



Nevada Stateline-to-Stateline Bikeway Project Desired Design Parameters



Prepared for:



EDAW | AECOM



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ACRONYMS AND ABBREVIATIONS

AASHTO	American Association of State Highway and Transportation Officials
ADA	Americans with Disabilities Act
Bikeway	Nevada Stateline-to-Stateline Bikeway Project
BMPs	Best Management Practices
DDPs	Desired Design Parameters
EMS	emergency medical services
FHWA	Federal Highway Administration
ICS	Incident Command System
ITE	Institute of Transportation Engineers
mph	miles per hour
MUTCD	Manual of Uniform Traffic Control Devices
NDOT	Nevada Department of Transportation
NEV	neighborhood electric vehicles
SEZs	Stream Environment Zones
TRPA	Tahoe Regional Planning Agency
U.S.	United States

DESIRED DESIGN PARAMETERS

The purpose of this document is to present Desired Design Parameters (DDPs) that provide design guidance for the 30+-mile Nevada Stateline-to-Stateline Bikeway Project (Bikeway). *DDPs provide physical facility expressions of the project's Guiding Principles for Bikeway Design*, as expressed in the Draft Nevada Stateline-to-Stateline Bikeway Project Concept Document (Appendix A). The DDPs establish the basis for stakeholders, including the public, to formulate alternative alignment options, evaluate the relative functionality and feasibility of the potential alignments, and ultimately develop design standards for the first implementation phase, i.e., the North and South Demonstration projects.

The east shore of Lake Tahoe poses considerable unique challenges to the implementation of a dedicated facility for bicyclists and pedestrians, and in some cases the most “desired” solution may not be feasible. It is important to consider that the DDPs are guidelines against which alternative alignments will be measured and it may not be possible to achieve full compliance in every instance. In these cases, innovative and/or specialized solutions may be necessary to create a safe and enjoyable experience while at the same time minimizing impacts to the built and natural environment.

User safety is an overarching concern and is the basis for many of the DDPs. It is addressed by ensuring that the Bikeway conforms to criteria for: adequate sightlines, vertical and horizontal clearances, trail width, grades, warning signage, speed management through facility design, separation of faster and slower users, rest areas, separation from motor vehicle use, and regulated intersections where the Bikeway crosses the motorized transportation system.

Many specific implementation and management details, as well as specific design details (e.g., striping, lighting, and signage), are not addressed by the DDPs. While these issues are critically important to the cost and functioning of the future Bikeway, their determination is not within the scope of a DDP, which is concerned with questions of alignment desirability and feasibility. There are numerous regulations (e.g., planning boundaries and land coverage), as well as physical and natural resource opportunities and constraints (e.g., topography, cultural resources, wildlife habitat), that will also dictate the location and design of the Bikeway; these regulations and opportunities and constraints will be addressed in a separate and subsequent project deliverable (i.e., Opportunities and Constraints Report). Together, the Guiding Principles (Appendix A), this DDPs document, and the forthcoming opportunities and constraints report and related trail suitability modeling that will be conducted for the Bikeway will be used to develop a systematic basis for selection of suitable trail alignments.

Each DDP is listed below with the corresponding Guiding Principle(s) from Appendix A.

1 BIKEWAY DESIGN

Related Guiding Principle(s): 1, 2, 4, 6, 11, 13, 14

Specific design and implementation guidelines and standards will ensure the Bikeway is constructed to a consistent set of the highest and best standards currently available. The design standards identified herein are derived in part from the following sources:

- ▶ Americans with Disabilities Act (ADA) Standards for Accessible Design (United States [U.S.] Department of Justice 1994)
- ▶ American Association of State Highway and Transportation Officials (AASHTO): Guide for the Development of Bicycle Facilities (AASHTO 1999)
- ▶ Institute of Transportation Engineers (ITE): Design and Safety of Pedestrian Facilities (ITE 1998)
- ▶ Manual of Uniform Traffic Control Devices (MUTCD) (U.S. Department of Transportation, Federal Highway Administration [FHWA] 2007)
- ▶ Nevada State Bicycle Plan (Nevada Department of Transportation [NDOT] 2003)
- ▶ FHWA: Conflicts on Multiple-Use Paths (FHWA and The National Recreational Trails Advisory Committee 1994)
- ▶ United States (U.S.) Forest Service: Trail Construction and Maintenance Notebook (U.S. Department of Agriculture, Forest Service 2000)
- ▶ U.S. Forest Service: Engineering Manual 7720-103, Standard Specifications for the Construction and Maintenance of Trails (U.S. Department of Agriculture, Forest Service 1996)
- ▶ U.S. Forest Service: Engineering Manual 7720-104, Standard Drawings for the Construction and Maintenance of Trails (U.S. Department of Agriculture, Forest Service 1996)
- ▶ U.S. Forest Service: Forest Service Handbook 2309.18, Trail Management Handbook (U.S. Department of Agriculture, Forest Service, 1991)
- ▶ International Fire Code

In addition, the Tahoe Regional Planning Agency (TRPA) Lake Tahoe Regional Bicycle and Pedestrian Master Plan (TRPA 2006) was referenced for its planning context within the Lake Tahoe Basin.

