

CHAPTER 2: NEEDS ANALYSIS

This chapter discusses how the existing transportation network functions and makes recommendations for improved infrastructure. High-use routes are shown through qualitative and quantitative data. Future use is estimated based on the Bike Trail User Model. This chapter also identifies common barriers to active transportation found throughout the Region. Strategies are offered to initiate solution-oriented problem-solving that can assist in continuing to create a convenient and safe network for bicycling and walking.

2.1 EXISTING CONDITIONS

In Lake Tahoe, the active transportation network serves many purposes. **Infrastructure such as shared-use paths, bike lanes, and sidewalks are both recreational resources and year round transportation modes for a recreation based economy.** When planning and designing projects, implementers must consider the needs of different user groups and how they *intuitively interact* with existing land-uses. Some important questions to consider are:

- Where do people want to go?
- Which way are people going already, even without existing facilities?
- How can all roadway users meet their needs safely, without conflict or excessive delay?

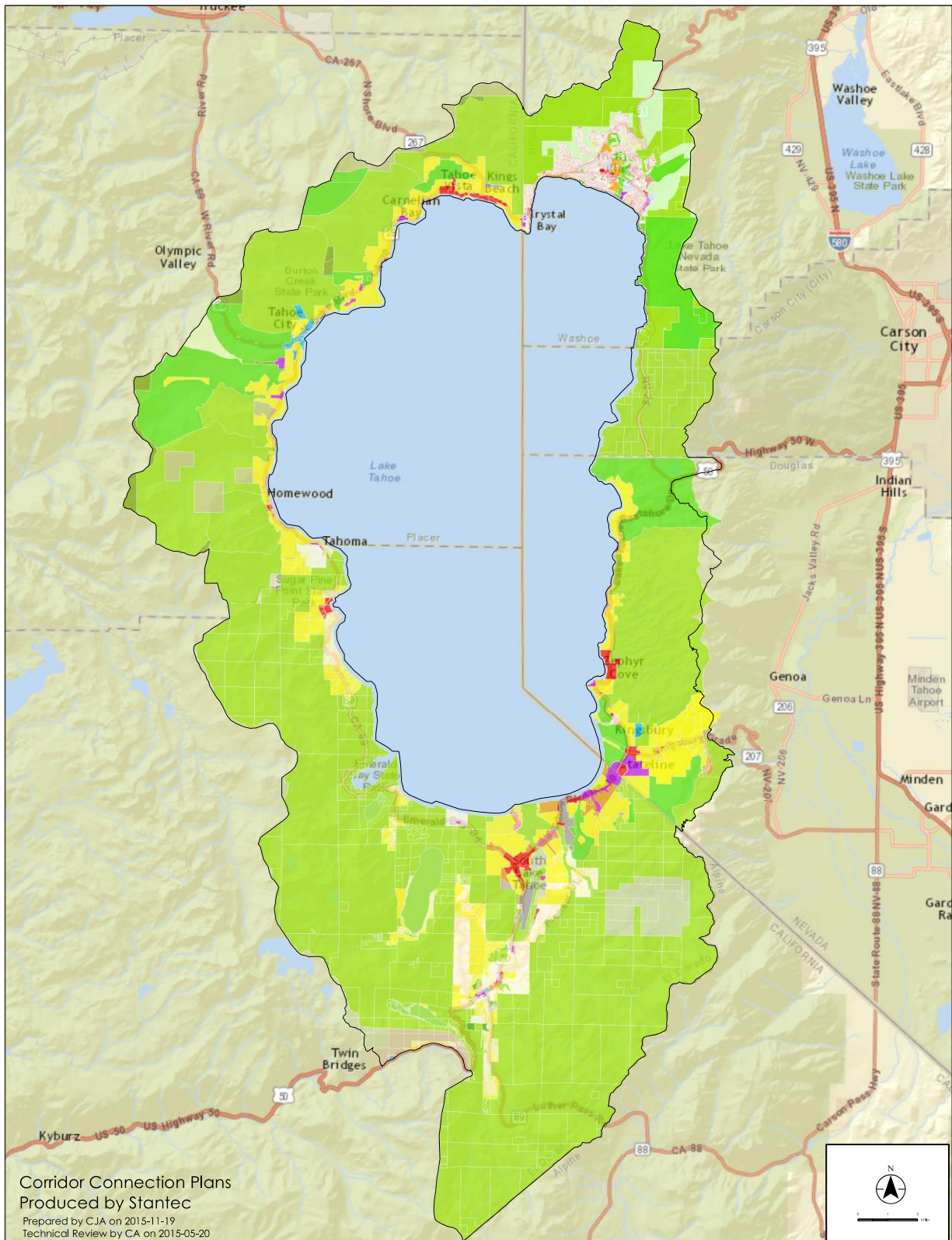
Common Infrastructure & Users Found at Lake Tahoe

The Lake Tahoe Region weaves a variety of infrastructure types together to create its active transportation network. To get from origin to destination, a bicyclist may take a bike route to a shared-use path to a bike lane. In many locations no designated active transportation infrastructure is present. Existing land-use, such as shops, restaurants, and homes dictate where people want to go. The type of infrastructure available prescribes, in part, how people will choose to get to their destinations. Figure 2-1 illustrates the locations of commercial centers and where the majority of people live throughout the Region.



FIGURE 2-1: REGIONAL POPULATION DENSITY AND COMMERCIAL CENTERS

(See legend on following page.)



Legend

TRPA Boundary

SR89/28 - Placer County Zoning

- Residential
- Commercial
- Commercial/Public Service
- Tahoma Commercial
- Tahoe City Commercial
- Tahoe Vista Special Area
- North Star
- Kings Beach Industrial/Commercial/Public Service
- Upper Ward Valley Recreation
- Burton Creek Area Conservation
- Open Space
- Forest
- Timberland Production
- Water Influence

NV SR28 - Washoe County Zoning

- Medium Density Rural 1 du/5 ac
- High Density Rural 1 du/2.5 ac
- Low Density Suburban 1 du/ac
- Medium Density Suburban 3 du/ac
- High Density Suburban 7 du/ac
- Low Density Urban 10 du/ac
- Medium Density Urban 21 du/ac
- Neighborhood Commercial
- General Commercial
- Tourist Commercial
- Parks & Recreation
- Public Services
- General Rural
- Open Space
- Roads
- Water Bodies

US50 East Shore - Carson City Zoning

- Conservation Reserve

US50 East Shore - Douglas Co. Zoning

- Tahoe Mixed Use

US50 East Shore - Douglas Co. Zoning

- Commercial (C)
- Managed Resource (M)
- Public Service (P)
- Recreation (S)
- Residential (R)
- Tourist (T)

US50 South Shore - Douglas Co. Land Use

- Residential (R)
- Commercial (C)
- Public Service (P)
- Recreation (S)
- Managed Resource (M)

US50 South Shore - Douglas Co. Zoning

- Multi-Family Residence 6.01-16 Dwelling Units/Ac*
- Mixed Used Commercial
- Neighborhood Commercial
- Tahoe Mixed Use
- Tahoe Commercial
- Tahoe - Tourist
- Tahoe Resort Recreation
- Tahoe - Recreation
- Public Facility
- Forest Range, 19 Acres; Forest Range, 40 Acres

US50 South Shore - City of South Lake Land Use

- Low Density Residential
- High Density Residential
- BJ/AT CP
- Neighborhood Commercial
- Town Center
- Special District
- Tourist
- Recreation
- Conservation

Meyers Y/SR89 Recreation - El Dorado County Zoning

- Exclusive Agricultural
- Commercial/Office
- Tahoe Planned Commercial
- Tahoe Commercial
- Industrial
- MCP-1
- MCP-2
- MCP-3
- MCP-4
- MCP-5
- Tahoe One Family Residential; Residential; R1A; R3A
- Residential 5/10
- Residential - 20
- Residential - 160
- Tahoe Two Family Residential
- Residential Multi-Family
- Tahoe Resort Residential
- Planned Development
- Recreation Facilities
- Tahoe Agricultural
- Timberline Preserve Zone
- Tahoe Transportation Corridor

The main types of bicycle and pedestrian infrastructure currently in place in the Lake Tahoe Region are described below.

- **Shared-Use Path (Class I)**

A shared-use path is a completely separate trail for active transport users. The path is recommended to be 10 feet wide and provide for two-direction travel.

- **Bike Lane (Class II)**

Bike lanes are striped six feet wide lanes and provide one-way travel on a shared roadway with vehicles.



Sharrows, Tahoe City.

- **Bike Route (Class III)**

A bike route is a shared roadway typically located on low-volume and low-speed streets. Signs and painted “sharrows” assist with wayfinding and show the preferred location of the biker within the roadway.

- **Sidewalk**

Sidewalks are at least five feet wide and offer pedestrians a separated way to travel along the street network.

- **Marked Crosswalk**

Painted markings that span a roadway to indicate where pedestrians have the right of way. Crosswalks can be accompanied by traditional signals or stop signs.

- **Pedestrian-Activated Flashing Beacon**

Lights, accompanied by signage, that flash when activated by pedestrians when they want to cross a street. Cars are required to stop when lights are flashing.



Pedestrian-Activated Beacon, Lake Tahoe Boulevard. Photo: Mike Vollmer.

Existing Network

A list of all existing projects can be found in Appendix H, *Existing & Proposed Project Lists*. Table 2-1 illustrates existing mileage by jurisdiction and class.

Table 2-1: Existing Facility Mileage. Source: TMPO

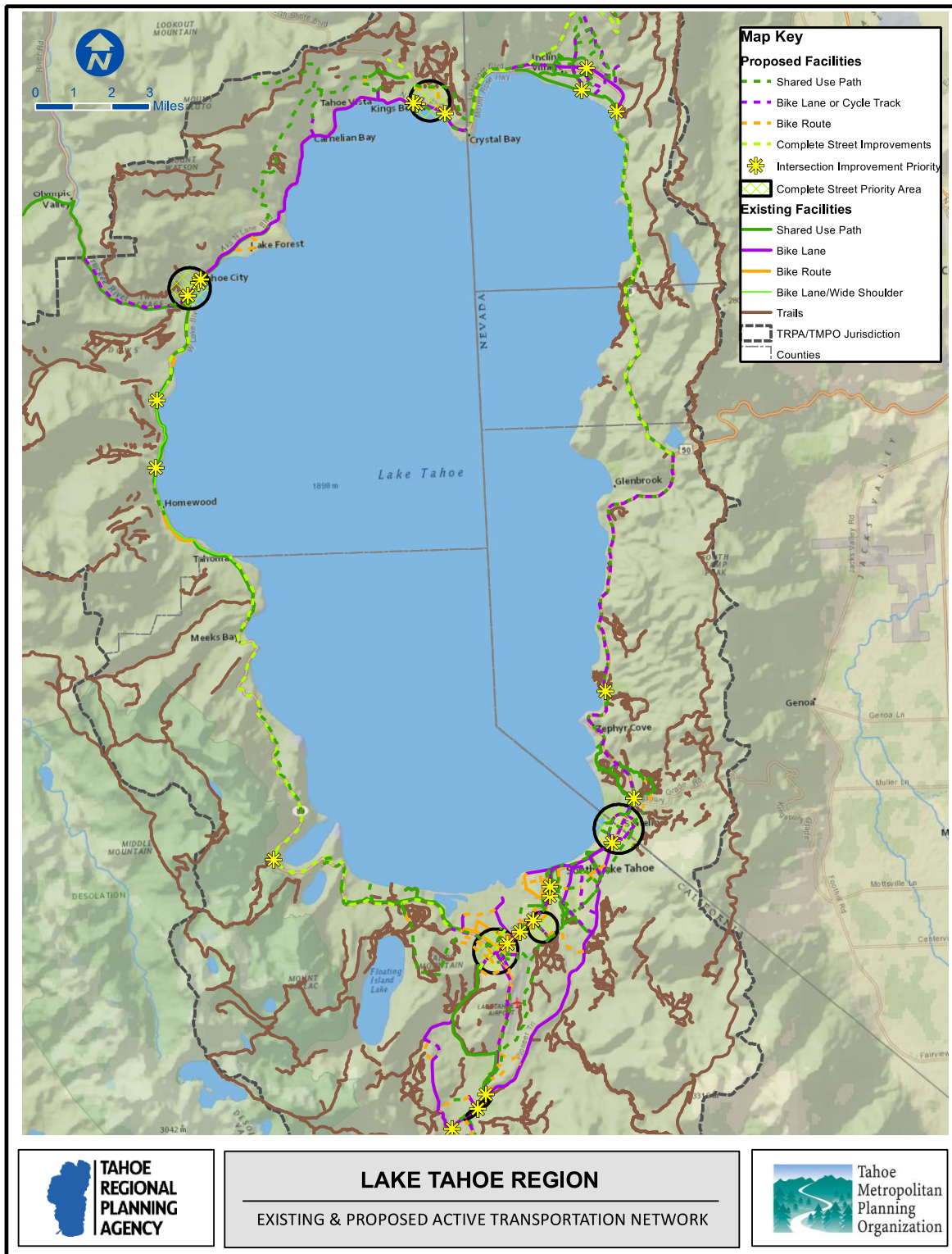
Jurisdiction	Path Class I	Bike Lane Class II	Bike Route Class III	Sidewalk	TOTAL
El Dorado County	11	6	0	0*	17
City of South Lake Tahoe	8	15	8	12	43
Placer County	20	11	2	4	37
Douglas County	5	1	0	3	9
Carson City	0	0	0	0	0
Washoe County	7	4	0	3	14
TOTAL	51	37	10	22	120

*El Dorado County sidewalk is roughly .06 miles.



