

Urban Trail Master Plan

# KLAMATH FALLS URBAN TRAIL MASTER PLAN

Klamath Falls, OR

Prepared for:

**City of Klamath Falls  
Klamath County**

Prepared by:

**Kittelson & Associates, Inc.**  
354 SW Upper Terrace Drive, Suite 101  
Bend, Oregon 97702

In Association with:

**Adkins Consulting Engineering, L.L.P.**  
2950 Shasta Way  
Klamath Falls, Oregon 97603



MOVING **FORWARD** THINKING™

Urban Trail Master Plan

# **Klamath Falls Urban Trail Master Plan**

Klamath Falls, Oregon

**Draft**

January 2016

## Urban Trail Master Plan

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**Kittelson & Associates, Inc.**  
354 SW Upper Terrace Drive Suite 101  
Bend, Oregon 97702  
(541) 312-8300

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The contents of this document do not necessarily reflect views or policies of the State of Oregon.



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## ACKNOWLEDGEMENTS

### Citizen Advisory Committee

John Bellon  
*City of Klamath Falls*

Jim Chadderdon  
*Discover Klamath*

Jessie DuBose  
*Blue Zones Project*

Mike Green  
*US Bureau of  
Reclamation*

Tyler Hammersmith  
*US Bureau of  
Reclamation*

Todd Honeywell  
*Oregon Parks and  
Recreation Department*

Brian Irwin  
*Local Business Owner*

Jennifer Little  
*Sky Lakes and Healthy  
Klamath*

Chip Massie  
*Klamath County  
Chamber of Commerce*

Sean Price  
*Oregon Parks and  
Recreation Department*

Scott Preson  
*Klamath County Bike  
and Pedestrian Trail  
Advisory Committee*

David Scott  
*Local Business Owner*

Randy Shaw  
*Klamath County  
Economic Development  
Association*

Stephanie Van Dyke  
*Sky Lakes Wellness  
Center*

\* Indicates Project Management Team (PMT) member

### Technical Advisory Committee

Mark Ahalt  
*Klamath County*

Scott Edelman  
*Oregon DLCD*

Mark Gallagher\*  
*Klamath County*

Butch Hansen  
*Oregon Department of  
Transportation*

Devin Hearing\*  
*Oregon Department of  
Transportation*

Jarod Johnson  
*Oregon Department of  
Transportation*

Erik Nobel\*  
*City of Klamath Falls*

Bob Shingler  
*City of Klamath Falls*

Stan Strickland\*  
*Klamath County*

Joe Wall\*  
*City of Klamath Falls*

Mark Willrett  
*City of Klamath Falls*

### Consultant Team

Kittelson & Associates, Inc.

Nick Foster, AICP

Marc Butorac, PE, PTOE

Ashleigh Griffin

Jacqueline Gulczynski

Adkins Consulting Engineering, L.L.P.

Jeremy Morris, PE



Section 1  
Executive Summary

## EXECUTIVE SUMMARY

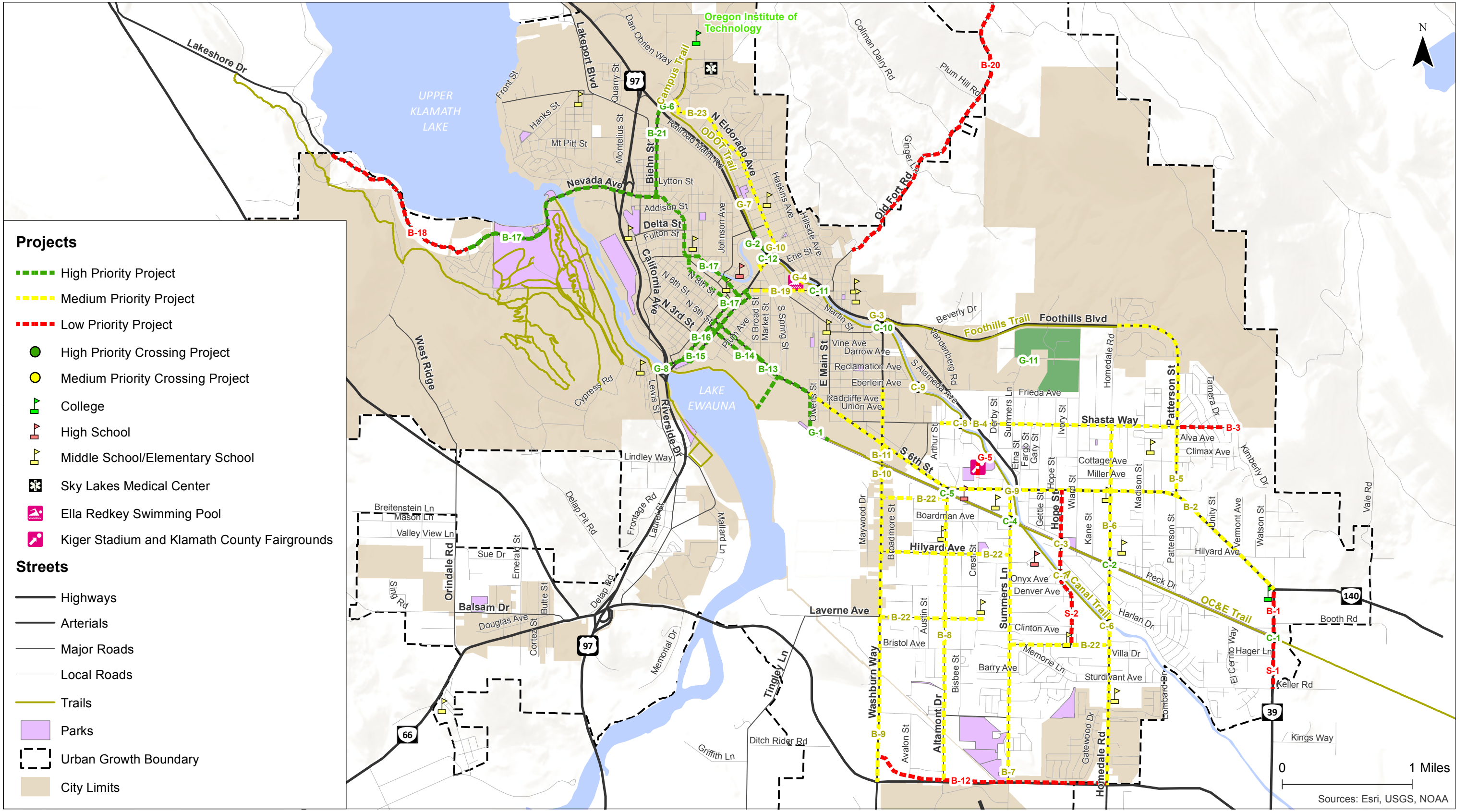
The Klamath Falls Urban Trail Master Plan was developed through a collaborative process involving a team of stakeholders from the community and relying heavily on public input. The plan is intended to guide investment in the urban trail system and connections to nearby facilities and activity centers. It provides a summary of the projects, policies, programs, and studies needed to complete the trail network and outlines priorities for the City and County to implement. Figure EX-1 shows the locations of the plan elements, and Table EX-1 provides a description of them.

The plan includes the following sections:

- **Introduction:** This section highlights the purpose of the plan and overarching goals. This section also describes the document review conducted at the beginning of plan development and summarizes the public engagement process.
- **Urban Trail Master Plan:** This section provides an overview of the existing trail network and provides the final urban trail master plan, which lists the prioritized plan elements and maps the project locations. Basic information, such as priority, description, location, category, estimated cost, and potential funding sources are provided for each element.
- **Implementation Plan:** This section provides an overview of the existing funding sources available and a description of opportunities for additional funding in the future.

The appendices provide additional information to support the plan development, including the Technical Memorandums summarizing the Existing Conditions and Alternatives Analysis.





K:\H\_Bendroglou\118974 - Klamath Falls Trail Master Plan\GIS\FinalReport\Figure EX-1 Prioritized Plan Elements.mxd - agriffin - 9:06 AM 1/29/2016

- Projects**
- High Priority Project
  - Medium Priority Project
  - Low Priority Project
  - High Priority Crossing Project
  - Medium Priority Crossing Project
  - 🏫 College
  - 🎓 High School
  - 🏫 Middle School/Elementary School
  - 🏥 Sky Lakes Medical Center
  - 🏊 Ella Redkey Swimming Pool
  - 🏟 Kiger Stadium and Klamath County Fairgrounds
- Streets**
- Highways
  - Arterials
  - Major Roads
  - Local Roads
  - Trails
  - 🌳 Parks
  - ⬜ Urban Growth Boundary
  - 🏠 City Limits

Plan Elements  
Klamath Falls, Oregon  
Figure EX-1

Coordinate System: NAD 1983 StatePlane Oregon South FIPS 3602 Feet Intl  
Data Source: Delete if there isn't one.

Table EX-1. Prioritized Plan Elements

ID*	Project Description	Cost Estimate^
<b>High Priority Projects</b>		
G-1	Connect the OC&E Trail to downtown Klamath Falls via 6th Street bridge by widening sidewalk to provide for shared-use path. Provide a connection to the soon to be constructed Lake Ewauna trail. (Note: Lake Ewauna trail connection alignment is not confirmed; cost estimate does not include this connection.)	\$859,500
G-2	Connect the "A" Canal Trail to the ODOT Trail by widening the sidewalks to provide for a shared-use path.	\$166,500
G-6	Connect the Campus Trail to the Biehn Street bike lanes and sidewalk by widening the sidewalk on the south side of Campus Drive to complete the shared-use path connection. Possible modifications are needed at the Crater Lake Parkway intersection.	\$108,800
G-8	Connect Veteran's Park to the Link River Trail by widening the sidewalk on the north side of Main Street to provide for a shared use path. Install a crossing across Main Street west of the park road's access to Main Street to connect Veteran's Park with the path. Sharrows may work as an interim solution.	\$90,600
G-11	Formalize connections between Summers Lane and Steens Sports Park to provide southern connections to the park.	\$150,000
C-1	OC&E Trail crossing of OR 39: TBD by ongoing ODOT and Oregon Parks study	TBD
C-2	OC&E Trail crossing of Homedale Road: TBD by ongoing ODOT and Oregon Parks study	TBD
C-4	OC&E Trail crossing of Summers Lane: TBD by ongoing ODOT and Oregon Parks study	TBD
C-5	OC&E Trail crossing of Altamont Drive: TBD by ongoing ODOT and Oregon Parks study	TBD
C-10	Further study is required to determine final treatment for the crossing of the "A" Canal Trail at Washburn Way. Enhanced crossing treatments recommended.	\$2,000 - \$50,000
C-11	Further study is required to determine final treatment for the crossing of the "A" Canal Trail at Main Street. Enhanced crossing treatments recommended.	\$2,000 - \$50,000
C-12	Further study is required to determine final treatment for the crossing of the "A" Canal Trail at Esplanade Avenue. Enhanced crossing treatments recommended.	\$2,000 - \$50,000
B-13	Install bike lane on 6th Street between Market Street and Main Street.	\$15,700
B-14	Install bike lane on 5th Street between Main Street and 6th Street.	\$19,400
B-15	Install bike lanes on Klamath Avenue between Conger Avenue and Commercial Street. Coordinate with the Blue Zones project.	\$28,700
B-16	Install bike lanes on Main Street between Esplanade Avenue and Mill Street. Coordinate with the Blue Zones project.	\$24,600
B-17	The bicycle facility between Moore Park and downtown Klamath Falls will be determined by an ongoing project.	\$556,200
B-21	Widen the bike lanes on Biehn Street between Crater Lake Parkway and Oregon Avenue by restriping the roadway.	\$33,400
P-1	Develop a program to install and maintain wayfinding signage at all trailheads and trail crossings of public streets. <i>See Appendix F for more information.</i>	--
P-2	Develop a policy that requires bicycle parking to be provided at key locations and pursue grant funding to provide it at key locations where it is missing.	--
<b>Medium Priority Projects</b>		
G-3	Connect the "A" Canal Trail to the Foothills Trail by widening the sidewalk on the east side of the bridge to provide a shared use path between the intersection and the "A" Canal trail. Tighten the curb radius for NB right-turns onto Crater Lake Parkway.	\$153,000
G-4	Connect the "A" Canal Trail to the Ella Redkey Swimming Pool by installing a shared-use path between the parking lot/front entrance to the pool and the existing "A" Canal Trail.	\$55,800
G-7	Connect the ODOT Trail to Kit Carson Park by constructing a connection between the trail and the parking lot or existing sidewalk connecting the street to the park. <i>There are ongoing discussions to implement this as part of a project at the park.</i>	\$22,600
G-9	Connect the "A" Canal Trail to the signalized crossing at SW 6th Street by widening the sidewalk on the south side of SW 6th Street to better accommodate bicyclists.	\$18,700
G-10	Connect the "A" Canal Trail to Klamath Union High School by widening the sidewalk on the north side of Esplanade Avenue to provide a shared-use path to the high school. Coordinate with school for completing the connection.	\$298,500
C-3	Install striped crosswalk and appropriate signage at the OC&E Trail crossing of Hope Street.	\$3,300
C-6	Install marked crosswalk, appropriate signage, and raised median island at the "A" Canal Trail crossing of Homedale Road. Install a gate across the maintenance road on the east side of Homedale Road to indicate that the trail does not extend east of Homedale Road.	\$83,700
C-7	Install marked crosswalk and appropriate signage at the "A" Canal Trail crossing of Hope Street.	\$3,600
C-8	Further study is required to determine final treatment for the crossing of the "A" Canal Trail at Shasta Way. Enhanced crossing treatments recommended.	\$2,000 - \$50,000
C-9	Further study is required to determine final treatment for the crossing of the "A" Canal Trail at Eberlein Avenue. Enhanced crossing treatments recommended.	\$2,000 - \$50,000
B-2	Identify if there are parallel routes that would provide similar connectivity but greater comfort as an alternative to 6th Street between the railroad bridge and OR 39.	TBD
B-4	Look for opportunities for alternate routes or for traffic calming measures on Shasta Way between Patterson Street and Crater Lake Parkway.	TBD
B-5	Further study required to determine final treatment for bicycle facilities on Patterson Street between 6th Street and Foothills Boulevard. Candidates include buffered bike lanes or a shared-use path.	TBD
B-6 - B-11	Further study required to determine which north-south routes will be designated for bicycle travel in the southeast area of Klamath Falls and what the appropriate treatment is.	TBD
B-19	Install bike lanes on Main Street between Esplanade Avenue and Crater Lake Parkway.	\$30,600
B-22	Further study required to identify which east-west routes should receive shared lane markings, wayfinding, and/or traffic calming in the southeast area of Klamath Falls.	TBD
B-23	Install sharrows and traffic calming on N Eldorado Avenue. Sidewalks should be considered as a traffic calming measure.	\$679,500
P-3	Develop guidelines for how to evaluate trail crossings and determine the appropriate treatment for the City and County to use in applying consistent treatment at crossings for local streets.	--
<b>Low Priority Projects</b>		
G-5	Connect the "A" Canal Trail to the Kiger Stadium and Klamath County Fairgrounds by paving the existing informal service road from the "A" Canal Trail to the Kiger Stadium Parking lot. Install a shared use path along the west side of Crest Street from the Kiger Stadium Parking lot to the Fairgrounds.	\$199,100
B-1	Install protected or buffered bike lanes on OR 39 between the OC&E Trail and OR 140.	\$72,500
B-3	Install sharrows and traffic calming on Shasta Way between Patterson Street and Kimberly Drive.	\$75,500
B-12	Install shared-use path on OR 140 between Washburn Way and Homedale Road.	\$1,633,500
B-18	Widen the pavement to accommodate shoulders or bike lanes on Lakeshore Drive between Lynnewood Boulevard and the west UGB.	\$4,121,000
B-20	Widen the road to add paved shoulders or bike lanes on Old Fort Road between Loma Linda Drive and the UGB.	\$5,037,500
S-1	Install sidewalks on both sides of OR 39 between the OC&E Trail and Keller Road.	\$744,000
S-2	Install sidewalks on both sides of Hope Street between Bristol Avenue and SW 6th Street.	\$2,148,000
P-4	Evaluate the feasibility of installing illumination along the trail system, including type of illumination, priority locations, and cost/maintenance.	--
P-5	Develop a plan for strategic placement of bicycle repair stations and racks throughout the urban trail system.	--

\*The prefix on the ID numbers refers to the project category: "G-" refers to trail system projects; "B-" refers to on-street bikeways; "C-" refers to crossings; and "S-" refers to sidewalks; "P-" refers to policies and programs.

^Please note the costs outlined above are for 2015 and are planning level estimates only that do not include right-of-way. An annual inflation rate of 3 to 5 percent should be applied when projecting costs to the future.

Section 2  
Introduction



## INTRODUCTION

The purpose of the Klamath Falls Urban Trail Master Plan is to plan for a convenient, safe, and comfortable active transportation system. The plan identifies critical missing links in the existing trail system, key road crossing options, key connections to activity centers, policies, programs, studies, preliminary cost estimates, and potential sources of funding while ensuring

compliance with state and local requirements.

This section provides an overview of the purpose and background of the plan, the guiding principles, and the process and public engagement involved in developing the plan.

## OVERVIEW

Klamath Falls currently has several well used trails that traverse the urbanized area and connect different subareas. However, gaps in the trail system require users to cross or access busy streets during their trip in order to reach their final destination. The Klamath Falls Urban Trail Master Plan identifies and coordinates opportunities to create comfortable connections between the urban trails and nearby attractions within the Klamath Falls Urban Growth Boundary (UGB).

The plan provides a prioritized list of projects, policies, programs, and future studies to facilitate its implementation. By integrating bicycle and pedestrian facilities throughout the community, particularly to connect residential areas with schools and other activity centers, the plan seeks to reduce vehicle reliance on the urban area highways and arterials to travel to local destinations. The plan focuses on trails that are used for transportation and mobility rather than those that are only used for recreational purposes. The plan is not a full pedestrian and bicycle plan; gaps in the pedestrian and bicycle system that do not relate to trail access are not included in this study and can be found in the Klamath Falls Urban Transportation System Plan.

When implemented, the plan will offer transportation options for residents and tourists in the Klamath Falls urban area. The proposed urban trail routes will provide convenient access to attractors within Klamath Falls, reduce reliance on the automobile, and improve public health.

## BACKGROUND/REGULATORY CONTEXT

Existing federal, state, and local plans and policies were reviewed at the beginning of the development of the Urban Trail Master Plan and used to guide the plan's development. The existing plans provided

background information on previously identified issues and gaps in the trail system. The policies provided high-level guidance on the development of the plan. National, State, and local design guidelines also informed the types of projects included in the plan. *The complete review of these documents is located in Appendix A.*

## PLAN DEVELOPMENT

Engagement with project stakeholders and the public was sought at regular intervals throughout the project. Public involvement was obtained via regular meetings with a Technical Advisory Committee (TAC), a Citizen Advisory Committee (CAC), a website with project materials, online virtual and in-person open houses, and online interactive maps for public commenting. Finally, public adoption hearings were held at the City of Klamath Falls and Klamath County. Figure 2-1 illustrates the plan development process and the key points of the project when the TAC, CAC, and public provided input.

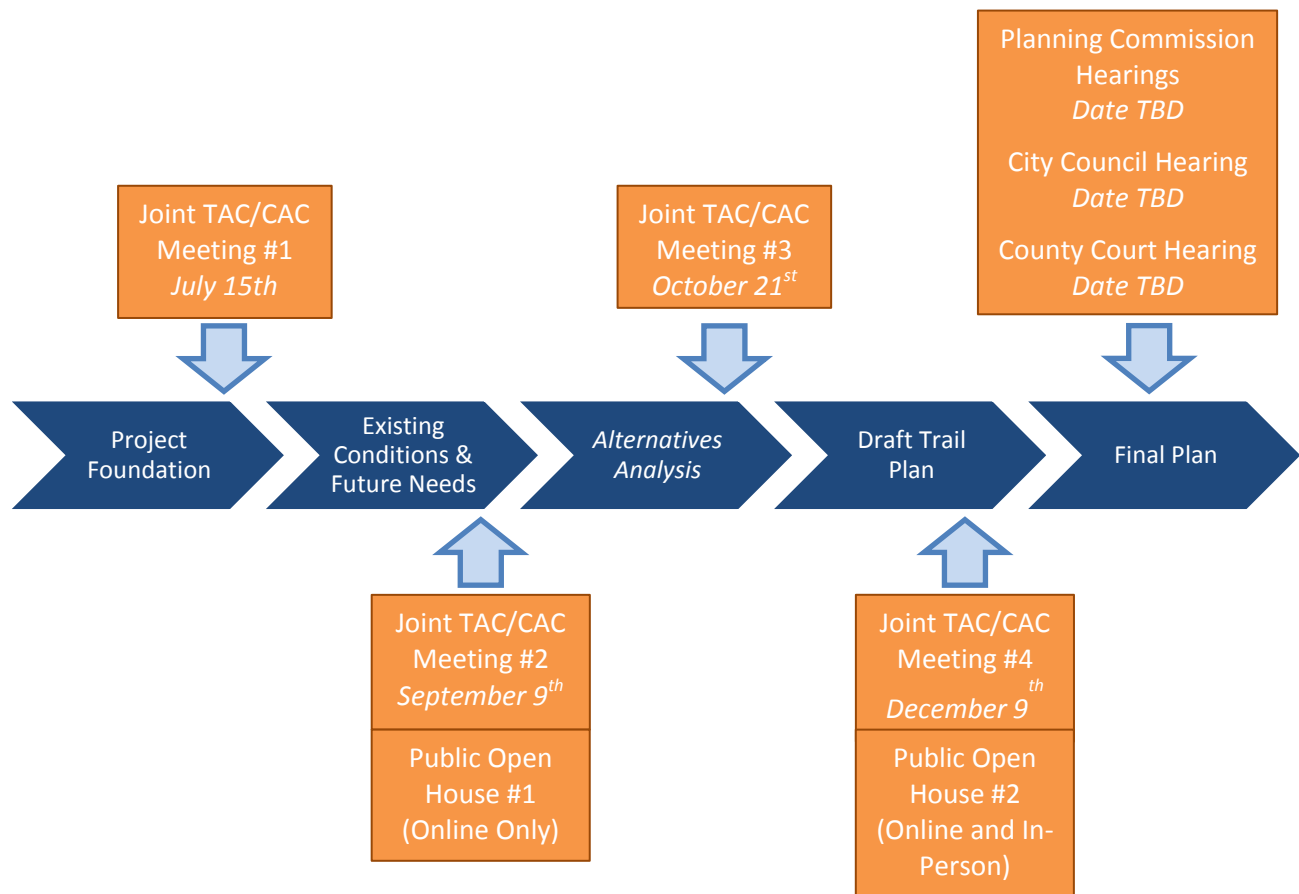


Figure 2-1 Plan Development Process and Stakeholder Engagement

### Advisory Committees

The Technical Advisory Committee (TAC) and Citizen Advisory Committee (CAC) were formed at the beginning of the project and met regularly to review project materials and provide feedback to the project team. Committee members were selected to provide representation from a variety of local

agencies, businesses, area residents, ODOT departments, etc. The TAC and CAC began the project with a bicycle tour of the existing trail system. Committee members reviewed and provided comments on all Technical Memorandums prepared during the course of the project, as well as the draft Urban Trail Master Plan.



**Stop Along the Bike Tour**

**Project Website**

The website for the Klamath Falls Urban Trail Master Plan (<http://klamathfallstrailplan.com/>) provided updates throughout the project and housed draft documents for review, information about meetings and public outreach, final technical memorandums, and the draft and final Klamath Falls Urban Trail Master Plan.



**December Open House**

**Open Houses**

Two online virtual open houses and one in-person open house were held during the plan development process to share project progress with the public and gather input on the draft plan elements. The open houses provided an opportunity for the public to learn about the goals and objectives of the plan, existing plans and previously identified projects, and draft project recommendations and prioritization. The public had the opportunity to comment on proposed plan elements as well as provide input on locations with issues or ideas for alternative treatments. Figure 2-2 shows an example of the first online open house, including the locations where people provided comments and an example of one of those comments. *Appendix B provides a summary of the comments received from the second virtual open house.*

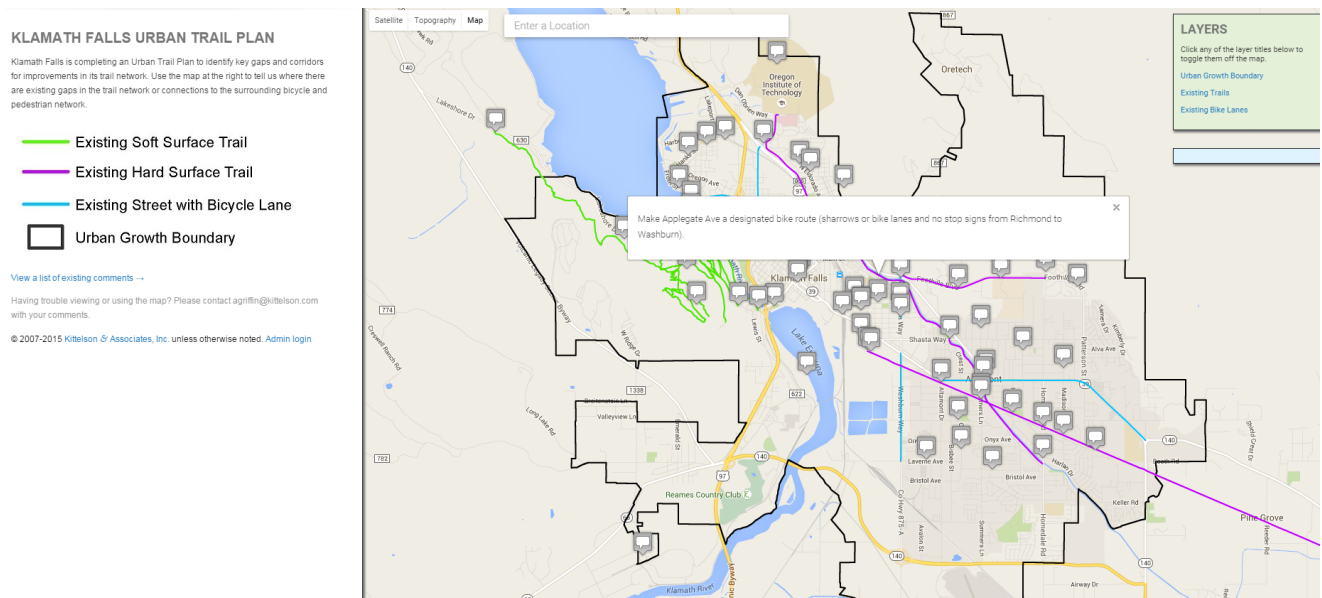


Figure 2-2 Online Open House Screenshot



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## OBJECTIVES AND GUIDING PRINCIPLES

Project objectives and guiding principles provided broad guidance for the Urban Trail Master Plan that helped direct the priorities and plan elements.

### Objectives

Project objectives were identified by the City, County, and ODOT during the project scoping process and refined through the advisory committees. These objectives included the following items:

- To review state, regional, and local transportation plans and policies that the Project and its recommendations must comply and be consistent with;
- To assess the condition of existing individual pathways and trails, and the broader, overall active transportation system;
- To map and inventory the Project Area's existing pathway, trail, sidewalk, and bike lane system;
- To establish a hierarchical trail classification system, with existing pathways classified accordingly;
- To prepare design guidelines for trail system branding, including enhanced way-finding and signage;
- To identify the essential links needed to complete, connect, and enhance the active transportation system;
- To conduct an Obstacles Analysis to identify impediments to closing missing system links and enhancing the active transportation system. Impediments may include physical barriers, safety concerns, non-compatible uses, and broader system deficiencies;
- To create an updated priority project listing, reflective of the identified missing links, community priorities, and fiscal realities;
- To map an ideal, proposed active transportation system. The proposed system will reflect the community's identified priorities and recommendations, but consider alternatives and fiscal realities;
- To propose funding strategies for priority capital projects and ongoing system-wide maintenance.

### Guiding Principles

Guiding principles were used throughout the plan development to develop and prioritize projects. The guiding principles included:

- Connect major destinations within the UGB to nearby trails using pedestrian and bicycle facilities;
- Complete existing gaps or deficiencies in the existing trail system;
- Identify low-cost, easy to implement solutions; and
- Provide comfortable and convenient access to the trail system for a wide range of users by providing low-stress connections.

## PUBLIC HEALTH

Improving public health in the Klamath Falls urban area was a primary motivator for completing this plan. As of the writing of this plan, there are a number of ongoing activities in Klamath Falls related to public health, in addition to this plan. Many of these initiatives are being spearheaded by Healthy Klamath, a consortium of health focused organizations, which completed a Community Health Improvement Plan in 2013. A primary goal of this plan is to increase the proportion of adult residents who engage in regular physical activity, recognizing that increased activity tends to lead to improved health outcomes with respect to a number of conditions. Providing more quality options for people to walk or bicycle, either for transportation or recreation, by implementing the recommendations of this plan would help the community achieve this goal.

This plan was coordinated with the ongoing public health efforts in Klamath Falls. The Citizen Advisory Committee (CAC) included representatives from Healthy Klamath members. Klamath Falls was accepted into the Blue Zones Project's Oregon initiative during the early stages of this plan. The Blue Zones Project is currently working with community members to develop a holistic action plan for creating a healthier Klamath Falls.

A representative of the Blue Zones Project was added to the CAC to ensure representation from this effort. There are areas of overlap between this plan and the Blue Zones Project's infrastructure team. The Blue Zones Project will likely take a more detailed look at a few of the areas identified for improvement in this plan and may ultimately develop more refined recommendations based on this detailed examination. In the event this occurs, this plan may need to be amended to include the updated recommendation. To facilitate this process, the overlapping projects that may require ongoing coordination with the Blue Zones Project are noted in the tables of recommended projects and in the project prospectus sheets included later in this plan document.

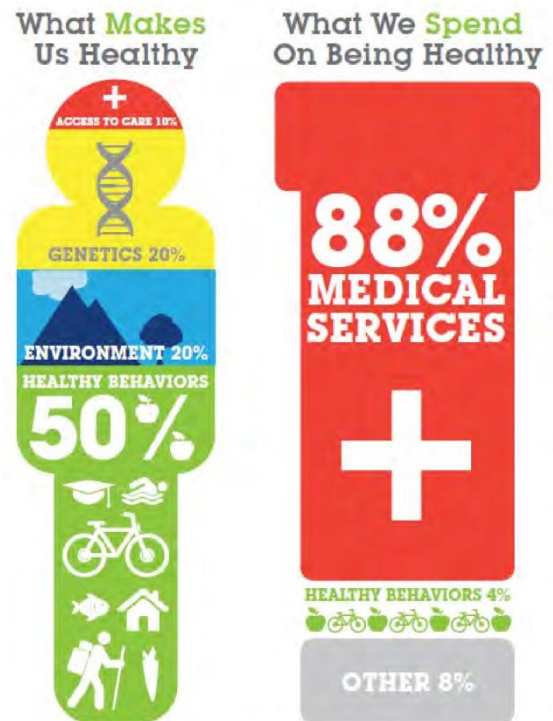


Image Source: Healthy Klamath

## Section 3 Urban Trail Master Plan

## URBAN TRAIL MASTER PLAN

This section presents the Urban Trail Master Plan for Klamath Falls. Its purpose, as described in Section 2, is to identify and coordinate opportunities to create seamless connections between the urban trails and nearby attractions, as well as nearby pedestrian and bicycle facilities, within the Klamath Falls Urban Growth Boundary (UGB). It considers existing conditions, as well as the need to serve future growth.



### EXISTING & FUTURE CONDITIONS

The existing trail system in Klamath Falls was assessed to determine areas where improvements were needed both now and in the future. The findings from this analysis formed the basis for the recommended projects, policies, programs, and studies that make up the Klamath Falls Urban Trail Master Plan.

Figure 3-1 shows the existing trail system and on-street bicycle facilities, and Figure 3-2 shows the existing sidewalk network on arterial and collector streets. These networks were used to identify gaps in the existing trail network and gaps between the trail system and key activity centers, such as schools. The condition of the existing trails was reviewed during a field visit.

The existing trail network was reviewed to identify gaps and deficiencies. A gap is defined as a missing link in the network, such as a missing off-street trail link or an on-street connection on a collector or arterial roadway that is missing sidewalks or a designated bicycle facility. A deficiency, or obstacle, is defined as a bicycle or pedestrian facility that is not up to standards or sufficient to meet users' needs. Examples of deficiencies include:

- On-street connection on a collector or arterial roadway that is not likely to be comfortable for a majority of the population (i.e., has a Bicycle Level of Traffic Stress rating greater than 2 [Interested but Concerned]);
- Arterial or collector roadway crossing where enhancement may be warranted.



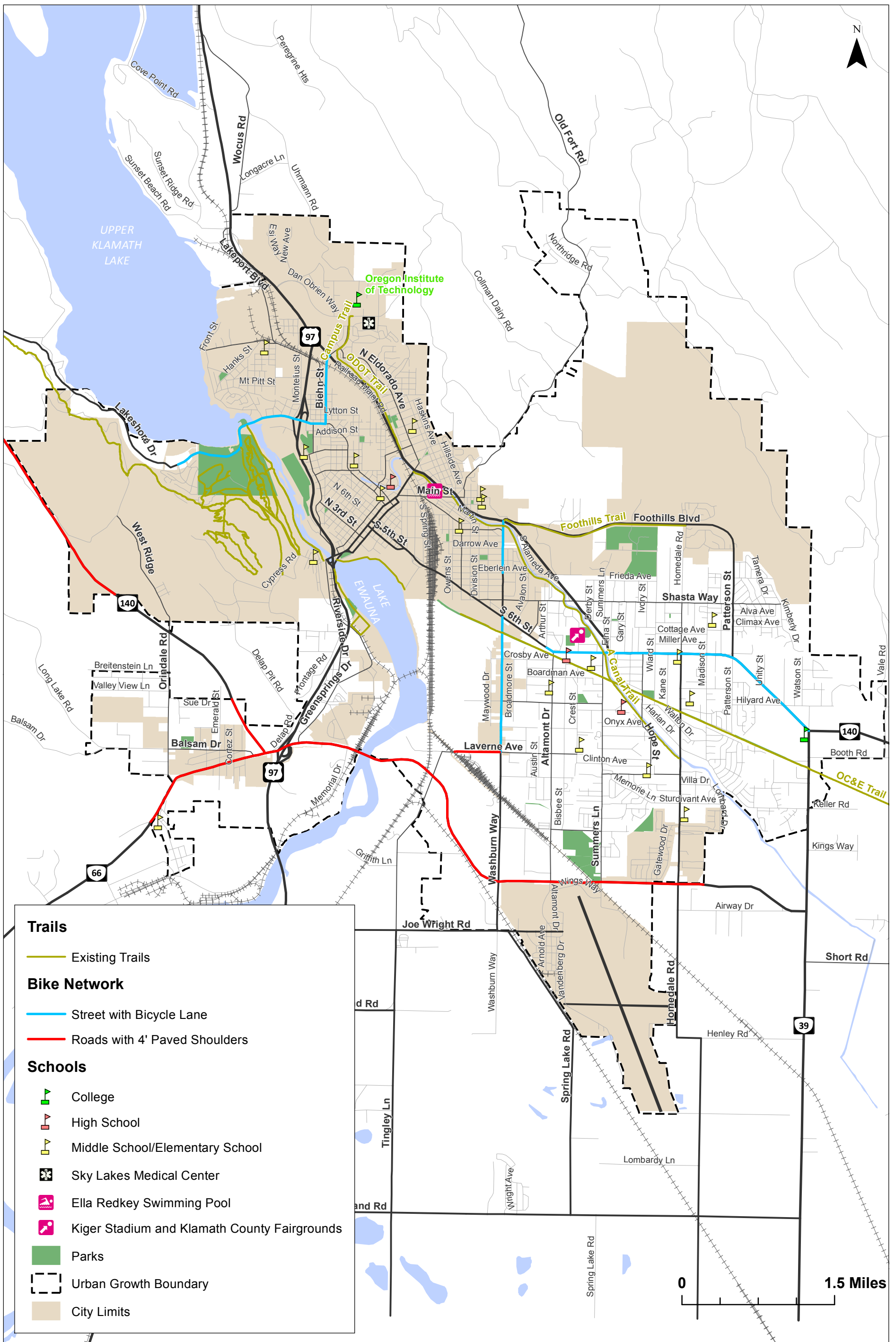
**Individuals Classified as “Interested, but Concerned” About Biking Make Up Over Half of the Population**

Source: Dill, J. and N. McNeil. “Four Types of Cyclists?” *Transportation Research Record: Journal of the Transportation Research Board*, No. 2387.1 (2013), pp. 129-138.

In addition, an analysis of historical bicycle and pedestrian crash data and roadway crossings was conducted to identify potential safety issues that could be addressed by the Urban Trail Master Plan. These analyses included reviewing historical crash data and examining roadway crossings. Trail crossings at collectors and arterials were identified for improvements when the existing treatments did not meet the recommendations based on National Cooperative Highway Research Program (NCHRP) Report 562 *Improving Pedestrian Safety at Unsignalized Crossings* procedures. NCHRP Report 562 provides guidance on the type of treatments that should be considered for an unsignalized crossing given a number of factors, including the speed limit of the roadway being crossed, pedestrian volumes, motor vehicle traffic volumes, length of the crossing, walk time, and expected compliance of motor vehicle drivers.

Other system gaps were identified based on connectivity needs and input from the public and advisory committees.

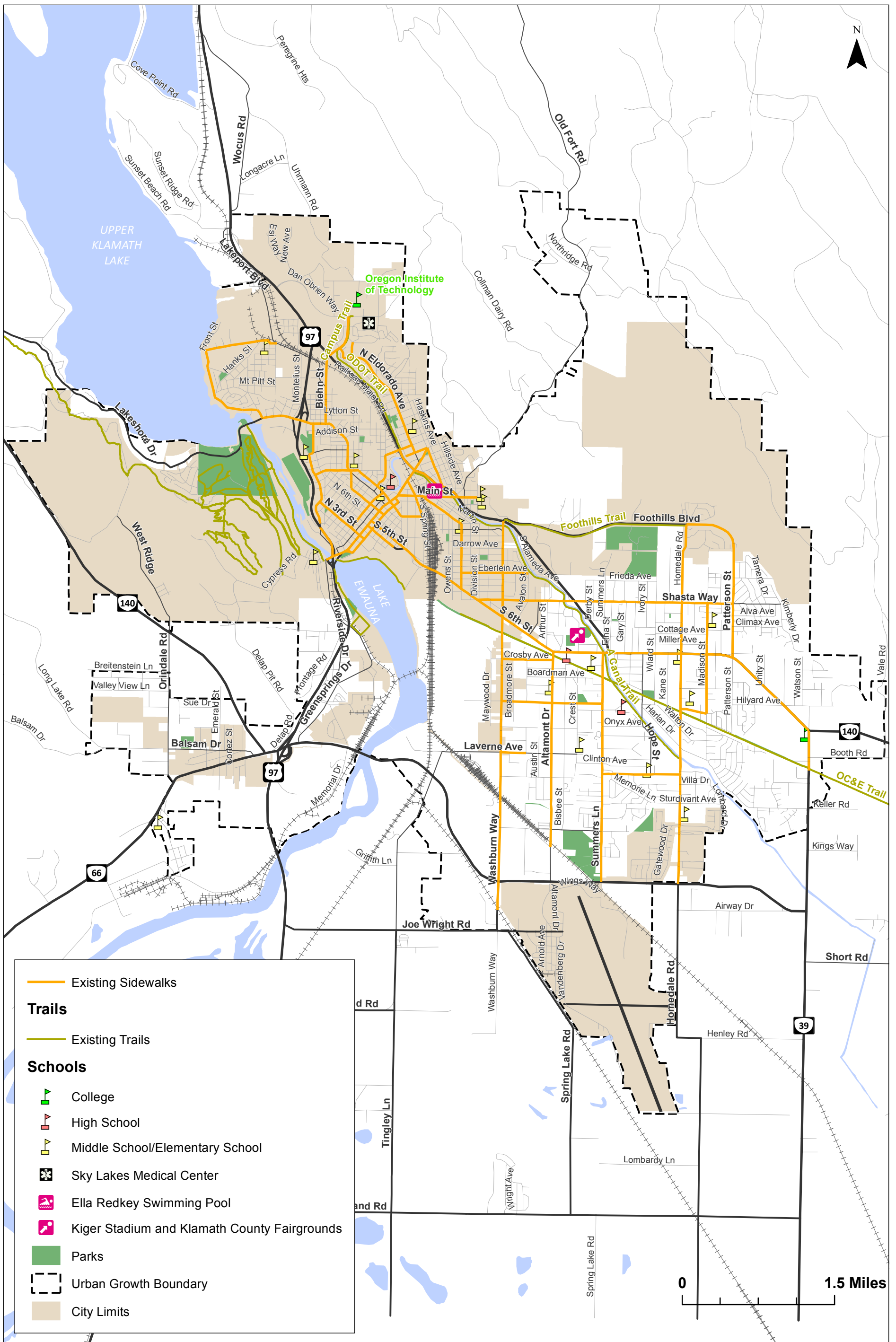
Based on the existing conditions analysis, a set of locations was identified for further review for potential treatments. *Appendix C contains Technical Memorandum 2: Existing Conditions, which provides a detailed summary of the analysis conducted.*



Existing Trail Network and On-Street Bicycle Facilities  
Klamath Falls, Oregon

Figure  
3-1

H:\projects\18974 - Klamath Falls Trail Master Plan\GIS\FinalReport\Figure 3-1\_Existing Trail and Bike Network.mxd - agriffin - 4:21 PM 1/19/2016



Existing Trail Network and Sidewalk Facilities  
Klamath Falls, Oregon

Figure  
3-2

H:\profiles\18974 - Klamath Falls Trail Master Plan\GIS\Final\Report\Figure 3-2\_Existing Trail Network\_Sidewalk.mxd - agriffin - 4:21 PM 1/19/2016

## PLAN ELEMENTS

The Klamath Falls Urban Trail Master Plan includes the following elements:

- **Projects** – capital investments made to improve the existing trail system and the bicycle and pedestrian system that connect to it. Examples include new shared-use paths, bicycle lanes, sidewalks, and crosswalks. In some cases, these projects could be implemented as pilot, or test, projects for a certain time period and then modified based on the evaluation during this period for final implementation.
- **Policies** – statements adopted in the Klamath Falls Urban Trail Master Plan that are intended to influence and guide decisions and actions related to pedestrian and bicycle planning. As an example, policies could relate to requirements for new developments to incorporate bicycle parking or provide pedestrian and bicycle facilities.
- **Programs** – plans of action aimed at accomplishing an identified County or City goal(s) that commonly include details on what work is to be done, by whom, when, and the intended outcome of the action. An example is implementing a program to install wayfinding signage at trail crossings and trailheads.
- **Future Studies** – research and investigation to be completed after the Klamath Falls Urban Trail Master Plan is completed. Such studies were not done during the Urban Trail Master Plan process due to lack of available data, a need for guidance and/or analysis from responsible agencies, and/or the need for a more focused public involvement and analysis process beyond the scope of work and budget of the Urban Trail Master Plan.

Note that the term “project” is used throughout the remainder of this plan to refer to plan elements for ease and brevity.

### Types of Projects








The types of projects recommended vary based on the specific needs of each unique location. In some cases, further study is recommended to identify the preferred project when adequate existing information was not available. In some situations, a standard bike lane may be sufficient, but in other cases, a buffered area may be needed due to motor vehicle traffic volumes and speeds.




*Appendix D, which contains Technical Memorandum 3: Alternatives Evaluation, provides the full evaluation matrix to explain why a specific treatment was selected.*

The types of projects that are recommended in the plan are summarized in Table 3-1. *These types of facilities are described in greater detail in the toolbox included in Appendix C.*



Table 3-1. Types of Projects Included in the Urban Trail Master Plan

Project Type	Description	Example Photo
<b>Bicycle Projects</b>		
<b>Shared lane facility</b>	Shared lane roadways include roadways without separated bicycle facilities, but that have been optimized to some extent for bicycle travel. They are recommended for lower speed (i.e., 25 MPH or slower) and lower volume (i.e., less than 3,000-4,000 vehicles per day) roadways. They may include shared lane markings (“sharrows”) or signage. Traffic calming may be recommended in conjunction to ensure vehicle speeds are low.	
<b>Parallel routes</b>	Parallel routes are recommended in locations where the road environment is not conducive to adding an on-street bicycle facility. In these situations the recommendation is to identify routes that may work as shared lane facilities.	
<b>Bike lane</b>	A standard bike lane is an on-street facility that provides space designated for bicyclists, separated from vehicles by pavement markings.	
<b>Buffered or protected bicycle lane</b>	Buffered bicycle lanes are on-street lanes that include an additional striped buffer of typically 2-3 feet between the bicycle lane and the vehicle travel lane and/or between the bicycle lane and the vehicle parking lane. Protected bicycle lanes are similar but use a physical barrier, such as planters or posts, in place of the painted buffer.	
<b>Shared-use path</b>	Shared-use paths are paved, bi-directional, trails away from roadways that can serve both pedestrians and bicyclists. In some situations, shared-use paths are recommended by widening existing sidewalks. Signage and/or pavement markings should be included in all projects to ensure clear direction on usage for pedestrians and bicyclists.	
<b>Pedestrian Projects</b>		
<b>Sidewalk</b>	A sidewalk is a dedicated pedestrian facility adjacent to the roadway and separated from traffic by a curb.	
<b>Shared-use path</b>	Shared-use paths are paved, bi-directional, trails away from roadways that can serve both pedestrians and bicyclists.	

Project Type	Description	Example Photo
<b>Trail Crossing Treatments</b>		
<p><b>Marked crosswalk with signage</b></p>	<p>In some locations, installing a marked crosswalk with pavement markings and appropriate signage may be sufficient to increase drivers' awareness of the pedestrian and bicyclist crossing. In some locations, a high visibility crosswalk may be preferred. High visibility crosswalks consist of reflective roadway markings and accompanying signage at intersections and priority pedestrian crossing locations.</p>	
<p><b>Enhanced crossing, which may include RRFBs and/or median refuge islands</b></p>	<p>Rectangular rapid flashing beacons (RRFBs) are crossing treatments that include signs that have a pedestrian-activated "strobe-light" flashing pattern to attract motorists' attention and provide awareness of pedestrians and/or bicyclists that are intending to cross the roadway. Crossing islands are cut-outs in the median that provide a protected area in the middle of a crosswalk for pedestrians to stop while crossing the street. Also called pedestrian refuge islands or median refuges, they can be used at intersections or mid-block crossings.</p>	
<p><b>Grade separated crossing</b></p>	<p>A grade-separated crossing is a bridge (overcrossing) or a tunnel (undercrossing) that carries non-motorized traffic over or under a motorized corridor or other barrier to travel.</p>	

### Prioritized Projects

Figure 3-3 illustrates the locations of the projects included in the Urban Trail Master Plan. Table 3-2 provides a summary of all plan elements, the estimated cost of each project, and the priority of each project. Projects were prioritized based on the following guiding principles for this project:

- Provide connections to major destinations;
- Complete existing gaps or deficiencies within the existing trail system;
- Provide comfortable and convenient access to the trail system for a wide range of users; and
- Provide feasible solutions (i.e., affordable and relatively simple to implement).

Projects that satisfied many of these criteria were prioritized higher than those that only satisfied one or two criteria. Feedback from the advisory committee and public was used to calibrate the prioritization and ensure that priorities reflected those of the community. *The complete evaluation matrix is provided in Appendix E.*

*Appendix E contains the cost estimate calculations shown for the projects.* The cost estimates are high-level conceptual cost estimates based on year 2015 unit costs, with one year of inflation applied, and






do not include right-of-way. Detailed cost estimates should be completed during the design phase of each project.

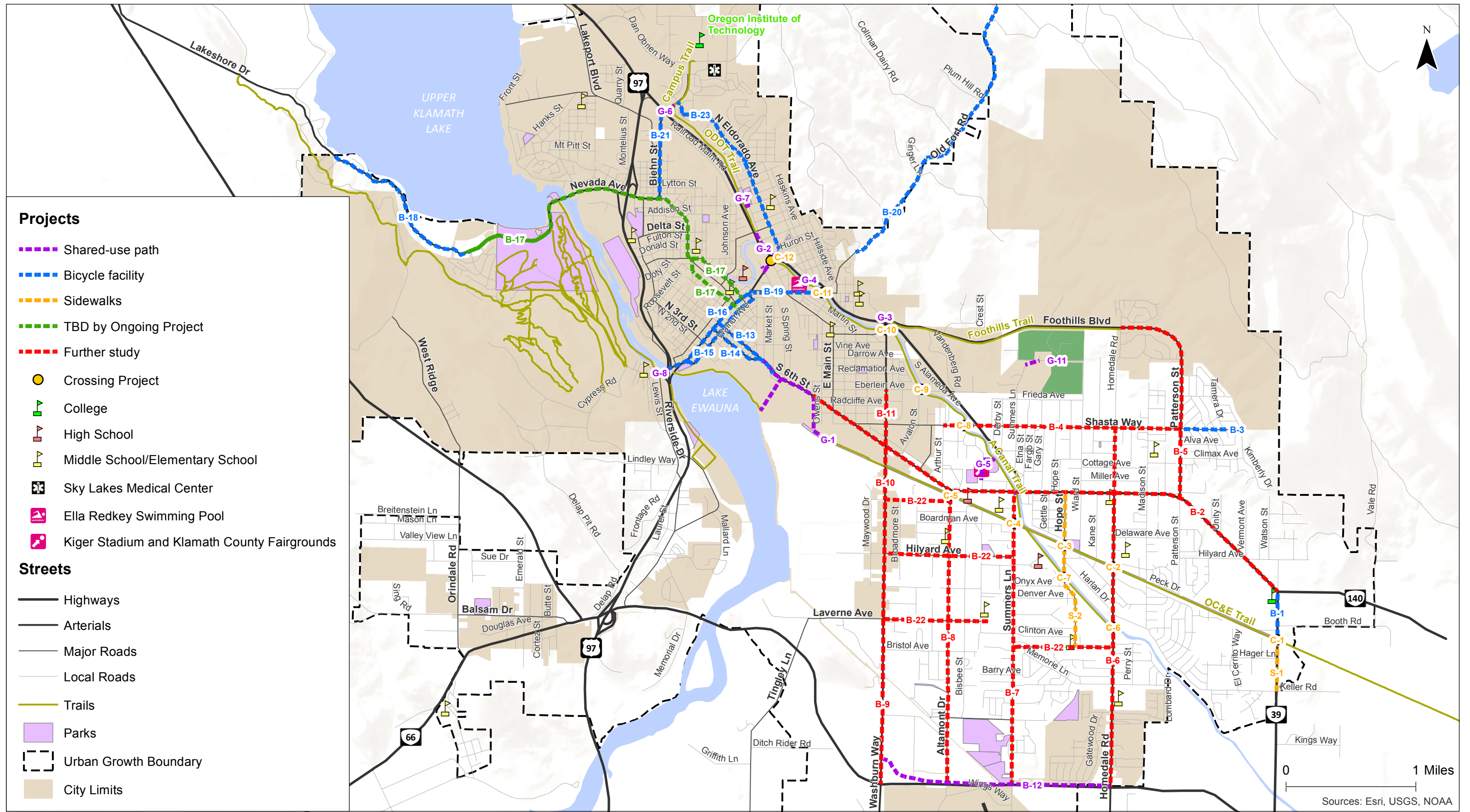
Several crossing projects are being designed through a separate on-going project. The costs for these projects are likely to range from \$2,000 for a marked crosswalk with appropriate signage up to \$50,000 for an enhanced crosswalk with a pedestrian refuge island and rectangular rapid flashing beacons (RRFBs).

### Project Prospectus Sheets

Project prospectus sheets are provided following Table 3-2. These sheets provide project descriptions, location, images, cost estimates, and potential funding sources and partners for each plan element. The prospectus sheets also indicate when there is a “grouping” of projects. Projects in the same grouping complement each other and their implementation should be coordinated when possible (e.g., the connection of the OC&E Trail to downtown as described in project G-1 would be enhanced by the completion of bike lanes on 5<sup>th</sup> and 6<sup>th</sup> Streets as described in projects B-13 and B-14).

Icons in the prospectus sheets indicate project type and priority, as summarized below.

-  Indicates a pedestrian focused project, such as a sidewalk, trail, or crossing.
-  Indicates a bicycle focused project, which may include on-street bicycle facilities, trails, or parallel routes.
-  Indicates a *low priority* project.
-  Indicates a *medium priority* project.
-  Indicates a *high priority* project.



Plan Elements  
Klamath Falls, Oregon

Figure  
3-3

K:\H\_Bendroglu\118974 - Klamath Falls Trail Master Plan\GIS\FinalReport\Figure 3-3 Plan Elements.mxd - egriffin - 9:01 AM 1/25/2016

Table 3-2. Planned Projects

ID*	Project Description	Cost Estimate <sup>^</sup>	Priority
<b>Trail System Gaps</b>			
G-1	Connect the OC&E Trail to downtown Klamath Falls via 6th Street bridge by widening sidewalk to provide for shared-use path. Provide a connection to the soon to be constructed Lake Ewauna trail. (Note: Lake Ewauna trail connection alignment is not confirmed; cost estimate does not include this connection.)	\$859,500	High
G-2	Connect the "A" Canal Trail to the ODOT Trail by widening the sidewalks to provide for a shared-use path.	\$166,500	High
G-3	Connect the "A" Canal Trail to the Foothills Trail by widening the sidewalk on the east side of the bridge to provide a shared use path between the intersection and the "A" Canal trail. Tighten the curb radius for NB right-turns onto Crater Lake Parkway.	\$153,000	Medium
G-4	Connect the "A" Canal Trail to the Ella Redkey Swimming Pool by installing a shared-use path between the parking lot/front entrance to the pool and the existing "A" Canal Trail.	\$55,800	Medium
G-5	Connect the "A" Canal Trail to the Kiger Stadium and Klamath County Fairgrounds by paving the existing informal service road from the "A" Canal Trail to the Kiger Stadium Parking lot. Install a shared use path along the west side of Crest Street from the Kiger Stadium Parking lot to the Fairgrounds.	\$199,100	Low
G-6	Connect the Campus Trail to the Biehn Street bike lanes and sidewalk by widening the sidewalk on the south side of Campus Drive to complete the shared-use path connection. Possible modifications are needed at the Crater Lake Parkway intersection.	\$108,800	High
G-7	Connect the ODOT Trail to Kit Carson Park by constructing a connection between the trail and the parking lot or existing sidewalk connecting the street to the park. <i>There are ongoing discussions to implement this as part of a project at the park.</i>	\$22,600	Medium
G-8	Connect Veteran's Park to the Link River Trail by widening the sidewalk on the north side of Main Street to provide for a shared use path. Install a crossing across Main Street west of the park road's access to Main Street to connect Veteran's Park with the path. Sharrows may work as an interim solution.	\$90,600	High
G-9	Connect the "A" Canal Trail to the signalized crossing at SW 6 <sup>th</sup> Street by widening the sidewalk on the south side of SW 6th Street to better accommodate bicyclists.	\$18,700	Medium
G-10	Connect the "A" Canal Trail to Klamath Union High School by widening the sidewalk on the north side of Esplanade Avenue to provide a shared-use path to the high school. Coordinate with school for completing the connection.	\$298,500	Medium
G-11	Formalize connections between Summers Lane and Steens Sports Park to provide southern connections to the park.	\$150,000	High
<b>Crossings</b>			
C-1	OC&E Trail crossing of OR 39: TBD by ongoing ODOT and Oregon Parks study	TBD	High
C-2	OC&E Trail crossing of Homedale Road: TBD by ongoing ODOT and Oregon Parks study	TBD	High
C-3	Install striped crosswalk and appropriate signage at the OC&E Trail crossing of Hope Street.	\$3,300	Medium
C-4	OC&E Trail crossing of Summers Lane: TBD by ongoing ODOT and Oregon Parks study	TBD	High
C-5	OC&E Trail crossing of Altamont Drive: TBD by ongoing ODOT and Oregon Parks study	TBD	High
C-6	Install marked crosswalk, appropriate signage, and raised median island at the "A" Canal Trail crossing of Homedale Road. Install a gate across the maintenance road on the east side of Homedale Road to indicate that the trail does not extend east of Homedale Road.	\$83,700	Medium
C-7	Install marked crosswalk and appropriate signage at the "A" Canal Trail crossing of Hope Street.	\$3,600	Medium
C-8	Further study is required to determine final treatment for the crossing of the "A" Canal Trail at Shasta Way. Enhanced crossing treatments recommended.	\$2,000 - \$50,000	Medium
C-9	Further study is required to determine final treatment for the crossing of the "A" Canal Trail at Eberlein Avenue. Enhanced crossing treatments recommended.	\$2,000 - \$50,000	Medium
C-10	Further study is required to determine final treatment for the crossing of the "A" Canal Trail at Washburn Way. Enhanced crossing treatments recommended.	\$2,000 - \$50,000	High
C-11	Further study is required to determine final treatment for the crossing of the "A" Canal Trail at Main Street. Enhanced crossing treatments recommended.	\$2,000 - \$50,000	High
C-12	Further study is required to determine final treatment for the crossing of the "A" Canal Trail at Esplanade Avenue. Enhanced crossing treatments recommended.	\$2,000 - \$50,000	High
<b>On-Street Bicycle Connections</b>			
B-1	Install protected or buffered bike lanes on OR 39 between the OC&E Trail and OR 140.	\$72,500	Low
B-2	Identify if there are parallel routes that would provide similar connectivity but greater comfort as an alternative to 6 <sup>th</sup> Street between the railroad bridge and OR 39.	TBD	Medium
B-3	Install sharrows and traffic calming on Shasta Way between Patterson Street and Kimberly Drive.	\$75,500	Low
B-4	Look for opportunities for alternate routes or for traffic calming measures on Shasta Way between Patterson Street and Crater Lake Parkway.	TBD	Medium
B-5	Further study required to determine final treatment for bicycle facilities on Patterson Street between 6 <sup>th</sup> Street and Foothills Boulevard. Candidates include buffered bike lanes or a shared-use path.	TBD	Medium
B-6 – B-11	Further study required to determine which north-south routes will be designated for bicycle travel in the southeast area of Klamath Falls and what the appropriate treatment is.	TBD	Medium
B-12	Install shared-use path on OR 140 between Washburn Way and Homedale Road.	\$1,633,500	Low
B-13	Install bike lane on 6 <sup>th</sup> Street between Market Street and Main Street.	\$15,700	High
B-14	Install bike lane on 5 <sup>th</sup> Street between Main Street and 6 <sup>th</sup> Street.	\$19,400	High
B-15	Install bike lanes on Klamath Avenue between Conger Avenue and Commercial Street. <i>Coordinate with the Blue Zones project.</i>	\$28,700	High
B-16	Install bike lanes on Main Street between Esplanade Avenue and Mill Street. <i>Coordinate with the Blue Zones project.</i>	\$24,600	High
B-17	The bicycle facility between Moore Park and downtown Klamath Falls will be determined by an ongoing project.	\$556,200	High
B-18	Widen the pavement to accommodate shoulders or bike lanes on Lakeshore Drive between Lynnewood Boulevard and the west UGB.	\$4,121,000	Low
B-19	Install bike lanes on Main Street between Esplanade Avenue and Crater Lake Parkway.	\$30,600	Medium
B-20	Widen the road to add paved shoulders or bike lanes on Old Fort Road between Loma Linda Drive and the UGB.	\$5,037,500	Low
B-21	Widen the bike lanes on Biehn Street between Crater Lake Parkway and Oregon Avenue by restriping the roadway.	\$33,400	High
B-22	Further study required to identify which east-west routes should receive shared lane markings, wayfinding, and/or traffic calming in the southeast area of Klamath Falls.	TBD	Medium
B-23	Install sharrows and traffic calming on N Eldorado Avenue. Sidewalks should be considered as a traffic calming measure.	\$679,500	Medium
<b>Sidewalks</b>			
S-1	Install sidewalks on both sides of OR 39 between the OC&E Trail and Keller Road.	\$744,000	Low
S-2	Install sidewalks on both sides of Hope Street between Bristol Avenue and SW 6 <sup>th</sup> Street.	\$2,148,000	Low
<b>Policies/Programs</b>			
P-1	Develop a program to install and maintain wayfinding signage at all trailheads and trail crossings of public streets. <i>See Appendix F for more information.</i>	--	High
P-2	Develop a policy that requires bicycle parking to be provided at key locations and pursue grant funding to provide it at key locations where it is missing.	--	High
P-3	Develop guidelines for how to evaluate trail crossings and determine the appropriate treatment for the City and County to use in applying consistent treatment at crossings for local streets.	--	Medium
P-4	Evaluate the feasibility of installing illumination along the trail system, including type of illumination, priority locations, and cost/maintenance.	--	Low
P-5	Develop a plan for strategic placement of bicycle repair stations and racks throughout the urban trail system.	--	Low

\*The prefix on the ID numbers refers to the project category: "G-" refers to trail system projects; "B-" refers to on-street bikeways; "C-" refers to crossings; and "S-" refers to sidewalks; "P-" refers to policies and programs.

<sup>^</sup>Please note the costs outlined above are for 2015 and are planning level estimates only that do not include right-of-way. An annual inflation rate of 3 to 5 percent should be applied when projecting costs to the future.

ID: G-1

## END OF THE OC&E TRAIL TO DOWNTOWN KLAMATH FALLS

**Description:**

Connect the OC&E Trail to downtown Klamath Falls via 6th Street bridge by extending the trail to 6<sup>th</sup> Street and widening sidewalk on one side of the bridge to provide for shared-use path. Provide a connection to the soon to be constructed Lake Ewauna trail. (Note: Lake Ewauna trail connection alignment is not confirmed; cost estimate does not include this connection.)

**Purpose:**

Connect the OC&E Trail to downtown Klamath Falls and the Lake Ewauna trail.

**Category:** Trail



**Grouping:** 6<sup>th</sup> Street Connections to Downtown (B-13, B-14, G-1)

**Priority:** High



**Cost:** \$859,500

**Potential Funding Sources:** Land and Water Conservation Fund; STIP; Local Sources

**Potential Project Partners:** City of Klamath Falls, ODOT, OPRD

**Considerations:**

May require the crossing of 6<sup>th</sup> Street on and off ramps. More work will be needed to determine if the bridge can accommodate the additional concrete weight. If possible, the path should be physically separated from motor vehicle traffic by a vertical barrier. By routing the trail connection through the Klamath Works property, the trail will connect to the future pedestrian crossing being installed at SW 6<sup>th</sup> Street/Adams Street. Signage and/or pavement markings to indicate that bikes and pedestrians share the space on the bridge should be included.

**Project Location/Images:**



Existing 6<sup>th</sup> Street railroad bridge

Photo Source: Google Maps

ID: G-2

## CONNECTING THE "A" CANAL TRAIL TO THE ODOT TRAIL

**Description:**

Connect "A" Canal Trail to the ODOT Trail using Crater Lake Parkway by widening the sidewalks on the east side of Esplanade Avenue and north side of Crater Lake Parkway to provide for a shared-use path.

**Purpose:**

To provide a complete connection between these two trails.

**Category:** Trail



**Grouping:** Esplanade Avenue Crossing

**Priority:** High



**Cost:** \$166,500

**Potential Funding Sources:** Land and Water Conservation Fund; STIP; Local Sources

**Potential Project Partners:** ODOT, City of Klamath Falls, Bureau of Reclamation

**Considerations:**

Requires crossing Crater Lake Highway. The Esplanade Avenue bridge may need to be examined further before additional concrete is added. Project design should include evaluating the crossing of Earle Street to determine if drainage improvements are needed. The alley between N Eldorado Avenue and Crater Lake Parkway could be used as an alternative route if an obstacle prevents the recommended improvement from Esplanade Avenue to Melrose Street.

**Project Location/Images:**



Photo Source: Google Maps

ID: G-3

## CONNECTING THE "A" CANAL TRAIL TO THE FOOTHILLS TRAIL

**Description:** Widen the sidewalk on the east side of the bridge to provide a shared use path between the Foothills Trail and the "A" Canal trail. Tighten the curb radius for NB right-turns onto Crater Lake Parkway.

**Purpose:** To provide a complete connection between these two trails and a comfortable crossing of the Crater Lake Parkway.

**Category:** Trail



**Grouping:** G-3, C-10

**Priority:** Medium



**Cost:** \$153,000

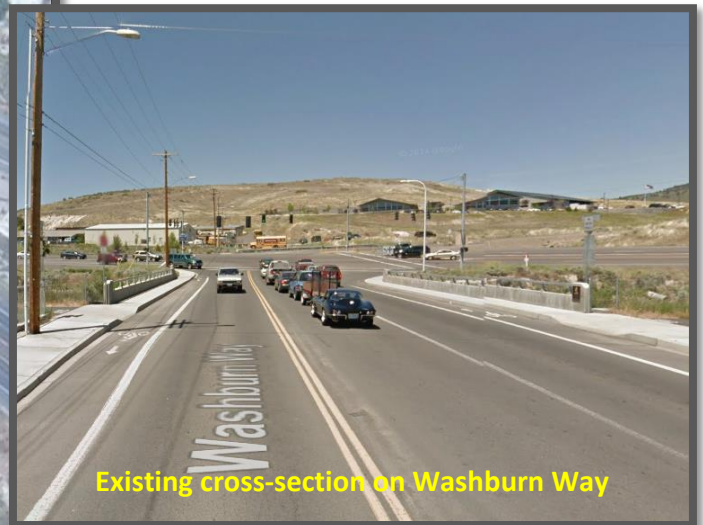
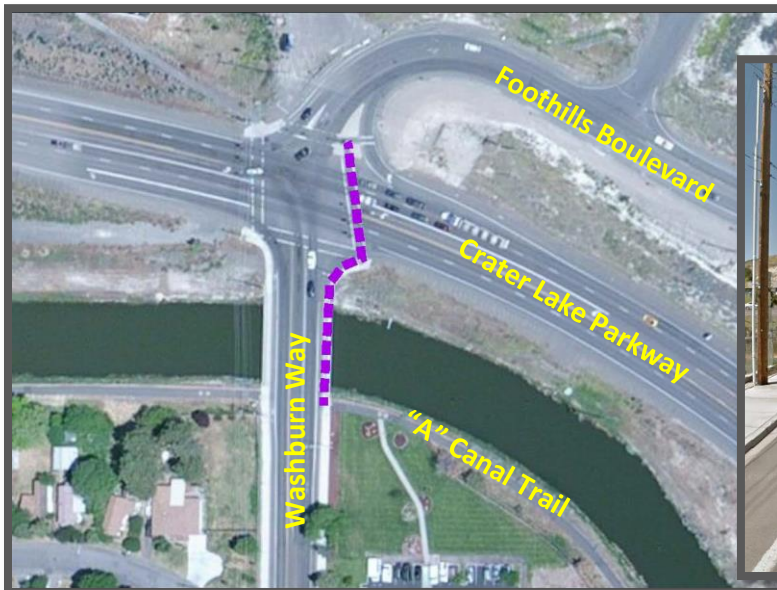
**Potential Funding Sources:** Land and Water Conservation Fund; STIP; Local Sources

**Potential Project Partners:** Klamath County, City of Klamath Falls, Bureau of Reclamation

**Considerations:**

Accommodating the shared-use path on the bridge may require either removing the bike lanes or lane width reductions. Project could be phased in. By expanding the sidewalk to a path on the east side, it allows southbound bicyclists to continue from the Foothills Trail to the "A" Canal trail eastbound with only one crossing. Tightening the curb radius will slow down right-turn vehicles making the crossing more comfortable. The long-term maintenance status of the "A" Canal Trail should be considered before implementing this project.

