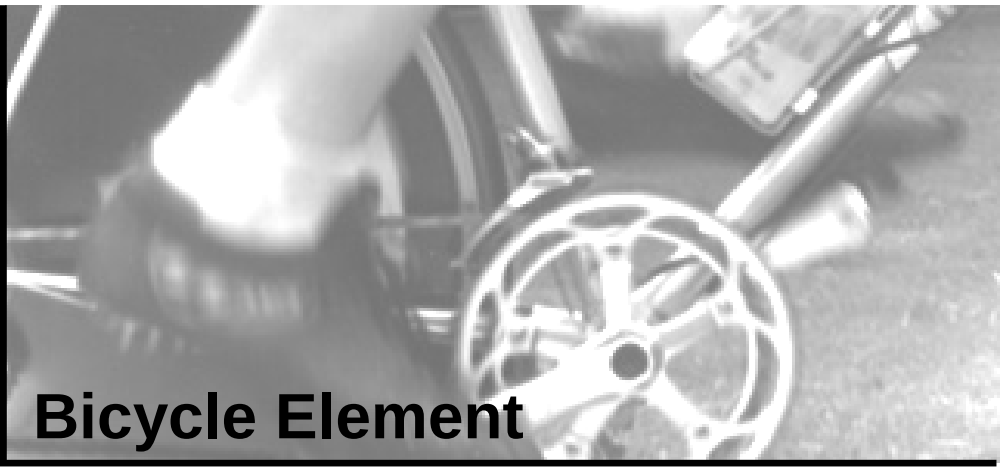

6 Bicycle Element

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 22 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 bicyclists. 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 17th Ave. Similar to the east/west roadways, these corridors are not continuous.

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 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 17th Ave. Additionally, there are a limited number of connections through the city to the Springwater Corridor, especially to the west of 45th Ave. The Trolley Trail, which will be completed in conjunction with the Portland-Milwaukie Light Rail (PMLR) 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 does not easily connect to points south.

Major facilities, such as McLoughlin Blvd, Hwy 224, and the railroads, create barriers to bicycling through the city, particularly for east-west 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 bicyclists 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 bicyclists. 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 specific problem crossings:

- 17th Ave/Hwy 224
- 17th Ave/Harrison St/Hwy 99E
- Railroad crossing of 21st 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 Bicyclists

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 bicyclists 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 multiuse paths, cycle tracks, bike lanes, shared roadways, and neighborhood greenways. Each of these facilities serves a particular purpose for bicycle travel. Bike lanes, cycle tracks, and multiuse paths can all accommodate 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
Multiuse 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.).
Cycle track	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.
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).
Neighborhood greenway	Lower-order, lower-volume streets with various treatments to promote safe and convenient bicycle travel and enhance pedestrian travel as well. 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

Multiuse Paths

As their name implies, multiuse 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 bicyclists from auto traffic. The American Association of State Highway Transportation Officials (AASHTO)[1] and the Oregon Department of Transportation (ODOT)[2] state that mixed-use paths can be designed along roadways, provided several design considerations are met:

Figure 6-1 Multiuse Path

Photo credit: Vince Schreck, www.pdxfamilyadventures.com

- 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.

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 2-ft "door zone" buffer (where adjacent to parked cars). Pavement markings on the cycle track provide guidance for bicyclists, as well as for motorists and pedestrians that may cross the cycle track at driveways or intersections.

Figure 6-2 Cycle Track

Photo credit: Michael O'Hare, www.citiesforpeople.net

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.

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[1] *A Guide for the Development of Bicycle Facilities*, American Association of State Highway and Transportation Officials, 1999.
[2] *Oregon Bicycle and Pedestrian Plan, An Element of the Oregon Transportation Plan*, Oregon Department of Transportation, Adopted June 14, 1995.

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 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 5 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

Photo credit: LA-32 Neighborhood Council, http://la32nc.org/category/transportation/

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 both bicycle and auto traffic. Figure 6-5 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 6-5 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 6-4 Shared Roadway

Photo credit: Portland Bureau of Transportation, www.portlandoregon.gov/transportation/

Figure 6-5 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 wayfinding 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.

