

3



Existing Conditions

The main objective of Milwaukie's Transportation System Plan (TSP) is to inventory, evaluate, and plan for all modes of travel. The purpose of this chapter is to document the existing transportation facilities in the TSP study area, and provide a basis of knowledge and benchmarks for assessing the physical and operational needs of the system.

OVERVIEW

Existing transportation conditions in Milwaukie were evaluated in late 2006. The existing traffic and transportation conditions for the following modes of travel and items that affect the transportation environment were inventoried and analyzed:

- Pedestrians
- Bicycles
- Public Transit
- Motor Vehicle
- Rail
- Parking
- Environmental Justice
- Environmental Resources

This list of areas covered includes two topics not previously included in the 1997 TSP: environmental justice and environmental resources. Environmental justice with respect to transportation is aimed at identifying underserved and vulnerable populations to help increase outreach efforts to adequately serve those areas within the city. The environmental resources evaluation within this document helps to identify and map environmentally sensitive areas with respect to flood plains, fish and wildlife habitat, wetlands, vegetation, and local historical resources.









The city of Milwaukie is located within Clackamas County just south of the city of Portland. Figure 3-1a shows the location of Milwaukie with respect to the Portland metropolitan region. The study area for this analysis is defined as approximately 1/4 mile beyond the city of Milwaukie boundary limits and includes twenty-two intersections that were selected to address major roadways and areas of concern. Figure 3-1b shows this study area and the study area intersections.

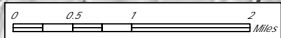
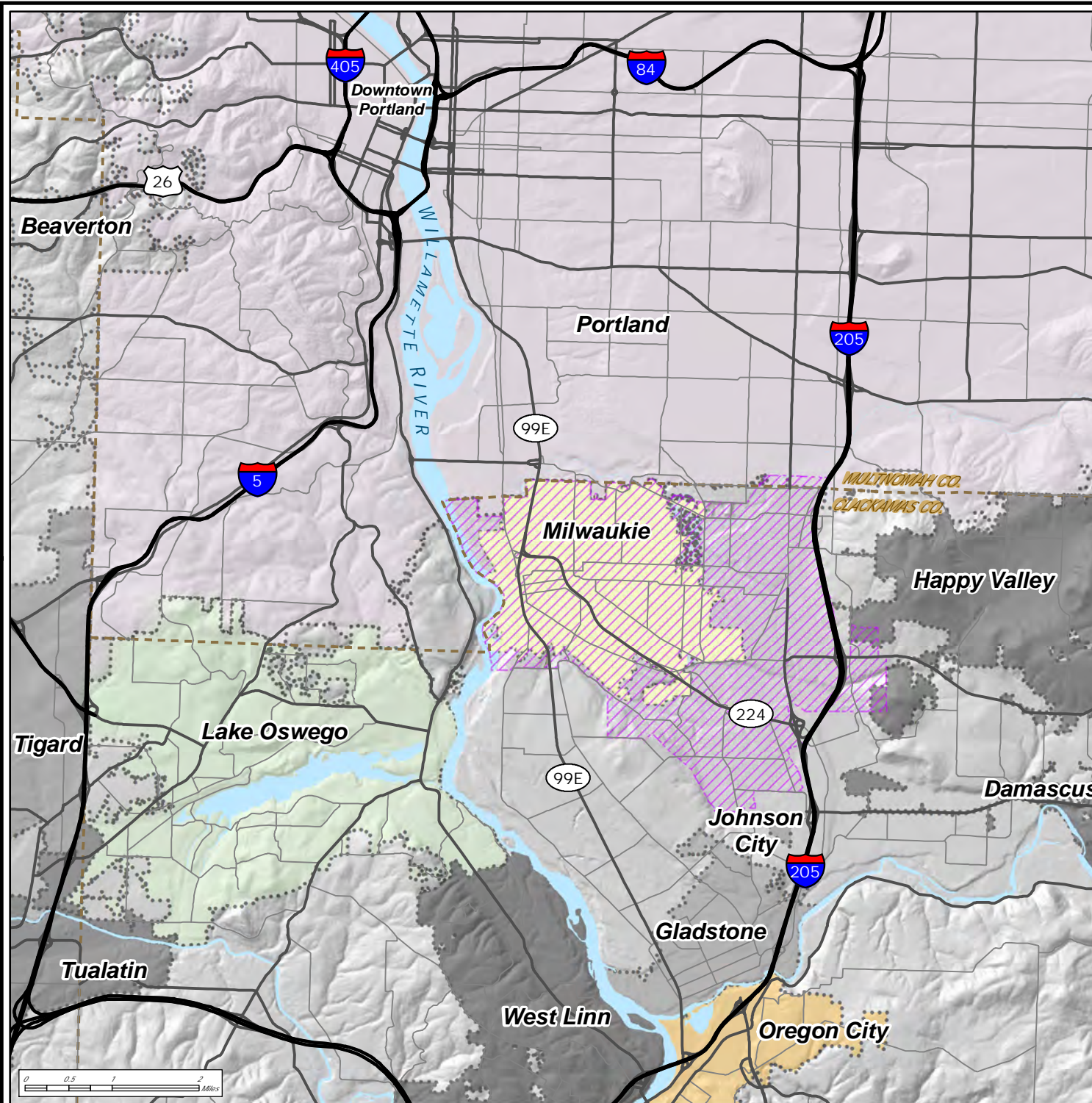


STUDY AREA CONTEXT

November 2013

LEGEND

-  *Milwaukie City Limits*
-  *Urban Growth Management Agreement (UGMA) area*
-  *Freeways*
-  *Major Arterials*
-  *Arterials*
-  *County Line*
-  *Water*
-  *City Limits*





Transportation System Plan

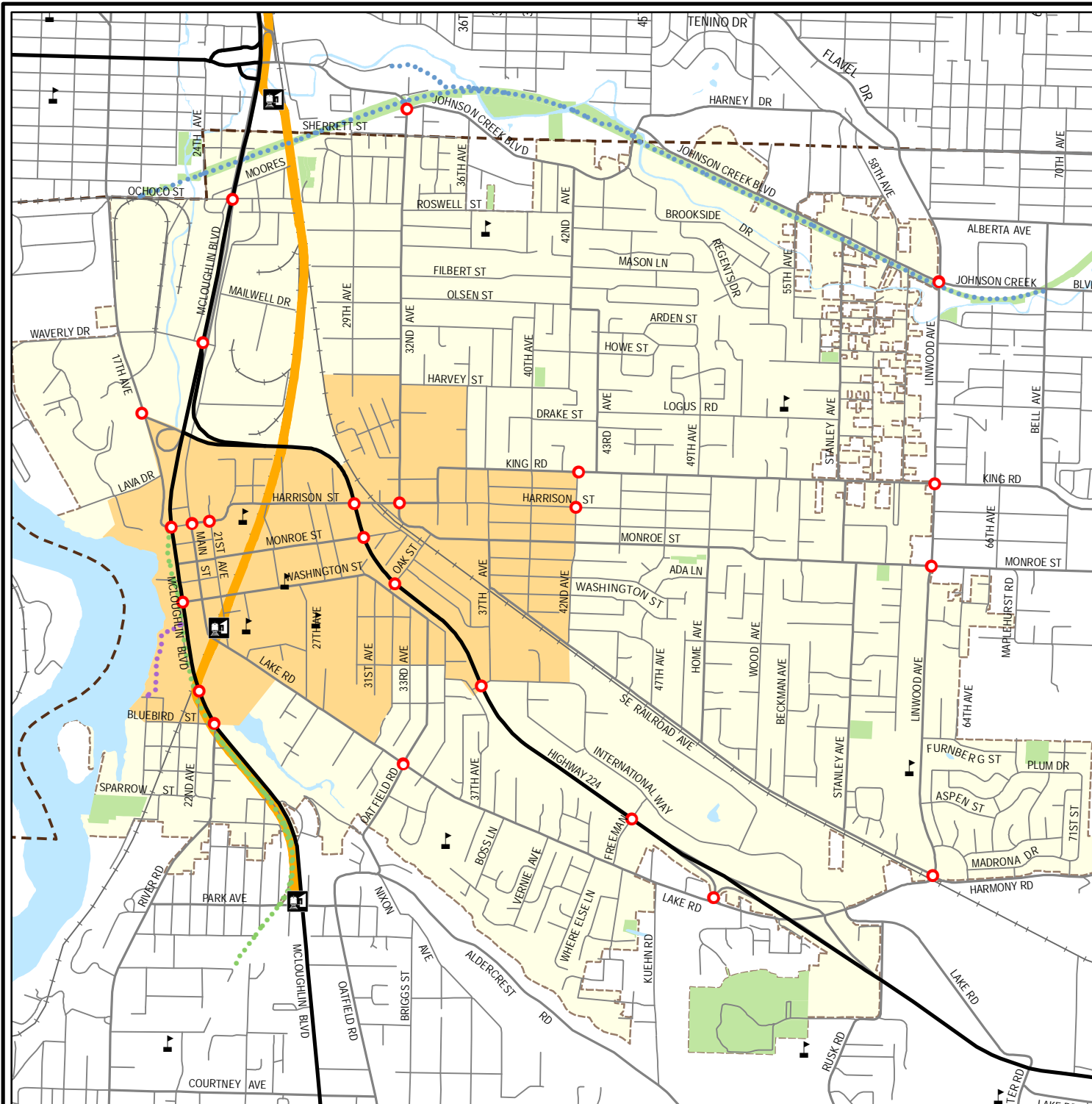
FIGURE 3-1b

STUDY AREA

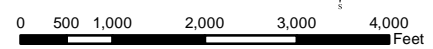
November 2013

LEGEND

- Study Intersections
- Major Highways
- Major Roads
- Streets
- Kellogg Creek Trail
- Springwater Trail
- Trolley Trail
- Light Rail Station
- Light Rail Transit
- Railroad
- Schools
- County Line
- Town Center
- Water
- Parks
- City Limits



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The following sections describe the City's existing transportation facilities and their usage and performance.

PEDESTRIANS

The Metro Regional Transportation Plan (RTP) identifies downtown Milwaukie as a Town Center; a local activity area that provides a range of local retail and service opportunities within close proximity to each other. Milwaukie's downtown is characterized by a variety of small specialty retail shops, storefront businesses, and a historic street grid network. There are three parks within downtown and five schools within the Town Center boundary. These features are important hubs of pedestrian activity.

Existing Pedestrian Facilities

All of the sidewalks and trails within Milwaukie are displayed in Figure 3-2. Many sections of the City's arterial and collector streets, identified as Major Roads on Figure 3-2, have sidewalks on at least one side of the street. A typical sidewalk configuration is a "curb tight" design, where the sidewalk is constructed adjacent to the curb.

In general, neighborhoods to the northeast of Hwy 224 lack adequate pedestrian facilities. For example many older residential areas in this part of the city have no sidewalks whatsoever whereas most of the streets in downtown and residential areas to the southwest of Hwy 224 have sidewalks on both sides. This patchwork of sidewalks is well illustrated in Figure 3-2, which shows the existing sidewalks and areas lacking.

Based on a visual inspection, many of the sidewalks in Milwaukie are in good to excellent condition, with no major cracking or heaving. Examples of sidewalks in very good or excellent condition are 37th Ave near Milwaukie Marketplace and along McLoughlin Blvd near downtown. Almost all sidewalks are located in the public right-of-way, yet in Milwaukie it is the responsibility of the adjacent property owner to repair sidewalks in poor condition.

Sidewalks are rarely free of obstructions, and Milwaukie sidewalks are no exception. In addition to the occasional utility pole, many Milwaukie residents share their sidewalks with mailboxes. This is more of a concern where older, narrower sidewalks exist; for instance, the western portion of Lake Rd, where the sidewalk is narrow and made of asphalt.

In Milwaukie, wheelchair ramps are not provided at every intersection with sidewalks. However, since the Americans with Disabilities Act (ADA) was enacted in 1991, the City has required and installed wheelchair ramps in all sidewalk projects. Over the past few years, the City has retrofitted numerous intersections in the downtown area with wheelchair ramps. There are still a number of intersections that have partial or no ramps and need to be retrofitted.

Pedestrian crosswalks exist primarily at signalized intersections and crossings. Most of these intersections have crosswalks on all four legs, but there are a few where crosswalks are only partially provided.

The Springwater Trail, a regional multiuse path, extends east from Ochoco St, and continues along Johnson Creek Blvd to Linwood Ave, where it extends beyond the city limits to the east. East of 45th Ave, this trail serves as a pedestrian facility for Johnson Creek Blvd, as there are no sidewalks on this stretch of road. The Three Bridges Project, which constructed bridges across the Union Pacific Railroad, McLoughlin Blvd, and Johnson Creek, has extended the Springwater Trail westward to the intersection of 19th St/Ochoco St. This trail is nearly continuous and connects Portland to Milwaukie. However, there is limited access to the trail between 45th Ave and Ochoco St due to grade separation of the trail and the streets it crosses.



Transportation System Plan

FIGURE 3-2

SIDEWALK INVENTORY

November 2013

LEGEND

Sidewalks

- < 5 ft width
- 5 ft - 10 ft width

Other Map Features

- Schools
- Kellogg Creek Trail
- Springwater Trail
- Trolley Trail
- Light Rail Station
- Light Rail Transit
- Major Roads
- Streets
- Railroad
- County Line
- 10' Contours
- Water
- Parks
- City Limits



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

The Kellogg Creek Trail, a regional multiuse path, is recognized by Metro as being part of the North Clackamas Greenway. The trail is 7.5 feet wide and runs along the Willamette River from Adams St to Eagle St, connecting downtown Milwaukie with the Island Station neighborhood. This trail serves as an alternative multiuse path along McLoughlin Blvd and the riverfront.

Another trail that is partially constructed is the Trolley Trail. This multiuse trail starts in downtown Milwaukie and extends south to Gladstone. The Trolley Trail provides an aesthetically pleasing and safe connection between neighborhoods, parks, schools, retirement communities, businesses, and public transit. A segment of the trail along McLoughlin Ave between Park Ave and River Rd is closed until 2014 due to construction of the Portland-Milwaukie Light Rail (PMLR).

Pedestrian Volume

Pedestrian crossing volumes were counted at the study intersections during the summer of 2006, and are shown in Figure 3-3a and Figure 3-3b. The counts were taken during the evening peak period (4:00 to 6:00 p.m.) at the study intersections, and represent a snapshot in time of pedestrian travel.

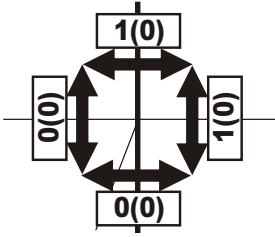
The most significant pedestrian movements occur near retail and educational areas, including downtown Milwaukie, the intersection of Linwood Ave and King Rd, and the intersection of Johnson Creek Blvd and Linwood Ave. Along major roadways, such as McLoughlin Blvd and Hwy 224, pedestrian crossings are limited to locations with traffic signal controls, due to high motor vehicle volumes and speeds.

Summary of Pedestrian Findings

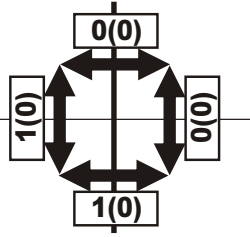
The following summarizes key pedestrian findings related to the level of activity documented as well as deficiencies for this mode of travel. These findings will be utilized to help guide future improvements to address the deficiencies for this mode of travel in the transportation network.

- The majority of study area intersections have pedestrian activity levels on individual legs of the intersections that are ten crossings or less during the p.m. peak hour. Locations with higher activity levels than this occur along the Springwater Trail and in downtown.
- There are a number of discontinuous sidewalks within Milwaukie that prohibit the ease of use for pedestrians to travel in and around the city. These occur primarily in the east and north areas of the city.
- The city contains numerous dead-end and curvilinear streets that hamper pedestrian connectivity.
- Travel between the eastern and western areas of the city is particularly problematic due to the location of Hwy 224 and the railroad line that parallels it to the north. Both of these transportation facilities act as barriers to pedestrian travel because there are few places where these facilities can be crossed. The roadway width and average vehicle speed on Hwy 224 also contribute to this barrier effect.
- The use of asphalt at the city's railroad crossings is also of concern to pedestrians because it is more prone to buckling than concrete. The city has numerous at-grade railroad crossings, and the condition at these crossings varies widely. Those crossings with uneven walking surfaces are of special concern to elderly and disabled individuals.

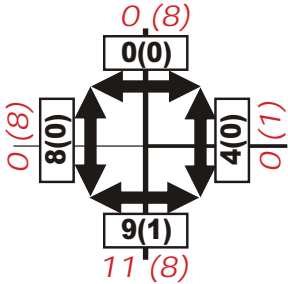
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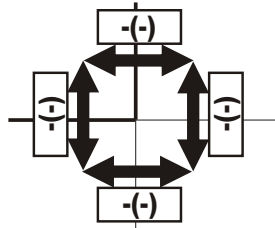
2 SE McLoughlin Blvd @ SE Milport Rd



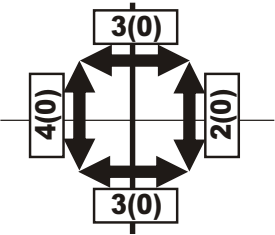
3 SE McLoughlin Blvd @ SE Harrison St/17th Av



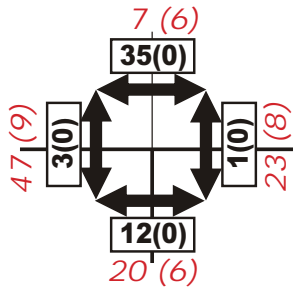
4 SE 42nd Av @ SE Harrison St



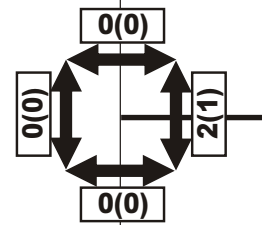
5 SE McLoughlin Blvd @ SE Washington St



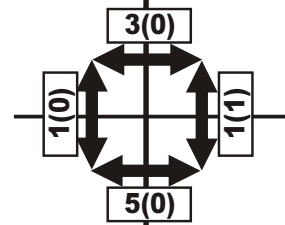
6 SE Harrison St @ SE Main St



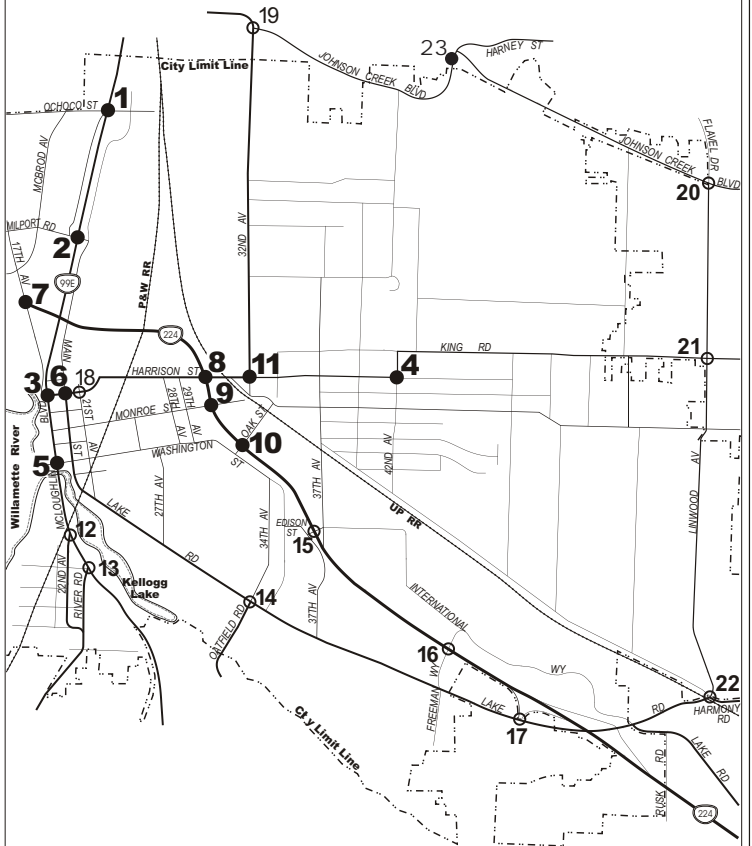
7 Hwy 224 @ SE 17th Av



8 Hwy 224 @ SE Harrison St

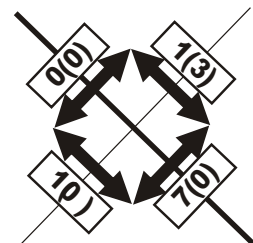


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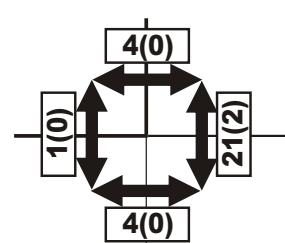