1.1 LOCATION

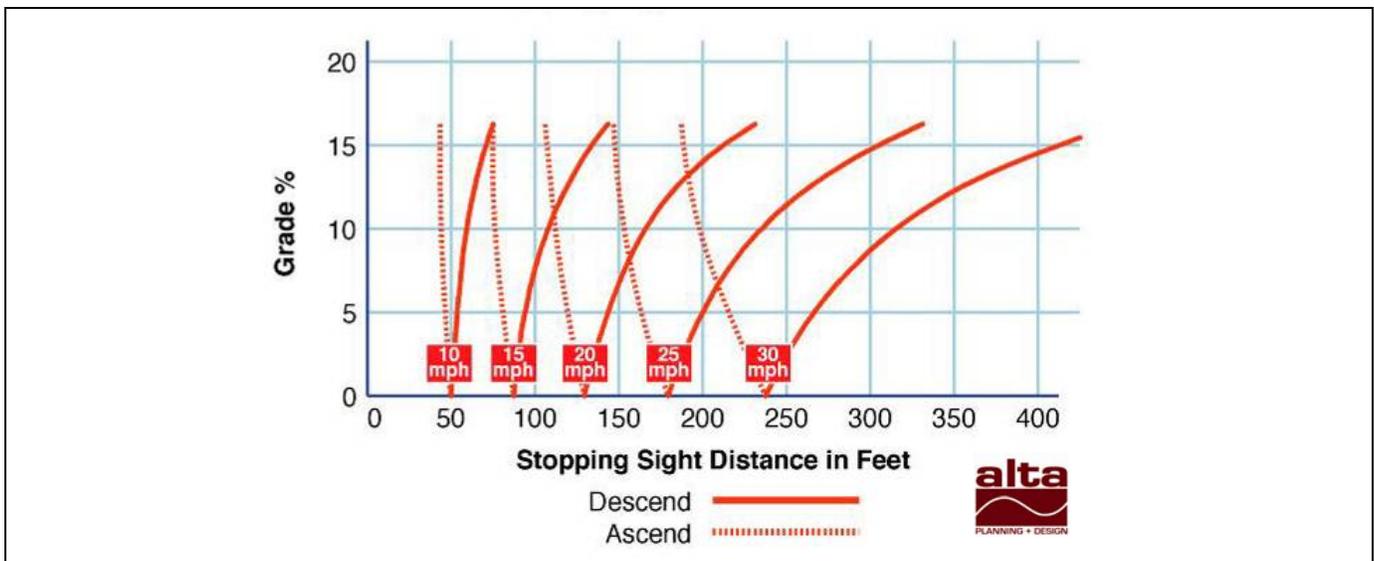
- 1.1.1 To appeal to the greatest number of potential users, the Bikeway should utilize an alignment that is separated from existing streets and highways. Alignments along streets and highways may be established, where appropriate, with preference given to low-volume residential streets; alignments along higher-volume streets and highways should be avoided, if feasible, as these will discourage use of the facility. The Bikeway should include at-grade crossings of highways only where avoidance is infeasible.
- 1.1.2 The Bikeway should minimize disturbance to the landscape by utilizing, where feasible and desirable, existing abandoned or marginally used roadbeds (e.g., former logging roads or sections of state highway, fire roads, old railbeds) and abandoned utility facilities (e.g., flume alignments).
- 1.1.3 The Bikeway should minimize disturbance to the landscape by utilizing, where feasible and desirable, existing improved non-motorized facilities (e.g., paved pathways).

- 1.1.4 The Bikeway should minimize disturbance to areas by utilizing existing facilities (e.g., schools, community centers) for trailheads, access points, rest areas, and wayside stops.
- 1.1.5 The Bikeway should avoid north- and northeast-facing aspects in areas of high vegetative cover, because these locations may hold snowpack longer into the spring season than other combinations of directional aspect and vegetation.
- 1.1.6 The Bikeway should avoid exposed areas with consistent and/or gusty winds greater than 10 miles per hour (mph). At a minimum such winds can discourage pathway use; stronger winds can be hazardous to cyclists, especially crosswinds with the capability to force a user over the edge of the shoulder.
- 1.1.7 The Bikeway should be located sufficiently above the high water line of adjacent bodies of water to preserve the visual character of the shore zone, minimize environmental impacts, reduce construction and maintenance costs, and ensure accessibility.
- 1.1.8 In areas where it is necessary to locate portions of the Bikeway along existing streets and highways, the Bikeway should be designed and located to avoid the need to make cuts into slopes that may impact roadway stability, while also capitalizing on the opportunity to stabilize cut and fill areas and mitigate current erosion problems.

1.2 DESIGN SPEED

On shared-use paths such as the Bikeway the AASHTO recommendation is to assume a design speed that is at least as high as the preferred speed of the faster bicyclists, which will typically be 20 mph. The Bikeway may be used by bicyclists that could be categorized as “serious enthusiasts” that would require a higher design speed; however, as indicated in Exhibit 1, the necessary horizontal and vertical alignments to accommodate this group could create a disproportionate disturbance to the landscape.

- 1.2.1 A 20 mph design speed should be utilized in most instances. To successfully implement this design speed it may be necessary to include design and traffic controls to decrease the speed of the fastest bicyclists.
- 1.2.2 Situations requiring a greater design speed, including long downhill sections or areas with a consistent tailwind, should be accommodated where necessary, but otherwise minimized.



Sight Stopping Distances for Bicyclists Help Determine Appropriate Design Speed

Exhibit 1

1.3 HORIZONTAL ALIGNMENT (CURVATURE)

- 1.3.1 Curve radii should be based upon the design speed of the applicable Bikeway section. For a 20 mph design speed the minimum radius is 100 feet. In some instances, such as steep terrain where stacked switchbacks may be necessary, there may be limitations created by the natural environment. In these situations consideration should be given to alternative methods to control speed, such as caution signage.
- 1.3.2 The design shall make accommodations for the operating speed of faster users near intersections and areas where users will be exiting or merging, such as access points and wayside stops.
- 1.3.3 On National Forest System lands and at other appropriate locations consideration should be given to horizontal alignments to accommodate Incident Command System (ICS) Type 3 Wildland Fire Engines (weight = 35,000 pounds, approximate height = 9 feet) where the Bikeway needs to facilitate fire response with appropriate turning radii for a vehicle with a 180-inch wheelbase (Appendix B).

1.4 VERTICAL ALIGNMENT (GRADES)

As the Bikeway will be used by both bicyclists and pedestrians it should conform to AASHTO guidelines for the development of shared-use paved pathways. ADA guidelines are in many instances not in agreement with AASHTO recommendations, but will be used where possible.

- 1.4.1 The running slope, or grade, on a shared-use path should be kept to a minimum; grades greater than 5% are undesirable and where necessary should be denoted with appropriate warning signage. Where terrain dictates, grade lengths are recommended as follows:
 - ▶ < 5% (< 1:20) any length
 - ▶ 5-6% for up to 800 feet
 - ▶ 7% for up to 400 feet
 - ▶ 8% for up to 300 feet
 - ▶ 9% for up to 200 feet
 - ▶ 10% for up to 100 feet
 - ▶ 11+% for up to 50 feet
- 1.4.2 Landscape disturbance, need for wall or bridge structures, and environmental impacts should be considered to determine appropriate grades and grade lengths where steep grades (> 5%) must be created.

