MILWAUKIE
Dogwood City of the West

To: **Planning Commission**

From: **Alicia Martin, Administrative Specialist**

Date: **September 20, 2013 for September 24, 2013 Public Hearing**

Subject: **Supplemental Packet Materials for the September 24 PC Meeting**

The following additional items are being provided to you for the packet you received this week:

- Supplemental Staff Memo
- Attachments for Item 5.1 CPA-13-03 Transportation System Plan (TSP) Update

ATTACHMENTS

Attachments are provided as indicated by the checked boxes. All material is available for viewing upon request.

		PC Packet	Public Copies	E-Packet
1.	Draft Ordinance	☒	☒	☒
	Exhibit A: Recommended Findings in Support of Approval	☒	☒	☒
	Exhibit B: Proposed Amendments to Transportation System Plan (Underline/Strikeout Version) – *already distributed to PC*	☐	☐	☐
2.	Addendum to Proposed TSP Amendments (revised)	☒	☒	☒
3.	Responses to Questions from Public Testimony on Sept 10	☒	☒	☒

MILWAUKIE
Dogwood City of the West

Memorandum

To: **Milwaukie Planning Commission**

From: **Brett Kelver, Associate Planner**

Date: **September 19, 2013**

Re: **Supplemental Meeting Materials for September 24, 2013, Planning Commission Meeting**

The supplemental meeting materials for the September 24, 2013, Planning Commission meeting are enclosed. These materials are:

1. Draft Ordinance and Findings – A draft of the ordinance for adoption of the proposed amendments was provided in the packet for the September 10 meeting, but the draft findings in support of approval was not ready at that time. Staff has since developed a draft of the recommended findings and is providing it along with a copy of the draft ordinance so the Commission will have all materials in hand for the September 24 meeting.

2. Revised Addendum to Proposed TSP Amendments – This document is comprised of a table listing all corrections or edits suggested for TSP amendments after the public review draft was first made available on August 20, 2013.
   - Edits highlighted in yellow were completed after the Planning Commission hearing on September 10, 2013. All other edits were made after the public review draft was made available but before the September 10 hearing.
   - Specific edited pages of the TSP are included in the Addendum following the table, in order by the page number on which they appear in the TSP. Yellow highlighting is used on these pages to call attention to the edited text. All pages with edits made since the public review draft was made available are included in this version of the addendum.

3. Response to Other Public Hearing Comments – This document contains short responses to significant comments or questions from the public testimony portion of the hearing on September 10. These are comments or questions that staff deemed to not have a substantive effect on the proposed TSP amendments, but which nevertheless merit some clarifying or informational response.

Please contact staff if you have any questions about these materials or any other TSP documents.

ATTACHMENT 1

ORDINANCE NO. _____

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF MILWAUKIE, OREGON, AMENDING THE TRANSPORTATION SYSTEM PLAN, AN ANCILLARY DOCUMENT OF THE COMPREHENSIVE PLAN, TO MAINTAIN COMPLIANCE WITH THE STATE TRANSPORTATION PLANNING RULE AND REGIONAL TRANSPORTATION PLAN (FILE # CPA-13-03).

WHEREAS, City's Transportation System Plan (TSP) was last updated in 2007, with a forecasting horizon to the year 2030; and

WHEREAS, the most recent Regional Transportation Plan (RTP) was adopted by Metro Council in 2010 and utilizes a forecasting horizon to the year 2035; and

WHEREAS, the State Transportation Planning Rule requires that local jurisdictions maintain their TSPs to be consistent with the applicable RTP; and

WHEREAS, Metro informed the City in December 2011 of the need for the City to demonstrate that its TSP is consistent with the 2035 RTP; and

WHEREAS, on October 31, 2012, Metro extended the City's deadline for demonstrating the TSP's consistency with the 2035 RTP to December 31, 2013; and

WHEREAS, all legal and public notices have been provided as required by law, in addition to efforts to educate community members more broadly about the proposal; and

WHEREAS, on September 10, 2013, the Planning Commission opened a public hearing on the proposed amendments and, on September 24, 2013, approved a motion to recommend that City Council adopt the amendments; and

WHEREAS, the City Council opened a public hearing on October 15, 2013, and finds that the proposed amendments are in the public interest of the City of Milwaukie and will ensure that the TSP remains compliant with the 2035 RTP and the State Transportation Planning Rule.

NOW, THEREFORE, THE CITY OF MILWAUKIE DOES ORDAIN AS FOLLOWS:

Section 1. Findings. Findings of fact in support of the amendments are attached as Exhibit A.

Section 2. Repeal and Replacement. The 2007 Transportation System Plan is repealed and replaced with the new 2013 Transportation System Plan as presented in Exhibit B.

Section 3. Amendments. The Transportation System Plan is amended as described in Exhibit C (strikeout/underline version).

Read the first time on _____, and moved to second reading by _____ vote of the City Council.

Read the second time and adopted by the City Council on _____.

Signed by the Mayor on _____.

_____
Jeremy Ferguson, Mayor

ATTEST:

_____
Pat DuVal, City Recorder

APPROVED AS TO FORM:
Jordan Schrader Ramis PC

_____
City Attorney

Document6 (Last revised 2/6/2008)

Recommended Findings in Support of Approval
File #CPA-13-03, Transportation System Plan Update

Sections of the Milwaukie Municipal Code not addressed in these findings are found to be inapplicable to the decision on this application.

1. The applicant, the City of Milwaukie, is proposing to amend its Transportation System Plan (TSP), an ancillary document to the Comprehensive Plan. The land use application file number is CPA-13-03.

2. The purpose of the proposed amendments is to ensure that the City's TSP remains consistent with Metro's 2035 Regional Transportation Plan (RTP) and therefore compliant with the State Transportation Planning Rule. The proposed amendments will also bring the TSP up to date in its representation of existing conditions and make it more current with regard to the prioritization of improvement projects.

3. The proposal is subject to the following provisions of the Milwaukie Municipal Code (MMC):
   - MMC 19.902 Amendments to Maps and Ordinances
   - MMC 19.1008 Type V Review

4. The application has been processed and public notice provided in accordance with MMC Section 19.1008 Type V Review. Public hearings were held by the Planning Commission on September 10 and September 24, and by City Council on _____, 2013, as required by law.

5. MMC Section 19.1008 Type V Review

   a. MMC Subsection 19.1008.3.A.1 requires opportunity for public comment and review.

      Opportunity for public comment and review has been provided. Public meetings were held on April 17, June 3, and September 5, 2013. The Planning Commission and City Council have each had worksessions that discussed the TSP. Public notice in the form of e-mail to the Neighborhood District Associations and over 50 interested persons, and information on the City website have publicized the Planning Commission's hearing on the TSP to encourage comment by any interested party.

   b. MMC Subsection 19.1008.3.A.2 requires notice of public hearing on a Type V Review to be posted on the City website and at City facilities that are open to the public. A notice of the Planning Commission's September 10, 2013, hearing was posted as required on August 9, 2013. A notice of the City Council's October 15, 2013, hearing was posted as required on September 13, 2013.

   c. MMC Subsection 19.1008.3.A.2 requires notice be sent to individual property owners if the proposal affects a discrete geographic area. The TSP is a document that is applicable to the entire city, and specific property owner notice is not required.

   d. MMC Subsection 19.1008.3.B and C require notice of a Type V application to be sent to Metro 45 days prior to the first evidentiary hearing and to the Department of Land Conservation and Development 35 days prior to the first evidentiary hearing. This notice was sent to Metro on July 26, 2013, and to the DLCD on August 6, 2013.

   e. MMC Subsection 19.1008.3.D requires notice to property owners if, in the Planning Director's opinion, the application would affect the permissible uses of land for those property owners. The TSP is a transportation master plan and does not affect permissible land uses for property owners. As such, this notice is not required

f. MMC Subsection 19.1008.4 and 5 establish the review authority and process for review of a Type V application. The Planning Commission held duly advertised public hearings on September 10 and September 24, 2013, and passed a motion recommending that the City Council approve the Comprehensive Plan amendment. The City Council held a duly advertised public hearing on _____, 2013, and approved the Comprehensive Plan amendments.

6. MMC Section 19.902 Amendments to Maps and Ordinances

a. MMC Subsection 19.902.3.B establishes criteria for Comprehensive Plan amendments. Amendments to ancillary documents such as the TSP are subject to the same criteria.

(1) The proposed amendments are consistent with the goals and policies of the Comprehensive Plan, as proposed to be amended.

(a) Chapter 1 – Citizen Involvement

The City strove to involve citizens throughout the Transportation System Plan (TSP) update process. To reach this goal, the City provided numerous opportunities for citizens to participate in the development of the TSP over the course of seven months. Approximately 60 people chose to participate by attending a public meeting or submitting comments. Public outreach and involvement efforts included the following:

- Open Houses & Workshops (3 meetings total)
- Ongoing E-mail Announcements
- Multiple Pilot Articles and Announcements

In addition to the above events, project staff created a project web site containing up-to-date information about the TSP update process, draft TSP revisions, meeting materials and notes, and information about how to use the TSP.

The TSP was distributed to all Neighborhood District Associations in the City for review and comment prior to the first public hearing. The public was properly notified of all public hearings pursuant to Milwaukie Municipal Code (MMC) Section 19.1008.

As noted in Finding 5, above, both the Planning Commission and City Council held public hearings to consider the proposed amendments and took public testimony on the proposal.

(b) Chapter 5 – Transportation, Public Facilities, Energy Conservation: Transportation Element

In combination with the TSP, the Transportation Element of the Comprehensive Plan reflects the City's long-term transportation goals and policies. The TSP has been updated to reflect current goals and policies, recognize the completion of goals and projects from the 2007 TSP, and reestablish project priorities.

(2) The proposed amendment is in the public interest with regard to neighborhood or community conditions.

The TSP identifies existing problem areas for all modes of transportation in the city, looks into the future to identify the needs created by growth, and provides solutions to existing and future needs with guidelines to develop a more robust multimodal transportation system. By identifying specific needs, the TSP helps guide the City in making future investments in the transportation system and outlines how land use and transportation decisions can be brought together for the benefit of the whole community. The proposed amendments to the TSP further the public interest by updating a document that will be used to improve the transportation infrastructure over the next two decades.

(3) The public need is satisfied by these particular proposed amendments.

The TSP contains the community's vision for the city's transportation system and includes both a policy framework (in the form of goals, policies, and recommendations) and a financially constrained project list (in the form of mode-specific Action Plans). The updates to the TSP reflect the community's preferences related to the project list, and recognize that the City has made progress on several of the projects since 2007.

(4) The proposed amendments are consistent with the Metro Urban Growth Management Functional Plan and relevant regional policies.

The proposed amendments were sent to Metro for comment. Metro did not identify any areas where the proposed amendments were inconsistent with the Metro Urban Growth Management Functional Plan and relevant regional policies.

(5) The proposed amendments are consistent with relevant State statutes and administrative rules, including the Statewide Planning Goals and Transportation Planning Rule.

The proposed amendments were sent to the Department of Land Conservation and Development (DLCD) for comment. DLCD did not identify any areas where the proposed amendments were inconsistent with State statutes and administrative rules.

The City Council finds that these criteria are met.

The City Council finds that the criteria of MMC 19.902 are met.

7. Notice of the proposed legislative changes was posted at City Hall, Ledding Library, and the City's office on Johnson Creek Boulevard, as well as online at the City's website. The proposed amendments were referred to various City departments, governmental agencies, neighborhood district associations (NDA), and stakeholders for review and comment. A draft of the proposed amendments to the TSP was posted online at the City's website, with hard copies made available to the NDAs. The proposed amendments were discussed at several Planning Commission and City Council meetings. Public comments received, including any City responses, are summarized in the staff report.

ATTACHMENT 2

Addendum to Proposed TSP Amendments

List of corrections or edits suggested for TSP amendments after the public review draft was made available on August 20, 2013

Edits highlighted in yellow were completed after the Planning Commission Hearing on September 10th, 2013

Chapter	Figure or Table Number	Edit or Correction	Page Number
1	N/A	Clarified that the intent of the 19th Ave and Sparrow St greenway is to connect to the Trolley Trail.	1-9
3	N/A	Clarified findings related to conditions of railroad crossings to accurately describe conditions as a result of Quiet Zone changes.	3-8
3	N/A	Corrected error that referred to "pedestrian travel" instead of "bicycle travel" in the bicycle findings section.	3-13
3	N/A	Edited "Pavement Conditions" section to clarify that it is the responsibility of the Street Surface Maintenance Program (SSMP) to determine the schedule of surface maintenance projects, not the TSP. *(Additional edits were made after September 10th Planning Commission hearing.)*	3-29
3	Figure 3-11	Added figure to illustrate the location of current, completed, and future Street Surface Maintenance Program projects.	3-31
3	N/A	Added finding that heavy truck traffic cutting through neighborhood streets has impacts on neighborhood livability.	3-45
5	Table 5-1	Split the sidewalk portion of Project V (Stanley Ave Neighborhood Greenway) into north and south segments to assist with future prioritization for funding and implementation.	5-8
5	Table 5-1	Added Adams St Connector project to the Pedestrian Master Plan project list	5-9
5	Table 5-1	Split Project W (Linwood Ave Sidewalks) into North and South segments to assist with future prioritization for funding and implementation.	5-11
5	Table 5-1	Corrected error that listed the extent of Project AI (Washington St Sidewalks) from 35th Ave to 37th Ave, instead of from 32nd Ave to 35th Ave.	5-11
5	Table 5-1	Removed Project AS (Springwater Trail Ramp Improvement at McLoughlin Blvd) because it has been replaced by a Tacoma Station Area Plan project (Project BD).	5-12
5	N/A	Revised text of description for Project AO (Franklin St Sidewalks) to correctly reference "Campbell Elementary School" instead of "Hector Campbell Elementary School."	5-12
5	Table 5-3	Revised Pedestrian Action Plan to reflect project adjustments: • Adams St Connector • Stanley Ave Neighborhood Greenway	5-15

Chapter	Figure or Table Number	Edit or Correction	Page Number
6	N/A	Revised text in third paragraph to clarify that barriers exist for “east-west” travel instead of for “north-south” travel.	6-2
6	Figures 6-1 through 6-6	Added photo credits for all images of bikeway configurations.	6-4 to 6-6
6	N/A	Added description of on-street parking as a potential traffic-calming measure that could be utilized for Neighborhood Greenway treatments.	6-7
6	N/A	Revised list of strategies for increasing bicycle use to include the implementation of a bike share program.	6-8
6	N/A	Revised list of neighborhood greenways to list 17th Ave as a distinct key project and to include 19th Ave and Sparrow St on the list of neighborhood greenway routes.	6-8
6	N/A	Changed language on page 6-8 to accurately describe the three categories of strategy: “capital, operational and maintenance, and policy.” Adjusted “Operational” heading on page 6-9 to be “Operational and Maintenance.”	6-8 and 6-9
6	Table 6-2	Split the bicycle portions of Projects U1 (Monroe St Neighborhood Greenway) and U3 (Stanley Ave Neighborhood Greenway) into multiple segments to assist with future prioritization for funding and implementation. Re-numbered all Neighborhood Greenway projects accordingly.	6-13 to 6-14
6	Table 6-2	Removed Project AA (Springwater Trail Ramp Improvement at McLoughlin Blvd) because it has been replaced by a Tacoma Station Area Plan project (Project AL).	6-17
6	Table 6-3	Revised Bicycle Action Plan to reflect project adjustments: • Monroe St Neighborhood Greenway • Stanley Ave Neighborhood Greenway	6-19
7	Table 7-1	Harrison St Transit Shelter project – Added cost of a transit shelter for stop at Harrison St and 24th Ave.	7-14
8	N/A	Added “by TriMet” to clarify responsibility for intersection improvement projects at Johnson Creek Blvd and 32nd Ave.	8-14
8	Tables 8-5 and 8-7	Standardized references to McLoughlin Blvd (Hwy 99E) as “McLoughlin Blvd” for consistency purposes. *(Additional edits were made after September 10th Planning Commission hearing.)*	8-16, 8-19, 8-27
8	N/A	Revised incorrect reference to Table 8-7 in last paragraph on page 8-24; should refer to Table 8-8.	8-24
8	N/A	Revised one reference to “Highway 224/99E Refinement Plan” text for consistency.	8-28

Chapter	Figure or Table Number	Edit or Correction	Page Number
8	Tables 8-10, 8-11	Revised description of project boundaries of McLoughlin Blvd portion of Hwy 224/99E Refinement Plan in narrative and in Tables 8-10 and 8-11, to be Tacoma St to River Rd instead of River Rd to 17th Ave	8-30, 8-34, and 8-37
8	Table 8-10	Removed Project F (Intersection Improvements at Harrison St and Main St).	8-35
9	N/A	Revised "Neighborhood Livability" recommendations to include reference to Chapter 11 for list of potential strategies to reduce heavy truck traffic on neighborhood streets.	9-4
10	N/A	Removed the word "Element" from chapter title. There are five central elements or modes of travel in the TSP = pedestrian, bicycle, transit, street, freight; this chapter addresses a specific issue.	10-1
10	N/A	Revised all text that proposed changes to street design standards because these changes were implemented after 2007.	10-1 to 10-4, 10-6, 10-8, 10-9, 10-10, and 10-11
11	N/A	Removed the word "Element" from chapter title. There are five central elements or modes of travel in the TSP = pedestrian, bicycle, transit, street, freight; this chapter addresses a specific issue.	11-1
11	N/A	Included freight traffic on list of neighborhood traffic concerns to be addressed through neighborhood traffic management strategies.	11-2
11	N/A	Added description of change in state law that provides the City with the authority to reduce the speed limits on local streets by five miles per hour, in the context of potential tools for traffic calming and management.	11-2
11	N/A	Removed stipulation that NDAs will provide matching funds for traffic management projects. Revised text describing the workings of the neighborhood traffic management program.	11-11
11	Figure 11-1	Added "Neighborhood" to flowchart title to specify that this chart applies to new neighborhood traffic concerns, not issues previously identified as projects in the TSP.	11-12
11	Table 11-2	Removed "with NDA match" from funding source for Walk Safely Milwaukie Program.	11-13
12	N/A	Revised references to "Residential Permit Zone" or "Residential Parking Zone" to be consistent as "Residential Parking Permit Zone."	12-9 and 12-13
12	N/A	Adjusted text in last bullet point on the page to clarify that parking spillover from PMLR station areas could trigger the need for the establishment of a Residential Parking Permit Zone program.	12-9

Chapter	Figure or Table Number	Edit or Correction	Page Number
12	Figure 12-1	Added PMLR alignment and station, changed from "Potential Park and Ride" to "Potential Parking Structure", added number of parking spaces at each Park and Ride, and changed title of figure to remain consistent with 2007 version.	12-10
12	Table 12-1	Adjusted footnote reference to reflect name-change of "Commercial Core Enhancement Program" to "Moving Forward Milwaukie" project.	12-11
12	Table 12-1	Added footnote reference to note that the future of the Southgate Park and Ride is unclear and to clarify the City's preferred future use of the site.	12-11
12	N/A	Revised point about Action Plan for implementation of the Residential Parking Permit Zone program to provide more general guidelines instead of specific procedures. Also adjusted language to acknowledge that neighborhoods near PMLR station areas might also need to establish Residential Parking Permit Zone programs.	12-13
13	N/A	Edited language about Street Surface Maintenance Program (SSMP) to clarify the various sources of funding for the SSMP. *(Additional edits were made after September 10th Planning Commission hearing.)*	13-4 and 13-5
13	Table 13-1	Added "Other Revenue" amount of $60,000 and re-tabulated totals accordingly.	13-5
13	Figures 13-1, 13-2	Replaced pie chart figures to reflect changes in Tables 13-1 and 13-2.	13-6 and 13-8
13	Table 13-2	Corrected computational errors related to Traditional Maintenance Activities and Action Plan Projects costs and re-tabulated totals accordingly.	13-7
13	Figure 13-3	Removed Figure 13-3 and associated text, which illustrated only one option for expected transportation expenditures over the 22-year planning period. Clarified that the TSP does not recommend a specific mix of expenditures, it only provides historical data and projected funding needs based on projects in the TSP.	13-8 and 13-9
13	Table 13-3	Revised Consolidated Action Plan to reflect project adjustments: • Adams St Connector • Monroe St Neighborhood Greenway • Stanley Ave Neighborhood Greenway • Kellogg Creek Underpass • Hwy 224 & Hwy 99E Refinement Plan	13-10 to 13-12
13	N/A	Added paragraph to "TSP Implementation and Update Steps" section to provide more detail about the relationship of the TSP to the Capital Improvement Plan (CIP), which is the main implementation device of the TSP.	13-15

Chapter	Figure or Table Number	Edit or Correction	Page Number
13	Table 13-4	Revised Prioritized Master Plan Project List to reflect project adjustments: • Adams St Connector • Monroe St Neighborhood Greenway • Stanley Ave Neighborhood Greenway • Highway 224 & Hwy 99E Refinement Plan • Intersection improvement project at Harrison St and Main St • Seismic upgrades to Johnson Creek bridges • Springwater Trail Ramp Improvement • Linwood Ave Sidewalks • Washington St Sidewalks • Franklin St Sidewalks • Kellogg Creek Underpass *(Additional edits were made after September 10th Planning Commission hearing.)*	13-16 to 13-18 and 13-21 to 13-25
Appendix F	N/A	Appendix F: Removed Metro Model Data Output info due to confidentiality agreement.	Removed F-1 to F-5
Appendix F	N/A	Appendix F: Added or replaced the following reports for three study intersections (two new and one updated): Linwood/Monroe (new) and King/42nd (new) and Linwood and King (updated). • Traffic count sheets • HCM intersection capacity analysis reports	Traffic Counts: F-61, F-77, F-78 HCM Reports: F-121, F-123 and F-124
Appendix F	N/A	Appendix F: Added 2035 PM Low-Build (Financially Committed) Future Volume Forecasts table.	F-125
Appendix F	N/A	Appendix F: Replaced SPIS (Safety Priority Index System) data for ODOT roadways Highway 224 and 99E.	F-149 to F-154

Note: All page number and figure/table references in the Table of Comments and throughout the document will be revised accordingly as part of the final draft.

BICYCLE FACILITIES

The bicycle is a human-powered vehicle that allows people of all ages to move independently, at relatively low cost and with little impact to the environment. Bicycling promotes the well-being of people who live and work in Milwaukie, with the added benefit of reducing auto traffic on city streets.

Milwaukie's existing bicycle system is deficient in three primary ways: lack of connectivity, difficult crossings, and insufficient street designations. Recommended improvements should be aimed at closing the gaps in the bicycle network, improve crossing safety, maintaining the existing system, improving signage, and educating cyclists and motorists.

Key Recommendations

- ~~**Bike Boulevard**~~**Neighborhood Greenway Improvements:** Prioritize "Neighborhood Greenways" (also sometimes referred to as "Bike Boulevards") as a method for providing safe bikeway connections to other transportation modes and between parks, schools, activity centers, and regional destinations. Establish Neighborhood Greenways along the following routes:
  - Monroe St from downtown to Linwood Ave
  - Stanley Ave from Railroad Ave to Springwater Trail
  - 29th Ave from Springwater Trail to Monroe St (via Harvey St and 40th Ave)
  - 19th Ave and Sparrow St to Trolley Trail
- **Bikeway Improvements:** Improve existing bikeways by paving, striping, adding signage, establishing bike lanes where appropriate, etc.
- **Intersection Improvements:** Make key intersections safer and more functional for cyclists with treatments such as improved striping, accessible signal buttons, and bicycle detection devices.
- **Education:** Improve education for cyclists and drivers and encourage cycling through planned cycling events.
- **Maintenance:** Keep bike lanes clear of debris.
- **Coordination with Other Jurisdictions:**
  - Work with other jurisdictions on long-range projects such as route connectivity and trail system planning and construction.
  - Improve response on day-to-day issues such as sweeping out bike lanes and enforcing traffic and parking laws.

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 ~~northern~~eastern and ~~southern~~western areas of the city is particularly problematic due to the location of Highway 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 Highway 224 also contribute to this barrier effect.
- The ~~widespread~~ 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 ~~asphalt~~ condition at these crossings varies widely. Those crossings with uneven walking surfaces~~, such as the one at Oak St,~~ are of special concern to elderly and disabled individuals.

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.

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 ~~northern~~eastern and ~~southern~~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 ~~pedestrian~~bicycle travel because there are few places where these facilities can be crossed. The roadway width and average vehicle speed on Highway 224 also contribute to this barrier effect.

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.

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

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 ~~program~~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 3-11 shows the location and extent of current, completed, and future SSMP projects.

~~To that effect~~, 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 (~~8-10~~70-100), while lower numbers (~~4~~50 or less) indicate roads that have deteriorated to the point of needing rehabilitation or replacement. Milwaukie's complete PCI survey is ~~included in the Technical Appendix~~updated on an annual basis.

An ~~weighted~~ average PCI[8] 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, ~~collector~~arterial streets have the highest rating, followed by ~~local streets~~collectors and then ~~arterials~~residential/local streets.

