CHAPTER 10 HIGH RISK RURAL ROADS (HR3) PROGRAM

CONTENTS

Section/Subject **Page Number**

10.1 INTRODUCTION 10-1
10.2 ELIGIBLE APPLICANTS 10-1
10.3 PROJECT ELIGIBILITY 10-1
10.4 FUNDING 10-3
10.5 AGENCY APPLICATION 10-3
10.6 APPLICATION REVIEW AND PROJECT SELECTION PROCESS 10-4
10.7 PROJECT IMPLEMENTATION 10-4
10.8 DESIGN STANDARDS 10-5
10.9 DEADLINES 10-5
10.10 STATUS REPORTS 10-6
10.11 PROJECT EVALUATIONS 10-6
10.12 FEDERAL AND STATE PROGRAM CODES AND PROJECT PREFIXES 10-6
10.13 REFERENCES 10-6

EXHIBITS

Section/Subject **Page Number**

EXHIBIT 10-A APPLICATION FORM FOR HIGH RISK RURAL ROADS PROGRAM FUNDS 10-7
EXHIBIT 10-B APPLICATION FORM INSTRUCTIONS 10-13
EXHIBIT 10-C SAFETY INDEX CALCULATION PROCEDURE AND INSTRUCTIONS 10-15
EXHIBIT 10-D AVERAGE COLLISION RATE AND COLLISION COST TABLE 10-19
EXHIBIT 10-E COLLISION REDUCTION FACTOR AND IMPROVEMENT LIFE 10-21
EXHIBIT 10-F PROJECT STATUS REPORT 10-23

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CHAPTER 10 HIGH RISK RURAL ROADS (HR3) PROGRAM

10.1 INTRODUCTION

The purpose of this program is to reduce the frequency and severity of collisions on rural roads by correcting or improving hazardous roadway locations or features. Approximately 60 percent of fatalities nationwide occur on rural roads. The Highway Safety Improvement Program (HSIP), codified as Section 148 of Title 23, United States Code (23 U.S.C. §148) was elevated to a core program as a result of the passage of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). Additionally, SAFETEA-LU introduced a new set-aside provision known as the High Risk Rural Roads Program, codified as 23 U.S.C. §148(f). This program is a component of the HSIP and is set-aside after HSIP funds have been apportioned to the states.

23 U.S.C. §148(a)(1) defines the High Risk Rural Roads Program:

> *"The term 'high risk rural road' means any roadway functionally classified as a rural major or minor collector, or rural local road –*
>
> *(A) on which the accident rate for fatalities and incapacitating injuries exceeds the statewide average for those functional classes of roadways; or*
>
> *(B) that will likely have increases in traffic volume that are likely to create an accident rate for fatalities and incapacitating injuries that exceeds the statewide average for those functional classes of roadway."*

10.2 ELIGIBLE APPLICANTS

The applicant for HR3 Program funds is an agency that assumes responsibility and accountability for the use and expenditure of federal-aid highway funds. The applicant must be a city or a county within the State of California. Exceptions to this requirement will be reviewed on a case-by-case basis.

10.3 PROJECT ELIGIBILITY

For a project to be eligible for HR3 funds, the project location must be on a roadway functionally classified as a rural major or minor collector, or a rural local road. Visit http://www.dot.ca.gov/hq/tsip/hseb/crs_maps/ to search and verify the functional classification of a roadway. The roadway location targeted for improvement must have a collision rate for fatalities and incapacitating injuries that exceeds the statewide average for those functional classes of roadways.

Examples of eligible construction and operational improvements may include, but are not limited to, the list of twenty-one project categories identified under 23 U.S.C. §148(a)(3)(B). Three of those categories are ineligible for funding under the HR3 Program. All 21 categories are shown below. Numerals (viii), (xiv) and (xv) are denoted as ineligible.

(i) An intersection safety improvement.

(ii) Pavement and shoulder widening (including addition of a passing lane to remedy an unsafe condition).

(iii) Installation of rumble strips or other warning devices, if the rumble strips or other devices do not adversely affect the safety or mobility of bicyclists, pedestrians, and the disabled.

(iv) Installation of skid-resistant surface at an intersection, or other location with a high frequency of accidents.

(v) An improvement for pedestrian or bicyclist safety or safety of the disabled.

(vi) Construction of any project for the elimination of hazards at a railway-highway crossing that is eligible for funding under Section 130, including the separation or protection of grades at railway-highway crossings.

(vii) Construction of railway-highway crossing safety features, including installation of protective devices.

(viii) The conduct of a model traffic enforcement activity at a railway-highway crossing. (**NOT eligible under HR3**)

(ix) Construction of a traffic-calming feature.