September 2007

10 Hwy 224 @ SE 32nd Av



11 SE Harrison St @ SE 32nd Av



LEGEND

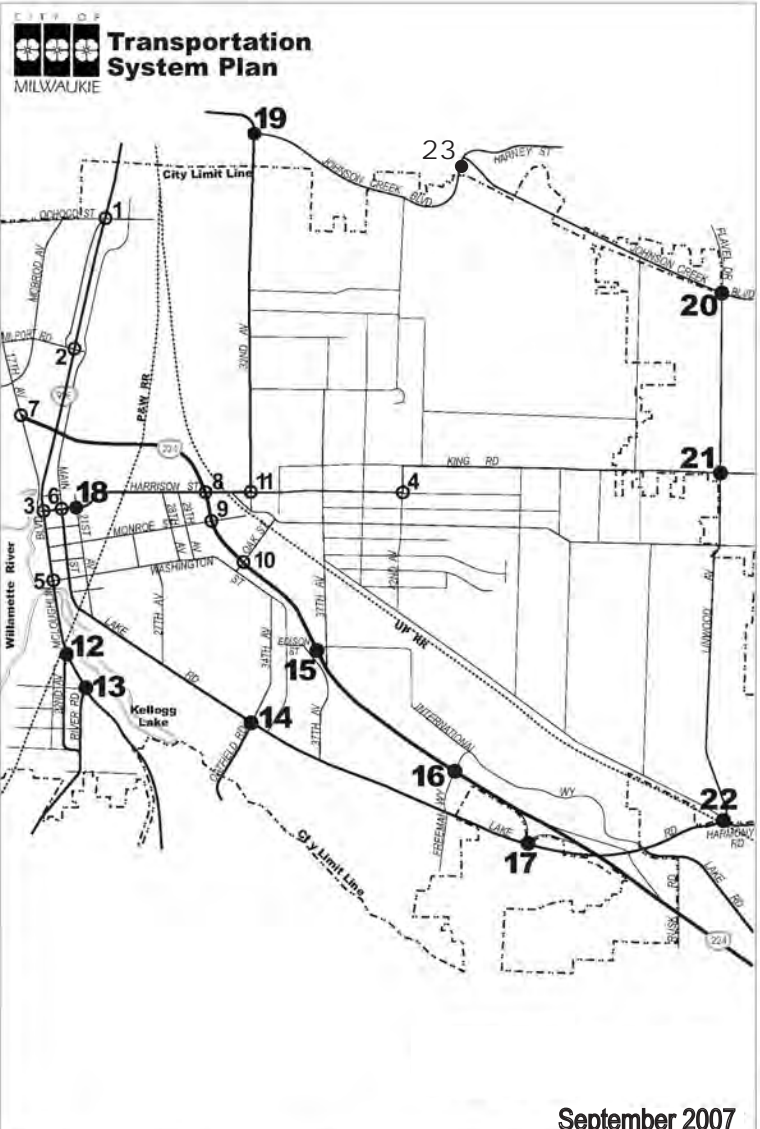
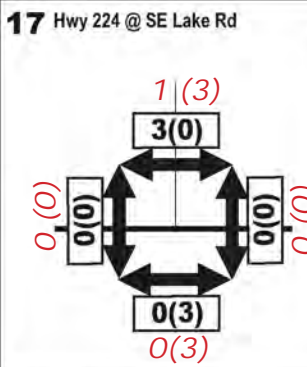
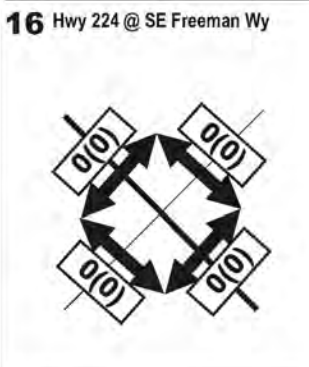
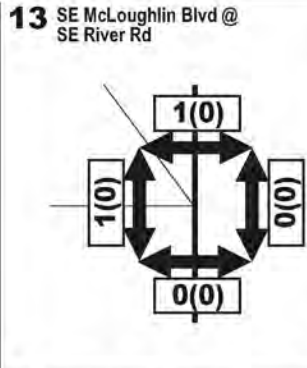
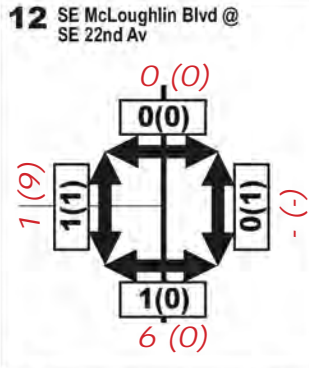
- X●** - Study Intersection & Number (This Sheet)
- XO** - Study Intersection & Number (Next Sheet)
- P(B)** - Pedestrian(Bicycle) Volume (Fall 2006)
- ↔** - Indicates No Available Data
- (-)** - Pedestrian (Bicycle) Volume (Summer 2007)

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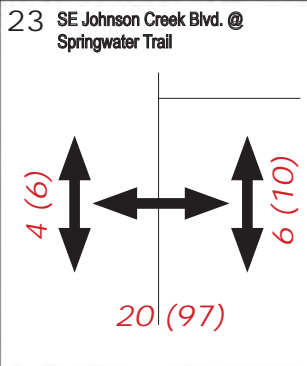
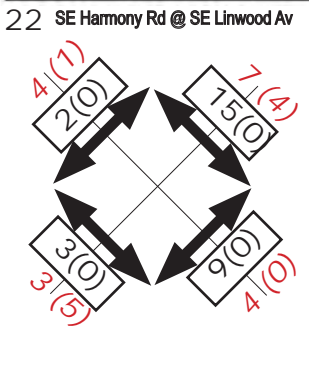
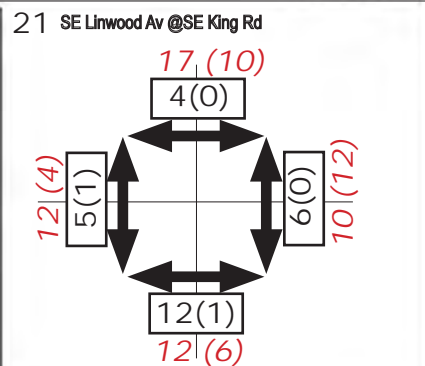
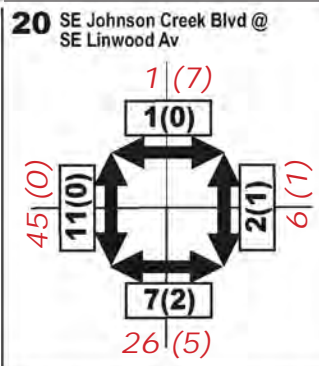
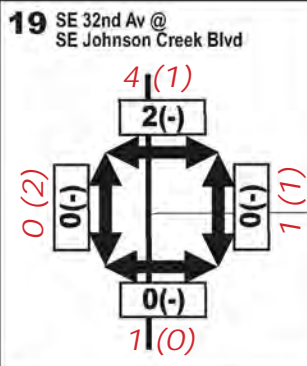
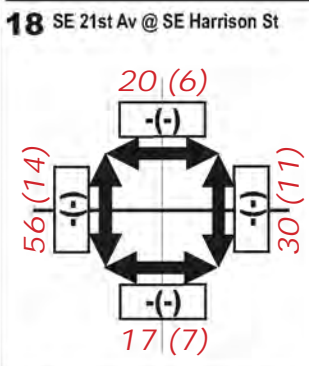


Figure 3-3a

EXISTING PEDESTRIAN & BICYCLE PM PEAK HOUR VOLUMES



September 2007



LEGEND
 X● - Study Intersection & Number (This Sheet)
 XO - Study Intersection & Number (Previous Sheet)
 P(B) - Pedestrian(Bicycle) Volume (Fall 2006)
 -(-) - Indicates No Available Data
 - Pedestrian (Bicycle) Volume (Summer 2007)

BICYCLES

In general, designated bicycle facilities are limited in Milwaukie, making it difficult for bicyclists to safely and easily access activity centers and other local and regional destinations. The State Transportation Planning Rule requires cities to provide bikeways along roads classified as arterials and major collectors.¹ Figure 3-4 shows the existing designated bicycle facilities in Milwaukie.

Existing Bicycle Facilities

There are a limited number of designated bikeways and bicycle facilities in Milwaukie. A bikeway can include any road that is designed to accommodate bicycles.² Bikeways may have wider lanes or shoulders, and can be marked by pavement markings and signage. On-road bikeways generally exist on arterial and collector streets and can consist of a delineated bike lane or a wide shoulder (six feet or more). However, in Milwaukie, bikeways do not exist on all arterial or collector streets. Typically, north-south bikeways are discontinuous, except for Linwood Ave. In general, bikeways exist on the edges of the city lack connectivity. Metro's Regional Transportation Plan (RTP) identifies Hwy 224 and parts of McLoughlin Blvd as regional on-street bikeways, although the lack of marked bike lanes and higher traffic volumes and speeds along these corridors may discourage use by bicyclists. There are no bicycle detectors at signalized intersections or bikeway signage on the streets.

There are three off-road multiuse trails that enhance bicycle access in Milwaukie. First is the Springwater Trail, which parallels Johnson Creek Blvd in Milwaukie, and connects bicyclists to downtown Portland to the northwest and to the I-205 north-south multiuse trail to the east. Due to grade separation, there is limited access to the trail in some locations. Another off-street facility available in Milwaukie is the Kellogg Creek Trail in the downtown riverfront area, which is part of the North Clackamas Greenway. Bicyclists also have access to a portion of the Trolley Trail where construction was recently completed in downtown Milwaukie. The Trolley Trail runs along an old streetcar route that begins in Riverfront Park in downtown Milwaukie and ends in Gladstone to the south. A segment of the trail along McLoughlin Blvd between River Rd and Park Ave is closed until 2014 due to construction of PMLR.

Based on a general visual survey, the surface conditions of bikeways are generally good to excellent with the exception of King Rd, where the bike and auto lanes suffer due to failing pavement conditions.

Bicycle Volume

Bicycle counts were conducted in Fall 2006 during the evening peak period (4:00 to 6:00 p.m.) at the study intersections shown in Figures 3-3a and 3-3b. At some locations, additional counts were taken in August 2007. These counts are shown in red on Figures 3-3a and 3-3b. The reported bicycle volumes are generally moderate, with the highest level of activity in the downtown area.

¹ (OAR 660-012-0020) Department of Land Conservation and Development, Division 12, Transportation Planning Rule.

² Oregon Bicycle and Pedestrian Plan, Oregon Department of Transportation, June 14, 1995.



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FIGURE 3-4

BICYCLE FACILITY INVENTORY

November 2013

LEGEND

Bicycle Lanes

— Shared Lane

— Bicycle Lane

Trails

••• Kellogg Creek Trail

••• Springwater Trail

••• Trolley Trail

Other Map Features

🏫 Schools

— Railroad



— County Line

— Light Rail Transit

— Water

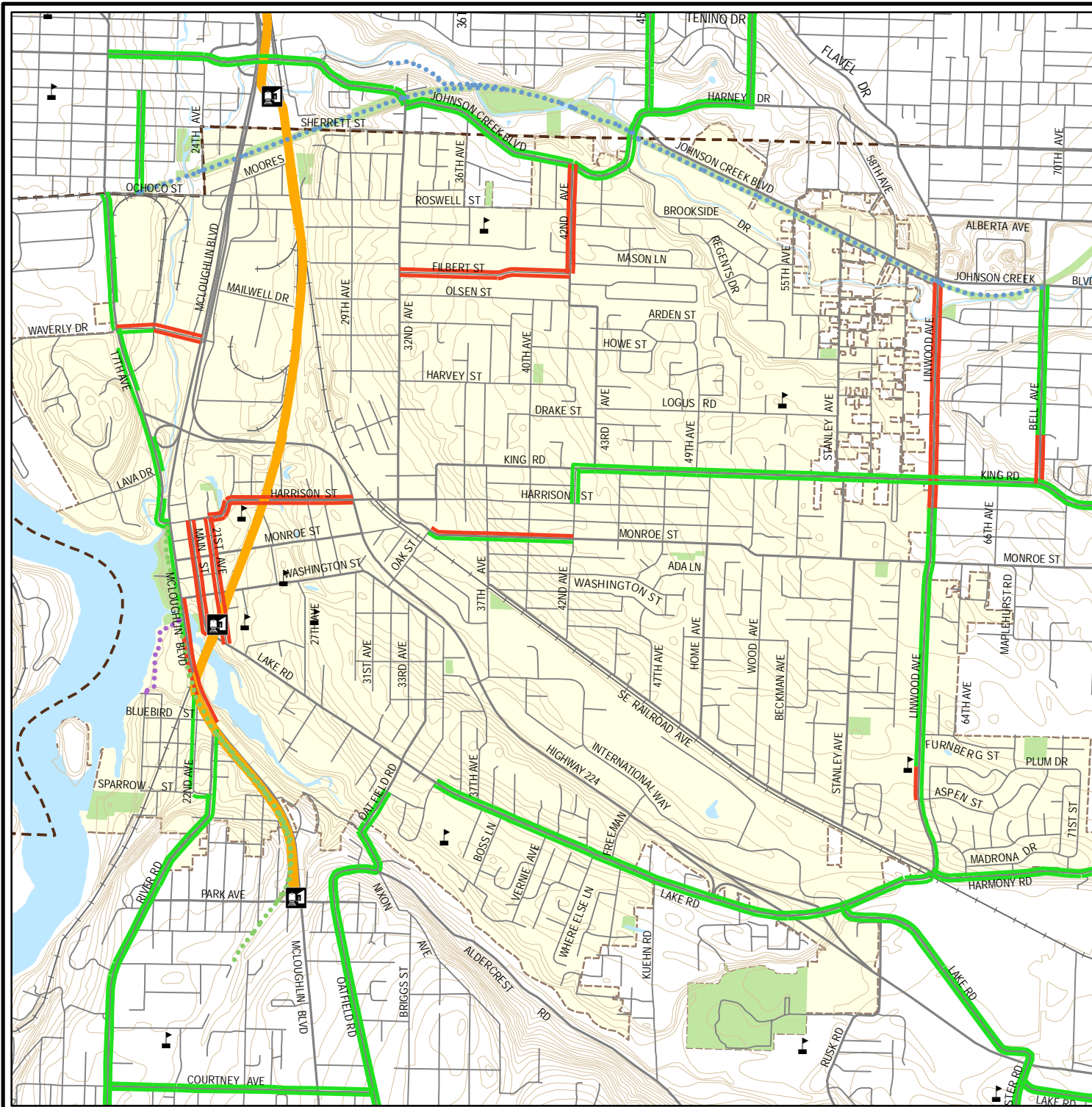
— Major Roads

— Parks

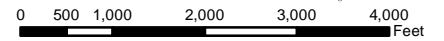
— Streets

— City Limits

— 10' Contours



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Summary of Bicycle Findings

The following summarizes key bicycle findings related to the level of activity documented as well as deficiencies for this mode of travel. These findings will be utilized to help guide future improvements to address the deficiencies for this mode of travel in the transportation network.

- In general, designated bikeways exist on the edges of the city and lack connectivity through the city.
- The Springwater Trail along the northern edge of the city is a valuable off-road bikeway; however, it is currently difficult to access west of 45th Ave.
- Bicyclists traveling between the eastern and western areas of the city are impeded by the location of Hwy 224 and the railroad line that parallels it to the north. Both of these transportation facilities act as barriers to bicycle travel because there are few places where these facilities can be crossed. The roadway width and average vehicle speed on Hwy 224 also contribute to this barrier effect.

PUBLIC TRANSIT

Fixed-route, dial-a-ride and paratransit services are available within Milwaukie for both local and regional trips. Two agencies, Clackamas County and the Tri-County Metropolitan District of Oregon Transit (TriMet), provide these services. TriMet provides transit service to and from Milwaukie, with fixed-route transit services including routes 28, 29, 31, 32, 33, 34, 70, 75, 99, and 152. These routes, their approximate headways, the locations of stops, shelters, the transit center, and park-and-rides are shown in Figure 3-5. This map also shows Neighborhood District Association boundaries to provide additional context for the location of existing transit facilities.

Table 3-1, below, shows each bus route's schedule, approximate headway, and main destinations.³ Most of the bus lines serving the city operate with average headways of 30 minutes or less (three have 15 minute headways) during the peak weekday commute hours. Bus service is limited on the weekends. When in service, the bus routes listed above transport riders to several local and regional destinations, including downtown Milwaukie, Clackamas Town Center, downtown Portland, Oregon City, Clackamas Transit Center, Milwaukie Providence Hospital, Lloyd Center, Clackamas Community College, and the Milwaukie Center.

Table 3-1 Service Route Schedules and Destinations

Existing Public Transit Service in Milwaukie					
Line # and Name	Weekday		Weekend		Destinations Served (partial list)
	Schedule	Approx. Headway (min.)	Schedule	Approx. Headway (min.)	
28 Linwood	6:00 a.m.-7:00 p.m. Peak and Off-peak	60	No Service	N/A	Milwaukie Transit Center Clackamas Town Center
29 Lake/ Webster	6:30 a.m.-8:00 p.m. Peak and Off-peak	60	No Service	N/A	Milwaukie Transit Center Clackamas Town Center
31 King Rd	6:00 a.m.-10:00 p.m. Peak Off-peak	30 60	Sat: 6:30 a.m.-10:00 p.m. Peak Off-peak	30 60	Milwaukie Transit Center Clack. Town Ctr. Transit Center Downtown Portland
32 Oatfield	7:00 a.m.-7:30 p.m. Peak Off-peak	30 60	Sat: 9:30a.m.-5:30 p.m. Peak and Off-peak	60	Milwaukie Transit Center Clackamas Comm. College Downtown Portland Oregon City Transit Center
33 McLoughlin	4:30 a.m.-2:00 a.m. Peak Off-peak	15 30	Sat & Sun: 5:30 a.m.-1:30 a.m. Peak Off-peak	15 30	Clackamas Comm. College Downtown Portland Oregon City Transit Center Milwaukie Transit Center
34 River Rd	5:30 a.m.-8:00 p.m. Peak and Off-peak	60	No Service	N/A	Oregon City Transit Center Milwaukie Transit Center
70 12 th Ave	5:00 a.m.-11:00 p.m. Peak Off-peak	15 30	Sat & Sun: 8:30 a.m.-11:00 p.m. Peak Off-peak	15 60	Milwaukie Transit Center Lloyd Center Columbia River Correction Center

³ A headway is the amount of time between bus arrivals.

Existing Public Transit Service in Milwaukie					
Line # and Name	Weekday		Weekend		Destinations Served (partial list)
	Schedule	Approx. Headway (min.)	Schedule	Approx. Headway (min.)	
75 Cesar Chavez (39 th Ave)/Lombard	4:30 a.m.-1:30 a.m. Peak Off-peak	15 30	Sat & Sun: 5:30 a.m.-1:30 a.m. Peak Off-peak	15 30	Milwaukie Transit Center Milwaukie Providence Hospital St. Johns
99 McLoughlin Express	Peak only	20	No Service	N/A	Clackamas Comm. College Downtown Portland
152 Milwaukie Shuttle	6:30 a.m.-6:30 p.m. Peak Off-peak	30 60	No Service	N/A	Milwaukie Transit Center Clackamas Town Center Milwaukie Center

Milwaukie is divided into seven officially recognized Neighborhood District Associations (NDAs) and two business and industrial centers, each with varying levels of transit coverage. Table 3-2 summarizes the transit service and amenities available in the different neighborhoods. All of the neighborhoods in Milwaukie have access to transit, with some neighborhoods having more service than others. Research has shown that a transit rider will walk up to 1/4 mile to a transit stop.⁴ Figure 3-5 illustrates existing transit facilities.