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 generally utilizing streets with lower traffic volumes and vehicle speeds, such as minor collectors or local streets that pass through residential neighborhoods. The neighborhood greenway 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

Image credit: Bicycle Transportation Alliance/Owen Walz, owenwalzdesign.com

Traffic controls along a 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. Neighborhood greenways also incorporate treatments to facilitate safe and convenient crossings of major streets. Neighborhood greenways work best in well-connected street grids, where riders can follow reasonably direct and logical routes and where higher-order, parallel streets exist to serve through-vehicle traffic.

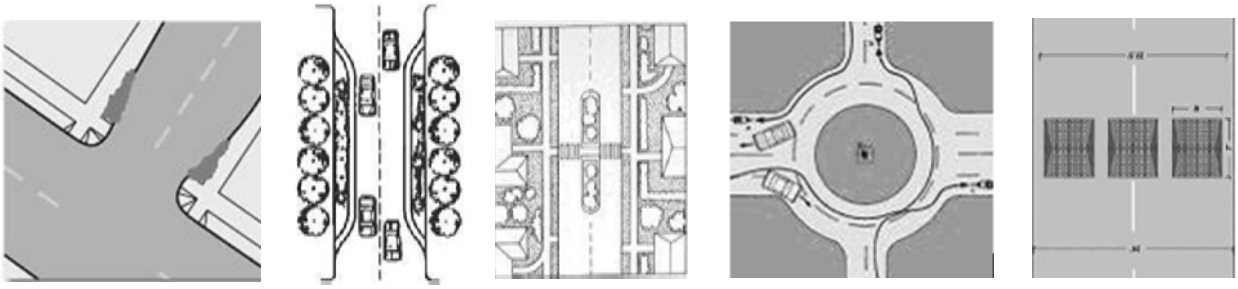
Milwaukie's neighborhood greenway network could be developed through a variety of improvements ranging from minor street enhancements (e.g., directional pavement markings) to larger-scale projects (e.g., intersection signalization). The various treatments fall into five major application levels based 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., wayfinding and warning signs along and approaching the 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 neighborhood greenway.

Figure 6-7 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



Bulbout **Choker** **Center Median** **Traffic Circle** **Speed Cushion**

Experience from other cities that have implemented neighborhood greenways shows that on-street vehicle parking can function as a traffic-calming measure. Drivers generally seem to slow down in response to the physical narrowing of the travel lane and the higher perceived risk of collision. In addition, parked cars create a barrier between moving cars on the street and pedestrians on the sidewalk. This barrier enhances both actual and perceived safety for pedestrians. Allowing or encouraging on-street vehicle parking can be one tool employed to make neighborhood greenways safe and pleasant for nonmotorized travel.

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 light rail (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, activity centers, and major transit stops.
- Improve crossing safety and connectivity.
- Designate 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 multiuse paths for recreational and commuter use.
- Involve bicyclists in the design and planning of bicycle and road facilities.
- Educate bicyclists and motorists about bicycle routes, laws, and opportunities.
- Directly implement or encourage the establishment of a bike-share program. This strategy could range from City ownership and administration of a bike-share system to revisions to the Municipal Code to allow for bike-share facilities owned by other private or public entities.

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, and policy. Capital strategies involve building physical infrastructure. Operational and maintenance strategies aim to make existing infrastructure more usable. Policy-oriented strategies seek to modify public processes in order to more effectively support bicycling as a viable transportation mode. 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

17th Ave between Waverly Dr and Harrison St is a key bicycle connection between downtown Milwaukie and the Sellwood neighborhood in Portland. This connection will be improved by constructing bike lanes and/or a multiuse path. In addition, several potential 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 6-8a and described below:

- Monroe St between downtown Milwaukie and Linwood Ave.
- Stanley Ave between Railroad Ave and Johnson Creek Blvd.
- A corridor roughly following 40th Ave north from Monroe St and then splitting into two separate corridors at Harvey St. One neighborhood greenway would continue north on 40th Ave and follow Olsen St and 42nd Ave to connect with Johnson Creek Blvd. The second neighborhood greenway would follow Harvey St west from 40th Ave and follow Balfour St, 29th Ave, and Van Water St to connect with the Springwater Corridor. If 29th Ave is extended to the south, the neighborhood greenway should connect to the south as well (see Figure 8-4, which shows the future extension of 29th Ave).
- A corridor following 19th Ave south from Eagle St to Sparrow St, then east on Sparrow St to River Rd. This corridor could be extended east on Sparrow St with construction of a multiuse path connecting to the Trolley Trail.