**Project Location/Images:**



Existing cross-section on Washburn Way

Photo Source: Google Maps



ID: G-4 **CONNECTING THE "A" CANAL TRAIL TO THE ELLA REDKEY SWIMMING POOL**

**Description:** Connect the trail by installing a shared-use path between the parking lot/front entrance to the pool and the existing "A" Canal Trail.

**Purpose:** Connects the "A" Canal Trail to a popular destination that it is currently grade-separated from.

**Category:** Trail  **Grouping:** None **Priority:** Medium 

**Cost:** \$55,800 **Potential Funding Sources:** Oregon Parks Local Government Grants; Recreational Trails Program; Land and Water Conservation Fund; STIP; Local Sources

**Potential Project Partners:** City of Klamath Falls, Bureau of Reclamation

**Considerations:** May require right-of-way or an easement. The long-term maintenance status of the "A" Canal Trail should be considered before implementing this project.

**Project Location/Images:**



ID: G-5 **CONNECTING THE "A" CANAL TRAIL TO THE KIGER STADIUM AND KLAMATH COUNTY FAIRGROUNDS**

**Description:** Pave the existing informal service road from the "A" Canal Trail to the Kiger Stadium Parking lot. Install a shared use path along the west side of Crest Street from the Kiger Stadium Parking lot to the Fairgrounds.

**Purpose:** Connects the "A" Canal Trail to popular destinations that it is currently grade-separated from

**Category:** Trail



**Grouping:** None

**Priority:** Low



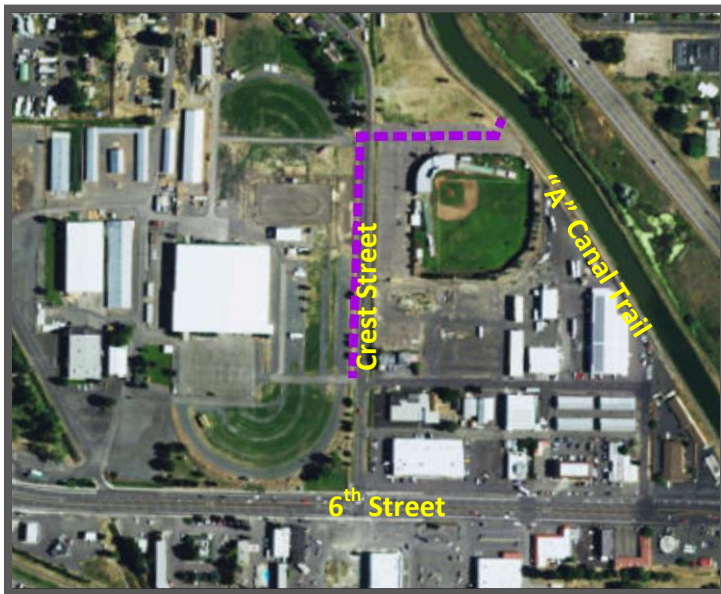
**Cost:** \$199,100

**Potential Funding Sources:** Oregon Parks Local Government Grants; Recreational Trails Program; Land and Water Conservation Fund; STIP; Local Sources

**Potential Project Partners:** Klamath County, Bureau of Reclamation

**Considerations:** May require right-of-way or an easement to reach Crest Street. The long-term maintenance status of the "A" Canal Trail should be considered before implementing this project.

**Project Location/Images:**



Existing cross-section on Crest Street

Photo Source: Google Maps

ID: G-6

### CAMPUS TRAIL TO BIEHN STREET CONNECTION

**Description:** Widen the sidewalk on the south side of Campus Drive to complete the shared-use path connection. Consider modifications to the Crater Lake Parkway intersection.

**Purpose:** Connect Campus Trail and the bike lane on Biehn Street, which connects to Oregon Avenue and downtown Klamath Falls, thereby providing a more complete connection between downtown Klamath Falls, OIT, and Sky Lakes Medical Center.

**Category:** Trail



**Grouping:** OIT to Downtown (G-6, B-21)

**Priority:** High



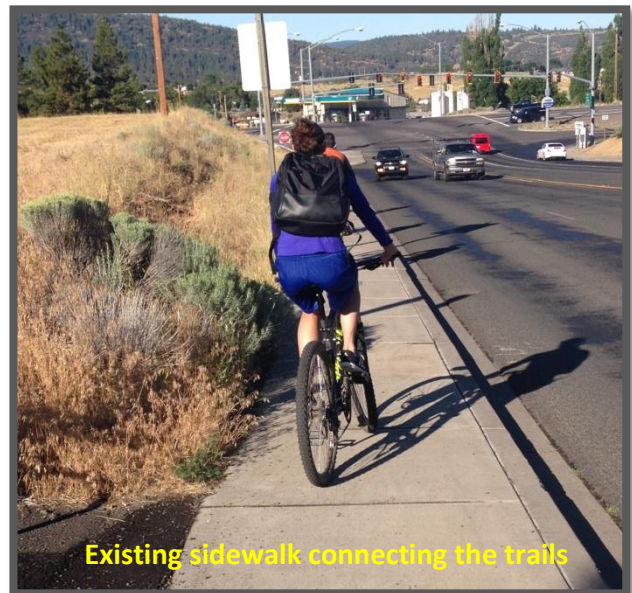
**Cost:** \$108,800

**Potential Funding Sources:** Land and Water Conservation Fund; STIP; Local Sources

**Potential Project Partners:** ODOT, City of Klamath Falls

**Considerations:** Southbound cyclists coming from the Campus Trail would use the crosswalks at the signalized intersection to transition to bike lanes. Modifications, such as tightening the northbound right-turn radius from Crater Lake Parkway onto Campus Drive and installing advanced warning signs for the pedestrian crossing at the Crater Lake Parkway intersection may be required to create a comfortable crossing.

#### Project Location/Images:



ID: G-7

## CONNECTING THE ODOT TRAIL TO KIT CARSON PARK

**Description:** Construct a connection between the trail and the parking lot or existing sidewalk connecting the street to the park.

**Purpose:** Provide a connection between the ODOT Trail and the park, which is currently separated by a fence.

**Category:** Trail



**Grouping:** None

**Priority:** Medium



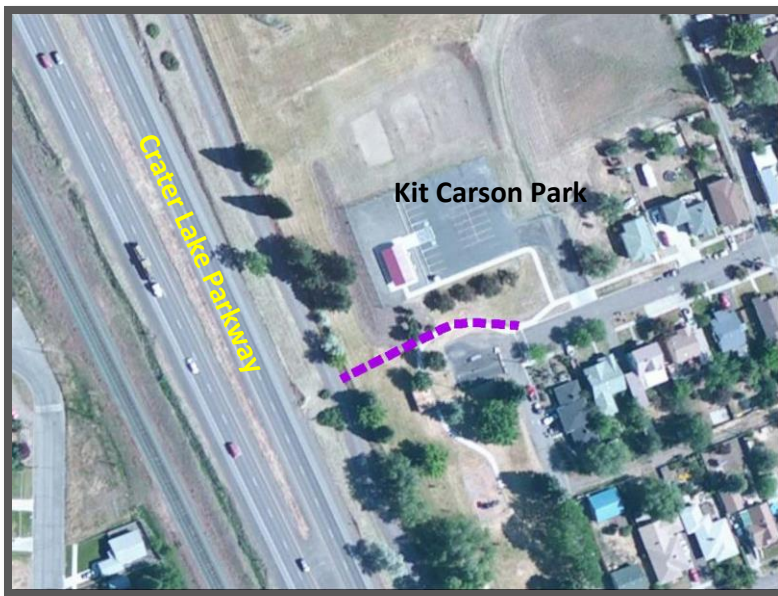
**Cost:** \$22,600

**Potential Funding Sources:** Oregon Parks Local Government Grants; Recreational Trails Program; Land and Water Conservation Fund; STIP; Local Sources

**Potential Project Partners:** ODOT, City of Klamath Falls

**Considerations:** May require right-of-way or an easement.

### Project Location/Images:



ID: G-8

### VETERAN'S PARK TRAIL CONNECTIONS

**Description:**

Widen the sidewalk on the north side of Main Street to provide for a shared use path to connect Veteran's Park with the Link River Trail. Install a crossing across Main Street west of the park road's access to Main Street to connect Veteran's Park with the path. Sharrows may work as an interim solution.

**Purpose:**

Provides a separated facility for pedestrians and bicyclists between two popular destinations.

**Category:** Trail



**Grouping:** None

**Priority:** High



**Cost:** \$90,600

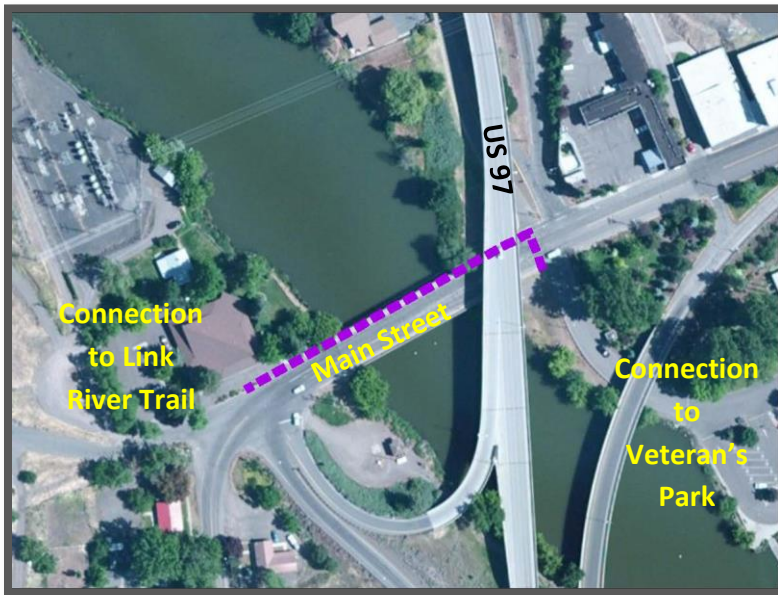
**Potential Funding Sources:** Oregon Parks Local Government Grants; Recreational Trails Program; Land and Water Conservation Fund; STIP; Local Sources

**Potential Project Partners:** ODOT, City of Klamath Falls

**Considerations:**

Lanes will have to be narrowed on the bridge to accommodate the shared-use path. An additional crossing of Main Street may be needed on the west side of the bridge. Ultimate configuration should be determined with redesign of interchange area. A connection to the visitor center could be considered as part of this project. Signage will be an important element of this project to direct cyclists and pedestrians to the trail connections.

**Project Location/Images:**



ID: G-9

### “A” CANAL TRAIL TO CROSSING AT 6TH STREET

**Description:** Widen the sidewalk on the south side of 6th Street to better accommodate bicyclists connecting to the signalized crossing.

**Purpose:** Provide a wider sidewalk between the trail and signalized crossing (approximately 40’ apart) to allow pedestrians and bicyclists to use the signalized crossing comfortably.

**Category:** Trail



**Grouping:** None

**Priority:** Medium



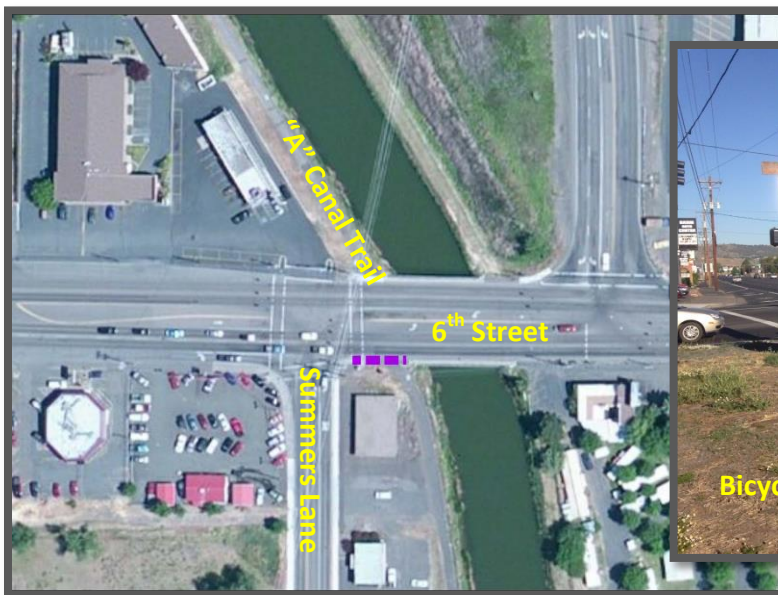
**Cost:** \$18,700

**Potential Funding Sources:** Local Sources; External Funds (if packaged with other projects)

**Potential Project Partners:** ODOT, Klamath County, Bureau of Reclamation

**Considerations:** Will need to verify there is sufficient right-of-way.

#### Project Location/Images:



Bicyclists using existing sidewalk to connect to crossing

ID: G-10

## "A" CANAL TRAIL CONNECTION TO KLAMATH UNION HIGH SCHOOL

**Description:**

Widen the sidewalk on the north side of Esplanade Avenue to provide a shared-use path to the high school. Coordinate with school for completing the connection.

**Purpose:**

Provide a connection for bicyclists between the "A" Canal Trail and Klamath Union High School.

**Category:** Trail



**Grouping:** Esplanade Avenue  
Crossing (G-10, C-12)

**Priority:** Medium



**Cost:** \$298,500

**Potential Funding Sources:** Land and Water Conservation Fund; STIP; Local Sources

**Potential Project Partners:** City of Klamath Falls, Klamath Union High School, Bureau of Reclamation

**Considerations:**

Coordination with the school will be required. This project assumes there is adequate width available under the railroad bridge to complete the widening for the trail. The long-term maintenance status of the "A" Canal Trail should be considered before implementing this project.

**Project Location/Images:**

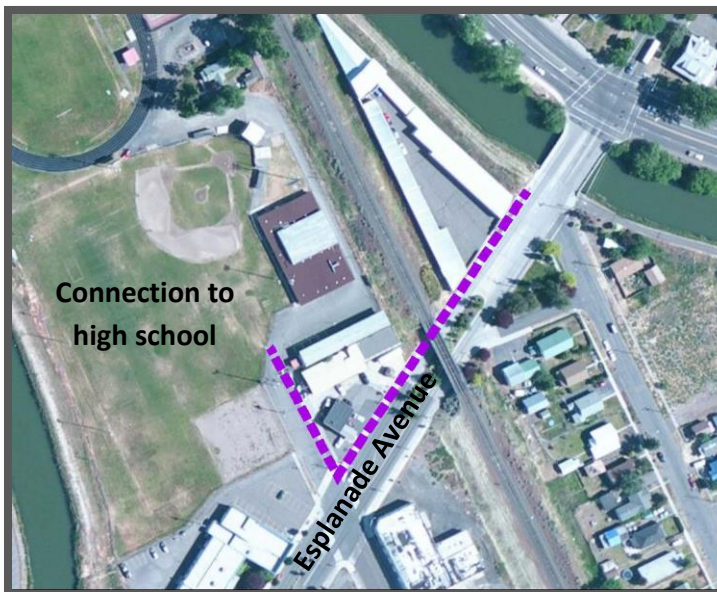


Photo Source: Google Maps

ID: G-11

## SOUTHERN CONNECTION TO STEEN SPORTS PARK

**Description:** Formalize connections between Summers Lane and Steens Sports Park

**Purpose:** Create a direction connection from Steens Sports Park to the south, where a large residential area is located.

**Category:** Trail



**Grouping:** None

**Priority:** High



**Cost:** \$150,000

**Potential Funding Sources:** Oregon Parks Local Government Grants; Recreational Trails Program; Land and Water Conservation Fund; STIP; Local Sources

**Potential Project Partners:** City of Klamath Falls, Klamath County, Steen Sports Park

**Considerations:** May require right-of-way or an easement to complete the connection.

### Project Location/Images:





ID: C-1

## OR 39: OC&E TRAIL CROSSING

**Description:** TBD by ongoing ODOT and Oregon Parks study

**Purpose:** To provide a comfortable crossing of OR 39 for trail users.

**Category:** Crossing



**Grouping:** None

**Priority:** High



**Cost:** TBD

**Potential Funding Sources:** TBD by ongoing ODOT and Oregon Parks study

**Potential Project Partners:** ODOT, Klamath County, OPRD

**Considerations:** TBD by ongoing ODOT and Oregon Parks study

### Project Location/Images:



ID: C-2

### HOMEDALE ROAD: OC&E TRAIL CROSSING

**Description:** TBD by ongoing ODOT and Oregon Parks study

**Purpose:** To provide a comfortable crossing of Homedale Road for trail users.

**Category:** Crossing



**Grouping:** None

**Priority:** High



**Cost:** TBD

**Potential Funding Sources:** TBD by ongoing ODOT and Oregon Parks study

**Potential Project Partners:** ODOT, Klamath County, OPRD

**Considerations:** TBD by ongoing ODOT and Oregon Parks study

#### Project Location/Images:



ID: C-3

## HOPE STREET: OC&E TRAIL CROSSING

**Description:** Install striped crosswalk and appropriate signage.

**Purpose:** To provide a comfortable crossing of Hope Street for trail users.

**Category:** Crossing



**Grouping:** None

**Priority:** Medium



**Cost:** \$3,300

**Potential Funding Sources:** Local Sources: External Sources (if combined with other projects in a package)

**Potential Project Partners:** Klamath County, OPRD

**Considerations:** Consider installing illumination at the crossing as well (it is currently located nearby but not at the crossing).

### Project Location/Images:



Photo Source: Google Maps

ID: C-4

### SUMMERS LANE: OC&E TRAIL CROSSING

**Description:** TBD by ongoing ODOT and Oregon Parks study

**Purpose:** To provide a comfortable crossing of Summers Lane for trail users.

**Category:** Crossing



**Grouping:** None

**Priority:** High



**Cost:** TBD

**Potential Funding Sources:** TBD by ongoing ODOT and Oregon Parks study

**Potential Project Partners:** ODOT, Klamath County, OPRD

**Considerations:** TBD by ongoing ODOT and Oregon Parks study

#### Project Location/Images:



ID: C-5

## ALTAMONT DRIVE: OC&E TRAIL CROSSING

**Description:** TBD by ongoing ODOT and Oregon Parks study

**Purpose:** To provide a comfortable crossing of Altamont Drive for trail users.

**Category:** Crossing



**Grouping:** None

**Priority:** High



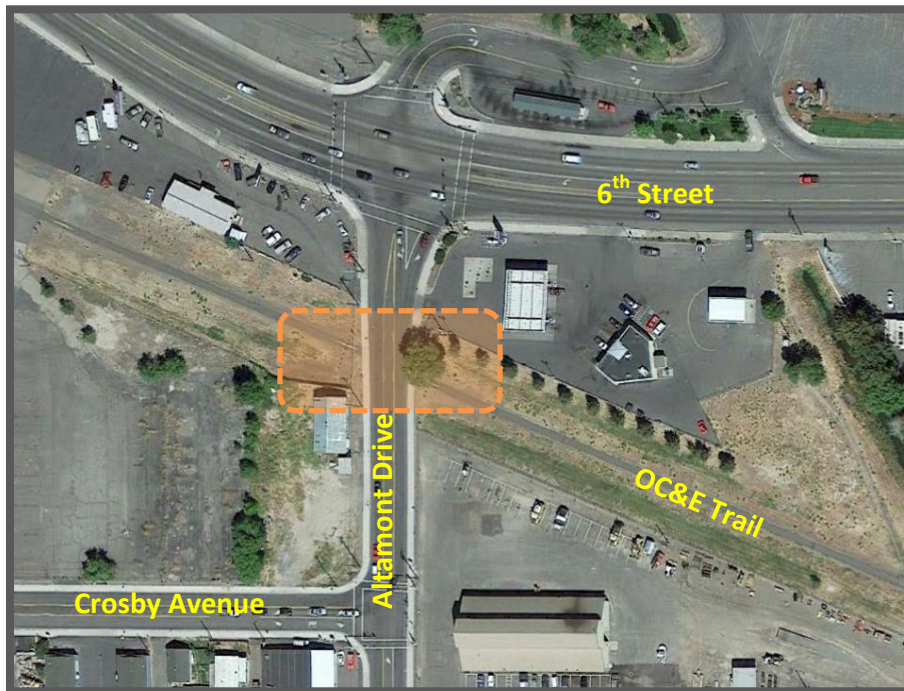
**Cost:** TBD

**Potential Funding Sources:** TBD by ongoing ODOT and Oregon Parks study

**Potential Project Partners:** ODOT, Klamath County, OPRD

**Considerations:** TBD by ongoing ODOT and Oregon Parks study

### Project Location/Images:



ID: C-6

### HOMEDALE ROAD: "A" CANAL TRAIL CROSSING

**Description:** Install marked crosswalk, appropriate signage, and raised median island. Install a gate across the maintenance road on the east side of Homedale Road to indicate that the trail does not extend east of Homedale Road.

**Purpose:** To provide a comfortable crossing of Homedale Road for trail users.

**Category:** Crossing



**Grouping:** None

**Priority:** Medium



**Cost:** \$83,700

**Potential Funding Sources:** Oregon Parks Local Government Grants; Recreational Trails Program; Land and Water Conservation Fund; STIP; Local Sources

**Potential Project Partners:** Klamath County, Bureau of Reclamation

**Considerations:** Consider installing illumination at the crossing as well (there is not existing illumination on Homedale Road in the crossing vicinity). The long-term maintenance status of the "A" Canal Trail should be considered before implementing this project.

#### Project Location/Images:



Photo Source: Google Maps

ID: C-7

## HOPE STREET: "A" CANAL TRAIL CROSSING

**Description:** Install marked crosswalk and appropriate signage.

**Purpose:** To provide a comfortable crossing of Hope Street for trail users.

**Category:** Crossing



**Grouping:** None

**Priority:** Medium



**Cost:** \$3,600

**Potential Funding Sources:** Local Sources; External Sources (if combined with other projects as a package)

**Potential Project Partners:** Klamath County, Bureau of Reclamation

**Considerations:** Consider installing illumination at the crossing as well (there is no existing illumination in the vicinity). Sight distance from the south should be verified. The long-term maintenance status of the "A" Canal Trail should be considered before implementing this project.

### Project Location/Images:



Photo Source: Google Maps

ID: C-8

### SHASTA WAY: "A" CANAL TRAIL CROSSING

**Description:** Further study required to determine final treatment. Active crossing treatments recommended and may include RRFBs and/or a pedestrian refuge island either directly at the trail crossing or at the intersection of Shasta Way/Crest Street.

**Purpose:** To provide a comfortable crossing of Shasta Way for trail users.

**Category:** Crossing



**Grouping:** None

**Priority:** Medium



**Cost:** \$2,000 - \$50,000

**Potential Funding Sources:** TBD

**Potential Project Partners:** Klamath County, Bureau of Reclamation

**Considerations:** A median island would require removing the left-turn lane. The long-term maintenance status of the "A" Canal Trail should be considered before implementing this project.

#### Project Location/Images:



Photo Source: Google Maps



ID: C-9

### EBERLEIN AVENUE: "A" CANAL TRAIL CROSSING

**Description:** Further study required to determine final treatment. Active crossing treatments recommended and may include a RRFB.

**Purpose:** To provide a comfortable crossing of Eberlein Avenue for trail users.

**Category:** Crossing



**Grouping:** None

**Priority:** Medium



**Cost:** \$2,000 - \$50,000

**Potential Funding Sources:** TBD

**Potential Project Partners:** City of Klamath Falls, Bureau of Reclamation

**Considerations:** Close proximity of Avalon Street may present issues. The long-term maintenance status of the "A" Canal Trail should be considered before implementing this project.

#### Project Location/Images:

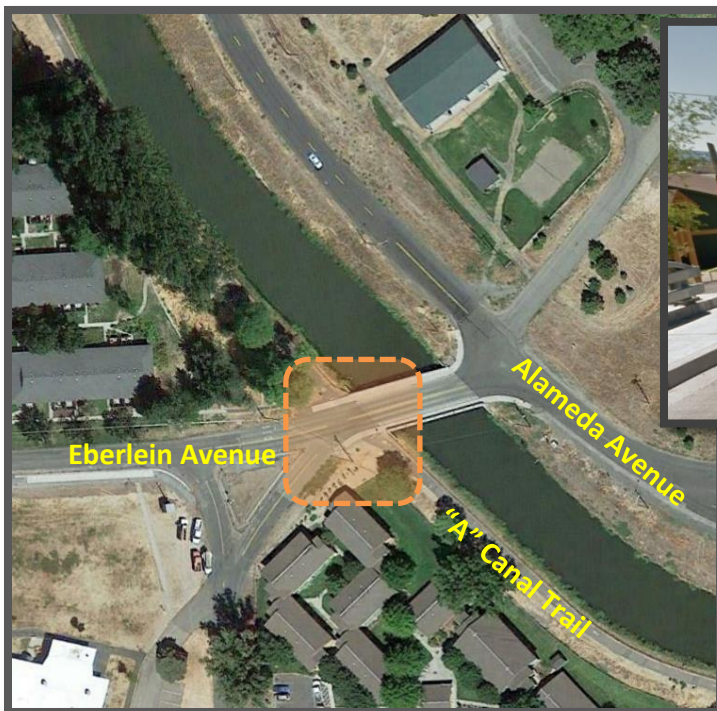


Photo Source: Google Maps

ID: C-10

## WASHBURN WAY: "A" CANAL TRAIL CROSSING

**Description:** Further study required to determine final treatment. Active crossing treatments recommended and may include a RRFB with pedestrian refuge island, connections to the traffic signal, or a grade-separated crossing of Washburn Way.

**Purpose:** To provide a comfortable crossing of Washburn Way for trail users.

**Category:** Further Study, Crossing



**Grouping:** G-3, C-10

**Priority:** High



**Cost:** \$2,000 - \$50,000

**Potential Funding Sources:** TBD

**Potential Project Partners:** City of Klamath Falls, Klamath County, Bureau of Reclamation

**Considerations:** A median island would impact left-turn lane storage. Close proximity to Crater Lake Parkway. The long-term maintenance status of the "A" Canal Trail should be considered before implementing this project.

### Project Location/Images:



Photo Source: Google Maps

### Existing crossing and signage



ID: C-11

### MAIN STREET: "A" CANAL TRAIL CROSSING

**Description:** Further study required to determine final treatment. Active crossing treatments recommended and may include a RRFB with pedestrian refuge island, connections to the traffic signal to encourage crossings there, or a grade-separated crossing of Main Street.

**Purpose:** To provide a comfortable crossing of Main Street for trail users.

**Category:** Crossing



**Grouping:** None

**Priority:** High



**Cost:** \$2,000 - \$50,000

**Potential Funding Sources:** TBD

**Potential Project Partners:** City of Klamath Falls, Klamath County, Bureau of Reclamation

**Considerations:** Queuing from the Crater Lake Parkway intersection may block the crossing at times. Free right-turn from Crater Lake Parkway onto Main Street may need to be modified. The long-term maintenance status of the "A" Canal Trail should be considered before implementing this project.

#### Project Location/Images:




Photo Source: Google Maps

ID: C-12

### ESPLANADE AVENUE: "A" CANAL TRAIL CROSSING

**Description:** Further study required to determine final treatment. Active crossing treatments recommended and may include RRFBs with pedestrian refuge island using existing median, connections to the traffic signal to encourage crossings there, or a grade-separated crossing of Esplanade Avenue.

**Purpose:** To provide a comfortable crossing of Esplanade Avenue for trail users.

**Category:** Further Study, Crossing 

**Grouping:** Esplanade Avenue Crossing (G-10, C-12)

**Priority:** High



**Cost:** \$2,000 - \$50,000

**Potential Funding Sources:** TBD

**Potential Project Partners:** City of Klamath Falls, Bureau of Reclamation

**Considerations:** A median island would impact left-turn lane storage. Close proximity to Crater Lake Parkway. Queuing from the Crater Lake Parkway intersection may block the crossing at times. The long-term maintenance status of the "A" Canal Trail should be considered before implementing this project.

**Project Location/Images:**

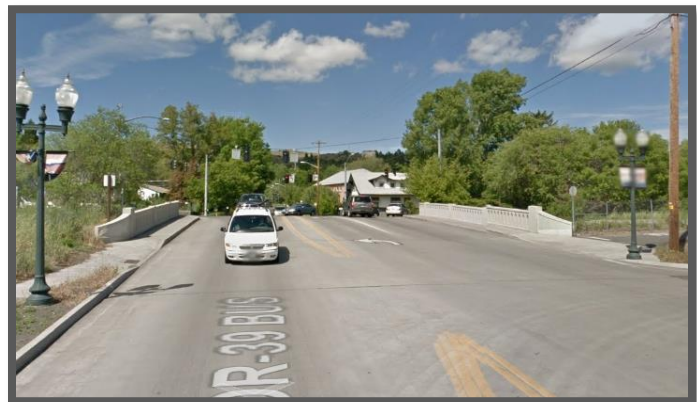


Photo Source: Google Maps

ID: B-1

OR 39 (OC&E TRAIL TO OR 140)

**Description:** Install protected or buffered bike lanes.

**Purpose:** To provide a comfortable on-street bicycling connection between the OC&E Trail and areas around OR 39 as they develop.

**Category:** On-Street Bike Facility



**Grouping:** None

**Priority:** Low



**Cost:** \$72,500

**Potential Funding Sources:** STIP

**Potential Project Partners:** ODOT

**Considerations:** May require additional pavement.

**Project Location/Images:**



Photo Source: Google Maps

ID: B-2

## 6<sup>TH</sup> STREET (RAILROAD BRIDGE TO OR 39)

**Description:** Identify if there are parallel routes on local streets that would provide similar connectivity but greater comfort

**Purpose:** To provide a comfortable on-street bicycling connection between land-uses along 6<sup>th</sup> Street and the surrounding trails.

**Category:** On-Street Bike Facility



**Grouping:** None

**Priority:** Medium



**Cost:** TBD

**Potential Funding Sources:** TBD

**Potential Project Partners:** ODOT, Klamath County, City of Klamath Falls

**Considerations:** Access to specific destinations on 6<sup>th</sup> Street will need to be considered. Local street connectivity is fragmented in locations. Use trails whenever possible.

### Project Location/Images:



Photo Source: Google Maps

ID: B-3

## SHASTA WAY (PATTERSON STREET TO KIMBERLY DRIVE)

**Description:** Install sharrows and traffic calming.

**Purpose:** To provide a comfortable on-street bicycling connection between Patterson Street and the residential areas on Shasta Way east of it.

**Category:** On-Street Bike Facility



**Grouping:** None

**Priority:** Low



**Cost:** \$75,500

**Potential Funding Sources:** STIP; Local Funds

**Potential Project Partners:** Klamath County

**Considerations:** Sharrows alone will not do much for the comfort of people bicycling. Traffic calming will also be required to lower the speed people are driving.

### Project Location/Images:



Photo Source: Google Maps

ID: B-4

## SHASTA WAY (PATTERSON STREET TO CRATER LAKE PARKWAY)

**Description:** Look for opportunities for alternate routes on local streets or for traffic calming measures on Shasta Way

**Purpose:** To provide a comfortable on-street bicycling connection between Crater Lake Parkway and Patterson Street.

**Category:** On-Street Bike Facility



**Grouping:** None

**Priority:** Medium



**Cost:** TBD

**Potential Funding Sources:** TBD

**Potential Project Partners:** Klamath County, City of Klamath Falls

**Considerations:** Local street connectivity is fragmented in locations.

### Project Location/Images:



Photo Source: Google Maps



ID: B-5

## PATTERSON STREET (6<sup>TH</sup> STREET TO FOOTHILLS BOULEVARD)

**Description:** Further study required to determine final treatment. Candidates include buffered bike lanes or a shared-use path.

**Purpose:** To provide a comfortable north-south on-street bicycling connection between the Foothills Trail and 6<sup>th</sup> Street.

**Category:** On-Street Bike Facility; Trail



**Grouping:** None

**Priority:** Medium



**Cost:** TBD

**Potential Funding Sources:** TBD

**Potential Project Partners:** Klamath County

**Considerations:** Needs to tie into Foothills Trail.

### Project Location/Images:



Photo Source: Google Maps

ID: B-6 to B-11

## NORTH-SOUTH ROUTES IN SE KLAMATH FALLS

**Description:**

Further study required to determine which routes will be designated for bicycle travel and what the treatments are. Options include providing buffered or protected bike lanes along the identified routes (i.e., Washburn Way, Altamont Drive, Summer Lane, and Homedale Road) or providing bicycle boulevard style treatments to parallel low-volume, low-speed streets.

**Purpose:**

To connect the neighborhoods in SE Klamath Falls to the OC&E and “A” Canal Trails with comfortable on-street bicycle routes.

**Category:** On-Street Bike Facility



**Grouping:** None

**Priority:** Medium



**Cost:** TBD

**Potential Funding Sources:** TBD

**Potential Project Partners:** Klamath County, City of Klamath Falls

**Considerations:** Parallel routes may be an option in certain locations.

**Project Location/Images:**



Photo Source: Google Maps

ID: B-12

### OR 140 (WASHBURN WAY TO HOMEDALE ROAD)

**Description:** Install shared-use path along the north side of OR 140.

**Purpose:** To provide a comfortable on-street bicycling connection between Homedale Road and Washburn Way, forming the southern section of a loop around the City for bicyclists.

**Category:** Trail



**Grouping:** None

**Priority:** Low



**Cost:** \$1,633,500

**Potential Funding Sources:** Oregon Parks Local Government Grants; Recreational Trails Program; Land and Water Conservation Fund; STIP

**Potential Project Partners:** ODOT, Klamath County

**Considerations:** Installing the trail along the north side of the road would minimize the number of bicycle crossings of OR 140. One crossing of the railroad is involved. Requires some type of transition between OR 140 and Washburn Way (which is connected by on/off ramps). May require purchasing right-of-way. Treatments may be needed at crossings with minor streets. Project development should include outreach to employees of Kingsley Field, who may use this trail for commuting purposes.

#### Project Location/Images:



Photo Source: Google Maps

ID: B-13

## 6<sup>TH</sup> STREET (MARKET STREET TO MAIN STREET)

**Description:** Stripe a bike lane on 6<sup>th</sup> Street from Market Street to Main Street; if space allows stripe as a buffered bike lane.

**Purpose:** To provide a comfortable on-street bicycling connection between Market Street and Main Street, providing a connection to downtown.

**Category:** On-Street Bike Facility



**Grouping:** 6<sup>th</sup> Street Connections to Downtown (B-13, B-14, G-1)

**Priority:** High



**Cost:** \$15,700

**Potential Funding Sources:** Local Sources (potentially as part of routine maintenance); External Sources (if packaged with other projects)

**Potential Project Partners:** ODOT, City of Klamath Falls

**Considerations:** One side of on-street parking may need to be removed. Project should be coordinated with B-14, which will determine whether a one-way or two-way facility is needed.

### Project Location/Images:




Photo Source: Google Maps

ID: B-14


### 5<sup>TH</sup> STREET (MAIN STREET TO 6<sup>TH</sup> STREET)

**Description:** Stripe a bike lane on 5<sup>th</sup> Street from Main Street to 6<sup>th</sup> Street; if space allows stripe as a buffered bike lane.

**Purpose:** To provide a comfortable on-street bicycling connection between Main Street and 6<sup>th</sup> Street, providing a connection to downtown.

**Category:** On-Street Bike Facility 

**Grouping:** 6<sup>th</sup> Street Connections to Downtown (B-13, B-14, G-1)

**Priority:** High 

**Cost:** \$19,400

**Potential Funding Sources:** Local Sources (potentially as part of routine maintenance); External Sources (if packaged with other projects)

**Potential Project Partners:** ODOT, City of Klamath Falls

**Considerations:** Project should be coordinated with B-13, which will determine whether a one-way or two-way facility is needed.

#### Project Location/Images:



Photo Source: Google Maps

ID: B-15

## KLAMATH AVENUE (CONGER AVENUE TO COMMERCIAL STREET)

**Description:** Stripe bike lanes on Klamath Avenue. *Coordinate with the Blue Zones project for the final facility type.*

**Purpose:** To provide a comfortable on-street bicycling connection within the downtown area.

**Category:** On-Street Bike Facility



**Grouping:** Klamath Avenue and Main Street Downtown (B-15, B-16)

**Priority:** High



**Cost:** \$28,700

**Potential Funding Sources:** Local Sources (potentially as part of routine maintenance); External Sources (if packaged with other projects)

**Potential Project Partners:** City of Klamath Falls

**Considerations:** May require the removal of on-street parking on at least one side of the road to accommodate the bike lane width. Project should be coordinated with B-16, which will determine whether a one-way or two-way facility is needed.

### Project Location/Images:



Photo Source: Google Maps



ID: B-16

## MAIN STREET (ESPLANADE AVENUE TO MILL STREET)

**Description:** Stripe bike lanes on Main Street. *Coordinate with the Blue Zones project for the final facility type.*

**Purpose:** To provide a comfortable on-street bicycling connection within the downtown area.

**Category:** On-Street Bike Facility



**Grouping:** Klamath Avenue and Main Street Downtown (B-15, B-16)

**Priority:** High



**Cost:** \$24,600

**Potential Funding Sources:** Local Sources (potentially as part of routine maintenance); External Sources (if packaged with other projects)

**Potential Project Partners:** City of Klamath Falls

**Considerations:** Project should be coordinated with B-15, which will determine whether a one-way or two-way facility is needed.

### Project Location/Images:



Photo Source: Google Maps

ID: B-17

### MOORE PARK TO DOWNTOWN BIKE FACILITY

**Description:** To be determined by ongoing Moore Park to Downtown Klamath Falls Corridor Plan.

**Purpose:** To provide a comfortable on-street bicycling connection between Moore Park and downtown.

**Category:** On-Street Bike Facility



**Grouping:** None

**Priority:** High



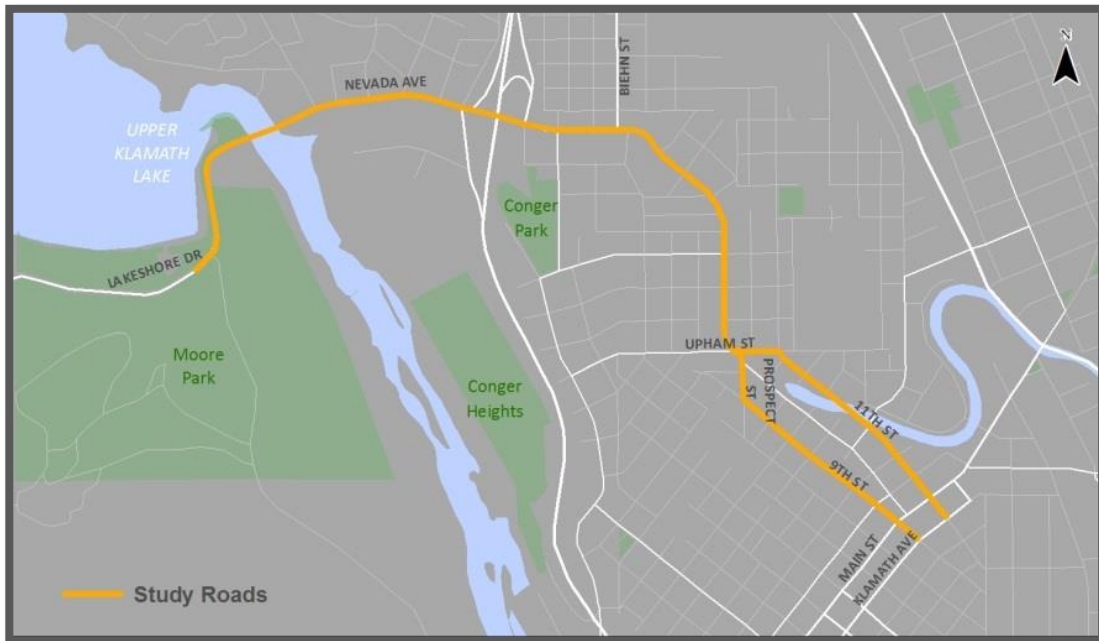
**Cost:** \$556,200

**Potential Funding Sources:** TBD by ongoing Moore Park to Downtown Klamath Falls Corridor Plan.

**Potential Project Partners:** City of Klamath Falls

**Considerations:** TBD by ongoing project.

#### Project Location/Images:





ID: B-18

## LAKESHORE DRIVE (LYNNEWOOD BLVD TO WEST UGB)

**Description:** Widen the pavement to accommodate shoulders or bike lanes.

**Purpose:** To provide a comfortable on-street bicycling facility along Lakeshore Drive, a popular recreational route.

**Category:** On-Street Bike Facility



**Grouping:** None

**Priority:** Low



**Cost:** \$4,121,000

**Potential Funding Sources:** Land and Water Conservation Fund; STIP

**Potential Project Partners:** Klamath County, City of Klamath Falls, Running Y

**Considerations:**

The road will need to be widened to accommodate paved shoulders, and the some earthwork is likely to be needed with the widening. There may be some ROW impacts associated with roadway widening. Project development should include outreach with Klamath County and Running Y to determine if the bike lanes may be extended to Running Y.

**Project Location/Images:**



Photo Source: Google Maps

ID: B-19

## MAIN STREET (ESPLANADE AVENUE TO CRATER LAKE PARKWAY)

**Description:** Stripe bike lanes on Main Street, ideally buffered bike lanes.

**Purpose:** To provide a comfortable on-street bicycling connection between Crater Lake Parkway and downtown. This route serves as a key connection to downtown for cyclists traveling from the “A” Canal Trail and the southeast area of the City.

**Category:** On-Street Bike Facility



**Grouping:** None

**Priority:** Medium



**Cost:** \$30,600

**Potential Funding Sources:** Local Sources (potentially as part of routine maintenance); External Sources (if packaged with other projects)

**Potential Project Partners:** City of Klamath Falls

**Considerations:** Between Spring Street and Crater Lake Parkway, elimination of the on-street parking or a road diet would be required to accommodate the bike lanes. The eastbound bike lane would require a transition treatment where E Main Street turns off of Main Street. The pavement width is not adequate for adding a bicycle lane under the railroad, so the sidewalk would need to be widened to accommodate bikes. A transition between the bike lanes and sidewalks would also be needed.

### Project Location/Images:



Photo Source: Google Maps

ID: B-20

## OLD FORT ROAD (LOMA LINDA DRIVE TO UGB)

**Description:** Widen the road to add paved shoulders or bike lanes.

**Purpose:** To provide a comfortable on-street bicycling facility on Old Fort Road which is a popular recreational route for bicyclists.

<b>Category:</b> On-Street Bike Facility 	<b>Grouping:</b> None	<b>Priority:</b> Low 
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<b>Cost:</b> \$5,037,500	<b>Potential Funding Sources:</b> Land and Water Conservation Fund; STIP
--------------------------	--

**Potential Project Partners:** Klamath County

**Considerations:** The road appears to have some gravel shoulders today, so widening will be needed.

### Project Location/Images:



Photo Source: Google Maps

ID: B-21

## BIEHN STREET (CRATER LAKE PARKWAY TO OREGON AVENUE)

**Description:** Widen the bike lanes by restriping the roadway.

**Purpose:** To provide a comfortable on-street bicycling connection Crater Lake Parkway and Oregon Avenue, which serves as part of the connection between OIT and downtown.

**Category:** On-Street Bike Facility



**Grouping:** OIT to Downtown (G-6, B-21)

**Priority:** High



**Cost:** \$33,400

**Potential Funding Sources:** Local Sources (potentially as part of routine maintenance); External Sources (if packaged with other projects)

**Potential Project Partners:** City of Klamath Falls

**Considerations:** No pavement widening is required. Narrowing the motor vehicle travel lanes may also calm traffic.

### Project Location/Images:



Photo Source: Google Maps

ID: B-22

## EAST-WEST ROUTES IN SOUTHEAST KLAMATH FALLS

**Description:**

Further study required to determine which routes will be designated for bicycle travel and what the treatments are. Options include providing buffered or protected bike lanes along the identified routes (i.e., Crosby Avenue, Hilyard Avenue, Laverne Avenue, and Bristol Avenue) or providing bicycle boulevard style treatments to parallel low-volume, low-speed streets.

**Purpose:**

To connect the neighborhoods in SE Klamath Falls to north-south routes which connect to the OC&E and "A" Canal Trails with comfortable on-street bicycle routes.

**Category:** On-Street Bike Facility



**Grouping:** None

**Priority:** Medium



**Cost:** TBD

**Potential Funding Sources:** TBD

**Potential Project Partners:** City of Klamath Falls, Klamath County

**Considerations:**

Further neighborhood outreach and speed studies may be necessary to identify specific treatments.

### Project Location/Images:



Photo Source: Google Maps

Potential east-west streets for improvements

ID: B-23

## N ELDORADO AVENUE

**Description:** Install sharrows and traffic calming. Sidewalks should be considered as a traffic calming measure.

**Purpose:** To provide on-street bicycle connections on the popular commute route between the residential areas along N Eldorado Avenue and the OIT and Sky Lakes Healthcare campuses.

**Category:** On-Street Bike Facility



**Grouping:** None

**Priority:** Medium



**Cost:** \$679,500  
(\$645,000 for sidewalk)

**Potential Funding Sources:** STIP; Local Sources

**Potential Project Partners:** City of Klamath Falls

**Considerations:** The higher end of the cost range includes sidewalks, the lower end does not. Posted speed limit indicates that a shared-roadway would be sufficient for bicyclists.

### Project Location/Images:



Photo Source: Google Maps

ID: S-1

## OR 39 (OC&E TRAIL TO KELLER ROAD)

**Description:** Install sidewalks on both sides of the road.

**Purpose:** To provide pedestrian connections between the OC&E Trail and areas around OR 39 as they develop.

**Category:** Sidewalk



**Grouping:** None

**Priority:** Low



**Cost:** \$744,000

**Potential Funding Sources:** STIP

**Potential Project Partners:** ODOT

**Considerations:** May require ROW.

### Project Location/Images:



Photo Source: Google Maps

ID: S-2 HOPE STREET (BRISTOL AVENUE TO SW 6<sup>TH</sup> STREET)

**Description:** Install sidewalks on both sides of the road.

**Purpose:** To provide pedestrian connections between the residential areas along Hope Street and the “A” Canal Trail. It also connects Peterson Elementary school and the OC&E and “A” Canal trails.

**Category:** Sidewalk



**Grouping:** None

**Priority:** Low



**Cost:** \$2,148,000

**Potential Funding Sources:** Land and Water Conservation Fund; STIP

**Potential Project Partners:** Klamath County

**Considerations:** The bridge over the canal already includes sidewalks. Project may require ROW.

**Project Location/Images:**



Photo Source: Google Maps



ID: P-1

## TRAIL SIGNING/WAYFINDING

**Description:** Develop a program to install and maintain wayfinding signage at all trailheads and trail crossings of public streets.

**Purpose:** To provide increase awareness and use of the trail system for residents and visitors.

**Category:** Program/Policy



**Grouping:** None

**Priority:** High



**Cost:** --

**Potential Funding Sources:** Oregon Parks Local Government Grants; Recreational Trails Program; Land and Water Conservation Fund; STIP; Local Sources; Public/Private Partnership

**Potential Project Partners:** ODOT, Klamath County, City of Klamath Falls, US Bureau of Reclamation

**Considerations:** Will need to determine who is responsible for the signs. See the suggested Wayfinding Guidelines and Best Practices in the Appendix.

### Project Location/Images:



Examples of wayfinding signage

ID: P-2

## BICYCLE PARKING

**Description:** Develop policy that requires bicycle parking to be provided at key locations and pursue grant funding to provide it at key locations where it is missing.

**Purpose:** To encourage future developments and redevelopments obtain bicycle parking. Users are more likely to bike to locations if they know there is a location to park their bike.

**Category:** Program/Policy



**Grouping:** None

**Priority:** High



**Cost:** --

**Potential Funding Sources:** External Grants; Public/Private Partnerships; Development Requirements

**Potential Project Partners:** City of Klamath Falls, Klamath County

**Considerations:**

### Project Location/Images:



ID: P-3

## LOCAL STREET TRAIL CROSSINGS

**Description:** Develop guidelines for how to evaluate trail crossings and determine the appropriate treatment for the City and County to use in applying consistent treatment at crossings for local streets.

**Purpose:** To provide consistent trail crossings of local streets throughout the City.

**Category:** Program/Policy



**Grouping:** None

**Priority:** Medium



**Cost:** --

**Potential Funding Sources:** TBD

**Potential Project Partners:** City of Klamath Falls, Klamath County

**Considerations:**

### Project Location/Images:



Photo Source: Google Maps

ID: P-4

## TRAIL ILLUMINATION

**Description:** Evaluate the feasibility of installing illumination along the trail system, including type of illumination, priority locations, and cost/maintenance.

**Purpose:** To provide illumination at key locations within the trail system to help reduce crime.

**Category:** Program/Policy



**Grouping:** None

**Priority:** Low



**Cost:** --

**Potential Funding Sources:** TBD

**Potential Project Partners:** City of Klamath Falls, Klamath County, Bureau of Reclamation, ODOT

**Considerations:** The location and design of lighting will need to consider impacts to surrounding residents and uses.

### Project Location/Images:



Photo Source: <http://www.smartswitchelectrical.com.au/commercial-electrician.html>

**Example of pedestrian scale lighting along trail**

ID: P-5

## BICYCLE REPAIR STATIONS

**Description:** Develop a plan for strategic placement of bicycle repair stations and bicycle racks throughout the urban trail system.

**Purpose:** To provide locations for bicyclists to rest and repair their bikes.

**Category:** Program/Policy



**Grouping:** None

**Priority:** Low



**Cost:** --

**Potential Funding Sources:** External Grants (from recreational groups); Public/Private Partnerships

**Potential Project Partners:** City of Klamath Falls, Klamath County, Bureau of Reclamation, ODOT

**Considerations:** Some stations may feature additional features such as water for cyclists.

### Project Location/Images:



*Photo Source: ODOT Region 4*

**Example of bicycle rest area and repair station**

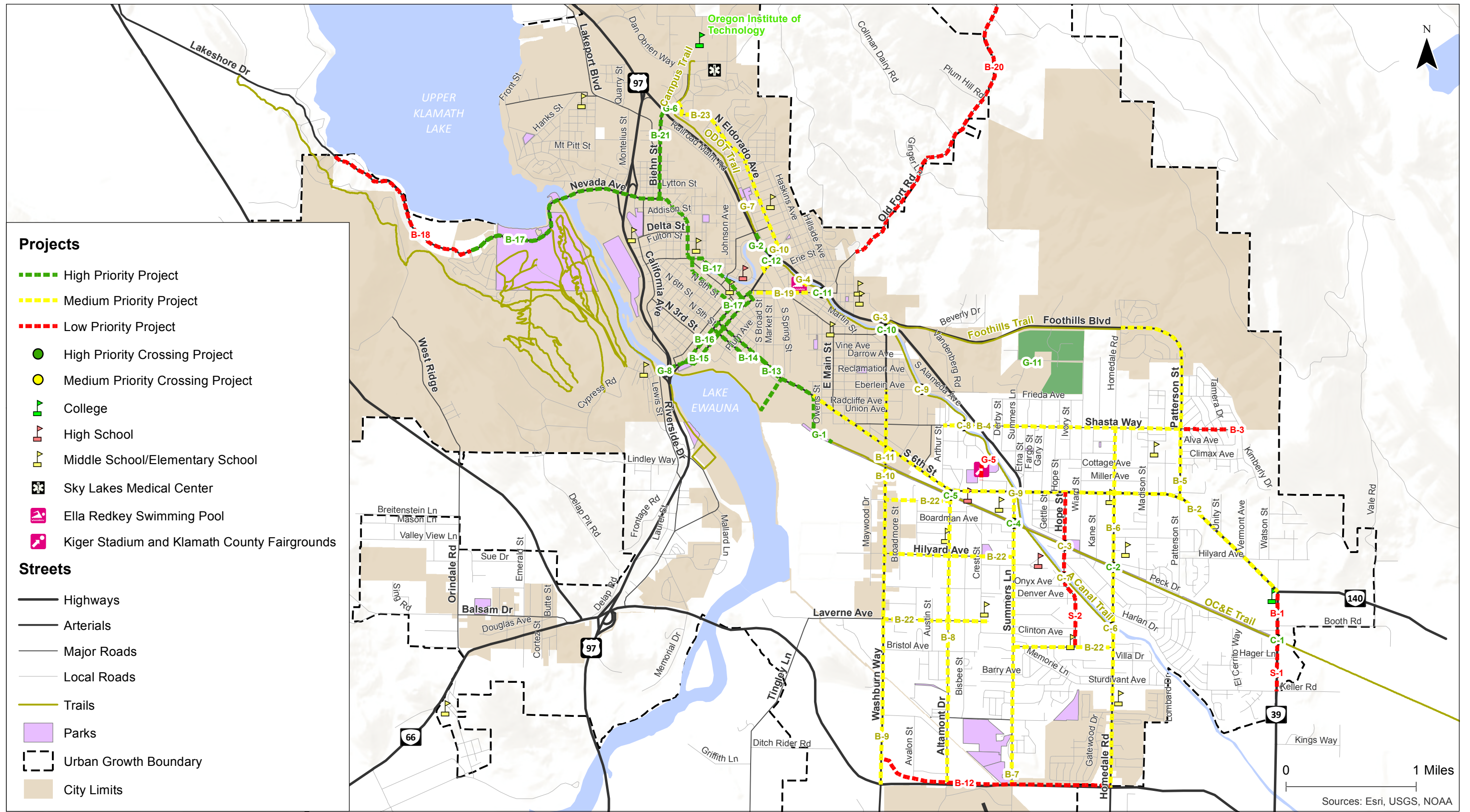
Section 4  
Implementation Plan

## IMPLEMENTATION PLAN

Funding for implementation of the Klamath Falls Urban Trail Master Plan may be identified from a variety of sources. Funding considerations should include the cost of the capital improvement project as well as the ongoing maintenance costs to maintain facilities after they are built. This section provides an overview of the potential funding options that may be used to complete the projects identified in this section.



Figure 4-1 shows the locations of the planned projects by priority, and Table 4-1 summarizes the projects by priority. This section summarizes the funding needs by project type and priority.



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Plan Elements  
Klamath Falls, Oregon  
Figure 4-1



Table 4-1. Prioritized Planned Projects

ID*	Project Description	Cost Estimate <sup>^</sup>
<b>High Priority Projects</b>		
G-1	Connect the OC&E Trail to downtown Klamath Falls via 6th Street bridge by widening sidewalk to provide for shared-use path. Provide a connection to the soon to be constructed Lake Ewauna trail. (Note: Lake Ewauna trail connection alignment is not confirmed; cost estimate does not include this connection.)	\$859,500
G-2	Connect the "A" Canal Trail to the ODOT Trail by widening the sidewalks to provide for a shared-use path.	\$166,500
G-6	Connect the Campus Trail to the Biehn Street bike lanes and sidewalk by widening the sidewalk on the south side of Campus Drive to complete the shared-use path connection. Possible modifications are needed at the Crater Lake Parkway intersection.	\$108,800
G-8	Connect Veteran's Park to the Link River Trail by widening the sidewalk on the north side of Main Street to provide for a shared use path. Install a crossing across Main Street west of the park road's access to Main Street to connect Veteran's Park with the path. Sharrows may work as an interim solution.	\$90,600
G-11	Formalize connections between Summers Lane and Steens Sports Park to provide southern connections to the park.	\$150,000
C-1	OC&E Trail crossing of OR 39: TBD by ongoing ODOT and Oregon Parks study	TBD
C-2	OC&E Trail crossing of Homedale Road: TBD by ongoing ODOT and Oregon Parks study	TBD
C-4	OC&E Trail crossing of Summers Lane: TBD by ongoing ODOT and Oregon Parks study	TBD
C-5	OC&E Trail crossing of Altamont Drive: TBD by ongoing ODOT and Oregon Parks study	TBD
C-10	Further study is required to determine final treatment for the crossing of the "A" Canal Trail at Washburn Way. Enhanced crossing treatments recommended.	\$2,000 - \$50,000
C-11	Further study is required to determine final treatment for the crossing of the "A" Canal Trail at Main Street. Enhanced crossing treatments recommended.	\$2,000 - \$50,000
C-12	Further study is required to determine final treatment for the crossing of the "A" Canal Trail at Esplanade Avenue. Enhanced crossing treatments recommended.	\$2,000 - \$50,000
B-13	Install bike lane on 6th Street between Market Street and Main Street.	\$15,700
B-14	Install bike lane on 5th Street between Main Street and 6th Street.	\$19,400
B-15	Install bike lanes on Klamath Avenue between Conger Avenue and Commercial Street. Coordinate with the Blue Zones project.	\$28,700
B-16	Install bike lanes on Main Street between Esplanade Avenue and Mill Street. Coordinate with the Blue Zones project.	\$24,600
B-17	The bicycle facility between Moore Park and Downtown Klamath Falls will be determined by an ongoing project.	\$556,200
B-21	Widen the bike lanes on Biehn Street between Crater Lake Parkway and Oregon Avenue by restriping the roadway.	\$33,400
P-1	Develop a program to install and maintain wayfinding signage at all trailheads and trail crossings of public streets. <i>See Appendix F for more information.</i>	--
P-2	Develop a policy that requires bicycle parking to be provided at key locations and pursue grant funding to provide it at key locations where it is missing.	--
<b>Medium Priority Projects</b>		
G-3	Connect the "A" Canal Trail to the Foothills Trail by widening the sidewalk on the east side of the bridge to provide a shared use path between the intersection and the "A" Canal trail. Tighten the curb radius for NB right-turns onto Crater Lake Parkway.	\$153,000
G-4	Connect the "A" Canal Trail to the Ella Redkey Swimming Pool by installing a shared-use path between the parking lot/front entrance to the pool and the existing "A" Canal Trail.	\$55,800
G-7	Connect the ODOT Trail to Kit Carson Park by constructing a connection between the trail and the parking lot or existing sidewalk connecting the street to the park. <i>There are ongoing discussions to implement this as part of a project at the park.</i>	\$22,600
G-9	Connect the "A" Canal Trail to the signalized crossing at SW 6th Street by widening the sidewalk on the south side of SW 6th Street to better accommodate bicyclists.	\$18,700
G-10	Connect the "A" Canal Trail to Klamath Union High School by widening the sidewalk on the north side of Esplanade Avenue to provide a shared-use path to the high school. Coordinate with school for completing the connection.	\$298,500
C-3	Install striped crosswalk and appropriate signage at the OC&E Trail crossing of Hope Street.	\$3,300
C-6	Install marked crosswalk, appropriate signage, and raised median island at the "A" Canal Trail crossing of Homedale Road. Install a gate across the maintenance road on the east side of Homedale Road to indicate that the trail does not extend east of Homedale Road.	\$83,700
C-7	Install marked crosswalk and appropriate signage at the "A" Canal Trail crossing of Hope Street.	\$3,600
C-8	Further study is required to determine final treatment for the crossing of the "A" Canal Trail at Shasta Way. Enhanced crossing treatments recommended.	\$2,000 - \$50,000
C-9	Further study is required to determine final treatment for the crossing of the "A" Canal Trail at Eberlein Avenue. Enhanced crossing treatments recommended.	\$2,000 - \$50,000
B-2	Identify if there are parallel routes that would provide similar connectivity but greater comfort as an alternative to 6th Street between the railroad bridge and OR 39.	TBD
B-4	Look for opportunities for alternate routes or for traffic calming measures on Shasta Way between Patterson Street and Crater Lake Parkway.	TBD
B-5	Further study required to determine final treatment for bicycle facilities on Patterson Street between 6th Street and Foothills Boulevard. Candidates include buffered bike lanes or a shared-use path.	TBD
B-6 - B-11	Further study required to determine which north-south routes will be designated for bicycle travel in the southeast area of Klamath Falls and what the appropriate treatment is.	TBD
B-19	Install bike lanes on Main Street between Esplanade Avenue and Crater Lake Parkway.	\$30,600
B-22	Further study required to identify which east-west routes should receive shared lane markings, wayfinding, and/or traffic calming in the southeast area of Klamath Falls.	TBD
B-23	Install sharrows and traffic calming on N Eldorado Avenue. Sidewalks should be considered as a traffic calming measure.	\$679,500
P-3	Develop guidelines for how to evaluate trail crossings and determine the appropriate treatment for the City and County to use in applying consistent treatment at crossings for local streets.	--
<b>Low Priority Projects</b>		
G-5	Connect the "A" Canal Trail to the Kiger Stadium and Klamath County Fairgrounds by paving the existing informal service road from the "A" Canal Trail to the Kiger Stadium Parking lot. Install a shared use path along the west side of Crest Street from the Kiger Stadium Parking lot to the Fairgrounds.	\$199,100
B-1	Install protected or buffered bike lanes on OR 39 between the OC&E Trail and OR 140.	\$72,500
B-3	Install sharrows and traffic calming on Shasta Way between Patterson Street and Kimberly Drive.	\$75,500
B-12	Install shared-use path on OR 140 between Washburn Way and Homedale Road.	\$1,633,500
B-18	Widen the pavement to accommodate shoulders or bike lanes on Lakeshore Drive between Lynnewood Boulevard and the west UGB.	\$4,121,000
B-20	Widen the road to add paved shoulders or bike lanes on Old Fort Road between Loma Linda Drive and the UGB.	\$5,037,500
S-1	Install sidewalks on both sides of OR 39 between the OC&E Trail and Keller Road.	\$744,000
S-2	Install sidewalks on both sides of Hope Street between Bristol Avenue and SW 6th Street.	\$2,148,000
P-4	Evaluate the feasibility of installing illumination along the trail system, including type of illumination, priority locations, and cost/maintenance.	--
P-5	Develop a plan for strategic placement of bicycle repair stations and racks throughout the urban trail system.	--

\*The prefix on the ID numbers refers to the project category: "G-" refers to trail system projects; "B-" refers to on-street bikeways; "C-" refers to crossings; and "S-" refers to sidewalks; "P-" refers to policies and programs.

<sup>^</sup>Please note the costs outlined above are for 2015 and are planning level estimates only that do not include right-of-way. An annual inflation rate of 3 to 5 percent should be applied when projecting costs to the future.

## MAINTENANCE AND TRAIL OPERATIONS FUNDING OPTIONS

In addition to the construction of the planned projects, the County and City should identify funds to be used for maintenance of existing and future trails, on-street bicycle facilities, and sidewalks. The goal of any maintenance program is to proactively address declining conditions as soon as possible. Such a program achieves the least cost for maintenance over time and the best condition possible. If maintenance is neglected past a certain point, then more expensive rehabilitation techniques are necessary.



**Crack in trail pavement**

Table 4-2 summarizes life cycle maintenance costs broken down into annual costs for maintenance need to maintain the existing trails in their current condition. The actual costs in any given year will vary from the annual costs shown in the table because each action is not performed every year (e.g., a two-inch overlay is prorated over a 20-year period of time). The portion of the estimated annual costs that are not outlaid each year for maintenance should be put into a long-term maintenance account and allowed to build for the years when more maintenance is required.

**Table 4-2. Estimated Annual Maintenance Costs**

Maintenance Action	Frequency	Estimated Annual Cost
Site Visit and documentation of conditions, safety hazards	2x/year (Spring/Fall)	\$900 <sup>1</sup>
Longitudinal striping and repainting of stop bars	Every 5 Years	\$2,000 <sup>2</sup>
Crack seal minor cracks less than 1" wide	Every 1 Year	\$2,700 <sup>3</sup>
Crack seal major cracks greater than 1" wide	Every 1 Year	\$3,400 <sup>4</sup>
Repair pot holes with patch	Every 1 Year	\$1,000 <sup>5</sup>
Inspect signs and replace as needed	Every 5 Years	\$500 <sup>5</sup>
2" hot mix overlay	Every 20 Years	\$79,000 <sup>6</sup>
<b>Total Annual Cost (with 20-year overlay)</b>		<b>\$89,500</b>
<b>Total Annual Cost (without 20-year overlay)</b>		<b>\$10,500</b>

<sup>1</sup>0.5 hours/mile x 15.3 trail miles x 2 times/year

<sup>2</sup>\$0.50 x 15.3 miles x 5,280 feet/mile x 25% length / 5 years

<sup>3</sup>Assumes topical crack seal applied at a cost of \$1/foot of crack, with cracks occurring every 100 feet on 10-foot wide trails.

<sup>4</sup>Assumes sawcutting and hot mix patch is necessary at a cost of \$5/foot of crack, with cracks occurring every 200 feet on 10-foot wide trails.

<sup>5</sup>Lump sum estimate

<sup>6</sup>2" overlay x 0.0065 tons/inch/square foot x 15.3 miles x 5,280 feet/mile x 10 feet wide x \$150/ton / 20 yrs.

Please note the costs outlined above are for 2015. An annual inflation rate of 3 to 5 percent should be applied when projecting costs to the future.

## PROJECT AND PROGRAMS FUNDING OPTIONS

As shown in Table 4-3, the total funding needed to accomplish the construction of all the projects identified in the plan is approximately \$17.5 million. Approximately \$2 million is needed to complete the high priority projects. This estimate does not include the funds necessary for construction of the OC&E Trail Crossings (projects C-1, C-2, C-4, and C-5) that are under current design through separate projects and which may already have construction funding in place.

