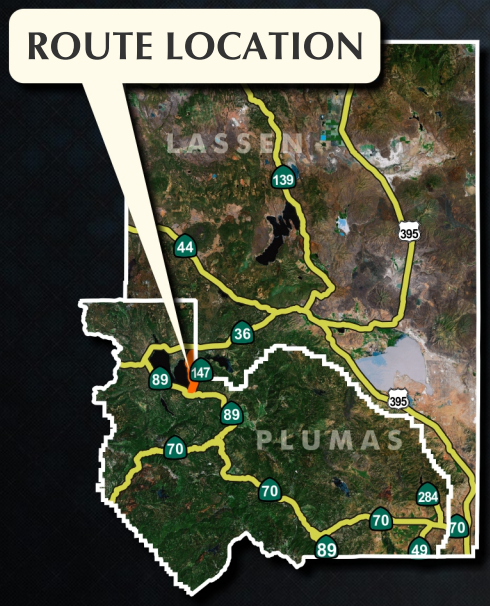
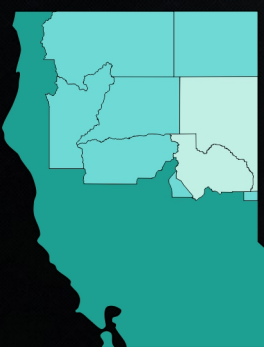
JUNE 2016

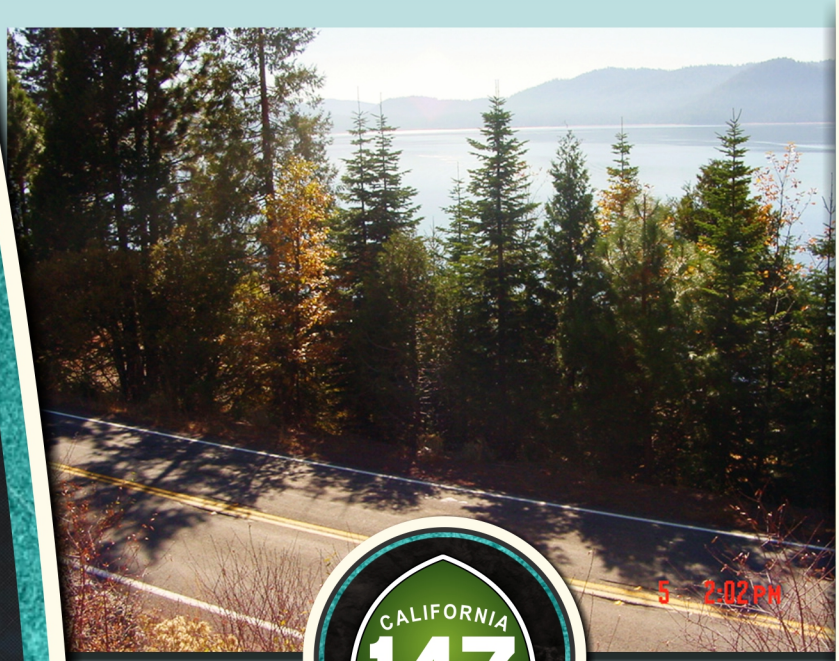
California State Route 147 Transportation Concept Report

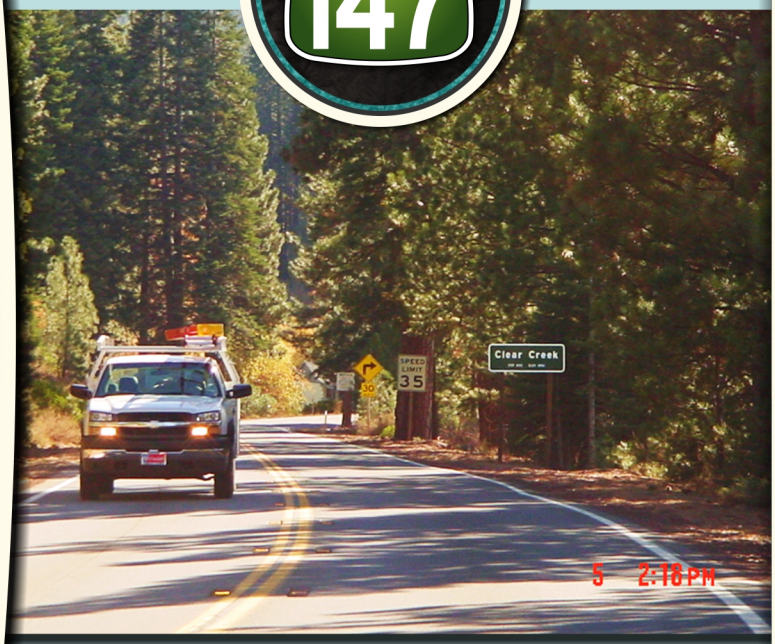


District 2



SYSTEM PLANNING





2016 Re-validation

To meet requirements of the Department of Finance and agreed to by Caltrans management; a comprehensive update of the 2009 version of this Transportation Concept Report for State Route (SR) 147 was considered but set aside. Data and conclusions in the TCR were evaluated against conditions in 2016. This review found that development and population growth rates in the vicinity of SR 147 since 2009 have been lower than projected. In particular, the Dyer Mountain Resort project has been abandoned and the subject property sold to a timber management company. Overall, however, there is still substantial property available and designated for development in the SR 147 area. Hence, the long-term potential level of development and transportation system improvement needs appear to still be substantially the same as described in the TCR (see Executive Summary, pages 1-2) but the time horizon may be somewhat longer. District staff have determined that best use of public resources is to re-validate the TCR at the present time, delaying a more comprehensive update until it can be determined if current (lower) development trends are likely to remain the norm.

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Transportation Concept Report
State Route 147

May 2009

California Department of Transportation
District 2

In partnership with Plumas and Lassen Regional Transportation Planning Agencies.

Additional Information

For additional information on the Transportation Concept Report for State Route 147, please contact:

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Office of System Planning
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Department of Transportation
Attn: Equal Employment Opportunity Officer
1657 Riverside Drive, Redding, CA 96001
P.O. Box 496073, Redding, CA 96049-6073
(530) 225-3055 Voice, 711 TTY

REPORT SIGNATURE SHEET (1 of 2)

TRANSPORTATION CONCEPT REPORT – STATE ROUTE 147

PREPARED BY:

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Date

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Caltrans, District 2

REPORT SIGNATURE SHEET (2 of 2)

TRANSPORTATION CONCEPT REPORT – STATE ROUTE 147

APPROVED BY:

JOHN BULINSKI District Director Caltrans, District 2	7/13/09 Date

CONCURRENCE BY:

MARTIN BYRNE Executive Director Plumas County Transportation Commission	08-10-09 Date
LARRY MILLAR Executive Secretary Lassen County Transportation Commission	7/24/09 Date

RESOLUTION NO. 09-12

RESOLUTION OF THE PLUMAS COUNTY TRANSPORTATION COMMISSION CONCURRING WITH THE TRANSPORTATION CONCEPT REPORT FOR STATE ROUTE 147

WHEREAS, the Plumas County Transportation Commission (PCTC) is the Regional Transportation Planning Agency for Plumas County and is responsible for regional transportation planning, which includes the functional relationship between the local road system and state highway system; and

WHEREAS, the California Department of Transportation (Caltrans), District 2, is responsible for planning, construction, and operation of the state highway system, which includes the functional relationship between the state highway system and local road system; and

WHEREAS, Caltrans, District 2, in cooperation with the PCTC has prepared a Transportation Concept Report for State Route 147 which sets forth a conceptual plan for the development and operation of the highway for the next twenty years; and

WHEREAS, preparation of the State Route 147 Transportation Concept Report also involved local elected officials, city and county staff, community organizations, state and federal agencies, tribal governments, the general public, and many other organizations; and

WHEREAS, the State Route 147 Transportation Concept Report identifies conceptual improvements that could be undertaken over the twenty year planning horizon; and

WHEREAS, the State Route 147 Transportation Concept Report also identifies improvements on or near the state highway system that may facilitate regional or local development, improve local circulation and enhance quality of life; and

WHEREAS, implementation of many of the improvements identified in the State Route 147 Transportation Concept Report will require funding and delivery partnerships between Caltrans, District 2, and its local and regional partners.

NOW, THEREFORE, BE IT RESOLVED by the PCTC, this 18th day of May, 2009, that:

1. The State Route 147 Transportation Concept Report presents a balanced and logical concept for the development and operation of State Route 147 over the next twenty years.

2. The State Route 147 Transportation Concept Report should be considered during preparation of the Regional Transportation Improvement Program, Interregional Transportation Improvement Program, and other plans and funding programs.

3. The Executive Director is hereby authorized to sign the "Concurrence" block on the signature sheet for the State Route 147 Transportation Concept Report.

Passed and Adopted by the Plumas County Transportation Commission by the following vote:

AYES: Commissioner: Kennedy, Olsen, Wilson & Meacher

NOES: Commissioner: None

ABSENT: Commissioner: Larrieu & Scarlett

Chairman, Plumas County Transportation Commission

ATTEST:

Martin J. Byrne, Executive Director

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LASSEN COUNTY TRANSPORTATION COMMISSION
Resolution 09-05

Concurring With the Transportation Concept Report for State Route 147

WHEREAS, the Lassen County Transportation Commission is the Regional Transportation Planning Agency for Lassen County and is responsible for regional transportation planning, which includes the functional relationship between the local road system and State Highway system; and

WHEREAS, the California Department of Transportation (Caltrans), District 2, is responsible for the planning, construction, and operation of the State Highway system, which includes the functional relationship between the state highway system and local road system; and

WHEREAS, Caltrans, District 2, in cooperation with the Lassen County Regional Transportation Planning Agency has prepared a Transportation Concept Report for State Route 147 which sets forth a conceptual plan for the development and operation of the highway for the next twenty years; and

WHEREAS, preparation of the State Route 147 Transportation Concept Report also involved local elected officials, city and county staff, community organizations, state and federal agencies, tribal governments, the general public, and many other organizations; and

WHEREAS, the State Route 147 Transportation Concept Report identifies conceptual improvements that could be undertaken over the twenty year planning horizon; and

WHEREAS, the State Route 147 Transportation Concept Report also identifies improvements on or near the state highway system that may facilitate regional or local development, improve local circulation and enhance quality of life; and

WHEREAS, implementation of many of the improvements identified in the State Route 147 Transportation Concept Report will require funding and delivery partnerships between Caltrans, District 2, and its local and regional partners.

NOW, THEREFORE, BE IT RESOLVED by the Lassen County Regional Transportation Planning Agency, this 11th day of May, 2009, that:

1. The State Route 147 Transportation Concept Report presents a balanced and logical concept for the development and operation of State Route 147 over the next twenty years.

2. The State Route 147 Transportation Concept Report should be considered during preparation of the Regional Transportation Improvement Program, Interregional Transportation Improvement Program, and other plans and funding programs.

3. The Executive Director is hereby authorized to sign the "Concurrence" block on the signature sheet for the State Route 147 Transportation Concept Report.