(x) Elimination of a roadside obstacle.

(xi) Improvement of highway signage and pavement markings.

(xii) Installation of a priority control system for emergency vehicles at signalized intersections.

(xiii) Installation of traffic control or other warning devices at a location with high accident potential.

(xiv) Safety-conscious planning. (**NOT eligible under HR3**)

(xv) Improvement in the collection and analysis of crash data. (**NOT eligible under HR3**)

(xvi) Operational activities relating to work zone safety. (Planning integrated interoperable emergency communications equipment and traffic enforcement activities relating to work zone safety are NOT eligible under HR3.)

(xvii) Installation of guardrails, barriers (including barriers between construction work zones and traffic lanes for the safety of motorists and workers), and crash attenuators.

(xviii) The addition of retrofitting of structures or other measures, to eliminate or reduce accidents involving vehicles and wildlife.

(xix) Installation and maintenance of signs (including fluorescent, yellow-green signs) at pedestrian-bicycle crossings and in school zones.

(xx) Construction and yellow-green signs at pedestrian-bicycle crossings and in school zones.

(xxi) Construction and operational improvements on high risk rural roads.

10.4 FUNDING

The Federal Highway Administration (FHWA) establishes the amount of annual funds apportioned to the HR3 Program. California's annual share of these funds will be approximately $8.25 million and should remain at or near this level throughout the duration of SAFETEA-LU.

Eligible project costs that the local agency is entitled to federal reimbursement include:

- Preliminary Engineering
  - Environmental Studies
  - Preparation of Plans, Specifications and Estimates (PS&E)
- Right of Way
  - Engineering
  - Appraisal and Acquisition
  - Utilities
- Construction
  - Construction Engineering
  - Construction

The maximum federal reimbursement ratio for any HR3 project will be 90 percent and the maximum federal reimbursement amount for any project will be $900,000. Projects that exceed $1,000,000 in total costs will be eligible for funding, but the maximum federal reimbursement will remain at $900,000. Requests for additional HR3 federal funds that exceed the original amount shown in the application will not be granted except in unusual circumstances and subject to the availability of funds.

10.5 AGENCY APPLICATION

The "Application Form" for HR3 Program Funds (see Exhibit 10-A in this chapter) must be completed in its entirety and accompany all application submittals. It is available on the HR3 website at: http://www.dot.ca.gov/hq/LocalPrograms/HR3.htm and can be downloaded for use by applicants. See "Application Form Instructions," Exhibit 10-B in this chapter for assistance.

The applicant is not required to calculate the Safety Index (SI) for the project. Caltrans staff will calculate the SI for all applications to maintain consistency and accuracy. Caltrans will share the results of the SI calculations with each applicant.

The applicant must submit the original application (and one copy) to its respective Caltrans District Local Assistance Office, directed to the attention of the District Local Assistance Engineer (DLAE).

Applications submitted after the deadline will not be accepted.

Applications must include cost estimates for all phases of the project.

Applications must include estimated dates when various project milestones will be completed.

Applications must contain supportive documentation on collision histories and their respective collision diagrams.

Schematic drawings or plans showing the general nature and location of the proposed improvements should be submitted for all projects. Photographs to better illustrate the problem are encouraged.

Any maps, schematics drawings, figures, or photographs that are attached to the application should be made on 8-1/2 x 11 inch paper.

10.6 APPLICATION REVIEW AND PROJECT SELECTION PROCESS

The Caltrans District Local Assistance staff will check the eligibility, accuracy, and completeness of all applications.

After the district review, the DLAE will send one (1) copy of each application to Headquarters Division of Local Assistance (DLA).

Headquarters DLA staff will calculate the SI for all applications. Projects will be ranked in descending order, based upon the calculated SI.

All projects above the funding cut-off line will be double-checked for eligibility and accuracy.

Headquarters DLA will release an approved list of projects and post it on the HR3 website at: http://www.dot.ca.gov/hq/LocalPrograms/HR3.htm . All applicants will be notified of the results by the DLAE.

10.7 PROJECT IMPLEMENTATION

Caltrans Headquarters DLA will send the Metropolitan Planning Organizations (MPOs) the list of projects approved for funding and will request the MPO to amend their Federal Transportation Improvement Program (FTIP) and program the projects under the Lump Sum-Safety Project. Caltrans, acting as the MPO for the rural Regional Transportation Planning Agencies (RTPA), will amend the Federal Statewide Transportation Improvement Program (FSTIP) accordingly. Projects cannot proceed with any phase of implementation unless the projects are included in the approved FSTIP.

Once programmed into the FSTIP, projects must be processed and implemented in accordance with the federal procedures contained in the *Local Assistance Procedures Manual* (LAPM).

