

Example Application from HSIP-Cycle 5 and HR3-Cycle 3

03-Placer County-1

Countermeasures Used:

R32: Install edge-lines and centerlines

Primary reasons this application was selected to show as an Example:

- Large, systemic striping project identified based on a yearly analysis of county roads
 - Countermeasure that can result in a relatively high B/C ratio even on rural roadways
- Large number of corridors, both rural and urban, are improved with a single project
- Clear match between the limits of improvements and crash locations
 - Clear crash diagram and crash data make the application easy to view
- For agencies without crash data, this type of project could still be identified and crash data and diagrams could be obtained using UC Berkeley TIMS tools
- Applicant simplified the application by only including Fatal and Severe Injury crashes. This minimized the crashes to track, saved staff time, and still resulted in a B/C ratio of 15

Changes needed for similar applications in future HSIP calls for projects:

- 2 to 3 photos for each countermeasure in an application would help demonstrate the need for the improvement and confirm that the countermeasure is being applied correctly

APPLICATION FOR HIGHWAY SAFETY IMPROVEMENT PROGRAM (HSIP) PROGRAM CYCLE 5 AND HIGH RISK RURAL ROADS (HR3) PROGRAM CYCLE 3

APPLICATION SUMMARY

After the application is finalized, please save this PDF form using the exact "Application ID" (shown below) as the file name.

This summary page is filled out automatically once the application is completed.

Application ID: 03-Placer County-1

Submitted By (Agency):
Placer County

Caltrans District
03

Application Number
1

Out of
4

Project Location

Various locations throughout Placer County, a systematic application.

Project Description

Installation of new pavement markings utilizing an all weather, high build paint and optical elements to increase retroreflectivity during nighttime and inclement weather times of the year.

Countermeasure 1: R32: Install edge-lines and centerlines

Countermeasure 2:

Countermeasure 3:

| | | | |
|-------------------------------|------------|---------------------------|----------------|
| Total Expected Benefit | 15,813,150 | Total Project Cost | \$1,050,300.00 |
|-------------------------------|------------|---------------------------|----------------|

B/C Ratio: 15.06

I. Basic Project Information

Date Caltrans District MPO

Agency County

Total number of applications being submitted by your agency

Application Number (each application must have a unique number)

Contact Person Information

Name (Last, First):

Position/Title of Contact Person

Email: Telephone: Extension:

Address:

City: Zip Code: (Enter only a 5-digit number.)

Project Information

Project Location
-Be Brief (limited to 250 characters)
-[See Instructions](#)

Project Description
-Be Brief (limited to 250 characters)
-[See Instructions](#)

Functional Classification (For Functional Classification and CRS Maps, Visit http://www.dot.ca.gov/hq/tsip/hseb/crs_maps/)

CRS Map ID (e.g. 08E14)

Urban/Rural Area (Visit <http://earth.dot.ca.gov/>)

Eligible for HR3 Funding ([See Instructions](#))

Work on the State Highway System ([See Instructions](#))

Does the project include improvements on the State Highway System?

If no, move on to the next page; If yes, go to the below question.

Is this a joint-funded project with Caltrans?

- If yes, check this box to confirm a formal Letter of Support from Caltrans - District Traffic is attached to the application. The letter should include estimates of cost sharing.
- If no, check this box to confirm a written correspondence from Caltrans District Traffic is attached to the application. The correspondence should indicate that Caltrans does not see issues that would prevent the proposed project from receiving an encroachment permit

Additional Information

1. Is the project focused primarily on "spot location" or "systemic" improvements?

The primary type of the "systemic" improvements:

2. Which of the California's Strategic Highway Safety Plan (SHSP) Challenge Areas does the project address primarily?
(For more information on the SHSP and its Challenge Areas, see: <http://www.dot.ca.gov/SHSP/>)

3. How were the safety needs and potential countermeasures for this project **first** identified?

4. What is the primarily mode of travel intended to be benefited by this project?

5. Approximate percentage of project cost going to improvements related to **motorized** travel %

6. Approximate percentage of project cost going to improvements related to **non-motorized** travel %

7. Is the project focused primarily on "Intersection" or "Roadway" improvement?

Miles of Roadway

8. Posted Speed Limit (mph)

| 9. Average Daily Traffic | ADT (Major Road) | ADT (Minor Road) | Year Collected |
|------------------------------------|-------------------------------------|----------------------------------|-----------------------------------|
| (See Instructions) | <input type="text" value="35,400"/> | <input type="text" value="124"/> | <input type="text" value="2006"/> |

II. Narrative Questions [\(See Instructions\)](#)

These narrative questions are intended to provide additional project details for the application reviewers and project files. Application reviewers will use the information in their “fatal flaw” assessment of the applications, including:

- 1) The project scope is eligible for HSIP and/or HR3 funding;
- 2) The countermeasures used in the B/C ratio calculation are appropriately applied based on the scope of the project;
- 3) The crash data used in the B/C ratio calculation is appropriately applied based on the scope of the project and countermeasures used;
- 4) The costs included in the application represent the likely total project cost necessary to fully construct the proposed scope. If the proposed project is a piece of a larger construction project, the entire scope of the larger project must be identified.
- 5) The application data and attachments are reasonable and meet generally accepted traffic engineering and transportation safety principles.

If significant inconsistencies or errors are found in the application information, the Caltrans reviewers may conclude that the application includes one or more “fatal flaws” and the application will be dropped from further funding considerations. The applicant will be notified of Caltrans findings until after the selection process is complete.

1. Overall Identification of Need

Describe how the agency identified the project as one of its top safety priorities. Was a data-driven, safety evaluation of their entire roadway network completed? (limited to 5,000 characters)

Placer County implemented a yearly safety analysis on County maintained roadways in 2009. The Placer County Traffic Accident Analysis System (TAAS) identifies five high collisions intersection and roadway segment locations throughout the County based on a system wide analysis annually. A detailed engineering study is preformed and identified countermeasures are implemented, when applicable, as a result of the investigation. Focused safety studies are also preformed for high collision locations related to run off road, head on, wet pavement, snow and ice, pedestrian and bicycle collisions on a 3-5 year rotation. Placer County received an Office of Traffic Safety Grant in 2011 for development of a GIS based collision analysis tool which aids in efficient identification of high concentration collision locations of a specific data set along roadway segments. This GIS tool, along with a detailed output of nighttime collision data from Crossroads, was used to identify the locations being applied for with this grant.

2. Potential for Proposed Improvements to Correct the Problem

Describe the primary causes of the collisions that have occurred within the project limits. Are there patterns in the crash types? Clearly demonstrate the connection between the problem and the proposed countermeasures utilized in the Benefit/Cost Ratio calculations. (limited to 5,000 characters)

Note: Safety improvements that do not have countermeasures and crash reduction factors identified in the TIMS B/C Calculator can be included in the project scope; they just won't be added to the project's B/C ratio shown in the application.

Placer County currently maintains 1056 miles of highway. The demographics of the County's highway network are extremely variable. Roadways in the western part of the County vary from major two or four lane arterials in urbanized areas to two lane rural roadways. The central portion of the county is mostly characterized with rolling to mountainous terrain. This area is more rural in nature than the western portion. Roadways within this area of the county have longer segment lengths, with a small exception in the more urbanized area of north Auburn. The eastern portion of the county, bordering the northwestern shores of Lake Tahoe, has more mountainous terrain with many rural roadways with long segments between intersections. It is also challenged with highly changeable weather and roadway surface conditions.

The three primary collisions types within this data set utilized for the grant preparation are Head On, Hit Object and Overturned. These collisions are primarily single vehicle collision in which a vehicle leaves the travel way or multi-vehicle collisions in which a vehicle crosses centerline. We are focusing our efforts on night time collisions during a period of the year that we experience

inclement weather. Traditional pavement markings can be hard to see in inclement weather, making it tricky for drivers to find their way if unfamiliar areas or possibly under impairment. The idea behind an all-weather paint application is to make driving lanes more visible during these periods thru higher retroreflection and durability, enhancing safety to motorists. The all-weather pavement marking system combines high-build waterborne paint and glass beads that provide good visibility in dry conditions with optical elements made of a ceramic core surrounded by high-refractive-index beads that provide retroreflectivity when it's wet, optimizing performance. All weather paint incorporates a special formulation of paint that uses high-build resin to enable the paint to be applied thicker. The increased thickness increases the life of the paint and helps to hold the optics. That translates into lines that last twice or three times as long as our current paint application, fewer traffic interruptions and less roadway safety exposure for County roadway personnel.

The all weather paint application meets, and in some applications exceeds, the current MUTCD standard for retroreflectivity of roadway markings. A test of this system shows that the all-weather paint system significantly outperforms the conventional markings under wet and rainy conditions.

An enhancement in our marking system would be designed to make it easier for drivers to navigate during the night under dry, rainy and wet conditions. Countermeasure R32 is applied in the benefit calculation.

3. Crash Data Evaluation

Describe how the limits of the crash data were established to ensure only appropriate crashes were included in the Collision Summary Report(s), Collision Diagram(s) and B/C calculations. Explain how the influence areas for each separate countermeasure were established. (limited to 5,000 characters)

The grant application targets collisions that are occurring primarily during the night time hours of the day. These night time collisions were further limited to the months within the year when we experience inclement weather such as rain, snow, ice and fog (October - May). Lastly, we are concentrating on only severe injury and fatal collision locations when doing an analysis of the highest concentration locations so as to target our most severe collision history locations with an initial year material application. The collisions utilized for the benefit costs are focused to these parameters. The data set encompasses 10 years, including the most recent 2011 data. Placer County will apply for three separate systemic grant applications in this cycle of HSIP/HR3 call for projects. Many roadways have been identified for countermeasure treatment under each grant application. Due to a concern for double counting of benefits, duplicate collision data within the project area (countywide) was removed from this application.

Placer County hand enters collisions data into the Crossroads database and does an annual crosscheck of this data against the SWITRS database in order to assure accuracy as well as provide for more expeditious access to current data. The roadways identified by the systematic identification analysis are included in an attachment. Walerga Road is used as an example roadway for purposes of a collision diagram. A full collision summary is also provided.

