RENO SPARKS BICYCLE & PEDESTRIAN PLAN

Master Plan

October 2011

RTC

FEHR & PEERS

ACKNOWLEDGEMENTS

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Carol Nicholson
Mary Ohren
Paula Santerior
Addison Wilhite

RTC Project Manager

Marchon Miller

Other RTC Staff

Chris Louis
Patrice Echola
Carol Perry
Amy Cummings

Technical Advisory Committee

Marchon Miller – RTC
Chris Louis – RTC
Patrice Echola – RTC
Christina Leach – RTC
Felicia Archer – RTC
Carol Perry – RTC
Amy Cummings – RTC
Steve Bunnell – City of Reno
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Jim Herman - City of Sparks
Clara Lawson – Washoe County
Don Morehouse – Washoe County
Bill Story – Washoe County
Rebecca Kapuler – Washoe County
Laurie Anne Grimes – Nevada Office of Traffic Safety
Amy Fitch – Bicycle/Pedestrian Advisory Committee

Consultants

Fehr & Peers

Katy Cole, Project Manager
Marissa Harned
Charlie Alexander
Seleta Reynolds
Meghan Mitman

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1. INTRODUCTION

Vision

To support walking and bicycling, the Region will have an integrated system of safe, convenient and comfortable bicycle, pedestrian and other non-motorized facilities that provide access to schools, jobs, shopping, neighborhoods, community facilities, parks and regional trails.

BACKGROUND

The Reno Sparks region is a pleasant, thriving, healthy, and sustainable community that strives to meet the needs of all of its citizens in an environmentally sensitive manner. Walking and bicycling for recreation, fitness, or as a means of transportation requires safe and accessible infrastructure. High quality infrastructure for bicycling and walking contributes to a higher quality of life for people in the region by encouraging an active lifestyle and reducing automobile traffic, with its associated noise, pollution, congestion, and reliance on foreign oil. The purpose of the *Reno Sparks Bicycle and Pedestrian Master Plan* is to make the region as bicycle and pedestrian friendly as possible in order to encourage people of all ages, abilities, and means to walk and/or bicycle.

This *Master Plan* creates a guide for achieving a comprehensive system of bicycle routes, pedestrian routes, and other related facilities that will result in a safe and convenient circulation system for pleasant, non-motorized travel. This plan addresses goals, policies, standards, funding strategies, education, and intermodal linkages throughout the Reno Sparks region. This plan provides prioritized lists of specific projects for implementation of a system with a fair balance among all modes of travel.

Walking and bicycling are low-cost, quiet, non-polluting, healthy forms of transportation that are ideal for many trips. They are also enjoyable activities that can improve personal health, promote a sense of community, and provide access to recreational amenities. A bicycle and pedestrian network benefits the entire community, including walkers, bikers, and wheelchair users, and people of all ages and abilities. This plan's primary focus is to increase the number of trips that people make by walking or bicycling by focusing on the trips people make the most - trips related to work, school, and other non-leisure activities. Recreational trips are also addressed in this document on a secondary level, as these trips are more difficult to monitor.

The Regional Transportation Commission's (RTC) *Regional Transportation Plan* (RTP) sets forth a blueprint for a system of bikeways in Washoe County. This *Bicycle and Pedestrian Master Plan* is part of the Regional Transportation Commission's (RTC) *Regional Transportation Plan* (RTP), which guides transportation investments in Reno, Sparks, and portions of Washoe County. This *Bicycle and Pedestrian Master Plan* is the official policy document addressing the development of bicycle and pedestrian facilities for transportation purposes in the Truckee Meadows.

The *Reno Sparks Bicycle and Pedestrian Master Plan* addresses the plan's relationship to other existing plans, goals and policies, existing conditions, bicycling and pedestrian needs, a recommended bicycle and pedestrian network, safety and education, future improvements, funding, and project prioritization.

This *Master Plan* was developed by Fehr & Peers, the RTC, the Bicycle/Pedestrian Advisory Committee (BPAC), the Project Technical Advisory Committee (TAC), Reno, Sparks, and Washoe County staff, and representatives from other local agencies. Fehr & Peers attended monthly BPAC meetings, held regular TAC meetings, and hosted two open house public workshops.

RELATIONSHIP TO OTHER PLANS AND CONSISTENCY

This *Bicycle and Pedestrian Master Plan* is consistent with existing plans and policies at the Federal, State, and local level.

Federal Policies

There are four key policy sources at the Federal level:

- The Safe, Accountable, Flexible, Efficient Transportation Equity Act - A Legacy for Users (SAFETEA-LU)
- The Federal Highway Administration's (FHWA) Joint Statement, *Accommodating Bicycle and Pedestrian Travel: A Recommended Approach*
- The American Association of State Highway and Transportation Official's (AASHTO) *Guide for the Development of Bicycle Facilities*
- The Americans with Disabilities Act (ADA)

SAFETEA-LU

SAFETEA-LU, passed in 2005, integrates bicycle and pedestrian travel into the mainstream transportation system. This builds on previous Federal transportation bills, beginning with the Intermodal Surface Transportation Efficiency Act (ISTEA), passed in 1991, and the Transportation Equity Act for the 21st Century (TEA-21), passed in 1998. The legislation asserts that bicycle and pedestrian facilities should offer a viable transportation choice while prioritizing the safety of all road users. SAFETEA-LU requires that bikeways and pedestrian walkways be included as the rule rather than the exception in all federally funded transportation projects. SAFETEA-LU also includes a Safe Routes to School program, which provides funding for safety and access projects that improve conditions for children walking or bicycling to school.

Accommodating Bicycle and Pedestrian Travel: A Recommended Approach

The Federal Highway Administration's Joint Statement, *Accommodating Bicycle and Pedestrian Travel: A Recommended Approach* offers a base for bicycle and pedestrian planning. The statement establishes an overall policy, as well as performance measures. The three key principles contained in the statement are as follows:

- Bicycling and walking facilities will be incorporated into all transportation projects unless exceptional circumstances exist
- Municipalities should use approaches to achieving policies that have worked elsewhere as a model
- Public agencies, professional associations, or advocacy groups should adopt several action items to improve the overall conditions for bicycling and walking

Guide for the Development of Bicycle Facilities

The AASHTO *Guide for the Development of Bicycle Facilities* offers design guidance for accommodating bicycle facilities into transportation projects. It is currently being revised and this plan considers proposed additions/changes to the *Guide*.

Manual on Uniform Traffic Control Devices

The *Manual on Uniform Traffic Control Devices* (MUTCD) is published by the FHWA, and defines the standards used by road managers nationwide to install and maintain traffic control devices on all public streets, highways, bikeways, and private roads open to public traffic.

Americans with Disabilities Act Title III

The Americans with Disabilities Act Title III is legislation enacted in 1990 that provides thorough civil liberties protections to individuals with disabilities with regard to employment, State and local government services, and access to public accommodations, transportation, and telecommunications. Title III of the Act requires places of public accommodation to be accessible and usable to all people, including those with disabilities. Public right-of-way, i.e. streets, are considered a public accommodations and facilities for disabled pedestrians must be provided wherever able-bodied facilities are provided.

State Plans and Policies

The Nevada Department of Transportation (NDOT) has developed the following plans and policies related to bicycle and pedestrian planning:

- Nevada Strategic Highway Safety Plan
- Nevada State Bicycle Plan
- Access Management Standards
- Road Design Guide
- Connecting Nevada – Planning Our Transportation Future

Nevada Strategic Highway Safety Plan

Nevada's Strategic Highway Safety Plan (SHSP)[1] is a statewide, comprehensive safety plan that provides a coordinated framework for reducing fatalities and serious injuries on all public roads. The SHSP strategically establishes statewide goals and critical emphasis areas developed in consultation with Federal, State, local, and private sector safety stakeholders. The plan was developed based on six guiding principles set forth by AASHTO and FHWA:

1. Comprehensive – In order to be highly effective at reducing crashes, SHSP's need to be comprehensive in nature and include strategies that address Enforcement, Education and Emergency Service, in addition to the more traditional Engineering improvements (the 4 Safety E's).
2. Systematic – The final list of safety strategies should be developed through a process that first identifies a universe of strategies and then screens the strategies through a series of filters so that the prioritized list directly links the improvements to the key factors that are contributing to high numbers of serious crashes.
3. Integrated – Most DOT's have focused the implementation of engineering type improvements along their system of State highways. To be more effective at reducing serious crashes, the guiding principles

[1] "Nevada Strategic Highway Safety Plan." September 2006. <http://www.drivesafenv.com/>

suggest that SHSP's need to be integrated across the entire system of roads and coordinated with all State and local agencies that have a hand in addressing public safety issues.

4. Stakeholder Involved – Representatives of each element of the 4 E's should be involved in the process of developing and screening the safety strategies because they could be a key partner in implementing the strategies.
5. Data Driven – SHSP's need to be driven by local crash data in order to ensure that the recommended improvement strategies are directly linked to the factors contributing to high frequencies of fatal and life changing injury crashes. Being able to access reliable and accurate data will help increase the overall effectiveness of the SHSP, increase the probability of directing resources to those strategies that will prevent the most crashes and assist in identifying those locations with the greatest needs.
6. Proactive – Most recent safety plans have been primarily focused on reacting to locations identified as having high crash frequencies. However, fatal and serious injury crashes are generally dispersed widely across the road system. Therefore, systems that rely strictly on crash frequency to select locations for improvement have no guarantee of being able to identify locations that have a high probability of having a life changing crash in the future. The guiding principles suggest that the most effective safety plans would include both a reactive component to deal with known locations with safety deficiencies and a proactive component to better address the random nature of serious crashes, especially those in rural areas.

In addition to these guiding principles, FHWA asked the states to address three key objectives: first set a safety goal, second identify a short list of the highest priority safety strategies and finally analyze your safety investment practices to determine the most effective way to achieve the adopted goal consistent with Federal regulations and State policies.

The safety goal and strategies of the Nevada Strategic Highway Safety Plan related to bicycles and pedestrians are presented in **Appendix A**.

Nevada State Bicycle Plan

The Nevada State Bicycle Plan[2] presents a "new approach to planning for the needs of bicyclists on the roads of Nevada, including State highways and local systems." The plan addresses two over-arching goals for the state in regards to bicycle planning, as well as more detailed goals and objectives to address planning, design, construction, education, enforcement, and encouragement. The plan "helps establish direction for NDOT's bicycle policy, and establishes a broader planning framework for local jurisdictions to follow in the development of municipal, County, and regional bicycle plans."

The two primary goals of the Nevada State Bicycle Plan include increasing levels of bicycling throughout Nevada, and reducing crashes involving bicyclists and motor vehicles.

State Bicycle Plan Vision

To provide Nevada's residents and visitors the choice of traveling to their destinations by bicycle by providing new and improved and well-maintained transportation facilities that conveniently and efficiently accommodate bicyclists in a suitable environment.

[2] "Nevada State Bicycle Plan." September 2004. <http://www.bicyclenevada.com/bikeplan03.htm>

Access Management Standards and Road Design Guide

The NDOT *Access Management System and Standards*[3] and NDOT *Road Design Guide*[4] provide basic design standards, policies, and procedures for implementing and constructing bicycle and pedestrian facilities within the State of Nevada. Nevada's access management standards and design guidelines are consistent with AASHTO design guidelines.

Connecting Nevada – Planning Our Transportation Future

The Connecting Nevada Plan[5] is a comprehensive statewide multi-modal planning effort with the goal of improving communication and coordination among partner agencies, geographic areas, and planning efforts. The intent of the Connecting Nevada Plan is to develop an umbrella framework that coordinates and integrates the results of the multitude of planning efforts into a unified, consistent vision. Through this plan, the individual goals of various studies, focus areas, and State, regional, and local plans can be synchronized into a concise set of larger, multi-modal transportation goals. Furthermore, the Connecting Nevada Plan provides a broad structure for previous ideas to be reconsidered under changed conditions. The intent is not to replace existing plans, studies, or processes but to enhance their effect across the transportation planning spectrum.

The primary purpose of the Connecting Nevada Plan is to identify and preserve priority right-of-way corridors throughout the State. This effort is envisioned to be achieved as part of a larger, integrated planning effort with the meaningful participation of Nevada's major transportation agencies and stakeholders.

Regional and Local Plans and Policies

- Washoe County Regional Transportation Plan
- Washoe County Master Plan
- City of Reno Master Plan
- City of Sparks Master Plan
- Truckee Meadows Regional Plan

Regional Transportation Plan

The RTC's *Regional Transportation Plan (RTP)*[6] has six overall goals to help guide the development of future transportation improvements in Washoe County. The overall goals promote multi-modal transportation and generally encourage a reduction of personal automobile use.

[3] Nevada Department of Transportation. "Access Management System and Standards." July 1999. <http://www.nevadadot.com/uploadedFiles/TrafEng_AccesMgtSysStandards.pdf>

[4] Nevada Department of Transportation. "Road Design Guide." 2010. <http://www.nevadadot.com/uploadedFiles/2010_DesignGuide.pdf>

[5] Nevada Department of Transportation. "Connecting Nevada – Planning Our Transportation Future." September 2009. <http://www.nevadadot.com/Documents/Public_Involvement/Statewide_Transportation_Planning.aspx>

[6] Regional Transportation Commission of Washoe County. "Regional Transportation Plan." July 2009. <http://rtcwashoe.com/planning-7>

Goal 1 - Provide for and sustain a mix of transportation modes that can meet the continuing needs for personal mobility and for the movement of goods consistent with regional goals and values.

Goal 2 - Comprehensively plan for all regionally significant modes of transportation and insure their interconnection. Coordinate with all other jurisdictions that either influence or are affected by regional transportation planning efforts.

Goal 3 - Develop a balanced land-use and transportation system that minimizes the need for automobile travel and maximizes the opportunity for transportation alternatives such as public transportation and non-motorized travel modes.

Goal 4 - Maintain, upgrade or develop existing and future transportation systems as a public service in a way that renders them safe, functional, flexible, environmentally acceptable and aesthetically pleasing.

Goal 5 - Manage the transportation system to provide an optimum level of mobility for the greatest number of persons while insuring mobility for the transportation disadvantaged.

Goal 6 - Improve safety in all transportation modes through timely maintenance of existing infrastructure, development of new infrastructure, enforcement of access controls and expanded public education and awareness.

To accomplish these goals the RTP is divided into six elements, each of which includes supporting objectives and policies. The *Reno Sparks Bicycle and Pedestrian Master Plan* is intended as the Bicycle and Pedestrian Element of the RTP. In addition, the Streets and Highways, the Public Transportation, and the Transportation Management/Intelligent Transportation Systems (ITS) Elements also provide guidance related to bicycle and pedestrian planning in Washoe County.

Streets and Highways Element

Policy 3 - Street and highway planning, design and traffic operations shall incorporate efficiency, effectiveness and safety for all modes.

Public Transportation Element

The Public Transportation Element policies cover the areas related to provision of service, quality of service, accessibility, cost issues/financial, and project development issues. The following policies relate to bicycle and pedestrian planning:

Quality of Service

Policy 9 - Allow bicycles on transit where feasible.

Accessibility

Policy 3 - RTC, in cooperation with local governments, shall ensure that pedestrian crosswalks are provided at bus stops consistent with traffic conditions and accepted safety design practices.

Transportation Management/Intelligent Transportation Systems (ITS) Element

The Transportation Management/Intelligent Transportation Systems (ITS) Element policies cover the areas related to transportation system management (TSM), transportation demand management (TDM), and intelligent transportation systems (ITS). The following policies relate to bicycle and pedestrian planning:

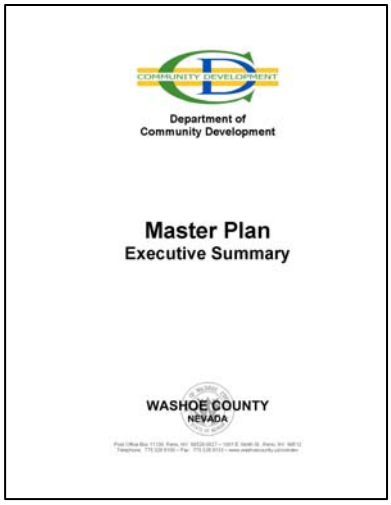
Policy 6 (TSM) - Construct sidewalks and bike lanes in accordance with the RTP bicycle and pedestrian elements whenever roads are constructed, reconstructed or rehabilitated where appropriate.

Policy 9 (TDM) - Encourage transit-oriented development (TOD) and/or planned unit development (PUD) with standards and features to promote the use of alternative modes of travel.

Policy 11 (TDM) - Encourage biking and walking to work to reduce system demand in the peak hours. Promote education for motorists, pedestrians and bicyclists to teach them to safely coexist.

Washoe County Master Plan

The *Washoe County Master Plan* contains seven elements and 13 area plans, and serves as guide to growth and development through goals, policies and action programs that address countywide issues and concerns. The goals related to bicycle and pedestrian planning are provided below. The corresponding policies and action programs for each goal are provided in **Appendix A**.



Conservation Element[7]

Goal 16: Develop a green space network.

Goal 22: Reduce mobile source emissions so that Washoe County air quality meets Federal, State and local ambient air standards for all pollutants.

Housing Element[8]

Goal 6: Promote Energy and Resource Efficiency.

Land Use and Transportation Element[9]

Land Use

Goal 1: Influence future development to abide by sustainable growth practices.

Goal 2: Standards ensure that land use patterns are compatible with suburban development and incorporate mixed-use.

[7] Washoe County Department of Community Development. "Master Plan Conservation Element." September 2010. <http://www.co.washoe.nv.us/comdev/planning_docs>

[8] Washoe County Department of Community Development. "Comprehensive Plan Housing Element." April 2008. <http://www.co.washoe.nv.us/comdev/planning_docs>

[9] Washoe County Department of Community Development. "Master Plan Land Use and Transportation Element." September 2010. <http://www.co.washoe.nv.us/comdev/planning_docs>

Goal 4: Land use patterns allow for a range of housing choices and interconnected streets.

Goal 5: Development occurs where infrastructure is available.

Goal 9: Natural resources are highly valued.

Goal 13: Washoe County should ensure appropriate resource management of open space designated areas.

Goal 14: Washoe County will, to the extent possible, create a cohesive interconnected trail network.

Community Design

Goal 17: Future plans should begin to move away from traditional codes and begin to create and implement form-based codes and other sustainable design practices.

Goal 18: Suburban communities and neighborhoods, through design, will provide a safe and healthy environment.

Goal 19: Incentives to promote more sustainable development.

Goal 22: Parking lots should be designed for everyday use and promote the utilization of other modes of transportation.

Transportation

Goal 29: Transportation systems are seamless and efficient.

Goal 30: Transportation systems reduce dependence on automobile.

Goal 31: Washoe County shall create a multi-modal corridor along Sun Valley Boulevard to provide travel access to connect with the regional transportation system.

Public Services and Facilities Element[10]

Parks and Recreation

PSF.8.4 Develop a phased regional trail system with access from major population areas and access to regional parks, special use facilities, and public lands.

PSF.8.5 Develop a phased bicycle system plan.

Area Plans

The Area Plans of the *Washoe County Master Plan* focus on the following planning areas of the county, and provide more detail regarding planning policies and action programs for those areas.

- Cold Springs
- Spanish Springs

[10] Washoe County Department of Community Development. "Master Plan Public Service and Facilities Element." September 2010. <http://www.co.washoe.nv.us/comdev/planning_docs>

- Forest
- High Desert
- North Valleys
- South Valleys
- Southeast Truckee Meadows
- Southwest Truckee Meadows
- Sun Valley
- Tahoe
- Truckee Canyon
- Verdi
- Warm Springs

City of Reno Master Plan

The *City of Reno Master Plan* includes Citywide Plans, which cover the City and its sphere of influence, Center and Corridor Plans for regional centers and transit oriented development (TOD) corridors, and Neighborhood Plans.

The Citywide Plans include a Policy Plan[11] which provides goals, policies, and objectives related to planning within the City of Reno. The policies section of the Policy Plan is divided into five sections: Region, Neighborhood, and Housing; Cultural Resources and the Environment; Public Services, Facilities, and Infrastructure; Civic Services and Participation; and Urban Design. A summary of each section's policies related to bicycle and pedestrian planning is provided below. A full description of each policy is provided in **Appendix A**.