LASSEN COUNTY TRANSPORTATION COMMISSION
Resolution 09-05

The foregoing resolution was passed and adopted at the May 11, 2009 meeting of the Lassen County Transportation Commission by the following vote:

AYES: Hanson, Dahle, Bonham, Keefer

NOES: None

ABSTAINED: None

ABSENT: Sayers, Franco, Chapman

Kurt Bonham

KURT BONHAM, Chairman
Lassen County Transportation Commission

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EXECUTIVE SUMMARY

Issues and Opportunities

This TCR identifies issues and opportunities on State Route (SR) 147. The issues were identified using a number of methods including technical studies, field reviews, meetings with local and regional agencies, and public outreach. Information regarding residential and commercial development, traffic volumes, and route operation is from the Almanor Regional Transportation Assessment (ARTA) – prepared jointly by Plumas County, Lassen County, and the California Department of Transportation (Caltrans).

The next 20 years will see an increase in both residential development and population growth, and traffic volumes are expected to double, and even triple, in some areas. However, SR 147 is projected to remain at or above the Concept Level of Service (LOS) of C/D now, and at the year 2030.

Concept LOS:

Caltrans LOS concept for SR 147 is the C/D threshold.

Capacity

Since there are no existing or forecast capacity constraints at 2030, no capacity improvements are necessary. However, there are proposals for major developments in the area that could significantly alter traffic patterns on SR 147. If these developments are successful, and there is a significant increase in traffic, local government will need to implement appropriate mitigations and/or develop a program to finance improvements. District 2 will monitor the developments in the area, in coordination with Plumas and Lassen Counties.

Operational

Operational issues identified during preparation of the TCR include:

- Width of treated shoulders limits both the recovery area for errant vehicles and the opportunity for bicycle travel.
- Lack of separate right and left turn lanes from southbound SR 147 onto northbound and southbound SR 89.

Twenty-Year Potential Operational Improvements

The following potential operational improvements may be considered on SR 147:

- Expand the SR 147 and SR 89 junction at PM 0.0 to include a right-hand turn pocket on SR 147.

- Install traffic signals and intersection safety lighting at the SR 147/A-13 intersection (may be implemented by local agencies as mitigation for specific projects and/or as part of a development impact fee program).
- The SR 147/A-21 intersection will require relocation and signalization if the Dyer Mountain Resort project is developed. This improvement will be the responsibility of the Dyer Mountain Resort as identified in the Final Environmental Impact Report for the Project.
- Install traffic signals at the intersection of SR 36/SR 147.
- Expand clear recovery zone where feasible.
- Widen treated and untreated shoulders where feasible. The design concept for paved shoulder width is four feet.
- Safety projects will be undertaken as the need arises.
- Other improvements may be required by local agencies for specific development projects.

To implement the improvements identified above, funding and delivery partnerships between Caltrans and its local and regional partners will be needed.

Other Potential Improvements

While no capacity improvements are required to maintain the Route Concept LOS of C/D through 2030, partner agencies and local residents asked for an assessment of potentially feasible improvements that could be considered in the event future conditions vary from the forecasts contained in this report. Should development conditions and/or availability of funding change from forecast, the following improvements could be considered for SR 147:

- Four-foot shoulders from post mile 0.0 to 7.4 in Plumas County.
- Approximately 3,000 feet of north-bound and south-bound passing lanes, and four-foot shoulders from PM 3.95 to 4.75 in Plumas County.
- Four-foot shoulders from post mile 0.0 to 7.4 in Plumas County, and also provide approximately 3,000 feet of passing lane in each direction.
- Two-lane facility on a new alignment, from post mile 2.3 to 7.5 in Plumas County, with approximately 1.5 miles of passing lane in each direction, four-foot shoulders, and two new bridges.
- Four-foot shoulders from post mile 0.0 to 7.5 in Plumas County, and also provide a two-lane facility on a new alignment, between post mile 2.3 and 7.5, with four-foot shoulders, approximately 1.5 miles of passing lane in each direction, and two new bridges.
- Two-lane facility on a new alignment, from post mile 0.2 to 1.3 in Lassen County, with four-foot shoulders and limited encroachments, which would have the potential to provide the following:
    - Relief to Clear Creek for through traffic.
    - Accommodate the SR 147/County Road A-21 intersection.
    - Accommodate an entrance for the proposed Dyer Mountain Resort project.

INTRODUCTION

The Transportation Concept Report (TCR) is a California Department of Transportation (Caltrans) System Planning document that includes an analysis of a transportation route or corridor. A TCR establishes a consensus-based concept for how California highways should operate and broadly identifies the nature and extent of improvements needed to attain that operating condition. A TCR considers a variety of factors that influence travel demand and behavior including: land uses, development policies, housing growth, economic conditions, local roadways, alternative transportation modes, and environmental conditions. The TCR development process is a collaborative one, which involves numerous internal and external stakeholders, as well as review of the land use and transportation plans of federal, state, regional, and local agencies.

As a long-range plan, the TCR is intended to help identify potential future issues on the state highway system before they occur and then present possible improvement options to address the identified issues; it does not commit funding to projects. The TCR presents concepts for highway improvements which may subsequently be used to develop projects as the forecast issues materialize. The information from TCRs is used during the preparation of Regional Transportation Plans (RTP), the State Transportation Improvement Program (STIP), and local or regional traffic improvement programs.

Route Description

State Route 147 is a two-lane conventional highway in rolling terrain located in Plumas and Lassen Counties. This minor arterial/regional connector provides access to recreational activities, private homes, and resource management activities in and around Lake Almanor. This 11.7-mile route also provides a link between two interregional routes, SR 89 and SR 36.

The California State Highway System consists of routes described in the California Codes-Streets and Highway (Chapter 2, Article 3). SR 147 is described as follows:

"Route 147 is from Route 89 near Canyon Dam to Route 36 near Westwood."

Regional Setting

The regional setting for SR 147 is shown on **Exhibit 1**, where the route is highlighted in red. This Exhibit also serves to represent the boundaries of District 2.

Plumas County

Plumas County is located in northeastern California at the northern boundary of the Sierra Nevada Range and the southern boundary of the Cascade Range. This county covers 2,618 square miles, with approximately 24% of the land privately owned and the remainder falling under public ownership.

SR 147 begins at the junction of SR 89 and runs south to north for 9.9 miles in Plumas County. Other highways in Plumas County include SR 36, SR 49, SR 70, SR 89, and SR 284.

Exhibit 1
SR 147- Regional Setting Map

SR 147 is an 11.7 mile Minor Arterial providing access to recreational activities, private homes, and resource management activities from southern Lake Almanor (SR 89) in Plumas County to SR 36 in Lassen County

Caltrans

State of California
Department of Transportation
Office of System Planning

Lassen County

Lassen County lies adjacent to, and northeast of, Plumas County with the Cascade Mountain Range to the north and the northern Sierra Nevada Mountains to the south. This county covers 4,547 square miles, with approximately 44% of the land privately owned and 56% of the land publicly owned.

SR 147 enters Lassen County near the community of Clear Creek and continues north 1.8 miles to where it meets with SR 36. Other highways in Lassen County include SR 36, SR 44, SR 139, SR 299, and US 395.

Coordination with Other Plans and Stakeholder Involvement

Caltrans is responsible for planning, construction, operation, and maintenance of highways within the State of California. These activities, however, are not performed in isolation. Development and approval of the SR 147 TCR involved a variety of stakeholders at the federal, state, and local level; including, Regional Transportation Planning Agencies, U.S. Forest Service (USFS), counties, economic development and business interests, resource agencies, tribal governments, and the general public.

The following planning documents were utilized during the preparation of the SR 147 TCR (see **Table 1**):

Table 1 **Document Review**
Regional Plans
Lassen County Regional Transportation Plan
Plumas County Regional Transportation Plan
General Plans
Lassen County General Plan
Westwood/Clear Creek Area Plan
Plumas County General Plan
Other Planning Documents
*Almanor Regional Transportation Plan (ARTA)
Lassen County Bikeway Master Plan
Plumas County Draft Bicycle Transportation Plan
* The Almanor Regional Transportation Assessment (ARTA) is a partnership study completed by Lassen County, Plumas County and Caltrans District 2 in September 2008. The study evaluated potential future development and traffic levels in the vicinity of Lake Almanor and identified transportation improvements that would likely be needed by the year 2030. The growth projections, traffic forecasts, operational analysis and potential improvements for SR 147 identified in the ARTA are utilized in this report.

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GENERAL ROUTE INFORMATION

Area History

The area around Lake Almanor, formerly Big Meadows, was known in the 1800's for its beauty and abundance of natural resources. The land was used for ranching, cattle grazing, logging, and mining. In 1914, the first dam was completed and Big Meadows became the bed of Lake Almanor (at less than one-fifth its current size). In 1930, the lake area was purchased and expanded by Pacific Gas and Electric (PG&E). The expansion required massive timber harvesting, which was accomplished by the Red River Lumber Company in Westwood. As the lake grew, so too did the communities surrounding it.

The area around Lake Almanor has gained in popularity over the last thirty years and has seen an increase in both secondary and retirement homes near the lake. The last decade in particular has brought larger developments offering luxury homes on both lakefront and golf course properties. While some people choose to spend the entire summer season in the Almanor Basin, others visit for a short time and utilize the motels, resorts, campgrounds, RV parks, and rental homes available in the area.

A host of year-round recreational activities are available in the vicinity. At 4,500 feet in elevation, the summers are just right for camping, or any number of activities on or around the lake. Hiking, biking, golfing, boating, fishing, water skiing, and swimming are popular summer activities. And, with an average winter snowfall of eleven feet, snowmobiling is quite prevalent.

Communities

Lake Almanor Peninsula

Lake Almanor Peninsula is in Plumas County, on the northeast side of Lake Almanor. The Peninsula can be accessed from County Road A-13, between SR 147 and SR 36. Census 2000 lists the population for this block group at 1,191. Housing units totaled 1,609, with only one-third being occupied year round. The other two-thirds are for seasonal, recreational, or occasional use.

Hamilton Branch

Hamilton Branch is located on A-13 in Plumas County, west of the SR 147/A-13 intersection. Census 2000 recorded this Census Designated Place (CDP) with 587 residents, and 400 homes. One-third of the housing is used for seasonal and recreational use.

East Shore

East Shore is a five-mile stretch of homes, inns, and resorts along the southern portion of SR 147. It begins two miles north of the SR 89/SR 147 intersection, and continues north to the

intersection of County Road A-13 and SR 147. Census 2000 recorded this CDP with 177 residents, and 332 homes. The majority of homes on the east shore, approximately 75%, are used seasonally. There are more than 100 private roads and driveways on this five-mile portion of the route.

Development on the East Shore encompasses both sides of SR 147, and is constrained with the lake to the west and the railroad to the east. Due to these constraints, many of the homes are located close to the highway.

Clear Creek

Clear Creek is on SR 147, in Lassen County, one-half mile south of the SR 147/A-21 intersection. Clear Creek is not a CDP; however, its population is estimated to be approximately 350 based on Census 2000 data. There are a few small businesses, a fire station, and a community park along the highway.