Table 4-3. Total Project Costs

Project Type	Low Priority	Medium Priority	High Priority	Total
Trail	\$199,100	\$548,600	\$1,375,400	<b>\$2,123,100</b>
Crossing	--	\$94,600 – \$190,600	\$6,000 - \$150,000	<b>\$100,600 - \$340,600</b>
On-Street Bicycle Facility	\$10,940,000	\$65,100	\$678,000	<b>\$11,683,100</b>
Sidewalk	\$2,892,000	\$645,000	--	<b>\$3,537,000</b>
Programs and Policies	TBD	TBD	TBD	<b>TBD</b>
<b>Total</b>	<b>\$14,031,100</b>	<b>\$1,353,300 - \$1,449,300</b>	<b>\$2,059,400 - \$2,203,400</b>	<b>\$17,443,800 - \$17,683,800</b>

While on-street bicycle facility projects make up the majority of estimated project costs, trail projects account for much of the high and medium priority project cost estimates, as shown in Figure 4-2.

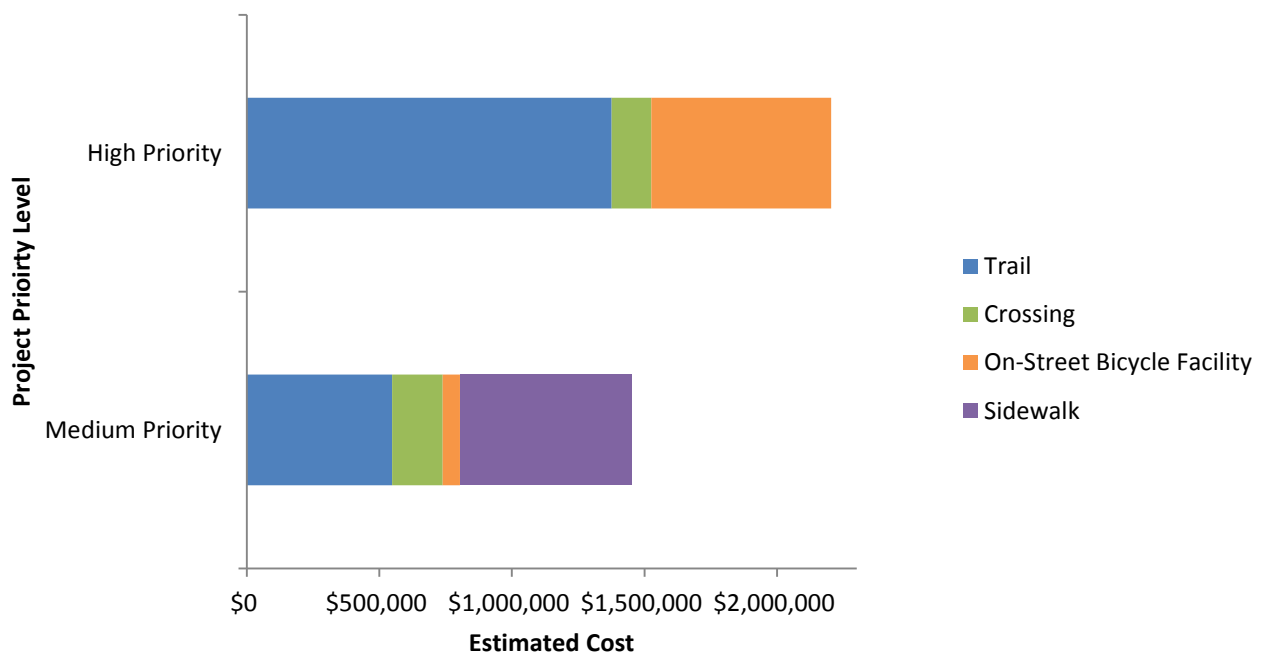


Figure 4-2 Cost Estimates of High and Medium Priority Projects by Project Type

## Existing Funding Levels

The City and County have limited existing resources to fund the pedestrian and bicycle projects identified in this plan. One percent of Klamath County's Motor Vehicle Apportionment, which amounts to approximately \$45,000 per year, is dedicated for bicycle trails. This fund is for the entire county and so must cover an area larger than just the urbanized area within Klamath Falls' UGB. These funds may only be used for projects within the County right-of-way. The City has approximately \$12,000 per year in funds dedicated for bicycle and pedestrian projects. These funds could potentially be used for projects that involve only striping modifications or minor construction efforts, but are not sufficient for major capital projects.

## Potential Funding Sources

Due to the lack of existing funding to support the recommended plan elements, new funding strategies should be considered to generate additional revenue for the trail system. Potential strategies for addressing these funding needs can generally be grouped into four categories: secure more external funding, identify public/private sponsorship opportunities, raise local revenue through user fees and taxes, and update the development code. Descriptions of the use of these strategies are described below. The strategies are not all mutually exclusive.

### *Secure External Funding*

Projects can be funded from a number of federal, state and local sources. Most federal and state funding programs are grant programs, which typically have eligibility requirements and applications required. Table 4-4 and Table 4-5 document potential federal/state and local funding sources, respectively.

Table 4-4. Potential Federal and State Grants for Klamath Falls Urban Trail Plan Projects

Source	Award Cycle	Intended Use	Applicable Project Types	Administration Agency	Local Match
<a href="#">Rivers, Trails, and Conservation Assistance Program</a>	Annual	Technical assistance for recreation and conservation projects.	Shared-use paths	National Park Service	None
<a href="#">Highway Safety Improvement Program</a>	Annual	Reduce fatalities and serious injuries on all public roads.	On-street bikeways, sidewalks, crossings	ODOT	10%
<a href="#">Oregon Parks and Recreation Local Government Grants</a>	Annual	Primary use is recreation; transportation allowed. Construction limited to outside road right-of-way, only in public parks or designated recreation areas	Shared-use paths	OPRD	20%
<a href="#">Recreational Trails Program</a>	Annual	Recreational trail-related projects, such as hiking, running, bicycling, off-road motorcycling, and all-terrain vehicle riding.	Shared-use paths, including wayfinding	OPRD	20%
<a href="#">Land and Water Conservation Fund</a>	Annual	Acquire land for public outdoor recreation or develop basic outdoor recreation facilities	Shared-use paths, bikeways, sidewalks	OPRD	50%
<a href="#">Enhance (STIP)</a>	Biennial	Activities that enhance, expand, or improve the transportation system. Projects that improve or enhance the state's multimodal transportation system.	All	ODOT	10%
<a href="#">All Roads Transportation Safety (ARTS)</a>	Biennial	Address safety needs on all public roads in Oregon; reduce fatal and serious injury crashes.	Projects consistent with those identified through ODOT's hot spot and systemic efforts.	ODOT	8%

## Public/Private Sponsorships

Public/private sponsorships involve a private entity such as a local business owner working with the public agency to fund a project. In return for their investment in the community, these business owners often have recognition for their role, providing a marketing venue for the business. In Klamath Falls, two potential opportunities for this type of partnership are the bicycle wayfinding signage project or additional bike rack/repair stations. Private organizations that sponsor a sign may have the opportunity to provide their logo on a sign and/or bike rack/repair station to help direct cyclists to their community and/or business.



**Clif Bar is a Sponsor of this Bike Repair Station at Portland State University**

*Image Source: Portland State University*

## Local Taxes and User Fees

Local taxes and user fees may be collected to finance construction and operations. Table 4-5 lists options that the City may wish to consider for funding local roads. The sources include a mix of fees and taxes, some of which if implemented would have implications for other aspects of the City budget. Some of these fees could also be used to provide a local match to obtain greater federal or state funding, further stretching local dollars if used as a local match for a grant. Some of the options identified in Table 4-5 may be better used for projects that include a motor vehicle element. However, obtaining these grants will help free up money for the City and County to use for trail projects.

Table 4-5. Potential Local Funding Sources for Klamath Falls Urban Trail Plan Projects

Source	Description	Comments
General Fund	Property taxes from the county's permanent tax rate.	Diverting general fund revenue to the Road Fund would have significant consequences for other county services.
Supplemental 5-year Serial Levy	Voter approved property tax levied in addition to the county's permanent tax rate.	A road fund serial levy would have to be approved by voters every five years. A one-time approval would buy time for the city and/or county to develop other options. This method could fund operations and capital programs, some of which might reduce future maintenance requirements.
Road Utility Fee	Monthly user fee with revenue dedicated to road operations. May be enacted legislatively but could be challenged and brought to a vote.	This type of fee is becoming more common in cities but would require substantial investment in rate studies, administrative staffing, software and computer systems to enable the county to collect the revenue. This source is generally better suited to funding operations than for capital improvements, but it may free up existing resources for capital projects.
Vehicle Registration Fee	An extra fee on all registered motor vehicles in the county. May be authorized legislatively but could be challenged and brought to a vote.	State must be willing to act as a collection agent for the county, otherwise would be easy to implement. This source could fund operations or capital programs.
Motor Vehicle Title Fee	Require that all motor vehicles registered in the county also have their title recorded as personal property with the City.	This would generate two sources of revenue: from the fee itself and from personal property taxes levied on motor vehicles. This could be problematic for renters and would increase taxable property that the Assessor must account for.
City Gas Tax	May be enacted legislatively but could be challenged and brought to a vote.	A local-option fuel tax would be easy to collect because the infrastructure is already in place. Would generate revenue for the city and/or county from motorists passing through the county. This method could fund operations and capital programs.
Increase Portion of Road Funds Allotted to Bicycle and Pedestrian Projects	The City and County each dedicate a portion of their transportation funds to bicycle-specific projects. This amount could be increased to provide additional funds for implementing this plan.	Doing so would divert funds from other road maintenance/expansion projects.

### Development Code Updates

Development code updates may be beneficial to provide an additional funding source. The development code identifies the requirements that a developer must meet before obtaining permission

to build. Klamath Falls and Klamath County may choose to require developers to complete sidewalks, trails, and/or bike lanes in locations where they are identified in the Urban Trail Master Plan and enforce the completion through the development code. The City and County may also choose to collect a payment in lieu of construction from the developers and then use the money to construct complete sections of sidewalk, trail, and bike lanes when enough is collected to create efficiencies.

We recommend, at a minimum, that the City and County consider updating their codes for the Klamath Falls Urban Area to include bicycle parking standards and the build-out of (or payment for) facilities identified in this plan along the development frontage. The bicycle parking standards should include information on the number of bicycle parking spaces required based on the development size and standards for the design of the parking (the Association of Pedestrian and Bicycle Professionals has published design guidelines for bicycle parking that could be incorporated).





## APPENDICES

Appendix A Technical Memorandum 1: Plans and Policy Review

Appendix C Technical Memorandum 2: Existing Conditions

Appendix D Technical Memorandum 3: Alternatives Analysis

Appendix E Cost Estimate Calculations & Prioritization Matrix

Appendix F Wayfinding Guidelines

Appendix G Implementing Ordinances

Appendix A    Technical Memorandum 1:  
Plans and Policy Review



# KITTELSON & ASSOCIATES, INC.

TRANSPORTATION ENGINEERING / PLANNING

354 SW Upper Terrace Drive, Suite 101, Bend, Oregon 97702 P 541.312.8300 F 541.312.4585

## TECHNICAL MEMORANDUM #1 – Plans and Policy Review

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Date: July 28, 2015 Project #: 18974  
To: Technical Advisory Committee & Citizen Advisory Committee  
From: Jacqueline Gulczynski, Nick Foster, AICP, and Marc Butorac, PE, PTOE  
Project: Klamath Falls Urban Trail Master Plan  
Subject: Plans and Policy Review

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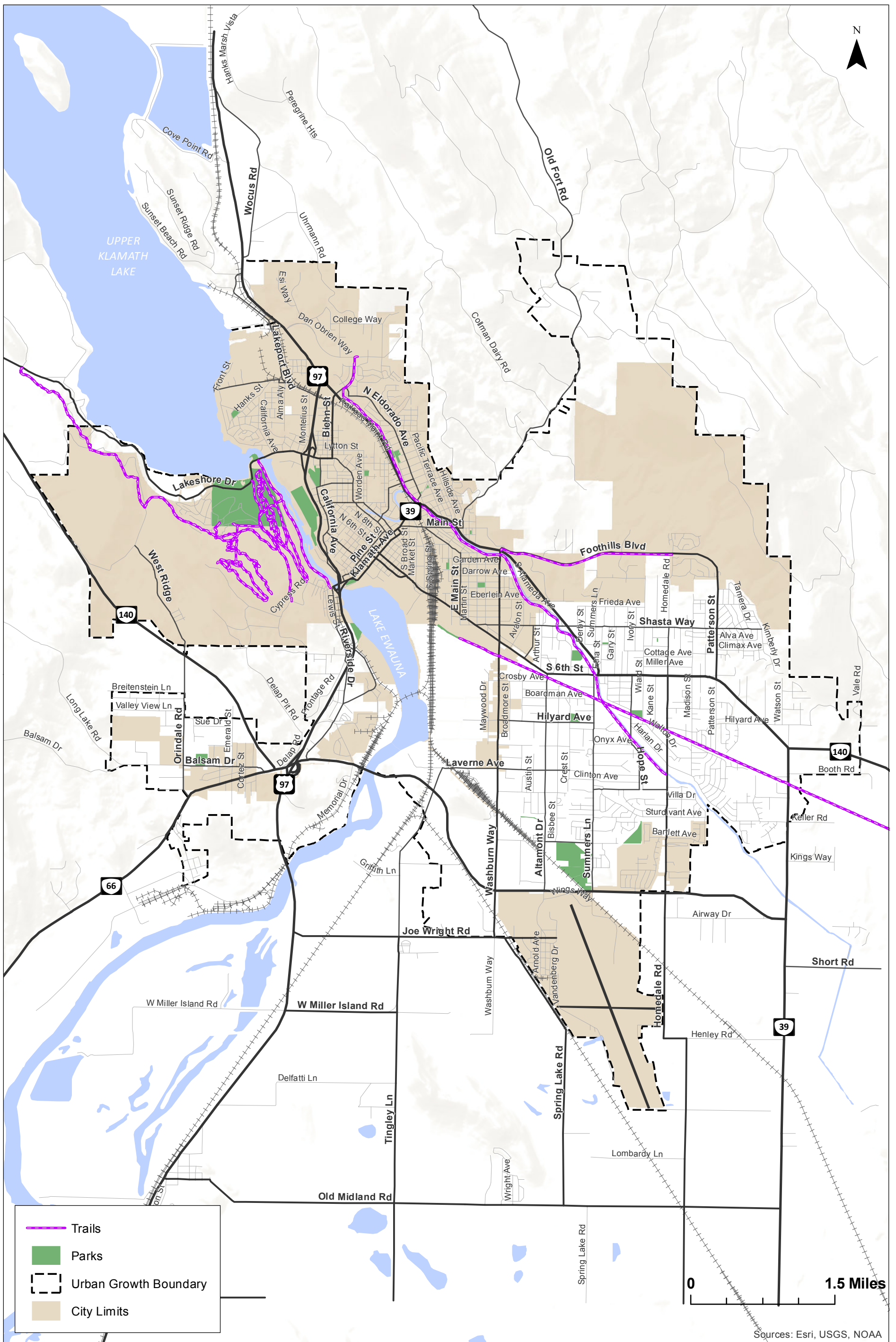
This memorandum provides baseline information for the Klamath Falls Urban Trail Master Plan project. It identifies, analyzes, and summarizes existing federal, state, and local laws, plans, policies, and design guidance that might impact the development of the plan. The intent of this memorandum is to establish familiarity with existing documents the plan will build from. It is organized as a literature review of national, state, and local documents. A summary of the documents reviewed is provided in Table 1 on the following page. For reference, Figure 1 includes a map of the existing trail network.

### NATIONAL/FEDERAL DOCUMENTS

- Americans with Disabilities Act (ADA)
  - This bill ensures pedestrians with disabilities have the opportunity to use the transportation system in an accessible and safe manner. The Federal Highway Administration (FHWA) ensures that recipients of Federal aid and State and local entities that are responsible for roadways and pedestrian facilities do not discriminate on the basis of disability in any highway transportation program, activity, service or benefit they provide to the general public. In addition, FHWA ensures that people with disabilities have equitable opportunities to use the public rights-of-way system.
  - The ADA is relevant to the Klamath Falls Urban Trail Master Plan as it provides guidance for planning and designing pedestrian facilities for people with disabilities. For example, it includes criteria on pedestrian curb ramps and crossings.

**Table 1 Documents Reviewed**

Document		Key Application for URBAN TRAIL MASTER PLAN
National/ Federal	Americans with Disabilities Act (ADA)	Guidance related to designing and planning for pedestrians with disabilities.
	Manual on Uniform Traffic Control Devices (MUTCD)	Guidance on how to properly sign and designate bicycle and pedestrian facilities.
	Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way	Proposed accessibility guidelines for sidewalks and shared-use paths that are generally considered best practices currently.
	Guide for the Development of Bicycle Facilities, 4 <sup>th</sup> Edition	Design guidance for bicycle facilities, including shared-use paths.
State	Oregon Transportation Plan (OTP) (2006)	Provides high-level guidance on system plans, particularly related to goals and evaluation metrics.
	Bicycle and Pedestrian Plan (1995) <i>(Currently being updated)</i>	Provides general principles and policies for bicycle/pedestrian facilities on state highways.
	Oregon Bicycle and Pedestrian Design Guide (2011)	Designates design standards and recommendations for bicycle and pedestrian facilities on state highways.
	Statewide Planning Goal #12 (Transportation)	Provides high-level guidance for local comprehensive planning as required by state law.
	Transportation Planning Rule	Implements Statewide Planning Goal #12 and provides rulemaking regarding the required Transportation System Plans.
	Statewide Transportation Improvement Program (STIP) (2015-2018)	Identifies funding for, and scheduling of, transportation improvement projects and programs.
Local	Klamath County Comprehensive Plan (2010)	Provides the long-term vision for the County and develops policies to help implement that vision.
	Klamath Falls Urban Area Transportation System Plan (TSP) (2012)	Identifies key issues and makes recommendations relating to transportation within the City and urbanized portion of the County. Sets the transportation goals for the City.
	Klamath County Transportation System Plan (TSP) (2010)	Identifies key issues and makes recommendations relating to transportation within the County.
	City Park and Recreation Master Plan (2000)	Identifies specific recommendations for trail system improvements.
	Urban Growth Boundary (UGB)	Identifies areas where future growth may occur. Housing tracks and other types of urban development are not allowed to occur outside of the UGB.
	City/County zoning and related ordinances	Identifies appropriate and desired land use areas within the City and the urbanized portion of the County.



Existing Trail Network  
Klamath Falls, Oregon

Figure  
1

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## NATIONAL/FEDERAL DOCUMENTS (CONTINUED)

- Manual on Uniform Traffic Control Devices (MUTCD)
  - The MUTCD is recognized as the national standard for all traffic control devices installed on any street, highway, bikeway, or private road open to public travel to ensure uniformity of traffic control devices. Part 9 of the MUTCD covers signs, pavement markings, and highway traffic signals specifically related to bicycle operation on both roadways and shared-use paths.
  - The MUTCD is relevant to the Urban Train Master Plan as it provides guidance on how to properly sign and designate bicycle and pedestrian facilities.
- Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way (PROWAG)
  - The United States Access Board has issued a notice of proposed rulemaking for its guidelines for pedestrian facilities, including shared-use paths, in the public right-of-way that are subject to the ADA. While the guidelines are awaiting adoption by the US Department of Justice before they become law, they are considered best practices and the Federal Highway Administration (FHWA) encourages their use.
  - Any design standards recommended by the Klamath Falls Urban Trail Master Plan should reference the proposed guidelines.
- Guide for the Development of Bicycle Facilities, 4th Edition
  - Published by the American Association of State Highway and Transportation Officials (AASHTO), this guide provides recommended design practices for bicycle facilities, including shared-use paths.
  - While the AASHTO guide is not an official standard, it provides useful design recommendations that should be considered in the Urban Trail Master Plan.

## STATE DOCUMENTS

- Oregon Transportation Plan (OTP) (2006)
    - The 25-year transportation plan guides statewide multimodal and modal plans and regional and local transportation system plans. As required by Oregon and federal legislation, the OTP provides overall policy direction and a framework for prioritizing transportation improvements and developing funding for them. It doesn't identify specific projects for development. Goal 1 (mobility and accessibility) is to provide a balanced, efficient and integrated transportation system that promotes transportation choices that are reliable, accessible and cost-effective. Goal 4 (sustainability) encourages conservation and communities to integrate land use and transportation choices.
-

- Policy 1.2 (Equity, Efficiency and Travel Choices: It is the policy of the State of Oregon to promote a transportation system with multiple travel choices that are easy to use, reliable, cost-effective and accessible to all potential users, including the transportation disadvantaged.
  - Policy 3.2 (Moving People to Support Economic Vitality): It is the policy of the State of Oregon to develop an integrated system of transportation facilities, services and information so that intrastate, interstate and international travelers can travel easily for business and recreation.
  - The OTC provides high-level guidance on system plans, particularly related to goals and evaluation metrics. The Urban Trail Master Plan should be consistent with these goals and policies.
  - Bicycle and Pedestrian Plan (1995) (*Currently being updated*)
    - This plan does not propose specific projects, but offers the general principles and policies that ODOT follows to provide bikeways and walkways along state highways. It also provides the framework for cooperation between ODOT and local jurisdictions, and offers guidance to cities and counties for developing local bicycle and pedestrian plans. Section One (policy and action plan) contains background information, such as the importance of bicycling and walking, legal mandates and current conditions. This is followed by the goals, actions and implementation strategies ODOT proposes to improve bicycle and pedestrian transportation. Section Two (bikeway and walking planning, design, maintenance, and safety) will assist ODOT, cities and counties in designing, constructing and maintaining pedestrian and bicycle facilities.
    - Projects on or across State highways (e.g. OR 39, US 97) will need to be coordinated with ODOT and be consistent with this plan.
  - Oregon Bicycle and Pedestrian Design Guide (2011)
    - Appendix L of the Oregon Highway Design Manual outlines the design standards and recommendations for use on Oregon highways. ODOT encourages local agencies to use the dimensions and designs recommended in this plan, but it is recognized that local standards may exceed ODOT standards. When ODOT is constructing a bikeway or walkway in collaboration with a local jurisdiction, the more appropriate of the two designs should be used, based on the context.
    - Bicycle and pedestrian facilities on State highways must meet the design standards outlined in this document.
  - Statewide Planning Goal #12 (Transportation)
    - This goal is to provide and encourage a safe, convenient and economic transportation system. It requires that a transportation plan, amongst other things,
-

consider all modes of transportation including mass transit, air, water, pipeline, rail, highway, bicycle and pedestrian.

- Statewide goals help guide local comprehensive planning as required by state law.
  - Transportation Planning Rule
    - Oregon Administrative Rule (OAR) 660-012-0045 (Implementation of the Transportation System Plan)
      - This rule requires each local government to amend its land use regulations to implement the TSP. It also requires local governments to adopt land use or subdivision ordinance regulations that provide for safe and convenient bicycle, pedestrian and vehicular circulation. Local governments are to ensure that new development provides on-site streets and access ways that provide reasonably direct routes for pedestrian and bicycle travel in areas where pedestrian and bicycle travel is likely if connections are provided, and which avoids wherever possible levels of automobile traffic which might interfere with or discourage pedestrian or bicycle travel.
    - OAR 660-12-0060
      - This rule states that if an amendment to a functional plan, an acknowledged comprehensive plan, or a land use regulation (including a zoning map) would significantly affect an existing or planned transportation facility, then the local government must put in place certain measures, unless the amendment is allowed under certain provisions of this rule.
    - The Transportation Planning Rule implements Statewide Planning Goal #12 and provides rulemaking regarding the required Transportation System Plans.
  - Statewide Transportation Improvement Program (STIP) (2015-2018)
    - The Pedestrian and Bicycle Grant Program ended as a stand-alone solicitation process in 2012 when the Oregon Transportation Commission (OTC) and ODOT changed how the STIP is developed. The STIP is now divided into two broad categories: Fix-It and Enhance. The Enhance category will fund activities that enhance, expand, or improve the transportation system. The Fix-It category will fund activities that fix or preserve the transportation system. The Final 2015-2018 STIP was released in May 2015. It funding for the construction of a portion of the Lake Ewauna Trail from Klamath Avenue to Spring Street, the Geo Trail, and sidewalk improvements on two sections of OR 39.
    - The STIP identifies funding for, and scheduling of, transportation improvement projects and programs. Bicycle and pedestrian improvements receiving federal funds must be identified in the STIP.
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## LOCAL DOCUMENTS

- Klamath County Comprehensive Plan (2010)
    - An objective in the Recreation section states that the development of bicycle pathways and trails should be promoted. A policy related to that goal states the County will communicate and cooperate with government agencies to protect existing recreational trails and promote additional trails.
    - An objective in the Land Use section states that potential trails will be evaluated by agencies and adhere to OAR 660-16-000 criteria.
    - Objectives in the Transportation section state that development should occur in such a manner as to encourage and facilitate alternative modes of transportation, such as public transit and bicycling. Specific policies state that in evaluating the transportation system, the County will support proposals that protect the quality of neighborhoods and the community. Also, a policy states that the County will encourage local government agencies to improve the safety of pedestrian and bicycle transportation.
    - The comprehensive plan provides a long-term vision for the County and develops policies to help implement that vision. Bicycle and trail facility improvements should be consistent with this plan.
  - Klamath Falls Urban Area Transportation System Plan (TSP) (2012)
    - The Urban Area TSP includes both the City of Klamath Falls and the portion of Klamath County within the Klamath Falls Urban Growth Boundary. It sets transportation goals and policies for the City.
    - The TSP recognizes that bicycle and pedestrian facilities serve a variety of trips. It also mentions that bike lanes are scattered and limited throughout the urban area.
    - The plan recognizes the following opportunities for bicycle connections:
      - Evaluate the feasibility and cost of installing bicycle facilities on arterials and collectors, starting with the highest traveled arterials.
      - If retrofitting is feasible, explore the advantages and disadvantages of striping actual lanes versus using bicycle symbols.
    - The TSP includes six pedestrian and three bicycle projects, all of which are high priorities. These projects are shown in Attachment A. An updated inventory of the pedestrian and bicycle facilities is shown in Attachment B.
    - The TSP identifies and addresses key issues relating to transportation within the UGB. The TSP should be the starting point to identify and validate future bicycle and trail improvements.
-

- Klamath County Transportation System Plan (TSP)(2010)
  - In the Balanced Transportation System section, the TSP recognizes the need for safe, attractive, and efficient pedestrian and bicycle facilities. These facilities should be in appropriate locations and be designed for safety, security, maintainability and affordability.
  - The County recognizes Klamath County Bike and Pedestrian Trails Advisory Committee as the group that coordinates bicycle advocacy issues. Additional bicycle advocates include the cities active bike club, the Klamath Freewheelers, and the local Rails-to-Trails chapter.
  - The County TSP does not include any bicycle or pedestrian projects in the Klamath Falls UGB.
- City Park and Recreation Master Plan (2000)
  - One of the objectives is to provide a variety of enjoyable hiking, biking and riding experiences throughout the city. This objective recommends routing trails over public lands whenever possible, and considers the use of private property. It advises the use of trail fencing in neighborhoods to avoid trespassing or infringement from trail riders. Additional policies advise enforcement of trail systems to encourage proper and safe use of the trails.
  - This plan identifies specific recommendations for a trail system in Klamath Falls, included in Attachment A at the end of this memorandum. These recommendations will be considered as part of this Trail plan.
- Urban Growth Boundary (UGB)
  - Housing tracts and other types of urban development are not allowed to occur beyond the UGB. The Trail plan should focus on improvements within the UGB or within expected amendments.
- County and City zoning and related ordinances
  - When developing the Trail Plan, transportation system improvements should not be in conflict with adjacent land uses or zoning ordinances.

## DESIGN STANDARDS

The cross-sectional design standards from local, State, and Federal guiding documents, as well as the recommended design standards from ASHTO were reviewed to establish baseline information. Standards are generally consistent across jurisdictions, as shown in Table 2 below.

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**Table 2 Design Standards Comparison**

Design Feature	City of Klamath Falls Engineering Standards	Klamath County Land Development Code	Oregon Bicycle and Pedestrian Design Guide	PROWAG	AASHTO
Sidewalk Width	5'-8' <sup>1</sup>	5'	5'	4-5' <sup>2</sup>	4'-8' <sup>3</sup>
Bicycle Lane Width	6'	6'	6'	N/A	4'-7' <sup>4</sup>
Shared-use Path Width	10'	N/A	10'-12'	4-5'	8'-14' <sup>4</sup>

<sup>1</sup>Varies depending on functional classification of adjacent roadway and surrounding land-use context

<sup>2</sup>4 feet of clear width is required on all pedestrian access routes, but 5' is preferred. If 5' is not provided, then passing zones of at least 5'x5' must be provided

<sup>3</sup>From *A Policy on Geometric Design of Highways and Streets*, 6th Edition (2011).

<sup>4</sup>From *Guide for the Development of Bicycle Facilities*, 4th Edition (2012).

In addition to these cross-section widths, there are standards related to grade, curb ramps, and other features. These standards ensure accessibility for all users and are laid out by current Federal guidance on ADA requirements. It is generally recommended that all new facilities be designed to meet the guidelines laid out in PROWAG.

## SUMMARY

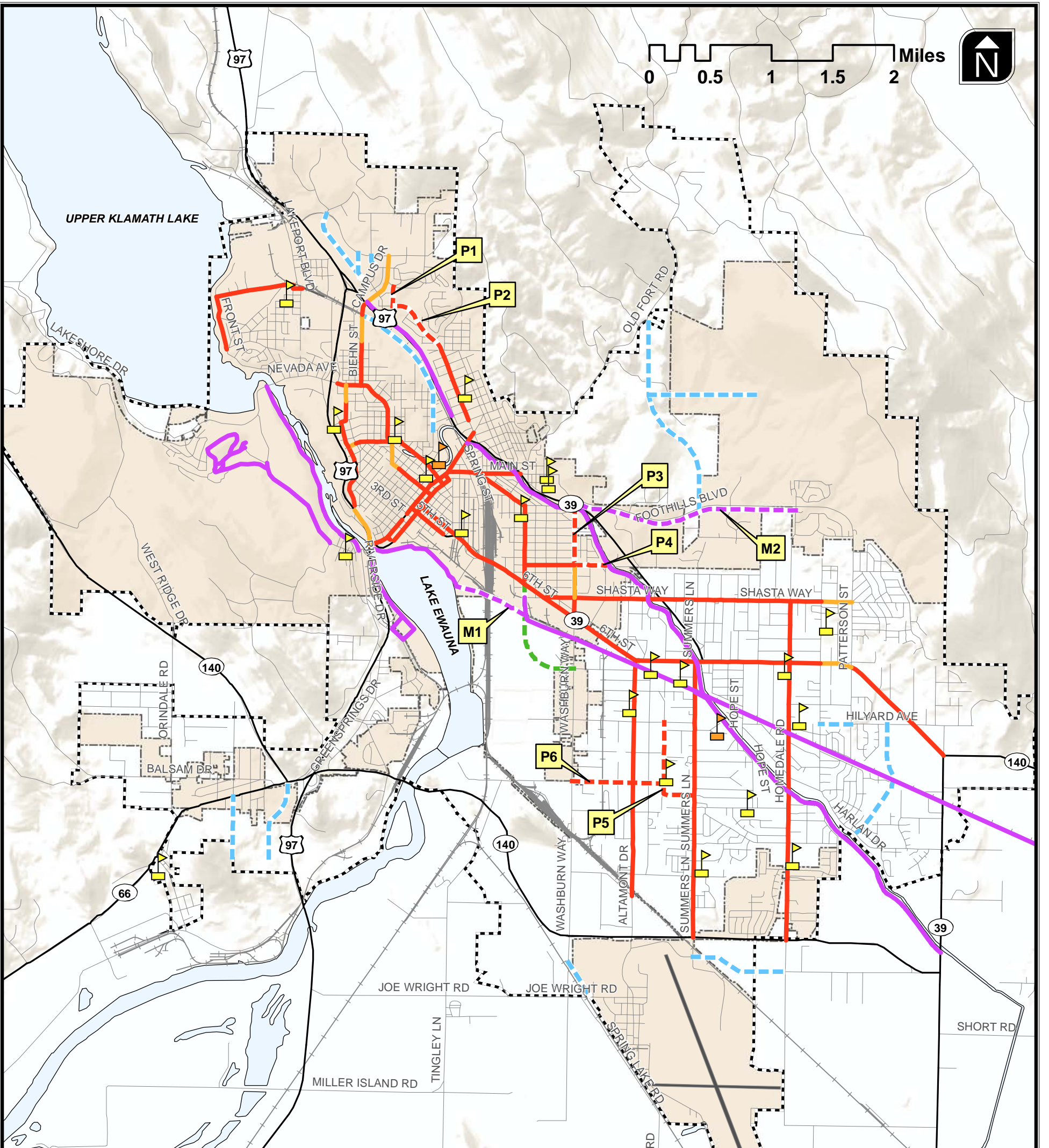
Based on the document review, key bicycle or trail gaps and deficiencies (needs) in Klamath Falls were identified, as well as planned projects. The key needs already identified are summarized below, while the specific proposed projects are included in Attachment A to this memo containing excerpts from the Urban Area TSP and the Parks and Recreation Master Plan.

- Key needs/deficiencies already identified:
  - Promotion of bicycles pathways and trails (Comp Plan)
  - Better connectivity for bicycle/pedestrian facilities are needed throughout the city. (TSP, Park & Rec Plan)
  - Bike lanes are currently limited and scattered throughout the urban area (TSP)
  - Stripping bike lanes verse using bicycle symbols (TSP)

## NEXT STEPS

Moving forward with the development of the Urban Trail Master Plan, this memorandum will be referenced for information on relevant policies and planned projects.

Attachment A Projects Identified in Other Plans

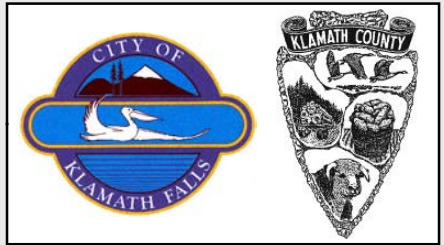


**Legend**

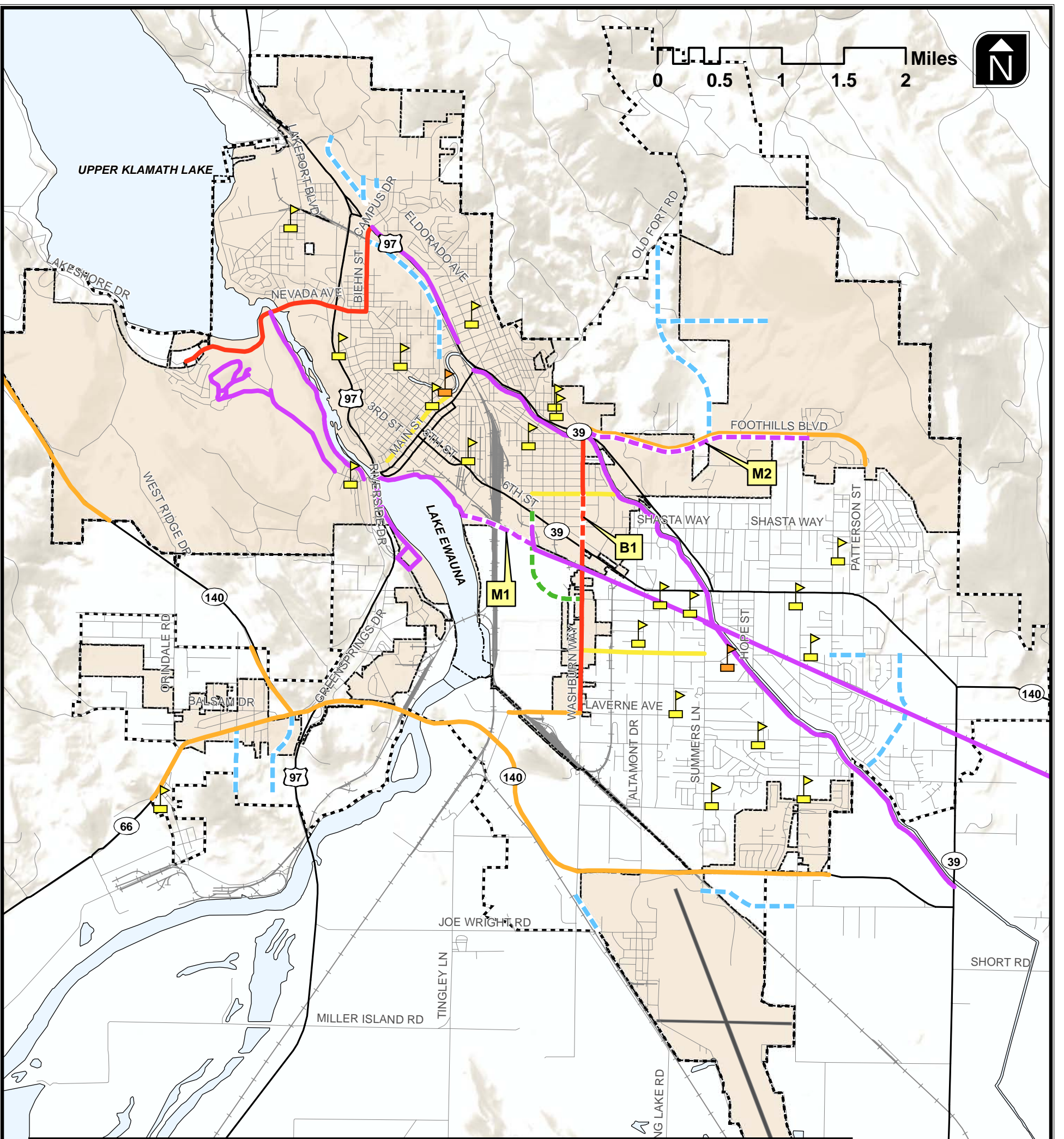
	Sidewalks on Both Sides of Street		High Schools
	Sidewalk on One Side of Street		Elementry and Junior High Schools
	Planned Sidewalk Project		UGB
	Multi-Use Path - Motorized Vehicles Prohibited		City Limits
	Planned Multi-Use Path Project		
	New Arterial		
	New Collector		

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# Pedestrian Network Map



**Figure  
5-1**

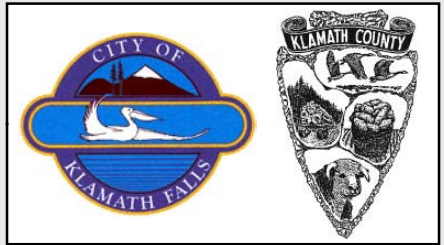


**Legend**

	Street with Bicycle Lane		High Schools
	Roads with 4' Paved Shoulders		Elementry and Junior High Schools
	Shared Lane Facility		UGB
	Planned Bicycle Projects		City Limits
	Multi-Use Path - Motorized Vehicles Prohibited		
	Planned Multi-Use Path Project		
	New Arterial		
	New Collector		

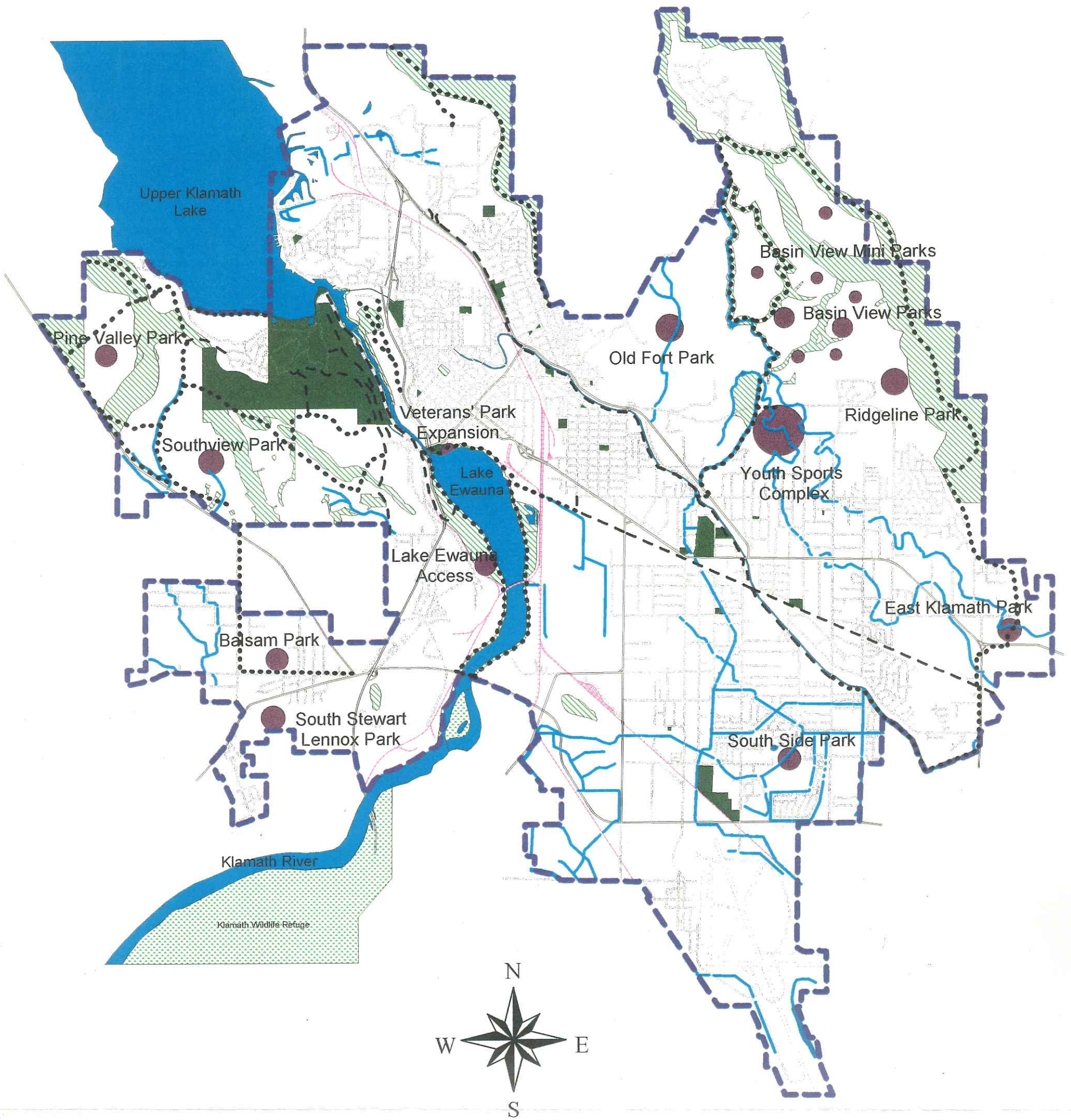
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# Bicycle Network Map



**Figure  
6-1**

# Facility Plan



 Urban Growth Boundary

 Existing Parks

 Wildlife Refuge

 Proposed Parks

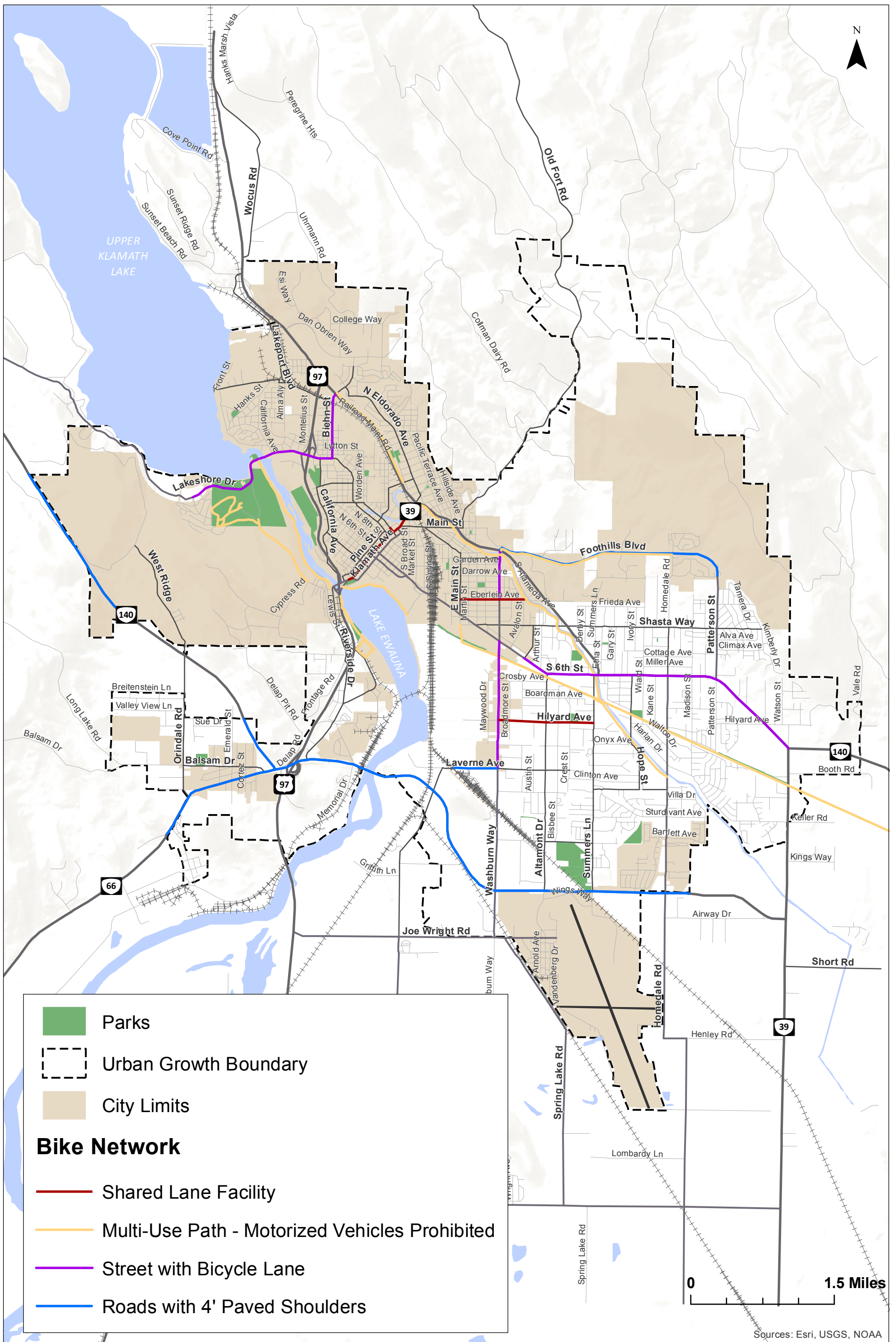
 Existing Trails

 Proposed Open Space

 Proposed Trails

## Attachment B Existing Pedestrian and Bicycle Facilities

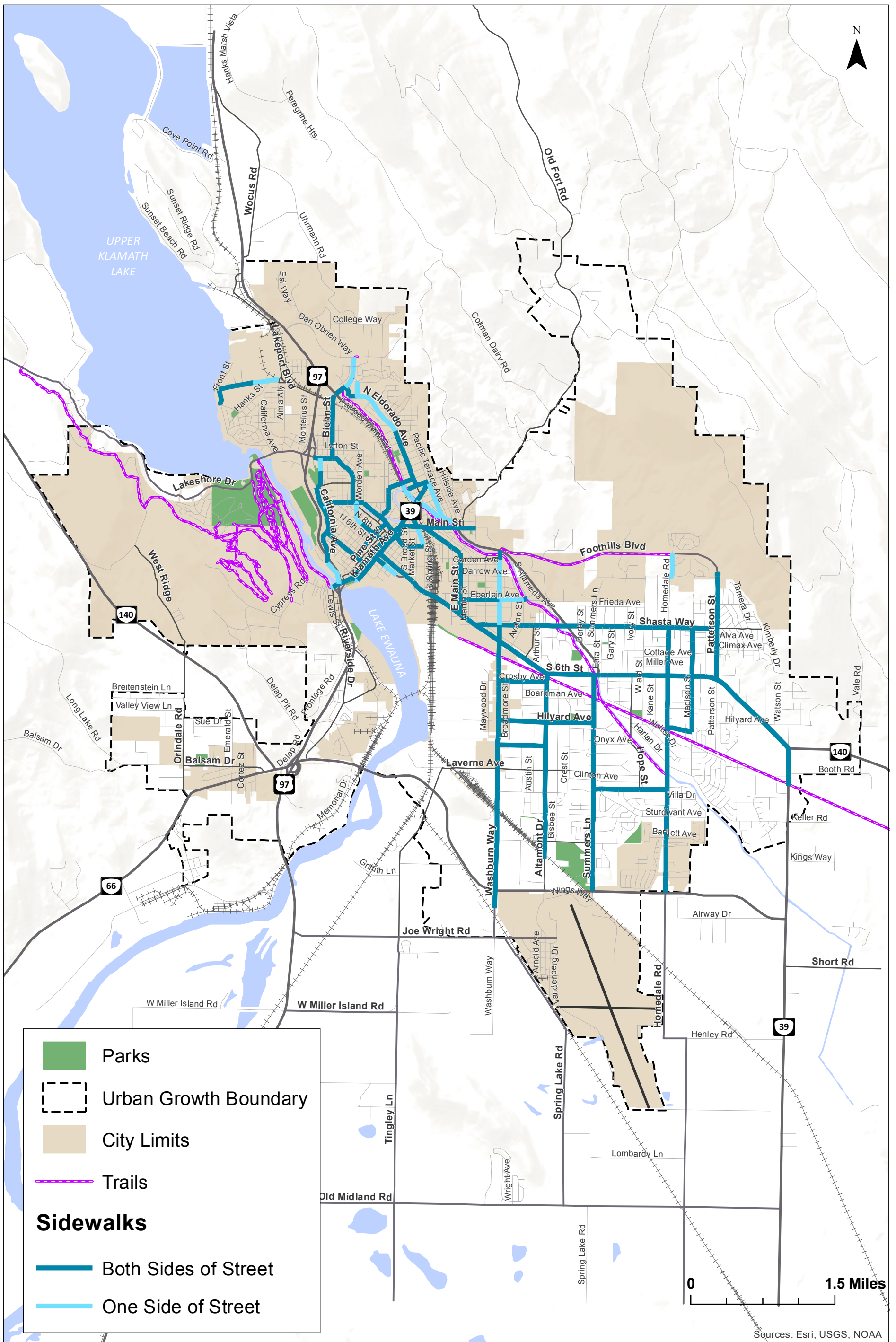




**Bicycle Network Map  
Klamath Falls, Oregon**

**Figure  
B1**

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**Pedestrian Network Map  
Klamath Falls, Oregon**

**Figure  
B2**

Appendix B Comments Received from  
Virtual Open House #2

ID*	Project Description	Priority Shown on Map at time of Open House	Comments Received from Interactive Map and In-Person Meeting	Number of Comment "Likes"	Resulting Proposed Changes by KAI
<b>Trail System Gaps</b>					
G-1	Connect the OC&E Trail to downtown Klamath Falls	High	Consider again the benefits of tying OC&E into East Main St. It would benefit the businesses on East Main, great Mexican Food. It is a direct route to Amtrak. The pedestrian access on Main St., North side of underpass needs a fix anyway. Many people use the southside walkway on the underpass and it is difficult to access off East Main and on Spring St.	2	Modify project to indicate the desire for a "protected" path if space permits, and include text about signage to be included. Main Street is out of direction for completing a connection to downtown, which is why the bridge alternative was preferred. Improving Spring Street as a connection between Esplanade Avenue and 6th Street is not directly related to this project.
			I think this should be one of the highest priority projects.	1	
			I think that this is one of the highest priorities! It is critical to connect the south suburbs to downtown safely!	1	
			To echo others, I also think that this is a high priority project- particularly making the S 6th overpass safer for pedestrians and cyclists. Could you consider putting in a PROTECTED multi-use path here? Traffic is zooming by on the overpass and some protection would increase pedestrian/bicyclist usage.	1	
			Spring Street could be a very nice connector and could be a terrific location for a buffered or protected bike lane as the road is already quite wide. Spring Street has the potential to be a quaint street lined by small businesses with a lot of foot traffic and a protected bike lane, especially one with beautiful planters, could help facilitate this positive growth.	1	
			Thanks for identifying this as a high priority. I would love to see the connection between OC&E and downtown. Protected bike lane would be ideal.	0	
			How to fund?	Comment from TAC/CAC Member	
	this is a big need and connecting to both OC&E and Ewauna is great. Signage that biking on the sidewalk will be important.	Comment from TAC/CAC Member			
G-2	Connect the "A" Canal Trail to the ODOT Trail	High	This is a messy intersection indeed. Instead of competing with the Crater Lake Parkway traffic how about routing to Melrose St via the underused ally between Crater Lake and Eldorado?	1	Modify description to be sure construction includes reviewing the drains/crossing at Earle Street. In the considerations, note that the alley or Eldorado could be used as an alternative route if an obstacle prevents the recommended improvement.
			I agree with the other comment- Crater Lake Parkway is a tremendously busy street, and even as an experienced cyclist/runner I avoid the sidewalk between where the bike path ends and Esplanade to connect to the A canal. Instead, I take the alley that the other commenter mentions. Please consider that even if you improve the sidewalk along Crater Lake Parkway here, pedestrians/cyclists may still avoid using it b/c there is so much road noise.	0	
			If not rerouted (as commenters on the Esplanade crossing have suggested), the sidewalk/path along Crater Lake Parkway needs to be re-done badly -- it's a nightmare on anything with wheels, and even when jogging. Perhaps turning it (or the sidewalk on the south side of Crater Lake Parkway other side of the street) into a protected bike lane?	0	
			At minimum, fixing the drains and crossing at Earle Street is needed. Every time it rains, mud and standing water accumulate at this crossing.	0	
			I use this area regularly, and it has good potential since it is quite wide, despite the heavy traffic on the street and the broken-down curbs. A protective barrier between pedestrians/cyclists and the street might be feasible here.	0	
			Fixing the sidewalk and signing it as a bike/ pedestrian shared path seems to be a good idea. I ride this regularly on my way to work @ skylakes, and early in the morning the (narrow and storm grated) lane is ok with limited traffic but not safe with more traffic, or heading south and one section of the sidewalk is terrible, needs to be fixed	2	
			This is a very difficult intersection for cyclists. Connect the A Canal Trail with Kit Carson in an easier manner.	1	
	Connecting the bike path to OIT and Skylakes with downtown should definitely be top priority. If this becomes a dedicated multiuse trail, then clearly marked trails should remind users of right away between pedestrians and bikes. It would also be good to have a solid line to designate direction of traffic.	0			
	Right now you can cross the parkway and take Eldorado as a parallel route or go back and get on the trail.	Comment from TAC/CAC Member			
G-3	Connect the "A" Canal Trail to the Foothills Trail	Medium	Not sure it's necessary to widen the sidewalk -- it's already decent size and won't be a huge improvement - low priority	Comment from TAC/CAC Member	No change
G-4	Connect the "A" Canal Trail to the Ella Redkey Swimming Pool	Medium			
G-5	Connect the "A" Canal Trail to the Kiger Stadium and Klamath County Fairgrounds	Low			
G-6	Connect the Campus Trail to the Biehn Street bike lanes and sidewalk	High	I think that it should be a higher priority to consider improvements to the Biehn St./Campus Dr./Bus 97 intersection. In the mornings, it feels unsafe with all of the traffic merging from Bus 97 northbound onto Campus Dr. - vehicles are driving 55 mph on Bus 97, and continue the high speed as they merge onto Campus Dr (speed limit 35 mph) and are distracted; not looking for pedestrians in the cross walk there. I wonder if you could put a stop light in BEFORE the merge here to help slow/control traffic. It's a really unsafe intersection for pedestrians and cyclists alike, and gets a fair amount of pedestrian and cyclist traffic.	3	Be more specific about the types of modifications that may be helpful at the Crater Lake Parkway intersection
			Many bikers don't want to bike on sidewalks, and it's plenty wide to accommodate walking	Comment from TAC/CAC Member	
G-7	Connect the ODOT Trail to Kit Carson Park	Medium	They are redesigning Kit Carson Park, so perhaps this could just be included in that redesign.	Comment from TAC/CAC Member	No change, this is indicated in full project description already.
G-8	Connect Veteran's Park to the Link River Trail	High	From Veteran Park to Riverside, can a trail be constructed under the Main St bridge along the Link river, to come up on the North side of Main Street? An underpass.	1	Add statement to "considerations" section in prospectus sheet to indicate that signage will be important element of this project. The trail under the bridge option was discussed by the TAC/CAC but was determined not to be feasible.
			Smoother walking and biking connections between Discover Klamath, the Link River Trail, downtown, Veterans Park, the back side of Moore Park, and the Wingwatcher's Trail are needed. This area could be a major nexus for bike/pedestrian connections, but everything has to run over some very busy bridges, and signage is poor.	2	
			Signage will be critical.	Comment from TAC/CAC Member	
G-9	Connect the "A" Canal Trail to the signalized crossing at SW 6th Street	Medium	The crossing here on the A canal trail across S 6th street seems like one of the most dangerous crossings in town (although I do not have access to city pedestrian/vehicle crash data). I have witnessed someone getting hit by a vehicle in the cross walk here. Please consider making this crossing more safe as a priority in the urban trail plan	0	No change. Improvements to 6th Street would be needed to modify the environment enough to improve this signalized crossing.
			Not sure sidewalk widening will do much... part of the problem is visibility to cars, timing of lights, and signage	Comment from TAC/CAC Member	
G-10	Connect the "A" Canal Trail to Klamath Union High School	Medium			
G-11	Formalize connections between Summers Lane and Steens Sports Park	Medium	This would be a huge improvement & would greatly improve connectivity - Steens might be able to help fundraise	Comment from TAC/CAC Member	Project was upgraded to High priority based on TAC/CAC and PMT comments, after reviewing evaluation criteria.
<b>Crossings</b>					
C-1	OC&E Trail crossing of OR 39	High	Raised medians would be great - making these crossings more visible is important and being able to stop traffic - like crossing lights - could help.	Comment from TAC/CAC Member	
C-2	OC&E Trail crossing of Homedale Road	High	Signage and a pedestrian refuge similar to the one that exists on Homedale at Brixner School would be really helpful here, as well as at the OC&E crossings of Altamont and Summers Lane.	0	No change based on TAC/CAC comments (part of ODOT project anyways) - the signage/wayfinding program will help with consistency. Each treatment may be different, but signage should be consistent.
			I would hope all crossings of OCE are consistent with "A" Canal crossings	Comment from TAC/CAC Member	
C-3	Install striped crosswalk and appropriate signage at the OC&E Trail crossing of Hope Street.	Medium			
C-4	OC&E Trail crossing of Summers Lane: TBD by ongoing ODOT and Oregon Parks study	High			
C-5	OC&E Trail crossing of Altamont Drive: TBD by ongoing ODOT and Oregon Parks study	High			
C-6	Install marked crosswalk, appropriate signage, and raised median island at the "A" Canal Trail crossing of Homedale Road.	High	The "A" Canal bike path does not cross Homedale and never did exist east of Homedale, so there should be no need for any crossing... Also, it looks to me like any sort of a non-traversable center median/bike-ped refuge at that location could interfere with traffic wanting to turn left out of Amberview Lane and head north on Homedale... Regardless of intentions, a crossing of the sort envisioned at this location is going to give folks the impression that the bike path continues east.	Email comment	Project was downgraded to Medium priority, and further description was added: "Install a gate to indicate that the trail does not extend east of Homedale Road." based on TAC/CAC and PMT comments.
C-7	Install marked crosswalk and appropriate signage at the "A" Canal Trail crossing of Hope Street.	Medium			

C-8	Further study is required to determine final treatment for the crossing of the "A" Canal Trail at Shasta Way. Enhanced crossing treatments recommended.	Medium			
C-9	Further study is required to determine final treatment for the crossing of the "A" Canal Trail at Eberlein Avenue. Enhanced crossing treatments recommended.	Medium			
C-10	Further study is required to determine final treatment for the crossing of the "A" Canal Trail at Washburn Way. Enhanced crossing treatments recommended.	High	This is a place of great potential. I can see a parking area on Foothill that would access the Foothill trail and some great Mt biking behind the Herald & News that KTA could work on connecting to Old Fort Rd and north to Oregon Tech. There is also a need to address Mt. Bike access to Hog Back, the 5000 road that goes up to the top of Old Fort. The "A canal" crossing at Washburn is difficult as is the crossing of Crater Lake.	1	No change
			In my experience, this is a very difficult crossing. I think a flashing light similar to the OC&E crossing of Washburn is needed for safety and to encourage trail use.	2	
			The bike path crossing Washburn Way is fine as it currently exist. No need for additional traffic constraints here.	0	
C-11	Further study is required to determine final treatment for the crossing of the "A" Canal Trail at Main Street. Enhanced crossing treatments recommended.	High	This would be a really good idea, and I don't think the second traffic lane is really necessary between East Main and Crater Lake Pkwy, so widening and making a good bike lane would be good! (more applicable to B-21)	0	No change
			I use this intersection a lot. Crossing Crater Lake Parkway could be enhanced by placing sensors in the pavement that pick up on bikes. I have seen these in Chico and Eugene. I do not have trouble crossing Main St on the "A canal path. It could be enhanced with paint and signage.	0	
C-12	Further study is required to determine final treatment for the crossing of the "A" Canal Trail at Esplanade Avenue. Enhanced crossing treatments recommended.	High			
<b>On-Street Bicycle Connections</b>					
B-1	Install protected or buffered bike lanes on OR 39 between the OC&E Trail and OR 140.	Low	KCC to where? What is destination south or collection points?	Comment from TAC/CAC Member	The destination is the trail, no change to this project.
B-2	Identify if there are parallel routes that would provide similar connectivity but greater comfort as an alternative to 6 <sup>th</sup> Street between the railroad bridge and OR 39.	Medium	Alt. routes could be good	Comment from TAC/CAC Member	No change
B-3	Install sharrows and traffic calming on Shasta Way between Patterson Street and Kimberly Drive.	Low	Sharrows don't do much and don't make cyclists more comfortable - just my opinion as a cyclist :)	Comment from TAC/CAC Member	No change, this is why traffic calming is included in the project.
B-4	Look for opportunities for alternate routes or for traffic calming measures on Shasta Way between Patterson Street and Crater Lake Parkway.	Low	Shasta Way is a good alternate route for bicyclists that do not want to ride on South 6th. Traffic calming would also be good for people that live in the neighborhood, as people tend to speed on this road. I think this should have a higher priority.	1	Bike lanes connect project B-4 to the Fred Meyer site. By updating the evaluation criteria to account for this, the priority can be adjusted to Medium. The other comment (west of B-4) is addressed by the parallel routes projects in the SE Area.
			I think that you should consider improvements on this stretch of Shasta so that there is a direct route to Fred Meyer and Sherm's. Now that there is no grocery store downtown, people will want to walk or bike along this route. (comment was made a bit West of the project line)	0	
B-5	Further study required to determine final treatment for bicycle facilities on Patterson Street between 6 <sup>th</sup> Street and Foothills Boulevard.	Medium	Continuing the existing multiuse path would be great	Comment from TAC/CAC Member	No change
B-6 – B-11	Further study required to determine which north-south routes will be designated for bicycle travel in the southeast area of Klamath Falls and what the appropriate treatment is.	Medium	I suggest bike boulevards here on low speed parallel streets- it's no fun walking/biking on Washburn, even if there is a bike lane. (B-11)	0	No change
			Seems like parallel / alt routes would be good	Comment from TAC/CAC Member	
B-12	Install shared-use path on OR 140 between Washburn Way and Homedale Road.	Low	It seems like this might be a heavily used trail by people commuting to Kingsley Field. It is good to have on the long-range plan, but perhaps inquiries at Kingsley might result in better input for people that would use this trail often if it existed...	0	Add comment to considerations section on prospectus sheet that project development should include outreach to Kingsley Field. The TAC/CAC member's suggestion is covered by different project, this trail serves different purpose (southern loop route).
			Nope! Move to Anderson & Laverne between Washburn-Homedale - lower speed convenient to stops	Comment from TAC/CAC Member	
B-13	Install bike lane on 6 <sup>th</sup> Street between Market Street and Main Street.	High	Agree!	Comment from TAC/CAC Member	No change
B-14	Install bike lane on 5 <sup>th</sup> Street between Main Street and 6 <sup>th</sup> Street.	High	Agree!	Comment from TAC/CAC Member	No change
B-15	Install bike lanes on Klamath Avenue between Conger Avenue and Commercial Street.	High	This would be a good idea and would potentially get people off the sidewalks and/or riding the wrong direction on the one-way streets.	2	No change
			Especially if a park or plaza is created on the corner of 11th and Klamath, both Klamath and 11th could be a terrific location for a buffered or protected bike lane - many families would likely use it and it could work toward downtown revitalization.	0	
			Agree!	Comment from TAC/CAC Member	
B-16	Install bike lanes on Main Street between Esplanade Avenue and Mill Street.	High	Agree!	Comment from TAC/CAC Member	No change
B-17	The bicycle facility on 9 <sup>th</sup> Street between Klamath Avenue and Prospect Street	High	This would also be a really nice connection, since the Moore Park area also connects to a lot of trails and recreational facilities.	1	No change
			Great idea! It is difficult to safely bike to the Moore Park now. I would love to see a protected lane for bicycles leading to the park.	0	
	The bicycle facility on N 11 <sup>th</sup> Street between Oregon Avenue and Klamath Avenue	High	Would be awesome & help beautify this rundown neighborhood	Comment from TAC/CAC Member	
B-17	The bicycle facility on Oregon Avenue between Moore Park and Upham Street	High	Possibly the most difficult part to implement. Needs improvements for a safe bicycle/running/walking route; as is, this stretch of road acts as deterrent to those trying to bike or run to Moore Park. Priority level fits the project.	2	No change
			Would be awesome & help beautify this rundown neighborhood	Comment from TAC/CAC Member	
B-18	Widen the pavement to accommodate shoulders or bike lanes on Lakeshore Drive between Lynnewood Boulevard and the west UGB.	Low	It would be nice for bicycles and for general safety to have Lakeshore widened, but I can understand why it is not a top priority. However, it should be kept on the long term plan.	2	No change in priority or project map (due to this project's boundary), but modify project description (consideration section) to connect to Running Y and coordinate with Klamath County/Running Y during project development.
			Would like to see this extended all the way to Running-Y. I know this is a common route for cyclists and the addition of a real bike lane could result in more traffic to/from the area.	1	
			I understand why Lakeshore is a low priority, but creating a buffered or protected bike lane one day could create a stunning asset for our community - one of the most beautiful rides in town, not to mention the slowing of traffic that would result thereby decreasing the number of collisions between cars and deer	1	
			Suggest making this a high priority project. It's a common route for bikers to access Running Y and Hwy 140.	1	
			So important - cars don't like cyclists on here & cyclists don't feel super comfortable - potential trail around lake that's proposed could be explored	Comment from TAC/CAC Member	
B-18	Install bike lanes on Main Street between Esplanade Avenue and Crater Lake Parkway.	Medium			
B-20	Widen the road to add paved shoulders or bike lanes on Old Fort Road between Loma Linda Drive and the UGB.	Low	This road is common with cycling enthusiasts looking for a good workout. No shoulder means bikes must compete with traffic going 55+mph. I personally have had two truck mirrors bounced off my helmet on this stretch of road.	3	No change
			I agree that this should be a low priority project- it only benefits a few users, and would be more expensive to implement.	0	
			I live on Old Fort Road and highly recommend upgrading this project to a High Priority Project. This road is popular with bikers and runners. There is no paved shoulder so it's dangerous for bikers and runners.	1	
			would be awesome	Comment from TAC/CAC Member	
B-21	Widen the bike lanes on Biehn Street between Crater Lake Parkway and Oregon Avenue	High	Good idea and easily done!	2	No change
			Widening the bike lanes would make this feel much safer! Thanks for making it a priority.	0	
			A buffered or protected bike lane on Biehn Street is a terrific idea! It would be utilized by many OIT and Sky Lakes commuters, and especially if planters were used as the buffer, would work to enhance the aesthetics of Biehn, stimulating positive growth.	2	
			I bike to work most of the days. This project would make it more comfortable and safe. Thanks.	0	
			aren't there already? I feel like they're fine now. it's moreso a horrible crossing from campus to Biehn.	Comment from TAC/CAC Member	
B-22	Further study required to identify which east-west routes should receive shared lane markings, wayfinding, and/or traffic calming in the southeast area of Klamath Falls.	Medium			
			To me, a far more important goal in this area would be to build a sidewalk on the NE side of Eldorado from Lexington Ave and Euclid Ave. I bicycle on this road	1	

B-23	Install sharrows and traffic calming on N Eldorado Avenue.	Medium	regularly and it works ok, but it is unsafe for pedestrian commuters to Oregon Tech the hospital and other businesses.	-	Maintain sharrows and traffic calming, but add sidewalks to list of potential traffic calming measures. Maintain medium priority for this plan, based on evaluation criteria. Include statement about evaluating necessary connections such as crosswalks at intersections along this road.
			More speed limit signs are needed all along both sides of Eldorado between here and Campus Drive. Many drivers treat this narrow, 25-mph neighborhood street like a 35-mph boulevard.	0	
			The sidewalks on Eldorado come and go and are not continuous. It is unsafe for pedestrians of which there are many. Create a consistent sidewalk!	1	
			I agree with the other commenter. I was very sad to see that none of the projects on the site discuss improving or creating side walks. OIT and Sky Lakes are large City employers, and it is a real shame (and unsafe) that no one can walk on sidewalks to get from anywhere in Pacific Terrace neighborhood to OIT/Sky Lakes. Please consider making it a high priority to install continuous sidewalks along N El Dorado all the way to Sky Lakes/OIT.	1	
			Please make sure and add sidewalks to Eldorado as there are many people who use this route for walking (including kids) and they are forced to walk on the street.	0	
Sharrows - not the best- bike lanes are better.					
Comment from TAC/CAC Member					
<b>Sidewalks</b>					
S-1	Install sidewalks on both sides of OR 39 between the OC&E Trail and Keller Road.	Low			
S-2	Install sidewalks on both sides of Hope Street between Bristol Avenue and SW 6 <sup>th</sup> Street.	Low			
<b>Policies/Programs</b>					
P-1	Develop a program to install and maintain wayfinding signage at all trailheads and trail crossings of public streets.	High	So important!	Comment from TAC/CAC Member	
P-2	Policy that requires bicycle parking to be provided at key locations and pursue grants for where it is missing today.	Medium	Yes! It's amazing how often bike racks are absent)	Comment from TAC/CAC Member	Project was upgraded to High priority based on TAC/CAC and PMT comments, after reviewing evaluation criteria.
P-3	Develop guidelines for how to evaluate trail crossings to use in applying consistent treatment at local street crossings.	Medium			
P-4	Evaluate the feasibility of installing illumination along the trail system.	Low			
P-5	Develop a plan for strategic placement of bicycle repair stations and racks throughout the urban trail system.	Low	Love this idea	Comment from TAC/CAC Member	
<b>Other/New Comments Received</b>					
		Maintenance	The "bike path" up to Sky Lakes/OIT desperately needs resurfacing.	2	
		Maintenance	The path along the A Canal SE of this point needs resurfacing. It's a bumpy ride.	0	
		Maintenance	Please resurface the bike path to OIT. It is in dire need of repair.	0	
		New	This intersection (Esplanade Ave/N Eldorado Ave) needs marked crosswalks and some kind of speed control. It is a major pedestrian walkway, including for KU students. The speeding on Esplanade and Eldorado is out of control.	0	This will be covered by the revised B-28 description.
		New	Hogback is a beautiful location for hiking and it falls within the UGB, so we should add a trail to the top to the master plan (even if it is a lower priority than the urban core). A trail to the top of Hogback would be a great community asset.	1	Recreational trail, not directly relevant to this plan.
		New	"A" Canal mentioned often, where is BOR on maintain and fund? Any possibility to add paved miles to "A" Canal EAST of Homedale?	Comment from TAC/CAC Member	Adding miles east of Homedale is beyond our scope; BOR was added as a potential partner for "A" Canal projects where they were not listed previously.

