

# KONOCTI CORRIDOR VEHICLE MILES TRAVELED (VMT) STUDY

June 2024



*Prepared for:*



*Prepared by:*



[www.HeadwayTransportation.com](http://www.HeadwayTransportation.com)

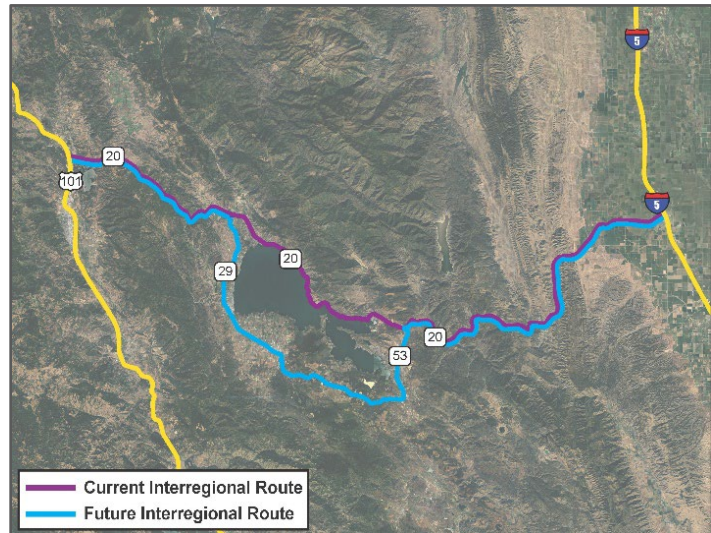
## YOUR QUESTIONS ANSWERED QUICKLY

### What is the purpose of this study?

The Konocti Corridor Vehicles Miles Traveled (VMT) Study examines the overall impact and VMT change associated with several interrelated planned projects on the Konocti Corridor; primarily the SR 29 improvement project. The Konocti Corridor encompasses state routes SR 29, SR 53, and SR 20 located around Clear Lake in Lake County, CA.

These projects aim to improve the corridor routes and ultimately reduce truck traffic on the northern SR 20 route and reroute it to the south via SR 20/SR 29/SR 53/SR 20. This will help promote the southern route as

the freight corridor and preferred interregional route and establish SR 20 as a local community route. This change is needed to facilitate and bolster the planned traffic calming and multimodal improvement projects on SR 20 and re-establish livable communities on the north shore.



Current and Future Interregional Routes

### What projects are planned?

In addition to the SR 29 project, the suite of projects also includes multimodal improvements on SR 20 to promote traffic calming and multimodal use as well as potential capacity and safety projects on SR 53. **Figure 1** illustrates the set of planned projects. These projects are referenced in the *2022 Lake County Regional Transportation Plan / Active Transportation Plan*, and are currently unfunded except for one segment of the SR 29 project.

### What is the impact to the VMT?

VMT is the sum of miles traveled by all vehicles in a specific area and time period. It is a key metric in evaluating



transportation projects. The analysis indicated the following:

- ▶ The planned projects on SR 29, SR 53, and SR 20 do not have a significant impact on the overall VMT within the study area. The overall VMT in the study area changed by +0.3 percent.
- ▶ The VMT increases on SR 29 and SR 53 and decreases on SR 20. This indicates that the projects (primarily the SR 29 improvement project) may alter traffic patterns and reroute a small portion of network trips. This is common for projects in a rural setting which typically do not induce demand.
- ▶ The VMT decreases on SR 20. This is a key benefit as this corridor is a community route, lined with residences, parks, and recreational areas. This route is planned for multimodal improvements, and it is desired for interregional traffic to reroute from SR 20 to routes SR 53 and SR 29.

### **What are the benefits of establishing SR 29 as the interregional route?**

SR 20 is a local route that runs through small communities which front the highway. It has a high density of driveways, intersections, and pedestrian crossings. To support livability, and SR 20 as a local route with more multimodal accommodations, it is important for trucks, recreational vehicles, and interregional traffic to shift use to corridors designed for that purpose – specifically SR 29 and SR 53. These routes have higher capacity, restricted access, and are appropriate for interregional and truck traffic.

### **What are the overall benefits of this suite of projects?**

The planned projects work together to benefit the entire Konocti Corridor. Separating traffic between the routes based on the trip purpose improves overall safety and efficiency, while having minimal impacts on VMT, emissions, and travel times. Previous reports highlight the benefits of individual projects, however, the overall benefits are:

- ▶ [Equity, access management](#), and livability improvements on local route SR 20 with multimodal accommodations and traffic calming.
- ▶ Capacity and reliability improvements on SR 29 and SR 53 creating more efficient truck and interregional routes.
- ▶ Safety and [evacuation](#) improvements for the Konocti Corridor.
- ▶ Climate Action Plan for Transportation Infrastructure (CAPTI) objectives met.

### **How do these projects [address the CAPTI](#)?**

The Climate Action Plan for Transportation Infrastructure (CAPTI) provides a framework for future state transportation funding decisions that support climate, environmental, equity, and other goals. This report demonstrates that the project will achieve the goals of CAPTI by:



- ▶ Safe multimodal infrastructure and equitable improvements to economically disadvantaged communities (SR 20 project).
- ▶ Safety and evacuation improvements (all projects).
- ▶ Low VMT impact (all projects).
- ▶ Reduced emissions through Alternatives Fuels Corridor infrastructure and designation (SR 29 project).
- ▶ Minimal disruptions and impacts during construction (all projects).
- ▶ Transit improvements (Transit Center off SR 53).





## TABLE OF CONTENTS

INTRODUCTION .....	1
PLANNED PROJECTS .....	3
ROADWAY NETWORK OVERVIEW .....	5
VMT ANALYSIS.....	6
VMT RESULTS .....	8
PROJECT BENEFITS.....	10
CAPTI OBJECTIVES MET .....	22
CONSIDERATIONS AND RECOMMENDATIONS .....	24
KEY FINDINGS.....	25

### LIST OF FIGURES

Figure 1. Planned Projects and Multimodal Improvements .....	2
Figure 2. Existing and Planned Number of Lanes .....	12
Figure 3. Approximate Driveway, Intersection, and Pedestrian Crosswalk Densities (SR 20) .....	14
Figure 4. Approximate Driveway, Intersection, and Pedestrian Crosswalk Densities (SR 29) .....	15
Figure 5. Approximate Driveway, Intersection, and Pedestrian Crosswalk Densities (SR 53) .....	16
Figure 6. Summary of Key Findings and Recommendations.....	27

### LIST OF TABLES

Table 1: VMT Results .....	7
Table 2: Summary of Future Plus Projects Model Scenario Modifications.....	8
Table 3: VMT Plus Projects Results.....	9
Table 4: Vehicles Per Lane Analysis.....	11
Table 5: Driveway, Intersection, and Pedestrian Crosswalk Densities .....	13
Table 6: Konocti Corridor Travel Measured Times and Speeds .....	19
Table 7: Potential Post Project Travel Times .....	20

### LIST OF APPENDICES

- A. VMT Calculations
- B. Travel Time Data



## INTRODUCTION

### *Purpose and Goals*

The overall purpose of the Konocti Corridor Vehicle Miles Traveled (VMT) Study is to assess the routes and planned projects qualitatively and quantitatively within the study limits to demonstrate how a suite of projects are interconnected and evaluate the overall benefits to the area.

The Konocti Corridor encompasses state routes SR 29, SR 53, and SR 20 located around Clear Lake in Lake County, CA. The northern route is SR 20, and the southern route runs along SR 29 and SR 53. The Study Area is shown in **Exhibit 1** and the current and potential future interregional routes are shown in **Exhibit 2**.

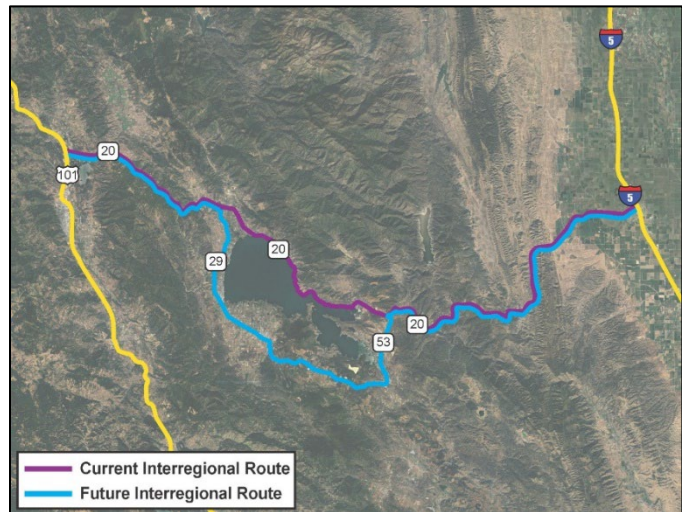


**Exhibit 1. Study Area**

The study limits are:

- ▶ SR 20: SR 29 to SR 53
- ▶ SR 29: SR 20 to SR 53
- ▶ SR 53: SR 29 to SR 20

The Konocti Corridor Project includes a suite of planned projects with the goal of establishing the southern route (SR 29 and SR 53) as the preferred interregional route rather than the current northern route along SR 20. The planned projects include multimodal and traffic calming improvements through the communities along SR 20, an eight-mile project on SR 29 to add lanes and improve the roadway, and potential intersection and/or roadway improvements on SR 53. **Figure 1** shows the project area and an overview of the planned projects.

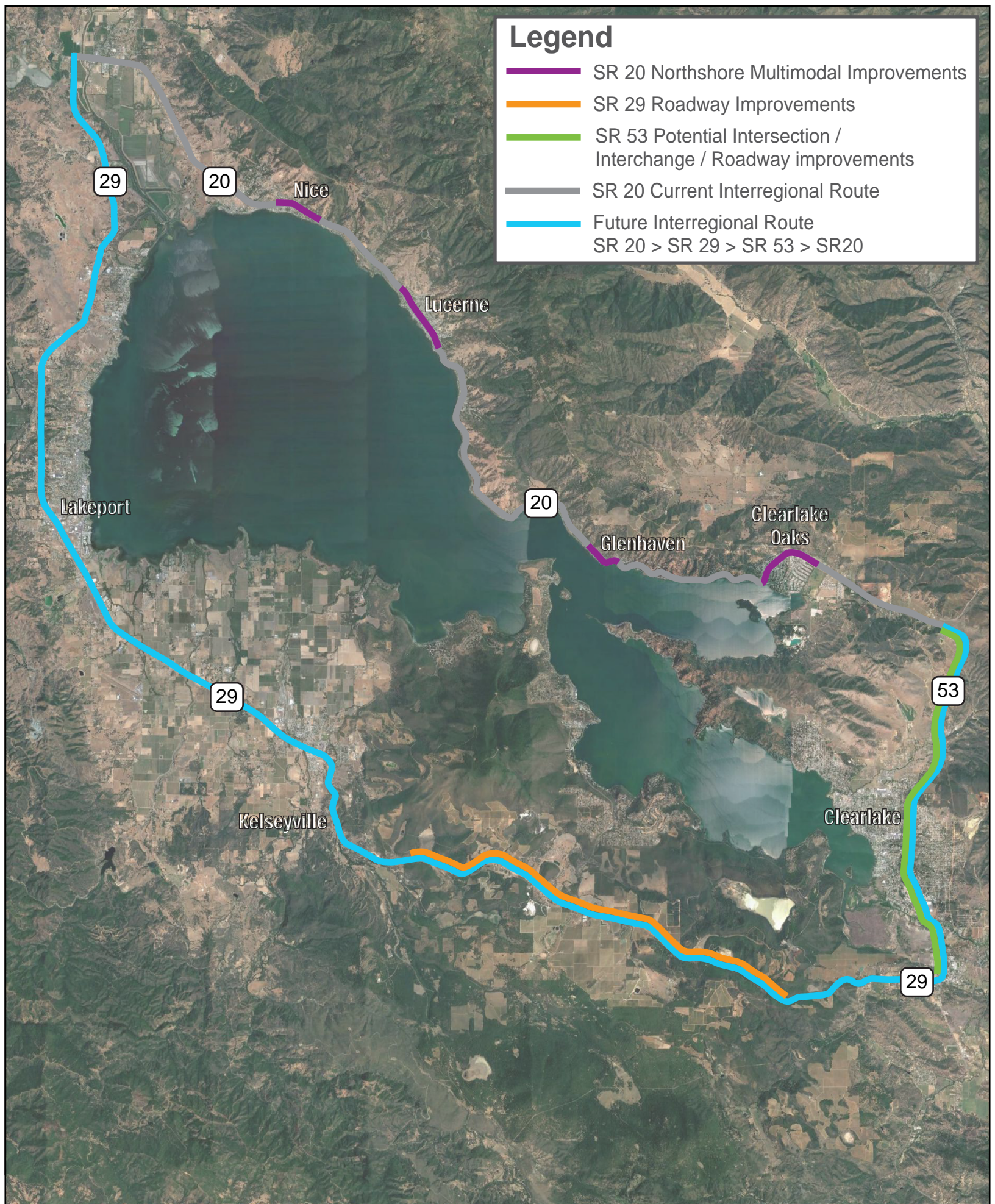


**Exhibit 2. Current and Potential Future Interregional Routes**



# Legend

- SR 20 Northshore Multimodal Improvements
- SR 29 Roadway Improvements
- SR 53 Potential Intersection / Interchange / Roadway improvements
- SR 20 Current Interregional Route
- Future Interregional Route  
SR 20 > SR 29 > SR 53 > SR20





## PLANNED PROJECTS

The Konocti Corridor Project strives to accomplish regional goals including:

- ▶ Promoting the designation of SR 20 in the Konocti Corridor limits as a Pedestrian Safety Corridor.
- ▶ Establishing the southern route as the interregional route.

