

Complete Street Focused Road Safety Assessment Report

U.S. Highway 50 Stateline (MP DO 0.00) to S.R. 28 (MP DO 12.3)

**Pre-Construction Phase Assessment
December 2016**



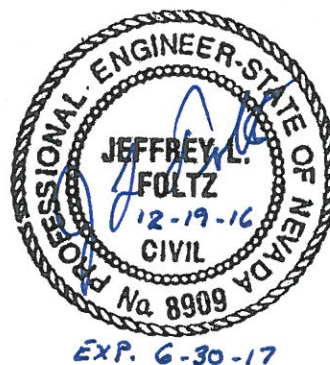
Prepared for:



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Prepared by:

PARSONS
Parsons Transportation Group



zero Fatalities
Drive Safe Nevada

Executive Summary

Nevada Department of Transportation (NDOT) Safety Engineering authorized a Complete Streets-Focused Road Safety Assessment (RSA) to be conducted on US 50, between Stateline NV and the intersection of SR 28. (See Study Corridor Vicinity Map on page 2.) This involved reviewing existing conditions and data and performing a field review. There have been previous RSA's conducted on this corridor. This specific RSA was initiated by the design team prior to construction of an upcoming project to convert this corridor into a "Complete Street". A complete street is designed to offer improved roadway usage to all users including motorists, motorcyclists, transit, bicyclists, and pedestrians. Per meetings with NDOT Safety, it was stated that the design team will look at all methods of obtaining a complete street, such as road diets/reconfiguration and road widening.

The purpose of this RSA is to identify potential road safety issues that currently exist and that could be considered when converted to a complete street layout and suggest countermeasures to mitigate those safety issues in future projects along the studied corridor.

The studied segment, shown in the map in photo 1 on page 2, is 12.30 miles long and has a right-of-way ranging from 30-200 ft from the centerline, from milepost (MP) DO 0.00 to MP DO 12.30. The current roadway geometry consists of two general purpose lanes in each direction with left turn lanes at select locations. The speed limit varies from 25 mph to 50 mph.

Primary suggestions include providing ADA compliant facilities, facilitating left turns, improving safety for pedestrians at the crosswalk on SR 207 (also known as Kingsbury Grade), addressing on street parking, and providing bicycle facilities. A summary of the suggestions is listed on page 47.

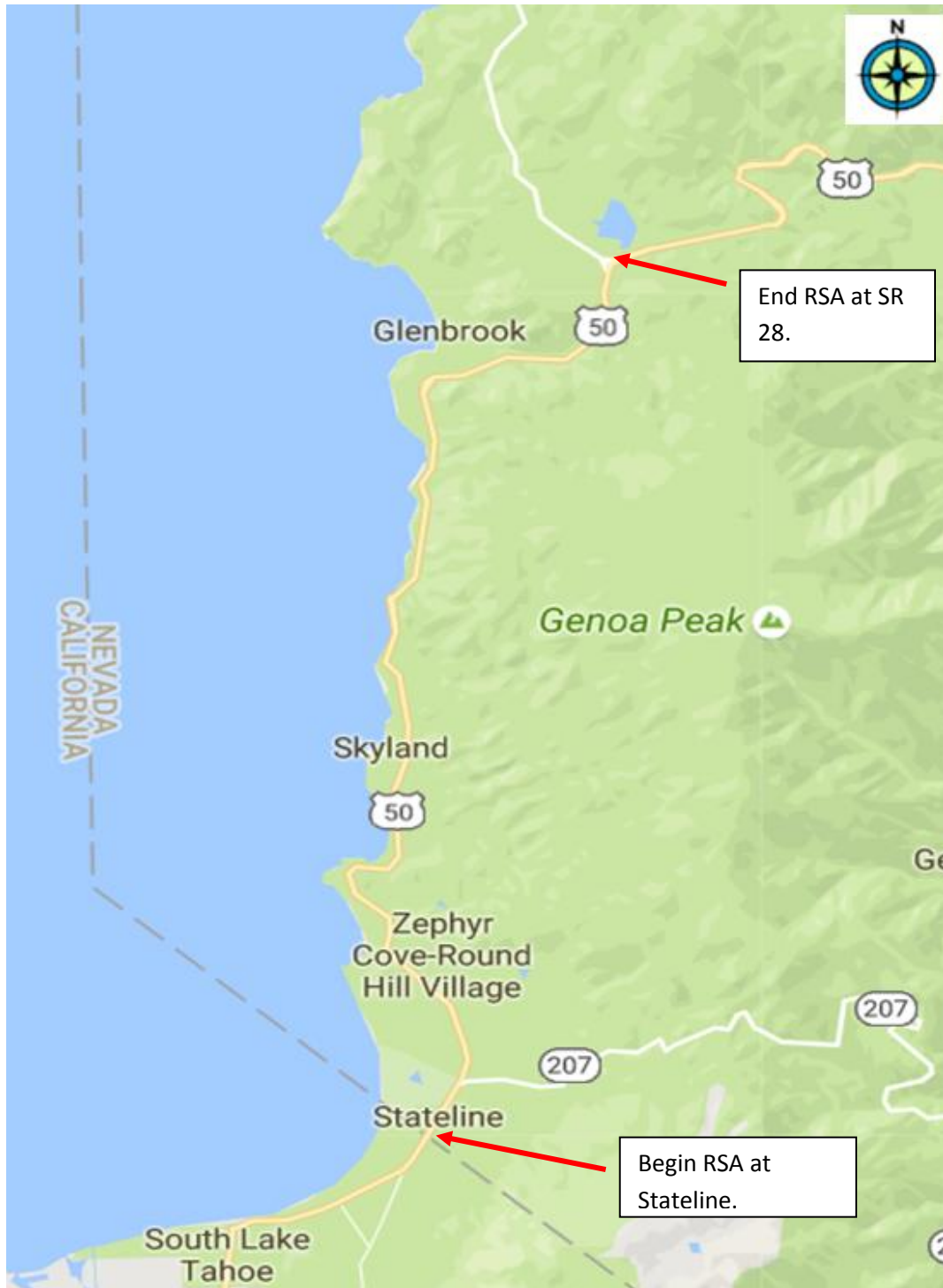


Photo 1- Study Corridor Vicinity Map

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Introduction

Nevada Department of Transportation (NDOT) Safety Engineering authorized a Complete Street-Focused Road Safety Assessment (RSA) to be conducted on US 50, between Stateline and SR 28. The purpose of the RSA is to identify the potential multiple road user safety issues and suggest countermeasures to mitigate those safety issues for inclusion in future US 50 Complete Street or road maintenance projects.

Scope of Assessment

The Road Safety Assessment Team conducted a Pre-Construction Phase Road Safety Assessment on US 50, between Stateline (MP DO 0.00) and SR 28 (MP DO 12.30), for over 12 miles on July 28, 2016.

The RSA Team recognizes that compliance with design standards does not necessarily result in an optimally safe road design and that the failure to comply with standards does not necessarily result in an unsafe design. The goal of this Road Safety Assessment was to identify potential road safety issues and identify opportunities for improvements in safety for all road users. However, the RSA was not intended as a replacement for design quality control or standard compliance checks, a traffic impact or safety impact study, a road safety inventory program, or a traffic safety modeling effort. Neither was the assessment intended as a means of evaluating design work, checking compliance with standards, investigating crashes, or providing a safety review. Instead, the Team strived to look at safety issues from a different perspective and develop suggestions for potential safety enhancement for all road users.

The objectives of these assessments are to identify potential traffic safety issues that may be addressed by the proposed project thereby reducing the risk and severity of crashes. The team considered the road user's perspective by identifying confusing and/or misleading messages. The team also raised awareness of safe maintenance practices.

Statutory Notice

23 U.S.C. § 409 : US Code - Section 409: Discovery and admission as evidence of certain reports and surveys

Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential accident sites, hazardous roadway conditions, or railway- highway crossings, pursuant to sections 130, 144, and 148 of this title or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing Federal-aid highway funds shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

Assessment Meetings and Participation

Meetings were held the morning and evening of July 28, 2016 before and after the site visit, in the Kahle Community Center. The morning meeting served as a briefing meeting in which Jeff Foltz, Parsons, gave a brief introduction covering the RSA procedures and site specific details. Attendees who would not be able to participate for the entirety of the field review had the opportunity to give their input about the assessment.

Topics of Discussion:

- Road Safety Assessment purpose, procedures, goals and objectives.
- Overview of US 50
- Overview of Complete Streets
- Review of safety issues/areas of concern

Following the morning meeting, the subject segment of US 50 was walked between Stateline and Kahle Drive. The team then drove from Kahle Drive to SR 28 in each direction during the daytime and night time field reviews. During the daytime field review, the team stopped at multiple intersections to observe and discuss safety concerns.

Two post field review meetings were held. The purpose of these meetings was to discuss field observations and prioritize suggested improvements.

The first post field review meeting was held in the evening of July 28, 2016 before the nighttime RSA field review. The second post field review meeting was held on October 10, 2016.