Westwood

Westwood is located on County Road A-21, one and one-half miles east of the SR 147/A-21 intersection. Census 2000 recorded this CDP with a population figure of 1,937, with a total of 1,048 homes. Most of these homes are owner/renter occupied with less than 10% being used seasonally. This historic mill town has a mix of land uses including a variety of businesses, residential areas, community services, churches, and schools.

Economic Setting

Following is a summary of the key economic activities currently occurring in the vicinity of SR 147:

Retail / Commercial

Commercial establishments along the route are located near the County Road A-13/SR 147 intersection in Plumas County, and the community of Clear Creek in Lassen County. These establishments primarily consist of highway commercial and convenience services such as gas stations, general stores, tourist-oriented shops, and a motel.

Recreation / Tourism

Plumas County and Lassen County are recreational in nature, and attract thousands of visitors each year. The revenues generated by recreation and tourism are essential to the local economy. A research study prepared for the California Travel and Tourism Commission indicated that the total travel spending in Plumas County alone in 2001 was $136 million. This figure includes accommodations, dining and groceries, ground transportation, retail spending, and recreation.

SR 147 provides recreational access that can be enjoyed year round. Some of the recreational activities available in the area include swimming, boating, fishing, hunting, camping, hiking,

biking, golfing, horseback riding, skiing, and snowmobiling. Some popular attractions that can be found near SR 147 include Lake Almanor, Lassen Volcanic National Park, the Bizz Johnson Rail Trail, and Eagle Lake.

Natural Resource Production

Timber Harvesting

Much of the land in the Chester and Lake Almanor area is zoned for timber production. Production along SR 147 is primarily managed by the Collins Pine Lumber Company which owns the 95,000-acre Collins Almanor Forest (CAF), and also operates a sawmill in Chester. However, intermingled within CAF timberlands exist ownerships by Roseburg Resources Company, Sierra Pacific Industries, Walker Family Forests (managed by W. M. Beaty & Associates, Inc.), and the U.S. Forest Service (USFS). Some small private timber land holdings are also in the area.

Hydroelectric

Lake Almanor is part of the Upper North Fork Feather River Hydroelectric Project owned by Pacific Gas and Electric Company (PG&E). The project includes a total of three dams and reservoirs, and five powerhouses. The largest reservoir is Lake Almanor, created by Canyon Dam, which is located near the town of the same name. The project generates an average of 1.172 billion kilowatt hours of electric energy annually. In normal years, this is enough energy to supply over 160,000 homes with electricity.

Under the Federal Power Act, the Federal Energy Regulatory Commission (FERC) has the exclusive authority to license non-federal hydropower projects on navigable waterways and federal lands. Hydropower licenses are initially issued by FERC for periods ranging from 30 to 50 years. When a license expires, FERC may re-license the project, the federal government may take over the project, or the project may be decommissioned.

The Upper North Fork Feather River Project license was set to expire in October 2004. PG&E submitted an application for a major new hydropower license (re-license) in October of 2002. Once an application for re-license has been filed, any resource agency, Native American community, or individual who believes additional scientific studies should be conducted must file a request with FERC.

The re-licensing of the Upper North Fork Feather River Project has generated much interest in the Lake Almanor area. Stakeholders who may be affected by the project have taken advantage of the opportunity to participate in the licensing process. Comments and requests for studies have been brought forth by a variety of individuals, citizen groups, organizations, Native American communities, elected officials, and agencies. Below are some of the concerns brought forth to date:

- Water supply
- Recreational activity
- Land value

- Wildlife and fish habitat
- Cultural Resources

The current lake level is a concern for both Caltrans and Plumas County because it directly impacts SR 147. The high water level causes erosion of the shoreline adjacent to the highway, and Rock Slope Protection (RSP) projects along SR 147 may be needed as a result of shoreline erosion. Plumas County would like to see any RSP projects mitigated as part of the FERC re-licensing.

Route History

In 1961, this route was defined as Legislative Route Number (LRN) 183, and in 1963 received its first numbered sign. In July of 1964, the State Legislature renumbered the California State Highway System, and it became SR 147.

Table 2 shows the length of SR 147 in miles:

Table 2
Length of State Route 147

Area	Miles
Plumas County	9.9
Lassen County	1.8
District 2 Total	**11.7**
State Total	**11.7**

Sources: California Department of Transportation and Transportation System Information Program

Route Designations

The Functional Classification for SR 147 is minor arterial. It serves to feed local/regional traffic to the interregional network of SR 89 and SR 36. **Table 3** presents other designations that may affect planning and/or operations on SR 147. These designations are defined in **Appendix A - Glossary**.

Table 3
Route 147 Scenic Designations

Designation	Plumas & Lassen Counties
All American Road (Volcanic Legacy Scenic Byway)[1]	Yes
National Scenic Byway[1]	Yes
U.S. Forest Service Scenic Byway[1]	No
State Scenic Highway[2]	No (eligible)

(Note: [1]Federal Designation; [2]State Designation)

Sources: California Department of Transportation, Bureau of Land Management, U.S. Forest Service, and VolcanicLegacyByway.org

Goods Movement

Goods movement, which is the transportation of freight rather than people, can have significant impacts on a state's economy. The goods movement along or near SR 147 is accomplished predominately with highways, and to a lesser degree, rail and airports.

Trucks

Goods movement along SR 147 is for the most part limited to local timber operations which utilize SR 147 and a local rail spur at PM 9.53. These goods are produced locally; therefore, there is little need for additional goods movement facilities. Truck traffic accounts for approximately 10% of the traffic on SR 147.

SR 147 was previously a California Legal Truck Route with an advisory sign stating "tractor-semis over 30 feet kingpin to rear axle not advised." A widening project was recently completed on SR 147 from post mile 1.1 to 1.8 in Lassen County allowing the removal of the advisory signing. This route is now open to California Legal trucks, without the advisory. Surface Transportation Assistance Act (STAA) trucks are not permitted on SR 147.

Rail

Short Line Railroads

Short line railroads act as connectors to the major railroads. Along SR 147 there is one short line railroad known as Almanor Railroad, which is owned by Collins Pine Lumber Company. Collins Pine used the rail line to move lumber from their sawmill, in Chester, to a connection point owned by Burlington Northern Santa Fe (BNSF). This rail line is currently non-operational.

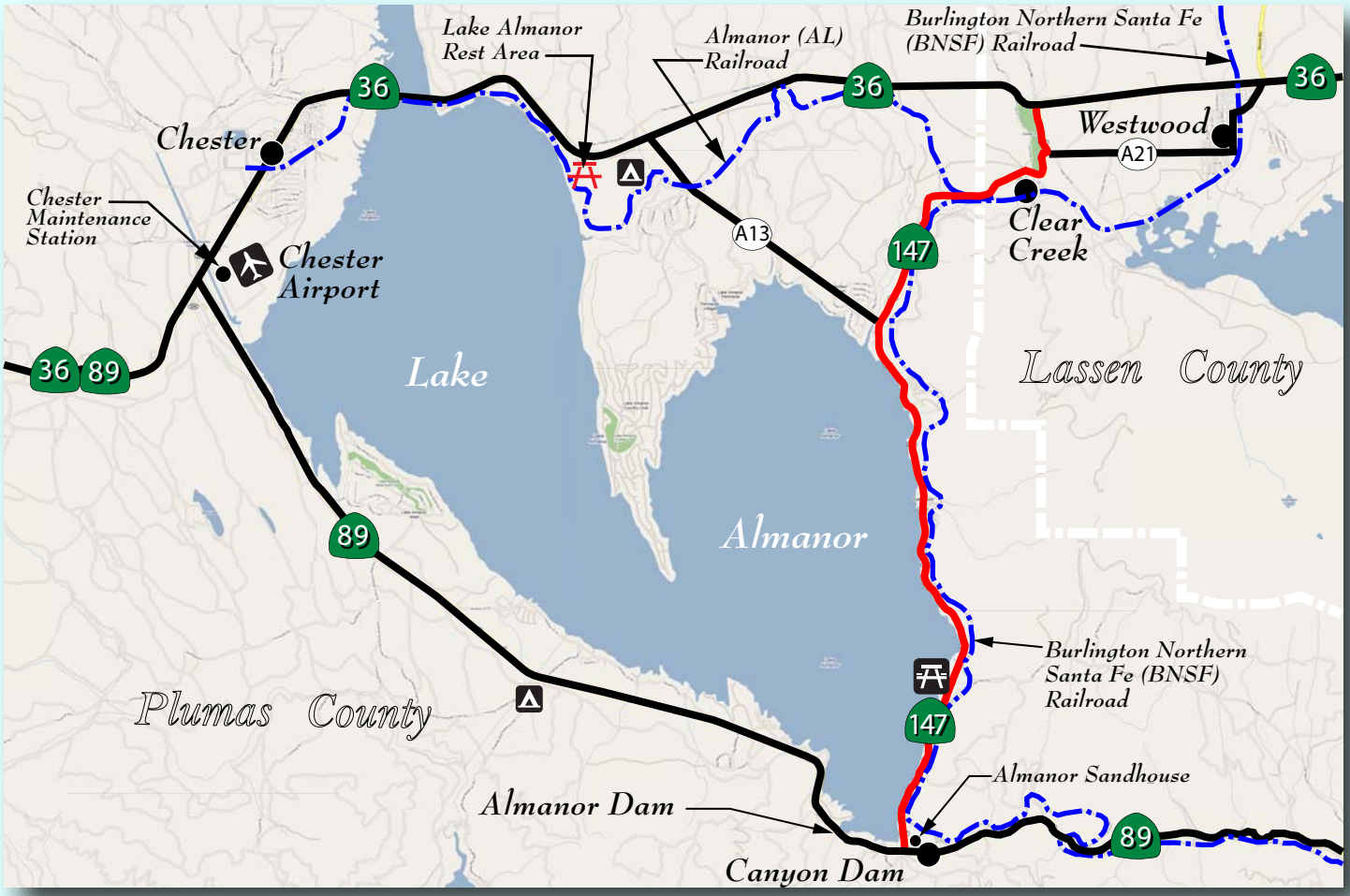
Major Railroads

California is served by two major railroads; the Burlington Northern Santa Fe (BNSF), and Union Pacific (UP). These rail lines are almost exclusively dedicated to freight movement. The BNSF operates 112 miles of track between Bieber and Keddie. It travels along SR 89 to Lake Almanor then up the east side of SR 147 to PM 1.1 in Lassen County where it veers away from the route and continues east. The Almanor Railroad spur connects to the BNSF line near the Plumas/Lassen County line.

Airports

There is one public airport operating in the vicinity of SR 147. It is located a few miles west of SR 147 in Chester. It predominantly serves the local community, with little goods movement or interregional travel. **Exhibit 2** depicts the locations of the airport and rail lines in relation to SR 147.