4. Prior attempts to address the Safety Issue

If appropriate, list all other projects/countermeasures that have been (or are being) deployed at this location. Applicants must identify all prior federal HSIP, HR3 or Safe Routes To School (SRTS) funds approved within or directly adjacent to the propose projects limits within the last 5 years. (limited to 5,000 characters)

Our current pavement marking system utilizes traditional paint which is typically applied at 15 mil wet thickness and dries to 9 mil. This thin line is hard-pressed to withstand the wear- and-tear of the larger vehicles on the road today. The result is that County crews are forced to re-stripe the entire County every year in order to maintain MUTCD retroreflectivity standards. This method of repainting at a short frequency in order to maintain retroreflectivity is becoming more and more difficult to administer with increased in traffic volumes and decreased in staffing due to difficult economic times.

Placer County has been awarded a number of HSIP and HR3 grants within the project limits (i.e. King Road, Rollins Lake Road, Foresthill Road). A Safe Routes to School grant was also awarded for the community of Sheridan. None of these grants specifically address the issues of night time marking retroreflectivity.

5. Total project costs

Describe the process used to establish the total cost for the project. Confirm contingencies for reasonably expected costs, including drainage, environmental, traffic, etc, are included. (limited to 5,000 characters)

Note: For applications with more than one countermeasure used in the B/C calculations, applicants need to describe the logic used to distribute the total project cost to each countermeasure.

Construction Cost estimates were developed from construction industry preliminary bid estimates for materials such as all-weather paint, glass and ceramic bead elements. Due to the increase in vehicle weight capability for the new material elements, Placer County would need to purchase a new Highway Striper to facilitate the application. This purchase would enable County crews to apply the initial material as well as continue this method of striping into the future. Placer County is proposing to fund the purchase of a Highway Striper. Rental costs of the equipment are included during the first year of material application funded thru the grant. It is the intent of Placer County to transition from a standard striping material to the proposed roadway striping method of all-weather paint and ceramic elements long term. The total material costs were developed from the list of roadways identified from our high concentration locations. The material acquired thru an HSIP grant would be applied to roadways which have been identified to have high occurrences of fatal and severe injury collisions. Into the future, the County would utilize other roadway funding monies to complete the remainder of the roadway network with all-weather materials. Right-of-way and environmental costs are expected to be zero due to presence of existing right-of-way and a anticipated Exemption under environmental law. Preliminary Engineering was developed from previous experience with grant delivery items. Minimal time is anticipated for plan approval and engineering. Construction Inspection and Engineering costs were developed based on previous grant delivery costs. A 10% contingency was used due to a high reliability of construction costs and pervious experience with engineering, inspection and labor costs. We feel that the number included in these categories are conservative for the type of project in which funds are requested.

III. Project Cost Estimate (See Instructions)

All project costs must be accounted for on this form, even if substantial elements of the overall project are to be funded by other sources.

Round all costs up to the nearest hundred dollars. Once all costs are entered, click "Check Cost Estimate" to perform validation. If errors are detected, they will appear below the button. Click it to check again each time when the costs have been revised.

| Phase | Federal Funds | Local/Other Funds ⁽⁷⁾ | Total Cost | Federal/Total ⁽⁵⁾ | |
|--|---|----------------------------------|------------------|------------------------------|------------|
| Preliminary Engineering | Environmental | \$0 | \$0 | \$0 | |
| | PS&E | \$20,000 | \$10,000 | \$30,000 | |
| | PE Subtotal⁽²⁾ | \$20,000 | \$10,000 | \$30,000 | 67% |
| <input type="checkbox"/> Agency does NOT request federal funds for PE Phase (automatically checked if PE - federal funds is \$0). | | | | | |
| Right of Way | Right of Way Engineering | \$0 | \$0 | \$0 | |
| | Appraisals, Acquisitions & Utilities | \$0 | \$0 | \$0 | |
| | ROW Subtotal⁽³⁾ | \$0 | \$0 | \$0 | 0% |
| Construction Engineering & Construction | Construction Engineering ⁽⁴⁾ | \$23,000 | \$44,200 | \$67,200 | 34% |
| | Construction ⁽¹⁾ | \$857,000 | \$96,100 | \$953,100 | 90% |
| | CON Subtotal | \$880,000 | \$140,300 | \$1,020,300 | |
| Total Cost⁽⁵⁾⁽⁶⁾⁽⁷⁾ | | \$900,000 | \$150,300 | \$1,050,300 | |

- (1) The "Total Construction Cost" (including contingencies) must match the detailed Engineer's Estimate (attached to the application).
- (2) "Federal Funds" for Preliminary Engineering may not exceed 25% of the Federal Construction Cost.
- (3) "Federal Funds" for Right of Way may not exceed 25% of the Federal Construction Cost.
- (4) "Federal Funds" for Construction Engineering may not exceed 15% of the Federal Construction Cost.
- (5) "Federal Funds" may not exceed 90% of "Total Cost." This applies to each phase.
- (6) "Federal Funds" may not exceed \$900,000.
- (7) To maintain efficiencies in the overall Program and Project Management, the total "Federal Funds" must be no less than \$100,000 (see Application Form Instructions for exceptions). If needed, agencies should consider extending the project limits and/or adding other safety improvements in order to increase both the Benefits and Costs.

Check Cost Estimate [Per (2) through (7) above]

Congratulations! No errors have been found in the cost estimate.

IV. Implementation Schedule [\(See Instructions\)](#)

The local agency is expected to deliver the project per Caltrans Local Assistance [safety program delivery requirements](#). In order for the milestones to be calculated correctly, all fields needs to be filled in. For steps that are not applicable, enter "0".

Target Date for the Project's Amendment into the FTIP: 01/01/2013

Time for agency to internally staff project and request PE authorization 0 Month(s)

Typical Time for Caltrans and FHWA to process and approve PE authorization 2 Month(s)

Proposed PE Authorization Date: 03/02/2013 **(PE Authorization Delivery Milestone)**

Will external consultants be required to complete the PE phase of this project? No

Additional time needed to the Delivery Process for hiring PE consultant(s) 0 Month(s) (0 - 6)

Time to prepare environmental studies request 0 Month(s)

Time to complete CEQA/NEPA studies/approvals 1 Month(s)

See PES Form in the LAPM for Typical studies and permits

Time to complete the Right of Way Acquisition (federal process) 0 Month(s)

Plan on 18 months minimum for federal process including a condemnation

Time to complete final PS&E documentation 1 Month(s)

Other 0.5 Month(s)

Expected Completion Date for the PE Phase: 05/17/2013

Time for agency to request CON authorization 1 Month(s)

Typical Time for Caltrans and FHWA to process and approve CON Auth 3 Month(s)

Proposed CON Authorization Date: 09/15/2013 **(CON Authorization Delivery Milestone)**

Time included for the agency's workload-leveling or construction-window needs 8 Month(s)

Time to award contract with CON contractor (following the federal process, including Board/Council approval, advertise, award, execute and mobilize) 0 Month(s)

Time to complete construction 4 Month(s)

Time included for closing the CON contract 1 Month(s)

Other 0 Month(s)

Expected Completion Date for the CON Phase: 10/15/2014

Time to complete the project close-out process 2 Month(s)

Typical Time for Caltrans and FHWA to process and approve project close-out 3 Month(s)

Expected Completion Date for the project Close-Out: 03/16/2015 **(Close-Out Delivery Milestone)**

V. Countermeasures, Crash Data and Benefit/Cost Ratio [\(See Instructions\)](#)

In the process of completing this application, the Local Agency is required to utilize the Benefit/Cost Ratio Calculation Tool that is included in the Safe Transportation research and Education Center (SafeTREC) Transportation Injury Mapping System (TIMS) web site. This **web site** can be assessed at <http://tims.berkeley.edu/>

The final output summary page from TIMS must be included as part of the official application (both electronically and hard copy). The hard copy page must be included in the application following this page.

In order to facilitate the electronic collection and tracking of this data, Caltrans is requiring agencies to manually enter some of the key "input data" and "output data" used in their final TIMS B/C Ratio. *NOTE: If any of the values inputted on this sheet do not match the values from the TIMS B/C Ratio Output Summary sheet, THE APPLICATION WILL BE REJECTED. **Be Careful and confirm the numbers!***

TIMS Application ID: (This ID is generated by this form. TIMS Application ID must match this ID.)

Version (from TIMS) :

Total Project Cost: (This must match the total project cost in Section III.)

Countermeasure Information

Number of countermeasures utilized:

| | Countermeasure | % of Total Project Cost |
|-----|--|--------------------------------------|
| #1: | <input type="text" value="R32: Install edge-lines and centerlines"/> | <input type="text" value="100"/> (%) |
| #2: | <input type="text"/> | <input type="text" value="0"/> (%) |
| #3: | <input type="text"/> | <input type="text" value="0"/> (%) |

B/C Ratio Calculation

| | Expected Benefit (Life) | Expected Cost | Resulting B/C |
|----------------------------------|---|--|------------------------------------|
| Countermeasure #1 | <input type="text" value="\$15,813,150"/> | <input type="text" value="\$1,050,300"/> | <input type="text" value="15.06"/> |
| Countermeasure #2 | <input type="text"/> | <input type="text" value="\$0"/> | <input type="text" value="0.00"/> |
| Countermeasure #3 | <input type="text"/> | <input type="text" value="\$0"/> | <input type="text" value="0.00"/> |
| Project's Total (Overall) | <input type="text" value="\$15,813,150"/> | <input type="text" value="\$1,050,300"/> | <input type="text" value="15.06"/> |

VI. Application Data Verification and Signature [\(See Instructions\)](#)

All HSIP/HR3 applications (hard-copies only) must be signed by a registered engineer or the Agency's Transportation Manager in responsible charge of their Traffic Engineering section. By signing and submitting this application, the engineer/manager is attesting to:

1. All data in the application is accurate and represents the total scope of the planned project.
2. All likely project costs are included in the Total Project Cost (additional federal funds for cost increases will not be approved.)
3. Each countermeasure included represents a minimum of 20% of the Total Project Cost.
4. All crash data is: 1) accurately shown in collision diagram(s) attached to this application; and 2) applied to countermeasures using generally accepted traffic engineering principles.
5. The agency understands the Project Delivery Requirements for the HSIP and HR3 programs and is prepared to deliver the project with these requirements;
6. The agency understands if Caltrans staff determine that any of the above requirements are not met, inaccurate, or fail to meet the program guidelines and application instructions, the application will be rejected and will not be eligible to receive federal safety funding. Due to time constraints in the evaluation process, applicants will not be notified until after the selection process is complete. Refer to Application Form Instructions for more information on "fatal flaws."

