule for HR3 safety in title 23 United States Code section 148(g)(1), which states: "If the fatality rate on rural roads in a State increases over the most recent 2-year period for which data are available, that State shall be required to obligate in the next fiscal year for projects on high risk rural roads an amount equal to at least 200 percent of the amount of funds the State received for fiscal year 2009 for high risk rural roads under subsection (f) of this section, as in effect on the day before the date of enactment of the MAP-21."

Project Summary

Since the HR3 Program was established under SAFETEA–LU, Caltrans completed three cycles of project solicitation, review, prioritization, and selection. All projects have been programmed in the 2013 Federal Transportation Improvement Program (FTIP). Starting with the third of these three cycles and moving forward, the HR3 eligible projects are being tracked within the Local HSIP program. A summary of HR3 projects from the first two cycles is shown in Table 6. Links to the complete list of approved projects are available on the Internet at <http://www.dot.ca.gov/hq/LocalPrograms/HR3/>. All information relating to the third HR3 cycle is included in the fifth cycle of the Local HSIP program and reported in the Local HSIP portion of this report.

Table 6

HR3 PROGRAM PROJECT SUMMARY*

	Cycle 1	Cycle 2	Total
Program Release Date	4/30/2007	7/9/2008	
Number of Applications	68	71	139
Number of Approved Projects	35	30	65
Program Plan ($millions)	20.6	18.2	38.8
Federal Funds Obligated ($millions)	16.1	9.5	25.6
FTIP Amendment Completed	35	30	65
Preliminary Engineering Authorization Completed	35	30	65
Construction Authorization Completed	30	18	48
Project Closed Out and Completed	13	7	20

* Data as of 6/10/2013.

Program Evaluation

Individual project evaluations will not occur until a project has been exposed to routine traffic for a minimum of two years after construction has been completed. The Division of Local Assistance will conduct project evaluations as directed by the FHWA and anticipates completing the program evaluation requirements per FHWA's new Online Reporting Tool that is being rolled out and is eventually expected to be used for nation-wide annual reports.

IV. Railway-Highway At-Grade Crossings Program

Overview

The purpose of the Railway-Highway At-Grade Crossings Program (Program) is to reduce the number and severity of highway collisions by eliminating hazards to vehicles, bicyclists, and pedestrians at existing railroad crossings. California has received approximately $16 million each year for this Program through FFY 2013.

The California Public Utilities Commission (CPUC) determines project selection for the Program. The CPUC annually updates the list of crossings it deems eligible for funding and transmits the list to Caltrans. Caltrans then delivers the projects as identified by the CPUC.

One of the provisions of the HSIP requires that funds be split equally between State highways and local roads. The State does not allocate funding in this manner because the Program funds are only a small part of the overall group of funds to which the federal

requirement applies. Even in instances where 100 percent of the Program funds are spent on local roads, it does not significantly affect the State's overall compliance in meeting the HSIP requirement. The CPUC reviews and prioritizes State highway crossings in the same manner as crossings on local roads, ensuring that the Program goal of eliminating hazards at existing crossings considers the overall priority of crossings statewide and that State highway crossings and local road crossings are treated equally in identifying and addressing needs in the State.

A number of factors are used in determining eligibility for funding and respective ranking, including the use of a hazard index formula and other site-specific factors as required by statute. The hazard index formula used is as described in section III, part B, of the FHWA *Railroad Highway Grade Crossing Handbook—Revised Second Edition*.[3] In addition, the State's experience from post-collision investigations is used to identify common hazards specific to an area, type of crossing, or corridor of crossings.

The CPUC determines the modifications required at each crossing in consultation with the Diagnostic Team. The Diagnostic Team is comprised of experts from railroad and roadway agencies. Modifications to improve safety include the installation or upgrade of active grade crossing equipment, such as flashers, gates, cantilevers, light-emitting diodes, signal interconnections, and constant time warning detection, as well as crossing approach improvements, such as medians, traffic signals, presignals, curbing, guardrails, illumination, and road closures.

Caltrans uses the project recommendations and cost estimates to submit the eligible crossings to the regional transportation planning agencies, metropolitan transportation commissions, or local transportation commissions. Caltrans requests that they program the projects into the FTIP by amendment for the program year of the Program priority list. Upon verification that the FTIP has been amended for the project in question, Caltrans provides the programming documentation, estimates, environmental assessments, and right-of-way certifications to the FHWA, which upon approval of the material submitted, obligates the funds. Caltrans then negotiates and executes contracts with railroads and local agencies to construct the projects.

The CPUC maintains and updates a database that contains information about all public crossings in the State, shown in Table 7. The CPUC develops, updates, and maintains the crossing inventory as part of its routine duties. On average, the inventory is updated every five years through site visits. Data that cannot be obtained by reviewing the site conditions, such as vehicular and rail volumes, is obtained through direct contact with the railroad and local agencies. However, this data is often out of date. The CPUC has completed the upgrading and is now implementing its crossing database. The CPUC is further working on a coordinating inventory project plan. This will allow for improved

[3] <http://www.ite.org/bookstore/gradecrossing/sec03.htm#b>, accessed August 23, 2010.

analysis in identifying locations for Program funding. MAP-21 continued allowing the CPUC to use up to 2 percent of Program funds to implement the plan.

Table 7

PUBLIC CROSSINGS IN CALIFORNIA*

At-Grade			Total At-Grade Crossings	Grade Separated
Passive	**Flasher**	**Gated**		
1915	633	3540	6088	1733

* This table excludes light-rail crossings, which are not eligible under the Program in California.

Project Summary

During FFY 2013, no new projects were initiated on State highway crossings; however, 70 grade crossing improvement projects on local streets and roads were under construction. The total estimated cost of these projects is $46.24 million. The projects generally include the installation of active grade crossing warning devices and improvements to the crossing approaches. The approach improvements may include median islands, traffic signal improvements, and pedestrian path of travel improvements.

Program Evaluation

Since the inception of the Program, the number of collisions and resultant fatalities and injuries has declined even though the number of collisions has remained stable in recent years. In addition, when viewed in light of the increase in train and vehicular traffic volumes, the ratio of collisions to volume continues to decline. It is difficult to demonstrate quantitatively how much of these reductions are due specifically to the Program versus other improvements that have been incorporated into the rail and highway systems over the past several decades. Another limitation in providing quantitative data about the Program's effectiveness is the small sample size of projects and collision data. Collisions at crossings are usually infrequent and a longer evaluation period and larger number of projects are needed before conclusive evaluation with reasonable level of statistical confidence can be made.

Between July 1, 2008, and June 30, 2009, construction of 14 projects that included 20 crossings were completed. These projects are listed in Appendix B, Table B1. All the crossings are public, vehicular, and at-grade railway-highway crossings.