Region, Neighborhood, and Housing

Urban Core

The Urban Core policies encourage the City to provide a safe, clean, and inviting atmosphere for pedestrians in the downtown, center, and corridor areas. Development of pedestrian friendly treatments is encouraged.

Housing

New housing developments are encouraged to provide pedestrian, bicycle, and transit access to facilitate the reduction of automobile use, where possible.

Cultural Resources and the Environment

Open Space and Greenways

The Open Space and Greenways policies encourage the development of a well-connected, user friendly, non-motorized transportation network that provides amenities where appropriate. The policies encourage active planning of a regional trail/bikeway system.

[11] City of Reno. "The City of Reno Master Plan Policy Plan." 16 July 2008. < http://www.reno.gov/Index.aspx?page=755>

Public Services, Facilities, and Infrastructure

Transportation

The Transportation policies encourage coordination between jurisdictions to support the development of well designed bicycle and pedestrian network in an effort to reduce vehicle trips.

Streets, Parking and Access

The Streets, Parking and Access policies emphasize the importance of safety when planning bicycle and pedestrian facilities.

Schools

New housing developments are encouraged to accommodate design standards that reflect direct and convenient access to public schools. The City should encourage all school sites to be located next to parks and recreation areas and middle and high school locations near public transportation routes and major bikeways.

Urban Design

Community Development

The Community Development policies encourage infill development and mixed use developments to support the use of alternative modes of transportation. New developments should include the provision of bicycle and pedestrian facilities.

Site Design

New subdivisions, planned unit developments, commercial uses, and office spaces are encouraged to provide safe pedestrian walkways and bicycle facilities that provide direct links between streets and major destinations.

City of Sparks Master Plan

The *City of Sparks Master Plan* was in the update process at the time of this document's publication. The goals and policies presented in this section are in draft form and may differ from the final goals and policies presented in the *Final City of Sparks Master Plan*. The *Master Plan* goals are provided below, and the corresponding policies are provided in **Appendix A**.

Chapter 5: A Connected City

Goal CC1: Foster the Concept of Moving People - Goal CC1 sets the ground work for future circulation decisions to consider the transport of people, not just moving vehicles from one point to another. This goal's intent is to change the decision-making so that all users of streets are considered when planning, designing, building and operating roadways.

Goal CC2: Promote Design That Facilitates Multi-Modal Transportation - The transportation system needs to facilitate efficient travel while promoting a variety of motorized and non-motorized modes. Goal CC2 calls for

the City to develop an integrated multi-modal transportation system. This goal differs from Goal CC1 in that its intent is to change the construction and implementation process.

Goal CC3: Coordinate Land Use and Circulation Decisions to Promote Alternative Modes of Transportation - The intent of Goal CC3 is to ensure coordination between transportation agencies and other departments within the City for the promotion of an alternative transportation system. Coordination will ensure that all modes of transportation are considered when designing and improving the transportation network.

Goal CC4: Develop a City-Wide Multi-Use Pathway System - Goal CC4 emphasizes the importance of a City-wide, connected multi-use pathway/network. In order to complete the pathway system, an inventory must be done and the improvements prioritized.

Truckee Meadows Regional Plan

The Truckee Meadows Regional Plan provides a blueprint for development in Washoe County over the next 20 years. The geographic focus of the plan is on the southern 15% of the County. The plan addresses the regional form and pattern, management of our natural resources, provision of infrastructure and services, and plan implementation strategies. The goals related to bicycle and pedestrian planning are provided below. The corresponding policies for each goal are provided in **Appendix A**.

Module 1 – Regional Form and Pattern

Goal 1.2 - Local government and affected entity master plans, facilities plans and other similar plans will provide for the necessary resources, services and infrastructure to support the densities summarized in Table 1.2.1 of the Regional Plan (Visit tmrpa.org for a copy of the Truckee Meadows Regional Plan and table 1.2.1).

Module 2 – Management of the Region's Natural Resources

Goal 2.1 - To better coordinate natural resource management, local governments will prepare integrated plans to address natural resources in the region, in consultation with the community and key stakeholders.

Goal 2.4 - The Regional Plan encourages Washoe County, through coordination with local, State, Federal, tribal, and private partners, to secure funding to implement the regional open space plan, and requires local governments to revise their master plans to establish a coordinated network of open space and greenways, wherever possible, that links urbanized areas, public facilities including schools, recreation opportunities, and surrounding public lands.

Module 4 – Regional Plan Implementation

Goal 4.1 - The Regional Planning Commission (RPC) will review the master plans, facilities plans, and other similar plans of local governments and affected entities. These plans will be revised in accordance with policies set forth in the adopted Regional Plan, in order to conform with the regional form and pattern and all applicable goals and policies.

Development Code

The City of Reno, City of Sparks, and Washoe County each have their own separate development codes. **Appendix A** includes a summary of the development code for each entity related to bicycle and pedestrian facilities. The City of Reno, City of Sparks, and Washoe County should coordinate their respective development codes to make the transition between municipalities as seamless as possible.

The three jurisdictions should modify their codes to require sidewalk on both sides of all regional roads.

Code of Ordinances

The City of Reno, City of Sparks, and Washoe County each have their own separate code of ordinances. A table is provided in **Appendix B** that compares the three codes and provides recommendations to unify the codes between the three jurisdictions.

2. PUBLIC OUTREACH

Public outreach is an important component of the *Reno Sparks Bicycle and Pedestrian Master Plan*. Fehr & Peers and the RTC solicited public input on the existing bicycle and pedestrian network, potential bikeways, desired intersection treatments, and the types of support facilities or programs needed to improve walking and bicycling in the Reno Sparks region. The planning process included coordination with the Bicycle and Pedestrian Advisory Committee (BPAC) and the Technical Advisory Committee (TAC), as well as public outreach activities and utilization of social media outlets.

COMMITTEE COORDINATION AND MEETINGS

As part of the public outreach component of the *Master Plan*, Fehr & Peers attended numerous meetings to promote the project and enlist public feedback.

Bicycle/Pedestrian Advisory Committee (BPAC)

The Bicycle/Pedestrian Advisory Committee (BPAC) was formed in April 2008 at the request of the RTC Board of Commissioners to promote bicycle and pedestrian planning and livability through the implementation of a well-connected network of bicycle and pedestrian facilities. The BPAC consists of 12 voting members and one ex officio non-voting member, each appointed by the RTC Board of Commissioners.

The BPAC was consulted regularly regarding the progress of the plan and to ensure community participation in the project. Fehr & Peers attended the following BPAC meetings during the development of the *Reno Sparks Bicycle and Pedestrian Plan*:

- April 28, 2010
- May 26, 2010
- June 23, 2010
- July 28, 2010
- August 25, 2010
- September 22, 2010
- October 27, 2010
- December 8, 2010
- January 26, 2011
- February 23, 2011
- March 23, 2011

Project Technical Advisory Committee (TAC)

The Project Technical Advisory Committee (TAC) includes members from the Regional Transportation Commission, City of Reno, City of Sparks, Washoe County, University of Nevada, Reno, Nevada Department of Transportation, Washoe County School District Police Department, Nevada Department of Public Safety, and the Bicycle/Pedestrian Advisory Committee. Regular TAC meetings were held to discuss the progress of the plan and obtain input on the various components. Meetings were held on the following dates:

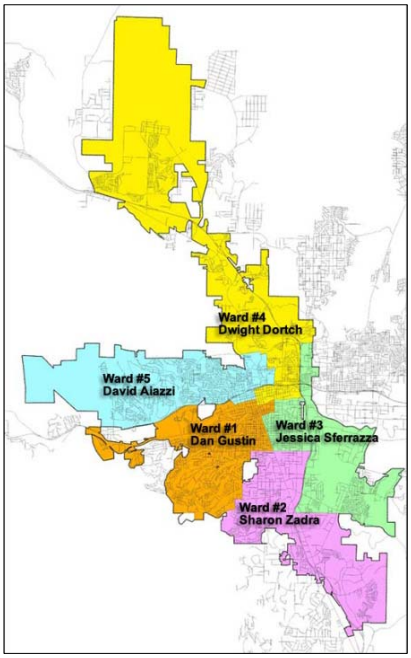
- July 13, 2010
- December 7, 2010

- August 10, 2010
- September 21, 2010
- January 25, 2011

Neighborhood Advisory Board

Fehr & Peers and the RTC presented the *Reno Sparks Bicycle and Pedestrian Plan* project at the following City of Reno Neighborhood Advisory Board meetings:

- Ward 1 Southwest Reno – September 14, 2010
- Ward 2 Central & Ward 2 South Reno (combined meeting) – August 5, 2010
- Ward 3 East Reno – August 26, 2010
- Ward 4 North Valleys – August 16, 2010
- Ward 4 Northeast – September 13, 2010
- Ward 5 Old Northwest – June 10, 2010; September 9, 2010
- Ward 5 Northwest – July 15, 2010



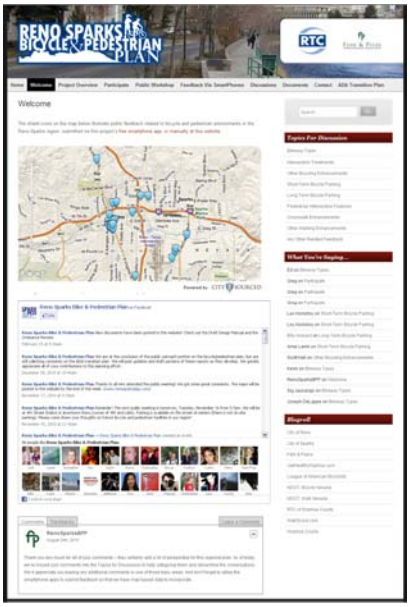
Ward 5 Old Northwest was visited twice because they asked for a second meeting to provide a mini public workshop with maps to draw their desired facilities and where they would like to see improvements.

PROJECT MEDIA

Web Page

A project website, *renosparksbpp.com*, was created to keep the public informed on the progress of the project and give people an opportunity to leave comments and suggestions about the bicycle and pedestrian network. A library of information was housed on the website including the project schedule and announcements of upcoming events, sample documents of *Bicycle and Pedestrian Master Plan's* from other areas, draft materials such as the Existing and Proposed Facilities maps and the *Draft Design Best Practices*, and discussion forums where people could leave comments related to the project. The project website also included a map of georeferenced comments submitted via the smartphone app created for the project. A widget was included on the Home page linking the project's Facebook page directly to the renosparksbpp.com website.

The website received approximately 75 comments, all of which were recorded and considered for incorporation into the plan. A list of the comments received via the website is provided in **Appendix C**.



www.renosparksbpp.com

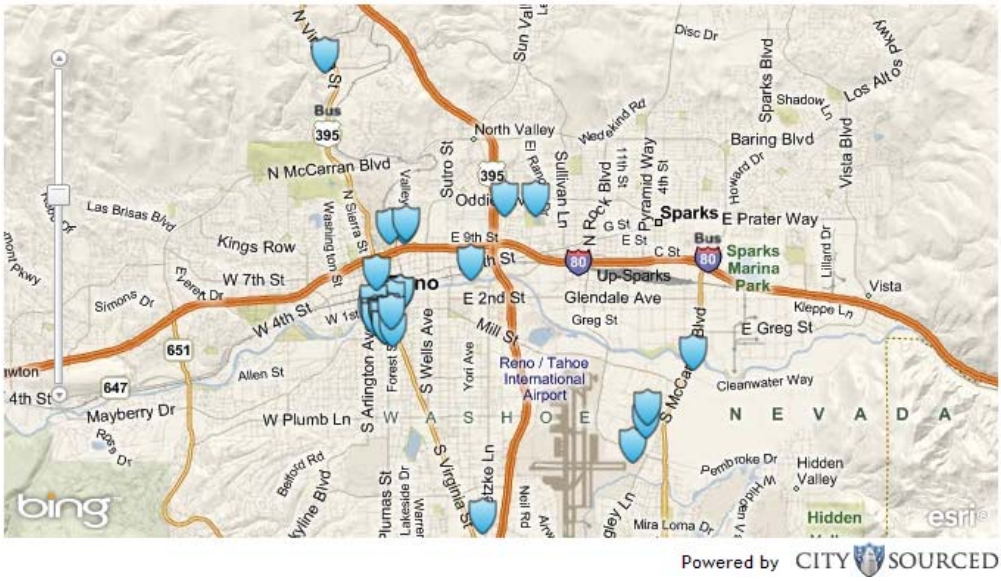
Facebook and Twitter

A Facebook page was created for the project to disseminate information to the public. Postings included event announcements, requests for comments, and regular updates on the status of project. The *Reno Sparks Bicycle and Pedestrian Plan* Facebook page acquired approximately 85 fans during the planning process.

A Twitter page was also created and linked to the Facebook page as another outlet for providing information about the project.

Smartphone App

Fehr & Peers partnered with CitySourced to create a smartphone app to solicit public comments for the project. The app was created for iPhone, Blackberry, and Android users, and also included a web-based application for those without a smartphone. The app allowed users to report issues on the bicycle and pedestrian network using the camera on their phone. The user would take a picture of the issue they wanted to report and then select from a drop-down menu of options, e.g. "Damaged Sidewalk," "It Feels Safe to Bike Here," or "Needs Bike Parking." The user could also leave a specific comment related to the issue. Comments submitted through the app were uploaded to the map shown in the figure below using the global positioning system (GPS) in the phone to pinpoint the exact location of the reported issue. Each shield on the map below represents a submitted comment. Approximately 50 comments were received through the smartphone app.



Smartphone App

OPEN HOUSE PUBLIC WORKSHOPS

Two Open House Public Workshops were hosted to provide the walking and bicycling public an opportunity to give comments and feedback on the facilities they enjoy and what they would like to see more of in the future. The first workshop was hosted July 29, 2010 at Centennial Plaza Transit Station in Sparks. The second workshop was held November 16, 2010 at 4th Street Station in Reno.

July 2010 Public Workshop

The main goal of the July public workshop was to get public feedback on what people like about the existing bicycle and pedestrian facilities in the Reno Sparks area, and where they would like to see additional facilities and improvements in the future.

Large scale maps of existing bicycle facilities in North Reno, South Reno, and Sparks were displayed for participants to draw on. Participants were asked to make notes about the existing bicycle and pedestrian facilities, including what they like about the facility and what can be improved. Participants were also asked to draw where they would like to see future facilities constructed.

Note cards were also provided with the following questions:

- What makes a great walking and bicycling system?
- Where do you like to walk or bike in the Reno Sparks area? What do you like about it?
- Other Comments.

Additionally, informational posters were displayed with examples of different bicycle and pedestrian facilities and features including:

- Bikeway Types – Shared Use Paths, Bicycle Lanes, Shared Roadways
- Other Bicycling Enhancements – Bicycle Boulevards, Road Diets[12], Sharrows, Pavement Markings & Signs
- Long Term Bicycle Parking – Bicycle Lockers, Bicycle Cages, Indoor Storage
- Pedestrian Intersection Features – Crosswalks, Push Buttons, Curb Ramps, Countdown Timers
- Other Walking Enhancements – Advanced Stop Bars, Advanced Yield Lines, Pedestrian Scramble, Reduced Corner Radius

Three informational posters were also provided that gave participants the opportunity to vote for their favorite features:

- Intersection Treatments – Bicycle Loop Detectors, Bicycle Push Buttons, Bicycle Path Intersections, Bicycle Boxes

Comments Cards

What makes a great walking and bicycling system?

"Connectivity"

"Well Maintained"

Where do you like to walk or bike in the Reno Sparks area? What do you like about it?

"California Avenue – I like the urban feel and window shopping"

Other Comments:

"The new bike lanes on California Avenue are great!"

"Make education of all users an important component, slower traffic"

Participants drew their "dream routes" on maps of Reno and Sparks.

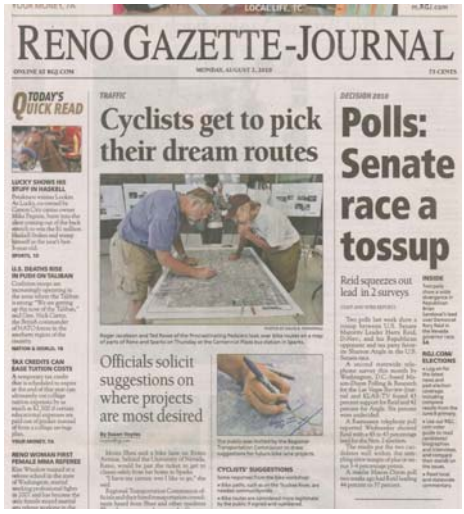
[12] Road Diets, or Road Conversions, include reducing the number of vehicle travel lanes on roadway and adding bicycles lanes. Typically a road conversion changes a roadway with two travel lanes in each direction to one travel lane in each direction with a two-way left-turn lane and bicycle lanes.

- Short Term Bicycle Parking – Inverted U, Bicycle Hitch Rack, Swerve Rack, Lightning Rack
- Crosswalk Enhancements – Bulbouts and Refuge Islands, Enhanced Striping, Warning Lighting, Pedestrian Signal

Advertising

To encourage participation at the public workshop, numerous advertising methods were used to publicize the event.

- Flyers, comment cards, and project business cards were delivered to local bicycle shops in Reno and Sparks.
- The Reno Gazette Journal interviewed project managers Marchon Miller (RTC) and Katy Cole (Fehr & Peers) and wrote an article reporting on the plan and inviting people to attend the public workshop.
- The Event was posted on the Reno News & Review and Business Weekly website calendars.
- 50 flyers were delivered to the RTC to post on their buses.
- An email blast was sent to the local bicycle clubs.
- The event was posted on the Facebook and Twitter pages.


RENO GAZETTE-JOURNAL

TODAY'S QUICK READ

Cyclists get to pick their dream routes

Polls: Senate race a tossup

Reid squeezes out lead in 2 surveys

Officials solicit suggestions on where projects are most desired

Post Workshop Articles

The Reno Gazette Journal (RGJ) and the Reno News & Review (RNR) wrote post public workshop articles related to the *Reno Sparks Bicycle and Pedestrian Plan*. The RGJ article, titled "Cyclists get to pick their dream routes," covered the July public workshop and the most popular comments left by attendees. Among the most desired routes were a connection between downtown Reno and downtown Sparks and better facilities around UNR.


Life, cycle!

A RNR article, titled "Life, cycle!" highlighted recent road rehabilitation projects that included a reduction in vehicle travel lanes and the addition of bicycle lanes. The article addressed the *Reno Sparks Bicycle and Pedestrian Plan* and provided information about the project website, smartphone app, and Facebook and Twitter pages. Readers were encouraged to provide comments related to existing and future bicycle and pedestrian facilities.

November 2010 Public Workshop

As a follow up to the public workshop held in July, a second workshop was held in November to present the Future Facilities maps developed based on comments and feedback received from the public via the project website, comment cards, the smartphone app, Facebook and Twitter, and the July public workshop. The main goal of the November public workshop was to confirm and prioritize the proposed future facilities.

Large scale maps of the existing and future bicycle facilities in North Reno, South Reno, and Sparks were displayed and participants were asked to put stickers on their top three choices.

Advertising

To encourage participation at the public workshop, numerous advertising methods were used to publicize the event.

- Flyers were delivered to local bicycle shops in Reno and Sparks
- An email blast was sent to the local bicycle clubs (approximately 70 recipients)
- The event was posted on the Facebook and Twitter pages

3. GOALS AND POLICIES

A vision statement provides the inspiration and framework for strategic planning. Goals are broad statements of purpose, and policies provide the course of action to achieve the goals.

This *Bicycle and Pedestrian Plan* contains goals and policies for developing and implementing a bicycle and pedestrian system that can be broken down into three general categories:

- Provide a viable transportation alternative to the automobile and thus improve transportation choices for residents of the Truckee Meadows
- Improve safety for bicyclists and pedestrians
- Provide residents with access to a connected system of sidewalks and bicycle facilities to encourage walking and bicycling for health and recreation.

The goals provide the foundation for the community's long-term vision for developing a regional bicycle and pedestrian network that is safe and accessible for all users.

VISION STATEMENT

To support walking and bicycling, the Region will have an integrated system of safe, convenient, and comfortable bicycle, pedestrian, and other non-motorized facilities that provide access to schools, jobs, shopping, neighborhoods, community facilities, parks and regional trails.