## Comments Received via Project Website Comment Submission Form

Danise Brakeman  
[itsdanise@gmail.com](mailto:itsdanise@gmail.com)  
5415456553

It wasn't clear on your map what trails are existing and what are proposed. I like the idea of connectivity and fully support it.

I understand a grant was obtained by the City and County for consulting work. As a resident of Bonanza, I would like to pitch the idea of creating a trail from Bonanza to Klamath. We have many walkers and bicyclists that would enjoy a safe trail to Klamath.

brian  
[brian.abarca@yahoo.student.kcsd.k12.or.us](mailto:brian.abarca@yahoo.student.kcsd.k12.or.us)  
541-331-5385

I think this plan will make the area better for people because it will make getting around easier and people will not have to always be careful of cars.

Alex Pena  
[penaalex576@yahoo.com](mailto:penaalex576@yahoo.com)  
541-281-9148

i think the Klamath Falls bike trail plan is an excellent idea because bike riders don't have to watch out for cars and don't have to ride across town to go to a specific store. People can take time off and use these trails for shortcuts and they can also get around easier.

Jorge Palomar  
[jorge.palomar@student.kcsd.k12.or.us](mailto:jorge.palomar@student.kcsd.k12.or.us)  
541-238-4539

I think this plan is good because people will not have to worry about cars anymore and it will make it easier for people to get around town.

Makenzie Girtman  
[Makenzie.girtman@student.kcsd.k12.or.us](mailto:Makenzie.girtman@student.kcsd.k12.or.us)  
541-591-5603

The Klamath Falls Urban Trail plan would make an enormous impact on our community. If everything goes as planned it will create a healthier basin, easier access to popular destinations, as well as a great trail system that is connected throughout the community. In Klamath we tend to drive on the busy roads rather than get outside and exercise; this plan will push for the community to realize the accessibility they have to easy exercise and the access to overlook of our basin's beauty.

Lizbeth Ramirez  
[lizbeth.ramirez@student.kcsd.12.or.us](mailto:lizbeth.ramirez@student.kcsd.12.or.us)  
(541)798-5666

I think that connecting the trails could be a good idea. It could make it easier for those people that like walking, running or riding a bike and can reduce the accidents.

Luz Hernandez  
[luz.hernandez@student.kcsd.k12.or.us](mailto:luz.hernandez@student.kcsd.k12.or.us)

I think that the plan of having better options for people to be healthier is a good idea. Making new trails, sidewalks and bicycle lines would make a healthier city and it would be safer.

## Comments Received via Project Website Comment Submission Form

Eric Jimenez  
[eric.jimenez646@gmail.com](mailto:eric.jimenez646@gmail.com)

I believe this is a great idea because new trails could possibly increase tourism and the new roads could improve the efficiency of getting around.

brisa rodriguez  
[brisa.rodriguez@student.kcsd.k12.or.us](mailto:brisa.rodriguez@student.kcsd.k12.or.us)  
541-591-9744

i think this an excellent idea! To be able to go on more trails and have more options is a good idea. It's also a good idea for the Klamth basin.

yvette navarro  
[yvette.navarro@student.kcsd.k12.or.us](mailto:yvette.navarro@student.kcsd.k12.or.us)  
541-281-4086

I think is good idea that you guys are doing this and improving Klamath Falls. It will be good for the community.

Stephanie Rizo  
[stephanie.rizolope@student.kcsd.k12.or.us](mailto:stephanie.rizolope@student.kcsd.k12.or.us)  
541-887-9604

In my opinion, I think it is very nice that they're building trails for bicyclists and runners. It definitely is going to improve Klamath Falls. It will be better for our community and health because it gives us more options of transportation.

Jason Coatney  
[jasoncoatney2003@yahoo.com](mailto:jasoncoatney2003@yahoo.com)  
541-331-0034

I just wanted to comment on the Urban Trail Plan. I think this is an outstanding opportunity for our community and I think we should concentrate on building more urban trails over bike lanes whenever possible. Separating vehicles from cyclists and pedestrians will encourage more people to use them and not have to worry about being hit by a vehicle. This would increase the number of kids to use these as well.

Thank you for your time.  
Jason

Ana Garcia  
[anagarcia.og@gmail.com](mailto:anagarcia.og@gmail.com)

I think the trail is a good idea! It will encourage people to get more active and provide better transportation for everyone.

Cecilia Pena  
[cecilia.pena@student.kcsd.k12.or.us](mailto:cecilia.pena@student.kcsd.k12.or.us)  
541-539-5965

I think the Klamath Falls urban trail plan is a great idea. it's a good way of getting out without having to worry about crossing traffic.

Dante Esqueda  
[esquedadante13@gmail.com](mailto:esquedadante13@gmail.com)

I think the trail would be a great idea. I think there's a great need for bike trails for bikers in Klamath Falls. This would give people the chance to get out and do something rather than just sitting at home.



## Comments Received via Project Website Comment Submission Form

Daniel Valadez  
[danielvaladez2017@gmail.com](mailto:danielvaladez2017@gmail.com)

This, depending on how many people actually use the trail, could be a great idea. It promotes exercise throughout the city, and it is also an opportunity to the city to expand upon itself. Improving existing trails and adding new ones to connect them all could also improve travel for those who do not drive. The improvement of the trails also makes the city itself more presentable to those who choose to visit for whatever purpose.

Carlos Chavez  
[Carlos.s.chavezjr@gmail.com](mailto:Carlos.s.chavezjr@gmail.com)  
5418913124

I personally think its a good idea, expanding the trials will give the community something to do. I personally know people that like to go biking and would appreciate this. And as an athlete i could use these trails to run on for my endurance.

Christopher Whisenhunt  
[christopherwhisenhunt13@gmail.com](mailto:christopherwhisenhunt13@gmail.com)  
541 331 3996

The Klamath Falls Trail Plan is an excellent idea. Putting this trail in will provide the community a safer way to be physically active.

Jon Grounds  
[jongrounds13@gmail.com](mailto:jongrounds13@gmail.com)

Dear, Herald and News committee, I believe that this would bring a lot of good to this small community. As a local runner of Klamath Falls I think that if we connected some existing paths and made new paths around town then that would really help me out, because before this all I could run on was the OC&E trail. Yes that is fun, but I cant get all around town on that trail. This can bring a lot of opportunities to local runners and bikers and if completed the way you said it would then a lot of good can happen. Grounds,Jon

Alma  
[almazamora984@gmail.com](mailto:almazamora984@gmail.com)  
5415910867

La idea de que tengan bicicletas para las personas que corren, pienso que es buena idea por que asi pueden seguir asiendo sus ejercicios un poco mas facil e incluso pueden recorrer mas millas de lo normal en las bicicletas que corriendo y de todos modos les puede ayudar en su cuerpo fisicamente, y permanecerse de forma saludable.

Kristen Johnson  
[Kristen8422@gmail.com](mailto:Kristen8422@gmail.com)  
541-281-7892

The Klamath Falls Urban Trail Plan would be a great deal to many people around the basin. It would help people who like to exercise get from place to place faster and it opens up longer routes and different routes people could go on. I think creating and improving on these trails will better our community giving runners and bikers an easier way to get through town.  
Johnson, Kristen

I am sending this as official comment on the trail project that the City of Klamath Falls has proposed using the Consulting Firm Kittelson's and Associates. The Klamath Falls area formerly known as Linkville sits on a very culturally rich area. The village of Ewawana was a thriving metropolis for thousands of years before the coming of the European and the cultural resources on the surface of the ground as well as the cultural resources in the earth in this area are vast. In order to protect these resources it will be imperative to do cultural resource surveys and to culturally monitor all ground disturbing activities on

## Comments Received via Project Website Comment Submission Form

this project. My office will be glad to assist you in any phase of this project and we are anxious to hear from you as the project moves forward.

Perry Chocktoot, Director  
Culture and Heritage Department  
541-783-2219 x 178

Troy Rife  
[trife@uefc.org](mailto:trife@uefc.org)  
541-205-5379

I really like the KF Urban Trail Master Plan. We really enjoy using existing trails to run errands and ride around for fun on our bikes during good weather. We live in Moyina Heights but go down to Walmart or downtown KF. Having more trails like this increases options and provides greater safety that would be greatly appreciated. Thanks for looking into this.

Reynaldo Espinoza  
[reynaldoespinoza49@yahoo.com](mailto:reynaldoespinoza49@yahoo.com)  
(541)-810-1675

I think this is bad idea because to add more bike trails you will have to destroy something in Klamath that could mean destroying something that is important to many people.

Sarah  
[sarah.herman@student.kcsd.k12.or.us](mailto:sarah.herman@student.kcsd.k12.or.us)  
541-238-4306

I think this is a good idea because it may help our community and the health of our community. If this does help our community in a positive way then this could lead to some very good things in the future.

Baler  
[baler.mann@student.kcsd.k12.or.us](mailto:baler.mann@student.kcsd.k12.or.us)  
541-723-7051

I believe that it is a great idea to open up new bike trails. i guarentee that the klamath bsin will be more fit as a whole with more exersice oppurtuntiys.

Angel Quintanar  
[angel.quintanar@student.kcsd.k12.or.us](mailto:angel.quintanar@student.kcsd.k12.or.us)  
541-274-1853

I think that is a really good idea because more people can ride than drive.

Talin Rider  
[Talin.rider@gmail.com](mailto:Talin.rider@gmail.com)  
5418920123

I do like making more so people who ride bikes dont fight with cars.

Troy Parks  
[troy.parks@student.kcsd.k12.or.us](mailto:troy.parks@student.kcsd.k12.or.us)

The plan for the new trails are an amazing idea. This will be much safer and fun for the people who rides bikes or walks. I hope you can get the grants for this project.

# Comments Received via Project Website Comment Submission Form

Kalista Whisenhunt  
[kalista.whisenhunt@student.kcsd.k12.or.us](mailto:kalista.whisenhunt@student.kcsd.k12.or.us)

I think this is a good idea because it creates more ways to get other places and for pedestrians to get somewhere in a safer way.

Jenna Moran  
[jenna.morangifford@student.kcsd.k12.or.us](mailto:jenna.morangifford@student.kcsd.k12.or.us)

I think that this would be a good idea because it could provide more ways for people to get around in a safer manner.

jonathan.barajas  
[jonathanbarajas@yahoo.com](mailto:jonathanbarajas@yahoo.com)

i think thats a good idea because people like too ride bikes.

Daniel Howrad  
[danielhoward3334@gmial.com](mailto:danielhoward3334@gmial.com)

I believe that it is a good idea because there are many people that want to ride there bikes on free trails and look at the scenery.

ximena lemus  
[ximena.lemushernan@student.kcsd.k12.or.us](mailto:ximena.lemushernan@student.kcsd.k12.or.us)

I think this is actually an amazing idea, simply because having more trails will bring various benefits to Klmath Basin residents. More trails will drecrease the amount of pollution, encourage physical activity, and create easier acces to important places such as the Skylakes Medical Center and OIT.

zachary ross  
[zacharyross@student.kcsd.k12.or.us](mailto:zacharyross@student.kcsd.k12.or.us)  
5412384981

i dont think this is a good investment beacuse you can spend the money on something way more useful

Jesus  
[jesus.beltran@student.kcsd.k12.or.us](mailto:jesus.beltran@student.kcsd.k12.or.us)  
5418511688

I dont think it is a good idea because,i think that will just spend alot of money. We can use that money for somthing that people will use and will care about.

shasta howard  
[shasta.howard@student.kcsd.k12.or.us](mailto:shasta.howard@student.kcsd.k12.or.us)  
541-851-1688

I think this is a good idea becasue it is a safer way for pedestrians to get around.

Ty Cook  
[orrin.cook@student.kcsd.k12.or.us](mailto:orrin.cook@student.kcsd.k12.or.us)  
541-892-2765

I think its a great idea. It gives multiple opportunities.

## Comments Received via Project Website Comment Submission Form

Suzy Cobian  
[scobian1105@gmail.com](mailto:scobian1105@gmail.com)  
541-887-7105

It is a good idea to make new trails and sidewalks. This is expanding our community. It is also making our town of Klamath Falls look nicer.

Israel Ruedas  
[israel.jr1110@gmail.com](mailto:israel.jr1110@gmail.com)

How many trails will you guys be planning to make?

Can you guys make more skate parks and can they be bigger?

Why did you guys not make it earlier?

yajaira  
[yajairacobian1@gmail.com](mailto:yajairacobian1@gmail.com)  
541-539-9833

I think this is a very good idea, due to the fact that there are many neighboring communities and an abundance of homes and citizens living in the area whom do not own a motorized vehicle. This could make it easier for these people to get around. Many college students also need a simpler way of getting around and this could be the solution.

Katie Hogue  
[katelyn.hogue@student.kcsd.k12.or.us](mailto:katelyn.hogue@student.kcsd.k12.or.us)  
541-810-0006

I think that the idea of building more trails and connecting them in Klamath is a good idea for the following reasons. If they connect trails through beautiful scenery it will attract more visitors and it would get used more by different things. Also more people would use bikes rather than cars if they enjoy the ride.

Jasmine James`  
[jasmine.james@student.kcsd.k12.or.us](mailto:jasmine.james@student.kcsd.k12.or.us)  
(541)-281-0777

I think that the idea of adding more trails and connecting them in Klamath Falls is a good idea. People can be safe and have a better way to get around without getting in the way of cars and not getting in car accidents.

zachary buller  
[zachbuller@student.kcsd.k12.or.us](mailto:zachbuller@student.kcsd.k12.or.us)  
541-892-8924

I believe that the idea of new trails in Klamath Falls is an outstanding idea. The only question that i have is how much the project will cost. other than that question i like the fact that something new is being added to Klamath.

Nolan  
[nolanrb13@icloud.com](mailto:nolanrb13@icloud.com)  
541-891-0393

I think that the new trail system is a very good idea. Their are many residents throughout the area whom will enjoy the paths. This gives them areas to hike, bicycle and do as they please. I believe that this is a great addition to the city.

Sergio Cisneros  
[Cisneross14@gmail.com](mailto:Cisneross14@gmail.com)  
541-884-0069

## Comments Received via Project Website Comment Submission Form

The Klamath Falls Urban Trail plan is an excellent idea and opportunity for this community. It will benefit the area by improving its quality of life, economic activity, and presence.

coy ross  
[crosskfo@yahoo.com](mailto:crosskfo@yahoo.com)  
541-891-8858

this is exciting news for Klamath falls!  
what can I do y\to be part of this

Jerry  
[jerry@newearth.com](mailto:jerry@newearth.com)  
541-281-4183

What is the web address for the urban master trail plan?

Jerry Anderson  
[jerry@newearth.com](mailto:jerry@newearth.com)  
541-281-4183

This is a great project for Klamath Falls. As an avid biker and runner, KF is tough - especially for bikes - to get around town. There's too much competition with cars. For better health and improved safety, Klamath Falls could use more access for bikers/runners/walkers. This project is on the right track.

Appendix C Technical Memorandum 2:  
Existing Conditions



## Technical Memorandum #2- Existing System Conditions and Future System Needs Assessment

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Date: September 30, 2015

Project #: 18974

To: Technical Advisory Committee & Citizen Advisory Committee

From: Ashleigh Griffin, Nick Foster, AICP, and Marc Butorac, PE, PTOE; Kittelson & Associates  
Jeremy Morris, PE; Adkins Consulting Engineering

Subject: Klamath Falls Urban Trail Master Plan - Existing System Conditions and Future System Needs Assessment

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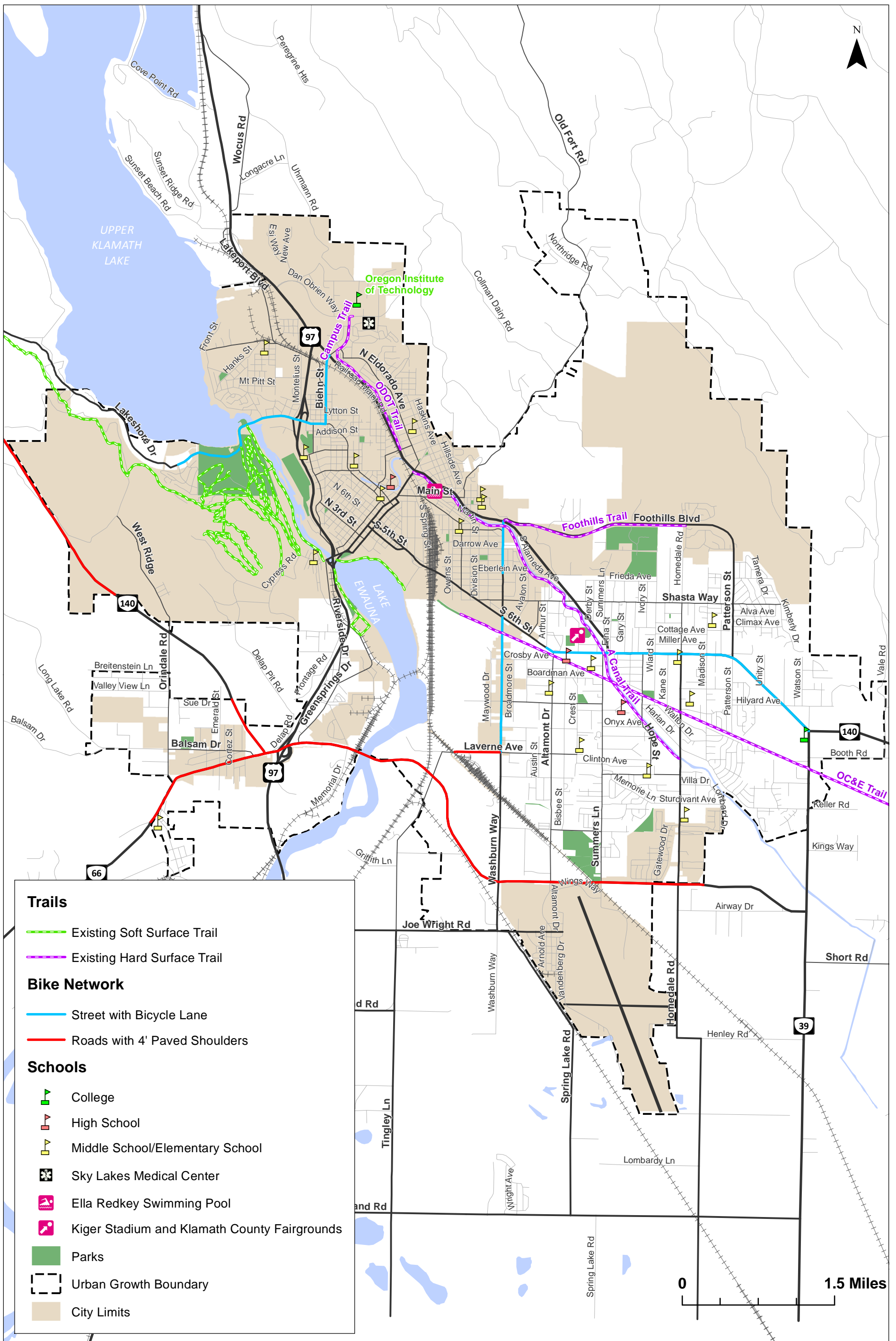
This memorandum provides an overview of the existing urban trail system in Klamath Falls and an assessment of areas in need of improvement, both now and in the future. These findings will form the basis for the recommended projects, policies, programs, pilot projects, and studies that will make up the Klamath Falls Urban Trail Master Plan.

### EXISTING CONDITIONS

The following section describes the existing trail system and its condition, as well as health indicators in the Klamath Falls urban area.

#### Trail System Inventory

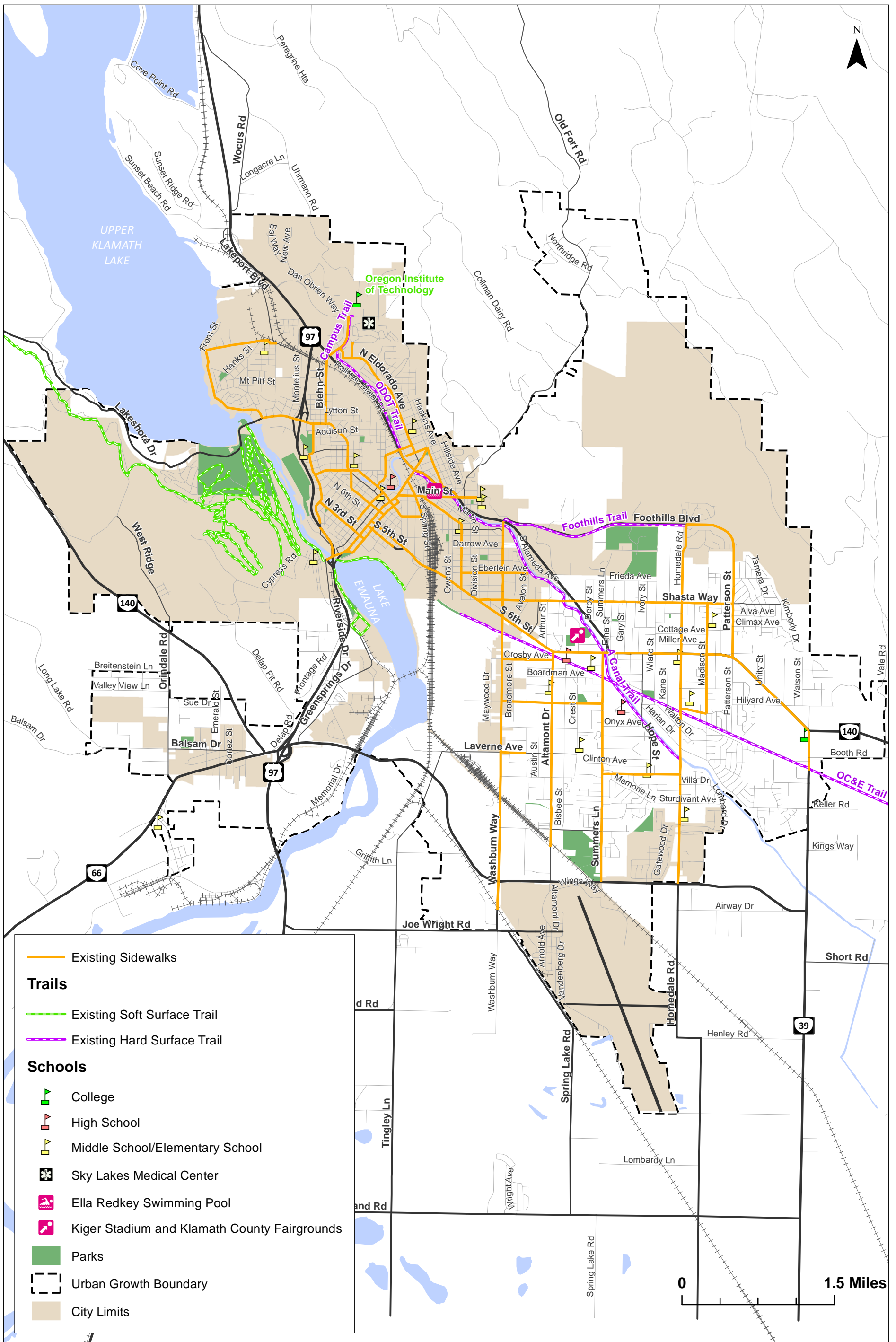
Figure 1 illustrates the inventory of the existing trail network, including on-street bicycle facilities and Figure 2 shows the trail network along with an inventory of sidewalks on arterial and collector streets in the Klamath Falls Urban Growth Boundary (UGB). These inventories use the Klamath Falls Urban Area Transportation System Plan as a starting point and have been updated to include information provided by City of Klamath Falls, Klamath County, and Oregon Department of Transportation (ODOT) staff, as well as in-person observations made by the project team and advisory committee members.



Existing Trail Network and On-Street Bicycle Facilities  
Klamath Falls, Oregon

Figure  
1





Existing Trail Network and Sidewalk Facilities  
Klamath Falls, Oregon

Figure  
2

H:\projects\18974 - Klamath Falls Trail Master Plan\GIS\TMAP\Fig02\_Existing Trail Network\_Sidewalk.mxd - egriffin - 12:03 AM 9/29/2015

## Hard Surface Trails

Most of the trails illustrated in Figures 1 and 2 have hard surfaces and are used for both transportation and recreation purposes. These trails include:

- **OC&E Trail** – This is a rail-to-trail conversion in the former railbed of the Oregon, California, and Eastern Railroad. The trail extends east from Klamath Falls to the community of Olene, before heading northeast to Bly and the Sycan Marsh Preserve. Within the Klamath Falls UGB, the OC&E Trail is 7.5-miles long and runs through neighborhoods in the central and eastern portions of the urbanized area. It nearly connects these neighborhoods to downtown Klamath Falls, but currently ends at the still-active rail tracks east of downtown. The OC&E Trail is maintained by Oregon State Parks.



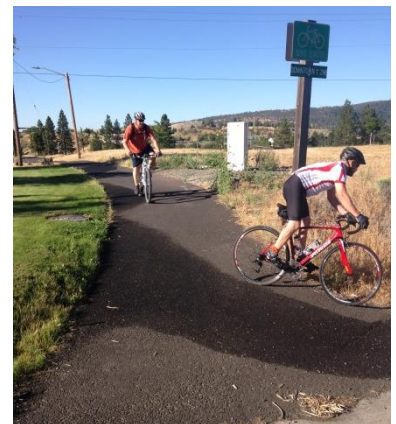
**OC&E Trail West of Washburn Way**

- **“A” Canal Trail** – This paved trail, owned by the Bureau of Reclamation, parallels the “A” Canal from Homedale Road in the southeast portion of the urbanized area to Esplanade Avenue north of downtown Klamath Falls. Because the trail is located adjacent to the canal it is grade separated from many of the surrounding neighborhoods. The “A” Canal Trail is 4.1-miles long and crosses the OC&E Trail east of Summers Lane. A ¼-mile connection along Crater Lake Parkway is necessary to reach the Crater Lake Parkway Trail.



**“A” Canal Trail West of Washburn Way**

- **ODOT Trail** – This trail parallels Crater Lake Parkway (OR 39) from Portland Street to Campus Drive and the Campus Trail, which connects to the Oregon Institute of Technology (OIT) and Sky Lakes Medical Center campuses. The ODOT Trail is 1.5-miles long.
- **Campus Trail** – The Campus Trail is an asphalt path adjacent to Campus Drive and connects the ODOT Trail to Campus Drive on the southern boundary of OIT where it becomes a sidewalk. The Campus Trail is 0.4-miles long.



**ODOT Trail at Campus Drive**

- **Foothills Trail** – The newest trail to be added to the system, this trail is 1.8 miles long and located within the Foothills Boulevard right-of-way from the Crater Lake Parkway to Homedale Road. In addition to providing access to the surrounding neighborhoods, this trail

connects to the 150-acre Steen Sports Park, which provides facilities for a wide variety of sports and other activities year-round.

These hard surface trails listed above are the primary focus of this planning effort, given the significant role they play in the active (bicycle and pedestrian) transportation system.

### ***Soft Surface Trails***

The inventory also includes a number of soft surface (e.g., dirt, gravel) trails that are primarily used for recreation, though they may also receive some utilitarian transportation use. While adding soft surface trails is not the primary focus of this effort, understanding locations of popular recreational trails, such as the ones included in this inventory, is important because they are destinations for people using the area's transportation system. The soft surface trails shown on Figure 1 include:

- Stonehenge Trail
- Split Tree Trail
- Power Line Trail
- Autobahn Trail
- Archery Trail
- 5 Gallon Trail
- Eulalona Trail
- Link River Trail
- Rat Camp Trail
- Sidewinder Trail
- Vampire Trail
- Klamath Ridgeview Trail
- Connection Trail
- Blueberry Trail
- Buzzard Trail
- Jeep Road Trail
- Mudd Trail
- Ridgeline Trail
- Nick's Pick Trail
- Lake Ewauna Trail
- Lake Ewauna Nature Trail

### **Trail Conditions & Maintenance Needs**

The project team reviewed the conditions of the hard-surface trails described above. Understanding the conditions of the trails is important for establishing maintenance needs and identifying priority areas. Trails in poor condition can discourage use or even present hazards to users.

### ***Existing Conditions***

The hard-surface trails in the Klamath Falls urban area were installed over many years by different agencies. Most of the trails are in good condition, though there are areas of cracking, bumps, and potholes. In general, the newer the trail the better condition it is in. A brief assessment based on a field review of each trail is provided below:

- Foothills Trail (relatively new and in good condition, no major cracks observed)
- ODOT Trail (relatively new and in good condition, no major cracks observed)

- OC&E Trail (generally good condition inside the UGB, although thermal cracks are starting to become present)
- Campus Trail (generally good condition, but a mix of surfaces including concrete and asphalt)
- “A” Canal Trail (generally poor with minor thermal cracks occurring every 40 to 50 feet and major thermal cracks, large bumps, and pot holes occurring every few hundred feet. We understand some people avoid bicycling on the trail due to the presence of large cracks that tend to be repetitive and hard on bikes. In addition, the ramp crossings can be difficult to navigate for novice cyclists)



**Patched Crack on OC&E Trail**

### ***Maintenance Needs***

The goal of any maintenance program is to proactively address declining conditions as soon as possible. Such a program achieves the least cost for maintenance over time and the best condition possible. If maintenance is neglected past a certain point, then more expensive rehabilitation techniques are necessary. For example, related to roadways, chip seals are the least cost method for maintaining a road and cost around \$0.25 per square foot, compared to \$2.00 per square foot for a two-inch overlay or \$8-\$10 per square foot for a full roadway rebuild. The catch is that a chip seal program has to be started early in the life cycle of a roadway, it is not a fix all for roads that have alligator cracked. The life cycle costs for a 20 year program for a rebuild is \$8-\$10 per square foot, while the same life cycle cost for a chip seal would be less than \$1 per square foot, assuming a 7 year cycle (i.e. chip sealing would occur approximately 3 times in 20 years).

The usual asphalt distress for multi-use paths is the occurrence of thermal cracks. These cracks are the response of the asphalt to hot, cold, and oxidation of oil over the lifetime of the asphalt. In addition, original construction techniques also influence certain failure mechanisms for asphalt. For instance, it is our understanding that the “A” Canal Trail is a thin lift of asphalt over marginal base. The presence of adjacent water may have also affected the compaction of the subgrade soils and aggregate base. The “A” Canal Trail has the most thermal cracks and pot holes of the local trails.

Table 1 summarizes life cycle maintenance costs broken down into annual costs for maintenance need to maintain the trails in their current condition. The actual costs any given year will vary from the annual costs shown in the table because each action is not performed every year (e.g., a two-inch overlay is prorated over a 20-year period of time). The portion of the estimated annual costs that aren’t outlaid each year for maintenance should be put into a long term maintenance account and allowed to build for the years when more maintenance is required.

**Table 1 Estimated Annual Maintenance Costs**

Maintenance Action	Frequency	Estimated Annual Cost
Site Visit and documentation of conditions, safety hazards	2x/year (Spring/Fall)	\$900 <sup>1</sup>
Longitudinal striping and repainting of stop bars	Every 5 Years	\$2,000 <sup>2</sup>
Crack seal minor cracks less than 1" wide	Every 1 Year	\$2,700 <sup>3</sup>
Crack seal major cracks greater than 1" wide	Every 1 Year	\$3,400 <sup>4</sup>
Repair pot holes with patch	Every 1 Year	\$1,000 <sup>5</sup>
Inspect signs and replace as needed	Every 5 Years	\$500 <sup>5</sup>
2" hot mix overlay	Every 20 Years	\$79,000 <sup>6</sup>
<b>Total Annual Cost (with 20-year overlay)</b>		<b>\$89,500</b>
<b>Total Annual Cost (without 20-year overlay)</b>		<b>\$10,500</b>

<sup>1</sup>0.5 hours/mile x 15.3 trail miles x 2 times/year

<sup>2</sup>\$0.50 x 15.3 miles x 5,280 feet/mile x 25% length / 5 years

<sup>3</sup>Assumes topical crack seal applied at a cost of \$1/foot of crack, with cracks occurring every 100 feet on 10-foot wide trails.

<sup>4</sup>Assumes sawcutting and hot mix patch is necessary at a cost of \$5/foot of crack, with cracks occurring every 200 feet on 10-foot wide trails.

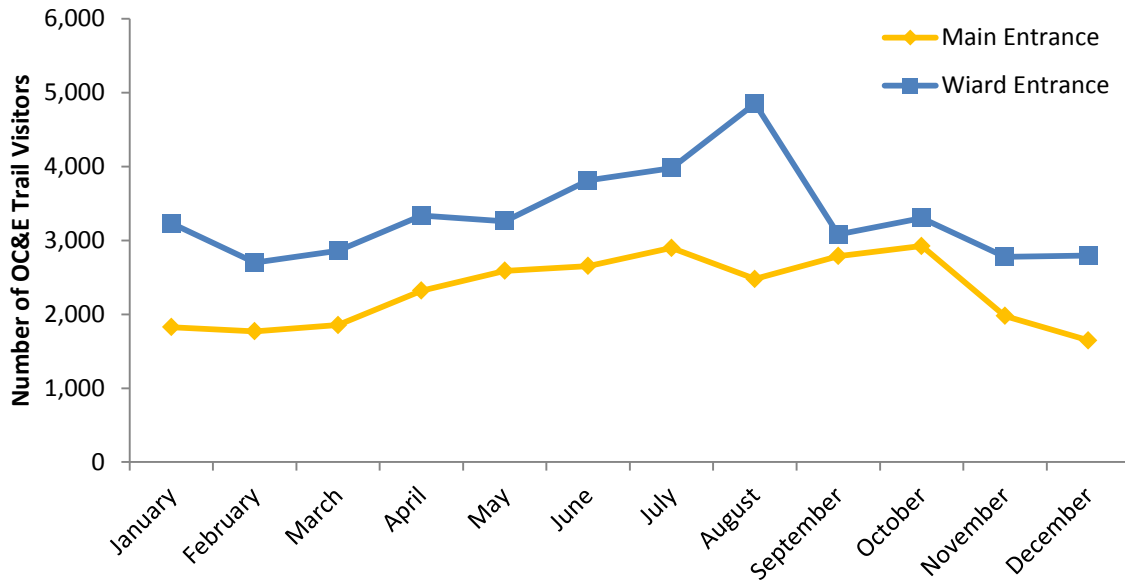
<sup>5</sup>Lump sum estimate

<sup>6</sup>2" overlay x 0.0065 tons/inch/square foot x 15.3 miles x 5,280 feet/mile x 10 feet wide x \$150/ton / 20 yrs.

Please note the costs outlined above are for 2015. An annual inflation rate of 3 to 5 percent should be applied when projecting costs to the future.

### Existing Trail Use

Oregon State Parks uses automated counters to estimate the number of people walking and biking at two entrances to the OC&E Trail; one near the Main entrance off Crosby Street and one near Wiard Park. Figure 3 illustrates the average monthly count at these two locations from January 2012 through July 2015. Per discussions with Oregon State Parks staff, these counts should be considered approximate as many people who pass by these entrances do not walk or bike by the counters themselves. Therefore, actual usage is likely higher than shown in the figure.



**Figure 3 Average Monthly Counts at OC&E Trail Entrances (January 2012 – July 2015)**

Both entrances see peak usage during the summer months. Wintertime counts are approximately 50-70% of peak summertime use.

### Public Health

According to County Health Rankings, a program of the Robert Wood Johnson Foundation and the University of Wisconsin Population Health Institute, Klamath County<sup>1</sup> is in the bottom third of Oregon counties for health outcomes and factors (Reference 1). Table 2 provides a summary of how Klamath County compares to the rest of the state with respect to specific factors that are most likely to be directly impacted by transportation choices.

**Table 2 Health Factors Impacted by Transportation - Klamath County Compared to Oregon Averages**

Factor	Klamath County Measure	Oregon Average
% of Adults Considered Obese	29%	27%
% of Adults Reporting No Physical Activity	19%	16%
% of Adults Living Near a Park or Recreational Facility	70%	89%
Driving Alone to Work	75%	72%
Driving Alone to Work (>30 Minute Commute)	14%	26%

<sup>1</sup> Data is not available for the urbanized area of Klamath Falls, so Klamath County data is used.

Klamath County is generally below the Oregon state average with respect to physical activity measures. However, Klamath County residents are less likely to drive alone for a longer commute. Physical activity measures are important to consider because inactivity is associated with a higher risk for poor health outcomes, such as heart disease, diabetes, early deaths, and depression (Reference 2).

### ***Improving Public Health***

Parks and designated recreational facilities are not the only means to provide opportunities for physical activity. Constructing transportation infrastructure that provides for active transportation modes (i.e., walking and biking) and implementing policies and programs that promote these modes are other means. Urban design infrastructure and policies have also been proven to have an impact on physical activity levels (Reference 3).

Healthy Klamath, a consortium of health focused organizations in Klamath County, is actively working to improve public health in Klamath County. The group completed a Community Health Improvement Plan in 2013 (Reference 4). The plan identifies a goal of increasing the number of adults who engage in regular physical activity from 58.7 to 60 percent. A number of measurable objectives are identified in the plan for use in evaluating progress towards increasing physical activity. These include:

- Reducing the number of people with a body mass index greater than 25 from 26 to 21 percent;
- Reducing the number of low-income preschoolers who are obese from 12.7 to 8.7 percent;
- Reducing the number of people with diabetes from 7.3 to 5.0 percent;
- Reducing the number of people with high blood pressure from 29.4 to 25 percent; and
- Reducing the number of people with high cholesterol from 34.3 to 30 percent.

## **SYSTEM GAPS AND DEFICIENCIES**

The following section documents gaps and deficiencies in the existing system. Potential solutions to address these issues will be the focus of the next phase of this project.

The existing trail network has been reviewed to identify gaps and deficiencies. A gap is defined as a missing link in the network, such as a missing off-street trail link or an on-street connection on a collector or arterial roadway that is missing sidewalks or a designated bicycle facility. A deficiency, or obstacle, is defined as a bicycle or pedestrian facility that is not up to standards or sufficient to meet users' needs. Examples of deficiencies include:

- On-street connection on a collector or arterial roadway that has a Bicycle Level of Traffic Stress rating greater than 2 (Interested but Concerned)
- Arterial or collector roadway crossing where enhancement may be warranted
- Sidewalks that are too narrow to meet ADA standards or crossings without a curb ramp

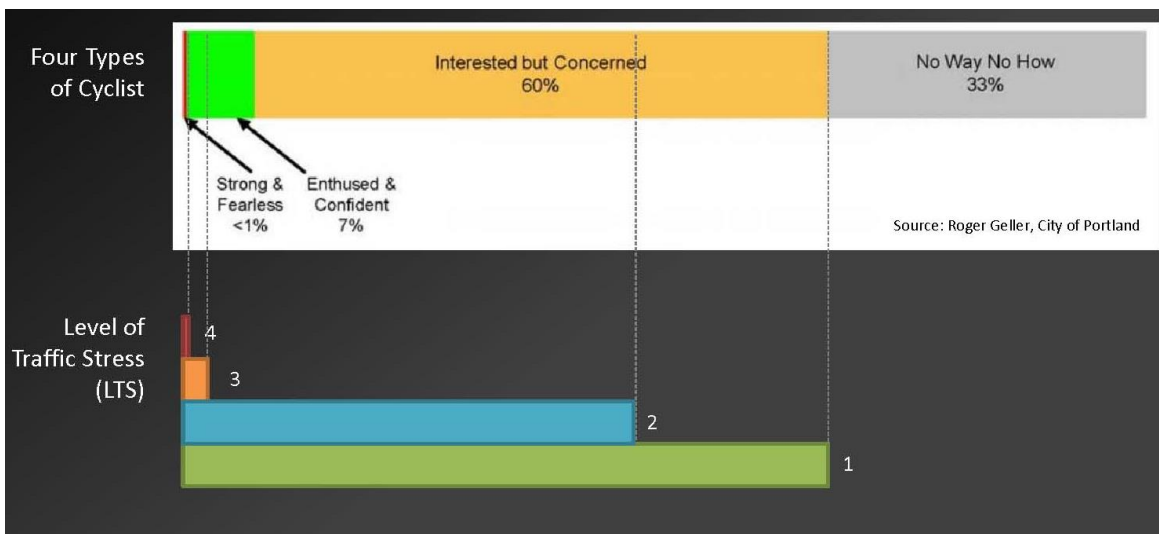
## Bicycle Level-of-Traffic Stress

Bicycle Level of Traffic Stress (LTS) analyses have been performed on key arterial and collector level on-street connections in accordance with the procedures described in the Mineta Transportation Institute report *Low Stress Bicycling and Network Connectivity*, as referenced in the ODOT Analysis Procedures Manual (APM, Reference 5). The LTS methodology defines criteria to assess how stressful a street may feel for a person bicycling and what type of person may feel comfortable bicycling on the street. The criteria are primarily based on whether a bicycle lane (with or without on-street parking) is provided and how wide it is, the number of motor vehicle lanes on the road (as a surrogate for traffic volume), and the posted speed limit of the road. These criteria are used to classify roadways into one of four stress levels described in Table 3.

**Table 3 Traffic Stress Levels**

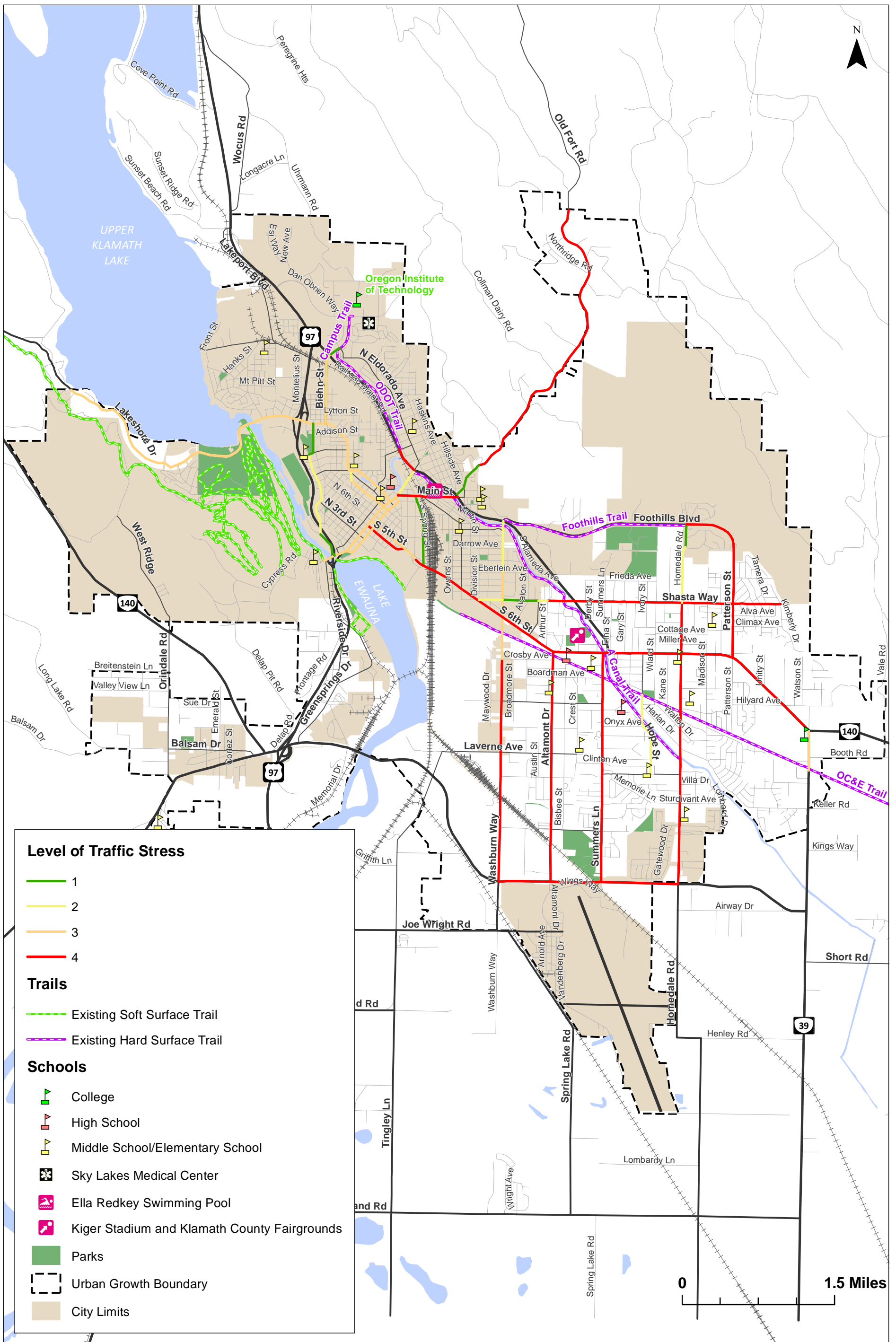
LTS Level	Description
1	Suitable for most people, including children whom are comfortable bicycling across intersections
2	Comfortable for most adults
3	Suitable for most people who are already bicycling today
4	Likely only the most confident bicyclists will ride on roads at this LTS

Figure 4 shows the results of the LTS analysis. Many of the streets have an LTS of 3 or 4. These are typically streets with higher speeds (30 MPH or higher) and usually without bike lanes. Streets with an LTS of 3 or 4 will be examined for potential improvements to create more accessible connections to the trail system.



**How LTS Relates to the Type of Person Who Might Ride on a Facility**





**Bicycle Level of Traffic Stress Results  
Klamath Falls, Oregon**

**Figure  
4**

## Safety Analyses

Safety analyses include reviewing historical crash data and examining roadway crossings, as described in the following sections

### *Crash Data*

Crash records were obtained from ODOT for the period of January 1, 2009 through December 31, 2013 for the Klamath Falls urban area. Figure 5 shows the locations of all pedestrian and bicycle related crashes in the Klamath Falls Urban Growth Boundary (UBG) during that time. *Attachment A* provides the crash data summary sheets.

As shown in Table 4, there were 33 reported pedestrian crashes and 19 reported bicycle crashes in the urban area. All of these crashes resulted in some level of injury, with one crash resulting in a fatality.

**Table 4 Reported Pedestrian and Bicycle Crashes by Severity (2009 – 2013)**

Crash Type	Crash Severity					Total Number of Crashes
	Fatal	Severe Injury	Moderate Injury	Minor Injury	Property Damage Only	
Pedestrian	1	5	14	13	0	33
Bicycle	0	3	10	6	0	19
<i>Total</i>	<i>1</i>	<i>8</i>	<i>24</i>	<i>19</i>	<i>0</i>	<i>52</i>

### *Bicycle Crashes*

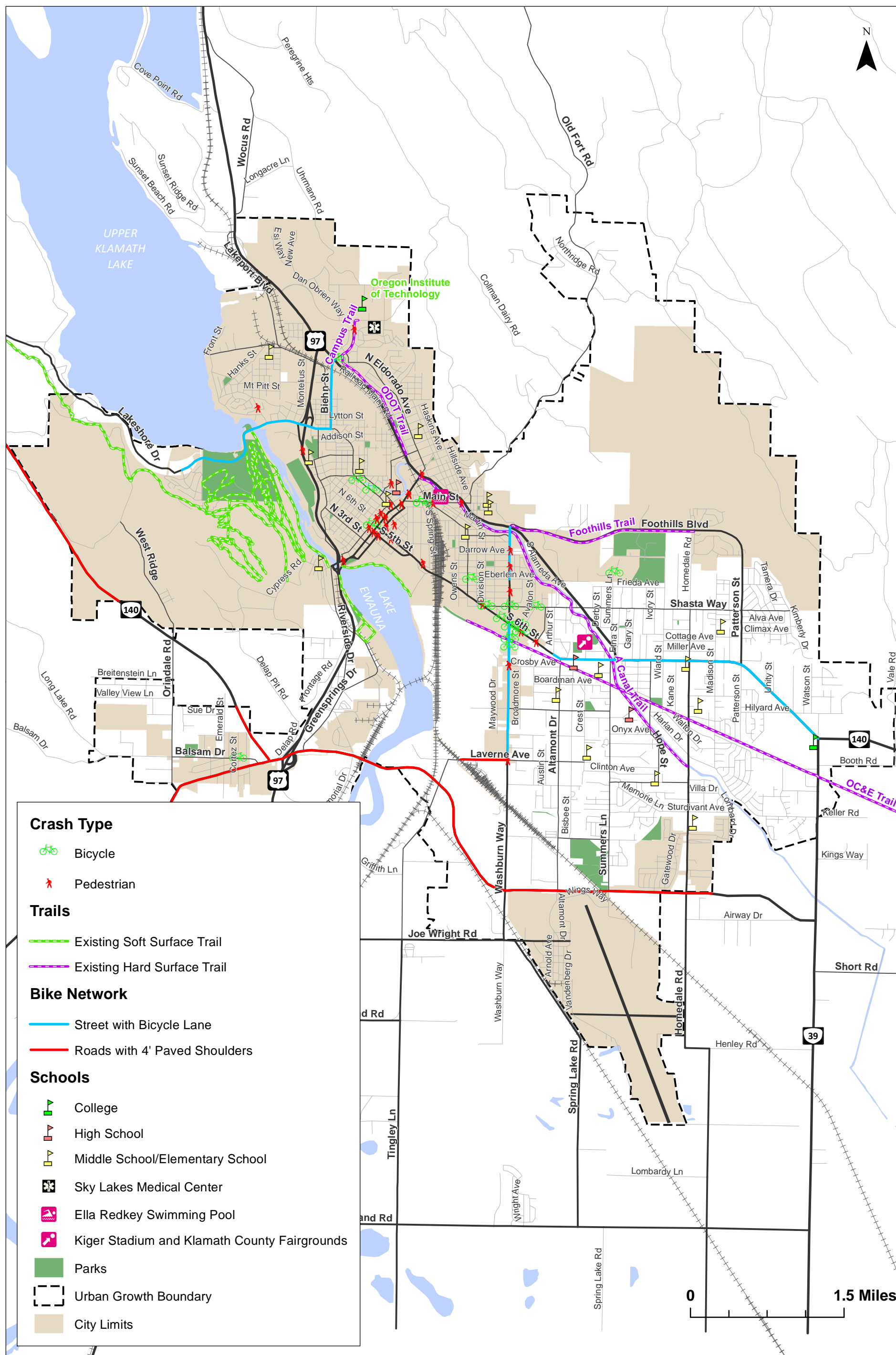
Nearly all, 18 of the 19, bicycle crashes were classified as angle or turning movement crashes, indicating they likely occurred at a conflict point such as a driveway, intersection, or trail crossing. The majority of the bicycle crashes (16 out of 19) occurred on roadways that did not have a designated bicycle lane or adjacent trail. Only two bicycle crashes occurred during non-daylight light conditions.

Ten bicycle-related crashes occurred near the S 6<sup>th</sup> Street/Washburn Way intersection. All of these crashes were categorized as turning movement or angle crashes. The intersection is large with relatively high motor vehicle volumes and speeds. The OC&E trail crosses Washburn way approximately 0.15-miles south of the intersection. Therefore, people using the trail to access downtown Klamath Falls may pass through this intersection to access the trail.

### *Pedestrian Crashes*

The majority of the pedestrian crashes occurred at intersections. Four pedestrian crashes were reported at midblock locations. Failure to yield right-of-way, on behalf of either the person driving or walking, was the most commonly cited contributing factor (26 crashes).

The highest concentration of pedestrian crashes occurred in downtown Klamath Falls. All of the pedestrian crashes downtown occurred during weekdays (Monday through Friday) and during daytime



Reported Pedestrian and Bicycle Crashes (2009-2013)  
Klamath Falls, Oregon

Figure  
5

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hours (between 7:00 AM and 5:00 PM), which is likely when the highest levels of pedestrian activity occur. The majority of the downtown pedestrian crashes occurred at intersections; only one of the crashes was reported at a midblock location.

### ***Roadway Crossings***

Trail crossings on arterial and collector roadways have been reviewed to determine whether the type of crossing currently present may warrant enhancement. This review includes assessing the crossings using National Cooperative Highway Research Program (NCHRP) Report 562 *Improving Pedestrian Safety at Unsignalized Crossings* procedures (Reference 6). NCHRP Report 562 provides guidance on the type of treatments that should be considered for an unsignalized crossing given a number of factors, including the speed limit of the roadway being crossed, pedestrian volumes, motor vehicle traffic volumes, length of the crossing, walk time, and expected compliance of motor vehicle drivers. Treatment categories include no treatment, crosswalk, active/enhanced (measures such as rectangular rapid flashing beacon) and signal. These analyses use future volumes (year 2035) from the recently adopted Klamath Falls Urban Area TSP. Existing volumes will be used later in the project to help identify priority locations.

Table 5 and Figure 6 summarize the results of this analysis for the sixteen intersections where a trail crosses an arterial or collector roadway.

**Table 5 NCHRP Report 562 Crossing Analysis Results**

ID	Roadway	Trail	Current Condition	NCHRP 562 Treatment Recommendation	Enhancement Potentially Needed?
C-1	OR 39	OC&E	Sign	Active/ Enhanced	Yes
C-2	Homedale Road	OC&E	No Treatment	Crosswalk	Yes
C-3	Hope Street	OC&E	Sign	Crosswalk	Yes
C-4	Summers Lane	OC&E	Sign	Active/ Enhanced	Yes
C-5	Altamont Drive	OC&E	Sign	Crosswalk	Yes
C-6	Washburn Way	OC&E	Signal	Signal	No
C-7	Homedale Road	A Canal	Sign	Crosswalk	Yes
C-8	Hope Street	A Canal	Sign	Crosswalk	Yes
C-9	6 <sup>th</sup> Street	A Canal	Signal <sup>1</sup>	Signal	No
C-10	Shasta Way	A Canal	Sign	Active/ Enhanced	Yes
C-11	Eberlein Avenue	A Canal	Sign	Crosswalk	Yes
C-12	Washburn Way	A Canal	Sign/Signal <sup>1</sup>	Active/ Enhanced	Yes
C-13	Main Street	A Canal	No Treatment	Active/ Enhanced	Yes
C-14	Esplanade Avenue	A Canal	No Treatment	Active/ Enhanced	Yes
C-15	Portland Street (Crossing Crater Lake Parkway)	ODOT	Hybrid Beacon	Signal	No
C-16	Dahlia Street	Campus	Signal <sup>1</sup>	N/A	No

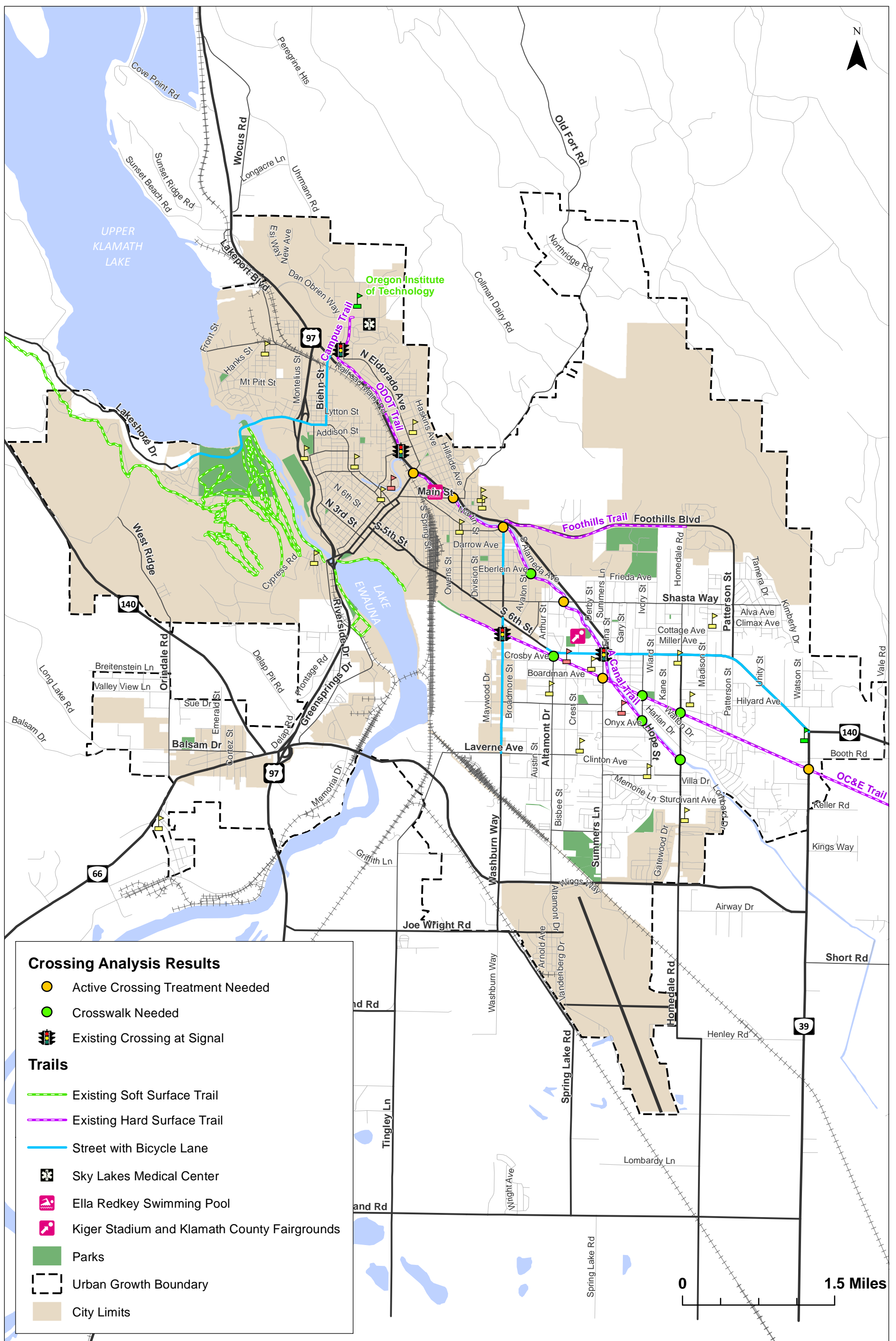
<sup>1</sup>Requires use of the sidewalk to access signal

Note that a count of crossings at these locations is not available. The analysis used for this project *assumes that there are at least 20 crossings in the peak hour at each of these crossings*. That may be higher than what exists today at certain locations, but this analysis is based on future conditions (i.e. year 2035 motor vehicle volumes) and the goal to achieve higher usage of these trails. For locations with fewer than 20 crossings in the peak hour, the NCHRP Report 562 methodologies recommend treatments to shorten the crossing and/or calm traffic (e.g. curb extensions, raised median islands), in lieu of the treatment shown above.

Based on this analysis, improvements may be warranted at 12 out of the 16 intersections once they reach 20 crossings in a single hour.



**Unmarked "A" Canal Trail Crossing**



**Crossing Analysis Results  
Klamath Falls, Oregon**

**Figure  
6**

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## Other System Gaps

In addition to the gaps and deficiencies identified above, the project team has identified the following specific gaps to be addressed in this planning effort.

1. *OC&E Trail Connection to Downtown Klamath Falls* – The current TSP contains a planned project to extend the OC&E across the railroad tracks. Other options will also be examined.
2. *Connecting the “A” Canal Trail to the ODOT Trail* – There is currently a ¼-mile gap between these two trails and a crossing of Crater Lake Parkway.
3. *Connecting the “A” Canal Trail to the Foothills Trail* – There is a short gap and a crossing of Crater Lake Parkway.
4. *Connecting the “A” Canal Trail to the Ella Redkey Swimming Pool* – The trail is grade separated from the pool.
5. *Connecting the “A” Canal Trail to the Kiger Stadium and Klamath County Fairgrounds* – The trail is grade separated from these locations.
6. *Campus Trail to Biehn Street Connection* – There is a gap between the Campus Trail and the bike lane on Biehn Street, which connects to Oregon Avenue and downtown Klamath Falls.
7. *Connecting the ODOT Trail to Kit Carson Park* – The ODOT Trail is adjacent to the park, but a fence separates the park from the trail.
8. *Veteran’s Park Trail Connections* – There are not connections between the multiple trails that meet near Veteran’s Park.
9. *“A” Canal Trail Crossing at SW 6<sup>th</sup> Street/Summers Lane* – The connection from the trail to the Summers Lane crossing of 6<sup>th</sup> Street requires using the sidewalk.
10. *Trail Signing/Wayfinding* – Wayfinding and trail signs are generally absent, including near the OC&E trailheads. Signage provides an opportunity to increase awareness and use of



**End of the OC&E Trail**



**No Connection from the “A” Canal Trail to the Foothills Trail**



**Crater Lake Parkway Crossing Between Campus Trail and Biehn Street**

the trail system for residents and visitors.

11. *Bicycle Parking* – Bicycle parking is absent from many destinations, including some parks.

The project team also reviewed sidewalk connections on collector level and arterial streets to the existing trail system. Based on the inventory shown in Figure 2, Hope Street and OR 39 are missing sidewalks. Hope Street, which is crossed by the “A” Canal trail and the OC&E trail, lacks sidewalks from Bristol Avenue to SW 6<sup>th</sup> Street. OR 39 lacks sidewalks south of the OC&E trail crossing.