Table 3-5 Average Pavement Condition Index

Classification	~~Surveyed~~ Length (~~feet, citywide~~lane miles)	~~Weighted~~ Average Pavement Condition Index
Arterial	~~21,460~~12.23	~~6.2~~78
Collector	~~62,659~~24.97	~~6.9~~64
Residential/Local	~~285,398~~111.1	~~6.5~~58

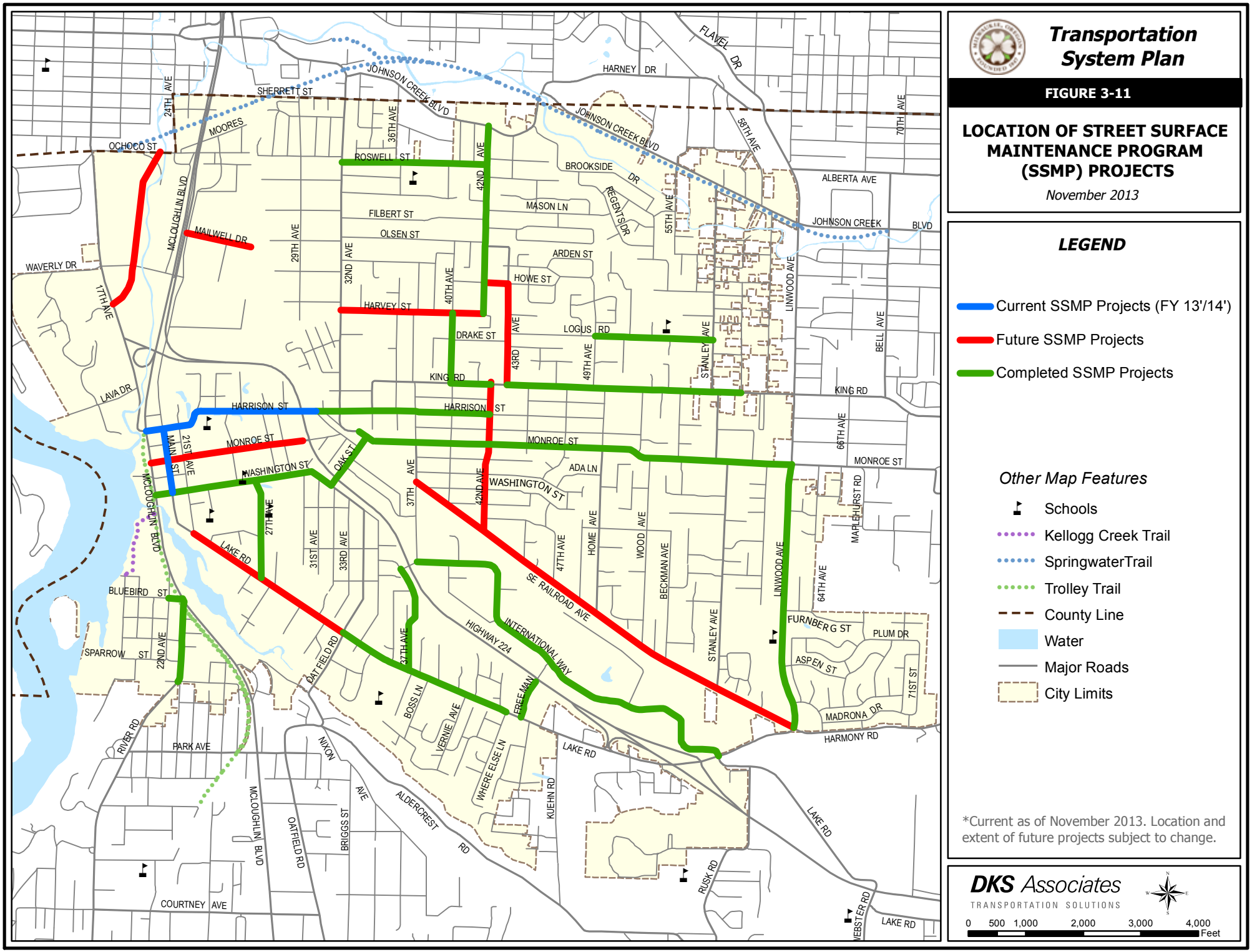
Source: City of Milwaukie PCI Survey, 2013

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 (~~64~~61.8%) and residential/local (~~58~~61.8%) streets can be considered in good to excellent condition. ~~Only 44% of Milwaukie's arterial streets, on the other hand, fall into this category.~~ Over half of Milwaukie's streets rank in the very good to ~~excellent~~good category. In general ~~24~~36%, or ~~nearly 12~~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 ~~51st Ave, 40th Ave, and 49th Ave~~Maple Ct, 56th Ave, and Lloyd St.

Table 3-6 Pavement Condition Index Rating by Functional Classification

Rating (PCI Score)	Street Type ~~and Length in Feet and Percentage~~(as rated by segment)			
	Arterial ~~21,460 ft~~	**Collector** ~~62,659 ft~~	**Residential/Local** ~~284,448 ft~~	**Total** ~~368,567 ft~~

[8] ~~$Average PCI = \frac{\sum (PCI * Length)}{\sum Length}$~~


Transportation System Plan
FIGURE 3-11
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
SpringwaterTrail
Trolley Trail
County Line
Water
Major Roads
City Limits
*Current as of November 2013. Location and extent of future projects subject to change.
DKS Associates
TRANSPORTATION SOLUTIONS
0 500 1,000 2,000 3,000 4,000 Feet
JOHNSON CREEK BLVD
HARNEY DR
FLAVEL DR
SHERRETT ST
OCHOCO ST
MOORES
24TH AVE
36TH AVE
42ND AVE
58TH AVE
70TH AVE
ROSWELL ST
BROOKSIDE DR
REGENTS DR
ALBERTA AVE
JOHNSON CREEK BLVD
MASON LN
FILBERT ST
OLSEN ST
ARDEN ST
HOWE ST
HARVEY ST
DRAKE ST
LOGUS RD
KING RD
MCLOUGHLIN BLVD
MAILWELL DR
29TH AVE
32ND AVE
40TH AVE
43RD AVE
49TH AVE
55TH AVE
LINWOOD AVE
BELL AVE
STANLEY AVE
WAVERLY DR
17TH AVE
LAVA DR
HARRISON ST
MONROE ST
WASHINGTON ST
ADA LN
MAIN ST
21ST AVE
OAK ST
37TH AVE
42ND AVE
47TH AVE
HOME AVE
WOOD AVE
BECKMAN AVE
66TH AVE
MAPLEHURST RD
64TH AVE
LAKE RD
27TH AVE
31ST AVE
33RD AVE
SE RAILROAD AVE
HIGHWAY 224
INTERNATIONAL WAY
FURNBERG ST
PLUM DR
ASPEN ST
71ST ST
MADRONA DR
HARMONY RD
BLUEBIRD ST
SPARROW ST
22ND AVE
OATFIELD RD
37TH AVE
BOSS LN
VERNIE AVE
FREEMAN
WHERE ELSE LN
KUEHN RD
RUSK RD
WEBSTER RD
RIVER RD
PARK AVE
NIXON AVE
ALDERCREST RD
BRIGGS ST
COURTNEY AVE

operates ~~three~~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 ~~Freight and~~ Rail and Freight 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.[19] 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 Highway 224 and McLoughlin Boulevard, as well as weight restrictions on Johnson Creek Boulevard, cause trucks to divert onto local streets not intended or preferred for freight traffic.

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

Map ID[3]	Priority	Type	Project Name	Project Description[4]	From	To	Cost~~(s)~~ ($1,000s[5])
U	~~Low~~High	C	43rd Avenue Sidewalks	Fill in sidewalk gaps on both sides of street.	Howe St/42nd Ave	King Rd/43rd Ave	~~$550~~ 600
V1	High	C	Stanley Avenue ~~Sidewalks~~Neighborhood Greenway (north)	Fill in sidewalk gaps on both sides of street.	Johnson Creek Blvd	~~Railroad Ave~~King Rd	~~$4,304~~ $1,900
V2	High	C	Stanley Avenue Neighborhood Greenway (south)	Fill in sidewalk gaps on both sides of street.	King Rd	Railroad Ave	$2,800
Y	~~Low~~High	C	International Way Sidewalks	Fill in sidewalk gaps on both sides of street.	Criterion Ct	Lake Rd	~~$767~~ 840
Z	~~Low~~High	C	Harmony Road Sidewalks	Fill in sidewalk gaps on both sides of street.	Linwood Ave	City limits	~~$38~~ 40
AL	~~Low~~High	C	River Road Sidewalks	Fill in sidewalk gaps on both sides of street.	McLoughlin Blvd	City limits	~~$626~~ 690
AR	High	C	Kellogg Creek Dam Removal and Hwy 99E Underpass	Replace Hwy 99E bridge over Kellogg Creek, remove dam, restore habitat; construct bike-ped~~estrian~~ undercrossing between downtown Milwaukie and Riverfront Park.	~~Site~~Location specific	~~Site~~Location specific	~~$9,000~~ 9,900
AU	High	C	Kellogg Creek Bike-Ped Bridge	Construct bike-ped overpass over Kellogg Creek in conjunction with light rail bridge.	Lake Rd	Kronberg Park	$2,500
AV	High	C	Kronberg Park Trail	Construct multi-use path to connect bike-ped bridge to safe crossing of Hwy 99E.	Kellogg Creek Bridge	River Rd at Hwy 99E	$300
AW	High	C	Intersection Improvements at McLoughlin Boulevard and 22nd Avenue	Improve safety of Trolley Trail crossing at 22nd Ave.	Location specific	Location specific	$200
AX	High	C	Improved Connection to Springwater Trail at 29th Avenue and Sherrett Street	Pave the connection to Springwater Trail at 29th Ave and Sherrett St. (TSAP)	Location specific	Location specific	$20
AY	High	C	Improved Connection from Springwater Trail to Pendleton Site (Ramps)	Construct ramps to improve existing connection of Springwater Trail to Pendleton site at Clatsop St. (TSAP)	Location specific	Location specific	$630

Map ID[3]	Priority	Type	Project Name	Project Description[4]	From	To	Cost~~(s)~~ (~~$1,000s~~[5])
AY	High	C	Improved Connection from Springwater Trail to Pendleton Site (Widened Undercrossing)	Widen existing undercrossing to improve connection of Springwater Trail to Pendleton site at Clatsop St. (TSAP)	Location specific	Location specific	$100
AZ	High	C	Improved Connection from Springwater Trail to Tacoma Station	Construct stairs to connect Springwater Trail to Tacoma Station. (TSAP)	Location specific	Location specific	$80
BL	High	C	Adams Street Connector	Construct pedestrian- and bicycle-only facility on Adams St between 21st Ave and Main St	21st Ave	Main St	$450
N/A	~~Low~~High	C	Intersection Curb Ramp Improvements	Install curb ramps at all intersections with sidewalks (approximately 700 intersections).	Citywide	Citywide	~~$5~~ 3,500
Medium Priority Projects							
~~J~~	~~Med~~	~~C~~	~~Railroad Crossing Pedestrian Improvements at Oak Street~~	~~Improve intersection for pedestrians.~~	~~Location specific~~	~~Location specific~~	~~$15~~
F	~~High~~Med	C	King Road Boulevard Treatments	Install street boulevard treatments: widen sidewalks and improve multiple crossings.	~~42nd~~43rd Ave	Linwood Ave	~~$500~~ 550
M	Med	C	McLoughlin Boulevard Sidewalks	Fill in sidewalk gaps on both sides of street.	Washington St	Southern city limits	~~$596~~ 650
N	Med	C	Lake Road Sidewalks	Fill in sidewalk gaps on both sides of street.	~~Kuehn Rd~~Where Else Ln	Hwy 224	~~$2,049~~ 2,200
Q	~~High~~Med	C	Logus Road Sidewalks	Fill in sidewalk gaps on both sides of street.	43rd Ave	49th Ave	~~$771~~ 850
T	Med	C	37th Avenue Sidewalks	Fill in sidewalk gaps on both sides of street.	Lake Rd	Harrison St	~~$794~~ 870
AE	Med	C	Brookside Drive Sidewalks	Fill in sidewalk gaps on both sides of street.	Johnson Creek Blvd	Regents Dr	~~$15~~ 20
AT	~~High~~Med	C	Springwater Trail Completion	Contribute to regional project to complete Springwater Trail ("Sellwood Gap") along Ochoco S~~treet~~.	17th Ave	19th Ave	~~$80~~ 90

Map ID[3]	Priority	Type	Project Name	Project Description[4]	From	To	Cost~~(s)~~ ($1,000s[5])
~~I~~	~~Low~~	~~C~~	~~Intersection Improvements at Harmony and Lake~~	~~Improve pedestrian crossing.~~	~~Location specific~~	~~Location specific~~	~~$15~~
K	Low	C	Intersection Improvements at Stanley Avenue and Logus Road	Improve pedestrian crossing.	Location specific	Location specific	~~$15~~ 20
R	Low	C	Olsen Street Sidewalks	Fill in sidewalk gaps on north side of street.	32nd Ave	42nd Ave	~~$432~~ 470
S	Low	C	Johnson Creek Boulevard Sidewalks	Fill in sidewalk gaps on both sides of street.	Harney ~~Dr~~St	City limits	~~$378~~ 410
W1	Low	C	Linwood Avenue Sidewalks (north)	Fill in sidewalk gaps on both sides of street (part of Linwood Ave~~nue~~ road widening project).	Johnson Creek Blvd	~~Railroad Ave~~King Rd	~~$2,960~~ 1,050
W2	Low	C	Linwood Avenue Sidewalks (south)	Fill in sidewalk gaps on both sides of street (part of Linwood Ave road widening project).	King Rd	Railroad Ave	$2,150
X	Low	C	Hwy 224 Sidewalks	Fill in sidewalk gaps on both sides of street.	Oak St	37th Ave	~~$420~~ 460
AA	Low	C	Home Avenue Sidewalks	Fill in sidewalk gaps on both sides of street.	Railroad Ave	King Rd	~~$756~~ 830
AB	Low	C	Harvey Street Sidewalks	Fill in sidewalk gaps on both sides of street.	32nd Ave	42nd Ave	~~$534~~ 590
AC	Low	C	Roswell Street Sidewalks	Fill in sidewalk gaps on both sides of street.	32nd Ave	36th Ave	~~$192~~ 210
AD	Low	C	Mason Lane Sidewalks	Fill in sidewalk gaps on both sides of street.	42nd Ave	Regents Dr	~~$671~~ 740
AF	Low	C	Regents Drive Sidewalks	Fill in sidewalk gaps on both sides of street.	Brookside Dr	Winsor Dr	~~$494~~ 540
AG	Low	C	Rusk Road Sidewalks	Fill in sidewalk gaps on both sides of street.	Lake Rd	North Clackamas Park	~~$662~~ 730
AH	Low	C	Pedestrian Connection to North Clackamas Park	Create pedestrian connection between the school and the park.	~~North Clackamas Park~~Rowe Middle School	~~Rowe Middle School~~North Clackamas Park	~~$1,284~~ 1,400

Map ID[3]	Priority	Type	Project Name	Project Description[4]	From	To	Cost~~(s)~~ ($1,000s[5])
AI	Low	C	Washington Street Sidewalks	Fill in sidewalk gaps on both sides of street.	~~35th~~32nd Ave	~~37th~~35th Ave	~~$115~~ 130
AJ	Low	C	22nd Avenue Sidewalks	Fill in sidewalk gaps on both sides of street.	McLoughlin Blvd	Sparrow St	~~$325~~ 360
AK	Low	C	19th Avenue Sidewalks	Fill in sidewalk gaps on both sides of street.	Kellogg Creek Trail	Sparrow St	~~$305~~ 330
AM	Low	C	Oatfield Road Sidewalks	Fill in sidewalk gaps on both sides of street.	Guilford Ct	City limits	~~$132~~ 150
AN	Low	C	49th Ave Sidewalks	Fill in sidewalk gaps on both sides of street.	Logus Rd	King Rd	~~$250~~ 270
AO	~~Med~~Low	C	Franklin Street Sidewalks	Install sidewalks on both sides of street to connect to ~~Hector~~ Campbell Elementary School.	42nd Ave	45th Ave	~~$200~~ 220
AP	Low	C	Ochoco Street Sidewalks	Construct sidewalks on Ochoco St~~reet~~ to connect bus stops to Goodwill.	19th Ave	McLoughlin Blvd	$1,300
AQ	Low	C	Edison Street Sidewalks	Fill in sidewalk gaps on both sides of street.	35th Ave	37th Ave	~~$116~~ 130
~~AS~~	~~Low~~	~~C~~	~~Springwater Trail Ramp Improvement at McLoughlin Boulevard~~	~~Improve ramp at Springwater Trail and McLoughlin Blvd.~~	~~Location specific~~	~~Location specific~~	~~$15~~
AY	Low	C	Improved Connection from Springwater Trail to Pendleton Site (Tunnel)	Construct tunnel under Springwater Trail to improve connection to Pendleton site at Clatsop St. (TSAP)	Location specific	Location specific	$1,200
BG	Low	C	Intersection Improvement at all Crossings of McLoughlin Boulevard	Improve all existing crossings of McLoughlin Blvd (e.g., extended time for crossing, signage). (ODOT to do.)	Location specific	Location specific	---
BH	Low	C	Bike-Ped Path on Sparrow Street	Establish a dedicated bicycle and pedestrian connection on Sparrow St, connecting River Rd to Trolley Trail	River Rd	Trolley Trail	$350
BI	Low	C	Bike-Ped Overpass over McLoughlin Boulevard at River Road	Establish a dedicated bicycle and pedestrian connection across McLoughlin Blvd.	Kronberg Park	River Rd	$2,500

ACTION PLAN

The Pedestrian Action Plan (Table 5-3) identifies the highest priority projects that are reasonably expected to be funded with local funds by ~~2030~~2035, which meets the requirements of the State's Transportation Planning Rule.[8] The Action Plan project list is ~~the result of~~based upon a 2007 citywide project ranking process. In 2007, ~~A~~all of the modal master plan projects were ranked by the TSP Advisory Committee after consideration of the Working Groups' priorities, other public support for the project, and how well each project implements the TSP goals and policies. For the 2013 TSP Update, City staff reassessed the prioritization of all projects, incorporating public comments gathered at and around a public meeting in June 2013. Action Plan projects that were completed since 2007 were removed from the Action Plan and new projects identified as top priorities were added.~~The highest-ranking pedestrian projects that are reasonably expected to be funded (see Chapter 13) with local funds are shown in Table 5-3.~~

Table 5-3 Pedestrian Action Plan

Map ID	Project Name	Project Description	From	To	Project Cost ($1,000s)	Direct Funding or Grant Match
L	17th Avenue ~~Sidewalks~~Improvements	Fill in sidewalk gaps on both sides of street; fill in gaps in existing bicycle network with bike lanes; and/or provide multi-use path. ~~and~~ iImprove intersection~~s~~ safety at Milport Rd, McBrod Ave, Hwy 224, Lava Dr, and Hwy 99E.	Ochoco St	McLoughlin Blvd	$1,000	~~Direct~~ Match
BL	Adams Street Connector	Construct pedestrian- and bicycle-only facility on Adams St between 21st Ave and Main St	21st Ave	Main St	$450	Match
O	Railroad Avenue ~~Sidewalks~~Capacity Improvements	Pedestrian aspect: Fill in sidewalk gaps on both sides of street or construct multi-use path on one side~~(part of Railroad Avenue road widening project)~~.	37th Ave	Harmony Rd	$1,800	Match
P	Monroe Street ~~Sidewalks~~Neighborhood Greenway	Fill in sidewalk gaps on both sides of street.	42nd Ave	City limits	$1,800	Match
AR	Kellogg Creek Dam Removal and Hwy 99E Underpass	Replace 99E bridge over Kellogg Creek, remove dam, restore habitat; construct bike-pe~~destrian~~ undercrossing between downtown Milwaukie and Riverfront Park.	~~Site~~Location specific	~~Site~~Location specific	$9,900	Match
V1	Stanley Avenue Neighborhood Greenway (north)	Fill in sidewalk gaps on both sides of street.	Johnson Creek Blvd	King Rd	$1,900	Match
V2	Stanley Avenue Neighborhood Greenway (south)	Fill in sidewalk gaps on both sides of street.	King Rd	Railroad Ave	$2,800	Match

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

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

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

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

Crossings

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

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

Street Designations

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

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

Figure 6-1 Multi-use Path

Photo Credit: Vince Schreck, www.pdxfamilyadventures.com

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

Cycle Tracks

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

Figure 6-2 Cycle Track

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

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

Bike Lanes

When possible, bike lanes should be directly adjacent to the curb, rather than adjacent to parked cars or combined with sidewalks. The recommended width of six feet provides sufficient

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

travel space and additional room for bicyclists to steer clear of the curb or parked cars while maintaining a comfortable distance from adjacent moving traffic. Wide bike lanes also enable bicyclists to maneuver around drainage grates, manhole covers, glass and debris. Provision of bike lanes also benefits motor vehicles, which gain greater shy distance/emergency shoulder area, and pedestrians, who gain a buffer between walking areas and moving vehicles. Where right-of-way is limited, the bike lane can be reduced to five feet. Alternatively, widening the curb travel lane (for example, from 12 feet to 14 or 15 feet) can provide better bicycle accommodations and a greater measure of safety as well. However, with higher-volume roadways (e.g., streets with more than 3,000 Average Daily Trips), dedicated bike lanes are much more desirable than wide outside lanes.

Figure 6-3 Bike Lane

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

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

Shared Roadways

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

Figure 6-4 Shared Roadway

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

Figure 6-~~1~~5 Bicycle Signs and Markings

Bicycle Warning Sign

"Share the Road" Plaque

Bike Route Sign

Bicycle Pavement Marking

Bicycle Wayfinding Signage

It should be noted, however, that while posting "Bike Route" signage for bicyclists is an acceptable way for the City to demarcate bike routes, such signs should be coupled with pavement markings and/or way finding signage for bicyclists to get the most value out of the City's investment. Although this is an adopted MUTCD sign, it does not provide much information. Adding way-finding information such as distances to various destinations, directional arrows, and estimated travel times makes the sign much more useful. These signs are most effective when placed in useful locations, such as where a bike route makes a turn that is not intuitive to riders.

~~Bike Boulevards~~Neighborhood Greenways

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

Figure 6-6 Neighborhood Greenway

Image Credit: Bicycle Transportation Alliance/Owen Walz owenwalzdesign.com

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

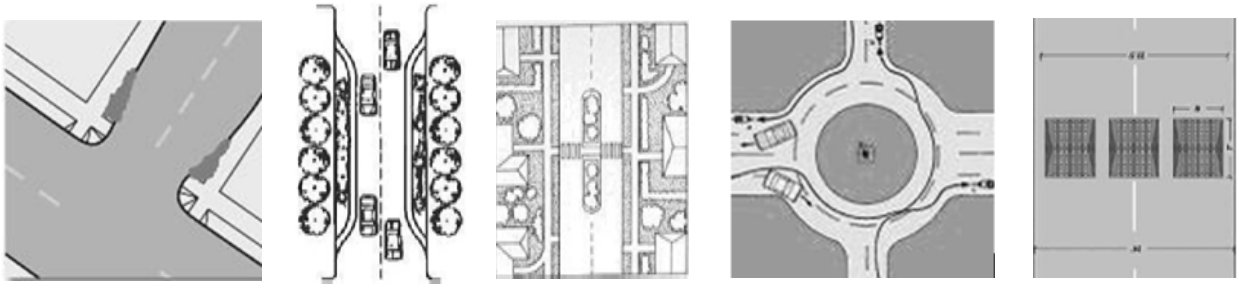
Milwaukie's ~~bike boulevard~~ neighborhood greenway network could be developed through a variety of improvements ranging from minor street enhancements (e.g., directional pavement markings) to larger-scale projects (e.g., intersection signalization). The various treatments fall into five major application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

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

Corridors targeted for higher-level applications would also receive relevant lower-level treatments. For instance, a street targeted for Level 3 applications should also include Level 1 and 2 applications as necessary. It should be noted that some applications might not be appropriate on all streets. In other words, it may not be necessary to implement all Level 2 applications on a particular street designated for Level 2 treatment in order to create a functional ~~bike boulevard~~neighborhood greenway.

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

Figure 6-7 Sample Traffic Calming Measures



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

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

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

Bicycle Parking

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

RECOMMENDATIONS

Strategies

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

- Fill in gaps in the existing bike corridor network (on arterials and collectors).
- Construct new bike lanes on strategic arterials and collectors.
- Connect key bicycle corridors to schools, parks, ~~and~~ activity centers, and major transit stops.
- Improve crossing safety and connectivity.
- Designate ~~bike boulevards~~neighborhood greenways on lower-volume streets that connect major bicycle facilities and/or bicycle destinations.
- Maintain bike lanes, off-street paths, signage, and other facility improvements.
- Construct and improve multi-use paths for recreational and commuter use.
- Involve cyclists in the design and planning of bicycle and road facilities.
- Educate cyclists and motorists about bicycle routes, laws, and opportunities.
- Directly implement or encourage the establishment of a bike share program. This strategy could range from City ownership and administration of a bike share system to revisions to the Municipal Code to allow for bike share facilities owned by other private or public entities.