1.5 WIDTH

- 1.5.1 The preferred width of the Bikeway should be 10 feet with minimum 2-foot wide graded shoulders on each side for two-way traffic, as recommended by AASHTO. In anticipated low travel volume areas or in specific instances where severe physical constraints are present unique solutions (such as reduced paved path width, or a pathway split with two one-directional paved paths) to meet the criteria set forth in other guiding principles may be necessary. However, these instances should be discrete and used sparingly so as not to jeopardize potential federal funding opportunities. Conversely, in high travel volume areas it may be necessary or desirable to increase the path width.
- 1.5.2 A minimum 2-foot wide graded shoulder area with a maximum 1:6 slope should be maintained adjacent to both sides of the path; however, 3 feet or more is desirable to provide clearance from trees, poles, walls, fences, guardrails, or other lateral obstructions. Where the path is adjacent to canals, ditches, or downward slopes steeper than 1:3, a wider separation should be considered. A minimum 5-foot separation from the edge of the path pavement to the top of the slope is desirable. Depending on the height of embankment and condition at the bottom, a physical barrier may be necessary.

1.5.3 On National Forest System lands and at other appropriate locations consideration should be given to lane widths to accommodate ICS Type 3 Wildland Fire Engines (weight = 35,000 pounds, approximate height = 9 feet) where the Bikeway needs to facilitate fire response by providing a minimum of 10-foot wide paved areas with 2-foot wide compacted shoulders on each side.

1.6 CLEARANCE

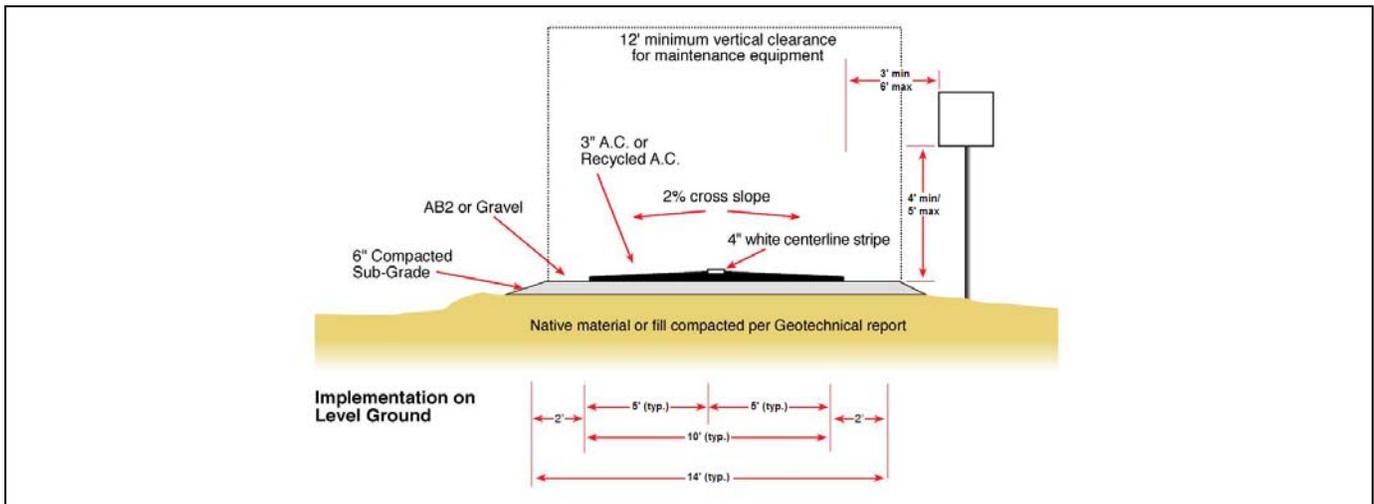
1.6.1 The vertical clearance minimum for bicycle use is 8 feet. In most instances, including undercrossings and tunnels, 10 feet is desirable. As indicated in Exhibit 2, the minimum standard clearance to accommodate maintenance vehicles should be 12 feet; access for emergency or specialty vehicles may require greater vertical clearance. The landscape and natural environment should be minimally disturbed when providing greater than the minimum vertical clearance.

1.6.2 The horizontal clearance minimum for bicycle use is 3 feet from edge of pavement on a minimum 10-foot wide path.

1.6.3 On National Forest System lands and at other appropriate locations consideration should be given to clearance requirements to accommodate ICS Type 3 Wildland Fire Engines (approximate height = 9 feet) where the Bikeway needs to facilitate fire response with a 12-foot vertical clearance standard.

1.7 CROSS-SECTION

1.7.1 The typical cross-section of the Bikeway should incorporate the relevant standards and guidelines noted herein to generally resemble that shown in Exhibit 2. It is anticipated that specific designs (e.g., bridges, boardwalks) will be necessary to accommodate unique situations.



**Typical AASHTO Bicycle Path Cross-Section
Indicating Preferred Vertical and Horizontal Dimensions**

Exhibit 2

1.8 DRAINAGE

Maintaining Lake Tahoe’s legendary clarity is of utmost importance to the Bikeway design, and the Bikeway should adhere to erosion control design standards adopted by TRPA. To minimize the project’s contribution to sedimentation of waterways to the greatest extent possible the project should adhere to the following standards:

1.8.1 Utilize alignments that result in cross-section grades that avoid concentration of runoff and instead perpetuate sheet flow runoff.