Table 3-2 Neighborhood Service Routes and Public Transit Amenities

Neighborhood	Transit Route #'s	Stops	Facilities
Ardenwald	31, 75, 28	39	2 Shelters
Hector Campbell	31	12	No Extra Facilities
Historic Milwaukie	29, 31, 32, 33, 34, 70, 75, 99, 28, 152	36	1 Transit Center with Shelters 1 park-and-ride
Island Station	33, 34, 99	13	No Extra Facilities
Lake Rd	29, 32	30	No Extra Facilities
Lewelling	28, 31, 75	30	No Extra Facilities
Linwood	28, 31	26	No Extra Facilities
McLoughlin Industrial	31, 32, 33, 99	17	3 Shelters
Milwaukie Business & Industrial	31, 152	22	No Extra Facilities

Milwaukie's bus transit center is located in downtown Milwaukie on the blocks surrounding City Hall. In addition to the transit center, a single shared-use park-and-ride is located along Lake Rd south of downtown. TriMet has plans to construct a second park-and-ride facility on Main St at the former Southgate Theater site. Currently there are only six shelters provided within Milwaukie. TriMet typically considers locating transit shelters at stops with 35 or more boardings

⁴ Planning Commission TOD Committee, Walking Distance Research, http://www.fairfaxcounty.gov/planning/tod_docs/walking_distance_abstracts.pdf, Fairfax County, Virginia.



Transportation System Plan

FIGURE 3-5

TRANSIT ROUTES AND SHELTERS

November 2013

LEGEND

Transit Facilities

Bus Routes
< 30 Min. Frequency

Bus Routes
> 30 Min. Frequency

TC Transit Center

● Stop

● Shelter

P Park-and-Ride

Light Rail Station

Light Rail Transit

Other Map Features

Schools

Kellogg Creek Trail

Springwater Trail

Trolley Trail

Water

Parks

Major Roads

Streets

Railroad

County Line

City Limits

Neighborhood District Associations

ARDENWALD

HECTOR CAMPBELL

HISTORIC MILWAUKIE

ISLAND STATION

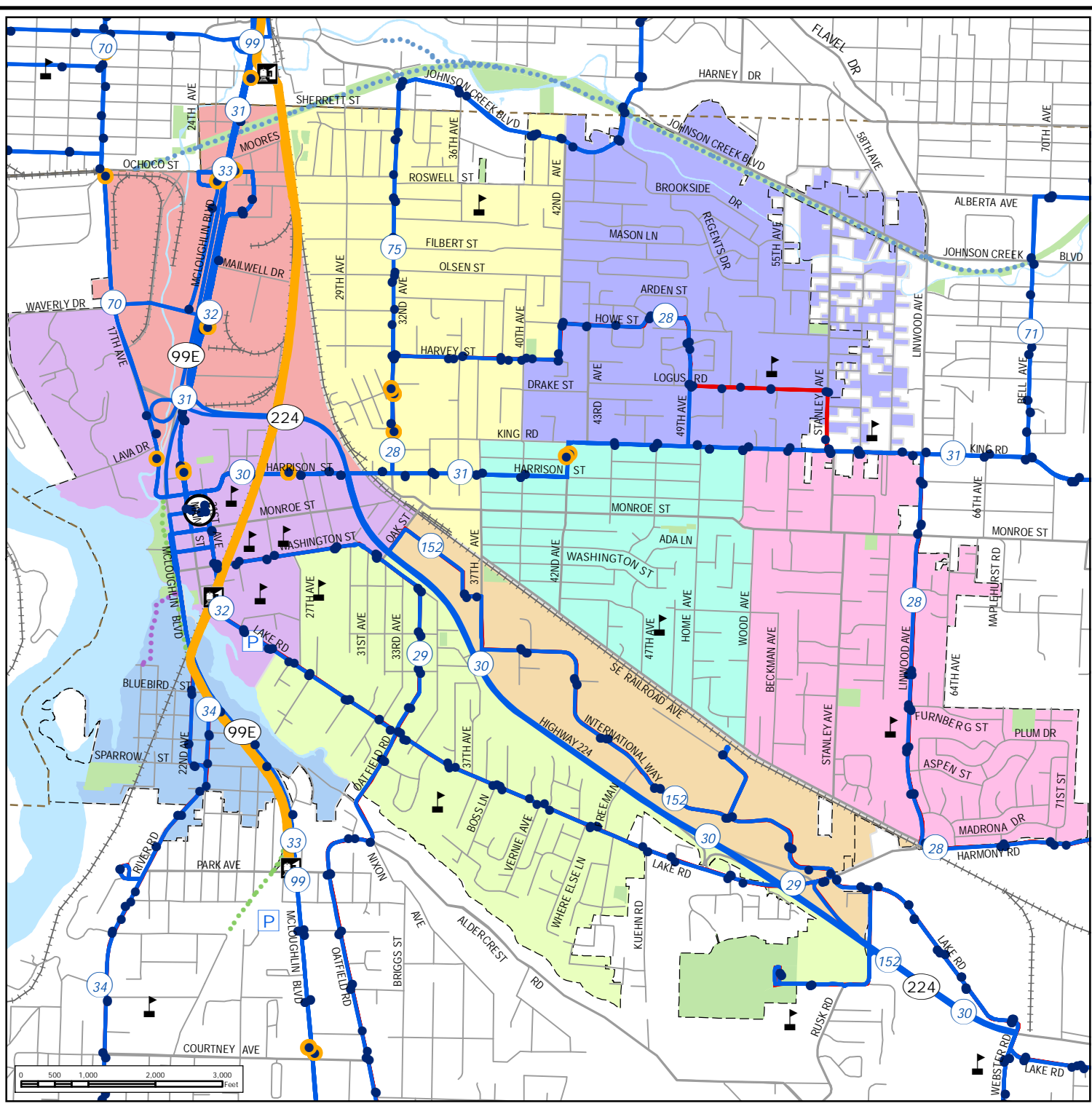
LAKE ROAD

LEWELLING

LINWOOD

MCLOUGHLIN INDUSTRIAL

MILWAUKIE BUSINESS INDUSTRIAL



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per day.⁵ One stop meets this minimum boarding threshold, but does not offer a shelter.⁶ This stop is located near the intersection of Harrison St and 24th Ave.

Transit service quality, or its Level of Service (LOS), is measured as the headway between arriving buses. Headway is the average amount of time that a person could expect to wait to catch a bus. For instance, a transit service with a low headway (<10 min) provides a high LOS ("A"), because vehicles are arriving frequently (approximately 1 vehicle every 10 minutes). The average headways and corresponding LOS (based on the *Highway Capacity Manual* methodology⁷) for each of the routes serving Milwaukie are listed in Table 3-3.

Table 3-3 TriMet Service Routes and Weekday Peak Period Level of Service

Line # and Name	Average Headway (minutes)			Level of Service (LOS) (based on headways)		
	a.m.	Midday	p.m.	a.m.	Midday	p.m.
28 Linwood	62	71	75	F	F	F
29 Lake/Webster Rd	62	71	76	F	F	F
31 King Rd	28	28	29	D	D	D
32 Oatfield	36	58	30	E	E	E
33 McLoughlin	18	20	18	C	D	C
34 River Rd	70	72	70	F	F	F
70 12 th /NE 33 rd Ave	18	19	17	C	C	C
75 Cesar Chavez/Lombard	14	17	13	B	C	B
99 McLoughlin Express	26	*	21	D	*	D
152 Milwaukie	36	69	27	E	F	D

Note: a.m. period = 06:00-08:30, Midday period = 08:30-16:00, p.m. period = 16:00-18:00

Level of Service (LOS) for transit service based on headway:

- **LOS A** = less than 10 minutes
- **LOS B** = 10-14 minutes
- **LOS C** = 14-19 minutes
- **LOS D** = 20-29 minutes
- **LOS E** = 30-60 minutes
- **LOS F** = greater than 60 minutes

*No service.

Special Transit Services

Special transit services are available to residents of Milwaukie through the Milwaukie Center Transportation Program, and TriMet Lift Program. The Milwaukie Center Transportation Program is part of the Clackamas County Transportation Consortium, which is dedicated to providing coordinated transportation services to seniors and ADA-eligible persons. Transit opportunities are also available to the residents of Hillside Manor and Hillside Park, a low-income housing area located near the corner of Hillside Court and 32nd Ave. The Milwaukie Center, located within North Clackamas Park, is a community center that offers different social services and a place for social gatherings. The different transit programs available through the Milwaukie Center include:

- **The Dial-a-Ride program**, which offers rides to service area residents who are over age 60 or disabled. The service offered is available within the city of Milwaukie and its urban growth boundary, and runs between locations, such as the Milwaukie Center, shopping locations, and the residents' homes.

⁵ *Design Criteria*, TriMet, August 2002.

⁶ Based on Fall 2006 weekday bus boarding information as provided by TriMet.

⁷ *2000 Highway Capacity Manual*, Transportation Research Board, 2000, Chapter 27.

- **The Transportation Reaching People (TRP) program**, which is a volunteer service available to seniors and people with disabilities, and consists of drivers from Clackamas County Volunteer Connection. It takes people to their appointments on a donation basis.
- **The Catch-a-Ride program**, which offers similar services to residents of Hillside Manor, Hillside Park, and other Milwaukie area residents. It serves a number of different locations within the city, including the Milwaukie Transit Center and Clackamas Town Center.

TriMet, the primary public transportation provider in the region, has a special transit program available to Milwaukie residents:

- **The TriMet Lift program**, which provides small bus transportation services that are equipped to handle persons with disabilities. Those eligible for program services have physical or mental disabilities that prevent their use of fixed-route transit service (as required by the Americans with Disabilities Act). This service is available seven days per week and the TriMet service area is a 0.75-mile radius around existing bus routes. Eligible users are to call in advance to schedule for Lift Program pick-up.

Summary of Public Transit Findings

The following summarizes key transit findings related to the level of activity and deficiencies documented for this mode of travel. These findings will be utilized to help guide how future improvements can address the deficiencies for this mode of travel.

- The majority of Milwaukie is served by some form of transit that is accessible within 1/4 mile of transit stops provided by TriMet, with the exception of an area to the east bounded by Railroad Ave to the south, 42nd Ave to the west, Monroe St to the north and Stanley Ave to the east. The existing railroad line that parallels Hwy 224 in this area restricts transit accessibility to the south for this area, and existing transit routes that run along Linwood Ave and King Rd are beyond the 1/4-mile radius that a pedestrian would typically travel to access transit. A second area in the northeast corner of Milwaukie, roughly centered on Johnson Creek Blvd and 55th Ave, lacks adequate transit service. This area includes many of the properties that recently annexed into the city.
- In total, approximately 15% of land coverage in Milwaukie does not have access to transit within 1/4 mile of existing transit stops, with approximately half of that lacking coverage occurring in the area identified above.
- Generally, Milwaukie is served with headways (time between buses) along existing transit routes of 30 minutes or better. However, some roadways have headways longer than 30 minutes. These facilities are: Lake Rd, Oatfield Rd, Linwood Ave, International Way, and Harvey St/Logus Rd.
- There are currently six transit stops that have shelters. Two additional stops have existing ridership that meet TriMet's standard for placing shelters:
 - Harrison St/24th Ave
 - 42nd Ave/Llewellyn St

MOTOR VEHICLES

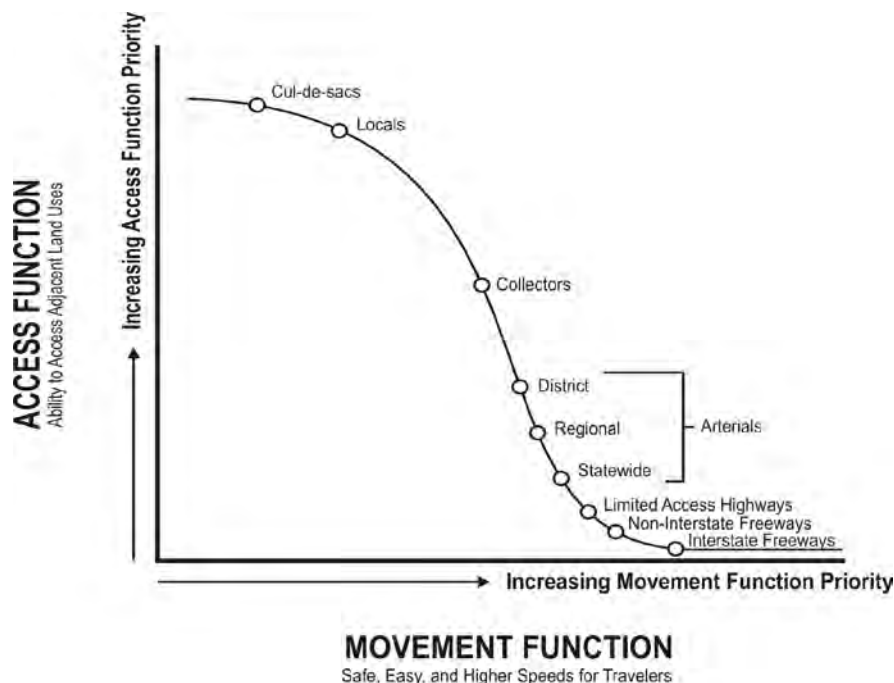
The following section addresses all aspects of the motor vehicle network throughout Milwaukee. The topics addressed include:

- Roadway functional classification
- Roadway characteristics
- Motor vehicle volume
- Measures of effectiveness
- Safety
- Heavy vehicles

Roadway Functional Classification

The functional classification system is designed to serve transportation needs within the community. The schematic diagram below illustrates the competing functional nature of a roadway facility as it relates to access, mobility, multimodal transport, and facility design. The diagram is useful for understanding how worthwhile objectives can have opposing effects. For example, as mobility is increased (bottom axis), the provision for nonmotor vehicle modes is decreased accordingly. Similarly, as access increases (left axis), the facility design dictates slower speeds, narrower travel-ways, and nonexclusive facilities. The goal of selecting functional classes for particular roadways is to provide a suitable balance of these two competing objectives.

Figure 3-6: Functionality of Access versus Movement



The diagram above shows that as street classifications progress from local, to collector, to arterial, to freeway (top left corner to bottom right corner) the following occurs:

- **Mobility Increases:** As the level of mobility increases, the distance between destinations as well as the proportions of freight and through traffic generally increases.

- **Integration of Pedestrian and Bicycle Facilities Decreases:** Provisions for adjoining sidewalks and bike facilities are required up through the arterial class; however, the frequency of intersection or midblock crossings for nonmotorized vehicles steadily decreases with higher functional classes. Expressway and freeway facilities typically do not allow pedestrian and bike facilities adjacent to the roadway, and any crossings are grade-separated to enhance mobility and safety.
- **Access Decreases:** As mobility increases, access to parking, loading, and land are reduced.
- **Facility Design Standards Increase:** Roadway design standards increase in technical complexity to accommodate wider and faster facilities for exclusive use by motor vehicles. The opposite end of the scale is the most basic two-lane roadway with unpaved shoulders that requires minimal technical design.

The existing Milwaukie functional class system for roadway facilities is shown in Figure 3-7. A street-by-street comparison to ODOT, Metro and the City of Milwaukie classifications for arterial and collector streets is shown in Table 3-4. Additionally, Table 3-4 compares the right-of-way (ROW) width to the actual pavement width for each facility.



Transportation System Plan

FIGURE 3-7

FUNCTIONAL CLASSIFICATION

November 2013

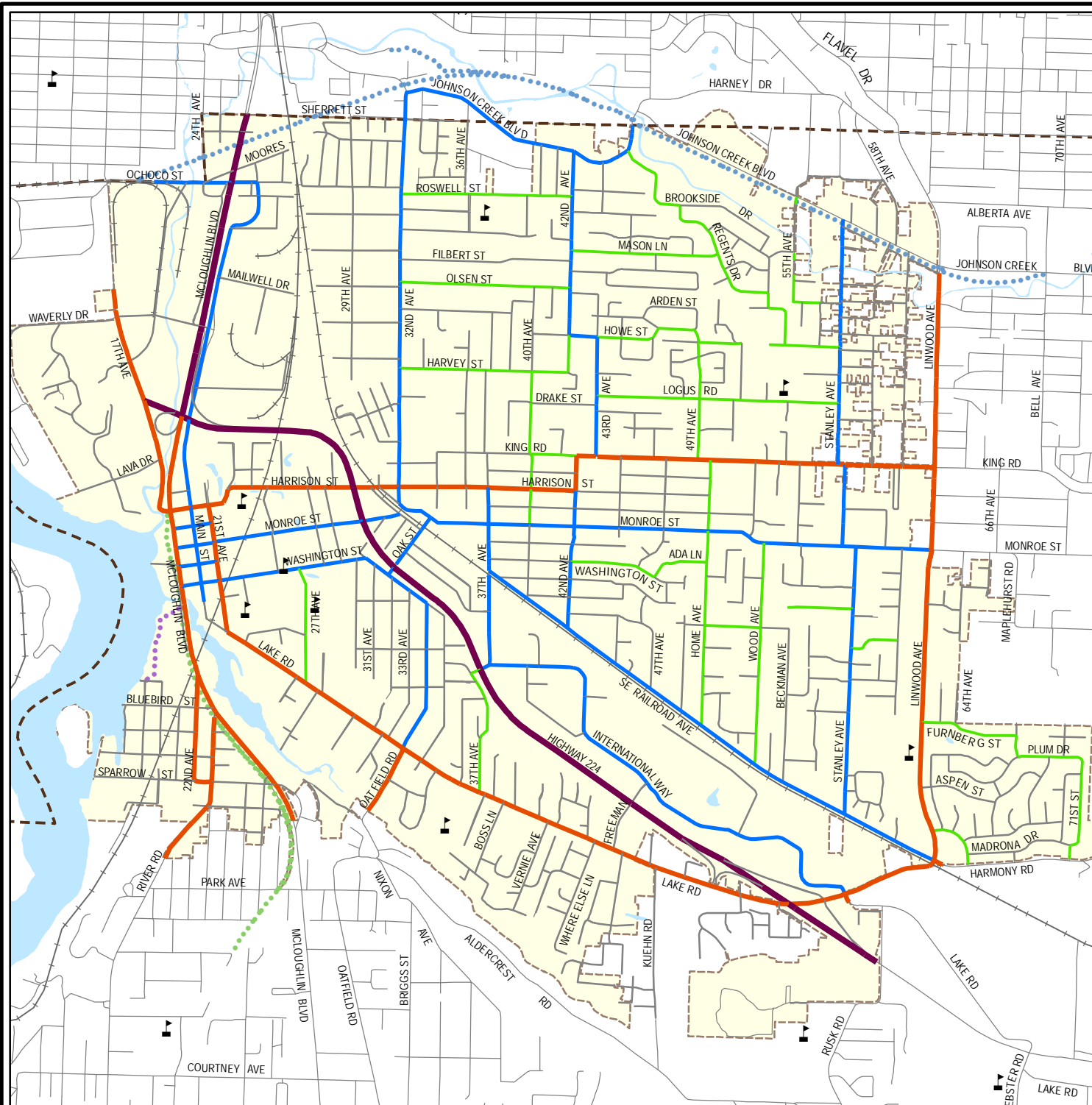
LEGEND

Functional Classification

- Regional Routes
- Arterials
- Collectors
- Neighborhood Routes
- Local

Other Map Features

- Schools
- Kellogg Creek Trail
- Springwater Trail
- Trolley Trail
- Railroad
- County Line
- Water
- City Limits



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

Table 3-4 Functional Classification Comparison Arterial and Collector Streets

Roadway	ODOT	Metro	Clackamas County	City of Milwaukie	ROW/ Pavement Width (ft)
McLoughlin Blvd	Urban Principal Arterial—Other	Principal Arterial (Highway)/ Major Arterial	Major Arterial	Freeway/ Regional Route	110-120/ 65-140
Hwy 224	Urban Principal Arterial—Other Fwy or Expy	Principal Arterial (Highway)	Freeway/ Expressway	Freeway/ Regional Route	165/80-100
17 th Ave	—	—	Minor Arterial	Arterial	35-60/60
21 st Ave	—	Minor Arterial	Minor Arterial	Arterial	60/45
22 nd Ave	—	—	Minor Arterial	Arterial	60/25-40
Harrison St	—	Minor Arterial	Minor Arterial	Arterial	60/20-50
Harmony Rd	—	Major Arterial	Major Arterial	Arterial	60/35-60
Johnson Creek Blvd	—	—	Minor Arterial	Arterial	60/30-50
King Rd	—	Minor Arterial	Minor Arterial	Arterial	60/20-50
Linwood Ave	—	Minor Arterial	Minor Arterial	Arterial	60/35-50
Lake Rd	—	Minor Arterial	Minor Arterial	Arterial	60/30-60
Oatfield Rd	—	Minor Arterial	Minor Arterial	Arterial	60/35-40
Railroad Ave	—	Minor Arterial	Collector	Collector	60/20-35
River Rd	—	—	Minor Arterial	Arterial	60/20-35
32 nd Ave	—	—	Collector	Collector	60/25-40
34 th Ave	—	—	Collector	Collector	60/35-40
37 th Ave	—	—	Local	Collector/ Neighborhood Route	60/30-40
42 nd Ave	—	—	Collector	Collector/ Neighborhood Route	60/30-35
43 rd Ave	—	—	Collector	Collector	40-60/25-30
Bell Ave	—	—	Collector	Collector	60/30-40
Home Ave	—	—	Local	Neighborhood Route	50/20-25
Jackson St	—	—	Collector	Collector	60-80/15-60
Jefferson St	—	—	Collector	Collector	50-70/20-45
Main St	—	—	Collector	Collector	80/30-55
Monroe St	—	—	Collector	Collector	60-70/20-45
Oak St	—	—	Collector	Collector	60/35-50
Rusk Rd	—	—	Collector	Collector	40/25-30
Stanley Ave	—	—	Collector	Collector	60/20
Washington St	—	—	Collector	Collector	60/20-40

Sources: ODOT, Oregon Highway Plan, 1999, and Metro, 2010 Regional Transportation Plan (RTP), Regional System Concepts and Policies.