These strategies will be used to guide and develop projects that address the needs of the bicycling community in Milwaukie as well as those of bicyclists throughout the region. The projects resulting from these strategies fall into three categories: capital, operational~~,~~ and maintenance, and policy. Capital strategies involve building physical infrastructure, operational and maintenance strategies aim to make existing infrastructure more usable, and policy-oriented strategies seek to modify public processes in order to more effectively support bicycling as a viable transportation mode. Key projects in each of these categories are described below.

Capital

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

Key projects

17th Ave between Waverly Dr and Harrison St is a key bicycle connection between downtown Milwaukie and the Sellwood neighborhood in Portland. This connection will be improved by constructing bike lanes and/or a multi-use path. In addition, ~~S~~several potential ~~bike boulevard~~neighborhood greenway corridors have been identified to enhance Milwaukie's bicycle network. The corridors were identified with respect to major bicycling destinations as well as their proximity to desired bicycle travel routes. The recommended corridors are shown in Figure 6~~.2~~-3a and described below:

- ~~17th Ave between Waverly Dr and Harrison St, a key bicycle connection between downtown Milwaukie and the Sellwood neighborhood in Portland. The connection should be improved by constructing bike lanes or a multiuse path.~~
- Monroe St between downtown Milwaukie and Linwood Ave
- Stanley Ave between Railroad Ave and Johnson Creek Blvd
- A corridor roughly following 40th Ave north from Monroe St and then splitting into two separate corridors at Harvey St. One ~~bike boulevard~~neighborhood greenway would continue north on 40th Ave and follow Olsen St and 42nd Ave to connect with Johnson Creek Blvd. The second ~~bike boulevard~~neighborhood greenway would follow Harvey St west from 40th Ave and follow Balfour St, 29th Ave, and Van Water St to connect with the Springwater Corridor. If 29th Ave is extended to the south, the ~~bike boulevard~~neighborhood greenway should connect to the south as well (see Figure 8-3a, which shows the future extension of 29th Ave).
- A corridor following 19th Ave south from Eagle St to Sparrow St, then east on Sparrow St to River Rd. This corridor could be extended east on Sparrow St with construction of a multi-use path connecting to the Trolley Trail.

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

Operational and Maintenance

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

Key projects

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

Table 6-2 Bicycle Master Plan Projects

Map ID[3]	Priority	Type	Project Name	Project Description	From	To	Cost~~(s)~~ (~~$1,000s~~[4])
High Priority Projects							
E	~~Low~~High	C	Intersection Improvements at Linwood Avenue and Monroe Street	Improve safety of crossing at intersection.	Location specific	Location specific	$10
G	High	C	Hwy 224 Crossing Improvements at Oak and Washington Streets	Improve intersection crossing safety for cyclists at Washington St~~reet~~ and Oak St~~reet.~~	Location specific	Location specific	$10
J	~~Low~~High	C	Lake Road Bike Lanes	Fill in gaps in existing bicycle network with bike lanes ~~(cost included with Lake Road road widening project)~~.	Main St	Guilford Dr	~~NA~~ $3,400
N	High	C	Railroad Avenue ~~Bike Lanes~~Capacity Improvements	Bicycle aspect: Fill in gaps in existing bicycle network with bike lanes, cycle track, multi-use path, or other facilities ~~(cost included with Railroad Avenue road widening project)~~.	37th Ave	Linwood Ave	~~N/A~~ $4,800
U1	High	C	Monroe Street ~~Bicycle Boulevard~~Neighborhood Greenway (downtown)	Designate as a ~~Bicycle Boulevard~~Neighborhood Greenway and install ~~bicycle~~bike boulevard improvements.	21st Ave	~~Linwood Ave~~Hwy 224	~~$300~~ $85
U2	High	C	Monroe Street Neighborhood Greenway (central)	Designate as a Neighborhood Greenway and install bike boulevard improvements.	Hwy 224	42nd Ave	~~$300~~ $80
U3	High	C	Monroe Street Neighborhood Greenway (east)	Designate as a Neighborhood Greenway and install bike boulevard improvements.	42nd Ave	Linwood Ave	~~$300~~ $165
U4	High	C	29th/Harvey/40th ~~Bicycle Boulevard~~Neighborhood Greenway	Designate as a ~~Bicycle Boulevard~~Neighborhood Greenway and install ~~bicycle~~bike boulevard improvements.	Springwater Trail	Monroe St	~~$200~~ 220
U5	~~Med~~High	C	Stanley Avenue ~~Bicycle Boulevard~~Neighborhood Greenway (north)	Designate as a ~~Bicycle Boulevard~~Neighborhood Greenway and install ~~bicycle~~bike boulevard improvements.	Springwater Trail	~~Railroad Ave~~King Rd	~~$300~~ 135

[3] See Figure 6-~~2~~3a.
[4] Project costs are in ~~2007~~2012 dollars. Future costs may be more due to inflation. Costing details can be found in the Technical Appendix. In the case of operational projects, estimated costs are for the entire 22-year planning period.

Map ID[3]	Priority	Type	Project Name	Project Description	From	To	Cost~~(s)~~ ($1,000s[4])
U6	High	C	Stanley Avenue Neighborhood Greenway (south)	Designate as a Neighborhood Greenway and install ~~bicycle~~bike boulevard improvements.	King Rd	Railroad Ave	~~$300~~ 195
Z	High	C	17th Avenue ~~Bikeway and Intersection Safety~~ Improvements	Fill in sidewalk gaps on both sides; ~~F~~fill in gaps in existing bicycle network with bike lanes; and/or provide multi-use path. Improve intersection safety at Milport Rd, McBrod Ave, Hwy 224, Lava Dr, and Hwy 99E.~~and eastbound connection at 17th Ave/Hwy 99E. Improve intersection safety at 17th Ave/Hwy 224.~~	Waverly Dr	Harrison St	~~$135~~ 1,000
~~NA~~AC	~~Low~~High	C	Kronberg Park Trail	~~Construct multi-modal trail along Kellogg Creek, connecting Kronberg Park to downtown Milwaukie~~. Construct multi-use path to connect bike-ped bridge to safe crossing of Hwy 99E.	~~McLoughlin Blvd~~Kellogg Creek Bridge	~~Downtown~~River Rd at Hwy 99E	~~$1,200~~ 300
AD	High	C	Kellogg Creek Bike-Ped Bridge	Construct bike-ped overpass over Kellogg Creek in conjunction with light rail bridge.	Lake Rd	Kronberg Park	$2,500
AE	High	C	Kellogg Creek Dam Removal and Hwy 99E Underpass	Replace Hwy 99E bridge over Kellogg Creek, remove dam, restore habitat; construct bike-ped undercrossing between downtown Milwaukie and Riverfront Park.	Location specific	Location specific	~~$9,000~~ 9,900
AF	High	C	Intersection Improvements at McLoughlin Boulevard and 22nd Avenue	Improve safety of Trolley Trail crossing at 22nd Ave.	Location specific	Location specific	$200
AG	High	C	Improved Connection to Springwater Trail at 29th Avenue and Sherrett Street	Pave the connection to Springwater Trail at 29th Ave and Sherrett St. (TSAP)	Location specific	Location specific	$20
AH	High	C	Improved Connection from Springwater Trail to Pendleton Site (Ramps)	Construct ramps to improve existing connection of Springwater Trail to Pendleton site at Clatsop St. (TSAP)	Location specific	Location specific	$630
AH	High	C	Improved Connection from Springwater Trail to Pendleton Site (Widened Undercrossing)	Widen existing undercrossing to improve connection of Springwater Trail to Pendleton site at Clatsop St. (TSAP)	Location specific	Location specific	$100
~~NA~~	~~High~~	~~C~~	~~Bike Route Signage~~	~~Install neighborhood bike route signage.~~	~~Citywide~~	~~Citywide~~	~~$150~~

Map ID[3]	Priority	Type	Project Name	Project Description	From	To	Cost~~(s)~~ ($1,000s[4])
P	Low	C	Linwood Avenue Bike Lanes (north)	Fill in gaps in existing bicycle network with bike lanes.	Queen Rd	Johnson Creek Blvd	~~$1,692~~ 1,900
Q	Low	C	Linwood Avenue Bike Lanes (south)	Fill in gaps in existing bicycle network with bike lanes.	Juniper St	Harmony Rd	~~$296~~ 320
R	Low	C	Rusk Road Bike Lanes	Fill in gaps in existing bicycle network with bike lanes.	Lake Rd	North Clackamas Park	~~$936~~ 1,000
~~T~~	~~Low~~	~~C~~	~~21st Avenue Bike Lanes~~	~~Fill in gaps in existing bicycle network with bike lanes.~~	~~Harrison St~~	~~Lake Rd~~	~~$50~~
X	Low	C	Kellogg Creek Trail Improvements	Resurface trail and provide wayfinding signage to/from trail.	Milwaukie Riverfront	Treatment Plant	~~$623~~ 680
~~Y~~	~~Low~~	~~C~~	~~Trolley Trail Signage~~	~~Design and install Trolley Trail signage.~~	~~Milwaukie Riverfront~~	~~Southern city limits~~	~~$54~~
~~AA~~	~~Low~~	~~C~~	~~Springwater Trail Ramp Improvement at McLoughlin Boulevard~~	~~Improve ramp at Springwater Trail and McLoughlin Blvd.~~	~~Location specific~~	~~Location specific~~	~~$15~~
AH	Low	C	Improved Connection from Springwater Trail to Pendleton Site (Tunnel)	Construct tunnel under Springwater Trail to improve connection to Pendleton site at Clatsop St. (TSAP)	Location specific	Location specific	$1,200
AO	Low	C	Bike-Ped Path on Sparrow Street	Establish a dedicated bicycle and pedestrian connection on Sparrow St, connecting River Rd to Trolley Trail	River Rd	Trolley Trail	$350
AP	Low	C	Bike-Ped Overpass over McLoughlin Boulevard at River Road	Establish a dedicated bicycle and pedestrian connection across McLoughlin Blvd.	Kronberg Park	River Rd	$2,500
AQ	Low	C	Crossing Improvements of McLoughlin Boulevard at Ochoco Street and Milport Road	Construct improvements at Ochoco St and Milport Rd to improve bike-ped crossing of McLoughlin Blvd (per ODOT, this will require full intersection improvements). (TSAP)	Location specific	Location specific	$8,320
AR	Low	C	Bicycle-Pedestrian Connection between McLoughlin Boulevard and Stubb St	Establish bike-ped connection to McLoughlin Blvd sidewalk at west end of Stubb St. (TSAP)	Location specific	Location specific	$20
N/A	Low	O	Milwaukie Bike Map	Produce a Milwaukie Bike Map.	Citywide	Citywide	~~$50~~ 60
N/A	Low	O	Police Enforcement on Drivers	Enforce laws related to bike lanes and bicycle safety.	Citywide	Citywide	$10
N/A	Low	O	Bike Lane Striping	Re-stripe existing bike lanes and stripe bike lanes on streets where buses and bicyclists share the road.	Citywide	Citywide	$20

Action Plan

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

Table 6-3 Bicycle Action Plan

Map ID	Project Name	Project Description	From	To	Project Cost ($1,000s)	Direct Funding or Grant Match
Z	17th Avenue ~~Bikeway and Intersection Safety~~ Improvements	Fill in sidewalk gaps on both sides; ~~F~~fill in gaps in existing bicycle network with bike lanes; and/or provide multi-use path. Improve intersection safety at Milport Rd, McBrod Ave, Hwy 224, Lava Dr, and Hwy 99E.~~and eastbound connection at 17th Ave/Hwy 99E. Improve intersection safety at 17th Ave/Hwy 224.~~	Waverly Dr	Harrison St	$1,000	Match
U1	Monroe Street~~Bicycle Boulevard~~Neighborhood Greenway (downtown)	Designate as a ~~Bicycle Boulevard~~Neighborhood Greenway and install ~~bicycle~~bike boulevard improvements.	21st Ave	~~Linwood Ave~~Hwy 224	~~$330~~ $85	Match
U2	Monroe Street Neighborhood Greenway (central)	Designate as a Neighborhood Greenway and install bike boulevard improvements.	Hwy 224	42nd Ave	$80	Match
U3	Monroe Street Neighborhood Greenway (east)	Designate as a Neighborhood Greenway and install bike boulevard improvements.	42nd Ave	Linwood Ave	$165	Match
U5	Stanley Avenue Neighborhood Greenway (north)	Designate as a Neighborhood Greenway and install bike boulevard improvements.	Springwater Trail	~~Railroad Ave~~King Rd	~~$330~~ $135	Match
U6	Stanley Avenue Neighborhood Greenway (south)	Designate as a Neighborhood Greenway and install bike boulevard improvements.	King Rd	Railroad Ave	$195	Match
N	Railroad Avenue Capacity Improvements	Bicycle aspect: Fill in gaps in existing bicycle network with bike lanes, cycle track, multi-use path, or other facilities.	37th Ave	Linwood Ave	$4,800	Match
AD	Kellogg Creek Bike-Ped Bridge	Construct bike-ped overpass over Kellogg Creek in conjunction with light rail bridge.	Lake Rd	Kronberg Park	$2,500	Match

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

Table 7-1 Public Transit Master Plan Projects

Priority	Type	Project Name	Project Description	From	To	Cost~~(s)~~ (~~$1,000s~~[10])
High Priority Projects						
High	C	Downtown Transit Center Improvements	Construct new bus layover facility outside of the downtown core. ~~Improve downtown bus stops and shelters consistent with level 3 features and including ample bike parking.~~	Location specific	Location specific	$1,250
~~High~~	~~C~~	~~Railroad Avenue Transit Improvements~~	~~Improve Railroad Ave for bus service to extend to Clackamas Town Center and points east. Part of Railroad Ave widening project identified in Table 8-8.~~	~~42nd Ave~~	~~Eastern city limits~~	~~TBD~~
High	SE	Railroad Avenue ~~Bus Service~~Capacity Improvements	~~Identified bus route need.~~Transit aspect: Provide bus service to extend to Clackamas Town Center and points east.	Harrison St	Eastern city limits	TBD
High	SE	Johnson Creek Blvd Bus Service	Identified bus route need.	45th Ave	Eastern city limits	TBD
High	SE	Park-and-Ride Bus Service	Reroute bus line #70 to serve the Milwaukie Park-and-Ride on Main Street.	Location specific	Location specific	TBD
~~Low~~High	O	Milwaukie Transportation Management Association Program	Implement a transportation management association for downtown employers.	Milwaukie Town Center	Milwaukie Town Center	$200
High	SE	Downtown Loop Bus	Establish bus service from downtown to Tacoma and Park Ave Station.	Downtown	Tacoma Station, Park Ave Station	TBD
High	SE	Neighborhood Loop Bus	Establish bus service between eastern neighborhoods and downtown.	Eastern city limits	Downtown	TBD
Medium Priority Projects						
~~Med~~	~~C~~	~~Park-and-Ride Facilities~~	~~Add new park-and-ride capacity at former Southgate theater site. Other potential new park-and-ride locations are: Kmart parking lot, SE corner of Linwood Ave and King Rd, SW corner of Park Ave and Hwy 99E, and 37th Ave behind Milwaukie Marketplace.~~	~~Location specific~~	~~Location specific~~	~~TBD~~
Med	C	Harrison Street Transit Shelter at 24th Avenue	Install transit shelter at Harrison St and 24th Avenue, as this stop currently meets minimum boarding requirements.	Location specific	Location specific	~~TBD~~ $5

[10] Project costs are order of magnitude estimates and are in ~~2007~~2013 dollars. Future costs may be more due to inflation. Costing details can be found in the Technical Appendix. In the case of operational projects, estimated costs are for the entire 22-year planning period.

Linwood Ave @ King Rd	D	47.5	0.83	**E**	~~**70.3**~~ **61.1**	~~**0.98**~~ **0.94**
Linwood Ave @ Harmony Rd	**E**	**64.5**	0.94	~~C~~**F**	~~27.3~~ **>80.0**	~~0.73~~ **1.55**

Notes: A/A=major street LOS/minor street LOS
Signalized and all-way stop delay = average vehicle delay in seconds for entire intersection
Unsignalized delay = highest minor street approach delay
Intersections shown in **bold type** exceed jurisdictional standards or have V/C ratios >1.0
Intersections and corresponding LOS or V/C are illustrated in Figure 8-2

Milwaukie's needs, in terms of capacity~~-related~~ improvements, are generally greater on~~-along~~ regionally significant routes such as Highway 99E (McLoughlin Blvd) and Highway 224 due to the role these routes play in carrying people to destinations throughout the region while passing through the city.

Two of the study intersections currently do not meet the City's Minimum Acceptable Measure of Effectiveness of LOS D: (1) Johnson Creek Blvd at 32nd Ave and (2) Linwood Ave at Harmony Rd.

- **Johnson Creek Blvd at 32nd Ave:** As part of the Portland-Milwaukie Light Rail project, a traffic signal and westbound left turn lane are planned to be constructed for this intersection by TriMet. Table 8-4 considers the intersection as-is and so represents the projected LOS if the planned improvements are NOT made.
- **Linwood Ave at Harmony Rd:** This intersection is within the jurisdiction of Clackamas County and is being addressed as part of the County's current TSP update project. Milwaukie City Council has indicated willingness to consider the current LOS E to be acceptable, given neighborhood concerns about the traffic implications of a major improvement to the intersection.

Figure 8-3 depicts the study area intersections with good, adequate, or poor operational performance during the PM peak hour in the year 2035. As can be seen in this figure, approximately half (10 of 24) of the study intersections will operate under poor conditions in 2035. The high growth in volumes along regional facilities such as McLoughlin Blvd and Highway 224 will not only bring those facilities close to capacity but will also create significant delay on side streets. The future operational analysis for each intersection is outlined in the following sections.

The introduction of the light rail line may affect operational performance at key intersections downtown. As a result, a future update to the TSP may need to include new intersections on the study list (e.g., Washington St and Main St, Washington St and 21st Ave).

Table 8-5 summarizes the existing and future needs that have been identified and lists potential strategies to address each need.

Table 8-5 Summary of Motor Vehicle System Gaps and Needs

Reference ID	Location	Need	Potential Strategies to Address Need				
			Intersection Control	Lane Channelization	Alternative Route Improvements	Transportation System Management & Operations (TSMO)	Corridor Extension/ Widening
		Existing Intersection Needs					
N1	Johnson Creek Blvd @ 32nd Ave	Intersection Capacity	X	X	X	X	
N2	Linwood Ave @ Harmony Rd	Intersection Capacity		X	X	X	
N3	Highway 224 @ Lake Rd	Safety Improvements	X	X			
		Future Intersection Needs					
N4	Monroe St @ Linwood Ave	Intersection Capacity	X	X	X	X	
N5	Highway 224 @ Harrison St	Intersection Capacity		X	X	X	
N6	McLoughlin Blvd @ Harrison St	Intersection Capacity		X	X	X	
N7	McLoughlin Blvd @ Washington St	Intersection Capacity		X	X	X	
N8	McLoughlin Blvd @ River Rd	Intersection Capacity		X	X	X	
N9	Highway 224 @ 37th Ave	Intersection Capacity		X	X	X	
N10	Highway 224 @ Freeman Way	Intersection Capacity		X	X	X	
N11	Johnson Creek Blvd @ Linwood Ave	Intersection Capacity		X	X	X	
N12	Linwood Ave @ King Rd	Intersection Capacity		X	X	X	
		Future Corridor Needs					
N13	Johnson Creek Blvd	Corridor Capacity			X	X	X
N14	Linwood Ave	Corridor Capacity			X	X	X
N15	McLoughlin Blvd (Hwy~~OR~~ 99E)	Corridor Capacity			X	X	X
N16	Oatfield Rd	Corridor Capacity			X	X	X
		Aterial/Collector Grid System Gaps					
N17	Johnson Creek Boulevard (near 42nd Avenue) to Lake Road (near Oatfield Road)	North-south arterial connection					X
N18	McLoughlin Blvd (Hwy~~OR~~ 99E) to Linwood Ave (between Johnson Creek Boulevard and Harrison Street / King Road)	East-west collector connection					X

Table 8-4~~5~~6 Access Spacing Standards for City Street Facilities

Access Treatment	Functional Classification	Intersection				Desirable Signal Spacing[~~62~~63]	Median Control
		Public Road		Private Drive			
		Type	Spacing	Type	Spacing		
Full control (freeway)	Arterials	Interchange	2-3 mi	None	NA	None	Full
Partial control	Arterials	At grade	530-1000 ft	Lt/Rt Turns	300 ft	1000 ft	Partial/None
Partial control	Collectors	At grade	300-600 ft	Lt/Rt Turns	150 ft	1,000 ft	None

Many existing roadways and driveways do not meet these standards because they were installed when traffic volumes were substantially lower and before the City established access spacing criteria. As traffic volumes increase, controlling access on arterial and collector roadways will be important to maintaining a safe and functioning street network.

Access Management for State Facilities

The Oregon Highway Plan (OHP) defines access spacing standards on state facilities for roadways such as McLoughlin Blvd and Highway 224. These standards are shown in Table 8-~~5~~6. Preserving capacity on state facilities is especially important, since substandard performance due to a lack of capacity could force drivers to look for alternative routes along city streets.

Table 8-~~5~~7 Access Spacing Standards for ODOT Facilities

Facility	Location	Highway Classification	National Highway System	Truck Route	Freight Route	Access Spacing Standard (ft)
~~(~~McLoughlin Blvd~~)~~ (Highway 99E)	North city limits to Hwy 224	Statewide	Yes	Yes	Yes	990
	Hwy 224 to Scott St	District	No	Yes	No	500
	Scott St to River Rd	District (Special Transportation Area)*	No	Yes	No	175*
	River Rd to South city limits	District	No	Yes	No	500
~~ORE~~Highway 224	17th Ave to ~~Hwy 99E~~McLoughlin Blvd	District	No	No	Yes	500
	~~Hwy 99E~~McLoughlin Blvd to East city limits	Statewide (Expressway)	Yes	Yes	Yes	2640

*Minimum access management spacing for public road approaches is the existing city block spacing or the city block spacing as identified in the local comprehensive plan. Public road connections are preferred over private driveways, and in Special Transportation Areas, driveways are discouraged. However, where driveways are allowed and where land use patterns permit, the minimum access management spacing for driveways is 175 feet (55 meters) or mid-block if the current city block is less than 350 feet (110 meters).[~~74~~75]

[~~64~~] Generally, signals should be spaced to minimize delay and disruptions to through traffic. Signals may be spaced at intervals closer than those shown to optimize capacity and safety.
[~~75~~] Oregon Department of Transportation (ODOT), 1999 Oregon Highway Plan (OHP).

~~***Insert Figure 8-3b - Functional Classification***~~

Transportation Demand Management

Transportation Demand Management (TDM) is a general term used to describe any action that removes single occupant vehicle trips from the roadway network during peak travel demand periods. As growth occurs, the number of vehicle trips and travel demand in the area will also increase. The ability to change a user's travel behavior and provide alternative mode choices will help to minimize the potential growth in trips.

Generally, TDM focuses on promoting alternative modes of travel for large employers as a way to reduce the vehicle miles traveled. This is due in part to the Employee Commute Options (ECO) rules that were passed by the Oregon Legislature in 1993 to help protect the health of Portland area residents from air pollution and to ensure that the area complied with the Federal Clean Air Act.[~~96~~]

Currently, Metro supports an online tool, "Drive Less. *Connect*," through the Regional Travel Options program that promotes a ride-matching service for area residents. It connects carpoolers and bike buddies. Since the launch in 2011, commuters avoided using approximately 50,000 gallons of gasoline and saved roughly $308,000 collectively by joining carpools, biking, and riding transit.

Research has shown that a comprehensive set of complementary policies implemented over a large geographic area can have a measured effect on the number of vehicle miles traveled to/from that area.[~~107~~] However, the same research indicates that for TDM measures to be effective, they should go beyond the low-cost, noncontroversial measures commonly used such as carpooling, establishing transportation coordinators or associations, and designation of priority parking spaces.

The more effective TDM measures include parking and congestion pricing, improved services for alternative modes of travel, and other market-based measures. However, TDM includes a wide variety of actions that are specifically tailored to the individual needs of an area. In general, TDM elements and programs have a potential trip reduction ranging between one and ten percent. To help implement TDM measures in the future, the City should consider setting TDM goals and policies for new development.

With an increase in the number of projected regional trips through the city, ~~regionwide~~regional TDM measures should help to reduce congestion and be a benefit to the City of Milwaukie and the region. The RTP includes TDM projects for the Milwaukie area in the ~~2030~~2035 financially constrained plan. These measures are identified in Table 8-~~6~~7~~8~~8.

[~~97~~] Oregon Administrative Rules, Chapter 340, Division 30.
[~~108~~] *The Potential for Land Use Demand Management Policies to Reduce Automobile Trips*, ODOT, by ECO Northwest, June 1992.

