KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING
354 SW Upper Terrace Drive, Suite 101, Bend, Oregon 97702 P 541.312.8300 F 541.312.4585

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

Project #: 18974

Date: September 2, 2015

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

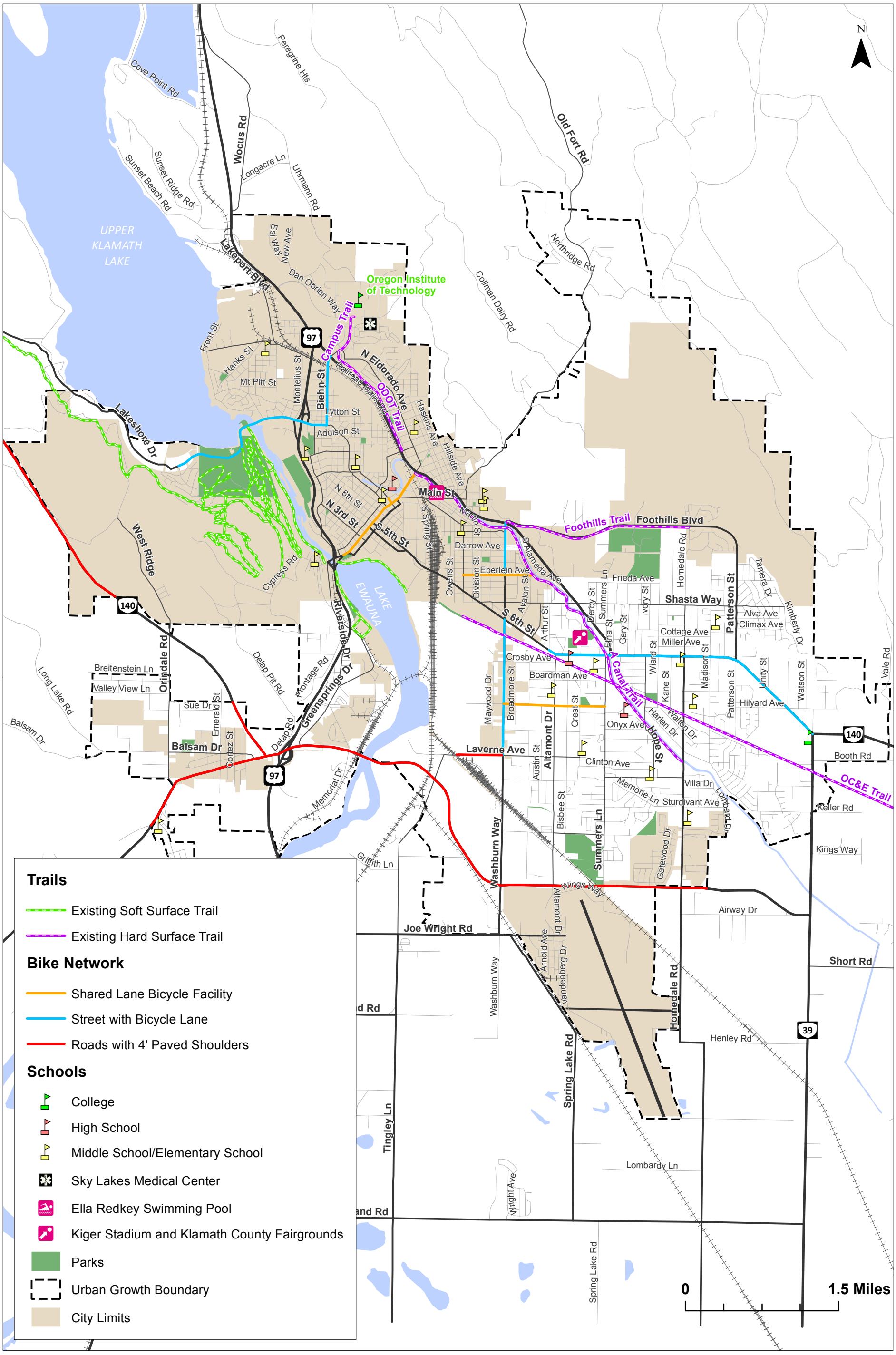
This memorandum provides an overview of the existing urban trail system in Klamath Falls and an assessment of areas in need of improvement, both now and in the future. These findings will form the basis for the recommended projects, policies, programs, pilot projects, and studies that will make up the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