The system gaps and deficiencies identified in this section were identified based on an initial field visit and data analysis. As summarized in the Next Steps section, input will be gathered from the PAC and public to refine and expand the list of gaps and deficiencies for a final comprehensive list.

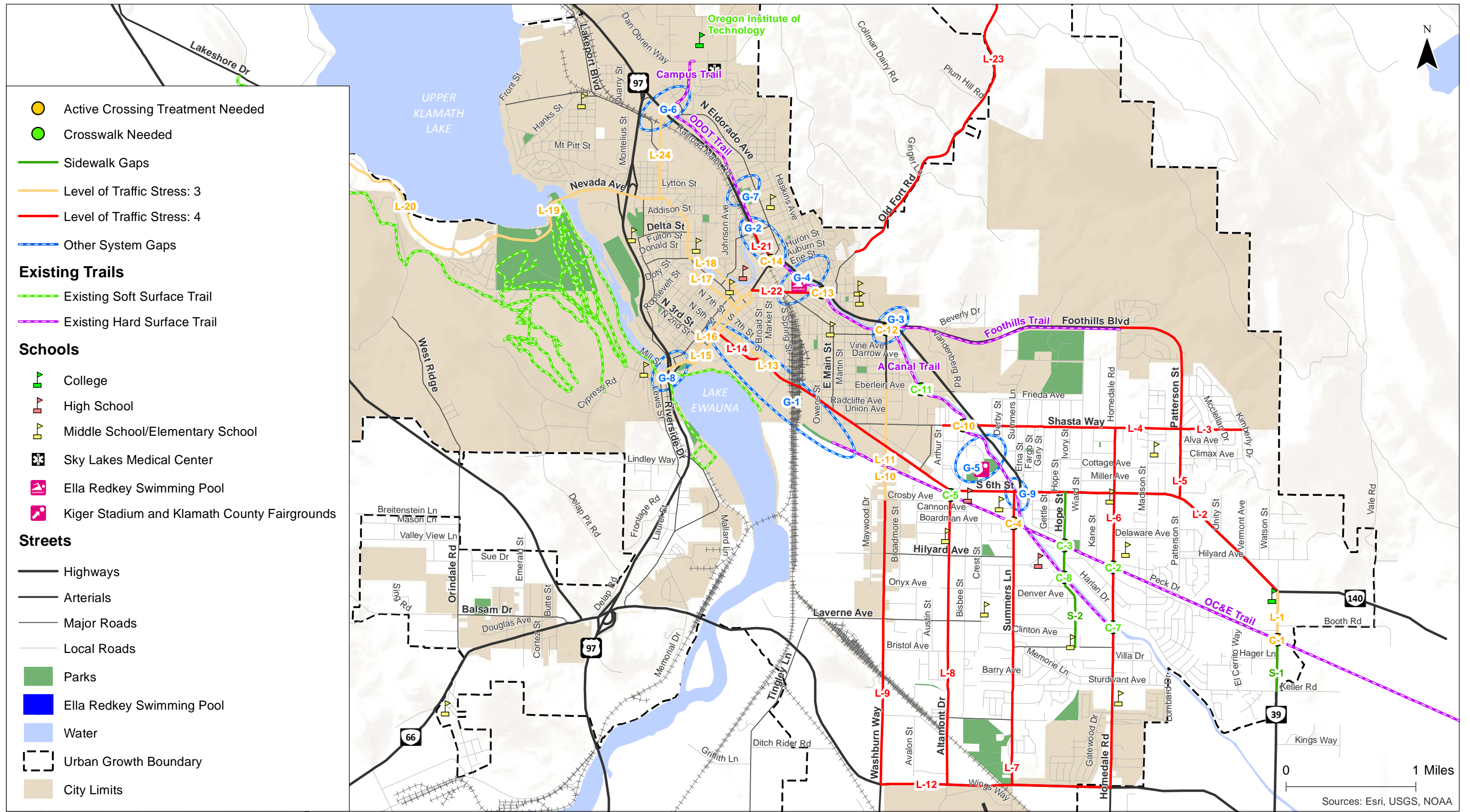
## Summary

Figure 7 summarizes the initial set of locations that have been identified in the above sections for further review for potential treatments in the next phase of this project. *Attachment B contains tables referencing the project identification numbers shown in Figure 7.* These have been identified based on a field visit, feedback from the TAC and CAC, feedback from the general public, and the project team’s analysis, described previously.

## NEXT STEPS

This memorandum was reviewed by the TAC and CAC on September 9, 2015. The findings from this memo were also reviewed with the general public through a virtual open house. *Feedback from the virtual open house is summarized in Attachment C.* The memorandum was updated based on feedback received from the TAC, CAC, and general public. Moving forward with the development of the Urban Trail Master Plan, the deficiencies and gaps identified in this memorandum will be reviewed to identify potential solutions using the treatments contained in the toolbox attached to this memorandum (*Attachment D*).





Locations for Further Study  
Klamath Falls, Oregon

Figure  
7

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## REFERENCES

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2. *Physical Activity*. Healthy People 2020. U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. <http://www.healthypeople.gov/2020/topics-objectives/topic/physical-activity>. Last updated: April 23, 2015.
3. Guide to Community Preventive Services. *Environmental and policy approaches to increase physical activity: community-scale urban design land use policies*. <http://www.thecommunityguide.org/pa/environmental-policy/communitypolicies.html>. Last updated: January 14, 2015.
4. Healthy Klamath. *Klamath County Community Health Improvement Plan*. 2013.
5. Oregon Department of Transportation. *Analysis Procedures Manual, Version 2*. Last Updated: November 2014.
6. National Cooperative Highway Research Program (NCHRP) Report 562 *Improving Pedestrian Safety at Unsignalized Crossings*. Transportation Research Board, 2006.

Attachment A Crash Data

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION  
 TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT  
 CRASH SUMMARIES BY YEAR BY COLLISION TYPE

Pedestrian and/or Bicycle Involved Crashes In Klamath Falls City and Urban Area  
 January 1, 2009 through December 31, 2013

COLLISION TYPE	FATAL CRASHES	NON- FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER- SECTION	INTER- SECTION RELATED	OFF- ROAD
YEAR: 2013														
PEDESTRIAN	1	4	0	5	1	4	0	5	0	4	1	4	0	0
TURNING MOVEMENTS	0	2	0	2	0	2	0	2	0	2	0	2	0	0
2013 TOTAL	1	6	0	7	1	6	0	7	0	6	1	6	0	0
YEAR: 2012														
ANGLE	0	1	0	1	0	1	0	1	0	1	0	1	0	0
PEDESTRIAN	0	7	0	7	0	7	0	6	1	5	2	7	0	0
TURNING MOVEMENTS	0	4	0	4	0	4	0	4	0	4	0	4	0	0
2012 TOTAL	0	12	0	12	0	12	0	11	1	10	2	12	0	0
YEAR: 2011														
ANGLE	0	2	0	2	0	2	0	2	0	2	0	1	0	0
PEDESTRIAN	0	12	0	12	0	12	0	12	0	9	3	8	1	0
SIDESWIPE - MEETING	0	1	0	1	0	2	0	0	1	1	0	0	0	1
TURNING MOVEMENTS	0	2	0	2	0	2	0	1	1	2	0	1	0	0
2011 TOTAL	0	17	0	17	0	18	0	15	2	14	3	10	1	1
YEAR: 2010														
PEDESTRIAN	0	3	0	3	0	4	0	2	1	1	2	3	0	0
SIDESWIPE - OVERTAKING	0	1	0	1	0	1	0	1	0	1	0	0	0	0
TURNING MOVEMENTS	0	1	0	1	0	1	0	1	0	0	1	0	0	1
2010 TOTAL	0	5	0	5	0	6	0	4	1	2	3	3	0	1
YEAR: 2009														
ANGLE	0	5	0	5	0	5	0	5	0	4	1	1	0	0
PEDESTRIAN	0	6	0	6	0	6	0	4	2	4	2	4	0	0
TURNING MOVEMENTS	0	1	0	1	0	1	0	1	0	1	0	0	0	0
2009 TOTAL	0	12	0	12	0	12	0	10	2	9	3	5	0	0
FINAL TOTAL	1	52	0	53	1	54	0	47	6	41	12	36	1	2

*Disclaimer: A higher number of crashes may be reported as of 2011 compared to prior years. This does not reflect an increase in annual crashes. The higher numbers result from a change to an internal departmental process that allows the Crash Analysis and Reporting Unit to add previously unavailable, non-fatal crash reports to the annual data file. Please be aware of this change when comparing pre-2011 crash statistics.*























## ACTION CODE TRANSLATION LIST

ACTION CODE	SHORT DESCRIPTION	LONG DESCRIPTION
000	NONE	NO ACTION OR NON-WARRANTED
001	SKIDDED	SKIDDED
002	ON/OFF V	GETTING ON OR OFF STOPPED OR PARKED VEHICLE
003	LOAD OVR	OVERHANGING LOAD STRUCK ANOTHER VEHICLE, ETC.
006	SLOW DN	SLOWED DOWN
007	AVOIDING	AVOIDING MANEUVER
008	PAR PARK	PARALLEL PARKING
009	ANG PARK	ANGLE PARKING
010	INTERFERE	PASSENGER INTERFERING WITH DRIVER
011	STOPPED	STOPPED IN TRAFFIC NOT WAITING TO MAKE A LEFT TURN
012	STP/L TRN	STOPPED BECAUSE OF LEFT TURN SIGNAL OR WAITING, ETC.
013	STP TURN	STOPPED WHILE EXECUTING A TURN
015	GO A/STOP	PROCEED AFTER STOPPING FOR A STOP SIGN/FLASHING RED.
016	TRN A/RED	TURNED ON RED AFTER STOPPING
017	LOSTCTRL	LOST CONTROL OF VEHICLE
018	EXIT DWY	ENTERING STREET OR HIGHWAY FROM ALLEY OR DRIVEWAY
019	ENTR DWY	ENTERING ALLEY OR DRIVEWAY FROM STREET OR HIGHWAY
020	STR ENTR	BEFORE ENTERING ROADWAY, STRUCK PEDESTRIAN, ETC. ON SIDEWALK OR SHOULDER
021	NO DRVR	CAR RAN AWAY - NO DRIVER
022	PREV COL	STRUCK, OR WAS STRUCK BY, VEHICLE OR PEDESTRIAN IN PRIOR COLLISION BEFORE ACC. STABILIZED
023	STALLED	VEHICLE STALLED
024	DRVR DEAD	DEAD BY UNASSOCIATED CAUSE
025	FATIGUE	FATIGUED, SLEEPY, ASLEEP
026	SUN	DRIVER BLINDED BY SUN
027	HDLGHTS	DRIVER BLINDED BY HEADLIGHTS
028	ILLNESS	PHYSICALLY ILL
029	THRU MED	VEHICLE CROSSED, PLUNGED OVER, OR THROUGH MEDIAN BARRIER
030	PURSUIT	PURSUIING OR ATTEMPTING TO STOP A VEHICLE
031	PASSING	PASSING SITUATION
032	PRKOFFRD	VEHICLE PARKED BEYOND CURB OR SHOULDER
033	CROS MED	VEHICLE CROSSED EARTH OR GRASS MEDIAN
034	X N/SGNL	CROSSING AT INTERSECTION - NO TRAFFIC SIGNAL PRESENT
035	X W/ SGNL	CROSSING AT INTERSECTION - TRAFFIC SIGNAL PRESENT
036	DIAGONAL	CROSSING AT INTERSECTION - DIAGONALLY
037	BTWN INT	CROSSING BETWEEN INTERSECTIONS
038	DISTRACT	DRIVER'S ATTENTION DISTRACTED
039	W/TRAF-S	WALKING, RUNNING, RIDING, ETC., ON SHOULDER WITH TRAFFIC
040	A/TRAF-S	WALKING, RUNNING, RIDING, ETC., ON SHOULDER FACING TRAFFIC
041	W/TRAF-P	WALKING, RUNNING, RIDING, ETC., ON PAVEMENT WITH TRAFFIC
042	A/TRAF-P	WALKING, RUNNING, RIDING, ETC., ON PAVEMENT FACING TRAFFIC
043	PLAYINRD	PLAYING IN STREET OR ROAD
044	PUSH MV	PUSHING OR WORKING ON VEHICLE IN ROAD OR ON SHOULDER
045	WORK ON	WORKING IN ROADWAY OR ALONG SHOULDER
046	W/ TRAFIC	NON-MOTORIST WALKING, RUNNING, RIDING, ETC. WITH TRAFFIC
047	A/ TRAFIC	NON-MOTORIST WALKING, RUNNING, RIDING, ETC. FACING TRAFFIC
050	LAY ON RD	STANDING OR LYING IN ROADWAY
051	ENT OFFRD	ENTERING / STARTING IN TRAFFIC LANE FROM OFF ROAD
052	MERGING	MERGING
055	SPRAY	BLINDED BY WATER SPRAY
088	OTHER	OTHER ACTION

ACTION CODE TRANSLATION LIST

ACTION CODE	SHORT DESCRIPTION	LONG DESCRIPTION
099	UNK	UNKNOWN ACTION



CAUSE CODE TRANSLATION LIST

CAUSE CODE	SHORT DESCRIPTION	LONG DESCRIPTION
00	NO CODE	NO CAUSE ASSOCIATED AT THIS LEVEL
01	TOO-FAST	TOO FAST FOR CONDITIONS (NOT EXCEED POSTED SPEED)
02	NO-YIELD	DID NOT YIELD RIGHT-OF-WAY
03	PAS-STOP	PASSED STOP SIGN OR RED FLASHER
04	DIS SIG	DISREGARDED TRAFFIC SIGNAL
05	LEFT-CTR	DROVE LEFT OF CENTER ON TWO-WAY ROAD; STRADDLING
06	IMP-OVER	IMPROPER OVERTAKING
07	TOO-CLOS	FOLLOWED TOO CLOSELY
08	IMP-TURN	MADE IMPROPER TURN
09	DRINKING	ALCOHOL OR DRUG INVOLVED
10	OTHR-IMP	OTHER IMPROPER DRIVING
11	MECH-DEF	MECHANICAL DEFECT
12	OTHER	OTHER (NOT IMPROPER DRIVING)
13	IMP LN C	IMPROPER CHANGE OF TRAFFIC LANES
14	DIS TCD	DISREGARDED OTHER TRAFFIC CONTROL DEVICE
15	WRNG WAY	WRONG WAY ON ONE-WAY ROAD; WRONG SIDE DIVIDED RO
16	FATIGUE	DRIVER DROWSY/FATIGUED/SLEEPY
17	ILLNESS	PHYSICAL ILLNESS
18	IN RDWY	NON-MOTORIST ILLEGALLY IN ROADWAY
19	NT VISBL	NOT VISIBLE: DARK / NON-REFLECTIVE CLOTHING
20	IMP PKNG	VEHICLE IMPROPERLY PARKED
21	DEF STER	DEFECTIVE STEERING MECHANISM
22	DEF BRKE	INADEQUATE OR NO BRAKES
24	LOADSHFT	VEHICLE LOST LOAD OR LOAD SHIFTED
25	TIREFAIL	TIRE FAILURE
26	PHANTOM	PHANTOM / NON-CONTACT VEHICLE
27	INATTENT	INATTENTION
28	NM INATT	NON-MOTORIST INATTENTION
29	F AVOID	FAILED TO AVOID VEHICLE AHEAD
30	SPEED	DRIVING IN EXCESS OF POSTED SPEED
31	RACING	SPEED RACING (PER PAR)
32	CARELESS	CARELESS DRIVING (PER PAR)
33	RECKLESS	RECKLESS DRIVING (PER PAR)
34	AGGRESV	AGGRESSIVE DRIVING (PER PAR)
35	RD RAGE	ROAD RAGE (PER PAR)
40	VIEW OBS	VIEW OBSCURED
50	USED MDN	IMPROPER USE OF MEDIAN OR SHOULDER

COLLISION TYPE CODE TRANSLATION LIST

COLL CODE	SHORT DESCRIPTION	LONG DESCRIPTION
&	OTH	MISCELLANEOUS
-	BACK	BACKING
0	PED	PEDESTRIAN
1	ANGL	ANGLE
2	HEAD	HEAD-ON
3	REAR	REAR-END
4	SS-M	SIDESWIPE - MEETING
5	SS-O	SIDESWIPE - OVERTAKING
6	TURN	TURNING MOVEMENT
7	PARK	PARKING MANEUVER
8	NCOL	NON-COLLISION
9	FIX	FIXED OBJECT OR OTHER OBJECT

CRASH TYPE CODE TRANSLATION LIST

CRASH TYPE	SHORT DESCRIPTION	LONG DESCRIPTION
&	OVERTURN	OVERTURNED
0	NON-COLL	OTHER NON-COLLISION
1	OTH RDWY	MOTOR VEHICLE ON OTHER ROADWAY
2	PRKD MV	PARKED MOTOR VEHICLE
3	PED	PEDESTRIAN
4	TRAIN	RAILWAY TRAIN
6	BIKE	PEDALCYCLIST
7	ANIMAL	ANIMAL
8	FIX OBJ	FIXED OBJECT
9	OTH OBJ	OTHER OBJECT
A	ANGL-STP	ENTERING AT ANGLE - ONE VEHICLE STOPPED
B	ANGL-OTH	ENTERING AT ANGLE - ALL OTHERS
C	S-STRGHT	FROM SAME DIRECTION - BOTH GOING STRAIGHT
D	S-1TURN	FROM SAME DIRECTION - ONE TURN, ONE STRAIGHT
E	S-1STOP	FROM SAME DIRECTION - ONE STOPPED
F	S-OTHER	FROM SAME DIRECTION-ALL OTHERS, INCLUDING PARKING
G	O-STRGHT	FROM OPPOSITE DIRECTION - BOTH GOING STRAIGHT
H	O-1TURN	FROM OPPOSITE DIRECTION - ONE TURN, ONE STRAIGHT
I	O-1STOP	FROM OPPOSITE DIRECTION - ONE STOPPED
J	O-OTHER	FROM OPPOSITE DIRECTION-ALL OTHERS INCL. PARKING

## DRIVER LICENSE CODE TRANSLATION LIST

LIC CODE	SHORT DESC	LONG DESCRIPTION
0	NONE	NOT LICENSED (HAD NEVER BEEN LICENSED)
1	OR-Y	VALID OREGON LICENSE
2	OTH-Y	VALID LICENSE, OTHER STATE OR COUNTRY
3	SUSP	SUSPENDED/REVOKED

## DRIVER RESIDENCE CODE TRANSLATION LIST

RES CODE	SHORT DESC	LONG DESCRIPTION
1	OR<25	OREGON RESIDENT WITHIN 25 MILE OF HOME
2	OR>25	OREGON RESIDENT 25 OR MORE MILES FROM HOME
3	OR-?	OREGON RESIDENT - UNKNOWN DISTANCE FROM HOME
4	N-RES	NON-RESIDENT
9	UNK	UNKNOWN IF OREGON RESIDENT

## ERROR CODE TRANSLATION LIST

ERROR CODE	SHORT DESCRIPTION	FULL DESCRIPTION
000	NONE	NO ERROR
001	WIDE TRN	WIDE TURN
002	CUT CORN	CUT CORNER ON TURN
003	FAIL TRN	FAILED TO OBEY MANDATORY TRAFFIC TURN SIGNAL, SIGN OR LANE MARKINGS
004	L IN TRF	LEFT TURN IN FRONT OF ONCOMING TRAFFIC
005	L PROHIB	LEFT TURN WHERE PROHIBITED
006	FRM WRNG	TURNED FROM WRONG LANE
007	TO WRONG	TURNED INTO WRONG LANE
008	ILLEG U	U-TURNED ILLEGALLY
009	IMP STOP	IMPROPERLY STOPPED IN TRAFFIC LANE
010	IMP SIG	IMPROPER SIGNAL OR FAILURE TO SIGNAL
011	IMP BACK	BACKING IMPROPERLY (NOT PARKING)
012	IMP PARK	IMPROPERLY PARKED
013	UNPARK	IMPROPER START LEAVING PARKED POSITION
014	IMP STRT	IMPROPER START FROM STOPPED POSITION
015	IMP LGHT	IMPROPER OR NO LIGHTS (VEHICLE IN TRAFFIC)
016	INATTENT	INATTENTION (FAILURE TO DIM LIGHTS PRIOR TO 4/1/97)
017	UNSF VEH	DRIVING UNSAFE VEHICLE (NO OTHER ERROR APPARENT)
018	OTH PARK	ENTERING/EXITING PARKED POSITION W/ INSUFFICIENT CLEARANCE; OTHER IMPROPER PARKING MANEUVER
019	DIS DRIV	DISREGARDED OTHER DRIVER'S SIGNAL
020	DIS SGNL	DISREGARDED TRAFFIC SIGNAL
021	RAN STOP	DISREGARDED STOP SIGN OR FLASHING RED
022	DIS SIGN	DISREGARDED WARNING SIGN, FLARES OR FLASHING AMBER
023	DIS OFCR	DISREGARDED POLICE OFFICER OR FLAGMAN
024	DIS EMER	DISREGARDED SIREN OR WARNING OF EMERGENCY VEHICLE
025	DIS RR	DISREGARDED RR SIGNAL, RR SIGN, OR RR FLAGMAN
026	REAR-END	FAILED TO AVOID STOPPED OR PARKED VEHICLE AHEAD OTHER THAN SCHOOL BUS
027	BIKE ROW	DID NOT HAVE RIGHT-OF-WAY OVER PEDALCYCLIST
028	NO ROW	DID NOT HAVE RIGHT-OF-WAY
029	PED ROW	FAILED TO YIELD RIGHT-OF-WAY TO PEDESTRIAN
030	PAS CURV	PASSING ON A CURVE
031	PAS WRNG	PASSING ON THE WRONG SIDE
032	PAS TANG	PASSING ON STRAIGHT ROAD UNDER UNSAFE CONDITIONS
033	PAS X-WK	PASSED VEHICLE STOPPED AT CROSSWALK FOR PEDESTRIAN
034	PAS INTR	PASSING AT INTERSECTION
035	PAS HILL	PASSING ON CREST OF HILL
036	N/PAS ZN	PASSING IN "NO PASSING" ZONE
037	PAS TRAF	PASSING IN FRONT OF ONCOMING TRAFFIC
038	CUT-IN	CUTTING IN (TWO LANES - TWO WAY ONLY)
039	WRNGSIDE	DRIVING ON WRONG SIDE OF THE ROAD (2-WAY UNDIVIDED ROADWAYS)
040	THRU MED	DRIVING THROUGH SAFETY ZONE OR OVER ISLAND
041	F/ST BUS	FAILED TO STOP FOR SCHOOL BUS

ERROR CODE TRANSLATION LIST

ERROR CODE	SHORT DESCRIPTION	FULL DESCRIPTION
042	F/SLO MV	FAILED TO DECREASE SPEED FOR SLOWER MOVING VEHICLE
043	TO CLOSE	FOLLOWING TOO CLOSELY (MUST BE ON OFFICER'S REPORT)
044	STRDL LN	STRADDLING OR DRIVING ON WRONG LANES
045	IMP CHG	IMPROPER CHANGE OF TRAFFIC LANES
046	WRNG WAY	WRONG WAY ON ONE-WAY ROADWAY; WRONG SIDE DIVIDED ROAD
047	BASCRULE	DRIVING TOO FAST FOR CONDITIONS (NOT EXCEEDING POSTED SPEED)
048	OPN DOOR	OPENED DOOR INTO ADJACENT TRAFFIC LANE
049	IMPEDING	IMPEDING TRAFFIC
050	SPEED	DRIVING IN EXCESS OF POSTED SPEED
051	RECKLESS	RECKLESS DRIVING (PER PAR)
052	CARELESS	CARELESS DRIVING (PER PAR)
053	RACING	SPEED RACING (PER PAR)
054	X N/SGNL	CROSSING AT INTERSECTION, NO TRAFFIC SIGNAL PRESENT
055	X W/SGNL	CROSSING AT INTERSECTION, TRAFFIC SIGNAL PRESENT
056	DIAGONAL	CROSSING AT INTERSECTION - DIAGONALLY
057	BTWN INT	CROSSING BETWEEN INTERSECTIONS
059	W/TRAF-S	WALKING, RUNNING, RIDING, ETC., ON SHOULDER WITH TRAFFIC
060	A/TRAF-S	WALKING, RUNNING, RIDING, ETC., ON SHOULDER FACING TRAFFIC
061	W/TRAF-P	WALKING, RUNNING, RIDING, ETC., ON PAVEMENT WITH TRAFFIC
062	A/TRAF-P	WALKING, RUNNING, RIDING, ETC., ON PAVEMENT FACING TRAFFIC
063	PLAYINRD	PLAYING IN STREET OR ROAD
064	PUSH MV	PUSHING OR WORKING ON VEHICLE IN ROAD OR ON SHOULDER
065	WK IN RD	WORKING IN ROADWAY OR ALONG SHOULDER
070	LAYON RD	STANDING OR LYING IN ROADWAY
071	NM IMP USE	IMPROPER USE OF TRAFFIC LANE BY NON-MOTORIST
073	ELUDING	ELUDING / ATTEMPT TO ELUDE
079	F NEG CURV	FAILED TO NEGOTIATE A CURVE
080	FAIL LN	FAILED TO MAINTAIN LANE
081	OFF RD	RAN OFF ROAD
082	NO CLEAR	DRIVER MISJUDGED CLEARANCE
083	OVRSTEER	OVER-CORRECTING
084	NOT USED	CODE NOT IN USE
085	OVRLOAD	OVERLOADING OR IMPROPER LOADING OF VEHICLE WITH CARGO OR PASSENGERS
097	UNA DIS TC	UNABLE TO DETERMINE WHICH DRIVER DISREGARDED TRAFFIC CONTROL DEVICE

## EVENT CODE TRANSLATION LIST

EVENT CODE	SHORT DESCRIPTION	LONG DESCRIPTION
001	FEL/JUMP	OCCUPANT FELL, JUMPED OR WAS EJECTED FROM MOVING VEHICLE
002	INTERFER	PASSENGER INTERFERED WITH DRIVER
003	BUG INTF	ANIMAL OR INSECT IN VEHICLE INTERFERED WITH DRIVER
004	INDRCT PED	PEDESTRIAN INDIRECTLY INVOLVED (NOT STRUCK)
005	SUB-PED	"SUB-PED": PEDESTRIAN INJURED SUBSEQUENT TO COLLISION, ETC.
006	INDRCT BIK	PEDALCYCLIST INDIRECTLY INVOLVED (NOT STRUCK)
007	HITCHIKR	HITCHHIKER (SOLICITING A RIDE)
008	PSNGR TOW	PASSENGER OR NON-MOTORIST BEING TOWED OR PUSHED ON CONVEYANCE
009	ON/OFF V	GETTING ON/OFF STOPPED/PARKED VEHICLE (OCCUPANTS ONLY; MUST HAVE PHYSICAL CONTACT W/ VEHIC
010	SUB OTRN	OVERTURNED AFTER FIRST HARMFUL EVENT
011	MV PUSHD	VEHICLE BEING PUSHED
012	MV TOWED	VEHICLE TOWED OR HAD BEEN TOWING ANOTHER VEHICLE
013	FORCED	VEHICLE FORCED BY IMPACT INTO ANOTHER VEHICLE, PEDALCYCLIST OR PEDESTRIAN
014	SET MOTN	VEHICLE SET IN MOTION BY NON-DRIVER (CHILD RELEASED BRAKES, ETC.)
015	RR ROW	AT OR ON RAILROAD RIGHT-OF-WAY (NOT LIGHT RAIL)
016	LT RL ROW	AT OR ON LIGHT-RAIL RIGHT-OF-WAY
017	RR HIT V	TRAIN STRUCK VEHICLE
018	V HIT RR	VEHICLE STRUCK TRAIN
019	HIT RR CAR	VEHICLE STRUCK RAILROAD CAR ON ROADWAY
020	JACKNIFE	JACKKNIFE; TRAILER OR TOWED VEHICLE STRUCK TOWING VEHICLE
021	TRL OTRN	TRAILER OR TOWED VEHICLE OVERTURNED
022	CN BROKE	TRAILER CONNECTION BROKE
023	DETACH TRL	DETACHED TRAILING OBJECT STRUCK OTHER VEHICLE, NON-MOTORIST, OR OBJECT
024	V DOOR OPN	VEHICLE DOOR OPENED INTO ADJACENT TRAFFIC LANE
025	WHEELOFF	WHEEL CAME OFF
026	HOOD UP	HOOD FLEW UP
028	LOAD SHIFT	LOST LOAD, LOAD MOVED OR SHIFTED
029	TIREFAIL	TIRE FAILURE
030	PET	PET: CAT, DOG AND SIMILAR
031	LVSTOCK	STOCK: COW, CALF, BULL, STEER, SHEEP, ETC.
032	HORSE	HORSE, MULE, OR DONKEY
033	HRSE&RID	HORSE AND RIDER
034	GAME	WILD ANIMAL, GAME (INCLUDES BIRDS; NOT DEER OR ELK)
035	DEER ELK	DEER OR ELK, WAPITI
036	ANML VEH	ANIMAL-DRAWN VEHICLE
037	CULVERT	CULVERT, OPEN LOW OR HIGH MANHOLE
038	ATENUATN	IMPACT ATTENUATOR
039	PK METER	PARKING METER
040	CURB	CURB (ALSO NARROW SIDEWALKS ON BRIDGES)
041	JIGGLE	JIGGLE BAR OR TRAFFIC SNAKE FOR CHANNELIZATION
042	GDRL END	LEADING EDGE OF GUARDRAIL
043	GARDRAIL	GUARD RAIL (NOT METAL MEDIAN BARRIER)
044	BARRIER	MEDIAN BARRIER (RAISED OR METAL)
045	WALL	RETAINING WALL OR TUNNEL WALL
046	BR RAIL	BRIDGE RAILING OR PARAPET (ON BRIDGE OR APPROACH)
047	BR ABUTMNT	BRIDGE ABUTMENT (INCLUDED "APPROACH END" THRU 2013)
048	BR COLMN	BRIDGE PILLAR OR COLUMN
049	BR GIRDR	BRIDGE GIRDER (HORIZONTAL BRIDGE STRUCTURE OVERHEAD)
050	ISLAND	TRAFFIC RAISED ISLAND
051	GORE	GORE
052	POLE UNK	POLE - TYPE UNKNOWN
053	POLE UTL	POLE - POWER OR TELEPHONE
054	ST LIGHT	POLE - STREET LIGHT ONLY
055	TRF SGNL	POLE - TRAFFIC SIGNAL AND PED SIGNAL ONLY
056	SGN BRDG	POLE - SIGN BRIDGE
057	STOPSIGN	STOP OR YIELD SIGN
058	OTH SIGN	OTHER SIGN, INCLUDING STREET SIGNS
059	HYDRANT	HYDRANT

## EVENT CODE TRANSLATION LIST

EVENT CODE	SHORT DESCRIPTION	LONG DESCRIPTION
060	MARKER	DELINEATOR OR MARKER (REFLECTOR POSTS)
061	MAILBOX	MAILBOX
062	TREE	TREE, STUMP OR SHRUBS
063	VEG OHED	TREE BRANCH OR OTHER VEGETATION OVERHEAD, ETC.
064	WIRE/CBL	WIRE OR CABLE ACROSS OR OVER THE ROAD
065	TEMP SGN	TEMPORARY SIGN OR BARRICADE IN ROAD, ETC.
066	PERM SGN	PERMANENT SIGN OR BARRICADE IN/OFF ROAD
067	SLIDE	SLIDES, FALLEN OR FALLING ROCKS
068	FRGN OBJ	FOREIGN OBSTRUCTION/DEBRIS IN ROAD (NOT GRAVEL)
069	EQP WORK	EQUIPMENT WORKING IN/OFF ROAD
070	OTH EQP	OTHER EQUIPMENT IN OR OFF ROAD (INCLUDES PARKED TRAILER, BOAT)
071	MAIN EQP	WRECKER, STREET SWEEPER, SNOW PLOW OR SANDING EQUIPMENT
072	OTHER WALL	ROCK, BRICK OR OTHER SOLID WALL
073	IRRL PVMT	OTHER BUMP (NOT SPEED BUMP), POTHOLE OR PAVEMENT IRREGULARITY (PER PAR)
074	OVERHD OBJ	OTHER OVERHEAD OBJECT (HIGHWAY SIGN, SIGNAL HEAD, ETC.); NOT BRIDGE
075	CAVE IN	BRIDGE OR ROAD CAVE IN
076	HI WATER	HIGH WATER
077	SNO BANK	SNOW BANK
078	LO-HI EDGE	LOW OR HIGH SHOULDER AT PAVEMENT EDGE
079	DITCH	CUT SLOPE OR DITCH EMBANKMENT
080	OBJ FRM MV	STRUCK BY ROCK OR OTHER OBJECT SET IN MOTION BY OTHER VEHICLE (INCL. LOST LOADS)
081	FLY-OBJ	STRUCK BY ROCK OR OTHER MOVING OR FLYING OBJECT (NOT SET IN MOTION BY VEHICLE)
082	VEH HID	VEHICLE OBSCURED VIEW
083	VEG HID	VEGETATION OBSCURED VIEW
084	BLDG HID	VIEW OBSCURED BY FENCE, SIGN, PHONE BOOTH, ETC.
085	WIND GUST	WIND GUST
086	IMMERSED	VEHICLE IMMERSED IN BODY OF WATER
087	FIRE/EXP	FIRE OR EXPLOSION
088	FENC/BLD	FENCE OR BUILDING, ETC.
089	OTHR CRASH	CRASH RELATED TO ANOTHER SEPARATE CRASH
090	TO 1 SIDE	TWO-WAY TRAFFIC ON DIVIDED ROADWAY ALL ROUTED TO ONE SIDE
091	BUILDING	BUILDING OR OTHER STRUCTURE
092	PHANTOM	OTHER (PHANTOM) NON-CONTACT VEHICLE
093	CELL PHONE	CELL PHONE (ON PAR OR DRIVER IN USE)
094	VIOL GDL	TEENAGE DRIVER IN VIOLATION OF GRADUATED LICENSE PGM
095	GUY WIRE	GUY WIRE
096	BERM	BERM (EARTHEN OR GRAVEL MOUND)
097	GRAVEL	GRAVEL IN ROADWAY
098	ABR EDGE	ABRUPT EDGE
099	CELL WTNSD	CELL PHONE USE WITNESSED BY OTHER PARTICIPANT
100	UNK FIXD	FIXED OBJECT, UNKNOWN TYPE.
101	OTHER OBJ	NON-FIXED OBJECT, OTHER OR UNKNOWN TYPE
102	TEXTING	TEXTING
103	WZ WORKER	WORK ZONE WORKER
104	ON VEHICLE	PASSENGER RIDING ON VEHICLE EXTERIOR
105	PEDAL PSGR	PASSENGER RIDING ON PEDALCYCLE
106	MAN WHLCHR	PEDESTRIAN IN NON-MOTORIZED WHEELCHAIR
107	MTR WHLCHR	PEDESTRIAN IN MOTORIZED WHEELCHAIR
108	OFFICER	LAW ENFORCEMENT / POLICE OFFICER
109	SUB-BIKE	"SUB-BIKE": PEDALCYCLIST INJURED SUBSEQUENT TO COLLISION, ETC.
110	N-MTR	NON-MOTORIST STRUCK VEHICLE
111	S CAR VS V	STREET CAR/TROLLEY (ON RAILS OR OVERHEAD WIRE SYSTEM) STRUCK VEHICLE
112	V VS S CAR	VEHICLE STRUCK STREET CAR/TROLLEY (ON RAILS OR OVERHEAD WIRE SYSTEM)
113	S CAR ROW	AT OR ON STREET CAR OR TROLLEY RIGHT-OF-WAY
114	RR EQUIP	VEHICLE STRUCK RAILROAD EQUIPMENT (NOT TRAIN) ON TRACKS
115	DSTRCT GPS	DISTRACTED BY NAVIGATION SYSTEM OR GPS DEVICE
116	DSTRCT OTH	DISTRACTED BY OTHER ELECTRONIC DEVICE
117	RR GATE	RAIL CROSSING DROP-ARM GATE

## EVENT CODE TRANSLATION LIST

EVENT CODE	SHORT DESCRIPTION	LONG DESCRIPTION
118	EXPNSN JNT	EXPANSION JOINT
119	JERSEY BAR	JERSEY BARRIER
120	WIRE BAR	WIRE OR CABLE MEDIAN BARRIER
121	FENCE	FENCE
123	OBJ IN VEH	LOOSE OBJECT IN VEHICLE STRUCK OCCUPANT
124	SLIPPERY	SLIDING OR SWERVING DUE TO WET, ICY, SLIPPERY OR LOOSE SURFACE (NOT GRAVEL)
125	SHLDR	SHOULDER GAVE WAY
126	BOULDER	ROCK(S), BOULDER (NOT GRAVEL; NOT ROCK SLIDE)
127	LAND SLIDE	ROCK SLIDE OR LAND SLIDE
128	CURVE INV	CURVE PRESENT AT CRASH LOCATION
129	HILL INV	VERTICAL GRADE / HILL PRESENT AT CRASH LOCATION
130	CURVE HID	VIEW OBSCURED BY CURVE
131	HILL HID	VIEW OBSCURED BY VERTICAL GRADE / HILL
132	WINDOW HID	VIEW OBSCURED BY VEHICLE WINDOW CONDITIONS
133	SPRAY HID	VIEW OBSCURED BY WATER SPRAY

FUNCTIONAL CLASSIFICATION TRANSLATION LIST

FUNC CLASS	DESCRIPTION
01	RURAL PRINCIPAL ARTERIAL - INTERSTATE
02	RURAL PRINCIPAL ARTERIAL - OTHER
06	RURAL MINOR ARTERIAL
07	RURAL MAJOR COLLECTOR
08	RURAL MINOR COLLECTOR
09	RURAL LOCAL
11	URBAN PRINCIPAL ARTERIAL - INTERSTATE
12	URBAN PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXP
14	URBAN PRINCIPAL ARTERIAL - OTHER
16	URBAN MINOR ARTERIAL
17	URBAN COLLECTOR
19	URBAN LOCAL
78	UNKNOWN RURAL SYSTEM
79	UNKNOWN RURAL NON-SYSTEM
98	UNKNOWN URBAN SYSTEM
99	UNKNOWN URBAN NON-SYSTEM

HIGHWAY COMPONENT TRANSLATION LIST

CODE	DESCRIPTION
0	MAINLINE STATE HIGHWAY
1	COUPLET
3	FRONTAGE ROAD
6	CONNECTION
8	HIGHWAY - OTHER

INJURY SEVERITY CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
1	KILL	FATAL INJURY
2	INJA	INCAPACITATING INJURY - BLEEDING, BROKEN BONES
3	INJB	NON-INCAPACITATING INJURY
4	INJC	POSSIBLE INJURY - COMPLAINT OF PAIN
5	PRI	DIED PRIOR TO CRASH
7	NO<5	NO INJURY - 0 TO 4 YEARS OF AGE

LIGHT CONDITION CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	UNK	UNKNOWN
1	DAY	DAYLIGHT
2	DLIT	DARKNESS - WITH STREET LIGHTS
3	DARK	DARKNESS - NO STREET LIGHTS
4	DAWN	DAWN (TWILIGHT)
5	DUSK	DUSK (TWILIGHT)

MEDIAN TYPE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	NONE	NO MEDIAN
1	RSDMD	SOLID MEDIAN BARRIER
2	DIVMD	EARTH, GRASS OR PAVED MEDIAN

MILEAGE TYPE CODE TRANSLATION LIST

CODE	LONG DESCRIPTION
0	REGULAR MILEAGE
T	TEMPORARY
Y	SPUR
Z	OVERLAPPING

**MOVEMENT TYPE CODE TRANSLATION LIST**

CODE	SHORT DESC	LONG DESCRIPTION
0	UNK	UNKNOWN
1	STRGHT	STRAIGHT AHEAD
2	TURN-R	TURNING RIGHT
3	TURN-L	TURNING LEFT
4	U-TURN	MAKING A U-TURN
5	BACK	BACKING
6	STOP	STOPPED IN TRAFFIC
7	PRKD-P	PARKED - PROPERLY
8	PRKD-I	PARKED - IMPROPERLY

**PARTICIPANT TYPE CODE TRANSLATION LIST**

CODE	SHORT DESC	LONG DESCRIPTION
0	OCC	UNKNOWN OCCUPANT TYPE
1	DRVR	DRIVER
2	PSNG	PASSENGER
3	PED	PEDESTRIAN
4	CONV	PEDESTRIAN USING A PEDESTRIAN CONVEYANCE
5	PTOW	PEDESTRIAN TOWING OR TRAILERING AN OBJECT
6	BIKE	PEDALCYCLIST
7	BTOW	PEDALCYCLIST TOWING OR TRAILERING AN OBJECT
8	PRKD	OCCUPANT OF A PARKED MOTOR VEHICLE
9	UNK	UNKNOWN TYPE OF NON-MOTORIST

**PEDESTRIAN LOCATION CODE TRANSLATION LIST**

CODE	LONG DESCRIPTION
00	AT INTERSECTION - NOT IN ROADWAY
01	AT INTERSECTION - INSIDE CROSSWALK
02	AT INTERSECTION - IN ROADWAY, OUTSIDE CROSSWALK
03	AT INTERSECTION - IN ROADWAY, XWALK AVAIL UNKNWN
04	NOT AT INTERSECTION - IN ROADWAY
05	NOT AT INTERSECTION - ON SHOULDER
06	NOT AT INTERSECTION - ON MEDIAN
07	NOT AT INTERSECTION - WITHIN TRAFFIC RIGHT-OF-WAY
08	NOT AT INTERSECTION - IN BIKE PATH
09	NOT-AT INTERSECTION - ON SIDEWALK
10	OUTSIDE TRAFFICWAY BOUNDARIES
13	AT INTERSECTION - IN BIKE LANE
15	NOT AT INTERSECTION - INSIDE MID-BLOCK CROSSWALK
18	OTHER, NOT IN ROADWAY
99	UNKNOWN LOCATION

**TRAFFIC CONTROL DEVICE CODE TRANSLATION LIST**

CODE	SHORT DESC	LONG DESCRIPTION
000	NONE	NO CONTROL
001	TRF SIGNAL	TRAFFIC SIGNALS
002	FLASHBCN-R	FLASHING BEACON - RED (STOP)
003	FLASHBCN-A	FLASHING BEACON - AMBER (SLOW)
004	STOP SIGN	STOP SIGN
005	SLOW SIGN	SLOW SIGN
006	REG-SIGN	REGULATORY SIGN
007	YIELD	YIELD SIGN
008	WARNING	WARNING SIGN
009	CURVE	CURVE SIGN
010	SCHL X-ING	SCHOOL CROSSING SIGN OR SPECIAL SIGNAL
011	OFCR/FLAG	POLICE OFFICER, FLAGMAN - SCHOOL PATROL
012	BRDG-GATE	BRIDGE GATE - BARRIER
013	TEMP-BARR	TEMPORARY BARRIER
014	NO-PASS-ZN	NO PASSING ZONE
015	ONE-WAY	ONE-WAY STREET
016	CHANNEL	CHANNELIZATION
017	MEDIAN BAR	MEDIAN BARRIER
018	PILOT CAR	PILOT CAR
019	SP PED SIG	SPECIAL PEDESTRIAN SIGNAL
020	X-BUCK	CROSSBUCK
021	THR-GN-SIG	THROUGH GREEN ARROW OR SIGNAL
022	L-GRN-SIG	LEFT TURN GREEN ARROW, LANE MARKINGS, OR SIGNAL
023	R-GRN-SIG	RIGHT TURN GREEN ARROW, LANE MARKINGS, OR SIGNAL
024	WIGWAG	WIGWAG OR FLASHING LIGHTS W/O DROP-ARM GATE
025	X-BUCK WRN	CROSSBUCK AND ADVANCE WARNING
026	WW W/ GATE	FLASHING LIGHTS WITH DROP-ARM GATES
027	OVRHD SGNL	SUPPLEMENTAL OVERHEAD SIGNAL (RR XING ONLY)
028	SP RR STOP	SPECIAL RR STOP SIGN
029	ILLUM GRD X	ILLUMINATED GRADE CROSSING
037	RAMP METER	METERED RAMPS
038	RUMBLE STR	RUMBLE STRIP
090	L-TURN REF	LEFT TURN REFUGE (WHEN REFUGE IS INVOLVED)
091	R-TURN ALL	RIGHT TURN AT ALL TIMES SIGN, ETC.
092	EMR SGN/FL	EMERGENCY SIGNS OR FLARES
093	ACCEL LANE	ACCELERATION OR DECELERATION LANES
094	R-TURN PRO	RIGHT TURN PROHIBITED ON RED AFTER STOPPING

**ROAD CHARACTER CODE TRANSLATION LIST**

CODE	SHORT DESC	LONG DESCRIPTION
0	UNK	UNKNOWN
1	INTER	INTERSECTION
2	ALLEY	DRIVEWAY OR ALLEY
3	STRGHT	STRAIGHT ROADWAY
4	TRANS	TRANSITION
5	CURVE	CURVE (HORIZONTAL CURVE)
6	OPENAC	OPEN ACCESS OR TURNOUT
7	GRADE	GRADE (VERTICAL CURVE)
8	BRIDGE	BRIDGE STRUCTURE
9	TUNNEL	TUNNEL



095	BUS STPSGN	BUS STOP SIGN AND RED LIGHTS
099	UNKNOWN	UNKNOWN OR NOT DEFINITE

**VEHICLE TYPE CODE TRANSLATION LIST**

<b>CODE</b>	<b>SHORT DESC</b>	<b>LONG DESCRIPTION</b>
01	PSNGR CAR	PASSENGER CAR, PICKUP, LIGHT DELIVERY, ETC.
02	BOBTAIL	TRUCK TRACTOR WITH NO TRAILERS (BOBTAIL)
03	FARM TRCTR	FARM TRACTOR OR SELF-PROPELLED FARM EQUIPMENT
04	SEMI TOW	TRUCK TRACTOR WITH TRAILER/MOBILE HOME IN TOW
05	TRUCK	TRUCK WITH NON-DETACHABLE BED, PANEL, ETC.
06	MOPED	MOPED, MINIBIKE, SEATED MOTOR SCOOTER, MOTOR BIKE
07	SCHL BUS	SCHOOL BUS (INCLUDES VAN)
08	OTH BUS	OTHER BUS
09	MTRCYCLE	MOTORCYCLE, DIRT BIKE
10	OTHER	OTHER: FORKLIFT, BACKHOE, ETC.
11	MOTRHOME	MOTORHOME
12	TROLLEY	MOTORIZED STREET CAR/TROLLEY (NO RAILS/WIRES)
13	ATV	ATV
14	MTRSCTR	MOTORIZED SCOOTER (STANDING)
15	SNOWMOBILE	SNOWMOBILE
99	UNKNOWN	UNKNOWN VEHICLE TYPE

**WEATHER CONDITION CODE TRANSLATION LIST**

<b>CODE</b>	<b>SHORT DESC</b>	<b>LONG DESCRIPTION</b>
0	UNK	UNKNOWN
1	CLR	CLEAR
2	CLD	CLOUDY
3	RAIN	RAIN
4	SLT	SLEET
5	FOG	FOG
6	SNOW	SNOW
7	DUST	DUST
8	SMOK	SMOKE
9	ASH	ASH

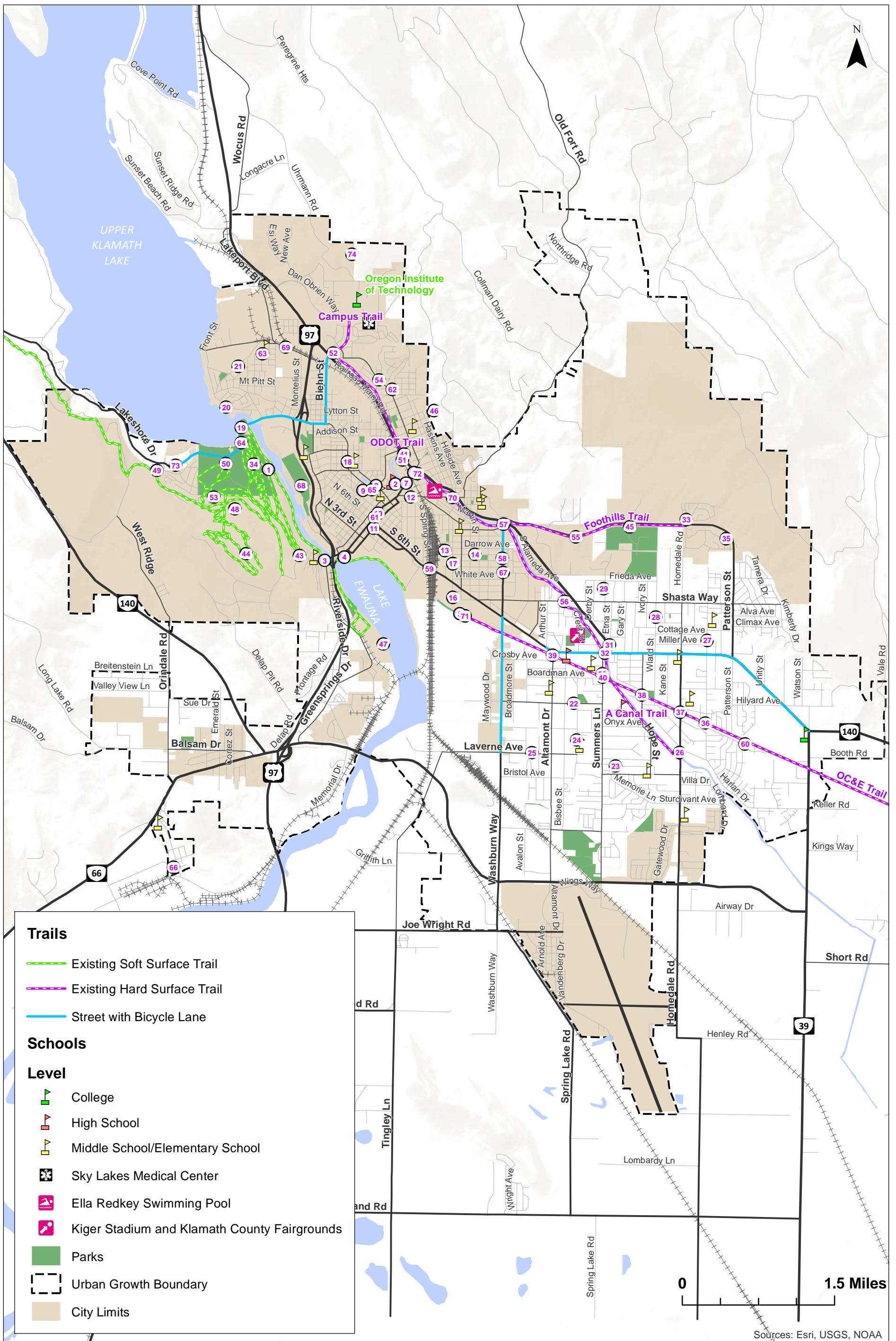
**Attachment B Tables Summarizing Locations of Future Needs**

Summary of Gaps and Deficiencies	
Segments with Level of Traffic Stress (LTS) Above 2	
L-1	OR 39 (OC&E Trail to OR 140)
L-2	6th Street (Market Street to OR 39)
L-3	Shasta Way (Patterson Street to Kimberly Drive)
L-4	Shasta Way (Patterson Street to Crater Lake Parkway)
L-5	Patterson Street (6th Street to Foothills Boulevard)
L-6	Homedale Road (OR 140 to Shasta Way)
L-7	Summers Lane (OR 140 to SW 6th Street)
L-8	Altamont Drive (OR 140 to OC&E Trail)
L-9	Washburn Way (Crosby Avenue to OR 140)
L-10	Washburn Way (OC&E Trail to Crosby Avenue)
L-11	Washburn Way (Eberlein Avenue to OC&E Trail)
L-12	OR 140 (Washburn Way to Homedale Road)
L-13	6th Street (Market Street to Main Street)
L-14	5th Street (Main Street to 6th Street)
L-15	Klamath Avenue (Conger Avenue to Commercial Street)
L-16	Main Street (Esplanade Avenue to Mill Street)
L-17	9th Street (Klamath Avenue to Prospect Street)
L-18	N 11th Street (Oregon Avenue to Klamath Avenue)
L-19	Oregon Avenue-Nevada Street-Lakeshore Drive (Moore Park to Upham Street)
L-20	Lakeshore Drive (Lynnewood Blvd to West UGB)
L-21	Crater Lake Highway (Main Street to Portland Street)
L-22	Main Street (Esplanade Avenue to Crater Lake Parkway)
L-23	Old Fort Road (Loma Linda Drive to UGB)
L-24	Biehn Street (Crater Lake Parkway to Oregon Avenue)*
Sidewalk Gaps	
S-1	OR 39 between the OC&E Trail and Keller Road
S-2	Hope Street between Bristol Avenue and SW 6th Street
Summary of Trail Crossing Locations	
C-1	OC&E Trail Crossing of OR 39
C-2	OC&E Trail Crossing of Homedale Road
C-3	OC&E Trail Crossing of Hope Street
C-4	OC&E Trail Crossing of Summers Lane
C-5	OC&E Trail Crossing of Altamont Drive
C-7	A Canal Trail Crossing of Homedale Road
C-8	A Canal Trail Crossing of Hope Street
C-10	A Canal Trail Crossing of Shasta Way
C-11	A Canal Trail Crossing of Eberlein Avenue
C-12	A Canal Trail Crossing of Washburn Way
C-13	A Canal Trail Crossing of Main Street
C-14	A Canal Trail Crossing of Esplanade Avenue
Other System Gaps & Deficiencies	
G-1	OC&E Trail Connection to Downtown Klamath Falls
G-2	Connecting the "A" Canal Trail to the ODOT Trail
G-3	Connecting the "A" Canal Trail to the Foothills Trail
G-4	Connecting the "A" Canal Trail to the Ella Redkey Swimming Pool
G-5	Connecting the "A" Canal Trail to the Kiger Stadium and Klamath County Fairgrounds
G-6	Campus Trail to Biehn Street Connection
G-7	Connecting the ODOT Trail to Kit Carson Park
G-8	Veteran's Park Trail Connections
G-9	"A" Canal Trail Crossing at SW 6 <sup>th</sup> Street
G-10	Trail Signing/Wayfinding
G-11	Bicycle Parking

\*Biehn Street's calculated LTS rating was a 2. However, public comments indicated that the bike lane is narrow and vehicle speeds feel fast on this road.

Grey boxes indicate a project that is currently scheduled to be designed and completed by ODOT.

## Attachment C Results of Virtual Workshop



H:\projects\18974 - Klamath Falls Trail Master Plan\GIS\TMS2\Virtual\Workshop\_Comments.mxd - agriffin - 12:00 AM 9/29/2015

**Virtual Workshop #1 Comments  
Klamath Falls, Oregon**

**Figure  
C-1**

Virtual Workshop Comments Received			
Comment ID	Note	Comment	Number of Likes
1		I'm not positive, but pretty sure that this link between the Link River Trail (PacifiCorp property) and Powerline Trail (Moore Park, City property) isn't formalized or sanctioned by landowners. Perhaps this has changed, but it is worth looking at and clarifying since I've heard rumors of bad blood about such a linkage. Connecting the Link River Trail and Moore Park System would be great, but to my knowledge such a link does not exist.	4
2		Would like to see more bike lanes leading to/from Klamath Union High School.	4
3		Would like to see bike lanes or rec. paths leading to/from the Link River Trail.	5
4		Would like to see the short paved MUP at Veterans Park connected to something. A connection to the OC&E trail would be great, but seems difficult. A connection to the Link River Trail, a downtown path or bike lane system, or a trail that goes farther to the east and south-east around Lake Ewauna would be great too. It just needs to go to something :)	5
5		The Path to Nowhere -- perhaps the most egregious issue with the Klamath Falls trails system. Personally, nothing makes me feel less safe and disappointed in a trail system than ending up on a path that abruptly ends in the middle of nowhere. I think this loose end is a pretty big and embarrassing deal. It needs to go somewhere.	3
6		Would love to see the A Canal path continue along the canal to KU campus.	5
7		Sharrows on Esplanade please.	2
8		Sharrows in the right lane of 11th please.	3
9		Sharrows on 9th St. please	4
10		Sharrows on Main St. please	3
11		Sharrows on Klamath Ave please	5
12		Bike lanes on Main St. east of Esplanade please	5
13		Bike routes (sharrows?) or MUP connecting Mills Little League Park to trails system or bike route system	1
14		Make Applegate Ave a designated bike route (sharrows or bike lanes and no stop signs from Richmond to Washburn).	1
15		Make Owens a designated bike route (sharrows or bike lanes) and no stops between East Main and S. 6th, except at intersection with Richmond (also a bike route).	0
16		Connect Owens St. to OC&E trail.	2
17		THIS IS A CORRECTED COMMENT. Make Owens a designated bike route (sharrows or bike lanes) and no stops between East Main and S. 6th, except at intersection with APPLGATE (also a bike route)	1
18		Bike lanes on Oregon Ave please	4
19		Wider bike lanes on Nevada between HWY 97 and Moore Park.	7
20		Make Front St. a designated bike route with bike lanes or sharrows.	1
21		Make Hanks St. a designated bike route with bike lanes or sharrows.	1
22		Make Hilyard a designated bike route with bike lanes or sharrows.	1
23		Make Clinton a designated bike route with bike lanes or sharrows	0
24		Make Crest a designated bike route with bike lanes or sharrows	1
25		Make Laverne a designated bike lane with bike lanes or sharrows.	2
26		Bike lanes on Homedale please	1
27		Make Madison a designated bike route with lanes or sharrows and few stop signs.	0
28		Make Wiard a designated bike route with lanes or sharrows and few stop signs	0
29		Make Summers Ln a designated bike route with lanes or sharrows and few stop signs.	0
30		Bike lanes on Summers Ln south of South 6th please	2
31		Improve bike/ped access connecting Summers Ln and South 6th. use Etna St. dead end?	0
32		This intersection is a mess, both for cars and pedestrians. Uhg, good luck!	2
33		There is currently a Multi use path on the west side from Foothills Blvd to Basin View Dr.	0
34		There are a lot of Culturally sensitive areas here! Have these been addressed? Has the Tribe looked into this?	1
35		Please finish the loop! The Foothills Path was not completed!	4
36	OC&E Trail	Pedestrian cross walk needed. Traffic does not stop for walkers the majority of the time. There have been several instances where a walker has started to cross because a car has slowed down only to have the car continue traveling through or a car will see a pedestrian waiting to cross and attempt to make a quick stop (because there was not a crosswalk or warning for them and they are making a last minute attempt) and the car behind them rear ends them or almost causes a collision. I see this daily as I use the trail and I also have a walking group of elderly women that I lead. I'm afraid of a fatal accident. There have been many accidents involving two cars as it is.	1
37	OC&E Trail	Pedestrian cross walk needed. Traffic does not stop for walkers the majority of the time. There have been several instances where a walker has started to cross because a car has slowed down only to have the car continue traveling through or a car will see a pedestrian waiting to cross and attempt to make a quick stop (because there was not a crosswalk or warning for them and they are making a last minute attempt) and the car behind them rear ends them or almost causes a collision. I see this daily as I use the trail and I also have a walking group of elderly women that I lead. I'm afraid of a fatal accident. There have been many accidents involving two cars as it is.	1
38	OC&E Trail	Pedestrian cross walk needed. Traffic does not stop for walkers the majority of the time. There have been several instances where a walker has started to cross because a car has slowed down only to have the car continue traveling through or a car will see a pedestrian waiting to cross and attempt to make a quick stop (because there was not a crosswalk or warning for them and they are making a last minute attempt) and the car behind them rear ends them or almost causes a collision. I see this daily as I use the trail and I also have a walking group of elderly women that I lead. I'm afraid of a fatal accident. There have been many accidents involving two cars as it is.	1
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40	OC&E Trail	Pedestrian cross walk needed. Traffic does not stop for walkers the majority of the time. There have been several instances where a walker has started to cross because a car has slowed down only to have the car continue traveling through or a car will see a pedestrian waiting to cross and attempt to make a quick stop (because there was not a crosswalk or warning for them and they are making a last minute attempt) and the car behind them rear ends them or almost causes a collision. I see this daily as I use the trail and I also have a walking group of elderly women that I lead. I'm afraid of a fatal accident. There have been many accidents involving two cars as it is.	2

41		Connection between A canal trail and Kit Carson trail needs some work -- this is sidewalk very much in need of repair at the moment and is not a smooth connection for cycling or jogging.	5
42		Klamath Ridge View Trail needs to connect to the Running Y trail Network. Right now, there's no "destination" at the end of this trail.	3
43		Signage directing people to the Eulalona trailhead from downtown (or at least down the hill) is needed. For that matter, signage at the trailhead so that it's clear from the road that this is an official trailhead is also needed.	3
44		This area is not city property, and the status of these trails on top of Moore Mountain has often been in question. Trail easements or land acquisitions (or clear signage) are important.	2
45		Well-signed connections between the Foothills Blvd paved path and soft-surface trails in Steens would be great -- right now, these connections are hard to find if you don't already know about them.	1
46		Is there anything that can be done to "officially" connect or develop informal trails up above Pacific Terrace -- perhaps connect the "K" all the way around to the OIT "O"?	2
47		Extending the WingWatchers Trail south would be highly desirable -- in the long run, a loop trail all the way around Lake Ewauna (with a pedestrian bridge over the Klamath River) would be amazing!	4
48		The "Existing Soft Surface" layer doesn't include the relatively new "Big Sky" Trail in Moore Park.	0
49		The map appears to be missing the Lynnewood connector to the Ridge View Trail.	0
50		The paved trail overlooking Moore Park is an embarrassment, with the asphalt in general disrepair. This is a nice short walk that I'd love to regularly take out-of-town visitors to, because of the spectacular lake views, but I'm embarrassed to, because of the state of maintenance.	3
51		This could be a nice area for a junction to connect Kit Carson, the A-Canal, and an Oregon Avenue bike lane. A-Canal should continue to the high school. Oregon Avenue should have a protected bike lane to connect Lakeshore to Downtown and the A-Canal.	6
52		Campus Drive, especially crossing the highway from Biehn ST is not a good experience on bike. A safer connection between Biehn and Campus DR and the Kit Carson trail would be nice.	7
53		The "Soft Surface Trail" layer appears to be missing many of the "lower" trails in Moore Park.	0
54		There is a short gap in sidewalk connectivity here. This is a lot of foot traffic down El Dorado especially for those working at Skylakes and OIT. The sidewalks are generally good so it would take a minimal investment to just make the connection so people don't have to walk in the road.	1
55	Foothills Trail	Trees would be nice.	2
56		Signal crossing needed on A-Canal.	3
57		Signal crossing needed on A-Canal.	5
58	Street with Bicycle Lane	Bicycle lane is not adequately protected for such a busy road. Cyclists and drivers are both at risk and will be apprehensive until there is a solution. In my opinion there must be a barrier, even if it's bushes or a line or trees between traffic and pedestrians and bikes. If there is not enough road width for a protected bike lane, can we turn one sidewalk into a multiuse paved trail?	2
59		Many people travel over the 6th St via duct and it's quite scary on a bicycle. I see many people bike on the sidewalk. A bike lane would be nice just to alert drivers and give cyclists some security. The best option would be a protected bike lane. Also, with the closure of downtown Safeway/Haggens, many lower income people on bikes will have to travel over the via duct to get to grocery stores. Otherwise they have to go way off course on the A Canal trail...	2
60		OC&E is great, but I'd compare it to the A Canal with large cracks that are quite jarring on a bike.	2
61		I would love to see sharrows, but this would also be a great place to see protected bike lanes, as it would add to beautification AND result in safer bike - car interactions.	2
62		I would love to see bike lanes on eldorado as well	0
63		Construct sidewalks in the Pelican School area to allow and promote more walking to school from this entire neighborhood.	0
64		Create protected bike lanes from Moore Park to downtown to encourage biking to the city center.	1
65		Painting bike sharrows on 10th St.--connecting Main St. and Oregon Ave.--may be the most ideal approach to create better access for cyclists and to inform drivers. I bike this road on an almost daily basis. Traffic is moderate at the Pine, High and Washington St. intersections--signage at these intersections may help. Traveling further north on 10th, traffic is low/moderate as the street becomes a one-way until it intersects Prospect St.	1
66		A connection (and permission to use) to the Weyerhaeuser road as an alternative to riding Highway 66 would really help. That highway is frequently ridden by local riders and does not lend itself well to such. A route that keeps people off that highway would give locals easy access to some of the best cycling in the state.	0
67		There is a really awkward merge if a cyclist is traveling north on Washburn here.	1
68		Packed walking or biking path loop in the conger heights area.	1
69		Make bike lanes to Jeldwen to promote cycling to work. Lakeport is extremely dangerous to cyclist and there is no other direct route there (without having to go all the way around to the lake).	2
70		Putting bike sensing inducting loops into the stop lights crossing the parkway would really help. Cyclist do not like to have to use the crosswalks.	1
71	OC&E Trail	Having this trail connect to The end of East Main as well as continuing west towards Downtown with out having to use S 6th or East Main st to get Downtown.	1
72	A Canal Trail	The Canal Trail has been neglected and needs paving & lights to make it safe & rideable.	1
73		It would be really great if the bike lane continued on Lakeshore Drive west of Moore Park. At the very least, instead of a "Bike Lane Ends" sign, there should be a "Bikes and cars share the road" sign.	1
74		Bike lanes on/around campus would promote student, faculty, and staff active transportation to work.	0

## OTHER COMMENTS RECEIVED FROM WEBSITE

Scott Meredith  
[coachmeredith@yahoo.com](mailto:coachmeredith@yahoo.com)  
707 599-8391

Seriously need a sidewalk on Lakeport Blvd. Children and everyone else is in danger as cars pass by close and fast. Pelican Elementary school kids use the route. It connects the entire Harbor Isles area to the city.

Also need speed bumps on Harbor Isle Blvd as people speed tremendously there and it has been used as a drag strip where cars race.

Linda  
[suicidalsigyn@gmail.com](mailto:suicidalsigyn@gmail.com)  
5039563228

I love the idea of expanding hiking/walking/biking trails in Klamath Falls. My only concern is that many towns in the past have removed horse or dog access as they have expanded bicycle access. I don't want to remove current access. Horse riding groups volunteer and do a significant amount of trail maintenance and clearing. People who want to walk with their dog should not be delegated to walk on busy streets. We want to be open to everyone who wants to enjoy the outdoors. Respect should be encouraged for everyone rather than exclusion. We don't want to exclude outdoor enthusiasts or have another snobby trail system that needs to be policed to enforce a bunch of exclusionary rules. Please don't remove current access and please don't be exclusionary. Otherwise I am excited!