Each of the individual projects has studies documenting the benefits and measures of effectiveness. This report analyzes the various benefits of the set of projects as a whole, evaluating the effects on the VMT of the network, and other components such as emissions, safety, evacuation, etc. This report also describes how the projects meet the criteria for the Climate Action Plan for Transportation Infrastructure (CAPTI). The following studies provide individual project details and benefits:

- ▶ *Lake 29 Study - Final Environmental Impact Report/Environmental Assessment and De Minimis Section 4(f)* (Caltrans 2016)
- ▶ *SR 20 Northshore Communities Traffic Calming Plan and Engineered Feasibility Study* (W-Trans June 2020)
- ▶ *State Route 53 Corridor Local Circulation Study* (TJKM March 2022)
- ▶ *2022 Lake County Regional Transportation Plan/Active Transportation Plan* (Lake Area Planning Associates/Dow & Associates)

### **SR 29 Improvements (All Segments)**

SR 29 serves the local communities of Lakeport, Kelseyville, Lower Lake, and Middletown, as well as interregional and truck traffic between US 101 and Interstate 5 (I-5). It has four existing lane segments, and it is the primary link between the incorporated and commercial areas of Lakeport and Clearlake, CA.

The SR 29 project includes adding lanes along an eight-mile portion, going from two lanes to four lanes divided with realigned portions. The project creates a four-lane expressway, with acceleration and deceleration lanes, frontage roads at connected roadways, and improves access management at intersections. The overall anticipated project benefits are improved level of service, additional capacity, capacity for emergency services and evacuations, and accommodation of interregional traffic. The project also provides safety benefits by improving horizontal and vertical alignment,

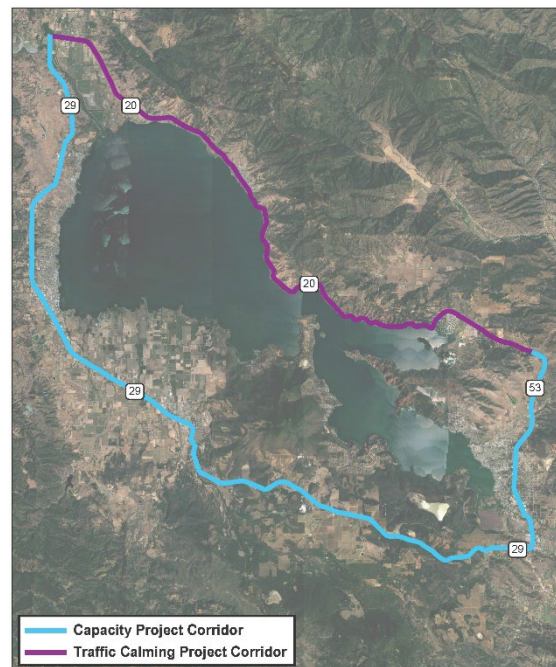


Exhibit 3. Konocti Corridor Projects Designation





and providing passing lanes, shoulder medians, and clear zones. The project is broken into three segments: 2A (PM 23.6-26.9), 2B (PM 26.1-29.1), and 2C (PM 28.5-31.6). Segments 2A and 2B are funded through design. Segment 2C was completed in June 2023.

PLANNED PROJECTS

Capacity and traffic calming projects work together to promote SR 29 as the preferred interregional route.

### ***SR 20 Northshore Multimodal Improvements***

This project identifies multimodal improvements needed to enhance livability in the local SR 20 corridor and provide traffic calming measures in the communities of Nice, Lucerne, Glenhaven, and Clearlake Oaks. Improvements include bike lanes, new pedestrian crossings, enhanced pedestrian crossings, sidewalks, and lighting improvements. Several Complete Streets projects have been programmed in the State Highway Operation and Protection Program (SHOPP). Lucerne Complete Streets is currently in its environmental phase (2024 SHOPP) with construction scheduled for December 2028. Other projects are slated for inclusion in the 2026 SHOPP.

### ***SR 53 Improvements***

The associated study (*State Route 53 Corridor Local Circulation Study*, TJKM March 2022) identifies intersection improvements along SR 53 with the goal of reducing delays and travel times, improving safety, and promoting efficient travel consistent with expressway standards. The study identifies the overarching goals of promoting interregional travel on the corridor and diverting truck traffic away from SR 20. Many potential short-term and long-term improvements were identified. For the purpose of measuring study area VMTs, projects are assumed to be as recommended in the Introduction section of the reports as:

- ▶ Interchange at SR 53 / 18th Avenue: Replacing the existing signalized intersection.
- ▶ Interchange at SR 53 / 40<sup>th</sup> Avenue: "...to be constructed when justified and programmed," replacing the existing signalized intersection.
- ▶ Access to SR 53 at Dam Road: To be closed and terminated on both sides of SR 53, eliminating the signalized intersection when the 18th Avenue interchange is constructed.

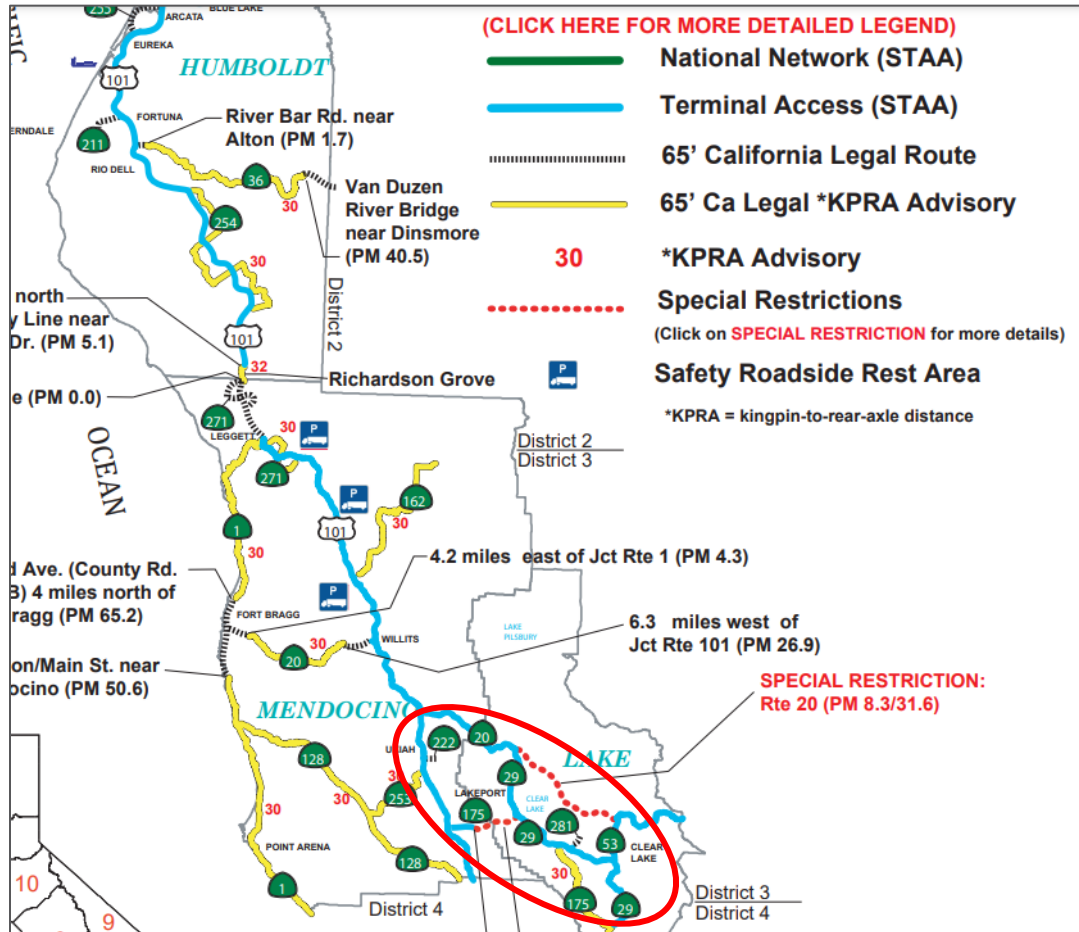
*It is noted that the exact projects and timing of projects on SR 53 is unknown. For the VMT analysis, modifications were coded to represent intersection and capacity improvements that would generally cover similar types of improvement projects.*



## ROADWAY NETWORK OVERVIEW

### Truck Routes

Caltrans has designated the southern route as a *Terminal Access* route and the northern route as a restricted route, as shown in **Exhibit 4**. The restriction states: “No vehicles transporting hazardous materials/waste due to adjacent waters (Otherwise, route is Terminal Access).”



**Exhibit 4. Caltrans Truck Routes**  
 Source: Caltrans

The restriction on SR 20 reinforces that the southern route is more suitable for truck traffic.

### Classifications

**Exhibit 5** shows the existing Caltrans classifications and illustrates that all routes in the Konocti Corridor are classified as *Other Principal Arterial*.



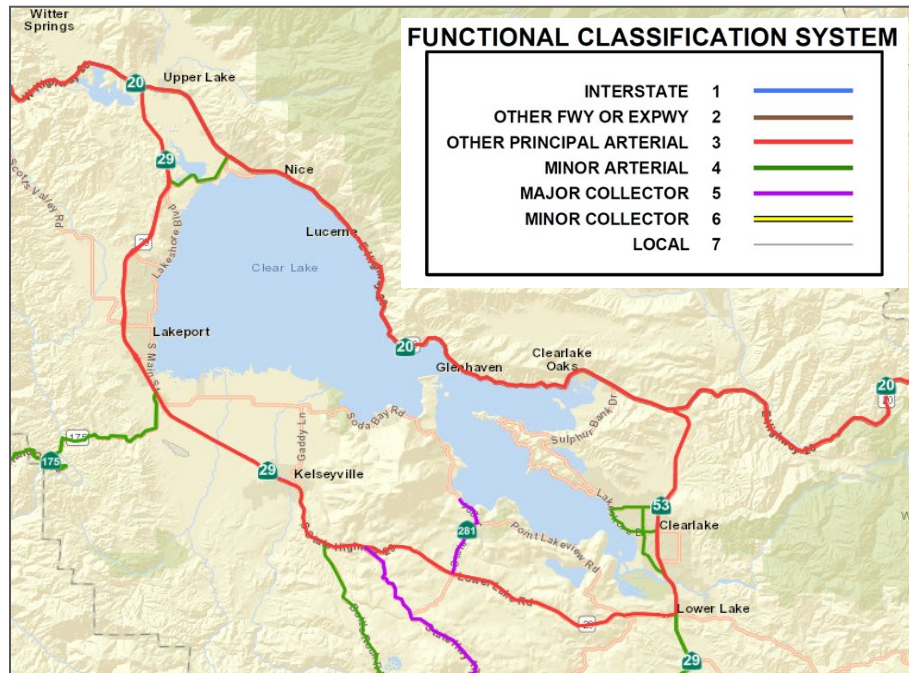


Exhibit 5. Roadway Classifications  
Source: Caltrans

The following roadway classifications were noted in other studies and/or sources:

- ▶ The SR 29 improved segment will be reclassified as an Expressway per the *Lake 29 EIR*.
- ▶ SR 53 is classified as an Expressway per the *State Route 53 Corridor Local Circulation Study*.
- ▶ SR 20 per the *SR 20 Northshore Communities Traffic Calming Plan and Engineered Feasibility Study* is designated as follows: “Highway 20 is classified by Caltrans as a minor arterial roadway, but due to its function as a through traffic route, it operates more like a principal arterial.” The RTP also classifies the roadway as a Minor Arterial in the study limits.

## VMT ANALYSIS

The VMT analysis is a state legislation initiative derived from Senate Bill (SB) 743 which changed the primary method of evaluating transportation projects for CEQA analysis from level of service to VMT. The VMT is the sum of miles traveled by all vehicles in a specific area and time period. The VMT calculation details are in **Appendix A**.

### **Travel Demand Model Data and VMT Methodology**

The travel demand model used in the VMT analysis is the Lake-Mendocino Travel Demand Model (LMTDM). The model area incorporates both counties, was updated in 2023, and includes the base year 2019 and the future year 2050.



VMT analysis using a travel demand model incorporates network links and trips (i.e., vehicles traveling from zone to zone based on socioeconomic data) and calculates the total vehicles multiplied by the number of miles traveled – with and without modifications to the roadway network. The following scenarios were evaluated for the Study Area:

- ▶ Base Year (2019)
- ▶ Future Year (2050)
- ▶ Future Year plus Projects – With the planned projects on SR 29, SR 20, and SR 53 coded

**Table 1** shows the Existing and Future Year (2050) VMT results for the study links.

**Table 1: VMT Results**

Corridor/Region	VMT (per day)	
	Existing	Future Year (2050)
SR 29	287,369	292,170
SR 53	100,093	103,186
SR 20	145,482	146,706

**Table 1** indicates that VMT increases slightly from the Existing to the Future Year (no changes) conditions. This is expected as traffic volumes generally increase over time.

***Planned Projects***

The full detail of all modifications to the roadway network for the VMT analysis based on the planned projects is in **Appendix A**. A summary of planned projects and the associated modifications for the *Future Plus Projects* model scenario is shown in **Table 2**.





**Table 2: Summary of Future Plus Projects Model Scenario Modifications**

Project Name	Corridor	Project Description	Network Coding Modifications (Future + Projects Scenario)		
			Number of Lanes	Facility Type	Speed & Other
SR 29 Improvements	SR 29	Adding lanes and other roadway improvements along an eight-mile segment (two lanes to four divided lanes with realigned portions)  <a href="#">Additional Detail</a>	From 2 to 4	From 3 (Principal Arterial) to 2 (Expressway)	Speed Increase from 45 to 50 mph
SR 20 Multimodal Improvements	SR 20	Multimodal improvements in the communities of Nice, Lucerne, Glenhaven, and Clearlake Oaks including bike lanes, new pedestrian crossings, enhanced pedestrian crossings, sidewalks, and lighting improvements  <a href="#">Additional Detail</a>	No Change	From 3 (Principal Arterial) to 4 (Minor Arterial)	Speed Reduction by 5 mph (various speeds along SR 20)
SR 53 Corridor Improvements	SR 53	Intersection and interchange improvements as identified in the <i>SR 53 Corridor Local Circulation Study</i> (TJKM 2022)  <a href="#">Additional Detail</a>	No Change	No Change	Code Intersection Modifications (increased the segment post speed by 5 mph)

**Mode Shift**

The SR 20 multimodal improvements and other projects are not expected to cause a significant mode shift from vehicle to transit, bicycle, or walking. While a small shift may occur, the traffic volumes were not reduced to reflect a mode shift.