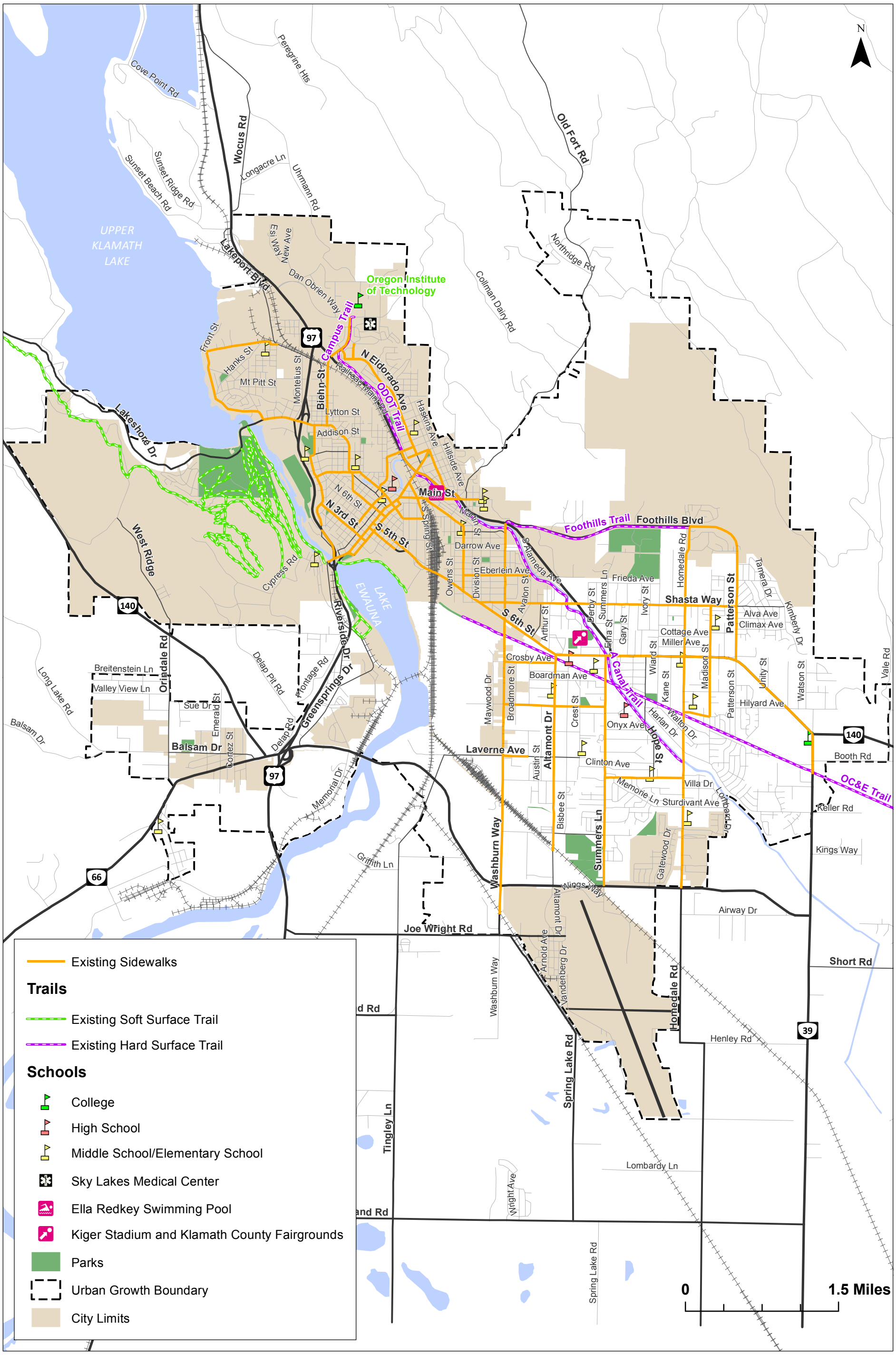
Figure 1 illustrates the inventory of the existing trail network, including on-street bicycle facilities and Figure 2 shows the trail network along with an inventory of sidewalks on arterial and collector streets in the Klamath Falls Urban Growth Boundary (UGB). These inventories use the Klamath Falls 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**

H:\projfile\18974 - Klamath Falls Trail Master Plan\GIS\TM2\Fig01_Existing Trail and Bike Network.mxd - agriffin - 5:45 PM 8/31/2015



Existing Trail Network and Sidewalk Facilities
Klamath Falls, Oregon

Figure **2**

H:\projfile\18974 - Klamath Falls Trail Master Plan\GIS\TM2\Fig02_Existing Trail Network_Sidewalk.mxd - agriffin - 2:29 PM 9/1/2015

Hard Surface Trails

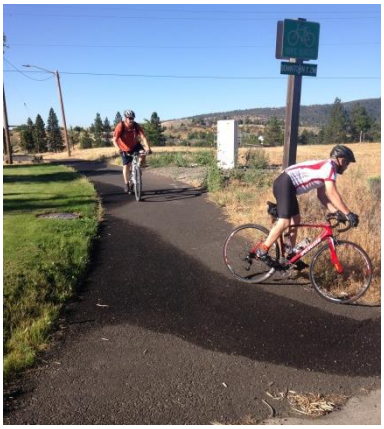
Most of the trails illustrated in Figures 1 and 2 have hard surfaces and are used for both transportation and recreation purposes. These trails include:

OC&E Trail West of Washburn Way

- *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.