Name (Last, First): Title: Engineer License Number

Signature*:

Date:

* Note: This signature is only expected on the two hard copies of the application. The electronic copy of this PDF form must be saved in the original format (NOT a scanned copy) so the application data can be extracted.

Application Attachments [\(See Instructions\)](#)

Check all attachments included in this application.

- Vicinity map /Location map (Required)
- Project map showing existing and proposed conditions (Required)
- Collision diagram(s) (Required)
- Collision summary report / list (Required)
- TIMS output summary sheet (Required)
- Detailed Engineer's Estimate (Required)
- Warrant studies (Required when applicable to proposed improvements)
- Letter of Support from Caltrans (Required when applicable)
- Additional narration, documentation, photographs, letters of support, etc.

Application Submittal Process

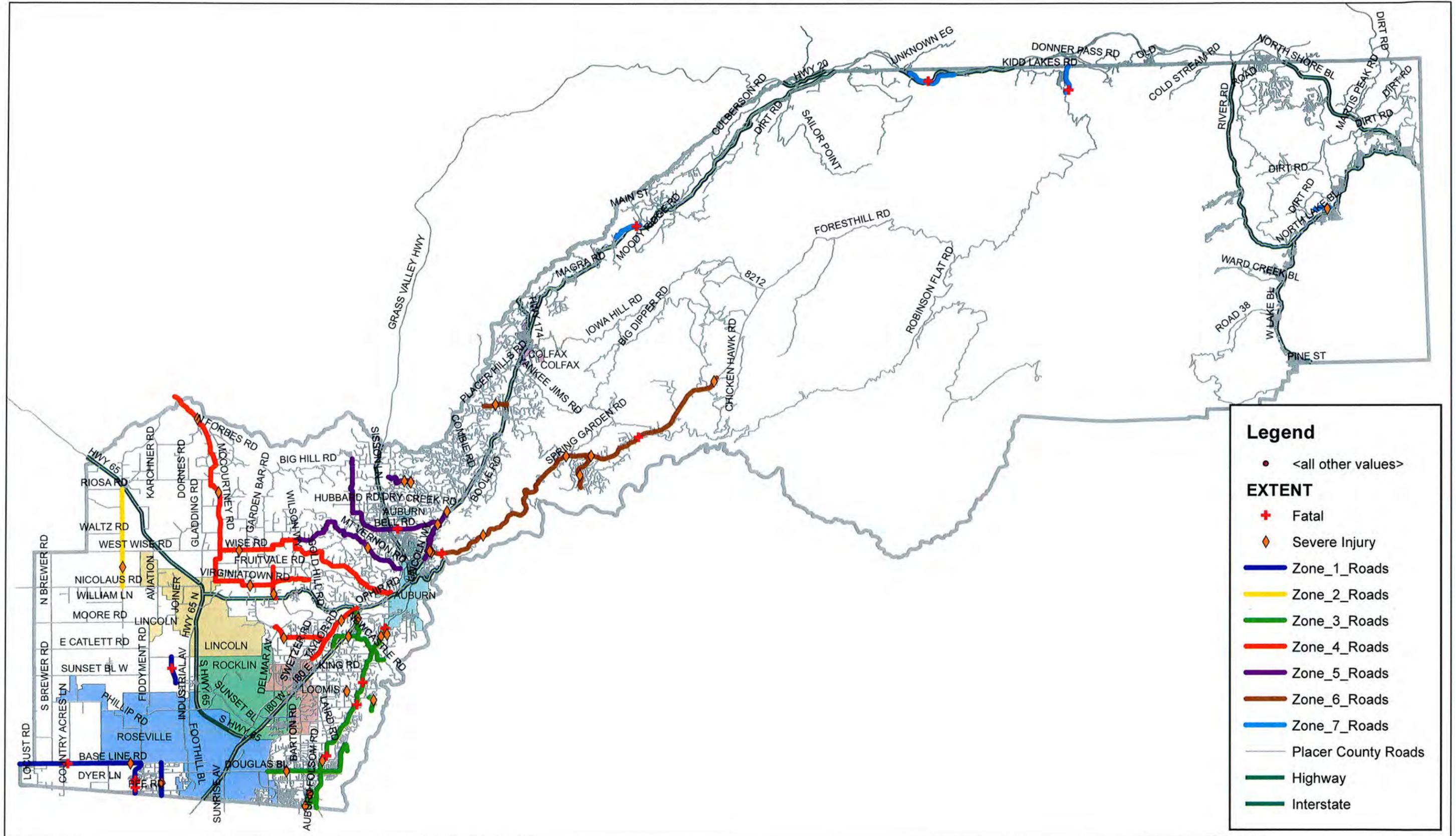
For applications to be included in the final Caltrans review, ranking and selection process, they must follow the exact submittal process identified in the application instructions. Some of the key requirements are as follows:

- 1). Submit two (2) original copies of the SIGNED application form and attachments;
- 2). On a CD or flash drive, submit electronic copies of
 - The original PDF form with application data. The file name must match the "Application ID" shown on the cover page. This file will be used to extract the application data. It can not be a scanned or printed copy.
 - Separate electronic PDF files for a scanned copy of signed application form and application attachments.
- 3) The above must be submitted to Caltrans Local Assistance [District Local Assistance Engineer \(DLAE\)](#), by Friday, July 20, 2012.

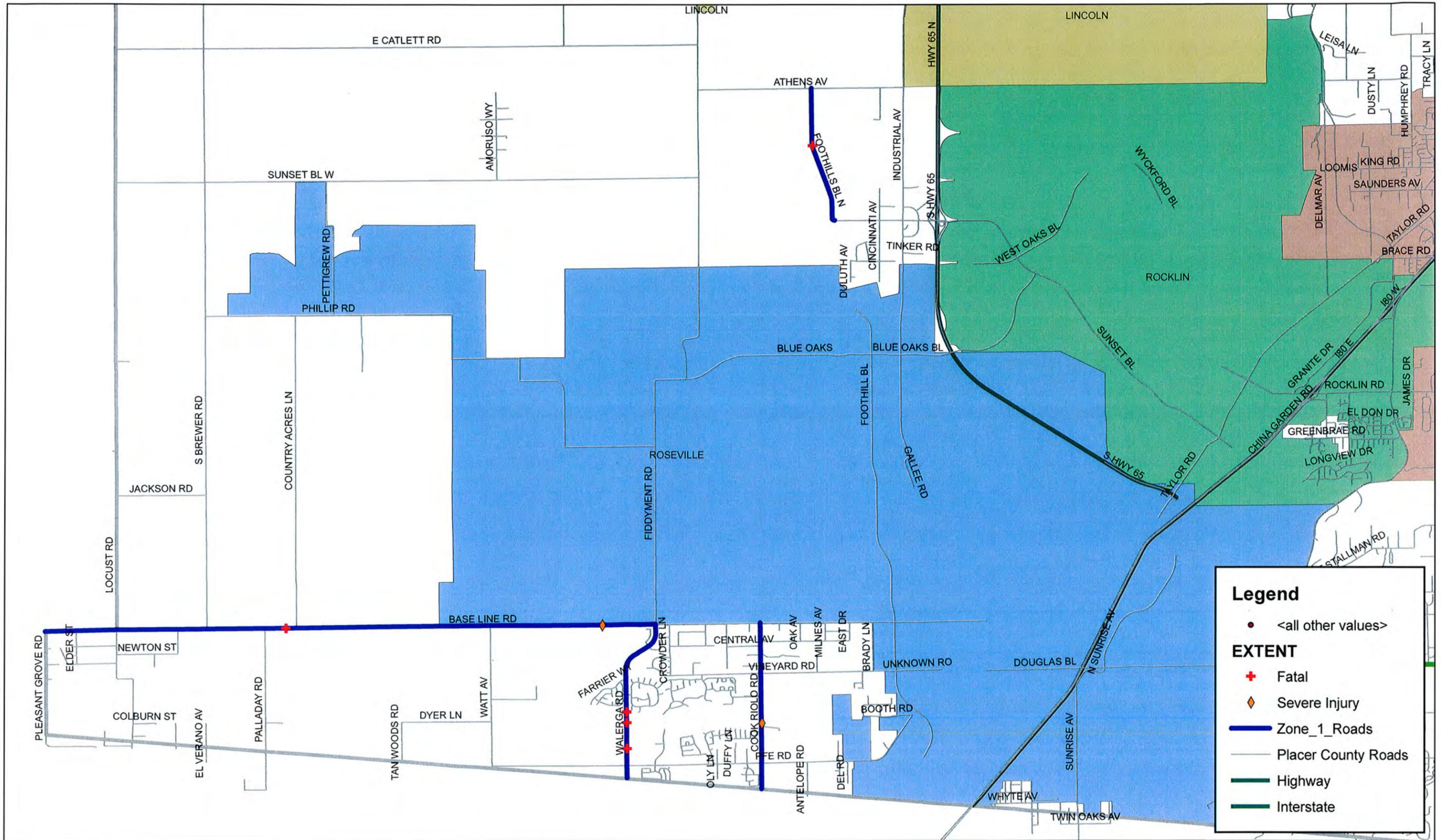
HSIP Cycle 5 Application: 03-Placer County-1

Night Time Fatal and Severe Injury Collisions

2002-2011



HSIP Cycle 5 Application: 03-Placer County-1 Zone 1 Roadways and Collisions



Legend

- <all other values>
- EXTENT**
- + Fatal
- ◇ Severe Injury
- ▬ Zone_1_Roads
- ▬ Placer County Roads
- ▬ Highway
- ▬ Interstate