Table 1 shows the attendance for all the meetings and field review.

Table 1- Attendance List

Name		Morning Meeting July 28, 2016	Field Review	Evening Meeting July 28, 2016	Follow Up Meeting October 11, 2016
Lori Campbell	NDOT Safety	✓	✓	✓	✓
Bianca Saaverda	NDOT Roadway Design Scoping				✓
Kent Steele	NDOT Roadway Design Scoping	✓	✓	✓	✓
Milton Towne	NDOT Roadway Design Scoping	✓	✓	✓	✓
Casey Sylvester	NDOT Traffic Operations	✓	✓	✓	✓
Tim Rowe	NDOT Bicycle & Pedestrian Coordinator	✓	✓	✓	✓
Steve Williams	NDOT Road Maintenance				✓
Jon Erb	Douglas County Public Works	✓	✓	✓	✓
Ted Bates	Douglas County School District	✓			
Carl Hasty	Tahoe Transportation District	✓			
Russel Nygaard	Tahoe Transportation District		✓		
Karen Fink	Tahoe Regional Planning Agency	✓			
Morgan Beryl	Tahoe Regional Planning Agency				✓
Anjanette Hoefer	U.S. Forest Service	✓			
Lt. Carl Johnson	Nevada Highway Patrol	✓	✓		
Sgt. Rob Rikalo	Nevada Highway Patrol	✓	✓	✓	
Todd Moss	Tahoe Douglas Fire Protection	✓	✓		
Jeff Foltz	Parsons	✓	✓	✓	✓
Diana Maragakis	Parsons	✓	✓	✓	

General Project Information

Study Segment Description

US 50 between Stateline and SR 28

US Route 50 is a transcontinental highway and the studied area was in Douglas County, Nevada. The study segments runs from the California/Nevada Stateline to the junction with State Route 28 (SR 28). Land use along US 50 includes casinos, retail businesses, and residential neighborhoods. This corridor becomes congested during events, holidays, summer season due to beach access, and winter season due to ski access.

The segment of US 50 that was reviewed for this report is 12.30 miles long, from MP DO 0.00 to MP DO 12.30.

- There are two general purpose lanes in each direction on this section of US 50. The segments from Stateline Avenue to Lake Parkway and from SR 207 to Kahle Drive have a center lane that alternates between a two way left turn lane (TWLTL) and a dedicated left turn lane. The remainder of the roadway has left turn lanes only at select locations. These include westbound at Lake Parkway, westbound at Kahle Drive, westbound at Lake Village Drive, eastbound and westbound at Elks Point Road, westbound at the Safeway driveway entrance, eastbound and westbound at the Zephyr Cove Resort/USFS campground entrance, westbound at Warrior Way, eastbound at Tahoe Drive, eastbound at the Cave Rock State Park entrance, at a private driveway at approximately MP DO 9, eastbound at Glenbrook Road, westbound at a driveway at approximately MP DO 12, and eastbound at the SR 28 intersection. There is traffic signal control at the intersections at Stateline, MontBleu and CVS, Lake Parkway, SR 207, Kahle Drive, Elks Point Road, and Zephyr Cove.
- The functional classification of US 50 in Douglas County is Principal Arterial – Other.
- The posted speed limit on the studied portion of US 50 ranges from 25 mph to 50 mph, increasing from Stateline to SR 28.
- The right of way for this roadway ranges from 30-200' from the centerline. In the casino area, the right of way is from the back of curb to the back of curb.

This corridor is being studied for a Complete Street roadway configuration. Complete streets are designed and operated to offer safe access for all roadway users. This includes motorists, transit, bicycles, and pedestrians.

Methods of achieving a complete street include doing a roadway reconfiguration. Roadway reconfigurations can include lane width reductions, addition of center lane, and adjusting pavement width. Left turns can be accommodated by reducing the highway to one lane in each direction and adding a two way left turn center lane. This type of road reconfiguration could also allow for the addition of bicycle lanes to the highway.

Based on a capacity analysis performed by NDOT Traffic Operations, the corridor could be reduced to one through lane in each direction from SR 28 to Elks Point Road. The capacity analysis results showed the need for two lanes in each direction from Elks Point Road to Stateline.

Overview of Crash Data

- According to NDOT Traffic Count Station data the 2015 Annual Average Daily Traffic (AADT) along the study segment of US 50 is as follows:
 - US 50 0.4 mile west of SR 28: 13,000
 - US 50 0.25 mile west of the road to Glenbrook: 12,500
 - US 50 1.5 miles west of Zephyr Cove: 19,000
 - US 50 0.4 mile east of SR 207: 22,000
 - US 50 300 feet east of NV-CA Stateline: 25,000
- There were 451 total crashes that occurred on this 12.3 mile section of US 50 during the 5-year study period between January 1, 2011 and December 31, 2015.
- Of the 451 crashes, 197 were non-collision crashes and 100 were angle crashes.
- Of the 451 crashes, 9 of them were fatal crashes and there were 266 injuries with 160 injury crashes.
- Table 2 compares the US 50 Study Segment crash rates with the 2014 NDOT statewide crash rates for the roadway classification Principal Arterial- Other. The table shows the crash rates for Overall, Fatal, Injury and Property Damage Only (PDO) rates.
- The overall crash summary shown in the appendix provides more detailed crash information.

Table 2- US 50 Study Crash Rates

	Functional Classification	Overall Crash Rate	Fatal Crash Rate	Injury Crash Rate	PDO Crash Rate
US 50 Study Segment MP DO 0.00 to MP DO 12.3	Principal Arterial - Other	1.1089	0.022	0.387	0.681
Functional Classification Crash Rate for Nevada	Principal Arterial- Other	1.6871	0.0126	0.8224	0.8522
Rates per million vehicle miles traveled					

- For the five-year period from 2011 through 2015, non-collision crashes were the predominant crash type. The crash data is summarized in Table 3.

Table 3-US 50 Crash Data

Crash Type	Number of Crashes by crash type	Number of Injury Crashes by crash type	Number of Injuries by crash type	Night Time crashes*
Angle	100	56	100	21
Head-On	13	8	23	3
Non-Collision	197	51	59	56
Rear-End	84	32	45	6
Sideswipe, Meeting	21	7	11	1
Sideswipe, Overtaking	34	5	5	3
Unknown	2	1	1	0
*Includes Dark - Continuous Lighting, Dark - Spot Lighting, Dark - No Lighting, Dawn, and Dusk				

Observations and Suggested improvements

Report Methodology

Following is a compilation of the comments and suggestions from the field reviews and debriefing meeting:

Note: Bulleted items are team observations; ***suggested improvements are in bold italics.***

Suggested improvements are only one method of mitigation presented by the RSA team for discussion. Other mitigation strategies can and should be explored by the responsible Design Team of the using agency where possible.

Priority 1a - defined as those suggested improvements that can be implemented by NDOT in the immediate future such as maintenance activities.

Priority 1b - defined as those suggested improvements that can be implemented by Tahoe Transportation District (TTD) in the immediate future such as maintenance activities.

Priority 1c - defined as those suggested improvements that can be implemented by Douglas County Public Works in the immediate future such as maintenance activities.

Priority 2a - defined as those suggested improvements that can be implemented by NDOT in a future Complete Streets or 3R project.

Priority 2b - defined as those suggested improvements that can be implemented by TTD in a future project.

Priority 2c - defined as those suggested improvements that can be implemented by Douglas County Public Works in a future project.

Priority 3a – defined as those suggested improvements that can be included in NDOT’s long range improvement plan.

Priority 3b – defined as those suggested improvements that can be included in TTD’s future US 50 South Shore Revitalization Project.

The observations and suggested improvements provided in are listed starting from Stateline and progressing to SR 28. This is the same order in which the RSA field review was conducted. Any intersections not specifically listed below are included within the General Observations. Observations and suggestions are therefore structured in this report as follows:

- General Observations along US 50
 - During the daytime field review
 - During the nighttime field review
- US 50 from Stateline to Kahle Drive (the section the RSA team walked)
- US 50/Lake Village Drive
- US 50/Elks Point Road
- US 50/Round Pine Hills
- Lakeshore Blvd./US 50/ Lake View Drive
- US 50/Zephyr Cove
- US 50/Warrior Way
- US 50/Tahoe Glen (immediately south of Lyons Avenue)
- US 50/Cave Rock
- US 50/SR 28

Positive Observations Noted Along the Corridor

- The existing pavement markings are generally in good condition.

General Observations along US 50 during the daytime RSA field review

These are observations that were generally found throughout the study corridor. For more details refer to the sections that follow describing observations at each individual intersection/location.