**VMT RESULTS**

The model was processed with the modifications described in **Table 2**, and the results were compared to the Future (no modifications) VMT. The changes may impact both local and interregional trips, leading to vehicles choosing different paths between their origin and destination. **Table 3** shows the VMT calculations. The results are shown in vehicle miles traveled per day.



**Table 3: VMT Plus Projects Results**

Corridor/Region	VMT (per day)		% Change (Future to Future PP)
	Future Year (2050)	Future Year + Projects	
SR 29	292,170	309,412	5.90%
SR 53 <sup>1</sup>	124,408	138,824	11.59%
SR 20	146,706	138,268	-5.75%
<i>Sum SR 29, 53<sup>1</sup>, 20</i>	<i>563,284</i>	<i>586,504</i>	<i>4.12%</i>
Adjacent Network Links	3,455,992	3,443,438	-0.36%
Network Sum	4,019,276	4,029,942	0.27%

*Notes: 1. For purposes of comparing Future to Future Plus Projects, adjacent links were included for SR 53 to capture local diversions/reroutes from the SR 53 projects, including the Dam Road closure.*

The results indicate that:

- ▶ The VMT increases on SR 29. Rerouted trips from SR 20 to an improved route SR 29 with increased capacity and speeds are expected to be a primary factor in this increase.
- ▶ The VMT increases on SR 53. The VMT analysis for SR 53 includes adjacent streets since one potential project (the Dam Road closure at SR 53) would reroute local trips to the adjacent network, impacting the VMT directly on SR 53. Rerouted trips from SR 20 and local impacts of the projects are expected to be primary factors in this increase.
- ▶ The VMT decreases on SR 20. Interregional trips diverting to SR 53 and SR 29 is expected to be a primary factor in this decrease.
- ▶ The “Network Sum” includes all the links adjacent to and connecting to the study area roadway links. *The overall change in VMT is minimal at 0.3 percent, indicating that for the overall area these projects are not inducing demand, but rerouting trips to more appropriate roadways.*

**Induced Demand in Rural Settings**

The results mimic what is generally expected in roadway projects in rural settings in regard to induced demand. The SR 29 project is not expected to create additional demand for the roadway network, but potentially alter traffic patterns. Studies have generally indicated that roadway projects in rural settings that do not significantly change roadway and speed parameters typically do not induce significant demand. Induced demand in a rural setting is currently

VMT RESULTS

The VMT for the network is similar with and without the projects. This is expected given the nature of the induced demand in a rural setting.



being studied in detail as part of the *Nevada County Transportation Rural Counties Task Force: Rural Induced Demand Study*<sup>1</sup>.

Similarly, the *Lake 29 Study – Final Environmental Impact Report/Environmental Assessment and De Minimis Section 4(f)* (Caltrans 2016) indicated that the estimated VMT for the alternative was expected to be similar to the No Build Conditions.

## PROJECT BENEFITS

### **Roadway Capacity**

The *Lake 29 Study* and follow-up environmental assessments demonstrate that the SR 29 improvement project is needed to address capacity deficiencies and provide opportunities for passing.

**Figure 2** shows the number of lanes and major intersection controls located along the corridor. The entire length of SR 20 has two through lanes (one in each direction), with some portions including a two-way left turn lane. SR 29 and SR 53 both have varying cross sections, ranging from two lanes undivided to four lanes divided or with a two-way left turn lane. Generally, the segments with more lanes are through cities or communities. As the figure illustrates, SR 29 and SR 53 are more suitable routes for trucks, recreational vehicles and motorists passing through the county.

CAPACITY

SR 29 and SR 53 have higher capacities than SR 20 to carry daily traffic volumes.

Average Annual Daily Traffic (AADT) data for the roadways within the study area is available from Caltrans. Traffic volumes along various segments were compared to the number of through lanes and are presented in **Table 4**. The vehicles per lane are color coded from red (highest ratio of vehicles per lane) to green (lowest ratio of vehicles per lane).

---

<sup>1</sup> <https://www.nctc.ca.gov/Reports/RCTF-Rural-Induced-Demand-Study/index.html>



**Table 4: Vehicles Per Lane Analysis**

CALTRANS DATA - Daily and Peak Hour Volumes								Vehicles/Lane**			
Rte	Post Mile	DESCRIPTION	BACK PEAK HOUR	BACK AADT	AHEAD PEAK HOUR	AHEAD AADT	# of Thru Lanes	BACK PEAK HOUR	AHEAD PEAK HOUR	BACK AADT	AHEAD AADT
29	21.650	SEIGLER CANYON RD	1150	11600	1050	10600	3	383	350	3867	3533
	22.190	POINT LAKEVIEW DR	1050	10600	860	9100	3	350	287	3533	3033
	27.89*	JCT. RTE. 281	860	9100	900	9300	2	430	450	4550	4650
	31.05*	JCT. RTE. 175	900	9300	1000	9850	2	450	500	4650	4925
	41.423	LAKEPORT, LAKEPORT BLVD	1300	13000	1350	13500	4	325	338	3250	3375
	47.849	LUCERNE	980	10400	700	7000	4	245	175	2600	1750
53	0.000	LOWER LAKE, JCT. RTE. 29			2100	17700	4		525		4425
	1.470	OLD STATE HIGHWAY	2100	17700	2200	18300	4	525	550	4425	4575
	2.960	40TH AVE			970	8500	2		485		4250
	2.960	40TH AVE	2200	18300			4	550		4575	
	7.445	JCT. RTE. 20	560	5700			2	280		2850	
20	8.319	JCT. RTE. 29 SOUTH	1150	10050	1750	7700	2	575	875	5025	3850
	12.199	LUCERNE CUTOFF	1000	9800	1250	12000	2	500	625	4900	6000
	18.530	LUCERNE, EAST; BELL RAY AVE	910	8700	780	7500	2	455	390	4350	3750
	25.970	CLEAR LAKE OAKS, EAST	610	5800	700	10300	2	305	350	2900	5150
	31.525	JCT. RTE. 53 SOUTH	900	8500	900	8500	2	450	450	4250	4250
	31.620	JCT. RTE. 53 SOUTH	900	8500	940	7300	2	450	470	4250	3650

\*In limits of proposed SR 29 project






\*\*Color coding is graded from highest value in red to lowest value in green

**Table 4** shows that SR 29 and SR 53 generally have more lanes and therefore available capacity. SR 20 shows more segments of higher volume per lane, indicating that rerouting traffic to SR 29 and SR 53 which have additional capacity would be beneficial.

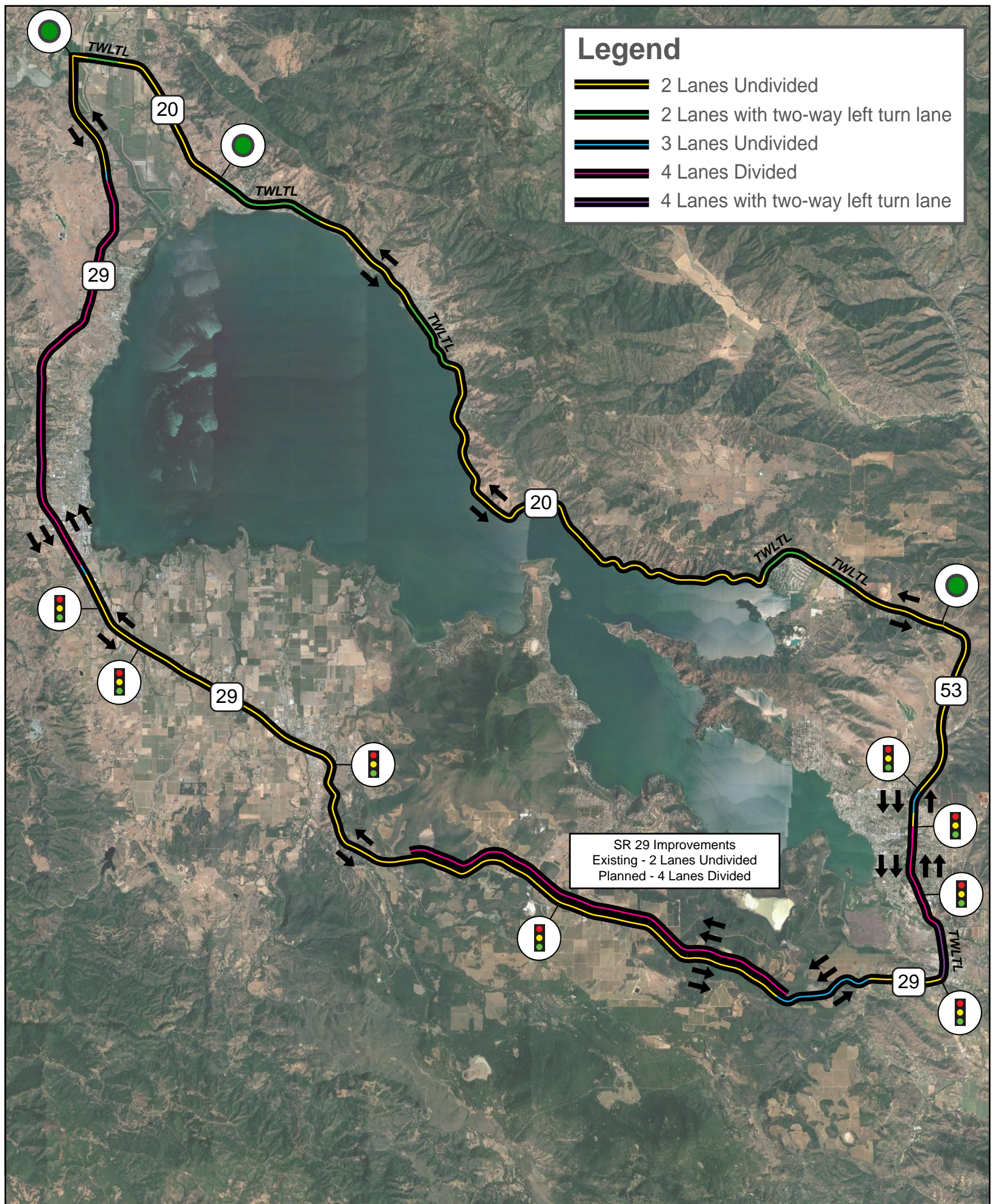




# Legend

-  2 Lanes Undivided
-  2 Lanes with two-way left turn lane
-  3 Lanes Undivided
-  4 Lanes Divided
-  4 Lanes with two-way left turn lane

SR 29 Improvements  
 Existing - 2 Lanes Undivided  
 Planned - 4 Lanes Divided





**Access Management and Conflicts**

The number of lanes and density of driveways, intersections, and pedestrian crosswalks were evaluated for all routes in the study area. **Table 5** and **Figures 3** through **5** show the driveway, intersection, and pedestrian crosswalk densities on the various routes.