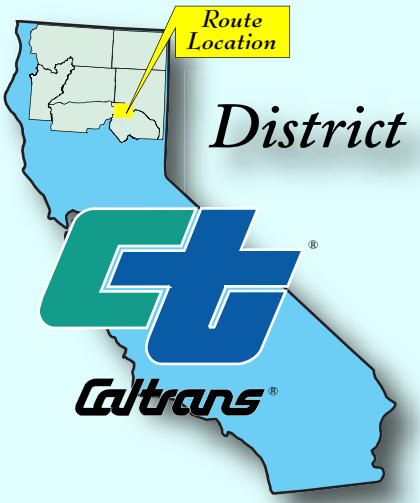
Exhibit 2
SR 147- Related Facilities Map



No Scale

LEGEND

- Highways
- State Route 147
- County Boundaries



District 2

Caltrans

State of California
Department of Transportation
Office of System Planning

Right of Way

Right of way is real estate acquired for transportation purposes, which includes the facility itself (highway, fixed guideway, etc.), as well as associated uses (maintenance structures, drainage systems, roadside landscaping, etc.). The state's existing right of way along SR 147 varies in width and type and is summarized in **Table 4**.

Table 4
Existing Right of Way on State Route 147

County	Begin/End PM	Approximate Right of Way Width	Type of Right of Way
Plumas	0.0/9.9	80-100'	Fee Title
Lassen	0.0/1.1	80'	Fee Title
Lassen	1.1/1.8	Special	Prescriptive

Source: California Department of Transportation, Office of Right of Way

As observed from **Table 4** above, State Route 147 has a mixture of right of way types:

- Fee title is the highest and most complete form of property ownership. This type of ownership is absolute, and allows the state full use of the land.

- Prescriptive is a type of easement that comes into existence without formal action because of long term historical use in a corridor. In this case, right of way widths are defined by the area of use. When new projects are programmed along SR 147 in District 2, the Department will attempt to convert prescriptive rights into fee title.

Access Management

The type and extent of access allowed onto a highway has a direct effect on facility safety and operation. More access points or less control of access locations typically reduces travel speeds and introduces vehicle conflicts on the facility. Access management involves controlling or managing where vehicles are allowed to enter and exit the highway in order to improve highway operations and reduce traffic incidents.

The only section of SR 147 with a significant number of access points is segment one, between PM 0.0 and 7.4. Over 100 driveways and other forms of encroachment are located within this segment. This degree of access could become an issue as traffic volumes increase along this route in the future. To reduce the potential for future problems Caltrans will work to manage access through the following:

- Utilizing the encroachment permits process. All new developments will be required to obtain encroachment permits.

- Design of highway improvements. Implementation of major improvement projects would require that all affected encroachments meet current design standards.

Safety

Traffic

The safety information provided in this TCR was taken from Table B of the Traffic Accident and Surveillance and Analysis System (TASAS). It should be used for general planning purposes and as an indicator of how the accident rate of a particular highway compares to the average accident rate on similar routes statewide. Higher than average rates are not lone indicators that corrective action by Caltrans is warranted. Accident rates can be greatly influenced by the length of the segment under consideration as well as the time period being measured. **Table 5** summarizes a five-year summary of the traffic collision rates for SR 147. As can be seen in the table, the accident rates for SR 147 are about the same as the statewide rates for similar facilities.

Table 5
Traffic Collision Rate (per million vehicle miles) for State Route 147

County	SR 147 Actual Accident Rate		Statewide Average Accident Rate	
	Fatal	Fatal + Injury	Fatal	Fatal + Injury
Plumas	0.000	0.72	0.0034	0.74
Lassen	0.000	0.69	0.0033	0.72

Source: TASAS Database (DATE 03/01/2003 to 02/28/2008)

Railroad Crossing

There is one at-grade railroad crossing located at PM 9.53. At-grade railroad crossings are places where highway traffic crosses railroad tracks at the same elevation. This railroad spur is owned and operated by Collins Pine Lumber Company and is not currently in use. Although there are signs and pavement markings to make drivers aware of the crossing, it does not have lights or crossing gates. In the past, Collins Pine employees have manually stopped vehicles on each side of the crossing.

Bridges and Grade Separation Structures

Bridges are structures of more than 20 feet in length that span a body of water. The one bridge on SR 147, Hamilton Branch Bridge (09-0065), is located at PM 8.9 in Plumas County. The following improvements could be scheduled during the 20-year planning period:

- Widen bridge to 40 feet (currently 27 feet) in order to provide standard shoulders.
- Deck rehabilitation or replacement.

Grade separations are vertical separations of intersecting facilities (road, rail, etc.) by the provision of crossing structures. With an underpass the state highway crosses under the railroad, and with an overhead the highway passes over the railroad. There are no grade separations on SR 147.

Maintenance and Operations

The California State Highway System represents an enormous taxpayer investment so preservation of the existing system is a top priority. The Caltrans Maintenance Program is

responsible for the preservation and keeping of rights of way, highways, structures, plantings, illumination equipment, and other facilities in a safe and usable condition. For maintenance purposes, routes within the state highway system are assigned a Maintenance Service Level (MSL) classification of either Class 1, 2, or 3. State Route 147 is classified as MSL 3.

Caltrans Maintenance Stations

Maintenance Stations are facilities used by Caltrans to maintain the highway year-round. Caltrans Maintenance Station number 674, in Chester (see **Exhibit 2**), is responsible for maintaining the entire length of SR 147, from PM 0.0 in Plumas County through PM 1.8 in Lassen County.

Caltrans Sand Houses

Sand houses are storage facilities for abrasives and de-icers, and are located in areas which have consistently low temperatures. The Almanor Sand House is located on SR 89, at PM 29.3 in Plumas County, and is approximately one-tenth of a mile from the southern end of SR 147 (see **Exhibit 2**).

Traffic Control

The following types of traffic control are present at major intersections along SR 147:

- Plumas County, PM 0.0; SR 147/SR 89 intersection; stop control on southbound 147
- Plumas County, PM 7.4; SR 147/A-13 intersection; stop control on A-13
- Lassen County, PM 1.1; SR 147/A-21 intersection; stop controls on southbound 147 and on westbound A-21
- Lassen County, PM 1.8; SR 147/SR 36 intersection; stop control on northbound 147

Intelligent Transportation Systems

Intelligent Transportation Systems (ITS) apply advanced communication, information, and electronics technology to solve existing transportation problems. ITS technologies often offer the potential to improve safety and efficiency relatively quickly and at a reasonable cost. ITS applications are not currently in use on SR 147; however, there are several potential ITS elements identified in the vicinity of SR 147 which are listed in **Table 6**. The acronyms used in this section are defined in Appendix A – Glossary.

Table 6
ITS Elements in Vicinity of SR 147 by Type

Type	Location	County	Route
CCTV	SR 89 near Canyon Dam	Plumas	89
HAR Flasher	SR 89 south of Jct. with SR 147	Plumas	89
RWIS	SR 89 near Canyon Dam	Plumas	89
CMS	SR 36 near Jct. with SR 147	Lassen	36
HAR	SR 36 near Jct. with SR 147	Lassen	36

These elements may be pursued in the future if funding becomes available. California Department of Transportation.

Alternate Travel Routes

There are several state highways and arterial streets paralleling or intersecting SR 147:

State Highways

SR 89 at the southern end of SR 147, in Plumas County.
SR 36 at the northern end of SR 147, in Lassen County.

County Roads

County Road A-13 in Plumas County at the northern end of Lake Almanor.
County Road A-21 in Lassen County at the northern end of SR 147.

Transportation Options

The categories that follow provide information regarding transportation options (transit, rail, airports, and non-motorized) and alternative facilities (roads that have the potential to serve as alternate routes for travelers).

Regional Transit

Provision of transit in rural areas is challenging for a number of reasons including: long distances, limited or dispersed population base, scheduling difficulty, and limited funding. Regional transit services available on or near SR 147 are as follows:

Plumas County

Plumas County Transit (PCT) System offers fixed route services to many locations in Plumas County including a stop along SR 147 at Hamilton Branch.

Lassen County

Lassen Rural Bus provides services in Susanville and surrounding areas in Lassen County. Service is provided along SR 36, County Road A-21, and along SR 147 through Clear Creek to Hamilton Branch.

Both the PCT and the Lassen Rural Bus travel to Hamilton Branch in Plumas County. This allows passengers to transition smoothly between the two counties.

Interregional Transit

There are no interregional carriers serving the Lake Almanor area.

Rail Passenger Service

BNSF and Almanor Rail do not provide passenger service.

Airports

There are five publicly owned airports in Lassen County, and three publicly owned airports in Plumas County. Rogers Field is located in Chester and is the only operating airport within the study area. The airport currently experiences an increase in use during peak summer holiday periods. With the area growth potential, and the proposed Dyer Mountain Resort project, it is likely that this facility will continue to see an increase in aircraft operations. The nearest locations for commercial passenger airline flight service are Reno, Nevada and Redding, California.

Bicycle Travel

Bicycles are allowed on SR 147. Bicyclists should expect to share the 22 to 24 foot wide roadway with other vehicles as there are little or no paved shoulders along this route. Caltrans, District 2, has created the "Cycling Guide for State Highways of Northern California" to give bicyclists an idea of what to expect while cycling in the northeastern counties of California. This guide is available at the following address: http://www.dot.ca.gov/dist2/pdf/bikeguide.pdf

There are two recreational trails near SR 147; the Lake Almanor Recreation Trail, and the Bizz Johnson Rail Trail. The Lake Almanor Recreation Trail is in Plumas County and runs near SR 89 on the southwest shore of Lake Almanor. The paved trail is 10 feet wide and 9.5 miles in length. There are a total of six access/parking areas along this trail.

The Bizz Johnson Rail Trail is approximately 25 miles in length and is located in Lassen County. This trail runs from Westwood to Susanville on the old Southern Pacific Railroad line, in the Susan River Canyon. The trail can be accessed from three different locations off of SR 36; Susanville, Westwood, or Devil's Corral (located seven miles west of Susanville). It can also be accessed from the Goumaz Trailhead off of SR 44.

The Westwood/Clear Creek Area Plan proposes a trail corridor (non-motorized) extending west from Westwood with the intention of connecting Westwood to Clear Creek, and regionally, to Lake Almanor. Alignment of this conceptual trail has yet to be determined, as further research will be needed to propose the most feasible and safest trail alignment.

Environmental Status

Caltrans strives to maintain, operate, and improve highways in a manner sensitive to the environmental context. Environmental issues are addressed in the project planning and development process. Some of the key environmental issues along SR 147 are:

- Eight known archaeological sites (four historic period and four Native American)
- Biological (state/federally listed species)
- Deer/wildlife-crossings (common points where deer and wildlife cross roadways)
- Water quality/drainage/erosion (preserving water quality and adequate handling of drainage and erosion along SR 147)
- Mapped flood plains

Adoptions, Rescissions, and Relinquishments

Adoption involves action by the California Transportation Commission to approve the location and general alignment of a new route or route segment. Rescission involves removing or deleting a previously adopted route alignment. Relinquishment involves the transfer of all or a portion of a state highway to a city, county or other public entity. There are currently no planned adoptions, rescissions, or relinquishments on SR 147.

Railroad Lines and SR 147 with Lake Almanor in the background

EXISTING CONDITIONS

Route Segmentation

For purposes of analysis, highways are divided into smaller pieces called segments. Each segment selected has one or more characteristics that distinguish it from other segments. Information that is obtained and/or developed at the segment level includes traffic growth projections, present and future level of service, target (concept) level of service, environmental issues, and adjoining land uses. This information is used during assessment of the potential need for operational and capacity improvements, as well as in subsequent development of project initiation documents.