- Throughout the study corridor, especially from Stateline to Kahle Drive, there are areas where sidewalks, crosswalks, and pedestrian ramps are not ADA compliant, and no bicycle lanes exist. There are also gaps between existing segments of sidewalk between Lake Parkway and Kahle Drive. See photos 3, 10, 13, 14, 15, 17, and 23 on pages 18, 21, 23, 23, 24, 25, and 28, respectively.
- ❖ ***Priority 2a- Consider addressing all non-ADA compliant facilities by including improvements such as pedestrian ramps, detectable warnings (aka tactile strips), adjustments to pedestrian push button heights, etc., throughout the corridor.***
- ❖ ***Priority 2a- Install continuous sidewalks or walking paths throughout the corridor. If this is not feasible, install continuous facilities at least through areas frequented by pedestrian traffic.***

- Throughout the corridor, US 50 does not have turn pockets for most of the intersections and driveways with the exception of the casino area, signalized intersections, and SR 28. (Examples of intersections without turn pockets include Lakeview Drive, Tamarack Drive and Cave Rock Drive.) Vehicles sometimes wait in the fast lane for a gap in opposing traffic to turn left onto a side street. In many areas, including the above intersections, there is no refuge area for vehicles turning left onto the highway from the side streets. See photo 33 on page 36. There were 84 rear-end crashes in the corridor, and 40 of those were in road segments without left turn lanes for the intersections and driveways.
- ❖ ***Priority 2a –Implement a complete street roadway reconfiguration to install a two way left turn lane for vehicles turning left onto a side street/driveway, and to provide refuge and space to merge for left turning vehicles entering the highway, where feasible based on capacity analysis throughout the corridor.***
- Throughout the study corridor, there are no bicycle lanes along the highway. However, there are some shared use paths in the vicinity of the highway.
- ❖ ***Priority 2a – Install Wayfinding guide signs (reference MUTCD section 2D.50) to direct users to the shared use paths in the vicinity of the highway throughout the corridor.***
- ❖ ***Priority 2a- Consider roadway reconfigurations that would provide bicycle lanes throughout the corridor.***
- There is limited parking at many locations of the corridor such as Zephyr Cove, which, per the team members’ observations, frequently fills up, especially during weekends, holidays and special events. The RSA team observed vehicles parking on the side of the road and over the fog line. See photo 35 on page 38. Per the NHP representative of the RSA team, people also parked where parking was prohibited.
- ❖ ***Priority 2a- Consider widening the shoulder to allow more space for parked vehicles and for all road user throughout the corridor. This could be done by methods of restriping or widening the paving limits.***
- ❖ ***Priority 2a– Consider creating “park and ride” locations to minimize parking on the fog line and jaywalking throughout the corridor.***
- ❖ ***Priority 2b- Perform a corridor parking study to identify supply and demand locations and to create an optimized parking management system.***
- ❖ ***Priority 2b- Identify ITS (Intelligent Transportation Systems) strategies throughout the corridor to optimize all modes of transportation, refer to TRPA’s 2014 Intelligent Technology Systems Plan.***
- During the field review, the team noticed many people jaywalking, especially in the casino area and near Warrior Way, to leave/return to their parked vehicles. See photos 5 and 36 on pages 19 and 39.

- ❖ ***Priority 2a- Consider installing crosswalks in areas where parking on the roadway is routine to encourage pedestrians to cross at a single location.***
- Per NHP representative of the RSA team, there are not enough turnout areas for temporary use by NHP when patrolling and for motorists with disabled vehicles.
- ❖ ***Priority 2a- Consider adding turnouts that can be used by NHP and motorists with disabled vehicles throughout the corridor.***
- Per the NHP representative of the RSA team, some locations become extremely slippery in winter conditions. These locations include the SR 207 (Kingsbury Grade) approach to US 50, eastbound US 50 approaching Elks Point Rd., the Lake View Drive approach to US 50, eastbound and westbound on US 50 approaching the Zephyr Cove intersection, eastbound and westbound on US 50 approaching the Cave Rock Tunnel, and westbound on US 50 at MP DO 11.5. Summary crash data for these locations is provided in Appendix C.
- ❖ ***Priority 2a- Perform surface friction testing at the SR 207 (Kingsbury Grade) approach to US 50, eastbound US 50 approaching Elks Point Rd., the Lake View Drive approach to US 50, eastbound and westbound on US 50 approaching the Zephyr Cove intersection, eastbound and westbound on US 50 approaching the Cave Rock Tunnel, and westbound on US 50 at MP DO 11.5, and evaluate placement of high friction surface treatment at these locations if warranted.***
- ❖ ***Priority 2a- Consider adding changeable speed signs during winter road conditions.***
- ❖ ***Priority 2a-Evaluate drainage improvements for possible reductions of sheet flow.***
- RSA team members pointed out that roundabout intersections are a proven mitigation measure for high crash locations.
- ❖ ***Priority 3a- Consider converting intersections, such as SR 28 and Lake Parkway, throughout the corridor into roundabouts.***

General Observations along US 50 during the nighttime RSA field review

There were a total of 90 nighttime crashes in the corridor during the five year study period (refer to Table 3).

- The current striping maintenance schedule seems adequate because existing pavement markings were generally in good condition at the time of the RSA, showing good reflectivity. However, per RSA members, striping wears out quickly due to weather conditions and frequent sanding and snow plowing.
- ❖ ***Priority 2a- Construct inlaid/recessed striping.***

- Signs generally have relatively good reflectivity throughout the corridor, but some of the signs on traffic signals lack reflectivity.
- ❖ **Priority 1a- Replace all NDOT-maintained signs that exhibit reduced reflectivity with new signs that meet current standards.**
- ❖ **Priority 1c- Replace all County-maintained signs that exhibit reduced reflectivity with new signs that meet current standards. (Douglas County maintains the signs associated with the traffic signals on the highway.)**
- There is lighting in the corridor only at some intersections and from the casinos.
- ❖ **Priority 2a- Consider installing additional lighting throughout the corridor, where needed, especially on all marked crosswalks. Take light pollution into consideration and consider installing LED lighting.**

DAYTIME OBSERVATIONS BY LOCATION (Intersection or road segment)

From Stateline Avenue to Kahle Drive

- At Stateline Avenue there are no detectable warnings in the pedestrian ramps on the Nevada side of the street. There is no overhead lighting on the traffic signal on the Nevada side. The southwest corner (California side) is the only corner with overhead lighting. See photos 2 and 3 (page 18). There are no pedestrian push buttons at this intersection and the pedestrian phase operates with every traffic signal cycle.
- ❖ **Priority 2a- Consider installing overhead lighting at Stateline Avenue on both sides of US 50.**
- ❖ **Priority 2a- Construct new ADA compliant pedestrian facilities at Stateline Avenue on the Nevada sides of US 50, including push button activated pedestrian crossing signs.**



Photo 2- Intersection at Stateline Avenue without overhead lighting



Photo 3- Non-ADA compliant ramps at Stateline.

- The future US 50 South Shore Revitalization Project, by the Tahoe Transportation District (TTD), will realign US50 along Lake Parkway East, resulting in the reclassification of the current US 50 from Stateline Avenue to Lake Parkway as a local street. This will allow the street to be closed to vehicular traffic for special events. The NHP representative of the RSA team expressed concern about the potential for unauthorized vehicles to enter the roadway during the street closures.
- ❖ ***Priority 3b- Install appropriate traffic control barriers at Stateline Avenue and at Lake Parkway with the future US 50 South Shore Revitalization Project to prevent unauthorized vehicular access to the casino corridor during events requiring street closure.***
- Per NHP representative of the RSA team, pedestrians attempt to climb traffic signal/light poles in the casino corridor.
- ❖ ***Priority 2a-Consider constructing improvements to discourage pedestrians from climbing the traffic signal and light poles throughout the casino core area. See photo 4.***



Photo 4- Example of light fixtures used in Las Vegas to discourage pedestrians from climbing.

- Pedestrian traffic in the casino area (Stateline Avenue to Lake Parkway) is high. The RSA team observed jaywalking in the casino area and damaged pedestrian fencing. See photos 5 and 6.
- ❖ ***Priority 2a- Repair damaged pedestrian fencing from Stateline to Lake Parkway.***
- ❖ ***Priority 2a- Install pavement markings and signs at gaps in the pedestrian fencing (at driveway entrances) to discourage jaywalking from Stateline to Lake Parkway.***
- ❖ ***Priority 3b- Conduct access management study to compare existing driveway locations to Access Management standards and consider consolidating driveways throughout the casino core area.***



Photo 5- Gap in fence where pedestrians jaywalk in casino area.

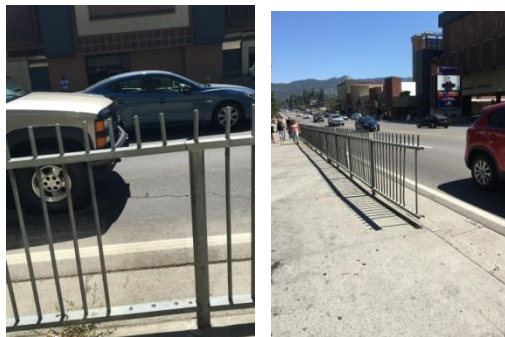


Photo 6- Missing and broken pedestrian handrail on US 50 in Casino area.