"A" Canal 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.



ODOT Trail at Campus Drive

- *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.
- *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 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)

Patched Crack on OC&E Trail

- 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)

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[1]
Longitudinal striping and repainting of stop bars	Every 5 Years	$2,000[2]
Crack seal minor cracks less than 1" wide	Every 1 Year	$2,700[3]
Crack seal major cracks greater than 1" wide	Every 1 Year	$3,400[4]
Repair pot holes with patch	Every 1 Year	$1,000[5]
Inspect signs and replace as needed	Every 5 Years	$500[5]
2" hot mix overlay	Every 20 Years	$79,000[6]
Total Annual Cost (with 20-year overlay)		**$89,500**
Total Annual Cost (without 20-year overlay)		**$10,500**

[1]0.5 hours/mile x 15.3 trail miles x 2 times/year
[2]$0.50 x 15.3 miles x 5,280 feet/mile x 25% length / 5 years
[3]Assumes topical crack seal applied at a cost of $1/foot of crack, with cracks occurring every 100 feet on 10-foot wide trails.
[4]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.
[5]Lump sum estimate
[6]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.

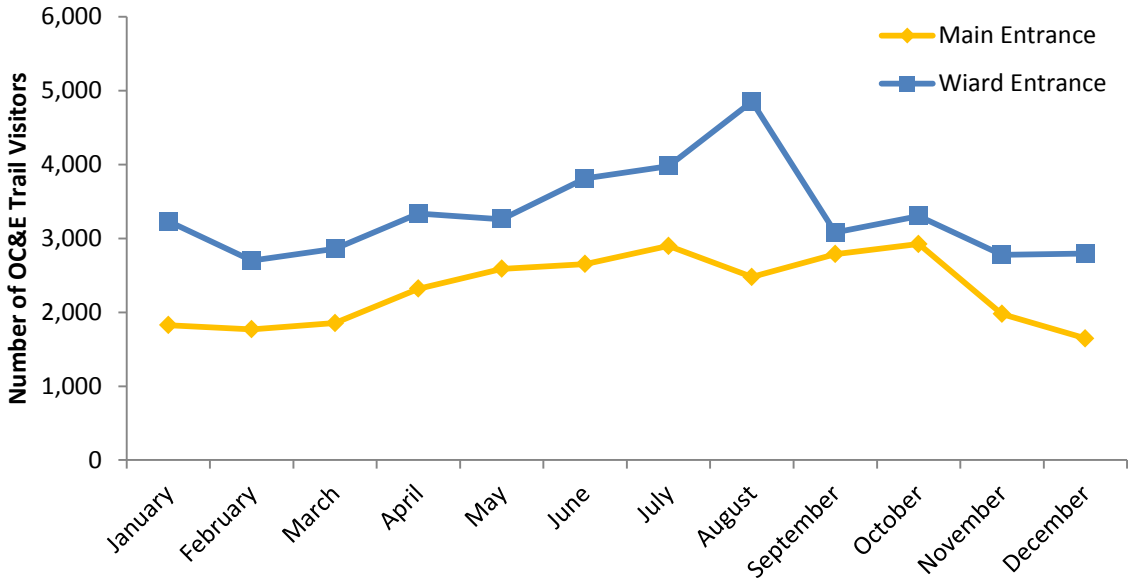


Figure 3 Average Monthly Counts at OC&E Trail Entrances (January 2012 – July 2015)

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[1] 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%