- **Johnson Creek Blvd/32nd Ave:** This intersection is in the city of Portland which has an operating standard of LOS D. PM peak signal warrants are currently met at this intersection. Installing a traffic signal and a ~~southbound~~westbound left-turn lane would improve the LOS at this intersection from F to ~~C~~D.[~~13~~9] This improvement is consistent with TriMet plans as part of the PMLR project. As an alternative improvement, ~~W~~widening the existing bridge north of 32nd Ave would be necessary to provide a southbound left turn lane at this intersection and realign the intersection so that 32nd Ave would form a T-intersection with Johnson Creek Blvd. While ~~T~~this realignment would be more conducive to serve traffic demands along Johnson Creek Blvd, the primary travel corridor, bridge widening would significantly increase the project cost. A roundabout may be an alternative for this location.

  While not studied, the two all-way stop controlled intersections east of 32nd Ave (36th and 42nd Aves) would likely require similar treatment (traffic signal with turn lanes) to meet operational standards. As with the 32nd Ave intersection, the scale of the improvements does not fit well in the residential neighborhood setting. Limiting the project to signals alone would not bring the intersection operations to the desired standard but would relieve traffic congestion.

  The City of Portland has jurisdiction of Johnson Creek Blvd from Tacoma St to just west of 40th Ave, the section that includes the 32nd Ave intersection. Portland does not have plans to modify the bridge or the roadway. Clackamas County has jurisdiction north of Brookside Dr and continuing eastward. The County's TSP includes a project to widen the bridge over Johnson Creek. Milwaukie has jurisdiction over the intersection of Johnson Creek Blvd/42nd Ave, and will coordinate with Portland and Clackamas County if improvements are considered in this corridor. The project listed in the Master Plan is for signalization only at 42nd Ave.

- **Johnson Creek Blvd/Linwood Ave:** Adding eastbound, ~~and~~ westbound, and northbound right-turn lanes would improve the operations at this intersection from F to D. No additional improvement would be necessary for the operation of this intersection to meet City standards. Any intersection improvements should protect, if not improve, the Springwater Trail crossing through this intersection.

- **Linwood Ave/King Rd:** Aside from modifying phasing at this intersection or increasing street connectivity throughout the city with parallel routes to Linwood Ave and King Rd, there are no simple solutions to improve operation of this intersection.

McLoughlin Blvd ~~(Highway 99E)~~ Alternatives

While most intersections along McLoughlin Blvd ~~(Highway 99E)~~ do not meet future operating standards (V/C of 1.1 within the Town Center and to the north), the intersections of McLoughlin Blvd with Ochoco St and Milport St are near capacity but still operate within the ODOT operating standards. Because access is severely restricted from McLoughlin Blvd, the City and ODOT are investigating options for improving freight-related access and circulation for the North Industrial Area. Since both of these intersections are forecasted to meet standards in ~~2030~~2035, improvements will focus on access and circulation, not capacity improvements. These potential improvements are outlined in more detail in Chapter 9, Freight Element and Appendix C.

The intersection of McLoughlin Blvd and 17th Ave is primary portal to downtown Milwaukie from McLoughlin Blvd, especially for vehicles traveling to Milwaukie from the north. Improvements to

[~~13~~10] Signalization alone would improve the delay from ~~245~~approximately 135 seconds to ~~120~~110 seconds, and the intersection would still operate at LOS "F" in the TSP forecast year, ~~2030~~2035. Changes to the intersections in this corridor should be coordinated to ensure that they work together to improve safety and are designed for the posted speed (25 mph).

The intersection of McLoughlin Blvd and 17th Ave is primary portal to downtown Milwaukie from McLoughlin Blvd, especially for vehicles traveling to Milwaukie from the north. Improvements to this intersection would be difficult because of the intersection's geometry[~~14~~10] and phasing, and the proximity of Johnson Creek Blvd.

The phasing for eastbound and westbound traffic is currently split phase (one side operates independent of the other side). This phasing arrangement increases the amount of time required for vehicles traveling on Harrison St/17th Ave and also decreases the potential time for northbound and southbound vehicle movements.

Shifting traffic away from this intersection and can improve how it functions (its V/C ratio). One way to do this would be to restrict eastbound left turns from 17th Ave onto McLoughlin Blvd Travelers needing to make this turn could instead be directed through the intersection, to turn left at the next intersection (Harrison St/Main St) and left on Scott St, and right onto northbound McLoughlin Blvd. Forcing this movement would allow for the split phasing at the intersection of Harrison St and McLoughlin Blvd to be removed and improve intersection operations. This option could redirect up to 20 drivers, who normally access McLoughlin Blvd via this intersection, into downtown Milwaukie during the ~~p.m.~~PM peak hour.

The interchange of McLoughlin Blvd and Highway 224 currently connects southbound traffic on McLoughlin Blvd to eastbound on Highway 224 and westbound traffic on Highway 224 to northbound on McLoughlin Blvd. It does not provide for a direct connection of the northbound McLoughlin Blvd or eastbound Highway 224 to southbound McLoughlin Blvd traffic. The construction of a full interchange between McLoughlin Blvd and Highway 224 would shift vehicles to the interchange and improve operations at the intersection of McLoughlin Blvd and 17th Ave. This interchange, along with the rest of the McLoughlin Blvd/Highway 224 corridor between Tacoma St and 17th Ave should be studied as part of a Highway 224/99E~~/224~~ Refinement Plan to determine the most cost effective set of improvement options for the corridor and the City of Milwaukie.

Improvement of the intersection of 17th Ave and Harrison St could involve any number of options, including an increase in the intersection's capacity, improved local connectivity, and parallel routes to decrease demand at the intersection. The City should work with ODOT and Metro to create a solution to maintain operational levels at this intersection while minimizing possible negative impact of any improvements to the intersection. Any improvement recommended by the Highway 224/99E Refinement Plan should also include improvements to this intersection.

McLoughlin Blvd and River Rd

Without improvements, the intersection~~s~~ of McLoughlin Blvd ~~with 22nd Ave and~~ /River Rd would ~~both~~ operate at unacceptable levels during the PM peak hour in ~~2030~~2035 (V/C of 1.14 exceeds Town Center target of 1.1). A sketch-level operational analysis conducted for two potential improvement alternatives found that either would improve the intersection to the point of meeting operational mobility standards. The two alternatives are described below.

- **Alternative 1:** One possible improvement would leave the intersection of McLoughlin Blvd and 22nd Ave open in its current configuration. The intersection of McLoughlin Blvd and River Rd would require a second northbound left-turn lane and additional right-of-way to operate within ODOT standards (a V/C ratio of ~~0.99~~1.10). This option would ~~not~~ improve the operations of the intersection (~~the~~ V/C ratio of 1.06) ~~as much as with~~ in a similar manner to

[~~14~~11] 17th Ave is perpendicular to McLoughlin Blvd for only a short distance of less than 100 feet. After this distance, the road makes a 90-degree bend to the north and runs parallel to McLoughlin Blvd. This geometry is a result of the close proximity of Johnson Creek and the Willamette River.

point for long-term solutions for Highway 224. These alternatives are not all-inclusive and are meant to serve as an example of possible improvement options.

- **Alternative 1—Seven-Lane:** The Highway 224 seven-lane cross section alternative would involve increasing the number of through lanes for each direction from two to three, beginning north of Harrison St to south of Lake Rd. This option would require the acquisition of right-of-way, and increase the crossing distance at the intersections. It would solve the future operational deficiencies at the study intersections out to ~~2030~~2035.

  While widening Highway 224 does allow for adequate intersection operations at study area intersections, it would create an even greater barrier to local connectivity. For this reason, some additional alternatives were evaluated to help reduce the potential side street delay and improve the potential east/west connectivity across Highway 224. In addition, capacity improvements such as widening facilities along the entire corridor is not consistent with Metro's regional prioritization of transportation improvements (which place more focus on intersection or system management improvements).

- **Alternative 2—Modified Split Diamond Interchange:** Construction of a modified split diamond interchange between Harrison St and 37th Ave would involve elevating Highway 224 from Harrison St to 37th Ave and constructing two tight urban interchanges (which require less right-of-way space than standard freeway interchanges), Monroe St and Oak St would pass under Highway 224 with a frontage road under Highway 224 to connect between Harrison St and 37th Ave. To improve connectivity within the city, this option includes the construction of an at-grade rail crossing along Monroe St and the extension of Monroe St to 32nd Ave. This configuration allows for much better intersection operations due to the removal of the Highway 224 traffic through the intersections. A planning-level operational analysis revealed that the intersections would operate within the state's mobility standards.

- **Alternative 3—Highway 224 Overpass/Underpass:** Grade separation of the highway would improve the localized intersection operations, but would divert traffic bound for or leaving Highway 224 to other streets. An overpass over Highway 224 could be placed at several locations, including Harrison St, Freeman Way and International Way/37th Ave. An option to the overpasses would be to construct Highway 224 below grade with City streets passing over the highway. This alternative improves intracity connectivity by removing the barrier effect caused by Highway 224.

- **Alternative 4—Highway 224 TSMO Improvements:** Improve arterial corridor operations by expanding traveler information and upgrading traffic signal equipment and timings. Install upgraded traffic signal controllers, establish communications to the central traffic signal system, provide arterial detection (including bicycle detection where appropriate) and routinely update signal timings. Provide real-time and forecasted traveler information on arterial roadways including current roadway conditions, congestion information, travel times, incident information, construction work zones, current weather conditions and other events that may affect traffic conditions. Also includes on-going maintenance and parts replacement (such as monitoring systems; providing power; and replacing cameras, loops, or other data collectors and devices).

Highway 224/99E Refinement Plan

The City and ODOT should complete a Refinement Plan to evaluate the problems in the Highway 224 and 99E corridor, and identify specific projects to solve them. This plan should focus on an influence area that includes McLoughlin Blvd from Tacoma St~~River Rd~~ to ~~17th~~ ~~Ave~~River Rd, and Highway 224 from McLoughlin Blvd to Lake Rd. The Refinement Plan needs to address the projected intersection deficiencies and meet the goals of both ODOT and the City

Table 8-8~~10~~ ~~Auto~~ Street Network Master Plan Projects

Map ID[17]	Priority	Type	Project Name	Project Description	From	To	Cost~~(s)~~ $1,000s[18]
High Priority Projects							
C	High	C	Hwy 224 & Hwy 99E Refinement Plan	Conduct refinement study that focuses on minimizing barrier effect and improving auto and freight mobility.	Hwy 99E Project Limits: Tacoma St to ~~17th Ave~~River Rd	Hwy 224 Project Limits: Hwy 99E to Lake Rd Interchange	~~$250~~ 270
D	High	C	~~Hwy 224~~ Intersection Improvements at Hwy 224 and 37th Avenue	Consolidate the two northern legs of 37th Ave and International Way into one leg at Hwy 224.	Location specific	Location specific	~~$1,946~~ 2,100
H	High	C	Linwood Avenue Capacity Improvements (north)	Widen to standard three lane cross section. Widen bridge over Johnson Creek.	Johnson Creek Blvd	King Rd	~~$8,500~~ 9,300
H	High	C	Linwood Avenue Capacity Improvements (south)	Widen to standard three lane cross section.	King Rd	Harmony Rd	~~$11,400~~ 12,500
P	High	C	~~Hwy 224~~ Intersection Improvements at Hwy 224 and Oak Street	Add left turn-lanes and protected signal phasing on Oak St approaches.	Location specific	Location specific	$20
R	~~Low~~High	C	Stanley Avenue Connectivity at King Road	Enhance connection along Stanley Ave at King Rd.	Location specific	Location specific	~~$53~~ 60
S	~~Low~~High	C	Stanley Avenue Connectivity at Monroe Street	Enhance connection along Stanley Ave at Monroe St.	Location specific	Location specific	~~$53~~ 60
~~T~~	~~High~~	~~C~~	~~Railroad Crossing Safety and Quiet Zone Project~~	~~Construct railroad crossing safety improvements at Oak St, Harrison St, and 37th Ave.~~	~~Location specific~~	~~Location specific~~	~~$285~~
V	High	C	Intersection Improvements at McLoughlin Boulevard and 22nd Avenue	Improve safety of Trolley Trail crossing at 22nd Ave.	Location specific	Location specific	$200

[17] See Figure 8-4.
[18] Project costs are in ~~2007~~2012 dollars. Future costs may be more due to inflation. Costing details can be found in the Technical Appendix. In the case of operational projects, estimated costs are for the entire 22-year planning period.

Map ID[17]	Priority	Type	Project Name	Project Description	From	To	Cost~~(s)~~ $1,000s[18]
Medium Priority Projects							
A	Med	C	~~McLoughlin Blvd~~ Intersection Improvements at McLoughlin Blvd and 17th Avenue	Prohibit left turn movement from 17th Ave to northbound McLoughlin Blvd and include in Hwy 224 & Hwy 99E Refinement Plan.	Location specific	Location specific	~~$15~~ 20
E	Med	C	~~Johnson Creek Blvd~~ Intersection Improvements at Johnson Creek Boulevard and Linwood Avenue	Add eastbound right turn lane and westbound right turn lane.	Location specific	Location specific	~~$803~~ 880
~~F~~	~~Med~~	~~C~~	~~Harrison Street Intersection Improvements at Harrison Street and Main Street~~	~~Add westbound shared through/right turn lane or eastbound right turn lane.~~	~~Location specific~~	~~Location specific~~	~~$34 40~~
G	Med	C	Intersection Improvements at Linwood Avenue and King Road	Implement protected/permissive left turn phasing for northbound and southbound approaches.	Location specific	Location specific	~~$16~~ 20
J	Med	C	~~McLoughlin Blvd~~ Intersection Improvements at McLoughlin Boulevard and River Road	Consolidate a single access point for the area at Bluebird St with full intersection treatment and signalization or add second northbound left-turn lane at River Rd.	Location specific	Location specific	~~$898~~ 980
K	Med	C	Harrison Street Capacity Improvements	Widen to standard three lane cross section.	32nd ~~St~~Ave	42nd ~~St~~Ave	~~$2,565~~ 2,800
L	Med	C	Intersection Improvements at Harrison Street and Hwy 224	Add left turn-lanes and protected signal phasing on Harrison St approaches.	Location specific	Location specific	$20
O	Med	C	Harrison Street and King Road Connection	Enhance connection between King Rd and Harrison St	King Rd	Harrison St	~~$53~~ 60

Action Plan

The ~~Auto~~ Street Network Action Plan (Table 8-11) identifies the highest priority projects that ~~can~~are reasonably be expected to be funded with ~~City~~local funds by ~~2030~~2035, which meets the~~a~~ requirements of the ~~updated~~State's Transportation Planning Rule.[19] The Action Plan project list ~~in Table 8-9~~ is ~~the result of a multimodal~~based upon a 2007 citywide project ranking process. In 2007, ~~A~~all of the modal master plan projects were ranked by the TSP Advisory Committee ~~with~~after consideration of the Working Groups' priorities, other public support for the project, and ~~the~~how well each project~~'s~~ implement~~sation of~~ the TSP goals and policies. For the 2013 TSP Update, City staff reassessed the prioritization of all projects, incorporating public comments gathered at and around a public meeting in June 2013. Action Plan projects that were completed since 2007 were removed from the Action Plan and new projects identified as top priorities were added.

Table 8-~~9~~11 ~~Auto~~ Street Network Action Plan

Map ID	Project Name	Project Description	From	To	Project Cost ($1,000s)	Direct Funding or Grant Match
P	~~Hwy 224~~ Intersection Improvements at Hwy 224 and Oak Street	Add left turn-lanes and protected signal phasing on Oak St approaches.	Location specific	Location specific	$20	~~Direct~~ Match
V	Intersection Improvements at McLoughlin Boulevard and 22nd Avenue	Improve safety of Trolley Trail crossing at 22nd Ave.	Location specific	Location specific	$200	Match
C	Hwy 224 & Hwy 99E Refinement Plan	Conduct refinement study that focuses on minimizing barrier effect and improving auto and freight mobility.	Hwy 99E Project Limits: Tacoma St to ~~17th Ave~~River Rd	Hwy 224 Project Limits: Hwy 99E to Lake Rd Interchange	$270	Match
	~~Railroad Avenue Capacity Improvements~~	~~Widen to standard three lane cross section.~~	~~37th Ave~~	~~Linwood Ave~~		~~Match~~
	~~Railroad Crossing Safety and Quiet Zone Project~~	~~Construct railroad crossing safety improvements at Oak St, Harrison St, and 37th Ave.~~	~~Location specific~~	~~Location specific~~		~~Direct~~

The completion of the Action Plan project list would improve transportation operations at several locations in the City of Milwaukie. The study intersections would operate as listed in Table 8-11 with the inclusion of Action Plan projects during the year 2035 PM peak hour. Approximately one third of study intersections (8 of 24 locations) would not meet performance standards with the inclusion of the Action Plan projects. Six of these intersections would be located on ODOT facilities (McLoughlin Blvd or Highway 224), while the remaining two locations would be on City of Milwaukie facilities (Linwood Ave). Additional refinement plans for McLoughlin Blvd and Highway 224 are needed to identify appropriate improvements and/or alternate mobility targets for traffic mobility along the corridors.

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

RECOMMENDATIONS

Strategies

To address the needs described above, the City will pursue the following strategies.

Accessibility

Several alternatives for improving truck access and local circulation in the North Milwaukie industrial area were examined during the preparation of th~~is~~e 2007 Transportation System Plan update. The purpose of this detailed analysis was to develop and analyze various alternatives to improve access and circulation for freight to and from this area. The work was conducted with an awareness of the potential impacts that the Portland-Milwaukie light rail project could have on access to the area. To help develop alternatives that would meet the access and circulation needs of this area, a separate sub-group of the Freight Working Group was established to help develop a problem statement, goal statement, and evaluation criteria to help guide the development and analysis of the various alternatives.

The preferred alternative among the participants of the sub-group was the construction of an overpass of Highway 99E at Ochoco St~~reet~~ with alternative access to Highway 99E via on/off lanes, and restricting access at Milport Rd to right-out movements, in concert with a "Tillamook" branch alignment of light rail. The detailed analysis for this process can be found in the Technical Appendix of this TSP. Because this access issue sits within the larger question of the best design of the Highway 99E/ Highway 224 corridor, the Freight Working Group recommended forwarding these findings to a future Highway 99E/Highway 224 Corridor Refinement Plan, rather than including a specific improvement or set of improvements in the TSP Master Plan.

Rail Crossings

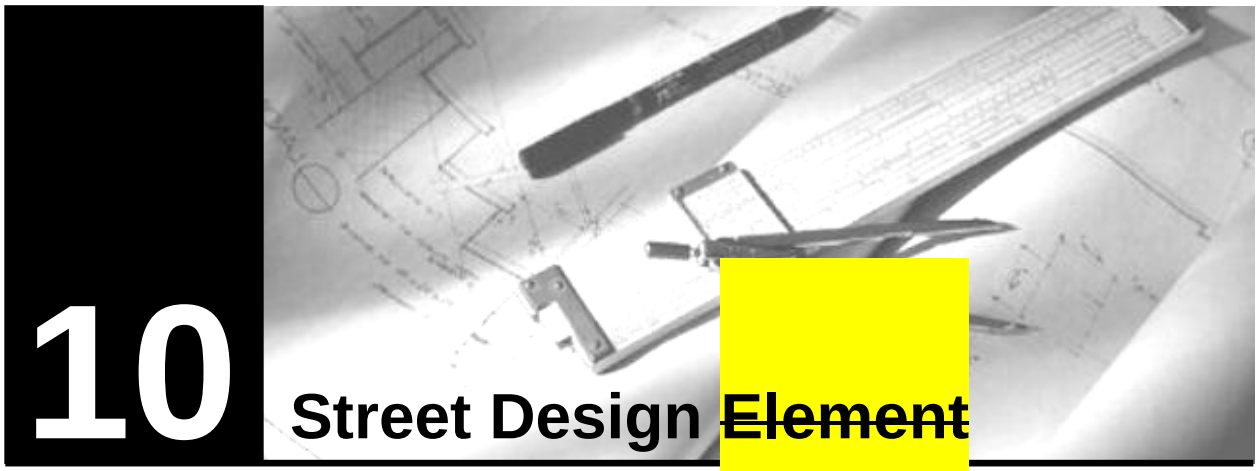
Improving the quality of the materials at at-grade crossings and pursuing the grade separation of key crossings, such as the UPRR and Harrison St~~reet~~, and the UPRR and Harmony Rd crossings, are included in the master plan. The City should not support the introduction of any new at-grade heavy rail crossings in the city.

Truck Maneuverability

Intersections that are part of the local freight network or provide access to regional facilities ought be designed to fully accommodate truck turning maneuvers. As part of new design guidelines, the City should adopt clear standards for adequate turning radii, lane widths and other geometric requirements of heavy vehicles for those streets that are local preferred freight routes or internal circulation routes within industrial areas. The Master Plan includes a project to correct two Mailwell Dr intersections that are currently problematic for truck maneuvers.

Neighborhood Livability

In support of minimizing residential impacts, the City actively encourages all heavy vehicles to use, to the extent practical, the identified local freight routes. Potential strategies to reduce freight traffic on local streets not identified as freight routes, such as traffic calming and diversion treatments, can be found in Chapter 11 (Neighborhood Traffic Management). The rail crossing improvements described above also address livability issues. The rail crossing safety improvements, which could allow the creation of a "Quiet Zone," included in the ~~Auto~~ Street Network Master Plan would also reduce the negative impacts of freight facilities on residential areas.



10 Street Design ~~Element~~

This chapter describes the importance of street design, why it matters, and the street design options available in Milwaukie. This chapter also explores the benefits of a well-designed street and illustrates the relationship between street design, functional classification, and land use. Street design recommendations in this chapter are policy-based, not project-based. They direct the City to ~~develop~~implement balanced and flexible street design standards that reflect the community's vision and include new and innovative design options.

GOALS AND POLICIES

Milwaukie has developed a set of goals to guide the development of its transportation system (see Chapter 2). Listed below are the specific TSP Goals that guide the City's policies on street design:

- **Goal 1 Livability** guides the City to design and construct transportation facilities in a manner that enhances livability.
- **Goal 2 Safety** guides the City to design safe transportation facilities.
- **Goal 4 Quality Design** guides the City to design streets to support their intended users and calls for the ~~development~~implementation of street design standards that promote context-sensitive transportation facilities that fit the physical context, respond to environmental resources, and maintain safety and mobility.
- **Goal 6 Sustainability** guides the City to take the natural environment into account when planning and designing transportation facilities.

STREET DESIGN

What is Street Design

A street's design determines how it will look and function. How a street looks and functions is ultimately dependent upon which street elements are included, their dimensions, and how they relate to each other. Street elements may include, but are not limited to: travel lanes, parking lanes, bicycle lanes, green zones,[1] pedestrian facilities, traffic calming devices, and green street treatments. A street with two travel lanes and a gravel shoulder, for example, looks very different than one with four travel lanes and sidewalks. These two types of streets also function differently. The two-lane street likely has lower traffic volumes but, without pedestrian facilities, does not support safe pedestrian travel. The four-lane street likely has higher traffic volumes and, with sidewalks, supports safe pedestrian travel; however, without bike lanes, it probably does not support safe bicycle travel.

Since different streets serve different purposes, a functional classification system, which is a hierarchy of street designations, provides a framework for identifying which street elements to include in a street's design. A street's functional classification does not dictate which street elements to include. It does, however, provide a framework for determining the size and type of street elements to consider.

The City's functional classification system is used to balance the opposing needs for both mobility and access. These functions are opposing, since high speeds and continuous movement are desirable for mobility, while low speeds and traffic breaks are desirable for access to private property. Streets with a higher classification, such as arterial streets, emphasize a higher level of mobility for through-movement. They look and function very differently than streets with a lower classification, such as local streets, which emphasize the land access function. The different functional classifications are more fully discussed in Chapter 8.

Why Milwaukie ~~Needs~~Has Street Design Options

The City's street design standards are contained in and/or referenced by the Milwaukie Municipal Code (MMC) which is the City's main regulatory document. As required by the MMC, street design standards are applied to new streets and to existing streets when development triggers the need for additional public street improvements. Since the majority of land in Milwaukie has already been developed, street design standards are most frequently applied to existing streets, many of which were only partially improved when constructed.[2] Many of the city's residential streets, for example, were constructed without bicycle, pedestrian, or stormwater facilities. Retrofitting an existing street with needed improvements is typically a much more complicated process, both in terms of design and construction, than constructing a new street.

The City has some flexibility when applying its existing design standards. ~~However, that flexibility is limited to reducing the size of individual elements by a foot or two, which is often insufficient when retrofitting an existing street with new improvements. Moreover,~~ Tthe addition, alteration, or elimination of most street elements requires extensive review. When this type of review occurs, the City's existing design standards ~~fail to provide decision makers with any design guidance. They~~ identify the elements that should be included and their required and minimum allowed dimensions. ~~However, they fail to~~ They also identify which elements are most

[1] The green zone is the area between the curb and sidewalk and is commonly called a landscape strip.
[2] Partially improved streets are often referred to as incomplete streets.

important to include when right-of-way is insufficient or which elements are most appropriate to alter or eliminate in certain situations.

~~In addition to the lack of flexibility and design guidance, T~~the City's existing street design standards ~~don't~~ allow for more innovative types of designs, such as skinny streets, green streets, and alternative pedestrian facilities, all of which the community strongly supports. Green street development, in particular, has far reaching benefits for the region and the city. In addition to reducing stormwater runoff to streams and rivers, which improves water quality and wildlife habitat in general, green street development would help recharge the local aquifer, the city's main water supply.