**Table 5: Driveway, Intersection, and Pedestrian Crosswalk Densities**

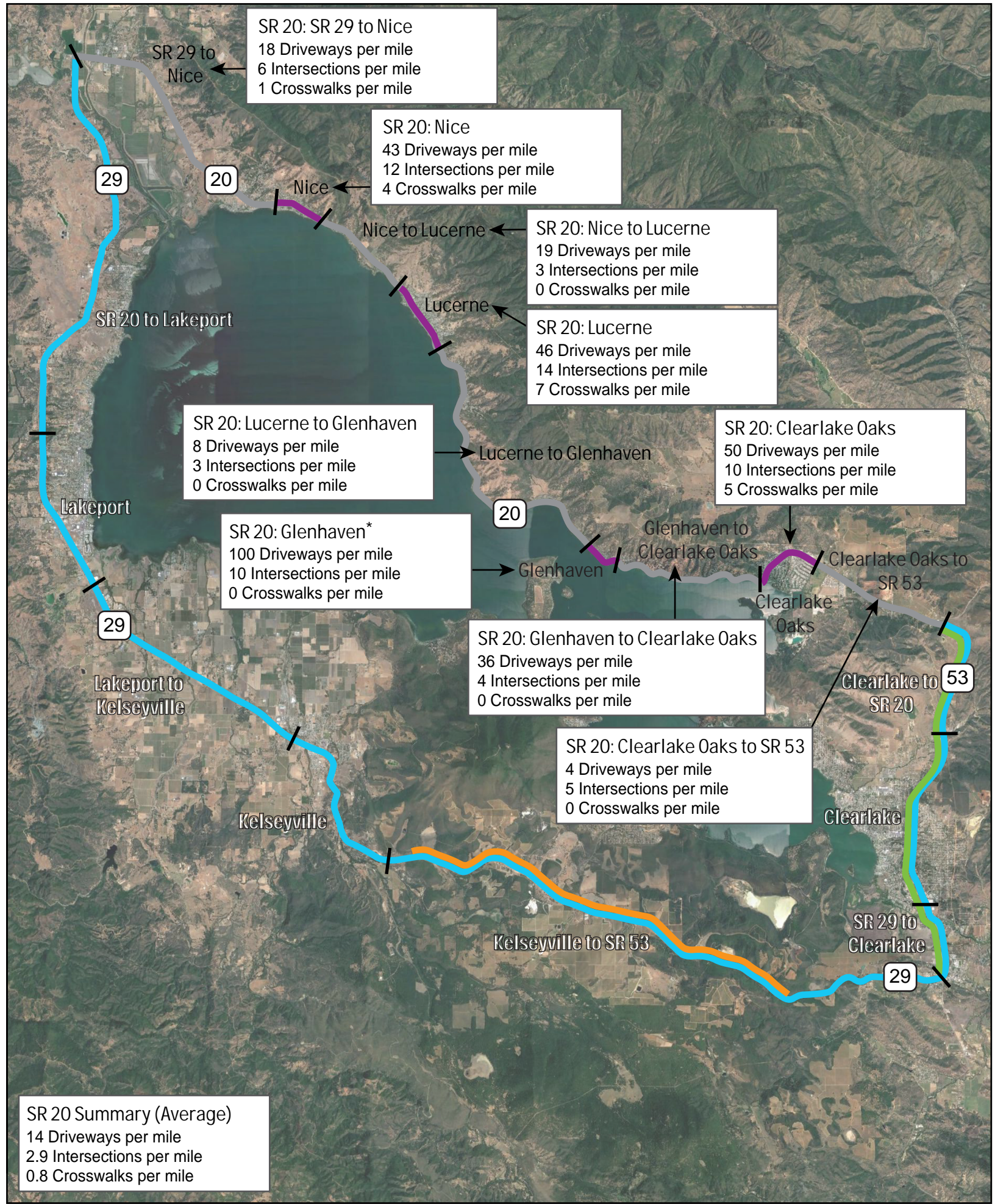
Route	Segment	Approx. Length (miles)	Approx. Driveways per mile	Approx. Intersections per mile	Approx. Pedestrian Crosswalks per mile
SR 20	SR 29 to Nice	5.2	18	6	1
	Nice	1	43	12	4
	Nice to Lucerne	2	19	3	0
	Lucerne	1.4	46	14	7
	Lucerne to Glenhaven	6.3	8	3	0
	Glenhaven	0.3	100	10	0
	Glenhaven to Clearlake Oaks	3	36	4	0
	Clearlake Oaks	1.5	50	10	5
	Clearlake Oaks to SR 53	2.5	4	5	0
SR 29	SR 20 to Lakeport	7.8	2	0	0
	Lakeport	3.2	0	0	0
	Lakeport to Kelseyville	4.8	0	1	0
	Kelseyville	3.3	2	2	1
	Kelseyville to SR 53	11.6	4	1	0
SR 53	SR 29 to Clearlake	1.5	10	5	1
	Clearlake	3.4	0	2	1
	Clearlake to SR 20	2.6	2	1	0
Density Factor: Northern SR 20 Route / Southern SR 29 and SR 53 Route			28	8	7

**DENSITY FACTORS**

SR 20 has significantly more driveways, local street intersections, and crosswalks than SR 53 and SR 29, making it more suitable for local traffic, and SR 29 and SR 53 more suitable for interregional traffic.







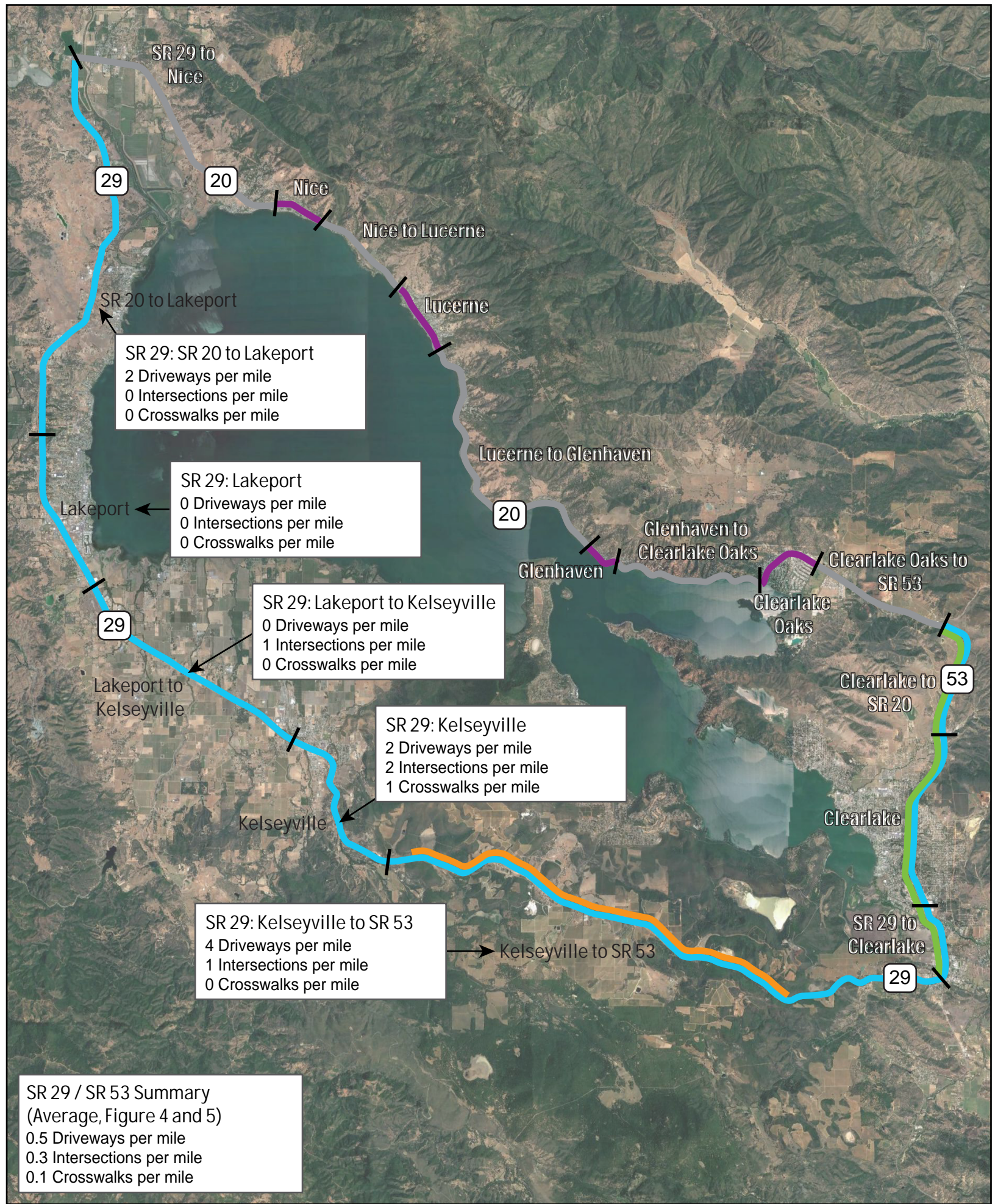
**SR 20 Summary (Average)**  
 14 Driveways per mile  
 2.9 Intersections per mile  
 0.8 Crosswalks per mile



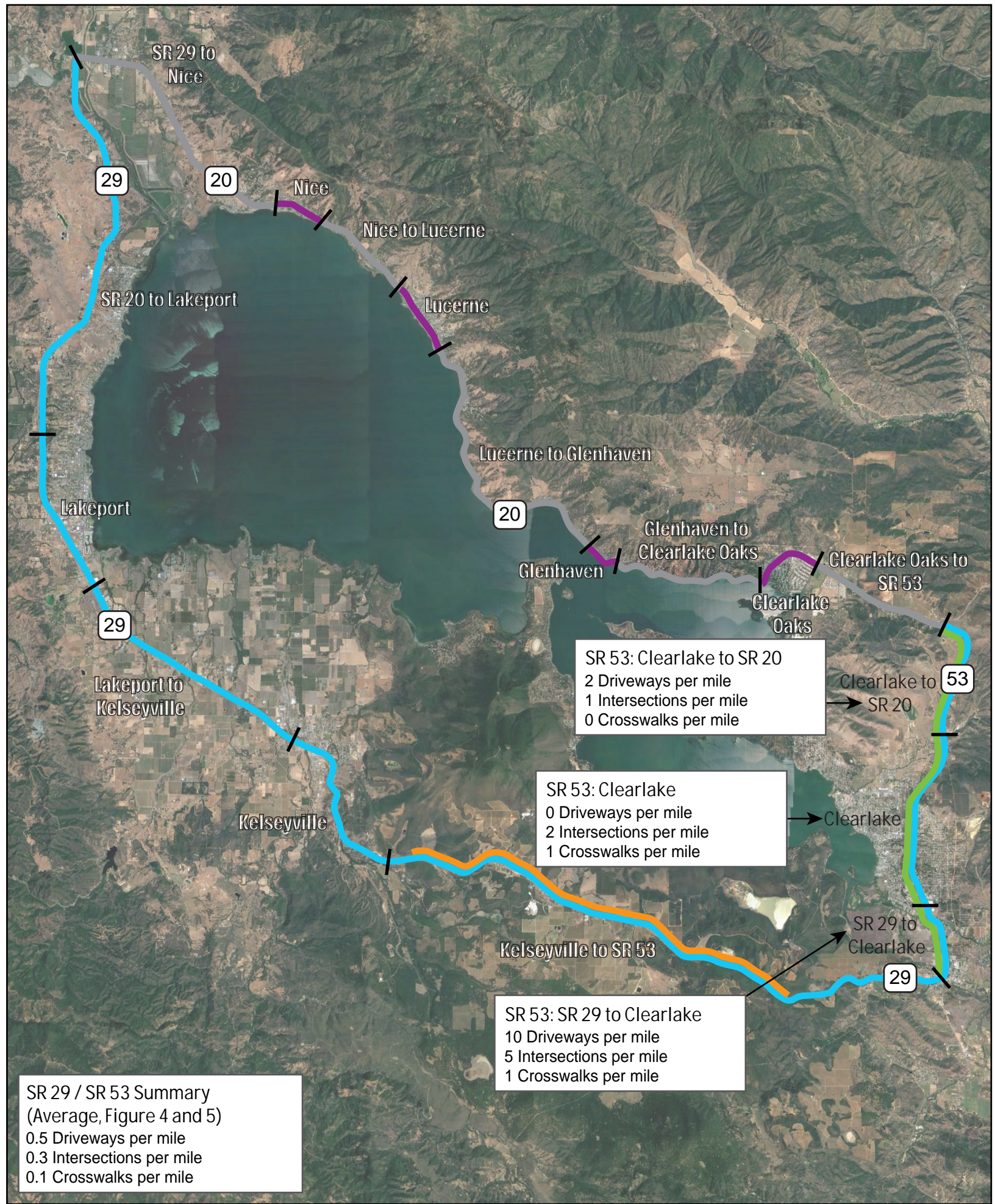
— Approximate Segment Limits \*Short Segment, 0.3 miles

**Figure 3**  
 Konocti Corridor  
 Vehicle Miles Traveled Study  
 Approximate Driveway, Intersection, and Pedestrian Crosswalk Densities (SR 20)









| - Approximate Segment Limits

Figure 5  
Konocti Corridor  
Vehicle Miles Traveled Study  
Approximate Driveway, Intersection, and Pedestrian Crosswalk Densities (SR 53)



DENSITY FACTORS

SR 20 has more curves, parks, bus stops, on-street parking, etc. than SR 53 and SR 29, making it more suitable for local traffic and less suitable for interregional traffic.

Per **Table 5**, there are approximately 28 times more driveways per mile on the northern route (SR 20) than on the southern route (SR 29 and SR 53). Similarly, there are eight times more intersections per mile and seven times more pedestrian crosswalks per mile. SR 20 is lined with homes, small businesses, schools, and parks, and

serves as the primary arterial for several local communities. **Table 5** illustrates that SR 29 and SR 53 have far lower driveway, intersection, and pedestrian crosswalk densities than SR 20, indicating that these routes are more appropriate to accommodate trucks, recreational vehicles, and interregional traffic. SR 20 is more appropriate for local, community traffic.

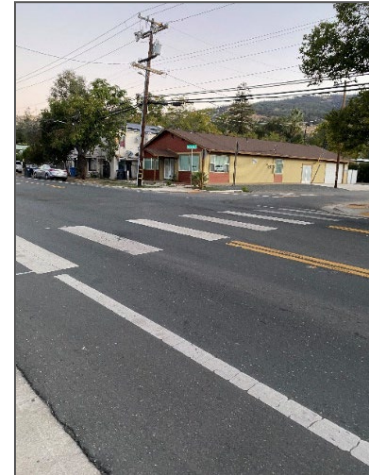


Exhibit 6. Crosswalks on SR 20

The SR 29 project will reduce the number of driveways and intersections through the construction of frontage roads, further lowering the density, and thus reinforcing this route as the more appropriate choice for interregional and truck traffic.

**Side Friction and Congestion Considerations**

In addition to the access management/driveway density assessment, the routes were also evaluated for elements that would promote their appropriateness as local versus interregional routes. The following elements were noted during travel time assessments/field visits (approximated/estimated over multiple runs):

- ▶ SR 20 has nine advisory speed curves, and several segments of limited sight distance curves; SR 29/SR 53 route has seven.
- ▶ SR 20 has 26 unsignalized pedestrian crosswalks; the SR 29/SR 53 route has none.
- ▶ Approximately 45 parked cars and six pedestrians were observed on SR 20; neither were observed on SR 29/SR 53.
- ▶ Two schools and several parks line SR 20, while neither exist on SR 29/SR 53. School buses were observed stopping on SR 20 for student pick-up/drop-off.
- ▶ SR 20 is lined with many residences, with mail services and trash services occurring directly on SR 20. This results in slowed/stopped traffic several times a day/week. Very few residences were noted on SR 29/SR 53.



Exhibit 7. Lucerne Creek Park on SR 20



## Evacuation

All routes in the study area – SR 20, SR 29, and SR 53 – are primary travel corridors and main evacuation routes. The improvements on SR 29 would provide important evacuation and emergency service benefits including:

EVACUATION



Improvements on SR 29 have evacuation related benefits.