[1] 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

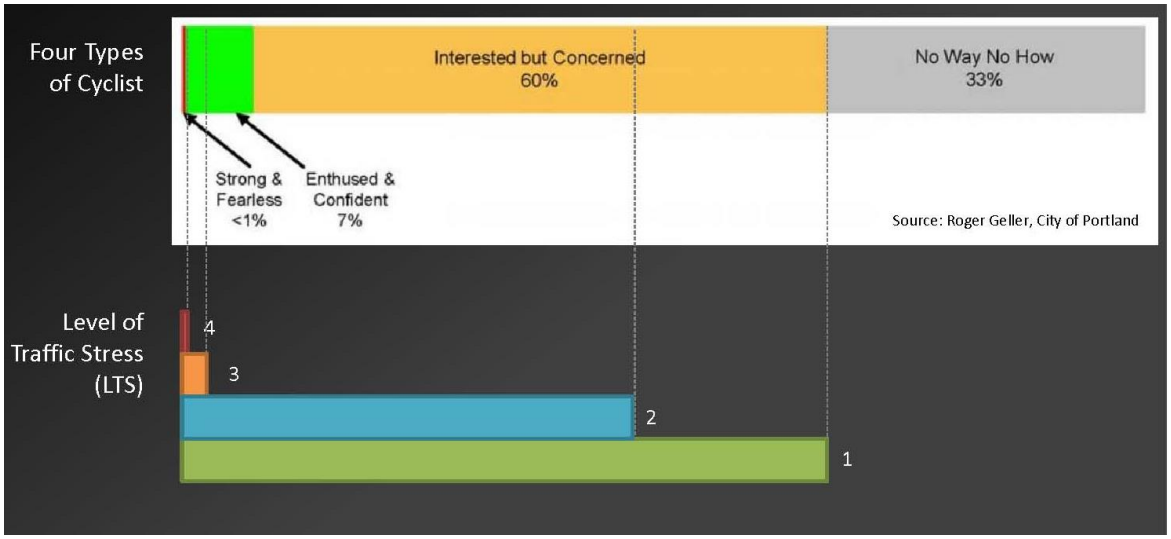
Bicycle Level-of-Traffic Stress

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.