- There currently are gaps between the existing segments of sidewalk.
- ❖ ***Priority 2a- Consider a continuous sidewalk or multi-use path from Lake Parkway to Kahle Drive on both sides of the highway, as noted in the 2016 Active Transportation Plan.***
- There are no bicycle lanes from Lake Parkway to Kahle Drive.
- ❖ ***Priority 2a-Consider restriping to add bicycle lanes from Lake Parkway to Kahle Drive.***

- The sign installations for transit stops do not meet MUTCD standards (at the entrance to Harvey's, for example). The transit stops do not exhibit route and schedule information. Some signs are shielded from view by nearby signs (near the Hard Rock, for example). See photos 7 and 8.
- ❖ **Priority 1b- Install BlueGo transit signs in accordance with MUTCD standards at locations with good visibility.**
- ❖ **Priority 1b- Consider adding route and schedule information to the existing transit signs.**



Photo 7- Transit stops lacking proper signage.



Photo 8- Casino sign blocking transit sign.

- Bus stop locations in the casino corridor have no shelters or pullouts and currently buses block through lanes when stopped. See photo 7.
- ❖ **Priority 3b- Consider installing new transit shelter facilities.**
- ❖ **Priority 3b- Consider the installation of bus turnouts with the US 50 South Shore Revitalization Project.**

- There are large planters in the sidewalk immediately adjacent to the back of curb in front of the Hard Rock Hotel and Casino. There are no visual or detectable warnings to guide pedestrians, especially disabled pedestrians, around the planters. See photos 9 and 10.
- ❖ ***Priority 2b- Tahoe Transportation District to coordinate with casinos to create a pathway with detectable warnings to guide pedestrians, especially the visually impaired, around the planters outside the Hard Rock Hotel and Casino.***
- ❖ ***Priority 3b- Create a pathway with detectable warnings to guide pedestrians, especially the visually impaired, around the planters outside the Hard Rock Hotel and Casino.***



Photo 9- Large planters on US 50 in front of the Hard Rock Hotel and Casino.



Photo 10- Sidewalks without detectable warning signs

- The “X” shaped crosswalk at the Hard Rock Hotel and Casino facilitates an “all walk” movement across the highway with diagonal and perpendicular crossings of US 50. The diagonal crossings are long and there are no diagonally facing heads on the traffic signal poles on the CVS and Montbleu corners. (There are two pedestrian signal heads at these locations, one facing perpendicular to the highway and the other facing across the alley). Pedestrians approaching the crosswalk from Harvey’s must take a circuitous route around a planter to access the crosswalk, and some pedestrians choose to enter the street rather than take that route. The planters restrict the width of sidewalk access to the crosswalks in front of the Hard Rock Hotel and Casino. See photos 11 and 12. There were 5 crashes at or near this crosswalk during the five year study period.
- ❖ ***Priority 2a- Consider redesigning the crosswalk between Harvey’s, Montbleu, and CVS after reevaluating the overall crosswalk design with respect to crossing distances and the need for diagonal crosswalks.***



Photo 11- Aerial view of crosswalk between Hard Rock, Montbleu, and CVS.



Photo 12- Pedestrian signal head not facing diagonally.

- Many of the pedestrian facilities in the casino core areas are not ADA compliant. Many pedestrian ramps do not meet current construction standards because they have a raised lip and/or lack the required detectable warnings. Also, many of the pedestrian push buttons are not ADA compliant. For example, the push button in front of the Hard Rock Hotel and Casino is mounted higher than ADA standards. See photos 13, 14, and 15 (page 24).
- ❖ ***Priority 2a- Reconstruct the existing pedestrian facilities at the north and south corners of the intersection by the Montbleu/CVS entrances to be ADA compliant.***
- ❖ ***Priority 2a- Lower the height of the pedestrian push button at the crosswalk in front of the Hard Rock Hotel and Casino to be ADA compliant.***

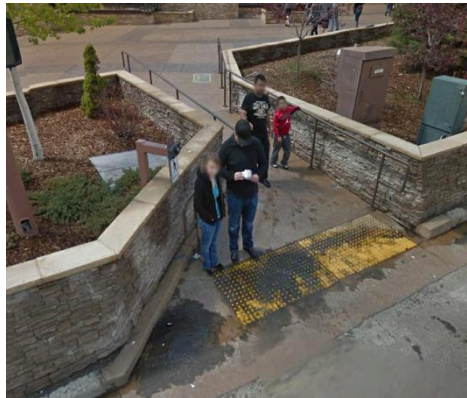


Photo 13- Non-ADA compliant ramp outside of Hard Rock Hotel and Casino. This ramp is too steep and narrow.



Photo 14- Non-ADA compliant ramp outside CVS lacking detectable warnings.



Photo 15-The height of this pedestrian push button outside of Hard Rock Hotel and Casino is non-ADA compliant.

- At the Lake Parkway intersection there is no crosswalk across US 50 on the north side of the intersection and no sidewalk on the east side of US 50, north of the intersection. See photo 16.
- ❖ ***Priority 1a- Install signage directing eastbound pedestrians on the southeast corner of US 50/Lake Parkway East to cross US 50 because the sidewalk on the east side of US 50 ends at the intersection.***

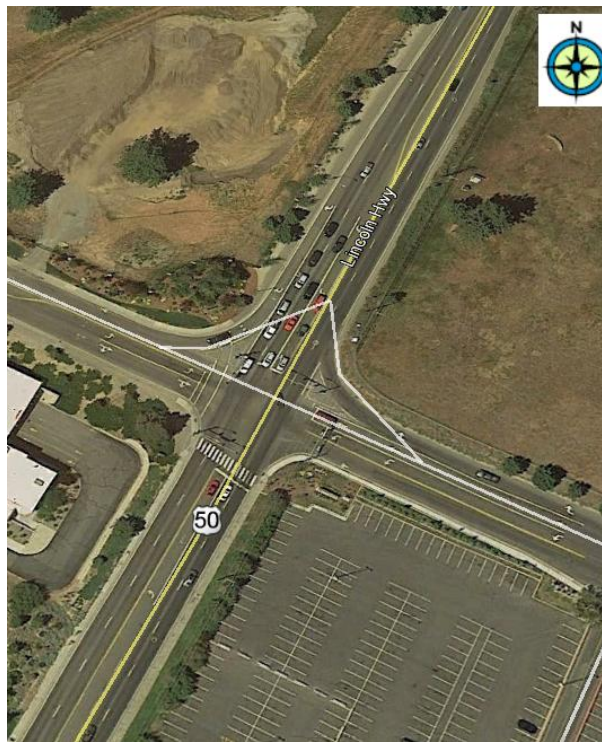


Photo 16- Aerial view of US 50 and Lake Parkway.

- Also at Lake Parkway, the pedestrian push button in the island on the northwest corner of the intersection is located on the wrong side of the signal pole (back side of the pole relative to the crosswalk location), and is not ADA accessible since there is no ramp onto the island. See photo 17.
- ❖ **Priority 2a- Move the push button on the northwest corner of the Lake Parkway/US 50 intersection to the crosswalk side of the pole and add a pedestrian ramp to the island for push button access.**
- ❖ **Priority 2a- Move the signal pole on the southwest corner of the Lake Parkway intersection out of the sidewalk or widen the sidewalk behind the pole.**
- ❖ **Priority 2a- Construct ADA compliant pedestrian facilities on all four corners of the Lake Parkway intersection.**



Photo 17-Pedestrian push button at Lake Parkway facing wrong direction and no pedestrian ramp.

- The space available for pedestrians waiting at the southwest corner of the Lake Parkway intersection is insufficient for large groups. The traffic signal pole on the southwest corner is in the sidewalk and the sidewalk is broken. See photos 18 and 19 (page 26).
- ❖ **Priority 2a- Widen the existing sidewalk on the corners of the Lake Parkway intersection to accommodate more pedestrians.**
- ❖ **Priority 2a- Reconstruct the broken concrete sidewalk at the intersection of Lake Parkway.**



Photo 18-Broken concrete sidewalk.



Photo 19- Signal pole is in the sidewalk. Consider widening sidewalk to accommodate more pedestrians.

- The Lake Parkway intersection is planned for reconstruction as a roundabout with the future US 50 South Shore Revitalization Project, by Tahoe Transportation District (TTD). See photo 16 on page 24.
- ❖ ***Priority 3a- Support reconstruction of the Lake Parkway intersection as a roundabout as part of the US 50 South Shore Revitalization Project by TTD.***
- ❖ ***Priority 3b- Reconstruct the Lake Parkway intersection as a roundabout as part of the US 50 South Shore Revitalization Project by TTD.***
- The lighting utility box cover in the shared use path between Lake Parkway and SR 207 (also known as Kingsbury Grade) intersections is broken. See photo 20, page 27.

- ❖ ***Priority 1c- Replace the broken lighting utility box cover between Lake Parkway and SR 207.***
- ❖ ***Priority 2c- Consider replacing all non-traffic rated utility boxes in the right of way between Lake Parkway and SR 207 with traffic rated boxes and covers.***



Photo 20- Broken lighting utility box cover.