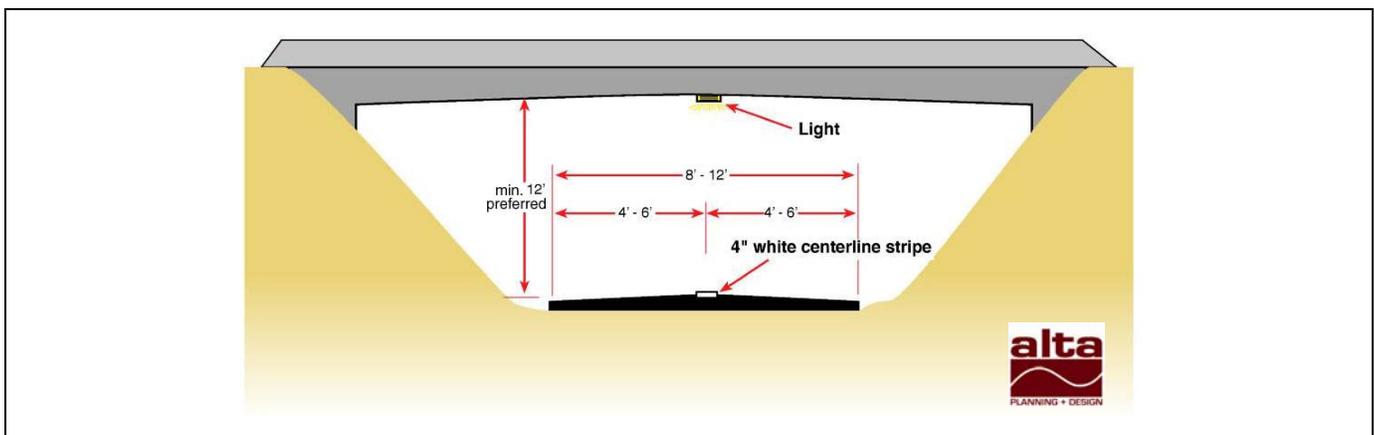
- 1.8.2 Avoid alignments on lands that have a relatively high erosion hazard based on soil types, slope, and precipitation levels.
- 1.8.3 Avoid alignments on lands with lower levels of vegetative cover and impermeable soils.
- 1.8.4 Minimize cut and fill slopes and vegetation removal to reduce disturbance to native soils.
- 1.8.5 Select alignments that utilize lands where the watershed has already sustained impacts from development or where proper design and implementation will reduce existing impacts.
- 1.8.6 Select alignments on lands that have an ability to revegetate, based upon soil and site properties.
- 1.8.7 Select alignments that utilize lands with opportunities for water quality improvements in the vicinity.
- 1.8.8 Where natural filtration opportunities exist, select alignments that are sufficiently distant from Lake Tahoe to allow natural filtration of runoff.
- 1.8.9 Bikeway design should avoid hydrologic connectivity from the facility to surface waters.
- 1.8.10 Bikeway drainage system design should be based on analysis of the surrounding landscape to accept the drainage with minimal impact.

1.9 FUNCTIONALITY

- 1.9.1 The Draft Nevada Stateline-to-Stateline Bikeway Project Concept Document indicates that the Bikeway should be designed to accommodate bicyclists and pedestrians, and the design guidelines provided in this document provide for such. The Bikeway will not be designed to accommodate other motorized or non-motorized recreation or transportation users (e.g., horses, neighborhood electric vehicles [NEVs]).
- 1.9.2 The Bikeway may accommodate non-motorized winter trail use, such as cross-country skiing and snowshoeing, but will not be specifically designed for such users. As currently envisioned, the Bikeway will not be plowed to clear snow nor will it be groomed for winter use; these are management details that, if implemented, may affect Bikeway material lifespan and maintenance costs.
- 1.9.3 On National Forest System lands and at other appropriate locations consideration should be given to accommodating ICS Type 3 Wildland Fire Engines so that the Bikeway may be used, where needed, for access in the event of a fire. Where needed and possible, the Bikeway should also be considered for use by the Forest Service and other land management entities for additional forest management purposes, such as fuels reduction access, to increase the functionality of the facility.
- 1.9.4 The Bikeway should accommodate pickup truck-sized maintenance vehicle access at least every 3 miles.

1.10 HIGHWAY CROSSINGS & TRAFFIC SAFETY

- 1.10.1 The number of at-grade crossings with highways will be minimized and other design options, such as bridges or underpasses (Exhibit 3), should be considered to provide for the improved safety of the bikeway users. Underpasses are preferred for purposes of maintaining travel route scenic quality, but may not be feasible due to other site-specific constraints.
- 1.10.2 Where no feasible alternative exists to an at-grade crossing of a highway, traffic signals and other treatments should be considered given the high volume of vehicle traffic on State Route (SR) 28 and U.S. Highway 50 (U.S. 50).



Bikeway Undercrossings Are Preferred Over At-Grade Crossings of Highways to Increase User Safety

Exhibit 3

2 TRAILHEAD DESIGN

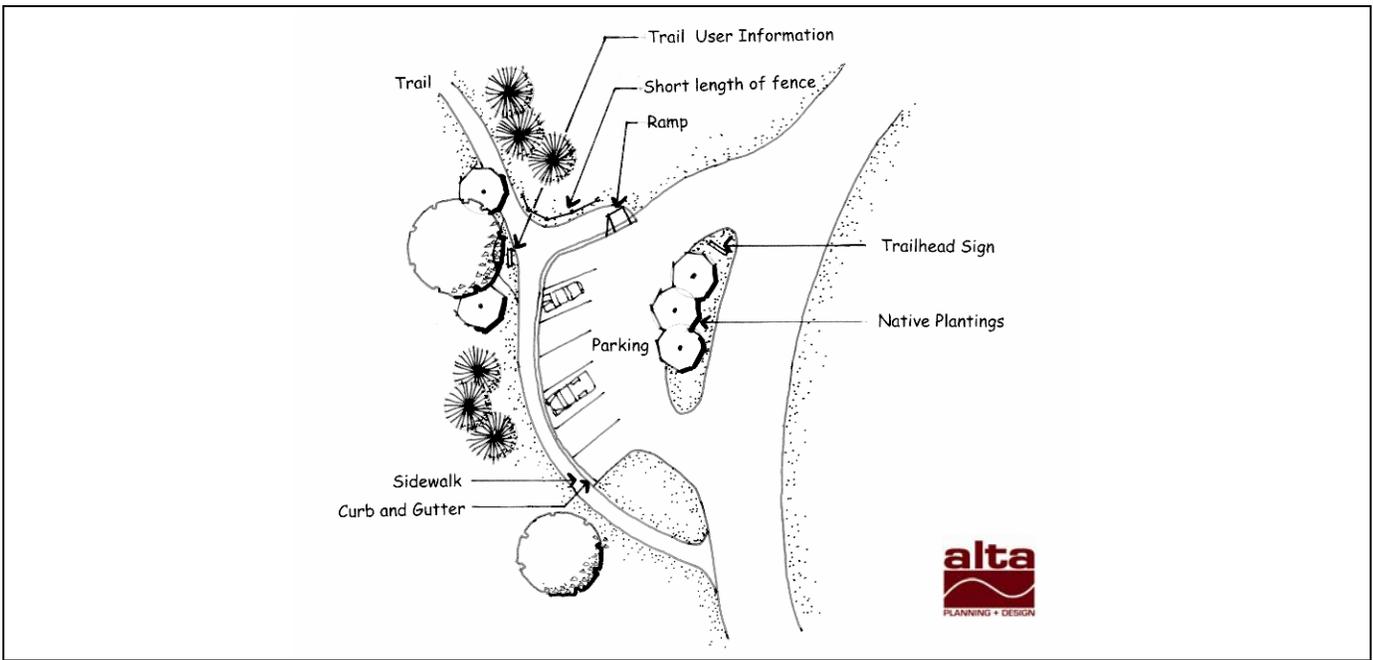
Related Guiding Principle(s): 3, 7, 10, 14, 15