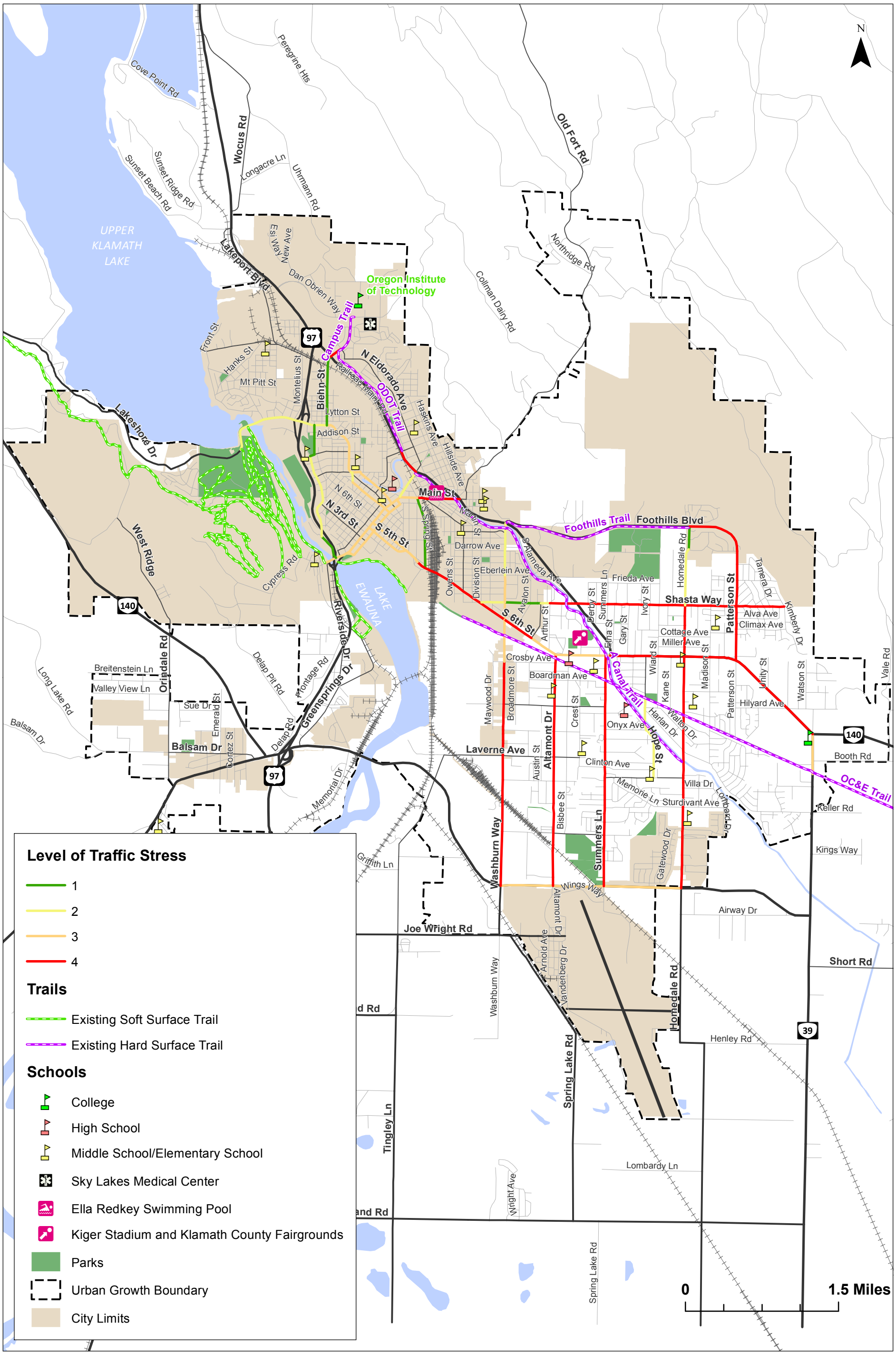
Table 3 Traffic Stress Levels

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**

H:\projfile\18974 - Klamath Falls Trail Master Plan\GIS\TM2\Fig04_BicycleLTS.mxd - agriffin - 5:59 PM 8/31/2015

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*
Total	*1*	*8*	*24*	*19*	*0*	*52*

Bicycle Crashes

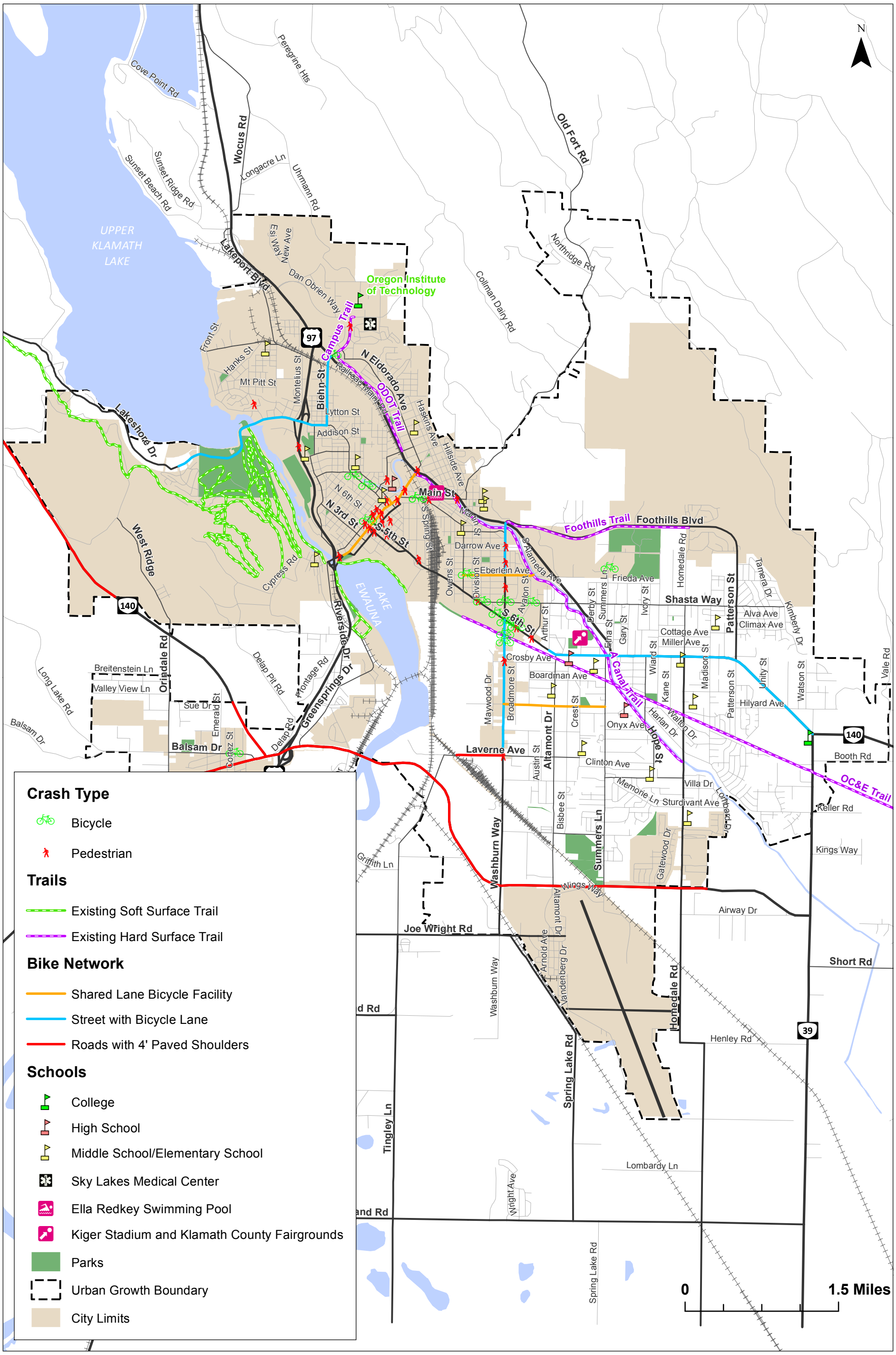
Nearly all, 18 of the 19, bicycle crashes were classified as angle or turning movement crashes, indicating they likely occurred at a conflict point such as a driveway, intersection, or trail crossing. The majority of the bicycle crashes (16 out of 19) occurred on roadways that did not have a designated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