Figure 3-8 illustrates roadway ownership and maintenance of the various roads in Milwaukie. McLoughlin Blvd and Hwy 224 are State facilities. Hwy 224 is classified as a Principal Arterial. McLoughlin Blvd is classified as a Principal Arterial north of Hwy 224 and a Major Arterial south of Hwy 224. As such, the preferred regional mobility route through Milwaukie from Portland is along McLoughlin Blvd to Hwy 224, and along Hwy 224 to I-205 and destinations outside of the

city of Milwaukie. The majority of arterial and collector roadways outside the city limit but within the city's Urban Growth Management Area are owned and operated by Clackamas County or ODOT. The City is responsible for the majority of the roads inside the city limits.

Roadway Characteristics

Field inventories of posted speed limits, number of roadway lanes, and intersection controls were conducted to determine characteristics of major roadways in the TSP study area. These characteristics define roadway capacity and operating speeds through the street system, which affect travel path choices for drivers in Milwaukie.

Posted Speed Limits

A limited inventory of the posted speeds in Milwaukie can be seen in Figure 3-9. Collector roadways such as King Rd, Railroad Ave, and Monroe St have posted speeds ranging from 25 to 40 miles per hour (mph). The majority of local access roadways in Milwaukie are posted at 25 mph. Arterial roadways such as McLoughlin Blvd, Hwy 224, and Johnson Creek Blvd are posted at higher speeds ranging from 30 to 50 mph.

Intersection Controls

Figure 3-10 illustrates the existing intersection controls at major roads in Milwaukie. Traffic signals exist mainly along McLoughlin Blvd and Hwy 224. Harrison St, Lake Rd, and Linwood Ave have a few signals and one of the intersections along Johnson Creek Blvd is also signalized. The study intersections for this TSP Update include eighteen signalized intersections and four intersections without signals.

Roadway Width

The widest roadways are McLoughlin Blvd and Hwy 224. Harrison St widens near Hwy 224, but is primarily a two-lane road. King St has three lanes, as do some sections of Lake Rd. The remaining roads in the city are one or two lane roads.

Stormwater Management

A roadway is not only limited to what can be seen on the surface; there are also other aspects which can affect a roadway's performance and longevity, such as its the base, the materials and methods used in construction, and drainage features. Many of these topics go beyond the scope of a transportation system plan; however, the issue of drainage will be briefly touched upon. A properly designed, constructed, and maintained stormwater drainage system—which can include a combination of gutters, curbs, storm drains, and storm sewers—minimizes water pollution and reduces the risk of flooding and erosion that can interrupt functioning of the transportation system.

Figure 3-11 shows the locations of the City of Milwaukie's stormwater system. This map also shows locations identified by City staff where rainwater drainage has been problematic. Many of these locations correlate to streets with no gutters, curbs, or sidewalks. Railroad Ave, for instance, has drainage issues along its length from 37th Ave nearly to Linwood Ave. Many of the streets with drainage issues do not have curbs, gutters, or sidewalks. However, there are many other locations throughout the city that do not have these amenities and do not have drainage issues.



Transportation System Plan

FIGURE 3-8

ROADWAY JURISDICTION

November 2013

LEGEND

Jurisdiction

- State of Oregon
- Clackamas County
- City of Portland
- Joint Milwaukie/Portland
- Private

NOTE: All other roads within Milwaukie are under authority of the City.

Other Map Features

- Schools
- Major Roads
- Streets
- Railroad
- Kellogg Creek Trail
- Springwater Trail
- Trolley Trail
- County Line
- Water
- Parks
- City Limits
- Light Rail Station
- Light Rail Transit



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



Transportation System Plan





FIGURE 3-9

POSTED SPEED INVENTORY

November 2013



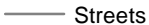




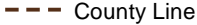



LEGEND

Speed Limits

-  30
-  35
-  40
-  45
-  50

NOTE: All other roads assumed to be 25 MPH.

Other Map Features

-  Schools
-  Major Roads
-  Streets
-  Railroad
-  Kellogg Creek Trail
-  Springwater Trail
-  Trolley Trail
-  County Line
-  Water
-  Parks
-  City Limits

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





Transportation System Plan

FIGURE 3-10

INTERSECTION CONTROLS

November 2013

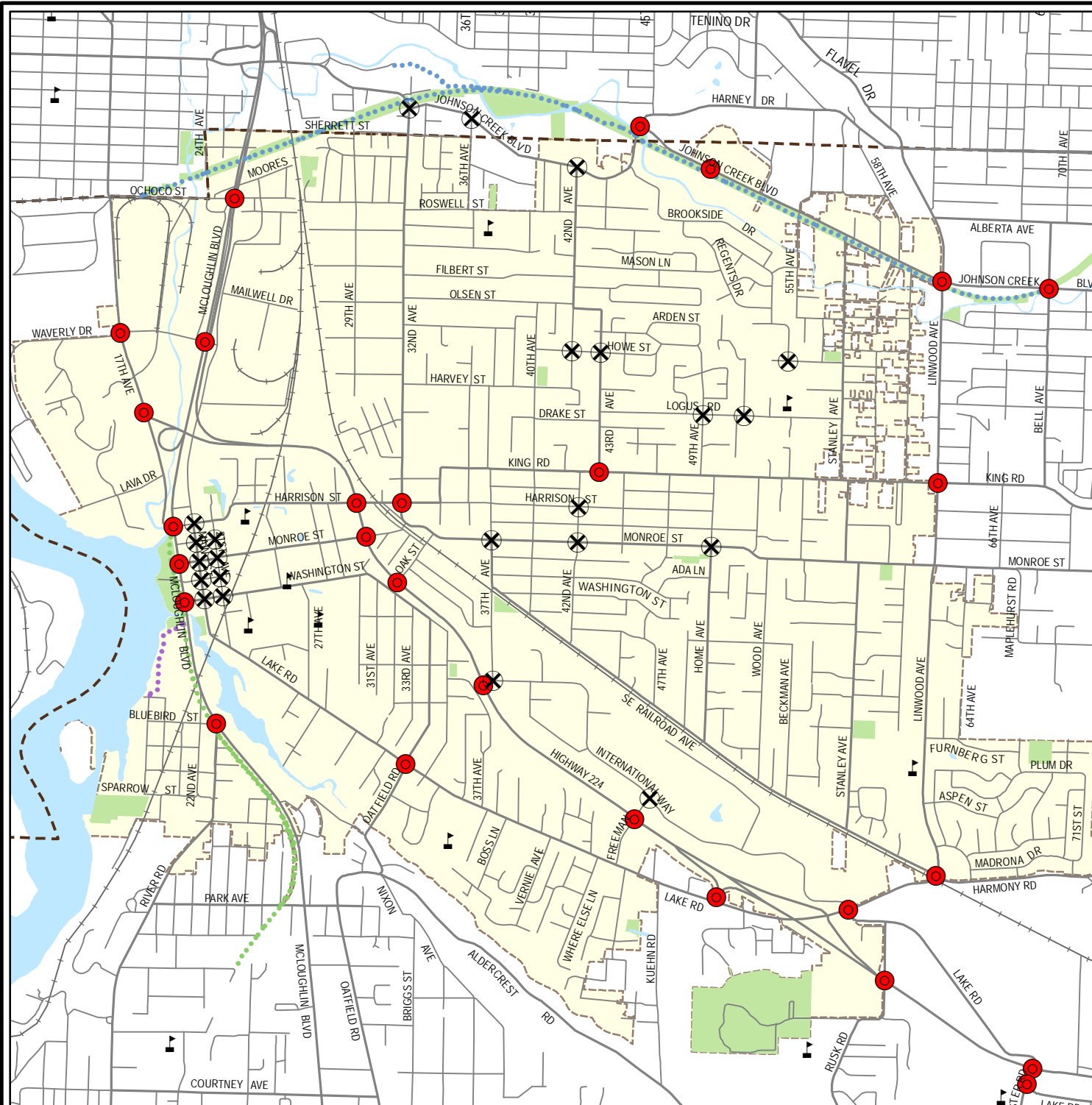
LEGEND

Intersection Control

- All-Way Stop
- Signalized

Other Map Features

- Schools
- Kellogg Creek Trail
- Springwater Trail
- Trolley Trail
- Major Roads
- Streets
- Railroad
- County Line
- Water
- Parks
- City Limits



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



Transportation System Plan

FIGURE 3-11

STORMWATER AND TOPOGRAPHY

November 2013

LEGEND

Stormwater Features

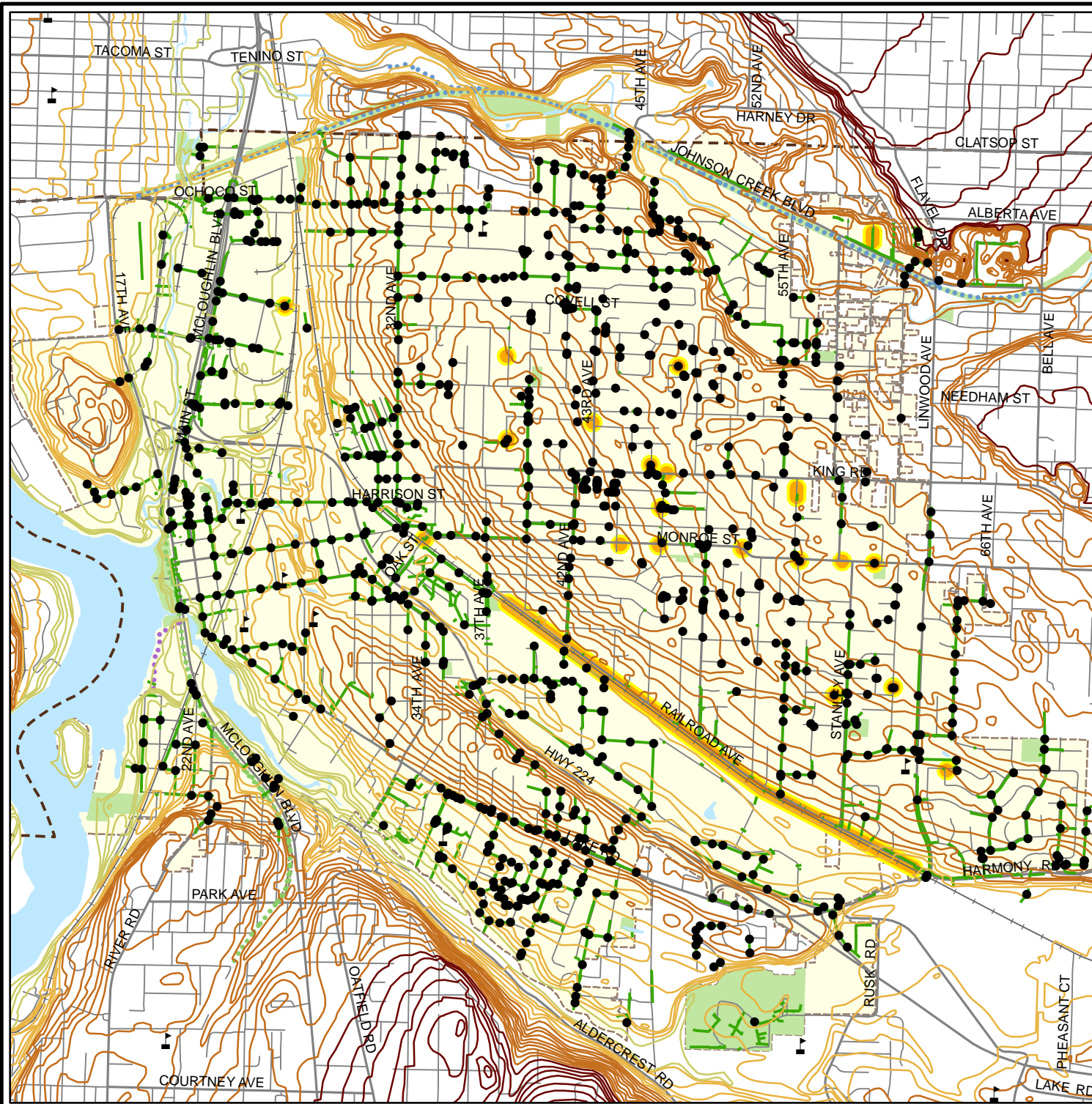
- Manholes and Drywells
- Pipes
- Locations with Drainage Issues

Elevation Above Sea Level

- < 50 feet
- 50 - 100 feet
- 100 - 200 feet
- > 200 feet

Other Map Features

- Schools
- ⋯ Kellogg Creek Trail
- ⋯ Springwater Trail
- ⋯ Trolley Trail
- Major Roads
- Streets
- Railroad
- - - County Line
- Water
- Parks
- City Limits



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

Pavement Conditions

The City of Milwaukie has conducted an extensive visual inspection of its roadways as part of an ongoing Pavement Management System (PMS). PMS is a tool for making cost-effective decisions about pavement maintenance and rehabilitation. Pavement conditions are recorded in the TSP to document existing conditions, but no recommendations are made about the schedule of surface maintenance projects. The PMS tool is utilized by the Street Surface Maintenance Program (SSMP), which was established in 2006 to fund the assessment, maintenance, and repair of street surfaces in the city. It is the function of the SSMP to determine the schedule of surface maintenance projects. Figure 3-12 shows the location and extent of current, completed, and future SSMP projects.

As part of the ongoing SSMP project selection process, sections of a roadway have been rated on a Pavement Condition Index (PCI), a scale that rates a roadway's condition from 0 to 100. High numbers correlate to newer streets in good condition (70-100), while lower numbers (50 or less) indicate roads that have deteriorated to the point of needing rehabilitation or replacement. Milwaukie's complete PCI survey is updated on an annual basis.

An average PCI was calculated for the three different city street classifications—arterial, collector, and residential/local—based on the length of street covered by a specific PCI rating. These findings are summarized in Table 3-5. From the table, it can be seen that, on average, the road condition for all three street types is relatively close. On average, arterial streets have the highest rating, followed by collectors and then residential/local streets.

Table 3-5 Average Pavement Condition Index

Classification	Length (lane miles)	Average Pavement Condition Index
Arterial	12.23	78
Collector	24.97	64
Residential/Local	111.1	58

Source: City of Milwaukie PCI Survey, 2013

Table 3-6 lists the breakdown of PCI ratings throughout the city for each street type by length of roadway and percentage. This more detailed look into the pavement condition shows that the majority of the arterial (73.1%), collector (61.8%) and residential/local (61.8%) streets can be considered in good to excellent condition. Over half of Milwaukie's streets rank in the very good to good category. In general 36%, or 26.73 miles, of the streets in the city are considered to be in poor to very poor condition. The street sections with the lowest PCI included Maple Ct, 56th Ave, and Lloyd St.

Table 3-6 Pavement Condition Index Rating by Functional Classification

Rating (PCI Score)	Street Type (as rated by segment)			
	Arterial	Collector	Residential/Local	Total
Very Good (85-100)	61.7%	44.4%	45.4%	46.4%
Good (70-85)	11.4%	25.3%	16.4%	17.5%
Poor (50-70)	6.9%	26.7%	14.8%	16.3%
Very Poor (0-50)	20%	3.6%	23.4%	19.8%

Source: City of Milwaukie PCI Survey, 2013



Transportation System Plan

FIGURE 3-12

LOCATION OF STREET SURFACE MAINTENANCE PROGRAM (SSMP) PROJECTS

November 2013

LEGEND

- Current SSMP Projects (FY 13/14')
- Future SSMP Projects
- Completed SSMP Projects

Other Map Features

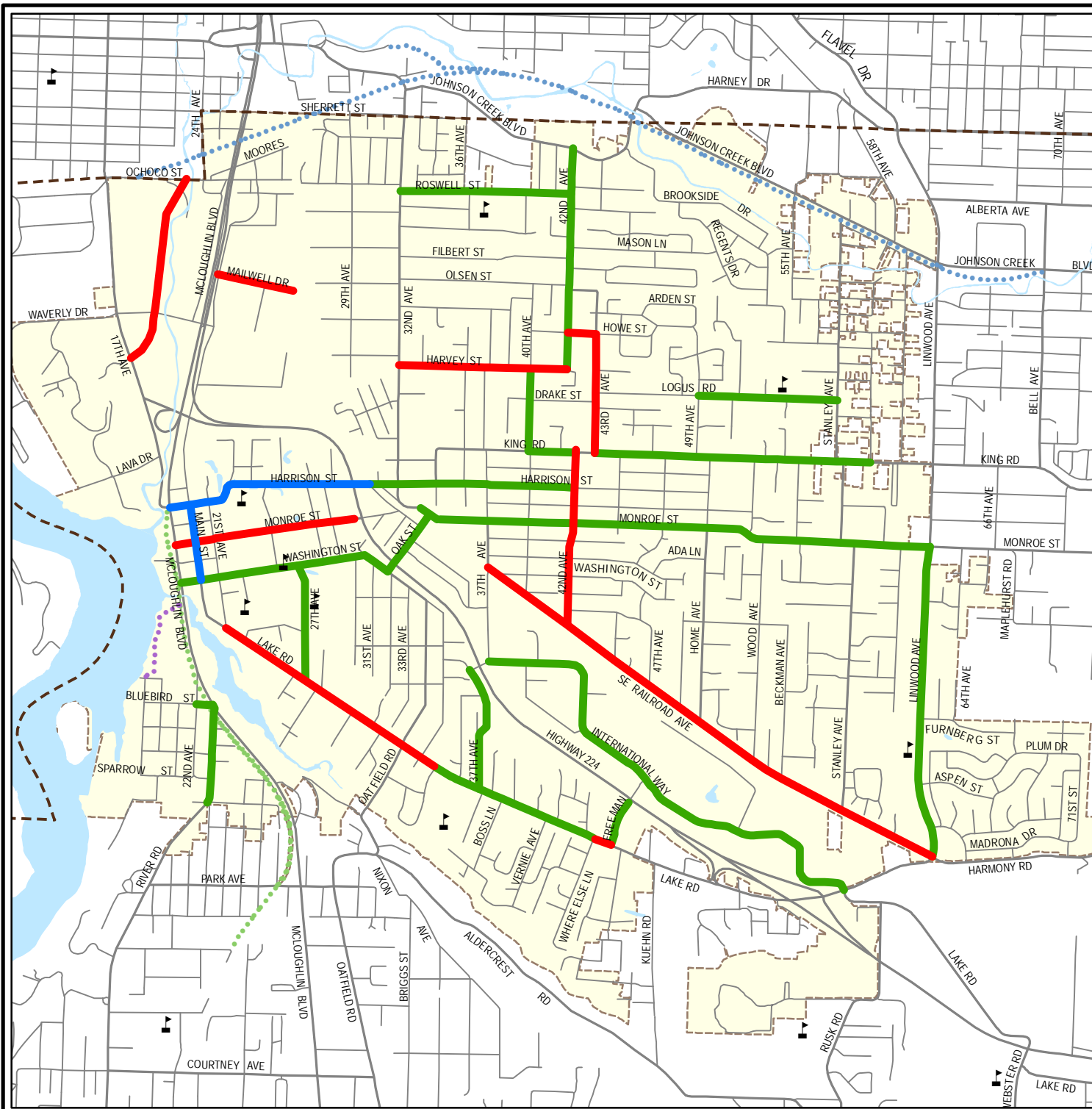
- Schools
- Kellogg Creek Trail
- Springwater Trail
- Trolley Trail
- County Line
- Water
- Major Roads
- City Limits

*Current as of November 2013. Location and extent of future projects subject to change.