Viking Way and Lake Tahoe Boulevard. Photo: Mike Vollmer

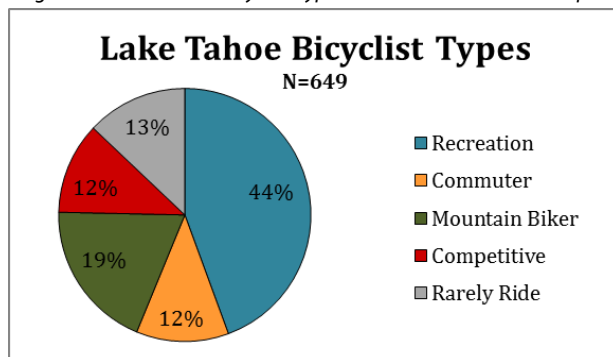
FIGURE 2-2: REGIONAL EXISTING & PROPOSED ACTIVE TRANSPORTATION NETWORK MAP



Described below are the different types of users seen on the active transportation network. These are generalizations and people may find they fall into multiple categories depending on the day or the activity they are conducting.

- **Recreational:** Mostly bike or walk for fun or exercise
- **Commuter:** Mostly bike or walk to get to places like work, school, or shopping
- **Competitive Cyclist:** Mostly bike for training in competitions
- **Mountain Biker:** Mostly ride on mountain bike trails, sometimes using the street network

Figure 2-3: Lake Tahoe Bicyclist Types. Source: 2015 Active Transportation Plan Survey



The 2015 Survey asked respondents to identify the “type” of bicyclist they consider themselves to be if they bike in Tahoe. Respondents were only allowed to choose one category and the results are shown in Figure 2-3.

Multi-Modal Connections

A complete transportation network offers multiple methods of travel to residents and visitors. A major component to successfully encouraging people to get out of their car and use active transportation or public transit relies on offering a convenient, timely, comfortable, and safe system. Multi-modal connections help reduce barriers to active transportation, such as long distances, physically challenging topography, or a lack of active transport facilities. Additionally, multi-modal systems must consider “first and last mile,” which is how people get to and from pick-up and drop-off points to their destinations.

Some marks of a strong multi-modal system include:

- Transit stations are accessible by biking, walking, and driving
- Quality and sufficient parking is available for cars and bikes
- Transit stations have a protected waiting area with support amenities such as benches, bathrooms, and water fountains
- Buses have sufficient bicycle carrying capacity
- Transit is timely and convenient
- Ticket prices are affordable
- Long stretches of connected active transportation facilities

TRANSIT:

Transit service provided through the Tahoe Transportation District on the South Shore and Tahoe Area Regional Transit (TART) on the North Shore addresses many of the above characteristics and continues to improve its services and facilities. Services include year-round fixed routes, para-transit, and seasonal shuttles. Many transit stops have bike racks and shelters and are accessible by all modes. Figure 2-5 (on page 2-10) illustrates the regional multi-modal system, including major transit stations, routes, waterborne transit, and intercept lots. For more detailed information on the transit system, please refer to the Tahoe Transportation District (www.tahoetransportation.org) or the Truckee North Tahoe Transportation Management Association (www.laketahoetransit.com).



Tahoe City Transit Center. Photo: Bruce R. Damonte

To assist transit providers in meeting the needs of multi-modal riders, the 2015 Survey asked respondents a variety of questions regarding transit use with their bikes. The *2015 Community Outreach Report* contains significant data on respondents' use of public transit and how often they use transit with their bicycles. Figure 2-4 illustrates which routes are most often used in combination with bicycles.

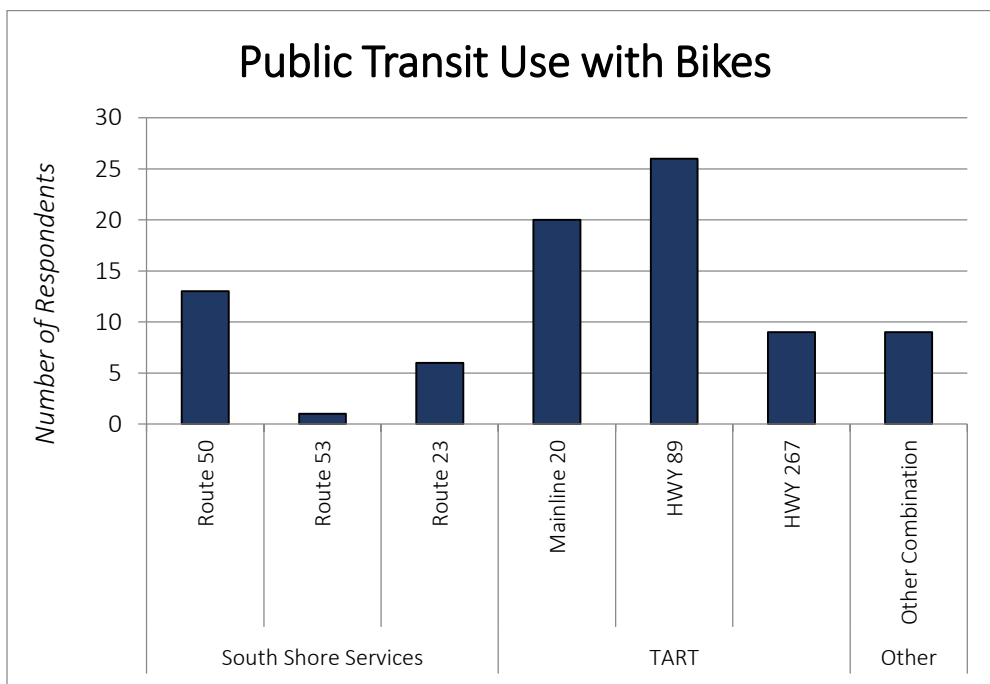


Figure 2-4: Public Transit Use with Bikes. Source: 2015 Active Transportation Plan Survey



Bike racks on TART bus

Respondents were also asked whether buses typically have sufficient carrying capacity for their bicycles or adequate bicycle parking at bus stops. Eleven percent of respondents indicated buses seldom have space for their bikes, and 47 percent said bus stations do not have adequate bicycle parking. This information can be valuable for transit providers when determining priorities for improvements.

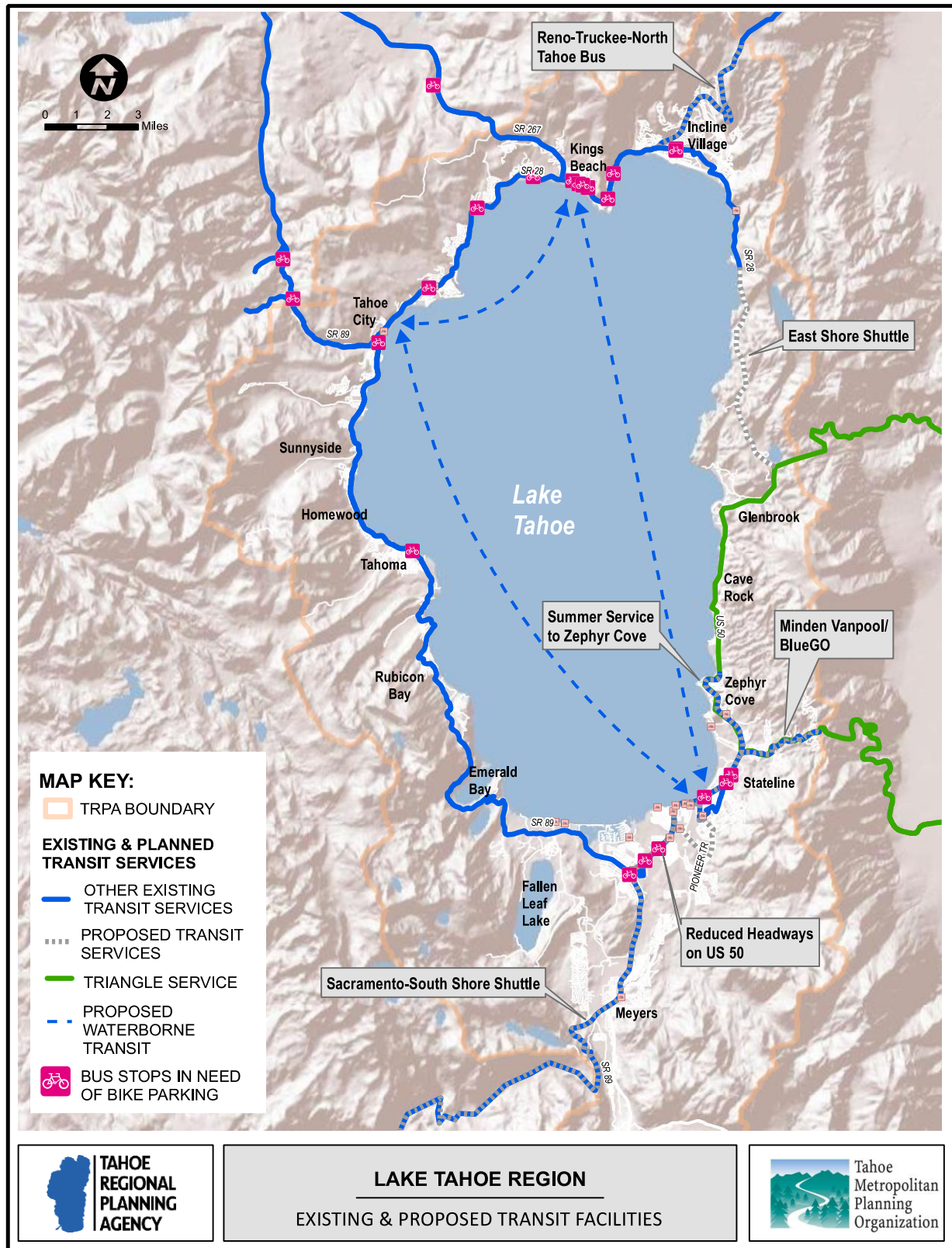
Multi-modal recommendations in the Community Outreach Report:

- TART Highway 89, TART Mainline, and South Shore Route 50 are the routes with the most multi-modal riders and should be prioritized for bicycle carrying capacity increases.
- Transit stops most in need of bike parking are the Tahoe City Transit Station, the “Y” Transit Station, all transit stops in Kings Beach, and the transit station at Southwood Boulevard and State Route 28 in Incline Village.