For these reasons, the City ~~needs more~~has flexibility when applying existing street design standards, more design guidance, and more street design options. Three of the main reasons are summarized below.

- When making improvements to existing streets, existing street design standards often need to be modified to "fit" the existing street conditions.
- Even when a typical street design would work, more environmentally friendly designs and alternative pedestrian facilities may be appropriate.
- More design flexibility and options ~~would~~ enable the City to allow street improvements that respond to the character of the surrounding natural and built environments.

The City recognizes the diversity of public opinion and development patterns that exist within Milwaukie and acknowledges that street design should not be a "one size fits all" approach. That is why the City ~~should have~~has multiple street design options that support a street's intended users and its functional classification while also responding to adjacent land uses, neighborhood character, and environmental considerations.

Why Street Design Matters

Streets are the cornerstone of our transportation network. They are used by all modes of travel for a wide variety of commercial, recreational, and travel purposes. Since they traverse the entire city they also greatly influence neighborhood character. Street design matters because well-designed streets are a significant community asset. Poorly designed streets, on the other hand, can have a detrimental effect on commercial activities, recreational opportunities, personal mobility, emergency response, and property values. Since the design of a street is so closely tied to how it performs and how people experience the city, it is important for the City to carefully consider how it wants its streets to look and function and to design them accordingly.

Benefits of Good Street Design

The benefits of good street design occur on many levels. Benefits vary depending on the function of the street and the type of design implemented, but may include:

- Improved livability
- Increased safety for pedestrians, cyclists, drivers, and transit riders
- Increased pedestrian and bicycle activity
- Increased social and recreational opportunities
- Decreased environmental impacts through localized stormwater management or reduced stormwater runoff
- Enhanced air and water quality
- Street beautification
- Increased property values

Many of these benefits come from enhancements to pedestrian and green zones, which are the areas between the curb (or edge of roadway where no curb exists) and the outer edge of the right-of-way (see Figure 10-1). The green zone acts as a buffer between motor vehicle traffic and pedestrian traffic. This buffer area increases pedestrian comfort and safety, reduces the affect of road spray on pedestrians, allows for more separation between pedestrians and vehicle exhaust fumes, and when combined with mature street trees, can reduce vehicle speeds by giving the appearance of a narrower street. Reduced vehicle speeds are a safety benefit for all modes of travel, and an environment that supports walking creates opportunities for social contact, reduces motor vehicle reliance, and contributes to healthier and more active communities.

As its name implies, the green zone provides a space for street trees and other plantings that benefit the environment through improved air and water quality. When appropriately designed, green zone plantings can also manage local stormwater runoff, which reduces the transportation system's impact on local streams and rivers. The green zone also provides a space for placement of utilities, fire hydrants, and other street furniture, so that the sidewalk can remain uncluttered, allowing for unimpeded pedestrian passage. Additionally, this area can be used for the placement of transit shelters and benches, which increases the safety and comfort of transit users.

STREET DESIGN ELEMENTS

The purpose of this chapter is to create a ~~street design~~ policy framework that will guide ~~the development of design standards that better~~ street design decisions to meet the needs and values of the community. The first step in this process is to describe the different street elements, which are listed below. This is followed by a discussion about which elements are optional and which are required (see the Street Design Cross Sections section) and what alternative design options are available and preferred by the community (see the Street Design Alternatives section).

All streets are composed of a number of different elements; however, not all elements are included on all streets. A street's functional classification, adjacent land uses, and available right-of-way width all influence which elements are included. When a specific element is included, it is generally located in the same location on the street relative to other elements. However, an element's design, dimension, and relationship to adjacent elements can and should vary depending upon neighborhood character, traffic management needs, and/or social, cultural, or environmental factors.

The following is a description of the different street elements or zones that comprise most streets.

Development Zone

The development zone is not in, but adjoins, the public right-of-way. In commercial or industrial zones, a building face may clearly define the edge of the right-of-way. In residential zones, the outer edge of the right-of-way is often not clearly or accurately marked. Access to the development zone is almost always through the public right-of-way in the form of a driveway or sidewalk.

STREET DESIGN CROSS SECTIONS

Figure 10-1 contains cross sections for four of the City's street functional classifications. ~~Since this TSP update has identified a need for a more flexible approach to street design, T~~this figure lays the foundation for more flexible design standards. Street design elements marked with asterisks are optional when right-of-way width is insufficient to include all elements. Elements not marked with asterisks are required under all circumstances. The local and neighborhood street cross section, for example, indicates that, at a minimum, one travel lane and one pedestrian facility is required if there is truly insufficient right-of-way width to accommodate any other elements.

The local and neighborhood cross section also includes a skinny street option since a skinny street can contain all of the same elements as a local or neighborhood street. The difference between a skinny street and a local or neighborhood street is that a skinny street typically has narrower elements and/or overlapping parking and mixed travel zones.

Variations to these cross sections may also be welcomed and/or required by the City when:

- Environmentally beneficial or green street treatments are proposed or needed.
- A street is an identified bikeway or pedestrian walkway in the TSP master plan.
- Existing structures are unusually close to the right-of-way.

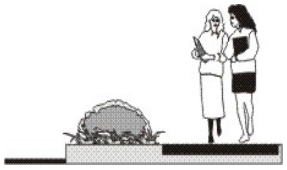
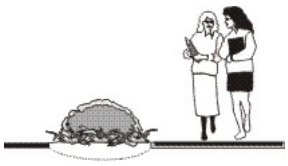
The cross sections in Figure 10-1 are shown without dimensions, as the intent is to provide a policy framework—not specific design details—for ~~the development of~~ more flexible street design standards ~~that will be adopted as a separate regulatory document at a later date. At that time the City will need to identify preferred and minimum dimensions for each street element. It will also be necessary for the City to develop a design prioritization approach that identifies which elements to reduce and/or eliminate when sufficient right-of-way width is not available.~~

STREET DESIGN ALTERNATIVES

Pedestrian Facilities

Three pedestrian facility design alternatives are shown in Table 10-1.

Table 10-1 Pedestrian Facility Design Alternatives

Design Alternative	Description
Vertical and Horizontal Separation	Separation from the street zone both vertically by a curb and horizontally by a green zone. This design alternative can incorporate green street treatments as outlined in the following section on green street design. 
Horizontal Separation	Separation from the street zone horizontally by a green zone or other horizontal element or barrier. The pedestrian zone is at the same grade as the street zone. This design alternative can incorporate green street treatments as outlined in the following section on green street design. 
Vertical Separation	Separation from the street zone vertically by a curb. The pedestrian zone is located "curb tight" against the street zone with no horizontal separation. Pedestrians could still be buffered from vehicular traffic in the street zone by on-street parking and/or bicycle lanes. If wide enough, this design alternative could incorporate tree wells for street trees. 

Source: DKS Associates

Vertical and horizontal separation is the community preferred pedestrian facility design in most situations and especially on streets with higher traffic volumes and speeds. Where traffic volumes and speeds are low, horizontal separation is preferred by the community over vertical separation, especially in neighborhoods that desire a less traditional sidewalk design. Two-sided pedestrian facilities are preferred, but one-sided pedestrian facilities are acceptable and even desirable under certain circumstances. When ~~developing~~utilizing pedestrian facility design standards, it will be essential that the City identify the circumstances and the process by which one design alternative is chosen or required over another.

It is worth noting that the two preferred pedestrian facility designs include a green zone. In addition to horizontally separating pedestrians from the street zone, the pedestrian facilities that include a green zone are preferred because of the additional aesthetic and environmental benefits the green zone provides pedestrians and the street as a whole.

Green Streets

A traditional stormwater management system for a street uses a curb and gutter to capture and convey stormwater runoff to a catch basin and then a pipe. Piped runoff is then discharged offsite into a stream or river. A green street uses a different stormwater management approach. Instead of discharging stormwater offsite, a green street incorporates a stormwater management system into the right-of-way that allows most stormwater runoff to remain onsite,

where it is absorbed and cleansed through natural biological processes. Green street treatments capture and treat stormwater runoff locally, thereby protecting streams, groundwater, and wildlife habitat. Additionally, since Milwaukie's water supply comes from local wells, it is in the city's best interest to incorporate green zones and green street treatments into its streets as much as possible to protect and maintain the local groundwater supply—a vital city resource.

Most green street treatments have all of the benefits associated with the green zone but require regular maintenance to maintain their functionality and appearance. However, unlike traditional piped stormwater systems, maintenance usually does not require specialized equipment or training. Since some treatments can easily be incorporated into green zones, center medians, or the area usually occupied by parking lanes, streets can often be retrofitted with green street treatments without having to substantially alter any existing street elements or the right-of-way width.

Green street treatments are not dependent upon functional classification and can be incorporated into all street types. Table 10-2 below shows the different green street treatments and the zones in which they may be applicable.

Table 10-2 Green Street Design Treatments[4]

Treatment	Application	How it Works	Application Zone		
			Pedestrian	Green	Street
			■ Recommended ⊡ Optional □ Not Recommended		
Rainwater Harvesting	Aboveground or subgrade containers that capture and reuse stormwater runoff for landscape irrigation.	Stormwater is conveyed to storage facilities during the wet season for use during the dry season.	■	■	⊡
Permeable Paving	Replacement of impermeable surfaces with permeable materials, such as permeable pavement, concrete, or paving blocks.	Permeable materials allow water infiltration through the surface to the subgrade.	■	■	■
Bio-retention (Raingardens)	Aboveground or subgrade containers that promote infiltration and evapotranspiration of stormwater.	Engineered or amended soils and vegetation are used to promote these processes.	□	■	□
Bio-swales	Subgrade channels with vegetation that convey and treat stormwater.	Vegetation is used to control flow velocities and settle pollutants.	□	■	□[5]

When ~~developing~~utilizing green street design standards, it will be essential that the City identify the circumstances under which green street treatments would be required or recommended.

[4] The soils within an area where green street treatments could be implemented need to be tested to determine the rate of infiltration they can sustain. In addition to green street treatments, traditional stormwater management facilities need to be designed to control overflow if the capacities of the green street treatments are exceeded.
[5] With the exception of medians.

Additionally, the City should ensure that green street treatments receive ongoing maintenance to preserve their functionality and appearance.

Skinny Streets

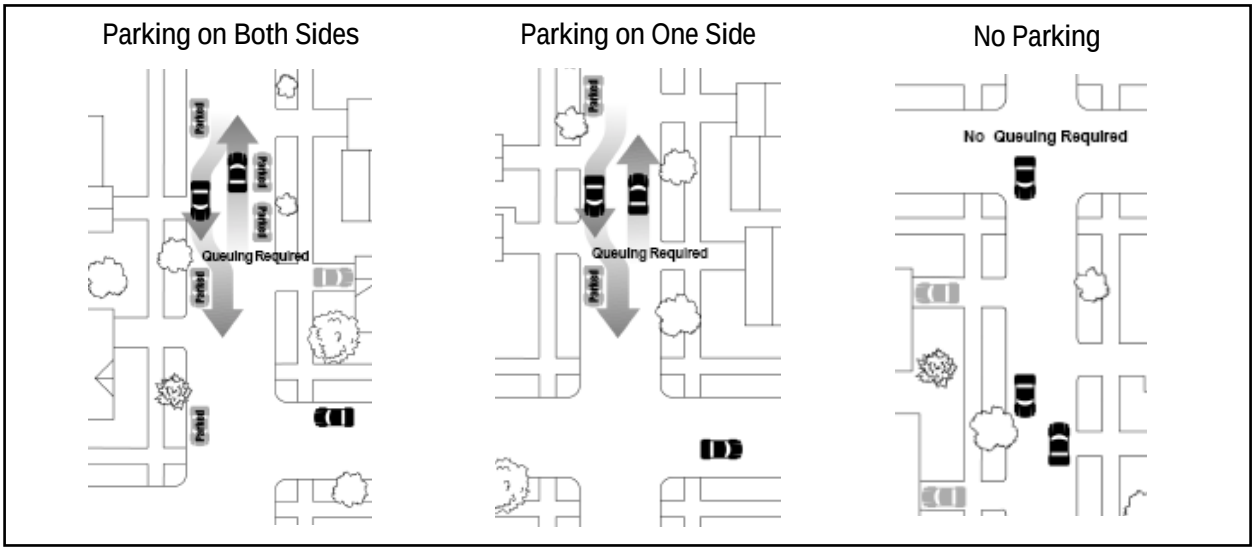
A skinny street is narrower than a normal street and is typically constructed when less paved surface area is desired or in areas with limited rights-of-way or physical constraints. Skinny street designs are typically only considered for streets that have lower traffic volumes and speeds, such as local or neighborhood streets, or in one-way couplet situations. Skinny streets function like regular streets and often have the following additional benefits:

- Slower vehicle speeds
- Enhanced bicycle and pedestrian safety due to slower vehicle speeds
- Reduced right-of-way impacts on adjacent properties
- Reduced stormwater runoff and other environmental impacts due to reduced impervious surface area

For emergency service personnel to be able to respond to emergencies in a timely manner, the Fire Code recommends that street zones have a minimum width of 20 feet to allow for passage and equipment set up.[6] Solid waste collectors and delivery trucks have similar needs.

Figure 10-2 illustrates three possible skinny street design options. These design options include parking on both sides of the street, parking on one side of the street, or parking on neither side of the street. The design option with parking on both sides of the street requires the widest paved street zone, and the design option with no parking requires the narrowest paved street zone. The design options with parking have overlapping travel and parking lanes. As a result, queuing may be required, which is where one vehicle waits in an open parking area or driveway for the other vehicle to pass.

Figure 10-2 Skinny Street Design Options



When ~~developing~~utilizing skinny street design standards, it will be essential that the City identify under what circumstances skinny street designs would be required or recommended.

[6] *Neighborhood Street Design Guidelines, An Oregon Guide for Reducing Street Widths*. State of Oregon. November 2000.

RECOMMENDATIONS

In summary, the recommended actions and policy directions listed below call for the City to ~~develop~~utilize balanced and flexible street design standards that reflect the community's vision and that include new and innovative design options, including green streets, skinny streets, and alternative pedestrian facility designs.

Design Standards

Recommended Action

~~Develop~~Maintain a baseline cross section for each street functional classification (with preferred dimensions for all street elements) and a street design prioritization approach when the baseline elements do not fit. ~~Develop~~Maintain street design standards for green streets, skinny streets, and alternative pedestrian facilities and identify under what circumstances alternative designs would be required or recommended. ~~Develop~~Maintain a list of alternative materials, such as permeable pavers, and identify situations in which alternative materials would be suitable and desirable.

Policy Direction

- ~~Build more~~Maintain flexibility in~~to~~ street design standards to allow for local design preferences and to avoid costly and time-consuming variance process requirements.
- Balance citywide needs, local design preferences, and best practices when ~~developing~~utilizing street design standards.
- Provide for public involvement in the ~~development~~utilization of street design standards and during the design phase of street-related Capital Improvement Projects.
- Consider maintenance costs and issues when ~~developing~~utilizing design standards.
- ~~Develop~~Utilize design standards, including alternative designs that accommodate emergency response routes and needs.
- Require a minimum of one-sided pedestrian facilities on all streets.
- Require green zones and green street treatments where appropriate and practical.
- Maintain design consistency along a street's length where appropriate.

Green Zone and Green Street Plantings

Recommended Action

Develop a list of appropriate, low-maintenance plant species for use in green zones and green street treatments. Develop street tree replacement policies and regulations.

Policy Direction

- Ensure green zones and green street treatments are planted with appropriate, low-maintenance species.
- Preserve and expand the city's tree canopy

11 Neighborhood Traffic Management ~~Element~~

Neighborhood traffic management is a term used to describe the many and varied traffic management approaches used to reduce the impacts of traffic volumes and speeds on residential neighborhoods and improve safety for pedestrians and bicyclists. This chapter describes the need for neighborhood traffic management, identifies tools that the City can use to slow and/or divert traffic, and outlines a process for implementing neighborhood traffic management measures. It is not the purpose of this chapter to identify streets in need of traffic management or to propose projects at specific locations.

GOALS AND POLICIES

Milwaukie has developed a set of goals to guide the development of its transportation system (see Chapter 2). Listed below are the specific TSP Goals that guide the City's policies on neighborhood traffic management:

- **Goal 1 Livability** guides the City to protect residential neighborhoods from excessive through traffic and travel speeds while providing reasonable access to and from residential areas.
- **Goal 2 Safety** guides the City to maintain a safe transportation system.
- **Goal 4 Quality Design** guides the City to design streets to support their intended users and respond to the surrounding natural and built environments.

The main benefits of effective neighborhood traffic management are improved livability and safety. Reduced vehicle speeds are a safety benefit for all modes of travel. Reduced cut-through traffic improves livability through the reduction of vehicular noise, pollutants, and traffic volumes. Additionally, streets that are used in ways for which they weren't designed lead to congestion and safety hazards.

NEEDS

Most of the land within Milwaukie consists of residential neighborhoods. The city, with just over 20,000 citizens, has a relatively small population compared to the surrounding Portland metropolitan area. Because of Milwaukie's proximity to the city of Portland, its employment centers, and the two major regional routes through the city (Highways 99E and 224), cut-through traffic and speeding is an ongoing concern for citizens. Cut-through traffic most often occurs when congestion occurs on regional routes and major streets and nonlocal traffic goes in search of less congested or more direct routes. Speeding can occur under many different

circumstances; however, the city has a number of streets that are relatively straight with few intersections or traffic control devices. These types of streets often invite speeding violations.

Neighborhood traffic management is a means to address the negative impacts of unchecked traffic speed and volume on neighborhood streets. Effective use of neighborhood traffic management can address neighborhood needs and concerns, including, but not limited to, the following:

- Speeding
- Cut-through traffic, especially by heavy freight trucks
- Bicycle and pedestrian safety
- Student safety around school zones

Student safety around school zones has been and continues to be a concern in Milwaukie neighborhoods. In 1995, the Milwaukie Traffic Safety Commission was charged with identifying and implementing school trip safety improvements in collaboration with schools, parent teacher organizations, neighborhood district associations, residents, and staff. The now defunct commission enacted many safety improvements, but not all recommended projects were pursued or implemented. This chapter does not recommend specific traffic management measures at specific locations, such as schools; however, Chapter 5 (Pedestrian Element) and Chapter 6 (Bicycle Element) recommend projects that directly address student safety.

TOOLS

There are many different measures available in the neighborhood traffic management "tool box," but not all of these measures are appropriate for all streets or in all situations. As with street design, traffic management measures need to take street functional classification, surrounding land uses, existing street design, emergency service provider access needs, and neighborhood preferences into account.

Table 11-1 groups neighborhood traffic management measures into four categories and shows the recommended application based on street functional classification. The four categories are as follows:

- Horizontal deflection (reduces traffic speeds)
- Vertical deflection (reduces traffic speeds)
- Volume control measures (reduces or diverts traffic volumes)
- Other measures

Most of the measures in the first three categories require physical changes to the street; whereas, most of the measures in the last category involve nonphysical changes such as signage, education, enforcement, speed monitoring trailers, and signal timing.

Additionally, state law provides the City authority to lower the speed limit of a residential street to five miles per hour below the the statutory speed required by the Oregon Department of Transportation. The statutory speed for local streets is 25 miles per hour; therefore, the City can lower the speed limit on local streets to 20 miles per hour. Three criteria must be met to establish the ordinance, in addition to posting new speed limit signs:

1. The street is located in a residential district.
2. The street has an average volume of fewer than 2,000 motor vehicles per day, more than 85 percent of which are traveling less than 30 miles per hour.
3. A traffic control device is used to indicate the presence of pedestrians and bicyclists.

IMPLEMENTATION

Successful neighborhood traffic management requires the following:

- A process that identifies, evaluates, and prioritizes traffic management needs
- Citizen involvement in traffic management measure selection
- Professional design that considers the safety of all users
- Funding and implementation of prioritized needs

The Milwaukie Public Safety Advisory ~~Board~~Committee is responsible for administering the City's neighborhood traffic management program. This ~~board~~committee meets once a month and has ~~focused almost exclusively on~~ addressed the enforcement and education aspects of neighborhood traffic management through both the Traffic Safety Program and the Walk Safely Milwaukie Program. Engineering staff ~~will join~~assist this ~~board~~committee to improve neighborhood traffic management program coordination and to provide the technical expertise needed for evaluation and implementation of deflection and volume control traffic management measures.

The neighborhood traffic management program relies on citizens to identify neighborhood traffic concerns. This identification process, by its very nature, is reactive. However, the funding level and evaluation process will be deliberate and methodical to allow for equitable and efficient use of limited funds. The City will endeavor to allocate money each year to undertake selected neighborhood traffic management measures (see Table 11-2). ~~with the expectation that neighborhood district associations will provide matching funding for projects in their district~~.

RECOMMENDATIONS

Figure 11-1 outlines the proposed neighborhood traffic management process for the City of Milwaukie. As shown in this figure, there are multiple points in the process for public input and involvement and a feedback loop at the end to monitor the success of neighborhood traffic management measures that have been implemented.

It is recommended that the City annually fund the neighborhood traffic management program so that prioritized needs are implemented over time. The Neighborhood Traffic Management Action Plan (see Table 11-2) does not identify specific projects, but it does show the level of funding the City ~~proposes~~aspires to commit to the neighborhood traffic management program for the duration of this plan. With regard to this funding, it is recommended that the City develop a process that ensures neighborhood traffic management funding is equitably distributed throughout the city.

Many of the policy recommendations contained in the Street Design chapter are applicable to neighborhood traffic management as well, the most relevant of which are summarized below.

- **Variety:** Allow for a wide variety of traffic management measures, as identified in this chapter's neighborhood traffic management "tool box."
- **Effectiveness:** Ensure that the chosen measure addresses the identified problem.
- **Landscaping:** Provide for landscaping wherever feasible and practicable.
- **Maintenance:** Consider maintenance needs and issues when designing traffic management measures and ensure long-term maintenance needs can be met.
- **Neighborhood Input:** Provide for neighborhood input when designing traffic management measures.

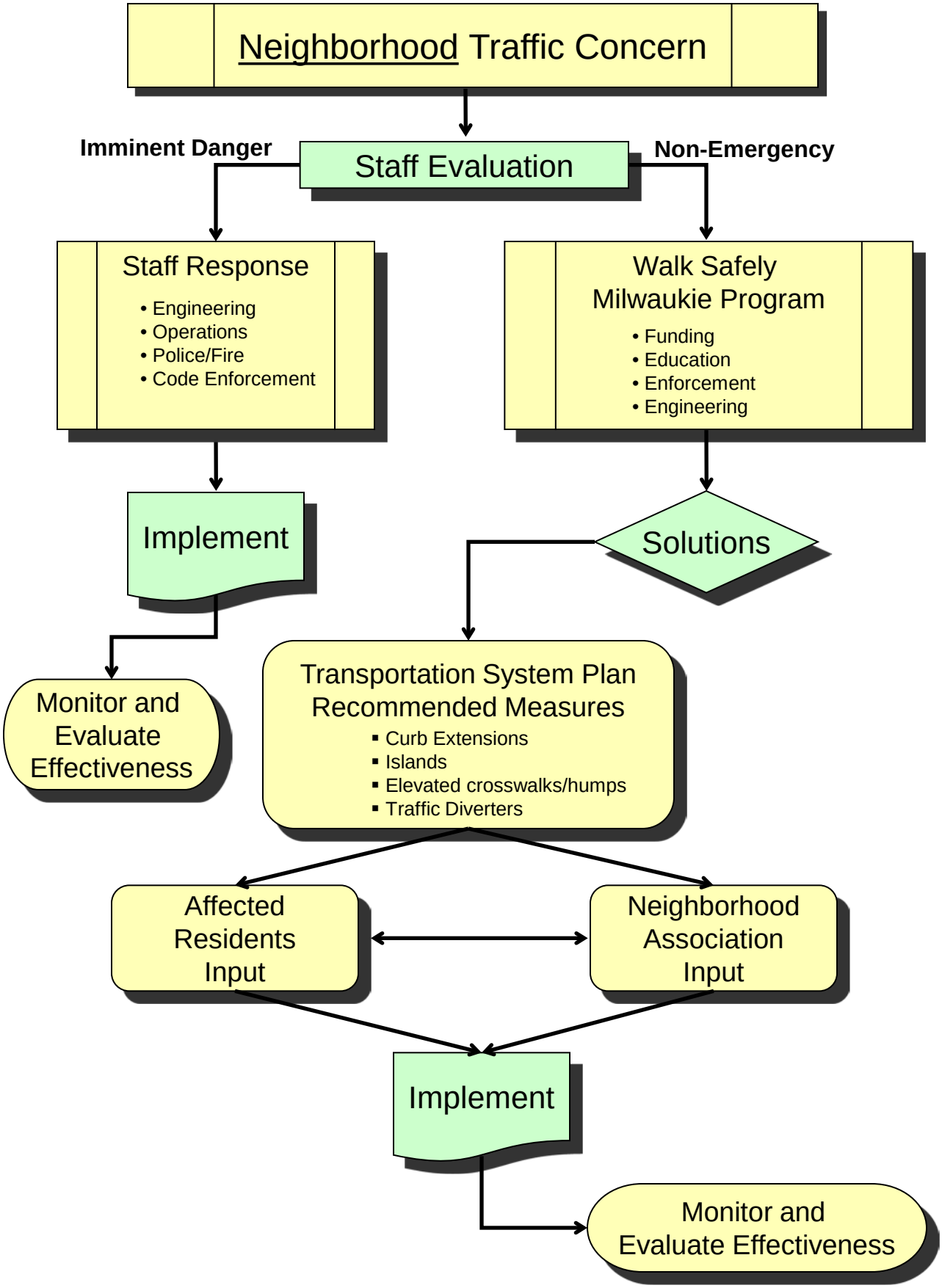

Neighborhood Traffic Concern
Imminent Danger
Staff Evaluation
Non-Emergency
Staff Response
• Engineering
• Operations
• Police/Fire
• Code Enforcement
Walk Safely Milwaukie Program
• Funding
• Education
• Enforcement
• Engineering
Implement
Solutions
Monitor and Evaluate Effectiveness
Transportation System Plan Recommended Measures
▪ Curb Extensions
▪ Islands
▪ Elevated crosswalks/humps
▪ Traffic Diverters
Affected Residents Input
Neighborhood Association Input
Implement
Monitor and Evaluate Effectiveness

Table 11-2 Neighborhood Traffic Management Action Plan

Project Name	Project Description	From	To	Project Cost~~(s)~~ ($1,000s[1])	Direct Funding or Grant Match
~~Neighborhood Pedestrian and Traffic Safety Program~~Walk Safely Milwaukie Program	Complete a few small traffic calming and pedestrian safety projects throughout the city each year.	Citywide	Citywide	$300 ($13 annually)[2]	Direct ~~(with NDA match)~~

[1] Project costs are in ~~2007~~2012 dollars. Future costs may be more due to inflation. Costing details can be found in the Technical Appendix.