- The pedestrian signal to cross SR 207 shows “WALK” at the same time that the eastbound drivers have a green through light and are able to make a free right turn onto SR 207. The pedestrian crossing appears to be out of the direct line of sight of approaching drivers. See photo 21.
- ***Priority 2a- Evaluate the sight distance at SR 207 pedestrian crosswalk with respect to eastbound vehicles on US 50 turning onto SR 207, and consider installing a separate right turn signal for vehicles turning from US 50 onto SR 207, prohibiting drivers from turning right during the pedestrian phase.***



Photo 21- The crosswalk on the intersection of SR 207 (also known as Kingsbury Grade) and US 50 is not in the same line of sight as the driver.

- At the SR 207 intersection with US 50, not all facilities are ADA compliant. Some pedestrian ramps lack detectable warnings and some pedestrian areas in the island undulate and are not clearly defined. See photos 22 and 23.
- ❖ ***Priority 2a- At the SR 207 intersection, reconfigure all pedestrian facilities to meet ADA requirements.***



Photo 22- Sidewalk at the intersection of SR 207



Photo 23- Pedestrian ramp lacking detectable warning.

- The RSA team noticed westbound trucks on US 50 having difficulty making left turns onto Kingsbury Grade.
- ❖ **Priority 2a- Evaluate the SR 207 intersection for potential conversion to a roundabout.**
- ❖ **Priority 2a- Evaluate turning movement geometry and consider adjusting the current SR 207 intersection geometry to improve turning movement for trucks.**



Photo 24-Aerial view of the SR 207 And US 50 intersection.

- The “Wrong Way” sign on westbound US 50 at SR 207 is partially blocked by tree branches. See photo 25.
- ❖ **Priority 1a- Trim tree to improve the visibility of the “Wrong Way” sign on westbound US 50 at SR 207.**

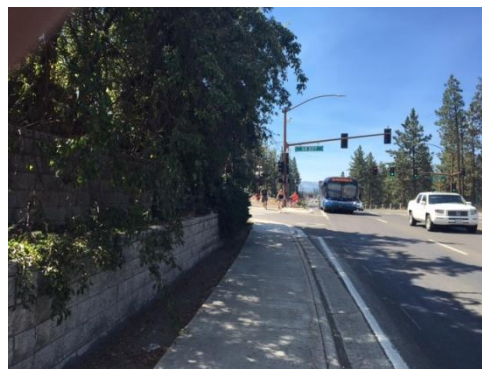


Photo 25- “Wrong Way” sign at SR 207 blocked by trees.

- From SR 207 to Kahle Drive the sidewalks are deteriorated and the pedestrian ramps are not ADA compliant. See photo 26.
- ❖ ***Priority 2a- From SR 207 to Kahle Drive, replace the sidewalk and pedestrian ramps, as needed, to make this area ADA compliant.***



Photo 26- Sidewalk in poor condition.

- There is a new multi-use path that goes from Kahle Drive to Round Hill Pines, but this is not apparent from the highway.
- ❖ ***Priority 1a- Install Wayfinding guide signs from Kahle Drive to Round Hill Pines to direct users to the new multi-use paths. See 2016 ATP, Complete Street Resource Guide, and SR 28 Signage Master Plan for TRPA recommended way finding signage.***
- At the Kahle Drive/US 50 intersection there is no pedestrian ramp on the northeast corner of the intersection. All other curb ramps and the pedestrian push button access on all four corners are not ADA compliant.
- ❖ ***Priority 2a- Construct new ADA compliant pedestrian facilities at the Kahle Drive/US 50 intersection at all four corners.***

US 50 at Lake Village Drive

- Per the NHP representative of the RSA team, standing water and ice sometimes occur at the Lake Village Drive intersection with US 50. There are two drop inlets on the highway, one on each side of Lake Village Drive. The drop inlet on the south side is damaged. Both drop inlets have debris in them. The PCC curb and gutter on the south side of the intersection ends well short of the drop inlet on the south side. See photo 27.
- ***Priority 1a- Clean drop inlets and culverts on US 50 at Lake Village Drive.***
- ***Priority 1a- Repair broken grate on drop inlet on the south side of the Lake Village Drive intersection.***
- ***Priority 2a- Construct a valley gutter across Lake Village Drive with curb, gutter, and spandrels to the drop inlets to eliminate standing water.***



Photo 27- Broken drop inlet.

- There is limited visibility for drivers turning onto US 50 from Lake Village Drive. See photo 28 (page 32).
- ❖ ***Priority 1a- Move the stop bar closer to the highway to improve sight distance looking south from Lake Village Drive.***
- ❖ ***Priority 1a- Evaluate right of way limits and remove or trim the trees near US 50, within right of way, to improve sight distance looking south from Lake Village Drive.***



Photo 28-Trees blocking line of sight for drivers on Lake Village Dr.

US 50 at Elks Point Road

- At Elks Point Road, none of the pedestrian ramps and pedestrian push buttons are ADA compliant. The traffic signal poles on the southeast and southwest corners obstruct portions of the sidewalk. See photo 29.
- ❖ ***Priority 2a- Construct new ADA compliant pedestrian facilities at the Elks Point Road/US 50 intersection on all four corners.***
- ❖ ***Priority 2a- Relocate the traffic signal poles or widen the sidewalk as needed to meet ADA requirements at the Elks Point Road/US 50 intersection.***



Photo 29- Current pedestrian ramps and traffic signal poles at US 50/Elks Point Road.

US 50 at Round Hill Pines

- The Round Hill Pines intersection is near the crest of a vertical curve on US 50. This location has limited sight distance in both directions. See photo 30. The speed limit is 45 mph, there is no left turn lane at this location, and eastbound drivers have little time to react to a vehicle waiting in the fast lane to make a left turn.
- ❖ ***Priority 1a- Consider redesigning turning movements to right-in, right-out only at the US 50/Round Hill Pines intersection.***
- ❖ ***Priority 1a- Consider installing signs warning of turning traffic ahead in both directions at the US 50/Round Hill Pines intersection.***
- ❖ ***Priority 2a- Consider construction of a westbound deceleration lane and acceleration lane at the US 50/Round Hill Pines intersection.***
- ❖ ***Priority 2a- Consider implementing a roadway configuration to install a two way left turn lane at the US 50/Round Hill Pines intersection.***
- ❖ ***Priority 2a- Install a changeable message sign on US 50 to advise drivers when the parking is full at Round Hill Pines Resort and to direct them to alternate parking locations.***
- ❖ ***Priority 2a- NDOT to coordinate with the US Forest Service to consider widening the opening in the rock wall at the Round Hill Pines resort entrance to allow for two-way traffic and improved sight distance.***



Photo 30- Sight distance from Round Hill Pines looking at eastbound and westbound US 50.

- During events and other periods of heavy use, cars are often parked on the westbound shoulder of the highway between the Round Hill Pines Resort entrance and the guardrail terminus near the Safeway driveway.
- ❖ ***Priority 2a- Evaluate measures to discourage parking along the westbound shoulder from the Round Hill Pines Resort entrance and the guardrail terminus near the Safeway driveway, including possibly extending the existing guardrail to the north, coupled with transit use.***
- ❖ ***Priority 2a- Consider in the complete street design project addressing on-street parking and pedestrian access on the west side of US 50 by Round Hill Pines if it can be done safely.***
- ❖ ***Priority 2a- Consider creating “park and ride” locations to minimize parking on the highway.***
- ❖ ***Priority 2b- Tahoe Transportation District to coordinate with the US Forest Service to review the on-site parking at Round Hill Pines and evaluate the efficiency of the parking area use for possible improvement.***

US 50 at Lake Shore Blvd and Lake View Drive

- The school zone signage “September thru June” is inconsistent with the continuously operated flasher, the summertime use of the crosswalk by the general public, and the time of the school year. See photo 31.
- ***Priority 1a- Remove the “September through June” sign on US 50 and replace it with a down arrow.***



Photo 31- School zone signage.

- There is a current NDOT project to redesign the crosswalk at Lake Shore Boulevard. Currently, there is an overhead flashing light that flashes continuously over the crosswalk. Drivers become accustomed to seeing the flasher in operation and as a result the flasher loses some effectiveness. See photo 32.
- ❖ ***Priority 2a- Coordinate with NDOT on the current on-going project to change the operation of the flashing lights at US 50/Lake Shore Boulevard from continuously flashing to pedestrian activated flashers.***



Photo 32- Overhead continuously flashing light.

- There is no pedestrian ramp on the west side of the highway and no wheelchair access. The ramp on the east side is not ADA compliant.
- ❖ ***Priority 2a- Provide ADA compliant access on the west side of US 50 at Lake Shore Boulevard.***
- Vehicles appear to be driving fast (speed limit of 45mph) and there is no left turn lane at this location. Drivers turning left off the highway stop in the fast lane to cross. See photo 33 (page 36).
- ❖ ***Priority 2a- Consider installing speed feedback signs.***
- ❖ ***Priority 2a- Consider construction of a westbound deceleration lane and acceleration lane on US 50 at Lake Shore Boulevard.***
- ❖ ***Priority 2a- Consider, in the complete street project, a roadway reconfiguration to install a two way left turn lane on US 50 at Lake Shore Boulevard, if feasible based on capacity analysis.***



Photo 33- No left turn lane.

