



# 6

## Bicycle Element

The bicycle is a human-powered vehicle that allows people of all ages to move independently, at relatively low cost and with little impact to the environment. Bicycling promotes the well-being of people who live and work in Milwaukie, with the added benefit of reducing auto traffic on city streets. This chapter outlines bicycle needs in Milwaukie over the next 20 years and recommends policy, operational and facility improvements to the city's bicycle system.

### TSP GOAL AND POLICY FRAMEWORK

Milwaukie has developed a set of goals to guide the development of its transportation system (see Chapter 2). Several of these TSP Goals guide the City's policies on bicycle access and connectivity, specifically the following:

- **Goal 1 Livability** calls for convenient bicycling facilities, and removal of barriers that impede capacity.
- **Goal 2 Safety** directs the City to design safe bicycle connections between parks, schools, and other activity centers in Milwaukie.
- **Goal 3 Travel Choices** calls for an integrated citywide network of bikeways.
- **Goal 4 Quality Design** directs the City to integrate bicycle facilities into both public and private street and development projects.
- **Goal 6 Sustainability** calls for the City to increase bicycling as a means of transportation.

### NEEDS

Milwaukie needs a safe and interconnected bicycle system that provides options for all types of cyclists. The deficiencies in Milwaukie's existing bicycle system can be categorized into three areas: Connectivity, Crossings, and Street Designations. Each of these categories is described in this section.

#### Connectivity

The lack of east/west and north/south on-street bicycle facilities creates significant gaps in the bicycle system for travel both in and around the city. There are two east/west roadways that include bike lanes in the city: King Rd and Lake Rd. However, neither of these facilities reaches the downtown area and/or connects with other facilities that could allow for travel to other

destinations. There are also two north/south roadways that have bike lanes: Linwood Ave and 17<sup>th</sup> Ave. Similar to the east/west roadways, these corridors are not continuous.

~~Two~~Three off-street facilities serve Milwaukie (the Springwater Corridor, the Trolley Trail, and the Kellogg Creek Trail), but they are not continuous. For example, while the connectivity of the Springwater Corridor was ~~recently~~recently upgraded in 2006 with completion of the "Three Bridges" project (three bridges constructed to cross over the Union Pacific Railroad, McLoughlin Blvd, and Johnson Creek), the trail ends just east of 17<sup>th</sup> Ave. Additionally, there are a limited number of connections through the city to the Springwater Corridor, especially to the west of 45<sup>th</sup> Ave. The Trolley Trail, which will be completed in conjunction with the Portland-Milwaukie Light Rail project, ends at Riverfront Park, nearly one mile south of the Springwater Corridor. The Kellogg Creek Trail connects the Milwaukie Riverfront area to the Island Station neighborhood, but doesn't not easily connect to points south.

Major facilities, such as McLoughlin Blvd, Highway 224, and the railroads, create barriers to cycling through the city, particularly for north-south travel. This lack of connectivity (both on-street and off-street) causes significant problems for bicyclists and limits this mode of travel, especially where they make it more difficult for cyclists to access major transit stops downtown.

## Crossings

Throughout the city, there is a need for convenient and safe crossings at arterials and collectors. There are many locations where bicycle routes cross arterials, highways, or railroad tracks, and few of these crossings were designed to accommodate cyclists. Typically, such intersections have limited sight-distance, inadequate pavement space for bicycles, no means for tripping a signal, or no direct, safe connection. The following locations were identified as ~~particular~~specific problem crossings:

- 17<sup>th</sup> Ave/Hwy 224
- 17<sup>th</sup> Ave/Harrison St/Hwy 99E
- Railroad crossing of 21<sup>st</sup> Ave at Adams
- Johnson Creek Blvd/Springwater Corridor
- King Rd/Stanley Ave
- Linwood Ave/Springwater Corridor
- King Rd/Linwood Ave
- Monroe St/Linwood Ave
- Linwood Ave/Harmony Rd

## Street Designations

The designation of certain roadways for bicycle travel does not serve all of the needs for bicycle travel in and around the city. Many trips that connect to parks, schools, retail activity centers, etc., occur off of arterial and collector streets. These trips should generally be accommodated on lower volume streets, preferably on designated routes. Such facilities could be considered "shared" facilities or could have a specific designation such as a "bike boulevard," or "neighborhood greenway," where actual treatments to the roadway are made that enhance the bicycle environment and make additional connections to bicycle destinations.

## BICYCLE FACILITY IMPROVEMENT TOOLBOX

### Types of Cyclists

Bicyclists are a varied group of people with different skill levels, abilities, bicycling experience, and trip types. For example, there are everyday commuters, avid recreational riders, children going to school, and families riding around in their neighborhoods. Their needs and comfort level with the bicycle infrastructure in Milwaukie will vary as a result of these differences. The City needs to accommodate these different types of cyclists by providing adequate facilities for all different types of riders.

Bicycle trips are typically longer than walking trips and shorter than motor vehicle trips, and are attractive at distances up to three miles. Bicycle facilities can generally be categorized as multi-use paths, cycle tracks, bike lanes, shared roadways, and ~~bike boulevards~~ neighborhood greenways. Each of these facilities serves a particular purpose for bicycle travel. Bike lanes, cycle tracks, and multi-use paths ~~both all can accommodate this length of trips of up to three miles~~. However, if the trip is shorter, or if the destination or origin of the trip is not next to a roadway with a bike lane, many bicycle trips can also be made on local streets. Table 6-1 summarizes each of these facilities with a general description of the elements inherent to each facility.

**Table 6-1 Bikeway Types**

Bikeway	Description
Multi-use path	Off-street route, typically recreational-focused, which can be used by several transportation modes, including bicycles, pedestrians, and other nonmotorized modes (i.e., skateboards, roller blades, etc.).
<u>Cycle track</u>	<u>Exclusive bike facility within the roadway, with elements of both a separated path and a bike lane. Separated from motor vehicle traffic by parked cars, bollards, landscaping, or other barriers.</u>
Bike lane	Area within street right-of-way specifically designated for bicycle use.
Shared roadway	Roadways where bicyclists and autos share the same travel lane. May include a wider outside lane and/or bike boulevard treatment (priority given to through bikes on local streets).
<u>Bike Boulevard</u> <u>Neighborhood Greenway</u>	Lower-order, lower-volume streets with various treatments to promote safe and convenient bicycle travel <u>and enhance pedestrian travel as well</u> . Usually accommodate bicyclists and motorists in the same travel lanes, often with no specific vehicle or bicycle lane delineation. Assign higher priority to through bicyclists, with secondary priority assigned to motorists. Also include treatments to slow vehicle traffic to enhance the bicycling environment.

### Bicycle Facility Design Considerations

#### Multi-use Paths

As their name implies, multi-use paths are designed to accommodate many types of users, and are typically constructed along an independent path such as a stream or greenway. Paths can also be built parallel to a roadway, but are most effective when built independent of a road, separating cyclists from auto traffic. The American Association of State Highway Transportation

Officials (AASHTO)<sup>1</sup> and the Oregon Department of Transportation (ODOT)<sup>2</sup> state that mixed-use paths can be designed along roadways, provided several design considerations are met:

- A minimum 5-foot buffer should be provided between the path and roadway to protect path users from conflicts with motorists.
- Relatively few vehicle/path user conflict points (e.g., cross-streets or driveways).
- The path can be terminated at each end onto streets with good bicycle/pedestrian facilities or onto another safe, well-designed path.
- The path should not take the place of bicycle/pedestrian facilities (e.g., sidewalks and bicycle lanes) on the parallel street.