2.1 TRAIL ACCESS POINTS

Trail access points, including trailheads, are an important component of the Bikeway and provide the primary method for users to enter and depart from the path. Because in some locations the Bikeway may be fairly remote from developed areas, the trail access points would become destinations and fill a more significant role in trail usage.

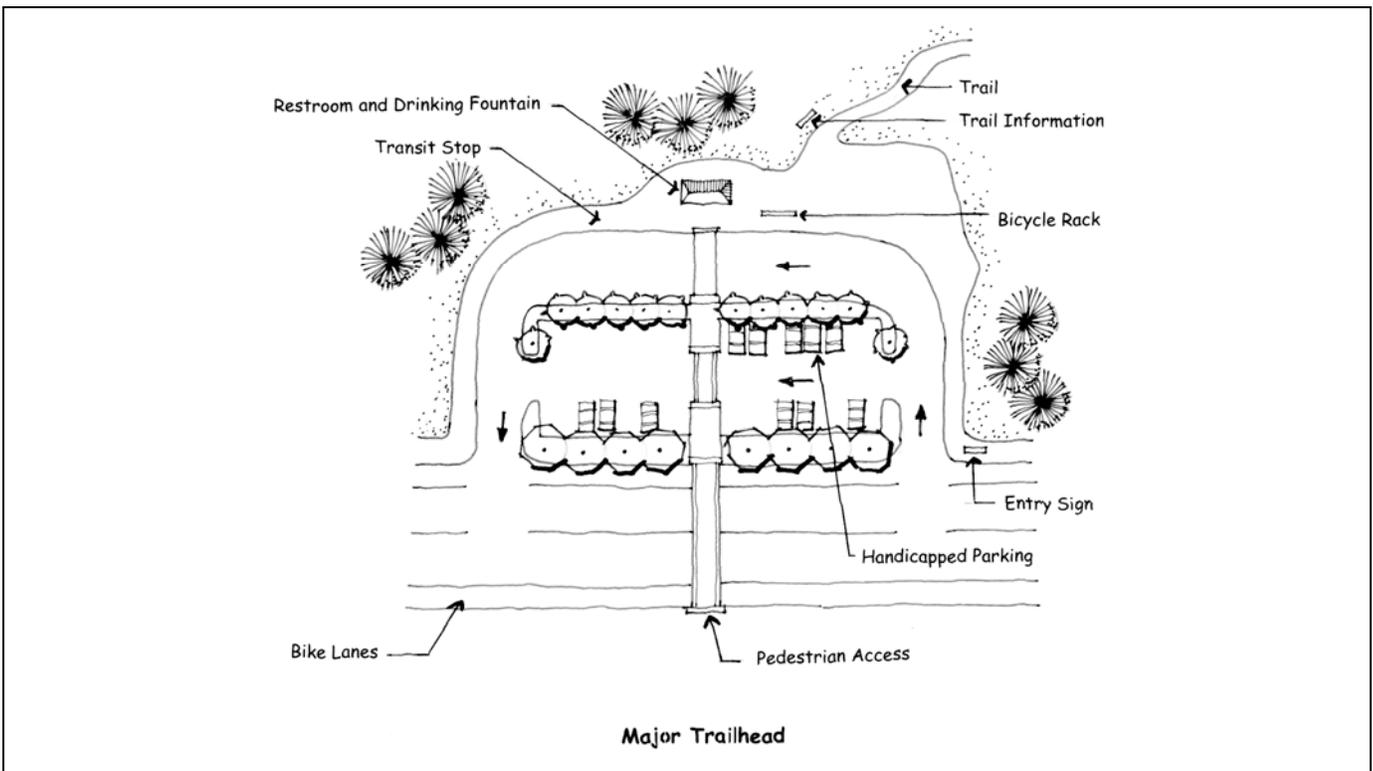
The following different types of access points correspond to the developed environment, anticipated user volume, and type of user expected for each. There are desired intervals for each type of access point to efficiently connect users with the pathway and to promote usage. Specific design standards address parking and circulation requirements within trailhead areas.