- ▶ Constructing a four-lane facility, providing additional capacity, and eliminating potential bottlenecks on a key evacuation route.
- ▶ Removing fixed objects, widening shoulders, and installing a median. These modifications will improve access for emergency services while also providing a firebreak.
- ▶ Constructing frontage roads to consolidate access points, thereby facilitating evacuation flow.
- ▶ Reducing interregional, recreational vehicle and truck traffic on SR 20, thereby increasing available capacity, and expediting evacuation of the communities along SR 20.

## Safety Analysis

Each project has documented the safety benefits and/or crash reduction potential of its respective improvements. For the SR 29 projects, the demonstrated safety benefits include “improvements to the horizontal and vertical alignment, addition of lanes that would create safer passing opportunities, removal of fixed objects, widening of shoulders, and the addition of a 36-foot unpaved median that would provide safety benefits to motorists in terms of increased sight distance, enhanced recovery areas, separation of traffic, and minimized exposure to fixed objects. The proposed project is expected to improve overall safety for bicyclists by providing widened shoulders that bicyclists can use, thus reducing modal conflicts.”<sup>2</sup> Similarly, the respective studies for the SR 20 and SR 53 projects discuss the safety benefits of each project.

This analysis focuses on the cumulative benefits of the set of projects, specifically the potential safety benefits of diverting truck and interregional traffic from SR 20. Safety data from Transportation Injury Mapping System (TIMS) for the most recent years available (2017-2021) along SR 20 within the study corridor was reviewed. TIMS captures only injury crashes and does not include Property Damage Only (PDO) crashes.

SAFETY



SR 20 Traffic Calming and Multimodal Improvements are aimed at improving safety.

<sup>2</sup> [https://www.cityoflakeport.com/news\\_detail\\_T14\\_R190.php](https://www.cityoflakeport.com/news_detail_T14_R190.php)



The 5-year (2017-2021) crash data indicates:

- ▶ Nineteen (19) injury crashes involved a pedestrian (representing six percent of the total injury crashes). Eight pedestrian crashes resulted in a serious injury or fatality.
- ▶ Seventeen (17) injury crashes involved a truck (representing six percent of the total injury crashes). Eight truck crashes resulted in a serious injury or fatality.
- ▶ Sixty-three (63) injury crashes were attributed to unsafe speed, representing 20 percent of the total injury crashes.



Exhibit 8. A school bus stops traffic on SR 20.

This data indicates that pedestrian safety, speeding, and truck crashes are a significant concern along the SR 20 corridor. Interregional traffic is less likely to be aware of pedestrians commonly crossing the highway and bicyclists. Rerouting truck and interregional traffic to the more suitable southern route is anticipated to help lower the crash frequencies.

### Travel Times

Travel time runs were conducted in October 2022, throughout a typical weekday. The purpose was to measure the current difference in travel times, route reliability, stopped time, and to document conditions along each route. Travel times were conducted using the standard “floating car method procedure.” In this methodology, the driver as safely as possible stays in the flow of traffic, passing as many vehicles as pass the test vehicles to record the travel time of a typical driver. It is noted that a temporary construction signal for SR 29 construction resulted in delays on some travel time runs that would not be part of typical conditions. The delay that occurred at the temporary construction signal was recorded and subtracted from the runs.

**Table 6** documents the average speeds and travel times. The travel time data and maps are in **Appendix B**.

**Table 6: Konocti Corridor Travel Measured Times and Speeds**

Route	Travel Time Range (minutes)	Avg Travel Time (minutes)	Avg Speed (mph)
Northern Route: SR 20 (23 miles)	29.5 - 32.2	30.6	45.8
Southern Route: SR 29/53 (38 miles)	43.5 - 46.3	44.4	53.3



The travel time data was conducted in the off-peak season on a typical work and school day. The table shows that travel times are higher on the southern route by approximately 14 minutes given the longer distance despite having higher speeds. Travel times are typically longer on SR 20 during peak season and weekends, and the difference in travel times is likely less. Planned projects on the corridors will impact the travel times and speeds as follows:

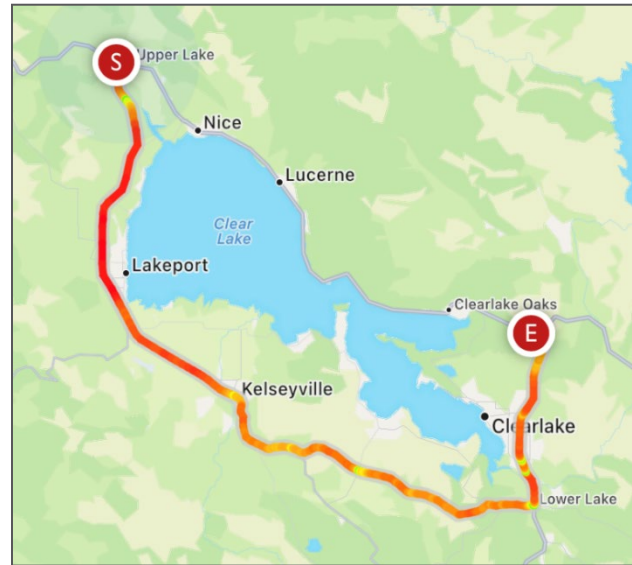


Exhibit 9. GPS App Records Position, Speed, and Travel Time

- ▶ SR 20 multimodal improvements are expected to calm traffic thereby decreasing speeds and increasing travel times. The actual impact of traffic calming measures varies greatly by situation, but by review of various case studies, a conservative reduction of 2 mph is applied for the purpose of evaluation.<sup>3</sup>
- ▶ The SR 29 project is predicted to increase speeds and improve travel times in near or over capacity conditions. The *Lake 29 Improvement Project Final EIR/EA*<sup>4</sup> indicated that the project could improve travel times by four minutes.
- ▶ SR 53 improvements will further improve travel times along the corridor. However, since the report does not quantify travel time or speed performance measures, the improvements are not quantified in this report.

Table 7 compares the potential impacts to travel times.

Table 7: Potential Post Project Travel Times

Route	Existing Travel Times	Estimated Travel Times Post Project Implementation
	Avg Travel Time (minutes)	Avg Travel Time (minutes)
SR 20 (23 miles)	30.6	31.5
SR 29/53 (38 miles)	44.4	40.4
<b>Difference</b>	<b>13.8</b>	<b>8.9</b>

This analysis indicates that the projects could potentially reduce the difference in travel times between the southern and northern routes from approximately 14 minutes down to nine minutes.

<sup>3</sup> [https://safety.fhwa.dot.gov/speedmgt/ePrimer\\_modules/module8.cfm](https://safety.fhwa.dot.gov/speedmgt/ePrimer_modules/module8.cfm)

<sup>4</sup> Section 2.2.2 Growth Inducement Analysis/ Geographic Study Area

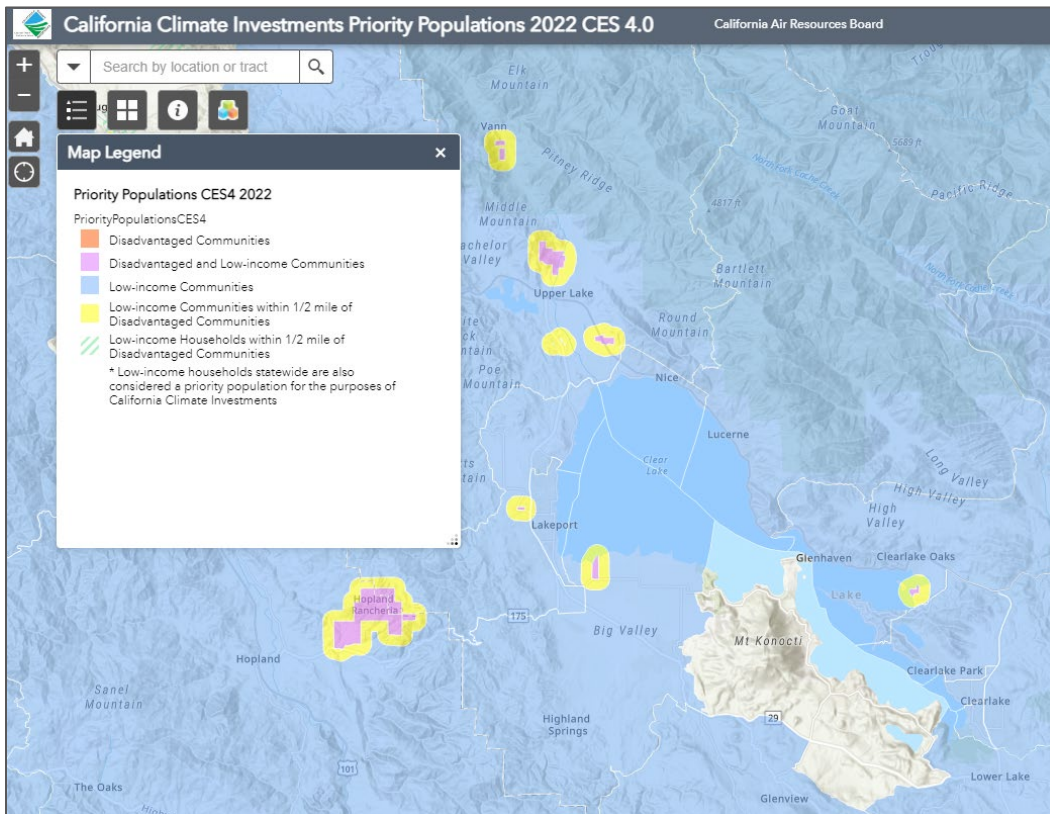




## Equity

The communities of Nice, Lucerne, and Clearlake Oaks along SR 20 have median household incomes below 80 percent of the statewide average, qualifying them as disadvantaged communities,⁵ **Exhibit 10** shows the disadvantaged and low-income communities surrounding the corridors.

**EQUITY** SR 20 Traffic Calming and Multimodal Improvements serve disadvantaged communities.



**Exhibit 10. Disadvantaged and Low-Income Population Areas**  
Source: California Climate Investments Priority Populations<sup>6</sup>

Low-income communities are present along the length of SR 20 within the project area, and have residences located directly on the route. These communities are often dependent on transit and

<sup>5</sup> Source: Konocti Corridor 2B, Lake 29 Konocti Trade Corridor Enhancement Program (TCEP) Application

<sup>6</sup> <https://webmaps.arb.ca.gov/PriorityPopulations/>

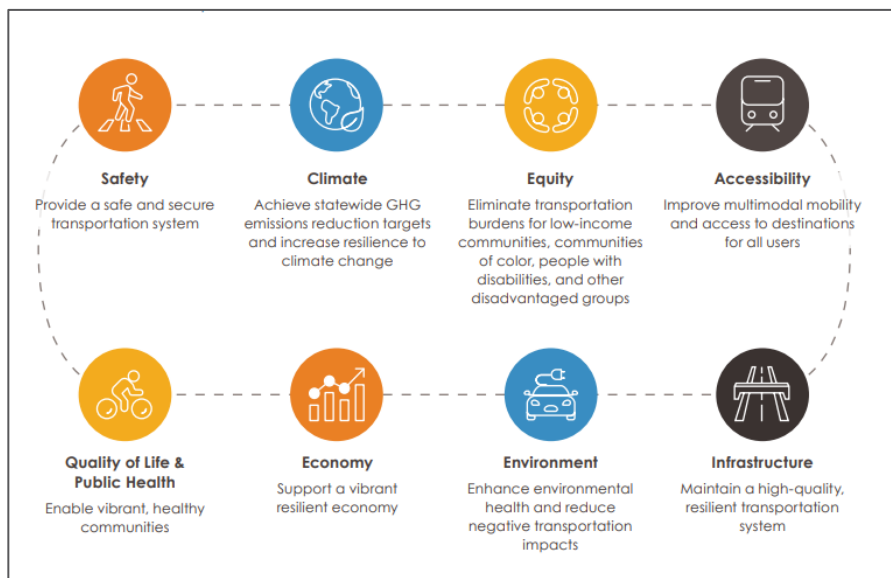




multimodal options. Low-income communities also exist within a portion of the SR 29/SR 53 route; however, the roadway is not lined with residences.

## CAPTI OBJECTIVES MET

The *Climate Action Plan for Transportation Infrastructure (CAPTI)* report (CalSTA July 2021) details “a holistic investment framework and outlines accompanying strategies... to combat and adapt to the climate crisis, while supporting public health, safety, and social equity goals.” The principles of CAPTI focus on innovations and strategic solutions to reduce VMT, and improve safety, foster equity, and reduce environmental impacts.



**Exhibit 11. CAPTI Goals**

Source: CAPTI Climate Action Plan for Transportation Infrastructure (CalSTA July 2021)

Ten (10) guiding principles aimed at shaping future state transportation funding decisions based on CAPTI are listed below followed by explanations describing how the project achieves each goal:

CAPTI

The set of projects fulfill the CAPTI objectives of fostering safety, equity, climate resiliency, and quality of life.

**1. Building toward an integrated, statewide rail and transit network.**

A new, state-of-the-art Transit Center is funded and is planned to be constructed within five years in Clearlake, just off SR 53. The transit center is planned to include hydrogen fueling infrastructure, four hydrogen buses, and electric charging stations (noted that electric buses are not part of the fleet for the immediate future). The SR 53 project includes improvements to add sidewalks connecting to transit stops. All of the Konocti Corridor projects complement the new transit center and transit network by improving key routes and through the implementation of



multimodal projects.

**2. Investing in networks of safe and accessible bicycle and pedestrian infrastructure.**

The SR 20 project is a multimodal project including bicycle lanes, sidewalks, pedestrian crosswalks, and other multimodal improvements throughout the communities of Nice, Lucerne, Clearlake Oaks and Glenhaven along SR 20, with over 40 improvement elements. However, for these projects to be successful, it is vital that truck traffic and interregional traffic be rerouted to the southern route. Therefore, the entire set of projects along SR 20, SR 29, and SR 53 are all needed to benefit the entire study area.