Tahoe City Transit Center. Photo: Placer County

FIGURE 2-5: EXISTING & PROPOSED TRANSIT FACILITIES



Regional Bikeways

Long stretches of connected active transportation infrastructure enable users to travel long distances by bicycle. The Lake Tahoe Region has a variety of trails that connect users through entire towns or provide access across town. Regional bikeway connections serve residents who live on one side of town but work on the other, or visitors who want to explore large swaths of Tahoe by bike. Many regional bikeways already exist, are programmed for construction over the next few years, or are still in the planning phase.

Once all of our regional bikeways are connected, these trails will make up the **“Lake Tahoe Bikeway”** which is a collaborative vision of the public and local, state, and federal agencies, known as the Lake Tahoe Bikeway Partnership. Once complete, the Lake Tahoe Bikeway will allow users a continuous shared use path around the entirety of Lake Tahoe. In North Lake Tahoe, multiple local, state, and federal agencies are working to construct a 40 mile connected paved path known as the **“Resort Triangle”** that will join the communities of Kings Beach, Tahoe Vista, Tahoe City, Alpine Meadows, Squaw Valley, Truckee, Martis Valley, and, Northstar in a continuous loop of shared use path. The portion of the Resort Triangle between Tahoe City and Tahoe Vista will also be a segment of the Lake Tahoe Bikeway allowing connection between the two regional pathways.

LAKE TAHOE REGIONAL BIKEWAYS:

Nevada Stateline-to-Stateline Bikeway

Proposed to extend over 30 miles, TTD manages this bikeway project that will eventually connect the Nevada state line on the North Shore to Stateline, Nevada on the South Shore. The bikeway is being constructed in phases. The “South Demonstration Project” currently offers users a trail from Round Hill Pines to Laura Drive. The next trails to be constructed will connect Incline Village to Sand Harbor State Park and Laura Drive to Stateline. The rest of the project is in the planning phase. Local jurisdictions and the USFS will manage and maintain the bikeway once constructed.



*NV Stateline to Stateline Bikeway: Round Hill Pines
Photo: Mike Vollmer*



Meyers Bikeway. Photo: Mike Vollmer

Meyers Bikeway

Completed in 2015, this major connection of 5.8 miles provides users with a continuous shared-use path from the west edge of Meyers to Viking Way in South Lake Tahoe. Construction of this path was a partnership of many agencies, including El Dorado County, the City of South Lake Tahoe, and the U.S. Forest Service (USFS). The Meyers Bikeway is made up of various paths including the Pat Lowe Trail, Sawmill Pond Trail, and Lake Tahoe Boulevard Trail.

South Tahoe Greenway

The Greenway, a projected network of 10 miles, has long been planned by the California Tahoe Conservancy (CTC). The path is envisioned to stretch from Meyers to the California state line, along the southeastern edge of the city. This project will be built in phases. The first phase was constructed in summer 2015, connecting Herbert Avenue to Glenwood Street. California Active Transportation Program funding awarded in 2015 will allow two more phases to be built, connecting residents in the Sierra Tract neighborhoods to Lake Tahoe Community College.



South Tahoe Greenway. Photo: Morgan Beryl



South Tahoe Bikeway. Photo: Morgan Beryl

South Tahoe Bikeway & Pope/Baldwin Beach Bike Path

Active transportation users can currently ride from mid-town South Lake Tahoe all the way to Baldwin Beach on a nearly eight-mile connected network of shared-use paths and bike routes. The Pope/Baldwin Beach Path is maintained by the USFS. It was upgraded in 2015 to meet modern design standards and was rerouted to create safer conditions with reduced user conflict. The South Tahoe Bikeway connects to the USFS maintained Pope/Baldwin Beach Path and brings users through half of the city, passing residences, commercial areas, meadows, and recreational amenities. The Bikeway is planned for further extension between 2016 and 2017.

West Shore Bike Path

One of the oldest bikeways in the Region, this bikeway offers 8.4 miles of gorgeous views along the West Shore of Lake Tahoe. The path connects users from Tahoe City to Sugar Pine Point and will soon extend to the Meeks Bay Campground thanks to a 2015 California Active Transportation Program award. The original path was

constructed by Tahoe City Public Utility District (TCPUD). The Meeks Bay connection will be constructed by TTD. TCPUD maintains the entire bikeway. As near-term projects are completed, the West Shore Bike Path in combination with the Lakeside Trail and Truckee River Trail (described on the following page) will create a continuous 19-mile network.

Lakeside Trail & Truckee River Trail

This path network completed in 2011 by the TCPUD spans the entire length of Tahoe City and connects users to Squaw Valley Mountain Resort along the Truckee River. The path is just over 6 miles long. It offers recreational opportunities and allows users to travel to opposite ends of town without using the street network. These trails are part of the soon-to-be continuous 19-mile trail network mentioned on the previous page.

Lakeside Trail



Lakeshore Path

Connecting one side of Incline Village to the other, this path sees the heaviest use in the Region, according to the TRPA/TMPO *Summer & Fall 2015 Data Collection Report*. Spanning roughly 3.5 miles, the path is highly recreational, though it also connects visitors and residents to local commercial areas. This path was upgraded in 2012.

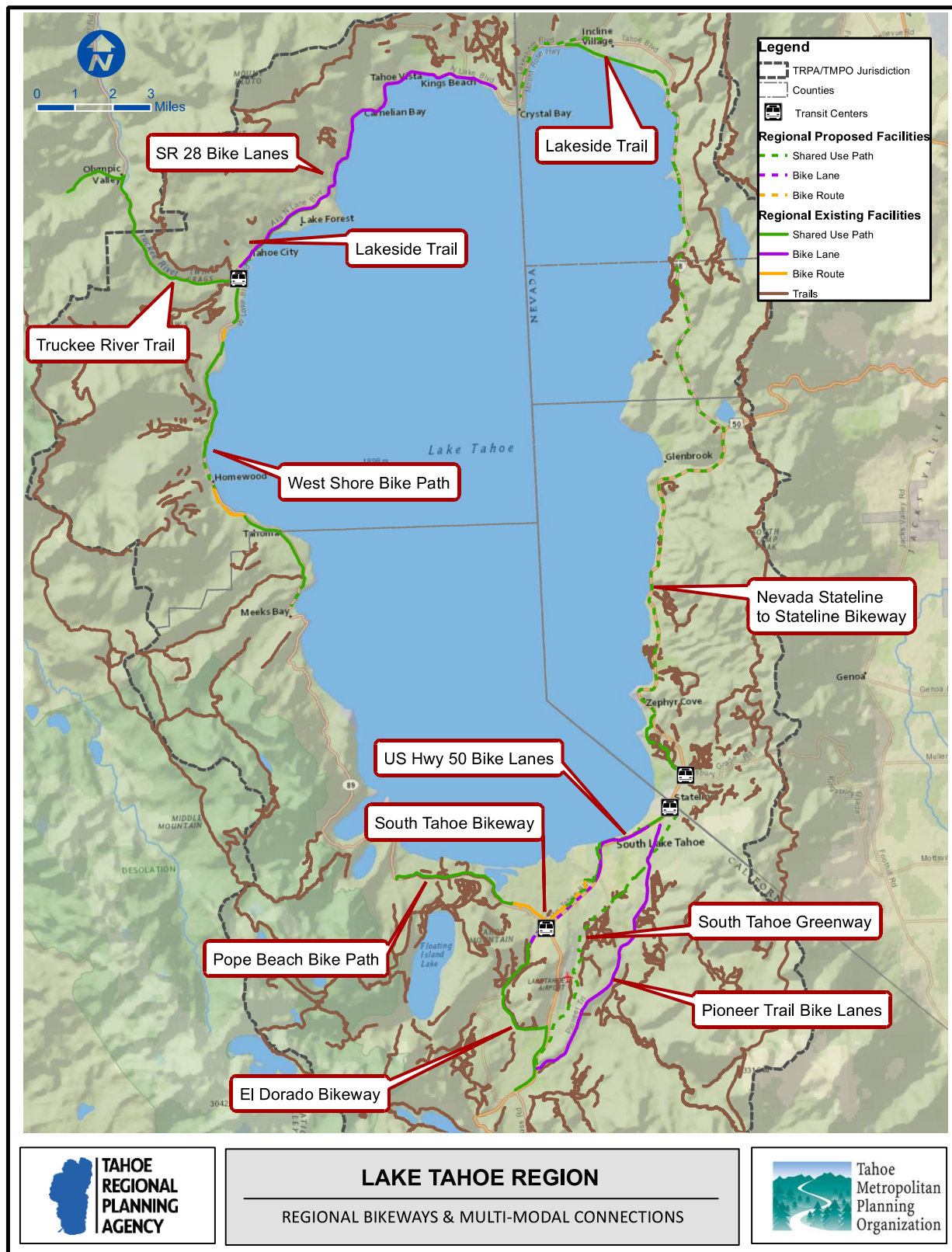
On-Street Network:

Continuous on-street bicycle infrastructure also acts as a regional bikeway for bicyclists. Many sections of US Highway 50 and State Route 28 have continuous bike lanes. These state highways act as main streets for City of South Lake Tahoe, Tahoe City, Kings Beach, and Incline Village. They serve commuters and competitive cyclists. Other major streets with bike lanes, like Pioneer Trail in South Lake Tahoe, also act as main thoroughfares for bicyclists. In some areas, bike lanes are in need of maintenance, including consistent restriping, widening, continuation through intersections, and repaving.



Lake Tahoe Boulevard bike lane. Photo: Mike Vollmer

FIGURE 2-6: REGIONAL BIKEWAYS & MULTI MODAL CONNECTIONS



Current Use Patterns

Active transportation trips are not easily measured or projected for an entire region without extensive data collection efforts. To better understand where people are going and how they are getting there, TRPA/TMPO worked with local partners to analyze historical data, conduct 2015 summer and fall counts, and analyze the 2015 Survey responses. Implementers should use conclusions found in these reports to inform their infrastructure designs and project priorities. Figure 2-7 illustrates all TRPA/TMPO monitored locations for 2015 by facility type. Additional locations were monitored by Douglas County and TCPUD. For more detailed analysis, refer to the *Summer & Fall 2015 Data Collection Report* located on the TMPO website and the *2015 Community Outreach Report* (Appendix B).