- 2.1.1 **Transit access point:** minimally developed access point generally with no trail-specific parking provided and integrated into typical transit facilities (e.g., bus shelters, trash/recycling receptacles). This type of access point should have small-scale signage to identify it and should be designed to accommodate users who will combine their trail visit with transit use. These transit stops will likely be used by both visitors and residents and will be critical in reducing demand for vehicle parking associated with Bikeway access. Transit access points should be located where existing or future transit stops can be accessed either directly or indirectly, via sidewalks, low-volume streets, or other appropriate connection, by the Bikeway.
- 2.1.2 **Neighborhood access point:** minimally developed access point, typically without dedicated parking facilities. This type of access point should have minimal to no signage to discourage outside use and should be designed for local use by the adjacent neighborhood. This facility will appeal primarily to local residents who wish to access the trail for short- to long-duration recreation and for transportation, while at the same time discouraging use by persons who are not in the immediate vicinity. To serve local communities, consideration should be given to providing access to all neighborhoods along the Bikeway.
- 2.1.3 **Trailhead:** moderately-sized trailhead with 5-20 parking spaces and some, but not all, facilities, such as signage, trash/recycling receptacles, and screened porta-potties that will be visually compatible with the surrounding area (Exhibit 4). Signage will likely include large-scale maps. This trailhead is intended to appeal primarily to local users whose primary goal is recreation, but will occasionally be utilized by individuals whose primary goal is transportation (e.g., bicycle commuters). Trailheads should be provided at least every 5 miles from one another or from a regional trailhead (see below) in populated areas. Opportunities to utilize existing public facilities or improve/develop facilities on public lands should be given primary consideration. Trailheads may have transit stops, preferably for travel in both directions.
- 2.1.4 **Regional trailhead:** large-scale trailhead with 20+ parking spaces and developed facilities. Facilities should include some combination of permanent restrooms, interpretive signage, drinking water, picnic tables, benches, trash/recycling receptacles, shade trees or structures, and large-scale maps, but constraints may not allow all of these facilities to be provided (Exhibit 5). Regional trailheads should also contain transit stops to allow multi-modal access to the Bikeway; it is intended to draw all types of visitors, particularly tourists who have come to recreate on the Bikeway. Regional trailheads should be provided at both ends of the Bikeway and at least once near the midpoint, so that recreational users can take advantage of restrooms, water fountains, benches, and picnic tables to increase the enjoyment of their excursion. Where possible, opportunities to utilize existing public facilities or improve/develop facilities on public lands should be given primary consideration.



Trailheads Allow Access for Local Residents Who Cannot Ride or Walk to the Path (Typical Concept)

Exhibit 4



Regional Trailheads Will Become Primary Destinations for Users of the Bikeway (Typical Concept)

Exhibit 5

2.2 TRAILHEAD & REGIONAL TRAILHEAD DESIGN

- 2.2.1 To maximize development and operating efficiencies, including shared parking and transfer of peak usage, trailheads and regional trailheads may be placed at existing parks, public recreation areas/points of interest, and other public institutions (e.g., schools and community centers). The existence of such facilities should be considered when choosing locations.
- 2.2.2 The pedestrian facilities and vehicle parking and circulation areas at trailheads and regional trailheads should be designed to accommodate all users, and should be in compliance with ADA standards.
- 2.2.3 Consideration should be given to seasonal temporary restroom facilities at trailheads where anticipated summertime usage is likely to be high.
- 2.2.4 Consideration should be given to the use of trailheads and regional trailheads for non-motorized winter recreation, and appropriate facilities should be designed to allow for this use.

3 CONNECTIVITY WITH OTHER TRAILS & ACCESS TO ADJACENT AREAS

Related Guiding Principle(s): 1, 3, 5, 7, 9, 12

3.1 CONNECTIVITY

- 3.1.1 To maximize the ability of users to move on and off the Bikeway and throughout the region, the path should provide regular, simple-to-use connections to existing and planned transportation systems such as streets, roads, highways, bus and waterborne transit facilities, pathways, trails, and sidewalks (Exhibit 6).
- 3.1.2 To encourage people to walk or ride their bicycles to recreation areas on the East Shore, the Bikeway should connect directly to existing or planned community and recreational facilities such as schools, community centers, recreational trail systems, other bicycle trails, open spaces, beaches, and parks, taking into account desired levels of visitation and environmental carrying capacities.
- 3.1.3 To encourage people to walk or ride their bicycles for transportation purposes, the Bikeway should connect directly to existing and planned residential, commercial, and institutional developments. Specifically, the Bikeway should connect the communities between Nevada statelines from Crystal Bay on the north to the casino core at Stateline on the south.
- 3.1.4 To encourage transit-bicycle intermodal trips, the Bikeway should connect directly to existing and planned transit facilities.
- 3.1.5 When direct connections are not possible between the Bikeway and identified facilities, then other infrastructure for non-motorized travel, particularly paved pathways, should be considered to provide the desired connectivity.



Well-Signed Connections Increase Options for Users to Access the Bikeway by Walking or Riding

Exhibit 6

4 SECURITY & EMERGENCY VEHICLE ACCESS

Related Guiding Principle(s): 7

4.1 PERSONAL SAFETY

The personal safety of trail users should be accommodated by reducing isolated spaces and providing good visibility through the following options:

- 4.1.1 Reduce the need for designs that create physical barriers to lateral movement off the trail, such as sections of pathway with high walls or fencing on both sides.
- 4.1.2 Select landscaping options that do not create dense vegetative barriers.
- 4.1.3 Provide localized lighting, where possible, in undercrossings and around other structural improvements.

4.2 NEIGHBORHOOD PRIVACY

The privacy concerns of residential neighbors adjacent to the Bikeway should be addressed by:

- 4.2.1 Maximizing visual access to the trail while respecting the privacy needs of adjacent residents.
- 4.2.2 Placing Bikeway access points into residential neighborhoods on existing public rights-of-way or facilities.
- 4.2.3 Using the design and placement of access points to encourage primarily local use.

4.3 EMERGENCY ACCESS

Input from local police, fire, and emergency medical services (EMS) providers, including the Forest Service, should be obtained to determine necessary access requirements. Design considerations should include:

- 4.3.1 Providing regular points of access by police, fire, and EMS motor vehicles to facilitate emergency movement of persons on and off the path. Motor vehicle access should be provided at least every 3 miles.
- 4.3.2 Determining if types of vehicles used by police, fire, and EMS providers will necessitate modifications to the bikeway design regarding horizontal and vertical clearance and turn radii to accommodate increased vehicle dimensions or movement requirements.
- 4.3.3 Specifically on National Forest System lands and at other appropriate locations consideration should be given to access that accommodates ICS Type 3 Wildland Fire Engines per Section 1.9.3 and Appendix B- ICS Type 3 Wildland Fire Engine Turning Radii.