HSIP Cycle 5 Application: 03-Placer County-1 Zone 2 Roadways and Collisions



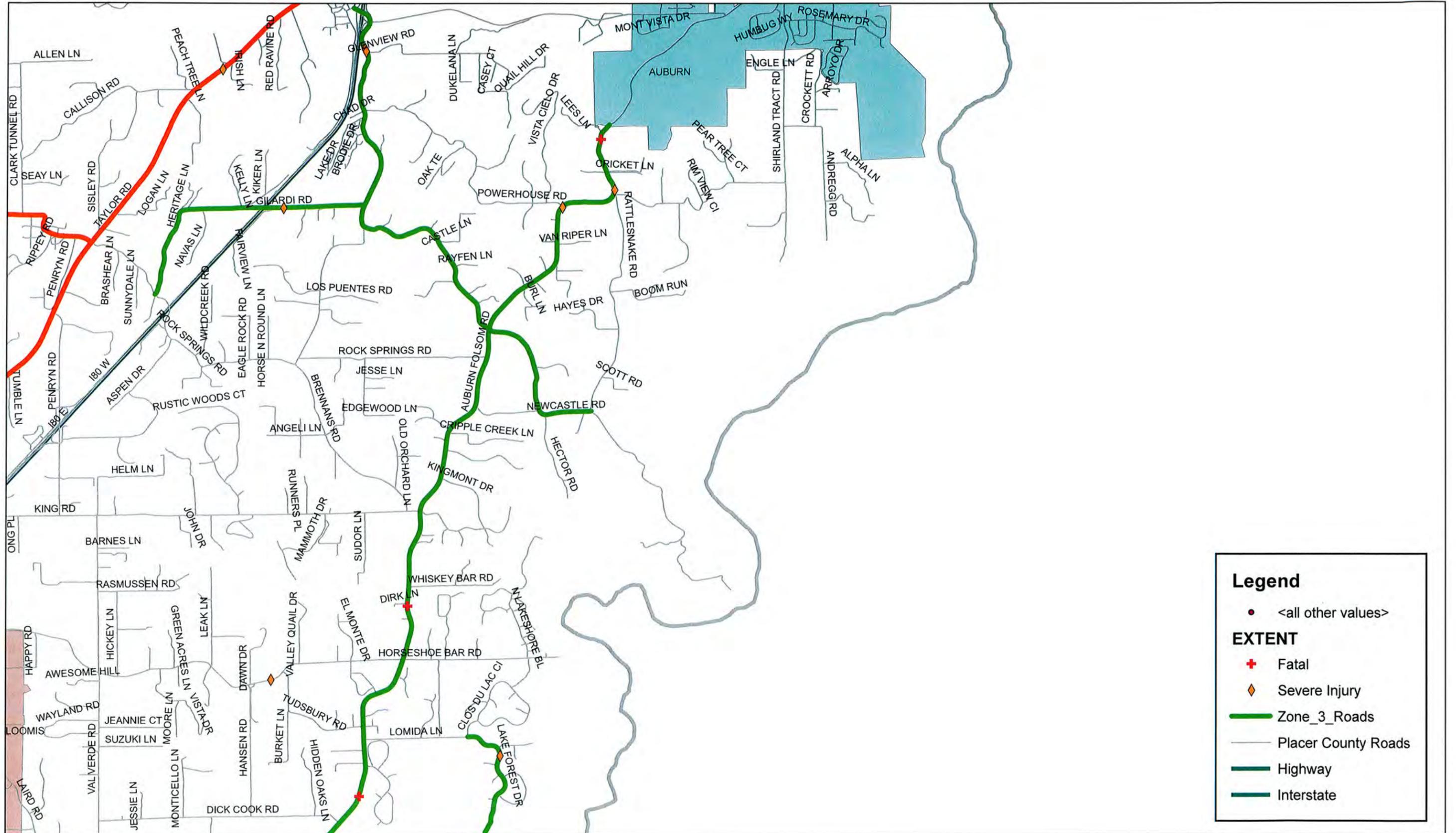
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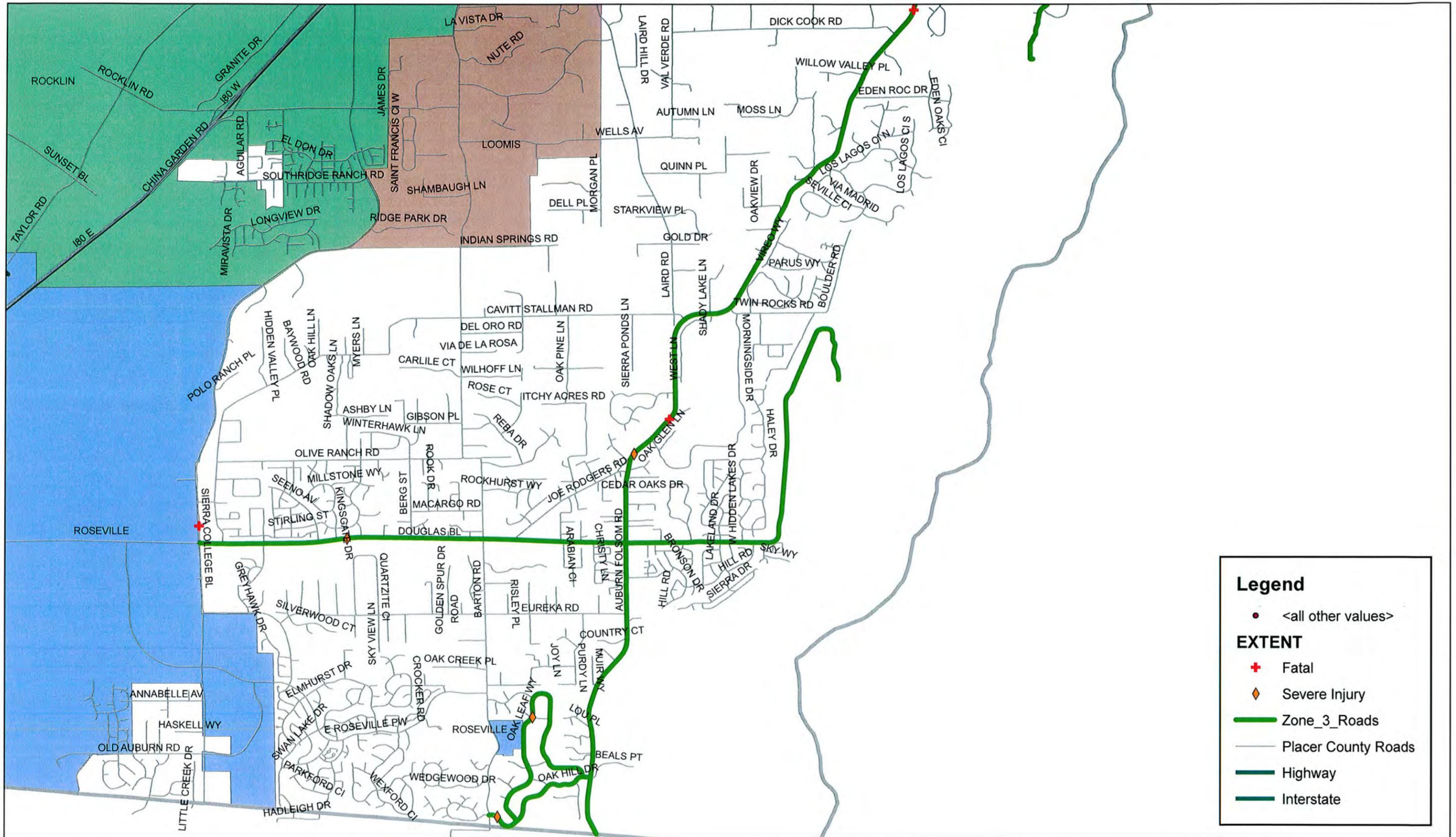
EXTENT

- ✚ Fatal
- ◆ Severe Injury
- Zone_2_Roads
- Placer County Roads
- Highway
- Interstate

HSIP Cycle 5 Application: 03-Placer County-1 Zone 3 Roadways and Collisions (Sheet 1 of 2)



HSIP Cycle 5 Application: 03-Placer County-1 Zone 3 Roadways and Collisions (Sheet 2 of 2)