Federal funds are considered obligated to each project phase when the Caltrans Headquarters DLA Area Engineer authorizes the work through the FHWA delegated authorization process. See Chapter 3, “Project Authorization” of the LAPM.

Projects cannot proceed with any phase of reimbursable work (Preliminary Engineering, Right of Way, or Construction) until the DLAE provides the local agency with the written “Authorization to Proceed” for each project phase.

All costs associated with any phase of work performed prior to receiving written “Authorization to Proceed” from Caltrans will not be eligible for reimbursement.

10.8 DESIGN STANDARDS

Chapter 11, "Design Standards" of the LAPM describes statewide design standards, specifications, procedures, guides, and references that are acceptable in the geometric, drainage, and structural design of local assistance projects. The chapter also describes design exception approval procedures. These standards and procedures shall be used for all HR3 projects.

All projects will be subject to meeting the requirements of the Americans with Disabilities Act of 1990 (ADA). For more information on ADA compliance, please refer to Chapter 11, "Design Standards," of the LAPM, or go to the DLA website at: http://www.dot.ca.gov/hq/LocalPrograms/DBE_CRLC/DBE_CRLC.html#ADA

All projects must upgrade nonstandard safety features to the appropriate standard when those features are within the scope and work area of the project. Requests for exceptions to this requirement will follow appropriate procedures.

A local agency that proposes to install an experimental traffic control device on a public roadway shall follow the process prescribed in Section 1A.10 of the *California Manual on Uniform Traffic Control Devices* (MUTCD). The California MUTCD is available at the following web link: http://www.dot.ca.gov/hq/traffops/signtech/mutcdsupp/. The local agency shall also comply with the experimental process of the California Traffic Control Devices Committee. For more information on that process, go to: http://www.dot.ca.gov/hq/traffops/signtech/newtech/others/guidelines-exp.pdf

10.9 DEADLINES

It is the intent of the HR3 Program that federal funds be expended on safety projects that can be designed and constructed expeditiously. Projects should not require the acquisition of significant rights of way, nor should they require extensive environmental review and mitigation.

Federal funds for the construction phase should be obligated by August 31 of the year in which the project was originally programmed for delivery. A local agency that fails to secure the obligation of federal funds for the construction of a project within the Federal Fiscal Year (FFY) for which it is programmed must request a time extension from the DLAE prior to September 1 of that year. If the DLAE does not approve the time extension, the project will be dropped from the program. If the DLAE approves the time extension, the local agency must secure federal funds for the construction of the project during the subsequent FFY, or risk having the project dropped from the program. In rare cases, a project may be given a second time extension with the approval from Headquarters DLA. Extension requests will not be granted for delays attributed to staffing issues.

Projects that are dropped from the program may re-apply when a future "call for projects" is announced by Caltrans.

10.10 STATUS REPORTS

Local agencies are required to provide an update of project schedules and costs on July 1 of each year for all projects that have not received "Authorization to Proceed" with the construction phase of the project. A local agency that fails to provide this annual update may have their project dropped from the program. The report should be mailed or e-mailed to the appropriate DLAE. A sample "Project Status Report" is included as Exhibit 10-F in this chapter, and can be downloaded from the HR3 website at: http://www.dot.ca.gov/hq/LocalPrograms/HR3.htm.

10.11 PROJECT EVALUATIONS

Federal directives require that improvements constructed with federal safety funds be evaluated after the project is completed. Applicants that receive funding for a project may be asked to collect and submit data to Caltrans. Typically, two years of "before" data and two years of "after" data are sufficient for analysis. Positive safety benefits documented on constructed projects will help justify continued funding at or above current funding levels.

10.12 FEDERAL AND STATE PROGRAM CODES AND PROJECT PREFIXES

The federal program code is LS20.

The project prefix is HRRRL.

The state accounting program code is 20.30.010.560.

(Refer to Exhibit 3-M, "Federal Highway Transportation Program" in Chapter 3, "Project Authorization," of the LAPM.)

10.13 REFERENCES

- Title 23, United States Code, Section 148
- Caltrans *Local Assistance Program Guidelines* (LAPG)
- Caltrans *Local Assistance Procedures Manual* (LAPM)
- Caltrans *Highway Design Manual*
- *Manual on Uniform Traffic Control Devices* (MUTCD)
- Caltrans *Highway Safety Improvement Program Guidelines*

EXHIBIT 10-A APPLICATION FORM FOR HIGH RISK RURAL ROAD PROGRAM FUNDS

Applicants seeking High Risk Rural Road (HR3) Program funds must use this form. Failure to provide information that is required or to prepare the application in accordance with general formatting instructions may result in your application being disqualified. See Exhibit 10-B for the "Application Form Instructions."