Criteria used in the selection of segments for analysis include:

- Change in route concept.
- Change in facility type.
- Change in function or use of route.
- Significant changes in ADT.
- Significant changes in terrain or grade.
- Junction/crossing of other highway or major facility.
- Urban/rural boundaries or other significant change in land use.
- District boundaries.
- County/state/national boundaries.

Table 7 provides a summary of the four segments identified for SR 147, while **Exhibit 3** (Segment Map) provides a visual representation of the segments. The pages that follow provide a detailed description of each segment.

Table 7
Route Segments

Segment	Co	Route	Begin PM	End PM	From	To
1	PLU	147	0.00	7.37	Jct. of SR 89	County Road A-13
2	PLU	147	7.37	9.89	County Road A-13	Lassen County Line
3	LAS	147	0.00	1.14	Lassen County Line	County Road A-21
4	LAS	147	1.14	1.79	County Road A-21	Jct. of SR 36

Exhibit 3
SR 147
Segment Map

District 2

N

No Scale

LEGEND

- Highways
- SR 147 Segment 4 PM 1.14/1.79
- SR 147 Segment 3 PM 0.00/1.14
- SR 147 Segment 2 PM 7.37/9.89
- SR 147 Segment 1 PM 0.0/7.37
- County Boundaries

State of California
Department of Transportation
Office of System Planning

Route Segments

Segment 1	
PM	Description:
PLU-0.0/7.4	SR 147/SR 89 junction near Canyon Dam to County Road A-13/SR 147 intersection
Facility Concept: Two-lane conventional highway	

Segment 1 begins at SR 89, near the southern end of Lake Almanor. The first thing you notice as you drive north is the lush green trees of the Plumas and Lassen National Forests bordering each side of the road. On the left you will find the Almanor Scenic Overlook owned by PG&E, and one-mile north is the East Shore Picnic Area. The road curves along the eastern shore of Lake Almanor and the water can be seen through the trees on the left, while the BNSF rail line parallels the highway on the right. Continuing north, the area becomes more populated with over one-hundred access points to homes. Nearing the end of the segment there is a gas station and store, then the junction of County Road A-13.

Segment 2	
PM	Description:
PLU-7.4/9.9	County Road A-13/SR147 intersection to the Plumas and Lassen County line
Facility Concept: Two-lane conventional highway	

Segment 2 is from County Road A-13 to the Plumas and Lassen County border. Development in this area is sparse and timber harvests have been well managed, providing a glimpse of the rural heritage of this mountainous area. The highway is winding and rolling with a slight climb. The Hamilton Branch Bridge (09-0065), which is located on SR 147 at PM 8.9, adds to the overall scenic qualities of the route. When the highway levels out again there is an at-grade railroad crossing, with no lights or crossing gates, around PM 9.53.

Segment 3	
PM	Description:
LAS-0.0/1.1	Plumas and Lassen County line to County Road A-21
Facility Concept: Two-lane conventional highway	

Segment 3 starts at the Plumas and Lassen County line and is similar in setting to the previous segments with tall trees and native vegetation. The route climbs and winds through the forest until you come upon the town of Clear Creek, with a population of about 350. This community has a large park with lush green grass and tall trees, a fire station, a motel, and a couple of establishments for goods and services. After passing through Clear Creek, the road takes on a steep grade until you reach County Road A-21.

Segment 4	
PM	Description:
LAS-1.1/1.8	County Road A-21/SR 147 intersection to SR 36/SR 147 junction
Facility Concept: Two-lane conventional highway	

Segment 4 begins at the intersection of County Road A-21 and ends 0.7 miles north at the junction of SR 147 and SR 36. Here, the landscape continues with natural forests and sparsely populated land. Just a short distance to the southeast of the County Road A-21 and SR 147 intersection is the site for the proposed Dyer Mountain Resort project. This large-scale recreation resort has plans for a golf course, hotels, ski lifts, and housing units.

Population

The U.S. Census Bureau listed the State of California population as 33,871,648 in 2000. Based on Census 2000, the U.S. Census Bureau projects the population in the State of California to be 38,067,134 in 2010. State Route 147 is wholly contained within Plumas and Lassen Counties, which in 2007 had populations of 20,615 and 35,031 respectively.

Residential Development

State Route 147 passes through the Almanor Planning Area in Plumas County and the Westwood/Clear Creek Planning Area in Lassen County (see **Exhibit 4**). **Table 8** provides the number of existing residential units in each Planning Area as well as the total.

Table 8 Existing Residential Units	
Planning Area	**Existing Residential Units**
Plumas County	
Subtotal Almanor Planning Area	**4,170**
Lassen County	
Subtotal Westwood/Clear Creek Planning Area	**1,155**
Total Existing Residential Units	**5,325**
Source: Almanor Regional Transportation Assessment (ARTA) – September 2008	

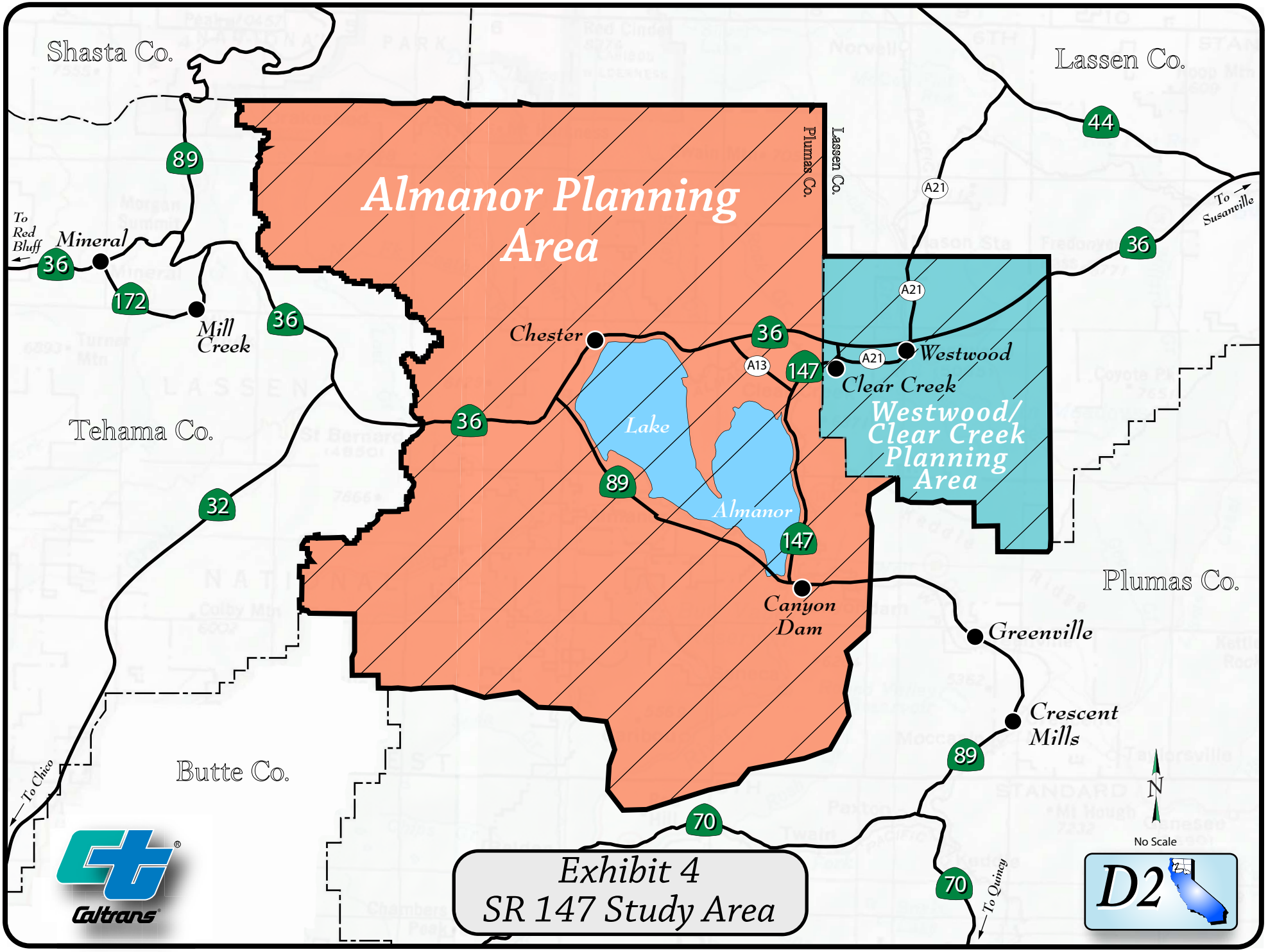


Exhibit 4
SR 147 Study Area

Commercial Development

There are approximately 1.5 million square feet of commercial development in the Almanor Planning Area, and 500,000 square feet of commercial development in the Westwood/Clear Creek Planning Area (source: ARTA). Chester and Westwood are the largest commercial centers within their respective planning areas, where typical commercial uses include markets, gas stations, restaurants, small retail, and general office. Plumas and Lassen Counties are recreational in nature and support seasonal commercial development including marinas, golf courses, resorts, recreational vehicle (RV) parks, and campgrounds.

Traffic Conditions

Although there is a small percentage of interregional traffic around Lake Almanor, most of the traffic is locally generated. The existing traffic volumes for SR 147 appear in **Table 9**.

Table 9
Existing Traffic Volumes for State Route 147

Segment	County	Segment Begin	Segment End	Existing P.M Peak Hour Volume
1	PLU	Jct. SR 89	County Road A-13	350
2	PLU/LAS	County Road A-13	Begin 35 mph	350
3	LAS	Begin 35 mph	County Road A-21	400
4	PLU	County Road A-21	Jct. SR 36	150

Source: Almanor Regional Transportation Assessment (ARTA) - September 2008 (from 2004 Traffic Volumes on California State Highways, State of California). Volumes are two-way (both directions of travel).

Level of Service (LOS)

LOS is a qualitative measure used to describe the operating conditions within a stream of traffic. Six letters designate each level, from "A" to "F", with LOS "A" representing the best operating condition, and LOS "F" the worst. For SR 147, Caltrans strives to maintain a Level of Service of C or better.

Concept LOS:

Caltrans LOS concept for SR 147 is the C/D threshold.

To calculate roadway LOS, traffic volumes and other information are input into the Highway Capacity Software (HCS+, developed at the McTrans Center, University of Florida), which uses the Highway Capacity Manual 2000 methodology to calculate the highway's operating

condition. The input parameters include traffic volumes, speed, lane width, shoulder width, percent trucks and buses, percent recreational vehicles, terrain, grade, and number of access points. On a two-lane highway, such as SR 147, LOS is defined by the amount of time spent following behind other vehicles. Less time following means better LOS, while more time following other vehicles equates to a lower LOS. **Table 10** lists the existing LOS on SR 147.