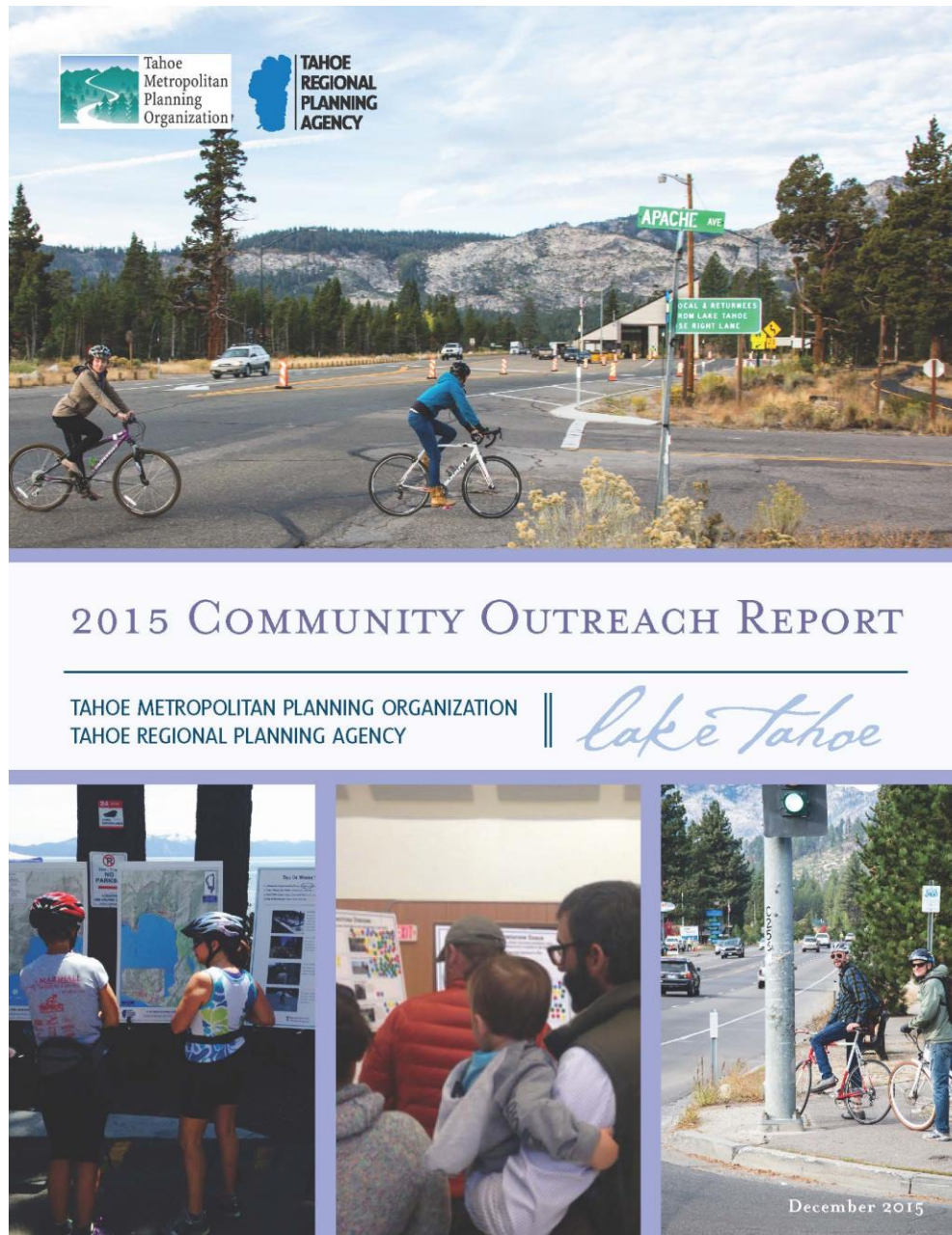


FIGURE 2-7: 2015 TRPA REGIONAL MONITORING LOCATIONS

**Note: Additional locations were monitored in 2015 by TCPUD and Douglas County.*

Summer & Fall 2015 Data Collection Report
Lake Tahoe Region Bicycle and Pedestrian Monitoring Program
October 23, 2015

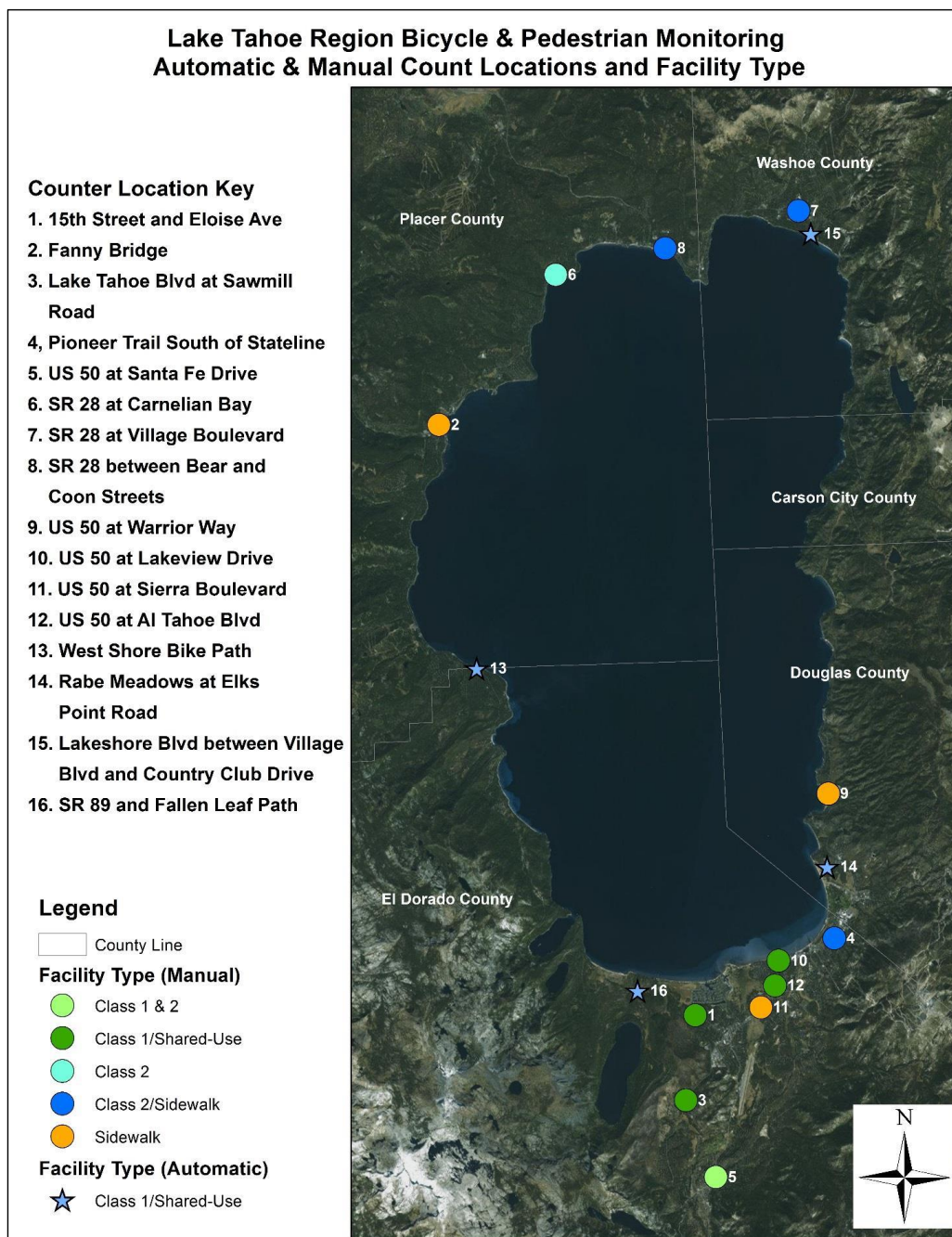


Figure 1. 2015 Summer and Fall Manual and Automatic Count Locations

The data collected in 2015 presents the following conclusions:

1. The presence of high quality facilities influences active transportation usage, while low quality or lack of infrastructure discourages use. When designing projects, agencies should consider implementation of the most up to date, comprehensive infrastructure to encourage increased use.
2. Currently, shared-use paths have the highest use in the Region and are preferred by the community. Shared-use paths accommodate more varieties of user types including less-experienced and recreational bicyclists, pedestrians, the disabled, and faster commute oriented bicyclists. When designing projects, feasibility for a shared-use path should be considered rather than a curb adjacent sidewalk.

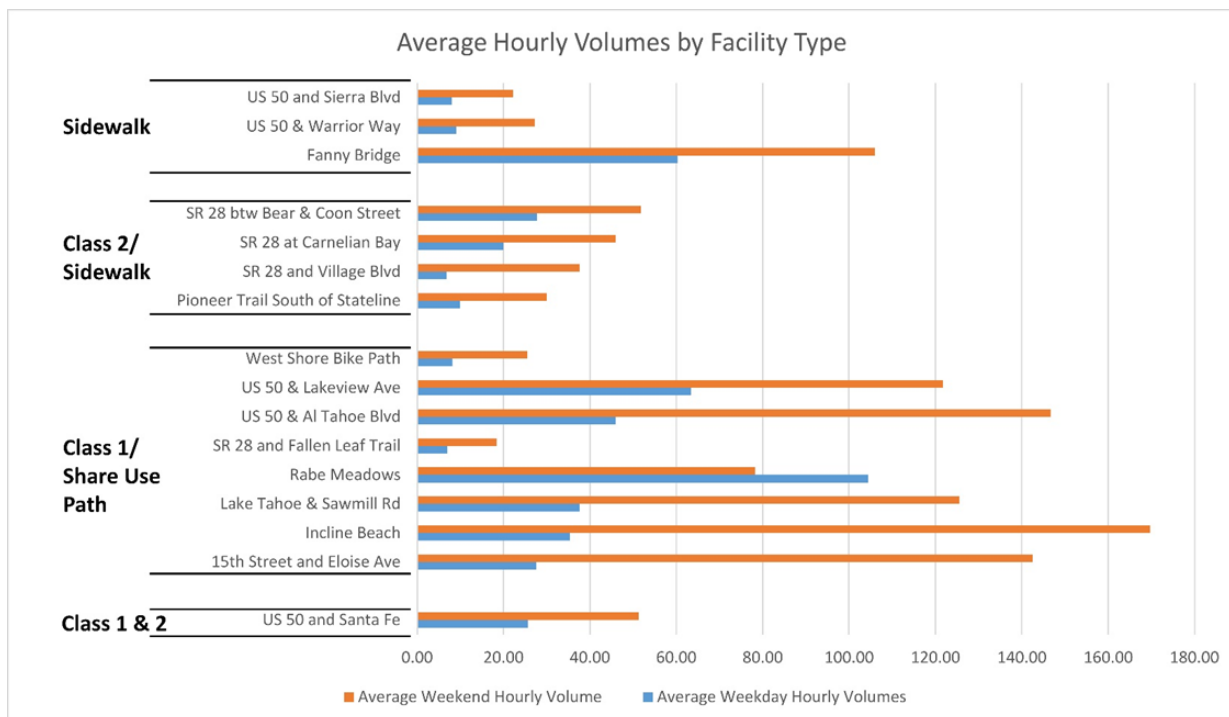


Figure 2-8: Average Hourly Volumes by Facility Type. Source Summer & Fall 2015 Data Collection Report

3. Trails located farther away from commercial centers are predominantly traveled by bicyclists, while locations closer to commercial centers have higher pedestrian activity. Pedestrian and bicycle use varies based on infrastructure type, but both are influenced by commercial activity. We see our highest volumes of pedestrian activity in commercial centers where sidewalks exist and bike activity in commercial centers that are connected to shared-use paths. Though regional connections facilitate long distance commuting, the average commute distance that encourages people to actively transport is 3 miles or less. Project priorities should focus on closing gaps and providing connections to commercial, in-town recreational amenities, and residential locations.

Locations	Average Pedestrian Hourly Volume	Average Bicyclist Hourly Volume
15th Street at Baldwin Path	6.50	59.42
Al Tahoe at US 50	23.42	52.17
Fanny Bridge	49.42	30.75
Lake Tahoe Blvd at Sawmill Road	3.58	13.00
Pioneer Trail	66.33	29.42
US 50 at Santa Fe Drive	5.83	13.00
SR 28 at Carnelian Bay	17.17	11.50
SR 28 at Village	28.08	7.67
SR 28 between Bear and Coon	67.33	12.25
US 50 at Lakeview Drive	35.08	47.75
US 50 at Sierra Blvd	13.67	20.50
US 50 at Warrior Way	4.92	7.83

Table 2-2: Average Pedestrian and Bicyclist Hourly Volume by Location. Source Summer & Fall 2015 Data Collection Report

- The Lakeshore Path in Incline Village sees the highest use of all locations, regardless of infrastructure type, as shown in Figure 2-9. This data supports the need for improvement at the intersection of Lakeshore Boulevard and State Route 28. Further, the path is likely to experience increased use as the shared-use path to Sand Harbor is implemented.
- State highways are heavily used by bicyclists even where infrastructure does not exist, such as along State Route 89 on the West Shore, and State Route 28 on the East Shore. Figure 2-10 illustrates survey respondents' most common routes.