Ten bicycle-related crashes occurred near the S 6th 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**

H:\projfile\18974 - Klamath Falls Trail Master Plan\GIS\TM2\Fig05_PedBikeCrashData.mxd - agriffin - 6:59 PM 8/31/2015

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.

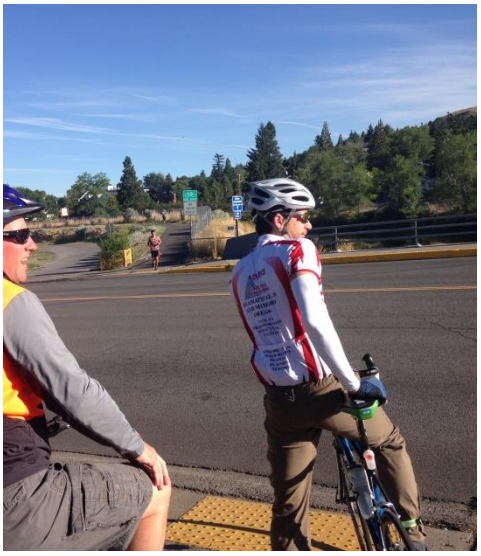
Table 5 NCHRP Report 562 Crossing Analysis Results

Roadway	Trail	Current Condition	NCHRP 562 Treatment Recommendation	Enhancement Potentially Needed?
OR 39	OC&E	Sign	Active/ Enhanced	Yes
Homedale Road	OC&E	No Treatment	Crosswalk	Yes
Hope Street	OC&E	Sign	Crosswalk	Yes
Summers Lane	OC&E	Sign	Active/ Enhanced	Yes
Altamont Drive	OC&E	Sign	Crosswalk	Yes
Washburn Way	OC&E	Signal	Signal	No
Homedale Road	A Canal	Sign	Crosswalk	Yes
Hope Street	A Canal	Sign	Crosswalk	Yes
6th Street	A Canal	Signal[1]	Signal	No
Shasta Way	A Canal	Sign	Active/ Enhanced	Yes
Eberlein Avenue	A Canal	Sign	Crosswalk	Yes
Washburn Way	A Canal	Sign/Signal[1]	Active/ Enhanced	Yes
Main Street	A Canal	No Treatment	Active/ Enhanced	Yes
Esplanade Avenue	A Canal	No Treatment	Active/ Enhanced	Yes
Portland Street (Crossing Crater Lake Parkway)	ODOT	Hybrid Beacon	Signal	No
Dahlia Street	Campus	Signal[1]	N/A	No