Jaime  
[guajardo888@gmail.com](mailto:guajardo888@gmail.com)  
5418101611

I have lived in Klamath Falls for 15 years and I always hear about hiking and biking trails. The problem I have is that I do not know where they are. I think it would be nice to have a kiosk like the ones at Highway Rest Areas someplace downtown or even in a major Park like Veterans Park or Moore Park or both. You could have a map opened up showing the trails and even leave brochures to take. You could put up info about upcoming outdoor events and you could sell the extra space to businesses to help pay for it. Unless there is already one there and I am unaware of it then you need to just spread the word.

David Scott  
[david.keith.scott@gmail.com](mailto:david.keith.scott@gmail.com)  
319 270 6768

Great job with the map! I've listed numerous comments and found no problems with the map functions. My only suggestion involves symbology. Consider changing the color for bike lanes. Light blue usually indicates waterways and the color may be hard to distinguish on some screens.

Regarding the trails system. I would like to see three things:

- 1) better connectivity between existing trails infrastructure
- 2) better signage to help residents and visitors access and enjoy existing trails infrastructure
- 3) use existing mid- to low-volume roadways to create designated bike routes around town. These roadways should have bike lanes or sharrows, lower speed limits for cars and few stop signs which discourage bike travel

For #3, I would prefer a strategy that utilizes secondary streets for bike travel rather than a strategy that tries to make major roads (ie. South 6th, Crater Lake Parkway) more bike friendly



## Klamath Falls Urban Trail Plan: Additional Comments Received

Date: 09/30/2015

1. Washburn way b/w Eberlein and S. 6<sup>th</sup>: Pretty obvious gap in the bike lane on either side of Washburn, thought the ROW doesn't look like it could accommodate a bike lane between these two streets. Looks like a challenging spot, but would be great to have that connection given the bike traffic to Fred Meyer and Our Place to Grow (daycare center at the corner of Eberlein and Washburn)
2. Washburn Way/A-Canal Crossing: Northbound cyclists have a crosswalk before the stop light at Crater Lake parkway, but it could be improved with the addition of a flashing pedestrian or bike crossing, similar to the one on Washburn at the Fred Meyer, and on the Washburn/OC&E crossing
3. A-Canal paved trail: Already saw some comments on the condition of the trail, so just re-iterating the need for re-surfacing. Adding lanes would be beneficial as well.
4. Main Street/A-canal trail crossing: Same situation here as the Washburn/A-canal crossing, the addition of a flashing pedestrian signal would be helpful.
5. A-Canal extension to Klamath Union High School: Agree on the extension of the trail, if ROW allows. Looks like you're getting pretty close to the rail line, and we all know how protective they are of their rail ROW.
6. OC&E dead-end: Potentially pave this section to connect with Owens street. Seems like an easy fix.
7. S. 6<sup>th</sup> bridge over the Railroad Tracks near downtown: Already a comment on the need for a bike lane on the bridge. Bikes currently use the sidewalks. Challenge here is the physical constraints of the bridge itself with the existing lanes. Maybe a separate pedestrian/bike bridge that parallels the vehicle bridge, and connects with Spring street? I'm already hearing the cash registers...









**Attachment D Bicycle and Pedestrian Treatments Toolbox**

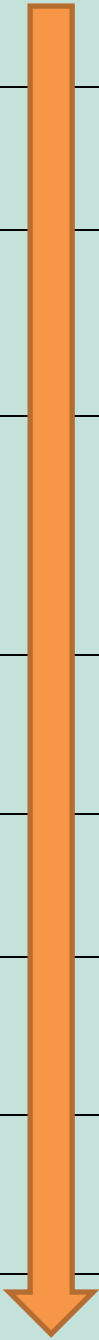
## TOOL BOX












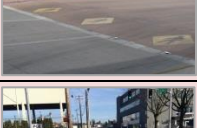
The treatments are organized into the categories listed above, with headers and footers indicating the categories. Where applicable, the treatments are organized from highest level of protection to lowest level of protection. Typically, the treatments that provide the most protection will have the highest appeal to a wide variety of users. For example, bicycle treatments are commonly categorized by the level of separation they provide bicyclists from motor vehicles. Separated facilities have been found to attract more bicyclists of a variety of ages and abilities and are generally considered “lower stress” facilities. However, separated facilities must be carefully designed to allow for safe crossings and turning movements for both motor vehicles and bicyclists at intersections. As another example, treatments for pedestrian mid-block crossings range from a high-level of protection with a pedestrian signal to a lower level of protection with a high-visibility crosswalk. Intermediary levels of protection can be provided with a pedestrian hybrid beacon or rectangular rapid flashing beacon.

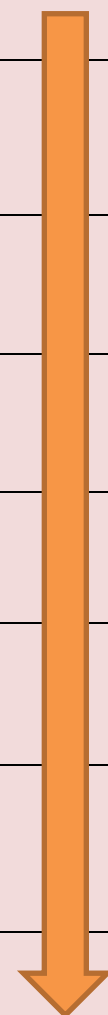
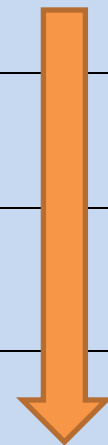
Table 1 summarizes the treatments provided in the toolbox by category. The toolbox that follows provides more detail on each facility type, benefits, other considerations, and common applications.



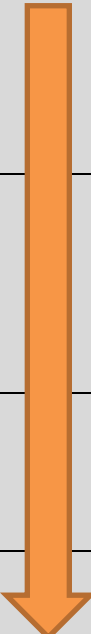




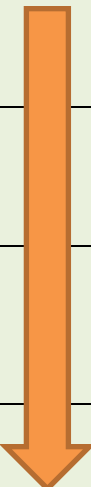



**Table 1. Toolbox Contents**

	Page #	Treatment	Image	Level of Separation / Protection
Bicycle Facilities	BF-1	Multi-Use Path		<b>High Level of Separation/Protection</b>
	BF-2	One-Way Separated Bike Lane (Cycle Track)		
	BF-3	Two-Way Separated Bike Lane (Cycle Track)		
	BF-4	Buffered Bike Lane		
	BF-5	Standard Bike Lane		
	BF-6	Advisory Bike Lane		
	BF-7	Paved Shoulder		
	BF-8	Bicycle Boulevard		
	BF-9	Shared Lane Roadways		<b>Low Level of Separation/Protection</b>



Pedestrian Facilities	PF-1	Multi-Use Path		High Level of Separation/Protection
	PF-3	Sidewalk		
	PF-2	Pedestrian Path (Sidepath)		
	PF-4	Shoulder Pedestrian Facility		Low Level of Separation/Protection
General Crossing Treatments	CT-1	Grade Separated Crossing		High Level of Separation/Protection
	CT-2	Pedestrian Signal		
	CT-3	Pedestrian Hybrid Beacon		
	CT-4	Rectangular rapid Flashing Beacon		
	CT-5	Crossing Island (Pedestrian Refuge)		
	CT-6	Bulb-Out/Curb Extension		
	CT-7	Raised Pedestrian Crossing		
	CT-8	High Visibility Crosswalk		Low Level of Separation/Protection



	CT-9	Leading Pedestrian Interval (LPI)		Not Applicable
Railroad Crossing Treatments	RR-1	Automatic Pedestrian Gate		<p>High Level of Separation/Protection</p>  <p>Low Level of Separation/Protection</p>
	RR-2	“Active” Treatments		
	RR-3	Basic “Passive” Treatments		
	RR-4	Other “Passive” Treatments		
Bicycle Intersection Treatments	BI-1	Bike Signal		<p>High Level of Separation/Protection</p>  <p>Low Level of Separation/Protection</p>
	BI-2	Bike Boxes		
	BI-3	Two-Stage Left Turn Boxes		
	BI-4	Pavement Markings Through Intersections		

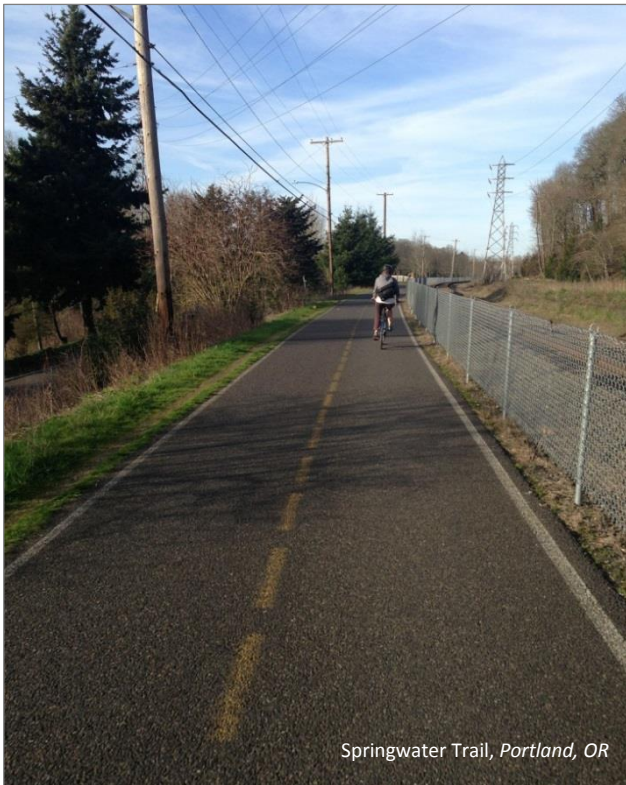
Pedestrian/Bicycle Amenities	A-1	Bicycle Parking		Not Applicable
	A-2	Street Furniture and Lighting		Not Applicable
	A-3	Transit Stop Shelters		Not Applicable
Traffic Calming Treatments	TC-1	Rumble Strips		Not Applicable
	TC-2	Speed Bumps, Speed Humps, Speed Tables		Not Applicable
	TC-3	Reduced Curb Radii		Not Applicable



# Bicycle Facilities

## MULTI-USE PATH

Cost: \$\$\$



Springwater Trail, Portland, OR



OC&E Trail, Klamath Falls, OR

*Multi-use paths are paved, bi-directional, trails away from roadways that can serve both pedestrians and bicyclists. Multi-use paths can be used to create longer-distance links within and between communities and provide regional connections. They play an integral role in recreation, commuting, and accessibility due to their appeal to users of all ages and skill levels.*

### Benefits

- Provides facility for both pedestrians and bicyclists in less space than separate facilities.
- Separation from motor vehicles can attract users of all levels.

### Constraints

- May be unsafe in areas with frequent crossings or driveways.
- When parallel to roadways, requires substantial space for buffer.
- Potential for conflicts between bicyclists and pedestrians due to shared facility.
- Isolated paths may introduce personal security concerns.

### Typical Applications

- Medium- to long-distance links within and between communities that also serve as recreational facilities.
- Parallel to roads in rural areas where sidewalks and on-street facilities are not present.

### Design Considerations

- Best suited in areas where roadway crossings can be minimized (such as parallel to travel barriers such as highways, railroad tracks, rivers, shorelines, natural areas, etc.).
- Necessitate high-visibility treatments for crossings.
- A minimum width of 10 feet is recommended for low-pedestrian/bicycle-traffic contexts; 12 to 20 feet should be considered in areas with moderate to high levels of bicycle and pedestrian traffic.
- Pavement markings can be used to indicate distinct space for pedestrian and bicycle travel.

### Additional Guidance

- AASHTO Guide for the Development of Bicycle Facilities
- ODOT Highway Design Manual





# Bicycle Facilities

## ONE-WAY SEPARATED BIKE LANE (CYCLE TRACK)

Cost: \$-\$\$\$



A one-way separated bike lane (SBL), also known as a cycle track or protected bike lane, is a bicycle facility within the street right-of-way separated from motor vehicle traffic by a buffer and a physical barrier, such as planters, flexible posts, parked cars, or a mountable curb. On two-way streets, a one-way SBL would be found on each side of the street, like a standard bike lane.

### Benefits

- Provides physical separation from motor vehicle traffic, which can attract users of all levels.
- Buffer can provide opportunities for landscaping.
- Reduced risk of “dooring” when parked cars are present.

### Constraints

- Requires additional right-of-way over standard bike lane.
- Construction may be more expensive than standard bike lane.
- May introduce street maintenance considerations, depending on buffer type.

### Typical Applications

- Roadway segments with sufficient right-of-way or where a “road diet” (vehicle lane reduction) can be implemented.
- Key segments of the bicycle network where more protection is desirable, such as areas with higher traffic volumes or speeds, or routes to common destinations, like schools.
- Roadways with infrequent driveways and side street accesses.

### Design Considerations

- Intersections must be designed to ensure visibility of bicyclists using the facility. Treatments include separate signal phases for bicyclists and high visibility pavement markings.
- Buffer type can vary depending on context, presence of parking, and available right-of-way.
- Green pavement markings or striping can add visibility and awareness in “conflict areas” or intersections where bicycle and vehicle travel paths cross.

### Additional Guidance

- NACTO Urban Bikeway Design Guide
- CROW Design Manual for Bicycle Traffic
- ODOT Highway Design Manual
- ODOT Bicycle and Pedestrian Design Guide
- FHWA Separated Bike Lane Planning and Design Guide



# Bicycle Facilities

## TWO-WAY SEPARATED BIKE LANE (CYCLE TRACK)

Cost: \$-\$\$\$



A two-way separated bike lane (SBL), also known as a two-way cycle track or protected bike lane, is a facility within the street right-of-way separated from motor vehicle traffic by a buffer and a physical barrier, such as planters, flexible posts, parked cars, or a mountable curb. Two-way SBLs serve bi-directional bicycle travel within the facility on one side of the street.

### Benefits

- Requires less right-of-way than a one-way SBL, due to the need for only one buffer.
- Provides physical separation from motor vehicle traffic, which can attract users of all levels.
- Reduced risk of “dooring” when parked cars are present.

### Constraints

- May be less intuitive due to apparent “wrong-way” travel on one side of street.
- Concern about crashes in areas with frequent crossings or driveways.
- Construction may be more expensive than standard bike lane.
- May introduce street maintenance considerations, depending on buffer type.

### Typical Applications

- On-street connections between off-street multi-use paths.
- Roadways with infrequent driveways and side street accesses.
- Key segments of the bicycle network where more protection is desirable, such as areas with higher traffic volumes or speeds or routes to common destinations, like schools.
- On one-way streets where two-way bicycle travel is desirable.

### Design Considerations

- Intersections must be designed to ensure visibility of bicyclists using the facility. Treatments include separate signal phases for bicyclists and high visibility pavement markings.
- Buffer type can vary depending on context, presence of parking, and available right-of-way.
- Green pavement markings or striping can add visibility and awareness in “conflict areas” or intersections where bicycle and vehicle travel paths cross.

### Additional Guidance

- NACTO Urban Bikeway Design Guide
- CROW Design Manual for Bicycle Traffic
- FHWA Separated Bike Lane Planning and Design Guide



# Bicycle Facilities

## BUFFERED BIKE LANE

Cost: \$-\$\$\$



Capitol Boulevard  
Boise, ID

*Buffered bicycle lanes are on-street lanes that include an additional striped buffer of typically 2-3 feet between the bicycle lane and the vehicle travel lane and/or between the bicycle lane and the vehicle parking lane.*

### Benefits

- A parking-edge buffer on streets with on-street parking can reduce the likelihood of “dooring.”
- Increased separation from motor vehicles (over standard bicycle lanes) can increase bicyclist comfort.

### Constraints

- Does not provide physical protection and therefore may not attract bicyclists of all levels.
- The additional width provided by the buffer may invite motorists to illegally park in the lane if not adequately signed and enforced.

### Typical Applications

- Long-distance links within and between communities.
- Streets with sufficient pavement width to provide a buffer.
- Widely applicable in both urban and rural settings.
- Segments of the bicycle network with moderate vehicle speeds or volumes.

### Design Considerations

- Typical buffer width is 2-3 feet, in addition to standard bicycle lane width of 5-6 feet, but a combined width of 6 feet is acceptable.
- Green pavement markings or striping can add visibility and awareness in “conflict areas” or intersections where bicycle and vehicle travel paths cross.
- Buffer space can have markings or rumble strips to deter vehicles from traveling or parking in the space.

### Additional Guidance

- AASHTO Guide for the Development of Bicycle Facilities
- NACTO Urban Bikeway Design Guide
- ODOT Highway Design Manual
- ODOT Bicycle and Pedestrian Design Guide



# Bicycle Facilities

## STANDARD BIKE LANE

Cost: \$-\$\$\$



A standard bike lane is an on-street facility that provides space designated for bicyclists, separated from vehicles by pavement markings.

### Benefits

- Provides a designated facility for bicyclists using the minimum pavement width.
- Provides increased visibility for bicyclists.
- Relatively inexpensive treatment when pavement width is available.

### Constraints

- Can position bicyclists in the “door zone” if located adjacent to parked vehicles without a buffer.
- Motorists may illegally park in the lane if not adequately signed and enforced.
- Does not provide physical protection or horizontal buffer from vehicles and therefore does not attract bicyclists of all levels.

### Typical Applications

- Arterials, collectors, and other non-local streets with speeds higher than 25 mph or over 3,000 average daily motorized traffic volumes.
- Streets without sufficient right-of-way or pavement width for buffered bike lanes or separated bike lanes (SBLs).

### Design Considerations

- Typical bike lane width is 6 feet, with 5 feet in constrained locations. A minimum 4-foot width can be used on constrained segments where on-street parking is not present.
- Green pavement markings or striping can add visibility and awareness in “conflict areas” or intersections where bicycle and vehicle travel paths cross.

### Additional Guidance

- AASHTO Guide for the Development of Bicycle Facilities
- NACTO Urban Bikeway Design Guide
- ODOT Highway Design Manual
- ODOT Bicycle and Pedestrian Design Guide



# Bicycle Facilities

## ADVISORY BIKE LANE

Cost: \$



Hanover, NH  
Photo: Danny Kim,  
The Dartmouth



Hanover, NH  
Photo: Danny Kim,  
The Dartmouth

Advisory bike lanes, also known as “suggestion lanes,” are bicycle lanes that motor vehicles can use to pass oncoming motor vehicles after yielding to bicyclists. Advisory bicycle lanes are used in combination with a single center lane (without a centerline) for bi-directional motor vehicle travel on relatively low-volume streets.

### Benefits

- Provides striped bicycle facility on roadways with very limited right-of-way or pavement width.
- Encourages slower motor vehicle speeds and yielding to bicyclists.
- Very inexpensive treatment consisting of only signing and striping.

### Constraints

- Motorists may not initially understand advisory lanes due to limited applications in the US to date.
- Does not provide physical protection from vehicles and may not attract bicyclists of all levels.

### Typical Applications

- Streets with less than 6,000 average daily motorized traffic that do not have sufficient width for exclusive bicycle facilities.
- Can be applied in urban or rural contexts.

### Design Considerations

- Advisory bike lanes can be striped as 5-7 foot lanes with a single center motorized vehicle lane of 10 to 18 feet.
- Explanatory signage may be helpful in US contexts to communicate to motorists that they must yield to bicyclists before passing oncoming vehicles.

### Additional Guidance

- CROW Design Manual for Bicycle Traffic (Netherlands Design Guide)



# Bicycle Facilities

## PAVED SHOULDER

Cost: \$-\$\$



Tucson, AZ



Hawaii

*A paved road shoulder can serve as a bicycle facility that provides space separated from motor vehicle traffic in rural areas.*

### Benefits

- Provides a space separated from motorists.
- Requires less right-of-way than a separated multi-use path.

### Constraints

- Does not provide physical protection from vehicles and may not attract bicyclists of all levels.
- Shoulders serving other uses, such as broken-down vehicles, may force bicyclists into travel lanes.

### Typical Applications

- Typically applied on rural roadways.
- Also used as an interim treatment in urbanizing areas.

### Design Considerations

- A 6-foot width is preferred to accommodate bicycle travel, with a 4-foot minimum in constrained areas. Greater widths can be used in higher-speed locations.
- Rumble strips or profiled striping can be used to enhance safety and minimize motorists encroaching on the shoulder.

### Additional Guidance

- AASHTO Guide for the Development of Bicycle Facilities
- ODOT Highway Design Manual
- ODOT Bicycle and Pedestrian Design Guide



# Bicycle Facilities

## BICYCLE BOULEVARD

Cost: \$



*Bicycle boulevards are low-volume, low-speed streets where bicycles and motorized vehicles share road space, but where bicycle movements are prioritized and optimized through use of motorized vehicle restrictions, traffic calming elements, and intersection crossing treatments.*

### Benefits

- Typically does not require additional right-of-way.
- Can create a comfortable space for bicyclists of all levels.
- Enhances connectivity of the network for bicyclists.

### Constraints

- Bicycle boulevards may reduce through routes for motorized vehicles
- Some treatments, such as traffic circles or chicanes, may be expensive.

### Typical Applications

- Local routes parallel to larger, higher-traffic roadways, such as arterials or collectors.
- Low-traffic neighborhood routes that can enhance the bicycle network connectivity.

### Design Considerations

- A variety of traffic calming elements can be employed, including speed humps, traffic circles, chicanes, median barriers, and traffic diverters in order to keep traffic volumes low and minimize through-traffic.
- Consider providing “bicycle-only” through movements at intersections, where motorists are required to turn off the bicycle boulevard.
- Include shared lane markings and wayfinding signage for bicyclists.
- Recommended for streets with posted speeds of 25 mph or lower and volumes less than 3,000 average daily motorized traffic.

### Additional Guidance

- NACTO Urban Bikeway Design Guide
- Manual on Uniform Traffic Control Devices (MUTCD)



# Bicycle Facilities

## SHARED LANE ROADWAYS

Cost: <\$



Shared lane roadways include roadways without separate bicycle facilities on which bicycle travel is not prohibited. Most roadways, with the exception of some limited access freeways, are “shared lane roadways” if they do not have a different type of bicycle facility. Shared lane roadways that are part of a designated bicycle network may include shared lane markings (“sharrows”) or signage to indicate the legal presence of bicyclists in the travel lane.

### Benefits

- Allows for bicycle travel when other treatments are not feasible.
- Low- to no-cost.

### Constraints

- Does not provide any separation from vehicles.
- Without additional traffic-calming treatments, it is likely to attract only strong and fearless bicyclists.

### Typical Applications

- Rural roadways without shoulders often use “share the road” signage to indicate to road users that bicyclists may be present.
- Sharrows are typically used in urban or suburban locations on bicycle network links where other facilities are not present.

### Design Considerations

- Sharrows should be placed at least 4 feet from the edge of the curb or on-street parking.

### Additional Guidance

- ODOT Bicycle and Pedestrian Design Guide
- ODOT Highway Design Manual
- Manual on Uniform Traffic Control Devices (MUTCD)





# Pedestrian Facilities

## MULTI-USE PATH

Cost: \$\$\$



*Multi-use paths are paved, bi-directional, trails away from roadways that can serve both pedestrians and bicyclists. Multi-use paths can be used to create longer-distance links within and between communities, provide regional connections and play an integral role in recreation, commuting, and accessibility due to their appeal to users of all ages and skill levels.*

### Benefits

- Provides opportunity for a scenic recreational pedestrian facility.
- Hard surface allows for universal accessibility.

### Constraints

- Pedestrian and bicycle conflicts may occur in shared space.
- When parallel to roadways, require substantial space for buffer.
- Isolated paths may introduce personal security concerns.

### Typical Applications

- Medium- to long-distance links within and between communities that also serve as recreational facilities.
- Rural areas where sidewalks and on-street facilities are not present.

### Design Considerations

- Best suited in areas where roadway crossings can be minimized (such as parallel to travel barriers such as highways, railroad tracks, natural areas, rivers, shorelines, etc.).
- Necessitate high-visibility treatments for crossings.
- A minimum width of 10 feet is recommended for low-pedestrian/bicycle-traffic contexts; 12 to 20 feet should be considered in areas with moderate to high levels of bicycle and pedestrian traffic.
- Pavement markings can be used to indicate distinct space for pedestrian and bicycle travel

### Additional Guidance

- ODOT Bicycle and Pedestrian Design Guide
- AASHTO Guide for the Development of Bicycle Facilities



# Pedestrian Facilities

## SIDEWALK

Cost: \$\$\$



Portland, OR



SE 17<sup>th</sup> Avenue  
Portland, OR



Milwaukee Ave  
Portland, OR

A sidewalk is a dedicated pedestrian facility adjacent to the roadway and separated from traffic by a curb.

### Benefits

- Provides pedestrians with a dedicated physically-separated space.
- Provides means of mobility for people using wheelchairs, people with strollers, or others who may not be able to travel on an unpaved surface.

### Constraints

- Adding a concrete curb and sidewalk to streets adds a substantial expense to the overall construction cost.
- Stormwater drainage needs to be considered when retrofitting existing streets.

### Typical Applications

- Typically provided on urban (non-rural) and residential streets, with the exception of limited access freeways.
- Typically added to streets in urbanizing areas as development occurs.

### Design Considerations

- Typically 6 to 8 feet wide. Sidewalks should be constructed at least 5 feet wide, with a minimum of 4 feet of clear width, excluding a shy distance of 1.5 feet from the curb and any adjacent obstructions.
- A landscaped buffer is preferable in residential areas and in locations with higher traffic speeds and volumes.
- Wider sidewalks of 12 to 20 feet can be beneficial in commercial or “town center” areas in order to accommodate higher pedestrian volumes, street furniture, pedestrian scale lighting, business signage, bike parking, transit stops, and other amenities.

### Additional Guidance

- ODOT Highway Design Manual.
- ODOT Bicycle and Pedestrian Design Guide
- AASHTO Green Book
- NACTO Urban Streets Design Guide



# Pedestrian Facilities

## PEDESTRIAN PATH (SIDEPATH)

Cost: \$\$



A pedestrian path is a hard-surface path adjacent to the roadway in lieu of a sidewalk in areas where other bicycle facilities exist. Similar to a multi-use path, pedestrian paths are narrower in width and generally do not invite bicycle travel.

### Benefits

- Provides a hard surface for pedestrians buffered from the roadway.
- Requires less right-of-way than a multi-use path.
- Lower cost than construction of a full sidewalk with curb and gutter.

### Constraints

- May also attract bicyclists, creating the potential for conflicts between pedestrians and bicyclists.

### Typical Applications

- In constrained rural areas where sidewalks are not present and multi-use paths cannot be accommodated.
- As an interim treatment in urbanizing areas to make connections between sidewalk facilities.

### Design Considerations

- Typically 5- to 8-foot wide asphalt surface.
- Pedestrian paths are typically separated from the roadway by a gravel or vegetated buffer instead of a curb and gutter.
- Should follow ADA standards to allow for universal access.
- Though not intended for bicyclists, pedestrian paths may attract bicyclists if a separate bicycle facility is not provided.

### Additional Guidance

- FHWA Designing Sidewalks and Trails for Access
- ODOT Highway Design Manual



# Pedestrian Facilities

## SHOULDER PEDESTRIAN FACILITY

Cost: \$-\$\$



*A paved shoulder facility provides access for pedestrians on a hard surface in rural areas where sidewalks are not present.*

### Benefits

- Provides a hard surface space separated from motorists.
- Requires less right-of-way than a separated multi-use path.
- More cost-effective than installing sidewalks.

### Constraints

- Does not provide physical protection of a curb and may not be comfortable for all users.
- Shoulders serving other uses, such as broken-down vehicles, may force pedestrians into travel lanes.

### Typical Applications

- Typically applied on rural roadways.
- Also used as an interim treatment in urbanizing areas.

### Design Considerations

- A 6-foot width is preferred to accommodate pedestrian travel, with a 4-foot minimum of paved surface in constrained areas. Greater widths can be used in higher-speed locations.
- Rumble strips or profiled striping can be used to enhance safety and minimize motorists encroaching on the shoulder.

### Additional Guidance

- ODOT Highway Design Manual
- AASHTO Green Book



# General Crossing Treatments

## GRADE SEPARATED CROSSING

Cost: \$\$\$\$\$



*A grade-separated crossing is a bridge (overcrossing) or a tunnel (undercrossing) that carries non-motorized traffic over or under a motorized corridor or other barrier to travel.*

### Benefits

- Provides physical separation from motor vehicle traffic, attracting users of all levels.
- Minimizes crash risk and can provide a safe crossing of any type of facility, including railroads and limited access highways.

### Constraints

- Grade-separated crossings can be very expensive.
- Depending on topography, may require significant additional space to make grade changes.
- Long under-crossings have the potential to present safety and security issues.

### Typical Applications

- Crossings of limited access highways, multi-lane roadways, or railroads.
- Multi-use path crossings often have grade separated crossings in order to provide comfortable and safe crossings for users of all levels.

### Design Considerations

- If a substantial slope or out-of-direction travel is required, some bicyclists or pedestrians may avoid using the crossing, so minimize slope and out-of-direction travel if possible.
- In selecting a grade separated crossing, consider the surrounding topography, natural features, and floodplain.
- Consider whether the crossing needs to accommodate equestrians.
- Ensure adequate sight distance for bicyclists entering the facility to see oncoming bicyclists or pedestrians. If not possible, consider requiring bicyclists to dismount.

### Additional Guidance

- NCHRP Report 562 Improving Pedestrian Safety at Unsignalized Crossings



# General Crossing Treatments

## PEDESTRIAN SIGNAL

Cost: \$\$\$\$



*This crossing type can provide pedestrians with a signal-controlled crossing at a mid-block location or at a previously stop-controlled intersection where pedestrian volumes warrant full signalization. The signal remains green for the mainline traffic movement until actuated by a push button to call a red signal for traffic.*

### Benefits

- Has nearly 100 percent rate of motorist yielding behavior at crossing locations.
- Same appearance as standard traffic signal, so motorist understanding is high.

### Constraints

- Must be activated by pedestrians.
- More costly than other crossing treatments.

### Typical Applications

- Midblock crossings with high pedestrian or bicycle demand and/or high traffic volumes.
- At locations where multi-use paths intersect with roadways.
- At previously stop-controlled intersections where pedestrian volumes warrant a signal.

### Design Considerations

- The push button to activate the pedestrian signal should be easily accessible by pedestrians, wheelchair users, and bicyclists (if applicable).

### Additional Guidance

- Manual on Uniform Traffic Control Devices (MUTCD)
- NACTO Urban Street Design Guide
- NCHRP Report 562 Improving Pedestrian Safety at Unsignalized Crossings





# General Crossing Treatments

## PEDESTRIAN HYBRID BEACON

Cost: \$\$\$-\$\$\$\$



Juneau, AK



Boise, ID

A pedestrian hybrid beacon (sometimes called a HAWK signal) is a pedestrian activated signal that is unlit when not in use. It begins with a yellow light alerting drivers to slow, and then displays a solid red light requiring drivers to remain stopped while pedestrians cross the street. Finally, the beacon shifts to flashing red lights to signal that motorists may proceed after pedestrians have completed their crossing.

### Benefits

- Has nearly 100 percent rate of motorist yielding behavior at crossing locations.
- Improves pedestrian safety and reduces pedestrian-involved crashes.
- Less delay to motor vehicle drivers than a signal.

### Constraints

- Must be activated by pedestrians.
- More costly than other crossing treatments.

### Typical Applications

- Midblock crossings with high pedestrian or bicycle demand and/or high traffic volumes.
- At locations where multi-use paths intersect with roadways.

### Design Considerations

- The push button to activate the pedestrian hybrid beacon should be easily accessible by pedestrians, wheelchair users, and bicyclists (if applicable).

### Additional Guidance

- Manual on Uniform Traffic Control Devices (MUTCD)
- NACTO Urban Street Design Guide
- NCHRP Report 562 Improving Pedestrian Safety at Unsignalized Crossings



# General Crossing Treatments

## RECTANGULAR RAPID FLASHING BEACON (RRFB)

Cost: \$\$-\$\$\$



*These crossing treatments include signs that have a pedestrian-activated “strobe-light” flashing pattern to attract motorists’ attention and provide awareness of pedestrians and/or bicyclists that are intending to cross the roadway.*

### Benefits

- Provides a visible warning to motorists at eye level.
- Increases motorists yielding behavior at crossing locations over round yellow flashing beacons (80 to 100 percent compliance).
- Allows motorists to proceed after yielding to pedestrians and bicyclists.

### Constraints

- Flashing beacons must be activated by pedestrians.
- Motorists may not understand the flashing lights of the RRFB, so compliance may be lower than with a traffic signal.

### Typical Applications

- Midblock crossings with medium to high pedestrian or bicycle demand and/or medium to high traffic volumes.
- Locations where multi-use paths intersect with roadways.

### Design Considerations

- The push button to activate the RRFB should be easily accessible by pedestrians, wheelchair users, and bicyclists (if applicable).
- Consider adding a push button in the median island for crossings of multi-lane facilities.

### Additional Guidance

- Manual on Uniform Traffic Control Devices (MUTCD)
- NACTO Urban Street Design Guide
- NCHRP Report 562 Improving Pedestrian Safety at Unsignalized Crossings
- ODOT Bicycle and Pedestrian Design Guide





# General Crossing Treatments

## CROSSING ISLAND (PEDESTRIAN REFUGE)

Cost: \$-\$\$



A crossing island in the median provides a protected area in the middle of a crosswalk for pedestrians to stop while crossing the street. Also called pedestrian refuge islands or median refuges, they can be used at intersections or mid-block crossings.

### Benefits

- Reduces pedestrian exposure at marked and unmarked crosswalks.
- Requires shorter gaps in traffic to cross the street.
- Allows pedestrians to cross in two phases.

### Constraints

- Streets with constrained right-of-way may not have sufficient width to allow for a crossing island.

### Typical Applications

- Preferred treatment for crossings of multi-lane streets.
- Often used in areas with high levels of vulnerable pedestrian users, such as near schools or senior centers/housing.
- Often applied in areas with high traffic volumes or with a pedestrian crash history.

### Design Considerations

- Must have at least 6 feet of clear width to accommodate people using wheelchairs.
- At crossing locations where bicyclists are anticipated, a width of 10 feet or greater is desirable to accommodate bicycles with trailers or groups of bicyclists.
- Can be applied in conjunction with other traffic control treatments.

### Additional Guidance

- ODOT Bicycle and Pedestrian Design Guide
- NACTO Urban Streets Design Guide
- NCHRP Report 562 Improving Pedestrian Safety at Unsignalized Crossings



# General Crossing Treatments

## BULB-OUT/CURB EXTENSIONS

Cost: \$\$



Boston, MA



Bend, OR

*An extension of the curb or the sidewalk into the street (in the form of a bulb), usually at an intersection, that narrows the vehicle path, inhibits fast turns, and shortens the crossing distance for pedestrians.*

### Benefits

- Shortens crossing distances for pedestrians.
- Reduces motorist turning speeds.
- Increases visibility between motorists and pedestrians.
- Enables permanent parking
- Enables tree and landscape planting and water runoff treatment.

### Constraints

- Can only be used on streets with unrestricted on-street parking.
- Physical barrier can be exposed to traffic.
- Greater cost and time to install than standard crosswalks.
- Can present turning radius problems to large vehicles.

### Typical Applications

- Mid-block or intersection pedestrian crossings on streets with unrestricted on-street parking.
- Streets with on-street parking where pedestrian volumes  $\geq 20$  pedestrians per hour, ADT  $\geq 1,500$  vehicles per day, and average right-turn speeds  $\geq 15$  mph.

### Design Considerations

- Include a narrow passage for bicyclists to prevent conflict with vehicles.
- Provide accessible curb ramps and detectible warnings.
- Include landscaping on the curb extension to differentiate path for pedestrian travel, especially for pedestrians with vision impairments.

### Additional Guidance

- ITE/FHWA Report Traffic Calming: State of the Practice
- FHWA Designing Sidewalks and Trails for Access *Part II of II: Best Practices Design Guide*



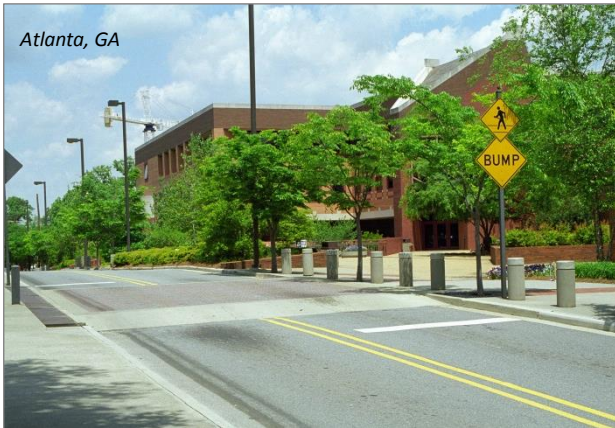
# General Crossing Treatments

## RAISED PEDESTRIAN CROSSING

Cost: \$\$



Orlando, FL



Atlanta, GA



Sanford, FL

*Raised pedestrian crossings bring the level of the roadway even with the sidewalk, providing a level pedestrian path and requiring vehicles to slow. Raised crossings can be used at midblock crosswalks or intersections.*

### Benefits

- Provides a better view for pedestrians and motorists
- Slows down motorists.

### Constraints

- Can be difficult to navigate for large trucks, snow plows, and low ground clearance vehicles.
- Relatively expensive.

### Typical Applications

- Raised crosswalks are typically provided at midblock crossings on two-lane roads where pedestrian volumes  $\geq 50$  pedestrians per hour and speed control is needed.
- Raised crosswalks may be provided at intersections where low-volume streets intersect with high-volume streets or where a roadway changes character (such as from commercial to residential).
- Raised crosswalks should not be used on transit routes or where there are steep grades or curves.

### Design Considerations

- Raised crosswalks should be even with the sidewalk in height and at least as wide as the crossing or intersection.
- Provide detectable warnings for pedestrians where they cross from the sidewalk in to the crossing area.
- Consider drainage needs and provide appropriate treatments.
- Use colored asphalt as opposed to brick or decorative surface materials to make the crossing smoother for those with mobility impairments.

### Additional Guidance

- ITE/FHWA Report Traffic Calming: State of the Practice
- FHWA Designing Sidewalks and Trails for Access *Part II of II: Best Practices Design Guide*



# General Crossing Treatments

## HIGH VISIBILITY CROSSWALK

Cost: \$



Portland, OR



Mount Rainier, MD



Boise, ID

*High visibility crosswalks consist of reflective roadway markings and accompanying signage at intersections and priority pedestrian crossing locations.*

### Benefits

- Communicates potential for pedestrian crossings to motorists.
- Designates a preferred crossing location for pedestrians.
- Motorists are required to stop for pedestrians entering crosswalks.
- Low cost.

### Constraints

- Can be more effective with other types of traffic control (signals, stop signs).
- At uncontrolled locations (midblock), motorist compliance is not as high as with other treatments.

### Typical Applications

- High visibility crosswalks are typically applied at intersections of arterials, collectors, and/or other facilities with moderate to high vehicle volumes and speeds.
- Can be applied at mid-block locations, especially in conjunction with other treatments.

### Design Considerations

- Crosswalk striping can vary, and may include continental striping (top photo), ladder striping, zebra striping (middle photo), etc.
- Can be constructed with paint or thermoplastic material.
- Minimum width is 6 feet, but wider crossings are preferred in areas with high number of pedestrians.

### Additional Guidance

- NCHRP Report 562 Improving Pedestrian Safety at Unsignalized Crossings
- ODOT Bicycle and Pedestrian Design Guide



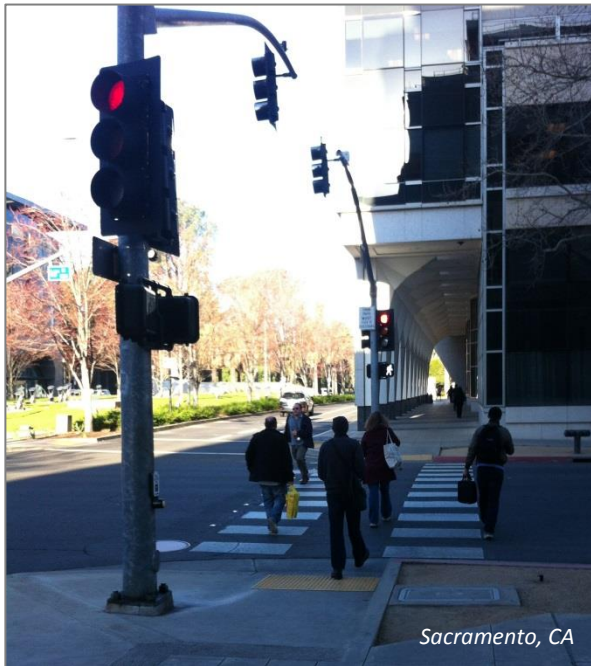
# General Crossing Treatments

## LEADING PEDESTRIAN INTERVAL (LPI)

Cost: \$



Orlando, FL



Sacramento, CA

*A leading pedestrian interval gives pedestrians a 2-5 second head start before the concurrent vehicle phase turns green to allow pedestrians to enter and occupy the crosswalk before turning vehicles get there.*

### Benefits

- Pedestrians are more visible in the crosswalk before vehicles start moving.
- Helps reduce conflicts with pedestrians and turning vehicles.

### Constraints

- Reduces green time for vehicle movements.
- May add to delays at intersections operating near capacity.

### Typical Applications

- Used in areas where right-turning vehicle movements often interfere with pedestrian crossing movements.

### Design Considerations

- Only possible when pedestrian signal faces are present.

### Additional Guidance

- ODOT Signal Design Manual
- ODOT Bicycle and Pedestrian Design Guide



# Railroad Crossing Treatments

## AUTOMATIC PEDESTRIAN GATE

Cost: \$\$\$\$



Billings, MT

*This “active” treatment is a gate connected to and activated by the train signal system, and lowers in tandem with the motor vehicle gate. It is designed to prevent pedestrians and bicyclists from crossing when a train is approaching.*

### Benefits

- Provide positive control and effectively communicates to pedestrians and bicyclists the need to stop at the railroad crossing.

### Constraints

- More costly than other crossing treatments.
- Without channelization, pedestrians may walk around the gate.

### Typical Applications

- Locations with limited sight distance at the pedestrian crossing.
- Locations with high-speed train operation.

### Design Considerations

- Must provide sufficient clear space between gate and railroad crossing, so that pedestrians or bicyclists do not get trapped if the gates descend while they are crossing.

### Additional Guidance

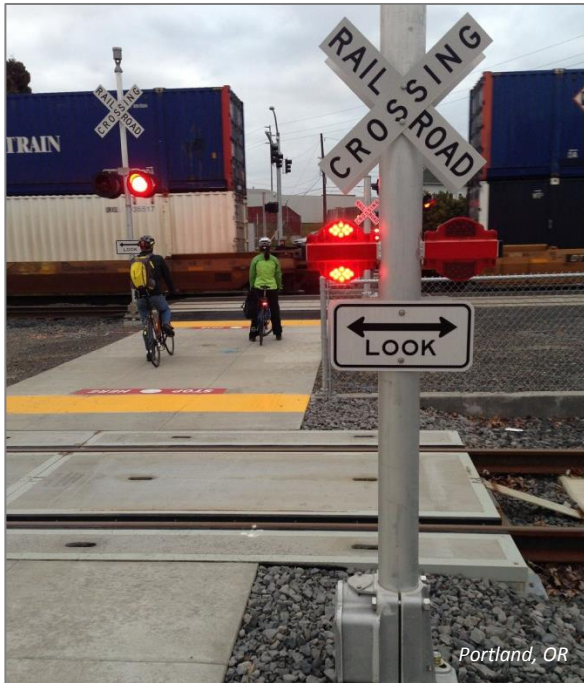
- FHWA Railroad Highway Grade Crossing Handbook
- Manual on Uniform Traffic Control Devices (MUTCD)
- TCRP Report 69 Light Rail Service: Pedestrian and Vehicular Safety



# Railroad Crossing Treatments

## “ACTIVE” TREATMENTS: FLASHING LIGHT SIGNALS AND AUDIBLE WARNINGS

Cost: \$\$\$



Portland, OR



Lehi, UT

Flashing light signals consist of two light units that flash alternately at a rate of 45 to 65 times per minute and are typically applied at motorized vehicle crossings. Smaller variations of flashing light signals, located at eye level, can be used at pedestrian and bicycle crossing locations. Audible warning bells can accompany the flashing lights. These treatments are “active” in that they only operate when a train is approaching.

### Benefits

- Actively communicate the approach of a train to pedestrians and bicyclists.
- Allows pedestrians to rely on active warning instead of needing to make a crossing judgment.

### Constraints

- More costly than passive crossing treatments.
- Audible warnings may have impact on surrounding community.

### Typical Applications

- At roadway intersections, active treatments are often used to control motorized vehicles and can also apply to adjacent pedestrian and bicycle facilities.
- At exclusive pedestrian or bicycle crossings, active treatments are used in locations where trains are traveling at moderate speeds, where pedestrian and bicycle volumes are moderate to high, or in cases with limited sight distance.

### Design Considerations

- Eye-level variations of typical flashing light signals can be used for exclusive pedestrian and bicycle crossings.
- Audible warning devices are generally installed in conjunction with flashing light signals.

### Additional Guidance

- FHWA Railroad Highway Grade Crossing Handbook
- Manual on Uniform Traffic Control Devices (MUTCD)
- TCRP Report 69 Light Rail Service: Pedestrian and Vehicular Safety



# Railroad Crossing Treatments

## BASIC “PASSIVE” TREATMENTS

Cost: \$



Basic treatments that can be used at rail crossings include “Stop Here” pavement markings, tactile warnings, and “look both ways” signage. These passive treatments are used to signal to pedestrians and bicyclists the correct location to stop when a train is approaching at a crossing and reminds them to look both ways before proceeding. “Passive” treatments are always present, as opposed to “active” treatments, which are operational only when a train is approaching.

### Benefits

- Clearly indicates the safe stopping location to pedestrians and bicyclists in locations where it may be unclear.

### Constraints

- Used alone, does not provide an active warning to pedestrians of an approaching rail vehicle, so pedestrians must make a judgment on when they can cross safely.

### Typical Applications

- Used in crossing locations where the safe stopping location may not be clear.
- Generally used at signalized or unsignalized crossings where trains are moving at lower speeds.
- Can be used in conjunction with other crossing treatments. At intersections, pedestrian and bicyclists may also be alerted by audible and flashing light signals that warn motorists of approaching trains and may be controlled by pedestrian or bicycle signal heads.

### Design Considerations

- Signs generally located on the right-hand side of the crossing, but should be located to optimize visibility.
- “Stop Here” and tactile warnings should be located in an area that provides safe queuing space for bicycles and pedestrians.

### Additional Guidance

- FHWA Railroad Highway Grade Crossing Handbook
- Manual on Uniform Traffic Control Devices (MUTCD)
- ODOT Bicycle and Pedestrian Design Guide
- TCRP Report 69 Light Rail Service: Pedestrian and Vehicular Safety





# Railroad Crossing Treatments

## OTHER “PASSIVE” TREATMENTS

Cost: \$-\$\$



Beaverton, OR



Lehi, UT

Other “passive” treatments include channeling (railing, fencing, or landscaping treatments) of pedestrian and bicycle movements to a specific location and swing gates that require a positive action by users, who must pull them open in order to cross the tracks.

### Benefits

- Channelization can slow pedestrians and bicyclists and position them to look both ways prior to crossing railroad tracks.
- Swing gates prevent pedestrians and bicyclists from crossing without stopping, increasing the likelihood that they will look both ways for trains.

### Constraints

- Channelization and swing gates must be carefully designed to ensure they are ADA accessible.
- Pedestrians must make judgment about when it is safe to cross.

### Typical Applications

- Used in crossing locations where pedestrians or bicyclists may cross tracks without looking or may fail to look both ways before crossing.

### Design Considerations

- Ensure that channel and swing gate dimensions allow for ADA access.
- Can be paired with “active” warning devices such as flashing light signals and audible warnings to further enhance effectiveness.

### Additional Guidance

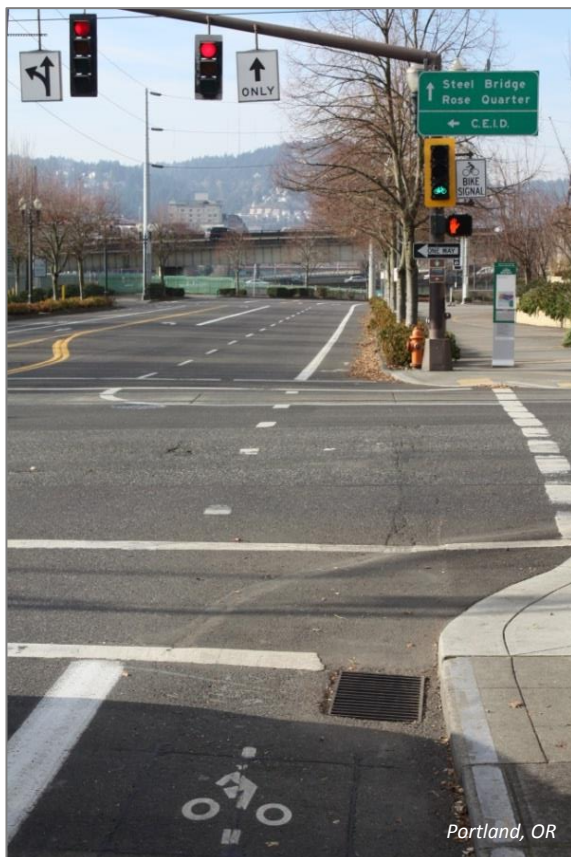
- FHWA Railroad Highway Grade Crossing Handbook
- Manual on Uniform Traffic Control Devices (MUTCD)
- TCRP Report 69 Light Rail Service: Pedestrian and Vehicular Safety



# Bicycle Intersection Treatments

## BIKE SIGNAL

Cost: \$\$\$\$



*Bicycle-only signals can be used at intersections to provide a separate signal phase that is dedicated to bicyclists.*

### Benefits

- Provides bicycles with a dedicated signal phase without potential motor vehicle conflicts.
- Provides increased protection for bicyclists.

### Constraints

- May increase intersection delay for motorists and bicyclists with the addition of a signal phase.

### Typical Applications

- Roadway intersections with multi-use trails.
- At intersections with separated bike lanes on the roadways, or at transitions to and from two-way separated bike lanes.
- At intersections where large numbers of turning vehicles have the potential to conflict with through bicycle movements.

### Design Considerations

- Ensure that signal heads are clearly visible to cyclists.
- Install painted indicators on bicycle detectors to show bicyclists where to wait.
- Consider prohibiting right-turn-on-red for motorists if right turns conflict with bicycle movements.

### Additional Guidance

- NACTO Urban Bikeway Design Guide
- FHWA Separated Bike Lane Planning and Design Guide



# Bicycle Intersection Treatments

## BIKE BOXES

Cost: \$



*Bicycle boxes are designated spaces at signalized intersections, placed between a set-back stop bar and the pedestrian crosswalk, that allow bicyclists to queue in front of motor vehicles at red lights.*

### Benefits

- Increases the visibility of queued bicyclists.
- Allows bicyclists to start up and enter the intersection in front of motor vehicles when the signal turns green and/or position for a left-turn.
- Provides queuing capacity for bicycles at signals beyond a typical bike lane.

### Constraints

- Driver compliance rates vary.
- Bike boxes may prevent drivers from making right-turn-on-red movements.

### Typical Applications

- Signalized intersections, particularly those with high bicycle volumes.
- Signalized intersections where a designated bicycle route turns left.

### Design Considerations

- Minimum depth of the bike box should be 10 feet, and it should extend across the bike lane, any buffer space, and at least one adjacent vehicle travel lane.
- Can be extended across multiple vehicle lanes on multilane streets to allow bicyclists to position for left turns.

### Additional Guidance

- Manual on Uniform Traffic Control Devices (experimental status)
- FHWA Separated Bike Lane Planning and Design Guide



# Bicycle Intersection Treatments

## TWO-STAGE LEFT TURN BOXES

Cost: \$



Portland, OR



Seattle, WA

*Two-stage left-turn boxes allow bicyclists to safely and comfortably make left-turns at multilane intersections from a right-side bicycle lane or cycle track. Bicyclists arriving on a green light travel into the intersection and pull out into the two-stage turn queue box away from through-moving bicycles and in front of cross street traffic, where they can wait to proceed through on the next green signal.*

### Benefits

- Provides a low-stress option for left turns, so that bicyclists do not need to merge into traffic.
- Provides a clear and visible location for queuing bicyclists waiting to cross.

### Constraints

- May be difficult to accommodate within a constrained intersection geometry.

### Typical Applications

- At signalized intersections with multi-lane roadways.
- At locations where a low-stress left turn movement for bicyclists is desirable.

### Design Considerations

- Should be located out of the way of through bicyclists, usually between the bike lane and the crosswalk. If there is on-street parking, space may be available between the bike lane and vehicle travel lane.
- Consider using passive bicycle detection in the two-stage left turn box to call the green signal phase for bicyclists.

### Additional Guidance

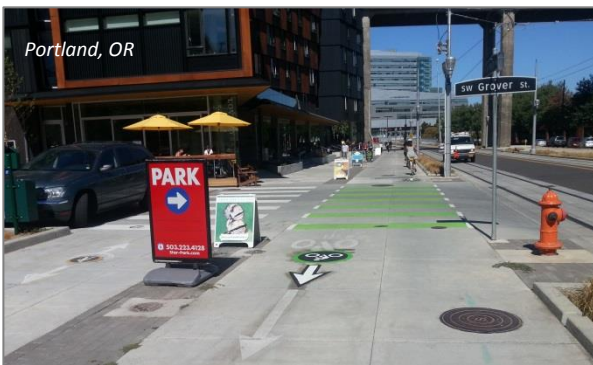
- Manual on Uniform Traffic Control Devices (experimental status)
- FHWA Separated Bike Lane Planning and Design Guide



# Bicycle Intersection Treatments

## PAVEMENT MARKINGS THROUGH INTERSECTIONS

Cost: \$



*Pavement markings can be extended through the intersection for both cycle tracks and bicycle lanes. Green paint can be used in “conflict zones” where vehicles and bicycles may cross paths in intersections, at driveways, or at right turn pockets.*

### Benefits

- Green paint can alert drivers of a conflict zone.
- Paint through an intersection can help bicyclists know where to cross and alert drivers to look for bicyclists.

### Constraints

- Paint may wear more quickly in intersections and require additional maintenance due to vehicles crossing it more frequently.

### Typical Applications

- Intersections and conflict zones, especially in high-traffic or high-speed areas.

### Design Considerations

- Use white dashed lines at a minimum to extend a treatment through an intersection or across a conflict zone. Dashed green pavement can enhance awareness and visibility.
- Other non-standard treatments, such as solid green paint or bicycle “chevron” markings have been used in locations throughout the US.

### Additional Guidance

- Manual on Uniform Traffic Control Devices (experimental status)
- FHWA Separated Bike Lane Planning and Design Guide
- NACTO Urban Bikeway Design Guide



# Bicycle/Pedestrian Amenities

## BICYCLE PARKING

Cost: \$



*Devices and/or areas that allow secure bicycle parking, often located at areas of high bicycle and pedestrian traffic such as bus stations, shopping centers, schools, and multi-use trails.*

### Benefits

- Provides a secure location to store and lock bicycles.
- Relatively inexpensive and easy installation.
- Encourages community bicycle use and makes local attractions/businesses more accessible to bicyclists.

### Constraints

- Requires space in potentially busy areas, such as sidewalks.
- May remove on-street parking space if located on the roadway.

### Typical Applications

- Typically provided at areas of high bicycle and pedestrian traffic such as bus stations, shopping centers, schools, and multi-use trails.

### Design Considerations

- The size and design of the bicycle rack can vary based on the estimated number of users and available space.
- Covered bicycle parking can provide protection from the weather for parked bicycles and people as they lock and unlock bikes. Bike lockers can provide additional security.
- If possible, bicycle racks should be placed immediately adjacent to the entrance/location they serve.
- Rack should not be placed to block the entrance of a building or inhibit pedestrian flow.
- Racks should be easy to find, convenient, and secure.

### Additional Guidance

- APBP Bicycle Parking Guidelines



# Bicycle/Pedestrian Amenities

## STREET FURNITURE AND LIGHTING

Cost: \$\$-\$\$\$



Austin, TX



Ft Lauderdale, FL

Street furniture includes pedestrian seating, information/wayfinding structures, and trash cans. Street furniture and lighting can be used to enhance the pedestrian experience and encourage pedestrian activity on a street.

### Benefits

- Encourages walking and sense of comfort and security for pedestrians.
- Relatively inexpensive and easy installation.
- Encourages foot traffic and can make local attractions/businesses inviting.

### Constraints

- Requires space in potentially busy areas, such as sidewalks.

### Typical Applications

- Typically provided at areas of high bicycle and pedestrian traffic such as bus stations, shopping centers, schools, and multi-use trails.
- Street furniture and pedestrian-scale lighting is usually provided on corridors with commercial activity and anticipated high-pedestrian use.

### Design Considerations

- Street furniture should not be placed to block the entrance of a building or inhibit pedestrian flow.
- The type and size of street furniture should be based on the available space and anticipated demand.
- Street furniture should be accessible to all users.

### Additional Guidance

- AASHTO Roadway Lighting Design Guide



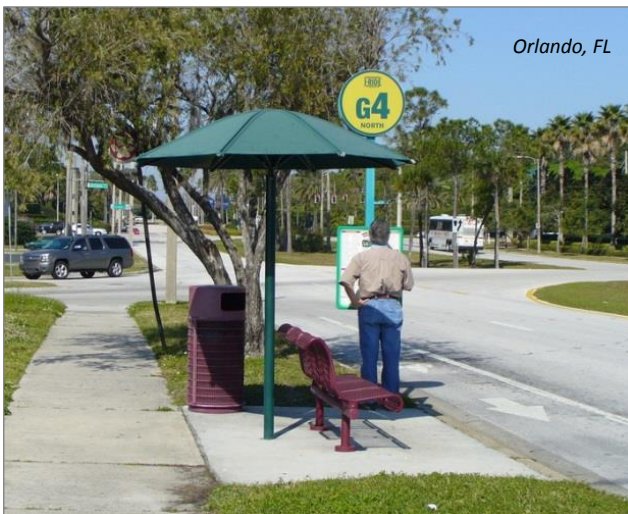
# Bicycle/Pedestrian Amenities

## TRANSIT STOP SHELTERS

Cost: \$\$\$



Portland, OR



Orlando, FL

*Transit stop shelters help protect passengers waiting to load the bus from the elements and provides a great level of comfort. They also increase the visibility of transit stops and attractiveness for riders.*

### Benefits

- Provides protection from the elements and a place to sit for people waiting for transit.
- Provides a prominent visual cue about where the transit stop is located.

### Constraints

- Costs more than a simple signed bus stop.
- Require additional sidewalk width beyond a standard 6-foot width.

### Typical Applications

- Typically provided at bus stops with higher levels of activity or those that serve major transfer points, senior communities, schools, or major trip generators.
- May be paired with other bus stop amenities, like benches and bicycle parking.
- Shelters can be fully enclosed or just an overhead canopy, although semi-enclosed shelters are most common.

### Design Considerations

- The style of the transit stop shelter can depend on the preferences of the local jurisdiction.
- At stops with a high number of daily boardings (i.e. over 100), a larger shelter or multiple shelters should be considered.
- Shelters should be cleaned and maintained regularly.
- Shelters should have transparent sides for greater visibility and panels should be resistant to fading or clouding.

### Additional Guidance

- TCRP Report 19: Guidelines for the Location and Design of Bus Stops





# Traffic Calming Measures

## RUMBLE STRIPS

Cost: <\$



*Pavement surface treatments intended to cause drivers to experience vehicular vibrations signaling them to slow down. Rumble strips can be raised pavement markers across the roadway or grooves along the shoulder or centerline. Rumble strips are best used in conjunction with other traffic calming treatments.*

### Benefits

- Low cost.
- Speed reduction and increase in driver awareness.

### Constraints

- Vibration noise created may be inappropriate in residential areas.
- Perceived more as a warning to slow down, than a physical measure that forces slower speeds.
- Impact the comfort and control of bicyclists.
- Potential impacts on pavement deterioration based on pavement quality and placement.

### Typical Applications

- Roadways with high speeds or where driver inattention is an issue.
- Rumble strips can be used on shoulders to alert drivers they are entering a part of the roadway not intended for use.
- Roadway rumble strips placed across the roadway are used to alert drivers of a changing roadway condition or the need for speed reduction.

### Design Considerations

- All road users need to be considered and accommodated. Bicycles need particular attention, especially if they are expected to use the roadway or shoulders.
- There are a variety of types of rumble strips, so the site application should be considered to determine the most appropriate design.

### Additional Guidance

- FHWA Technical Advisory: Shoulder and Edge Line Rumble Strips



# Traffic Calming Measures

## SPEED BUMPS, SPEED HUMPS, SPEED TABLES

Cost: \$\$



Howard County, MD



Austin, TX



Kissimmee, FL

There are a number of raised treatments that can be used in the roadway to slow vehicular traffic, including speed bumps, humps and tables.

Speed humps utilize a larger vertical radius than speed bumps that results in wider widths and a gentler crossing by vehicles.

Speed tables are wide mountable obstructions installed on the pavement surface across travel lanes, and intended to cause vehicles to slow. Speed tables are wider flat-top speed humps, and are gentler on vehicles. They can be used on higher order roads than bumps or humps, because they allow a smoother ride and higher speeds.

### Benefits

- Relatively inexpensive.
- Effectively slows vehicle speeds, with speed bumps and humps reducing speeds more than speed tables.
- Easily navigated by bicyclists.

### Constraints

- May be considered noisy by nearby residents.
- Forces emergency vehicles to slow down.
- Inappropriate on streets with bus traffic due to rider comfort and reduced travel speeds.

### Typical Applications

- Speed bumps or humps can be used on lower order roadways, while speed tables are appropriate on higher order roadways.
- Roadways where a reduction in speeds and traffic calming is desired.
- Speed bumps, humps, or tables work well with curb extensions.

### Design Considerations

- Drainage needs should be considered and accommodated.
- Treatments should be used midblock, not at intersections.
- Treatments are not appropriate on roadways with grades over 8%.
- Advance signing and pavement markings on the treatment can be provided.
- Typically preferred for treatment not to cover a bike lane.

### Additional Guidance

- ITE Traffic Calming Measures



# Traffic Calming Measures

## REDUCED CURB RADII

Cost: \$\$



*Street corner is reconstructed with a smaller radius to reduce vehicle turning speeds.*

### Benefits

- Forces sharper turn by right-turning motorists and thus slower speeds.
- Improves safety of pedestrians by reducing crossing width and slowing motorists.

### Constraints

- Requires additional space that may not be available.
- Makes turning movements more challenging for large vehicles and may not accommodate all trucks.

### Typical Applications

- Typically used at intersections with high vehicle speeds and high pedestrian volumes where space is available.

### Design Considerations

- The street type, angle of intersection, land uses, etc. should be considered when designing the curbs.
- Maintenance vehicles, emergency vehicles, school buses, and other anticipated large vehicles should be provided for in the design.
- The effective turning radius (considering presence of parking, bike lanes, medians, etc.) should be used to evaluate the ability of vehicles to make a turn, not the curb return radius.
- In locations where reducing the curb radius is challenging based on design vehicles, consider using a compound radius, at-grade paving treatments, or advance stop lines.

### Additional Guidance

- FHWA Signalized Intersections: An Informational Guide
- FHWA Pedestrian Safety Guide for Transit Agencies
- NACTO Best Practices for Pedestrian Master Planning and Design

Appendix D    Technical Memorandum 3:  
                         Alternatives Analysis



## Final Technical Memorandum #3- Alternatives Analysis

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Date: October 30, 2015 Project #: 18974  
To: Technical Advisory Committee & Citizen Advisory Committee  
From: Ashleigh Griffin, Nick Foster, AICP, and Marc Butorac, PE, PTOE; Kittelson & Associates  
Jeremy Morris, PE; Adkins Consulting Engineering  
Subject: Klamath Falls Urban Trail Master Plan – Alternatives Analysis

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This memorandum provides an assessment of project alternatives to be included in the Klamath Falls Urban Trail Master Plan. The preliminary recommendations from the draft version of this memorandum have been reviewed with the Technical Advisory Committee (TAC) and Citizen Advisory Committee (CAC). This final version of the memo includes modifications made to the project team's preliminary recommendations based on the feedback from the CAC and TAC. The recommended projects in this memorandum will be advanced to the draft master plan.

### BACKGROUND

The Klamath Falls Urban Trail Master Plan will identify and coordinate opportunities to create seamless connections between the urban trails and nearby attractions as well as nearby pedestrian and bicycle facilities. The intent of the Klamath Falls Urban Trail Plan is to identify key pedestrian and bicycle connections to the existing trail system and to identify key gaps and deficiencies of the trail system. The Plan is not a full pedestrian and bicycle plan; gaps in the pedestrian and bicycle system that do not relate to trail access are not included in this study.

### PLAN ELEMENTS

The final Klamath Falls Urban Trail Master Plan will include the following elements, which will be prioritized in the final Plan:

- **Projects** – capital investment made to improve the existing trail system and the bicycle and pedestrian system that connect to it. Examples include new shared-use paths, bicycle lanes, sidewalks, and crosswalks. In some cases, these projects could be implemented as pilot, or test, projects for a certain time period and then modified based on the evaluation during this period for final implementation.
- **Policies** – statements adopted in the Klamath Falls Urban Trail Plan that are intended to influence and guide decisions and actions related to pedestrian and bicycle planning. As an example, policies could relate to requirements for new developments to incorporate bicycle parking or provide pedestrian and bicycle facilities.

- **Programs** – plans of action aimed at accomplishing an identified County or City goal(s) that commonly include details on what work is to be done, by whom, when, and the intended outcome of the action. An example is implementing a program to install wayfinding signage at all trail crossings and trailheads.
- **Future Studies** – research and investigation to be completed after the Klamath Falls Urban Trail Master Plan is completed. Such studies will not be done during the Urban Trail Master Plan process due to lack of available data, a need for guidance and/or analysis from responsible agencies, and/or the need for a focused public involvement and analysis process beyond the Urban Trail Master Plan scope of work and budget.

Note that the term “project” is used throughout this memorandum to refer to plan elements for ease and brevity. For example, the “projects” for evaluation described in the next section include all elements of the Plan, including capital projects, policies, programs, and future studies.