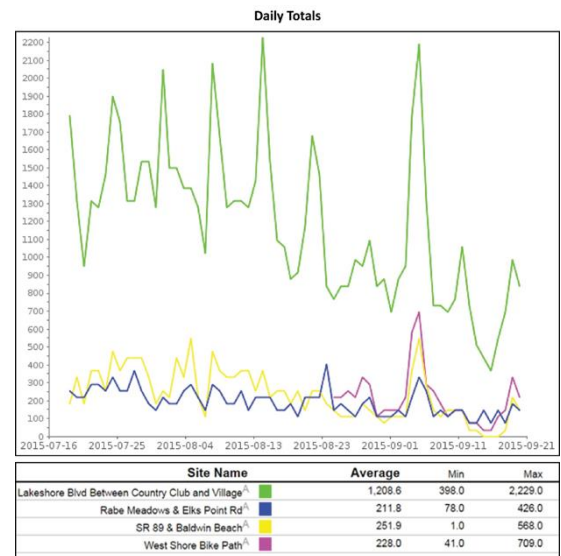
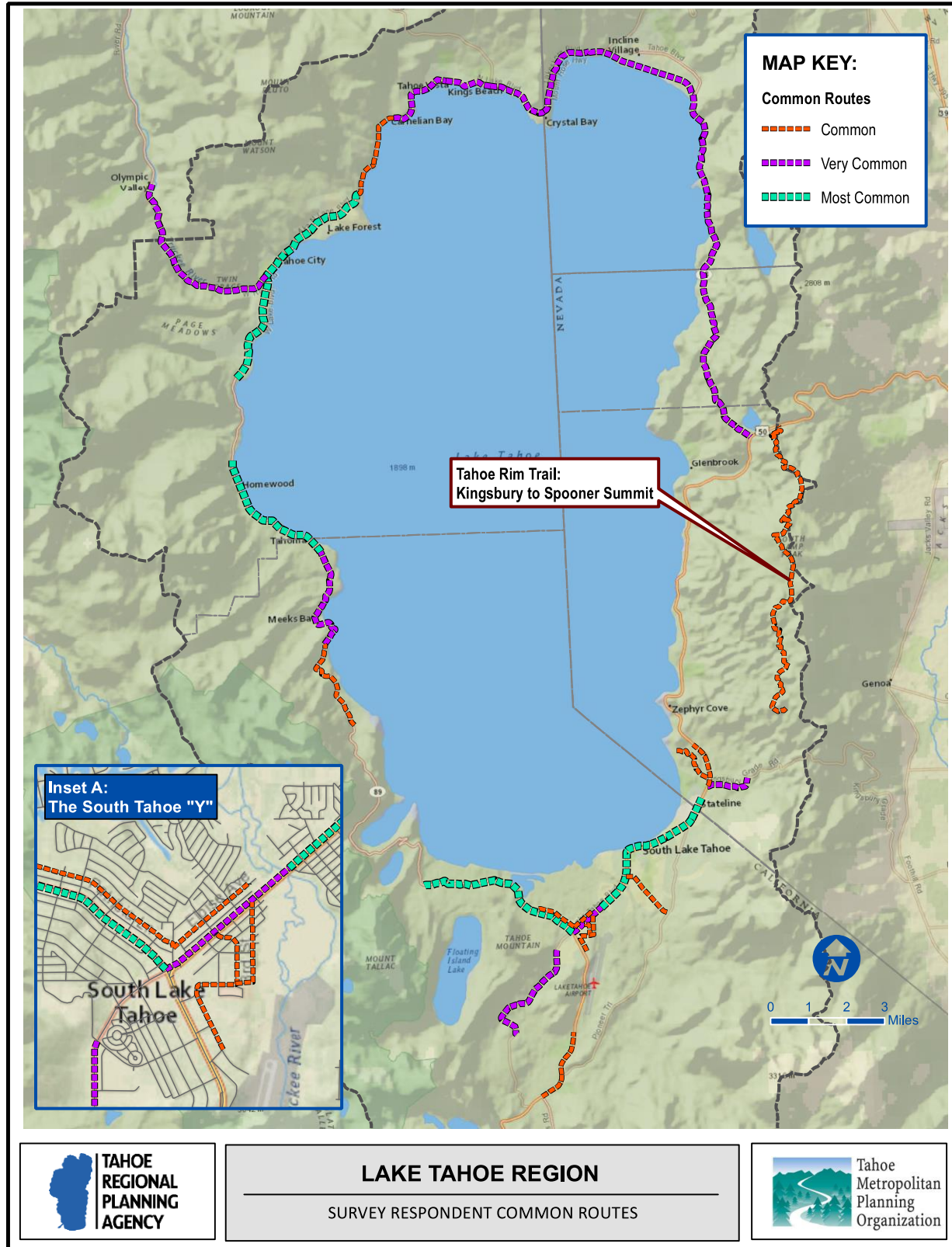


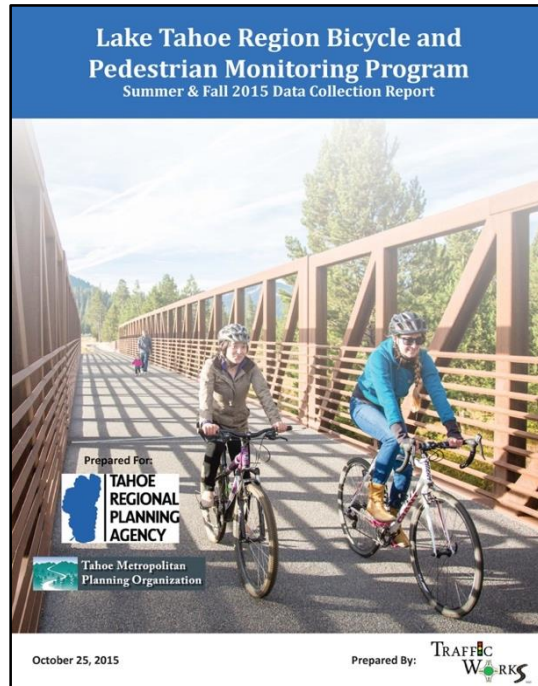
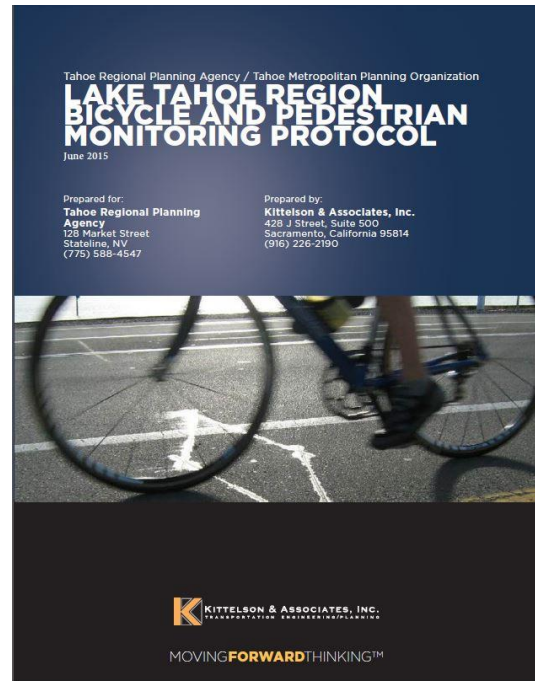
Figure 2-9: Automatic Counter Daily Totals. Source Summer & Fall 2015 Data Collection Report

FIGURE 2-10: REGIONAL SURVEY RESPONDENT MOST COMMON ROUTES



Estimating Future Volumes

Future active transportation trips will depend on multiple factors, including population, employment, climate, land-use development, and active transportation network build-out. For many years, TRPA/TMPO has maintained a transportation model that estimates future vehicle trips based on land-use scenarios. For the 2010 Bike and Pedestrian Plan, a bike trail user model was developed to predict regional active transportation rates and expected use of individual facilities. TRPA/TMPO began validating the Bike Trail User Model with the 2015 monitoring efforts. Over the next several years, TRPA/TMPO will continue to collect data to validate and update the model for the 2020 Regional Transportation Plan and Active Transportation Plan. As the official *Lake Tahoe Bicycle and Pedestrian Monitoring Protocol* (Appendix C) is implemented and extrapolation factors are determined, the model will become more sensitive to seasonal variation. For more information on the protocol, see Chapter 5, Section 5.4 Evaluation.



Using the model, TRPA/TMPO estimated future daily and annual use for the complete regional network. This estimate assumes a high quality, well maintained network of Class I shared-use paths on all major corridors where use is most common in the Tahoe Region. The model yielded an estimate of approximately 40,000 trips on the entire network on a peak summer day and almost 6 million annual trips assuming no winter path maintenance at complete build-out. The estimated 40,000 daily trips represent a four-fold increase over current active transportation rates on Class I shared-use paths. Assuming the same rates of commuting that were reported in the 2007 TRPA/Tahoe Coalition of Recreation Providers surveys, approximately 40 percent of these daily trips would be for commuter purposes.

2.2 CHALLENGES & STRATEGIES

Although Lake Tahoe offers many regional bikeways, multi-modal connections, and on-street facilities, barriers to active transportation still exist. Challenges that discourage active transportation and the development of projects to improve active transportation infrastructure include safety, gaps in connectivity, and the high cost of operations, maintenance, and implementation. This section discusses these challenges, and offers strategies to alleviate barriers.

Safety

A bicycle and pedestrian network that people feel safe using is a high priority in active transportation planning and could be a key factor in getting people out of their cars and onto the active transportation network. Safety can be measured in many ways, such as through crash statics, Level of Traffic Stress (LTS), or qualitatively. TRPA/TMPO collected crash data from state and local agencies, as well as anecdotal data through community outreach. TRPA/TMPO analyzes safety by identifying multiple crash site locations and by cataloguing locations where users feel comfortable or uncomfortable along the network. State and local crash data is provided by the agencies listed in Table 2-3. TRPA/TMPO conducts surveys to gather qualitative safety information.



2010-2014 Crash Report:

Multiple agencies are involved in active transportation-related crash reporting, as indicated in Table 2-3 below.

AGENCY TYPE	AGENCY NAME	RESPONSIBILITY		
		Responds to Crash	Records	Submits to State Collection System
State	California Highway Patrol (CHP)	X	X	X
	Nevada Highway Patrol (NHP)	X	X	X
Local	Barton Memorial Hospital		X	
	CSLT Police Department	X	X	X
	Douglas County Sherriff	Only upon request	X	X
	El Dorado County Sherriff	Only upon request	X	X
	Placer County Sherriff	Only upon request	X	X
	Washoe County Sherriff	Only upon request	X	X

Table 2-3: Agencies Responsible for Crash Reporting. Source: TRPA/TMPO

Accurately reporting crashes is essential for identifying safety needs. **Anecdotally it was identified that current bicycle and pedestrian crash reporting contains data gaps.** During 2014 and 2015, TRPA/TMPO, the Community Mobility Workgroup, and the Lake Tahoe Bicycle Coalition worked with agencies to collect data and discuss where and how reporting can be more robust.

Crashes may not always be accurately reported due to technical difficulties with recording systems, staff availability, injury severity, and non-reporting by victims. Recently, the City of South Lake Tahoe Police Department made progress in overcoming technical recording issues associated with how and what kind of data is inserted into computer databases.

Table 2-4 illustrates crashes reported to the states of California and Nevada. Crashes are separated by jurisdiction and injury severity. In some cases, data from 2014 may not be complete because state officials are still updating databases with 2014 information.

Jurisdiction	Total Crashes*	Pedestrian	Bicycle	Injury	Fatal
El Dorado County, CA	9	3	6	9	0
City of South Lake Tahoe, CA	25	11	14	25	1
Placer County, CA	59	20	39	57	2
Carson City, NV	0	0	0	0	0
Douglas County, NV	8	5	3	5	4
Washoe County, NV	4	2	2	2	0
Total	105	41	64	98	7
Accident Rate:	7.00%	This number is derived by dividing the total number of active transportation collisions between 2010 -2014 in California (93) by the total collisions on the California side of the Region over the same period of time (1305).			
*The sum of injuries and fatalities may be higher or lower than total accidents because sometimes the number of people in the party was greater than 1 or an injury did not occur.					

Table 2-4: Reported Crashes between 2010 -2014. Source: SWITRS/NHP

Some intersections have been the site of multiple crashes as indicated in Table 2-5 (on the next page), with the locations of highest crash occurrence highlighted in orange. The table also compares officially recorded crash sites to qualitative data collected from the 2015 Survey. Respondents were asked to identify locations they felt were in need of improvement and why. Crash information, along with community and stakeholder feedback, was used to identify intersection improvement location priorities, which are shown by corridor in Chapter 4, Network Recommendations. All intersections in the Region, however, could benefit from active transportation improvements.