The actual federal fiscal year funding of these projects ranges between 2001 and 2008, which is a reflection of how improved the process has become from identification to

construction. Collision statistics before project completion are not necessarily reflective of the improvement made or reason for nomination. To help better reflect the actual data, a five-year precollision history was used. A significant emphasis by both the CPUC and Caltrans on improvements to the Program is to reduce the amount of time between a project identified for Program funding and actual construction is yielding positive results.

Regarding benefit-cost consideration, it is unlikely that any meaningful conclusions can be drawn based on the type of implemented improvement. Although some improvements are less cost-sensitive based on implementation location, the cost of any improvement can vary widely because of the great variability in specific conditions at each crossing and variables in labor and materials cost from region to region, railroad to railroad, and agency to agency; no single or average cost can be attributed to any specific improvement. Benefit-cost is considered in the project by project-level ranking and analysis. It plays an important role in project selection to ensure the maximum use of Program funds.

Many benefits of the program are not directly quantifiable. When a crossing is improved all necessary and required improvements are made, not just the improvements related to mitigating the known collision history. For example, though a crossing may not have had any pedestrian incidents, the pedestrian pathways are reviewed and often are improved, providing a defined path of travel with additional pedestrian warning that was not there before. Similarly, all crossings where no medians are present pose a risk of gate drive-around. Each location is individually analyzed and median treatments may be installed, reducing the future risk of a collision. These types of improvements are known to prevent collisions from occurring in the future.

Appendix A

The following abbreviations and codes were used in Tables A1 and A2:

County Abbreviations

ALA .....Alameda	MRN .....Marin	SM ..... San Mateo
ALP .....Alpine	MPA.....Mariposa	SB ..... Santa Barbara
AMA .....Amador	MEN .....Mendocino	SCL..... Santa Clara
BUT.....Butte	MER .....Merced	SCR ..... Santa Cruz
CAL.....Calaveras	MOD.....Modoc	SHA..... Shasta
COL.....Colusa	MNO.....Mono	SIE..... Sierra
CC .....Contra Costa	MON.....Monterey	SIS ..... Siskiyou
DN.....Del Norte	NAP .....Napa	SOL ..... Solano
ED .....El Dorado	NEV.....Nevada	SON..... Sonoma
FRE .....Fresno	ORA.....Orange	STA..... Stanislaus
GLE.....Glenn	PLA.....Placer	SUT ..... Sutter
HUM .....Humboldt	PLU.....Plumas	TEH ..... Tehama
IMP .....Imperial	RIV .....Riverside	TRI ..... Trinity
INY .....Inyo	SAC .....Sacramento	TUL ..... Tulare
KER.....Kern	SBT.....San Benito	TUO..... Tuolumne
KIN .....Kings	SBD .....San Bernardino	VEN..... Ventura
LAK .....Lake	SD.....San Diego	YOL..... Yolo
LAS .....Lassen	SF.....San Francisco	YUB ..... Yuba
LA .....Los Angeles	SJ .....San Joaquin	
MAD .....Madera	SLO.....San Luis Obispo	

Improvement Type Codes

1. Intersection Improvements
   - A. Add/upgrade/modify/remove traffic signal and/or signal phasing.
   - B. Construct/improve channelization, turn lanes, speed change lanes, etc.
   - C. Install/improve signing and marking.
   - D. Install flashing beacon.
   - E. Install a skid resistant surface.
   - F. Install/improve lighting.
   - G. Install priority control system for emergency vehicles at signalized intersections.
   - H. Improve sight distance.
   - I. Other (describe).

2. Roadway and Structure Improvements
   - A. Widen pavement and/or shoulder (including adding a passing lane to remedy an unsafe condition).
   - B. Install rumble strips or other warning devices.

C. Install a skid-resistant surface.
D. Install/improve signing, pavement marking, and/or delineation.
E. Install/improve roadway lighting.
F. Construct/modify median.
G. Realign roadway.
H. Construct access management (driveways, median openings, etc.) modifications.
I. Install a traffic control or other warning device at a location with high crash potential (or high potential for severe crashes).
J. Add or retrofit structures or take other measures to eliminate or reduce vehicle wildlife collisions.
K. Plan integrated interoperable emergency communications equipment, operational activities, or traffic enforcement activities (including police assistance) relating to work zone safety.
L. Superelevation/Cross Slope.
M. Auxiliary Lane/Acceleration Lane.
N. Other (describe).

3. Roadside Improvements
   A. Eliminate/mitigate roadside obstacle(s).
   B. Install/upgrade guardrails, barriers (including temporary barriers between construction work zones and traffic lanes for the safety of motorists and workers), and crash attenuators.
   C. Other (describe).

4. Pedestrian and Bicycle Improvements
   A. Construct improvements that enhance pedestrian or bicyclist safety or safety of the disabled.
   B. Construct a traffic calming feature.
   C. Install and maintain signs (including fluorescent and yellow green signs) at pedestrian bicycle crossings and in school zones.
   D. Other (describe).

5. Other Improvements
   A. Improve safety-conscious planning.
   B. Improve the collection and analysis of crash data.
   C. Other (describe).

Functional Classification Codes

1 – Interstate
2 – Other Freeways or Expressways
3 – Other Principal Arterial
4 – Minor Arterial
5 – Major Collector
6 – Minor Collector
7 – Local

Table A1

COMPLETED PROJECTS FOR HSIP EVALUATION

Project No.	District	County*	Route	Post Mile	Improvement Type*	Project Cost $1,000
1	1	LAK	29	4.15/4.33	1B	$855
2	1	LAK	29	10.90/11.40	1B	$916
3	1	LAK	29	15.01/15.29	2A	$1,137
4	1	LAK	29	R40.02/R40.53	2C	$936
5	1	LAK	53	2.960	1B	$437
6	1	DN	101	14.39/14.82	2C	$566
7	1	HUM	101	28.16/35.75	3B	$1,294
8	1	HUM	101	R8.87/R10.17	2L	$956
9	1	MEN	101	69.3/69.7	2G	$2,264
10	1	DN	199	27.00/27.50	2C	$4,556
11	1	DN	199	9.12/9.52	2C	$255
12	1	HUM	255	0.112	1B	$331
13	2	TEH	36	L41.01	1A	$286
14	2	PLU	49	2.75/7.00	2A	$3,524
15	2	PLU	70	29.59/29.67	2L	$361
16	2	SIS	89	3.00/4.00	2G	$2,469
17	2	TRI	299	18.70/18.90	2A	$587
18	2	LAS	395	30.70/56.70	2A	$32,480
19	3	NEV/SIE	49	2.30/R3.80	3B	$1,042
20	3	NEV, PLA, SAC, SUT	49	VARIOUS	2C	$1,541
21	3	ED	50	60.25/60.45	2L	$838
22	3	BUT	70	11.55	1A	$4,195
23	3	YUB, SUT, BUT	70	VARIOUS	2B	$317
24	3	PLA	80	4.220	2C	$219
25	3	PLA/NEV	80	44.5/55.0, 68.6/2.5, 16.6/28.0	2B	$189
26	3	PLA/NEV	80	R58.70/R58.90	2M	$4,405
27	4	SCL	9	0.0/7.1 (009) 0/6.1 (152)	2B	$333
28	4	ALA	13	R9.19	3B	$315
29	4	ALA	84	21.00/23.10	2G	$21,640
30	4	SCL	85	R17.80/R19.60	3B	$3,643
31	4	ALA	580	R5.82/R5.94	3B	$139
32	4	SOL	80, 505, 780	VARIOUS	3A	$4,056

*See pages 17–18 for county abbreviations and improvement type codes.