**3. Including investments in light, medium, and heavy-duty zero-emission vehicle (ZEV) infrastructure.**

The Federal Highway Administration (FHWA) has several initiatives to support the construction of alternative fueling and charging infrastructure along roadways. FHWA plans to support Alternative Fuel Corridors through formal corridor designation and assist in bringing together stakeholders to support funding. Stakeholders of the project have positioned the corridor to be an Alternatives Fuels Corridor and will pursue opportunities for infrastructure and designation.

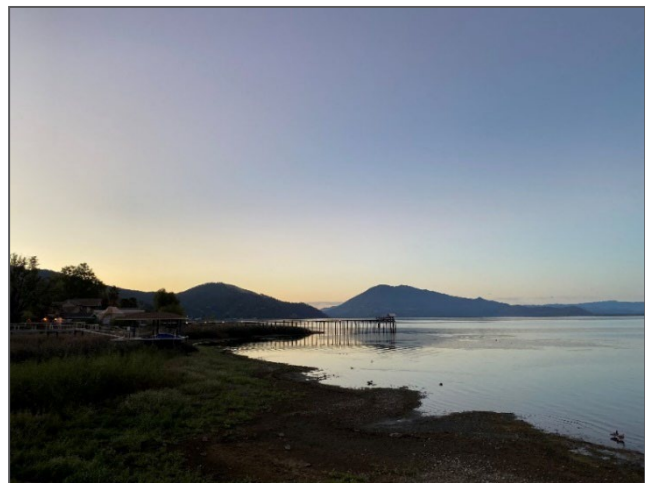


Exhibit 12. Communities on SR 20 along Clear Lake

**4. Strengthening our commitment to social and racial equity by reducing public health and economic harms and maximizing community benefits.**

The SR 29 project will directly support efforts to reduce truck traffic and interregional traffic through the economically disadvantaged communities located along SR 20. The success of the traffic calming and multimodal projects along SR 20 hinges upon diverting traffic through these communities. The SR 29 project is a vital piece to a suite of projects that support safety, lower emissions, and enhance quality of life in the SR 20 communities while also providing needed capacity on a key route.

**5. Making safety improvements to reduce fatalities and severe injuries of all users towards zero.**

The SR 29 project has demonstrated safety benefits for the corridor. Similarly, the SR 20 project has traffic calming and multimodal safety benefits. The set of projects together has the added safety benefit of moving truck and interregional traffic away from high conflict and residential areas.

**6. Assessing physical climate risk.**

SR 29 is a key evacuation route. This project will provide additional capacity to support evacuation and build resiliency into the roadway network. Shoulder widening provides passageway for emergency vehicles while the median and removal of fixed objects in the clear zone will provide



a fire break.

**7. Promoting projects that do not significantly increase passenger vehicle travel.**

The CAPTI report discusses that in a rural setting, such as surrounding Clear Lake, capacity projects are not anticipated to induce demand or significantly impact VMT. The multimodal improvements on SR 20 would create only a minor decrease to VMT, while shifting traffic to the interregional route is expected to minorly increase VMT. Overall, the suite of projects is expected to have only a minor impact on VMT.

**8. Promoting compact infill development while protecting residents and businesses from displacement.**

The SR 29 and SR 20 projects improve existing roadways instead of building another. No permanent displacements are expected and only minimal disruptions during construction are anticipated.

**9. Developing a zero-emission freight transportation system.**

As previously discussed in principle No. 3, the local agencies intend to pursue opportunities for infrastructure in support of an Alternative Fuels Corridor on SR 29 and reroute truck traffic to this route.

**10. Protecting natural and working lands.**

The project is expected to have minor impacts on the surrounding land.

### ***CAPTI in a Rural Setting***

The CAPTI report acknowledges that transportation projects in rural settings may have different needs and goals within the CAPTI framework, and that these projects typically have minor impacts on overall statewide VMT and GHG, but are still critical pieces of the transportation network. CAPTI also recognizes that providing sustainable transportation in rural areas is key to transportation equity. The Konocti Corridor is a prime example of applying CAPTI principles in rural settings.

## **CONSIDERATIONS AND RECOMMENDATIONS**

In addition to efforts to secure funding for the Konocti Corridor projects, the following are considerations or recommendations that may enhance the projects:

- ▶ Consider requesting that Caltrans officially designate SR 20 in the project area as a *Minor Arterial* roadway to support SR 20 as a local route.
- ▶ Pursue the possibility of establishing SR 20 in the project area as a *No Truck Route*. Caltrans acknowledges that trucking is legally protected, and *No Truck Routes* can only be established with compelling justification, supporting studies, and an alternative route.
- ▶ Pursue the possibility of designating SR 20 within the project area as a *Scenic Route* to strengthen the case for traffic calming and multimodal usage. Caltrans has designated the route as “eligible”, but it is not currently designated as a scenic route.



## KEY FINDINGS

### VMT

- ▶ The change in VMT in the study area is minimal at 0.3 percent, indicating that for the overall area these projects are not inducing demand, but rerouting trips to more appropriate roadways.
- ▶ The VMT increases on SR 29 and SR 53 and decreases on SR 20. Rerouted trips from SR 20 to an improved route increased capacity. Speeds are expected to be a primary factor in the change in VMT.
- ▶ The VMT decreases on SR 20 – a key benefit as this corridor is a community route, lined with residences, parks, and recreational areas. This route is planned for multimodal improvements, and it is desired for interregional traffic to reroute from SR 20 to routes SR 53 and SR 29.

### *Project Benefits*

The suite of projects referred to as the Konocti Corridor provides a range of benefits to the area surrounding Clear Lake, summarized below.

- ▶ The SR 29 improvements project benefits include:
  - » Additional capacity for daily needs and evacuating traffic.
  - » Passing opportunities
  - » Widened shoulders, medians, and clear zones, creating a safer roadway, and improving access for emergency services.
  - » A more resilient roadway network that provides a firebreak.
  - » Frontage roads and consolidated intersections, improving access management and benefiting daily traffic flows and evacuation.
  - » Positioning for Alternatives Fuels Corridor infrastructure and designation.
- ▶ The SR 53 project benefits include:
  - » Reduced delays and travel times
  - » Improved safety
  - » Efficient travel consistent with expressway standards.
- ▶ The SR 29 and SR 53 projects both have overarching goals of creating quality routes to encourage use for interregional, recreational vehicle and truck traffic instead of a local route, enhancing the benefits of the traffic calming and multimodal improvements on SR 20. This will move interregional and truck traffic to more appropriate, suitable routes given that SR 29 and SR 53 have:
  - » More capacity



- » Heightened access management (less driveways, intersections, and crosswalks)
  - » Fewer residences, schools, and parks
  - » Less pedestrian activity
  - » Fewer sources of friction impeding efficient flow, such as speed advisory curves and parked vehicles.
  - » Fewer sources of stopped vehicles impeding flow, including mail service, trash pick-up, and school bus stops.
- ▶ The SR 20 project benefits include:
- » Significant upgrades to bicycle and pedestrian infrastructure, improving safety, and supporting active transportation.
  - » Enhanced quality of life for disadvantaged communities.

**Figure 6** provides a summary overview of the key takeaways and benefits.



## Impacts of Projects Together

- Encourages interregional traffic to use the more appropriate routes SR 29 and SR 53 over SR 20.
- Helps to maintain SR 20 as a local route.
- Overall negligible impact to VMT.

SR 20 Current Interregional Route:  
This route has lower speeds, fewer lanes, and more driveways, side streets, parks, on-street parking, and stops, etc.

SR 20 Multimodal Improvements:  
Traffic Calming  
Pedestrian and Bicycle Safety  
Lower VMT

SR 53 Improvements:  
Reduced Delays  
Improved Safety

SR 29 Improvements:  
Capacity, Evacuation, Emergency Services  
Climate Resiliency  
Access Management Improvements

### Legend

- SR 20 Northshore Multimodal Improvements
- SR 29 Roadway Improvements
- SR 53 Potential Intersection / Interchange / Roadway improvements
- SR 20 Current Interregional Route
- Future Interregional Route  
SR 20 > SR 29 > SR 53 > SR20

Figure 6

Konocti Corridor  
Vehicle Miles Traveled Study

Summary of Key Findings and Recommendations



# Appendix A

## VMT Calculations





---

# Technical Memorandum

Date: 6/7/2024

To: Lauren Picou, Headway Engineering

From: Lawrence Liao, ETG  
Xuemei Liu, ETG

Subject: **Konocti Corridor VMT Analysis**

---

## OVERVIEW

This technical memorandum summarizes the assumptions, methodology and result of the Konocti Corridor Vehicle Miles Traveled (VMT) analysis using Lake-Mendocino Travel Demand Model. It includes the following sections:

- Overview
- Project Description
- VMT Modeling
- Summary of Result

## PROJECT DESCRIPTION

### ***STUDY AREA***

The Konocti Corridor encompasses the Clear Lake area in Lake County, including state routes SR 29, SR 53, and SR 20. SR 20 serves as the northern route, while the southern route is formed by SR 29 and SR 53.

The study limits are:

- SR 20: from SR 29 to SR 53
- SR 29: from SR 20 to SR 53
- SR 53: from SR 29 to SR 20

The study area is shown in ***Exhibit 1***.



**Exhibit 1. Study Area**





## PLANNED PROJECTS

The Konocti Corridor Project comprises a set of planned initiatives with the objective of establishing the southern route (SR 29 and SR 53) as the preferred interregional pathway, supplanting the existing northern route along SR 20. The proposed projects include various enhancements, such as an eight-mile widening project on SR 29, multimodal improvements and traffic calming measures in the communities along SR 20 and intersection and widening improvements on SR 53. **Exhibit 2** shows the project area and an overview of the planned projects.



**Exhibit 2. Planned Projects and Multimodal Improvements**





---

## VMT MODELING

This Konocti Corridor VMT Analysis aims to evaluate the collective influence of various interconnected projects on the Konocti Corridor, with a primary focus on the SR 29 widening initiative. The Lake-Mendocino Travel Demand Model (LMTDM) was selected as the modeling tool for assessing the influence of the planned projects on both regional and corridor-level VMT.

The LMTDM was developed in 2023 based on the Wine Country Model. The key updates and improvements include:

- Data collection
- Networks (including just Lake and Mendocino County areas)
- Socio-economic data
- Model calibration (Trip generation, Trip distribution)
- Model validation (Traffic assignment)
- Model applications (Including sub-area modeling)
- Active transportation (bike routes and assignment of bike trips)

The base year of the LMTDM is 2019 and the future year is 2050.

LMTDM was utilized to calculate VMT for the base year, the future year under a No-build scenario, and the future year under a Build scenario.

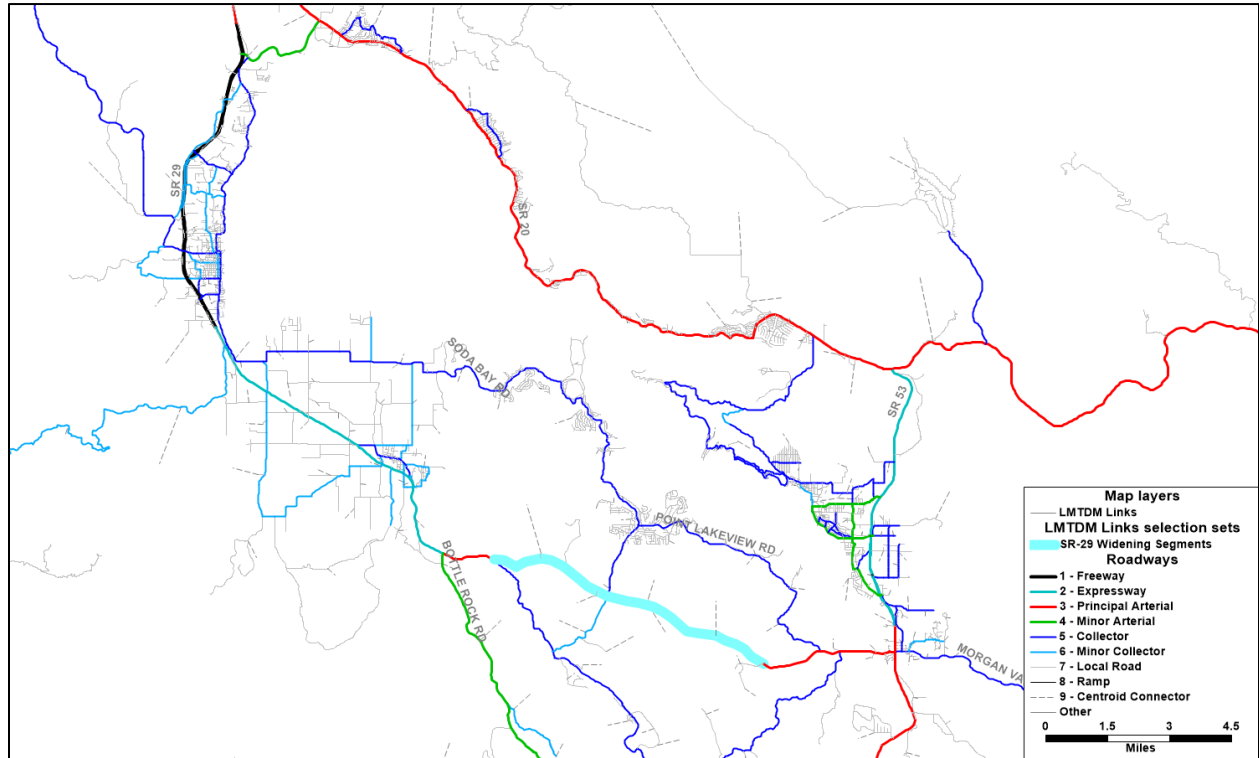
### ***CODING PLANNED PROJECTS***

LMTDM, like most regional travel demand models, represents roadway segment (link) characteristics by link attributes, such as average free-flow speed, # of lanes, and capacity in vehicles per lane per hour. Thus, the planned projects and multimodal improvements were coded in model highway network by modifying appropriate link attributes at selected locations that could best capture the overall impacts to the roadway segments by the planned project improvements. The coding of each planned project is described as follows.