This entire Application Form must be submitted, including this introductory page. Applicants should download the Application Form from the Internet. It can be found on the Division of Local Assistance Home Page at: http://www.dot.ca.gov/hq/LocalPrograms/HR3.htm. Limit the application to eight (8) pages plus attachments. Do not provide brochures and samples of materials unless they are directly related to a response.

Information provided with this Application Form will be used to calculate the Safety Index. Exhibit 10-C contains the "Safety Index Calculation Procedure and Instructions." **Applicants are NOT required to either complete Exhibit 10-C or calculate the Safety Index.**

Note: All yellow fields are required (after data is entered, the background will change to white).

Agency: **Date**

Caltrans District:

MPO/RTPA:

Project Location:

Description of Proposed Improvement(s):

Type(s) of Improvement(s) (See Exhibit 10-E, "Collision Reduction Factor and Improvement Life")

First, select from:

Then, click Add to add to the below list.

Selected Types (minimum 1, maximum 3)

Remove

Remove

Remove

Intersection or Road Section. (Select one. If it is a road section, indicate section length.)

Intersection

Road Section Section Length (Miles):

Speed Limit (mph):

Number of Lanes:

Functional Classification (select one):

Rural Major Collector Rural Minor Collector Rural Local Road

Visit http://www.dot.ca.gov/hq/tsip/hseb/crs_maps/ to verify functional classification.

Terrain (select one):

Flat Rolling Mountainous

Average Daily Traffic (ADT) (Current, all directions):

Traffic Collision Information

Time Period		to	
Collision Type	Fatal	Injury	Property Damage Only (PDO)
All Collisions			

Other Traffic Collision Information

Please provide some additional traffic collision data if certain improvement types are proposed (see below).

Type of Improvement	Additional Traffic Collision Data Required
Roadway Illumination (where no lighting exists) ……..	Nighttime collisions
Rumble Strip …….	Drift-off-the-road collisions
Superelevation Improvement …….	Run-off-the-road collisions
Truck Escape Ramp ……..	Run-away truck collisions

Time Period		to	
Collision Type	**Fatal**	**Injury**	**PDO**
Nighttime Collisions			
Drift-off-the-road Collisions			
Run-off-the-road Collisions			
Run-away Truck Collisions			

Project Cost Estimate

Complete the following "Project Costs Estimate" section. Include only those costs that are being requested for this project. For the three (3) primary headings, identify the Federal Fiscal Year in which funds should be programmed.

PROJECT COST ESTIMATE: (REQUIRED)

Federal Fiscal Year

Preliminary Engineering ……..

Environmental……$

PS&E…… $

Right of Way……

Engineering…..…… $

Acquisition…...…… $

Construction……...

Construction Engineering……..…… $

Construction……...……...…... $

Subtotal…… $

Contingency… .(10% of Subtotal; max) $

Total Project Cost……...……... $

Federal Funds Requested…….. $

The following parts of this Application Form request specific project-related information. Sections 1 and 2 request the applicant to provide a narration related to a specific topic. If pictures, maps, exhibits, data, diagrams, etc., are submitted in response to questions or statements in the application, they must be attached to the application.

1. IDENTIFICATION AND DEMONSTRATION OF NEED

This section requires the applicant to demonstrate the need for the project. Using the following questions and statements as a guide, provide a detailed narrative description of the problem.

Provide some background information about the problem. How was the problem identified? How long has the problem existed? Describe the primary cause(s) of the collisions that have occurred at the location. Given that other problems may exist within the applicant's jurisdiction, explain why this problem was chosen for improvement. Use whatever collision data, traffic data, community surveys, reports, plans, and other environmental conditions that may apply.

If available, provide photographs to illustrate the problem or deficiency. Include these photographs as attachments.

2. POTENTIAL FOR PROPOSED IMPROVEMENT TO CORRECT OR IMPROVE THE PROBLEM

This section requires the applicant to describe how the proposed solution will improve the safety of the public.The applicant must clearly demonstrate the connection between the problem and the proposed solution.

Describe how the proposed project corrects, or improves the traffic safety at or near the project site.

Describe options or alternatives that were considered.

3. IMPLEMENTATION SCHEDULE

Applicants must estimate dates for the following milestones:

Request Authorization to Proceed with Preliminary Engineering ……

Obtain Environmental Clearance (NEPA)……

Request Authorization to Proceed with Right of Way (if applicable)……..

Obtain Right of Way Clearance……

Request Authorization to Proceed with Construction… ……..