5 EASEMENTS & PRIVATE LAND ACQUISITIONS

Related Guiding Principle(s): 2

5.1 EASEMENTS FOR TRAIL DEVELOPMENT AND USE

- 5.1.1 Where necessary, easements for Bikeway development should be at least 40 feet wide to allow for adequate space within the easement to accommodate the typical 14-foot cross-section (Bikeway plus shoulders) in terrain that may contain trees, boulders, sensitive habitat, steep sideslopes, etc. A 60-foot wide construction/maintenance easement should accompany the primary easement. Particular situations may require greater easement widths.

5.2 ACQUISITIONS

- 5.2.1 Where private property is obtained from willing sellers for the purposes of developing the Bikeway it should be at least 40 feet wide to allow for adequate space within the easement to accommodate the typical 14-foot cross-section (Bikeway plus shoulders) in terrain that may contain trees, boulders, sensitive habitat, steep sideslopes, etc. Particular situations may require greater easement widths and therefore more land.

6 TRANSPORTATION & RECREATION SUPPORT FACILITIES

Related Guiding Principle(s): 3, 7, 15

6.1 FACILITIES

- 6.1.1 Wayside stops are informal locations for bicyclists and pedestrians to pull out of the main flow of traffic and rest, eat a snack, or take in the view. It is desirable to provide a wayside stop at least every 1 mile from each other or from a rest area (see below). They can be integrated into other facilities (e.g., trailheads, parks, interpretive points of interest, scenic vistas), but should be immediately adjacent to the Bikeway. Wayside stops should contain a minimum of facilities, such as benches, trash/recycling receptacles, shade trees or structures, and signage. Acceleration/deceleration areas should be provided to allow users to more safely move in and out of the flow of bicycle/pedestrian traffic.
- 6.1.2 Rest areas are formal locations for bicyclists and pedestrians to stop for a variety of reasons (Exhibit 7). Rest areas should contain restrooms, drinking water, trash/recycling receptacles, picnic areas, shade trees or structures, and signage. It is desirable to have rest areas at least 7 miles from each other. They can be integrated into other facilities (e.g., trailheads or regional trailheads, parks, community centers, interpretive points of interest) and may be up to 0.25 mile from the Bikeway. Acceleration/deceleration areas should be provided to allow users to more safely move in and out of the flow of bicycle/pedestrian traffic.



Existing Rest Area on the East Shore of Lake Tahoe

Exhibit 7

7 INCORPORATION OF VISTAS

Related Guiding Principle(s): 10, 15

Lake Tahoe is famous for its scenic views, and the Bikeway should take advantage of the surrounding vistas. The views can be experienced either passively while riding or walking or actively through specific viewpoints.

7.1 SCENIC VISTAS

- 7.1.1 The Bikeway should provide opportunities for users to actively experience scenic vistas of Lake Tahoe at specified points and should provide a link to popular existing vistas on the East Shore.
- 7.1.2 The opportunity should be provided at scenic vista points to allow users to remove themselves from the main flow of traffic and stop to appreciate the view, and should, therefore, be provided at rest areas, wayside stops, trailheads, or other similar Bikeway facilities.
- 7.1.3 The Bikeway should provide opportunities to experience scenic vistas while riding or walking by routing the Bikeway through areas that contain views of Lake Tahoe (Exhibit 8).



**The Beauty of Lake Tahoe Will Serve as
One of the Primary Features of the Bikeway**

Exhibit 8

8 RESOURCE PROTECTION

Related Guiding Principle(s): 4, 8, 10

8.1 RESOURCE PROTECTION

- 8.1.1 The Bikeway alignment should avoid negative impacts to Washoe Tribe cultural resources and traditions as identified by the Tribe.
- 8.1.2 The Bikeway should be aligned to minimize negative scenic impacts on shoreline and roadway travel units around Lake Tahoe.
- 8.1.3 The Bikeway alignment should avoid negative impacts to wildlife resources, including, but not limited to, habitat for: spotted owl, northern goshawk, golden eagle, bald eagle, American marten, osprey, and willow flycatcher.
- 8.1.4 The Bikeway should avoid requiring the removal or disturbance of visually significant rock outcroppings and the need for removal of boulders, where feasible.
- 8.1.5 The Bikeway should minimize tree removal (trees greater than 14 inches diameter at breast height [dbh]), avoid requiring the removal or disturbance of large trees (trees greater than 30 inches dbh), or stands of significant vegetation.
- 8.1.6 The Bikeway should avoid alignments that occupy Stream Environment Zones (SEZs). When Bikeway alignments through SEZ areas are unavoidable, such as for stream crossings, the alignment should minimize impacts to the SEZ through alignment choice, inclusion of stormwater Best Management Practices (BMPs), and structures (e.g., bridges and boardwalks).
- 8.1.7 The alignment of the Bikeway should minimize disruption of natural hydrologic flow paths, including minimizing diversion of streamflow and interception of surface and subsurface water. Where the Bikeway crosses a stream, the alignment should be designed to minimize the obstruction of streamflow leading to flow out of the channel in the event of a crossing failure.
- 8.1.8 The alignment of the Bikeway should avoid wetlands. When Bikeway alignments through wetlands areas are unavoidable, the Bikeway should be designed to have minimal negative impacts to the natural flow patterns in the wetland areas.
- 8.1.9 The alignment of the Bikeway should avoid meadow areas. When Bikeway alignments through meadow areas are unavoidable, the Bikeway should be designed to have minimal negative impacts to the natural habitat and scenic qualities of the meadow areas.
- 8.1.10 The Bikeway should connect to locations that can provide appropriate interpretation of natural, cultural, and historic resources so that they may be interpreted through signage. These areas should be accommodated by trailheads, wayside stops, and/or other facilities.
- 8.1.11 The Bikeway should give preference to alignments that utilize areas of existing verified coverage and higher capability lands (land capability districts 4 through 7) where feasible to minimize water quality impacts and coverage transfer costs. The Bikeway should be designed to minimize the amount of land coverage created by it and its ancillary facilities while meeting desired design parameters related to path width, safety, and vehicle access needs.