GOALS AND POLICIES

The Regional bicycle and pedestrian goals and policies are:

Goal 1: Support walking and bicycling and the development of a comprehensive bicycle and pedestrian transportation network that connects to other transportation modes, meets the needs of all users, and creates a viable alternative to the automobile in order to increase the number of people bicycling and walking to work to 10 percent[13] by 2040.

Policies:

1.1 Report bicycle and pedestrian commute mode split using US Census Bureau American Community Survey 3-year Estimates annually.[14]

1.2 Increase bicycle facility miles by at least 15 miles per year. Increase pedestrian facility miles by at least 5 miles per year.

[13] Based on 2009 US Census data, the current percentage of people bicycling and walking to work is 3.4 percent.

[14] The US Census Bureau's American Community Survey collects population and housing information every year for a cross-section of the population. The American Community Survey data is provided annually as a single year estimate, 3-year estimate, or 5-year estimate. For example the current 3-year estimate includes survey data collected in 2009, 2008, and 2007. The information is provided at www.factfinder.census.gov at the American Community Survey link. Bicycle and pedestrian commute mode split should be reported for the designated Reno-Sparks, NV Metro Area and can be found using American Community Survey Table *B08301.Means of Transportation to Work*.

1.3 Develop a bicycle parking installation program to provide bicycle parking within public or private right of way. Install at least 20 bicycle parking racks per year.

1.4 Update the *Bicycle and Pedestrian Master Plan* every five years along with project priorities and cost estimates.

1.5 Update the bicycle map showing bicycle facilities for public distribution both in print and via the RTC's website biannually.

1.6 Conduct bicycle and pedestrian counts and surveys whenever vehicle counts are conducted as part of public agency projects to gauge the effectiveness of improvements and programs.

1.7 Collaborate with other jurisdictions within the Region to create inter-jurisdictional facilities by utilizing regional bicycle/pedestrian design guidelines.

1.8 Develop a bicycle network that serves both the experienced and casual cyclist.

1.9 Install bicycle-sensitive loop detectors with bicycle stencils (or other detector type) on bicycle facilities as part of new signals, signal upgrades, and resurfacing/restriping projects.

1.10 Provide sidewalks on both sides of regional roadways where feasible.

1.11 Insure mobility for the transportation disadvantaged by providing accessible, universal design and ensuring that all transportation investments are socially equitable and take into account the needs of all users.

Goal 2: Maintain the aesthetic appeal, cleanliness, and functionality of the existing infrastructure with regular ongoing maintenance, as well as major rehabilitation efforts.

Policies:

2.1 Include bicycle and pedestrian upgrades in roadway rehabilitation projects where appropriate.

2.2 Encourage partner agencies to regularly sweep bicycle facilities (at least twice per year) and remove snow within 24-hours of a major snow event (6 inches of snow or more).

2.3 Encourage partner agencies to remove snow from sidewalks within ¼ mile of a transit stop within 24-hours of a major snow event (6 inches of snow or more).

2.4 Re-apply bicycle lane and sharrow pavement legends biannually.

2.5 Maintain crosswalk markings on regional roadways biannually.

2.6 Remove sidewalk barriers as appropriate with major rehabilitation efforts.

2.7 Consider bicyclists and pedestrians when designing temporary traffic control plans for constructions zones.

Goal 3: Develop and implement an education and enforcement program that will reduce the number of bicycle and pedestrian collisions each year with the ultimate goal of zero collisions.

Policies:

3.1 Implement goals, policies, and programs outlined in the Strategic Highway Safety Plan.

3.2 Monitor and record bicycle and pedestrian related collisions. Conduct counts at crash locations and identify safety countermeasures. Recommend and implement safety improvements on an annual basis.

Goal 4: Maximize the amount of State and Federal funding for bicycle and pedestrian transportation improvements for which Reno, Sparks, and Washoe County are eligible by identifying and aggressively pursuing grants each year, and by including bicycle and pedestrian improvements in all transportation projects.

Policies:

4.1 Pursue and achieve Bicycle Friendly Community status, an awards program by the League of American Bicyclists that recognizes municipalities that actively support bicycling.

4.2 Identify State and Federal funding programs along with specific funding requirements. Review the programs, requirements, and deadlines on an annual basis.

4.3 Prepare joint funding applications where appropriate to maximize funding opportunities.

Goal 5: Develop a well connected bicycle and pedestrian network that integrates with public transportation.

Policies:

5.1 Prioritize ADA compliant sidewalks on streets within ¼ mile of transit stops.

5.2 Ensure that the bicycle system serves transit stops and stations.

5.3 All buses should provide at least two onboard bicycle racks

Goal 6: Encourage project sponsors to consider the needs of bicyclists and pedestrians when designing, reviewing, and approving all development and transportation projects and accommodate those needs, whenever possible.

Policies:

6.1 Require traffic impact studies to include a discussion on existing bicycle and pedestrian facilities, bicycle and pedestrian counts, potential impacts to the system, and facilities needed to serve the proposed project. The discussion should include information about the project's proximity to transit and demonstrate an appropriate pedestrian facility connecting the land use to the transit.

6.2 Require traffic impact studies to include a discussion on existing bicycle and pedestrian facilities, potential impacts to the system, and facilities needed to serve the proposed project. The discussion should include information about the project's proximity to transit and demonstrate an appropriate pedestrian facility connecting the land use to the transit stop.

6.3 Projects should provide bicycle parking consistent with bicycle parking standards provided in the most current edition of *Bicycle Parking Guidelines* (Association of Pedestrian and Bicycle Professionals).

BENCHMARKING

An important aspect of developing goals and policies is to track their progress and understand how the region compares with other cities and regions.

A common term used to describe the demand for bicycle and pedestrian facilities is "mode split." Mode split refers to the form of transportation a person chooses to take, such as walking, bicycling, public transit, or driving. Mode split is often used in evaluating commuter alternatives such as bicycling and walking, where the objective is to increase the percentage of people selecting an alternative means of transportation to the single occupant automobile. Understanding why people travel from one place to the next is important when analyzing their primary mode of transportation. Trips are generally split into three categories: commute trips, shopping trips/errands, and recreational trips. **Table 1** presents 1990, 2000, and 2009 Census data for the journey-to-work mode split (commute trips) for Washoe County.

TABLE 1
JOURNEY-TO-WORK MODE SPLIT FOR WASHOE COUNTY

Mode (Home-Based Work Trips)	1990	2000	2009
Drive Alone	74.4%	75.3%	76.7%
Carpool	13.5%	13.8%	11.0%
Public Transit	3.7%	3.2%	3.2%
Bicycling	0.7%	0.7%	0.6%
Walking	4.2%	3.2%	2.8%
Other Means	1.1%	0.9%	1.6%
Work at Home	2.4%	2.9%	3.9%

Source: 1990, 2000, and 2009 U.S. Census

As shown in Table 1, between 1999 and 2009 bicycle trips have remained relatively constant representing approximately 0.6% of home-based work trips in Washoe County. Walking home-based work trips have decreased by 1.4% from 1990 to 2009. This should not be misinterpreted as the bicycle and pedestrian mode share of all trips for several reasons:

- Journey-to-work data only represents commute trips, which tend to be longer than shopping, school, recreation, and other trips, and are therefore less compatible with bicycling and walking.
- No separate accounting of shopping, school, or recreational trips is made in the Census; these trips make up more than half of the trips a person makes on a typical weekday and a significantly greater proportion on the weekend. These trips also tend to be short to medium in length and are therefore very well suited for bicycling and walking.
- Census journey-to-work data does not capture people who commute by bicycle or walking one or two days per week. The data only represents people who bicycle or walk for "the majority" of their commute days.

- Journey-to-work data does not account for commuters with multiple modes of travel to and from work, such as commuters that ride a bicycle to a bus station and then transfer to transit for the remainder of their journey to work.

- Journey-to-work reports information for adult work trips, but does not request data on school trips, which are much more likely to be bicycling trips because school-aged individuals cannot drive until the latter half of their high school years.

Since school trips, recreation trips and other non-work related trips are not counted by the Census, it is safe to say that the overall bicycle mode split is higher than 0.6%. According to the 2000 Census, there are 132,084 households in Washoe County. Assuming approximately nine daily person trips per household, there are a total of approximately 1,188,756 person trips per day in Washoe County, of which approximately 7,132 each day are by bicycle (assuming an overall bicycle mode share of 0.6%), and approximately 33,285 are by walking. Of course, as the County grows, the number of potential walking and bicycling trips should increase.

Future bicycle and pedestrian trips will depend on a number of factors such as the availability of well-connected facilities, and location, density, and type of future land development. With appropriate bicycle and pedestrian facilities in place and implementation of employee trip reduction programs, the walking and bicycle mode split could increase above its current rate. Based on the 2000 population, tripling the current bicycle mode split (to 1.8% for Census journey to work trips) would result in approximately 21,400 bicycle trips daily. Tripling the current walking mode split (to 8.4% for Census journey to work trips) would result in approximately 99,900 walking trips daily. This would increase the number of people bicycling and walking to work to 10 percent, meeting Goal 1 of this plan.

Table 2 shows commute mode split information from other cities throughout the U.S.

TABLE 2
BICYCLE & PEDESTRIAN STATISTICS FOR RENO-SPARKS AND OTHER COMPARABLE REGIONS

Location	Population[1]	2009 Bicycle to Work Percentage[2]	2009 Walk to Work Percentage[2]
Fresno, California	494,655	0.7%	2.0%
Redding, California	89,861	0.7%	1.7%
Sacramento, California	466,488	2.2%	3.3%
San Francisco, California	805,235	2.8%	10.0%
Boulder City, Colorado	97,385	10.8%	9.4%
Denver, Colorado	600,158	1.8%	4.1%
Boise, Idaho	205,671	4.2%	2.6%
Henderson, Nevada	257,729	0.2%	1.4%
Las Vegas, Nevada	583,756	0.4%	2.0%
Reno-Sparks, Nevada	367,693	0.6%	2.8%
Portland, Oregon	583,776	5.5%	5.2%
Austin, Texas	790,390	1.2%	2%
Salt Lake City, Utah	186,440	2.2%	5.1%
Spokane, Washington	208,916	1.2%	3.2%

Sources:

[1] Population based on 2010 US Census

[2] The US Census Bureau's American Community Survey collects population and housing information every year for a cross-section of the population. The American Community Survey data is provided annually as a single year estimate, 3-year estimate, or 5-year estimate. For example the current 3-year estimate includes survey data collected in 2009, 2008, and 2007. The information is provided at www.factfinder.census.gov at the American Community Survey link.

As shown in the table, the Reno Sparks region has a current bicycle commute mode share of 0.6%, and a walking commute mode share of 2.8%. Comparing to the other cities provided in the table, the Reno Sparks region's bicycle commute mode share is less than all of the cities listed except for Las Vegas and Henderson. The walking commute mode share falls in the middle, with some other places having a smaller walk commute mode share and some having a higher percentage, but the Reno Sparks region compares favorably with other Nevada metro areas.

4. BICYCLE NETWORK

This *Bicycle and Pedestrian Plan* sets forth a blueprint for completing a system of bikeways and support facilities within the Truckee Meadows. The bicycle element of the plan builds upon existing facilities throughout the Reno Sparks area, focusing on access to major destinations, including employment areas, retail areas, schools, and parks. This plan also includes criteria for defining different types of bicycle facilities, a project list, and education and safety programs. Complete Design Standards for this region are provided in the ***Reno Sparks Bicycle and Pedestrian Design Best Practices***.

TYPES OF BIKEWAY FACILITIES

Bikeway planning and design in Nevada typically relies on the guidelines and design standards established by the AASHTO *Guide for the Development of Bicycle Facilities.* Local jurisdictions typically provide their own standards and design guidelines for their region. All jurisdictions in the region generally provide the three distinct types of bikeway facilities – Shared Use Paths, Bicycle Lanes, and Shared Roadways.

Shared Use Paths

Shared use paths are facilities located separate from the roadway, for the exclusive use of bicyclists and pedestrians, with minimal cross flow by motor vehicles. Shared use paths are typically located within open space corridors along creeks, beside or underneath high voltage power line corridors, within vacant rail corridors, along busy highways or freeways, or in community/city-wide parks.

Shared Use Path
Sparks Boulevard

Bicycle Lanes

Bicycle lanes are areas within the paved street that are identified with striping, stencils, and signs for semi-exclusive use by bicyclists. Vehicle cross flow is generally permitted at intersections and driveways. Bicycle lanes provide a significant benefit to safe and efficient bicycle circulation. Conflicts between bicycles and autos are reduced when on-street bicycle lanes are installed. Having separate identifiable areas on the street for bicycles and autos places the travelers in more predictable, and therefore safer, locations. Buffered bicycle lanes can be provided on roadways with sufficient width and provide cyclists with a greater sense of security, as they can travel further away from vehicle traffic. Climbing bicycle lanes can be used on streets with limited right-or-way and steep grades. The climbing bicycle lane is placed on the uphill travel lane and typically coupled with shared lane markings (explained in Shared Roadways section below) on the downhill travel lane. More detailed explanations of various bicycle lane designs are provided in the *Design Best Practices*.

Bicycle Lane
Military Road

Shared Roadways (Shared Lanes)

Shared roadways provide right-of-way for bicycles in the vehicle travel lane with signs and pavement markings designating the shared travel way. Examples of enhanced shared roadway facilities include sharrows, “Super

Sharrows", and bicycle boulevards. A Shared Lane Marking (or "Sharrow") can be marked in the outside lane of a shared roadway to show the suggested path of travel for bicyclists. This is often done when the route has on-street parking, in order to encourage cyclists to ride a safe distance away from the parked vehicles' "door zone." Sharrow markings can also be used at intersections with multiple turn lanes to show bicyclists the recommended lane for through travel. Sharrows also raise awareness for drivers that cyclists should be expected on the street and given sufficient room. A sign stating "Bicycle May Use Full Lane" is often included (but not required). "Super Sharrows," which are not approved by the MUTCD, are being used in some areas (e.g. Long Beach, California) with experimental status. They include colored pavement and sharrow markings in the shared lane to emphasize the presence of bicyclists in the roadway. A Bicycle Boulevard is another shared roadway treatment that can be used on low volume (preferably 500 to 3,500 ADT), low speed roadways. Bicycle Boulevards usually include traffic calming devices to discourage through vehicle traffic.

Bikeway Support Facilities

Bikeway support facilities can include short term and long term bicycle parking, shower and locker facilities, bicycle stations, and trailheads and staging areas. Bikeway support facilities are described in more detail in the Support Facilities section of this chapter.

BICYCLIST TYPES

Bicycle riders vary in experience, skill, ability, and confidence. The bikeway system including the type, location, and characteristics of the bicycle facilities must consider the needs of a broad range of cyclists in order to adequately serve both utilitarian and recreational user groups. This plan provides a connected network of facilities that provide access for casual and experienced cyclists.

AASHTO Categories

Specific categories of bicycle user types were established in the American Association of State Highway and Transportation Officials (AASHTO) *Guide for the Development of Bicycle Facilities*:

- Experienced and Confident - This group includes bicyclists who are comfortable riding on most types of bicycle facilities. This group also includes utilitarian and recreational riders of many ages who are confident enough to ride on busy roads when necessary to reach their destination, but often prefer to travel on low traffic residential streets or shared use paths. Such bicyclists may deviate from the most direct route to travel their preferred facility type. Experienced bicyclists may include commuters, long-distance road bicyclists, racers, and those who regularly participate in rides organized by bicycle clubs.

- Casual and Less Confident - This group includes a majority of the population, and includes people who enjoy bicycling occasionally but will only ride on paths or low traffic streets in favorable conditions. These people ride for recreation, often doing so with their family, and may drive from their house to a trailhead rather than bicycling. These individuals are interested in riding more but perceive significant barriers, particularly traffic safety. Some may need targeted encouragement to incorporate bicycling more regularly into their lives to include commuting or shopping trips. Others in this category may ride on a regular basis, but do so primarily because they have no other transportation options. People in this category may move over time to the 'experienced and confident' category.

Portland Study – Four Types of Cyclists

Four Types of Cyclists, by Roger Geller, Bicycle Coordinator for the Portland Office of Transportation, defines four categories of transportation bicyclists within the City of Portland: – Strong and Fearless, Enthused and Confident, Interested but Concerned, and "No Way No How."

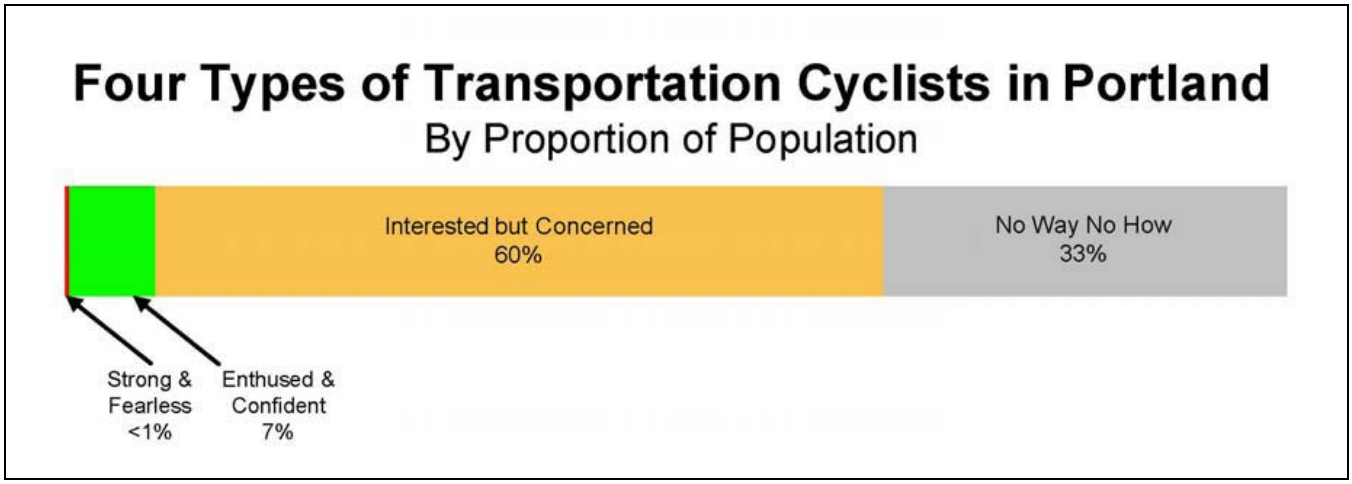
- Strong and Fearless - represents people who consider themselves "bicyclists" and consider bicycling a big part of their identity. The Strong and Fearless are not intimidated by road conditions and have no problem riding with vehicle traffic.

- Enthused and Confident - consists of people who are comfortable riding with vehicle traffic, but prefer their own right-of-way (i.e. bicycle lanes or bicycle boulevards). This group could easily be persuaded to ride regularly with improved facilities and better connectivity to popular destinations.

- Interested but Concerned - represents riders who enjoy bicycling, but are afraid to ride with vehicle traffic. Very few in this group ride a bicycle regularly, and when they do, they rarely venture past the bounds of their neighborhood or local park. This group would ride more frequently if "safer," low volume, low speed facilities were more readily available.

- No Way, No How - consists of people who either have no interest in cycling or lack the ability to do so. No amount of encouragement or improvements to existing facilities will change their minds.

The figure below is based on studies conducted in Portland, Oregon, and shows an estimation of the population in each cyclist group.



Source: *Four Types of Cyclist*, Roger Geller, Bicycle Coordinator, Portland Office of Transportation

As shown in the figure above, a potential expansion of bicyclists could be attracted by investing in a better, safer bikeway system.

REASONS FOR BICYCLING

Bikeways, like streets and sidewalks, are used by a wide range of people including children riding to school, commuters riding to work, and people exercising, racing, or touring. While some people rely on the bicycle as

their primary means of transportation, others ride only for recreational purposes. In general, bicycle trips can be categorized into three groups: commuter trips, shopping trips or errands, and recreational.

Commuter

Commuter trips include people bicycling to work and students riding to school. Depending on the length of the commute and the type of employment, commuters may or may not need shower and locker facilities at their place of employment. Many workplaces provide these facilities anyway, and several newer office buildings have begun installing facilities for this purpose. Workers can usually carry everything that they need with them on a bicycle, including books, laptops, lunches, and clothes, in backpacks or panniers (baskets mounted to the side of a bicycle).