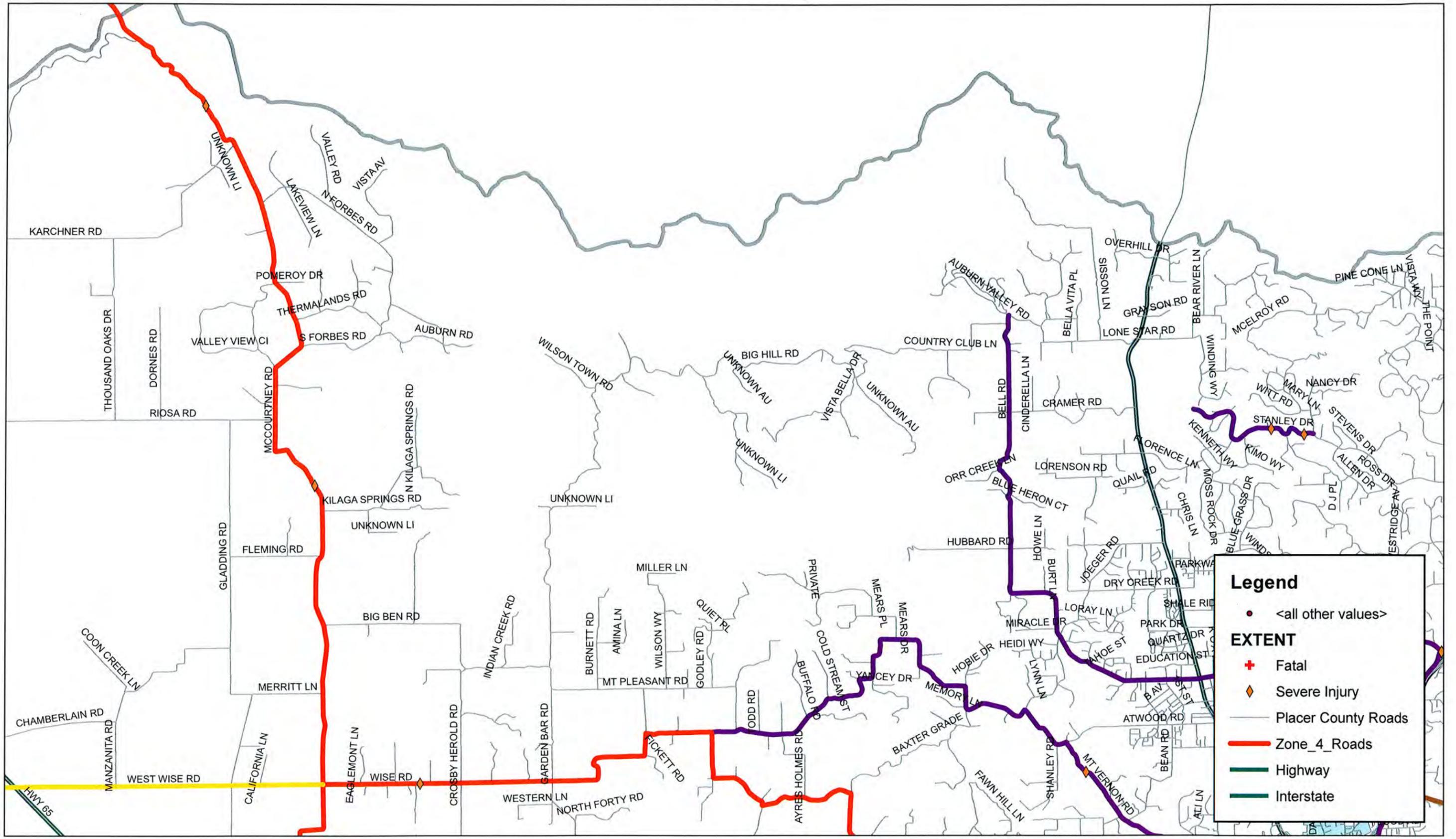
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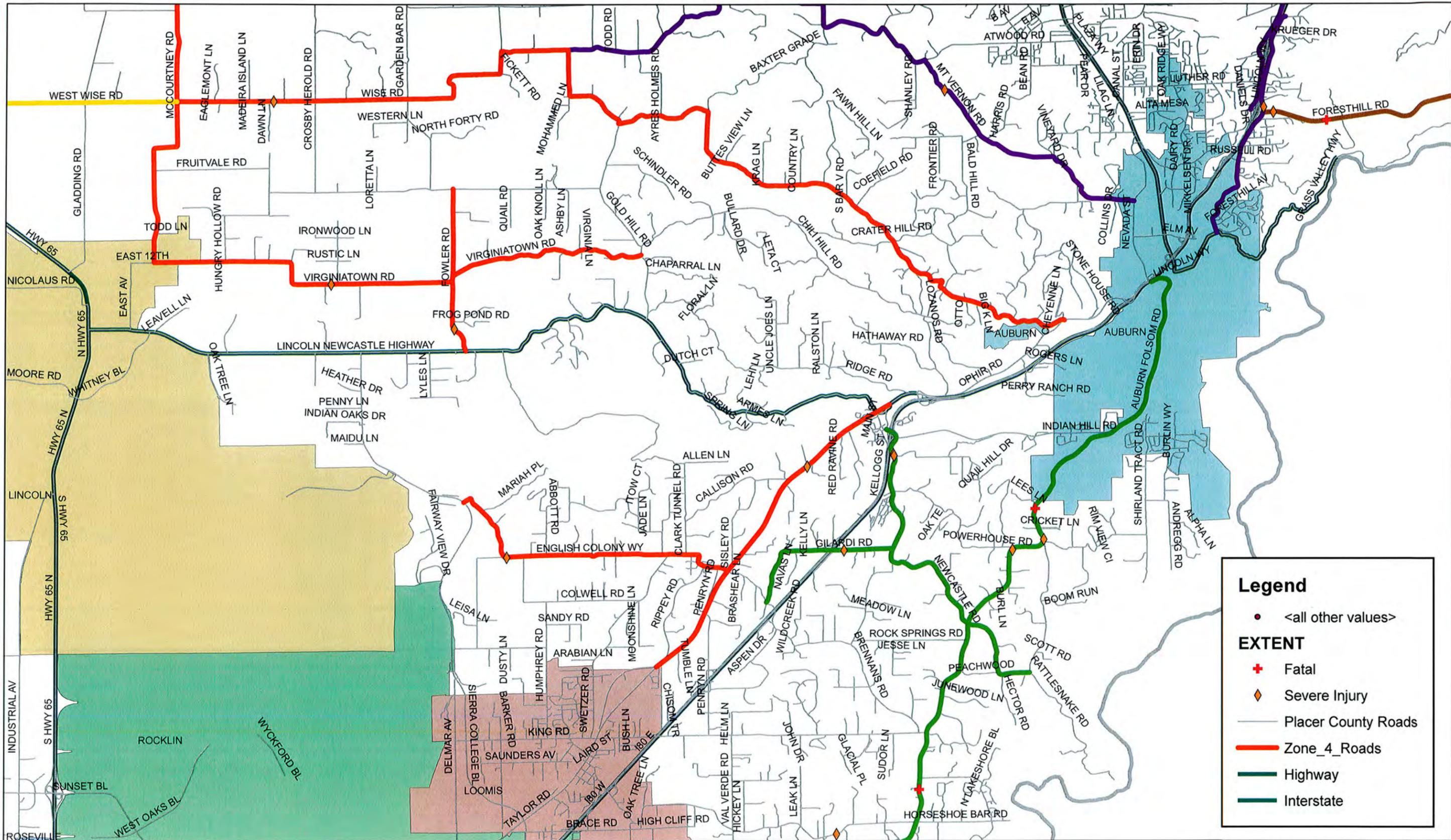
EXTENT

- ✚ Fatal
- ◆ Severe Injury
- Zone_3_Roads
- Placer County Roads
- Highway
- Interstate

HSIP Cycle 5 Application: 03-Placer County-1 Zone 4 Roadways and Collisions (Sheet 1 of 2)



HSIP Cycle 5 Application: 03-Placer County-1 Zone 4 Roadways and Collisions (Sheet 2 of 2)