## ALTERNATIVES EVALUATION

Projects have been developed to address the gaps and deficiencies identified in Technical Memorandum #2. These gaps and deficiencies were identified from feedback from the general public and project advisory committees and the project team’s evaluation. In many instances, multiple alternative projects for a single gap or deficiency are presented in this memorandum, along with the project team’s assessment of the options. Project alternatives are based on feedback from the advisory committee and the general public, the 2012 Klamath Falls Urban Area Transportation System Plan, and the project team’s experience with developing bicycle and pedestrian projects.

The project team’s recommendations include specific projects (e.g. stripe a bicycle lane, add beacons to a crosswalk) whenever possible. However, there are instances when more information is needed that is beyond the scope of this area-wide plan and the recommendation is for further study.

The recommendations were selected based on the overall project goal of identifying low-cost, easy to implement solutions that provide comfortable and convenient access to the trail system for a wide range of people and feedback from the advisory committees. For instance, the recommended projects for improving the bicycle system are only those types of facilities that most adults would feel comfortable bicycling on (i.e. Level of Traffic Stress 1 or 2). Table 1 summarizes the potential types of bike facilities that would be required to meet this objective on different types of roads. Note that the table provides general guidelines and site specific characteristics (e.g., number and type of driveways, traffic volumes) are also considered in our recommendations.

**Table 1 Bicycle Facility Suitability Matrix**

Speed Limit	# of Lanes	Suitable Bike Facility Types				
		Shared Lane <sup>1</sup>	Bike Lane	Buffered Bike Lane	Protected Bike Lane	Shared-use Path
<=25 MPH	2-3	Y	Y	Y	Y	Y
	>3	-	-	Y	Y	Y
30 MPH	2-3	M <sup>2</sup>	Y	Y	Y	Y
	>3	-	-	Y	Y	Y
35 MPH <sup>3</sup>	2-3	-	-	Y	Y	Y
	>3	-	-	Y	Y	Y
>=40 MPH <sup>3</sup>	2-3	-	-	-	Y	Y
	>3	-	-	-	Y	Y

<sup>1</sup>Includes streets with sharrows

<sup>2</sup>Suitable treatment only if traffic volumes are low and there is no centerline on the roadway

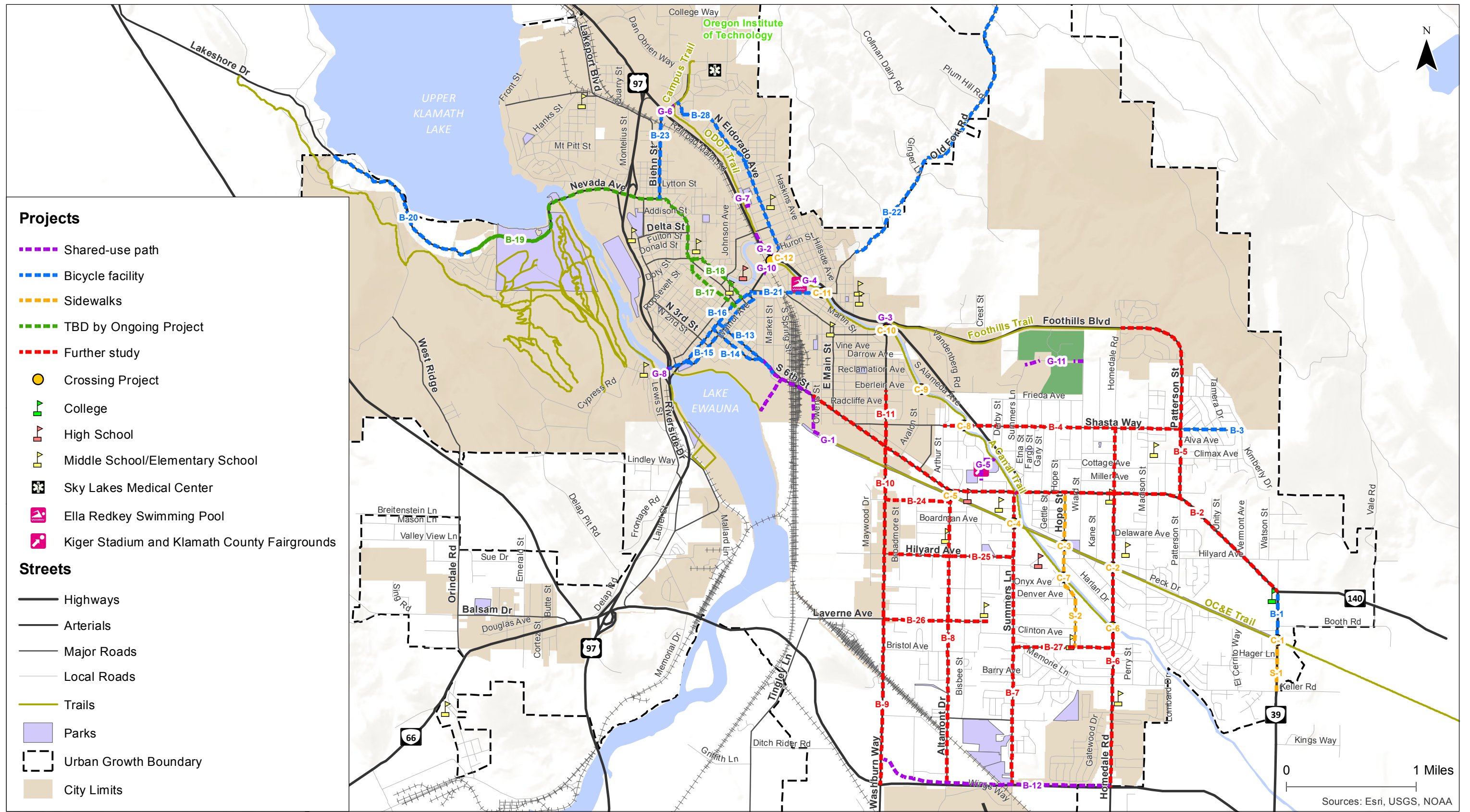
<sup>3</sup>On higher speed roadways where a protected bike lane is not feasible and/or desirable, the best option may be to provide a parallel route on lower speed roadways

Further, whenever possible, the lowest cost means to implement a project is recommended. This consideration typically occurs when evaluating how to install some type of bike lane or provide an enhanced crossing. Restriping a roadway to provide a bike lane, as opposed to widening the roadway, is generally recommended. Instances where restriping may necessitate the removal of a motor vehicle travel lane or center turn lane will likely require further study and detailed public involvement before they can be implemented.

## PROPOSED PROJECT LIST

Table 2 summarizes the project list. The locations of each project are shown in Figure 1. The complete evaluation matrix, which includes all alternatives that were considered, is provided in *Attachment A*. The columns in the table below describe:

- **ID:** unique identifying number assigned to each proposed project, corresponding to the need identified in Technical Memorandum #2.
- **Location Name/Description:** general description of the location of the issue, including the boundary of the issue.
- **Issue:** description of the issue (gap, deficiency, etc.)
- **Project Description:** a description of the proposed project with key elements identified
- **Category:** projects are classified into general categories based on plan element type, with capital projects further categorized into shared-use path, crossing, bicycle facility, and sidewalk.
- **Benefits:** a brief discussion of the benefits of the proposed project.
- **Cost estimate:** planning-level cost estimate, intended to provide a sense of magnitude.
- **Considerations:** other site-specific characteristics or factors that warrant unique consideration in the project development phase.



**Recommended Projects  
Klamath Falls, Oregon** Figure  
**1**

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**Table 2 Recommended Project List**

ID*	Location	Issue	Project Description	Benefits	Cost Estimate <sup>A</sup>	Considerations
<b>Trail System Gaps</b>						
G-1	End of the OC&E Trail to Downtown Klamath Falls	Trail ends without obvious connection to downtown.	Connect the trail via 6th Street bridge by widening sidewalk to provide for shared-use path. Provide a connection to the soon to be constructed Lake Ewauna trail. (Note: Lake Ewauna trail connection alignment is not confirmed; cost estimate does not include this connection.)	Lower cost and easier to implement than dedicated bridge.	\$507,000	May require the crossing of 6 <sup>th</sup> Street and ramps on/off the bridge. Requires trail users to travel to 6 <sup>th</sup> Street. More work will be needed to determine if the bridge can accommodate the additional concrete weight. By routing the trail connection through the Klamath Works property, the trail will connect to the future pedestrian crossing being installed at SW 6 <sup>th</sup> Street/Adams Street.
G-2	Connecting the "A" Canal Trail to the ODOT Trail	There is currently a ¼-mile gap between these two trails and a crossing of Crater Lake Parkway.	Connect the trail using Crater Lake Parkway by widening the sidewalks to provide for a shared-use path.	Lower cost to implement and maintain.	\$68,000	Requires crossing Crater Lake Highway. Requires a trail crossing of Esplanade Avenue. Requires widening the sidewalk on the bridge to connect the "A" Canal Trail to the signalized intersection.
G-3	Connecting the "A" Canal Trail to the Foothills Trail	The Foothills Trail ends at the intersection of Foothills Boulevard/ Crater Lake Parkway, and there is a gap between the intersection and the "A" Canal trail.	Widen the sidewalk on the east side of the bridge to provide a shared use path between the intersection and the "A" Canal trail. Tighten the curb radius for NB right-turns onto Crater Lake Parkway.	This option uses the existing signalized crossing as well as sidewalks and bike lanes south of OR 39 to complete the transition. By expanding the sidewalk to a path on the east side, it allows southbound bicyclists to continue from the Foothills Trail to the "A" Canal trail eastbound with only one crossing. Project could be phased in. Tightening the curb radius will slow down right-turn making the crossing more comfortable.	\$60,000	Accommodating the shared-use path on the bridge may require either removing the bike lanes or lane width reductions. Requires a trail crossing of Washburn Way.
G-4	Connecting the "A" Canal Trail to the Ella Redkey Swimming Pool	The trail is grade separated from the pool.	Connect the trail by installing a shared-use path between the parking lot/front entrance to the pool and the existing "A" Canal Trail.	Low cost, short trail connection needed.	\$15,000	May require right-of-way or an easement.
G-5	Connecting the "A" Canal Trail to the Kiger Stadium and Klamath County Fairgrounds	The trail is grade separated from these locations.	Pave the existing informal service road from the "A" Canal Trail to the Kiger Stadium Parking lot. Install a shared use path along the west side of Crest Street from the Kiger Stadium Parking lot to the Fairgrounds.	Provides facility for both pedestrians and bicyclists. Separates pedestrians and bicyclists from vehicles at Kiger Stadium.	\$105,000	May require right-of-way or an easement to reach Crest Street. More costly than only connecting to the Stadium.
G-6	Campus Trail to Biehn Street Connection	There is a gap between the Campus Trail and the bike lane on Biehn Street, which connects to Oregon Avenue and downtown Klamath Falls.	Widen the sidewalk on the south side of Campus Drive to complete the shared-use path connection. Possible modifications to the Crater Lake Parkway intersection.	This connection would also connect with the ODOT trail. Uses the existing intersection of Crater Lake Parkway/Biehn Street to complete the highway crossing.	\$47,000	Southbound cyclists coming from the Campus Trail would use the crosswalks at the signalized intersection to transition to bike lanes. Modifications to the Crater Lake Parkway intersection may be required to create a comfortable crossing.
G-7	Connecting the ODOT Trail to Kit Carson Park	The ODOT Trail travel adjacent to the park, but a fence separates the park from the trail.	Construct a connection between the trail and the parking lot or existing sidewalk connecting the street to the park.	Low cost, short trail connection needed.	\$18,000	May require right-of-way or an easement.
G-8	Veteran's Park Trail Connections	There are no bicycle connections between Veteran's Park and the Link River Trail.	Widen the sidewalk on the north side of Main Street to provide for a shared use path to connect Veteran's Park with the Link River Trail. Install a crossing across Main Street west of the park road's access to Main Street to connect Veteran's Park with the path. Sharrows may work as an interim solution.	Provides a separated facility for pedestrians and bicyclists between two popular destinations.	\$51,000	Lanes will have to be narrowed on the bridge to accommodate the shared-use path. An additional crossing of Main Street may be needed on the west side of the bridge. Ultimate configuration should be determined with redesign of interchange area.
G-9	"A" Canal Trail to Crossing at SW 6th Street	The trail crosses SW 6th Street approximately 40 feet east of the crosswalk at the signalized intersection of Summers Lane/SW 6th Street.	Widen the sidewalk on the south side of SW 6th Street to better accommodate bicyclists connecting to the signalized crossing.	Low cost; requires minimal out of direction travel.	\$7,000	Will need to verify there is sufficient right-of-way.
G-10	"A" Canal Trail Connection to Klamath Union High School	There is no connection for bicyclists between the "A" Canal Trail and the high school.	Widen the sidewalk on the north side of Esplanade Avenue to provide a shared-use path to the high school. Coordinate with school for completing the connection.	There appears to be adequate width available under the railroad bridge to complete the widening. Provides connection for bicyclists between the trail and high school.	\$127,000	Coordination with the school will be required.

ID*	Location	Issue	Project Description	Benefits	Cost Estimate^	Considerations
G-11	Southern Connection to Steen Sports Park	There is no connection to Steens Sports Park from the south without using Homedale Road and Foothills Boulevard.	Formalize connections between Summers Lane and/or Wiard Street and Steens Sports Park	Will create a more direct access to the south of the park.	\$40,000	May require right-of-way or an easement to complete the connection.
<b>Crossings</b>						
C-1	OR 39: OC&E Trail Crossing	This crossing is currently only marked with a sign. The NCHRP 562 treatment recommendation is an Active/Enhanced crossing.	TBD by ongoing ODOT and Oregon Parks study			
C-2	Homedale Road: OC&E Trail Crossing	This crossing is currently not marked or signed. The NCHRP 562 treatment recommendation is a crosswalk.	TBD by ongoing ODOT and Oregon Parks study			
C-3	Hope Street: OC&E Trail Crossing	This crossing is currently marked with a sign. The NCHRP 562 treatment recommendation is a crosswalk.	Install striped crosswalk and appropriate signage.	Low cost.	\$2,000	Consider installing illumination at the crossing as well (it is currently located nearby but not at the crossing).
C-4	Summers Lane: OC&E Trail Crossing	This crossing is currently only marked with a sign. The NCHRP 562 treatment recommendation is an Active/Enhanced crossing.	TBD by ongoing ODOT and Oregon Parks study			
C-5	Altamont Drive: OC&E Trail Crossing		TBD by ongoing ODOT and Oregon Parks study			
C-6	Homedale Road: A Canal Trail Crossing	This crossing is currently marked with a sign. The NCHRP 562 treatment recommendation is a crosswalk.	Install marked crosswalk, appropriate signage, and raised median island.	Low cost.	\$8,000	Consider installing illumination at the crossing as well (there is not existing illumination on Homedale Road in the crossing vicinity).
C-7	Hope Street: A Canal Trail Crossing	This crossing is currently marked with a sign. The NCHRP 562 treatment recommendation is a crosswalk.	Install marked crosswalk and appropriate signage.	Low cost.	\$2,000	Consider installing illumination at the crossing as well (there is no existing illumination in the vicinity). Sight distance from the south should be verified.
C-8	Shasta Way: A Canal Trail Crossing	This crossing is currently only marked with a sign. The NCHRP 562 treatment recommendation is an Active/Enhanced crossing.	Further study required to determine final treatment. Active crossing treatments recommended. See Alternatives Evaluation Matrix for options.	Improved crossing opportunities.	TBD	A median island would require removing the left-turn lane.
C-9	Eberlein Avenue: A Canal Trail Crossing	This crossing is currently marked with a sign. The NCHRP 562 treatment recommendation is a crosswalk.	Further study required to determine final treatment. Active crossing treatments recommended. See Alternatives Evaluation Matrix for options.	Improved crossing opportunities.	TBD	Close proximity of Avalon Street may present issues

ID*	Location	Issue	Project Description	Benefits	Cost Estimate^	Considerations
C-10	Washburn Way: A Canal Trail Crossing	This crossing is currently only marked with a sign. The NCHRP 562 treatment recommendation is an Active/Enhanced crossing.	Further study required to determine final treatment. Active crossing treatments recommended. See Alternatives Evaluation Matrix for options.	Improved crossing opportunities.	TBD	A median island would impact left-turn lane storage. Close proximity to Crater Lake Parkway.
C-11	Main Street: A Canal Trail Crossing	This crossing is currently not marked or signed. The NCHRP 562 treatment recommendation is an Active/Enhanced Crossing.	Further study required to determine final treatment. Active crossing treatments recommended. See Alternatives Evaluation Matrix for options.	Improved crossing opportunities.	TBD	Queuing from the Crater Lake Parkway intersection may block the crossing at times. Free right-turn from Crater Lake Parkway onto Main Street may need to be modified.
C-12	Esplanade Avenue: A Canal Trail Crossing	This crossing is currently not marked or signed. The NCHRP 562 treatment recommendation is an Active/Enhanced Crossing.	Further study required to determine final treatment. Active crossing treatments recommended. See Alternatives Evaluation Matrix for options.	Improved crossing opportunities.	TBD	A median island would impact left-turn lane storage. Close proximity to Crater Lake Parkway. Queuing from the Crater Lake Parkway intersection may block the crossing at times.
<b>On-Street Bicycle Connections</b>						
B-1	OR 39 (OC&E Trail to OR 140)	This segment has a LTS of 3. There are no existing bicycle lanes.	Install protected or buffered bike lanes.	Potentially a low cost improvement.	\$12,000	May require additional pavement. Project will primarily serve future development in the area.
B-2	6th Street (Railroad Bridge to OR 39)	This segment has a LTS of 4. This is a four-lane road with a center turn lane. There are no bike lanes.	Identify if there are parallel routes that would provide similar connectivity but greater comfort	Low volume, low speed local roads can provide comfortable alternatives to high-speed, high volume arterials	TBD	Access to specific destinations on 6 <sup>th</sup> Street will need to be considered. Local street connectivity is fragmented in locations. Use trails whenever possible.
B-3	Shasta Way (Patterson Street to Kimberly Drive)	This segment has a LTS of 4. It is currently a two-lane road with a marked centerline and pavement width of approximately 22 feet.	Install sharrows and traffic calming.	Width is not sufficient for bike lanes. Appears to be relatively low-volume street. The sharrows would alert vehicles that bicyclists share the road. Does not require roadway widening.	\$43,000	Sharrows alone will not do much for the comfort of people bicycling. Traffic calming will also be required to lower the speed people are driving.
B-4	Shasta Way (Patterson Street to Crater Lake Parkway)	This segment has a LTS of 4. No bike lanes are present, and the existing pavement width is approximately 37' wide with one travel lane in each direction and center turn lanes throughout.	Look for opportunities for alternate routes or for traffic calming measures on Shasta Way	Low volume, low speed local roads can provide comfortable alternatives to high-speed, high volume arterials	TBD	Local street connectivity is fragmented in locations.
B-5	Patterson Street (6 <sup>th</sup> Street to Foothills Boulevard)	The segment has a LTS of 4. There are no existing bicycle lanes.	Further study required to determine final treatment. Candidates include buffered bike lanes or a shared-use path.	TBD	TBD	Needs to tie into Foothills Trail
B-6 – B-11	North-South Routes in SE Klamath Falls	These routes all have an LTS of 3 or 4.	Further study required to determine which routes will be designated for bicycle travel and what the treatment is.	TBD	TBD	Parallel routes may be an option in certain locations.
B-12	OR 140 (Washburn Way to Homedale Road)	This segment has a LTS of 4.	Install shared-use path.	Installing it along the north side of the road would minimize the number of bicycle crossings of OR 140. Provides physical separation between bikes and vehicles. Provides facility for pedestrians too.	\$820,000	One crossing of the railroad is involved. Requires some type of transition between OR 140 and Washburn Way (which is connected by on/off ramps). May require purchasing right-of-way. Treatments may be needed at crossings with minor streets.

ID*	Location	Issue	Project Description	Benefits	Cost Estimate^	Considerations
B-13	6th Street (Market Street to Main Street)	This segment has a LTS of 3. There are no existing bicycle facilities on the road. The road is one-way with two travel lanes and a total pavement width of 46 feet. In the downtown area there are turn lanes and on-street parking.	Install bike lane.	No roadway widening is required.	\$8,000	One side of on-street parking may need to be removed.
B-14	5th Street (Main Street to 6th Street)	This segment has a LTS of 4. There are no existing bicycle facilities on the road. The road is one-way with two travel lanes and a total pavement width of 45 feet. In the downtown area there are turn lanes and on-street parking.	Install bike lane.	No roadway widening is required.	\$9,000	
B-15	Klamath Avenue (Conger Avenue to Commercial Street)	This segment has a LTS of 3. This is a one-way eastbound segment with no bike lanes.	Install bike lanes. <i>Coordinate with the Blue Zones project.</i>	No roadway widening is required.	\$15,000	May require the removal of on-street parking on at least one side of the road to accommodate the bike lane width.
B-16	Main Street (Esplanade Avenue to Mill Street)	This segment has a LTS of 3. This is a one-way westbound segment with no bike lanes.	Install bike lanes. <i>Coordinate with the Blue Zones project.</i>	No roadway widening is required.	\$15,000	
B-17	9th Street (Klamath Avenue to Prospect Street)	This segment has a LTS of 3. There are no bicycle lanes; the 2-way roadway has a minimum pavement width of 26 feet.	TBD by ongoing project			
B-18	N 11th Street (Oregon Avenue to Klamath Avenue)	This segment has a LTS of 3. There are no bicycle lanes. The 2-lane roadway has a minimum pavement width of 25 feet.	TBD by ongoing project			
B-19	Oregon Avenue (Moore Park to Upham Street)	The segment has a LTS of 3. Although there are bike lanes, they are narrow. Actual traffic speeds are expected to be higher than posted.	TBD by ongoing project			
B-20	Lakeshore Drive (Lynnewood Blvd to West UGB)	The segment has a LTS of 3. There are no shoulders or bike lanes.	Widen the pavement to accommodate shoulders or bike lanes.	Provides a facility for bicyclists.	\$1,860,000	The road will need to be widened to accommodate paved shoulders, and the some earthwork is likely to be needed with the widening. There may be some ROW impacts associated with roadway widening.

ID*	Location	Issue	Project Description	Benefits	Cost Estimate^	Considerations
B-21	Main Street (Esplanade Avenue to Crater Lake Parkway)	The segment has an LTS of 4. The eastern portion of the corridor is 4 lanes and 58-60 feet wide. Aerial images indicate this area is also used for on-street parking. The western portion of the corridor is approximately 54 feet wide and has two travel lanes with two sides of on-street parking.	Install bike lanes.	Provides a facility for bicyclists.	\$19,000	Between Spring Street and Crater Lake Parkway, elimination of the on-street parking or a road diet would be required to accommodate the bike lanes. The eastbound bike lane would require a transition treatment where E Main Street turns off of Main Street. The pavement width is not adequate for adding a bicycle lane under the railroad, so the sidewalk would need to be widened to accommodate bikes. A transition between the bike lanes and sidewalks would also be needed.
B-22	Old Fort Road (Loma Linda Drive to UGB)	The LTS is 4. The road is higher speed and lacks bike lanes and shoulders. This is a popular recreational route.	Widen the road to add paved shoulders or bike lanes.	The road appears to have some gravel shoulders today, so the additional widening may be minimal.	\$2,668,000	This is a long distance to pave (high cost).
B-23	Biehn Street (Crater Lake Parkway to Oregon Avenue)	The road is part of an important link between OIT and downtown. The existing bike lanes are narrow.	Widen the bike lanes by restriping the roadway.	No pavement widening is required. Narrowing the motor vehicle travel lanes may also calm traffic.	\$22,000	
B-24 – B-27	East-West Routes in Southeast Klamath Falls	These streets connect neighborhoods to the north-south routes that connect to the trail system.	Further study required to identify which should receive shared lane markings, wayfinding, and/or traffic calming.	Low cost improvements that could enhance comfort for people bicycling and increase the use of the trail system.	TBD	Further neighborhood outreach and speed studies may be necessary to identify specific treatments.
B-28	N Eldorado Avenue	This road lacks bicycle facilities and sidewalks on one side of the road. This road is a popular commute route to the hospital, and also connects student apartments to the campus.	Install sharrows and traffic calming.	Posted speed limit indicates that a shared-roadway would be sufficient. The sharrows would alert vehicles that bicyclists share the road. No roadway widening is required.	\$23,000	This project does not provide any new pedestrian facilities, but sidewalks exist on one side of the road.
<b>Sidewalks</b>						
S-1	OR 39 (OC&E trail to Keller Road)	There are no sidewalks.	Install sidewalks on both sides of the road.		\$396,000	May require ROW.
S-2	Hope Street (Bristol Avenue to SW 6th Street)	There are no sidewalks on Hope Street, with the exception of those around Denver Avenue.	Install sidewalks on both sides of the road.	Provides connection for pedestrians between Peterson Elementary school and the OC&E and A Canal trails. The bridge over the canal already includes sidewalks.	\$1,170,000	May require ROW.
<b>Policies/Programs</b>						
P-1	Trail Signing/Wayfinding	Wayfinding and trail signs are generally absent, including near the OC&E trailheads. Signage provides an opportunity to increase awareness and use of the trail system for residents and visitors.	Develop a program to install and maintain wayfinding signage at all trailheads and trail crossings of public streets.	Signage provides an opportunity to increase awareness and use of the trail system for residents and visitors.	--	Will need to determine who is responsible for the signs.
P-2	Bicycle Parking	Bicycle parking is absent from many destinations, including some parks.	Develop policy that requires bicycle parking to be provided at key locations and pursue grant funding to provide it at key locations where it is missing.	The policy would help future developments or redevelopment locations obtain bicycle parking. Pursuing grant funding for existing locations in need will help fill-in existing gaps.	--	

ID*	Location	Issue	Project Description	Benefits	Cost Estimate^	Considerations
P-3	Local Street Trail Crossings	The "A" Canal trail and the OC&E trails cross many local streets. There is a desire for consistent crossings.	Develop guidelines for how to evaluate trail crossings and determine the appropriate treatment for the City and County to use in applying consistent treatment at crossings for local streets.	Guidance would encourage consistent crossings on all roads throughout the trail system.	--	
P-4	Trail Illumination	Most of the trail system does not have illumination.	Evaluate the feasibility of installing illumination along the trail system, including type of illumination, priority locations, and cost/maintenance.	The study will allow engagement with nearby property owners. The illumination may help reduce crime.	--	

\*The prefix on the ID numbers refers to the category of the issue: "G-" refers to general gaps or deficiencies in the trail system; "B-" refers to segments that were identified due to having a bicycle Level of Traffic Stress (LTS) greater than 2; "C-" refers to locations with crossings that were identified for improvements; and "S-" refers to gaps in the sidewalk system; "P-" refers to policies and programs.

^Please note the costs outlined above are for 2015 and are planning level estimates only that do not include right-of-way. An annual inflation rate of 3 to 5 percent should be applied when projecting costs to the future.

## Locations for Further Study

Several locations were identified for further study. These are described below.

### *'A' Canal Trail Crossings*

The 'A' Canal Trail crosses Washburn Way, Main Street, and Esplanade Avenue in close proximity to the Crater Lake Parkway (OR 39). None of these crossings are currently marked and require trail users to divert to the nearest signal or other location to use a marked crossing. The close proximity of the trail to the Crater Lake Parkway can present the following challenges to installing a direct crossing at the trail location:

- The crossing may require shortening the left-turn lane for traffic turning onto the highway from the street being crossed, which could cause queues of left-turning traffic to block the through travel lane.
- Right-turning traffic from the highway onto the street being crossed may be traveling at a relatively high speed and not expecting to have to stop for a person crossing the road. This is particularly a concern at Main Street, where the right-turn from the highway is channelized and not controlled by the signal.

For these locations, especially Main Street, the ideal solution would be a grade-separated crossing (e.g. a bridge over the roadway). This is our ultimate recommendation for these crossings. However, we recognize that building these grade separated crossings is likely cost-prohibitive in the near or intermediate terms and that there is a near-term desire for better crossings.

Our preliminary recommendations for the interim period originally included providing enhanced at-grade crossings, generally crossings with a median refuge island and rectangular rapid flash beacons (RRFBs) with accompanying features designed to mitigate the two challenges above. These features include advanced RRFB beacons to alert turning traffic the crossing is being used, potentially reconfiguring the free right-turn onto Main Street, and studying the locations further to determine what impact the refuge island may have on left-turn storage and whether the impact can be mitigated with signal timing modifications.

The advisory committees expressed some concern about the impacts that a refuge island may have on motor vehicle traffic operations and whether a direct at-grade crossing would be safe at some of these locations. Based on this feedback, we recommend that these crossings, as well as the "A" Canal Trail crossings of Eberlein Avenue and Shasta Way, undergo a more detailed study, similar to the current OC&E Trail crossings project that ODOT and the Oregon Parks and Recreation Department (OPRD) are undertaking. These studies could include more detailed traffic operations and engineering review, as well as focused public involvement.

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### ***S 6<sup>th</sup> Street and Shasta Way***

Both of these streets have speed limits of 35 MPH. 6<sup>th</sup> Street has four travel lanes, a center turn lane, and a number of commercial driveways. It will likely only be a comfortable route for people to bicycle on if its character is significantly changed through access management, providing protected bike lanes, and possibly removing travel lanes. Based on comments from the advisory committees, such a make-over of the road is not likely to occur. Therefore we do not recommend any improvements for 6<sup>th</sup> Street and that access to 6<sup>th</sup> Street from the trail system be considered as part of a future effort considering wayfinding in the area.

Shasta Way has two travel lanes and a center turn lane. Because of its 35 MPH speed limit, it is not likely to be a comfortable route for most people to bicycle on without a buffered or protected bike lane. The only way to provide such a facility would be to either expand the road or to remove the center turn lane. Advisory committee members generally preferred that other options be explored, such as looking for alternate routes or traffic calming along Shasta Way.

### ***Southeast Klamath Falls***

Southeastern Klamath Falls (i.e., the area roughly bounded by OR 140 to the south, Washburn Way to the west, Homedale Road to the east, and the OC&E Trail to the north) is generally recommended for further study to identify which north-south and east-west routes are optimal for providing bicycle routes to the trail system.

North-south collector roads generally have three lanes and 35 MPH speed limits. Providing buffered or protected bike lanes would be the recommendation for these routes to provide a comfortable bicycle facility for most people. However, this would require either widening the roadways or removing center turn lanes. In certain cases, parallel local roads (e.g., Bisbee Street) could be used to provide the connection. Therefore, we recommend further study including public involvement to determine which north-south routes are the most appropriate for bicycle travel in this area.

In instances where a parallel route is determined to be the most desirable way forward, wayfinding signage should be used to direct trail users to the route and to destinations along the route. Appropriate crossings of major streets should also be provided. Enhancing the route for bicycle travel through traffic calming and/or diversion measures should also be considered.

East-west routes were not analyzed in Technical Memorandum #2 primarily because these routes do not provide direct trail connections. At the request of Advisory Committee members, we have reviewed the major east-west routes in this area, shown as projects B-24 through B-27 in Figure 1, for this memorandum. These streets generally have one travel lane in each direction, sidewalks, and posted speed limits of 25 MPH. Given these conditions, these streets are likely to operate comfortably for many adults as shared streets for bicycling. Shared lane markings (i.e., sharrows) along with wayfinding signage would be an appropriate treatment for these routes. Traffic calming measures (e.g., bulb-outs,



chicanes) could also be deployed on these streets if people are driving faster than the posted 25 MPH speed limit.

## NEXT STEPS

The project team revised this memorandum and the project list based on feedback from the CAC and TAC. These projects will be advanced into the draft version of the Urban Trail Master Plan. This plan will be reviewed with both committees at the next project meeting and the general public at an open house, currently scheduled for December 9, 2015. The recommended projects will be refined based on feedback received from these meetings, as well as from ongoing coordination with other projects in the area, in particular the Blue Zones project, before they are advanced into the final plan.

Attachment A Alternatives Evaluation Matrix

ID	Location	Issue	Potential Project	Benefits	Cost Estimate	Considerations	Recommended Project	Recommended for Further Analysis
G-1	End of OC&E Trail to Downtown Klamath Falls	Trail ends without obvious connection to downtown	Extend the trail over RR tracks to downtown, as planned for in 2012 TSP	Direct connection Keeps trail users separate from high-speed/high-volume streets	\$5.5 Million (TSP)	High Cost	Connect the trail via 6th Street bridge by widening sidewalk to provide for shared-use path. Provide a connection to the soon to be constructed Lake Ewauna trail. (Note: Lake Ewauna trail connection alignment is not confirmed; cost estimate does not include this connection.)	
			Connect the trail via 6th Street bridge by widening sidewalk to provide for shared-use path. Provide a connection to the soon to be constructed Lake Ewauna trail. (Note: Lake Ewauna trail connection alignment is not confirmed; cost estimate does not include this connection.)	Lower cost and easier to implement than dedicated bridge	\$507,000	May require crossings of 6th Street and ramps on/off bridge.		
			Connect the trail via Main Street undercrossing	Lower cost and easier to implement than dedicated bridge Only interaction with 6th Street is a signalized crossing	\$107,000	Out-of-direction to most of downtown. Requires trail users to ride in traffic under the railroad bridge or use sidewalk too narrow for people biking and walking to comfortably share. Main Street does not have bicycle lanes. The width would allow it, but it requires the removal of on-street parking.		
G-2	Connecting the "A" Canal Trail to the ODOT Trail	There is currently a ¼-mile gap between these two trails and a crossing of Crater Lake Parkway.	Connect the trail via Crater Lake Parkway by widening the sidewalks to provide for shared-use path.	Lower cost to implement and maintain.	\$68,000	Requires crossing Crater Lake Parkway. Requires a trail crossing of Esplanade Avenue. Requires widening the sidewalk on the bridge for a shared-use path to connect the A Canal trail to the intersection of Esplanade Avenue/Crater Lake Parkway.	Connect the trail via Crater Lake Parkway by widening the sidewalks to provide for shared-use path	
			Connect the trail by constructing a new shared-use path along the railroad tracks.	Requires fewer conflicts with local streets than using the Crater Lake Parkway sidewalks. The crossing of Crater Lake Parkway would occur at the signal of Esplanade Avenue/Crater Lake Parkway. Provides a connection to the school ballfields area.	\$819,000	Would require separate bridge at the river crossing. Requires a trail crossing of Esplanade Avenue. Requires expanding the sidewalk to accommodate a shared-use path under the railroad tracks. Would likely require ROW or an easement from the railroad.		
			Connect the "A" Canal trail to the school using the school's canal bridge and a new shared-use trail connect, and then connect to Upham Street and Crescent Street.	Provides a connection to the school. Uses an existing bridge to cross the canal. Uses the crossing of Crater Lake Highway at Portland Street to complete the connection to the ODOT Trail, but may also provide a connection to the bike lanes on Oregon Avenue via Upham Street.	\$206,000	Requires expanding the sidewalk to accommodate a shared-use path under the railroad tracks. Requires a trail crossing of Esplanade Avenue. May require ROW from the school.		
G-3	Connecting the "A" Canal Trail to the Foothills Trail	The Foothills Trail ends at the intersection of Foothills Boulevard/Crater Lake Parkway, and there is a gap between the intersection and the "A" Canal trail south of the canal.	Widen the sidewalk on the east side of the bridge to provide a shared use path between the intersection and the "A" Canal trail. Tighten the curb radius for NB right-turns onto Crater Lake Parkway. Project could be phased in. Tightening the curb radius will slow down right-turns making the crossing more comfortable	This option uses the existing signalized crossing as well as sidewalks and bike lanes south of OR 39 to complete the transition. By expanding the sidewalk to a path on the east side, it allows southbound bicyclists to continue from the Foothills Trail to the "A" Canal trail eastbound with only one crossing.	\$60,000	Accommodating the shared-use path on the bridge may require either removing the bike lanes or lane width reductions Requires a trail crossing of Washburn Way. Would require out-of-direction travel if the sidewalk is not widened to a shared-use path	Widen the sidewalk on the east side of the bridge to provide a shared use path between the intersection and the "A" Canal trail. Tighten the curb radius for NB right-turns onto Crater Lake Parkway.	
G-4	Connecting the "A" Canal Trail to the Ella Redkey Swimming Pool	The trail is grade separated from the pool.	Connect the trail by installing a shared-use path between the parking lot/front entrance to the pool and the existing "A" Canal Trail.	Would provide a direct connection between the trail and a popular destination	\$15,000	May require right-of-way or an easement.	Connect the trail by installing a shared-use path between the parking lot/front entrance to the pool and the existing "A" Canal Trail.	
G-5	Connecting the "A" Canal Trail to the Kiger Stadium and Klamath County Fairgrounds	The trail is grade separated from these locations.	Pave the existing informal service from from the "A" Canal Trail to the Kiger Stadium Parking lot. Install a shared use path along the west side of Crest Street from the Kiger Stadium Parking lot to the Fairgrounds.	Provides facility for both pedestrians and bicyclists. Separates pedestrians and bicyclists from vehicles at Kiger Stadium.	\$105,000	May require right-of-way or an easement to reach Crest Street More costly than connecting to only the stadium	Pave the existing informal service from from the "A" Canal Trail to the Kiger Stadium Parking lot. Install a shared use path along the west side of Crest Street from the Kiger Stadium Parking lot to the Fairgrounds.	
	Campus Trail to Biehn Street	There is a gap between the Campus Trail and the bike lane on Biehn	Widen the sidewalk on the south side of Campus Drive to complete the shared-use path connection. Possible modifications to the Crater Lake Parkway intersection.	This connection would also connect with the ODOT trail. Uses the existing intersection of Crater Lake Parkway/Biehn Street to complete the highway crossing.	\$47,000	Southbound cyclists coming from the Campus Trail would use the crosswalks at the signalized intersection to transition to bike lanes. Modifications of the Crater Lake Parkway intersection may be required to create a comfortable crossing	Widen the sidewalk on the south side of Campus Drive to complete the	

ID	Location	Issue	Potential Project	Benefits	Cost Estimate	Considerations	Recommended Project	Recommended for Further Analysis
G-6	Connection	Street, which connects to Oregon Avenue and downtown Klamath Falls.	Provide bike lanes on Campus Drive. Possible modifications to the Crater Lake Parkway intersection.	Same as above	\$4,000	Modifications of the Crater Lake Parkway intersection may be required to create a comfortable crossing Requires southwest-bound bicyclists to transition from the shared use path to the bicycle lane, likely at the intersection with Dahlia Street. The bike lanes would need to be buffered or protected to bring the LTS below 3.	shared-use path connection. Possible modifications to the Crater Lake Parkway intersection.	
G-7	Connecting the ODOT Trail to Kit Carson Park	The ODOT Trail is adjacent to the park, but a fence separates the park from the trail.	Construct a connection between the trail and the parking lot or existing sidewalk connecting the street to the park.	Low cost, short trail connection needed.	\$18,000	May require right-of-way or an easement.	Construct a connection between the trail and the parking lot or existing sidewalk connecting the street to the park.	
G-8	Veteran's Park Trail Connections	There are no bicycle connections between Veteran's Park and the Link River Trail.	Widen the sidewalk on the north side of Main Street to provide for a shared use path to connect Veteran's Park with the Link River Trail. Install a crossing across Main Street west of the park road's access to Main Street to connect Veteran's Park with the path. Sharrows may work as an interim solution.	Provides a separated facility for pedestrians and bicyclists between two popular destinations	\$51,000	Lanes will have to be narrowed on the bridge to accommodate the shared-use path. An additional crossing of Main Street may be needed on the west side of the bridge.	Widen the sidewalk on the north side of Main Street to provide for a shared use path to connect Veteran's Park with the Link River Trail. Install a crossing across Main Street west of the park road's access to Main Street to connect Veteran's Park with the path. Sharrows may work as an interim solution.	Ultimate configuration should be determined with redesign of interchange area.
G-9	"A" Canal Trail to Crossing at SW 6th Street	The trail crosses SW 6th Street approximately 40 feet east of the crosswalk at the signalized intersection of Summers Lane/SW 6th Street.	Widen the sidewalk on the south side of SW 6th Street to better accommodate bicyclists connecting to the signalized crossing.	Low cost; requires minimal out of direction travel.	\$7,000	Will need to verify there is sufficient right-of-way.	Widen the sidewalk on the south side of SW 6th Street to better accommodate bicyclists connecting to the signalized crossing.	
G-10	"A" Canal Trail Connection to Klamath Union High School	There is no connection for bicyclists between the "A" Canal Trail and the high school.	Widen the sidewalk on the north side of Esplanade Avenue to provide a shared-use path to the high school. Coordinate with school for completing the connection.	Provides connection for bicyclists between the trail and high school. There appears to be adequate width available under the railroad bridge to complete the widening.	\$127,000	Should be completed in conjunction with the crossing in project C-12. Coordination with the school will be required.	Widen the sidewalk on the north side of Esplanade Avenue to provide a shared-use path to the high school. Coordinate with school for completing the connection.	
G-11	Southern Connection to Steen Sports Park	There is no connection to Steens Sports Park from the south without using Homedale Road and Foothills Boulevard.	Formalize connections between Summers Lane and/or Wiard Street and Steens Sports Park.	Will create a more direct access to the south of the park.	\$40,000	May require right-of-way or an easement to complete the connection.	Formalize connections between Summers Lane and/or Wiard Street and Steens Sports Park	
C-1	OR 39: OC&E Trail Crossing	This crossing is currently only marked with a sign. The NCHRP 562 treatment recommendation is an Active/Enhanced crossing.	TBD by ongoing ODOT and Oregon Parks study.				TBD by ongoing ODOT and Oregon Parks study.	
C-2	Homedale Road: OC&E Trail Crossing	This crossing is currently not marked or signed. The NCHRP 562 treatment recommendation is a crosswalk.	TBD by ongoing ODOT and Oregon Parks study.				TBD by ongoing ODOT and Oregon Parks study.	
C-3	Hope Street: OC&E Trail Crossing	This crossing is currently marked with a sign. The NCHRP 562 treatment recommendation is a crosswalk.	Install striped crosswalk and appropriate signage.	Low cost.	\$2,000	Consider installing illumination at the crossing as well (it is currently located nearby but not at the crossing).	Install striped crosswalk and appropriate signage.	
C-4	Summers Lane: OC&E Trail Crossing	This crossing is currently only marked with a sign. The NCHRP 562 treatment recommendation is an Active/Enhanced crossing.	TBD by ongoing ODOT and Oregon Parks study.				TBD by ongoing ODOT and Oregon Parks study.	
C-5	Altamont Drive: OC&E Trail Crossing	This crossing is currently marked with a sign. The NCHRP 562 treatment recommendation is a crosswalk.	TBD by ongoing ODOT and Oregon Parks study.				TBD by ongoing ODOT and Oregon Parks study.	
C-6	Homedale Road: A Canal Trail Crossing	This crossing is currently marked with a sign. The NCHRP 562 treatment recommendation is a crosswalk.	Install marked crosswalk, appropriate signage, and raised median.	Low cost.	\$8,000	Consider installing illumination at the crossing as well (there is not existing illumination on Homedale Road in the crossing vicinity).	Install marked crosswalk, appropriate signage, and raised median.	
C-7	Hope Street: A Canal Trail Crossing	This crossing is currently marked with a sign. The NCHRP 562 treatment recommendation is a crosswalk.	Install marked crosswalk and appropriate signage.	Low cost.	\$2,000	Consider installing illumination at the crossing as well (there is no existing illumination in the vicinity). Sight distance from the south should be verified.	Install marked crosswalk and appropriate signage.	
C-8	Shasta Way: A Canal Trail Crossing	This crossing is currently only marked with a sign. The NCHRP 562 treatment recommendation is an Active/Enhanced crossing.	Install refuge island and RRFBs where the trail crosses. Install marked pedestrian crossing with RRFBs at the intersection of Shasta Way/Crest Street.	Provides a refuge for people crossing the road Direct crossing Existing pavement width would accommodate the refuge. May permit the westbound left-turn lane to remain. Lower cost	\$46,000 \$40,000	Would likely require closing the westbound left-turn lane into Crest Street Requires out of direction travel. Greater exposure without the refuge island. Sidewalks between crossing and trail may need to be widened to accommodate pedestrians and bicyclists.		Further study required to determine final treatment. Active crossing treatments recommended.
C-9	Eberlein Avenue: A Canal Trail Crossing	This crossing is currently marked with a sign. The NCHRP 562 treatment recommendation is a crosswalk.	Install marked crosswalk, appropriate signage, and RRFB.	Low cost.	\$40,000	Sight distance may be an issue. Closing the eastern Avalon Street connection to Eberlein Avenue could be considered.		Further study required to determine final treatment. Active crossing treatments recommended.
C-10	Washburn Way: A Canal Trail Crossing	This crossing is currently only marked with a sign. However, it is in close proximity to a traffic signal. The NCHRP 562 treatment recommendation is an Active/Enhanced crossing.	Install enhanced crossing with refuge island and RRFBs at the trail crossing. Install grade-separated crossing of Washburn Way.	Direct crossing Provides separation between vehicles and bicyclists/pedestrians without requiring out of direction travel.	\$56,000 \$800,000	Would restrict the length of the northbound left-turn lane at the intersection of Washburn Way/OR 39 if a pedestrian refuge island is installed. Advanced RRFBs may be installed to warn vehicles turning onto Washburn Way when a pedestrian has activated the RRFB. High cost.		Further study required to determine final treatment. Active crossing treatments recommended.

ID	Location	Issue	Potential Project	Benefits	Cost Estimate	Considerations	Recommended Project	Recommended for Further Analysis
			Provide connections to the traffic signal to encourage crossing there.	Provides a protected crossing without restricting the left-turn lane at the intersection.	\$36,000	Requires out of direction travel of approximately 500 feet. May require a fence/gate to direct people to the correct location. Would require widening the sidewalks to accommodate shared-use paths (for 2-way bike travel) between the trail and the intersection.		
C-11	Main Street: A Canal Trail Crossing	This crossing is currently not marked or signed. The NCHRP 562 treatment recommendation is an Active/Enhanced Crossing.	Install activated crossing with refuge island at the trail crossing.	Direct crossing	\$56,000	The 4-lane cross section is approximately 60-ft of pavement, which may provide adequate width to widen for a refuge island. Queuing from the intersection of Main Street/OR 39 may block the crossing at times. Advanced RRFBs may be installed to warn vehicles turning from Crater Lake Parkway onto Main Street when a pedestrian has activated the RRFB. Or the free right-turn onto Main Street could be modified to be stop-controlled.		Further study required to determine final treatment. Active crossing treatments recommended.
				Island provides the potential for a two-stage crossing				
			Install grade-separated crossing of Main Street.	Provides separation between vehicles and bicyclists/pedestrians without requiring out of direction travel.	\$800,000	High cost.		
			Provide connections to the traffic signal to encourage crossing there.	Would not impact or be impacted by the intersection queuing.	\$46,000	Requires out of direction travel. May require a fence/gate to direct people to the correct location. May require sidewalk widening to accommodate transporting bicyclists and pedestrians to the signalized crossing.		
C-12	Esplanade Avenue: A Canal Trail Crossing	This crossing is currently not marked or signed. The NCHRP 562 treatment recommendation is an Active/Enhanced Crossing.	Install activated crossing with refuge island at the trail crossing.	Direct crossing	\$56,000	Advanced RRFBs may be needed on OR 39. Queuing from the intersection of Esplanade Avenue/OR 39 may block the crossing at times. The left-turn lane on Esplanade Avenue may need to be shortened to accommodate a refuge island.		Further study required to determine final treatment. Active crossing treatments recommended.
				Island provides the potential for a two-stage crossing				
			Install grade-separated crossing of Esplanade Avenue.	Provides separation between vehicles and bicyclists/pedestrians without requiring out of direction travel.	\$800,000	High cost.		
			Provide connections to the traffic signal to encourage crossing there.	Would not impact or be impacted by the intersection queuing.	\$0	Requires out of direction travel. May require a fence/gate to direct people to the correct location. May require sidewalk widening to accommodate transporting bicyclists and pedestrians to the signalized crossing.		
B-1	OR 39 (OC&E Trail to OR 140)	This segment has a LTS of 3. There are no existing bicycle lanes.	Install buffered bicycle lanes or protected bicycle lanes.	By widening existing shoulders and narrowing lanes/center turn lanes, sufficient width for bicycle lanes may exist using existing pavement. However, additional pavement may be needed for buffered bike lane or protected bike lanes.	\$12,000	Additional treatments such as colored pavement markings should be considered at the junction of OR 140/OR 39.	Install protected or buffered bike lanes.	
B-2	6th Street (Railroad Bridge to OR 39)	This segment has a LTS of 4. This is a four-lane road with a center turn lane. There are no bike lanes.	Install buffered or protected bicycle lanes in both directions.	The buffered facility would provide separation between bicyclists and vehicles.	\$72,000	There are many driveways along this corridor, and access will need to be maintained with the buffered bike lanes. The existing pavement width is not wide enough to install protected bike lanes without widening the road or removing an existing lane(s). Widening may not be possible due to existing building locations. A buffered bike lane may be possible. Existing inside lanes are approximately 12' wide, with a 16' center turn lane. The outer travel lanes are approximately 15' wide. No additional shoulders exist.		Identify if there are parallel routes that would provide similar connectivity but greater comfort
				All of the major roads that are crossed by 6th Street are controlled with a signal.				
			Widen existing sidewalk on both sides of the road to become a shared-use path and accommodate pedestrians and bicyclists.	Provides a separated facility for bicyclists.	\$3,240,000	Creates a potential conflict area between pedestrians and bicyclists. Requires additional treatments at driveways and minor street intersections		
				Identify if there are parallel routes that would provide similar connectivity but greater comfort		TBD		

ID	Location	Issue	Potential Project	Benefits	Cost Estimate	Considerations	Recommended Project	Recommended for Further Analysis
B-3	Shasta Way (Patterson Street to Kimberly Drive)	This segment has a LTS of 4. It is currently a two-lane road with a marked centerline and pavement width of approximately 22 feet.	Install sharrows and traffic calming.	Width is not sufficient for bike lanes. Appears to be relatively low-volume street. The sharrows would alert vehicles that bicyclists share the road. Does not require roadway widening.	\$43,000	Sharrows alone will not do much for the comfort of people bicycling. Traffic calming will also be required to lower the speed people are driving.	Install sharrows and traffic calming	Outreach to neighborhood to determine support for traffic calming measures.
B-4	Shasta Way (Patterson Street to Crater Lake Parkway)	This segment has a LTS of 4. No bike lanes are present, and the existing pavement width is approximately 37' wide with one travel lane in each direction and center turn lanes throughout.	Look for opportunities for alternate routes or for traffic calming measures on Shasta Way	Low volume, low speed local roads can provide comfortable alternatives to high-speed, high volume arterials	TBD	Local street connectivity is fragmented in locations.		Look for opportunities for alternate routes or for traffic calming measures on Shasta Way
			Remove the center turn lane and provide buffered or protected bicycle lanes	Provides on-street bicycle facility that does not require out-of-direction travel by cyclists. Fewer right-of-way impacts	\$50,000	The removal of the center turn lane could increase motor vehicle crashes at driveways and intersections and increase delay for people driving		
B-5	Patterson Street (6th Street to Foothills Boulevard)	This segment has a LTS of 4. There are no existing bicycle lanes. The pavement width is approximately 38' for most of the segment, and the cross section is one-lane in each direction with a center turn lane. When the road reduces to two lanes (and transitions to Foothills Blvd), it has paved shoulders of approximately 7 feet in width.	Install buffered or protected bicycle lanes by restriping to remove center turn lane.	Provides a comfortable space for people to bicycle in Pedestrians are accommodated using the sidewalks on Patterson Street between 6th Street and Church Hill Drive, and then pedestrians must use the residential neighborhood streets to connect west to Homedale Road.	\$37,000	Even if the center turn lane is removed, some additional widening may be needed to provide protected or buffered bike lanes. Because the posted speed limit is 35 mph, installing a bike lane with no buffer will not bring the LTS below 3.		Further study required to determine final treatment. Candidates include buffered bike lanes or a shared-use path.
			Widen one side sidewalk to accommodate shared-use path, and install shared use path on north end where the sidewalk ends to connect to Foothills trail.	Provides separated bicycle facility. Could connect with Foothills trail without crossing any major roads.	\$247,000	The bicycle facilities need to connect with the end of the Foothills Trail, which would require a transition from one path, to bike lanes, and back to another path, unless the Patterson Street path continued all the way around the corner, increasing the cost of the project. The intersections with local streets on the corridor would need treatments to alert drivers of potential cyclists from either direction. Creates potential conflicts between bicyclists and pedestrians on the path. Will likely have ROW impacts since widening will likely have to be done away from the road, and the northern section of trail will likely have ROW impacts.		
B-6	Homedale Road (OR 140 to Shasta Way)	This segment has a LTS of 4. The 3-lane cross section is approximately 37' wide throughout.	Install protected or buffered bicycle lanes by removing the center turn lane.	The existing bridges have adequate width if the center turn lane is dropped at the bridge. Roadway can be restriped with 7.5' buffered or protected bike lane and 11' travel lanes.	\$88,000	Installing bicycle lanes here may be done in conjunction with signage to direct vehicles to other routes. (prioritizing bikes on this road and vehicles on other roads)		Further study required to determine which routes will be designated for bicycle travel and what the treatment is.
B-7	Summers Lane (OR 140 to SW 6th Street)	This segment has a LTS of 4. The 3-lane cross section is approximately 37' wide throughout.	Alternate/parallel route.	Providing east-west connections to Homedale Road and prioritizing improvements on Homedale Road may serve as an alternate route for Summers Lane.	TBD after further study of best parallel routes	Some cyclists would likely continue using this route due to convenience.		Further study required to determine which routes will be designated for bicycle travel and what the treatment is.
			Install protected or buffered bicycle lanes by removing the center turn lane.	The existing canal bridge is wide enough to support bike lanes (potentially not buffered on the bridge) if the center turn lane is removed here.	\$72,000	Would require roadway widening or removal of center turn lane.	Signage would be needed to encourage cyclists to use the parallel routes.	
B-8	Altamont Drive (OR 140 to OC&E Trail)	This segment has a LTS of 4. The pavement width is approximately 28' with two travel lanes.	Install buffered or protected bike lanes by widening the roadway.	Separates bicyclists from vehicles.	\$3,273,000	Would require roadway widening and may have ROW impacts.		Further study required to determine which routes will be designated for bicycle travel and what the treatment is.
			Parallel routes	Parallel low volume/low speed routes could be comfortable as a shared space	TBD after further study of best parallel routes	Would need to further consider the route and crossing treatments		
B-9	Washburn Way (Crosby Avenue to OR 140)	This segment has a LTS of 4. Five-foot wide bike lanes are present and the cross section is 5-lanes. The pavement width is 70' wide.	Encourage Altamont Drive as alternate/parallel route.		TBD after further study of best parallel routes	Some cyclists would likely continue using this route due to convenience.		Further study required to determine which routes will be designated for bicycle travel and what the treatment is.
			Install buffered or protected bicycle lanes in both directions by	Provides separated bicycle facility.	\$2,353,000	Requires some type of transition between OR 140 and Washburn Way (which is connected by on/off ramps), dependent upon treatment for OR 140 too. Would likely require roadway widening. The existing travel lanes and sidewalks likely cannot be reduced in width.	Buffered/Protected Bicycle Lane or Parallel Routes	

ID	Location	Issue	Potential Project	Benefits	Cost Estimate	Considerations	Recommended Project	Recommended for Further Analysis
			widening the road..			The bridge over the railroad is constrained and would not accommodate buffered bike lanes and sidewalks. This would likely need to have the sidewalk widened on both sides to create paths but there is very limited width to do so.		
B-10	Washburn Way (OC&E Trail to Crosby Avenue)	This segment has a LTS of 3. Five-foot wide bike lanes are present and the cross section is 5-lanes. The pavement width is 68' wide.	Connect Maywood drive north to the OC&E Trail, and promote Maywood drive as an alternate route north of Hilyard Avenue.	Removes bicyclists from the 5-lane busy road.	\$124,000	Some cyclists may continue using Washburn Way.  Would likely require ROW or an easement to complete the new trail connection.	Buffered/protected bicycle lane or parallel Routes, including using Crosby to connect to Altamont drive	Further study to evaluate trade-offs of protected/buffered bicycle lane impacts and parallel routes.
			Widen existing sidewalk to become shared-use path.	Provides separated bicycle facility.	\$102,000	This project should be consistent with L-9.  Driveways along the corridor would need treatment.		
			Install buffered or protected bicycle lanes in both directions by restriping to remove the center turn lane.	Provides separated bicycle facility.	\$8,000	This project should be consistent with L-9. Further evaluation of impacts associated with removing the center turn lane is needed.		
B-11	Washburn Way (Eberlein Avenue to OC&E Trail)	This segment has a LTS of 3. South of OR 39, bike lanes exist. North of OR 39, bike lanes end, and the section is 5-lanes wide (60' of pavement).	Install buffered or protected bicycle lanes in both directions by restriping to remove the center turn lane.	Provides separation between vehicles and bicyclists.  Would provide continuity between the existing bike lanes south of OR 39 and north of Eberlein.	\$19,000	Driveways and local streets access may need treatments.	Buffered or protected bike lanes, or parallel routes.	Further study required to determine which routes will be designated for bicycle travel and what the treatment is.
			Parallel routes to connect to Altamont Drive.	Removes bicyclists from the 5-lane busy road.	Further study needed to determine best route.	Some cyclists would likely continue using this route due to convenience.		
B-12	OR 140 (Washburn Way to Homedale Road)	This segment has a LTS of 4.	Install buffered or protected bicycle lanes in both directions by widening the existing shoulders.	Provides some separation between vehicles and bikes.	\$1,279,000	One crossing of the railroad is involved.  Requires some type of transition between OR 140 and Washburn Way (which is connected by on/off ramps).  Requires widening, which may have ROW impacts.	Shared-use path	
			Installed shared-use path.	Installing it along the north side of the road would minimize the number of bicycle crossings of OR 140.  Provides physical separation between bikes and vehicles.  Provides facility for pedestrians too.	\$820,000	One crossing of the railroad is involved.  Requires some type of transition between OR 140 and Washburn Way (which is connected by on/off ramps).  Requires widening, which may have ROW impacts.  Treatments may be needed at crossings with minor streets.		
B-13	6th Street (Market Street to Main Street)	This segment has a LTS of 3. There are no existing bicycle facilities on the road. The road is one-way with two travel lanes and a total pavement width of 46 feet. In the downtown area there are turn lanes and on-street parking.	Install bicycle lane.	No roadway widening is required.	\$8,000	One side of on-street parking may need to be removed.	Bike Lane	
B-14	5th Street (Main Street to 6th Street)	This segment has a LTS of 4. There are no existing bicycle facilities on the road. The road is one-way with two travel lanes and a total pavement width of 45 feet. In the downtown area there are turn lanes and on-street parking.	Install bicycle lane.	No roadway widening is required.	\$9,000		Bike Lane	
B-15	Klamath Avenue (Conger Avenue to Commercial Street)	This segment has a LTS of 3. This is a one-way eastbound segment with no bike lanes.	Install bike lanes.	No roadway widening is required.	\$15,000	Would require consideration of on-street parking impacts in the design.  May require the removal of on-street parking or a travel lane to accommodate the bike lane width.	Bike Lane; Coordinate with Blue Zones project	
B-16	Main Street (Esplanade Avenue to Mill Street)	This segment has a LTS of 3. This is a one-way westbound segment with no bike lanes.	Install bike lanes.	No roadway widening is required.	\$15,000		Bike Lane; Coordinate with Blue Zones project	
B-17	9th Street (Klamath Avenue to Prospect Street)	This segment has a LTS of 3. There are no bicycle lanes; the 2-way roadway has a minimum pavement width of 26 feet.	TBD by ongoing study.				TBD by ongoing project.	TBD by ongoing project
B-18	N 11th Street (Oregon Avenue to Klamath Avenue)	This segment has a LTS of 3. There are no bicycle lanes. The 2-lane roadway has a minimum pavement width of 25 feet.	TBD by ongoing study.				TBD by ongoing project.	TBD by ongoing project
B-19	Oregon Avenue (Moore Park to Upham Street)	The segment has a LTS of 3. Although there are bike lanes, they are narrow. Actual traffic speeds are expected to be higher than posted.	TBD by ongoing study.				TBD by ongoing project.	TBD by ongoing project
B-20	Lakeshore Drive (Lynnewood Blvd to West UGB)	The segment has a LTS of 3. There are no shoulders or bike lanes.	Widen the pavement to accommodate shoulders or bike lanes.	Provides a facility for bicyclists.	\$1,860,000	The road will need to be widened to accommodate paved shoulders, and the some earthwork is likely to be needed with the widening.  There may be some ROW impacts associated with roadway widening.	Bike Lanes	
B-21	Main Street (Esplanade Avenue to Crater Lake Parkway)	The segment has an LTS of 4. The eastern portion of the corridor is 4 lanes and 58-60 feet wide. Aerial images indicate this area is also used for on-street parking. The western portion of the corridor is approximately 54 feet wide and has two travel lanes with two sides of on-street parking. (This is also a potential connection that is relevant to project G-1. The undercrossing below the railroad tracks requires cyclists to ride in the lanes or use the narrow tunnel.)	Install bike lanes	Provides a facility for bicyclists.	\$19,000	The on-street parking may need to be reconfigured between Spring Street and Esplanade Avenue to accommodate the bike lane.  Between Spring Street and Crater Lake Parkway, elimination of the on-street parking or a road diet would be required to accommodate the bike lanes.  The eastbound bike lane would require a transition treatment where E Main Street turns off of Main Street.  The pavement width is not adequate for adding a bicycle lane under the railroad, so the sidewalk would need to be widened to accommodate bikes. A transition between the bike lanes and sidewalks would also be needed.	Bike lanes	
B-22	Old Fort Road (Loma Linda Drive to UGB)	The LTS is 4. The road is higher speed and lacks bike lanes and shoulders. This is a popular recreational route	Widen the road to add paved shoulders or bike lanes.	The road appears to have some gravel shoulders today, so the additional widening may be minimal.	\$2,668,000	This is a long distance to pave (high cost).	Bike lanes	
			Install a shared-use path			May require ROW.		

ID	Location	Issue	Potential Project	Benefits	Cost Estimate	Considerations	Recommended Project	Recommended for Further Analysis
			to accommodate cyclists and pedestrians.		\$1,710,000	The number of pedestrians in this area is likely very low.		
B-23	Biehn Street (Crater Lake Parkway to Oregon Avenue)	The road is part of an important link between OIT and downtown. The existing bike lanes are narrow.	Widen the bike lanes by restriping the roadway.	No pavement widening is required. Narrowing the motor vehicle travel lanes may also calm traffic.	\$22,000		Widen the bike lanes	
B-24	Crosby Avenue (Washburn Way - Altamont Drive)	Connects neighborhoods to the north-south routes that connect to the trail system.	Shared lane markings, wayfinding, and/or traffic calming	Low cost improvements that could enhance comfort for people bicycling and increase the use of the trail system.	TBD	Further neighborhood outreach and speed studies may be necessary to identify specific treatments.		Further study required to identify which should receive shared lane markings, wayfinding, and/or traffic calming.
B-25	Hillyard Avenue (Washburn Way - Summers Lane)	Connects neighborhoods to the north-south routes that connect to the trail system.	Shared lane markings, wayfinding, and/or traffic calming	Low cost improvements that could enhance comfort for people bicycling and increase the use of the trail system.	TBD	Further neighborhood outreach and speed studies may be necessary to identify specific treatments.		Further study required to identify which should receive shared lane markings, wayfinding, and/or traffic calming.
B-26	Laverne Avenue (Washburn Way - Crest Street)	Connects neighborhoods to the north-south routes that connect to the trail system.	Shared lane markings, wayfinding, and/or traffic calming	Low cost improvements that could enhance comfort for people bicycling and increase the use of the trail system.	TBD	Further neighborhood outreach and speed studies may be necessary to identify specific treatments.		Further study required to identify which should receive shared lane markings, wayfinding, and/or traffic calming.
B-27	Bristol Avenue (Summers Lane - Homedale Road)	Connects neighborhoods to the north-south routes that connect to the trail system.	Shared lane markings, wayfinding, and/or traffic calming	Low cost improvements that could enhance comfort for people bicycling and increase the use of the trail system.	TBD	Further neighborhood outreach and speed studies may be necessary to identify specific treatments.		Further study required to identify which should receive shared lane markings, wayfinding, and/or traffic calming.
B-28	N Eldorado Avenue	This road lacks bicycle facilities and sidewalks on one side of the road. This road is a popular commute route to the hospital, and also connects student apartments to the campus.	Install sharrows and traffic calming.	Posted speed limit indicates that a shared-roadway would be sufficient. The sharrows would alert vehicles that bicyclists share the road. No roadway widening is required.	\$23,000	This project does not provide any new pedestrian facilities, but sidewalks exist on one side of the road.	Install sharrows and traffic calming.	
S-1	OR 39 (OC&E trail to Keller Road)	There are no sidewalks.	Install sidewalks on both sides of the road.		\$396,000	May require ROW.	Sidewalks	
S-2	Hope Street (Bristol Avenue to SW 6th Street)	There are no sidewalks on Hope Street, with the exception of those around Denver Avenue.	Install sidewalks on both sides of the road.	Provides connection for pedestrians between Peterson Elementary school and the OC&E and A Canal trails. The bridge over the canal already includes sidewalks.	\$1,170,000	May require ROW.	Sidewalks	
P-1	Trail Signing/Wayfinding	Wayfinding and trail signs are generally absent, including near the OC&E trailheads. Signage provides an opportunity to increase awareness and use of the trail system for residents and visitors.	Develop a program to install and maintain wayfinding signage at all trailheads and trail crossings of public streets.	Signage provides an opportunity to increase awareness and use of the trail system for residents and visitors.	Program	Will need to determine who is responsible for the signs.	Develop a program to install and maintain wayfinding signage at all trailheads and trail crossings of public streets.	
P-2	Bicycle Parking	Bicycle parking is absent from many destinations, including some parks.	Develop policy that requires bicycle parking to be provided at key locations when new development or redevelopment occurs and pursue grant funding to provide it at key locations where it is missing.	The policy would help future developments or redevelopment locations obtain bicycle parking. Pursuing grant funding for existing locations in need will help in-fill existing gaps.	Policy/Program		Develop policy that requires bicycle parking to be provided at key locations when new development or redevelopment occurs and pursue grant funding to provide it at key locations where it is missing.	
P-3	Local Street Trail Crossings	The "A" Canal trail and the OC&E trails cross many local streets. There is a desire for consistent crossings.	Develop guidelines for how to evaluate trail crossings and determine the appropriate treatment for the City and County to use in applying consistent treatment at crossings for local streets.	Guidance would encourage consistent crossings on all roads throughout the trail system.	Policy			
P-4	Trail Illumination	Most of the trail system does not have illumination.	Evaluate the feasibility of installing illumination along the trail system, including type of illumination, priority locations, and cost/maintenance.	The study will allow engagement with nearby property owners. The illumination may help reduce crime.	Policy			



Appendix E Cost Estimate Calculations &  
Prioritization Matrix

**Construct end of the OC&E Trail to Downtown**

Item	Description	Unit	Quantity	Unit Price	Total
1	Mobilization (10%)	LS	1	\$ 55,000	\$ 55,000
2	Traffic Control (2%)	LS	1	\$ 11,000	\$ 11,000
3	New Shared Use Path across 6th Street Bridge	LS	1	\$ 507,000	\$ 507,000
<b>2016 CONSTRUCTION COSTS</b>					<b>\$ 573,000</b>
	Construction Contingency (20%)				\$ 114,600
	Design Engineering/Surveying				\$ 57,300
	Construction Administration /Engineering/Inspection				\$ 57,300
	Permitting				\$ 57,300
<b>TOTAL</b>					<b>\$ 859,500</b>

\*Does not include inflation. Typical Inflation rates vary and are between 3 and 5 percent per year.