9 REFERENCES

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APPENDIX A

Draft Nevada Stateline-to-Stateline Bikeway Project
Concept Document

DRAFT

NEVADA STATELINE-TO-STATELINE BIKEWAY PROJECT CONCEPT DOCUMENT

The Nevada Stateline-to-Stateline Bikeway Project is a joint proposal of local, state, and Federal agencies with responsibilities on the Nevada side of the Lake Tahoe Basin. The sponsoring agencies are Douglas County, Washoe County, Carson City, Incline Village General Improvement District, Tahoe Transportation District, Nevada Division of State Parks, Nevada Division of State Lands, Tahoe Regional Planning Agency, and USDA Forest Service. The Nevada Department of Transportation and the Washoe Tribe are partnering entities.

Public input is vital to the planning process for the Nevada Stateline-to-Stateline Bikeway Project. This concept document was prepared to provide a framework for beginning public discussion about the project. Drawing from other similar bikeway planning documents, this paper describes the vision, purpose and need, guiding design principles, and objectives of the bikeway planning process. It is recognized and expected that this document will evolve and be enhanced through public comment.

VISION FOR THE BIKEWAY

To complete the Nevada portion of a premier separated bikeway circling Lake Tahoe that connects communities, enhances recreational opportunities, expands transportation choices, and promotes the enjoyment of the Tahoe Basin.

STATEMENT OF PURPOSE & NEED

The purpose of the Nevada Stateline-to-Stateline Bikeway is to provide non-auto transportation opportunities that link recreation areas, community centers, transportation facilities, and neighborhoods in the bikeway corridor to expand recreational access and transportation choices for residents and visitors to the Tahoe Basin. Separated bicycle facilities are not available along most of the Nevada side of Lake Tahoe. The bikeway would provide a spectacular recreation opportunity to link public beaches and coves along the picturesque east shore. These popular recreation areas are generally accessed by automobile. Paved parking is limited and the high demand for these areas leads to shoulder parking and erosion problems. Providing bicycle links to East Shore beaches and recreation areas is an important step to reducing vehicle and parking impacts, improving the multi-modal options available to residents and visitors, improving safety, and providing an unparalleled recreation experience in the bike path itself.

The current bikeways in the basin are extremely popular and public surveys show that expansion of the system around the entire lake is desired. A well-planned bikeway is needed on the Nevada side of the lake to alleviate negative environmental impacts created by current use along the East Shore and to provide improved access to recreational facilities.

GUIDING PRINCIPLES FOR BIKEWAY DESIGN

1. Identify and provide convenient buildable connections to communities, public facilities, public lands, the lakeshore, and open space.
2. Establish separated bikeway alignments wherever feasible.
3. Serve both recreation and commuter needs, with recreation needs receiving first priority where choices must be made.
4. Support the protection, restoration, and sustainability of natural and cultural resources.

5. Anticipate future growth in the surrounding communities in Nevada and California.
6. Provide for a variety of bicycle and pedestrian uses on the bikeway, while recognizing and managing potential conflicts.
7. Provide adequate public and private support facilities.
8. Remain sensitive to the cultural resources and traditions of the Washoe Tribe.
9. Design the bikeway to create social and economic benefits.
10. Provide interpretive opportunities along the bikeway for natural, cultural, and historic resources.
11. Minimize the number of at-grade crossings on State Route 28 and U. S. Highway 50.
12. Provide connections to existing or new trails to recreation areas, transportation facilities, and community centers along the bikeway.
13. Where appropriate, enhance and use existing disturbed area, such as old logging and fire access roads, and take advantage of joint parking opportunities, such as at school sites.
14. Include opportunities for ADA accessibility.
15. Provide visitor amenities, such as rest areas and vistas, to make the bikeway an enjoyable experience.

OBJECTIVES OF THE PLANNING AND DESIGN PROCESS

1. Identify feasible bikeway alignments on the Nevada side of Lake Tahoe from the south Stateline to the north Stateline that will connect to adjacent California bikeways.
2. Complete two demonstration bikeway projects, one at the south end of the Lake (connecting the casino core to Nevada Beach and Round Hill Pines Beach) and one at the north end of the Lake (connecting Incline Village to Sand Harbor, with connections to Hidden Beach and Memorial Point).
3. Complete long-term maintenance, resource management, and operations plans for bikeway segments prior to construction.
4. Establish partnerships for operations and maintenance for each segment prior to approval of construction.
5. Encourage the shift in travel demand for East Shore recreation areas from driving to bicycling, walking, and transit.
6. Respect the Washoe community by involving them in determining ways to protect and interpret Washoe cultural, historic, and natural resources values.
7. Maximize funding source opportunities for timely project implementation and for long-term operation.
8. Provide opportunities for existing local businesses to participate in the process so they can help enhance the visitor experience on and access to the bikeway.
9. Coordinate bikeway decisions with the recommendations in the East Shore Access Plan and consider other alternative transportation choices.
10. Coordinate with appropriate agencies to incorporate the bikeway in new development plans and avoid conflicts with road and highway projects.

PUBLIC COMMUNICATIONS APPROACH

Regular public communication will occur through a variety of approaches to create multiple opportunities for public input and to provide helpful information about the progress of bikeway project planning, design, and construction. This will include a project web site for public information and input during bikeway planning and design. Community meetings will be held at several key milestones of the planning process, including early identification of issues, consideration of corridor opportunities and constraints, input on potential alternatives, and review of the draft feasibility report.

By involving the Washoe tribal community; local, state, and federal agencies; advocacy and interest groups; and the community-at-large in the planning process, greater stewardship and support of the implementation, maintenance/ management, and funding of the bikeway can be encouraged.

A draft of the Nevada Stateline-to-Stateline Bikeway Project Feasibility Study will be released for public review and comment. After making revisions to the study in consideration of public comment, it will be presented to the appropriate sponsoring agencies for approval.

APPENDIX B

ICS Type 3 Wildland Fire Engine Turning Radii
(prepared by LSC Transportation Consultants, Inc.)

Cal Fire Engine
 Model 34,35
 90, 180 degree turn