**Figure 6-1 Multi-use Path**



### **Cycle Tracks**

Cycle tracks can take a number of forms, depending on the nature of the existing street

infrastructure. They combine some elements of a fully separated path with those of a bike lane in the roadway. The key element of a cycle track is that it uses parked cars, bollards, landscaping, curbing, or other barriers to provide some separation from motor vehicle traffic. Cycle tracks may be one-way or two-way, and they may be located at road level, sidewalk level, or an intermediate level. They are distinct from the sidewalk and are designed exclusively as bike facilities. A recommended minimum width is 7 feet, with an additional two-foot "door zone" buffer (where adjacent to parked cars). Pavement markings on the cycle track provide guidance for cyclists, as well as for motorists and pedestrians that may cross the cycle track at driveways or intersections.

**Figure 6-2 Cycle Track**



There are currently no cycle tracks in Milwaukie, and no potential cycle track routes have been identified to date. However, this type of facility represents an option for future bike improvements that might be most appropriate in certain settings to provide safer bike routes in high-traffic corridors.

### **Bike Lanes**

When possible, bike lanes should be directly adjacent to the curb, rather than adjacent to parked cars or combined with sidewalks. The recommended width of six feet provides sufficient travel space and additional room for bicyclists to steer clear of the curb or parked cars while maintaining a comfortable distance from adjacent moving traffic. Wide bike lanes also enable bicyclists to maneuver around drainage grates, manhole covers, glass and debris. Provision of bike lanes also benefits motor vehicles, which gain greater shy distance/emergency shoulder

<sup>1</sup> *A Guide for the Development of Bicycle Facilities*, American Association of State Highway and Transportation Officials, 1999.

<sup>2</sup> *Oregon Bicycle and Pedestrian Plan, An Element of the Oregon Transportation Plan*, Oregon Department of Transportation, Adopted June 14, 1995.

area, and pedestrians, who gain a buffer between walking areas and moving vehicles. Where right-of-way is limited, the bike lane can be reduced to five feet. Alternatively, widening the curb travel lane (for example, from 12 feet to 14 or 15 feet) can provide better bicycle accommodations and a greater measure of safety as well. However, with higher-volume roadways (e.g., streets with more than 3,000 Average Daily Trips), dedicated bike lanes are much more desirable than wide outside lanes.

**Figure 6-3 Bike Lane**



The signing and marking of bike lanes should follow the *Manual on Uniform Traffic Control Devices* (MUTCD). Design features in the roadway can improve bicycle safety as well. For example, using curb storm drain inlets rather than catch basins significantly improves bicycle facilities.

**Shared Roadways**

Shared roadways can be designed to safely accommodate

**Figure 6-4 Shared Roadway**

both bicycle and auto traffic. Figure 6-1 illustrates an example of an appropriate warning sign with a supplemental "Share the Road" plaque that may be used to draw more attention to the fact that slow-moving forms of transportation may be using the roadway. When used, the supplemental plaque must be installed below the warning sign on the same signpost. Directional pavement markings may also be considered on shared roadways to supplement the bicycle warning signs when desired. The pavement markings illustrated in Figure 6-1 below are typically called "Sharrows" or "Shared Lane Markings" and are utilized on bicycle travel routes that have on-street parking but no designated bike lanes. Sharrows are commonly used on streets where dedicated bike lanes are desirable but are not possible for any number of reasons. The marking helps to align bicyclists, to shift their travel pattern out of the direction of a parked car door opening into their travel path.



**Figure 6-15 Bicycle Signs and Markings**



**Bicycle Warning Sign**



**"Share the Road" Plaque**



**Bike Route Sign**



**Bicycle Pavement Marking**



**Bicycle Wayfinding Signage**

It should be noted, however, that while posting "Bike Route" signage for bicyclists is an acceptable way for the City to demarcate bike routes, such signs should be coupled with pavement markings and/or way finding signage for bicyclists to get the most value out of the

City's investment. Although this is an adopted MUTCD sign, it does not provide much information. Adding way-finding information such as distances to various destinations, directional arrows, and estimated travel times makes the sign much more useful. These signs are most effective when placed in useful locations, such as where a bike route makes a turn that is not intuitive to riders.

### **Bike Boulevards Neighborhood Greenways**

The term "neighborhood greenway" has recently evolved from the "bike boulevard" concept of treatments, which improve the network of safe bicycle routes by ~~Bike boulevards~~ generally utilizing streets with lower traffic volumes and vehicle speeds, such as minor collectors or local streets that pass through residential neighborhoods. The bike boulevard treatments also make these routes safer for pedestrians and motorists (for example, through inclusion of traffic calming devices), while at the same time incorporating low-impact stormwater treatment measures such as bioswales and raingardens. The general traffic calming provided by neighborhood greenway improvements adds to neighborhood livability.

**Figure 6-6 Neighborhood Greenway**



Traffic controls along a ~~bike boulevard~~ neighborhood greenway assign priority to bicyclists while encouraging through-vehicle traffic to use alternate parallel routes. Traffic calming and other treatments along the corridor reduce motor vehicle speeds so that motorists and bicyclists generally travel at the same speed, creating a safer and more comfortable environment for all users. ~~Bike boulevards~~ Neighborhood greenways also incorporate treatments to facilitate safe and convenient crossings of major streets. ~~Bike boulevards~~ Neighborhood greenways work best in well-connected street grids, where riders can follow reasonably direct and logical routes. ~~Bike boulevards~~ and where also work best when higher-order, parallel streets exist to serve through vehicle traffic.

Milwaukie's ~~bike boulevard~~ neighborhood greenway network could be developed through a variety of improvements ranging from minor street enhancements (e.g., directional pavement markings) to larger-scale projects (e.g., intersection signalization). The various treatments fall into five major application levels based on their degree of physical intensity, with Level 1 representing the least physically intensive treatments that can be implemented at relatively low cost:

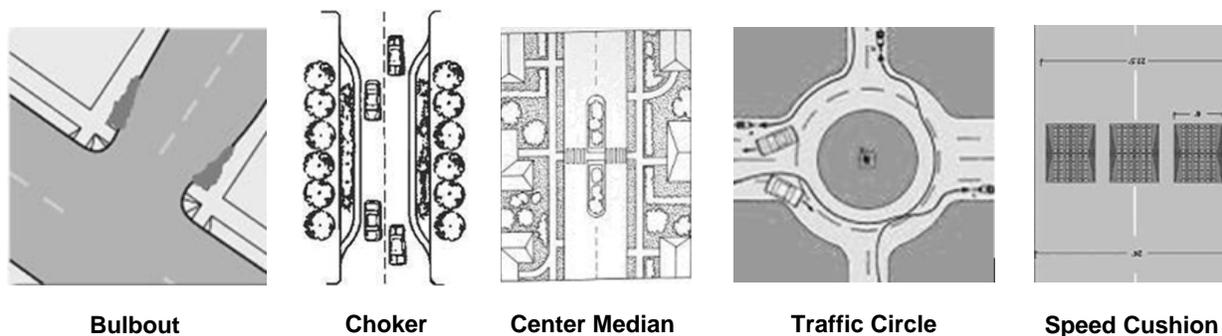
- **Level 1: Signage** (e.g., way-finding and warning signs along and approaching the ~~bike boulevard~~ neighborhood greenway)
- **Level 2: Pavement markings** (e.g., directional pavement markings, shared lane markings)
- **Level 3: Intersection treatments** (e.g., signalization, curb extensions, refuge islands)
- **Level 4: Traffic calming** (e.g., speed humps, mini traffic circles)
- **Level 5: Traffic diversion** (e.g., choker entrances, traffic diverters)

Corridors targeted for higher-level applications would also receive relevant lower-level treatments. For instance, a street targeted for Level 3 applications should also include Level 1 and 2 applications as necessary. It should be noted that some applications might not be

appropriate on all streets. In other words, it may not be necessary to implement all Level 2 applications on a particular street designated for Level 2 treatment in order to create a functional ~~bike boulevard~~ neighborhood greenway.