Table 10
Existing Roadway Level of Service (LOS) for State Route 147

Segment	County	Road From	Road To	Existing LOS
1	PLU	Jct. SR 89	County Road A-13	B
2	PLU/LAS	County Road A-13	Begin 35 mph	B
3	LAS	Begin 35 mph	County Road A-21	B
4	PLU	County Road A-21	Jct. SR 36	A

Source: Almanor Regional Transportation Assessment (ARTA) - September 2008

SR 147 Grade Between Clear Creek and the Intersection of County Road A-21

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FUTURE CONDITIONS FOR STATE ROUTE 147

The area around Lake Almanor and SR 147 is expected to see steady growth in both residential and commercial land development over the next 20 years. For the purposes of this report, the year 2030 was chosen to represent the long range planning horizon for SR 147. Although no capacity improvements are required to maintain the Route Concept LOS of C/D through 2030, a section titled "Other Potential Improvements" has been included at the request of local agencies and the public.

Facility Concept and Design Concept

Facility Concept

The current and long term facility concept for SR 147 is as a two-lane Conventional Highway. A conventional highway is a highway without control of access. Grade separations at intersections or access control may be used when justified at spot locations.

Design Concept

When projects are developed for this route, 12-foot lane widths and 4-foot shoulders should be considered. A four foot wide paved shoulder width has been identified for SR 147 due to extensive environmental constraints such as topography and proximity to waterways/riparian areas.

Population

Based on Census 2000, the U.S. Census Bureau projects the population in the State of California to be 46,444,861 in 2030. This represents a 22.0% increase in the twenty-year projection period from 2010 to 2030.

In 2030, the Department of Finance projects the populations in Plumas and Lassen Counties to be 24,530 and 47,240 respectively, which represents an increase of 29% in the combined populations for these counties over the projection period from 2007 to 2030. This information is summarized in **Table 11** below.

Table 11
County Populations

County	2007	2030 Projected	Percent Change 2007-2030
Plumas	20,615	24,530	18.99
Lassen	35,031*	47,240**	34.85
Combined Populations	**55,646**	**71,770**	**28.97**

* The Lassen County population includes inmates in State Correctional Facilities. The incarcerated population accounted for approximately 24% of Lassen County's total population in 2007.

** The Lassen County projected population includes inmates in State and Federal Correctional Facilities. The incarcerated population will account for approximately 22% of Lassen County's total population in 2030.

Sources: U.S. Census Bureau; California Department of Finance, Demographic Research Unit; California Department of Corrections, Communications Office.

Residential Development

The area around Lake Almanor is expected to see steady growth in residential land development over the next 20 years. Plumas County estimates that approximately 20% of the land designated for development in the Almanor Planning Area will develop by year 2030, while Lassen County estimates that 35% of the Westwood/Clear Creek Planning Area will develop during this period. **Table 12** shows the year 2030 projected number of new residential units by planning area.

Table 12 Projected New Residential Units at Year 2030	
Planning Area	**Projected New Residential Parcels/Units at Year 2030**
Plumas County	
Subtotal Almanor Planning Area	**1,765**
Lassen County	
Subtotal Westwood/Clear Creek Planning Area	**735**
Total Projected New Residential Units	**2,500**
Source: Almanor Regional Transportation Assessment (ARTA) – September 2008	

Combining the total existing residential units in **Table 8**, with the total projected new residential units in **Table 12**, results in a projected year 2030 total of 7,825 residential units; 5,935 units for the Almanor Planning Area, and 1,890 units for the Westwood/Clear Creek Planning Area.

Commercial Development

The area around Lake Almanor is also expected to see steady growth in commercial land development over the next 20 years. At year 2030, commercial development is projected to grow by approximately 955,000 square feet in the Almanor Planning Area, and by approximately 745,000 square feet in the Westwood/Clear Creek Planning Area (see **Table 13**).

Table 13 Projected New Commercial at Year 2030	
Commercial Area	**Projected Sq Ft of New Commercial Development for Year 2030**
Subtotal Almanor Planning Area	**955,000**
Subtotal Westwood/Clear Creek Planning Area	**745,000**
Total Projected New Commercial Development	**1,700,000**
Source: Almanor Regional Transportation Assessment (ARTA) – September 2008	

Traffic Growth

Year 2030 traffic projections indicate an increase in the summer P.M. Peak Hour Volume for each segment of SR 147. Traffic volumes by year 2030 will be two to three times higher than they are today. This data is displayed in **Table 14**.

Table 14
Year 2030 Traffic Volumes for State Route 147

Segment	County	Segment Begin	Segment End	Existing P.M. Peak Hour Volume	Year 2030 P.M. Peak Hour Volume
1	PLU	Jct. SR 89	County Road A-13	350	690
2	PLU/LAS	County Road A-13	Begin 35 mph	350	850
3	LAS	Begin 35 mph	County Road A-21	400	870
4	PLU	County Road A-21	Jct. SR 36	150	540

Source: Almanor Regional Transportation Assessment (ARTA) – September 2008. The Traffic Volumes are two-way (both directions of travel). P.M. Peak Hour Volumes are for a typical Friday afternoon during the summer.

Level of Service (LOS)

Table 15 provides estimates for LOS on SR 147 under year 2030 forecast traffic volumes, without the benefit of any transportation system improvements. Although **Table 15** indicates a drop in the LOS for all segments of SR 147 at year 2030, it is projected to operate at or above the Concept LOS threshold of C/D even without improvement.

Table 15
Year 2030 Roadway LOS for State Route 147 – Without Improvements

Segment	County	Road From	Road To	Existing LOS	Year 2030 LOS
1	PLU	Jct. SR 89	County Road A-13	B	C
2	PLU/LAS	County Road A-13	Begin 35 mph	B	C
3	LAS	Begin 35 mph	County Road A-21	B	C
4	PLU	County Road A-21	Jct. SR 36	A	C

Source: Almanor Regional Transportation Assessment (ARTA) – September 2008. LOS are for a typical Friday afternoon during the summer.

Potential Capacity Improvements

Since SR 147 will operate at or above the Concept Level of Service (C/D) at year 2030, no capacity improvements are proposed.

Potential Operational Improvements

The following potential operational improvements may be considered for SR 147:

- Expand the SR 147 and SR 89 junction at PM 0.0 to include a right-hand turn pocket on SR 147.
- Install traffic signals and intersection safety lighting at the SR 147/A-13 intersection (may be implemented by local agencies as mitigation for specific projects and/or as part of a development impact fee program).
- The SR 147/A-21 intersection will require relocation and signalization. This improvement is the responsibility of the Dyer Mountain Resort as identified in the Final Environmental Impact Report for the Project.
- Install traffic signals at the intersection of SR 36/SR 147.
- Expand clear recovery zone where feasible.
- Widen treated and untreated shoulders where feasible. The design concept for paved shoulder width is four feet.
- Safety projects will be undertaken as the need arises.
- Other improvements may be required by local agencies for specific development projects.

To implement the improvements identified above, funding and delivery partnerships between Caltrans and its local and regional partners will be needed.

Other Potential Improvements

While no capacity improvements are required to maintain the Route Concept LOS of C/D through 2030, partner agencies and local residents asked for an assessment of potentially feasible improvements that could be considered in the event future conditions vary from the forecasts contained in this report. Should development conditions and/or availability of funding change from forecast, the following improvements could be considered (no funds are currently available for these projects). All cost estimates are in 2009 dollars (not adjusted for inflation).

Concept #1: Add Four-Foot Shoulders, PM 0.0 - 7.4, Plumas County

This concept would add four-foot shoulders to SR 147 from post mile 0.0 to 7.4 in Plumas County (see **Exhibit 5**). The estimated cost of this concept is approximately $22 million (2009 dollars). This concept has a total project length of 7.4 miles, and would have the potential to provide the following benefits:

- Provide space for bicycles along the roadway.
- Increase recovery area for errant vehicles.
- Enhance safety for motor vehicles, bicycles, and pedestrians.

Concept #2: Passing Lanes, PM 3.95 - 4.75, Plumas County

This concept would add approximately 3,000 feet of north and south-bound passing lanes and

four-foot shoulders from PM 3.95 to 4.75 in Plumas County (see **Exhibit 5**). The estimated cost of this concept is approximately $9 million (2009 dollars). This concept would have a total project length of 0.8 miles and would have the potential to provide the following benefits:

- Provide space for bicycles along the roadway.
- Increase recovery area for errant vehicles.
- Enhance safety for motor vehicles, bicycles, and pedestrians.
- Provide north-bound and south-bound passing opportunities.
- Address current geometric design guidelines.

Concept #3: Four-Foot Shoulders and Passing Lanes, PM 0.0 - 7.4, Plumas County

Concept #3 combines concept #1 and concept #2 (see **Exhibit 5**). Together, these concepts would provide continuous four-foot shoulders on SR 147, from post mile 0.0 to 7.4 in Plumas County, and also provide approximately 3,000 feet of passing lane in each direction. The estimated cost of this concept is approximately $28 million (2009 dollars). The total project length for this concept is 7.4 miles and would have the potential to provide the following benefits:

- Provide space for bicycles along the roadway.
- Increase recovery area for errant vehicles.
- Enhance safety for motor vehicles, bicycles, and pedestrians.
- Provide north-bound and south-bound passing opportunities.
- Higher design speed with improved sight distance within limits of passing lanes.

Concept #4: New Alignment, PM 2.3 - 7.5, Plumas County

This concept proposes a two-lane facility on a new alignment, predominately east of the railroad, and would avoid current development (see **Exhibit 6**). This new alignment would include approximately 1.5 miles of passing lane in each direction, four-foot shoulders, and two new bridges. The estimated cost of this concept is approximately $70 million (2009 dollars). This concept is for the area between post mile 2.3 and 7.5, in Plumas County, and has a total project length of approximately 5.2 miles. This concept would have the potential to provide the following benefits:

- Provide space for bicycles along the roadway.
- Increase recovery area for errant vehicles.
- Enhance safety for motor vehicles, bicycles, and pedestrians.
- Provide north-bound and south-bound passing opportunities.
- Higher design speed with improved sight distance.
- Fewer encroachments along new alignment that would meet current design standards.
- Reduction in travel times and higher LOS.

- Allow for a lower speed limit, as well as truck weight limits, to be implemented on that portion of the existing alignment replaced by the new alignment as it would become a county road for local access.
- Remove interregional traffic volumes from existing highway.

Concept #5: New Alignment PM 2.3 - 7.5 and Four-Foot Shoulders PM 0.0 - 7.5, Plumas County

Concept #5 combines concept #1 and concept #4 (see **Exhibit 6**). Together, these concepts would provide continuous four-foot shoulders on SR 147, from post mile 0.0 to 7.5 in Plumas County, and also provide a two-lane facility on a new alignment, predominately east of the railroad, between post mile 2.3 and 7.5. This concept includes four-foot shoulders, approximately 1.5 miles of passing lane in each direction, and two new bridges. The estimated cost of this concept is approximately $77 million (2009 dollars). The total project length is 7.5 miles, and would have the potential to provide the following benefits:

- Provide space for bicycles along the roadway.
- Increase recovery area for errant vehicles.
- Enhance safety for motor vehicles, bicycles, and pedestrians.
- Provide north-bound and south-bound passing opportunities.
- Higher design speed with improved sight distance.
- Fewer encroachments along new alignment that would meet current design standards.
- Reduction in travel times and higher LOS.
- Allow for a lower speed limit, as well as truck weight limits, to be implemented on that portion of the existing alignment replaced by the new alignment as it would become a county road for local access.
- Remove interregional traffic volumes from existing highway.