- There is no sidewalk in the commercial area on the east side of US 50 between Lake View Drive and North Martin Drive.
- ❖ ***Priority 2a- Consider installing bicycle and sidewalk facilities to serve the commercial area on US 50 between Lake View Drive and North Martin Drive.***
- In the winter time, drivers who might normally approach the highway from Lake View Drive are redirected to use North Martin Drive instead because the Lake View approach is so steep. The RSA team noted that the sight distance at North Martin Drive has limited visibility.
- ❖ ***Priority 2a- Evaluate sight distance at North Martin Drive and consider constructing improvements to enhance sight distance such as considering cutting back the slope and constructing a retaining wall.***

US 50 at Zephyr Cove

- There is a paved turnout on the lake side of US 50, west of Zephyr Cove with “No Parking Any Time” signs at each end with left and right arrows. These signs face the road and appear to not be visible to drivers approaching the turnout.
- ❖ ***Priority 1a- Install new “No Parking Any Time” signs on US 50 west of Zephyr Cove that can be seen by approaching westbound traffic.***

- The Zephyr Cove resort is very popular in the summertime and has limited parking space. When the Resort parking areas are full or when vehicles arrive faster than they can be processed at the parking kiosk, NHP advised the RSA Team that vehicles queue back from the kiosk and onto US 50 in the westbound lanes. See photo 34. The resort staff places a folding sign at the entrance to notify patrons when the parking area is full.
- ❖ ***Priority 2a- Coordinate with Lake Tahoe Basin agencies to install a changeable message sign on US 50, and other ITS strategies, to advise drivers that the Zephyr Cove resort parking is full and to direct them to alternate parking locations.***
- ❖ ***Priority 2a- Consider identifying parking locations for when Zephyr Cove resort is full and implementing a park and ride system similar to that of Sand Harbor.***
- ❖ ***Priority 2b- Tahoe Transportation District to work with the USFS to identify ways to reduce queueing of vehicles onto the highway at the Zephyr Cove Resort entrance.***
- ❖ ***Priority 2b- Consider identifying parking locations for when Zephyr Cove resort is full and implementing a park and ride system similar to that of Sand Harbor.***



Photo 34- Driveway and kiosk at Zephyr Cove.

- The pedestrian ramps and pedestrian push buttons on the northwest, southwest, and southeast corners at Zephyr Cove are not ADA compliant and there are no pedestrian ramps on the northeast corner.
- ❖ ***Priority 2a- Construct/upgrade pedestrian facilities at all four corners of the US 50/Zephyr Cove intersection to be ADA compliant.***
- Based on RSA members' prior observations, in the summertime traffic queues can extend in both directions for long distances.
- ❖ ***Priority 3a- Consider reconstructing the US 50/Zephyr Cove intersection as a roundabout if feasible based on capacity study.***

US 50 at Warrior Way

- Many people park on the shoulder of US 50 in the vicinity of Warrior Way. Many parked vehicles are over the fog lines and people often cross the highway at random locations. Some potential reasons for parking on the side of the highway include the Zephyr Cove parking lot being full, and drivers wanting to avoid the fee associated with using the Zephyr Cove parking facilities. See photos 35 and 36 (page 39).
- ❖ **Priority 2a- Consider widening the shoulder on US 50 by Warrior Way to allow more space for parked vehicles coupled with pedestrian access facilities. This could be done by restriping or widening the pavement.**
- ❖ **Priority 2a- Consider installing a marked crosswalk with a rectangular rapid flashing beacon (RRFB) or a high-intensity activated crosswalk (HAWK) beacon on US 50 at Warrior Way.**
- ❖ **Priority 2a- Consider creating a “park and ride” location to minimize parking on the fog line and jaywalking on US 50 by Warrior Way.**
- ❖ **Priority 2a- Consider implementing a roadway reconfiguration to accommodate all road users.**
- ❖ **Priority 2b- Tailor current transit operations to help address pedestrian needs near Warrior Way and Zephyr Cove.**
- ❖ **Priority 3a- Evaluate other pedestrian crossing methods such as underground pedestrian crossing at Warrior Way.**
- ❖ **Priority 3a- Consider reconstructing the US 50/Warrior Way intersection as a roundabout if feasible based on capacity study.**
- ❖ **Priority 3a- Consider creating a “park and ride” location to minimize parking on the fog line and jaywalking on US 50 by Warrior Way.**



Photo 35- Vehicles parked on/over the fog line on US 50.



Photo 36- Pedestrians jaywalking across US 50 near Warrior Way.

- There is a fire station located near the intersection of US 50 and Warrior Way. The fire department representative on the RSA team said that sometimes vehicles park in front of the station garage doors blocking emergency vehicles. Also, when traffic queues through this area it makes it difficult for the fire department to enter the highway to respond to emergencies.
- ❖ ***Priority 1a- Add striping and/or signage to discourage the public from parking in front of the fire station at Warrior Way.***
- ❖ ***Priority 2a- Consider adding striping and/or signage which would maintain access to the highway in front of the fire station at Warrior Way.***

US 50 at Tahoe Glen (AKA Sadie Lane) immediately south of Lyons Avenue

- The NHP representative of the RSA team mentioned crashes in the vicinity of Tahoe Glen. There have been 6 crashes in this vicinity within the study period. Relatively high speeds and limited sight distances make left turns on and off of US 50 difficult in this area. The NHP representative of the RSA team indicated that boaters exiting the Cave Rock State Park sometimes turn right and then U-turn at Tahoe Glen to go east. During the time of the RSA Tahoe Glen was closed with portable fencing.
- ❖ ***Priority 2a- Consider restricting turning movements at the intersection of US 50/Tahoe Glen (AKA Sadie Lane) to right-in, right-out only.***
- ❖ ***Priority 2a- Consider reducing the speed limit on US 50 by Tahoe Glen (AKA Sadie Lane).***
- ❖ ***Priority 2a- Consider implementing a roadway reconfiguration to install a two way left turn lane to reduce the amount of u-turns on US 50 by Tahoe Glen by improving the left turn out from the Cave Rock boat ramp. This would also improve left turns from the highway to Tahoe Glen (AKA Sadie Lane).***

US 50 at Cave Rock

- NDOT recently extended the north end of the westbound tunnel because of falling rock. However, team members indicated seeing a substantial amount of falling rock at the south end of the eastbound Cave Rock tunnel. As shown in photo 37.
- ❖ ***Priority 2a- Install rock netting on the slope at the south end of the eastbound Cave Rock tunnel.***



Photo 37- South end at Cave Rock Tunnel

- There are no facilities within the Cave Rock tunnels to accommodate bicycles or pedestrians. During construction, both traffic directions are using one tunnel without problems.
- ❖ ***Priority 2a- Reconfigure the roadway by reducing vehicle lanes from two to one in each direction and use the remaining space within the Cave Rock tunnels for pedestrian and bicycle facilities.***
- Per NHP representative of the RSA team, parking at the Cave Rock Boat Ramp fills and vehicles park on the highway. Sometimes there is a queue backing onto the highway from the entry kiosk.
- ❖ ***Priority 2a- Review Cave Rock Boat Ramp Access/Egress.***

US 50 at State Route 28

- The team observed a queue of vehicles on State Route 28 (SR 28) waiting to turn left onto US 50. Potential reasons for the traffic back up could include drivers not knowing/understanding the geometry of the acceleration lane, drivers believing the acceleration lane is too short to accelerate to the speed of traffic, sight distance to the north being restricted by the curve, and being unable to tell whether the eastbound US 50 driver is turning until their turn is in progress. The aerial view of this intersection is shown in Photo 38.
- ❖ **Priority 1a- Install a traffic control sign that describes the geometry of the acceleration/merge lane on US 50 at SR 28. See photo 39 (page 42).**
- ❖ **Priority 2a- Consider shortening the median in US 50 to improve the turning movement for vehicles turning left onto US 50 from SR 28.**
- ❖ **Priority 2a- Consider converting the US 50/SR 28 intersection into a roundabout. Consider providing access to the future Information and Welcome Center Facility when designing the roundabout.**
- ❖ **Priority 2a- If the US 50/SR 28 intersection cannot be converted to a roundabout, consider lengthening the eastbound acceleration/merge lane on US 50.**



Photo 38- Aerial view of the intersection of US 50 and SR 28.



Photo 39- NDOT provided sign to describe geometry.