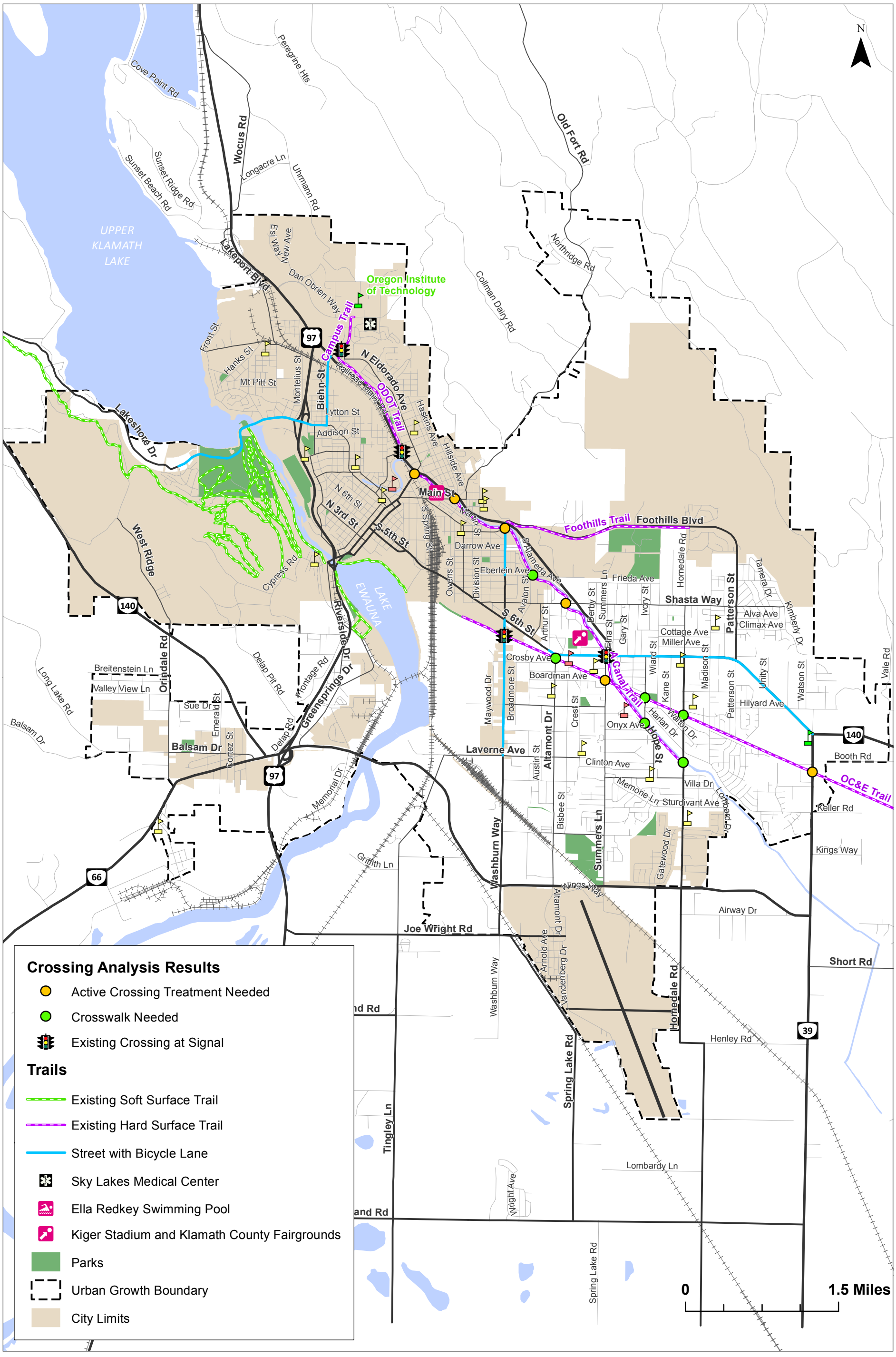
[1]Requires use of the sidewalk to access signal

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 are 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

- Active Crossing Treatment Needed
- Crosswalk Needed
- Existing Crossing at Signal

Trails

- Existing Soft Surface Trail
- Existing Hard Surface Trail
- Street with Bicycle Lane
- Sky Lakes Medical Center
- Ella Redkey Swimming Pool
- Kiger Stadium and Klamath County Fairgrounds
- Parks
- Urban Growth Boundary
- City Limits

Crossing Analysis Results
Klamath Falls, Oregon

Figure **6**

H:\proj\file18974 - Klamath Falls Trail Master Plan\GIS\TM2\Fig06_CrossingAnalysisResults.mxd - agriffin - 5:59 PM 8/31/2015

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.

End of the OC&E Trail

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 travel adjacent to the park, but a fence separates the park from the trail.
8. *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.
9. *Bicycle Parking* – Bicycle parking is absent from many destinations, including some parks.

No Connection from the "A" Canal Trail to the Foothills Trail

Crater Lake Parkway Crossing Between Campus Trail and Biehn Street

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, there are currently sidewalks on each collector and arterial street within a ½-mile of the trail the road connects to.