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



Motor Vehicle Volume

Twenty-four-hour traffic count data was collected at select locations within the city. It is useful to analyze this data to determine traffic flow throughout the day on the transportation network. Figure 3-13a is an hour-by-hour breakdown of traffic volumes along McLoughlin Blvd and Hwy 224, and shows two distinct peaks in traffic volumes on the Milwaukie's two highest traffic volume streets.⁸ These two peaks represent the a.m. and p.m. peak commuter traffic. The traffic volumes observed on McLoughlin Blvd show the typical a.m. and p.m. peak spike in commuter vehicular traffic demand. Hwy 224 also shows a.m. and p.m. peak spikes in demand, it is however unusual that the a.m. peak hour is greater than the p.m. peak hour. This type of travel pattern is unusual, because the a.m. peak hour usually consists of commuter traffic, whereas, the p.m. peak hour traffic volume contains many of the a.m. commuters, as well as those with retail and other miscellaneous destinations.

Figure 3-13b shows the 24-hour, two-way existing traffic volumes on streets in Milwaukie from 2005 and 2006. The locations of these counts correspond to locations counted on an annual basis by ODOT⁹ and/or Clackamas County.¹⁰ When compared to 24-hour traffic counts taken for the 1997 TSP, there has been growth on many of the streets within city limits. Figure 3-13c shows the location and change in traffic volume at select locations recorded in 1995 (basis for 1997 Milwaukie TSP).

In addition, an inventory of peak-hour traffic counts at study area intersections was conducted in the Fall/Winter of 2006. The traffic turn movement counts establish baseline information for future monitoring and identify current existing problem areas. Turn movement counts were conducted at twenty-two intersections during the evening peak period (4:00-6:00 p.m.) to determine existing operating conditions and are shown in Figures 3-14a and 3-14b. The p.m. peak-hour turn movements are useful when analyzing the operational characteristics of an intersection, since they generally represent the hour of highest traffic volume demand. It is assumed that if an intersection operates sufficiently during the p.m. peak hour it will operate sufficiently during the rest of the day. Study intersections were chosen in coordination with the City staff to address major roadways and noted areas of concern.

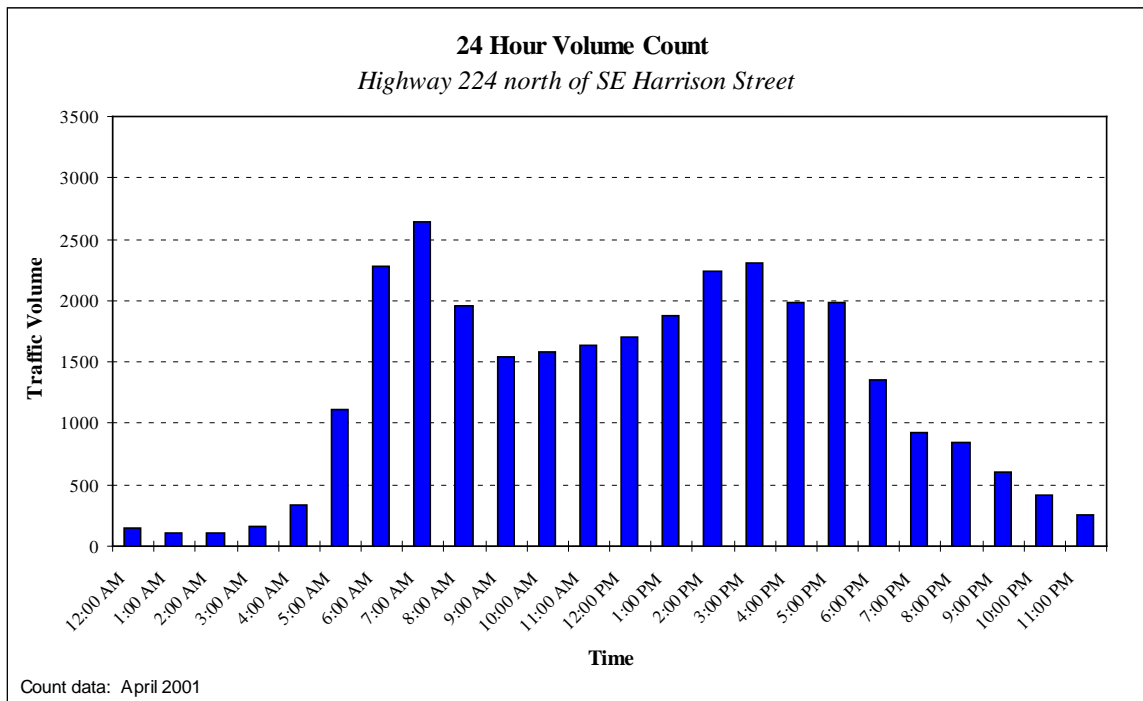
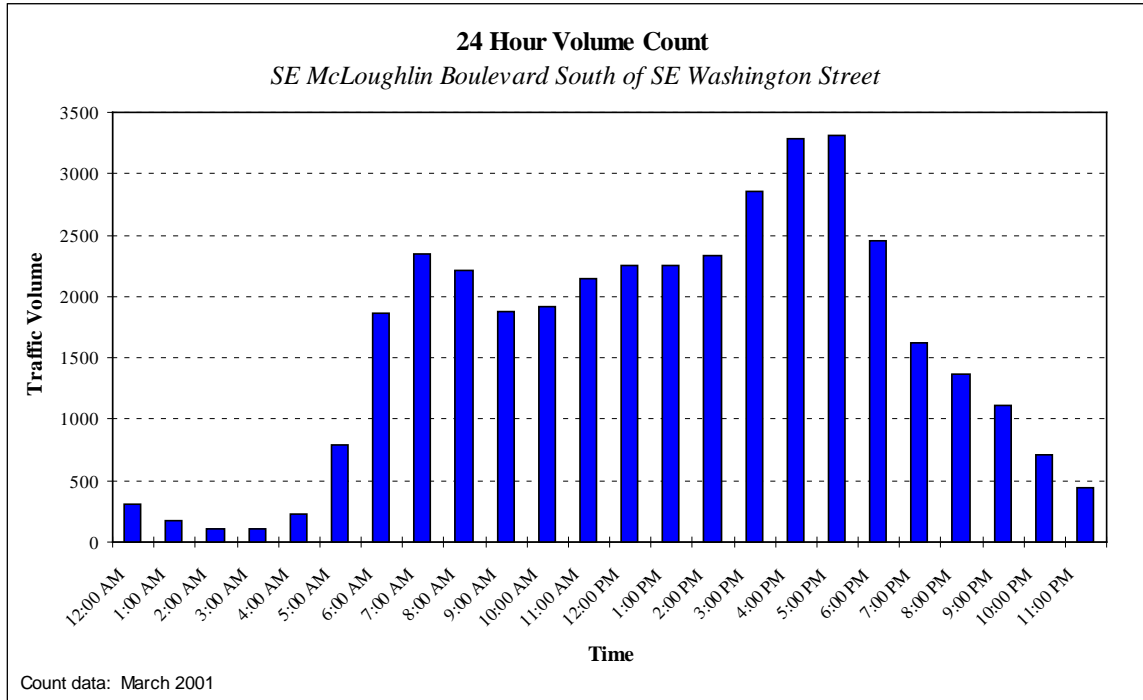
The p.m. peak-hour signal warrants were evaluated for all study area intersections without signals. The intersections of Harrison St/Main St and 32nd St/Johnson Creek Blvd both met the p.m. peak-hour signal warrants. This indicates that further study of these intersections is recommended to see if they would meet other ODOT required signal warrants. The peak-hour warrants can be found in Appendix G.

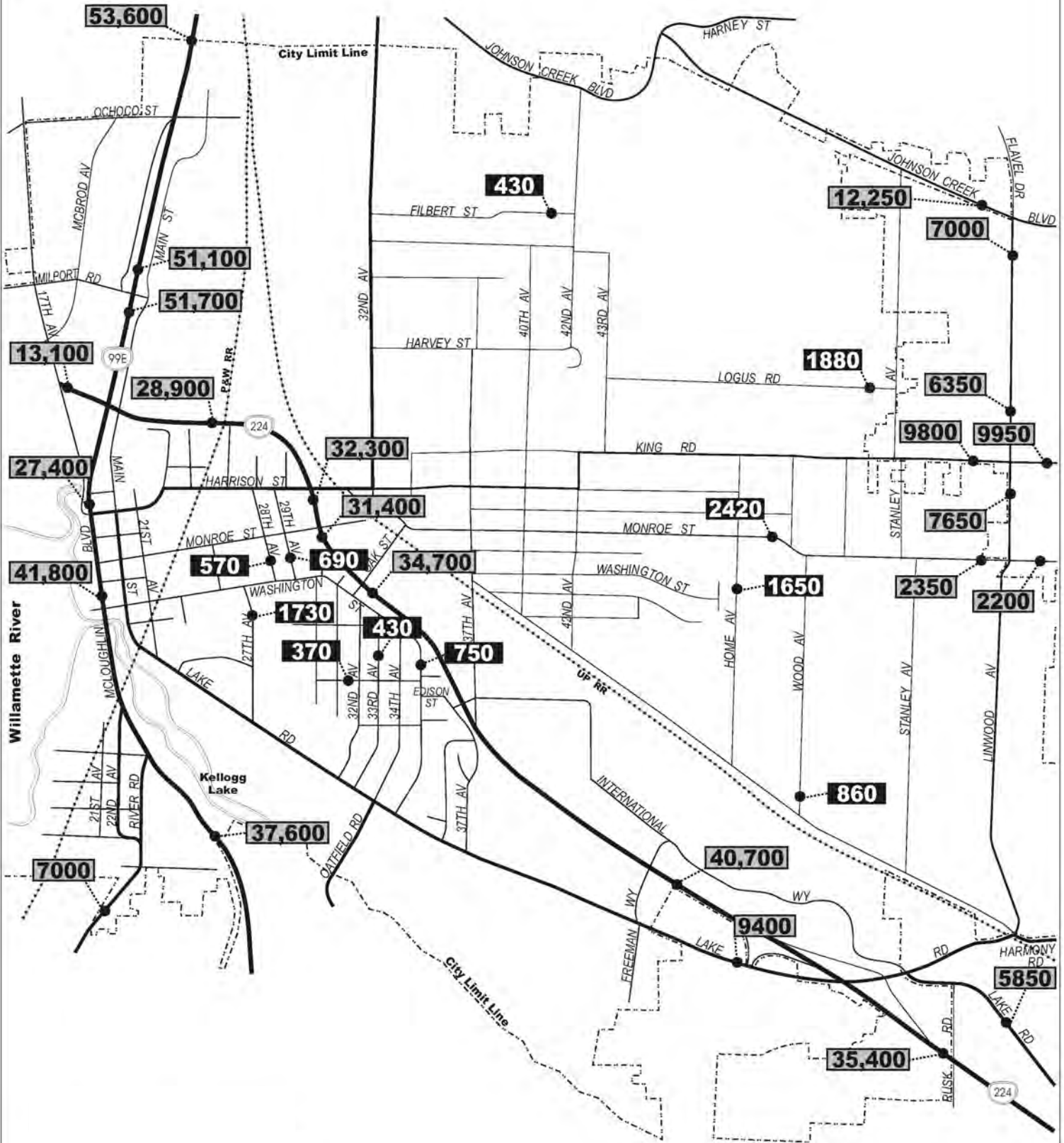
⁸ The 24-hour tube count data was collected in 2001 and was not refreshed as part of the 2007 update. Analysis of available data from Clackamas County and ODOT as well as from the PMLR project demonstrated that there have been no significant changes overall in traffic volumes since 2006-07. It was not necessary to refresh these data at this time; a more extensive update to the TSP in the future should revisit this issue.

⁹ ODOT Annual Traffic Counting Program.

¹⁰ Clackamas County Annual Traffic Counting Program.

Figure 3-13a 24-Hour Tube Count Data on McLoughlin Blvd and Hwy 224





LEGEND

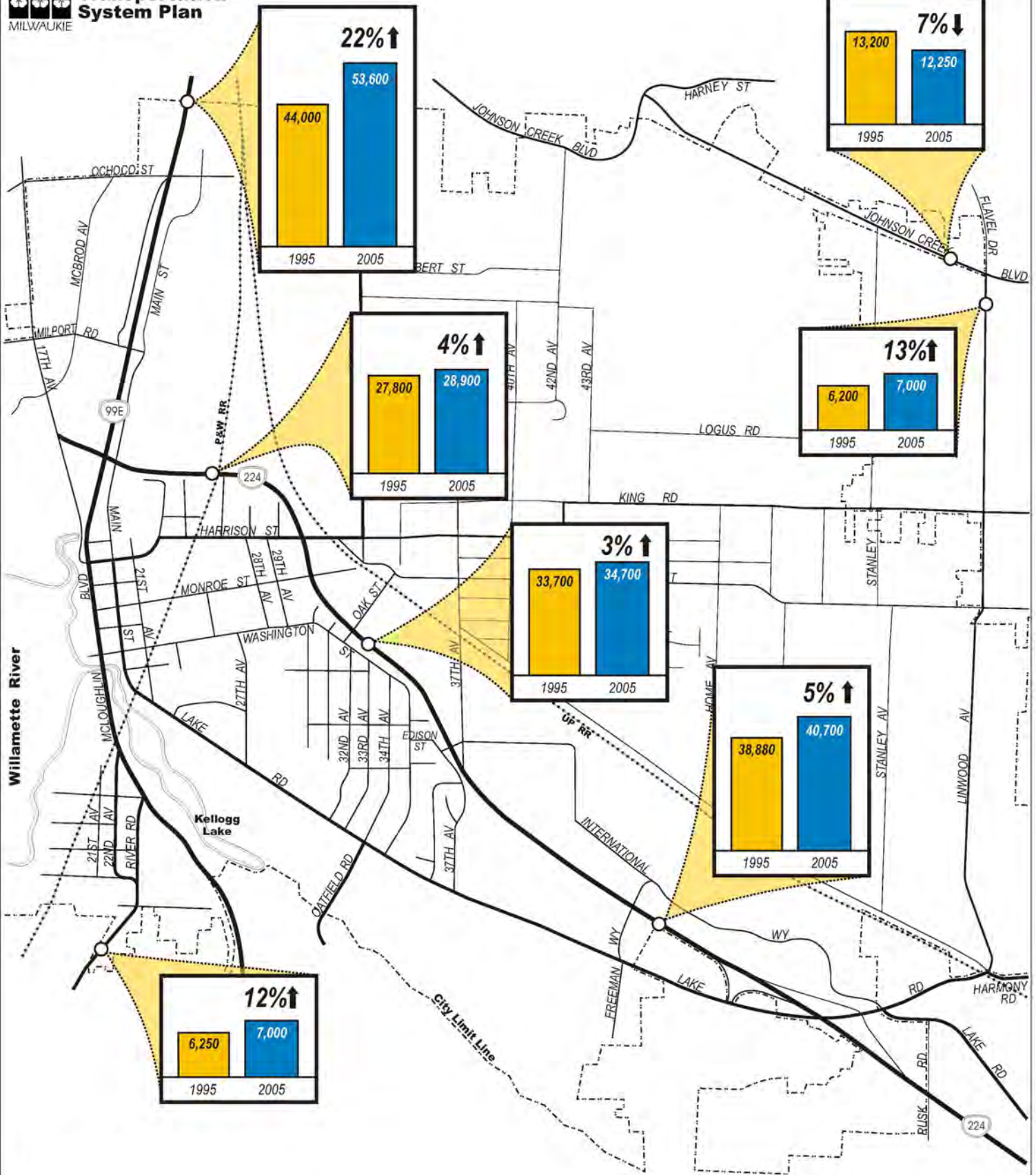
- 24 Hour Count Volume & Count Location (Fall 2006)
- 24 Hour Count Volume & Count Location (2005)

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Figure 3-13b

24 HOUR COUNT VOLUMES



LEGEND

- 00 - 24 Hour Count Volume (1995)
- 00 - 24 Hour Count Volume (2005)

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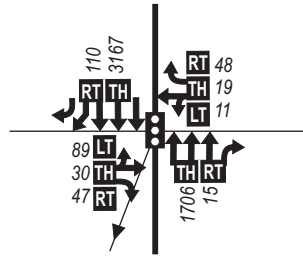


Figure 3-13c

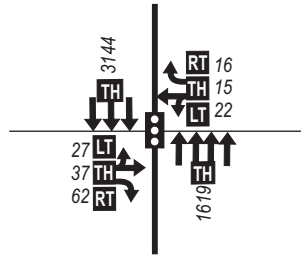
24 HOUR COUNT VOLUMES
HISTORIC COMPARISON

March 2007

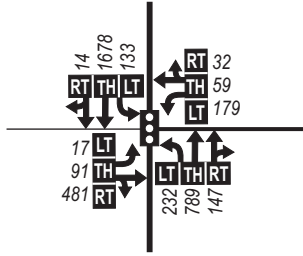
1 SE McLoughlin Blvd @ SE Ochoco St



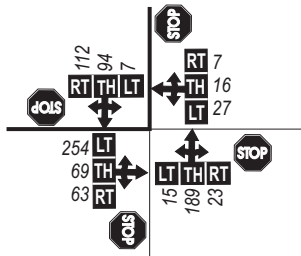
2 SE McLoughlin Blvd @ SE Milport Rd



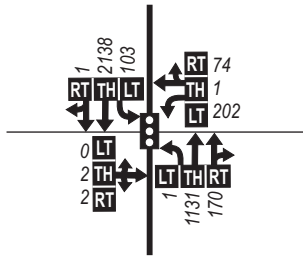
3 SE McLoughlin Blvd @ SE Harrison St/17th Av