The bicycle is a common mode of transportation for students. Elementary and middle school students can bicycle to school on quiet neighborhood streets, bicycle paths, or sidewalks. Elementary and middle schools are usually located within a couple miles of the residential areas they serve; sometimes parents even escort their young children to school via bicycle. High school students can also bicycle to school, although their schools are typically located farther away from their homes. Since teenagers have better motor skills and a better understanding of traffic laws than younger children, they are more capable of safely navigating more challenging routes to school. Bicycles are common among college students; college students are not provided with bus transportation from their home to school, often live on a fixed budget, and can usually lock up a bicycle closer to their classroom buildings than they can park a vehicle.

Shopping Trips/Errands

The bicycle is ideal for short errand trips, to the store, bank, or doctor for example. For trips that are less than a couple of miles in length, riding a bicycle usually takes the same amount of time as driving a car, especially when considering the time it takes to park a car. Bicyclists who use their bikes for errands usually carry their purchased goods in a backpack, a basket, or panniers.

Recreational

Bicycling for exercise and recreation is popular among people in the region. The extent to which bicyclists ride for exercise can vary; some ride just a few miles per their doctor's orders, while others ride long distances, multiple days per week, or while training for races. Recreational bicyclists range in age from children who ride with their parents to the elderly who prefer bicycling because it is a gentle form of exercise.

BICYCLIST NEEDS

The Reno Sparks area provides an excellent environment for bicycling, including picturesque scenery, existing regional trails, growing on-street facilities, and areas with relatively flat terrain. However, heavy vehicle traffic and lack of bicycle facility connections between major points of interest remains a significant challenge for bicyclists.

In addition to busy streets other constraints include incomplete connections between Reno and Sparks, and north Reno and south Reno. The Truckee River, Interstate 80 (I-80), and US 395 create challenges for providing safe, desirable, and cost effective bicycle facilities that connect these areas of desired travel. Older parts of the region, like Virginia Street in downtown Reno, are also challenging as right-of-way is generally constrained, making construction of new facilities difficult.

Bicycle Trip Types

When designing a bicycle system it is important to consider the purpose of a bicycling trip, which helps identify common needs among the user groups. Recreational and commuter riders can differ greatly in their choice of route. Recreational riders are often more interested in routes leading to parks or other areas of interest, while commuters and shoppers are interested in the shortest and safest route between two points. The RTC focuses on regional roadways and providing mobility for people's day to day needs; therefore, this *Master Plan* focuses on commuter or shopping trips (replacing a car trip), but also provides for recreation trips.

Commuter and Student Destinations and Needs

Commuter and student destinations include downtown employment centers, office parks, and schools. Targeting bikeway improvements to commuters is important because most roadway congestion, and a significant portion of air contaminant dispersion, occur during the AM and PM peak traffic periods.

In many cases, bicycling as a commute alternative has the potential to improve traffic and air quality. For example, bicycle commuters in the City of Davis have reduced peak hour vehicle traffic volumes by over 15% – to the point that many downtown streets that would normally require four traffic lanes (with no bicycle lanes) have only two traffic lanes and ample room for bicyclists. While Davis may be an anomaly, the Geller data (shown on page 26) indicates that 60% of people would bicycle if they felt safer. According to the 2000 US Census, 14% of work related trips in Washoe County are under 10 minutes. This shows that there is a substantial target group for bicycle commuters.

Commuters and students have similar travel behavior, which is typically to take the most direct route from origin to destination. For elementary school students, this may consist of residential or collector streets with few crossings of major arterials. For junior high and high school students, riders may have to cross several arterials to reach their school. College students and adult commuters are most often willing to ride less than five miles, but may ride up to 10 or 15 miles. The nearest university and community college are the University of Nevada, Reno (UNR) and the Truckee Meadows Community College (TMCC), both near to and north of downtown Reno. TMCC also has the following extension campuses in the Reno Sparks region: High Tech Center at Redfield, Meadowood Center, IGT Applied Technology Center, and Nell J. Redfield Foundation Performing Arts Center.

Commuters and students (in the morning) typically travel during peak periods of traffic to destinations that may have high levels of congestion and speeds. One of the most dangerous locations of a student's commute is the drop-off zone in front of the school where many vehicles search for parking or drop-off spaces.

Commuting and student bicyclists have simple and obvious needs. They require bicycle lanes or wide curb lanes along arterials and collectors, loop detectors at signalized intersections that respond to bicycles, signals where school children need to cross busy arterials, periodic maintenance of the pavement, and adequate bicycle storage and lockers/showers at their destination points.

Bicycle commuters with longer trips can link to another mode, such as bus stops or transit stations. RTC Ride buses currently have space for at least two bicycles, which helps extend the range of commute bicyclists in the Reno Sparks area.

Recreational Destinations and Needs

The Reno Sparks area has a diverse recreational system that includes city parks and trails, as well as regional parks and trails that appeal to various types of bicyclists. Recreational bicycling includes children riding to a nearby park, casual riders riding over their lunch hour or in the evening for exercise, older adults riding to a community center, and more serious cyclists riding tours. Recreational bicycling activities are generally done for

the pleasure of the ride itself, often have a recreational facility as a final destination, and are discretionary by nature.

Recreational bicyclists can generally be categorized into two groups. The first group includes casual bicyclists who typically make short trips and often include less experienced cyclists, particularly young children, families, and older adults. The second group includes more experienced and athletic riders who generally seek scenic back roads as their favorite domain.

It is important to understand these distinct types of bicyclists because the proposed system must provide opportunities for both groups. For the person riding for exercise, facility needs include a relatively quiet route with no stops, away from automobile traffic, if possible, preferably with visual interest, and shades from the wind and sun. A loop configuration is preferred so that the rider can start and finish their ride in the same place without backtracking. For the person going to another recreational destination (a park or a shopping mall), the route may consist of fairly direct back streets that allow arrival within a reasonable time through a comfortable environment. For other casual riders, a route that leads through interesting neighborhoods, along creeks, or through parks and open space offers the greatest interest.

Safety Programs

Safety is a major concern for both existing and potential users of the bikeway system, and safety perception is a significant factor that contributes to a person's decision to bicycle or allow their children to bicycle. This is a valid concern, given the potentially serious implications of a bicycle-vehicle collision. Bicycling safety programs for both children and adults are therefore an important component of this plan and should continue to be implemented throughout the region.

Connectivity is an important element to consider when designing residential neighborhoods and their supporting land uses (schools, businesses, etc.). Well-connected neighborhoods promote active transportation modes because they provide calmer streets and more direct routes to destinations. Many of the residential developments throughout Reno and Sparks do not provide connectivity between supporting land uses. Instead of a well-connected network of many different street types, motorists, bicyclists, and pedestrians are all required to use major streets, which carry traffic at high speeds. Streets with high vehicle speeds and volumes discourage children and adults from biking or walking to school or work; parents are reluctant to allow children to cross busy streets. Chapter 6 further discusses educational efforts currently underway in the Reno Sparks region to educate children and parents on how to bicycle or walk safely.

EXISTING CONDITIONS

An inventory of existing bicycle facilities in the Reno Sparks area was conducted using video GPS data collection techniques. Data from the existing bicycle facilities map created by the RTC and BPAC was used as a starting point for the data collection process. Maps were created showing the locations of existing bicycle facilities (provided in **Appendix D**), as well as locations of existing deficiencies (provided in **Appendix E**). The Reno Sparks region of Washoe County currently has approximately 205 miles of bikeway facilities consisting of:

- 43 miles of shared use paths

GPS Video Data Collection Unit

- 148 miles of bicycle lanes
- 14 miles of shared roadways

The Existing Bicycle Facilities map provided in **Appendix D** shows the locations of all existing bikeways.

Key Corridors

On-Street North-South Routes

The Reno Sparks region lacks a well-connected north-south bicycle route. In Reno, bicycle lanes are provided on Double R Boulevard, Airway Drive, and El Rancho Drive. The majority of Kietzke Lane and West McCarran Boulevard also have bicycle lanes with small missing sections throughout. Other roadways such as Wells Avenue, Terminal Way, Holcomb Avenue, Clear Acre Lane, and Sun Valley Boulevard provide short segments of north-south bicycle facilities, but connections between the facilities are not available. In Sparks, Pyramid Highway and Sparks Boulevard provide bicycle facilities for north-south travelers. Vista Boulevard also provides a section of bicycle lanes.

On-Street East-West Routes

West 7th Street in northwest Reno provides approximately 2 miles of bicycle lanes from west of McCarran Boulevard to Keystone Avenue for east-west travelers. Other roadway such as Victorian Avenue, Mill Street, and California Avenue provide short segments of east-west bicycle facilities, but connections between the facilities are not available.

Off-Street North-South Routes

A separated bicycle path exists on Sparks Boulevard between Lincoln Way and Disc Drive. Although the path is separated from vehicle traffic, the section of the trail between O'Callighan Drive and Baring Boulevard switches to the opposite side of the road requiring cyclists to cross vehicle traffic at the intersections. The asphalt path is striped for two-way travel north of Baring Boulevard.

Truckee River Trail Bicycle Ramp
Lake Street

Off-Street East-West Routes

The Truckee River Trail is a shared use path that provides a good east-west route for bicyclists in Reno and Sparks. As part of the Tahoe-Pyramid Bikeway, the trail extends from Verdi, west of Reno, to the east side of Sparks past Vista Boulevard. The ultimate goal of the Tahoe-Pyramid Bikeway is to provide a fully connected bikeway system from Lake Tahoe to Pyramid Lake. Large sections of the trail are constructed, however there is still much to be done before the trail will be complete. The sections of the trail between Truckee and Verdi, Sparks and Mustang, and USA Parkway and Wadsworth are not open to bicyclists.

Through Reno and Sparks, the trail is fairly well connected. Through downtown Reno, the Truckee River Trail shares the route with pedestrian traffic from Arlington Avenue to Lake Street. In addition, there is an awkward transition at Lake Street, where bicyclists have to use stairs to continue on the trail. The portion of the trail along Riverside Drive is designated as a Bicycle Boulevard, requiring bicyclists to share the route with vehicles. The portion of the trail through Idlewild Park and along Idlewild Drive creates some confusion for cyclists because a facility is provided, but signs are posted indicating "No Bicycles Allowed on Trail." One of the biggest challenges along the Truckee River Trail is providing connections to/from intersecting or adjacent roadways.

Key Issues in Bikeway Network

Several challenges with the bicycle network have been identified through public meetings, information from agency staff and field work. The following section discusses the key issues to be addressed in the Proposed Bikeway Network section and the *Design Best Practices*. A summary of all of the comments received is provided in **Appendix C**.

Comment Summary: Well Connected Bicycle Routes

- Reno-Sparks Connection: One of the biggest issues presented during the public meetings and comment period was a lack of connection between Reno and Sparks. 4th Street/Prater Way is the only east-west roadway that extends through the entire Reno Sparks area, and would be a very useful bicycle connection.
- McCarran Loop: Portions of the McCarran Loop have bicycle facilities, but the system is incomplete.
- North South Connection: Another issue raised during the public meetings and comment period was the lack of an adequate connection between North Reno and South Reno.
- Lemmon Drive: The bicycle facilities on Lemmon Drive are inadequate and uncomfortable for most cyclists.
- Near Schools: Bicycle facilities are needed to connect nearby neighborhoods to schools, on low speed, low volumes roads if possible.
- Connections to UNR from to/from the surrounding neighborhoods are needed to serve the students and faculty that live there.

Comment Summary: Intersections

- Loop detectors for actuating signal changes often do not register the presence of bicyclists at intersections. Usually bicyclists must wait through lengthy signal cycles or risk proceeding through the intersection against the light. Bicycle-specific detectors should be considered at major intersections along the bicycle network and stencils should be used to inform bicyclists where to position their bikes in order to actuate the signal. Specifications are provided in the *Design Best Practices*.
- Bicyclists have insufficient time to cross certain intersections which are typically timed for motorists. This happens predominantly on the minor street approach of signalized intersections. At these locations, minimum green times should be extended to allow adequate time for bicyclists.

Comment Summary: Freeway Interchanges

- Interstate 80 and US 395 run directly through Reno and Sparks necessitating multiple arterial-freeway interchanges throughout the cities. Characterized by fast moving vehicular traffic, wide travel lanes, and multiple turning lanes, these interchanges could be improved to provide safer passage for bicyclists.

Comment Summary: Maintenance

- Often bicycle lanes and pork-chop islands are not cleaned by the street sweeper and can become obstructed with debris. In the winter bicycle lanes are sometimes used for snow storage rendering them useless.

Comment Summary: Deficiencies and Recommendations

During the data collection effort, deficiencies in the existing network were identified. These deficiencies include improper signing/striping, facilities that are too narrow, and issues identified by the bicycling community. The Existing Bicycle Facilities Deficiencies Map in **Appendix E** displays deficiencies in the existing network. A table listing the deficiencies by location is provided in **Appendix F** with recommended improvements to mitigate the deficiencies.

RTC Improvement Projects

The Regional Transportation Commission has been implementing bicycle and pedestrian improvements in recent years during maintenance and reconstruction projects, including bicycle lanes, sharrows, and wider shoulders adjacent to vehicle travel lanes. The tables below outline the recent projects constructed by the RTC, as well as planned/approved projects anticipated for construction in the near term.

2009 Projects

Table 3 displays bicycle and pedestrian improvement projects constructed in 2009.

TABLE 3
2009 RTC BICYCLE & PEDESTRIAN FACILITY PROJECTS

Jurisdiction	Location	Limits	Improvement	Length (miles)
City of Reno	Lemmon Drive	Memorial Lane to US 395	Add bicycle lanes	0.2
City of Reno	Mae Anne Avenue	Avenida De Landa to Ambassador Drive	Add bicycle lanes	0.4
City of Reno	Silver Lake Road	Stead Boulevard to Red Rock Road	Add bicycle lanes	2.1
City of Reno	Moya Boulevard	Red Rock Road to Echo Avenue	Add bicycle lanes	2.3
City of Reno	Mill Street	Terminal Way to McCarran Boulevard	Add bicycle lanes	1.0
City of Reno	Peckham Lane	Kietzke Lane to Longley Lane	Bicycle Lanes from Kietzke Lane to Neil Road, and from Airway Drive to Longley Lane	1.0
City of Reno	Skyline Drive	McCarran Boulevard to Gibraltar Drive	Add bicycle lanes	0.1
City of Sparks	El Rancho Drive	Prater Way to Wedekind Road	Add bicycle lanes	1.2
City of Sparks	Lillard Drive	Brierly Way to Prater Way	Add bicycle lanes	0.9
City of Sparks	Lincoln Way	Sparks Boulevard to Lillard Drive	Add bicycle lanes	0.2
City of Sparks	Victorian Avenue	El Rancho Drive to 16th Street	Convert roadway to a 3-lane section with bicycle lanes and on-street parking	0.6
Washoe County	Dandini Boulevard	Sun Valley Road to US 395	Reduce vehicle lanes to 11', widen shoulders	1.7
Washoe County	Pembroke Drive	McCarran Boulevard to Boynton Bridge	Add shoulders for bicyclists and pedestrians	1.5
			Total Miles	13.2

Source: Regional Transportation Commission, Fehr & Peers, 2011

2010 Projects

Table 4 displays bicycle and pedestrian improvement projects constructed in 2010.

TABLE 4
2010 RTC BICYCLE & PEDESTRIAN FACILITY PROJECTS

Jurisdiction	Location	Limits	Improvement	Length (miles)
City of Reno	Arlington Avenue	Skyline Drive to 1st Street	Convert roadway to a 3-lane section with bicycle lanes	1.7
City of Reno	California Avenue	Mayberry Drive to Virginia Street	Convert roadway to a 3-lane section with bicycle lanes and sharrows	1.4
City of Reno	Double Diamond Parkway	Double R Boulevard South to Double R Boulevard North	Add bicycle lanes	2.4
City of Reno	Double R Boulevard	Double Diamond Parkway to Amston Road	Add bicycle lanes	2.2
City of Reno	Holcomb Avenue	Virginia Street to Mill Street	Convert roadway to a 3-lane section with bicycle lanes	1.1
City of Reno	Bravo Avenue	Mt Limbo Street to Ramsey Way	Add shoulders for bicyclists and pedestrians	1.1
City of Reno	Market Street	Villanova Drive to Vassar Street	Add bicycle lanes	0.3
City of Reno	Military Road	Lemmon Drive to Echo Avenue	Add shoulders for bicyclists and pedestrians	2.5
City of Reno	Mill Street	Lake Street to Terminal Way	Convert roadway to a 3-lane section with bicycle lanes from Lake Street to Wells Avenue. Narrow vehicle lanes and add bicycle lanes from Wells Avenue to Terminal Way	2.7
City of Reno	Offenhauser Drive	Gateway Drive to Portman Avenue	Add bicycle lanes	0.4
City of Reno	Bluestone Drive	Portman Avenue to Autumn Hills Drive	Add sharrows	0.3
City of Reno	Portman Avenue	Offenhauser Drive to Bluestone Drive	Add sharrows	0.1
City of Reno	Parr Boulevard	Virginia Street to US 395 Northbound Ramps	Add bicycle lanes	1.1
City of Reno	Silver Lake Road	Stead Boulevard to Sky Vista Parkway	Add bicycle lanes	0.5
City of Reno	W 7th Street	McCarran Boulevard to Keystone Avenue	Narrow vehicle lanes and add bicycle lanes	1.6
City of Reno	Ridgeview Drive	Plumas Street to Lakeside Drive	Add sharrows or bicycle lanes	0.2
City of Sparks	Spice Island Drive	Greg Street to Franklin Way	Add bicycle lanes	1.6
City of Sparks	Victorian Avenue	Pyramid Way to Nichols Boulevard	Add cycle track with pedestrian amenities and landscaping	0.7
City of Sparks	Lincoln Way	McCarran Boulevard to Howard Drive	Add bicycle lanes	0.2

TABLE 4
2010 RTC BICYCLE & PEDESTRIAN FACILITY PROJECTS

Jurisdiction	Location	Limits	Improvement	Length (miles)
City of Sparks	Vista Boulevard	Los Altos Boulevard to Wingfield Parkway	Add bicycle lanes	2.5
City of Sparks	Vista Boulevard	Los Altos Boulevard to Wingfield Parkway	Add shared use path	2.5
City of Sparks/ Washoe County	El Rancho Drive	Wedekind Road to Sun Valley Boulevard	Convert roadway to a 3-lane section with bicycle lanes	1.6
			Total Miles	28.7

Source: Regional Transportation Commission, Fehr & Peers, 2011

Current Projects

Southeast McCarran Corridor

The Southeast McCarran Corridor Study includes a complete analysis of transportation operations on McCarran Boulevard from Longley Lane to Greg Street. Through the design of the project a separated bicycle path was added adjacent to the roadway on the south/east side. Phase 1 of the project will include construction from Alexander Lake Road, just east of Longley Lane, to Mira Loma Drive. Phase 2 of the project will construct the bicycle path from Mira Loma Drive to Greg Street, and includes a connection to the Truckee River Trail. Construction for Phase 1 is scheduled for 2011, with construction of Phase 2 anticipated to take place in 2012.

SouthEast Connector

The SouthEast Connector is a proposed north-south roadway that will connect the southern part of the Truckee Meadows to the eastern part of the Truckee Meadows east of the McCarran loop, providing a connection between Reno and Sparks. The roadway will connect Veterans Parkway to Sparks Boulevard, and will include a separated bicycle path as part of the design.

Virginia Street and Sierra Street Bicycle and Pedestrian Improvements

As part of the master planning process, bicycle and pedestrian improvements on Virginia Street and Sierra Street between 9th and the North Virginia Street/Sierra Street intersection were identified as high priority needs. The RTC is currently designing improvements that will be constructed in 2012. The improvements include enhanced pedestrian crossings on Sierra Street at Putnam Drive, 15th Street, and College Drive, and on Virginia Street at 17th Street and College Drive. The project also includes new bicycle lanes on Sierra Street between 9th Street and North Virginia Street.

College Drive/Virginia Street Intersection

Sierra Street at Ranch San Rafael

Planned Bicycle Projects

As the RTC identifies roadways with needed maintenance, consideration is given to the addition of bicycle lanes on the roadway. Since the roadway is being repaved and restriped, adding bicycle lane striping would not add to the overall cost of the project. A number of roadway maintenance projects thus far have included the addition of bicycle facilities. For example, the vehicle travel lanes on California Avenue and Arlington Avenue were reduced from two lanes in each direction to one lane in each direction and a two-way left-turn lane. The space recovered from the extra vehicle lane was used to include bicycle lanes on the roadway.