Table A1

COMPLETED PROJECTS FOR HSIP EVALUATION

Project No.	District	County*	Route	Post Mile	Improvement Type*	Project Cost $1,000
(Continued from page 19)						
33	4	ALA	880, 580, 24, 13	VARIOUS	3A	$3,967
34	5	SCR	1	15.34/16.80	3B	$3,630
35	5	SLO	1	17.11	1A	$265
36	5	SB	1	26.7/27.6	2C	$486
37	5	MON	1	74.70/R90.90 L4.20/R4.30 R0.2	3B	$674
38	5	SB	101	41.00/47.30	3B	$287
39	5	SLO	101	64.98/R69.30	3B	$616
40	5	MON	101	80.70/85.60	3B	$4,391
41	5	SB	101	R12.83/24.90	3B	$1,331
42	5	SB	101	R50.80/54.00	3B	$2,969
43	5	SB	101	R51.11/R80.22	3B	$1,349
44	5	MON	101	R6.75/R24.00	3B	$417
45	5	SCR	129	0.54	1A	$300
46	5	SCR	129	7.90/8.15	2G	$2,430
47	5	MON	156	R1.82/T5.13	2B	$74
48	5	SLO	166	42.50/43.70 44.70/45.10	2G	$3,660
49	5	SB	192	17.00/17.30	2A	$523
50	5	MON	198	4.35/4.65	2G	$648
51	6	KER	33	36.65	2A	$295
52	6	MAD	41	9.25	1B	$1,314
53	6	MAD	41	19.80/20.02	1A	$1,087
54	6	KER	58	R55.20	1A	$663
55	6	TUL	63	22.57	1A	$707
56	6	KER	99	36.27	1A	$455
57	6	MAD	99	24.34/26.80	2B	$1,063
58	6	MAD	99	R7.27	1A	$1,078
59	6	KER	119	30.41	1A	$323
60	6	KER	178	97.60	1D, 1H	$306
61	6	FRE	180	127.00/137.00	3B	$869
62	6	FRE	198	14.35/14.55	2A,	$187
63	6	KER	395	0.00/T14.79	2A	$5,765
64	7	LA	1	19.40/32.00	4A	$204
65	7	LA	5	13.11/13.46	3B	$970

*See pages 17–18 for county abbreviations and improvement type codes.

Table A1

COMPLETED PROJECTS FOR HSIP EVALUATION

Project No.	District	County*	Route	Post Mile	Improvement Type*	Project Cost $1,000
(Continued from page 20)						
66	7	LA	10	R4.70/R13.20	3B	$278
67	7	LA	10, 101, 110	VARIOUS	3A	$1,505
68	7	VEN	33	5.97/57.31	3B	$2,772
69	7	VEN	101	0.40/30.90	3B	$4,272
70	7	LA	101	34.20/38.19	3B	$3,901
71	7	LA	101	33.20/33.40	3B	$450
72	7	LA	105	R0.54	2C	$527
73	7	LA	110	21.40/23.50	2C	$2,056
74	7	VEN LA	126	0.00/34.60, 0.00/45.80	3B	$1,324
75	7	LA	138	44.42	2D	$129
76	7	LA	170	14.50/20.60	3B	$2,566
77	7	LA	187	6.49	1A	$581
78	7	LA	213	0.31/1.06	3B	$248
79	7	LA	605	21.98	3B	$221
80	8	RIV	10	52.34/57.60	3B	$960
81	8	SBD	15	86.20/185.80	2F	$27,857
82	8	SBD	18	110.84	1A	$74
83	8	SBD	38	48.43	1A	$460
84	8	SBD	38	0.75/1.50	1A	$85
85	8	RIV	60	22.20/26.50	2B	$144
86	8	SBD	62	17.10/17.80	1B	$1,248
87	8	RIV	74	0.00 /11.83	2B	$195
88	8	SBD	83	10.59	1A	$79
89	8	SBD	95	11.25/17.50	2A	$367
90	10	MPA	49	12.13	1B	$1,686
91	10	STA	99	R10.30/R12.20	3B	$2,773
92	10	STA	99	R15.13/R15.60	2B	$158
93	10	MER	152	21.05	1A	$301
94	11	SD	67	9.30/22.80	2B, 3B	$553
95	11	SD	79	10.20/18.00, 17.40/30.00	2B, 3B	$589
96	11	IMP	86	15.32	1A	$589
97	11	SD	5, 8, 15, 78, 94, 125, 805	VARIOUS	3B	$6,600

* See pages 17–18 for county abbreviations and improvement type codes.

Table A1

COMPLETED PROJECTS FOR HSIP EVALUATION

Project No.	District	County*	Route	Post Mile	Improvement Type*	Project Cost $1,000
(Continued from page 21)						
98	12	ORA	5	28.41	2C	$106
99	12	ORA	5	30.32	2C	$163
100	12	ORA	22	R10.30/R12.20	1A	$201
101	12	ORA	22	R10.40	2D	$710
102	12	ORA	22	R10.44	2C	$200
103	12	ORA	39	4.13	1F	$86
104	12	ORA	55	R4.47/R4.96	2A	$139
105	12	ORA	57	21.20	1A	$388
106	12	ORA	74	13.30/16.60	2A	$36,887
107	12	ORA	91	13.68/14.26	2M	$659
108	12	ORA	405	13.16/13.38	2A	$876
109	12	ORA	405	13.66	2C	$170
110	12	ORA	405	13.90	2C	$144
111	12	ORA	405	16.79	2E	$200

* See pages 17–18 for county abbreviations and improvement type codes.