These 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 and Maintenance

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 bicyclist education, including driver and biker awareness classes, "Share the Road" safety class, bike safety education for kids and adults.
- Encouraging bicycling through community events to get new bicyclists 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 bicyclists.
- Collect and maintain bicycling traffic counts to measure the effect of improvements.

- Work with the City of Portland and Clackamas County when implementing bike boulevards, bike lanes, and multiuse 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 6-8a). An inset map showing more detail in the downtown area is provided in Figure 6-8b. 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 Table 6-2 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 6-8a

BICYCLE MASTER PLAN

November 2013

LEGEND

Existing Bicycle Facillities
- Shared Lane
- Bicycle Lane
- Kellogg Creek Trail
- SpringwaterTrail
- Trolley Trail

Proposed Improvements
- Bicycle Intersection Safety Improvement
- Bicycle Lanes
- Neighborhood Greenway

- Schools
- Major Roads
- Streets
- Railroad
- County Line
- Water
- Parks
- City Limits
- Light Rail Station
- Light Rail Transit

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
- AP 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 exisiting bike network with bike lanes or multiuse path. Improve intersection safety on 17th Ave at HWY 224 and at 99E.
- AB Complete Springwater Trail along Ochoco St
- AC 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

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

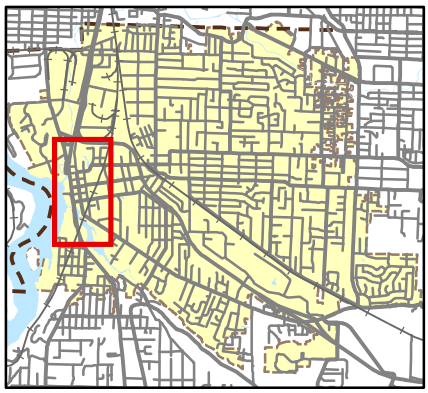
- AF McLoughlin and 22nd

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



DKS Associates
TRANSPORTATION SOLUTIONS

0 75 150 300 450 600 Feet

Table 6-2 Bicycle Master Plan Projects

Map ID[3]	Priority	Type	Project Name	Project Description	From	To	Cost ($1,000s[4])
High Priority Projects							
E	High	C	Intersection Improvements at Linwood Ave and Monroe St	Improve safety of crossing at intersection.	Location-specific	Location-specific	$10
G	High	C	Hwy 224 Crossing Improvements at Oak and Washington St	Improve intersection crossing safety for bicyclists at Washington St and Oak St.	Location-specific	Location-specific	$10
J	High	C	Lake Rd Bike Lanes	Fill in gaps in existing bicycle network with bike lanes.	Main St	Guilford Dr	$3,400
N	High	C	Railroad Ave Capacity Improvements	Bicycle aspect: Fill in gaps in existing bicycle network with bike lanes, cycle track, multiuse path, or other facilities.	37th Ave	Linwood Ave	$4,800
U1	High	C	Monroe St Neighborhood Greenway (downtown)	Designate as a "neighborhood greenway" and install traffic-calming improvements.	21st Ave	Hwy 224	$85
U2	High	C	Monroe St Neighborhood Greenway (central)	Designate as a "neighborhood greenway" and install traffic-calming improvements.	Hwy 224	42nd Ave	$80
U3	High	C	Monroe St Neighborhood Greenway (east)	Designate as a "neighborhood greenway" and install traffic-calming improvements.	42nd Ave	Linwood Ave	$165
U4	High	C	29th/Harvey/40th Neighborhood Greenway	Designate as a "neighborhood greenway" and install traffic-calming improvements.	Springwater Trail	Monroe St	$220
U5	High	C	Stanley Ave Neighborhood Greenway (north)	Designate as a "neighborhood greenway" and install traffic-calming improvements.	Springwater Trail	King Rd	$135
U6	High	C	Stanley Ave Neighborhood Greenway (south)	Designate as a "neighborhood greenway" and install traffic-calming improvements.	King Rd	Railroad Ave	195

[3] See Figure 6-3a.
[4] Project costs are order-of-magnitude estimates and are in 2012 dollars. Future costs may be more due to inflation. In the case of operational projects, estimated costs are for the entire 22-year planning period.