Complete Construction of Project……

4. APPLICATION SIGNATURES

An agency official representing the applicant must sign the application. The undersigned affirms that the statements contained in the application package are true and complete to the best of the applicant's knowledge. The undersigned also affirms that the applicant's agency owns, operates and maintains the facility upon which the proposed improvements will be constructed. If portions of the improvements extend into areas where the applicant has no jurisdictional authority, a notation must be made that officials representing the affected local agencies support the project. In the notation, provide names and telephone numbers of whom to contact for corroboration. Only one agency official needs to sign the application. "Agency Official" means Director, Assistant Director, Executive Director, Assistant Executive Director, or their respective designated administrators, engineers, or planners.

Agency Official:
Name

Signature

Title:

Phone Number:

E-mail:
(If available)

Notation: *(If applicable)*

Distribution: 1) Original & one copy - DLAE
2) One copy - HQ DLA

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EXHIBIT 10-B APPLICATION FORM INSTRUCTIONS

For projects that involve multiple locations, a separate form must be submitted for each spot location.

For projects that involve roads of more than 1 mile and if Average Daily Traffic (ADT) varies, a separate form must be submitted for each 1-mile segment. The evaluation of the entire project will be based on the average of the segments in the project.

The application form contains the following fields:

Agency: Provide the name of your agency

Date: Indicate the Application Date

Caltrans District: From the drop-down list, select Caltrans District (1 to 12) that the proposed project belongs to. Select "Other" if not applicable.

MPO/RTPA: From the drop-down list, select the MPO/RTPA (Metropolitan Planning Organization/Regional Transportation Planning Agency) that the proposed project belongs to. Select "Other" if not applicable. The following 18 MPOs/RTPAs are available from the drop-down list:

AMBAG: Association of Monterey Bay Area Governments
BCAG: Butte County Association of Governments
COFCG: Council of Fresno County Governments
KCAG: Kings County Association of Governments
KCOG: Kern Council of Governments
MCAG: Merced County Association of Governments
MCTC: Madera County Transportation Commission
MTC: Metropolitan Transportation Commission
SACOG: Sacramento Area Council of Governments
SANDAG: San Diego Association of Governments
SJCOG: San Joaquin Council of Governments
SLOCOG: San Luis Obispo Council of Governments
SBCAG: Santa Barbara County Area of Governments
SCRTPA: Shasta County Regional Transportation Planning Agency
SCAG: Southern California Association of Governments
STANCOG: Stanislaus Council of Governments
TCAG: Tulare County Association of Governments
TMPO: Tahoe Metropolitan Planning Organization

Project Location: Provide road name or geographical references to project location.

Description of Proposed Improvement(s): Describe the proposed improvements.

Type(s) of Improvement(s): List type(s) of improvement(s) proposed. Select from the predefined list (see Exhibit 10-E, "Collision Reduction Factor and Improvement Life"). Then click "Add." Usually only one (1) item needs to be selected. If multiple items apply, a maximum of three (3) items can be selected.

Intersection or Road Section: Check the project if it is for an intersection or a road section. If it is for a road section, indicate the length of the road section in miles.

Speed Limit (mph): Indicate the speed limit of the proposed road or location(s).

Number of Lanes: Indicate the total number of travel lanes of the current road (both directions). Do not include left-turn lanes, right-turn lanes or two-way turn lanes. If it is an intersection, use the average number of lanes of the roads approaching the intersection.

Functional Classification: Select one from the following three eligible categories: 1) Rural Major Collector; 2) Rural Minor Collector, and 3) Rural Local Road.

Terrain: Indicate the terrain: Flat, Rolling or Mountainous.

Average Daily Traffic (ADT): Indicate the existing (or most current) ADT volume of the proposed location (in thousands).

If the proposed improvement is at an intersection, add the existing (or most current) ADT volumes approaching the intersection from all directions and divide by 1,000. The ADT is the combined traffic volume of all approaches to the intersection on an average day.

If the proposed improvement is not at an intersection, the ADT is the number of vehicles that use the section of roadway proposed for improvement in both directions on an average day.

Traffic Collision Information: Do not include unreported collisions since the evaluation formula has already been adjusted to account for this anomaly. Collision summary reports that corroborate the values must be attached to the application. Do not attach the law enforcement field reports.

For spot improvements, collisions that occurred within 1/10 mile may be included.

For corridor or linear improvements, collisions that occurred within the corridor plus collisions that occurred within 1/10 mile of the ends of the project limits may be included.

For intersection improvements, collisions that occurred within 300 feet of the intersection in all directions may be used. If the distance to the nearest intersection is less than 600 feet, only those collisions that occurred from midblock may be used.

Time Period: The time period of the collision data provided. Data should be provided for at least the last three years.