Concept #6: Realignment, PM 0.2 - 1.3, Lassen County

This concept proposes a two-lane facility with four-foot shoulders and limited encroachments, along a new alignment, to provide relief to Clear Creek for through traffic (see **Exhibit 7**). This concept can be designed to accommodate the SR 147/County Road A-21 intersection and entrance to the proposed Dyer Mountain Resort project. The estimated cost of this concept is approximately $16 million (2009 dollars). This concept is for post mile 0.2 to 1.3 in Lassen County, with a total project length of approximately 1.1 miles, and would provide the following benefits:

- Provide space for bicycles along the roadway.
- Increase recovery area for errant vehicles.
- Enhance safety for motor vehicles, bicycles, and pedestrians.
- Higher design speed, fewer encroachments, and improved sight distance.
- Lesser grade than the six percent on the current alignment.
- Reduction in travel times and improved LOS.

- Allow for a lower speed limit, as well as truck weight limits, to be implemented on that portion of the existing alignment replaced by the new alignment as it would become a county road for local access.
- Remove interregional traffic volumes from existing highway.

SR 147 at Park in Clear Creek

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36
36
147
Clear Creek
A21
147
A13
Lake Almanor Peninsula
Peninsula Village
Hamilton Branch
PM 8.0
Plumas County
Lassen County
PM 7.0
147
Lake Almanor Country Club
PM 6.0
PM 5.0
Lake Almanor
PM 4.0
PM 3.0
PM 2.0
89
147
PM 1.0
Route 147
Exhibit 5
PM 0.0
89
Canyondam
N
No Scale
LEGEND
Existing State Routes
County Roads
Railroad BNSF
CONCEPTS
#1, 4' shoulders on existing alignment PM 0.0 to 7.4
#2, Passing lanes with 4' shoulders PM 3.9 to 4.7
#3, Combines Concept #1 and #2

36
36
147
Clear Creek
A21
147
A13
Lake Almanor Peninsula
Peninsula Village
Hamilton Branch
PM 8.0
Plumas County
Lassen County
PM 7.0
147
Lake Almanor Country Club
PM 6.0
PM 5.0
Lake Almanor
PM 4.0
PM 3.0
PM 2.0
89
147
PM 1.0
PM 0.0
89
Canyondam
LEGEND
Existing State Routes
County Roads
Railroad BNSF
CONCEPTS
#4, Potential new alignment PM 2.3 to 7.5
#5, Potential new alignment PM 2.3 to 7.5 and 4-foot shoulders PM 0.0 to 7.5
Route 147
Exhibit 6
D2
Caltrans
N
No Scale

D2
Caltrans
36
36
147
147
147
A21
A13
Clear Creek
Plumas County
Lassen County
Lake Almanor Peninsula
Peninsula Village
Hamilton Branch
Lake Almanor
Lake Almanor Country Club
N
No Scale
Route 147
Exhibit 7
LEGEND
Existing State Routes
County Roads
Railroad BNSF
CONCEPT
#6, Potential realignment
PM 0.2 to 1.3

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Appendix A – Glossary

Aa

Access Management: Involves managing where vehicles enter the highway to improve highway operations and reduce accidents.

Access Point: Location where vehicles can enter or exit a highway.

All-American Road: To receive an All-American Road designation, a road must possess multiple intrinsic qualities that are nationally significant and contain one-of-a-kind features that do not exist elsewhere. The road or highway must also be considered a 'destination unto itself.' That is, the road must provide an exceptional traveling experience so recognized by travelers that they would make a drive on the highway a primary reason for their trip.

Ancestral boundaries: The boundaries represent the areas that were once inhabited by Indian Tribes to camp, hunt, fish, and gather vegetation for food consumption and basketry material, or had sacred ceremonial and burial sites.

Annual Average Daily Traffic (AADT): Daily traffic that is averaged over a calendar year or fiscal year.

Arterial: A class of street that primarily serves through-traffic and major traffic movements.

Arterial Highway: A general term denoting a highway primarily used by through traffic usually on a continuous route.

Average Daily Traffic (ADT): The average number of vehicles passing a specified point during a 24-hour period. Frequently used in relation to the "peak-month" average daily traffic.

Bb

Bike Route Class: Classification of a bicycle facility. There are three classes:

Class I - (bicycle facility separate from roadway) provides completely separated right-of-way for the exclusive use of bicycles and pedestrians with cross flow minimized.

Class II - (designated bicycle facility adjacent to roadway) provides a striped lane for one-way bike travel on a street or highway.

Class III - (non-designated but open to bicycles) provides for shared use with pedestrians or motor vehicle traffic.

Cc

California Environmental Quality Act (CEQA): 1970 state legislation which requires state agencies to regulate activities with major consideration for environmental protection.

Caltrans or Department: California Department of Transportation.

Capacity: The number of vehicles that a facility can accommodate during a specified period of time. It represents the flow rate that can be achieved during peak periods of demand. Capacity is also used to estimate the maximum amount of traffic that a facility can accommodate while maintaining a prescribed level of operation (Level of Service).

Changeable Message Signs (CMS): Electronic signs that can change the message it displays. Often used on highways to warn and redirect traffic. Also referred to as variable or electronic message signs.

Clear Recovery Zone: An area clear of fixed objects adjacent to the roadway to provide a recovery zone for vehicles that have left the traveled way. A minimum clear recovery area of 20 feet on conventional highways and 30 feet on freeways and high-speed expressways is desirable.

Closed Circuit Television (CCTV): This ITS technology allows a camera to display remote verification of road and weather conditions, traffic conditions, and incidents. This television can have compatibility with other communications technologies, such as cable TV, kiosks, and the internet.

Collision: An unintended event that produces damage or injury.

Concept: A strategy for future improvements that will reduce congestion or maintain the existing level of service on a specific route.

Concept LOS: Used to describe the target operational condition for a facility during the twenty-year planning horizon of the Transportation Concept Report. Planning studies for projects to improve highway capacity should begin at the time when a highway segment is projected to reach the concept LOS.

Congestion: Defined as reduced speeds of less than 35 miles per hour for longer than 15 minutes.

Conventional Highway: A highway without control of access, which may or may not be divided. Grade separations at intersections or access control may be used when justified at spot locations.

Corridor: A set of essentially parallel transportation facilities for moving people and goods between two points.

Corridor Preservation: Identify and discuss the locations targeted for corridor preservation, and address existing and future rail and highway corridor, and seaport and airport facility land reservation needs.

Dd

Daily Vehicle Miles of Travel: An estimate of Annual Vehicle Miles of Travel is the product of AADT x Segment Length x 365 days.

Delay: The time lost while traffic is impeded by some element over which the driver has no control.

Design Speed: A speed selected to establish specific minimum geometric (horizontal, vertical, site distance) design elements for a particular section of highway.

District: Department of Transportation Districts.

Ee

Easement: A right to use or control the property of another for designated purposes.

Encroachment: Occupancy of project right-of-way by non-project structures or objects of any kind or character.

Ff

Facility Concept: General term used to describe the number of lanes and degree of access control on a state route or freeway. The term can be used to describe the existing facility or the future facility that will be required to handle projected traffic volumes within adopted level of service standards.

Fatal Plus Injury Actual: Contains specific data for accidents that are state highway related. Each accident record contains a ramp, intersection or highway post-mile address that ties it to the highway database.

Fatal Plus Injury Average: The Statewide Average Accident Rate (SWA) is based on a rated segment. The accident-rating factor (ARF) indicates how the existing segment compares to other segments on the State Highway System. The ARF is a comparison of the segment's accident rate to the statewide average accident rate for roads of the same type and having similar characteristics. Accident severity as well as accident frequency is considered in calculating the ARF.

Federal Highway Administration (FHWA): An agency of the US Department of Transportation that funds highway-planning programs.

Free Flow Speed: The average speed of vehicles on a given facility, measured under low-volume conditions, when drivers tend to drive at their desired speed and are not constrained by delay from traffic control devices.

Functional Classification: Guided by federal legislation, refers to a process by which streets and highways are grouped into classes or systems according to the character of the service that is provided (i.e., Principal Arterials, Minor Arterials and Major Collectors).

Gg

Geometric Design: Geometric design is the arrangement of the visible elements of a road such as alignment, grades, sight distances, widths, slopes, etc.

Goods Movement: The general term referring to the flow of commodities, modal goods movement systems, and goods movement institutions.

Grade: As used in capacity analysis, grade refers to the average change in elevation on the segment under study, expressed as a percentage.

Hh

Highway: Term applies to roads, streets, and parkways, and also includes right-of-way, bridges, railroad crossings, tunnels, drainage structures, signs, guard rails, and protective structures in connection with highways.

Highway Advisory Radio (HAR): An ITS technology that provides valuable information to travelers through prerecorded messages that contain traffic information, road conditions, chain requirements and road closures, etc. Transmission is generally accomplished through low-powered AM broadcast.

Highway Advisory Radio (HAR) Flasher: An ITS technology that signals the traveling public that information is available for a specific route via a nearby transmitting HAR.

Highway Capacity Manual (HCM): Updated in 2000 by the Transportation Research Board of the National Research Council, the HCM presents various methodologies for analyzing the operation (Level of Service) of transportation systems.

Highway Classification: For purposes of capacity analysis, separation of two-lane highways into Class I, II or III. Class I includes major interregional routes, Class II includes smaller links in the system and Class III includes segments of two-lane highway in smaller developed areas or communities.

Highway Trust Fund: Federal user fees on gasoline, etc. go into this fund. Used to reimburse states for federal-aid projects.

Ii

Incident Management: Technologies that allow transportation managers to identify and respond quickly to incidents on the highway system.

Initial Study: A preliminary analysis prepared by the lead agency to determine whether an environmental impact report (EIR) or negative declaration must be prepared pursuant to the California Environment Quality Act (CEQA).

Intelligent Transportation Systems (ITS): Use of advanced sensor, computer, and electronic systems to increase the safety and efficiency of the transportation system.

Intermodal: The ability to connect, and make connections between modes of transportation.

Interregional Transportation Strategic Plan (ITSP): The ITSP identifies six key objectives for implementing the Interregional Improvement Program and strategies and actions to focus improvements and investments. This document also addresses development of the interregional road system and intercity rail in California, and defines a strategy that extends beyond the 1998 State Transportation Improvement Program (STIP).

Intersection: The general area where two or more roadways join or cross, which include roadside facilities for traffic movements in that area.

Interstate Highway System: The system of highways that connects the principal metropolitan areas, cities, and industrial centers of the United States. The Interstate System also connects the US to internationally significant routes in Mexico and Canada.

Kk

Kilometer Post (KP): Using kilometers and counties, the KP system identifies specific and unique locations in the California highway system.

Ll

Left-Turn Lane: A storage area designated to only accommodate left turning vehicles.