Map ID[3]	Priority	Type	Project Name	Project Description	From	To	Cost ($1,000s[4])
Z	High	C	17th Ave Improvements	Fill in sidewalk gaps on both sides of street, fill in gaps in existing bicycle network with bike lanes, and/or provide multiuse path. Improve intersection safety at Milport Rd, McBrod Ave, Hwy 224, Lava Dr, and Hwy 99E.	Ochoco St	McLoughlin Blvd	$1,000
AC	High	C	Kronberg Park Trail	Construct multiuse path to connect bike/ped bridge to safe crossing of Hwy 99E.	Kellogg Creek Bridge	River Rd	$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	$9,900
AF	High	C	Intersection Improvements at McLoughlin Blvd and 22nd Ave	Improve safety of Trolley Trail crossing at 22nd Ave.	Location-specific	Location-specific	$200
AG	High	C	Improved Connection to Springwater Trail at 29th Ave and Sherrett St	Pave the connection to Springwater Trail at 29th 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
N/A	High	O	Bike Lane Maintenance	Sweep bike lanes to remove debris.	Citywide	Citywide	$1,200
N/A	High	O	Bicycle-friendly Street Grates	Install bicycle-friendly street grates.	Citywide	Citywide	$60

Map ID[3]	Priority	Type	Project Name	Project Description	From	To	Cost ($1,000s[4])
Medium Priority Projects							
I	Med	C	Harrison St Bike Lanes	Fill in gaps in existing bicycle network with bike lanes (cost included with Harrison St road widening project).	Hwy 99E	21st Ave	$300
K	Med	C	Oatfield Rd Bike Lanes	Fill in gaps in existing bicycle network with bike lanes.	Guilford Ct	Lake Rd	$380
U7	Med	C	19th and Sparrow Neighborhood Greenway	Designate as a "neighborhood greenway" and install traffic-calming improvements. This would connect the south end of Kellogg Creek Trail to River Rd.	Eagle St	River Rd	$800
V	Med	C	Bicycle and Pedestrian Overpass over Railroad Ave	Establish a dedicated bicycle and pedestrian connec-tion across Railroad Ave and the railroad tracks.	Railroad Ave	International Way	$2,200
AB	Med	C	Springwater Trail Completion	Contribute to regional project to complete Spring-water Trail ("Sellwood Gap") along Ochoco St.	17th Ave	19th Ave	$90
AI	Med	C	International Way Bicycle Facilities	Construct bike lanes or other bike facilities.	37th Ave	Lake Rd	$400
AJ	Med	C	Bicycle/Pedestrian Improvements to Main St	Construct multiuse 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 Blvd	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 23rd 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

Map ID[3]	Priority	Type	Project Name	Project Description	From	To	Cost ($1,000s[4])
N/A	Med	O	Bicyclist Education	Promote bicycling through bike use and route selection education.	Citywide	Citywide	$10
N/A	Med	O	Community Bicycle Rides	Support community bike rides to encourage bike use.	Citywide	Citywide	$5
Low Priority Projects							
B	Low	C	Springwater Trail Intersection Improvements at 45th Ave	Improve safety of crossing at intersection.	Location-specific	Location-specific	$10
C	Low	C	Intersection Improvements at Johnson Creek Blvd and Linwood Ave	Improve safety of crossing at intersection.	Location-specific	Location-specific	$10
D	Low	C	Intersection Improvements at Linwood Ave and King Rd	Improve safety of crossing at intersection.	Location-specific	Location-specific	$10
H	Low	C	Intersection Improve-ments at International Way and Lake Rd	Improve safety of crossing at intersection.	Location-specific	Location-specific	$10
L	Low	C	Harrison St Bike Lanes	Fill in gaps in existing bicycle network with bike lanes.	Hwy 224	42nd Ave	$10
M	Low	C	37th Ave Bike Lanes	Fill in gaps in existing bicycle network with bike lanes.	Harrison St	Hwy 224	$3,200
O	Low	C	43rd Ave Bike Lanes	Fill in gaps in existing bicycle network with bike lanes.	King Rd	Filbert St	$1,100
P	Low	C	Linwood Ave Bike Lanes (north)	Fill in gaps in existing bicycle network with bike lanes.	Queen Rd	Johnson Creek Blvd	$1,900
Q	Low	C	Linwood Ave Bike Lanes (south)	Fill in gaps in existing bicycle network with bike lanes.	Juniper St	Harmony Rd	$320
R	Low	C	Rusk Rd Bike Lanes	Fill in gaps in existing bicycle network with bike lanes.	Lake Rd	North Clackamas Park	$1,000
X	Low	C	Kellogg Creek Trail Improvements	Resurface trail and provide wayfinding signage to/from trail.	Milwaukie Riverfront	Treatment Plant	$680
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 St	Establish a dedicated bicycle and pedestrian connection on Sparrow St, connecting River Rd to Trolley Trail	River Rd	Trolley Trail	$350