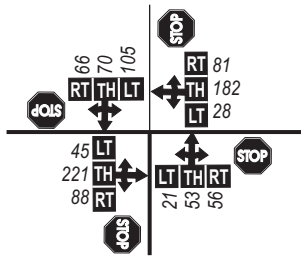
4 SE 42nd Av @ SE Harrison St



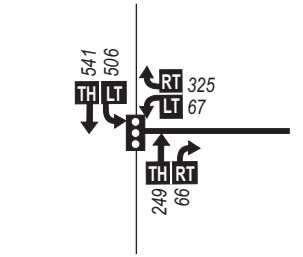
5 SE McLoughlin Blvd @ SE Washington St



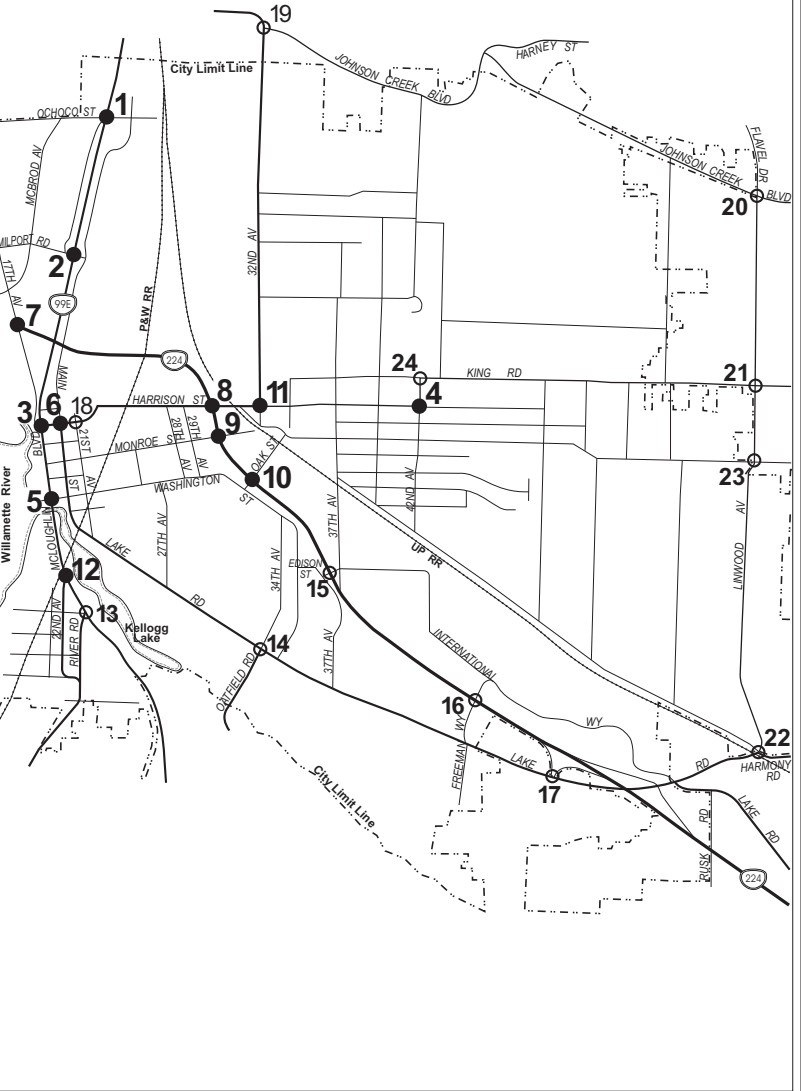
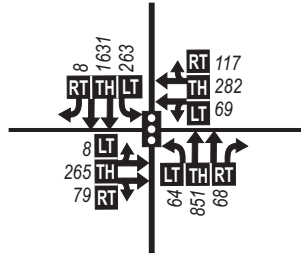
6 SE Harrison St @ SE Main St



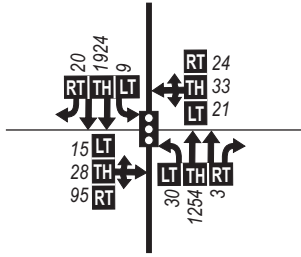
7 Hwy 224 @ SE 17th Av



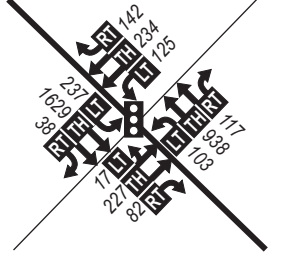
8 Hwy 224 @ SE Harrison St



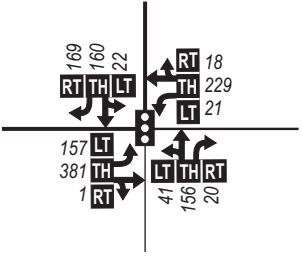
9 Hwy 224 @ SE Monroe St



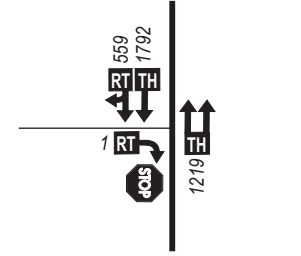
10 Hwy 224 @ SE Oak St



11 SE Harrison St @ SE 32nd Av



12 SE McLoughlin Blvd @ SE 22nd Av



LEGEND

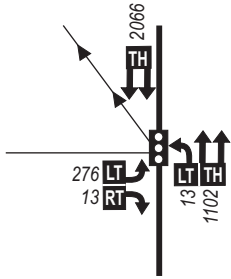
- X ● - Study Intersection & Number (This Sheet)
 - X ○ - Study Intersection & Number (Next Sheet)
 - ← - Lane Configuration
 - STOP - Stop Sign
 - ⬆ - Traffic Signal
 - 00 - PM Peak Hour Traffic Volume*
 - LT|TH|RT - Volume Turn Movement
 - Left+Thru+Right
- Counts revised/added in 2013 for intersections 21, 23, 24
- * Traffic Volume Count Conducted in the Fall/Winter 2006



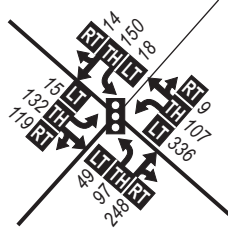
Figure 3-14a

EXISTING PM PEAK HOUR TRAFFIC VOLUMES

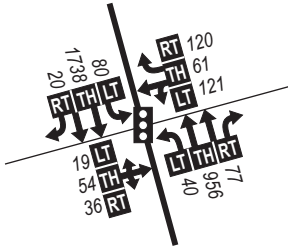
13 SE McLoughlin Blvd @ SE River Rd



14 SE Lake Rd @ SE Oatfield Rd



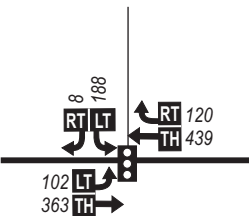
15 Hwy 224 @ SE 37th Av / SE Edison St



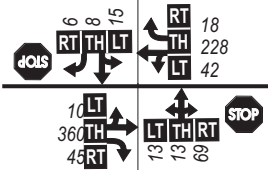
16 Hwy 224 @ SE Freeman Wy



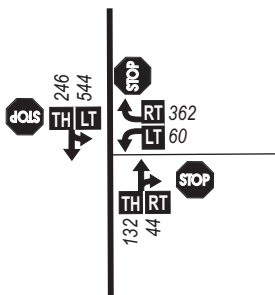
17 Hwy 224 @ SE Lake Rd



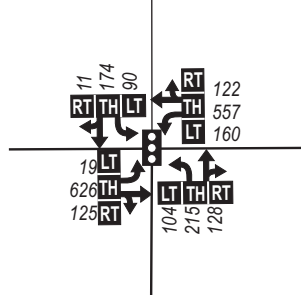
18 SE 21st Av @ SE Harrison St



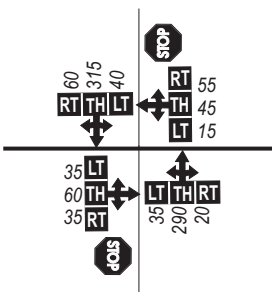
19 SE 32nd Av @ SE Johnson Creek Blvd



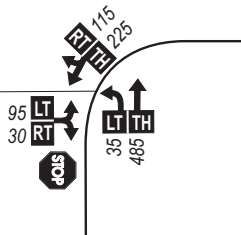
20 SE Johnson Creek Blvd @ SE Linwood Av



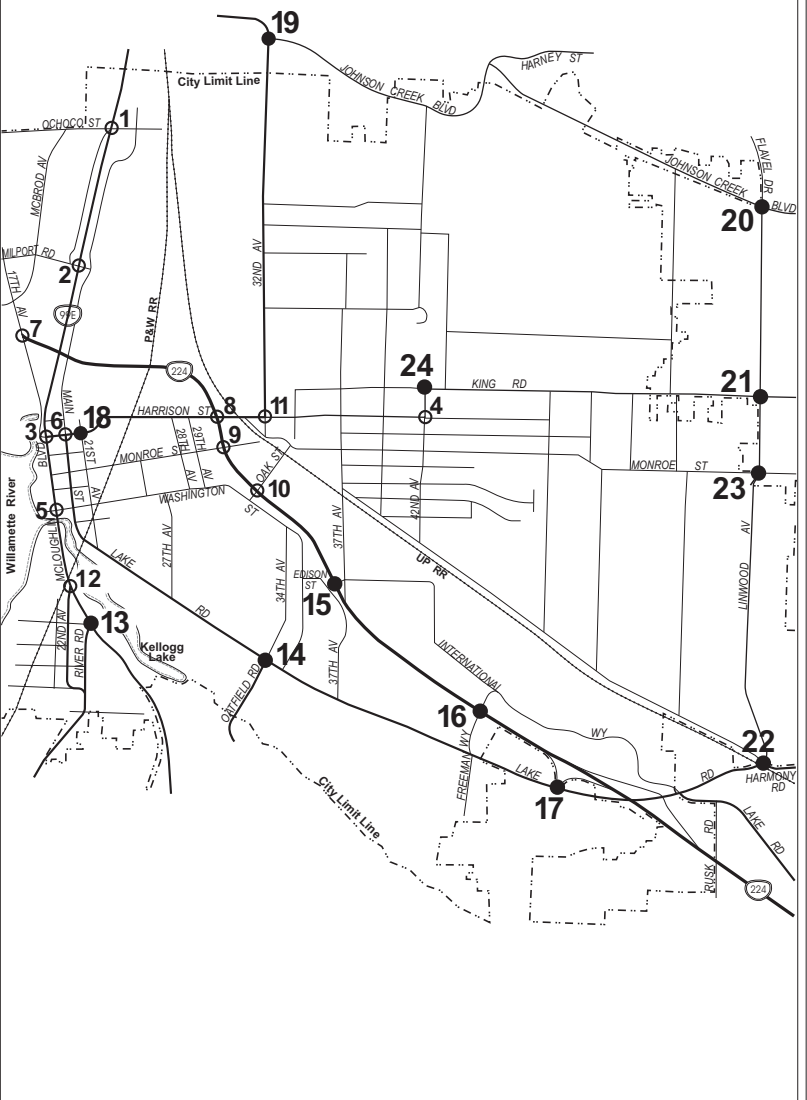
23 SE Linwood Av @ SE Monroe St



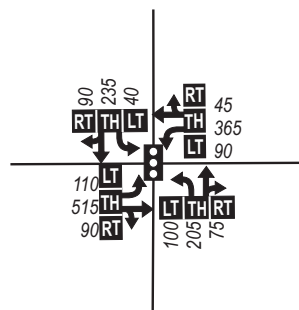
24 SE King Rd @ SE 42nd Av



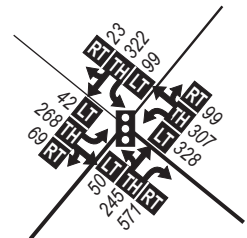
CITY OF MILWAUKIE Transportation System Plan



21 SE Linwood Av @ SE King Rd



22 SE Harmony Rd @ SE Linwood Av



LEGEND

- X● - Study Intersection & Number (This Sheet)
 - X○ - Study Intersection & Number (Previous Sheet)
 - ← - Lane Configuration
 - STOP - Stop Sign
 - ⬆ - Traffic Signal
 - 00 - PM Peak Hour Traffic Volume*
 - LT|TH|RT - Volume Turn Movement (Left-Thru-Right)
- Counts revised/added in 2013 for intersections 21, 23, 24
 * Traffic Volume Count Conducted in the Fall/Winter 2006

DKS



Figure 3-14b

EXISTING PM PEAK HOUR TRAFFIC VOLUMES

Land Use

In addition to major regional highways, such as Hwys 224 and 99E, land use within Milwaukie is a key factor in understanding current transportation patterns and roadway traffic volumes as it plays a large role in driving transportation choices. The adopted land use zoning designations within the city boundaries are shown in Figure 3-15.

Measures of Effectiveness

Level of service (LOS) is used as a measure of effectiveness for the operation of both signalized and unsignalized intersection operation. It is similar to a "report card" rating based upon average vehicle delay.

- LOS A, B, and C indicate conditions where traffic moves without significant delays over periods of peak-hour travel demand.
- LOS D and E are progressively worse peak-hour operating conditions.
- LOS F represents conditions where average vehicle delay exceeds 80 seconds per vehicle entering a signalized intersection and demand has exceeded capacity.

LOS F is typically evident in long queues and delays. LOS D or better is generally the accepted standard for signalized intersections in urban conditions.

At intersections without signals, a LOS E and even LOS F can occur for a specific turning movement; however, the majority of traffic may not be delayed (in cases where major street traffic is not required to stop). When these conditions exist, it generally provides a basis to study the intersections further to determine the availability of acceptable gaps for vehicles that are stopped and waiting to enter the traffic flow. It also indicates an intersection where traffic signal warrants should be conducted to determine if the intersection is reaching a point where it could be considered for signalization. A summary of level of service descriptions for signalized and unsignalized intersections is provided in Appendix F.

Intersections within the city are subject to one or more measure of effectiveness standards from the City, Metro, and ODOT. Milwaukie has a LOS D standard during the peak operating conditions for all intersections that fall within the City's jurisdiction.¹¹ Metro also uses a LOS standard, but further refines its requirements to include the top two peak hours. Their LOS standard is F for the first peak hour and E for the second peak hour.¹² ODOT uses a volume to capacity ratio (V/C) as a measure of effectiveness, which is similar to LOS, but is a ratio of the volume of vehicles traveling through an intersection to its calculated capacity. Similar to Metro, ODOT has two sets of maximum acceptable V/C ratios for the Hwys 99E and 224 in Milwaukie. These standards are outlined in Table 3-7.

¹¹ Milwaukie Municipal Code, Section 19.1407.4(A).

¹² Regional Transportation Plan, Metro, 2000, Table 1.2.



Transportation System Plan








FIGURE 3-15

ZONING MAP













November 2013

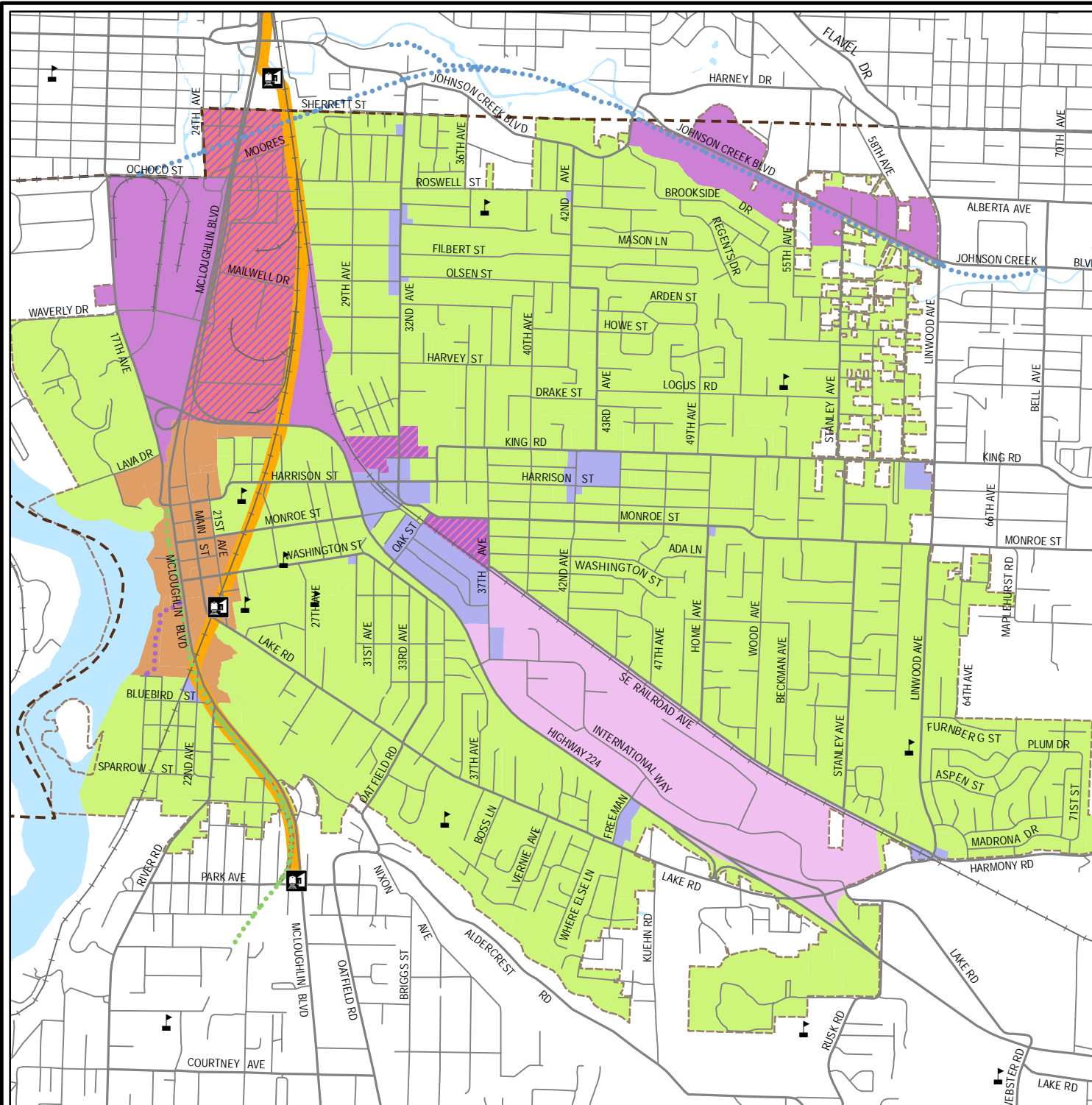
LEGEND

Zoning

-  Business Industrial
-  Manufacturing
-  Commercial
-  Downtown
-  MTSA (Manufacturing - Tacoma Station Area)
-  Residential
-  Mixed Use

Other Map Features

-  Schools
-  Kellogg Creek Trail
-  Springwater Trail
-  Trolley Trail
-  Light Rail Station
-  Light Rail Transit
-  Major Roads
-  Streets
-  Railroad
-  County Line
-  Water
-  City Limits



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TRANSPORTATION SOLUTIONS



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

Table 3-7 Existing P.M. Peak-Hour Study Area Intersection Operations

Intersection	Minimum Acceptable Measure of Effectiveness (MOE)			Level of Service (LOS)	Average Delay (Seconds)	Volume/Capacity (V/C)
	City ¹³	Metro ¹⁴	ODOT ¹⁵			
Two-Way Stop Controlled Intersections						
McLoughlin Blvd @ 22 nd Ave		F/E	0.99/0.99	A/D	26.4	0.01
Harrison St @ 21 st Ave	D			A/C	18.0	0.10
All-Way Stop Controlled Intersections						
Harrison St @ Main St	D			B	13.2	0.39
42 nd Ave @ Harrison St	D			B	14.3	0.22
Johnson Creek Blvd @ 32 nd Ave	D			F	>50	0.77
Signalized Intersections						
McLoughlin Blvd @ Ochoco St		F/E	1.10/0.99	B	10.1	0.85
McLoughlin Blvd @ Milport Rd		F/E	1.10/0.99	A	4.4	0.78
McLoughlin Blvd @ Harrison St		F/E	1.10/0.99	D	47.1	0.99
McLoughlin Blvd @ Washington St		F/E	1.10/0.99	C	20.0	0.88
Hwy 224 @ 17 th Ave		F/E	0.99/0.99	C	20.7	0.59
Hwy 224 @ Harrison St		F/E	0.99/0.99	D	40.0	0.89
Hwy 224 @ Monroe St		F/E	0.99/0.99	B	19.0	0.75
Hwy 224 @ Oak St		F/E	0.99/0.99	D	44.1	0.88
Harrison St @ 32 nd Ave	D	F/E		B	10.5	0.45
McLoughlin Blvd @ River Rd		F/E	0.99/0.99	D	35.5	0.99
Lake Rd @ Oatfield Rd		F/E		D	36.0	0.62
Hwy 224 @ 37 th Ave		F/E	0.99/0.99	C	25.5	0.82
Hwy 224 @ Freeman Way		F/E	0.99/0.99	C	30.5	0.94
Hwy 224 @ Lake Rd		F/E	0.99/0.99	B	16.1	0.68
Johnson Creek Blvd @ Linwood Ave	D	F/E		D	53.6	0.97
Linwood Ave @ King Rd	D	F/E		D	47.5	0.83
Linwood Ave @ Harmony Rd	D	F/E		E	64.5	0.94

Signalized and All-Way Stop Intersection LOS:

- **LOS** = Level of Service
- **Delay** = Average vehicle delay in the peak hour for entire intersection
- **V/C** = Volume to Capacity Ratio
- **MOE** = (ODOT & Metro) First Peak Hour/Second Peak Hour

Unsignalized Intersection LOS:

- **A/A** = Major Street turn LOS/Minor street turn LOS

Turn movement counts taken at the study intersections and conducted during the evening peak periods were used to determine the existing 2006 LOS based on the 2000 Highway Capacity Manual methodology for signalized and unsignalized intersections.¹⁶

¹³ Milwaukie Municipal Code, Section 19.1407.4(A).