Table 5 below provides a list of planned bicycle facilities to be implemented with roadway maintenance projects in the near term.

TABLE 5
PLANNED RTC BICYCLE IMPROVEMENT PROJECTS WITH MAINTENANCE

Location	Limits	Improvement	Length (miles)
1st Street	Keystone Avenue to Ralston Street	Convert roadway to a 3-lane section with bicycle lanes	0.3
Brinkby Avenue	Lakeside Drive to Virginia Street	Add bicycle lanes	0.5
Lymberry Street	Moana Lane to Brinkby Avenue	Add bicycle lanes	0.5
Manzanita Lane	Plumas Street to Lakeside Drive	Add bicycle lanes	0.3
McCarran Boulevard	Nichols Boulevard to Prater Way	Add sidewalk on the east side of the road	0.4
Moana Lane	Virginia Street to US 395	Add bicycle lanes	0.6
Socrates Drive	McCarran Boulevard to Sienna Park Drive	Convert most of the roadway to a 3-lane section with bicycle lanes and on-street parking	1.1
Alexander Lake Road	McCarran Boulevard to end of pavement	Add bicycle lanes and shoulders	3.1
Caughlin Parkway	Longknife Road to McCarran Boulevard	Add bicycle lanes	0.9
Delucchi Lane	Virginia Street to Tyrone Road	Add bicycle lanes	0.6
Greenbrae Drive	El Rancho Drive to Sullivan Lane	Convert roadway to a 3-lane section with bicycle lanes	0.2
Merchant Street	Sullivan Lane to Clinic	Add bicycle lanes	0.2
Huffaker Lane	Del Monte Lane to Spring Leaf Circle	Convert roadway to a 3-lane section with bicycle lanes	0.8
Hunter Lake Road	Rodney Drive to Plumb Lane	Add bicycle lanes	0.6
Plumb Lane	McCarran Boulevard to Ferris Lane	Convert roadway to a 3-lane section with bicycle lanes and on-street parking	1.0
Woodland Avenue	Sugar Pine Court to 4th Street	Add bicycle lanes	0.3
		Total Miles	11.4

Source: Regional Transportation Commission, Fehr & Peers, 2011

PROPOSED BIKEWAY NETWORK

A bikeway network consists of routes that are designed to be the primary system for bicyclists traveling through the region. It is important to recognize that by law, unless explicitly prohibited (as they are on I-80 and US 395 within the urbanized area), bicyclists are allowed on all streets and roads regardless of whether the streets and roads are a part of the bikeway network. The bikeway network is a tool that allows jurisdictions to focus and prioritize implementation efforts where they will provide the greatest community benefit. Streets or corridors selected for inclusion in the network should be targeted for specific improvements, such as the installation of bicycle lanes, shared use paths, or signage.

The proposed system was developed according to the following planning criteria:

- Coverage: The system should provide equitable, reasonable access from all areas of the region to both experienced and confident and casual and less confident riders.
- Purpose: Each link in the system should serve one or more of these purposes: commuting, connection, recreation, with a focus on commuting. On-street facilities should be continuous and direct, and off-street facilities should have a minimal number of arterial crossings and uncontrolled intersection crossings.
- Connection to Employment/Retail Centers: Downtown Reno, Downtown Sparks, business parks, major retail, and other employment centers should be accessible from all neighborhoods via a reasonably direct system.
- Connection to Transit: The bicycle network should provide access to major transit hubs and stops to provide the opportunity for linking bicycle and transit trips.
- Connection to Schools and Other Community Facilities: Schools and community facilities such as community centers, libraries, and City Hall should be accessible by bikeways. While not serving every residential street, the bikeway system should provide access routes with special treatments at busy intersections, such as bicycle loop detectors or signage.
- Connection to Parks and Open Space: Parks and open space should be accessible by bikeways so that residents are able to bicycle from home to both local and regional recreation.

The Existing and Proposed Bikeway Network map is provided on page 41, with a large scale map and more detailed Map Book provided in **Appendix G**. The proposed system includes a total of approximately 215 miles of new bikeway facilities in addition to the 206 miles currently in place. **Table 6** shows the number of existing and proposed miles for each bikeway classification.

TABLE 6
LENGTH (MILES) OF SYSTEM BY BIKEWAY CLASSIFICATION

Bikeway Classification	Existing	Proposed	Total
Shared Use Path	43	22	**65**
Bicycle Lane	149	152	**300**
Shared Roadway	18	41	**56**
Total	**210**	**215**	**425**

Source: Fehr & Peers, 2011

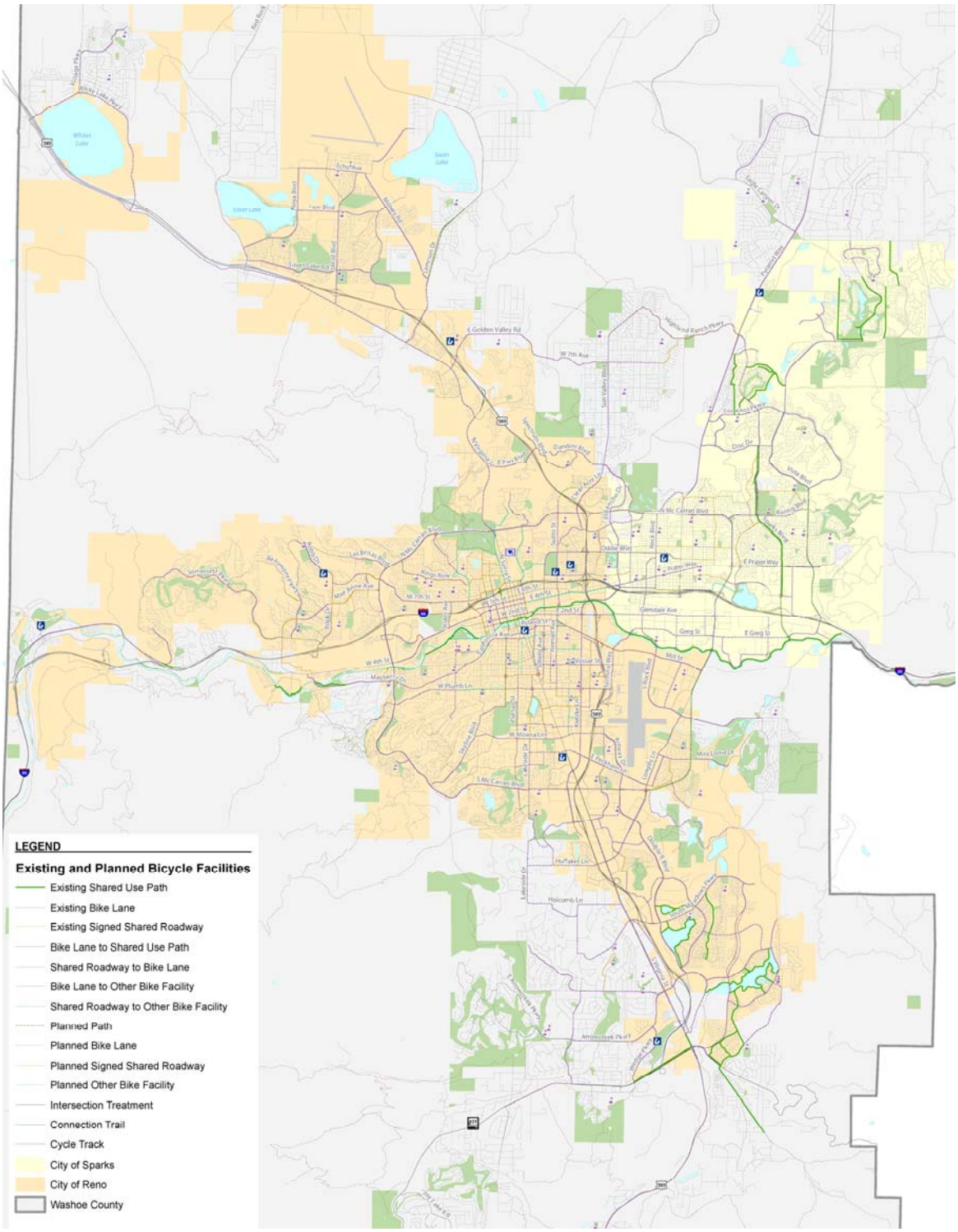
Proposed Facilities

A prioritized list of recommended on and off-street bicycle facility improvements is discussed in the Project Prioritization section of this chapter and a table of facilities is provided in **Appendix H**.

The ultimate goal of this plan is to provide a continuous network of bicycle facilities with the greatest degree of bicycle comfort possible. The *Design Best Practices* provides details for constructing bicycle facilities including:

- Paths
- Bicycle Lanes
- Shared Roadways
- Accommodating bicycles at intersections
- Other Innovative bicycle treatments

The RTC will endeavor to complete the listed projects to the maximum extent possible to avoid discontinuous segments.



Regional Area Bicycle Facilities – Existing and Proposed
(see Appendix G for a detailed Map Book)

SUPPORT FACILITIES

Every bicycle trip has two basic components: 1) the route selected by the cyclist and 2) the "end-of-trip" facilities (or support facilities) available at the destination. They can include short and long-term bicycle parking, showers, lockers, restrooms, good lighting, and even public phones. A lack of adequate support facilities at a rider's destination can be one of the biggest deterrents to cycling for many riders.

Types of Bicycle Parking and Support Facilities

There are different types of support facilities just as there are different levels of bikeway facilities.

Bicycle Parking

Bicycle parking needs to be installed with the following considerations: protection from weather, theft, and vandalism; gear storage; and, where appropriate, 24-hour access. Bike parking typically comes in two basic forms:

- Short Term Bicycle Parking is typically provided via bike racks and is usually used when cyclists park their bicycles for a couple of hours or less. An example is a trip to the library or store. Bike racks should be placed close to the bicyclists' destinations in highly visible, illuminated locations, as close to a building's front door or main access as possible, while maintaining adequate pedestrian clearance per ADA and local design standards. Bike racks should be installed with the minimum necessary clearances from walls, landscaping, and driveways per manufacturer's specifications so that the bike rack's design capacity can be fully used. Quality bike racks provide at least two points of contact with the bicycle and allow both frame and wheels to be locked. For special events such as sporting events or concerts, short term bicycle parking may be provided by valet bicycle parking in a corral or specified area. However, this type of parking requires supervision by the valet service.

Short Term Bicycle Parking

- Long Term Bicycle Parking is typically provided at major employment sites, schools, and transportation terminals in the form of bicycle lockers, bicycle cages, or bicycle rooms. These facilities provide a higher level of security so bicyclists feel comfortable leaving their bicycles for long periods of time. Long term parking should be fully protected from the weather. Bicycle lockers may be placed outdoors and some may be stacked to save space. Electronic bicycle lockers, or e-lockers, provide secure, individualized parking that can be accessed with an electronic card. Bicycle cages are fully enclosed, roofed areas with bicycle racks inside the enclosure with secure (limited) access, and are commonly located in parking garages or in outdoor areas. Bicycle rooms or closets are secure, limited-access rooms within a building.

Bicycle parking will be implemented at the discretion of the individual agencies and maintenance will be provided by the respective jurisdictions.

Bicycle parking design guidelines are provided in the *Reno Sparks Bicycle and Pedestrian Plan Design Best Practices*.

Showers and Locker Facilities

People are more likely to commute to work on a bicycle if they have convenient access to showers and lockers. Showers are important for bicycle commuters with a rigorous commute and/or formal office attire. These types of bicycle support facilities are important factors in encouraging regular commuting via bicycle. Lockers provide a secure place for bicyclists to store their helmets or other riding gear.

Bicycle Stations

Bicycle stations provide free all-day, attended bicycle parking. Bicycle stations can provide bicycle tune-ups, repairs, and rentals in order to sustain their operation. They are intended to serve locations with large numbers of bicycle commuters needing long-term bicycle parking and are an excellent means of facilitating the intermodal connections between bicycles and transit.

Trailheads & Staging Areas

Trailheads and staging areas provide access to trails and areas for support facilities along trails. These may include bicycle racks, public telephones, restrooms, drinking fountains, and maps and signage.

Bicycle Parking Programs

Most schools and public buildings, such as libraries and hospitals, provide bicycle parking. The RTC will identify locations for additional bicycle parking, such as major retail centers, entertainment areas, and downtown Reno and Sparks. This *Master Plan* includes a bicycle parking installation project. The program allows businesses, bicyclists, or other stakeholders to request bicycle parking. The RTC will install at least 20 bicycle parking racks per year. The RTC reserves the right to choose to install or not install bicycle parking in response to a request.

Bicycle Sharing Programs

Bicycle Sharing programs in the US are gaining in popularity. Bicycle sharing programs provide community bicycles at key locations that people can rent. In most cases the bikes can be returned at any rental location within the region.

A bicycle share program encourages bicycle use by providing bicycle stations throughout a region with bicycles for the public to rent or borrow for a nominal fee or no fee. Typically renters are given a bicycle for an allotted amount of time and can return the bicycle to any station throughout the region.

Locally, the Reno-Tahoe Public Bike Share is a pilot project being initiated by Tour de Nez Outreach, in partnership with Secure Storage Technologies, Reno Bike Project, Entersport, City of Reno, the RTC, and UNR. The bike share program would provide bicycles and bicycle storage at key population centers, and throughout recognized transportation corridors in the City of Reno, at a nominal fee or no fee to the public for a specific period of time. Various bike share programs have been researched throughout the United States and abroad, to determine the elements of a successful program. Vendors interested in supplying bicycles for the program, and a system to securely store bicycles, have been contacted. Tour de Nez also plans to assist with securing funding and partnerships necessary to install and maintain a bike share program, as well as provide long term administration of the program.

PROJECT PRIORITIZATION

Key Corridor Projects

The RTC has identified three major corridors as key projects for major rehabilitation and reconstruction. The following corridors will include improvements to transit, vehicle operations, and bicycle and pedestrian facilities:

- 4th Street/Prater Way – Keystone Avenue to Petes Way
- Wells Avenue/Oddie Boulevard – Kuenzli Street to Pyramid Way
- Mill Street/Terminal Way
    - Mill Street – Lake Street to Terminal Way
    - Terminal Way – Mill Street to Plumb Lane

Key Early Action Bicycle/Pedestrian Projects

Key early action bicycle/pedestrian projects are projects identified by the TAC and BPAC. A list of 16 projects were identified during meeting discussions and prioritized based on a voting system. **Table 7** lists the key early action bicycle/pedestrian project identified and prioritized by the TAC and BPAC.

Proposed Project List

TABLE 7
KEY EARLY ACTION PROPOSED BICYCLE/PEDESTRIAN PROJECTS

Roadway/Location	Limits	Proposed Project	Cost Estimate ($1,000)[1]
Sierra Street	North Virginia Street to 9th Street	Road conversion with bicycle lanes Install curb extensions and stutter flash beacons at several locations	$300,000
Virginia Street	North McCarran Boulevard to 9th Street	Install pedestrian signal at College Drive Add crosswalk with stutter flash beacon at 17th Street	$200,000
4th Street (Sparks)	Entire Length	Convert to Bicycle Boulevard	$250,000
Mount Rose Street	Arlington Avenue to Virginia Street	Convert to Bicycle Boulevard Add bike boxes at intersections	$105,000
Mill Street	At Yori Drive	Install stutter flash beacon	$18,000
Forest Street	California Avenue to Mount Rose Street	Reduce to one southbound vehicle travel lane Add cycle track	$800,000
Sparks Boulevard	Lincoln Way to Greg Street	Add bicycle lanes	$22,000
Regionwide		Install bicycle parking - 100 racks	$20,000 plus Installation
Nichols Boulevard	Victorian Avenue to Howard Drive	Add bicycle lanes or cycle track	Bicycle Lanes - $26,500; Cycle Track - $475,000
Victorian Avenue	15th Street to Pyramid Way	Convert to shared roadway (with sharrows)	$7,200
Lake Street	On Truckee River Bridge	Remove parking on west side Convert to cycle track with improved ramp at Truckee River Trail (remove stairs)	Needs Further Discussion/Evaluation of Appropriate Improvement

TABLE 7
KEY EARLY ACTION PROPOSED BICYCLE/PEDESTRIAN PROJECTS

Roadway/Location	Limits	Proposed Project	Cost Estimate ($1,000)[1]
Taylor Street	Holcomb Avenue to Kietzke Lane	Convert to shared roadway (with sharrows) Add stutter flash beacon at Wells Avenue Restrict left-turns at Wells Avenue with a median refuge island	$65,000
Moran Street	Virginia Street to Kirman Avenue	Convert to shared roadway (with sharrows) Add stutter flash beacon at Wells Avenue Restrict left-turns at Wells Avenue with a median refuge island	$62,000
Kings Row	North McCarran Boulevard to Keystone Avenue	Restripe with bicycle lanes	$75,000
Carat Drive	Double Diamond Parkway to Steamboat Parkway	Add bicycle lanes	$24,000
Stoker Avenue	7th Street to 4th Street	Road conversion with bicycle lanes from 4th Street to Stardust Street Add bicycle climbing lane on uphill side from Stardust Street to 7th Street Add sharrows on downhill side from to Stardust Street to 7th Street	$40,000

Notes: [1] Cost estimates are based on conceptual construction cost estimates.
Source: Fehr & Peers, 2011

Ranking Proposed Bicycle Improvements

The proposed bicycle network, when fully implemented, will provide a comprehensive, non-motorized system for the Reno Sparks region. However, due to limited resources, the proposed improvements need to be prioritized, so agencies can start with the most critical connections. The prioritization provided in this chapter is meant to serve as a guide and not an impediment to implementation. Agencies will pursue opportunities to implement projects through routine resurfacing or development projects as they arise, regardless of a project's place in the prioritization.

The proposed network was first developed by considering public comment and providing a complete, connected network. Once the proposed network was developed and new facilities/projects were identified, the projects were scored and prioritized based on five factors which were weighted based on importance. The following factors were used to determine a project's score and prioritization:

- Gap Closure: Projects that close a gap in the existing network were given the highest priority and were scored out of 10 points. If a project was identified as a gap closure, it was given 10 points; if a project was not identified as a gap closure, it was given 0 points.

- Latent Demand/Collision History: Projects were evaluated to determine if they would serve land uses that would be conducive to bicycling such as schools, parks, hospitals, regionally significant commercial areas, and high residential/employment areas. If a proposed facility is within 1.5 miles of these land uses it was given the highest latent demand ranking; if it is within 2.5 miles it was given a lower latent demand ranking; and if it is further than 2.5 miles it was given the lowest ranking for latent demand. The ranking system is sensitive to the number of land uses that the proposed bicycle facility is near. For example if a proposed bicycle facility is within 1.5 miles of a school, park, hospital, shopping center, high density residential, high density employment, it would receive the highest latent demand ranking.

  Similarly, if a facility is located within 0.5 mile of 5 or more bicycle collisions it received the highest ranking due to collisions; if it is within 0.5 miles of 3-4 bicycle collisions it received the middle ranking; if it is within 0.5 miles of 1-2 bicycle collisions it received a lower ranking; and if there were no collisions within 0.5 miles, the facility received the lowest ranking.

  Scores were given on a scale of 1-5, and were weighted based on a total of 8 possible points.

- User Versatility: This factor was ranked on a scale of 1 to 5 (with 1 being the highest ranking) and weighted based on a total of 6 possible points. This factor takes into account roadway character and related bicycle comfort. Local streets and low volume, low speed collector streets, with relatively flat grade were given the highest ranking for user versatility (i.e. would be attractive to casual and experienced bicyclists). Collector and arterial streets with higher volumes and speeds were given a middle ranking, and arterials with high volumes, speeds and several lanes or roadways with steep grades were given the lowest ranking.

- Constructability: This factor was ranked on a scale of 1 to 5 (with 1 being the highest ranking) and weighted based on a total of 4 possible points, This factor takes into account ease of construction. The highest ranking (1) was given to facilities that are easy to construct, i.e. just require signing and striping. A rank of 2 corresponds to facilities that require changes to existing striping, but do not require widening or changes to the pavement width. A rank of 3 corresponds to facilities that require minor widening, some curb/gutter reconstruction, but can be constructed in the existing right-of-way. A ranking of 4 corresponds to facilities that require widening, curb/gutter reconstruction, and some right-of-way. A ranking of 5 corresponds to facilities that require major reconstruction (including bridge construction or modification) and significant right-of-way.