Table A2

HIGHWAY LOCATIONS AND STUDY TIME PERIODS FOR HSIP EVALUATION

Seg. ID	Dist.	Rte.	Co.	Begin Post Mile	End Post Mile	Functional Classification Code*	Before Time Period						After Time Period					
							From			To			From			To		
							Mo.	Dy.	Yr.	Mo.	Dy.	Yr.	Mo.	Dy.	Yr.	Mo.	Dy.	Yr.
1	1	29	LAK	4.150	4.330	4	8	27	05	8	27	08	8	27	08	6	30	11
2	1	29	LAK	10.900	11.400	4	8	27	05	8	27	08	8	27	08	8	27	11
3	1	29	LAK	15.010	15.290	4	1	20	06	1	20	09	1	20	09	6	30	11
4	1	29	LAK	40.020	40.530	3	12	9	05	12	9	08	12	9	08	6	30	11
5	1	53	LAK	2.960	2.960	3	10	10	05	10	10	08	10	10	08	6	30	11
6	1	101	DN	14.390	14.820	3	6	30	06	6	30	09	6	30	09	6	30	11
7	1	101	HUM	8.870	10.170	3	11	4	05	11	4	08	11	4	08	6	30	11
8	1	101	HUM	28.160	35.750	3	10	27	05	10	27	08	10	27	08	10	27	11
9	1	101	MEN	69.300	69.700	3	3	18	06	3	18	09	3	18	09	6	30	11
10	1	199	DN	9.120	9.520	3	11	25	06	11	25	09	11	25	09	6	30	11
11	1	199	DN	27.000	27.500	3	12	24	05	12	24	08	12	24	08	12	24	11
12	1	255	HUM	0.112	0.112	4	2	19	06	2	19	09	2	19	09	6	30	11
13	2	36	TEH	41.010	41.010	3	9	4	05	9	4	08	9	4	08	6	30	11
14	2	49	PLU	2.750	7.000	4	8	8	05	8	8	08	8	8	08	6	30	11
15	2	70	PLU	29.590	29.670	4	7	18	05	7	18	08	7	18	08	6	30	11
16	2	89	SIS	3.000	4.000	3	10	10	05	10	10	08	10	10	08	10	10	11
17	2	299	TRI	18.700	18.900	3	11	20	06	11	20	09	11	20	09	6	30	11
18	2	395	LAS	30.700	56.700	3	11	13	05	11	13	08	11	13	08	11	13	11
19	3	49	NEV	2.300	3.800	3	9	22	05	9	22	08	9	22	08	9	22	11
20	3	49	NEV	21.900	22.044	4	6	29	06	6	29	09	6	29	09	6	30	11
21	3	49	NEV	22.208	23.200	4	6	29	06	6	29	09	6	29	09	6	30	11
22	3	50	ED	60.250	60.450	3	11	20	05	11	20	08	11	20	08	6	30	11
23	3	51	SAC	5.100	5.900	2	6	29	06	6	29	09	6	29	09	6	30	11
24	3	70	BUT	0.000	13.510	3	8	13	06	8	13	09	8	13	09	6	30	11
25	3	70	BUT	11.550	11.550	3	11	25	05	11	25	08	11	25	08	11	25	11
26	3	70	YUB	15.510	25.820	3	8	13	06	8	13	09	8	13	09	6	30	11
27	3	80	NEV	2.500	12.062	1	8	18	05	8	18	08	8	18	08	8	18	11
28	3	80	NEV	13.075	16.600	1	8	18	05	8	18	08	8	18	08	8	18	11
29	3	80	NEV	58.712	58.834	1	11	20	05	11	20	08	11	20	08	11	20	11
30	3	80	NEV	58.836	58.899	1	11	20	05	11	20	08	11	20	08	11	20	11

* See page 18 for functional classification codes.

Table A2

HIGHWAY LOCATIONS AND STUDY TIME PERIODS FOR HSIP EVALUATION

Seg. ID	Dist.	Rte.	Co.	Begin Post Mile	End Post Mile	Functional Classification Code*	Before Time Period						After Time Period					
							From			To			From			To		
							Mo.	Dy.	Yr.	Mo.	Dy.	Yr.	Mo.	Dy.	Yr.	Mo.	Dy.	Yr.
(Continued from page 23)																		
31	3	80	PLA	4.220	4.220	1	6	29	06	6	29	09	6	29	09	6	30	11
32	3	80	PLA	16.600	28.000	1	8	18	05	8	18	08	8	18	08	8	18	11
33	3	80	PLA	44.500	55.000	1	8	18	05	8	18	08	8	18	08	8	18	11
34	3	80	PLA	55.008	66.920	1	8	18	05	8	18	08	8	18	08	8	18	11
35	3	80	PLA	58.700	58.711	1	11	20	05	11	20	08	11	20	08	11	20	11
36	3	80	PLA	66.907	68.600	1	8	18	05	8	18	08	8	18	08	8	18	11
37	3	99	BUT	0.000	19.700	3	8	13	06	8	13	09	8	13	09	6	30	11
38	3	99	BUT	32.200	32.700	2	8	13	06	8	13	09	8	13	09	6	30	11
39	3	99	SUT	11.700	13.300	3	8	13	06	8	13	09	8	13	09	6	30	11
40	3	99	SUT	19.500	20.000	3	6	29	06	6	29	09	6	29	09	6	30	11
41	3	99	SUT	19.857	20.500	3	8	13	06	8	13	09	8	13	09	6	30	11
42	3	99	SUT	21.200	22.300	3	8	13	06	8	13	09	8	13	09	6	30	11
43	3	99	SUT	34.973	36.155	3,4	8	13	06	8	13	09	8	13	09	6	30	11
44	3	99	SUT	36.286	42.389	4	8	13	06	8	13	09	8	13	09	6	30	11
45	4	9	SCL	0.000	7.100	5, 4	6	4	06	6	4	09	6	4	09	6	4	11
46	4	13	ALA	4.262	8.670	2	10	10	05	10	10	08	10	10	08	10	10	11
47	4	13	ALA	9.199	9.199	2	9	3	05	9	3	08	9	3	08	6	30	11
48	4	24	ALA	4.230	5.650	2	10	10	05	10	10	08	10	10	08	10	10	11
49	4	80	SOL	13.000	42.000	1	8	25	05	8	25	08	8	25	08	6	30	11
50	4	84	ALA	21.000	23.100	3	10	31	05	10	31	08	10	31	08	10	31	11
51	4	85	SCL	17.800	19.600	2	6	15	06	6	15	09	6	15	09	6	15	11
52	4	101	SCL	28.500	29.122	2	6	15	06	6	15	09	6	15	09	6	15	11
53	4	101	SCL	29.029	31.500	2	6	15	06	6	15	09	6	15	09	6	15	11
54	4	152	SCL	0.000	6.100	5	6	4	06	6	4	09	6	4	09	6	4	11
55	4	505	SOL	0.200	0.700	1	8	25	05	8	25	08	8	25	08	6	30	11
56	4	580	ALA	5.820	5.940	1	3	30	06	3	30	09	3	30	09	6	30	11
57	4	580	ALA	20.790	45.470	1	10	10	05	10	10	08	10	10	08	10	10	11
58	4	780	SOL	1.500	7.300	1	8	25	05	8	25	08	8	25	08	6	30	11
59	4	880	ALA	28.620	29.910	1	10	10	05	10	10	08	10	10	08	10	10	11
60	5	1	MON	74.700	75.135	3	2	25	06	2	25	09	2	25	09	2	25	11
61	5	1	MON	75.224	91.019	2, 3	2	25	06	2	25	09	2	25	09	2	25	11
62	5	1	MON	91.261	91.600	3	2	25	06	2	25	09	2	25	09	2	25	11

* See page 18 for functional classification codes.