## SR-29 Widening

The SR 29 project involves widening an eight-mile segment (PM 23.6- PM 31.6) from two lanes to four divided lanes, including realignment. In the model network, the corresponding segments were identified and the number of lanes is changed from 2 to 4. The facility type for these segments is modified to Expressway. The post speed is increased from 45mph to 50mph. **Figure 1** shows the project segments coded on model network.



**Figure 1. SR 29 Widening Segments Locations**



## SR-20 Northshore Multimodal Improvements

The multimodal enhancements are designed to elevate the quality of life along the SR 20 corridor and implement traffic-calming measures in the communities of Nice, Lucerne, Glenhaven, and Clear Oaks. These improvements involve the integration of bike lanes, establishment of new pedestrian crossings, upgrading existing crosswalks, installation of sidewalks, and enhancements to the lighting infrastructure. Directly coding these enhancements on the travel demand model network is not feasible. Instead, adjustments to the facility type and speed have been decided upon for the network. **Figure 2** depicts the changes in network coding to represent these improvements.

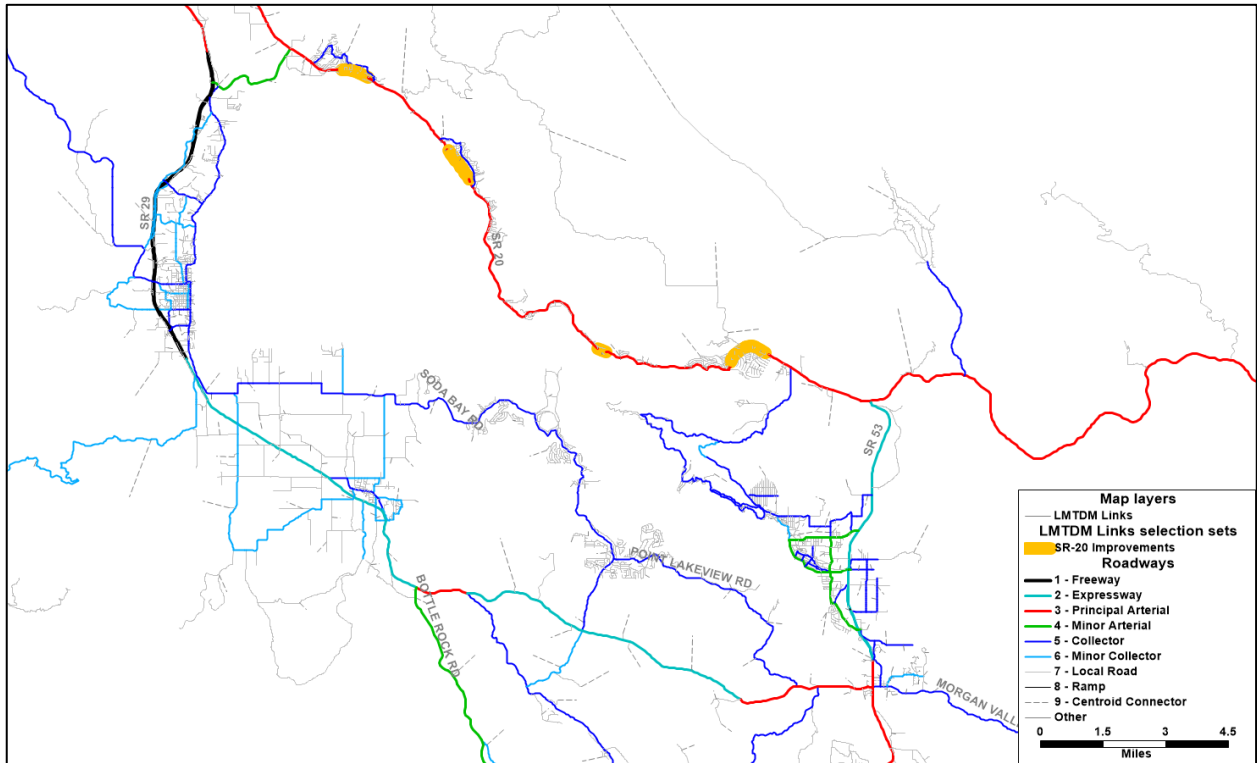


Figure 2. SR 20 Multimodal Improvements Locations

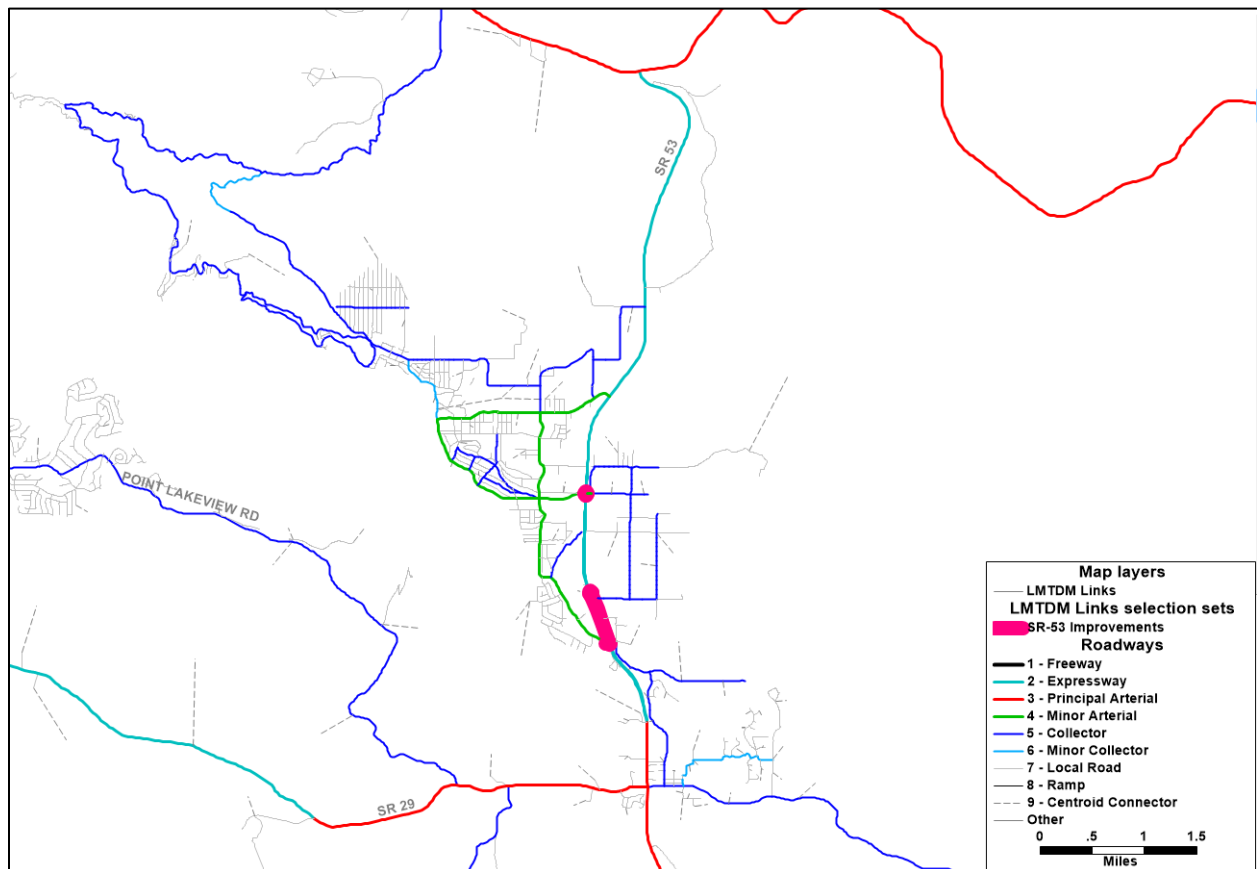


## SR 53 Improvements

The associated study (State Route 53 Corridor Local Circulation Study, TJKM March 2022) highlights intersection improvements along SR 53 aimed at minimizing delays and travel times, enhancing safety, and facilitating efficient travel in line with expressway standards. The improvements that have been coded on the network include:

- Build an interchange at SR 53 / 18th Avenue, replacing the existing signalized intersection
- Build an Interchange at SR 53 / 40th Avenue, replacing the existing signalized intersection
- Close the access to SR 53 at Dam Road

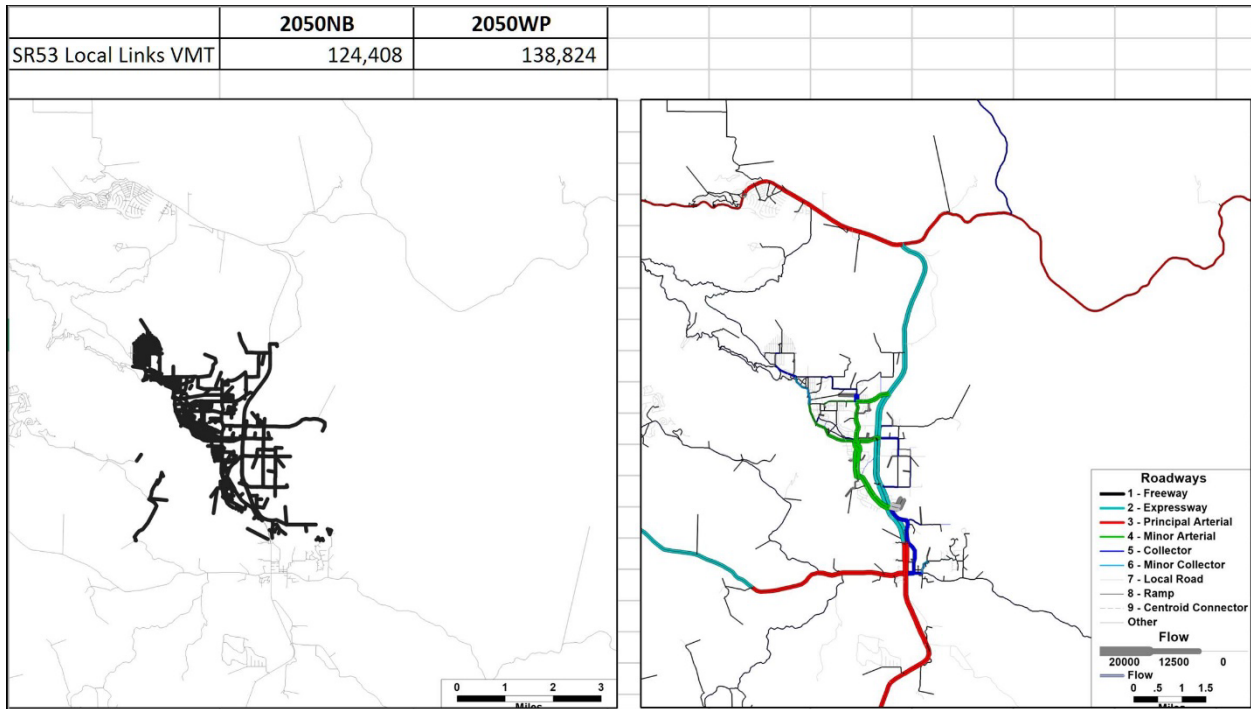
In addition to encoding the aforementioned modifications, the speed of the neighboring segments has been raised by 5 mph. **Figure 3** depicts the changes in network coding to represent these improvements.



**Figure 3. SR 53 Improvement Locations**

To capture local reroutes and diversions that may occur due to the improvements, particularly the closure of Dam Road, adjacent routes were included in the comparison between Future Year and Future Year Plus Project as shown in Figure 4.





**Figure 4. SR 53 Comparison Including Adjacent Local Links – Future Year and Future Year Plus Projects Comparison**

## SUMMARY OF RESULT

LMTDM was run for 2019 Base Year, 2050 No-Build and 2050 Build scenarios. The VMT on SR 29, SR 53, and SR 20 in the study area were calculated. **Table 1** indicates that VMT increases slightly from the Base Year to the Future Year (No-Build) conditions. This is expected as traffic volumes generally increase over time.

Corridor/Region	VMT (per day)	
	Existing	Future Year (2050)
SR 29	287,369	292,170
SR 53	100,093	103,186
SR 20	145,482	146,706

**Table 1. Konocti Corridor VMT Growth from Base Year to Future Year No Build**

To account for local diversions/ reroutes from the SR 53 projects, including the Dam Road closure, the VMT on adjacent local links of SR 53 were included in the VMT for SR 53. The VMT by corridor and region are tabulated in **Table 2**.



Corridor/Region	Future Year	Future Year Plus Projects (PP)	% Change (Future to Future PP)
SR 29	292,170	309,412	5.90%
SR 53 <sup>1</sup>	124,408	138,824	11.59%
SR 20	146,706	138,268	-5.75%
Sum SR 29, 53 <sup>1</sup> , 20	563,284	586,504	4.12%
Adjacent Network Links	3,455,992	3,443,438	-0.36%
Network Sum	4,019,276	4,029,942	0.27%

Notes: 1. Adjacent links were included for SR 53 to capture local diversions/ reroutes from the SR 53 projects, including the Dam Road closure.

**Table 2. Konocti Corridor VMT Impact Summary**

Some observations from the VMT analysis include:

- The VMT increases on SR 29. Rerouted trips from SR 20 to an improved route SR 29 with increased capacity and speeds are expected to be a primary factor in this increase.
- The VMT increases on SR 53. The VMT analysis for SR 53 includes adjacent streets since one potential project (the Dam Road closure at SR 53) would reroute local trips to the adjacent network, impacting the VMT directly on SR 53. Rerouted trips from SR 20 and local impacts of the projects are expected to be primary factors in this increase.
- The VMT decreases on SR 20. Interregional trips diverting to SR 53 and SR 29 is expected to be a primary factor in this decrease.
- The “Network Sum” includes all the links adjacent to and connecting to the study area roadway links. The overall change in VMT is minimal at 0.3 percent, indicating that for the overall area these projects are not inducing demand, but rerouting trips to more appropriate roadways.