¹⁴ Regional Transportation Plan, Metro, 2000, Table 1.2.

¹⁵ 1999 Oregon Highway Plan Alternative Highway, Maximum Volume to Capacity Ratios Within Portland Metropolitan Region, Oregon Department of Transportation, January 2006, Table 7.

Traffic counts and level of service calculation sheets can be found in Appendix G. A list of results for existing p.m. peak-hour intersection operation at the twenty-two study intersections is shown in Table 3-7. All but four study intersections operate at an LOS of D or better. The intersection of Johnson Creek Blvd/32nd Ave operates at LOS F during the peak hour.

Safety

ODOT ranks intersections in their Safety Priority Index System (SPIS) based on the most current three years of collision data. The SPIS values range from one to one hundred, with lower values equating to lower collision rates. The score is derived from the number of collisions, the type of collisions, collision severity, and traffic volumes. Each year, a list of the top 10% SPIS sites is generated and the top 5% sites are investigated by ODOT for safety problems. If ODOT identifies a correctable problem, a benefit/cost analysis is performed and appropriate projects are initiated, often with funding from the Highway Safety Improvement Program. None of the 22 study intersections were identified as being on the SPIS top 10% list.

In addition to SPIS data, intersection safety is also analyzed using intersection collision rates. Collision rates are measured as the number of collisions per million entering vehicles (MEV). This measure allows comparison of intersections with varying volumes. ODOT provided collision data for the study intersections along the State facilities, McLoughlin Blvd and Hwy 224. All collisions involving a fatality, injury, or property damage greater than \$1,500 are included in the reports supplied by ODOT. The crash rates and corresponding data can be seen in Table 3-8. Further investigation should be conducted at the intersection of Hwy 224/Lake Rd, since the corresponding crash rate is greater than 1.0, indicating that the intersection might have safety problems.

¹⁶ 2000 Highway Capacity Manual, Transportation Research Board, 2000.

Table 3-8 SPIS Rating of Milwaukie TSP Update Study Area Intersections

Inter-section Number	ODOT SPIS Rating	Street	Cross Street	Intersection Collisions (2002-2005) ¹	Fatal	Injury	Corridor Collisions 2002-2005 ²	Collision Rate 2002-2005 ³
17	74.81	Hwy 224	Lake Rd	15	1	7	21	1.12
10	34.42	Hwy 224	Oak St	22	0	12	16	0.52
2	50.42	McLoughlin Blvd	Milport Rd	9	0	4	18	0.17
3	49.48	McLoughlin Blvd	Harrison St	8	0	3	24	0.19
15	20.2	Hwy 224	Edison St	1	0	1	7	0.03
8	52.82	Hwy 224	Harrison St	10	0	4	18	0.25
13	23.72	McLoughlin Blvd	River Rd	5	0	0	15	0.13
12	14.47	McLoughlin Blvd	22 nd Ave	1	0	1	16	0.03
7	11.03	Hwy 224	17 th Ave	2	0	1	9	0.10
1	21.27	McLoughlin Blvd	Ochoco St	5	0	4	8	0.09
16	21.7	Hwy 224	Freeman Way	4	0	3	5	0.11
5	39.68	McLoughlin Blvd	Washington St	2	0	1	6	0.05
9	26.95	Hwy 224	Monroe St	5	0	2	7	0.13
4	N/A	42 nd Av	Harrison St	4	0	1	N/A	0.42
6	N/A	Harrison St	Main St	6	0	4	N/A	0.53
11	N/A	Harrison St	32 nd Ave	12	0	8	N/A	0.80
14	N/A	Lake Rd	Oatfield Rd	7	0	1	N/A	0.49
18	N/A	21 st Ave	Harrison St	3	0	2	N/A	0.33
19	N/A	32 nd Ave	Johnson Creek Blvd	0	0	0	N/A	0.00*
20	N/A	Johnson Creek Blvd	Linwood Ave	7	0	6	N/A	0.27
21	N/A	Linwood Ave	King Rd	2	0	1	N/A	0.09
22	N/A	Harmony Rd	Linwood Ave	19	0	10	N/A	0.72

¹ Collisions within the intersection: reported by City/County/State Police to ODOT.

² Collisions along McLoughlin Blvd or Hwy 224 within 0.05 miles of the intersection: reported by City/County/State Police to ODOT.

³ Collision Rate = (Number of Collisions x 1,000,000)/(Number of Years of Data x 365 x Annual Average Daily Traffic)

*No crashes were recorded at this intersection.

Heavy Vehicles

The economical movement of raw materials and finished products depends on efficient truck movement to and through urban areas. The designation of through truck routes provides for efficient movement while at the same time maintaining neighborhood livability, public safety, and minimizing maintenance costs of the roadway system. McLoughlin Blvd and Hwy 224 are identified by ODOT,¹⁷ Metro, and the City of Milwaukie as truck routes. The City identifies truck routes on roads under its jurisdiction. Truck routes are illustrated in Figure 3-16.

Truck (or heavy vehicle) volumes were collected as part of the intersection turn movement counts. Any vehicle with more than two axles was considered a heavy vehicle. The number of trucks was totaled and divided by the total number of vehicles in the traffic stream to get the percentage of trucks. Seven of the twenty-two studied intersections present truck volumes exceeding 100 vehicles per hour (vph), with volumes exceeding 150 vph at the Hwy 99E and Ochoco St intersection.

¹⁷ 1999 Oregon Highway Plan, The Oregon Department of Transportation, May 1999.



Transportation System Plan

FIGURE 3-16

TRUCK ROUTES

November 2013

LEGEND

Freight Routes

- Major Regional
- Minor Preferred (Local)
- Weight Restricted
- Minor Preferred (Local)

Freight Volumes

- 0 - 50 Heavy Vehicles/Hour
- 51 - 100 Heavy Vehicles/Hour
- 101 - 150 Heavy Vehicles/Hour
- > 150 Heavy Vehicles/Hour

Other Map Features

- Schools
- Kellogg Creek Trail
- Springwater Trail
- Trolley Trail
- Light Rail Transit
- Light Rail Station
- Major Roads
- Streets
- Railroad
- County Line
- Water
- Parks
- City Limits



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

Summary of Motor Vehicle Findings

The following summarizes key motor vehicle findings related to the level of activity documented as well as deficiencies for this mode of travel. These findings will be utilized to help guide future improvements to address the deficiencies for this mode of travel in the transportation network.

- The functional classification of roadways found in the city of Milwaukie allows for the proper hierarchy of roadways that balances mobility and access. Currently the business industrial area south of Railroad Ave, north of Hwy 224, east of 37th Ave and west of Lake Rd has roadways without functional classification. International Way serves as an existing facility that provides connectivity within this area, and access to arterials and collectors.
- Street drainage issues appear to be located in the southeast area of the city, and are typically due to locations not being connected to the stormwater pipe system. An area of specific concern today is the area along Railroad Ave from Harmony Rd to 37th Ave.
- There is currently one study area intersection that does not meet jurisdictional operating standards: Johnson Creek Blvd/32nd Ave. Additionally, four other intersections are reaching capacity:
 - McLoughlin Blvd/Harrison St
 - McLoughlin Blvd/River Rd
 - Hwy 224/Freeman Way
 - Johnson Creek Blvd/Linwood Ave
- Many of the study intersections in Milwaukie have low reported collision rates. Two intersections have collisions of 10 or more. These are the intersections of Hwy 224/Lake Rd (which also included a fatality) and Hwy 224/Harrison St.
- The majority of heavy vehicle counts collected at study area intersections occur along major regional truck routes (such as McLoughlin Blvd and Hwy 224), however the intersection of Lake Rd/Oatfield Rd had a high number of heavy vehicles counted during the p.m. peak hour (100-150 heavy vehicles). Neither of these facilities are designated as truck routes, indicating that trucks could be utilizing these facilities as a "cut-through" route due to congestion and/or access issues on the major regional truck routes.

RAIL

There is one other mode of transportation in Milwaukie: the railway system. Figure 3-17 shows the rail facilities and crossings in Milwaukie.

There are three rail freight lines, two Union Pacific Railroad (UPRR) lines and one Oregon Pacific Railroad (OPR) line that currently traverse Milwaukie. The UPRR main line, also named the C line, is the main line between Portland and Eugene. It extends from northern Milwaukie, south and east through the city to the east and operates twenty-four freight trains a day and six Amtrak passenger trains per day with maximum authorized speeds of 45 and 50 mph, respectively. There are four at-grade railroad crossings along this line on Harrison Ave, Oak St, 37th Ave, and Harmony Ave, all of which are gated.

The UPRR Tillamook line, also known as the FD line, is leased to Portland & Western Railroad (PNWR). It extends from Portland in the north through Milwaukie and exits to the south. PNWR operates four trains per day along this line with a maximum authorized speed of 45 mph. There are twelve railroad crossings along this line, including one underpass, four overpasses, and three crossings without gates on Wren St, Bluebird St, and Bobwhite St.

The rail line operated by Oregon Pacific passes through the northwestern corner of the city of Milwaukie and has three at-grade railroad crossings, two which are without gates. These crossings without gates are at Milport Rd and McBrod Ave.

There are no airports, pipelines, ferries, or ports within Milwaukie's city limits or its UGMA.

Summary of Rail Findings

The following summarizes key findings related to other modes of travel in Milwaukie. These findings will be utilized to help guide future improvements to address the deficiencies for this mode of travel in the transportation network.

- The maximum authorized speeds within Milwaukie for many of the existing rail lines are 45-50 miles per hour. Many of the existing crossings in the city are at-grade facilities that are gated. However, there are six at-grade crossings that do not have gates. Three occur in the north Milwaukie industrial area east and west of McLoughlin Blvd, and the other three occur in the Island Station neighborhood to the south.
- Typical vertical clearance for underpasses (whether they are roadway or railway) is 14 feet.¹⁸ This is a typical clearance to allow for trucks to clear the underpass, even if they are not on a freight-classified facility. The three underpasses at Lake Rd, Sparrow St, and Lark St do not meet this typical vertical clearance.
- The traffic generated by heavy trucks cutting through neighborhoods has both real and perceived impacts on neighborhood livability, including noise, vibration, safety, aesthetics, and air quality. Accessibility issues on Hwy 224 and McLoughlin Blvd, as well as weight restrictions on Johnson Creek Blvd, cause trucks to divert onto local streets not intended or preferred for freight traffic.

¹⁸ Based on *A Policy on Geometric Design of Highways and Streets*, Fourth Edition, American Association of State Highway and Transportation Officials (AASHTO), page 389.



Transportation System Plan

FIGURE 3-17

RAIL ROUTES & CROSSINGS

November 2013

LEGEND

Rail Facilities

++++ Existing Railroad

Number of Trains Daily

Rail Crossings

At Grade - Gated

At Grade - Ungated

Road Overpass

Road Underpass

Other Map Features

Schools

Kellogg Creek Trail

Springwater Trail

Trolley Trail

Light Rail Rapid Transit

Light Rail Station

Major Roads

Streets

County Line

Water

Parks

City Limits



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

PARKING

City Parking Policies

On-street parking is generally available in residential areas of Milwaukie. The Milwaukie Municipal Code includes requirements for off-street parking for both residential and commercial properties. Milwaukie's Zoning Ordinance incorporates both minimum and maximum parking requirements based on specific uses.

Downtown Milwaukie Parking

Downtown Milwaukie, the area bounded by McLoughlin Blvd, 21st Ave, Hwy 224, and Lake Rd, has parking characteristics that are different from other areas of the city. The off-street parking requirements in the Downtown Zones are the same as the rest of the city, except that no off-street parking is required in the Downtown Storefront Zone or in the Downtown Office Zone north of Washington St and east of McLoughlin Blvd. The Code also limits the development of parking facilities in the Downtown Residential and Downtown Open Space Zones.

The majority of the on-street parking in the downtown area is short-term in nature, which consists of 15-minute to 4-hour parking. The majority of the off-street parking is private surface parking serving businesses in the downtown area. Figure 3-18 illustrates the locations of on- and off-street parking. Table 3-9 summarizes the parking supply as well as the type and public/private nature of the parking.

Table 3-9 Inventory of Existing Downtown Parking

Type of Parking	Total Inventory	Percentage of Inventory
On-Street		
Short-term (4 hours or less)	366	95%
Unmarked	11	3%
ADA parking	8	2%
Subtotal	385	100%
Off-Street		
Short-term (public)	29	2%
Long-term (public)	123	9%
City employee parking	42	3%
ADA parking (public)	28	2%
Private parking garage	59	4%
Private surface parking	1,162	80%
Subtotal	1,443	100%
All Parking	1,828	100%

Source: City of Milwaukie

Data Collected: December 13, 2012

Since 1993, the City has operated a permit system to allow employees of downtown businesses to park in three to four downtown parking lots, as well as in specifically marked on-street spaces. This parking permit program includes 151 parking spaces downtown. Permits can be obtained through the City of Milwaukie for a cost of \$25 per month. All off-street public parking is available on a first-come, first-served basis only. There are no reserved spaces.

It is the City's practice to conduct regular detailed inventory and utilization studies of the parking within the downtown core area. The December 2012 utilization study found that there are many



FIGURE 3-18

DOWNTOWN PARKING

November 2013

LEGEND

Number of spaces

Short Term On Street

15 Minute Parking

1 Hour Parking

2 Hour - < 5 ft

2 Hour/Permit

2 Hour Parking

2 Hour Uncontrolled

Loading Zone - 2 Hr

4 Hour Parking

4 Hour Uncontrolled

4 Hour/Permit

Public ADA Parking

ADA On-street

ADA Off-street

Long Term Off Street

Public Parking

City Pkg Permit Req

City Employee Pkg

Private Lots

Parking Garage

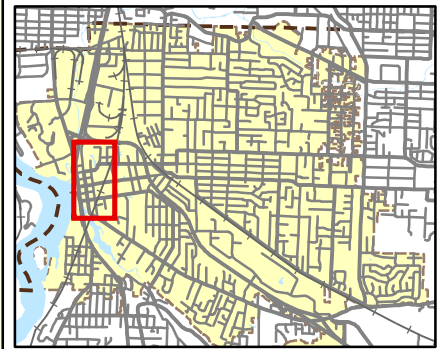
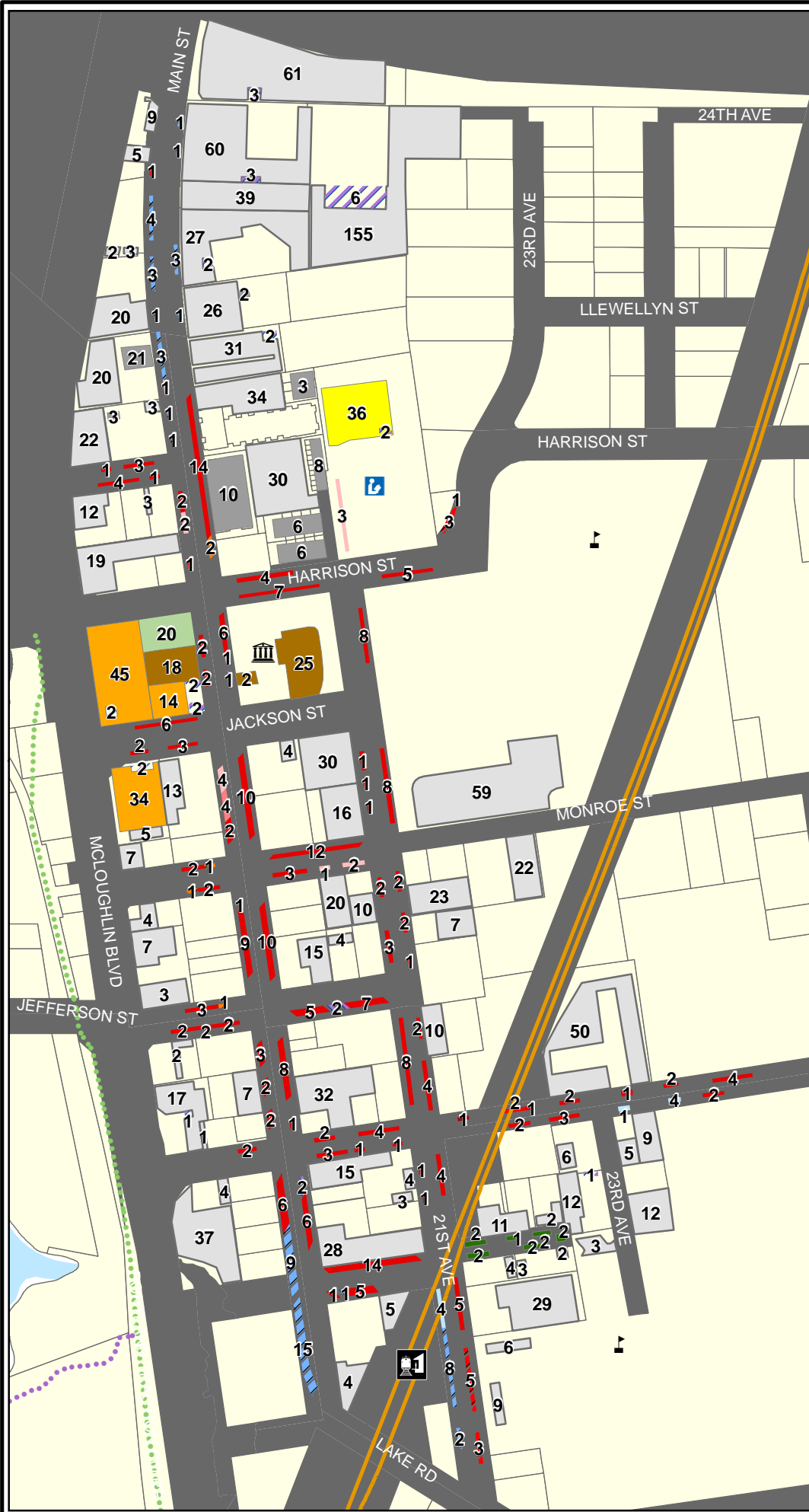
Private Parking

Other

Other Off-street

Other On-street

- Tax lots
- Schools
- City Hall
- Leading Library
- Kellogg Creek Trail
- Trolley Trail
- Light Rail Transit
- LRT Station



pockets of utilization in specific areas of downtown, particularly in the core commercial area along Main Street between Washington and Harrison Streets. However, there is an overall abundance of underutilized and available parking in the peak hour (11:00 a.m. to 12:00 p.m.).