Figure 6-2 shows examples of some of the types of intersection treatments and traffic calming measures that could be appropriate for application on neighborhood greenway routes. Some study and analysis is necessary to determine which measures would be most effective in specific locations. Within Chapter 11 (Neighborhood Traffic Management), Table 11-1 provides more examples of traffic calming measures.

### **Figure 6-7 Sample Traffic Calming Measures**



~~Designating a street as a "bike boulevard" does not suggest that only bicyclists should use it. In fact, the treatments applied to bike boulevards make these routes safer for pedestrians and motorists as well, and the general traffic calming adds to neighborhood livability. With that in mind, using alternative labels for "bike boulevards" might be appropriate to stress the multimodal benefit. Suggestions include "community corridors" and "neighborhood parkways."~~

## **Bicycle Parking**

Bicycle parking and storage facilities are an important component of an effective bicycle system. Lack of proper storage facilities discourages potential riders from traveling by bicycle. Bike racks should be located at significant activity generators including schools, parks, and commercial areas, as well as at major transit stops. Racks should be placed in highly visible locations and within convenient proximity to main building entrances. Bike racks should be designed to provide two points of contact to the bicycle so the user can lock both the wheel and the frame to the rack. Bike lockers, showers, and caches of repair equipment (patch kits, tire tubes, etc.) would be helpful at locations where long-term parking is expected, such as the future MAX stations downtown, on Park Ave, and at Tacoma St; downtown bus stops; and major employment centers. The attractiveness of bicycle parking is also improved by providing covered parking and/or secured facilities where bicycles may be locked away.

## **RECOMMENDATIONS**

### **Strategies**

Bikeway improvements are aimed at closing the gaps in the bicycle network along arterial and collector roadways, establishing low-traffic routes that parallel arterials and collectors, and providing multimodal links to improve livability. To meet the TSP goals and policies outlined in Chapter 2, and address the needs outlined in this chapter, the City should take the following steps for improving the bicycle system:

- Fill in gaps in the existing bike corridor network (on arterials and collectors).

- Construct new bike lanes on strategic arterials and collectors.
- Connect key bicycle corridors to schools, parks, ~~and~~ activity centers, and major transit stops.
- Improve crossing safety and connectivity.
- Designate ~~bike boulevards~~ neighborhood greenways on lower-volume streets that connect major bicycle facilities and/or bicycle destinations.
- Maintain bike lanes, off-street paths, signage, and other facility improvements.
- Construct and improve multi-use paths for recreational and commuter use.
- Involve cyclists in the design and planning of bicycle and road facilities.
- Educate cyclists and motorists about bicycle routes, laws, and opportunities.

These strategies will be used to guide and develop projects that address the needs of the bicycling community in Milwaukie as well as those of bicyclists throughout the region. The projects resulting from these strategies fall into three categories: capital, operational, and maintenance. Key projects in each of these categories are described below.

### Capital

These projects are typically large-scale infrastructure projects or projects that require some sort of physical infrastructure to be built. Capital projects also typically require ongoing maintenance that must be programmed into the existing maintenance schedule.

#### *Key projects*

Several potential ~~bike boulevard~~ neighborhood greenway corridors have been identified to enhance Milwaukie's bicycle network. The corridors were identified with respect to major bicycling destinations as well as their proximity to desired bicycle travel routes. The recommended corridors are shown in Figure 6-2-3a and described below:

- 17<sup>th</sup> Ave between Waverly Dr and Harrison St, a key bicycle connection between downtown Milwaukie and the Sellwood neighborhood in Portland. The connection ~~should~~ will be improved by constructing bike lanes or a multi-use path.
- Monroe St between downtown Milwaukie and Linwood Ave
- Stanley Ave between Railroad Ave and Johnson Creek Blvd
- A corridor roughly following 40<sup>th</sup> Ave north from Monroe St and then splitting into two separate corridors at Harvey St. One ~~bike boulevard~~ neighborhood greenway would continue north on 40<sup>th</sup> Ave and follow Olsen St and 42<sup>nd</sup> Ave to connect with Johnson Creek Blvd. The second ~~bike boulevard~~ neighborhood greenway would follow Harvey St west from 40<sup>th</sup> Ave and follow Balfour St, 29<sup>th</sup> Ave, and Van Water St to connect with the Springwater Corridor. If 29<sup>th</sup> Ave is extended to the south, the ~~bike boulevard~~ neighborhood greenway should connect to the south as well (see Figure 8-3a, which shows the future extension of 29<sup>th</sup> Ave).

These ~~bike boulevards~~ neighborhood greenways should be targeted for Level 4 applications, including signage, pavement markings, intersection treatments, and traffic calming. Each corridor currently includes some boulevard components (e.g., speed humps). Due to limited street connectivity, Level 5 bike boulevard applications (traffic diversion) are not recommended for these corridors. To identify and develop additional site-specific treatments, the City should involve the bicycling community, neighborhood groups, and the Public Works Department. Further analysis and engineering work may also be necessary to determine the feasibility of some applications.

## Operational

These projects involve actions that make existing infrastructure more useable. They include upkeep of existing facilities, educational campaigns, or distributing information about the use of the transportation network. They are typically smaller in scale and dollars than capital projects and are implemented more broadly than in one specific location.

### *Key projects*

- Driver and cyclist education, including driver and biker awareness classes, "Share the Road" safety class, bike safety education for kids and adults.
- Encouraging cycling through community events to get new cyclists involved and interested in how to commute by bike.
- Consider applying rumble strips or other treatments to safely define bike lanes in places, such as Johnson Creek Blvd, where vehicles commonly cross into the bike lane.

## Policy

These projects do not typically improve the bicycle environment in a physical manner, but rather result in a fundamental change to the way bicycle travel is thought of and treated within the city of Milwaukie.

### *Key projects*

- Enforce traffic laws that protect cyclists.
- Collect and maintain cycling traffic counts to measure the effect of improvements.
- Work with the City of Portland and Clackamas County when implementing bike boulevards, bike lanes, and multi-use paths to ensure good connectivity beyond Milwaukie.
- Consider establishing a committee to advise and advocate for implementation of the projects in this plan.

## Master Plan

The Bicycle Master Plan is composed of a list of projects that address the identified needs (see Figure 6-23a). An inset map showing more detail in the downtown area is provided in Figure 6-3b. Summarized in Table 6-2, the Master Plan represents the "wish list" of bicycle-related projects in Milwaukie. The planning-level cost estimates provided in Tables 6-2 and 6-3 are based on general unit costs for transportation improvements but do not reflect the unique elements that can significantly add to project costs. As projects are pursued, each of these project costs will need further refinement in order to detail right-of-way requirements and costs associated with special design details.