Map ID[3]	Priority	Type	Project Name	Project Description	From	To	Cost ($1,000s[4])
AP	Low	C	Bike/Ped Overpass over McLoughlin Blvd at River Rd	Establish a dedicated bicycle and pedestrian connection across McLoughlin Blvd.	Kronberg Park	River Rd	$2,500
AQ	Low	C	Crossing Improvements for McLoughlin Blvd at Ochoco St and Milport Rd	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 Blvd 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	$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	Restripe 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	$20
N/A	Low	O	North Clackamas Greenway Corridor Study	Study feasibility of corridor for multiuse path construction (possibly along Kellogg Creek).	Downtown	Clackamas Regional Center	$50

Notes:

C = Capital Project
O = Operational Project
P = Policy Project

High = High priority
Med = Medium priority
Low = Low priority

TSAP = Tacoma Station Area Plan

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 2035, which meets the requirements of the State's Transportation Planning Rule.[5] The action plan project list is 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.

Table 6-3 Bicycle Action Plan

Map ID	Project Name	Project Description	From	To	Project Cost ($1,000s)	Direct Funding or Grant Match
Z	17th Ave Improvements	Fill in sidewalk gaps on both sides of street, fill in gaps in existing bicycle network with bike lanes, and/or provide multiuse path. Improve intersection safety at Milport Rd, McBrod Ave, Hwy 224, Lava Dr, and Hwy 99E.	Ochoco St	McLoughlin Blvd	$1,000	Match
U1	Monroe St Neighborhood Greenway (downtown)	Designate as a "neighborhood greenway" and install traffic-calming improvements.	21st Ave	Hwy 224	$85	Match
U2	Monroe St Neighborhood Greenway (central)	Designate as a "neighborhood greenway" and install traffic-calming improvements.	Hwy 224	42nd Ave	$80	Match
U3	Monroe St Neighborhood Greenway (east)	Designate as a "neighborhood greenway" and install traffic-calming improvements.	42nd Ave	Linwood Ave	$165	Match
U5	Stanley Ave Neighborhood Greenway (north)	Designate as a "neighborhood greenway" and install traffic-calming improvements.	Springwater Trail	King Rd	$135	Match
U6	Stanley Ave Neighborhood Greenway (south)	Designate as a "neighborhood greenway" and install traffic-calming improvements.	King Rd	Railroad Ave	$195	Match
N	Railroad Ave Capacity Improvements	Bicycle aspect: Fill in gaps in existing bicycle network with bike lanes, cycle track, multiuse path, or other facilities.	37th Ave	Linwood Ave	$4,800	Match
AD	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

[5] *OAR Chapter 660*, Department of Land Conservation and Development, Division 012, Transportation Planning, adopted on March 15, 2005, effective April 2005.

Map ID	Project Name	Project Description	From	To	Project Cost ($1,000s)	Direct Funding or Grant Match
AE	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
U4	29th/Harvey/40th Neighborhood Greenway	Designate as a "neighborhood greenway" and install traffic-calming improvements.	Springwater Trail	Monroe St	$220	Match
AC	Kronberg Park Trail	Construct multiuse path to connect bike/ped bridge to safe crossing of Hwy 99E.	Kellogg Creek Bridge	River Rd	$300	Direct
N/A	Bike Lane Maintenance	Sweep bike lanes to remove debris.	Citywide	Citywide	$1,200	Direct

REGIONAL TRANSPORTATION PLAN (RTP) COMPLIANCE

The projects identified in the master plan list and further refined in the action plan list are 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.