Table A2

HIGHWAY LOCATIONS AND STUDY TIME PERIODS FOR HSIP EVALUATION

Seg. ID	Dist.	Rte.	Co.	Begin Post Mile	End Post Mile	Functional Classification Code*	Before Time Period						After Time Period					
							From			To			From			To		
							Mo.	Dy.	Yr.	Mo.	Dy.	Yr.	Mo.	Dy.	Yr.	Mo.	Dy.	Yr.
(Continued from page 24)																		
63	5	1	SB	26.700	27.600	3	12	17	05	12	17	08	12	17	08	6	30	11
64	5	1	SCR	15.340	16.800	2	10	30	05	10	30	08	10	30	08	10	30	11
65	5	1	SLO	17.110	17.110	3	2	27	06	2	27	09	2	27	09	2	27	11
66	5	68	MON	4.200	4.300	3	2	25	06	2	25	09	2	25	09	2	25	11
67	5	101	MON	2.100	7.630	3	3	26	06	3	26	09	3	26	09	3	26	11
68	5	101	MON	6.750	24.050	3	3	27	06	3	27	09	3	27	09	3	27	11
69	5	101	MON	80.700	85.600	3, 2	6	29	06	6	29	09	6	29	09	6	30	11
70	5	101	SB	12.830	24.900	2	5	5	06	5	5	09	5	5	09	5	5	11
71	5	101	SB	41.000	47.300	3	8	4	05	8	4	08	8	4	08	6	30	11
72	5	101	SB	50.800	54.000	3	9	26	05	9	26	08	9	26	08	6	30	11
73	5	101	SB	51.000	82.200	3, 2	5	28	06	5	28	09	5	28	09	5	28	11
74	5	101	SLO	64.900	67.450	3	3	26	06	3	26	09	3	26	09	3	26	11
75	5	101	SLO	67.456	69.300	3	3	26	06	3	26	09	3	26	09	3	26	11
76	5	129	SCR	0.540	0.541	3	8	6	05	8	6	08	8	6	08	8	6	11
77	5	129	SCR	7.900	8.150	4	4	20	06	4	20	09	4	20	09	4	20	11
78	5	156	MON	0.200	0.201	3	2	25	06	2	25	09	2	25	09	2	25	11
79	5	156	MON	1.820	5.130	3	12	19	06	12	19	09	12	19	09	6	30	11
80	5	166	SLO	42.000	45.000	4	2	23	06	2	23	09	2	23	09	2	23	11
81	5	192	SB	17.000	17.300	4	1	9	06	1	9	09	1	9	09	1	9	11
82	5	198	MON	4.350	4.650	4	5	18	06	5	18	09	5	18	09	5	18	11
83	6	33	KER	36.650	36.650	4	8	21	06	8	21	09	8	21	09	6	30	11
84	6	41	MAD	9.250	9.250	3	8	20	05	8	20	08	8	20	08	6	30	11
85	6	41	MAD	19.800	20.020	3	5	21	06	5	21	09	5	21	09	5	21	11
86	6	58	KER	55.243	55.243	2	6	22	06	6	22	09	6	22	09	6	30	11
87	6	63	TUL	22.570	22.570	3	4	14	06	4	14	09	4	14	09	4	14	11
88	6	99	KER	36.276	36.276	3	12	19	05	12	19	08	12	19	08	6	30	11
89	6	99	MAD	7.270	7.270	3	12	15	05	12	15	08	12	15	08	6	30	11
90	6	99	MAD	24.340	26.800	2	7	24	05	7	24	08	7	24	08	6	30	11
91	6	119	KER	30.410	30.410	4	3	17	06	3	17	09	3	17	09	6	30	11
92	6	178	KER	97.601	97.601	3	12	22	05	12	22	08	12	22	08	6	30	11
93	6	180	FRE	127.00	137.00	3	4	2	6	4	2	9	4	2	9	6	30	11
94	6	198	FRE	14.357	14.557	4	8	29	05	8	29	08	8	29	08	8	29	11

* See page 18 for functional classification codes.

Table A2

HIGHWAY LOCATIONS AND STUDY TIME PERIODS FOR HSIP EVALUATION

Seg. ID	Dist.	Rte.	Co.	Begin Post Mile	End Post Mile	Functional Classification Code*	Before Time Period						After Time Period					
							From			To			From			To		
							Mo.	Dy.	Yr.	Mo.	Dy.	Yr.	Mo.	Dy.	Yr.	Mo.	Dy.	Yr.
(Continued from page 25)																		
95	6	395	KER	0.000	0.470	3	2	17	06	2	17	09	2	17	09	6	30	11
96	6	395	KER	0.854	1.448	3	2	17	06	2	17	09	2	17	09	6	30	11
97	6	395	KER	1.469	11.680	3	2	17	06	2	17	09	2	17	09	6	30	11
98	6	395	KER	14.548	14.798	3	2	17	06	2	17	09	2	17	09	6	30	11
99	7	1	LA	19.400	32.000	3	3	5	06	3	5	09	3	5	09	6	30	11
100	7	5	LA	13.111	13.466	1	12	3	05	12	3	08	12	3	08	6	30	11
101	7	10	LA	2.155	13.000	1	12	10	05	12	10	08	12	10	08	12	10	11
102	7	10	LA	4.700	13.200	1	8	13	05	8	13	08	8	13	08	6	30	11
103	7	33	VEN	6.000	57.500	3, 4	1	9	06	1	9	09	1	9	09	1	9	11
104	7	101	LA	0.000	9.500	2	12	10	05	12	10	08	12	10	08	12	10	11
105	7	101	LA	17.000	24.000	2	12	10	05	12	10	08	12	10	08	12	10	11
106	7	101	LA	33.200	33.400	2	10	6	6	10	6	9	10	6	9	6	30	11
107	7	101	LA	34.200	38.190	2	3	16	06	3	16	09	3	16	09	3	16	11
108	7	101	VEN	0.000	0.100	2	3	16	06	3	16	09	3	16	09	3	16	11
109	7	101	VEN	0.400	30.900	2	3	11	06	3	11	09	3	11	09	3	11	11
110	7	105	LA	0.540	0.540	3	12	16	05	12	16	08	12	16	08	6	30	11
111	7	110	LA	20.000	25.900	1, 2	12	10	05	12	10	08	12	10	08	12	10	11
112	7	110	LA	21.400	23.500	1, 2	9	11	05	9	11	08	9	11	08	6	30	11
113	7	126	LA	0.000	5.800	3	8	28	05	8	28	08	8	28	08	6	30	11
114	7	126	VEN	0.000	4.908	2	8	28	05	8	28	08	8	28	08	6	30	11
115	7	126	VEN	5.030	16.519	3, 2	8	28	05	8	28	08	8	28	08	6	30	11
116	7	126	VEN	16.520	16.734	3	8	28	05	8	28	08	8	28	08	6	30	11
117	7	126	VEN	17.013	22.530	3	8	28	05	8	28	08	8	28	08	6	30	11
118	7	126	VEN	22.530	34.625	3	8	28	05	8	28	08	8	28	08	6	30	11
119	7	138	LA	44.424	44.424	3	10	21	05	10	21	08	10	21	08	6	30	11
120	7	170	LA	14.500	20.551	2	12	2	05	12	2	08	12	2	08	6	30	11
121	7	187	LA	6.490	6.490	3	10	21	05	10	21	08	10	21	08	6	30	11
122	7	213	LA	0.310	1.060	3	6	18	6	6	18	9	6	18	9	6	30	11
123	7	605	LA	21.980	21.981	1	4	20	6	4	20	9	4	20	9	6	30	11
124	8	10	RIV	52.340	57.600	1	5	29	06	5	29	09	5	29	09	6	30	11
125	8	15	SBD	86.200	138.68	1	11	9	05	11	9	08	11	9	08	11	9	11
126	8	15	SBD	139.00	185.50	1	11	9	05	11	9	08	11	9	08	11	9	11