- Recreational Value: The proposed network focuses on providing well connected routes that serve a variety of users, primarily to support bicycle commuting and replace car trip activities. This factor provides a ranking for facilities that could serve commute trips, as well as provide recreational value. Many of the routes that are ranked with high recreational value are routes that are commonly used today, as identified during public outreach. This factor has the lowest priority of the overall factors used to prioritize projects. Scores were given on a scale of 1-5, and were weighted based on a total of 2 possible points.

Facilities were ranked in the order listed above, placing facilities that provide a gap closure at the top of the list. Of the facilities that provide a gap closure, the facilities with high latent demand/collision history were ranked highest. Furthermore, facilities with high user versatility were ranked above facilities with low versatility, and so on.

The proposed project list is provided in **Appendix H**.

Other Projects/Enhancements

In addition to physical bicycle facility improvements, project funding should be prioritized to include enhancements to education and marketing campaigns, as well as a Bicycle/Pedestrian Coordinator position within the region. The Bicycle/Pedestrian Coordinator could be tasked with overseeing/managing implementation of all bicycle and pedestrian improvement project within the region, securing funding for such projects, applying for future grant funding, and coordinating with appropriate counterparts of other local agencies.

5. PEDESTRIAN NETWORK

Planning for pedestrians requires an understanding of two key concepts:

- Pedestrian Demand - is the extent to which people want to walk to a particular place and is influenced by land use and development types including mixes and intensities of activities, the presence of public spaces and parks, and the availability of transit facilities.

- Pedestrian Walkability - refers to the ease, comfort, and safety of walking, and is influenced by connectivity, accessibility, the sense of safety (real and perceived, from traffic and crime), and the quality of the pedestrian environment.

Pedestrian walkability and demand are interdependent, and an evaluation of pedestrian conditions involves consideration of both.

A place can be categorized based on its levels of pedestrian walkability and demand. A place may have desirable destinations, such as retail, office parks, and schools, but may be a difficult or unsafe place to walk. This may be due to inadequate sidewalks, infrequent street crossing opportunities or lack of a direct route. Such a place would have high demand, but low walkability. Alternatively, a place may be walkable because of improved facilities, but may lack a destination to which people want to travel. Such a place would have high walkability and low demand.

The optimum pedestrian environment would have high walkability and high demand. Consequently, all plans and guidelines must work toward achieving high levels of both if their aim is to increase pedestrian travel.

This chapter reviews existing conditions in areas of high pedestrian demand in the Reno Sparks area. Design specifications for pedestrian facilities are provided in the *Reno Sparks Bicycle and Pedestrian Plan Design Best Practices*. This plan is also closely tied to the *Reno Sparks Americans with Disabilities Act (ADA) Transition Plan.*

EXISTING CONDITIONS

An inventory of the region's pedestrian facilities was collected as part of the *ADA Transition Plan*. This section provides a summary of pedestrian conditions throughout Reno and Sparks. A description of the existing infrastructure including gaps in the sidewalk network, sidewalk obstructions, and bus stop amenities in key pedestrian areas is provided.

Inventory of Existing Issues

The data collected for the *ADA Transition Plan* was geo-coded, mapped, and analyzed to determine issues and opportunities with the existing pedestrian network. Understanding the quality of pedestrian facilities in Washoe County is essential for determining future opportunities for improvement. The following issues were evaluated in the facilities assessment:

- Sidewalk Condition: surface condition, missing sidewalk, width, cross slope, etc.

- Sidewalk Obstructions: deteriorating pavement/pot holes, protruding vegetation, fire hydrants, signs, street light and utility poles, street trees, newspaper kiosks, guy wires, excessive cross slopes, etc.

- Safety and ADA Compliance: curb ramps, crosswalk conditions and locations, sidewalk cross slopes (particularly at driveways)
- Intersections: control type - signalized or unsignalized, presence of marked crosswalks
- Bus Stop Amenities: shelter, benches, wheelchair seating, landing

Sidewalk Conditions and Curb Ramps

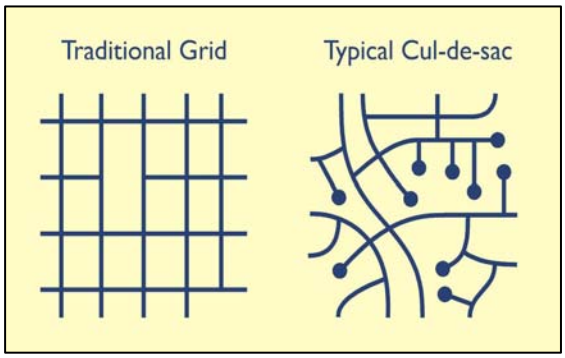
The sidewalks throughout Reno and Sparks vary greatly in condition. Newer areas of construction and areas that have recently been upgraded or rehabilitated have good sidewalk conditions with few obstructions. Sidewalks in older parts of the cities generally have high concentrations of obstructions with segments of deteriorated sidewalks. The majority of driveways in residential areas do not meet ADA standards.

Curb ramps provide safe access to the sidewalk for mobility impaired pedestrians, such as wheelchair users or those with canes by providing a gradual transition from the crosswalk or roadway to the sidewalk. According to ADA guidelines, curb ramps with truncated domes are required at every street corner to ensure access between the sidewalk and street for people with disabilities. While many of the newer curb ramps throughout Reno and Sparks meet ADA standards, a large number of ramps do not have truncated domes. A small number of street corner locations, particularly in older residential areas, do not have curb ramps at all.

Access and Connectivity

A well connected network of streets and pedestrian ways provides more incentive for people to use it. Good connectivity includes safe, convenient street crossings, and access to transit. Walking and transit go hand in hand, as most transit riders typically supplement their trip with some form of pedestrian travel at both ends.

The Reno Sparks area generally provides good connectivity for pedestrians throughout the region. The majority of the roadways throughout the region have sidewalks and crosswalks at intersections; however, the conditions of the sidewalks are varied. While some sections of sidewalk are in good condition, other sections are deteriorated, with some sections missing completely.



A traditional grid network provides greater pedestrian connectivity than a typical cul-de-sac network. Pedestrian cut through locations improve pedestrian access in a cul-de-sac network.

The downtown areas of Reno and Sparks are generally well connected and walkable, however some of the outlying sections of the region can be difficult to reach as a pedestrian. An example is the Summit Sierra shopping mall which is virtually impossible to access as a pedestrian. There are no existing sidewalks on Virginia Street from just south of Damonte Ranch Parkway to the mall property. Pedestrians wishing to access the mall would have to use the unpaved shoulder of Virginia Street and jaywalk across a multi-lane off-ramp from US 395.

Other Challenges to Creating a Walkable Environment

To develop a pedestrian-friendly environment, it is important to consider other challenges faced by pedestrians in the Reno Sparks area that may not be captured in the pedestrian audit. Obstacles to walking contribute to

individual decisions and attitudes about walking. Identifying the most common kinds of obstacles will help to devise the appropriate measures to be taken. The most common obstacles include:

- Missing Infrastructure: As noted, some areas within the region lack basic pedestrian infrastructure. Basic pedestrian infrastructure begins with sidewalks and curb ramps, but also includes well-marked street crossings, pedestrian push buttons at actuated signalized intersections, and other accessories that facilitate safe, convenient pedestrian travel.

- Lack of Pedestrian Sensitivity: Areas with buildings oriented away from the sidewalk appear uninviting towards pedestrians and are closed off from the activity of the street. Additionally, some sidewalks and pedestrian facilities, while well intentioned, are not conducive to easy and comfortable pedestrian access. Narrow meandering sidewalks substantially increase pedestrian travel distances.

- Wide, High Speed Arterial Roadways: In addition to freeways and rail tracks, a major barrier to pedestrian travel is wide, high speed arterial roadways. Many roadways have been built with multiple travel lanes to accommodate peak traffic levels. However, during non-peak hours, these wide roadways can encourage high speed travel above established speed limits. High vehicle speeds are problematic for pedestrians as they limit the time that pedestrians can safely cross the street, and make them vulnerable to more severe collisions. Creating a walkable environment includes addressing ways to manage speeds, including such measures as landscaping, synchronized signal timing to slow traffic, and lane reconfiguration to narrow excessively wide roadways.

- Maintenance and Funding: Maintenance of sidewalks presents an additional issue as funding of new pedestrian projects is often a concern.

PROPOSED IMPROVEMENTS

This section includes recommendations for improvements to the Truckee Meadow's pedestrian network based on the existing conditions, collision analysis and input from the Bicycle/Pedestrian Advisory Committee and the general public.

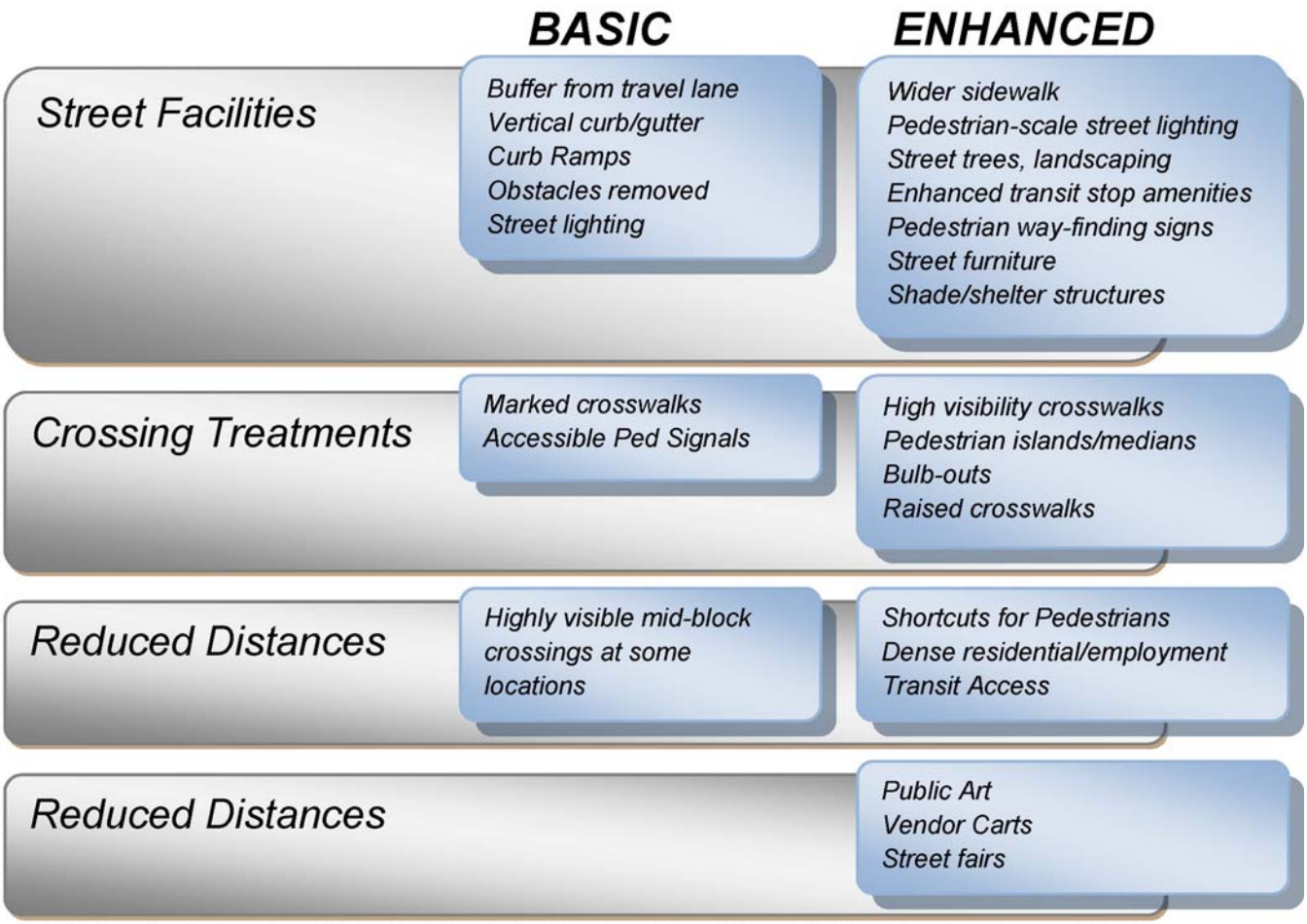
Levels of Pedestrian Improvement

Pedestrian enhancement projects should be expected to provide all improvements along the street, including sidewalks, lighting and landscaping. Most areas of Reno and Sparks should have "basic" accommodations, but areas such as the downtown Core, should have "enhanced" facilities. Using the "basic" or "enhanced" levels of improvements, an appropriate pedestrian treatment can be selected for each area of the region.

- At a minimum, "basic" pedestrian improvements, including four foot minimum sidewalks, high visibility striping at crosswalks, and advanced yield lines, should be required on all roads. Note that sidewalks less than five feet in width require a passing space every 200 feet, as referenced in the *Design Best Practices*.

- Where pedestrian demand is at its highest, "enhanced" improvements should be used. These improvements include all of the basic improvements plus additional elements that make the pedestrian setting an active urban place. Features like extra-wide sidewalks, landscape buffers, special lighting, signage, and seating areas can be used as enhancements.

The basic and enhanced levels of improvements are summarized in the figure on the next page. The *Design Best Practices* provides design features for basic and enhanced levels of improvement.



**The Reno Sparks Bicycle and Pedestrian Plan Design Manual provides additional detail on sidewalk and crosswalk design.*

Basic Pedestrian Needs

As part of the data collection effort, presence of sidewalk was identified on all Regional Roadways. At a minimum, all Regional Roadways should provide basic sidewalk treatments, on both sides of the street. **Appendix I** provides a table of existing roadway segments with missing sidewalk and other crosswalk and pedestrian improvements. It should also be noted that the *ADA Transition Plan* provides a comprehensive list of sidewalk recommendations throughout Reno, Sparks, and Washoe County. The improvements identified in the *ADA Transition Plan* provide access for everyone.

Walking Audits

Four walking audits were performed in areas of high pedestrian activity. The purpose of these walking audits was to identify improvements and train attendees on performing walking audits. Members of the public were invited to attend the walking audits and provide feedback on their experience. Maps were marked up noting things people liked, such as wide sidewalks and pleasant walking environments, as well as deficiencies and obstructions. The four walking audit locations included:

- East side of the University of Nevada, Reno – Evans Avenue, Highland Avenue
- Near Renown Hospital – Mill Street, Gould Street, Stewart Street, Yori Avenue
- Aces Ballpark – Lake Street, State Street, Virginia Street, 1st Street, Center Street, 2nd Street
- West of Sparks Marina – Nichols Boulevard

Maps were created for each walking audit route reporting issues and recommended improvements. The walking audit maps are provided in **Appendix J**. Guidelines for "How To Perform Your Own Walking Audit" are also provided in **Appendix J**.

6. SAFETY, EDUCATION, ENCOURAGEMENT, AND ENFORCEMENT PROGRAMS

SAFETY

Safety is a major concern for both existing and potential users of the bicycle and pedestrian networks, and safety perception is a significant factor that contributes to a person's decision to bicycle or walk, or allow their children to bicycle or walk. This is a valid concern, given the potentially serious implications of a bicycle-vehicle or pedestrian-vehicle collision.

A *Pedestrian Safety Action Plan* (PSAP) has been developed to evaluate pedestrian safety in Washoe County. The PSAP provides a summary of existing safety measures and goals for future implementation of programs and policies to reduce the pedestrian accidents throughout Washoe County.

Bicycle Collisions

Bicycle collision data was provided by NDOT for Washoe County. The data represents all reported bicycle-vehicle collisions that occurred in Washoe County from January 2005 to March 2010. Collisions that occurred on off-street paths are not included in the NDOT data. **Table 8** summarizes the collision data by year and severity of the collision. Five fatalities were reported during the 63 month period, with no more than two per year. Most of the collisions reported (75 percent) resulted in some form of injury. Maps showing the collision locations are provided in **Appendix K**.

Collisions that involve bicycles, whether they involve cars, other bicycles, or pedestrians, are generally underreported. Some bicycle collisions likely occurred that were not reported and therefore not included in the NDOT data. Additionally, collisions that occur on off-street paths are not included in the data.

TABLE 8
WASHOE COUNTY BICYCLE COLLISION SUMMARY
JANUARY 2005 – MARCH 2010

Year	Property Damage Only Collisions	Injury Collisions	Fatal Collisions	Total Collisions
2005	62	55	0	117
2006	17	70	2	89
2007	20	75	2	97
2008	6	87	0	93
2009	13	76	1	90
2010 (January – March)	0	10	0	10
Total	**118 (24%)**	**373 (75%)**	**5 (1%)**	**496**

Source: Nevada Department of Transportation

Trends and Comparisons

Analysis of the collision data indicates that the most common cause of vehicle-bicycle collisions was failure to yield right-of-way by vehicles. Approximately 78 percent of the collisions occurred during the day, with the peak number of collisions from 4:00 to 6:00 PM.

Pedestrian Collisions

Pedestrian collision data for Washoe County was provided by NDOT. The data represents all reported pedestrian-vehicle collisions that occurred in Washoe County from January 2005 to March 2010. **Table 9** summarizes the collision data by year and severity of the collision. 34 fatalities were reported during the five-plus year period, with as many as 11 per year. Most of the collisions reported (77 percent) resulted in some form of injury. A map of the pedestrian collision locations is provided in **Appendix L**.

TABLE 9
WASHOE COUNTY PEDESTRIAN COLLISION SUMMARY
JANUARY 2005 – MARCH 2010

Year	Property Damage Only Collisions	Injury Collisions	Fatal Collisions	Total Collisions
2005	75	51	5	131
2006	35	125	7	167
2007	7	146	11	164
2008	9	143	6	158
2009	5	102	5	112
2010 (January – March)	3	10	0	13
Total	**134 (18%)**	**577 (77%)**	**34 (5%)**	**745**

Source: Nevada Department of Transportation

Trends and Comparisons

A total of 745 vehicle-pedestrian collisions were reported between January 2005 and March 2010. The most common cause of the collisions were right-of-way violations. Several areas, particularly in the downtown areas, have unmarked crossing locations. In many instances, a sidewalk terminates at a road without provision of a marked crosswalk. In many cases these are legal crossing locations (where drivers are required to yield to pedestrians), but the lack of a marked crosswalk creates ambiguity for pedestrians and drivers about who has the right-of-way.

The pedestrian collision data indicates that approximately 63 percent of the collisions occurred during the day; the peak collision hours occur from 4:00 to 6:00 PM.

EXISTING PROGRAMS

Education and Encouragement Programs

Printed Bicycle Maps

The Bicycle/Pedestrian Advisory Committee, in conjunction with the RTC, has created a map of existing and future bicycle facilities in the Truckee Meadows region including shared use paths, bicycle lanes, and shared roadways. The map includes instructions on how to load and unload your bicycle from the bicycle racks attached to the RTC Ride buses. The map also includes safety tips for sharing the road with motorists and provides a graphic of hand signals that should be used when turning or slowing. The 2011 Bike Map is available at local bicycle shops or from the RTC. These maps are useful to riders as they are small enough that riders can take them with them on rides. The map is also printed on a durable tear-resistant and water-resistant paper.

RTC SMART TRIPS

The RTC SMART TRIPS program provides a trip matching service for people looking for a Bike Buddy or Walking Buddy. The program is intended to encourage bicycling and walking, and increase safety for bicyclists and pedestrians. The program allows users to select their preferred mode of transportation and customize the route for each trip. For example, a person may be interested in a bike buddy for trips to work, and a walking buddy for a trip to the movies. In addition to those features, the program includes a commute calendar that allows participants to record trips made by any alternate mode, and see a running total of the dollars they are saving, the amounts of air pollutants they are reducing and the calories they are burning when active travel modes are used.