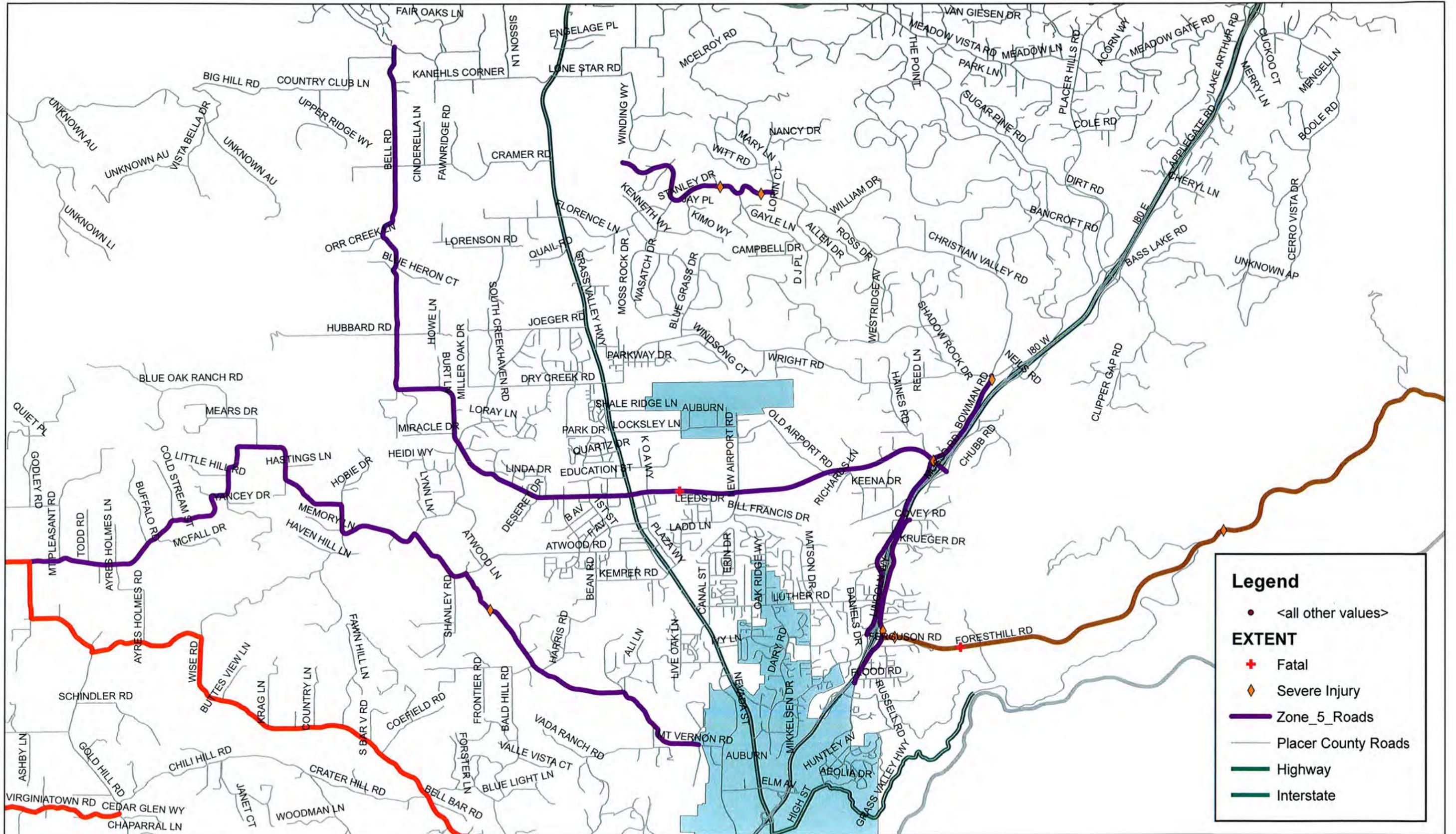
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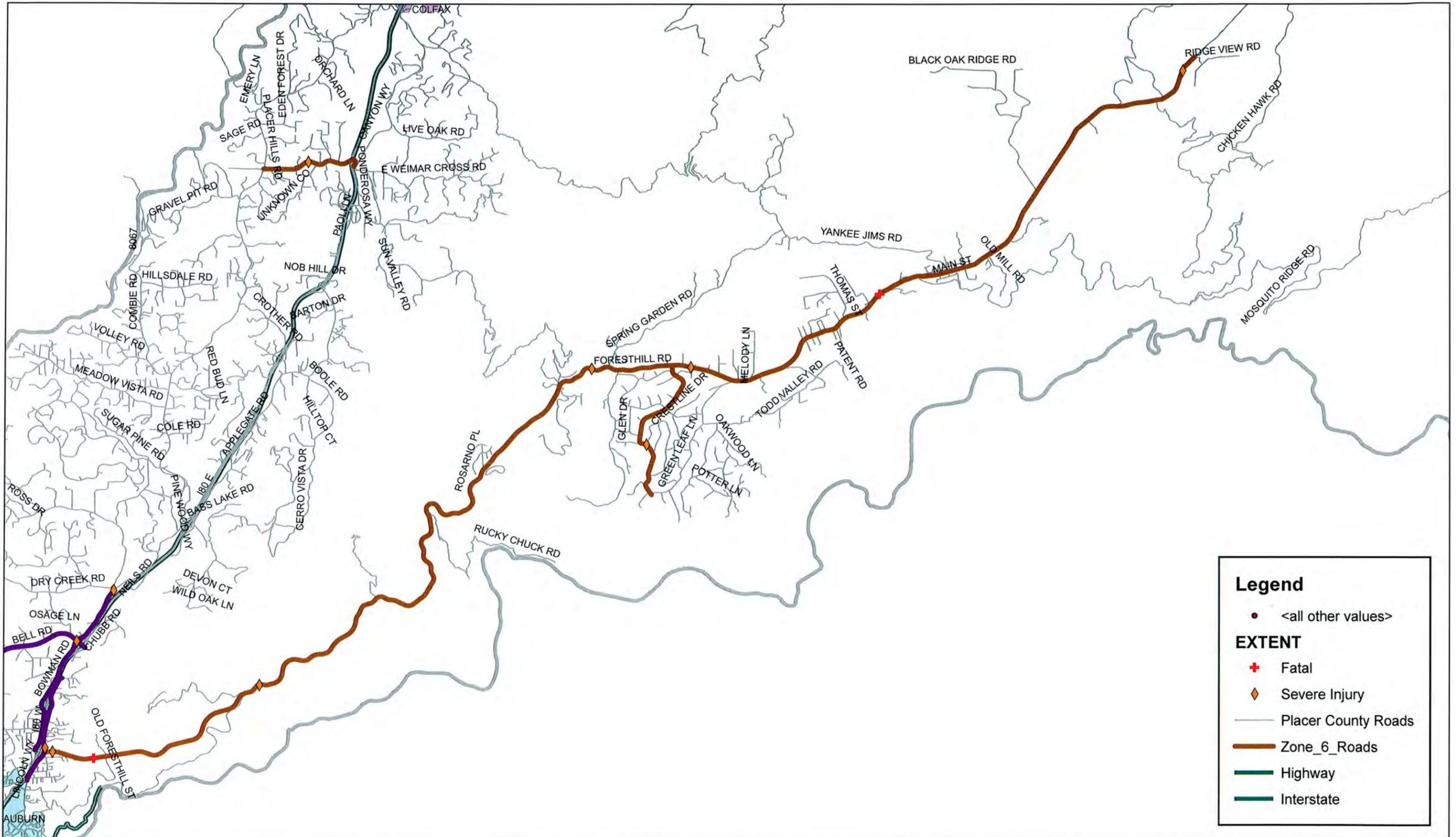
EXTENT

- ✚ Fatal
- ◆ Severe Injury
- Placer County Roads
- Zone_4_Roads
- Highway
- Interstate

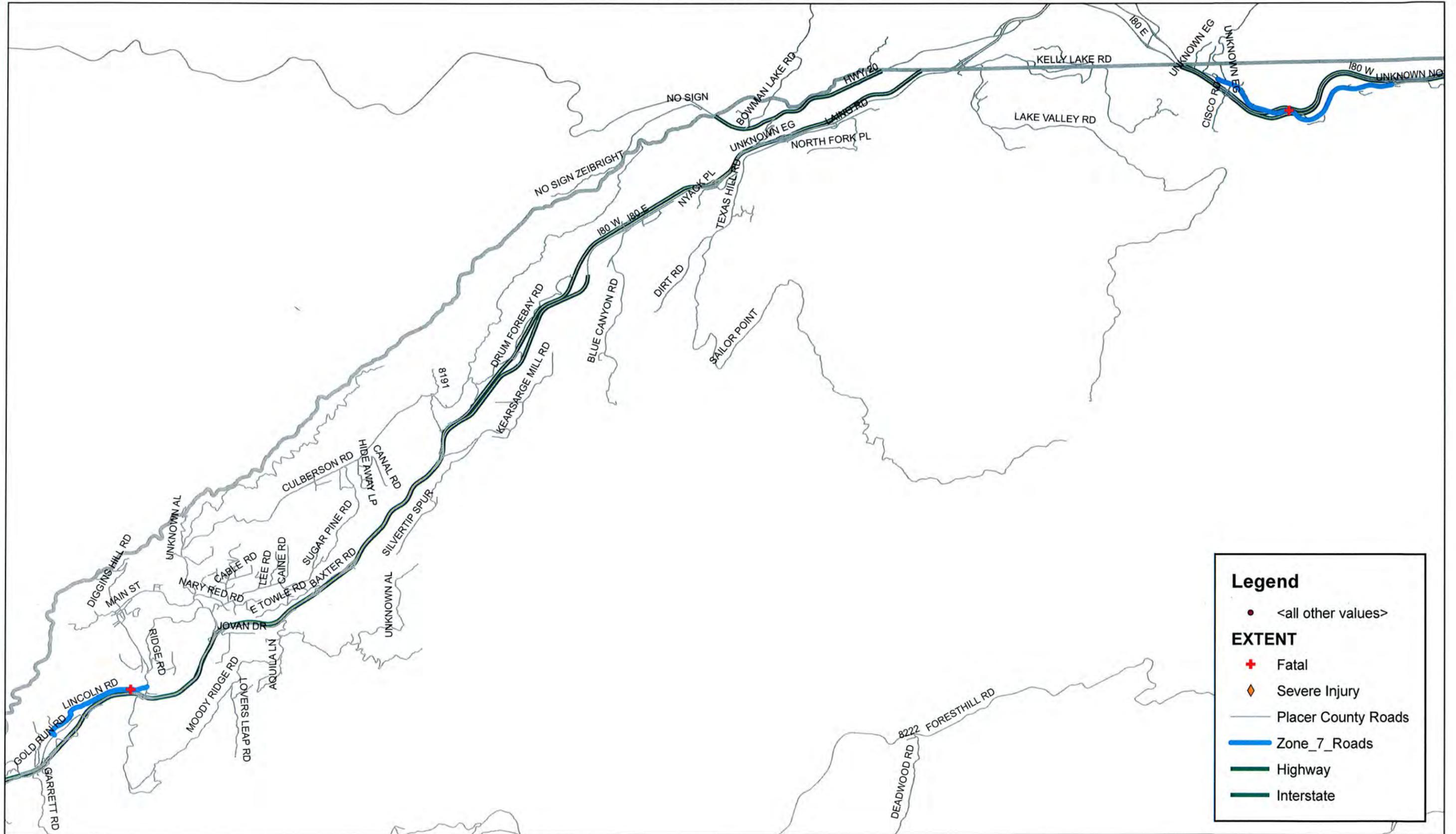
HSIP Cycle 5 Application: 03-Placer County-1 Zone 5 Roadways and Collisions



HSIP Cycle 5 Application: 03-Placer County-1 Zone 6 Roadways and Collisions



HSIP Cycle 5 Application: 03-Placer County-1 Zone 7 Roadways and Collisions (Sheet 1 of 2)



Legend

- <all other values>

EXTENT

- ✚ Fatal
- ◆ Severe Injury
- Placer County Roads
- Zone_7_Roads
- Highway
- Interstate

HSIP Cycle 5 Application: 03-Placer County-1 Zone 7 Roadways and Collisions (Sheet 2 of 2)



Legend

- <all other values>

EXTENT

- ✚ Fatal
- ◆ Severe Injury
- Placer County Roads
- Zone_7_Roads
- Highway
- Interstate

Nighttime (10 year) - Winter/Spring Collision Data

| Project Costs | | | | |
|---------------------------|----------|------|-----------|-----------|
| Item Description | Quantity | Unit | Unit Cost | Total |
| Right of Way | 0 | ACRE | \$0 | \$0 |
| Environmental | 0 | LS | \$0 | \$0 |
| Pre. Engineering (PS&E) | 1 | LS | \$30,000 | \$30,000 |
| Construction Costs | 1 | LS | \$953,100 | \$953,100 |
| Construction Inspec./Eng. | 240 | HR | \$280 | \$67,200 |

Total **\$1,050,300**
 HSIP Funding \$900,000
 Local Match and other Funds \$150,300

| Benefit/Cost Ratio | |
|---------------------|--------------|
| Benefit (annual) | \$1,581,315 |
| Benefit (Life) | \$15,813,150 |
| Project Cost | \$1,050,300 |
| Data Period [Years] | 10 |
| B/C Ratio | 15.06 |

| Counter Measures | | |
|------------------|------------|-------------|
| Description | CFR # | Reduction |
| Edgelines | R32 | 0.25 |

| Collision Information - (Nov - May) | | | | | |
|-------------------------------------|-------------------|------------|-------------|----------------------|------------------|
| Severity (HSM) | 555 Severity | Severity # | Crash Cost | Number of Collisions | Total Crash Cost |
| PDO | PDO | 0 | \$7,400 | 509 | \$3,766,600 |
| Minor Injury | Complaint of Pain | 1 | \$44,900 | 130 | \$5,837,000 |
| Injury | Other Visible | 2 | \$79,000 | 18 | \$1,422,000 |
| Severe Injury | Severe Injury | 3 | \$216,000 | 33 | \$7,128,000 |
| Fatal | Fatal | 4 | \$4,008,900 | 14 | \$56,124,600 |