All Collisions: The occurrences of all collisions **(not number of victims)** in the time period per three severities: Fatal, Injury and Property Damage Only (PDO).

Other Traffic Collision Information: Please provide some additional traffic collision data if certain improvement types are proposed (see below). Each of the below four types of improvements only reduces its corresponding collisions.

Type of Improvement	Additional Traffic Collision Data Required
Roadway Illumination (where no lighting exists) ……..	Nighttime collisions
Rumble Strip …….	Drift-off-the-road collisions
Superelevation Improvement …….	Run-off-the-road collisions
Truck Escape Ramp ……..	Run-away truck collisions

Project Cost Estimate: See the Application Form.

Identification and Demonstration of Need: See the Application Form.

Potential for Proposed Improvement to Correct or Improve the Problem: See the Application Form.

Implementation Schedule: See the Application Form.

Application Signatures: See the Application Form.

EXHIBIT 10-C SAFETY INDEX CALCULATION PROCEDURE AND INSTRUCTIONS

(*This Exhibit is for information only. Applicants do **NOT** need to fill in this form.)*

Local Agency: _____ Date: _____
Calculated By: _____
Checked By: _____

Project Location: _____

Description of Proposed Improvement(s):
_____
_____
_____

Total Project Cost (in $1000s): _____

ADT (existing, all directions, in 1000s): _____

STEP 1: SIGNIFICANCE TEST ON THE SEVERITY DISTRIBUTION OF EXISTING COLLISION DATA

Before estimating collisions that would occur on the existing facilities with no improvements and collisions that would occur after the proposed improvements, a statistical Significance Test needs to be performed on the severity distribution of the collisions occurring over the past several years on the existing road. If the distribution is normal or approximately so, the state average cost of collisions for that road type is used. If, however, the collisions are more severe than normal, a higher collision cost is used to reflect the higher costs of fatal and injury collisions. Conversely, if the collisions are less severe than usual, a lower cost is used. In this manner, considerably more weight is given to the fatal and injury collisions than to the "fender benders."

The Table below is used to perform the Severity Distribution of Existing Collision Data.

TABLE 1:SIGNIFICANCE TEST

Item	Description	Formula/Source	Total	F*	I*	F+I*	PDO*
A	No. of Collisions	(From Application Form)	(A1)				
B	% Severity	(From Exhibit 10-D)	100				
C	Average No. of Collisions	(A1) x B					
D	Difference	A – C					
E	Maximum Expected Deviations	$\sqrt{2.072xC}$ + 0.5					
F	Significant	If (absolute value of D) >E, Yes. Otherwise, No.		(Yes +/- /No)**	(Yes +/- /No)**	(Yes +/- /No)**	

* F: Fatal; I: Injury; F+I: Fatal + Injury; PDO: Property Damage Only.

** Yes (+) when D is positive; Yes (-) when D is negative.

STEP 2: COLLISION REDUCTION FACTOR (CRF)

In order to estimate the collisions that may still occur after the proposed improvements are completed, a Collision Reduction Factor (CRF) will be applied to the number of collisions. In Exhibit 10-E "Collision Reduction Factor and Improvement Life," a standard (or average) CRF can be found for each type of the improvements. However, this CRF may be too large, because it may result in a collision rate less than the Average Base Rate (ABR), which is available in Exhibit 10-D "Average Collision Rate and Collision Cost Table." In this case, a lesser CRF, or adjusted CRF, should be used.

The following table is used to calculate the CRF of collisions.

TABLE 2: DETERMINATION OF COLLISION REDUCTION FACTOR

Item	Description	Formula/Source	Value
1	No. Of Collisions (all severities)	(From Application Form)	
2	Time Period (years)	(From Application Form)	
3	ADT (in 1000s)	(From Application Form)	
4	N*	(From Application Form)	
5	Initial Collision Rate	(1) ÷ ((2) × (3) × (4) × 0.365)	
6	Standard RF (see the instruction)	(From Exhibit 10-E)	
7	Collisions Reduced	(5) × (6)	
8	Reduced Collision Rate	(5) – (7)	
9	Average Base Rate	(From Exhibit 10-D)	
10	Differential Rate	(5) – (the larger of (8) and (9))	
11	Adjusted RF	(10) ÷ (5)	

*N: 1 if the project is for an intersection; length in miles (rounded to an integer, minimum 1) if the project is for a road section.

If the project includes more than one type of improvement, adjust the CRF in accordance with the relative percentages of the work category (see example below).