STREET SMART

Street Smart is a pedestrian safety awareness effort funded through a grant by the Nevada Department of Public Safety Office of Traffic Safety. Current partners working to develop and implement the Street Smart program include:

- Regional Transportation Commission
- Get Healthy Washoe
- University of Nevada, Reno School of Community Health Sciences
- Safe Kids Washoe County
- Sparks Police Department
- Reno Police Department
- Washoe County Sherriff's Office

The goals of the Street Smart program are to increase pedestrian safety awareness and education within the community, encourage safe walking through the promotion of the benefits and making it fast, easy, and efficient for people to locate walking companions, and reduce the number of pedestrian injuries and fatalities within Washoe County.

Hosted Bicycle Challenges

The Truckee Meadows Bicycle Alliance is a volunteer organization that hosts an annual *Bike to Work/School Week* challenge incentivizing local businesses and employees to ride their bike to work rather than drive. According to gethealthywashoe.com, 950 riders registered for Bike to Work Week in 2010, translating into the following estimated benefits to the community and environment:

- $5,427.70 saved through lower commute costs
- 349,200 calories or 99.7 pounds of fat burned
- 226.6 pounds of carbon monoxide emissions eliminated
- 970 pounds of carbon dioxide emissions eliminated

These types of programs motivate bicyclists of all ages and skill levels and should continue to be supported by local public agencies.

Kiwanis Bike Program

The Reno Sparks Kiwanis Bike Program is a local organization that provides bicycle education programs related to bicycle repair and safe riding practices for at risk youth throughout northern Nevada. In addition to their regular bicycle rodeos and bicycle repair clinics, Kiwanis Bike Program distributes over 600 bicycles and over 1,500 helmets annually. Kiwanis offers a "Caught Safe" incentive programs that encourages children to use helmets.

According to Nevada Big Book of Safety, Kiwanis has expanded to teach pedestrian safety basics, and plans to develop two educational guides – one focused on bicycle safety and one on pedestrian safety – which they will share with other community education groups in an effort to collaborate community wide.

Safe Kids "Ready to Walk and Roll" Summer Camp

The Safe Kids Washoe County Coalition, which is coordinated by REMSA staff organizes the Safe Kids "Ready to Walk and Roll" Summer Camp aimed at encouraging Sun Valley neighborhood youth to become independent travelers. The six one-week camps teach children between the ages of 10-13 years old how to safely reach the many recreational, educational and future work destinations available in their community by establishing a safe and positive bicycling culture in Washoe County. Campers are provided with a mountain-style bike, helmet, lock and repair kit. Through active participation and attendance the children can earn these items to keep. The RTC and many other organizations assist with the camps.

RTC staff work together to coordinate and present the Bikes on Buses option to the campers as one of their camp activities. The children begin their trek from base camp at the Sun Valley Community Center and end at the RTC 4TH STREET STATION where they learn about the RTC, the advantages of using alternative modes of transportation, and how riding bicycles and buses, as well as walking, benefits their health and improves the air quality in the Truckee Meadows. The activity also includes a "hands on" exercise on how to safely load and unload a bike on the bus and wraps up with a ride on RTC SIERRA SPIRIT to the UNR Knowledge Center. The summer camp program runs from mid-June through the end of August.

Riding Bicycles on Sidewalk Brochure

The RTC SMART TRIPS program has published a brochure titled *Riding Bicycles on Sidewalks Can Be Dangerous and Illegal in Many Places!* The brochure is intended to educate bicyclists on laws and safety issues

related to bicycling on the sidewalk. Drivers mainly look for traffic in the roadway, and do not expect cyclists on sidewalks when turning into driveways or intersections, making these conflicts points. The brochure also addresses safety issues and the legality of riding the wrong way against vehicle traffic.

Cycling at Night Brochure

The RTC SMART TRIPS program has published an educational brochure about riding at night. The brochure provides information about Nevada laws related to cycling at night, and safety tips including information about headlights and rear reflectors, high visibility clothing, defensive riding, and effective trip planning.

Triggering Traffic Lights with Bicycles Brochure

The RTC SMART TRIPS program has published a brochure with information on how to be detected by a traffic signal while riding a bicycle. The brochure provides positioning techniques and information about what to look for in the travel lane. The brochure also provides a hotline number to call with complaints about specific signalized intersection locations that have trouble detecting bicycles.

Bicycle Friendly Communities Application

A Bicycle Friendly Communities Application was prepared by the RTC in 2011. The League of American Bicyclists offers bicycle friendly communities award recognition for actively supporting bicycling, providing safe accommodations for cycling, and encouraging people to bicycle for transportation and recreation. Applications can be awarded Platinum, Gold, Silver, Bronze, and Honorable Mention designations. The Reno, Sparks, and Washoe County region was awarded with the Bronze level award.

Walk Friendly Communities Program

The City of Sparks received an honorable mention Walk Friendly City designation based on their Draft Comprehensive Plan and the Draft Reno Sparks Bicycle and Pedestrian Master Plan.

Pocket Guides

The Nevada Office of Traffic Safety has published two pocket guides titled *SWAPNV Safe Walking and Pedaling* and *Kids Walking Nevada Safely*. Each pocket guide provides information on Nevada's State pedestrian laws and tips on how to walk safely and be seen while walking.

Enforcement Programs

Police Bicycle Patrol

In Downtown Reno police regularly patrol on bicycle during weekends and during major events.

Photo Red Light Enforcement Programs

Activated by loops in the pavement, red light cameras photograph the license plate and sometimes the driver of any vehicle entering an intersection after the light has turned red. Warnings or citations are sent to offenders to discourage a repeat of the offense. Speeding and double-parking can be discouraged with similar measures.

Red light cameras are appropriate for locations with speeding or red-light-running issues. Fines from citations help pay for the red light camera system. These programs discourage drivers from performing dangerous maneuvers that can be particularly harmful to a bicyclist or pedestrian.

Radar Speed Signs

Radar speed signs feature a changeable message sign linked to a radar unit; the signs display a vehicle's actual speed as the vehicle approaches the sign. Radar speed signs can be mounted permanently to a pole (where they are powered by hard wire or a solar unit) or alternatively they can be mounted to a trailer (also known as a "speed trailer") and deployed on a temporary basis. Studies in the United States have shown that radar speed signs are an effective way of slowing traffic. Slower vehicle traffic creates a safer and more comfortable walking and bicycling environment for bicyclists and pedestrians.

Reno Police Bicycle/Pedestrian Enforcement

According to the Nevada Big Book of Safety, the Reno Police Department recognizes the need to increase the enforcement of bicycle and pedestrians laws. This project focuses its efforts by funding increased police enforcement targeting pedestrians, bicyclists, and motorists in an effort to expand obedience to traffic laws while promoting a safer traffic environment.

Sting Operations

Sting operations are used to target motorists who dangerously violate the right-of-way of bicyclists and pedestrians in the roadway, particularly motorists who do not stop for a pedestrian in a crosswalk, or motorists who drive in a bicycle lane. Similarly, sting operations also target bicyclists and pedestrians who commit moving violations. Sting operations are most effective on roadways and intersections with high bicycle and pedestrian volumes.

Sting operations should be conducted on a recurring basis since changes in motorist behavior can be short-term. In addition to, or in lieu of, fines, officers can issue educational materials that inform drivers and bicyclists of the rules of the road. By working with local news media, the sting operations can reach a broader segment of the public in addition to residents who are pulled over. Sting operations can also be developed to target children who bicycle without helmets. Other cities, such as Bend, Oregon, have received Federal grant funding to pay police officers for the overtime work necessary to conduct sting operations.

SAMPLE PROGRAMS

This section provides a toolbox of education, encouragement and enforcement programs that is both adaptable to the unique needs of each municipality and flexible to budget opportunities and constraints. Elements of several of these tools are already utilized in the region. Many education efforts involve an element of community participation as they are volunteer-based. As a result, education programs are among the most inexpensive tools to improve the walking and bicycling environment. Education programs can also be a collaborative effort between the agencies and local public health organizations.

Education and Encouragement Programs

Media Awareness Campaign

The purpose of general media campaigns is to educate the general public about the rights and responsibilities of bicyclists and motorists. An additional purpose is to improve the overall perception of bicycling as a fun mode of transportation that can improve health, the environment, and reduce transportation costs associated with fuel purchases. These campaigns can include printed brochures, maps, stickers, buttons, posters, radio and television ads/commercials, events, mailings, partnerships between agencies and private businesses, raffles, challenges, online information, billboards, and ads posted on public transit vehicles, bus stops, and stations. Each of these tactics can encourage bicycling, while building a fundamental awareness about bicycle safety.

In 1988, the City of Colorado Springs, Colorado established a $4.00 bike tax on every bicycle sold in the City. The funds generated by that tax (approximately $85,000 each year in a city of 414,000) are specifically earmarked for bicycle projects. Similar taxes in other cities could be used to fund bicycle projects (bike paths or bike lanes), or alternatively could be used for outreach campaigns.

Billboards and Electronic Message Boards

Billboards and electronic message boards can be used to promote bicycle and pedestrian safety in the community, inform the public about safety programs, and provide feedback on the programs' effects. *Street Smarts* is one example of a public education campaign targeted toward changing driver, pedestrian, and bicyclist behavior to improve safety on our streets.

Street Smarts Program

Street Smarts is an example of a safety program initiated by the City of San Jose, California. Electronic message boards were used to display safety messages. Messages were changed regularly and the boards were moved repeatedly to maximize their impact. The *Street Smarts* campaign was launched in November 2002 and has received positive feedback from the public.

Street Smarts was designed as both a media and a community relations campaign. It uses education to raise awareness of certain problem behaviors that contribute to traffic collisions, and aims to change those behaviors over time. Current behaviors being addressed by the campaign are: red-light running, speeding, stop sign violations, school zone violations, and crosswalk violations. In addition to a media campaign, it is critical to include a community relations campaign, working with schools, neighborhood associations, businesses and community organizations to create a public forum to address this growing community issue.

Message boards can be used at various pedestrian hot spots. The *Street Smarts* campaign materials are designed for use by any public agency for any community and are available from the City of San Jose. Materials are available in English, Spanish and Vietnamese.

The *Street Smarts* program has many advantages:

- The use of electronic message boards allow agencies to communicate multiple messages using a single tool
- High-quality campaign materials were designed to be used regionally by any public agency
- The artwork is available from the City of San Jose for $3,500

- Media campaigns use a wide variety of communication tools

Although the *Street Smarts* campaign requires staff resources, the overall cost is relatively low to implement.

Street Smarts Campaign Graphics, City of San Jose, CA

Bike Rides with Politicians

Group bicycle rides are a great way to encourage new users, and including local celebrities can often motivate new bicyclists. Including political officers in the rides emphasizes the importance of bicycling in their community. The agencies could work with advocacy groups to lead bicycle rides with local political officers and celebrities on local bicycle routes, with emphasis on encouraging new bicycle users. Additional "ribbon cutting" rides could be hosted to celebrate the completion of segments of the bikeway system.

Bicycle Detection Brochures

The *Design Best Practices* includes details for providing bicycle detection at signalized intersections. As more signals in the region include bicycle detection, brochures can be useful in educating bicyclists on how traffic signals work and the best way to be detected at a signalized intersection. A bicycle detection brochure should describe the types of traffic signal detection that can be used at an intersection (video detection and inductive loop detection) and explain how the detectors work.

Brochures can be distributed at locations with high volumes of bicyclists and on the RTC's website, as part of a general education campaign. Brochures are generally a low cost way to communicate a point, but may not reach a wide audience.

Public Service Announcements

Public service announcements (PSAs) are an important part of creating bicycling awareness, as they can effectively reach the general public via TV, radio, Internet, or print media, and reinforce other education and outreach messages. A well-produced public service message can be memorable and effective. The following are example messages from the *Decide to Ride* bicycle-focused public service announcement campaign developed by the Bicycle Transportation Alliance:

"What If?"	Encourages residents to try bicycling for transportation or exercise
"Look Right, See Right"	Reminds drivers to look over their shoulder before changing lanes
"See and be Seen"	Encourages bicyclists to use lights at night
"Wrong Way"	Reminds bicyclists not to bicycle against traffic
"Close Call"	Reminds bicyclists that they must obey traffic laws just like a vehicle

When developing PSAs it is important to consider how a message is received. For example, while bicycle safety messages are great for individuals who are already interested in bicycling, they may not be successful in encouraging individuals to take up bicycling for the first time. Safety PSAs bring the potential safety risk to the forefront before the positive encouragement, which can often result in a negative perception that biking is unsafe or more unsafe than other modes of transportation. Alternatively, innovative PSAs that raise bicycling awareness through positive encouragement without negatively associating it with safety messages or potential safety risks are often more effective.

The Bicycling on Sidewalks brochure and Cycling at Night brochure are examples of existing PSAs developed by the RTC.

Employer Incentives

Many people will commute by bicycle only if their workplace conditions support the activity. In addition to physical amenities such as quality long-term bicycle parking and shower/locker facilities, government agencies or employers can provide several policy incentives. Transportation Management Associations (TMAs) can provide support to the public agencies. Some incentives that have shown success in a variety of work environments include:

- Discounts at bike shops.
- Subsidized bicycle repair.
- Discounts on bicycle registration.
- Special events such as barbeques with information and raffle drawings.
- Friendly competitions, such as the Bike to Work Corporate Challenge, that publicize firms' commuting habits and provides weekly drawings for bicycle commuters.
- Giveaways, such as a bicycle "starter kit," which might include a water bottle, patch kit, reflective stickers, and instructions to obtain a bike map.
- Employee information about bicycle commuting with weekly brown bag discussions or a website.
- Coordinated "bicycle buddy" systems in which another employee rides to work with a new commuter, providing advice, information, and moral support.
- Recreational or fitness rides at lunchtime or after work, where employees can socialize and ride together.
- Prizes and acknowledgement for people who bike to work regularly.
- Cash back to bicyclists who do not use an employee parking space.
- Flextime or a longer grace period for bicycle commuting.
- A newsletter that establishes company goals and monitors the program's progress.
- Cash incentives to frequent commuters.

- "Smart Cycling Clinics" taught by a League Certified Instructor (LCI) from the League of American Bicyclists.

Employer Recognition

Employer recognition programs take place when public agencies work with area businesses and help train, support, and recognize those that encourage employee and visitor bicycling. This type of program may include a variety of participation incentives:

- Bicycle-friendly business audit program
- Annual bicycle-friendly business certification program
- Assistance with bicycle parking
- Cash or credit at a local bicycle shop
- Staff time and/or financial support for building facilities and creating incentives
- Discounts for customers who arrive by bicycle
- Public recognition of bicycle-friendly businesses on a bicycle map or elsewhere

Similar to the League of American Bicyclists' Bicycle Friendly Business program, the RTC could develop a local bicycle-friendly business award program. Businesses that take significant steps toward promoting bicycling among their employees or customers could be formally recognized on an annual basis; the RTC could additionally host a webpage that showcases each year's award winners. Benefits provided by a bicycle-friendly business might include commuter tax benefits for employees, secure bicycle parking, and promotion of Bike to Work Week. This type of program would benefit businesses in two ways: businesses are incentivized by RTC advertising to become bicycle friendly, and evaluations of other businesses will clearly demonstrate what steps they need to take to better accommodate bicyclists.

The Truckee Meadows Bicycle Alliance currently hosts an annual Bike to Work Week challenge incentivizing local businesses to encourage their employees to ride their bike to work rather than drive.

Smart Phone/Web-Based Trip Maps and Planning Resources

Online trip mapping has increased in popularity over the years; *www.maps.google.com* recently began offering online directions via bicycle. Using Google's interface, users can input their origin and destination addresses and receive directions that route them onto roadways that offer bicycle facilities. Some websites, such as *www.mapmyride.com*, allow users to create, store, and download routes using online maps and aerial imagery to share with other interested parties. Smartphone apps for with these features could provide a mobile interface for bicyclists and pedestrians to use while "on-the-go." An app with an existing bicycle facilities map could be included for easy access.

In addition to online trip mapping, several cities are using map-based interfaces to receive public comment to identify locations where maintenance is needed; a smartphone app was created for this *Master Plan* for that purpose.

Health Promotion

Bicycling offers a means for residents to maintain a physical and healthy lifestyle. Studies show that people are attracted to bicycling because they want to lose weight or stay in shape.[15]

Local agencies can take advantage of bicycling health benefits by incorporating health promotions into multi-modal marketing campaigns. In addition, local health care providers such as Renown Health and Saint Mary's Medical Center could provide health information to patients. Public agencies can take an active role by forming a task force that includes area advocates and health officials. Bicycle friendly events, such as Car-Free Days, Earth Day (each year on April 22), and Bike to Work Week (each year in May), can also be used to promote bicycling as a healthy activity.

Weekly Ciclovía

A ciclovía – which translates from Spanish to "bike path" in English – is an event where streets are temporarily closed to automobiles and used exclusively by bicyclists, runners, and skaters. The ciclovía originated in Bogota, Colombia, where several city streets are closed each Sunday from 7:00 AM until 2:00 PM. During that time, residents bicycle, run, and skate in the streets; city parks also host musicians, aerobics classes, and yoga sessions. The ciclovía has been mimicked by cities such as San Francisco, which hosts the Sunday Streets events on nine Sundays throughout the year. Several other cities throughout the United States have developed similar events.

Pedestrian Mascot

A pedestrian mascot is a fun way to educate school children on pedestrian safety. Bellevue, Washington launched a pedestrian mascot campaign at their elementary schools in conjunction with roadway improvements. The mascot called PedBee is pictured on school safety signs and makes personal appearances at school safety days. Safety days include local city staff from the City's Transportation and Police Departments. Children are taught bicycle, pedestrian, and traffic safety basics, and are given traffic safety workbooks that provide guidance through hands on activities such as coloring and safety procedure quizzes.

Walk Wise, Drive Smart

With the growing number of Americans age 65 or older, *Walk Wise, Drive Smart* was created in Hendersonville, North Carolina to improve the pedestrian environment for senior adults. This community-based pedestrian safety program is funded by the National Highway Traffic Safety Administration (NHTSA) and provides educational workshops and walking audits in support of pedestrian safety awareness for seniors, as well as educational workshops, walking audits, and feedback surveys. Activities are aimed at senior citizens providing exercise at a pace and location comfortable to the participants, but are open to all.

Share the Road Campaign

Share the Road campaigns serve as a reminder to all transportation system users – bicyclists, pedestrians, and motorists – that everyone is a legitimate user of the roadway, and that the roadway right-of-way system must be shared between user types.

[15] Liliana Gonzalez, et al. (Feb. 2004). 2002 Bicycle Transportation User Survey; Developing Intermodal Connections for the 21st Century. University of Rhode Island Transportation Center. URITC Project No. 536182.

A Share the Road Week that features special educational opportunities for bicyclists and motorists could be implemented as part of this campaign. City and County Police Departments could conduct focused traffic stops during that week for violations related to sharing the road (driving in the bike lane, not yielding to pedestrians at crosswalks, etc.). The "Share the Road" phrase could be delivered via radio ads, television commercials, billboards, buses, or on variable message signs.

Enforcement Programs

Enforcement tools have proven to be very effective in improving safety for road users. However, some programs can require a significant investment from local agencies. Newer enforcement tools like red-light running cameras and radar "wagons" can minimize the amount of staff time required of local law enforcement agencies. The following examples of enforcement programs have been implemented in areas around the United States in an effort to improve safety for all road users.

Moving Violations

Decreasing moving violations committed by motorists, bicyclists, and pedestrians is critical to improving bicycle and pedestrian safety and encouraging all roadways users to share the road. Moving violations by motorists that affect bicyclists and pedestrians include:

- Speeding
- Passing without sufficient clearance
- Driving in the bicycle lane
- Turning right in front of a bicyclist
- Failing to use a turn signal
- Double parking
- Failing to yield or stop at a crosswalk

Moving violations by bicyclists and pedestrians include:

- Running stop signs or red lights
- Failing to use hand signals
- Wrong-way riding
- Riding without lights at night
- Failing to wear a helmet (if under 18 years of age)
- Jaywalking
- Stepping out from between vehicles or other objects
- Failing to give motorists sufficient time to stop before crossing the road

Moving violations can be reduced by increasing fines for offenders. To further enhance the effectiveness of elevated fines, a "target week" can be established after advertising increased fines for these types of violations. By advertising the increase in fines via radio ads, television commercials, and billboards, agencies can remind all residents of bicycle-related vehicle codes.