* See page 18 for functional classification codes

Table A2

HIGHWAY LOCATIONS AND STUDY TIME PERIODS FOR HSIP EVALUATION

Seg. ID	Dist.	Rte.	Co.	Begin Post Mile	End Post Mile	Functional Classification Code*	Before Time Period						After Time Period					
							From			To			From			To		
							Mo.	Dy.	Yr.	Mo.	Dy.	Yr.	Mo.	Dy.	Yr.	Mo.	Dy.	Yr.
(Continued from page 26)																		
127	8	18	SBD	110.84	110.84	3	12	19	6	12	19	9	12	19	9	6	30	11
128	8	38	SBD	0.750	1.500	3,	1	13	06	1	13	09	1	13	09	6	30	11
129	8	38	SBD	48.439	48.439	3	10	9	05	10	9	08	10	9	08	6	30	11
130	8	60	RIV	22.200	26.500	3	3	5	6	3	5	9	3	5	9	6	30	11
131	8	62	SBD	17.100	17.800	3	4	27	06	4	27	09	4	27	09	6	30	11
132	8	74	RIV	0.000	11.830	4, 3	3	24	6	3	24	9	3	24	9	6	30	11
133	8	83	SBD	10.593	10.593	3	12	18	05	12	18	08	12	18	08	6	30	11
134	8	95	SBD	11.250	17.500	4	2	4	06	2	4	09	2	4	09	2	4	11
135	10	49	MPA	12.139	12.140	4	10	14	05	10	14	08	10	14	08	10	14	11
136	10	99	STA	10.300	12.200	2	4	21	06	4	21	09	4	21	09	4	21	11
137	10	99	STA	15.130	15.600	2	5	22	06	5	22	09	5	22	09	6	30	11
138	10	152	MER	21.058	21.059	3	9	15	05	9	15	08	9	15	08	9	15	11
139	11	67	SD	9.300	22.800	3, 4	12	12	05	12	12	08	12	12	08	6	30	11
140	11	79	SD	10.200	18.000	4	12	15	05	12	15	08	12	15	08	6	30	11
141	11	86	IMP	15.320	15.320	4	8	26	05	8	26	08	8	26	08	6	30	11
142	11	94	SD	17.400	30.000	2, 3	12	15	05	12	15	08	12	15	08	6	30	11
143	11	163	SD	1.200	2.400	2	8	6	05	8	6	08	8	6	08	8	6	11
144	12	5	ORA	28.417	28.417	1	4	2	6	4	2	9	4	2	9	6	30	11
145	12	5	ORA	30.323	30.323	1	7	30	05	7	30	08	7	30	08	6	30	11
146	12	22	ORA	10.307	10.307	2	4	23	06	4	23	09	4	23	09	6	30	11
147	12	22	ORA	10.440	10.440	2	10	28	05	10	28	08	10	28	08	6	30	11
148	12	22	ORA	10.443	10.443	2	10	28	05	10	28	08	10	28	08	10	28	11
149	12	39	ORA	4.131	4.131	3	10	30	05	10	30	08	10	30	08	6	30	11
150	12	55	ORA	4.470	4.960	2	12	16	05	12	16	08	12	16	08	6	30	11
151	12	57	ORA	21.200	21.200	2	6	4	06	6	4	09	6	4	09	6	30	11
152	12	74	ORA	13.300	16.599	4	5	5	06	5	5	09	5	5	09	5	5	11
153	12	91	ORA	13.680	14.260	2	5	28	06	5	28	09	5	28	09	6	30	11
154	12	405	ORA	13.160	13.380	1	2	2	06	2	2	09	2	2	09	2	2	11
155	12	405	ORA	13.663	13.663	1	11	7	6	11	7	9	11	7	9	6	30	11
156	12	405	ORA	13.901	13.901	1	6	15	6	6	15	9	6	15	9	6	30	11
157	12	405	ORA	16.797	16.797	1	4	13	06	4	13	09	4	13	09	6	30	11

* See page 18 for functional classification codes.

Table A3

COLLISION DATA FOR HIGHWAY LOCATIONS FOR HSIP EVALUATION (3 YEARS BEFORE VS. 3 YEARS AFTER)

Seg ID*	Total Before	Total After	Fatal Before	Fatal After	Injury Before	Injury After	PDO Before	PDO After	Fatality Before	Fatality After	Injuries Before	Injuries After
1	3	1	0	0	1	0	2	1	0	0	3	0
2	3	3	0	1	3	0	0	2	0	2	7	1
3	2	0	0	0	2	0	0	0	0	0	2	0
4	15	16	0	1	9	8	6	7	0	1	12	16
5	19	6	0	0	8	5	11	1	0	0	17	8
6	9	12	0	1	3	4	6	7	0	2	4	9
7	12	11	1	0	6	4	5	7	1	0	8	6
8	43	29	3	1	16	12	24	16	3	1	21	15
9	17	7	0	0	2	2	15	5	0	0	2	2
10	12	1	0	0	7	1	5	0	0	0	9	1
11	11	3	0	0	5	3	6	0	0	0	6	3
12	17	6	0	0	12	1	5	5	0	0	19	1
13	12	4	0	0	5	3	7	1	0	0	6	3
14	5	3	1	0	3	3	1	0	1	0	5	4
15	2	1	0	0	2	1	0	0	0	0	4	1
16	3	2	0	0	1	2	2	0	0	0	1	3
17	2	0	1	0	1	0	0	0	1	0	2	0
18	170	133	4	1	40	28	126	104	5	1	68	42
19	16	24	1	1	4	6	11	17	2	1	9	8
20	2	1	0	0	1	1	1	0	0	0	1	2
21	8	5	0	0	6	4	2	1	0	0	14	6
22	21	9	3	0	9	5	9	4	3	0	14	6
23	212	90	1	1	80	38	131	51	1	1	107	62
24	113	105	2	2	42	38	69	65	2	2	72	52
25	22	13	0	0	8	3	14	10	0	0	12	3
26	116	100	1	4	50	35	65	61	1	4	81	60
27	157	84	3	0	45	25	109	59	3	0	69	42
28	111	95	1	0	32	23	78	72	1	0	51	29
29	9	2	0	0	3	0	6	2	0	0	7	0
30	2	3	0	0	1	0	1	3	0	0	1	0
31	23	24	0	0	8	7	15	17	0	0	13	9
32	296	235	2	2	96	81	198	152	3	2	136	107
33	403	347	6	3	109	96	288	248	6	4	231	160
34	280	258	2	2	83	64	195	192	3	2	144	112
35	1	0	0	0	0	0	1	0	0	0	0	0

* See Table A2 for segment identification (Seg. ID), location information, and analysis time period.