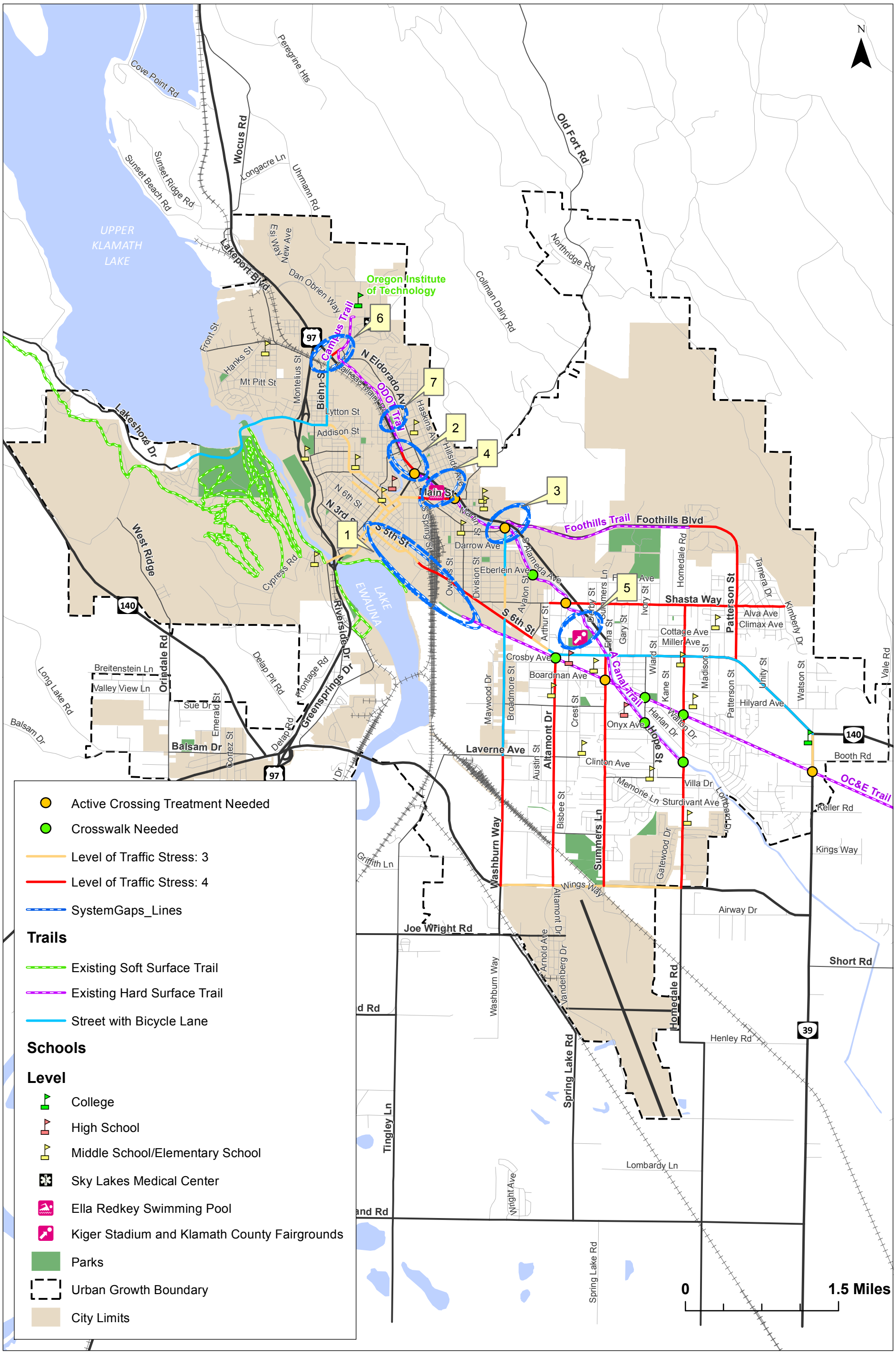
The system gaps and deficiencies identified in this section were identified based on an initial field visit and data analysis. As summarized in the Next Steps section, input will be gathered from the PAC and public to refine and expand the list of gaps and deficiencies for a final comprehensive list.

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. These have been identified based on a field visit, initial feedback from the TAC and CAC, and the project team's analysis. This inventory of areas to address in the next phase of the project will be updated based on feedback from the TAC and CAC and from the general public via a virtual open house and online commenting map.

NEXT STEPS

This memorandum will be reviewed by the TAC and CAC on September 9, 2015. The findings from this memo will also be reviewed with the general public through a virtual open house. The project team will update this memorandum based on feedback received from TAC/CAC members and the 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 B).



Locations for Further Study
Klamath Falls, Oregon

Figure **7**

H:\projfile\18974 - Klamath Falls Trail Master Plan\GIS\TM2\Fig07_LocationsFurtherStudy.mxd - agriffin - 6:00 PM 8/31/2015

REFERENCES

1. *Klamath County, Oregon*. County Health Rankings & Roadmaps. Robert Wood Johnson Foundation and University of Wisconsin Population Health Institute. http://www.countyhealthrankings.org/app/oregon/2015/rankings/klamath/county/outcomes/overall/snapshot. Accessed August 14, 2015.
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.