Table 2-5 identifies several locations where complete street improvements are currently underway or planned. These include the Tahoe City “Wye” as part of the **SR 89/Fanny Bridge Community Revitalization Project**, State Route 28 and Chipmunk Street as part of the **Kings Beach Boardwalk/Gateway Project**, and Stateline & US Highway 50, as part of the **US 50/South Shore Community Revitalization Project**. Further, State Route 28 and Bear and Fox streets have recently been improved as part of the **Kings Beach Commercial Core Project**.

NUMBER OF CRASHES			TYPE OF INTERSECTION		COMMUNITY IDENTIFIED	REASON
Location	Bicycle	Pedestrian	Signalized	Unsignalized		
Pioneer Trail & Moss Rd, CSLT		2		✓	1	Long wait time & High vehicle volumes
SR 28 & Agatam Ave., Tahoe Vista		2		✓		
SR 28 & SR 89, Tahoe City		3	✓		15	Do not feel safe, Does not have a crosswalk, High vehicle volumes, Distance is too long, & Wait time is too long.
US 50 & Stateline, CSLT		3	✓		1	
SR 28 & Bear St., Kings Beach	2			✓	9	Do not feel safe & High vehicle volumes
SR 28 & Chipmunk St., Kings Beach	4			✓	2	High vehicle speeds
SR 28 & Fabian Way, Dollar Point	2			✓		
SR 28 & Fox St., Kings Beach	2			✓	7	High vehicle volumes & speeds, Small waiting area
SR 28 & Grove St., Tahoe City	2			✓	9	High vehicle volumes
SR 28 & Old County Rd., Incline Village	3			✓		
SR 89 & Granlibakken Rd., Tahoe City	3			✓		
SR 89 & Oak St., Homewood	2			✓	2	
TOTAL:	20	10	2	10	46	

Table 2-5: Intersection Crash Index. Source: SWITRS/NHP; 2015 Active Transportation Plan Survey

TRPA/TMPO sought to collect qualitative crash data that can supplement recorded police data over the four-year period from 2010 to 2014. Survey respondents were asked whether or not they had experienced a bicycle- or pedestrian-related crash between 2010 and 2014. In total, 22 respondents noted they had experienced a crash between those years, of which 14 incidents were unreported. Table 2-6 summarizes crash data recorded from the California Statewide Integrated Traffic Records System (SWITRS), the Nevada Crash Database, and the 2015 Survey. Crash locations are depicted by corridor in maps in Chapter 4: Network Recommendations.

Total Bicycle & Pedestrian Crashes: 2010 -2014						
Reported By:	2010	2011	2012	2013	2014	Total Collisions:
SWITRS	17	16	23	19	18	93
NHP	1	3	4	4	0	12
TRPA/TMPO Active Transportation Plan Survey	Collected for consolidated 4-year period, indicates only non-reported collisions					14
Total Collisions:	18	19	27	23	18	119

Table 2-6: Total Bicycle & Pedestrian Crashes, 2010-2014. Sources: SWITRS, NHP, 2015 Active Transportation Plan Survey

Barton Memorial Hospital began recording active transportation-related injuries in 2012. TRPA/TMPO conducted outreach to Incline Village Community Hospital to clarify if they also recorded transportation-related injuries. The hospital indicated that it does collect this information, but does not consolidate it into any report for public consumption. Barton data is provided below and is compared to data available in SWITRS for the City of South Lake Tahoe, El Dorado County, and Douglas County during the same time period. Hospital data does not include area codes, so this

comparison assumes records only include injuries from the Barton Hospital identified primary service area for Lake Tahoe, including the City of South Lake Tahoe, El Dorado County, and Douglas County. Table 2-7 highlights the discrepancy between the number of crashes reported to the state and the number of actual active transportation-related injuries treated by Barton Hospital.

SWITRS & Barton Memorial Hospital Crash Data Comparison: 2012 - 2014				
Year Reported & Agency:	2012	2013	2014	Total Collisions:
SWITRS	12	3	4	18
Barton Memorial Hospital	24	16	21	61

Table 2-7: SWITRS & Barton Memorial Hospital Crash Data Comparison, 2012 -2014.Sources: Barton Memorial Hospital & SWITRS

Designing for Safety:

Perceptions of safety directly influence people’s choice to use active transportation. Poor sight distance, high vehicle volumes and speed, lack of lighting, and lack of infrastructure may cause people to choose to drive even though they may prefer to make their trip by biking or walking. The 2015 Survey asked respondents why they felt locations they indicated were in need of improvement. Their answers are illustrated in the figures below. The issues relayed in the figures, such as not feeling “protected from traffic,” should be used as design criteria when designing future projects or reconfiguring roadways.

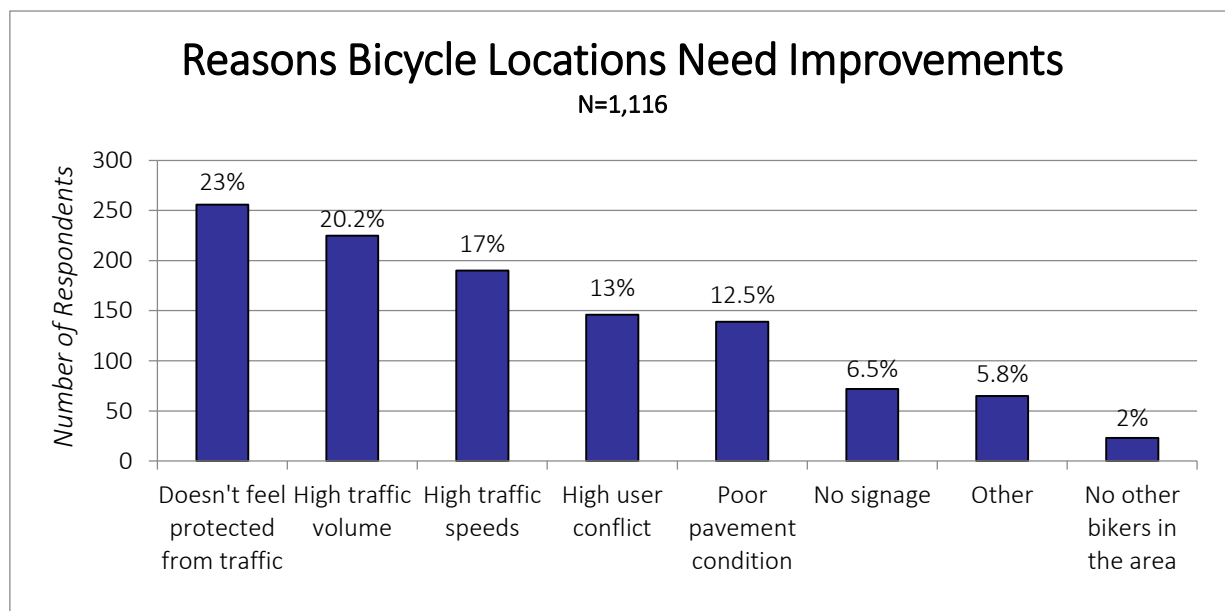


Figure 2-11: Reasons Intersections Need Improvements for Bicyclists. Source: 2015 Active Transportation Plan Survey

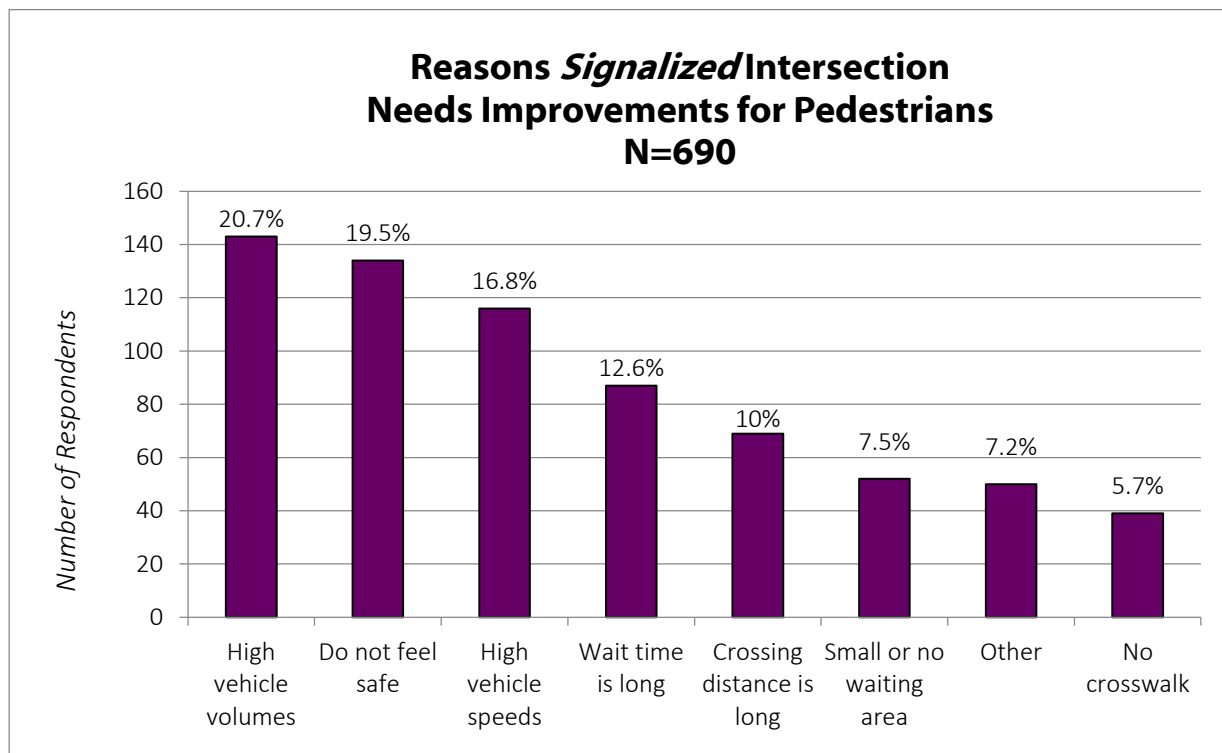


Figure 2-12: Reasons *Signalized* Intersections Need Improvements for Pedestrians. Source: 2015 Active Transportation Plan Survey

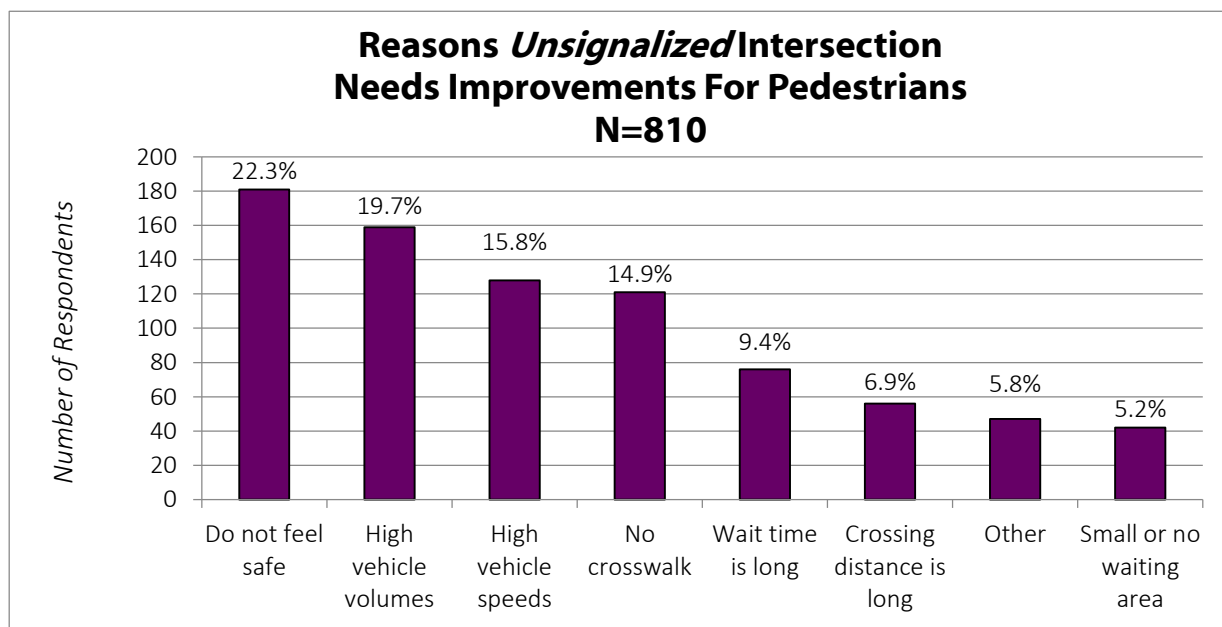


Figure 2-13: Reasons *Unsignalized* Intersections Need Improvements for Pedestrians. Source: 2015 Active Transportation Plan Survey

Safety - Challenges & Strategies:

The sections above illustrate three clear safety challenges. These challenges are listed below, and include recommended strategies as possible solutions.