# Transportation System Plan

FIGURE 6-2

EXISTING (2007) BICYCLE MASTER PLAN December 2007

### LEGEND

Existing Bicycle Facilities	Proposed Improvements
Shared Facility	Bicycle Intersection Safety Improvement
Bicycle Lane	Bicycle Corridor Enhancement
Springwater Trail	Bike Boulevard
Kellogg Creek Trail	Bicycle Lanes
	Trolley Trail
Schools	County Line
Major Roads	Parks
Streets	Water
Railroad	City Limits
10' Contours	

### PROPOSED PROJECTS

- Improve Intersection to Increase Bicycle Safety**
- A** Adams St/21st Ave/Railroad Crossing
  - B** Johnson Creek Blvd/Springwater Trail
  - C** Johnson Creek Blvd/Linwood Ave
  - D** Linwood Ave/King Rd
  - E** Linwood Ave/Monroe St
  - F** Linwood Ave/Harmony Rd
  - G** Washington St/Oak St/HWY 224
  - H** International Way/Lake Rd
- Provide Bicycle Lanes Where not Currently Present**
- I** Harrison St from HWY 99E to 21st Ave
  - J** Lake Rd from Main St to Guilford Dr
  - K** Oatfield Rd from Guilford Ct to Lake Rd
  - L** Harrison St from HWY 224 to 42nd Ave
  - M** 37th Ave from Harrison St to HWY 224
  - N** Railroad Ave from 37th Ave to Linwood Ave
  - O** 43rd Ave from King Rd to Filbert St
  - P** Linwood Ave from Queen Rd to Johnson Creek Blvd
  - Q** Linwood Ave from approximately Juniper St to Harmony Rd
  - R** Rusk Rd from Lake Rd to North Clackamas Park
  - S** Main St from Harrison St to Moores St
  - T** 21st Ave from Harrison St to Lake Rd
- Enhance Existing Bicycle Connection**
- U** Install Bike Boulevard treatments at various locations
  - V** Construct bicycle overpass from Railroad Ave to International Way
  - W** Improve Springwater Trail paving
  - X** Improve Kellogg Creek Trail
  - Y** Install Trolley Trail signage
  - Z** Fill in gaps in existing bike network with bike lanes or multiuse path.
  - AA** Improve intersection safety on 17th Ave at HWY 224 and at 99E.
  - AB** Complete Springwater Trail along Ochoco St

All improvements completed since 2007 were changed from proposed to existing facilities (see Figure 3-4 Bicycle Facility Inventory for details)

Removed completed Springwater Trail paving project

1) Removed shared lane designation on 224  
2) Extended proposed bike lanes on Harrison to Main St

Removed shared lane designation on Monroe and Washington

Replaced intersection improvement at Adams and 21st with Adams St Connector

Added:  
1) Bike-ped underpass under McLoughlin at Kellogg Creek  
1) Kellogg Creek Bridge  
2) Kronberg Park Trail  
3) Intersection improvement at McLoughlin and 22nd  
4) Bike-ped connection over McLoughlin at River Rd

Added proposed bike lanes on International way

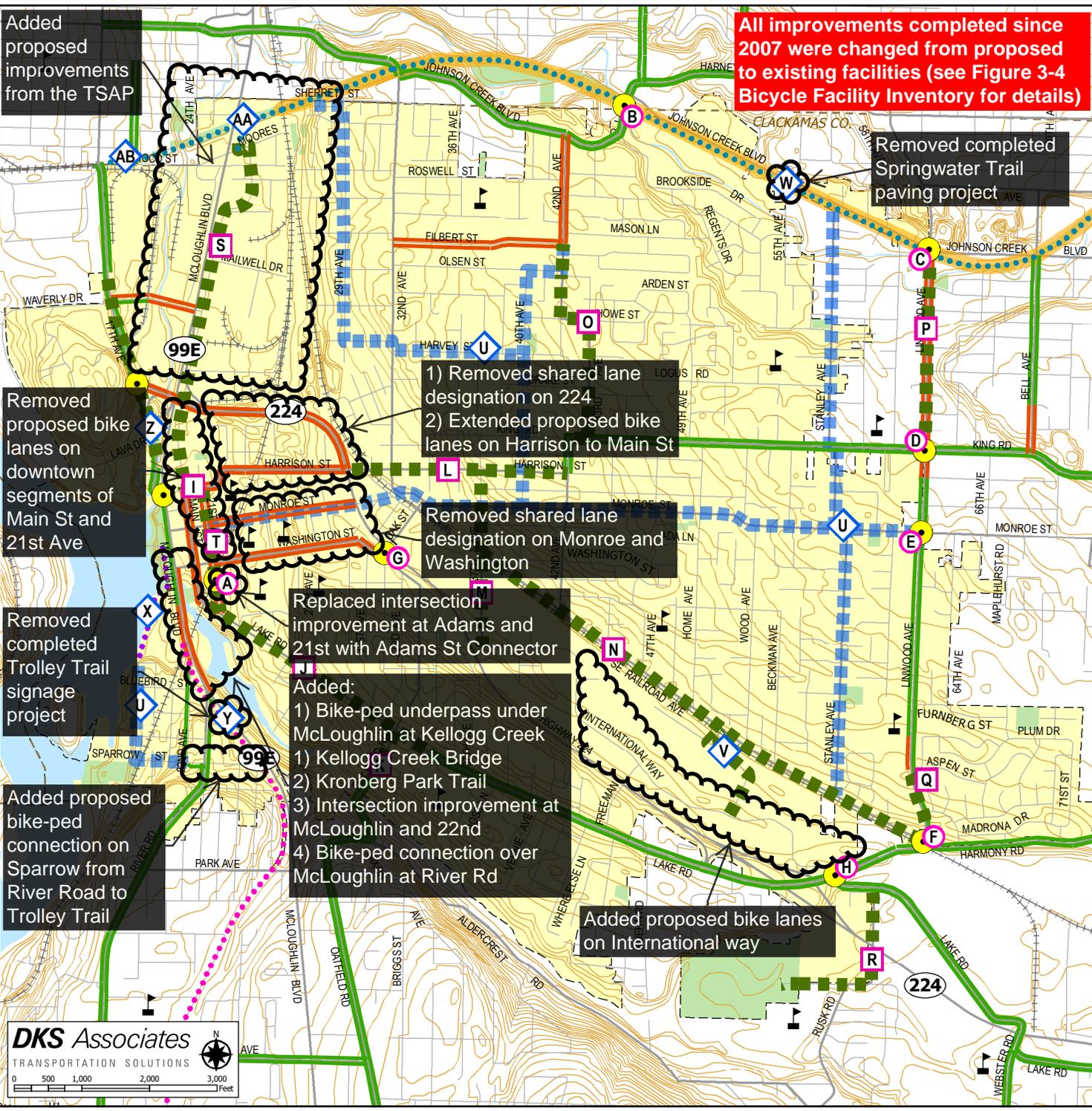
Added proposed improvements from the TSAP

Removed proposed bike lanes on downtown segments of Main St and 21st Ave

Removed completed Trolley Trail signage project

Added proposed bike-ped connection on Sparrow from River Road to Trolley Trail

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# Transportation System Plan