Educational Videos

Several jurisdictions throughout the United States have developed videos to educate motorists, bicyclists, and pedestrians regarding laws related to each mode of transportation. Videos are a useful education tool and can be shown to drivers when applying for a drivers license, or to students taking driver education courses. Videos can also be developed specifically for the education of law enforcement officers so they know how to properly enforce laws related to bicycling.

Tattletale Lights

To help law enforcement officers catch red-light runners safely and more effectively, a "rat box" is wired into the backside of a traffic signal controller and allows enforcement officers stationed downstream to identify, pursue, and cite red-light runners. Warning signs may be set up along with the box to warn drivers about the fine for red-light violations.

Rat boxes are a low-cost initiative (approximately $100 to install the box), but do require police officers for enforcement.[16]

[16] The City of San Jose's Traffic Enforcement Unit has an established program using the rat box. Further information on its use is available on the City's Web site: http://www.sjpd.org/BFO/SpecialOps/TEU/

7. FUNDING AND IMPLEMENTATION

COST OF NEW FACILITIES

Construction Costs

Unit cost summaries for the construction of bikeway facilities and pedestrian-related facilities in the Truckee Meadows are provided in **Tables 10 and 11** below. These estimates are based on costs experienced in the Reno Sparks area and other communities throughout the west, with small increases to account for engineering, construction management, inspection, and contingency costs. More detailed estimates should be developed following the preliminary engineering stage as individual projects advance towards implementation.

Bicycle Facilities

For purposes of this *Bicycle and Pedestrian Master Plan*, conceptual construction costs for the proposed bikeway system were based on the following:

- New Shared Use Paths would be constructed on generally flat right-of-way with no grade separation and minimal grading needed; cost of right-of-way acquisition and trail amenities are not included.
- New Bicycle Lane costs include three categories: 1) signing/striping only with minimal or no roadway improvements, 2) signing/striping and roadway widening with no curb/gutter, and 3) signing/striping, roadway widening with curb/gutter improvements/construction. The cost of right-of-way is not included.
- New Shared Roadway costs include three categories: 1) just signing, 2) signing and pavement stencils ("sharrows"), and 3) bicycle boulevard construction with signing/striping and traffic calming devices such as bollards, medians, and speed humps. The cost of right-of-way is not included.

TABLE 10
CONCEPTUAL UNIT COST ESTIMATES FOR BIKEWAY CONSTRUCTION

Facility Type	Estimated Cost per Mile
Shared Use Path – Construct path with minimal grading needed	$1,000,000
Bicycle Lane – Signing/Striping Only	$25,000
Bicycle Lane – Signing/Striping with Additional Width (No Curb/Gutter Improvements)	$100,000
Bicycle Lane – Signing/Striping with Additional Width and Curb/Gutter Improvements	$350,000
Shared Roadway – Signing Only	$2,650
Shared Roadway – Signing with Sharrows	$6,000
Bicycle Boulevard	$115,000

Notes: Costs are in 2011 dollars. Right-of-way costs are not included in estimates.
Source: Fehr & Peers, 2011

Pedestrian Facilities

For purposes of this *Bicycle and Pedestrian Master Plan*, conceptual construction costs for the proposed pedestrian improvements were based on the following assumptions:

- Cost estimates do not include demolition costs.
- Cost of relocating utility poles and fire hydrants does not include engineering costs or undergrounding of utilities.

TABLE 11
CONCEPTUAL UNIT COST ESTIMATES FOR SIDEWALK-RELATED CONSTRUCTION

Facility Type	Estimated Cost per Mile
Relocate Utility Pole	$5,000
Relocate Street Sign	$250
Relocate/Remove Tree	$1,200
Relocate Fire Hydrant	$20,000
Bus Stop Shelter and Installation	$20,000
Bus Stop Bench and Installation	$1,500
Sidewalk Construction	$15 / sq. ft.
Truncated Dome Installation	$250
Curb Ramp and Truncated Dome Installation	$4,000

Notes: Costs are in 2011 dollars. Right-of-way costs are not included in estimates.
Source: Fehr & Peers, 2011

Note that the cost estimates provided in Tables 10 and 11 are meant to provide "ballpark" estimates, and do not include right-of-way acquisition or other design elements that may cause an increase in the overall cost of a project. A detailed cost estimate should be performed as an individual project moves to construction.

Maintenance Costs

Shared use path maintenance includes cleaning, resurfacing, and re-striping the asphalt path, repairing bridges and other structures, cleaning drainage systems, removing trash, and landscaping. While this maintenance effort may not be incrementally major, it does have the potential to develop heavy expenses if it is not done periodically.

The estimated annual maintenance expense for a shared use path is approximately $25,000 per mile. For bicycle lanes, the cost consists of maintaining pavement markings and striping. The estimated annual maintenance cost is approximately $1,600 per mile. Shared roadways will require maintenance of signs located along the route. The estimated annual maintenance cost is $150 per mile.

FUNDING SOURCES

Federal Funding Sources

The following Federal sources provide funding that could be utilized by the Reno Sparks region for implementation of bicycle and pedestrian projects.

Safe, Accountable, Flexible, Efficient Transportation Equity Act – A Legacy for Users (SAFETEA-LU) –SAFETEA-LU provides funding for roads, transit, safety, and environmental enhancements. These are generally State and local improvements for highways and bridges that accommodate additional modes of transit. Improvements include capital costs, publicly owned intercity facilities, and pedestrian and bicycle facilities. This legislation also includes a Safe Routes to School program, with funding for projects that improve pedestrian and bicycle access and safety around primary and middle schools. Cities, counties, and transit operators can apply for SAFETEA-LU funds. A local match of between 0 percent and 20 percent is required, based on the funding program. SAFTEA-LU was passed in 2005 and was originally set to expire in 2009 but has since been extended with short-term measures. The most recent extension was passed by the House of Representatives on March 2, 2011, extending SAFTEA-LU legislation through September 30, 2011. Transportation leaders in the House and Senate have indicated their hopes to enact a full six-year authorization bill later in 2011, but many believe this will not occur until after the 2012 presidential election. At that time it will be necessary to review any changes to current Federal funding opportunities. Currently, there are several SAFETEA-LU programs that can be used to fund bicycle and pedestrian projects. These include the following:

- *Surface Transportation Program Fund, Section 1108 (STP)* – STP are block grant funds that are used for roads, bridges, transit capital, and bicycle projects. Eligible bicycle projects include bicycle transportation facilities, bike-parking facilities, equipment for transporting bicycles on mass transit facilities, bike activated traffic control devices, preservation of abandoned railway corridors for bicycle trails, and improvements for highways and bridges. Cities, counties, metropolitan planning organizations (MPO), and transit operators can apply for STP funds. An 11.5 percent local match is required for these funds when used for bicycle projects. Ten percent of each State's annual STP funds are set aside for Transportation Enhancement Activities (see *State Funding Sources*).

- *National Highway System Fund (NHS), Section 1103* – NHS funds provide for an interconnected system of principal arterial routes. The goal of the program is to afford access to major population centers, international border crossings, and transportation systems; meet national defense requirements; and serve interstate and inter-regional travel. This travel includes access for bicyclists. Facilities must be located and designed pursuant to an overall plan developed by each metropolitan planning organization (MPO) and State, and incorporated into the RTP. Both State and local governments can apply for NHS funds. A 20 percent local or State match is required for these funds.

- *Congestion Mitigation and Air Quality Improvement Program (CMAQ), Section 1110* – CMAQ funds are available for projects that will help attain National Ambient Air Quality Standards (NAAQS) identified in the 1990 Federal Clean Air Act Amendments. Projects must be located within jurisdictions in non-attainment areas. Eligible projects include bicycle facilities intended for transportation purposes, bicycle route maps, bike-activated traffic control devices, bicycle safety and education programs, and bicycle promotional programs. Cities, counties, MPO, State, and transit operators can apply for CMAQ funds. Generally a local or State match is required for these funds. The program is administered by the State.

- *Bridge Repair and Replacement Program (BRRP), Section 1114* – BRRP funds are available for bridge rehabilitation and replacement. When a highway bridge deck is being replaced or rehabilitated with Federal funds, the bridge-deck must provide bicycle accommodations, if access is not fully controlled.

Bridge projects must be incorporated into the Regional Transportation Improvement Program (RTIP). Cities may apply for these funds. No local match is required specifically for bicycle accommodations.

- *National Recreational Trails Fund, Section 1112* – Funds are available for recreational trails for use by bicyclists and other non-motorized and motorized users. Projects must be consistent with a Statewide Comprehensive Outdoor Recreation Plan (SCORP). Projects include development of urban trail links, maintenance of existing trails, restoration of trails damaged by use, trail facility development, provision of access for people with disabilities, administrative costs, environmental and safety education programs, acquisition of easements, and construction of new trails. Private individuals/organizations, cities, counties, and other governmental agencies can apply for these funds. The program is administered by Nevada State Parks. A 20 percent local match for funds is required. Funding ranges from $4,000 to $100,000 per project.

- *National Highway Safety Act, Section 402* – The Highway Safety Program is a non-capital safety project grant program under which states may apply for funds for certain approved safety programs and activities. There is a priority list of projects for which an expedited funding mechanism has been developed; bicycle safety programs have been included on this list. States must adopt a Highway Safety Plan (HSP) reflecting State highway problems and a Performance Plan, which establishes goals and performance measures to improve highway safety to be eligible. Eligible projects include bicycle safety programs, program implementation, and identification of highway hazards. State departments, cities, counties, and school districts may apply for these funds. The local match required varies between 0% and 10%. The maximum grant award is $900,000.

- *Transportation, Community and System Preservation (TCSP) Program, Section 1117* – TCSP funds are available for transit-oriented development, traffic calming and other projects that improve the efficiency of the transportation system, reduce the impact on the environment, and provide efficient access to jobs, services and trade centers. The program is intended to provide communities with the resources to explore the integration of their transportation system with community preservation and environmental activities. The program is administered by the Federal Highway Administration. States, MPOs, local governments and tribal agencies are eligible for discretionary grants. TCSP Program funds require a 20 percent match. Project awards range from about $100,000 to $2 million.

- *Transit Enhancement Activity, Section 3003* – The Transit Enhancement Activity fund can be used for bicycle access to mass transportation, including bicycle storage facilities and installation of equipment for transporting bicycles on mass transportation vehicles. Regional transportation planning agencies, State, and local agencies may apply for these funds. A 5 percent local match is required for these funds.

- *Highway Safety, Research, and Development Fund, Section 2003* – This fund can be used to improve bicycle safety through education, police enforcement, and traffic engineering. Projects must be incorporated into the RTIP. Cities, counties, and State agencies can apply for these funds. A 25 percent local match is required for these funds.

- *Section 3 Mass Transit Capital Grants* – This fund can be used for mass transit station access including bicycle access, bicycle parking facilities, bicycle racks, and other equipment for transporting bicycles on transit vehicles. States, regional, local governments, and transit operators can apply for these funds. A 10 percent local match is required for bicycle related projects using these funds.

- *Interstate Maintenance (IM), Section 1101* – IM funds may be used to resurface, restore, rehabilitate, and reconstruct interstate routes, including pedestrian and bicycle facilities over, under, or along interstate routes. Funds are administered by the State.

State Funding Sources

- *Transportation Enhancements Program (TE)* – The TE Program is a 10 percent fund set aside from the STP (see *Federal Funding Sources*). Projects must have a direct relationship to the intermodal transportation system through function, proximity, or impact. This program has 12 activities that are eligible for funding. Two enhancement activities are specifically bicycle related: 1) provision of facilities for bicyclists, and 2) preservation of abandoned railway corridors (including the conversion and use for bicycle trails). Local, regional, and State public agencies, special districts, non-profit and private organizations can apply for TE funds. Cities, counties, or transit operators must sponsor and administer the proposed projects. A 12 percent local match is required for these funds.

- *Community Development Block Grants (CDBG)* - CDBG funds are available for projects and programs that develop viable urban communities by providing decent housing and a suitable living environment and by expanding economic opportunities, primarily for persons of low and moderate income. Funds may be used for acquiring property; building public facilities and improvements, such as streets, sidewalks, and recreational facilities; and planning and administrative expenses, such as costs related to developing a consolidated plan and managing CDBG funds. The State makes funds available to eligible cities and counties through a variety of different grant types and grantees enter into a contract with the State. Eligible agencies are determined based on a formula, and are listed on the HUD website (Reno and Sparks are both listed as entitlement cities).[17]

- *Office of Traffic Safety (OTS) Grants* - OTS grants are administered by the Nevada Department of Public Safety. Grants are used to establish new traffic safety programs, expand ongoing programs or address deficiencies in current programs. Pedestrian safety is included in the list of traffic safety priority areas. Grants are available for government agencies, State colleges, State universities, school districts, fire departments and public emergency services providers. Funds cannot be used for program maintenance, research, rehabilitation or construction. Grants are awarded on a competitive basis, and priority is given to agencies with the greatest need. Evaluation criteria to assess need include: potential traffic safety impact, collision statistics and rankings, seriousness of problems, and performance on previous OTS grants. The Nevada application deadline is April of each year.[18]

- *National Scenic Byways Program* - The National Scenic Byways Program identifies roads with outstanding scenic, historic, and cultural, natural, recreational, and archaeological qualities as National Scenic Byways. The program provides funding for scenic byway projects and for planning, designing, and developing scenic byway programs. There is a 20 percent match requirement. Funds can be used for on-street and off-street bicycle facilities, pedestrian facilities, intersection improvements, user maps and other publications.[19]

- *Rivers, Trails and Conservation Assistance Program (RTCA)* - RTCA is a National Parks Service program which provides technical assistance via direct staff involvement, to establish and restore greenways, rivers, trails, watersheds and open space. The RTCA program provides only for planning assistance, and not implementation. Projects are prioritized for assistance based upon criteria which include conserving significant community resources, fostering cooperation between agencies, serving a large number of users, encouraging public involvement in planning and implementation, and focusing on lasting accomplishments. Eligible applicants include non-profit organizations, community groups, tribes or tribal

[17] http://portal.hud.gov/hudportal/HUD?src=/states/nevada/community/cdbg

[18] http://ots.state.nv.us/OTS_FormsPubs.shtml#grant (see Mini-Grant Applications, Bike-Ped Mini Grant Application 2010-2011)

[19] http://www.bywaysonline.org/grants/

governments, and local, State, or Federal government agencies. Federal agencies may be the lead partner only in collaboration with a nonfederal partner.[20]

Local and Regional Funding Sources

- *Regional Road Impact Fee (RRIF)* - The RRIF program was implemented in November 1995 which included the preparation of a "capital improvements plan" (CIP) as required by the Nevada impact fee statute, NRS 278B, *Impact Fees for New Development.* With the preparation of the CIP and its companion, General Administrative Manual, the RRIF program was adopted and is jointly administered by the Regional Transportation Commission of Washoe County (RTC), the City of Reno, the City of Sparks and Washoe County, within the framework of an Interlocal cooperation agreement as authorized by the State Interlocal Cooperation Act. Revenue collection under the RRIF began in February 1996. The fee mainly funds capacity improvements such as new roads and ramps, road widening and intersection improvements, but bicycle and pedestrian accommodation can be incorporated into these projects. Sidewalks are part of the design standards for roadways built as part of the RRIF and can therefore be funded.

- *General Funds* - General funds from sales taxes, property taxes, and other taxes and fees are available for use on bicycle and pedestrian improvements. There are generally few restrictions on the use of these funds, which are used for a variety of local budget needs, however, the demand for these funds is typically high.

- *Special Improvement Districts* - Counties and cities may establish special improvement districts to provide funding for specific public improvement projects within the designated district. Property owners in the district pay a fee to fund these improvements which can either be a one-time or on-going fee. Street pavement, curbs, gutters, sidewalks, and streetlights are some of the common improvements funded by special improvement districts. Business Improvement Districts and Special Assessment Districts are example of special improvement districts.

- *Integration into Larger Projects* - The Nevada Department of Transportation has a "Bicycle Facilities Checklist" that it compares against roadway project designs. Roadway projects must incorporate facilities in approved local bicycle and pedestrian plans where feasible. Bicycle and pedestrian facilities may also be constructed as part of private developments or local projects.

Other Funding Sources

- *Kodak American Greenways Program* – The Kodak American Greenways Program provides funding for the planning and design of greenways. The program is administered by The Conservation Fund, and awards may be used to fund unpaved trail development. Eligible applicants include non-profit organizations and public agencies. The maximum award is $2,500, but awards typically range from $500 to $1,500. The application deadline for 2011 is on June 15th.[21]

- *Bikes Belong Grant* - Bikes Belong is an organization sponsored by bicycle manufacturers with the intent to increase bicycle use in the United States. Bikes Belong provides grant opportunities of up to $10,000 with a minimum 50% match to organizations and agencies seeking to support facility and advocacy

[20] http://www.nps.gov/ncrc/programs/rtca/

[21] http://www.conservationfund.org/kodak_awards

efforts. Eligible projects include bike paths, trails, and bridges, mountain bike facilities, bike parks, and BMX facilities.[22]

IMPLEMENTATION STRATEGIES

This section outlines various implementation actions recommended in support of the related bicycle and pedestrian improvements.

Monitoring

As funding allows, the RTC and partner agencies should develop a monitoring program that tracks various aspects of the bicycle and pedestrian plan implementation. Ideally, the agencies would designate one individual (i.e. a regional bicycle and pedestrian coordinator or assign a transportation engineer/planner) to develop and conduct the program. Alternatively, the monitoring can be assigned to multiple individuals (either regionally or at the local jurisdiction level).

- **Plan Review**: Roadway improvement plans and development plans should be reviewed by the individual responsible for monitoring to ensure that bikeway and pedestrian improvements are implemented, and design standards are met. The review should also include an assessment of impacts to existing bicycle and pedestrian safety, access, and mobility and strategies to mitigate any impacts.

- **Collision Monitoring**: Bicycle and pedestrian related collision data should be collected annually from NDOT and the law enforcement agencies and tabulated to show patterns by location and collision type.

- **Public Involvement**: The responsible individual should provide the Bicycle and Pedestrian Advisory Committee with materials, information, and other support as the system is being implemented. Bicycle and pedestrian promotional and educational events should be coordinated by the responsible individual.

- **Maintenance**: Monitor the annual maintenance and operations budget, collaborating with the Utility Division. The responsible individual should keep track of long term bicycle/pedestrian facility maintenance, schedule repairs, and respond to calls from the public or staff regarding maintenance needs. In addition, surface conditions need such as sweeping or snow removal should be monitored by the individual.

- **Funding Monitoring**: The responsible individual should work closely with various funding agencies such as NDOT and FHWA to keep abreast of funding opportunities and to follow up on applications to ensure maximum success.

- **Safety Monitoring**: The individual should be responsible for coordinating with law enforcement regarding the needed enforcement on bicycle/pedestrian facilities.

- **Bicycle & Pedestrian Facility Implementation Log**: Keep a record of project implementation.

- **Census Data and Mode Split:** The individual should track journey to work Census data on an annual basis.

- **Goals/Policies Report Card**: The individual should develop an annual report card that identifies progress with meeting the Master Plan Goals/Policies.

[22] http://www.bikesbelong.org/grants

In addition, the RTC should facilitate an annual bicycle/pedestrian agency summit that includes engineering, planning, transit operations, enforcement, community development, and parks/recreation staff from the RTC, Reno, Sparks, and Washoe County. The summit would allow jurisdictions to coordinate on bicycle and pedestrian issues and during the meeting the annual report card would be presented.

Funding

The following options should be considered by the RTC for fulfilling the funding commitment necessary to complete the proposed system:

- For multi-agency bikeway projects, prepare joint applications with partner agencies for competitive funding programs at the State and Federal levels. Joint applications often increase the competitiveness of projects for funding; however, coordination amongst the participating jurisdictions is often challenging. The RTC should consider acting as the lead agency, with a strong emphasis on coordination between participating jurisdictions and agencies (including City of Reno, City of Sparks, Washoe County, and public health organizations) on important projects to ensure they are implemented as quickly as possible.
- Use existing funding sources as matching funds for State and Federal funding.
- Include bikeway projects in local traffic impact fee programs and assessment districts.
- Require construction of bicycle facilities as part of new development.
- Continue to include proposed bikeways as part of roadway projects involving widening, overlays, or other improvements.

The RTC and partner agencies should also take advantage of private contributions, if appropriate, in developing the proposed system. This could include a variety of resources such as volunteer labor during construction or monetary donations towards specific improvements.