Example: A project consists of constructing a left-turn pocket at an unsignalized intersection and installing new safety lighting. From Exhibit 10-E, "Collision Reduction Factor and Improvement Life," a 35 percent reduction can be applied to the left-turn pocket improvement, and a 15 percent reduction of nighttime collisions can be applied to the safety lighting. If there was an average of 20 collisions/year at this location with an average of 12 nighttime collisions/year, then the combined CRF is calculated as follows:

Lighting: (12 nighttime collisions) x 15% = 1.8 collisions reduced
Channelization: [(20 total collisions) - 1.8 collisions] x 35% = 18.2 x 35% = 6.4 collisions reduced
Combined: 1.8 + 6.4 = 8.2 total collisions reduced
Combined CRF: 8.2 ÷ 20 = 0.41 or 41%

STEP 3: PER COLLISION COST

If all three Significance Tests result in "No," which indicates that the actual collision experience is not statistically higher or lower than normal, skip this step. The collision costs used would be the state average collision cost for the identified existing and proposed rate groups.

If Significance Test result is "Yes" for "Fatal," use Table 3.1 to calculate per collision cost, and then go to Step 4.

If Significance Test result is "No" for "Fatal," but "Yes" for "Injury" and/or "Fatal + Injury," use Table 3.2 to calculate per collision cost, and then go to Step 4.

TABLE 3.1 PER-COLLISION COST CALCULATION TABLE WHEN THE SIGNIFICANCE TEST IS "YES" FOR FATAL

	Collision Severity	F*	I*	PDO*	All Collisions
A	Collisions Per Year	(A1) (From Application Form)	(A2) (From Application Form)	(A3) (From Application Form)	(A4) = (A1)+(A2)+(A3)
B	Per Collision Cost – before ($1000s)	$3,900	$77.4	$4	(B4) (From Exhibit 10-D)
C	Total Collision Cost – before ($1000s)	(C1) =(A1) × $3,900	(C2) =(A2) × $77.4	(C3) =(A3) × $4	(C4) = (C1)+(C2)+(C3)
D	Per Collision Cost – before (all collisions) ($1000s)				(D4) = (C4)÷(A4)
E	Per Collision Cost – after (all collisions) ($1000s)**				(B4) or (D4) (See notes **)

* F: Fatal; I: Injury; F+I: Fatal + Injury; PDO: Property Damage Only.
** Per Collision Cost – After is:
a) (B4) if the Significance Test for "Fatal" is Yes (+);
b) (D4) (Per Collision Cost – Before) if the Significance Test for "Fatal" is Yes (-).

TABLE 3.2 PER-COLLISION COST CALCULATION TABLE WHEN SIGNIFICANCE TEST IS "YES" FOR "I" AND/OR "F+I"

	Collision Severity	F+I*	PDO*	All Collisions
A	Collisions Per Year	(A1) (From Application Form)	(A2) (From Application Form)	(A3) = (A1)+(A2)
B	Per Collision Cost – before ($1000s)	(B1) (From Exhibit 10-D)	$4	(B3) (From Exhibit 10-D)
C	Total Collision Cost – Before ($1000s)	(C1) =(A1) × (B1)	(C2) =(A2) × $4	(C3) = (C1)+(C2)
D	Per Collision Cost – before (all collisions) ($1000s)			(D3) = (C3)÷(A3)
E	Per Collision Cost – after (all collisions) ($1000s)**			(B3) or (D3) (See notes **)

* F+I: Fatal + Injury; PDO: Property Damage Only.
** Per Collision Cost – After is:
a) (B3) if the Significance Test for "Injury" and/or "Fatal + Injury" is Yes (+);
b) (D3) (Per Collision Cost – Before) if the Significance Test for "Injury" and/or "Fatal + Injury" is Yes (-).

STEP 4: SAFETY INDEX CALCULATION

Use the Table 4 below to calculate the estimated collision costs both before the improvement and after the proposed improvement.

TABLE 4: COLLISION COSTS BEFORE AND AFTER THE IMPROVEMENT

Item	Description	Formula/Source	Value
1	No. Of Collisions	(From Application Form)	
2	Time Period (Years)	(From Application Form)	
3	Initial Collisions per Year	(1) ÷ (2)	
4	Per Collision Cost – Before (All collisions)	(From Step 3, if any "yes" in Significance Test, else from Exhibit 10-D)	
5	Per Collision Cost – After (All collisions)	(From Step 3, if any "yes" in Significance Test, else from Exhibit 10-D)	
6	Improvement Life (Years)	(From Exhibit 10-E)	
7	Adjusted RF	(From Step 2)	
8	Expected Collisions per Year after Improvement	(3) × (1.0 - (7))	
9	Total Collision Cost – Before ($1000)	(3) × (4) × (6)	
10	Total Collision Cost – After ($1000)	(5) × (6) × (8)	