Project Description:  
Connecting the OC&E Trail to downtown via 6th Street bridge by widening the sidewalk to provide a shared-use path.

Includes:  
Using the existing bridge, striping lane shifts, building an elevated multi-use path on the south side, reusing the existing bridge rail, etc.



**Connecting the "A" Canal Trail to the ODOT Trail**

Item	Description	Unit	Quantity	Unit Price	Total
1	Mobilization (10%)	LS	1	\$ 11,000	\$ 11,000
2	Traffic Control (2%)	LS	1	\$ 2,000	\$ 2,000
3	New Shared Use Path	LS	1	\$ 98,000	\$ 98,000
<b>2016 CONSTRUCTION COSTS</b>					<b>\$ 111,000</b>
	Construction Contingency (20%)				\$ 22,200
	Design Engineering/Surveying				\$ 11,100
	Construction Administration /Engineering/Inspection				\$ 11,100
	Permitting				\$ 11,100
<b>TOTAL</b>					<b>\$166,500</b>

\*Does not include inflation. Typical Inflation rates vary and are between 3 and 5 percent per year.

**Project Description:**

Connecting the "A" Canal Trail to the ODOT Trail by widening the sidewalks to provide for a shared use path.

**Includes:**

Asphalt, Concrete, Bridge Work, Demolition, Restriping, Signs



**Connecting the "A" Canal Trail to the Foothills Trail**

Item	Description	Unit	Quantity	Unit Price	Total
1	Mobilization (10%)	LS	1	\$ 10,000	\$ 10,000
2	Traffic Control (2%)	LS	1	\$ 2,000	\$ 2,000
3	New Shared Use Path across bridge on east side	LS	1	\$ 90,000	\$ 90,000
<b>2016 CONSTRUCTION COSTS</b>					<b>\$ 102,000</b>
	Construction Contingency (20%)				\$ 20,400
	Design Engineering/Surveying				\$ 10,200
	Construction Administration/Engineering/Inspection				\$ 10,200
	Permitting				\$ 10,200
<b>TOTAL</b>					<b>\$ 153,000</b>

\*Does not include inflation. Typical Inflation rates vary and are between 3 and 5 percent per year.

**Project Description:**

Connecting the "A" Canal Trail to the Foothills Trail by widening the sidewalk on the east side of the Washburn Way bridge to provide a path between the two trails.

**Includes:**

RRFB, Concrete, Demolition, Adjusting Curb Radius, Restriping & Signs



**Connecting the "A" Canal Trail to the Ella Redkey Swimming Pool**

Item	Description	Unit	Quantity	Unit Price	Total
1	Mobilization (10%)	LS	1	\$ 2,500	\$ 2,500
2	New Shared Use Path	LS	1	\$ 25,000	\$ 25,000
				<b>2016 CONSTRUCTION COSTS</b>	<b>\$ 27,500</b>
	Construction Contingency (20%)				\$ 5,500
	Design Engineering /Surveying				\$ 10,000
	Construction Administration/Engineering/Inspection				\$ 10,000
	Permitting				\$ 2,800
<b>TOTAL</b>					<b>\$55,800</b>

\*Does not include inflation. Typical Inflation rates vary and are between 3 and 5 percent per year.

**Project Description:**

Connecting the "A" Canal Trail to the Ella Redkey Pool by installing a shared use path between the trail and the parking lot/front entrance to the pool.

**Includes:**

Retaining Wall, Rail, Asphalt, Fill & Aggregate Base.

**Connecting the "A" Canal Trail to Kiger Stadium and Klamath County Fairgrounds**

Item	Description	Unit	Quantity	Unit Price	Total
1	Mobilization (10%)	LS	1	\$ 13,000	\$ 13,000
2	Traffic Control (2%)	LS	1	\$ 2,600	\$ 2,600
3	New Shared Use Path	LS	1	\$ 117,000	\$ 117,000
				<b>2016 CONSTRUCTION COSTS</b>	<b>\$ 132,600</b>
	Construction Contingency (20%)				\$ 26,600
	Design Engineering/Surveying				\$ 13,300
	Construction Administration/Engineering/Inspection				\$ 13,300
	Permitting				\$ 13,300
<b>TOTAL</b>					<b>\$199,100</b>

\*Does not include inflation. Typical Inflation rates vary and are between 3 and 5 percent per year.

**Project Description:**

Connecting the "A" Canal Trail to Kiger Stadium and the Klamath County Fairgrounds by paving the informal service road from the "A" Canal Trail to the Kiger Stadium Parking Lot and installing a shared use path along the west side of Kiger Stadium to the Fairgrounds.

**Includes:**

Asphalt, Fill, Striping & Aggregate Base.



**Campus Trail to Biehn Street Connection**

Item	Description	Unit	Quantity	Unit Price	Total
1	Mobilization (10%)	LS	1	\$ 7,000	\$ 7,000
2	Traffic Control (2%)	LS	1	\$ 1,400	\$ 1,400
3	Install Shared Use Path	LS	1	\$ 64,000	\$ 64,000
				<b>CONSTRUCTION COSTS</b>	<b>\$ 72,400</b>
	Construction Contingency (20%)				\$ 14,500
	Design Engineering /Surveying				\$ 7,300
	Construction Administration /Engineering/Inspection				\$ 7,300
	Permitting				\$ 7,300
				<b>TOTAL</b>	<b>\$108,800</b>

\*Does not include inflation. Typical Inflation rates vary and are between 3 and 5 percent per year.

Project Description:  
Connecting Campus Trail to Biehn Street by widening the sidewalks on the north side of Campus Drive.

Includes:  
Demolition, Excavation, Right of way, Utility Relocation



**Connecting the ODOT Trail to Kit Carson Park**

Item	Description	Unit	Quantity	Unit Price	Total
1	Mobilization (10%)	LS	1	\$ 1,100	\$ 1,100
2	New Shared Use Path	LS	1	\$ 10,000	\$ 10,000
				<b>CONSTRUCTION COSTS</b>	<b>\$ 11,100</b>
	Construction Contingency (20%)				\$ 2,300
	Design Engineering /Surveying				\$ 6,000
	Construction Administration/Engineering/Inspection				\$ 2,000
	Permitting				\$ 1,200
				<b>TOTAL</b>	<b>\$22,600</b>

\*Does not include inflation. Typical Inflation rates vary and are between 3 and 5 percent per year.

Project Description:  
Connecting the ODOT Trail to Kit Carson Park with a shared use path.

Includes:  
Excavation, Aggregate, Asphalt, Signs





**Veteran's Park Trail Connections**

Item	Description	Unit	Quantity	Unit Price	Total
1	Mobilization (10%)	LS	1	\$ 6,000	\$ 6,000
2	Traffic Control (2%)	LS	1	\$ 1,200	\$ 1,200
3	New Shared Use Path	LS	1	\$ 51,000	\$ 51,000
4	New Crosswalk	LS	1	\$ 2,000	\$ 2,000
				<b>2016 CONSTRUCTION COSTS</b>	<b>\$ 60,200</b>
	Construction Contingency (20%)				\$ 12,100
	Design Engineering /Surveying				\$ 6,100
	Construction Administration/Engineering/Inspection				\$ 6,100
	Permitting				\$ 6,100
				<b>TOTAL</b>	<b>\$90,600</b>

\*Does not include inflation. Typical Inflation rates vary and are between 3 and 5 percent per year.

**Project Description:**

Connecting Veteran's Park and the Link River Trail by widening the sidewalks on the north side of Main Street to provide for a shared use path. Installation of a crossing at Main Street west of the park's access.

**Includes:**

Restriping, Signs, Bike Symbols



**"A" Canal Trail to Crossing at SW 6th Street**

Item	Description	Unit	Quantity	Unit Price	Total
1	Mobilization (10%)	LS	1	\$ 1,000	\$ 1,000
2	Traffic Control (2%)	LS	1	\$ 1,000	\$ 1,000
3	New Shared Use Path	LS	1	\$ 7,000.00	\$ 7,000
				<b>2016 CONSTRUCTION COSTS</b>	<b>\$ 9,000</b>
	Construction Contingency (20%)				\$ 1,800
	Design Engineering/Surveying				\$ 5,000
	Construction Administration/Engineering/Inspection				\$ 2,000
	Permitting				\$ 900
<b>TOTAL</b>					<b>\$18,700</b>

\*Does not include inflation. Typical Inflation rates vary and are between 3 and 5 percent per year.

**Project Description:**

Improving the "A" Canal Crossing at SW 6th Street by widening sidewalks on the south side of SW 6th Street to better accommodate bicyclists using the signalized crossing.

**Includes:**

Demolition, New Sidewalk



**"A" Canal Trail Connection to Klamath Union High School**

Item	Description	Unit	Quantity	Unit Price	Total
1	Mobilization (10%)	LS	1	\$ 20,000	\$ 20,000
2	Traffic Control (2%)	LS	1	\$ 4,000	\$ 4,000
3	New Shared Use Path	LS	1	\$ 175,000	\$ 175,000
				<b>2016 CONSTRUCTION COSTS</b>	<b>\$ 199,000</b>
	Construction Contingency (20%)				\$ 39,800
	Design Engineering/Surveying				\$ 19,900
	Construction Administration/Engineering/Inspection				\$ 19,900
	Permitting				\$ 19,900
				<b>TOTAL</b>	<b>\$298,500</b>

\*Does not include inflation. Typical Inflation rates vary and are between 3 and 5 percent per year.

**Project Description:**

Connecting the "A" Canal to Klamath Union High School by widening the sidewalk to provide a shared use path to the High School.

**Includes:**

Sidewalk widening, Utility Relocation, Railroad Coordination, Rail Flaggers



**Southern Connection to Steen Sports Park**

Item	Description	Unit	Quantity	Unit Price	Total
1	Mobilization (10%)	LS	1	\$ 10,000	\$ 10,000
2	New Shared Use Path	LS	1	\$ 90,000	\$ 90,000
				<b>2016 CONSTRUCTION COSTS</b>	<b>\$ 100,000</b>
	Construction Contingency (20%)				\$ 20,000
	Design Engineering/Surveying				\$ 10,000
	Construction Administration/Engineering/Inspection				\$ 10,000
	Permitting				\$ 10,000
<b>TOTAL</b>					<b>\$ 150,000</b>

\*Does not include inflation. Typical Inflation rates vary and are between 3 and 5 percent per year.

**Project Description:**

Creating a connection on the south side of Steen Sports Park between Summers Lane and Wiard Street.

**Includes:**

Asphalt, Lighting, Right of way



**Hope Street: OC&E Trail Crossing**

Item	Description	Unit	Quantity	Unit Price	Total
1	Mobilization (10%)	LS	1	\$ 500.00	\$ 500
2	Traffic Control (2%)	LS	1	\$ 200.00	\$ 200
3	New Crosswalk	LS	1	\$ 2,000.00	\$ 2,000
				<b>2016 CONSTRUCTION COSTS</b>	<b>\$ 2,700</b>
	Construction Contingency (20%)				\$ 600
	Design Engineering /Surveying				**
	Construction Administration				**
<b>TOTAL</b>					<b>\$ 3,300</b>

\*Does not include inflation. Typical Inflation rates vary and are between 3 and 5 percent per year.

\*\*By City or County

**Project Description:**

Installing striped crosswalk and appropriate signage across the Hope Street OC&E Trail crossing.

**Includes:**

Crosswalk and signage



**Homedale Road: "A" Canal Trail Crossing**

Item	Description	Unit	Quantity	Unit Price	Total
1	Mobilization (10%)	LS	1	\$ 5,000.00	\$ 5,000
2	Traffic Control	LS	1	\$ 5,000.00	\$ 5,000
3	New Crossing (Homedale Road)	LS	1	\$34,000.00	\$ 34,000
4	Gate	LS	1	\$ 5,000.00	\$ 5,000
				<b>2016 CONSTRUCTION COSTS</b>	<b>\$ 49,000</b>
	Construction Contingency (20%)				\$ 9,800
	Design Engineering /Surveying				\$ 10,000
	Construction Administration /Engineering/Inspection				\$ 10,000
	Permitting				\$ 4,900
				<b>TOTAL</b>	<b>\$83,700</b>

\*Does not include inflation. Typical Inflation rates vary and are between 3 and 5 percent per year.

**Project Description:**

Install striped crosswalk, appropriate signage, Rectangular Rapid Flashing Beacon & a raised median across the Homedale Road OC&E Trail Crossing.  
Install gate across the maintenance road on the east side of Homedale Road.

**Includes:**

Striping, Lighting, Signage, RRFB, Raised Median & Demolition, Gate



**Hope Street: "A" Canal Trail Crossing**

Item	Description	Unit	Quantity	Unit Price	Total
1	Mobilization (10%)	LS	1	\$ 500.00	\$ 500
2	Traffic Control (2%)	LS	1	\$ 200.00	\$ 200
3	New Crosswalk	LS	1	\$ 2,000.00	\$ 2,000
				<b>2016 CONSTRUCTION COSTS</b>	<b>\$ 2,700</b>
	Construction Contingency (20%)				\$ 600
	Design Engineering /Surveying				**
	Construction Administration/Engineering/Inspection				**
	Permitting				\$ 300
<b>TOTAL</b>					<b>\$ 3,600</b>

\*Does not include inflation. Typical Inflation rates vary and are between 3 and 5 percent per year.

\*\*By City or County

Project Description:  
Install striped crosswalk and appropriate signage acrossed the Hope Street OC&E Trail crossing.

Includes:  
Crosswalk and signage.



**OR 39 (OC&E Trail to OR 140)**

Item	Description	Unit	Quantity	Unit Price	Total
1	Mobilization (10%)	LS	1	\$ 4,600	\$ 4,600
2	Traffic Control (2%)	LS	1	\$ 1,500	\$ 1,500
3	Install Buffered Bike Lane	LS	1	\$ 42,000	\$ 42,000
				<b>2016 CONSTRUCTION COSTS</b>	<b>\$ 48,100</b>
	Construction Contingency (20%)				\$ 9,700
	Design Engineering /Surveying				\$ 4,900
	Construction Administration/Engineering/Inspection				\$ 4,900
	Permitting				\$ 4,900
<b>TOTAL</b>					<b>\$72,500</b>

\*Does not include inflation. Typical inflation rates vary and are between 3 and 5 percent per year.

**Project Description:**

Install buffered bicycle lanes by widening existing shoulders and narrowing lanes/ center turn lane.

**Includes:**

Striping both sides of Highway, Demolition, Right of way, Utility Relocates





**Shasta Way (Patterson Street to Kimberly Drive)**

Item	Description	Unit	Quantity	Unit Price	Total
1	Mobilization (10%)	LS	1	\$ 5,000	\$ 5,000
2	Traffic Control (2%)	LS	1	\$ 1,000	\$ 1,000
3	Sharrows	LS	1	\$ 8,000	\$ 8,000
4	Traffic Calming	LS	1	\$ 35,000	\$ 35,000
				<b>2016 CONSTRUCTION COSTS</b>	<b>\$ 49,000</b>
	Construction Contingency (20%)				\$ 9,800
	Design Engineering/Surveying				\$ 4,900
	Construction Administration/Engineering/Inspection				\$ 4,900
	Public Outreach				\$ 2,000
	Permitting				\$ 4,900
<b>TOTAL</b>					<b>\$75,500</b>

\*Does not include inflation. Typical Inflation rates vary and are between 3 and 5 percent per year.

**Project Description:**

Install sharrows and traffic calming along Shasta Way from Patterson Street to Kimberly Drive.

**Includes:**

Sharrows, Traffic Calming



**OR 140 South Side Bypass: Washburn Way to Homedale Road**

Item	Description	Unit	Quantity	Unit Price	Total
1	Mobilization (10%)	LS	1	\$ 107,000	\$ 107,000
2	Traffic Control (2%)	LS	1	\$ 22,000	\$ 22,000
3	Install Shared Use Path	LS	1	\$ 960,000	\$ 960,000
<b>2016 CONSTRUCTION COSTS</b>					<b>\$ 1,089,000</b>
	Construction Contingency (20%)				\$ 217,800
	Design Engineering/Surveying				\$ 108,900
	Construction Administration/Engineering/Inspection				\$ 108,900
	Permitting				\$ 108,900
<b>TOTAL</b>					<b>\$ 1,633,500</b>

\*Does not include inflation. Typical Inflation rates vary and are between 3 and 5 percent per year. Does not include Roadroad Crossing modifications.

Project Description:  
Install shared-use path on South Side Bypass from Homedale Road to Washburn Way.

Includes:  
Demolition, Asphalt, Aggregate base, Utility Relocation, Right of Way



**6th Street (Market Street to Main Street)**

Item	Description	Unit	Quantity	Unit Price	Total
1	Mobilization (10%)	LS	1	\$ 1,500	\$ 1,500
2	Traffic Control (2%)	LS	1	\$ 1,000	\$ 1,000
3	Install Bike Lane Striping/Symbols	LS	1	\$ 8,000	\$ 8,000
<b>2016 CONSTRUCTION COSTS</b>					<b>\$ 10,500</b>
	Construction Contingency (20%)				\$ 2,100
	Design Engineering /Surveying				**
	Construction Administration/Engineering/Inspection				**
	Public Outreach				\$ 2,000
	Permitting				\$ 1,100
<b>TOTAL</b>					<b>\$ 15,700</b>

\*Does not include inflation. Typical Inflation rates vary and are between 3 and 5 percent per year. May require modifications to remove parking, City to perform public outreach to adjacent businesses.

\*\*By City

**Project Description:**

Install bicycle lane striping on 6th Street from Market Street to Main Street. No roadway widening required.

**Includes:**

Public outreach, 8" Wide Striping, Two Bicycle Symbols per Block at \$400/ea.



**5th Street (Main Street to 6th Street)**

Item	Description	Unit	Quantity	Unit Price	Total
1	Mobilization (10%)	LS	1	\$ 1,500	\$ 1,500
2	Traffic Control (2%)	LS	1	\$ 1,000	\$ 1,000
3	Install Bike Lane Striping/Symbols	LS	1	\$ 9,000	\$ 9,000
	<b>2016 CONSTRUCTION COSTS</b>				<b>\$ 11,500</b>
	Construction Contingency (20%)				\$ 2,300
	Design Engineering/Surveying				\$ 1,200
	Construction Administration/Engineering/Inspection				\$ 1,200
	Public Outreach				\$ 2,000
	Permitting				\$ 1,200
<b>TOTAL</b>					<b>\$ 19,400</b>

\*Does not include inflation. Typical Inflation rates vary and are between 3 and 5 percent per year. May require modifications to remove parking, City to perform public outreach to adjacent businesses.

\*\*By City

**Project Description:**

Install bicycle lane striping along 5th Street from Main Street to 6th Street. No roadway widening required.

**Includes:**

Public outreach, 8" wide striping, two bicycle symbols per block at \$400/ea.



**Klamath Avenue (Conger Avenue to Commercial Street)**

Item	Description	Unit	Quantity	Unit Price	Total
1	Mobilization (10%)	LS	1	\$ 1,700	\$ 1,700
2	Traffic Control (2%)	LS	1	\$ 1,000	\$ 1,000
3	Install Bike Lane Striping/Symbols	LS	1	\$ 15,000	\$ 15,000
<b>2016 CONSTRUCTION COSTS</b>					<b>\$ 17,700</b>
	Construction Contingency (20%)				\$ 3,600
	Design Engineering/Surveying				\$ 1,800
	Construction Administration/Engineering/Inspection				\$ 1,800
	Public Outreach				\$ 2,000
	Permitting				\$ 1,800
<b>TOTAL</b>					<b>\$ 28,700</b>

\*Does not include inflation. Typical Inflation rates vary and are between 3 and 5 percent per year. May require modifications to remove parking, City to perform public outreach to adjacent businesses.

\*\*By City

**Project Description:**

Install bicycle lane striping on Klamath Avenue from Conger Avenue to Commercial street. No roadway widening required.

**Includes:**

Public outreach, 8" wide striping, two bicycle symbols per block at \$400/ea.



**Main Street (Esplanade Avenue to Mill Street)**

Item	Description	Unit	Quantity	Unit Price	Total
1	Mobilization (10%)	LS	1	\$ 1,700	\$ 1,700
2	Traffic Control (2%)	LS	1	\$ 600	\$ 600
3	Install Bike Lane Striping/Symbols	LS	1	\$ 15,000	\$ 15,000
<b>2016 CONSTRUCTION COSTS</b>					<b>\$ 17,300</b>
	Construction Contingency (20%)				\$ 3,500
	Design Engineering/Surveying				**
	Construction Administration/Engineering/Inspection				**
	Public Outreach				\$ 2,000
	Permitting				\$ 1,800
<b>TOTAL</b>					<b>\$ 24,600</b>

\*Does not include inflation. Typical Inflation rates vary and are between 3 and 5 percent per year. May require modifications to remove parking, City to perform public outreach to adjacent businesses.

\*\*By City

**Project Description:**

Install bicycle lane striping on Main Street from Esplanade Avenue to Mill Street. No roadway widening required.

**Includes:**

Public outreach, 8" wide striping, two bicycle symbols per block at \$400/ea.



**9th, Nevada, & Oregon Avenue (Moore Park to Downtown Bike Facilities)**

Item	Description	Unit	Quantity	Unit Price	Total
1	Mobilization (10%)	LS	1	\$ 38,000	\$ 38,000
2	Traffic Control (2%)	LS	1	\$ 20,000	\$ 20,000
3	Two-way Bicycle Lane with Delineators	LS	1	\$ 325,000	\$ 325,000
<b>2016 CONSTRUCTION COSTS</b>					<b>\$ 383,000</b>
	Construction Contingency (20%)				\$ 76,600
	Preliminary Engineering/Feasibility Study				\$ 15,000
	Design Engineering/Surveying				\$ 38,300
	Construction Administration/Engineering/Inspection				\$ 38,300
	Public Outreach				\$ 5,000
<b>TOTAL</b>					<b>\$ 556,200</b>

\*Does not include inflation. Typical Inflation rates vary and are between 3 and 5 percent per year. May require modifications to remove parking, City to perform public outreach to adjacent businesses.

**Project Description:**

Install two-way bicycle lanes with delineators from Moore Park to downtown facilities (Oregon Ave. - Moore Park to Upham St., 9th Street - Klamath Ave to Prospect St., and 11th St. - Klamath Ave. to Oregon Ave.)

**Includes:**

Public outreach, striping, permanent signs, delineators (±40' spacing), remove existing striping, ±5' asphalt widening (Nevada Ave. - Thrall S.t to California Ave. and California Ave. to Bridge).



**Lakeshore Drive (Lynnewood Blvd to West UGB)**

Item	Description	Unit	Quantity	Unit Price	Total
1	Mobilization (10%)	LS	1	\$ 273,000	\$ 273,000
2	Traffic Control (2%)	LS	1	\$ 55,000	\$ 55,000
3	Bike Lane - Asphalt Widening	LS	1	\$ 2,416,000	\$ 2,416,000
<b>2016 CONSTRUCTION COSTS</b>					<b>\$ 2,744,000</b>
	Construction Contingency (20%)				\$ 548,800
	Design Engineering/Surveying				\$ 274,400
	Construction Administration/Engineering/Inspection				\$ 274,400
	Public Outreach				\$ 5,000
	Permitting				\$ 274,400
<b>TOTAL</b>					<b>\$ 4,121,000</b>

\*Does not include inflation. Typical inflation rates vary and are between 3 and 5 percent per year.

**Project Description:**

Widening of pavement to accommodate shoulders or bicycle lanes on Lakeshore Drive from Lynnewood Blvd to West Urban Growth Boundary.

**Includes:**

Asphalt widening, Demolition, Right of way, Retaining Walls



**Main Street (Esplanade Avenue to Crater Lake Parkway)**

Item	Description	Unit	Quantity	Unit Price	Total
1	Mobilization (10%)	LS	1	\$ 2,000	\$ 2,000
2	Traffic Control (2%)	LS	1	\$ 1,000	\$ 1,000
3	Install Bike Lane Striping/Symbols	LS	1	\$ 19,000	\$ 19,000
	<b>2016 CONSTRUCTION COSTS</b>				<b>\$ 22,000</b>
	Construction Contingency (20%)				\$ 4,400
	Design Engineering/Surveying				**
	Construction Administration/Engineering/Inspection				**
	Public Outreach				\$ 2,000
	Permitting				\$ 2,200
	<b>TOTAL</b>			<b>\$</b>	<b>\$ 30,600</b>

\*Does not include inflation. Typical Inflation rates vary and are between 3 and 5 percent per year. May require modifications to remove parking, City to perform public outreach to adjacent businesses.

\*\*By City

**Project Description:**

Install bicycle lane striping on Main Street from (Esplanade Avenue to Crater Lake Parkway).

**Includes:**

8" Wide Stiping, Two Bicycle Symbols per Block at \$400/ea.



**Old Fort Road (Loma Linda Drive to UGB)**

Item	Description	Unit	Quantity	Unit Price	Total
1	Mobilization (5%)	LS	1	\$ 285,000	\$ 285,000
2	Traffic Control (2%)	LS	1	\$ 60,000	\$ 60,000
3	Asphalt Widening	LS	1	\$ 3,000,000	\$ 3,000,000
				<b>2016 CONSTRUCTION COSTS</b>	<b>\$ 3,345,000</b>
	Construction Contingency (20%)				\$ 669,000
	Design Engineering/Surveying				\$ 334,500
	Construction Administration/Engineering/Inspection				\$ 334,500
	Public Outreach				\$ 20,000
	Permitting				\$ 334,500
<b>TOTAL</b>					<b>\$ 5,037,500</b>

\*Does not include inflation. Typical Inflation rates vary and are between 3 and 5 percent per year.

**Project Description:**

Widening of Old Fort Road from Loma Linda Drive to the Urban Growth Boundary to add paved shoulders or bike lanes.

**Includes:**

Asphalt, Aggregate Base, Drainage Ditches/Pipes, Utility Relocation, New Driveways and Right of Way.



**Biehn Street (Crater Lake Parkway to Oregon Avenue)**

Item	Description	Unit	Quantity	Unit Price	Total
1	Mobilization (10%)	LS	1	\$ 2,600	\$ 2,600
2	Traffic Control (2%)	LS	1	\$ 1,000	\$ 1,000
3	Install Bike Lane Striping/Symbols	LS	1	\$ 22,000	\$ 22,000
<b>2016 CONSTRUCTION COSTS</b>					<b>\$ 25,600</b>
	Construction Contingency (20%)				\$ 5,200
	Design Engineering /Surveying				**
	Construction Administration/Engineering/Inspection				**
	Permitting				\$ 2,600
<b>TOTAL</b>					<b>\$ 33,400</b>

\*Does not include inflation. Typical Inflation rates vary and are between 3 and 5 percent per year.

\*\*By City

Project Description:

Widening the bicycle lanes along Biehn Street from Crater Lake Parkway to Oregon Avenue by restriping the roadway.

Includes:

Remove Striping, New Striping/Symbols



**N Eldorado Avenue (From Huron Street to Campus Drive)**

Item	Description	Unit	Quantity	Unit Price	Total
1	Mobilization (10%)	LS	1	\$ 45,000	\$ 45,000
2	Traffic Control (2%)	LS	1	\$ 10,000	\$ 10,000
3	Install Sharrows	LS	1	\$ 23,000	\$ 23,000
4	Install Traffic Calming	LS	1	\$ 35,000	\$ 35,000
5	New Sidewalk	LS	1	\$ 225,000	\$ 225,000
6	Replace Curbs (Including Demo)	LS	1	\$ 40,000	\$ 40,000
7	Earthwork	LS	1	\$ 50,000	\$ 50,000
8	Asphalt Patching	LS	1	\$ 25,000	\$ 25,000
<b>2016 CONSTRUCTION COSTS</b>					<b>\$ 453,000</b>
	Construction Contingency (20%)				\$ 90,600
	Design Engineering/Surveying				\$ 45,300
	Construction Administration/Engineering/Inspection				\$ 45,300
	Permitting				\$ 45,300
<b>TOTAL</b>					<b>\$ 679,500</b>

\*Does not include inflation. Typical Inflation rates vary and are between 3 and 5 percent per year.

**Project Description:**

Installation of Sharrows, Install Sidewalk on one or both sides of the street to complete the corridor & Install Traffic Calming along N Eldorado Avenue from Huron Street to Campus Drive. Curbs are existing and anticipated to only be replaced at driveways and ADA ramps (assume 33% of length).

**Includes:**

Pavement Legend (3 per block @ \$300/each), Retaining Wall, Traffic Calming, Sharrows and sidewalks (one or both sides of the street to complete corridor)



**OR 39 (OC&E Trail to Keller Road)**

Item	Description	Unit	Quantity	Unit Price	Total
1	Mobilization (10%)	LS	1	\$ 50,000	\$ 50,000
2	Traffic Control (2%)	LS	1	\$ 10,000	\$ 10,000
3	Install Sidewalks/Curbs	LS	1	\$ 436,000	\$ 436,000
	<b>2016 CONSTRUCTION COSTS</b>				<b>\$ 496,000</b>
	Construction Contingency (20%)				\$ 99,200
	Design Engineering/Surveying				\$ 49,600
	Construction Administration/Engineering/Inspection				\$ 49,600
	Permitting				\$ 49,600
<b>TOTAL</b>					<b>\$ 744,000</b>

\*Does not include inflation. Typical Inflation rates vary and are between 3 and 5 percent per year.

**Project Description:**

Installation of sidewalks on both sides of Highway 39 from the OC&E Trail to Keller Road.

**Includes:**

Sidewalk and curb installation on both sides of the street, Right of way, Utility Relocation.

**Hope Street (Bristol Avenue to SW 6th Street)**

Item	Description	Unit	Quantity	Unit Price	Total
1	Mobilization (10%)	LS	1	\$ 142,000	\$ 142,000
2	Traffic Control (2%)	LS	1	\$ 30,000	\$ 30,000
3	Install Sidewalks	LS	1	\$ 1,260,000	\$ 1,260,000
				<b>2016 CONSTRUCTION COSTS</b>	<b>\$ 1,432,000</b>
	Construction Contingency (20%)				\$ 286,400
	Design Engineering/Surveying				\$ 143,200
	Construction Administration/Engineering/Inspection				\$ 143,200
	Permitting				\$ 143,200
<b>TOTAL</b>					<b>\$ 2,148,000</b>

\*Does not include inflation. Typical Inflation rates vary and are between 3 and 5 percent per year.

**Project Description:**

Installation of sidewalks on both sides of Hope Street from Bristol Avenue to to SW 6th Street.

**Includes:**

Sidewalk and curb installation on both sides of the street, Right of way, Utility Relocation.

Recommended Plan Elements

Recommended Plan Elements				Evaluation Criteria			
Project ID	Description	Cost	Priority	Provides connections to major destinations	Completes existing gaps or deficiencies	Provides comfortable and convenient access to the trail system for wide range of users	Low-cost, feasible, easy to implement
G-1	Connect the OC&E Trail to downtown Klamath Falls via 6th Street bridge by widening sidewalk to provide for shared-use path. Provide a connection to the soon to be constructed Lake Ewauna trail. (Note: Lake Ewauna trail connection alignment is not confirmed; cost estimate does not include this connection.)	\$859,500	High	+	+	+	+
G-2	Connect the "A" Canal Trail to the ODOT Trail using Crater Lake Parkway by widening the sidewalks to provide for a shared-use path.	\$166,500	High	o	+	+	+
G-3	Connect the "A" Canal Trail to the Foothills Trail by widening the sidewalk on the east side of the bridge to provide a shared use path between the intersection and the "A" Canal trail. Tighten the curb radius for NB right-turns onto Crater Lake Parkway.	\$153,000	Medium	o	+	+	+
G-4	Connect the "A" Canal Trail to the Ella Redkey Swimming Pool by installing a shared-use path between the parking lot/front entrance to the pool and the existing "A" Canal Trail.	\$55,800	Medium	+	+	+	+
G-5	Connect the "A" Canal Trail to the Kiger Stadium and Klamath County Fairgrounds by paving the existing informal service road from the "A" Canal Trail to the Kiger Stadium Parking lot. Install a shared use path along the west side of Crest Street from the Kiger Stadium Parking lot to the Fairgrounds.	\$199,100	Low	+	+	+	o
G-6	Connect the Campus Trail to the Biehn Street bike lanes and sidewalk by widening the sidewalk on the south side of Campus Drive to complete the shared-use path connection. Possible modifications are needed at the Crater Lake Parkway intersection.	\$108,800	High	+	+	+	+
G-7	Connect the ODOT Trail to Kit Carson Park by constructing a connection between the trail and the parking lot or existing sidewalk connecting the street to the park.	\$22,600	Medium	+	+	+	+
G-8	Connect Veteran's Park to the Link River Trail by widening the sidewalk on the north side of Main Street to provide for a shared use path. Install a crossing across Main Street west of the park road's access to Main Street to connect Veteran's Park with the path. Sharrows may work as an interim solution.	\$90,600	High	+	+	+	+
G-9	Connect the "A" Canal Trail to the signalized crossing at SW 6 <sup>th</sup> Street by widening the sidewalk on the south side of SW 6th Street to better accommodate bicyclists.	\$18,700	Medium	o	+	+	+
G-10	Connect the "A" Canal Trail to Klamath Union High School by widening the sidewalk on the north side of Esplanade Avenue to provide a shared-use path to the high school. Coordinate with school for completing the connection.	\$298,500	Medium	+	+	+	o
G-11	Formalize connections between Summers Lane and/or Wiard Street and Steens Sports Park to provide southern connections to the park.	\$150,000	High	+	+	+	+
C-1	OC&E Trail crossing of OR 39: TBD by ongoing ODOT and Oregon Parks study		High	o	+	+	N/A
C-2	OC&E Trail crossing of Homedale Road: TBD by ongoing ODOT and Oregon Parks study		High	o	+	+	N/A
C-3	Install striped crosswalk and appropriate signage at the OC&E Trail crossing of Hope Street.	\$3,300	Medium	o	+	+	+
C-4	OC&E Trail crossing of Summers Lane: TBD by ongoing ODOT and Oregon Parks study		High	o	+	+	N/A
C-5	OC&E Trail crossing of Altamont Drive: TBD by ongoing ODOT and Oregon Parks study		High	o	+	+	N/A
C-6	Install marked crosswalk, appropriate signage, and raised median island at the "A" Canal Trail crossing of Homedale Road.	\$83,700	Medium	o	+	+	+
C-7	Install marked crosswalk and appropriate signage at the "A" Canal Trail crossing of Hope Street.	\$3,600	Medium	o	+	+	+
C-8	Further study is required to determine final treatment for the crossing of the "A" Canal Trail at Shasta Way. Active crossing treatments recommended.	\$50,000	Medium	o	+	+	N/A

C-9	Further study is required to determine final treatment for the crossing of the "A" Canal Trail at Eberlein Avenue. Active crossing treatments recommended.	\$50,000	Medium	o	+	+	N/A
C-10	Further study is required to determine final treatment for the crossing of the "A" Canal Trail at Washburn Way. Active crossing treatments recommended.	\$50,000	High	o	+	+	N/A
C-11	Further study is required to determine final treatment for the crossing of the "A" Canal Trail at Main Street. Active crossing treatments recommended.	\$50,000	High	+	+	+	N/A
C-12	Further study is required to determine final treatment for the crossing of the "A" Canal Trail at Esplanade Avenue. Active crossing treatments recommended.	\$50,000	High	+	+	+	N/A
B-1	Install protected or buffered bike lanes on OR 39 between the OC&E Trail and OR 140.	\$72,500	Low	o	+	+	+
B-2	Identify if there are parallel routes that would provide similar connectivity but greater comfort as an alternative to 6 <sup>th</sup> Street between the railroad bridge and OR 39.	TBD	Medium	+	o	+	N/A
B-3	Install sharrows and traffic calming on Shasta Way between Patterson Street and Kimberly Drive.	\$75,500	Low	o	o	+	+
B-4	Look for opportunities for alternate routes or for traffic calming measures on Shasta Way between Patterson Street and Crater Lake Parkway.	TBD	Medium	o	o	+	N/A
B-5	Further study required to determine final treatment for bicycle facilities on Patterson Street between 6 <sup>th</sup> Street and Foothills Boulevard. Candidates include buffered bike lanes or a shared-use path.	TBD	Medium	o	+	+	N/A
B-6 - B-11	Further study required to determine which north-south routes will be designated for bicycle travel in the southeast area of Klamath Falls and what the appropriate treatment is.	TBD	Medium	+	+	+	N/A
B-12	Install shared-use path on OR 140 between Washburn Way and Homedale Road.	\$1,633,500	Low	o	o	+	o
B-13	Install bike lane on 6 <sup>th</sup> Street between Market Street and Main Street.	\$15,700	High	+	+	o	+
B-14	Install bike lane on 5 <sup>th</sup> Street between Main Street and 6 <sup>th</sup> Street.	\$19,400	High	+	+	o	+
B-15	Install bike lanes on Klamath Avenue between Conger Avenue and Commercial Street. <i>Coordinate with the Blue Zones project.</i>	\$28,700	High	+	+	o	+
B-16	Install bike lanes on Main Street between Esplanade Avenue and Mill Street. <i>Coordinate with the Blue Zones project.</i>	\$24,600	High	+	+	o	+
B-17	The bicycle facility between Moore Park and downtown Klamath Falls will be determined by an ongoing project.	\$556,200	High	+	+	+	N/A
B-18	Widen the pavement to accommodate shoulders or bike lanes on Lakeshore Drive between Lynnewood Boulevard and the west UGB.	\$4,121,000	Low	o	o	o	-
B-19	Install bike lanes on Main Street between Esplanade Avenue and Crater Lake Parkway.	\$30,600	Medium	+	+	o	-
B-20	Widen the road to add paved shoulders or bike lanes on Old Fort Road between Loma Linda Drive and the UGB.	\$5,037,500	Low	o	o	o	-
B-21	Widen the bike lanes on Biehn Street between Crater Lake Parkway and Oregon Avenue by restriping the roadway.	\$33,400	High	+	o	+	+
B-22	Further study required to identify which east-west routes should receive shared lane markings, wayfinding, and/or traffic calming in the southeast area of Klamath Falls.	TBD	Medium	+	+	+	N/A
B-23	Install sharrows and traffic calming on N Eldorado Avenue.	\$679,500	Medium	+	o	+	+
S-1	Install sidewalks on both sides of OR 39 between the OC&E Trail and Keller Road.	\$744,000	Low	o	+	+	+
S-2	Install sidewalks on both sides of Hope Street between Bristol Avenue and SW 6 <sup>th</sup> Street.	\$2,148,000	Low	o	+	+	-
P-1	Develop a program to install and maintain wayfinding signage at all trailheads and trail crossings of public streets.	--	High	+	o	+	+
P-2	Develop a policy that requires bicycle parking to be provided at key locations and pursue grant funding to provide it at key locations where it is missing.	--	High	+	o	+	+
P-3	Develop guidelines for how to evaluate trail crossings and determine the appropriate treatment for the City and County to use in applying consistent treatment at crossings for local streets.	--	Medium	o	+	+	+
P-4	Evaluate the feasibility of installing illumination along the trail system, including type of illumination, priority locations, and cost/maintenance.	--	Low	o	o	+	o
P-5	Develop a plan for strategic placement of bicycle repair stations and racks throughout the urban trail system.	--	Low				



## Appendix F Wayfinding Guidelines

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## WAYFINDING AND BRANDING GUIDELINES AND BEST PRACTICES

It is important that trail users have access to information to enhance their experience. Trail information can be disseminated in a wide variety of formats, including kiosks, brochures, websites, guidebooks, and on-trail signs and blazes. Even with good trail guides and websites available, trail signage is indispensable. If trail users are uncertain about trail location or direction, they may become disoriented. They may also be unaware of opportunities to make connections to certain destinations via the on-street network, which will be particularly important information to communicate along the urban trails in Klamath Falls.

A standardized wayfinding system is a means of creating a cohesive and consistent brand and enhancing the overall appearance of the trail system. This increases awareness of where a connected system exists, potentially leading to increased use of the system. A trail wayfinding plan should provide specific and detailed design recommendations, as well as information about installation of trail signs. It is important to ensure that signs do not overwhelm the trail in complexity or number. A balance must be reached between providing signage for users to find their way and avoiding “sign pollution.”

The following topics are covered in these guidelines:

- Developing a plan
- Objectives of a wayfinding system
- Sign design
- Sign locations
- Maintenance
- Other plans to reference

### DEVELOPING A PLAN

These guidelines are meant to inform a future effort to develop a comprehensive wayfinding and signing system for the urban trails in Klamath Falls. Such an effort could be completed with the help of a professional private company, completed internally by agency staff, or prepared as part of a partnership with local trail groups. However the project is moved forward, the following agencies, as owners of the various trails in the urbanized area of Klamath Falls, should be involved in the process:

- City of Klamath Falls
- Klamath County
- Oregon Department of Transportation (ODOT)
- Oregon Parks and Recreation Department (OPRD)

- United States Bureau of Reclamation

## OBJECTIVES OF A WAYFINDING SYSTEM

The recommended objectives for a wayfinding system for the urban trails in Klamath Falls are:

- improve the trail user experience;
- create a consistent brand;
- improve travel within and between various trails and on-street connections;
- increase comfort and confidence in navigating the trail system;
- enhance the safety of people, vehicles, and property;
- promote trail use for multiple purposes (e.g., transportation, recreation).

Beyond navigation and ease of movement, consistent and thorough wayfinding can contribute greatly to the identity and sense of place within a trail. When visitors can easily recognize a consistent aesthetic throughout a place, they have greater confidence that the area they are in is safer, more established, more cared for and generally have a more positive experience than in places that have no clear identity. People often naturally gravitate towards areas that they can quickly identify and recognize, thereby increasing the traffic along the trail and to the area in general, helping stimulate economic vitality.

Effective wayfinding communicates the right information at the right time. By developing a hierarchy of information delivery, the user is not overloaded with information: they are given just enough information to find their way to a destination and to understand their location in relation to the environment in which they find themselves. Studies show that an optimum level of information can be understood and retained, beyond this level the user becomes disoriented and information delivery becomes less effective.

A branded and cohesive wayfinding system for the trail can help in successfully drawing not only locals, but visitors through consistent sign messages and signs posted at key decisions point allowing for ease of travel. Consistency in sign style, colors, and materials will help brand the trail thereby drawing attention and recognition to it along with stimulating the economy. Holistically, wayfinding is a key component in telling the story of the trail.

## SIGN DESIGN



The following section provides basic guidelines to consider in developing the sign design.



### General Guidelines



Trail signs are key elements to effective, safe wayfinding. It is important to understand that the design and implementation of wayfinding signs—including trail signs—are directed and governed by rules and

standards. Any signage within a public roadway right-of-way must be approved by the managing agency (i.e., City of Klamath Falls, Klamath County, ODOT). When applicable, these agencies standards should be followed instead of the guidelines below. For instance, Chapter 8 of the current ODOT *Sign Policy and Guidelines* (Reference 1) lays out acceptable signs that can be used for trail identification and wayfinding purposes on the State highway system. Sign #1 in Table 1 provides an example of a sign that meets these guidelines. The Intertwine Regional Trails Signage Guidelines (Reference 2) provides an example of design guidelines for a regional trail system in Oregon and illustrates how off-street signs may differ from on-street signs.

**Table 1 Sign Examples**

Sign #/ Location	Photo	Best Used For	Other Notes
<p>1 (Springwater Trail – Portland, Oregon)</p>		<p>On-Street Bikeways Paved Trails</p>	<ul style="list-style-type: none"> <li>- Complies with ODOT standards for signs in public highway right-of-way</li> <li>- Lists distance to destinations in both mileage and bicycling time</li> <li>- MUTCD compliant</li> <li>- Similar designs used in many states</li> </ul>
<p>2 (Butler Park – Austin, Texas)</p>		<p>Trails Sidewalks Areas with several amenities (e.g., parks, downtown)</p>	<ul style="list-style-type: none"> <li>- Use of universal symbols aids in comprehension</li> </ul>

<p>3 (downtown Portland, Oregon)</p>		<p>Wide sidewalks Plazas Other areas where there is space to linger and there is a high number of destinations (e.g., downtown)</p>	<ul style="list-style-type: none"> <li>- Most likely to be used by people walking</li> <li>- Space near the sign for people to linger and read the sign should be provided</li> </ul>
<p>4 (Madison, Wisconsin)</p>		<p>Bicycle boulevards (shared streets that have been optimized for bicycle travel)</p>	<ul style="list-style-type: none"> <li>- Helps establish a sense of place and identity for the street</li> </ul>

<p>5 (Salt Lake City, Utah)</p>		<p>Designated and Named Bikeways/Routes (with at least a section of the route being on-street)</p>	<ul style="list-style-type: none"> <li>- MUTCD compliant</li> <li>- Sets apart a particular bike route that provides some unique function/experience, similar to a scenic byway</li> </ul>
<p>6 (Portland, Oregon)</p>	 <p>(Image source: <a href="https://noticingswportland.wordpress.com/">https://noticingswportland.wordpress.com/</a>)</p>	<p>Trails (paved and unpaved)</p>	<ul style="list-style-type: none"> <li>- Brown sign is primarily used for hiking trails</li> <li>- 4T logo on brown sign and 40 Mile Loop logo on green sign indicate trail is part of larger routes that are consistently branded across the system</li> <li>- Green sign provides distance to destination and trail name</li> </ul>

<p>7</p>	 <p>(Image source: <a href="http://www.roadtrafficsigns.com/">http://www.roadtrafficsigns.com/</a>)</p>	<p>Trails or Shared-use Paths where there is a desire to separate people bicycling from people walking</p>	<ul style="list-style-type: none"> <li>- MUTCD compliant</li> </ul>
<p>8 (Ketchikan, Alaska)</p>		<p>Pedestrian walkways</p>	<ul style="list-style-type: none"> <li>- Pedestrian scale sign provides direction to popular destinations</li> <li>- Coloring provides a sense of place</li> <li>- Post-mounted simple sign does not require space for people to linger like a kiosk-type sign does</li> </ul>

### Content

The basis for producing trail signage is to provide information to trail users. It is appropriate to provide more information about a trail than simply marking a line on a map. It is therefore important to first fully understand what information is desired and to review the information you wish to present to be sure it is helpful and appropriate for each specific trail. For instance, the standard sign in the OODT guidelines includes destinations and the estimated time to ride a bicycle there (as opposed to mileage only, which not all users may understand – sign #1 in Table 1 for an example). Walking time could potentially be added, too. Where the urban trails meet recreational trails, consider providing information on how accessible the trail is so that people can judge whether it is appropriate for their abilities.

A variety of information formats may be used to convey trail information. Consideration should be given to providing written information in alternative formats such as Braille, large print, multiple languages, or an audible format, particularly at popular trailheads (e.g., the Main or Wiard entrances to the OC&E Trail). Sign #3 in Table 1 provides an example of a kiosk style sign that is most appropriate in areas where pedestrians have space to linger and there are several destinations (e.g. Downtown). In addition, simplified text and reliance on universal symbols (see sign #2 in Table 1 for an example) would provide information to individuals with limited reading abilities or limited understanding of the English language.

Also of importance is the necessity to develop a system for evaluating content for potential inclusion in the wayfinding system. To that end, a team needs to be formed to develop methodologies to quickly and objectively determine content eligibility for inclusion in the wayfinding system. Signed content needs to be reviewed to determine if items could be grouped together into a larger group. For example, if there was a trailhead that offered more than one amenity you would sign to the trailhead and not each amenity (note “SE Neighborhoods” destination in sign #1 in Table 1). This larger grouping helps reduce sign clutter by reducing the number of destinations needed to be signed on each panel, allows the group of destinations to be signed from a further distance since less destinations are required to be signed per panel, and the grouping provides added weight to the destinations by showing them as a collection of resources that tell a bigger story and may be more appealing to a user with limited time. When resources are grouped, the individual resources are signed individually at critical turning points for each of the individual resources and on signs with available room at very close proximity to the resource.

This process of determining content will setup guidelines that can be used to determine when content should be added in the future. Documentation of these guidelines helps future managers of the wayfinding plan to continue to develop the system in a consistent manner.

## Design

From a community vision to existing signage, many things can be a factor in shaping a wayfinding system and refining it to the area. Each place has a unique character, which gives it a sense of place and distinctiveness. Building on the understood place identity and themes will enrich the design process, and ensure design ideas emerge from the character of the place, rather than adding it on at the end as an imposed and separate element. An identity can be conveyed in the use of color, materials, form, and the method and means of communication. Many of the signs in Table 1 help provide a unique sense of place.

A consistent palette of colors should be used throughout the wayfinding system. Using the same colors increases legibility of the wayfinding system, enabling faster recognition and expectations of the signs as a user approaches. Since the wayfinding system needs to compete with the local environment and landscape, the color choices for signs must be strong, but not overwhelming to the environment.



**Finish & Contrast**

We recommend a format that adheres to the Americans with Disabilities Act (ADA) and the Federal Highway Administration (FHWA) minimum requirements regarding presentation of information on signs used to provide direction or identify spaces. Letter characters and backgrounds for both identification and directional signs must have a non-glare finish. Characters and symbols will have at least a 70% contrast with their background. Light characters on a dark background read more easily, especially at night, early morning, and dusk.

**Content Layout**

An effectively designed sign face is clear, concise, simple, and legible with well-spaced typography and plenty of space in the margin. Text for signs should be left-justified and use both capital and small-case lettering (except for wooden directional signs, which use all capital lettering). The chart below is a guide to determine the minimum letter size based on the desired maximum distance at which a proposed sign is to be viewed.

**Table 2 Capital Letter Height Based on Viewing Distance<sup>1</sup>**

Viewing Distance (feet)	Capital Letter Height (inches)
0-20	0.75
21-27	1
28-41	1.5
42-55	2
56-83	3
84-111	4

<sup>1</sup>The ODOT Sign Policy and Guidelines lays out these design elements for its signs and should be followed where applicable. These guidelines are meant for off-road applications.

The Manual on Uniform Traffic Control Devices (Reference 3) guidelines recommend listing destinations in the following way: destinations straight-ahead are signed first, followed by destinations to the left, then destinations to the right, and within each direction, destinations are ordered closest to furthest. Trail sign designs often allow for alternative arrangement of content due to type of content and structural design/shape.

**Environmental Considerations**

When designing a wayfinding system it is imperative that the material selection matches the environmental conditions in which they will exist. Signs may be constructed using different types of materials, which may vary depending on the type of sign being produced. Factors to consider when

choosing materials include budget, aesthetics, durability, maintenance costs, and replacement cost due to vandalism or theft.

Specifications of durable materials for the sign program shall take into account the environment, temperatures and climate within Klamath Falls area. In all cases the manufacturer guidelines will be the primary reference for material suitability.

**Wood** - Traditionally used for many types of trail signs since it is a natural material, aesthetically pleasing, and readily available

**Plastics, Fiberglass (fiber-reinforced polyester), and Composites** - These are widely available, easily adaptable, weather-resistant, fairly inexpensive, and a good choice for smaller signs and for signposts. Reflective material may be desirable for sign surfaces for high visibility in the dark. Plastics may not be appropriate in more primitive locations.

**Metal** - Aluminum is widely available, lightweight, durable, and most useful for traffic control signs. However, aluminum is more expensive and may not be appropriate for larger signs, especially where a more natural appearance is desired. Steel is more affordable and durable, but it weighs more than aluminum and requires special treatment to inhibit rust (stainless or galvanized steel). Steel and aluminum should be coated to prevent weathering damage. Powder coating and anodizing will give an even hard wearing finish.

**Stone** - Best used for cairns where other methods of marking trails are impractical, and as a decorative base for larger signs that require posts or as a significant entry signs.

**Vinyl Surfaces (3M)** - Poor colors for sunny environments include black, dark reds, and green, as they will be noticeably faded in a 3 to 5 years. Protective surface treatment includes UV resistant clear coat.

### ***Other Considerations***

- If using nails to attach a sign then use aluminum nails. Aluminum resists corrosion better than other metals and will not damage a saw when a future cut is made across a hidden nail.
- When driving nails into trees, be sure to leave a sufficient length protruding (approximately ½ inch) to allow for future tree growth. An exception can be made in areas of frequent vandalism or theft.
- Place waymarks at eye level of the user, when possible.
- Be sure to mark trails in both directions, first from one direction and then from the opposite direction, in order to gain each perspective. It may not be appropriate to simply put markers on opposite sides of the same sign post or tree.

- Trails need to be continuously marked, including when they follow roads.
  - This same principle applies to on-street bikeways, where signage can be supplemented with shared lane markings (aka “Sharrows”).
- Avoid placing waymarks so that more than one is readily obvious from the previous. One well-placed marker is better than several poorly placed markers.
- Be sure to keep vegetation pruned from in front of waymarks at all times.



**Sharrows can help with on-street wayfinding for people bicycling**

## SIGN LOCATIONS

Once sign messages are determined, sign locations can be established at the critical decision points along the trails and connecting on-street network: key intersections, points of entrance into the trails, and required turns to specific destinations. Signs should be located where they can easily be seen by trail users and should present information in a format that is easy to understand by all users. Trail markings should be visible, yet unobtrusive, balanced according to the characteristics of the trail. The text should be limited to what is necessary and should be supplemented by graphics that are universally understood.

## MAINTENANCE

The following are some tips to help plan for maintenance of the system.

### Management and Maintenance

Providing trail signs comes with a responsibility for long-term management. Management should be in place to ensure that trail signs are maintained in good order and that the signs continue to reflect the nature of the trail. This is particularly important on the Klamath Falls system where multiple agencies will have jurisdiction over the signs.

Management can be handled through the establishment of an inter-jurisdictional committee that oversees the funding, maintenance, and expansion of the sign program. A single point-person should be assigned the responsibility of day to day management of the system.

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## Special Considerations

In-house fabrication will likely be limited to graphics and lettering for changing messages, poles, foundations, and installation. An initial stock of parts should be included in the base bid of each phase of the project. This stock can include poles (painted), sign panels (painted/no lettering), brackets, and other parts.

## Best Cleaning Practices

**Maintenance Schedule** - Signs should be cleaned at least annually, twice a year is preferred.

**Dirt and Grime** - Use a mix of Simple Green (or similar product) and water.

**Removing Graffiti** - Use a mild enamel thinner.

**Removing Stickers** - Recommended products are Goof Off and/or Goo Gone.

## New Sign Types

Any additional sign types shall be designed to be consistent with the design of the wayfinding system. This includes color, materials and overall aesthetics.

## Priority for Sign Installation and Removal

If the system needs to be installed in phases, it is recommended that complete sign routes be installed. This will be the most effective way of providing a complete route to each destination.

Removal of existing signage should happen simultaneously or before, but as close as possible to, installation of the new signs. This will ensure that some level of direction or guidance is in place while the system is being installed.

## General Maintenance

The following are general timeframes for when maintenance may need to be performed.

### ***Short Term General Maintenance (0 – 4 Years)***

**Planning and Design** - Minor corrections and adjustments help the system operate efficiently. This may include additional signs, or adjustments based on new circulation patterns.

**Physical Maintenance (Materials)** - Annual cleaning and typical maintenance (wear and tear repairs), new panels, tightening of fasteners, replacement parts due to vandalism or auto damage.

**Physical Maintenance (Locations)** - Relocation may be necessary based on problem sign locations.

**Long Term General Maintenance (5 – 9 years)**

Planning and Design - Additions and deletions of destinations and/or messages and overall routing review may be necessary, based on physical changes to the area.

Physical Maintenance (Materials) - Materials begin to fade, warranties may expire, and a more concentrated effort is required to maintain the system. New panels, replacement parts, and sign replacement may be necessary.

Physical Maintenance (Locations) - Relocation may be necessary based on new routing or circulation.

**System Life Span (10 – 15+ years)**

Planning and Design - Complete review of the system and its effectiveness based on new destinations that may have opened or attractions which have closed. In addition, new circulation/routing and construction projects may affect the system. Design elements may be reviewed for consistency with the area's identity and marketing initiatives.

Physical Maintenance (Materials) - Materials begin to reach their life span, full sign replacement may be necessary for some signs if they have not been maintained in the past.

Physical Maintenance (Locations) - Relocation may be necessary based on new routing or circulation.

**REFERENCE TRAIL SIGNING PLANS**

Listed below are two trail wayfinding plans from other areas in Oregon that may be helpful to reference as Klamath Falls develops its own system.

- *Intertwine Regional Trails Signage Guidelines* (Portland, Oregon metropolitan area) – Regional trails signage guidelines to establish a consistent look for the Portland metro area. Includes detailed guidelines for on-street and off-street signs and different user groups.
- *Oakridge Area Wayfinding Plan* (Oakridge and Westfir, Oregon) – Tourism focused plan for an area known for recreational activities. Completed with a grant from Travel Oregon.

**REFERENCES**

1. Oregon Department of Transportation. *Sign Policy and Guidelines*. Last Update: September 2015. [http://www.oregon.gov/ODOT/HWY/TRAFFIC-ROADWAY/pages/sign\\_policy.aspx](http://www.oregon.gov/ODOT/HWY/TRAFFIC-ROADWAY/pages/sign_policy.aspx).
2. Metro. *The Intertwine Regional Trails Signage Guidelines*. May 2012.
3. US Department of Transportation. *Manual on Uniform Traffic Control Devices, 2009 Edition*. May 2012. <http://mutcd.fhwa.dot.gov/>.

## Appendix G Implementing Ordinances

**BOARD OF COUNTY COMMISSIONERS**

**KLAMATH COUNTY, OREGON**

**IN THE MATTER OF AMENDING )  
THE KLAMATH FALLS URBAN )  
AREA TRANSPORTATION SYSTEM )  
PLAN TO ADD IN THE KLAMATH )  
FALLS URBAN AREA TRAIL )  
MASTER PLAN TO SECTION 6 )  
(BICYCLE FACILITIES PLAN) )**

**ORDINANCE XX.XX**

**WHEREAS**, the Klamath County Board of Commissioners has the authority and desires to amend the Klamath Falls Urban Area Transportation System Plan; and

**WHEREAS**, the Klamath County Planning Department provided written notice of the public hearing as required in Klamath County Land Development Code Article 31; and

**WHEREAS**, a public hearing was held on **Month XX, 2016**, and public testimony was considered before the Klamath County Planning Commission and Board of County Commissioners; and

**WHEREAS** the Klamath County Planning Commission forwarded a recommendation of approval; and

**WHEREAS**, on **Month XX, 2016**, based on testimony entered and in consideration of the whole record, the Klamath County Board of Commissioners voted **unanimously** to approve the request.

**NOW, THEREFORE**, the Klamath County Board of Commissioners ordains that the Klamath Falls Urban Area Transportation System Plan Section 6 (Bicycle Facilities Plan) shall be amended by adding the Klamath Falls Urban Trail Master Plan and its associated appendices, attached hereto as Exhibit "1" and incorporated herein by reference are hereby adopted.

DATED this \_\_\_\_ day of \_\_\_\_\_, 2016.

**FOR THE BOARD OF COMMISSIONERS**

\_\_\_\_\_  
Chairman

\_\_\_\_\_  
Commissioner

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Commissioner

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County Counsel  
Approved as to form

**NOTICE OF APPEAL RIGHTS**

This decision may be appealed to the Oregon Land Use Board of Appeals (LUBA) within 21-days following the date of the mailing of this order. Contact LUBA for information as how to file this appeal (LUBA by phone 1-503-373-1265 or by mail at 550 Capitol Street NE, Suite 235, Salem Oregon 97301-2552). Failure to do so in a timely manner may affect your rights.



**AN ORDINANCE AMENDING THE URBAN AREA TRANSPORTATION SYSTEM PLAN BY ADDING THE KLAMATH FALLS URBAN TRAIL MASTER PLAN**

**WHEREAS**, in 2012, the City of Klamath Falls (City) adopted the Klamath Falls Urban Area Transportation System Plan (TSP) as the transportation element of its comprehensive plan; and

**WHEREAS**, the City is committed to providing a well-connected urban trail system, including connections between the trail system and major destinations, for its residents and visitors; and

**WHEREAS**, the City pursued and received grant funding for an Urban Trail Master Plan with the intent on updating the City's Urban Area Transportation System Plan as it relates to trails and bicycle and pedestrian facilities in the City; and

**WHEREAS**, the City, with consultants and an advisory committee made up of other agency partners and private citizens, created an Urban Trail Master Plan that identifies an interconnected network of paved trails and on-street bicycle and pedestrian facilities to improve mobility options for residents and visitors; and

**WHEREAS**, City staff provided complete public access to all related materials in print and on the website, in addition to open houses and engaging with local community groups to raise awareness during the project; and

**WHEREAS**, the hearing notices were duly given and Planning Commission held a public hearing on **Month, XX, 2016**, pursuant to applicable laws, at which time evidence with reference to said proposed amendment to the TSP was considered by the Planning Commission; and

**WHEREAS**, the hearing notices were duly given and the City Council held a public hearing **Month, XX, 2016**, on the record of and including the record of the Planning Commission concerning the proposed amendment of the TSP; and

**WHEREAS**, pursuant to such record and hearing, the City Council has determined the proposed amendments to the TSP to be in compliance with Statewide Land Use Goals 1 (Citizen Participation), Goal 2 (Land Use), and Goal 12 (Transportation); and,

**WHEREAS, the City Council adopted the findings of the Planning Commission attached and incorporated by this reference as Exhibit; NOW THEREFORE,**

**THE CITY OF KLAMATH FALLS ORDAINS AS FOLLOWS:**

The Klamath Falls Urban Area Transportation System Plan Section 6 (Bicycle Facilities Plan) shall be amended by adding the Klamath Falls Urban Trail Master Plan and its associated appendices, attached hereto as Exhibit A.

Passed by the Council of the City of Klamath Falls, Oregon, the \_\_\_\_ day of \_\_\_\_\_, 2016.

Presented to the Mayor, approved and signed this \_\_\_\_ day of \_\_\_\_\_, 2016.

\_\_\_\_\_  
Mayor

ATTEST:

\_\_\_\_\_  
City Recorder

STATE OF OREGON                    }  
COUNTY OF KLAMATH            }ss.  
CITY OF KLAMATH FALLS         }

I, \_\_\_\_\_, Recorder for the City of Klamath Falls, Oregon, do hereby certify that the foregoing is a true and correct copy of an Ordinance duly adopted by the Council of the City of Klamath Falls, Oregon at the meeting on the \_\_\_\_ day of \_\_\_\_\_, 2016 and therefore approved and signed by the Mayor and attested by the City Recorder.

\_\_\_\_\_  
City Recorder

## EXHIBIT A FINDINGS

### Statewide Land Use Goals

The City is proposing to amend the Klamath Falls Urban Area Transportation System Plan (TSP), thereby amending the City of Klamath Falls Comprehensive Plan. The following findings demonstrate that the adoption of the amended TSP is consistent with the relevant Statewide Land Use Planning Goals.

#### **Goal 1: Citizen Involvement**

*Goal 1 requires the development of a citizen involvement program to insure the opportunity for citizens to be involved in all phases of the planning process.*

#### Response:

The general public was invited to participate in this process through advertisements in the newspaper of record and specific outreach to local community groups. A public website ([www.klamathfallstrailplan.com](http://www.klamathfallstrailplan.com)) was published and made available throughout the duration of the project. The website included general information about the project, all project documents (draft and final), upcoming meeting and hearing information, meeting notes, and other relevant information about the project. Two online “virtual” open houses and one in-person open house were held throughout the development of the project. Citizens were able to learn more about the project and provide specific feedback on areas to be addressed by the plan and on the draft plan at these open houses. A citizen advisory committee that included private citizens of the City of Klamath Falls met regularly throughout the course of the project and provided feedback and guidance. Notices of the Planning Commission hearing were mailed to Klamath County Chamber of Commerce, the Klamath County Homebuilders Association, and the Klamath County Realtors Association. Public hearings were held in front of the City of Klamath Falls Planning Commission and City Council and the Klamath County Planning Commission and Board of Commissioners.

#### **Goal 2: Land Use Planning**

*This goal requires that a land-use planning process and policy framework be established as a basis for all divisions and actions related to use of land. All local governments and state agencies involved in the land-use action must coordinate with each other. Cities, counties, state and federal agencies and special districts plans and actions related to land use must be consistent with the comprehensive plans of cities and counties in regional plans adopted under Oregon Revised Statutes Chapter 268.*

#### Response:

Klamath County is in the process of initiating adoption of the same amendment to the TSP. The Oregon Department of Transportation and Department of Land Conservation and Development were members of the project advisory committee and were sent notices of the proposed amendment.

### **GOAL 12: TRANSPORTATION**

*Goal 12 requires cities, counties, Metropolitan planning organizations, and Oregon Department of Transportation to provide and encourage a “safe convenient and economic transportation system.” This is accomplished through the transportation system plans based on inventories of local, regional and state transportation needs.*

Response:

The proposed amendment to the transportation system plan is intended to facilitate the development of an interconnected active transportation system. When built out, this will improve the convenience and comfort of walking and bicycling in the City, providing economical transportation options to, and better connecting, residents and visitors to the City.

**FINDING:**

The proposed amendment to the transportation system planned complies with Goal 1, Goal 2, and Goal 12 of the Statewide Land Use Planning Goals.