[2] Historically, the Neighborhood Pedestrian and Traffic Safety Program received $13,000 annually. In more recent years, the program name changed to Walk Safely Milwaukie and funding was raised to $100,000 annually. Future funding for the program will be evaluated on a biennial basis with the budget.

- As long as spaces are available, off-street parking in downtown will be operated for the benefit of visitors, employees, and residents of downtown Milwaukie.
- Residential use of public off-street parking lots will be limited to nonbusiness hours (nights and weekends in some locations).
- Over time, public off-street parking will be transitioned to serve a higher mix of short-term visitor parking demand. Alternative mode options will be developed to support this transition.
- Except where Residential Parking Permit Zones are established, ~~O~~on-street parking outside of the downtown zones (i.e., in adjacent residential areas) will be unregulated but enforced by complaint only.
- If parking spillover from the downtown zones or from the future light rail station areas (at Tacoma St and Park Ave) results in inadequate parking availability ~~outside of the downtown zones~~ in the neighborhoods adjacent to these areas, the City will facilitate the establishment of Residential ~~Permit~~ Parking Permit Zone programs upon the request and support of the affected neighborhood(s).[98]

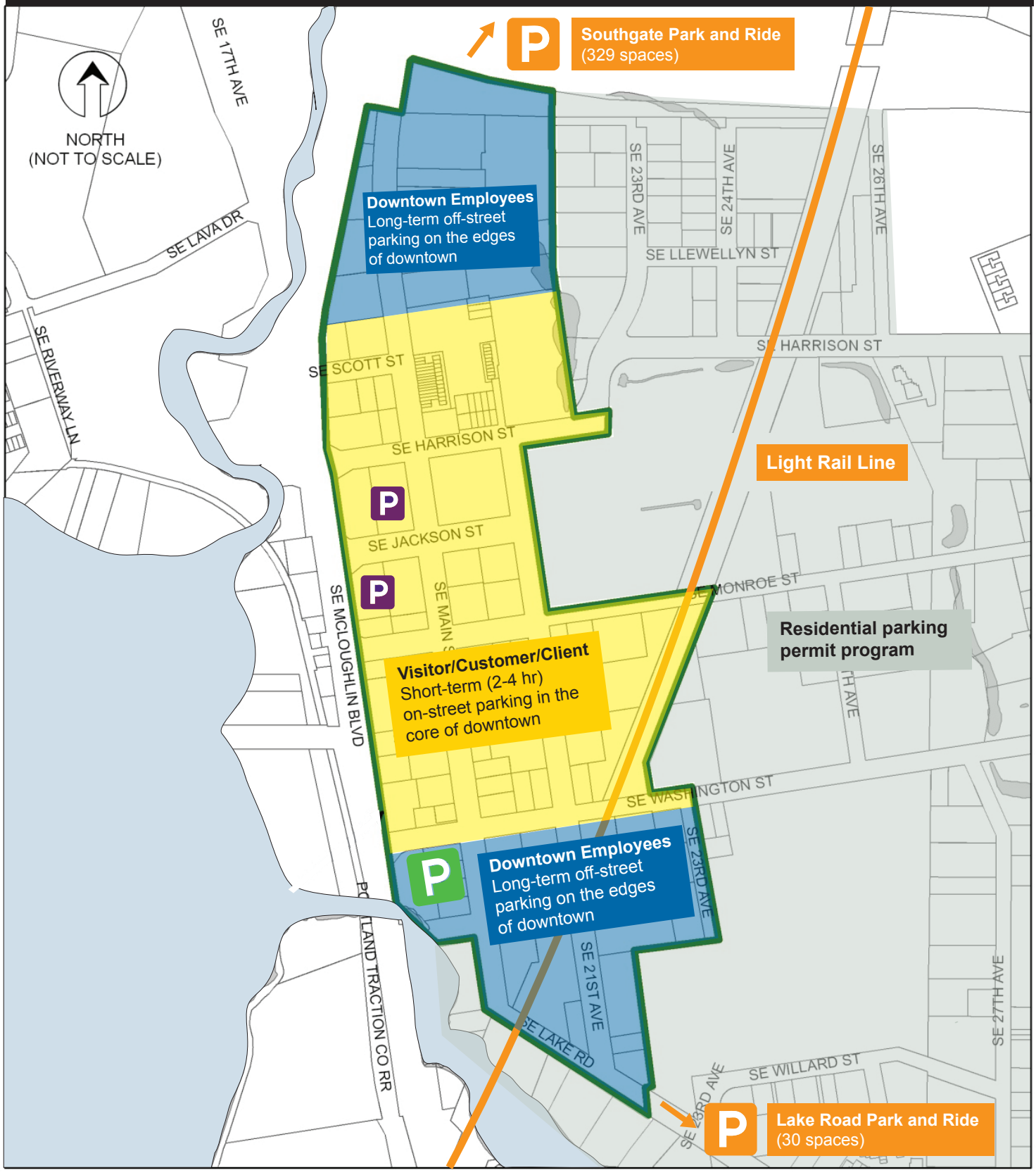
The application of both the Guiding Principles (Management Principles) and the Operating Principles will result in a parking distribution pattern that places each parking user in the location that best supports the goals of the Downtown Plan. As illustrated in Figure 12-1, visitor parking is provided in the retail core, employees are directed to public lots, park-and-ride commuters are moved to the downtown fringe, and residential neighborhoods are protected from spillover effects.

The goal is a clear and predictable downtown parking system, as summarized in Table 12-~~2~~1. The Guiding Principles account for each of the different types of parking users and the three types of parking stalls potentially available to them. Additionally, Transportation Demand Management Tools are diligently designed into the parking management system, varying slightly depending on the user type.

[98] See recommendation on Page 12-11 for detail.

Figure 12-1 | Diagram of Parking Type Locations

Downtown Milwaukie
November 2013



Existing Park and Ride

Potential Future Parking Structure

Existing long-term parking by permit
Subject to land and funding availability

Table 12-~~2~~1 Parking Facility Priorities by Parking User Type

Parking User Types	Parking Facility Type			Transportation Demand Management Tools
	On-Street Parking	**Off-Street Public Parking**	**Off-Street Private Parking**	
Visitor/Customer/ Client	**Priority** 2-hr and 4-hr parking	**Allowed** Subject to land and funding availability	**Allowed** On-site parking controlled by property owner	• Transit • Bike parking • Pedestrian access and amenities
Downtown Employees	**Limited** • When not needed for adjacent retail/ restaurant • By permit only • Subject to 85% rule	**Priority** • Subject to land and funding availability • Priority to occupants of buildings existing in 2007 • Locations may shift over time as downtown develops • Subject to 85% rule	**Allowed** • On-site parking controlled by property owner • Shared parking arrangements encouraged • Private paid parking lots are allowed • New office/ commercial devel-opment required to supply 0-2.5 stalls/1,000 sf[10]	• Transit passes • Bike parking • Encourage carpooling • Flexible parking permit options
Downtown Residents	**Limited** • After hours only	**Limited** • After hours only	**Allowed** • On-site parking controlled by property owner • Shared parking arrangements encouraged • Private paid parking lots are allowed • New residential development required to supply parking	• Transit passes • Bike parking • ~~Flexcar~~Car-share • More services in downtown, requir-ing fewer trips to destinations outside downtown
Park-and-Ride (to Portland)	**Not Allowed**	**Limited** • Restricted in the core downtown area • Conditionally allowed in a parking structure • Must support downtown activity over the long term	**Allowed** • On-site parking controlled by property owner	• ~~Milwaukie~~Southgate ~~p~~Park-and-~~r~~Ride (opened 2010)[11] ~~to open 2008~~ • ~~Existing park-and-ride on~~ Lake Rd Park-and-Ride (existing) • Improve E-W bus connections to downtown Milwaukie

[10] Downtown parking required for new development will be analyzed and potentially revised during the 2013-14 ~~Commercial Core Enhancement Project (CCEP) process~~"Moving Forward Milwaukie" project.

[11] The future of the Southgate Park-and-Ride is unclear once the Portland-Milwaukie Light Rail opens in 2015. The City prefers that the Southgate site transition into operation as a parking lot for local employees.

- Prohibit the creation of residential on-street parking permit programs within the Downtown Zones.

Adopt ~~a framework for Residential Permit Zone(s) in neighborhoods adjacent to the Downtown Zones~~an Action Plan to fully implement the Residential Parking Permit program by 2015.

As the new Portland-Milwaukie Light Rail (PMLR) begins to affect the City's downtown core and the neighborhoods near PMLR station areas at Tacoma St and Park Ave.~~grows~~ and as land uses intensify, spillover effects and resultant conflicts for parking in adjacent residential neighborhoods ~~adjacent to downtown~~ will likely occur as downtown users begin to spill over in the residential areas. In response, it is recommended that the City develop and enact an action plan to fully implement ~~the~~a Residential Parking Permit Zone program~~facilitate Residential Parking Zones (RPZs) at the request of affected neighborhoods. The City should adopt an approval framework for establishing an RPZ. The following elements of such a framework are would comprise the action plan and provided as an initial basis to begin discussions with neighborhoods:~~

- ~~Affected neighborhoods, coordinated through Neighborhood District Associations, petition the City for creation of a Residential Parking Zone (RPZ) by formally polling affected residents within a boundary.~~
- ~~If 51 percent% of affected residents within a boundary poll in favor of an RPZ, the City could then move to implement a permit program.~~
- ~~At that time, a formal RPZ boundary would be established and any parking between the hours of 8:00 a.m. and 5:00 p.m. (Monday - Friday) would be limited to two2 hours unless by displayed permit.~~
- ~~Permits would only be available to residents with addresses in the RPZ zone and only to vehicle license numbers with addresses in the RPZ zone.~~
- ~~A "guest pass" program would be established to accommodate visitors to residential properties within the zone.~~
- ~~A system for determining cost to the City and the neighborhoods would be established prior to implementing the program. Costs will include creation and replacement of signage, permit creation and processing, and enforcement.~~

~~Strengthen the Move-to-Evade Enforcement Policy~~

~~The City should revise the "Move-to-Evade" ordinance (10.20.080) to allow the City's Parking Manager more latitude to cite people who move their cars between short-term stalls during the day.~~

Operational Projects

Public Information and Marketing

- C~~reate and~~ontinue to distribute information to the public and downtown employees about location, cost, availability, and the purpose of downtown parking lot locations, as well means for utilizing the permit program. This can be accomplished through such efforts as targeted outreach to downtown businesses, mailings, brochures, maps, and website development.

Oregon motor vehicle fuel taxes are collected as a fixed amount per gallon of gasoline sold. The Oregon gas tax is currently 30 cents per gallon, increased from 24 cents per gallon on January 1, 2011~~and has not increased since 1993~~. Because it is levied on a per gallon basis, the revenue does not vary with changes in gasoline prices. Since ~~there has been no~~ increases do not keep up with inflation ~~since 1993~~, the value of this revenue has eroded over time as maintenance materials and repair costs have increased. Additionally, increased fuel efficiency in new vehicles has further reduced the total dollars collected relative to total miles driven.

Oregon vehicle registration fees are collected as a fixed amount at the time a vehicle is registered with the Department of Motor Vehicles. Vehicle registration fees in Oregon have recently increased to about $43 per year per vehicle~~from $15 per vehicle per year to $27 per vehicle per year for passenger cars, with similar increases for other vehicle types~~. Vehicle registration fees are not adjusted for inflation.

In fiscal year ~~2006/2007~~2011-12, the City received roughly $~~961,000~~1,110,000 from the Oregon Highway Trust Fund. The City's projected share of this fund is approximately $~~21~~27.1 million over the next 22 years.

These funds are flexible and are available for either capital or maintenance projects.

Bike Path Fund

One percent (1.0%) of the payments from the Highway Trust Fund must be reserved for the maintenance and construction of bicycle facilities. In fiscal year ~~2006/2007~~2011-12, the City received $~~9,711~~11,110 from this revenue source and expects to receive $~~215,000~~271,600 over the next 22 years. Although these monies may only be spent on bicycle facilities, they are classified as unrestricted because they can contribute to capital or maintenance projects.

Street Surface Maintenance Fee

The street maintenance fee is paid by all City of Milwaukie utility customers (residents, businesses, government units, etc.) through their utility bill and is based on an estimate of daily trips generated by each customer. In fiscal year 2011-12, revenues were approximately $609,000, and the fee is expected to generate $13.4 million over the next 22 years. Monies collected from this fee are dedicated to the Street Surface Maintenance Program (SSMP) for roadway surface preservation, including maintenance, rehabilitation, and reconstruction. They cannot be used to construct capital projects.

Portland General Electric (PGE) Privilege Tax

Similar to franchise fees, the PGE Privilege Tax is paid by a utility (in this case PGE) in exchange for the use of the public right-of-way. The rate approved by the Milwaukie City Council is 1.5% of Milwaukie customers' bills. ~~Because PGE payments to the City are based on a calendar year, the City will receive one-half of~~In fiscal year 2011-12, the ~~estimated annual~~ City received revenue of $~~300,000~~324,400 ~~from this source in the first program year~~. Revenues for the next 22 years are projected to total nearly ~~$6.8~~7.7 million. Monies collected from this tax are dedicated to the Street Surface Maintenance Program (SSMP) for roadway surface preservation, including maintenance, rehabilitation, and reconstruction. They cannot be used to construct capital projects.

~~**Street Surface Maintenance Fee**~~

~~The street maintenance fee is paid by all City of Milwaukie utility customers (residents, businesses, government units, etc.) through their utility bill and is based on an estimate of daily trips generated by each customer. Fiscal year 2007/2008 revenues are expected to be~~

~~$600,000, and the fee is expected to generate $13.4 million over the next 22 years. Monies collected from this fee are dedicated to roadway surface preservation, including maintenance, rehabilitation, and reconstruction. They cannot be used to construct capital projects.~~

Local ~~Motor Vehicle Fuel~~Gas Tax

The City of Milwaukie local gas tax of two cents per gallon went into effect in April 2007. Revenue generated in fiscal year ~~2007/2008~~2011-12 was~~ is expected to be~~ approximately ~~$125,000~~179,000. Over the next 22 years, the total revenue from this source~~ will~~ is expected to be approximately $~~2.8~~4.4 million. Monies collected from this tax are dedicated to the Street Surface Maintenance Program (SSMP) for roadway surface preservation, including maintenance, rehabilitation, and reconstruction. They cannot be used to construct capital projects.

Projected Transportation Revenue

Table 13-1 summarizes the current, anticipated, and approved funding sources and the estimated revenue available to the City of Milwaukie for transportation-related projects over the next 22 years. Total projected revenues over the next 22 years are approximately $1.2 million restricted for capital projects, $25.5 million restricted for maintenance projects, and $50.8 million for either capital or maintenance projects (unrestricted).

Table 13-1 Projected Transportation Revenue for the 22-Year Planning Period (in ~~2007~~2012 dollars)

Funding Source	Capital	Unrestricted	Maintenance	TOTAL
SDC and FILOC[2]	$~~3,756,273~~1,190,100			$ ~~3,756,273~~**1,190,100**
Franchise Fees		$ ~~12,026,300~~23,716,000		~~**12,026,300**~~**23,716,000**
State Gas Tax		~~21,151,174~~26,887,000		~~**21,151,174**~~**26,887,000**
Bike Path Fund		~~213,642~~271,600		~~**213,642**~~**271,600**
Street Maintenance Fee			$~~13,412,781~~13,420,000	~~**13,412,781**~~**13,420,000**
PGE Privilege Tax			~~6,765,000~~7,744,000	~~**6,765,000**~~**7,744,000**
Local Gas Tax			~~2,750,000~~4,356,000	~~**2,750,000**~~**4,356,000**
Other Revenue		$60,000		**$60,000**
Projected Revenue (~~2008~~2014 to ~~2030~~2035)[23]	**$~~3,756,273~~1,190,100**	**$~~33,391,116~~50,934,600**	**$~~22,927,781~~25,520,000**	**$~~60,075,170~~77,644,700**

The three line items in Table 13-1 that are specifically restricted to funding maintenance projects (street maintenance fee, PGE privilege tax, and local gas tax) have been designated by City

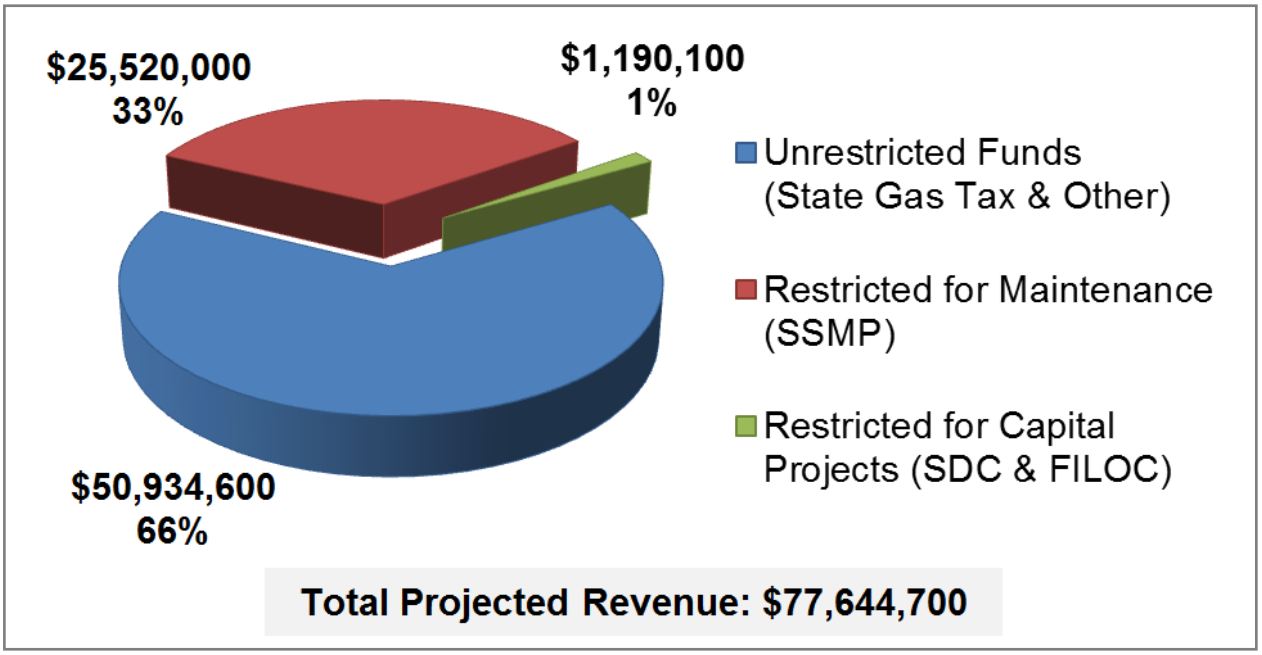
[2] Figure includes $444,500 of FILOC money currently in City coffers (unspent to date) in addition to $280,000 of projected FILOC revenue as estimated over the 22-year planning period.

[23] Projections for these funding sources were made based on the most recent year, with the exception of FILOC and SDC revenue. Because FILOC and SDC revenue is more variable, the projection is based on an average involving three years of actual revenues with an estimated small annual increase.

Council as the exclusive funding sources for the City's Street Surface Maintenance Program (SSMP). Projects eligible for SSMP funding include major rehabilitation and reconstruction of roadways; routine street maintenance (e.g., filling potholes or patching asphalt) must be funded from the "unrestricted" sources in Table 13-1.

Figure 13-1 provides a graphic depiction of the information presented in Table 13-1, showing the makeup of anticipated revenue for the 22-year planning period.

Figure 13-1 Projected Transportation Revenue for the 22-Year Planning Period (in 2012 dollars)



CAPITAL AND MAINTENANCE PROJECTS

Based on current figures, projected costs for operations and maintenance over the 22-year planning period total approximately $77.6 million. Table 13-2 provides a detailed breakdown of these costs. As noted in Table 13-1, estimated revenues for the same timeframe are also approximately $77.6 million. However, some of those funds (approximately $1.2 million) are specifically restricted to capital projects, so there is some projected shortfall for operations and maintenance over the 22-year planning period. Not only does this mean that additional funds will be necessary simply to cover projected operational and maintenance costs, but also that the unrestricted revenues will be effectively unavailable for capital projects.

A minimum of approximately $272,000 must be spent on bicycle projects (capital or maintenance), or the City must forego expending the 1% of Highway Trust Fund revenues that are required to be devoted to bicycle facilities. But given that the regular sweeping of streets with bike lanes accounts for an annual Operations and Maintenance expenditure of approximately $50,000 (or $1.2 million over the 22-year planning period), this requirement is met 4 times over by that one operational project.

Table 13-2 Operations, Maintenance, and Action Plan Costs for the 22-Year Planning Period (in ~~2007~~2012 dollars)

Projects	Capital Cost*	Operations Cost*	TOTAL Cost*
Operations & Maintenance Projects			
Traditional Maintenance Activities (sweeping[4], striping, signage, etc.)		$ ~~8,456,250~~22,170,000	**$ ~~8,456,250~~22,170,000**
Street Lighting		~~7,225,000~~7,956,000	**~~7,225,000~~7,956,000**
~~Overhead~~		~~4,510,000~~	**~~4,510,000~~**
~~Contributions to Support or Administration~~Indirect, Overhead, and Support to Administration		~~9,809,250~~20,307,000	**~~9,809,250~~20,307,000**
Street Surface Maintenance Program (SSMP)		~~22,927,781~~25,520,000	**~~22,927,781~~25,520,000**
Subtotal of Operations & Maintenance Projects		**~~$52,928,281~~75,953,000**	**~~$52,928,281~~75,953,000**
Action Plan Projects	**$5,428,000[5]**	**$1,206,000[6]**	**$6,634,000**
~~Motor Vehicle[3]/Freight~~	~~$2,668,000~~	~~$ 375,000~~	**~~$ 3,043,000~~**
~~Bicycle~~	~~640,000~~	~~1,100,000~~	**~~1,740,000~~**
~~Pedestrian~~	~~$ 2,239,400~~		**~~2,239,400~~**
~~Transit~~	~~75,000~~		**~~75,000~~**
~~Subtotal~~	**~~$5,622,400~~**	**~~$ 1,475,000~~**	**~~$ 7,097,400~~**
Total Approximate Costs (~~2008 to 2030~~2014 to 2035)	**~~$5,622,400~~$5,428,000**	**~~$54,403,281~~77,159,000**	**~~$60,025,681~~82,587,000**

*Approximate Costs

Table 13-2 demonstrates how the City can allocate available funds given their restrictions. Figure 13-2 provides a graphic depiction of the information presented in Table 13-2, showing the breakdown of anticipated costs for the 22-year planning period.