Then, Safety Index (SI) can be obtained by using the below formula:

Safety Index =100 × ((9) – (10)) ÷ Project Total Cost (in $1000s)

EXHIBIT 10-D AVERAGE COLLISION RATE AND COLLISION COST TABLE

Rate Group	Area	Terrain	Speed Limit	Base Rate	ADT Factor	Percentage of Collisions (%)			Per Collision Costs ($1000)[3]	
						F[1]	I[1]	F+I[1]	F + I	All
H01	Rural	Flat	≤55 mph	1.15	0.35	3.4	45.1	48.5	345.4	169.6
H02	Rural	Flat	>55 mph	0.90	0.35	3.8	44.6	48.5	376.7	184.8
H03	Rural	Roll	≤55 mph	1.30	0.35	2.2	46.0	48.2	251.9	123.5
H04	Rural	Roll	>55 mph	0.80	0.35	3.7	46.2	49.9	360.8	182.1
H05	Rural	Mountain	≤55 mph	1.65	0.40	2.1	48.2	50.3	237.0	121.2
H06	Rural	Mountain	>55 mph	1.25	0.40	2.7	44.8	47.5	294.7	142.1

Source: 2002 Caltrans Highway Safety Improvement Program.

1. F: Fatal; I: Injury; F+I: Fatal and Injury.
2. Average Base Rate (ABR) can be obtained by the following 2 steps:
   a. Use Area, Terrain and Speed Limit to identify the Rate Group;
   b. Average Base Rate = Base Rate + ADT Factor ÷ ADT (in thousands).
3. For rural roads, the statewide per collision costs are $3,900,000, $77,400 and $4,000 for fatal, injury and Property Damage Only (PDO) collisions respectively.

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EXHIBIT 10-E COLLISION REDUCTION FACTOR AND IMPROVEMENT LIFE

Collision Reduction Factor and Improvement Life

Type Of Improvement	Collision Reduction Factor (CRF)	Improvement Life (Years)
Roadway Illumination (where no lighting exists)	0.15(1)	15
Relocation or Breakaway Utility Poles	0.2	10
Traffic Signs (General)	0.05	6
Curve Warning Arrows	0.2	6
Advance Curve Warning with Advisory Speed	0.2	6
4-Way Stop	0.5	6
Upgrade with Breakaway Supports	0.2	10
Upgrade Median Barrier (includes new median barrier)	0.2	15
Remove Obstacles	0.2	20
New Traffic Signals	0.2	15
Upgrade Guardrail (include new guardrail)	0.2	10
Impact Attenuators	0.2	10
Upgrade Traffic Signals (includes interconnection)	0.2	15
Sight Distance Improvement	0.2	10
Construct Raised Median for Traffic Separation	0.2	20
Groove Pavement for Skid Treatment	0.1	10
Turning Lanes (except for new left-turn lane) and Traffic Channelization	0.15	15
New left-turn lane at signalized intersection (with no left-turn phase)	0.15	15
New left-turn lane at signalized intersection (with left-turn phase)	0.35	15
New left-turn lane at nonsignalized intersection	0.35	15
Two-way left-turn lane	0.25	15
Pavement Markings and Delineation	0.05	2
Widen or Improve Shoulder	0.2	20
Flatten Side Slopes	0.2	20
Realign Roadway	0.5	10
Overlay for Skid Treatment	0.1	10
Rumble Strip	0.5(2)	10
Superelevation Improvement	0.5(3)	15
Truck Escape Ramp	0.75(4)	20
Reconstruction (combinations & miscellaneous)	0.2	10

Source: 2001 Hazard Elimination Safety Program Guidelines supplemented by 2002 Caltrans Highway Safety Improvement Program.

(1) Applies to nighttime collisions only.
(2) Applies to drift-off-the-road collisions only.
(3) Applies to run-off-the-road collisions only.
(4) Applies to run-away truck collisions only.

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EXHIBIT 10-F PROJECT STATUS REPORT

PROJECT STATUS REPORT
Due July 1 each year
(Required only if a construction contract has not been awarded by July 1.)

Agency: _____Date: _____

Project Number:___*(to be completed by Caltrans District)*_____

Project Location:_____
_____

Work Description: _____
_____
_____
_____

Original Projected Award Date:_____

Current Projected Award Date:_____

If "current projected award date" is not within the same Federal Fiscal Year as the "original projected award date," attach letter requesting a time extension.

Original Cost Estimate: _____

Current Cost Estimate: _____

Reason for difference (increase or decrease): _____
_____
_____

Other comments: _____
_____
_____

Prepared by:_____
E-mail:_____
Telephone: _____

Distribution: 1) Mail to DLAE by July 1 of each year.

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