ACCURATE CRASH REPORTING

Strategy:

- *Encourage all crash victims to report incidents to police.* Some ways to encourage this behavior are through education campaigns that inform people how to report, such as calling hotlines. An online self-reporting tool could be developed to support increased reporting. Hospitals can also encourage victims to report their incident to law enforcement.
- *Ensure law enforcement records all active transportation-related crashes, regardless of injury severity, and includes those records in their report to the state.* This may entail altering the way law enforcement collects information, or may require updating technological systems to coordinate with state systems.

"HOT SPOT" LOCATIONS IN NEED OF IMPROVEMENT

Strategy:

- *Use 2010-2014 Crash Report and intersection priority locations to prioritize locations for improvement.* Priority locations should be added into capital improvement programs and included in private and public projects, where appropriate.

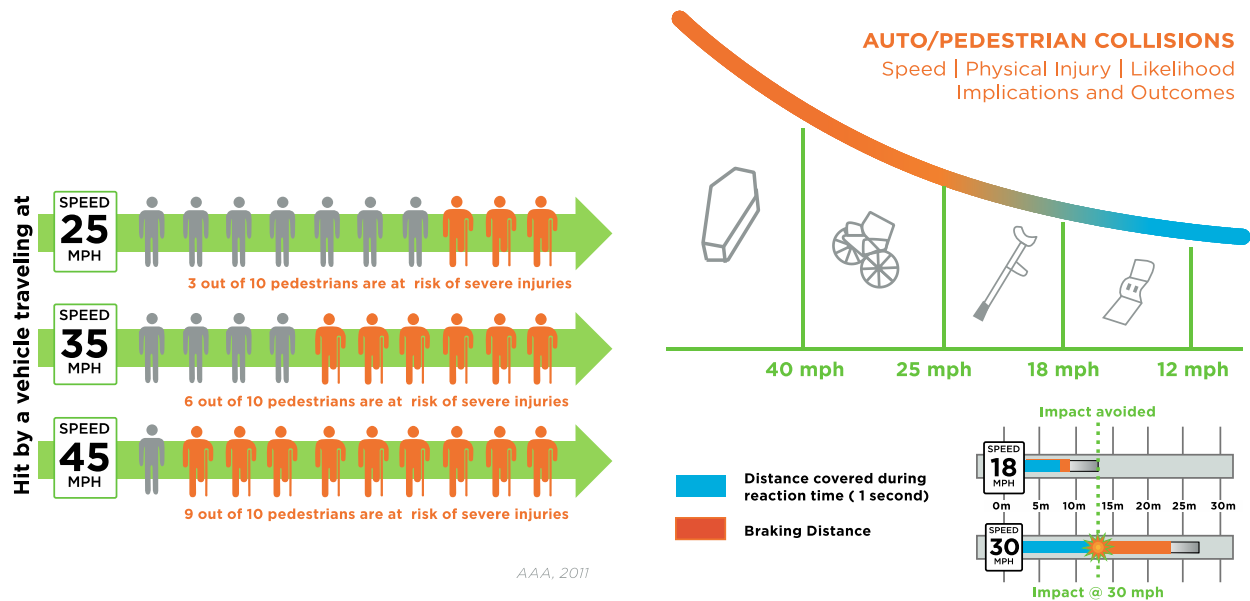


3rd Street & US 50 Intersection, vehicular left turn movement. Photo: Mike Vollmer

DESIGN FOR SAFETY

Strategy:

- Design projects for the safety of all roadway users. Use the data collected in the 2015 Survey to identify community-perceived risks to safety and design projects to address those issues. Lake Tahoe-specific issues that can be improved through design include lighting crosswalks, decreasing the distance between controlled crossing opportunities, reducing crossing exposure (Distance), and adding designated on-street infrastructure in uphill sections of roadway.



Connectivity

Gaps in connectivity impact a variety of user types in different ways. These differences are explained and analyzed as Level of Traffic Stress, which measures the ability for active transport users to travel between origin and destination without using links that exceed their tolerance for discomfort and that do not involve an undue level of detour. For a family of riders, parents may only feel comfortable taking their children on shared-use paths because they are completely separated from vehicular traffic. If a family cannot take the path from origin to destination, they may choose to drive even if they would prefer to bike. More experienced riders may be more comfortable riding in bike lanes with traffic, but may choose not to ride because bike lanes are not well maintained, are poorly designed, or inconsistent. If sidewalks do not extend the entire distance of a common commute or do not exist at all, and pedestrians are forced to walk along the road, they, too, may decide to drive. In many cases, people do not have transportation choices, as explained in the equity section in Chapter 1. At the 2015 Active Transportation Plan community gatherings, attendees were asked to identify top priorities for active transportation planning. *Connectivity is the top priority.*

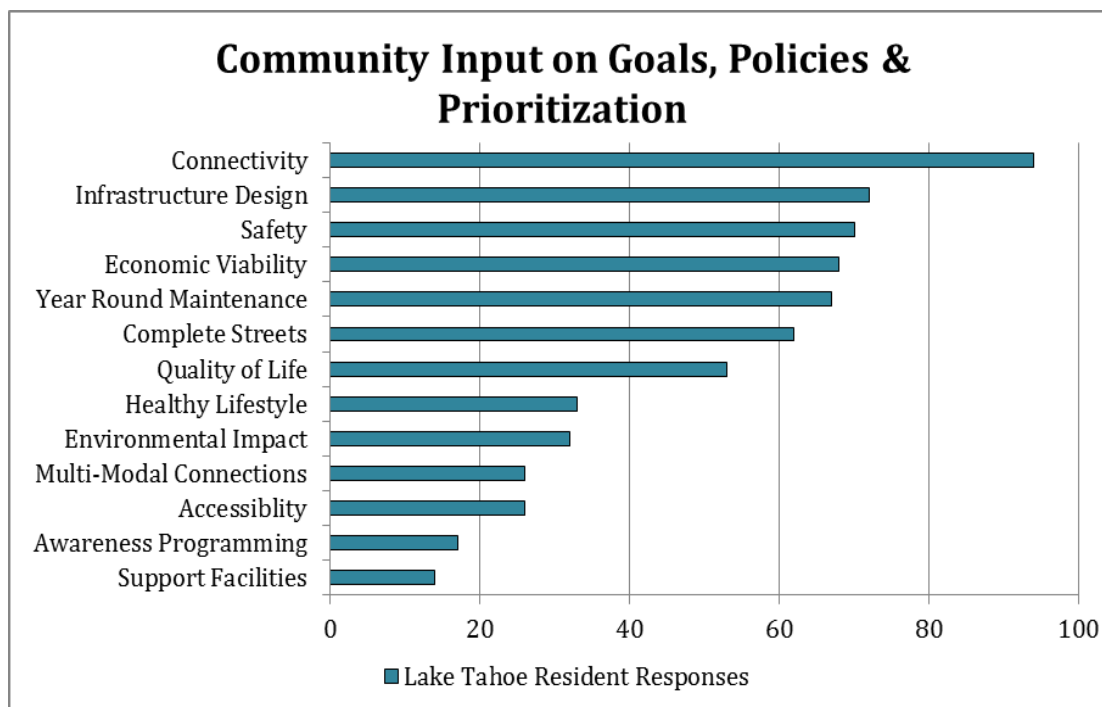
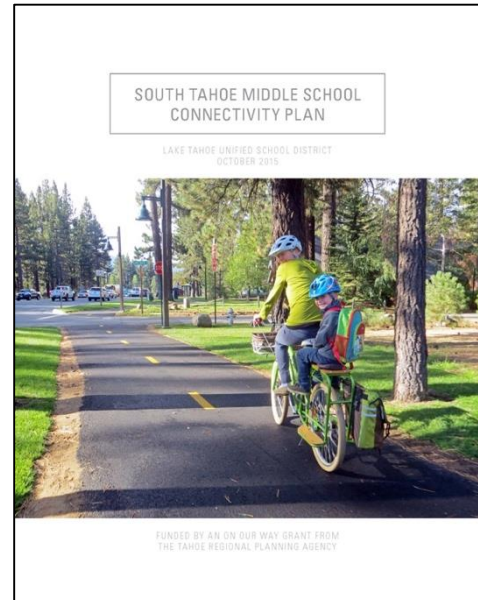


Figure 2-14: Community Input on Goals, Policies, and Priority. Source: 2015 Community Outreach Report

Connectivity - Challenges & Strategies:

The Lake Tahoe Region has a few key locations that sever the active transportation network and act as barriers to increased use. This list is not exhaustive, but identifies locations that are major gaps in regional connectivity as of 2015. These locations include:

Location	Status	Improvement	Project Lead
South Tahoe "Y" to Trout Creek	Programmed for Improvement 2017/8	Bike Lanes & Sidewalks	Caltrans
Al Tahoe Boulevard, from US 50 to Johnson Boulevard	Programmed for Improvement 2017	Bike Lanes, Shared-Use Path, Sidewalk, Intersection	City of South Lake Tahoe
SR 89 from Cascade to Meeks Bay	N/A	Bike Lanes & Shared -Use path	N/A
Kings Beach to Crystal Bay	N/A	Shared-Use Path	N/A
Crystal Bay to Incline Village	Planning for Improvement	Shared-Use path	Tahoe Transportation District & NDOT
Incline Village to Round Hill Pines.	Programmed and planning for improvement 2016 - Onward	Shared-Use Path	Tahoe Transportation District & NDOT
SR 28 & US 50 (Nevada)	N/A	Bike Lanes	NDOT

Table 2-8: Regional Gaps in Connectivity. Source: TMPO

Gaps in Connectivity are illustrated by the following physical infrastructure issues:

- Lack of infrastructure
- Discontinuous infrastructure
- Aged facilities that no longer feel safe
- Intersections that do not accommodate all user types
- Lack of wayfinding to direct users to a preferred network

Strategies to improve conditions and reduce connectivity gaps can involve small efforts such as installing wayfinding signage or large scale construction projects. Implementing agencies should prioritize closing network gaps by placing these projects on their capital improvement program lists. Recently, the City of South Lake Tahoe and El Dorado County have installed wayfinding signage on their trail systems through funding provided by Measure R and Measure S. Placer County, in coordination with the North Lake Tahoe Resort Association, has created a wayfinding manual to assist in the implementation of a comprehensive wayfinding network. Washoe County, as part of a TRPA/TMPO On Our Way Grant Program, is also creating a Signage Master Plan for the State Route 28 Corridor. These are great starts to assisting users on regional trails. The street network could benefit from similar efforts.