\$63,252,600

**
**
**

** Not included in Benefit/Cost Calculation

| Primary Road | CL Mileage | Striping Miles | Functional Classification | Map # ID | Urban/Rural | ADT |
|--------------------|----------------|-------------------|-------------------------------|----------|-------------|-------|
| Auburn Folsom Rd | 12.01 | 40 | Major Collector | 7H54 | Urban | 25671 |
| Base Line Rd | 7.93 | 20 | Major Collector | 7H52 | Rural | 9740 |
| Bell Rd | 8.74 | 35 | Minor Arterial/Major Collecto | 7H35 | Urban | 13648 |
| Bowman Rd | 2.63 | 7 | Minor Arterial/Major Collecto | 7H35 | Urban | 3623 |
| Cook Riolo Rd | 1.88 | 6 | Major Collector | 7J12 | Urban | 1746 |
| Douglas Bl | 4.06 | 16 | Major Collector | 7J14, 13 | Urban | 35400 |
| English Colony Wy | 3.38 | 13 | Minor Collector | 7H43 | Rural | 1590 |
| Foothills Bl N | 1.567 | 6 | Local | 7H52 | Rural | 1000 |
| Foresthill Rd | 21.39 | 120 | Major Collector | 7H34 | Rural | 5076 |
| Fowler Rd | 1.85 | 7.3 | Minor Collector | 7H34 | Rural | 1877 |
| Gilardi Rd | 1.8 | 0.44 | Local | 7H44 | Rural | 587 |
| Hampshire Rocks Rd | 3.05 | 6.1 | Minor Collector | 8G45 | Rural | 1000 |
| Happy Pines Dr | 2.39 | 4.7 | Local | 8G | Rural | 1115 |
| Lake Forest Dr | 0.69 | 2.5 | Major Collector | 9G54 | Urban | 2930 |
| Lincoln Rd | 1.71 | 0.15 | Local | 8G52 | Rural | 137 |
| Lincoln Wy | 1.59 | 6.4 | Minor Arterial/Major Collecto | 7H35 | Urban | 6499 |
| Mccourtney Rd | 11.39 | 34.7 | Major Collector | 7H43 | Rural | 1902 |
| Mt Vernon Rd | 8.25 | 27.8 | Major Collector | 7H34 | Rural/Urban | 1603 |
| N Dowd Rd | 5.53 | 11 | Minor Collector | 7H42 | Rural | 2294 |
| Newcastle Rd | 3.97 | 11.5 | Minor Collector | 7H44 | Rural | 1891 |
| Oak Hill Dr | 0.93 | 3.7 | Local | 7J14 | Urban | 1295 |
| Oak Leaf Wy | 1.95 | 7.8 | Local | 7J14 | Urban | 135 |
| Polaris Rd | 0.9 | 1.5 | Local | 9G54 | Urban | 194 |
| Soda Springs Rd | | 1.4 | Minor Collector | 9G | Rural | 447 |
| Stanley Dr | 1.02 | 4 | Minor Collector | 7H35 | Rural | 847 |
| Sunset Bl W | 6.5 | 17.5 | Minor Collector | 7H52 | Rural | 637 |
| Taylor Rd | 3.97 | 15.6 | Major Collector | 7H54,44 | Rural/Urban | 4514 |
| Virginiatown Rd | 5.41 | 10 | Local | 7H43 | Rural | 1136 |
| W Weimar Cross Rd | 1.49 | 6 | Major Collector | 8H21 | Rural | 4601 |
| Walerga Rd | 1.73 | 5 | Minor Arterial | 7J12 | Rural/urban | 9370 |
| Wise Rd | 13.06 | 49 | Minor Collector | 7H | Rural | 1057 |
| West Wise | | 13.4 | Major/Minor Collector | 7H/7H44 | Rural | 1419 |
| Total | 142.767 | 460.29 | | | | |

Night Time Collisions (2002 - 2011)
Fatal and Severe Injury Only

Data Removed from B/C calculation - included in separate HSIP Cycle 5 application (03-Placer County-3)

| # | REPNO | DATE | TIME | PRIMARY ROADWAY | COLL_TYPE | INVOLVED | EXTENT | PCF | LIGHTING | # INJ | # KLD | MPC1 | MPC2 |
|----|-------------|------------|----------|--------------------|----------------|---------------------|---------------|-------------------------|-------------------------|-------|-------|--------------------------|-----------------------|
| 1 | 03/2002-100 | 3/19/2002 | 6:20 PM | Base Line Rd | Head-On | Other Motor Vehicle | Fatal | Improper Passing | Dusk - Dawn | 3 | 1 | Crossed Into Opp.Ln | Proceeding Straight |
| 2 | 11/2003-195 | 11/28/2003 | 8:40 PM | Auburn Folsom Rd | Head-On | Other Motor Vehicle | Fatal | Wrong Side of Road | Dark - No Street Lights | 1 | 1 | Crossed Into Opp.Ln | Proceeding Straight |
| 3 | 04/2005-155 | 4/24/2005 | 7:25 PM | Walerga Rd | Head-On | Other Motor Vehicle | Fatal | Wrong Side of Road | Dusk - Dawn | 1 | 1 | Passing Other Vehicle | Proceeding Straight |
| 4 | 04/2006-62 | 4/14/2006 | 7:20 PM | Auburn Folsom Rd | Head-On | Other Motor Vehicle | Fatal | DUI | Dusk - Dawn | 3 | 3 | Passing Other Vehicle | Proceeding Straight |
| 5 | 11/2009-001 | 11/1/2009 | 1:15 AM | Base Line Rd | Head-On | Other Motor Vehicle | Fatal | DUI | Dark - No Street Lights | 3 | 1 | Crossed Into Opp.Ln | Proceeding Straight |
| 6 | 04/2002-111 | 4/20/2002 | 11:31 PM | Auburn Folsom Rd | Hit Object | Fixed Object | Fatal | Unsafe Speed | Dark - No Street Lights | 0 | | Ran Off Road | |
| 7 | 05/2003-99 | 5/17/2003 | | Walerga Rd | Hit Object | Fixed Object | Fatal | | Dark - No Street Lights | 0 | | Proceeding Straight | |
| 8 | 03/2005-82 | 3/19/2005 | 9:20 PM | Walerga Rd | Hit Object | Fixed Object | Fatal | Improper Turning | Dark - No Street Lights | 1 | 2 | Ran Off Road | |
| 9 | 3/2007-19T | 3/16/2007 | 25:00:00 | Hampshire Rocks Rd | Hit Object | Fixed Object | Fatal | | Dark - No Street Lights | 0 | 1 | Proceeding Straight | |
| 10 | 4015165 | 12/27/2008 | 10:25 PM | Foresthill Rd | Hit Object | Fixed Object | Fatal | DUI | Dark - No Street Lights | 0 | 1 | Other Unsafe Turning | |
| 11 | 05/2009-108 | 5/22/2009 | 1:35 AM | Auburn Folsom Rd | Hit Object | Fixed Object | Fatal | DUI | Dark - No Street Lights | 2 | 1 | Ran Off Road | |
| 12 | 05/2011-112 | 5/26/2011 | 3:00 AM | Foothills Bl N | Hit Object | Fixed Object | Fatal | Improper Turning | Dark - No Street Lights | 0 | 2 | Proceeding Straight | |
| 13 | 01/2006-54 | 1/29/2006 | 7:40 PM | Lincoln Rd | Overturned | Non-Collision | Fatal | DUI | Dark - No Street Lights | 1 | 1 | Ran Off Road | |
| 14 | 03/2004-114 | 3/18/2004 | 8:04 PM | Bell Rd | Vehicle - Ped. | Pedestrian | Fatal | Pedestrian Violation | Dark - No Street Lights | 0 | 1 | Proceeding Straight | Not Stated |
| 15 | 3/2008-19 | 3/5/2008 | 9:58 PM | Foresthill Rd | Vehicle - Ped. | Pedestrian | Fatal | Pedestrian Violation | Dark - Street Lights | 0 | 1 | Proceeding Straight | Not Applicable - Ped |
| 16 | 12/2002-40 | 12/9/2002 | 6:30 PM | Foresthill Rd | Head-On | Other Motor Vehicle | Severe Injury | Unsafe Speed | Dark - No Street Lights | 3 | 0 | Crossed Into Opp.Ln | Proceeding Straight |
| 17 | 04/2005-103 | 4/17/2005 | 8:25 PM | Newcastle Rd | Head-On | Other Motor Vehicle | Severe Injury | | Dark - No Street Lights | 2 | 0 | Crossed Into Opp.Ln | Proceeding Straight |
| 18 | 12/2007-122 | 12/20/2007 | 6:40 PM | Sunset Bl W | Head-On | Other Motor Vehicle | Severe Injury | Improper Passing | Dark - No Street Lights | 2 | 0 | Proceeding Straight | Passing Other Vehicle |
| 19 | 01/2003-19 | 1/4/2003 | 12:43 AM | Auburn Folsom Rd | Head-On | Other Motor Vehicle | Severe Injury | | Dark - No Street Lights | 2 | 0 | Crossed Into Opposing Ln | Proceeding Straight |
| 20 | 01/2010-068 | 1/16/2010 | 5:13 AM | Base Line Rd | Head-On | Other Motor Vehicle | Severe Injury | Wrong Side of Road | Dark - No Street Lights | 3 | 0 | Proceeding Straight | Traveling Wrong Way |
| 21 | 01/2010-069 | 1/16/2010 | 5:14 AM | Base Line Rd | Head-On | Other Motor Vehicle | Severe Injury | Unsafe Speed | Dark - No Street Lights | 2 | 0 | Stopped In Road | Proceeding Straight |
| 22 | 05/2002-24 | 5/5/2002 | 8:10 PM | Foresthill Rd | Hit Object | Fixed Object | Severe Injury | Wrong Side of Road | Dark - No Street Lights | 2 | 0 | Ran Off Road | |
| 23 | 05/2002-54 | 5/10/2002 | 11:15 PM | Gilardi Rd | Hit Object | Fixed Object | Severe Injury | Unsafe Speed | Dark - No Street Lights | 1 | | Ran Off Road | |
| 24 | 05/2002-123 | 5/22/2002 | 5:20 AM | N Dowd Rd | Hit Object | Other Object | Severe Injury | Unsafe Speed | Dusk - Dawn | 1 | | Ran Off Road | |
| 25 | 02/2003-86 | 2/18/2003 | 10:00 PM | Foresthill Rd | Hit Object | Fixed Object | Severe Injury | Unsafe Speed | Dark - No Street Lights | 1 | 0 | Ran Off Road | |
| 26 | 11/2003-155 | 11/21/2003 | 10:15 PM | Virginiatown Rd | Hit Object | Fixed Object | Severe Injury | Unsafe Speed | Dark - No Street Lights | 0 | 0 | Other Unsafe Turning | |
| 27 | 12/2003-51 | 12/9/2003 | 4:30 AM | Taylor Rd | Hit Object | Other Object | Severe Injury | Improper Turning | Dark - No Street Lights | 3 | 0 | Ran Off Road | |
| 28 | 1767714 | 12/2/2004 | 9:40 PM | Mccourtney Rd | Hit Object | Fixed Object | Severe Injury | Driving Under Influence | Dark - No Street Lights | 1 | 0 | Ran Off Road | |
| 29 | 02/2006-56 | 2/10/2006 | 8:28 PM | Cook Riolo Rd | Hit Object | Fixed Object | Severe Injury | DUI | Dark - No Street Lights | 4 | 0 | Ran Off Road | |
| 30 | 4/2007-61 | 4/16/2007 | 1:05 AM | Happy Pines Dr | Hit Object | Fixed Object | Severe Injury | DUI | Dark - No Street Lights | 2 | 0 | Ran Off Road | |
| 31 | 12/2007-84 | 12/15/2007 | 0:20:00 | Oak Leaf Wy | Hit Object | Fixed Object | Severe Injury | | Dark - No Street Lights | 1 | 0 | Ran Off Road | |
| 32 | 03/2008-094 | 3/26/2008 | 8:55 PM | Lake Forest Dr | Hit Object | Fixed Object | Severe Injury | DUI | Dark - No Street Lights | 2 | 0 | Ran Off Road | |
| 33 | 5/2008-24 | 5/11/2008 | 3:10 AM | Foresthill Rd | Hit Object | Fixed Object | Severe Injury | DUI | Dark - No Street Lights | 1 | 0 | Ran Off Road | |
| 34 | 11/2008-104 | 11/21/2008 | 8:30 PM | Mt Vernon Rd | Hit Object | Fixed Object | Severe Injury | DUI | Dark - No Street Lights | 3 | 0 | Other Unsafe Turning | |
| 35 | 11/2008-118 | 11/26/2008 | 12:08 AM | Stanley Dr | Hit Object | Fixed Object | Severe Injury | DUI | Dark - Street Lights | 2 | 0 | Ran Off Road | |