Table A3

COLLISION DATA FOR HIGHWAY LOCATIONS FOR HSIP EVALUATION (3 YEARS BEFORE VS. 3 YEARS AFTER)

Seg ID*	Total Before	Total After	Fatal Before	Fatal After	Injury Before	Injury After	PDO Before	PDO After	Fatality Before	Fatality After	Injuries Before	Injuries After
(Continued from page 28)												
36	28	25	0	0	11	12	17	13	0	0	17	17
37	258	208	6	4	122	83	130	121	6	7	197	134
38	80	58	0	0	25	16	55	42	0	0	40	26
39	13	11	2	1	4	2	7	8	3	2	17	5
40	21	14	0	1	5	5	16	8	0	1	7	11
41	6	1	0	0	1	0	5	1	0	0	1	0
42	6	2	1	0	2	1	3	1	1	0	4	1
43	39	20	1	1	18	4	20	15	1	1	33	9
44	158	129	2	3	73	44	83	82	2	4	123	74
45	164	97	4	1	90	59	70	37	5	1	114	71
46	203	135	3	0	64	45	136	90	3	0	78	63
47	4	5	0	0	1	3	3	2	0	0	1	3
48	260	192	2	0	74	60	184	132	2	0	99	71
49	3177	2633	22	10	888	819	2267	1804	26	11	1324	1236
50	13	4	0	0	3	2	10	2	0	0	3	2
51	152	135	0	0	49	35	103	100	0	0	65	45
52	82	69	0	1	29	14	53	54	0	2	47	21
53	201	149	2	1	68	39	131	109	2	1	102	64
54	83	107	1	2	29	42	53	63	1	2	44	58
55	13	14	0	0	10	3	3	11	0	0	14	6
56	4	1	0	0	0	0	4	1	0	0	0	0
57	3476	2404	12	14	1058	811	2406	1579	13	14	1497	1171
58	285	281	3	1	96	118	186	162	3	1	128	159
59	389	333	1	2	72	68	316	263	1	2	100	86
60	85	11	0	0	20	1	65	10	0	0	25	1
61	864	556	8	4	250	137	606	415	9	4	353	204
62	1	0	0	0	0	0	1	0	0	0	0	0
63	5	6	1	0	2	5	2	1	1	0	7	10
64	365	178	1	0	96	56	268	122	1	0	132	80
65	7	10	0	0	3	6	4	4	0	0	3	8
66	23	12	0	0	7	4	16	8	0	0	10	6
67	30	22	1	1	9	7	20	14	1	1	27	9
68	122	56	3	1	45	15	74	40	3	1	90	18
69	115	79	0	0	35	29	80	50	0	0	60	40
70	1425	942	10	3	421	238	994	701	11	4	609	341
71	116	117	1	0	45	30	70	87	1	0	61	45
72	25	35	0	2	9	12	16	21	0	2	12	26

* See Table A2 for segment identification (Seg. ID), location information, and analysis time period.

Table A3

COLLISION DATA FOR HIGHWAY LOCATIONS FOR HSIP EVALUATION (3 YEARS BEFORE VS. 3 YEARS AFTER)

Seg ID*	Total Before	Total After	Fatal Before	Fatal After	Injury Before	Injury After	PDO Before	PDO After	Fatality Before	Fatality After	Injuries Before	Injuries After
(Continued from page 29)												
73	351	208	12	1	137	84	202	123	18	1	226	132
74	14	10	1	0	2	1	11	9	1	0	4	1
75	10	4	0	1	5	1	5	2	0	1	5	4
76	6	1	0	0	0	0	6	1	0	0	0	0
77	27	0	1	0	9	0	17	0	1	0	14	0
78	0	0	0	0	0	0	0	0	0	0	0	0
79	141	125	2	2	51	47	88	76	3	3	91	82
80	18	7	3	2	7	1	8	4	4	1	21	5
81	1	0	0	0	0	0	1	0	0	0	0	0
82	2	0	0	0	0	0	2	0	0	0	0	0
83	1	0	0	0	0	0	1	0	0	0	0	0
84	0	0	0	0	0	0	0	0	0	0	0	0
85	3	5	0	0	2	2	1	3	0	0	5	3
86	0	3	0	1	0	1	0	1	0	1	0	2
87	9	3	0	0	2	2	7	1	0	0	2	2
88	5	3	0	0	2	1	3	2	0	0	2	1
89	5	5	5	5	5	5	5	5	5	5	5	5
90	93	42	4	0	30	10	59	32	4	0	50	17
91	11	2	0	0	6	2	5	0	0	0	7	2
92	0	0	0	0	0	0	0	0	0	0	0	0
93	5	3	0	0	1	2	4	1	0	0	1	2
94	6	1	0	0	4	1	2	0	0	0	6	1
95	1	1	0	0	0	0	1	1	0	0	0	0
96	0	0	0	0	0	0	0	0	0	0	0	0
97	0	0	0	0	0	0	0	0	0	0	0	0
98	0	0	0	0	0	0	0	0	0	0	0	0
99	902	491	2	1	393	258	507	232	2	1	629	351
100	27	33	0	0	6	7	21	26	0	0	10	11
101	3874	3139	14	9	1116	904	2744	2226	17	10	1572	1336
102	3407	2958	14	9	961	824	2432	2125	17	10	1367	1181
103	511	318	7	9	243	136	261	173	7	10	331	202
104	4125	3165	13	13	1091	854	3021	2298	13	14	1602	1239
105	1783	1468	4	2	643	558	1136	908	4	2	957	815
106	17	7	0	0	9	3	8	4	0	0	10	3
107	287	199	1	4	97	75	189	120	1	5	128	106
108	11	5	0	0	5	1	6	4	0	0	6	1
109	3681	2859	19	14	1073	793	2589	2052	20	14	1537	1115
110	57	43	0	0	15	17	42	26	0	0	18	21

* See Table A2 for segment identification (Seg. ID), location information, and analysis time period.