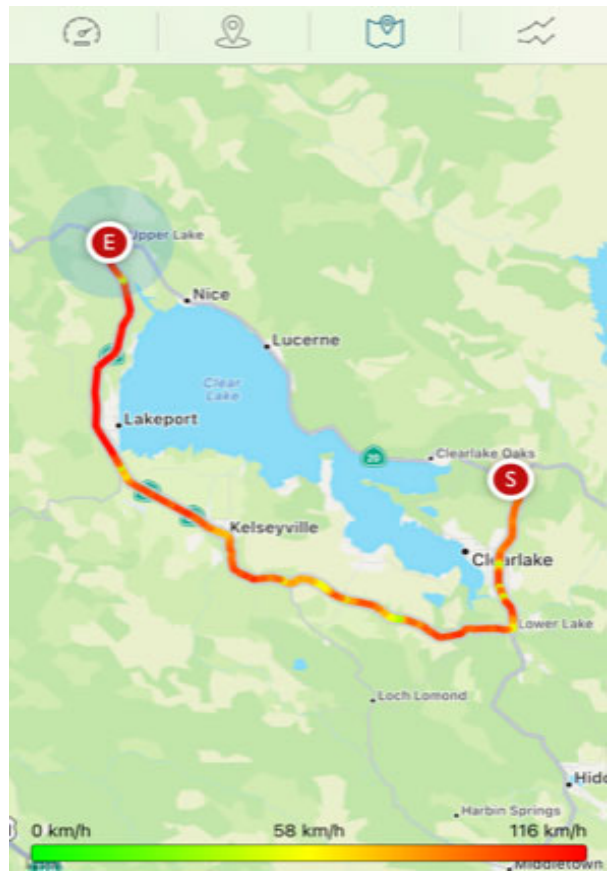
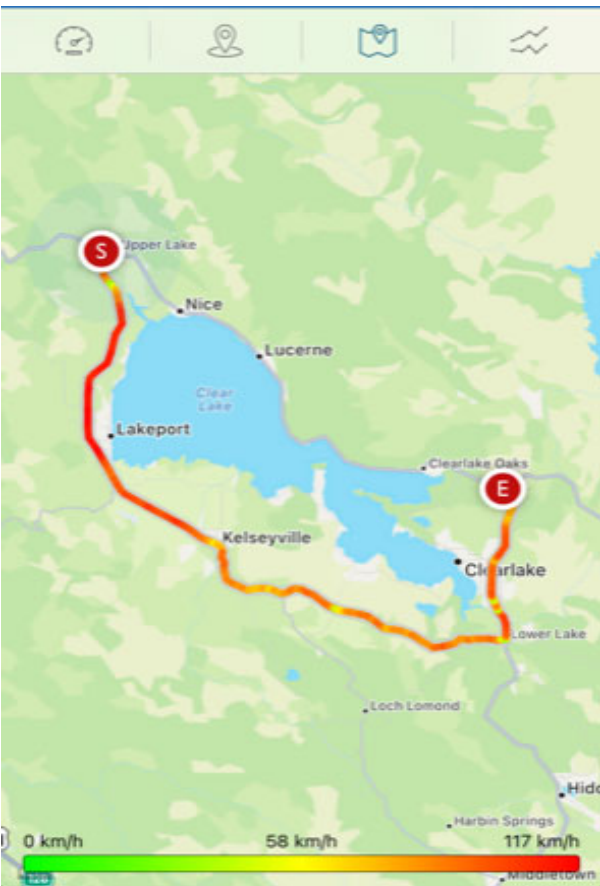
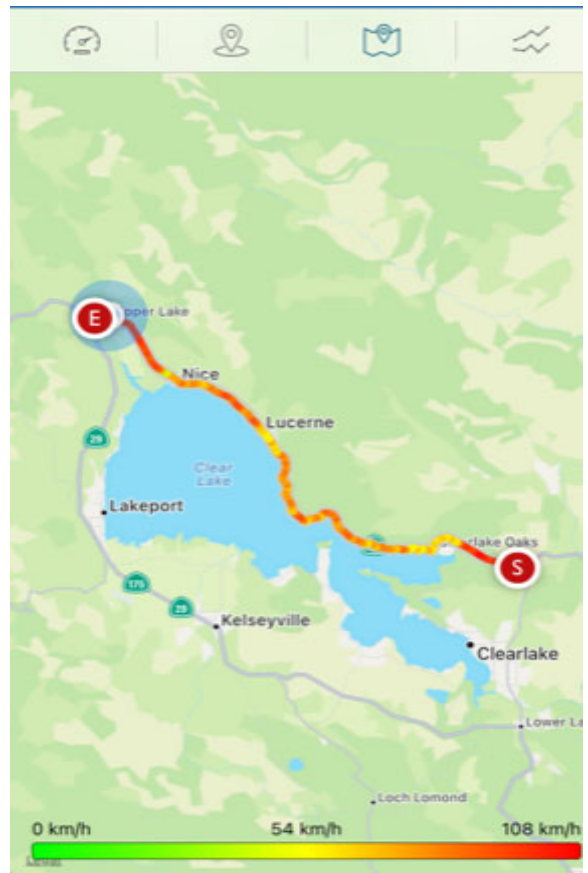
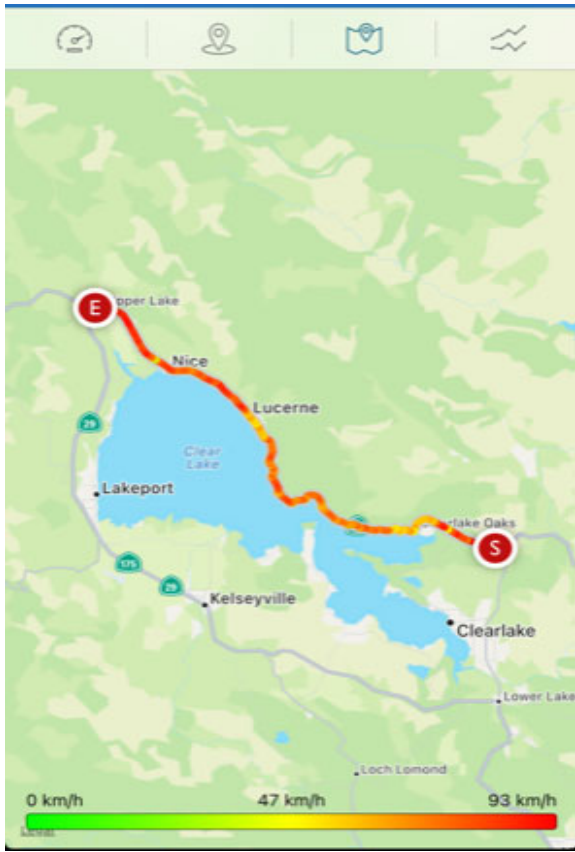
## **Appendix B**

### **Travel Time Data**

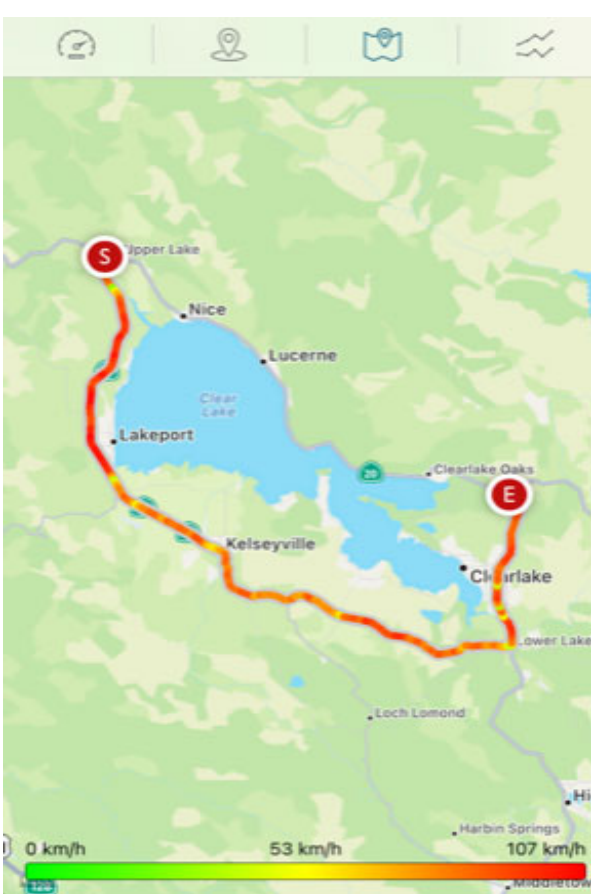
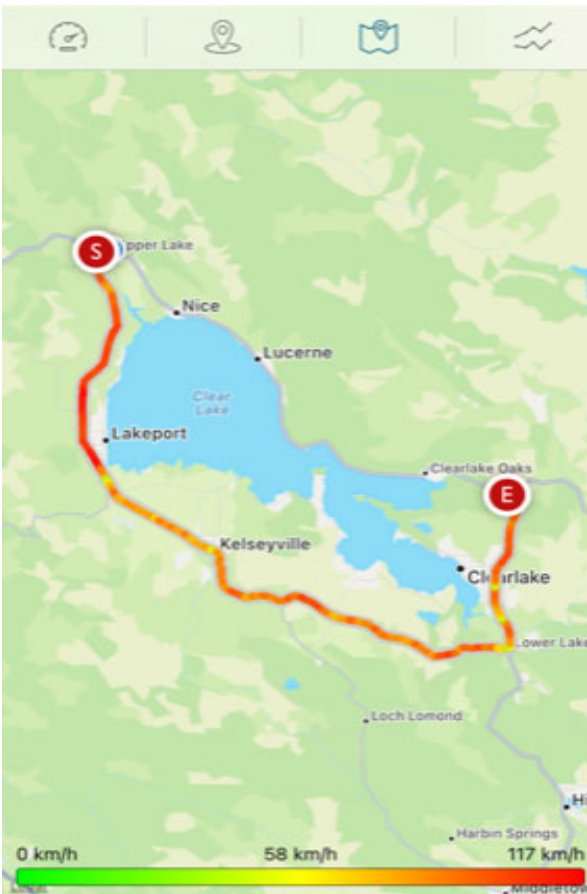
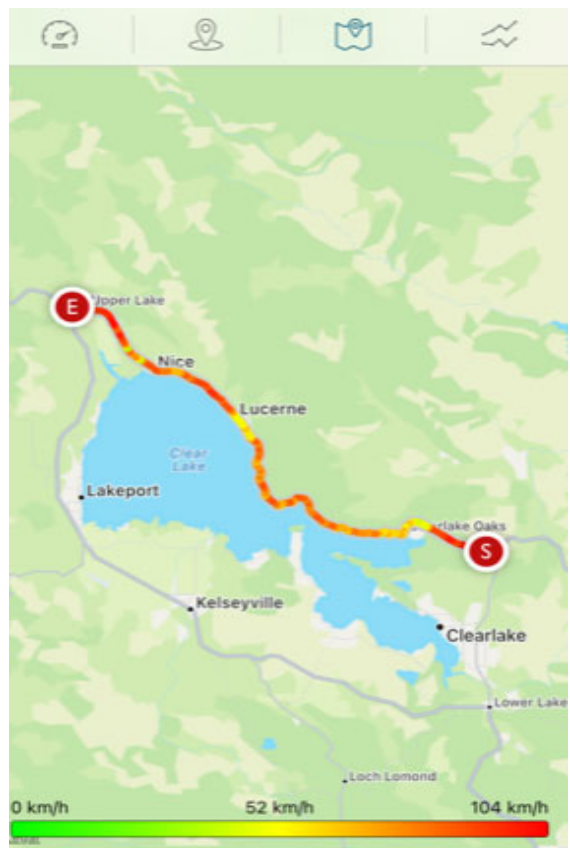
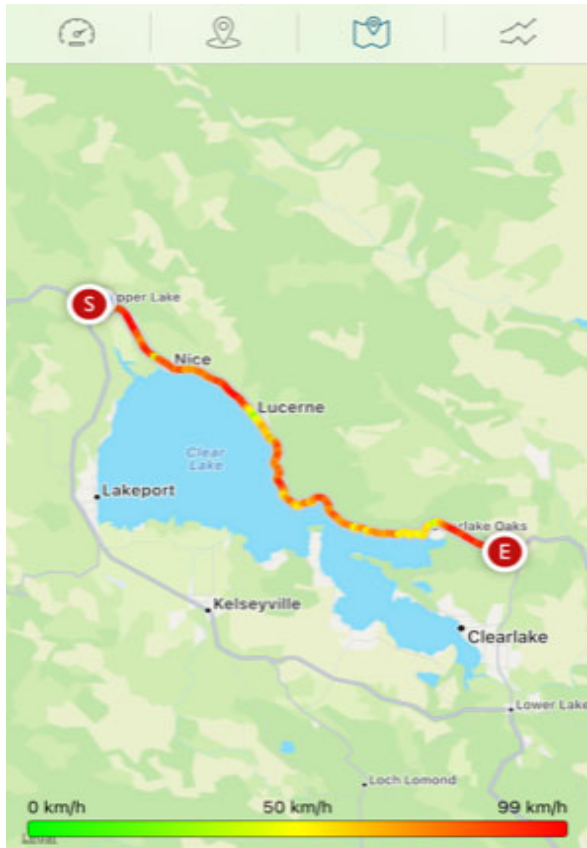




Appendix B: Konocti Corridor Travel Time  
Speed Maps



# Appendix B: Konocti Corridor Travel Time Speed Maps



# Appendix B: Konocti Corridor Travel Time Speed Maps