## FIGURE 6-8a

# BICYCLE MASTER PLAN (2013)

November 2013

### LEGEND

Existing Bicycle Facilities		Proposed Improvements	
	Shared Lane		Bicycle Intersection Safety Improvement
	Bicycle Lane		Bicycle Lanes
	Kellogg Creek Trail		Neighborhood Greenway
	Springwater Trail		Light Rail Station
	Trolley Trail		Light Rail Transit

	Schools		10' Contours		City Limits
	Major Roads		County Line		Light Rail Station
	Streets		Water		Light Rail Transit
	Railroad		Parks		

### PROPOSED PROJECTS

- Improve Intersection to Increase Bicycle Safety**
- A Adams St/21st Ave/Railroad Crossing
  - B Johnson Creek Blvd/Springwater Trail
  - C Johnson Creek Blvd/Linwood Ave
  - D Linwood Ave/King Rd
  - E Linwood Ave/Monroe St
  - F Linwood Ave/Harmony Rd
  - G Washington St/Oak St/HWY 224
  - H International Way/Lake Rd
  - AF McLoughlin and 22nd
  - AG McLoughlin/Ochoco/Milport
- Provide Bicycle Lanes Where Not Currently Present**  
See Table 6-2 for project descriptions B-R, AI, and AJ
- Enhance Existing Bicycle Connection**
- U# Install Neighborhood Greenway treatments at various locations
  - V Construct bicycle overpass from Railroad Ave to International Way
  - W Improve Springwater Trail paving
  - X Improve Kellogg Creek Trail
  - Y Install Trolley Trail signage
  - Z Fill in gaps in existing bike network with bike lanes or multiuse path.
  - AA Improve intersection safety on 17th Ave at HWY 224 and at 99E.
  - AB Improve ramp at Springwater Trail/HWY 99E
  - AC Complete Springwater Trail along Ochoco St
  - AD Construct Kronberg Park Trail
  - AD Construct bike-ped overpass over Kellogg Creek
  - AE Construct pedestrian underpass under HWY 99E at Kellogg Creek
  - AG Pave connection to Springwater Trail at 29th Ave and Sherrett
  - AH Improve connection from Springwater Corridor to Pendleton Site
  - AK Establish bike-ped connection over railroad tracks and LRT
  - AL Construct stairs to connect Springwater Corridor to McLoughlin Blvd
  - AM Construct bike-ped bridge over Johnson Creek along Clatsop St at 23rd Ave to connect to LRT station
  - AN Improve bike-ped connection to neighborhoods west of station
  - AO Establish bike-ped path on Sparrow to connect River Rd to Trolley Trail
  - AP Establish bike-ped connection over McLoughlin at River Rd
  - AR Establish bike-ped connection to McLoughlin at Stubb St



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0 500 1,000 2,000 3,000 4,000 Feet

**New figure for 2013**  
 All improvements completed since 2007 were changed from proposed to existing facilities (see Figure 3-4 Bicycle Facility Inventory for details)



# Transportation System Plan

FIGURE 6-8b

## BICYCLE MASTER PLAN DOWNTOWN INSET

November 2013

### LEGEND

#### Existing Bicycle Facilities

- Shared Facility
- Bicycle Lane
- Kellogg Creek Trail
- Trolley Trail

#### Proposed Improvement

- Intersection Improvements
- Bike Lanes
- Neighborhood Greenway

### PROPOSED PROJECTS

#### Improve Intersection to Increase Safety

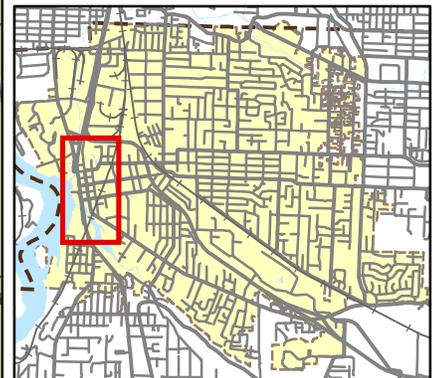
- AF McLoughlin and 22nd

#### Provide Bicycle Lanes Where not Currently Present

- I Fill in gaps in bike lanes on Harrison St

#### Enhance Existing Bicycle Connection

- X Improve Kellogg Creek Trail
- Z Fill in gaps in existing bike network and improve intersection safety on 17th Ave and HWY 224/99E
- AC Construct Kronberg Park Trail
- AD Construct bike-ped overpass over Kellogg Creek
- AE Construct pedestrian underpass under HWY 99E at Kellogg Creek



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0 75 150 300 450 600 Feet





# Transportation System Plan

FIGURE 6-8b

## BICYCLE MASTER PLAN DOWNTOWN INSET

November 2013

### LEGEND

#### Existing Bicycle Facilities

- Shared Facility
- Bicycle Lane
- Kellogg Creek Trail
- Trolley Trail

#### Proposed Improvement

- Intersection Improvements
- Bike Lanes
- Neighborhood Greenway

### PROPOSED PROJECTS

#### Improve Intersection to Increase Safety

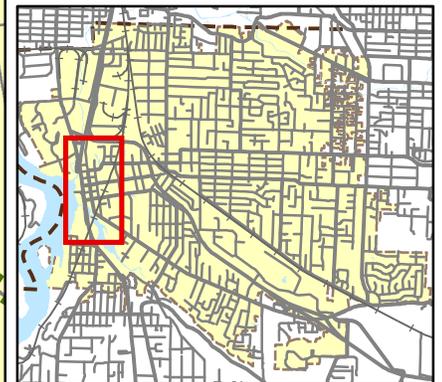
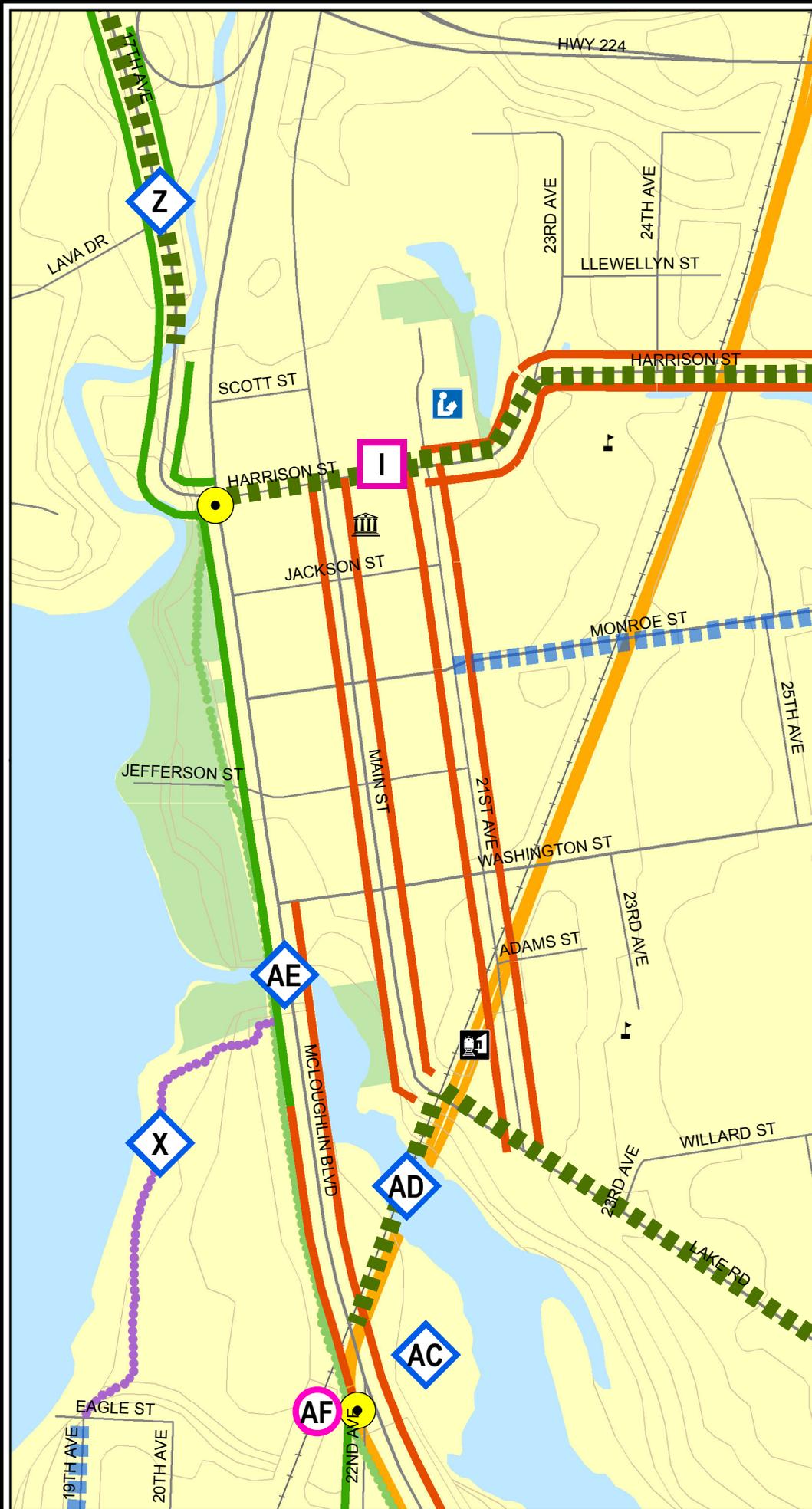
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#### Provide Bicycle Lanes Where not Currently Present