Table A3

COLLISION DATA FOR HIGHWAY LOCATIONS FOR HSIP EVALUATION (3 YEARS BEFORE VS. 3 YEARS AFTER)

Seg ID*	Total Before	Total After	Fatal Before	Fatal After	Injury Before	Injury After	PDO Before	PDO After	Fatality Before	Fatality After	Injuries Before	Injuries After
(Continued from page 30)												
111	4002	3418	6	7	998	909	2998	2502	6	7	1457	1316
112	1737	1831	0	5	424	472	1313	1354	0	5	625	728
113	85	67	2	0	32	27	51	40	2	0	64	48
114	203	184	1	0	68	55	134	129	1	0	83	82
115	486	286	7	3	155	105	324	178	8	3	228	181
116	9	3	0	0	2	0	7	3	0	0	3	0
117	181	166	2	3	70	52	109	111	3	3	101	78
118	146	131	7	5	59	42	80	84	7	5	94	67
119	25	24	0	0	14	6	11	18	0	0	22	8
120	1377	1079	14	3	496	407	867	669	14	3	818	618
121	1	1	0	0	1	1	0	0	0	0	1	1
122	3	0	0	0	2	0	1	0	0	0	3	0
123	9	13	0	0	4	7	5	6	0	0	4	12
124	186	108	3	1	66	27	117	80	4	1	104	38
125	1287	620	33	13	547	225	707	382	45	14	1058	408
126	894	599	27	14	366	235	501	350	30	16	695	427
127	13	6	0	0	9	5	4	1	0	0	19	16
128	50	21	1	0	23	13	26	8	1	0	42	25
129	11	7	0	0	6	3	5	4	0	0	16	4
130	215	150	6	0	70	47	139	103	6	0	107	75
131	42	15	3	1	16	6	23	8	3	1	33	15
132	234	210	14	8	141	107	79	95	14	8	179	135
133	6	2	1	0	2	0	3	2	1	0	4	0
134	19	10	0	2	9	3	10	5	0	2	15	9
135	3	1	0	0	2	1	1	0	0	0	3	2
136	186	118	0	0	42	34	144	84	0	0	55	48
137	126	74	1	0	36	30	89	44	1	0	53	57
138	19	21	0	0	7	4	12	17	0	0	13	4
139	280	246	14	6	149	113	117	97	16	6	249	182
140	82	50	2	1	54	32	26	17	2	1	69	42
141	16	5	0	0	11	2	5	3	0	0	18	4
142	206	132	6	3	98	68	102	61	6	3	150	122
143	234	134	0	0	77	44	157	90	0	0	106	58
144	5	2	0	0	0	1	5	1	0	0	0	1
145	10	9	0	0	1	1	9	8	0	0	1	1
146	4	8	0	0	2	3	2	5	0	0	2	4
147	1	0	0	0	1	0	0	0	0	0	3	0
148	22	31	0	0	3	2	19	29	0	0	3	3

* See Table A2 for segment identification (Seg. ID), location information, and analysis time period

Table A3

COLLISION DATA FOR HIGHWAY LOCATIONS FOR HSIP EVALUATION (3 YEARS BEFORE VS. 3 YEARS AFTER)

Seg ID*	Total Before	Total After	Fatal Before	Fatal After	Injury Before	Injury After	PDO Before	PDO After	Fatality Before	Fatality After	Injuries Before	Injuries After
(Continued from page 31)												
149	93	83	0	0	39	34	54	49	0	0	57	51
150	58	21	0	0	18	8	40	13	0	0	27	14
151	9	4	0	0	1	1	8	3	0	0	2	2
152	71	46	2	2	31	26	38	18	2	2	38	35
153	95	63	0	0	26	22	69	41	0	0	31	25
154	67	36	0	0	25	9	42	27	0	0	39	12
155	13	7	0	0	5	1	8	6	0	0	5	1
156	4	8	0	0	0	2	4	6	0	0	0	2
157	6	12	1	0	3	3	2	9	1	0	3	4

* See Table A2 for segment identification (Seg. ID), location information, and analysis time period

Appendix B

The following codes were used in Table B1:

Functional Classifications

3 – Other Principal Arterial
4 – Minor Arterial
5 – Major Collector
6 – Minor Collector
7 – Local

Project Types

1.....Active Grade Crossing Equipment Installation/Upgrade
2.....Roadway Geometry Improvements
3.....Grade Crossing Elimination

Table B1.

COMPLETED PROJECTS FOR THE RAILWAY-HIGHWAY AT-GRADE CROSSINGS PROGRAM

Project Number	Location	USDOT	Functional Class*	Project Type*	Crossing Protection	Project Cost ($)		Pre project (5 Years)			Post project (3 Years)		
						Non-State Hwy	State Hwy	Fatal	Injury	PDO	Fatal	Injury	PDO
50R975 (2 xings)	Fresno/Uninc	028441E	7	1	Active	689183	0	0	0	0	0	0	0
	Fresno/Uninc	028343N	7	1	Active	---	---	1	0	0	0	0	2
53R942 (4 xings)	San Bernardino/Uninc	026044A	4	1	Active	679931	0	0	0	0	0	0	0
	San Bernardino/Uninc	026045G	7	1	Active	---	0	0	0	0	0	0	0
	San Bernardino/Uninc	026047V	7	1	Active	---	0	0	0	0	0	0	0
	San Bernardino/Uninc	026046N	5	1	Active	---	0	0	0	0	0	0	0
75LX039 75LX049	Siskiyou/Mt Shasta	748865Y	7	1,2	Active	647498	0	0	0	0	0	0	0
7500(058)	Stanislaus/Uninc	028767V	3	2	Active	250000	0	1	0	0	0	0	1
7500(060)	Contra Costa/Richmond	029854C	7	1,2	Active	300000	0	0	1	0	0	0	1
7500(061)	San Bernardino/Uninc	026072D	7	1	Passive	260052	0	0	0	0	0	0	0
7500(068)	Fresno/Fresno	028585J	3	1,2	Active	690000	0	0	0	0	0	1	0
7500(066)	Kern/Uninc	028309G	7	1	Active	325000	0	0	0	0	0	0	0
7500(070)	San Bernardino/Uninc	810913D	3	1,2	Active	500000	0	0	0	1	0	0	0
7500(074)	Los Angeles/Hawthorne	760602M	4	1,2	Active	388311	0	0	1	1	0	0	0
7500(081)	Santa Clara/San Jose	750098A	5	1	Active	450000	0	0	0	1	0	0	1
7500(082)	Plumas/Uninc	834370H	7	1	Active	450000	0	0	0	0	0	0	0
7500(083)	Plumas/Uninc	834341X	5	1	Active	267574	0	0	0	0	0	0	0
7500(109) (3 xings)	Madera/Uninc	028627T	7	1,2	Active	320606	0	0	0	1	0	0	0
	Madera/Uninc	028619B	6	1	Active	---	---	0	0	0	0	0	0
	Madera/Uninc	028591M	7	1,2	Active	---	---	0	0	2	0	0	0