West Shore Wayfinding.
Photo: Alta Planning + Design

- ✚ For regional connectivity gaps, implementation of **large scale projects** may be necessary. These projects can be done in phases, such as first adding bike lanes and later providing a Class I shared-use path when funding is available. Interim projects can help close gaps more quickly at reduced costs. Constructing interim projects may allow more robust planning, outreach, and funding analysis to be conducted while still meeting the short-term needs of the community.
- ✚ For more localized connectivity gaps, **wayfinding signs** are a small improvement that can generate a large benefit. Tourists and residents may not understand that the Lake Tahoe network is comprised of various types of infrastructure, such as bike lanes that connect to bike routes that connect to a shared-use path. Wayfinding offers people recommendations about preferred routes, provides destination and distance information, and acts as a key landmark in case of emergency.

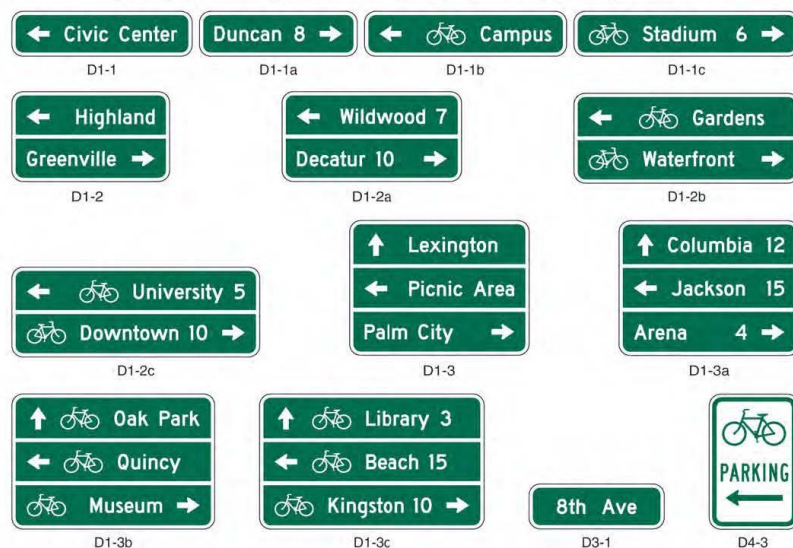
Strategies for improving wayfinding include:

- Be Consistent and use the 4 “D’s”
 - Distance
 - Direction
 - Destination
 - Duration
- Integrating wayfinding into structures in the public right-of-way, such as bus shelters, permanent trash cans, and other street furniture. Information must be accessible to people with disabilities.
- Install signs to direct users in the right direction, especially at route decision points.

California MUTCD 2012 Edition
(FHWA's MUTCD 2009 Edition, as amended for use in California)

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Figure 9B-4. Guide Signs and Plaques for Bicycle Facilities (Sheet 1 of 2)



Constructability

Project construction in the Region has accelerated thanks to the efforts of governmental agencies, funding awards, and advocacy groups. Multiple-resource benefits are also realized as more water quality projects include complete street improvements. Some examples of multi-benefit projects are Caltrans' work on US Highway 50 and State Route 89, and the City of South Lake Tahoe's Greenbelt. Projects anticipated to be completed by 2018 include:



US 50 Water Quality Improvement Project

Location	Improvement	Project Partners	Year of Construction
Al Tahoe Safety and Mobility Enhancement Project	Roadway realignment, Shared-Use Path, Bike Lanes, Sidewalks, Intersection Improvements	Caltrans & City of South Lake Tahoe	2017
SR 89 / Fanny Bridge Community Revitalization Project	Roundabouts, Bike Lanes, Shared-Use Paths, Crossing Improvements, Water Quality Improvements	TTD, Caltrans, TCPUD, and Placer County	2016/2017
Nevada Stateline to Stateline Bikeway (Incline Village to Sand Harbor)	Shared-Use Path, Parking Improvements	TTD, Washoe County, NDOT	2017
US 50 (Trout Creek to South Tahoe "Y")	Bike Lanes, Sidewalks, Intersection Improvements, Water Quality Improvements	Caltrans & City of South Lake Tahoe	2017
West Shore Bike Path Extension (Homewood & Meeks Bay)	Shared-Use Path	TTD, TCPUD, Caltrans, & Placer County	2016/17/18
South Tahoe Greenway	Shared-Use Path	CTC & City of South Lake Tahoe	2018
Kings Beach Commercial Core Revitalization Project	Roundabouts, Sidewalks, Bike Lanes, Water Quality Improvements	Placer County & Caltrans	2016

Table 2-9: Near Term Regional Project Implementation. Source: TMPO

Agencies still face many challenges moving projects into implementation, including a limited construction season and limited funding, and the difficulty of managing traffic control during peak summer travel times. Delaying projects that improve safety can result in preventable injuries or fatalities. One of the goals of this plan is to help agencies identify ways to deliver cost-effective projects to more quickly meet the needs and values of the community.

Implementation – Challenges & Strategies:

HIGH BUILDING COST

Strategies:

- *Be Opportunistic:* Look for nearby or similarly timed projects and identify opportunities to expand the scope to include complete street improvements.
- *Resurface and Repurpose:* If a roadway is programmed for resurfacing, revisit the street striping to include painted active transportation infrastructure.
- *Bundle Funds:* Be creative with funding sources by planning ahead and diversifying sources.
- *Design/Build vs. Construction Manager at Risk vs. Design/Bid/Build:* Cost savings can occur when contractors are brought on board for projects before they have reached 100 percent design. These methods give contractors an opportunity to provide feedback on the implementation challenges they foresee and creates buy-in to implement the project as envisioned.



Round Hill Pines Path Construction. Photo: TTD

PUBLIC SUPPORT

Strategies:

- *Interim Treatments:* During planning and outreach phases, construct low-cost, interim treatments that reflect future project plans. This gives the community a chance to understand the new infrastructure, give feedback, and improve the area in the short-term without large costs. Interim projects give staffers the opportunity to refine and rethink issues to implement better long-term projects. Some examples of interim treatments include:
 - Signs
 - Signal phase readjustment
 - Painted roadway markings
 - Street furniture (planters, benches, tables)
 - Superficial construction
 - Part-time closures



Jackson Hole, WY. Painted Curb Bulbouts. Photo: Alta Planning + Design

- **Phased Implementation:** Similar to interim treatments, phased implementation gives the community a chance to understand the project and experience benefits. As the project draws closer to completion, public support and desire for the project will be stronger.



Original Alignment

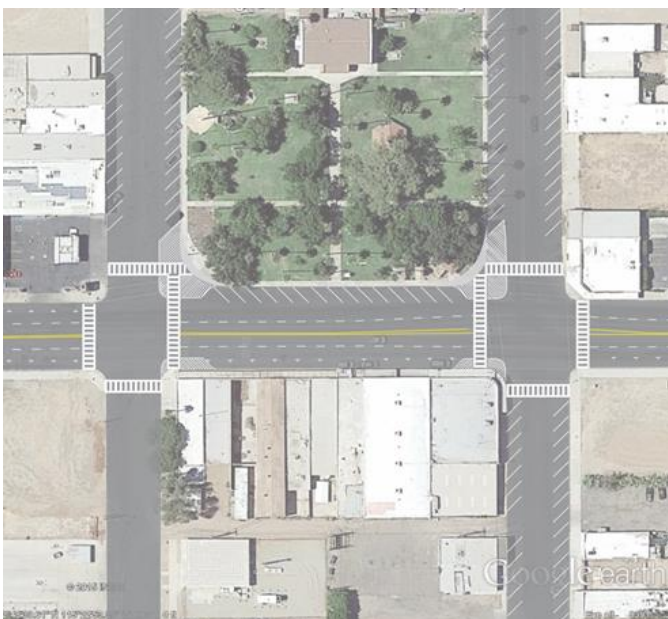


Phase 1: Painted crosswalks & roadway realignment

Phase 2: Painted Curb Bulbouts & Realigned Crosswalks



Phase 3: Bulbouts made permanent



Example supplied by Alta Planning + Design at the Transforming Tahoe Transportation Workshop

Maintenance

A major component of a healthy transportation network is maintaining and upgrading infrastructure so it is comfortable and safer to use. Some paths and on-street infrastructure in Lake Tahoe were implemented prior to current standards and best practices, or are weathered and need refurbishment. Many local agencies are taking the lead in upgrading the current trail system through refurbishment of pavement, expansion of width, and rerouting trails to reduce user conflict and heighten conflict awareness.



Banff, Canada – Cycle Track. Photo: Shay Navarro

Many on-street network upgrades are also needed. In many cases, bike lane striping is faint on the roadway, as agencies restripe at the end of summer and snow removal operations throughout the winter significantly degrade quality. Bike lanes throughout the Region are often minimum width and do not contain some updated design features such as buffers (painted or physical), cycle tracks, and intersection treatments. Table 2-10 highlights the high-priority facilities that are in need of upgrade as of 2015. The annual Active Transportation Plan

Implementation Report will continue to update priority facility upgrades and report on facilities that undergo improvement.

Location	Improvement	Project Partners
Pioneer Trail	Bike Lanes (buffered)	El Dorado County & City of South Lake Tahoe
SR 89 & West Shore Bike Path	Crossing	Caltrans, TCPUD, TTD, and Placer County
Eloise Bike Route	Pavement Resurface	City of South Lake Tahoe
US 50 (CSLT)	Bike Lanes	Caltrans & City of South Lake Tahoe
SR 28 (Tahoe City, Kings Beach)	Bike Lanes	Caltrans & Placer County
Various paths around Incline Village	Refurbish path and bring up to current standards	Washoe County

Table 2-10: Facilities in Need of Upgrade. Source: TMPO

Operations & Maintenance - Challenges & Strategies:

“Transforming Tahoe Transportation: A Workshop on Completing Our Streets” included a robust brainstorming session, presentations, and panel discussions on the challenges associated with maintenance. Strategies used in other locations to overcome similar issues were presented as case studies. More detailed information can be found in Appendix A, the *Lake Tahoe Complete Street Resource Guide*.

ONGOING MAINTENANCE COST

Strategies:

- *Public-Private Partnerships:* The Town of Truckee, Placer County in Kings Beach, and the City of South Lake Tahoe all employ this method. Facility and assessment districts are created when local government and businesses enter into an agreement where the government invests capital funds to build complete street improvements and add value to commercial centers while business owners pay fees to assist in ongoing maintenance. Local examples include the Kings Beach Benefit Assessment District and the Park Avenue Development Maintenance Association.
- *Surcharge on Property Taxes:* This tax can only be implemented by a vote by property owners, per Proposition 218 (for California). Taxes are used for transportation-related maintenance, including refurbishment and snow removal.
- *Design with Maintenance in Mind:* Include maintenance staff during design phase. Maintenance staff understands available resources. They can offer design strategies to alleviate known maintenance limitations.



Flush Curb. Photo: Alta Planning + Design

SNOW REMOVAL

Strategies:

- *Design for Snow Removal:* Design ingress and egress that is wide enough for existing equipment, delineate and defend hardscape, and provide capacity for snow storage on site.
- *Identify Primary Routes:* Not all facilities in the network are appropriate for snow removal. Use count and common route data to identify which routes are most heavily used and for what activity, such as commuting to work or recreation. In some cases, paths may be more appropriate for packing snow and providing cross country ski routes. For commute locations, schedule operations so that ideal conditions occur between 7 a.m. and 7 p.m., with added emphasis on peak travel times of 7-8 a.m. and 4-5 p.m. Begin snow clearing after two inches of accumulation.

- *Get Creative with Equipment:* Create smaller snow plows out of old Jeeps that can remove snow from trails, bike lanes, sidewalks, and pedestrian refuge islands.



TORT LIABILITY

Strategies:

- *Utilize Federal and State Design Flexibility:* Both the FHWA and Caltrans have released memos that direct local jurisdictions to utilize design and funding flexibility in multi-modal design.
 - Caltrans, 2014: "Design Flexibility in Multimodal Design"
 - FHWA, 2013: "Bicycle and Pedestrian Funding, Design, and Environmental Review: Addressing Common Misconceptions."
 - FHWA, 2015: "Revision of Thirteen Controlling Criteria for Design" (Docket No. FHWA- 2015-0020).



Salt Lake City – Buffered Bike Lane
Photo: Alta Planning + Design



Vancouver, BC
Photo: Alta Planning + Design