- I Fill in gaps in bike lanes on Harrison St

#### Enhance Existing Bicycle Connection

- X Improve Kellogg Creek Trail
- Z Fill in gaps in existing bike network and improve intersection safety on 17th Ave and HWY 224/99E
- AC Construct Kronberg Park Trail
- AD Construct bike-ped overpass over Kellogg Creek
- AE Construct pedestrian underpass under HWY 99E at Kellogg Creek



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0 75 150 300 450 600 Feet

**Table 6-2 Bicycle Master Plan Projects**

Map ID <sup>3</sup>	Priority	Type	Project Name	Project Description	From	To	Cost(\$) (\$1,000s <sup>4</sup> )
<b>High Priority Projects</b>							
E	<del>Low</del> High	C	Intersection Improvements at Linwood Avenue and Monroe Street	Improve safety of crossing at intersection.	Location specific	Location specific	\$10
G	High	C	Hwy 224 Crossing Improvements at Oak and Washington Streets	Improve intersection crossing safety for cyclists at Washington Street and Oak Street.	Location specific	Location specific	\$10
J	<del>Low</del> High	C	Lake Road Bike Lanes	Fill in gaps in existing bicycle network with bike lanes ( <del>cost included with Lake Road road widening project</del> ).	Main St	Guilford Dr	<del>NA</del> \$3,400
N	High	C	Railroad Avenue Bike Lanes Capacity Improvements	<u>Bicycle aspect:</u> Fill in gaps in existing bicycle network with bike lanes, cycle track, multi-use path, or other facilities ( <del>cost included with Railroad Avenue road widening project</del> ).	37 <sup>th</sup> Ave	Linwood Ave	<del>NA</del> \$4,800
U <sub>1</sub>	High	C	Monroe Street Bicycle Boulevard Neighborhood Greenway	Designate as a <del>Bicycle Boulevard Neighborhood Greenway</del> and install <del>bicycle</del> bike boulevard improvements.	21 <sup>st</sup> Ave	Linwood Ave	<del>\$300</del> 330
U <sub>2</sub>	High	C	29 <sup>th</sup> /Harvey/40 <sup>th</sup> Bicycle Boulevard Neighborhood Greenway	Designate as a <del>Bicycle Boulevard Neighborhood Greenway</del> and install <del>bicycle</del> bike boulevard improvements.	Springwater Trail	Monroe St	<del>\$200</del> 220
U <sub>3</sub>	<del>Med</del> High	C	Stanley Avenue Bicycle Boulevard Neighborhood Greenway	Designate as a <del>Bicycle Boulevard Neighborhood Greenway</del> and install <del>bicycle</del> bike boulevard improvements.	Springwater Trail	Railroad Ave	<del>\$300</del> 330
Z	High	C	17 <sup>th</sup> Avenue Bikeway and Intersection Safety Improvements	Fill in sidewalk gaps on both sides; Fill in gaps in existing bicycle network with bike lanes; and/or provide multi-use path. Improve intersection safety at Millport Rd, McBrod Ave, Hwy 224, Lava Dr, and Hwy 99E, and eastbound connection at 17 <sup>th</sup> Ave/Hwy 99E. Improve intersection safety at 17 <sup>th</sup> Ave/Hwy 224.	Waverly Dr	Harrison St	<del>\$135</del> 1,000

<sup>3</sup> See Figure 6-23a.

<sup>4</sup> Project costs are in ~~2007~~2012 dollars. Future costs may be more due to inflation. Costing details can be found in the Technical Appendix. In the case of operational projects, estimated costs are for the entire 22-year planning period.

Map ID <sup>3</sup>	Priority	Type	Project Name	Project Description	From	To	Cost(\$) (\$1,000s <sup>4</sup> )
NAAC	LowHigh	C	Kronberg Park Trail	Construct multi-modal trail along Kellogg Creek, connecting Kronberg Park to downtown Milwaukie. Construct multi-use path to connect bike-ped bridge to safe crossing of Hwy 99E.	McLoughlin Blvd Kellogg Creek Bridge	Downtown River Rd at Hwy 99E	\$1,200 300
AD	High	C	Kellogg Creek Bike-Ped Bridge	Construct bike-ped overpass over Kellogg Creek in conjunction with light rail bridge.	Lake Rd	Kronberg Park	\$2,500
AE	High	C	Kellogg Creek Dam Removal and Hwy 99E Underpass	Replace Hwy 99E bridge over Kellogg Creek, remove dam, restore habitat; construct bike-ped undercrossing between downtown Milwaukie and Riverfront Park.	Location specific	Location specific	\$9,000 9,900
AF	High	C	Intersection Improvements at McLoughlin Boulevard and 22 <sup>nd</sup> Avenue	Improve safety of Trolley Trail crossing at 22 <sup>nd</sup> Ave.	Location specific	Location specific	\$200
AG	High	C	Improved Connection to Springwater Trail at 29 <sup>th</sup> Avenue and Sherrett Street	Pave the connection to Springwater Trail at 29 <sup>th</sup> Ave and Sherrett St. (TSAP)	Location specific	Location specific	\$20
AH	High	C	Improved Connection from Springwater Trail to Pendleton Site (Ramps)	Construct ramps to improve existing connection of Springwater Trail to Pendleton site at Clatsop St. (TSAP)	Location specific	Location specific	\$630
AH	High	C	Improved Connection from Springwater Trail to Pendleton Site (Widened Undercrossing)	Widen existing undercrossing to improve connection of Springwater Trail to Pendleton site at Clatsop St. (TSAP)	Location specific	Location specific	\$100
NA	High	G	Bike Route Signage	Install neighborhood bike route signage.	Citywide	Citywide	\$150
N/A	High	O	Bike Lane Maintenance	Sweep bike lanes to remove debris.	Citywide	Citywide	\$1100 1,200
N/A	LowHigh	O	Bicycle-friendly Street Grates	Install bicycle-friendly street grates.	Citywide	Citywide	\$50 60
<b>Medium Priority Projects</b>							
I	Med	C	Harrison Street Bike Lanes	Fill in gaps in existing bicycle network with bike lanes (cost included with Harrison Street road widening project).	Hwy 99E	21 <sup>st</sup> Ave	NA \$300
K	LowMed	C	Oatfield Road Bike Lanes	Fill in gaps in existing bicycle network with bike lanes.	Guilford Ct	Lake Rd	\$348 380