Local Street or Local Road: A street or road primarily used for access to residences, businesses, or other abutting property.

Local Transportation Commission (LTC): A designated transportation planning agency for a county which is not within the jurisdiction of a statutorily created Regional Transportation Planning Agency (RTPA) or a Council of Governments (COG).

Mm

Maintained Miles: The length of a facility that is preserved and kept in the safe and usable condition to which it has been improved.

Maintenance Service Level (MSL): For maintenance purposes, routes within the state highway system are assigned a Maintenance Service Level classification of either Class 1, 2, or 3.

Mixed Flow: Traffic movement having automobiles, trucks, buses and motorcycles sharing traffic lanes.

Mode Choice: Type of transportation: auto, bicycle, bus, pedestrian, rail, etc.

Multimodal: The availability of transportation options using different modes within a system or corridor.

Nn

National Environmental Policy Act (NEPA): 1969 legislation requiring all federal agencies to prepare an environmental impact statement evaluating proposed federal actions which may significantly affect the environment.

National Scenic Byway (NSB): To be designated as a NSB, a road must possess at least one of the following six intrinsic qualities: archaeological, cultural, historic, natural, recreational, or scenic. The significance of the feature(s) contributing to the distinctive characteristics of the corridor's intrinsic qualities must be recognized throughout the multi-state region.

Non-Motorized Transportation Facility: That combination of vehicles and ways generally including bikeways, bicycles, sidewalks, bridle paths and horses which permit the transport of people.

Pp

Passing Lane: A lane added to improve passing opportunities in one direction of travel on a two-lane highway.

Peak:
1. The period during which the maximum amount of travel occurs. It may be specified as the morning (a.m.), or afternoon or evening (p.m.) peak.
2. The period during which the demands for transportation services is the heaviest.

Post-Mile (PM): Using miles and counties, the PM system identifies specific and unique locations in the California highway system.

Prescriptive: Type of easement that comes into existence without formal action because of long-term historical use in a corridor. A prescriptive right cannot be established over land owned by a governmental entity.

Public Participation: The active and meaningful involvement of the public in the development of transportation plans and programs.

Public Transportation: Transportation service to the public on a regular basis using vehicles that transport more than one person for compensation, usually but not exclusively over a set route or routes from one fixed point to another. Routes and schedules may be determined through a cooperative arrangement.

Rr

Region (Transportation Planning): A geographical area assigned to a Regional Transportation Planning Agency (RTPA) responsible for regional transportation planning.

Regional Transportation Plan (RTP): State-mandated documents to be developed biennially by all Regional Transportation Planning Agencies (RTPAs). They consist of policy, action, and financial elements.

Regional Transportation Planning Agency (RTPA): Created by AB 69 to prepare regional transportation plans and designated by the Business, Transportation and Housing (BT&H) secretary to receive and allocate transportation funds. RTPAs can be Councils of Government (COGs), Local Transportation Commissions (LTCs), Metropolitan Planning Organizations (MPOs), or statutorily-created agencies.

Rehabilitation: Activities which preserve the quality and structural integrity of a roadway by supplementing normal maintenance activities.

Relinquishment: A transfer of the state's right, title, and interest in and to a highway, or portion thereof, to a city or county.

Resurfacing: A supplemental surface or replacement placed on an existing pavement to restore its riding qualities or increase its strength.

Right-of-Way: Real estate acquired for transportation purposes, which includes the facility itself (highway, fixed guideway, etc.) as well as associated uses (maintenance structures, drainage systems, roadside landscaping, etc.).

Roadbed: That portion of the roadway extending from curb line to curb line or shoulder line to shoulder line. Divided highways are considered to have two roadbeds.

Roadway: That portion of the highway included between the outside lines of the sidewalks, or curbs and gutters, or side ditches including also the appertaining structures, and all slopes, ditches, channels, waterways, and other features necessary for proper drainage and protection.

Road Weather Information Systems (RWIS): This ITS system collects pavement temperature, visibility, wind speed and direction, and precipitation data and presents the data in a useable format to transportation system operators, potentially for the travelling public.

Ss

Safety Index: The traffic Safety Index is a tool for evaluating safety benefits which provides a measure of the accident dollars saved by the motorist expressed as a percentage of the sum of right-of-way (R/W) and construction costs.

Safety Roadside Rest: A roadside area provided for motorists to stop and rest for short periods. It includes paved parking areas, drinking water, toilets, tables, benches, telephones, information panels, and may include other facilities for motorists.

Segment: A portion of highway identified for analysis that is homogenous in nature.

Separate Turning Lane: An auxiliary lane for traffic in one direction, which has been physically separated from the intersection area by a traffic island.

Shoulder: The portion of the roadway contiguous with the traveled way for accommodation of stopped vehicles, for emergency use, and for lateral support of base and surface courses.

Signalized Intersection: A place where two roadways cross and have a signal controlling traffic movements.

Stakeholder: Individuals and organizations that are actively involved in the project, or whose interests may be positively or negatively affected as a result of project execution or project completion. They may also exert influence over the project and its results. In transportation, stakeholders include FHWA, CTC, RTPAs, transportation departments, transportation commissions, cities and counties, Native American Tribal Governments, economic development and business interests, resource agencies, transportation interest groups, the public and the Legislature.

State Freeway and Expressway System: The statewide system of highways declared by the Legislature to be essential to the future development of California.

State Highway Operation and Protection Program (SHOPP): A four-year program limited to projects related to state highway safety and rehabilitation.

State Routes: State highways within the state, other than Interstate and US routes, which serve intrastate and interstate travel. These highways can be freeways, expressways or conventional highways.

State Scenic Highway (SSH): The Legislature's intent is to designate certain portions of the state highway system as SSH to establish the state's responsibility for the protection and enhancement of California's natural scenic beauty by identifying those portions of the state highway system which, together with the adjacent scenic corridors, require special scenic conservation treatment. The Department shall establish and apply pertinent planning and design standards for development of official scenic highways.

State Transportation Improvement Program (STIP): Biennial document, adopted by the California Transportation Commission (CTC), which provides the schedule of projects for development over the upcoming five years.

Surface Transportation Assistance Act (STAA) Trucks: This act required states to allow larger trucks on the "National Network," which is comprised of the Interstate system plus the non-Interstate Federal-aid Primary System. "Larger trucks" includes (1) doubles with 28.5-foot trailers, (2) singles with 48-foot semi-trailers and unlimited kingpin-to-rear axle (KPRA) distance, (3) unlimited length for both vehicle combinations, and (4) widths up to 102 inches.

Tt

Terrain: The surface features of an area of land; topography. In capacity analysis, classification into one of three categories: flat, rolling or mountainous.

Thrie Beam: A standard Caltrans median barrier composed of 12-gauge, triple-corrugated galvanized steel beam mounted on wood posts and blocks.

Traffic Accident Surveillance and Analysis System (TASAS): A system that provides a detailed list and/or summary of accidents that have occurred on highways, ramps, or intersections in the State Highway System. Accidents can be selected by location, highway characteristics, accident data codes or any combination of these.

Traffic Conditions: Any characteristics of the traffic stream that may affect capacity or operation, including the percentage composition of the traffic stream by vehicle type and driver characteristics (such as the differences between weekday commutes and recreational drivers).

Traffic conflicts: Exist wherever two vehicles have the potential of occupying the same space.

Traffic Lane: The portion of the traveled way for the movement of a single line of vehicles.

Traffic Markings: All lines, words, or symbols (except signs) officially placed within the roadway to regulate, warn, or guide traffic.

Traffic Sign: A device mounted on a fixed or portable support, conveying a message or symbol to regulate, warn, or guide traffic.

Traffic Signal: A traffic control device regulating the flow of traffic with green, yellow and red phases.

Transit: Generally refers to passenger service provided to the general public along established routes with fixed or variable schedules at published fares. Related terms include:

public transit, mass transit, public transportation, urban transit and paratransit.

Transportation Concept Report (TCR): Planning document that identifies current operating conditions, future deficiencies, route concept, concept level of service (LOS) and conceptual improvements for a route or corridor.

Transportation Demand Management (TDM): "Demand-based" techniques for reducing traffic congestion, such as ridesharing programs and flexible work schedules enabling employees to commute to and from work outside of the peak hours.

Transportation Equity Act for the 21st Century (TEA21): As an addition to Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991, TEA21, which was enacted June 9, 1998, authorizes highway, highway safety, transit and other surface transportation programs for the following 6 years.

Transportation Improvement Program (TIP): Federally required annual schedule of projects for transportation development for the upcoming five years. A project must be in the appropriate regional-Federal TIP to receive Federal or CTC funding.

Transportation Management Center (TMC): A focal point that can monitor traffic and road conditions, as well as train and transit schedules, and airports and shipping advisories. From here, information about accidents, road closures and emergency notification is relayed to travelers.

Transportation Permits: The Department of Transportation has the discretionary authority to issue special permits for the movement of vehicles/loads exceeding statutory limitations on the size, weight and loading of vehicles contained in Division 15 of the California Vehicle Code. Requests for such special permits requires the completion of an application for a Transportation Permit from the office of Traffic Operations-Transportation Permits. Route Classes for length are labeled yellow, green, blue, brown and red. Route Classes for weight are labeled purple, orange and green. See http://www.dot.ca.gov/hq/traffops/permits/ for more information.

Transportation System Management (TSM): TSM is (1) a process oriented approach to solving transportation issues considering both short and long-term implications, and (2) a services and operations process in which low-cost, environmentally-responsive, and efficiency-maximizing improvements are implemented on existing facilities.

Travel Way: The portion of the roadway for the movement of vehicles, exclusive of shoulders.

Typical Section: Depiction of the basic (or typical) design elements/features for an existing or planned facility. Typical sections can be prepared for a variety of facilities, including: highway sections, lane transition areas, medians, interchanges, pavement structural sections, bike paths and drainage systems.

Uu

US Department of Transportation: The principal direct Federal funding agency for transportation facilities and programs. Includes the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), the Federal Railroad Administration (FRA), and others.

U.S. Forest Service Scenic Byway: "U.S. Forest Service Scenic Byways" can consist of a combination of federal, interstate, state and county roads. The route needs to showcase the outstanding scenery of the National Forest System, interpret the management activities of National Forests, as well as the cultural and national values and attractions, and cultivate partnerships with local communities and organizations to enhance rural economic diversity.

US Route: A network of highways of statewide and national importance. These highways can be freeways, expressways or conventional highways.

Vv

Vehicle Miles Traveled (VMT): Used in trend analysis and forecasts. (1) On highways, a measurement of the total miles traveled in all vehicles in the area for a specific time period. It is calculated by the number of vehicles multiplied by the miles traveled in a given area or on a given highway during the time period. (2) In transit, the number of vehicle miles operated on a given router or line or network during a specific time period.

Vista Point: A paved area beyond the shoulder, which permits travelers to safely exit the highway to stop and view a scenic area. In addition to parking areas, trash receptacles, interpretive displays, and in some cases rest rooms, drinking water and telephones may be provided.

Volume: The number of vehicles passing a given point during a specified period of time.

Ww

Weaving: The crossing of traffic streams, moving in the same general direction, accomplished by merging and diverging.

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