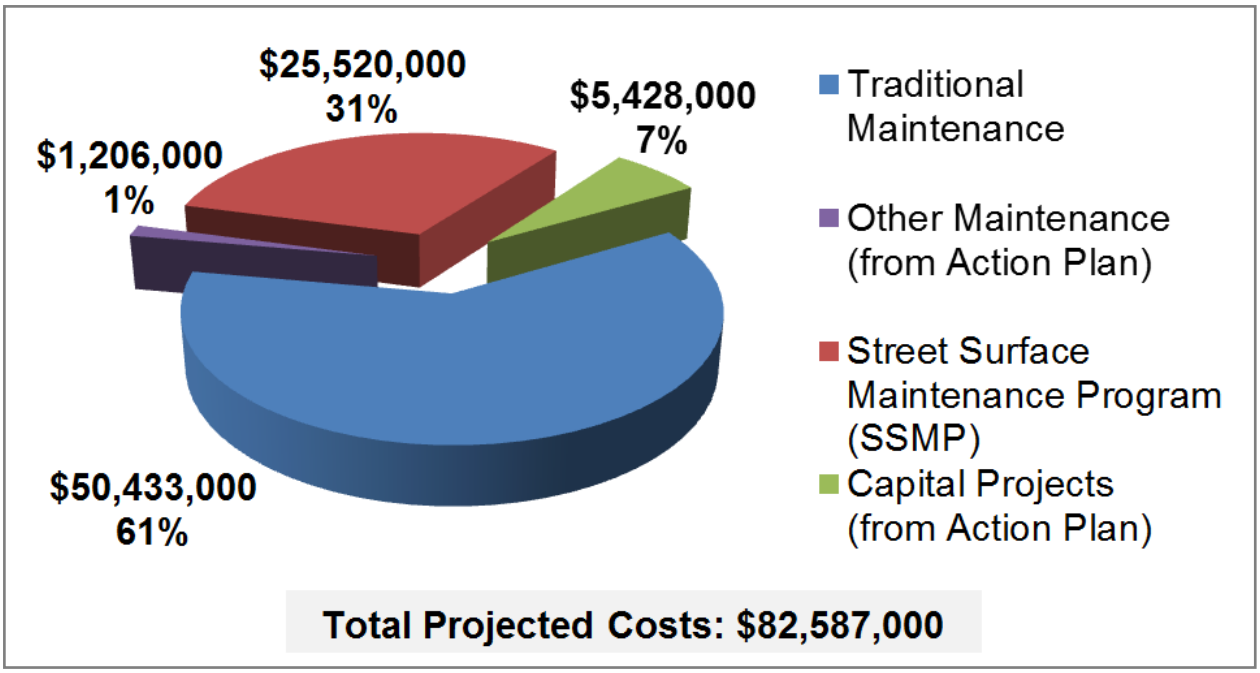
~~[3] Includes funding for Neighborhood Traffic Management Action Plan.~~

[4] Does not include sweeping on designated bike routes, which is reflected in the Action Plan portion of the table, below.

[5] Costs include all projects on the Consolidated Action Plan (Table 13-3). An 11% local match share was used for estimation purposes, except for directly funded projects

[6] Represents that portion of the cost of regular street sweeping that is spent on designated bike routes.

Figure 13-2 Projected Transportation Costs for the 22-Year Planning Period (in 2012 dollars) [7]



With limited local funding and many needs, the City will continually strive to allocate investments for projects that best meet the goals as outlined in Chapter 2. The mode-specific Action Plans—in Chapters 5, 6, 7, 8, 9, 11, and 12, respectively—contain those projects that the City has prioritized most highly and intends to find funding for within the 22-year planning period.

~~Additionally~~ In the past 7 to 8 years, the City ~~will pursue a strategy that~~ has allocated transportation expenditures ~~those funds not earmarked for maintenance (as shown in Table 13-2)~~ in the following manner:

- ~~Approximately 20% to local system maintenance~~
- ~~Approximately 20% to capital and maintenance projects that can be completed with limited City funds~~
- ~~Approximately 60% to leverage receipt of regional, State, and federal grants~~
- Approximately 95% to operations and maintenance
- Approximately 5% to capital projects

~~Leveraging limited local funds will allow the City to implement more projects sooner and to undertake larger projects than the City could otherwise afford.~~

~~The Prioritized Master Plan project list in Table 13-3 (at the end of this chapter) lists all of the proposed TSP projects that were generated through the TSP planning process. Additionally, it shows how well each project meets City goals and how the citizen working groups ranked them. The mode-specific Action Plans—in Chapters 5, 6, 7, 8, 9, 11, and 12, respectively—contain those projects that the City reasonably expects to fund that ranked high in the Prioritized Master Plan project list. The Action Plans include both capital projects and enhanced or new maintenance programs, such as increased bike lane sweeping.~~

[7] Costs include all projects on the Consolidated Action Plan (Table 13-3). An 11% local match share was used for estimation purposes, except for directly funded projects

However, Ggiven current revenue sources and projections and the ongoing need for maintenance of the existing transportation system, most of the remaining projects identified in the mode-specific Master Plan project lists are not expected to be funded with local funds within this plan's 22-year planning horizon. It is anticipated that almost all unrestricted revenues will be spent on operations and maintenance instead of capital projects. Figure 13-3 provides a graphic depiction of the anticipated commitment of future revenue to capital projects versus for operations and maintenance. Leveraging limited local funds to secure State and/or federal grants will be critical for enabling the City to implement more projects sooner and to undertake larger projects than the City could otherwise afford.

Existing operational and maintenance costs total approximately $53 million. See Table 13-2 for a detailed breakdown of these costs. The second half of this table summarizes how the City plans to spend the remaining $7 million of the projected $60 million of total revenue, broken down by mode. More detailed project descriptions and costs can be found in the mode-specific Action Plans.

Table 13-2 demonstrates how the City can allocate available funds given their restrictions. The combined Action Plan project lists must include a minimum of $3.75 million in capital projects because SDC and FILOC revenue cannot be used to fund maintenance projects. Table 13-2 shows that approximately $5.6 million is earmarked for capital projects, which is almost $2 million more than the minimum requirement. Additionally, the Bicycle Action Plan must either include a minimum of $215,000 in bicycle projects (capital or maintenance), or forego expending the 1% of Highway Trust Fund revenues devoted to bicycle facilities. Nearly $1.75 million is earmarked for bicycle facility improvements, which is over eight times the required minimum amount.

Figure 13-3 Projected Expenditures: Operations & Maintenance vs. Capital Projects for the 22-Year Planning Period (in 2012 dollars)

Project Cost Estimates

Order of magnitude cost estimates were developed for all projects identified in the modal master plans using general unit costs for transportation improvements. However, these estimates do not reflect unique project elements that can significantly add to project costs. More detailed project cost estimates will be developed as projects move closer to implementation, including detailed right-of-way requirements and costs associated with special designs. Because multiple modal improvements may occur on the same facility, costs were developed at a project level incorporating all modes, as appropriate. It may be desirable to break project mode elements out separately. However, in most cases, there are greater cost efficiencies in undertaking multiple modal improvements at the same time.

The Consolidated Action Plan project list (Table 13-3) presents the projects from all the mode-specific Action Plans in a single table. The Prioritized Master Plan project list in Table 13-4 (at the end of this chapter) lists all of the proposed TSP projects that have been generated through the TSP planning process, grouping them by priority (High, Medium, Low).

Table 13-3 Consolidated Action Plan Project List

On Action Plan List from TSP Chapter(s)	Project Name	Project Description	From	To	Project Cost ($1,000s)	Direct Funding or Grant Match
Pedestrian & Bicycle	17th Avenue Improvements	Fill in sidewalk gaps on both sides of street; fill in gaps in existing bicycle network with bike lanes; and/or provide multi-use path. Improve intersections safety at Milport Rd, McBrod Ave, Hwy 224, Lava Dr, and Hwy 99E.	Ochoco St	McLoughlin Blvd	$1,000	Match
Pedestrian, Bicycle, Transit	Railroad Avenue Capacity Improvements	Pedestrian aspect: Fill in sidewalk gaps on both sides of street or construct multi-use path on one side.	37th Ave	Harmony Rd	$1,800	Match
		Bicycle aspect: Fill in gaps in existing bicycle network with bike lanes, cycle track, multi-use path, or other facilities.	37th Ave	Linwood Ave	$4,800	Match
		Transit aspect: Provide bus service to extend to Clackamas Town Center and points east.	Harrison St	Eastern city limits	TBD	Direct (TriMet)
Pedestrian & Bicycle	Monroe Street Neighborhood Greenway	Pedestrian aspect: Fill in sidewalk gaps on both sides of street.	42nd Ave	City limits	$1,800	Match
		Bicycle aspect (downtown): Designate as a Neighborhood Greenway and install bike boulevard improvements.	21st Ave	~~Linwood Ave~~ Hwy 224	~~$330~~ $85	Match
		Bicycle aspect (central): Designate as a Neighborhood Greenway and install bike boulevard improvements.	Hwy 224	42nd Ave	$80	Match
		Bicycle aspect (east): Designate as a Neighborhood Greenway and install bike boulevard improvements.	42nd Ave	Linwood Ave	$165	Match
Pedestrian & Bicycle	Kellogg Creek Dam Removal and Hwy 99E Underpass	Replace Hwy 99E bridge over Kellogg Creek, remove dam, restore habitat; construct bike-ped undercrossing between downtown Milwaukie and Riverfront Park.	Location specific	Location specific	$9,900	Match
Pedestrian & Street	Intersection Improvements at McLoughlin Boulevard and 22nd Avenue	Improve safety of Trolley Trail crossing at 22nd Ave.	Location specific	Location specific	$200	Direct

On Action Plan List from TSP Chapter(s)	Project Name	Project Description	From	To	Project Cost ($1,000s)	Direct Funding or Grant Match
Pedestrian & Bicycle	Stanley Avenue Neighborhood Greenway (north)	Pedestrian aspect: Fill in sidewalk gaps on both sides of street. Bicycle aspect: Designate as a Neighborhood Greenway and install bike boulevard improvements.	Johnson Creek Blvd Springwater Trail	~~Railroad Ave~~ King Rd ~~Railroad Ave~~ King Rd	~~$4,700~~ $1,900 ~~$330~~ $135	Match Match
Pedestrian & Bicycle	Stanley Avenue Neighborhood Greenway (south)	Pedestrian aspect: Fill in sidewalk gaps on both sides of street. Bicycle aspect: Designate as a Neighborhood Greenway and install bike boulevard improvements.	King Rd King Rd	Railroad Ave Railroad Ave	$2,800 $195	Match Match
Pedestrian & Bicycle	Kronberg Park Trail	Construct multi-use path to connect bike-ped bridge to safe crossing of Hwy 99E	Kellogg Creek Bridge	River Rd at Hwy 99E	$300	Direct
Pedestrian & Bicycle	Kellogg Creek Bike-Ped Bridge	Construct bike-ped overpass over Kellogg Creek in conjunction with light rail bridge.	Lake Rd	Kronberg Park	$2,500	Match
Pedestrian & Street	Intersection Improvements at Hwy 224 Crossings	Pedestrian aspect: Improve pedestrian crossings at Freeman Way, 37th Ave, Oak St, Monroe St, and Harrison St Street aspect: Add left turn-lanes and protected signal phasing on Oak St approaches.	Location specific Location specific	Location specific Location specific	$100 ($20 each) $20	Match Match
Pedestrian	Adams Street Connector	Construct pedestrian- and bicycle-only facility on Adams St between 21st Ave and Main St	21st Ave	Main St	$450	Match
Bicycle	29th/Harvey/40th Neighborhood Greenway	Bicycle aspect: Designate as a Neighborhood Greenway and install bicycle boulevard improvements.	Springwater Trail	Monroe St	$220	Direct
Transit	Downtown Transit Center Improvements	Construct new bus layover facility outside of the downtown core.	Location specific	Location specific	$1,250	Match
Transit	Downtown Loop Bus	Establish bus service from downtown to Tacoma and Park Ave Stations.	Downtown	Tacoma Station, Park Ave Station	TBD	Direct (TriMet)
Transit	Neighborhood Loop Bus	Establish bus service between eastern neighborhoods and downtown.	Eastern city limits	Downtown	TBD	Direct (TriMet)

On Action Plan List from TSP Chapter(s)	Project Name	Project Description	From	To	Project Cost ($1,000s)	Direct Funding or Grant Match
Parking	Downtown Parking Management	Implement a downtown parking management system, including a dedicated parking manager.	Downtown	Downtown	$40	Direct
Nhbrhd Traffic Mgmnt	Walk Safely Milwaukie Program	Complete a few small traffic calming and pedestrian safety projects throughout the city each year.	Citywide	Citywide	$300 ($13 annually)[8]	Direct (with NDA match)
Street & Freight	Hwy 224 & Hwy 99E Refinement Plan	Conduct refinement study that focuses on minimizing barrier effect and improving auto and freight mobility.	Hwy 99E Project Limits: Tacoma St to ~~17th Ave~~River Rd	Hwy 224 Project Limits: Hwy 99E to Lake Rd Interchange	$270	Match
Bicycle	Bike Lane Maintenance	Sweep bike lanes to remove debris.	Citywide	Citywide	$1,200	Direct

POTENTIAL NEW FUNDING SOURCES

The Master Plan project lists in Chapters 5-9, 11, and 12 include a large number of unfunded, but nonetheless high-priority, projects and programs. Absent an increase in funding, the City will be unable to address operational deficiencies identified in Chapter 4. The City may wish to consider new revenue sources to ensure that funding is available for proposed capital projects and other transportation programs.

In addition, the City ~~expects to contribute~~is contributing $5 million in match to the regional share of the Portland-Milwaukie Light Rail project. ~~While the exact allocation of the regional share is still to be determined, the City of Milwaukie's contribution is likely to be around $5 million.~~ The vast majority of the City's transportation revenues are restricted in ways that ~~would~~do not allow the City to expend them on a light rail "match." SDC revenues, the only significant transportation revenue stream that could contribute to the project, are not projected to be adequate to cover the local match over the next 22 years~~, let alone in the next 5-8 years, the expected time-frame in which the City would contribute to the light rail project~~.

The ~~City's approach to planning for any local financial contribution to light rail parallels the region's: the draft financing plan of the Regional Transportation Plan (which is being updated simultaneously with this TSP) includes the sources of local match for upcoming major transit projects separately from the traditional revenue streams. These major capital projects are not included within the baseline funding commitments and are included as conditional upon the identification of additional revenues. Similarly, the~~ Milwaukie share of the Portland-Milwaukie light rail project is not included on the Public Transit Action Plan list because it will require revenues above and beyond those included in the baseline revenue projection.

Many cities use some combination of the following funding sources to supplement their capital and/or maintenance budgets.

[8] Historically, the Neighborhood Pedestrian and Traffic Safety Program received $13,000 annually. In more recent years, the program name changed to Walk Safely Milwaukie and funding was raised to $100,000 annually. Future funding for the program will be evaluated on a biennial basis with the budget.

TSP IMPLEMENTATION AND UPDATE STEPS

The primary function of the TSP is to provide guidance for long-range policy and investment decisions about needed improvements to the transportation system over the next 22 years. The Consolidated Action Plan in Table 13-3 provides a list of the highest priority projects for the community. This list is utilized to build the "Transportation Priority Project—Unfunded" section of the City's Capital Improvement Plan (CIP). The CIP is a list of projects for the City's water, wastewater, stormwater, and transportation systems that are scheduled to be funded in the short term. As funding becomes available, projects are moved from the unfunded section of the CIP to the section recommended for funding. Projects in the CIP section recommended for funding are reviewed for funding every 2 years through the City's budgeting process. In essence, the CIP is the primary implementation mechanism for TSP projects.

This document requires a series of implementing and on-going update steps to retain its usefulness over the next 22 years. Such steps include refining and updating the affected design standards for streets and trails, implementing the suggested development code and Comprehensive Plan text changes, and periodically updating and reviewing traffic forecasts and project priorities. The State suggests that cities should update local TSPs every ~~five~~5 years to keep current on the latest land development trends, capital project funding conditions, and priorities of the community. These activities would typically be funded through a combination of grants, engineering funds, and planning funds, and are not, therefore, included in the financial projections for the modal Action Plans.

Table 13-~~3~~4 Prioritized Master Plan Project List

Project Name	TSP Chapter	Project Description	From	To	Estimated Cost ($1,000s)[9]	Priority Ranking [10]	Is Project ~~Funded~~ in Action Plan?[11]	Project Type
HIGH PRIORITY PROJECTS								
17th Avenue ~~Sidewalks~~Improvements	Pedestrian & Bicycle	Fill in sidewalk gaps on both sides of street; fill in gaps in existing bicycle network with bike lanes; and/or provide multi-use path. ~~and i~~Improve intersections~~ safety~~ at Milport Rd, McBrod Ave, Hwy 224, Lava Dr, and Hwy 99E.	Ochoco St	McLoughlin Blvd	~~$920~~ 1,000	High	Yes	Capital
~~17th Avenue Bikeway and Intersection Safety Improvements~~	~~Bicycle~~	~~Fill in gaps in existing bicycle network with bike lanes or multiuse path. Improve intersection safety and eastbound connection at 17th Ave/Hwy 99E. Improve intersection safety at 17th Ave/Hwy 224.~~	~~Waverly Dr~~	~~Harrison St~~	~~$135~~	~~High~~	~~Yes~~	~~Capital~~
Railroad Avenue Capacity Improvements~~Sidewalks~~	Pedestrian ~~& Transit~~	Pedestrian aspect: Fill in sidewalk gaps on both sides of street or construct multi-use path on one side.	37th Ave	Harmony Rd	~~$1,625~~ 1,800	High	Yes	Capital
~~Railroad Avenue Bike Lanes~~	Bicycle	Bicycle aspect: Fill in gaps in existing bicycle network with bike lanes, cycle track, multi-use path, or other facilities.	37th Ave	Linwood Ave	~~$4,364~~ 4,800	High	~~No~~Yes	Capital
	Transit	Transit aspect: Provide bus service to extend to Clackamas Town Center and points east.	Harrison St	Eastern city limits	TBD	High	Yes	Service Enhance-ments
Monroe Street ~~Bicycle Boulevard~~Neighborhood Greenway (downtown)	Bicycle	Designate as a ~~Bicycle Boulevard~~Neighborhood Greenway and install ~~bicycle~~bike boulevard improvements.	21st Ave	~~Linwood Ave~~ Hwy 224	~~$300~~ ~~330~~ $85	High	Yes	Capital
Monroe Street Neighborhood Greenway (central)	Bicycle	Designate as a Neighborhood Greenway and install bike boulevard improvements.	Hwy 224	42nd Ave	$80	High	Yes	Capital
Monroe Street Neighborhood Greenway (east)	Bicycle	Designate as a Neighborhood Greenway and install bike boulevard improvements.	42nd Ave	Linwood Ave	$165	High	Yes	Capital
~~Monroe Street Sidewalks~~	Pedestrian	Fill in sidewalk gaps on both sides of street.	42nd Ave	City limits	~~$1,631~~ 1,800	High	Yes	Capital
Stanley Avenue ~~Bicycle Boulevard~~Neighborhood Greenway (north)	Bicycle & Pedestrian	Bicycle aspect: Designate as a ~~Bicycle Boulevard~~Neighborhood Greenway and install ~~bicycle~~bike boulevard improvements. Pedestrian aspect: Fill in sidewalk gaps on both sides of street	Springwater Trail	~~Railroad Ave~~ King Rd	~~$300~~ ~~330~~ $135	~~Medium~~High	~~No~~Yes	Capital
Stanley Avenue Neighborhood Greenway (south)	Bicycle & Pedestrian	Bicycle aspect: Designate as a Neighborhood Greenway and install bike boulevard improvements. Pedestrian aspect: Fill in sidewalk gaps on both sides of street	King Rd	Railroad Ave	$195	High	Yes	Capital
~~Stanley Avenue Sidewalks~~	Pedestrian	Fill in sidewalk gaps on both sides of street.	Johnson Creek Blvd	Railroad Ave	~~$4,304~~ 4,700	High	~~No~~Yes	Capital

[9] In the case of operational projects, estimated costs are for entire 22-year planning period. Costs are order of magnitude estimates presented in 2013 dollars.

[10] Projects are ranked as either high, medium, or low. -They are in no particular order within their ranking.

[11] ~~Funded projects are listed on one of the mode-specific Action Plans in the TSP and are expected to be funded within the 22-year planning period through either direct or leveraged City funding.~~

Project Name	TSP Chapter	Project Description	From	To	Estimated Cost ($1,000s)[9]	Priority Ranking [10]	Is Project ~~Funded~~ in Action Plan?[11]	Project Type
Downtown Transit Center Improvements	Transit	Construct new bus layover facility outside of the downtown core. ~~Improve downtown bus stops and shelters consistent with level 3 features and including ample bike parking.~~	Location specific	Location specific	$1,250	High	Yes	Capital
Kellogg Creek Dam Removal and Hwy 99E Underpass	Pedestrian & Bicycle	Replace Hwy 99E bridge over Kellogg Creek, remove dam, restore habitat; construct bike-pedestrian ~~undercrossing~~ between downtown Milwaukie and Riverfront Park.	Site Specific	Site Specific	~~$9,000~~ ~~12,400~~ 9,900	High	Yes	Capital
29th/Harvey/40th ~~Bicycle Boulevard~~Neighborhood Greenway	Bicycle	Designate as a ~~Bicycle Boulevard~~Neighborhood Greenway and install ~~bicycle~~bike boulevard improvements.	Springwater Trail	Monroe St	~~$200~~ 220	High	Yes	Capital
Bike Lane Maintenance	Bicycle	Sweep bike lanes to remove debris.	Citywide	Citywide	~~$1,100~~ 1,200	High	Yes	Operational
~~Bike Route Signage~~	~~Bicycle~~	~~Install neighborhood bike route signage.~~	~~Citywide~~	~~Citywide~~	~~$150~~	~~High~~	~~Yes~~	~~Operational~~
~~Hwy 224~~ Intersection Improvements at Hwy 224 and Oak Street	~~Automobile~~ Street	Add left turn-lanes and protected signal phasing on Oak S~~treet~~ approaches.	Location specific	Location specific	$20	High	Yes	Capital
~~Neighborhood Pedestrian and Traffic Safety Program~~ Walk Safely Milwaukie Program	Nbrhd Traffic Manage-ment	Complete a few small traffic calming and pedestrian safety projects throughout the city each year.	Citywide	Citywide	$300 ($13 annually)	High	Yes	Capital
Hwy 224 & Hwy 99E Refinement Plan	~~Automobile~~ Street & Freight	Conduct refinement study that focuses on minimizing barrier effect and improving auto and freight mobility.	Hwy 99E Project Limits: Tacoma St to ~~17th Ave~~River Rd	Hwy 224 Project Limits: Hwy 99E to Lake Rd Interchange	~~$250~~ 270	High	Yes	Capital
~~Railroad Crossing Safety and Quiet Zone Project~~	~~Automobile & Pedestrian~~	~~Construct railroad crossing safety improvements at Oak Street, Harrison Street, and 37th Avenue.~~	~~Location specific~~	~~Location specific~~	~~$285~~	~~High~~	~~Yes~~	~~Capital~~
Harrison Street Railroad Crossing Separation	Freight	Upgrade Harrison crossing of Union Pacific Railroad tracks to grade-separated facility. Assess as part of Hwy 224 & Hwy 99E Refinement Plan.	Location specific	Location specific	~~$28,000~~ 30,700	High	No	Capital
~~Hwy 224~~ Intersection Improvements at Hwy 224 and 37th Avenue	~~Automobile~~ Street & Freight	Consolidate the two northern legs of 37th Ave~~nue~~ and International Way into one leg at Hwy 224.	Location specific	Location specific	~~$1,946~~ 2,100	High	No	Capital
Linwood Avenue Capacity Improvements (north)	~~Automobile~~ Street	Widen to standard three lane cross section. Widen bridge over Johnson Creek.	Johnson Creek Blvd	King Rd	~~$8,500~~ 9,300	High	No	Capital
Linwood Avenue Capacity Improvements (south)	~~Automobile~~ Street	Widen to standard three lane cross section.	King Rd	Harmony Rd	~~$11,400~~ 12,500	High	No	Capital
Hwy 224 Crossing Improvements at Oak and Washington Streets	Bicycle	Improve intersection crossing safety for cyclists at Washington S~~treet~~ and Oak S~~treet~~.	Location specific	Location specific	$10	High	No	Capital