Map ID <sup>3</sup>	Priority	Type	Project Name	Project Description	From	To	Cost(\$) (\$1,000s <sup>4</sup> )
S	Med	G	Main Street Bike Lanes	Fill in gaps in existing bicycle network with bike lanes.	Harrison St	Moore St	\$2,131
U4	Med	C	19 <sup>th</sup> and Sparrow Bicycle Boulevard Neighborhood Greenway	Designate as a Bicycle Boulevard Neighborhood Greenway and install bicycle boulevard improvements. This would connect the south end of Kellogg Creek Trail to River Rd.	Eagle St	River Rd	\$737 800
V	LowMed	C	Bicycle and Pedestrian Overpass over Railroad Avenue	Establish a dedicated bicycle and pedestrian connection across Railroad Avenue and the railroad tracks.	Railroad Ave	International Way	\$2,025 2,200
W	Med	G	Springwater Trail Paving Project	Improve corridor through repaving existing trail.	29 <sup>th</sup> Ave	Linwood Ave	\$500
AB	HighMed	C	Springwater Trail Completion	Contribute to regional project to complete Springwater Trail ("Sellwood Gap") along Ochoco Street.	17 <sup>th</sup> Ave	19 <sup>th</sup> Ave	\$80 90
AI	Med	C	International Way Bicycle Facilities	Construct bike lanes or other bike facilities.	37 <sup>th</sup> Ave	Lake Rd	\$400
AJ	Med	C	Bicycle-Pedestrian Improvements to Main Street	Construct multi-use path or other improved bike-ped facilities on Main St to provide safer connection between downtown and Tacoma Station. (TSAP)	Hanna Harvester Dr	Tacoma Station	\$2,900
AK	Med	C	Bicycle-Pedestrian Connection from Eastern Neighborhoods to Tacoma Station Area	Establish bike-ped connection over existing railroad tracks and light rail to Tacoma Station Area. (TSAP)	Olsen St & Kelvin St	Mailwell Dr	\$4,000
AL	Med	C	Improved Connection from Springwater Trail to McLoughlin Boulevard	Construct stairs or other facility to connect Springwater Trail to west side of McLoughlin Blvd. (TSAP)	Location specific	Location specific	\$500
AM	Med	C	Bicycle-Pedestrian Connection over Johnson Creek	Construct bike-ped bridge over Johnson Creek along Clatsop St at 23 <sup>rd</sup> Ave to connect Tacoma Station Area with adjacent neighborhood. (TSAP)	Location specific	Location specific	\$400
AN	Med	C	Improved Bicycle-Pedestrian Connections on West Side of Tacoma Station Area	Improve bike-ped connections to adjacent neighborhood to west of Tacoma Station Area at Ochoco St and Milport Rd. (TSAP)	Location specific	Location specific	\$500
N/A	Med	O	Cyclist Education	Promote cycling through bike use and route selection education.	Citywide	Citywide	\$10
N/A	Med	O	Community Bicycle Rides	Coordinate/Support community bike rides to encourage bike use.	Citywide	Citywide	\$5

Map ID <sup>3</sup>	Priority	Type	Project Name	Project Description	From	To	Cost(s) (\$1,000s <sup>4</sup> )
<b>Low Priority Projects</b>							
A	Low	C	Intersection Improvements at Adams Street and 21 <sup>st</sup> Avenue	Improve safety of crossing at intersection.	Location specific	Location specific	\$10
B	Low	C	Springwater Corridor Trail Intersection Improvements at 45 <sup>th</sup> Avenue	Improve safety of crossing at intersection.	Location specific	Location specific	\$10
C	Low	C	Intersection Improvements at Johnson Creek Boulevard and Linwood Avenue	Improve safety of crossing at intersection.	Location specific	Location specific	\$10
D	Low	C	Intersection Improvements at Linwood Avenue and King Road	Improve safety of crossing at intersection.	Location specific	Location specific	\$10
F	Low	C	Intersection Improvements at Linwood and Harmony	Improve safety of crossing at intersection.	Location specific	Location specific	\$10
H	Low	C	Intersection Improvements at International Way and Lake Road	Improve safety of crossing at intersection.	Location specific	Location specific	\$10
L	Low	C	Harrison Street Bike Lanes	Fill in gaps in existing bicycle network with bike lanes.	Hwy 224	42 <sup>nd</sup> Ave	\$13 10
M	Low	C	37 <sup>th</sup> Avenue Bike Lanes	Fill in gaps in existing bicycle network with bike lanes.	Harrison St	Hwy 224	\$2,900 3,200
O	Low	C	43 <sup>rd</sup> Avenue Bike Lanes	Fill in gaps in existing bicycle network with bike lanes.	King Rd	Filbert St	\$1,014 1,100
P	Low	C	Linwood Avenue Bike Lanes (north)	Fill in gaps in existing bicycle network with bike lanes.	Queen Rd	Johnson Creek Blvd	\$1,692 1,900
Q	Low	C	Linwood Avenue Bike Lanes (south)	Fill in gaps in existing bicycle network with bike lanes.	Juniper St	Harmony Rd	\$296 320
R	Low	C	Rusk Road Bike Lanes	Fill in gaps in existing bicycle network with bike lanes.	Lake Rd	North Clackamas Park	\$936 1,000
T	Low	C	21 <sup>st</sup> Avenue Bike Lanes	Fill in gaps in existing bicycle network with bike lanes.	Harrison St	Lake Rd	\$50
X	Low	C	Kellogg Creek Trail Improvements	Resurface trail and provide wayfinding signage to/from trail.	Milwaukie Riverfront	Treatment Plant	\$623 680