- There are two paved turnouts in the vicinity of the NDOT maintenance station on US 50 west of the SR 28 intersection. Per NHP representative of the RSA team, snow accumulates in the turnouts during repeated plowing and vehicles eventually must park in the outside travel lane to install and remove chains. These are the only areas currently available in this section of roadway for snow chain removal and installation.
- ❖ ***Priority 1a- Adjust the current snow plow plan to maintain the entire width of the turnouts on US 50 by SR 28.***
- ❖ ***Priority 2a- Evaluate the need to add more chain installation/removal areas throughout the corridor.***
- Per NHP representative of the RSA team, the summer boat inspection area near the SR 28/US 50 intersection is used as parking for the snow park in the winter. Snow there is plowed to the edges of the pavement, and with each successive snow storm the access road and parking become smaller. Vehicles end up parking on both sides of the road, making it too narrow for emergency vehicles to access. See photo 40 (page 43).
- ❖ ***Priority 1a- Maintain the full width of the access road and parking area by the US 50/SR 28 intersection when plowing so vehicles do not park in the roadway.***



Photo 40- Summer boat inspection station location, also used in the winter as parking for the snow park.

US 50 at Spooner Summit

- The Team observed that there is no gap in the two sets of double yellow stripes on US 50 at Spooner Summit that would provide for legal left turns onto and off of the highway at the trailhead parking lots on both sides of the highway. Also, the Tahoe Rim Trail crosses the highway at this location, and there is no warning for motorists of potential hikers crossing the highway here. See photo 41.
- ❖ ***Priority 2a- Evaluate the access to the Spooner Summit trailhead parking lot. Evaluate the possibility to restripe the centerline striping at Spooner Summit to provide a gap in the two double yellow lines at the trailhead parking lot.***
- ❖ ***Priority 2a- Evaluate ways to improve this Tahoe Rim Trail crossing of US 50 at Spooner Summit for bicyclists and pedestrians.***



Photo 41- Parking at Spooner Summit.

Non-Safety Related Issues

- The Tahoe Douglas Fire Protection District representative noted that dying trees near the highway have blown onto US 50 during high winds.
- ❖ ***Remove dead/dying trees that are near US 50.***

Summary of Suggestions

Pre-Construction Phase RSA

Priority 1

Suggested improvements that can be implemented in the immediate future

Priority 1a- defined as those suggested improvements that can be implemented by NDOT in the immediate future such as maintenance activities

- 1. *Replace all NDOT-maintained signs that exhibit reduced reflectivity with new signs that meet current standards.***
- 2. *Install signage directing eastbound pedestrians on the southeast corner of US 50/Lake Parkway East to cross US 50 because the sidewalk on the east side of US 50 ends at the intersection.***
- 3. *Trim tree to improve the visibility of the “Wrong Way” sign on westbound US 50 at SR 207.***
- 4. *Install Wayfinding guide signs from Kahle Drive to Round Hill Pines to direct users to the new multi-use paths. See 2016 ATP, Complete Street Resource Guide, and SR 28 Signage Master Plan for TRPA recommended way finding signage.***
- 5. *Clean drop inlets and culverts on US 50 at Lake Village Drive.***
- 6. *Repair broken grate on drop inlet on the south side of the Lake Village Drive intersection.***
- 7. *Move the stop bar closer to the highway to improve sight distance looking south from Lake Village Drive.***
- 8. *Evaluate right of way limits and remove or trim the trees near US 50, within right of way, to improve sight distance looking south from Lake Village Drive.***
- 9. *Consider redesigning turning movements to right-in, right-out only at the US 50/Round Hill Pines intersection.***
- 10. *Consider installing signs warning of turning traffic ahead in both directions at the US 50/Round Hill Pines intersection.***
- 11. *Remove the “September through June” sign on US 50 and replace it with a down arrow.***
- 12. *Install new “No Parking Any Time” signs on US 50 west of Zephyr Cove that can be seen by approaching westbound traffic.***
- 13. *Add striping and/or signage to discourage the public from parking in front of the fire station at Warrior Way.***
- 14. *Install a traffic control sign that describes the geometry of the acceleration/merge lane on US 50 at SR 28.***

15. *Adjust the current snow plow plan to maintain the entire width of the turnouts on US 50 by SR 28.*
16. *Maintain the full width of the access road and parking area by the US 50/SR 28 intersection when plowing so vehicles do not park in the roadway.*

Priority 1b- defined as those suggested improvements that can be implemented by Tahoe Transportation District (TTD) in the immediate future such as maintenance activities

17. *Install BlueGo transit signs in accordance with MUTCD standards at locations with good visibility.*
18. *Consider adding route and schedule information to the existing transit signs.*

Priority 1c- defined as those suggested improvements that can be implemented by Douglas County Public Works in the immediate future such as maintenance activities

19. *Replace all County-maintained signs that exhibit reduced reflectivity with new signs that meet current standards. (Douglas County maintains the signs associated with the traffic signals on the highway.)*
20. *Replace the broken lighting utility box cover between Lake Parkway and SR 207.*

Priority 2

Suggested improvements that can be implemented in a Complete Streets or 3R projects.

Priority 2a - defined as those suggested improvements that can be implemented by NDOT in a future Complete Streets or 3R project

21. *Consider addressing all non-ADA compliant facilities by including improvements such as pedestrian ramps, detectable warnings (aka tactile strips), adjustments to pedestrian push button heights, etc., throughout the corridor.*
22. *Install continuous sidewalks or walking paths throughout the corridor. If this is not feasible, install continuous facilities at least through areas frequented by pedestrian traffic.*
23. *Implement a complete street roadway reconfiguration to install a two way left turn lane for vehicles turning left onto a side street/driveway, and to provide refuge and space to merge for left turning vehicles entering the highway, where feasible based on capacity analysis throughout the corridor.*
24. *Install Wayfinding guide signs (reference MUTCD section 2D.50) to direct users to the shared use paths in the vicinity of the highway throughout the corridor.*
25. *Consider roadway reconfigurations that would provide bicycle lanes throughout the corridor.*

- 26. Consider widening the shoulder to allow more space for parked vehicles and for all road users throughout the corridor. This could be done by methods of restriping or widening the paving limits.**
- 27. Consider creating “park and ride” locations to minimize parking on the fog line and jaywalking throughout the corridor.**
- 28. Consider installing crosswalks in areas where parking on the roadway is routine to encourage pedestrians to cross at a single location.**
- 29. Consider adding turnouts that can be used by NHP and motorists with disabled vehicles throughout the corridor.**
- 30. Perform surface friction testing at the SR 207 (Kingsbury Grade) approach to US 50, eastbound US 50 approaching Elks Point Rd., the Lake View Drive approach to US 50, eastbound and westbound on US 50 approaching the Zephyr Cove intersection, eastbound and westbound on US 50 approaching the Cave Rock Tunnel, and westbound on US 50 at MP DO 11.5, and evaluate placement of high friction surface treatment at these locations if warranted.**
- 31. Consider adding changeable speed signs during winter road conditions.**
- 32. Evaluate drainage improvements for possible reductions of sheet flow.**
- 33. Construct inlaid/recessed striping.**
- 34. Consider installing additional lighting throughout the corridor, where needed, especially on all marked crosswalks. Take light pollution into consideration and consider installing LED lighting.**
- 35. Consider installing overhead lighting at Stateline Avenue on both sides of US 50.**
- 36. Construct new ADA compliant pedestrian facilities at Stateline Avenue on the Nevada sides of US 50, including push button activated pedestrian crossing signs.**
- 37. Consider constructing improvements to discourage pedestrians from climbing the traffic signal and light poles throughout the casino core area. See photo 4.**
- 38. Repair damaged pedestrian fencing from Stateline to Lake Parkway.**
- 39. Install pavement markings and signs at gaps in the pedestrian fencing (at driveway entrances) to discourage jaywalking from Stateline to Lake Parkway.**
- 40. Consider a continuous sidewalk or multi-use path from Lake Parkway to Kahle Drive on both sides of the highway, as noted in the 2016 Active Transportation Plan.**
- 41. Consider restriping to add bicycle lanes from Lake Parkway to Kahle Drive.**
- 42. Consider redesigning the crosswalk between Harvey’s, Montbleu, and CVS after reevaluating the overall crosswalk design with respect to crossing distances and the need for diagonal crosswalks.**
- 43. Reconstruct the existing pedestrian facilities at the north and south corners of the intersection by the Montbleu/CVS entrances to be ADA compliant.**
- 44. Lower the height of the pedestrian push button at the crosswalk in front of the Hard Rock Hotel and Casino to be ADA compliant.**