As Table 3-9 indicates, the greatest concentration of underutilized parking spaces is in private lots, which represents 84% of all parking in downtown. Private lots (both surface parking and garages) comprise 1,221 total parking spaces and reach peak occupancy of just 42.0%. This leaves 708 unused spaces in the private supply.

Table 3-10 summarizes the utilization of downtown parking in December 2012.

Table 3-10 Use of Parking Spaces by Type

Type of Parking	Total Number of Spaces	Total Spaces Occupied at Peak Hour	Total Spaces Empty at Peak Hour	Peak-Hour Occupancy (%)
15 Minutes (on-street)	14	3	11	21.4
1 Hour (on-street)	4	3	1	75.0
2 Hours (on-street)	270	135	135	50.0
2 Hours, or all day with permit (on-street)	11	5	6	45.4
2-Hour loading zones (on-street)	5	0	5	0
4 Hours (on-street)	9	6	3	66.7
4 Hours, or all day with permit (on-street)	53	37	16	69.8
Unmarked (on-street)	11	9	2	81.8
ADA Spaces (on-street)	8	1	7	12.5
Subtotal On-Street	385	199	186	51.7
City permit (off-street)	87	60	27	69.0
Library/public (off-street)	65	27	38	41.5
City employee (off-street)	42	15	27	35.7
ADA spaces (off-street)	28	4	24	14.3
Subtotal Public Off-Street	222	106	116	47.7
Private lots (surface, garage)	1,221	513	708	42.0
Subtotal Private Off-Street	1,221	513	708	42.0
All Parking	1,828	818	1,010	44.7

Source: City of Milwaukie. Occupancy data was collected for the peak hour (11:00 a.m.-12:00 p.m.) on December 13, 2012.

Parking Demand

Parking ratios express the actual number of parking spaces available to serve demand for land uses (i.e., office, retail, residential, and/or mixed use development). The number of spaces represented by a parking ratio may exceed actual demand for parking or fall short of that demand. Demand ratios, on the other hand, are generally expressed in the context of peak-hour use of a specific built supply of parking. In other words, demand ratios represent an estimate of the actual number of spaces occupied at the peak hour relative to occupied land uses. Effectively managing the relationship between land uses and built and occupied parking supply is a fundamental challenge of parking management.

An understanding of actual demand also allows a city to estimate the impact of new development on an existing supply of parking. For downtown Milwaukie, two indicators help describe parking demand:

- **The actual current Built Ratio** of publicly available parking spaces, in relation to total built land uses in downtown Milwaukie.
- **The actual current Demand Ratio** for parking spaces per total built land use based on actual usage data from the most recent update of parking utilization.

Parking demand ratio calculations revealed two different, but equally useful, correlations:

- **Built Spaces to Built Land Use:** This represents the total number of existing parking spaces correlated to total existing land use square footage (occupied or vacant) within the study area. There are approximately 399,074 gross square feet of commercial uses in the Downtown Zones and a total of 1,828 parking spaces. Based on these numbers, there are approximately 4.58 parking spaces per 1,000 square feet of built land.
- **Combined Demand to Built Land Use:** This represents peak-hour occupancy within the Downtown Zones, combining the on and off-street supply (actual parked vehicles correlated with actual occupied building area). Parking spaces in downtown are utilized at a rate of 44.7% in the peak hour (818 vehicles parked). Building vacancy in downtown is approximately 11%, (approximately 355,176 of 399,074 gross square feet of building area occupied). Therefore, the actual current peak-hour demand ratio is approximately 2.3 parking spaces per 1,000 square feet of built land use.

Table 3-11 summarizes the analysis used to determine the built ratio of parking to built land use (i.e., 399,074 gross square feet) and general demand for that parking based on the peak-hour occupancy/demand for all parking inventoried in the study area.

Table 3-11 Downtown Parking Demand—Mixed Land Use to Built Supply

Sites in Downtown	Gross Square Footage (built)/ Gross Square Footage (occupied) ¹⁹	Total Spaces Inventoried in Downtown ²⁰	Built Ratio of Parking (sq ft)	Total Spaces Parked in Peak Hour	Actual Ratio of Parking Demand/ 1,000 sq ft
92	399,074/355,176	1,828	4.58/1,000 sq ft	818	2.3/1,000 sq ft

To date, parking in downtown Milwaukie has been built at an average rate of over 4.5 spaces per 1,000 square feet of development. This rate appears to have been effective, though significant stall availability currently exists within the on- and off-street parking system.

Land uses in downtown Milwaukie are generating parking demand ratios of 2.3 spaces per 1,000 gross square feet of commercial/retail development. It is important to recognize that the current parking demand number is also reflective of the current level of use by other modes (i.e., transit, bike, carpool, and walking). If the City had higher expectations and success in increasing alternative mode uses in the future, the parking "demand" ratio would be influenced downward from its current level.

¹⁹ Assumes downtown vacancy rate of 11%, per City of Milwaukie data base.

²⁰ This number represents all on-street spaces as well as public and private off-street lots in operation within the study zone and summarized in Table 3-11, above.

Summary of Parking Findings

The following summarizes key findings related to parking in Milwaukie. These findings will be utilized to help guide future improvements to address the deficiencies for this element related to the transportation environment.

- On-street parking comprises approximately 21% of the total parking supply (private and public) in the downtown area, while off-street parking comprises the remaining 79%.
- The total utilization of on-street parking in the downtown area is on average 52% throughout the day. While public off-street parking utilization is approximately 48% during the day. By comparison, the private off-street parking utilization is approximately 42% over the day.
- Parking space types with the highest utilization throughout the day are 1-hour, 4-hour, and unmarked parking spaces. All three of these types of parking are generally 65-80% occupied during the day and represent approximately 20% of the total on-street parking supply. Two-hour parking spaces are generally 50% occupied during the day.

ENVIRONMENTAL JUSTICE

As stated by the Environmental Protection Agency, "Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies."²¹ Within the context of the TSP, Environmental Justice is an effort to identify underserved and vulnerable populations so Milwaukie can improve transportation services while avoiding future impacts.

Figure 3-19 identifies the location of low-income housing (indicating populations most likely to be dependant on public transportation), areas of Milwaukie that are outside of the public transit coverage area, as well as the location of features such as hospitals, schools, and libraries. Transit coverage is based on comparing land that has a high enough density to support transit service versus a 1/4-mile walking distance buffer around transit stops.²² One significant gap in transit coverage area can be seen in the residential area north of Railroad Ave, stretching east/west from Stanley Ave to 42nd Ave. Other smaller gaps in transit coverage can be seen to the northeast and along the perimeter of the city.

In addition to regular public transit services, programs run by TriMet and the Milwaukie Center²³ provide transportation to senior citizens and disabled persons. The Milwaukie Center's transportation program provides four transit opportunities. Daily buses provide door-to-door service to and from the Center for lunch, shopping, and other activities. These buses have wheelchair-lift capacity, and phone-in requests are available with 24-hour notice. User fees are charged for the daily service. Rides are \$1.50 one way or \$3 per day to the Milwaukie Center. Rides are \$2 one way to the grocery store or \$4 round trip. Riders may purchase a 5-, 10-, or 20-ride card. Scholarships are available for riders who need financial assistance.

TriMet operates a fixed-route shuttle service (#152) between the Milwaukie Transit Center and Clackamas Town Center which stops at the Center. Transportation Reaching People (TRP) offers volunteer-provided services to take elderly/disabled residents for medical appointments, shopping, and personal needs. TriMet LIFT is a door-to-door transportation service for people who are unable to ride regular buses due to disability. This program targets those who are unable to use public transportation due to a disability or disabling health condition, and covers areas 3/4 of a mile past the outermost portions of TriMet's bus and light rail (MAX) services. These services are available on appointment from 4:30 am to 2:30 am, seven days a week. Cost is \$1.60 each way.

Summary of Environmental Justice Findings

The following summarizes key findings related to environmental justice in Milwaukie. These findings will be utilized to help guide future improvements to address the deficiencies for this element related to the transportation environment.

- Almost all of the facilities and/or land uses that would typically be dependent or rely upon transit/transportation facilities have support of these types of transportation facilities.
- The lack of pedestrian and bicycle connectivity within the city also contributes to the lack of transportation options for the transit dependant population in the city.

²¹ U.S. EPA, Environmental Justice, Compliance and Enforcement, Website, 2007.

²² Planning Commission TOD Committee, Walking Distance Research, http://www.fairfaxcounty.gov/planning/tod_docs/walking_distance_abstracts.pdf, Fairfax County, Virginia.

²³ <http://ncprd.com/wp-content/uploads/2011/02/transflyer.pdf>



Transportation System Plan

FIGURE 3-19

TRANSIT DISADVANTAGED

November 2013

LEGEND

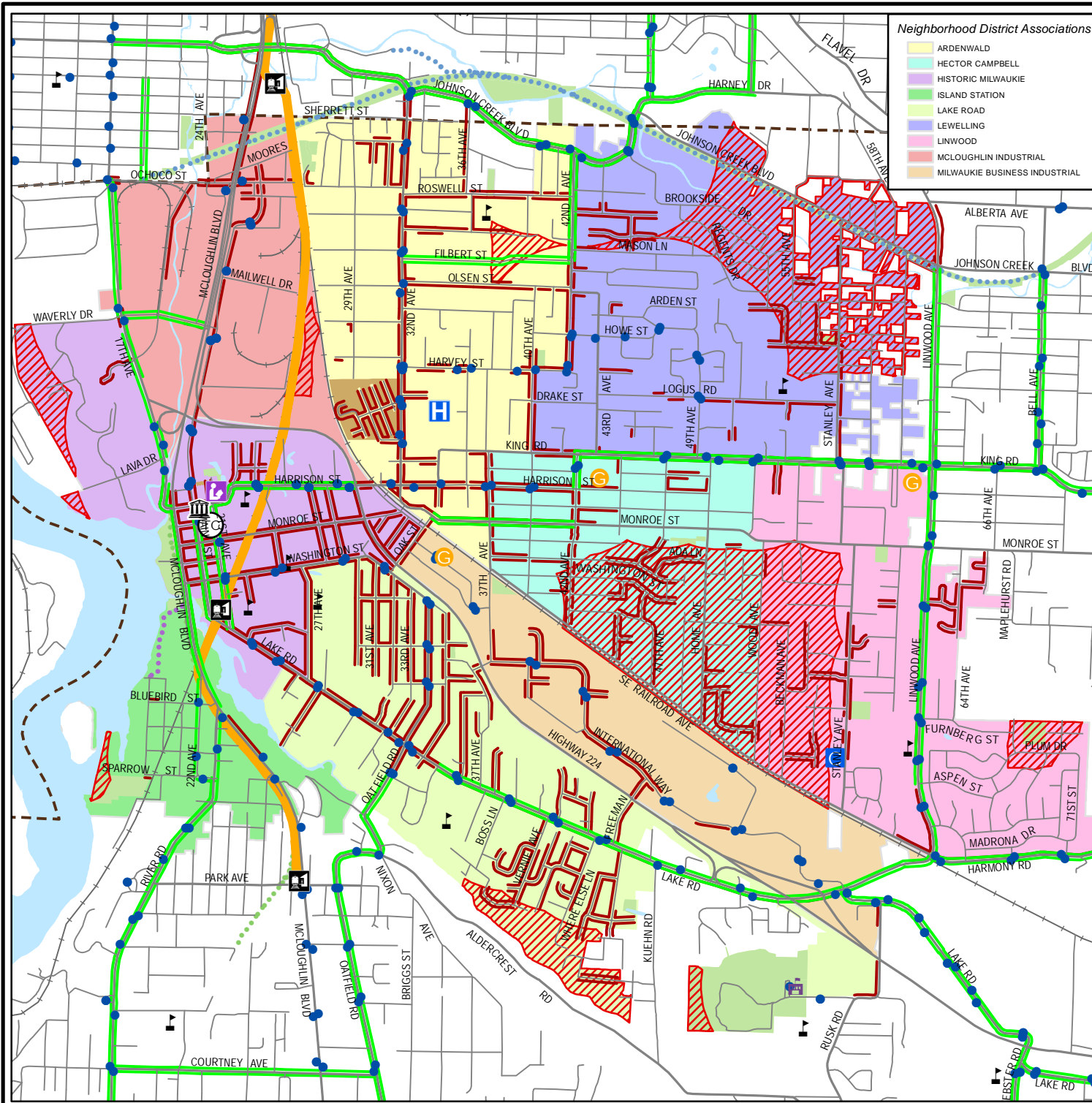
- Transit Disadvantaged (more than 1/4 mile walk from bus stop)
- Bus Stops
- Transit Center
- Light Rail Station
- Light Rail Transit
- Major Roads
- Streets
- Existing Bike Lanes
- Existing Sidewalks
- City Hall
- Convalescent Care
- Grocery
- Ledding Library
- Milwaukee Center
- Providence Hospital
- Low-Income Housing

Other Map Features

- Schools
- Kellogg Creek Trail
- Springwater Trail
- Trolley Trail
- Railroad
- County Line
- Water
- Parks

Neighborhood District Associations

- ARDENWALD
- HECTOR CAMPBELL
- HISTORIC MILWAUKIE
- ISLAND STATION
- LAKE ROAD
- LEWELLING
- LINWOOD
- MCLOUGHLIN INDUSTRIAL
- MILWAUKIE BUSINESS INDUSTRIAL



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

ENVIRONMENTAL RESOURCES

As a Transportation Planning Rule (TPR) requirement, a city's transportation system shall minimize adverse economic, social, environmental, and energy consequences.²⁴ An Environmental Resources Map is included here as Figures 3-20 through 3-22; showing Title 3 areas, the local Goal 5 inventory, National Wetland Inventory, identified historic properties, and known cultural resources.

The goal of Title 3 of the Metro Functional Plan is to protect water quality and floodplain areas. Since floodplains reduce flood hazards, control soil erosion, and reduce pollution of the region's waterways, the region's health and public safety are protected. It can be seen in Figure 3-20 that there are Title 3 areas dispersed throughout the city, including bands along Johnson Creek, the Willamette River, around Kellogg Lake, and along Kellogg Creek. Many of the Title 3 areas are also encompassed by floodplain, vegetation, and wetland zones. Endangered species habitat also correlates closely with the location of the Title 3 areas.

Local jurisdictions are required by Statewide Planning Goal 5 to adopt plans to protect natural resources and conserve scenic and historic areas and open spaces. Fish and wildlife habitats are among the natural resources that are protected by Goal 5. Figure 3-21 identifies the Goal 5 areas within Milwaukie.

Summary of Environmental Resources Findings

The following summarizes key findings related to environmental resources in Milwaukie. These findings will be utilized to help guide future improvements to address the deficiencies for this element related to the transportation environment.

- The 100-year flood plain affects lands to the west of McLoughlin from Waverly Dr to Washington St, then crosses to the east side of McLoughlin Blvd from Washington St to Oatfield Rd. This is of particular concern for any potential improvements associated within this area.
- Two large wetland and wetland buffer areas have been identified. One is located on the southeast corner of 37th Ave/Railroad Ave, while the other is located on the south side of Railroad Ave near 47th Ave. When considering potential improvements in this area, the City should be cautious about impacts to these areas.

²⁴ OAR 660-012-0035, Environmental Considerations for Transportation Planning.



Transportation System Plan

FIGURE 3-21

ENVIRONMENTAL RESOURCES - GOAL 5

November 2013

LEGEND

Goal 5 Conservation Value

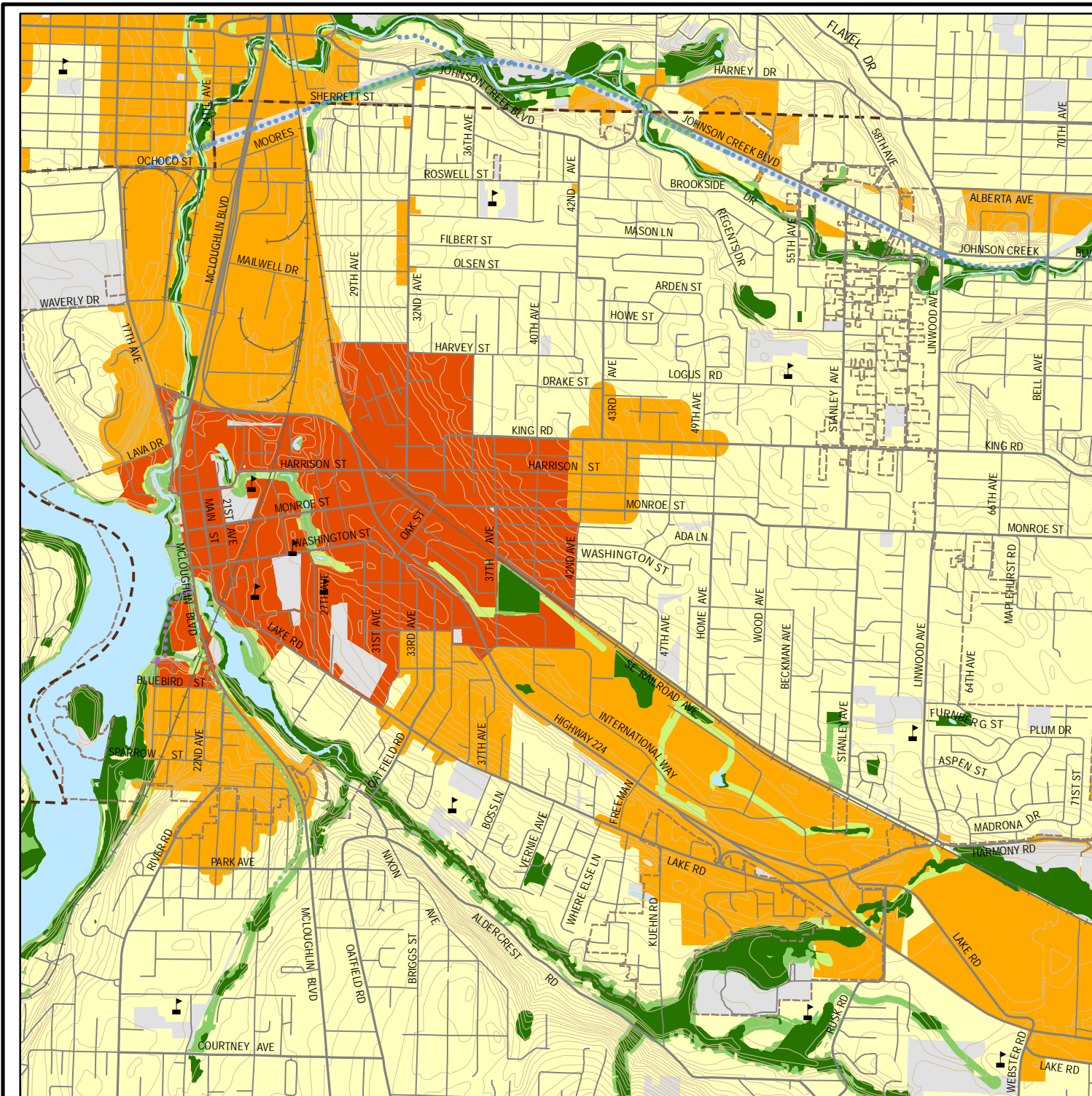
- HIGH
- MODERATE
- LOW

Goal 5 Development Value

- HIGH
- MEDIUM
- LOW
- NOT RANKED

Other Map Features

- Schools
- Kellogg Creek Trail
- Springwater Trail
- Trolley Trail
- Major Roads
- Streets
- Railroad
- County Line
- City Limits
- Water
- 10' Contours



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



Transportation System Plan

FIGURE 3-22

ENVIRONMENTAL RESOURCES - ZONING & VEGETATION

November 2013

LEGEND

METRO Environmental Zone

Conservation

Protection

Vegetation

High

Medium

Low

Title 3

Other Map Features

Schools

Kellogg Creek Trail

Springwater Trail

Trolley Trail

Major Roads

Streets

Railroad

County Line

Water

City Limits

10' Contours

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