Map ID <sup>3</sup>	Priority	Type	Project Name	Project Description	From	To	Cost(\$) (\$1,000s <sup>4</sup> )
Y	Low	G	Trolley Trail Signage	Design and install Trolley Trail signage.	Milwaukie Riverfront	Southern city limits	\$54
AA	Low	C	Springwater Trail_Ramp Improvement at McLoughlin Boulevard	Improve ramp at Springwater Trail and McLoughlin Blvd.	Location specific	Location specific	\$15 20
AH	Low	C	Improved Connection from Springwater Trail to Pendleton Site (Tunnel)	Construct tunnel under Springwater Trail to improve connection to Pendleton site at Clatsop St. (TSAP)	Location specific	Location specific	\$1,200
AO	Low	C	Bike-Ped Path on Sparrow Street	Establish a dedicated bicycle and pedestrian connection on Sparrow St, connecting River Rd to Trolley Trail	River Rd	Trolley Trail	\$350
AP	Low	C	Bike-Ped Overpass over McLoughlin Boulevard at River Road	Establish a dedicated bicycle and pedestrian connection across McLoughlin Blvd.	Kronberg Park	River Rd	\$2,500
AQ	Low	C	Crossing Improvements of McLoughlin Boulevard at Ochoco Street and Milport Road	Construct improvements at Ochoco St and Milport Rd to improve bike-ped crossing of McLoughlin Blvd (per ODOT, this will require full intersection improvements). (TSAP)	Location specific	Location specific	\$8,320
AR	Low	C	Bicycle-Pedestrian Connection between McLoughlin Boulevard and Stubb St	Establish bike-ped connection to McLoughlin Blvd sidewalk at west end of Stubb St. (TSAP)	Location specific	Location specific	\$20
N/A	Low	O	Milwaukie Bike Map	Produce a Milwaukie Bike Map.	Citywide	Citywide	\$50 60
N/A	Low	O	Police Enforcement on Drivers	Enforce laws related to bike lanes and bicycle safety.	Citywide	Citywide	\$10
N/A	Low	O	Bike Lane Striping	Re-stripe existing bike lanes and stripe bike lanes on streets where buses and bicyclists share the road.	Citywide	Citywide	\$20
N/A	Low	C	Springwater Trail Signage	Install wayfinding signage for Springwater Trail.	Citywide	Citywide	\$15 20
N/A	Low	O	North Clackamas Greenway Corridor Study	Study feasibility of corridor for multi-use path construction (possibly along Kellogg Creek).	Downtown	Clackamas Regional Center	\$50

**Notes:**

C = Capital Project      High = High priority      TSAP = Tacoma Station Area Plan  
 O = Operational Project      Med = Medium priority  
 P = Policy Project      Low = Low priority

## Action Plan

The Bicycle Action Plan (Table 6-3) identifies the highest priority projects that are reasonably expected to be funded with local funds by 2030~~2035~~, which meets the requirements of the updated State's Transportation Planning Rule.<sup>5</sup> The Action Plan project list is the result of based upon a 2007 citywide project ranking process. In 2007, All of the modal master plan projects were ranked by the TSP Advisory Committee after consideration of the Working Groups' priorities, other public support for the project, and how well each project implements the TSP goals and policies. For the 2013 TSP Update, City staff reassessed the prioritization of all projects, incorporating public comments gathered at and around a public meeting in June 2013. Action Plan projects that were completed since 2007 were removed from the Action Plan and new projects identified as top priorities were added. The highest-ranking bicycle projects that are reasonably expected to be funded (see Chapter 13) with local funds are shown in Table 6-3.

**Table 6-3 Bicycle Action Plan**

Map ID	Project Name	Project Description	From	To	Project Cost (\$1,000s)	Direct Funding or Grant Match
<u>Z</u>	17 <sup>th</sup> Avenue Bikeway and Intersection Safety Improvements	Fill in sidewalk gaps on both sides; Fill in gaps in existing bicycle network with bike lanes; and/or provide multi-use path. Improve intersection safety at Milport Rd, McBrod Ave, Hwy 224, Lava Dr, and Hwy 99E, and eastbound connection at 17 <sup>th</sup> Ave/Hwy 99E. Improve intersection safety at 17 <sup>th</sup> Ave/Hwy 224.	Waverly Dr	Harrison St	\$1,000	Match
<u>U1</u>	Monroe Bicycle Boulevard Neighborhood Greenway	Designate as a Bicycle Boulevard Neighborhood Greenway and install bicycle bike boulevard improvements.	21 <sup>st</sup> Ave	Linwood Ave	\$330	Match
<u>U3</u>	Stanley Avenue Neighborhood Greenway	Designate as a Neighborhood Greenway and install bike boulevard improvements.	Springwater Trail	Railroad Ave	\$330	Match
<u>N</u>	Railroad Avenue Capacity Improvements	Bicycle aspect: Fill in gaps in existing bicycle network with bike lanes, cycle track, multi-use path, or other facilities.	37 <sup>th</sup> Ave	Linwood Ave	\$4,800	Match
<u>AD</u>	Kellogg Creek Bike-Ped Bridge	Construct bike-ped overpass over Kellogg Creek in conjunction with light rail bridge.	Lake Rd	Kronberg Park	\$2,500	Match
<u>AE</u>	Kellogg Creek Dam Removal and Hwy 99E Underpass	Replace Hwy 99E bridge over Kellogg Creek, remove dam, restore habitat; construct bike-ped undercrossing between downtown Milwaukie and Riverfront Park.	Location specific	Location specific	\$9,900	Match
<u>U2</u>	29 <sup>th</sup> /Harvey/40 <sup>th</sup> Bicycle Boulevard Neighborhood Greenway	Designate as a Bicycle Boulevard Neighborhood Greenway and install bicycle boulevard improvements.	Springwater Trail	Monroe St	\$220	Direct
<u>AC</u>	Kronberg Park Trail	Construct multi-use path to connect bike-ped bridge to safe crossing of Hwy 99E.	Kellogg Creek Bridge	Hwy 99E	\$300	Direct

<sup>5</sup> OAR Chapter 660, Department of Land Conservation and Development, Division 012, Transportation Planning, adopted on March 15, 2005, effective April 2005.

N/A	Bike Lane Maintenance	Sweep bike lanes to remove debris.	Citywide	Citywide	\$1,200	Direct
	Bike Route Signage	Install neighborhood bike route signage.	Citywide	Citywide		Direct

## REGIONAL TRANSPORTATION PLAN (RTP) COMPLIANCE

The projects identified in the Master Plan list and further refined in the Action Plan list are in line consistent with the Metro 2035 Regional Transportation Plan (RTP). The RTP includes specific goals that can be used to measure the success of regional planning efforts to improve the overall transportation system. Specifically, the Master Plan and Action Plan projects identified in this chapter are in line with Metro's goals for regional mobility and non-single occupant vehicle (non-SOV) modal targets. Chapter 8 includes a discussion of the performance measures and targets that the City has adopted to achieve the relevant RTP goals.

Three of the goals in the 2035 RTP relate to the regional bicycle system in particular:

- Reduce the number of bicyclist fatalities plus serious injuries by 50% compared to 2005.
- Triple the biking mode share compared to 2005.
- Increase by 50% the number of essential destinations accessible within 30 minutes by trails and bicycling compared to 2005.

All of the Master Plan and Action Plan projects identified in this chapter will help the region meet these goals. At the community level in Milwaukie, some of these goals are already met. For example, there is no record of bicyclist fatalities or serious injuries in 2012. And given the relatively compact nature of the city, no destination is more than 30 minutes away by bicycle. Certainly, the strategies outlined in this chapter will allow Milwaukie to contribute further to the region meeting those goals. It is the effort to increase the biking mode share where Milwaukie can play a more active role in meeting the regional goal. As more data and tools become available to help measure local biking mode share, it will become easier to gauge the success of the projects identified in this chapter in increasing that share.