| | | | | | | | | | | | | | |
|----|--------------|------------|----------|-------------------|----------------------|---------------|---------------|-------------------------|-------------------------|---|---|----------------------|----------------------|
| 36 | 12/2009-058 | 12/11/2009 | 10:50 PM | Douglas Bl | Hit Object | Fixed Object | Severe Injury | DUI | Dark - Street Lights | 1 | 0 | Proceeding Straight | |
| 37 | 04/2010-085 | 4/24/2010 | 12:15 AM | Oak Hill Dr | Hit Object | Fixed Object | Severe Injury | Improper Turning | Dark - No Street Lights | 1 | 0 | Other | |
| 38 | 11/2010-061 | 11/13/2010 | 12:10 AM | Wise Rd | Hit Object | Fixed Object | Severe Injury | Improper Turning | Dark - No Street Lights | 1 | 0 | Ran Off Road | |
| 39 | 01/2011-031 | 1/6/2011 | 8:30 PM | Stanley Dr | Hit Object | Fixed Object | Severe Injury | Improper Turning | Dark - No Street Lights | 2 | 0 | Other Unsafe Turning | |
| 40 | 03/2011-097 | 3/22/2011 | 1:00 AM | Fowler Rd | Hit Object | Fixed Object | Severe Injury | DUI | Dark - No Street Lights | 1 | 0 | Other Unsafe Turning | |
| 41 | 04/2005-35 | 4/7/2005 | 5:20 AM | Auburn Folsom Rd | Hit Object | Fixed Object | Severe Injury | Unsafe Speed | Dark - No Street Lights | 1 | 0 | Proceeding Straight | |
| 42 | 1785115 | 12/7/2004 | 8:30 PM | Base Line Rd | Hit Object | Fixed Object | Severe Injury | Unsafe Speed | Dark - No Street Lights | 2 | 0 | Ran Off Road | |
| 43 | 11/2002-54 | 11/9/2002 | 2:20 AM | Bowman Rd | Hit Object | Fixed Object | Severe Injury | Wrong Side of Road | Dark - No Street Lights | 2 | 0 | Ran Off Road | |
| 44 | 02/2003-114 | 2/21/2003 | 10:25 PM | English Colony Wy | Overtuned | Non-Collision | Severe Injury | Unsafe Speed | Dark - No Street Lights | 2 | 0 | Proceeding Straight | |
| 45 | 05/2003-11 | 5/2/2003 | 9:00 PM | W Weimar Cross Rd | Overtuned | Non-Collision | Severe Injury | Driving Under Influence | Dark - No Street Lights | 1 | 0 | Ran Off Road | |
| 46 | 05/2004-177 | 5/29/2004 | 10:50 PM | Lincoln Wy | Overtuned | Non-Collision | Severe Injury | Auto R/W Violation | Dark - Street Lights | 1 | 0 | Proceeding Straight | Entering Traffic |
| 47 | 11/2007-23 | 11/21/2007 | 5:00 PM | Soda Springs Rd | Overtuned | Non-Collision | Severe Injury | Other Improper Driving | Dusk - Dawn | 1 | 0 | Ran Off Road | |
| 48 | 12/2010-052 | 12/8/2010 | 6:00 PM | Foresthill Rd | Overtuned | Non-Collision | Severe Injury | Unsafe Speed | Dark - No Street Lights | 1 | 0 | Ran Off Road | |
| 49 | 02/2006-127 | 2/26/2006 | 9:05 PM | Mccourtney Rd | Vehicle - Ped. | Non-Collision | Severe Injury | Other Than Driver | Dark - No Street Lights | 1 | 0 | Proceeding Straight | Not Stated |
| 50 | 05/2008-015T | 5/3/2008 | 5:21 AM | Polaris Rd | Vehicle - Ped. | Pedestrian | Severe Injury | Pedestrian Violation | Dark - No Street Lights | 1 | 0 | Proceeding Straight | Not Applicable - Ped |
| 51 | 03/2010-117 | 3/31/2010 | 7:56 PM | Bell Rd | Vehicle - Pedestrian | Pedestrian | Severe Injury | Pedestrian Violation | Dark - Street Lights | 1 | 0 | Proceeding Straight | Proceeding Straight |

Benefit / Cost Calculation Result

1. Project Information

Application ID 03-Placer County-1 Version 2

2. Countermeasures and Crash Data

• Install edge-lines and centerlines

| CM Number | Project Type | Crash Type | CRF | Life |
|-----------|---------------------|------------|-----|------|
| R32 | Operation / Warning | All | 25 | 10 |

| Crash Type | Fatality (Death) | Severe Injury | Injury - Other Visible | Injury - Complaint of Pain | Property Damage Only | Total |
|------------|------------------|---------------|------------------------|----------------------------|----------------------|-------|
| All | 14 | 33 | 0 | 0 | 0 | 47 |

| | |
|----------------|--------------|
| Annual Benefit | \$1,581,315 |
| Life Benefit | \$15,813,150 |
| Cost | \$ 1,050,300 |
| B/C Ratio | 15.06 |

3. Benefit Cost Result

| | |
|---------------|--------------|
| Total Benefit | \$15,813,150 |
| Total Cost | \$1,050,300 |
| B/C Ratio | 15.06 |

Safety Practitioner / Engineer: Stephanie Holloway

Signature: *Stephani Holloway*

By signing this B/C Calculation Result, you are attesting to your authority / responsibility at your local agency for this work and you are attesting to the accuracy of the values on this page and that they have been entered into the HSIP Application Form correctly, **DO NOT SIGN** if any of this is not the case.

Detailed Engineer's Estimate

For Construction Items Only

| Agency | Placer County | Application ID: 03-Placer County-1 | Date: 7/10/2012 | | |
|---------------------|--|------------------------------------|-----------------|-----------|------------------|
| Project Description | Installation of new pavement markings utilizing an all weather, high build paint and optical elements to increase retroreflectivity during nighttime and inclement weather time of the year. | | | | |
| Project Location | Various locations throughout Placer County, a systematic application of the entire County roadway network. | | | | |
| Prepared by | Stephanie Holloway | | | | |
| Item No. | Item Description | Quantity | Units | Unit Cost | Total |
| 1 | Highway Striper Lease Rental | 480 | HR | \$260 | \$124,800 |
| 2 | High Build Paint and Beads | 2,428,800 | LF | \$0.25 | \$607,200 |
| 3 | Traffic Control | 960 | HR | \$70 | \$67,200 |
| 4 | County Crew Labor | 960 | HR | \$70 | \$67,200 |
| | Subtotal | | | | \$866,400 |
| | Contingency (10%) | | | | \$86,700 |
| TOTAL: | | | | | \$953,100 |