45. *Move the push button on the northwest corner of the Lake Parkway/US 50 intersection to the crosswalk side of the pole and add a pedestrian ramp to the island for push button access.*
46. *Move the signal pole on the southwest corner of the Lake Parkway intersection out of the sidewalk or widen the sidewalk behind the pole.*
47. *Construct ADA compliant pedestrian facilities on all four corners of the Lake Parkway intersection.*
48. *Widen the existing sidewalk on the corners of the Lake Parkway intersection to accommodate more pedestrians.*
49. *Reconstruct the broken concrete sidewalk at the intersection of Lake Parkway.*
50. *Evaluate the sight distance at SR 207 pedestrian crosswalk with respect to eastbound vehicles on US 50 turning onto SR 207, and consider installing a separate right turn signal for vehicles turning from US 50 onto SR 207, prohibiting drivers from turning right during the pedestrian phase.*
51. *At the SR 207 intersection, reconfigure all pedestrian facilities to meet ADA requirements.*
52. *Evaluate the SR 207 intersection for potential conversion to a roundabout.*
53. *Evaluate turning movement geometry and consider adjusting the current SR 207 intersection geometry to improve turning movement for trucks.*
54. *From SR 207 to Kahle Drive, replace the sidewalk and pedestrian ramps, as needed, to make this area ADA compliant.*
55. *Construct new ADA compliant pedestrian facilities at the Kahle Drive/US 50 intersection at all four corners.*
56. *Construct a valley gutter across Lake Village Drive with curb, gutter, and spandrels to the drop inlets to eliminate standing water.*
57. *Construct new ADA compliant pedestrian facilities at the Elks Point Road/US 50 intersection on all four corners.*
58. *Relocate the traffic signal poles or widen the sidewalk as needed to meet ADA requirements at the Elks Point Road/US 50 intersection.*
59. *Consider construction of a westbound deceleration lane and acceleration lane at the US 50/Round Hill Pines intersection.*
60. *Consider implementing a roadway configuration to install a two way left turn lane at the US 50/Round Hill Pines intersection.*
61. *Install a changeable message sign on US 50 to advise drivers when the parking is full at Round Hill Pines Resort and to direct them to alternate parking locations.*
62. *NDOT to coordinate with the US Forest Service to consider widening the opening in the rock wall at the Round Hill Pines resort entrance to allow for two-way traffic and improved sight distance.*

- 63. Evaluate measures to discourage parking along the westbound shoulder from the Round Hill Pines Resort entrance and the guardrail terminus near the Safeway driveway, including possibly extending the existing guardrail to the north, coupled with transit use.*
- 64. Consider in the complete street design project addressing on-street parking and pedestrian access on the west side of US 50 by Round Hill Pines if it can be done safely.*
- 65. Consider creating “park and ride” locations to minimize parking on the highway.*
- 66. Coordinate with NDOT on the current on-going project to change the operation of the flashing lights at US 50/Lake Shore Boulevard from continuously flashing to pedestrian activated flashers.*
- 67. Provide ADA compliant access on the west side of US 50 at Lake Shore Boulevard.*
- 68. Consider installing speed feedback signs.*
- 69. Consider construction of a westbound deceleration lane and acceleration lane on US 50 at Lake Shore Boulevard.*
- 70. Consider, in the complete street project, a roadway reconfiguration to install a two way left turn lane on US 50 at Lake Shore Boulevard, if feasible based on capacity analysis.*
- 71. Consider installing bicycle and sidewalk facilities to serve the commercial area on US 50 between Lake View Drive and North Martin Drive.*
- 72. Evaluate sight distance at North Martin Drive and consider constructing improvements to enhance sight distance such as considering cutting back the slope and constructing a retaining wall.*
- 73. Coordinate with Lake Tahoe Basin agencies to install a changeable message sign on US 50, and other ITS strategies, to advise drivers that the Zephyr Cove resort parking is full and to direct them to alternate parking locations.*
- 74. Consider identifying parking locations for when Zephyr Cove resort is full and implementing a park and ride system similar to that of Sand Harbor.*
- 75. Construct/upgrade pedestrian facilities at all four corners of the US 50/Zephyr Cove intersection to be ADA compliant.*
- 76. Consider widening the shoulder on US 50 by Warrior Way to allow more space for parked vehicles coupled with pedestrian access facilities. This could be done by restriping or widening the pavement.*
- 77. Consider installing a marked crosswalk with a rectangular rapid flashing beacon (RRFB) or a high-intensity activated crosswalk (HAWK) beacon on US 50 at Warrior Way.*
- 78. Consider creating a “park and ride” location to minimize parking on the fog line and jaywalking on US 50 by Warrior Way.*
- 79. Consider implementing a roadway reconfiguration to accommodate all road users.*
- 80. Consider adding striping and/or signage which would maintain access to the highway in front of the fire station at Warrior Way.*
- 81. Consider restricting turning movements at the intersection of US 50/Tahoe Glen (AKA Sadie Lane) to right-in, right-out only.*

- 82. Consider reducing the speed limit on US 50 by Tahoe Glen (AKA Sadie Lane).**
- 83. Consider implementing a roadway reconfiguration to install a two way left turn lane to reduce the amount of u-turns on US 50 by Tahoe Glen by improving the left turn out from the Cave Rock boat ramp. This would also improve left turns from the highway to Tahoe Glen (AKA Sadie Lane).**
- 84. Install rock netting on the slope at the south end of the eastbound Cave Rock tunnel.**
- 85. Reconfigure the roadway by reducing vehicle lanes from two to one in each direction and use the remaining space within the Cave Rock tunnels for pedestrian and bicycle facilities.**
- 86. Review Cave Rock Boat Ramp Access/Egress.**
- 87. Consider shortening the median in US 50 to improve the turning movement for vehicles turning left onto US 50 from SR 28.**
- 88. Consider converting the US 50/SR 28 intersection into a roundabout. Consider providing access to the future Information and Welcome Center Facility when designing the roundabout.**
- 89. If the US 50/SR 28 intersection cannot be converted to a roundabout, consider lengthening the eastbound acceleration/merge lane on US 50.**
- 90. Evaluate the need to add more chain installation/removal areas throughout the corridor.**
- 91. Evaluate the access to the Spooner Summit trailhead parking lot. Evaluate the possibility to restripe the center line striping at Spooner Summit to provide a gap in the two double yellow lines at the trailhead parking lot.**
- 92. Evaluate ways to improve this Tahoe Rim Trail crossing of US 50 at Spooner Summit for bicyclists and pedestrians.**

Priority 2b - defined as those suggested improvements that can be implemented by TTD in a future project

- 93. Perform a corridor parking study to identify supply and demand locations and to create an optimized parking management system.**
- 94. Identify ITS (Intelligent Transportation Systems) strategies throughout the corridor to optimize all modes of transportation, refer to TRPA's 2014 Intelligent Technology Systems Plan.**
- 95. Tahoe Transportation District to coordinate with casinos to create a pathway with detectable warnings to guide pedestrians, especially the visually impaired, around the planters outside the Hard Rock Hotel and Casino.**
- 96. Tahoe Transportation District to coordinate with the US Forest Service to review the on-site parking at Round Hill Pines and evaluate the efficiency of the parking area use for possible improvement.**
- 97. Tahoe Transportation District to work with the USFS to identify ways to reduce queueing of vehicles onto the highway at the Zephyr Cove Resort entrance.**

- 98. Consider identifying parking locations for when Zephyr Cove resort is full and implementing a park and ride system similar to that of Sand Harbor.**
- 99. Tailor current transit operations to help address pedestrian needs near Warrior Way and Zephyr Cove.**

Priority 2c- defined as those suggested improvements that can be implemented by Douglas County Public Works in a future project

- 100. Consider replacing all non-traffic rated utility boxes in the right of way between Lake Parkway and SR 207 with traffic rated boxes and covers.**

Priority 3

Suggested improvements that can be implemented in a long range improvement plan/ future US 50 South Shore Revitalization Project.

Priority 3a – defined as those suggested improvements that can be included in NDOT’s long range improvement plan

- 101. Consider converting intersections, such as SR 28 and Lake Parkway, throughout the corridor into roundabouts.**
- 102. Support reconstruction of the Lake Parkway intersection as a roundabout as part of the US 50 South Shore Revitalization Project by TTD.**
- 103. Consider reconstructing the US 50/Zephyr Cove intersection as a roundabout if feasible based on capacity study.**
- 104. Evaluate other pedestrian crossing methods such as underground pedestrian crossing at Warrior Way.**
- 105. Consider reconstructing the US 50/Warrior Way intersection as a roundabout if feasible based on capacity study.**
- 106. Consider creating a “park and ride” location to minimize parking on the fog line and jaywalking on US 50 by Warrior Way.**

Priority 3b – defined as those suggested improvements that can be included in NDOT’s long range improvement plan

- 107. Install appropriate traffic control barriers at Stateline Avenue and at Lake Parkway with the future US 50 South Shore Revitalization Project to prevent unauthorized vehicular access to the casino corridor during events requiring street closure.**
- 108. Conduct access management study to compare existing driveway locations to Access Management standards and consider consolidating driveways throughout the casino core area.**

- 109. Consider installing new transit shelter facilities.**
- 110. Consider the installation of bus turnouts with the US 50 South Shore Revitalization Project.**
- 111. Create a pathway with detectable warnings to guide pedestrians, especially the visually impaired, around the planters outside the Hard Rock Hotel and Casino.**
- 112. Reconstruct the Lake Parkway intersection as a roundabout as part of the US 50 South Shore Revitalization Project by TTD.**

Non-Safety Related Issues

Remove dead/dying trees that are near US 50.

Appendices



- A. Study Aerial Maps**
- B. Traffic Count Data**
- C. Crash Data Summary**
- D. RSA Team Member Review Comments**
- E. Raw Crash Data (included on CD only)**