Project Name	TSP Chapter	Project Description	From	To	Estimated Cost ($1,000s)[9]	Priority Ranking [10]	Is Project ~~Funded~~ in Action Plan?[11]	Project Type
Downtown Parking ~~Enforcement~~Management	Parking	Implement a downtown parking management system, including a dedicated parking manager.	Downtown	Downtown	$40	High	~~No~~Yes	Operational
Kellogg Creek Bike-Ped Bridge	Pedestrian & Bicycle	Construct bike-ped overpass over Kellogg Creek in conjunction with light rail bridge.	Lake Rd	Kronberg Park	$2,500	High	Yes	Capital
Kronberg Park Trail	Pedestrian & Bicycle	~~Construct multimodal trail along Kellogg Creek connecting Kronberg Park to downtown Milwaukie.~~Construct multi-use path to connect bike-ped bridge to safe crossing of Hwy 99E.	~~McLoughlin Blvd~~ Kellogg Creek Bridge	~~Downtown~~ River Rd at Hwy 99E	~~$1,200~~ 300	~~Low~~High	~~No~~Yes	Capital
Adams Street Connector	Pedestrian	Construct pedestrian- and bicycle-only facility on Adams St between 21st Ave and Main St	21st Ave	Main St	~~$450~~	High	Yes	Capital
43rd Avenue Sidewalks	Pedestrian	Fill in sidewalk gaps on both sides of street.	Howe St/ 42nd Ave	King Rd/ 43rd Ave	~~$550~~ 600	~~Low~~High	No	Capital
Harmony Road Sidewalks	Pedestrian	Fill in sidewalk gaps on both sides of street.	Linwood Ave	City limits	~~$38~~ 40	~~Low~~High	No	Capital
International Way Sidewalks	Pedestrian	Fill in sidewalk gaps on both sides of street	Criterion Ct	Lake Rd	~~$767~~ 840	~~Low~~High	No	Capital
River Road Sidewalks	Pedestrian	Fill in sidewalk gaps on both sides of street.	McLoughlin Blvd	City limits	~~$626~~ 690	~~Low~~High	No	Capital
Intersection Curb Ramp Improvements	Pedestrian	Install curb ramps at all intersections with sidewalks (approximately 700 intersections).	Citywide	Citywide	~~$5~~ 3,500	~~Low~~High	No	Capital
~~Hwy 224~~ Intersection Improvements at Hwy 224 and 37th Avenue	Pedestrian	Improve pedestrian crossing.	Location specific	Location specific	$20	~~Low~~High	~~No~~Yes	Capital
~~Hwy 224~~ Intersection Improvements at Hwy 224 and Freeman Way	Pedestrian	Improve pedestrian crossing.	Location specific	Location specific	$20	~~Low~~High	~~No~~Yes	Capital
~~Hwy 224~~ Intersection Improvements at Hwy 224 and Harrison Street	Pedestrian	Improve pedestrian crossing.	Location specific	Location specific	$20	~~Low~~High	~~No~~Yes	Capital
~~Hwy 224~~ Intersection Improvements at Hwy 224 and Monroe Street	Pedestrian	Improve pedestrian crossing.	Location specific	Location specific	~~$15~~ 20	~~Low~~High	~~No~~Yes	Capital
~~Hwy 224~~ Intersection Improvements at Hwy 224 and Oak Street	Pedestrian	Improve pedestrian crossing.	Location specific	Location specific	$20	~~Low~~High	~~No~~Yes	Capital
Bicycle-friendly Street Grates	Bicycle	Install bicycle-friendly street grates.	Citywide	Citywide	~~$50~~ 60	~~Low~~High	No	Operational
Intersection Improvements at Linwood Avenue and Monroe Street	Bicycle	Improve safety of crossing at intersection.	Location specific	Location specific	$10	~~Low~~High	No	Capital
Lake Road Bike Lanes	Bicycle	Fill in gaps in existing bicycle network with bike lanes.	Main St	Guilford Dr	~~$3,142~~ 3,400	~~Low~~High	No	Capital

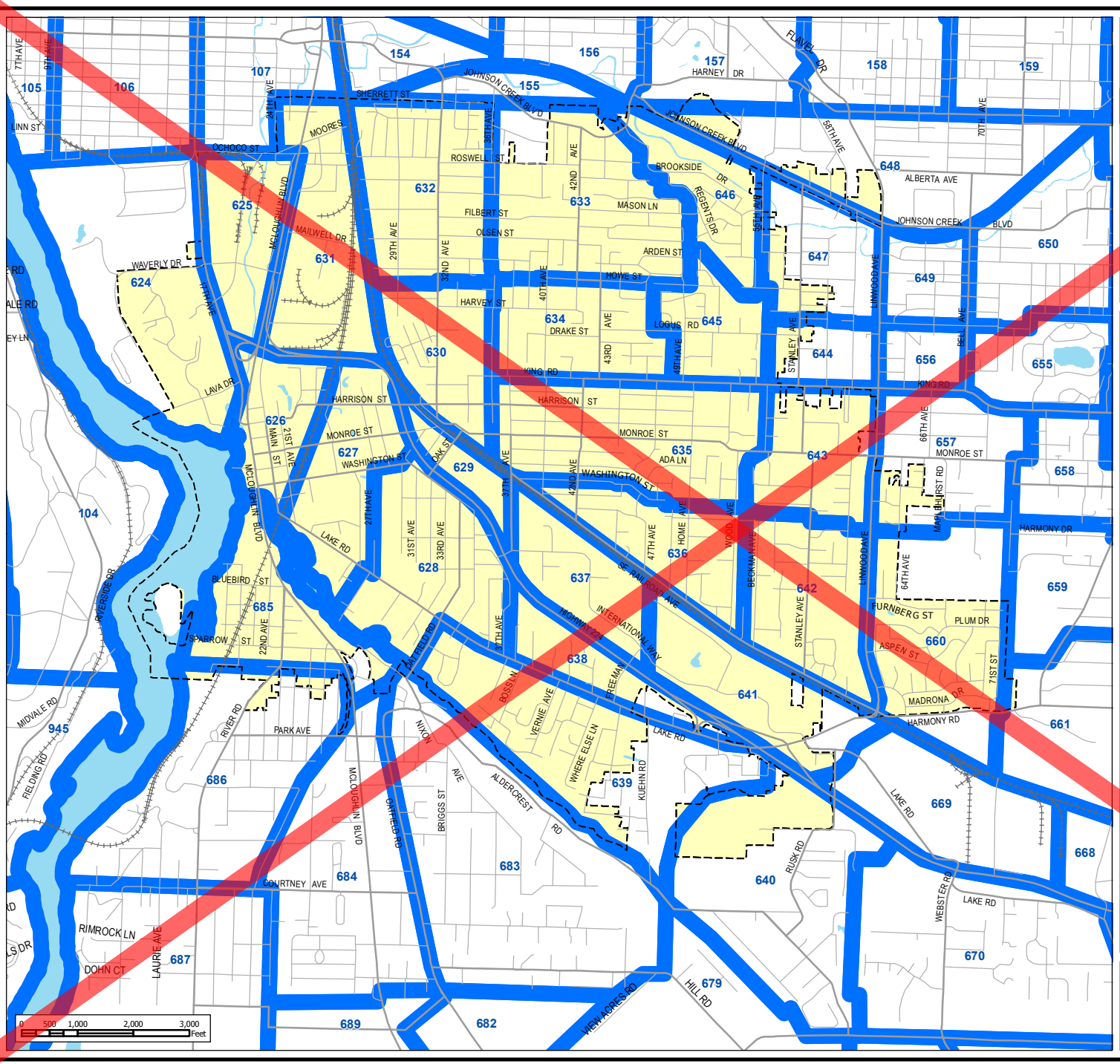
Project Name	TSP Chapter	Project Description	From	To	Estimated Cost ($1,000s)[9]	Priority Ranking [10]	Is Project ~~Funded~~ in Action Plan?[11]	Project Type
Cyclist Education	Bicycle	Promote cycling through bike use and route selection education.	Citywide	Citywide	$10	Medium	No	Operational
~~Railroad Crossing Pedestrian Improvements at Oak~~	~~Pedestrian~~	~~Improve intersection for pedestrians.~~	~~Location specific~~	~~Location specific~~	~~$15~~	~~Medium~~	~~No~~	~~Capital~~
Harrison Street Bike Lanes	Bicycle	Fill in gaps in existing bicycle network with bike lanes (cost included with Harrison St road widening project).	Hwy 99E	21st Ave	~~$273~~ 300	Medium	No	Capital
Intersection Improvements at Linwood Avenue and King Road	~~Automobile~~ Street	Implement protected/permissive left turn phasing for northbound and southbound approaches.	Location specific	Location specific	~~$16~~ 20	Medium	No	Capital
Brookside Drive Sidewalks	Pedestrian	Fill in sidewalk gaps on both sides of street.	Johnson Creek Blvd	Regents Dr	~~$15~~ 20	Medium	No	Capital
~~Springwater Trail Paving Project~~	~~Bicycle~~	~~Improve corridor through repaving existing trail.~~	~~29th Ave~~	~~Linwood Ave~~	~~$500~~	~~Medium~~	~~No~~	~~Capital~~
Lake Road Capacity Improvements	~~Automobile~~ Street	Widen to standard three lane cross section.	21st Ave	Oatfield Rd	~~$7,392~~ 8,100	Medium	No	Capital
Harrison Street Capacity Improvements	~~Automobile~~ Street	Widen to standard three lane cross section.	32nd ~~St~~Ave	42nd ~~St~~Ave	~~$2,565~~ 2,800	Medium	No	Capital
~~Johnson Creek Blvd~~ Intersection Improvements at Johnson Creek Blvd and Linwood Avenue	~~Automobile~~ Street	Add eastbound right turn lanes and westbound right turn lanes.	Location specific	Location specific	~~$803~~ 880	Medium	No	Capital
~~Harrison Street Intersection Improvements at Harrison Street and Main Street~~	~~Automobile~~ Street	~~Add westbound shared through/right turn lane or eastbound right turn lane.~~	~~Location specific~~	~~Location specific~~	~~$34~~ 40	~~Medium~~	~~No~~	~~Capital~~
Public Parking Structure	Parking	Construct 3- to 4-story public parking structure with retail at ground floor for visitor/employee parking.	Location specific	Location specific	~~$10,000~~ 11,000	Medium	No	Capital
Logus Road Sidewalks	Pedestrian	Fill in sidewalk gaps on both sides of street.	43rd Ave	49th Ave	~~$771~~ 850	~~High~~Medium	~~Yes~~No	Capital
Springwater Trail Completion	~~Bicycle &~~ Pedestrian & Bicycle	Contribute to regional project to complete Springwater Trail ("Sellwood Gap") along Ochoco Street.	17th Ave	19th Ave	~~$80~~ 90	~~High~~Medium	~~Yes~~No	Capital
Downtown Streetscape Improvements	Parking & Pedestrian	Install sidewalk bulbouts, lighting, and pedestrian amenities.	Downtown	Downtown	~~$6,700~~ 7,300	~~High~~Medium	~~Yes~~No	Capital
King Road Boulevard Treatments	Pedestrian	Install street boulevard treatments: widen sidewalks and improve crossings.	43rd Ave	Linwood	~~$500~~ 550	~~High~~Medium	~~Yes~~No	Capital
Bicycle and Pedestrian Overpass over Railroad Avenue	Pedestrian & Bicycle	Establish a dedicated bicycle and pedestrian connection across Railroad Avenue and the railroad tracks.	Railroad Ave	International Way	~~$2,025~~ 2,200	~~Low~~Medium	No	Capital
Oatfield Road Bike Lanes	Bicycle	Fill in gaps in existing bicycle network with bike lanes.	Guilford Ct	Lake Rd	~~$348~~ 380	~~Low~~Medium	No	Capital
International Way Bicycle Facilities	Bicycle	Construct bike lanes or other bike facilities.	37th Ave	Lake Rd	$400	Medium	No	Capital
Traffic Calming Improvements on River Road at Lark Street	Nbrhd Traffic Management	Install traffic calming measures such as a permanent speed-warning sign and/or roundabout.	Location specific	Location specific	$310	Medium	No	Capital

Project Name	TSP Chapter	Project Description	From	To	Estimated Cost ($1,000s)[9]	Priority Ranking [10]	Is Project ~~Funded~~ in Action Plan?[11]	Project Type
~~Seismic Upgrades to Johnson Creek Bridges~~	~~Street~~	~~Replace or retrofit City-jurisdiction bridges over Johnson Creek at 55th Ave and Stanley Ave for compliance with current seismic requirements.~~	~~Location specific~~	~~Location specific~~		~~Medium~~	~~No~~	~~Capital~~
Bicycle-Pedestrian Improvements to Main Street	Pedestrian & Bicycle	Construct multi-use path or other improved bike-ped facilities on Main St to provide safer connection between downtown and Tacoma Station. (TSAP)	Hanna Harvester Dr	Tacoma Station	$2,900	Medium	No	Capital
Bicycle-Pedestrian Connection from Eastern Neighborhoods to Tacoma Station Area	Pedestrian & Bicycle	Establish bike-ped connection over existing railroad tracks and light rail to Tacoma Station Area. (TSAP)	Olsen St & Kelvin St	Mailwell Dr	$4,000	Medium	No	Capital
Improved Connection from Springwater Trail to McLouhglin Boulevard	Pedestrian & Bicycle	Construct stairs or other facility to connect Springwater Trail to west side of McLoughlin Blvd. (TSAP)	Location specific	Location specific	$500	Medium	No	Capital
Bicycle-Pedestrian Connection over Johnson Creek	Pedestrian & Bicycle	Construct bike-ped bridge over Johnson Creek along Clatsop St at 23rd Ave to connect Tacoma Station Area with adjacent neighborhood. (TSAP)	Location specific	Location specific	$400	Medium	No	Capital
Improved Bicycle-Pedestrian Connections on West Side of Tacoma Station Area	Pedestrian & Bicycle	Improve bike-ped connections to adjacent neighborhood to west of Tacoma Station Area at Ochoco St and Milport Rd. (TSAP)	Location specific	Location specific	$500	Medium	No	Capital
LOW PRIORITY PROJECTS								
Railroad Avenue Capacity Improvements	~~Automobile~~ Street ~~& Transit~~	Widen ~~SE~~ Railroad Aven~~ue~~ to standard three lane cross section. ~~Accommodate future bus service.~~	37th Ave	Linwood Ave	~~$12,990~~ 14,200	~~High~~Low	~~Yes~~No	Capital
Ochoco Street Sidewalks	Pedestrian	Construct sidewalks on Ochoco S~~treet~~ to connect bus stops to Goodwill.	19th Ave	McLoughlin Blvd	~~$$$~~ $1,300	Low	No	Capital
Springwater ~~Corridor~~Trail Intersection Improvements at 45th Avenue	Bicycle	Improve safety of crossing at intersection.	Location specific	Location specific	$10	Low	No	Capital
Johnson Creek Boulevard and 42nd Avenue Signalization	~~Automobile~~ Street	Replace 3-way stop with signal when warranted.	Location specific	Location specific	~~$250~~ 270	Low	No	Capital
~~Springwater Trail Ramp Improvement~~	~~Bicycle & Pedestrian~~	~~Improve ramp at Springwater Trail and McLoughlin Blvd.~~	~~Location specific~~	~~Location specific~~	~~$15~~	~~Low~~	~~Yes~~	~~Capital~~
19th Avenue Sidewalks	Pedestrian	Fill in sidewalk gaps on both sides of street.	Kellogg Creek Trail	Sparrow St	~~$305~~ 330	Low	No	Capital
22nd Avenue Sidewalks	Pedestrian	Fill in sidewalk gaps on both sides of street.	McLoughlin Blvd	Sparrow St	~~$325~~ 360	Low	No	Capital
Edison Street Sidewalks	Pedestrian	Fill in sidewalk gaps on both sides of street.	35th Ave	37th Ave	~~$116~~ 130	Low	No	Capital
Harvey Street Sidewalks	Pedestrian	Fill in sidewalk gaps on both sides of street.	32nd Ave	42nd Ave	~~$534~~ 590	Low	No	Capital
Home Avenue Sidewalks	Pedestrian	Fill in sidewalk gaps on both sides of street.	Railroad Ave	King Rd	~~$756~~ 830	Low	No	Capital

Project Name	TSP Chapter	Project Description	From	To	Estimated Cost ($1,000s)[9]	Priority Ranking [10]	Is Project ~~Funded~~ in Action Plan?[11]	Project Type
Johnson Creek Boulevard Sidewalks	Pedestrian	Fill in sidewalk gaps on both sides of street.	Harney ~~Dr~~St	City limits	~~$378~~ 410	Low	No	Capital
Linwood Avenue Sidewalks (north)	Pedestrian	Fill in sidewalk gaps on both sides of street.	Johnson Creek Blvd	~~Railroad Ave~~ King Rd	~~$2,960~~ ~~3,200~~ 1050	Low	No	Capital
Linwood Avenue Sidewalks (south)	Pedestrian	Fill in sidewalk gaps on both sides of street.	King Rd	Railroad Ave	$2,150	Low	No	Capital
Mason Lane Sidewalks	Pedestrian	Fill in sidewalk gaps on both sides of street.	42nd Ave	Regents Dr	~~$671~~ 740	Low	No	Capital
Oatfield Road Sidewalks	Pedestrian	Fill in sidewalk gaps on both sides of street.	Guilford Ct	City limits	~~$132~~ 150	Low	No	Capital
Regents Drive Sidewalks	Pedestrian	Fill in sidewalk gaps on both sides of street.	Brookside Dr	Winsor Dr	~~$494~~ 540	Low	No	Capital
Roswell Street Sidewalks	Pedestrian	Fill in sidewalk gaps on both sides of street.	32nd Ave	36th Ave	~~$192~~ 210	Low	No	Capital
Rusk Road Sidewalks	Pedestrian	Fill in sidewalk gaps on both sides of street.	Lake Rd	North Clackamas Park	~~$662~~ 730	Low	No	Capital
Olsen Street Sidewalks	Pedestrian	Fill in sidewalk gaps on north side of street.	32nd Ave	~~43rd~~42nd Ave	~~$432~~ 470	Low	No	Capital
49th Avenue Sidewalks	Pedestrian	Fill in sidewalk gaps on both sides of street.	Logus Rd	King Rd	~~$250~~ 270	Low	No	Capital
Hwy 224 Sidewalks	Pedestrian	Fill in sidewalk gaps on both sides of street.	Oak St	37th Ave	~~$420~~ 460	Low	No	Capital
Intersection Improvements at Olsen Street and 42nd Avenue	Pedestrian	Improve pedestrian crossing.	Location specific	Location specific	$20	Low	No	Capital
~~Intersection Improvements at Harmony and Lake~~	~~Pedestrian~~	~~Improve pedestrian crossing.~~	~~Location specific~~	~~Location specific~~	~~$15~~	~~Low~~	~~No~~	~~Capital~~
Intersection Improvements at Railroad and 37th Avenues	Pedestrian	Improve pedestrian crossing.	Location specific	Location specific	$10	Low	No	Capital
Intersection Improvements at Stanley and Logus	Pedestrian	Improve pedestrian crossing.	Location specific	Location specific	~~$15~~ 20	Low	No	Capital
~~Springwater Trail Ramp Improvement at McLoughlin~~	~~Pedestrian~~	~~Improve ramp at Springwater Trail and McLoughlin Blvd.~~	~~Location specific~~	~~Location specific~~	~~$15~~	~~Low~~	~~No~~	~~Capital~~
Pedestrian Connection to North Clackamas Park	Pedestrian	Create pedestrian connection between the school and the park.	Rowe Middle School	North Clackamas Park	~~$1,284~~ 1,400	Low	No	Capital
~~Hwy 224~~ Intersection Improvements at Hwy 224 and 17th Avenue	Freight	Upgrade intersection turning radii to better accommodate freight movements.	Location specific	Location specific	~~$50~~ 60	Low	No	Capital
Intersection Improvements at Mailwell and Omark Drives	Freight	Upgrade intersection turning radii to better accommodate freight movements.	Location specific	Location specific	~~$50~~ 60	Low	No	Capital
Milwaukie Bike Map	Bicycle	Produce a Milwaukie Bike Map.	Citywide	Citywide	~~$50~~ 60	Low	No	Operational

Project Name	TSP Chapter	Project Description	From	To	Estimated Cost ($1,000s)[9]	Priority Ranking [10]	Is Project ~~Funded~~ in Action Plan?[11]	Project Type
~~Trolley Trail Signage~~	~~Bicycle~~	~~Design and install Trolley Trail signage.~~	~~Milwaukie Riverfront~~	~~Southern city limits~~	~~$54~~	~~Low~~	~~No~~	~~Capital~~
Springwater Trail Signage	Bicycle	Install wayfinding signage for Springwater Trail.	Citywide	Citywide	~~$15~~ 20	Low	No	Operational
Intersection Improvements at Johnson Creek Boulevard and Linwood Avenue	Bicycle	Improve safety of crossing at intersection.	Location specific	Location specific	$10	Low	No	Capital
Intersection Improvements at Linwood Avenue and King Road	Bicycle	Improve safety of crossing at intersection.	Location specific	Location specific	$10	Low	No	Capital
~~Intersection Improvements at Linwood and Harmony~~	~~Bicycle~~	~~Improve safety of crossing at intersection.~~	~~Location specific~~	~~Location specific~~	~~$10~~	~~Low~~	~~No~~	~~Capital~~
Intersection Improvements at International Way and Lake Road	Bicycle	Improve safety of crossing at intersection.	Location specific	Location specific	$10	Low	No	Capital
~~Intersection Improvements at Adams and 21st~~	~~Bicycle~~	~~Improve safety of crossing at intersection.~~	~~Location specific~~	~~Location specific~~	~~$10~~	~~Low~~	~~No~~	~~Capital~~
Harrison Street Bike Lanes	Bicycle	Fill in gaps in existing bicycle network with bike lanes.	Hwy 224	42nd Ave	~~$13~~ 10	Low	No	Capital
37th Avenue Bike Lanes	Bicycle	Fill in gaps in existing bicycle network with bike lanes.	Harrison St	Hwy 224	~~$2,900~~ 3,200	Low	No	Capital
43rd Avenue Bike Lanes	Bicycle	Fill in gaps in existing bicycle network with bike lanes.	King Rd	Filbert St	~~$1,014~~ 1,100	Low	No	Capital
Linwood Avenue Bike Lanes (north)	Bicycle	Fill in gaps in existing bicycle network with bike lanes.	Queen Rd	Johnson Creek Blvd	~~$1,692~~ 1,900	Low	No	Capital
Linwood Avenue Bike Lanes (south)	Bicycle	Fill in gaps in existing bicycle network with bike lanes.	Juniper St	Harmony Rd	~~$296~~ 320	Low	No	Capital
Rusk Road Bike Lanes	Bicycle	Fill in gaps in existing bicycle network with bike lanes.	Lake Rd	North Clackamas Park	~~$936~~ 1,000	Low	No	Capital
~~21st Avenue Bike Lanes~~	~~Bicycle~~	~~Fill in gaps in existing bicycle network with bike lanes.~~	~~Harrison St~~	~~Lake Rd~~	~~$50~~	~~Low~~	~~No~~	~~Capital~~
Police Enforcement on Drivers	Bicycle	Enforce laws related to bike lanes and bicycle safety.	Citywide	Citywide	$10	Low	No	Operational
Bike Lane Striping	Bicycle & Transit	Re-stripe existing bike lanes and stripe bike lanes on streets where buses and bicyclists share the road.	Citywide	Citywide	$20	Low	No	Operational
Kellogg Creek Trail Improvements	Bicycle	Resurface trail and provide wayfinding signage to/from trail.	Milwaukie Riverfront	Treatment Plant	~~$623~~ 680	Low	No	Capital
Hwy 224 Access Modifications at Freeman Way	~~Automobile~~ Street	Modify access at Freeman Way to improve intersection functioning.	Location specific	Location specific	~~$1,313~~ 1,400	Low	No	Capital
~~Harmony Road Grade Separation and Realignment at Linwood~~	~~Freight & Automobile~~	~~Grade separate Harmony Road from Union Pacific Railroad and align as a through east-west movement. Outcome of alignment and geometry is dependant upon the Harmony Road Environmental Assessment project (scheduled for completion Fall 2008).~~	~~Location specific~~	~~Location specific~~	~~$28,000~~	~~Low~~	~~No~~	~~Capital~~

Project Name	TSP Chapter	Project Description	From	To	Estimated Cost ($1,000s)[9]	Priority Ranking [10]	Is Project ~~Funded~~ in Action Plan?[11]	Project Type
Washington Street Sidewalks	Pedestrian	Fill in sidewalk gaps on both sides of street.	~~35th~~32nd Ave	~~37th~~35th Ave	$130	~~Low~~	No	Capital
Franklin Street Sidewalks	Pedestrian	Install sidewalks on both sides of street to connect to ~~Hector~~ Campbell Elementary School.	42nd Ave	45th Ave	~~$200~~ 220	~~Medium~~Low	No	Capital
Downtown Parking Signage	Parking	Install wayfinding and identification signage at McLoughlin Blvd~~.~~ intersections and around public parking lots.	Downtown	Downtown	$10	~~Medium~~Low	No	Capital
Intersection Improvements at 42nd Avenue and Harrison Street	~~Automobile~~ Street	Signalize intersection to facilitate dominant traffic flow.	Location specific	Location specific	~~$252~~280	~~Medium~~Low	No	Capital
Pedestrian Walkway Signage	Pedestrian	Provide maps and wayfinding signage on streets that identify ways to get around the city.	Citywide	Citywide	$10	~~Medium~~Low	No	Operational
Intersection Improvements at all Crossings of McLoughlin Boulevard	Pedestrian	Improve all existing crossings of McLoughlin Blvd (e.g., extended time for crossing, signage). (ODOT to do.)	Location specific	Location specific	---	Low	No	Capital
Bike-Ped Path on Sparrow Street	Pedestrian & Bicycle	Establish a dedicated bicycle and pedestrian connection on Sparrow St, connecting River Rd to Trolley Trail	River Rd	Trolley Trail	$350	Low	No	Capital
Bike-Ped Overpass over McLoughlin Boulevard at River Road	Pedestrian & Bicycle	Establish a dedicated bicycle and pedestrian connection across McLoughlin Blvd.	Kronberg Park	River Rd	$2,500	Low	No	Capital
Intersection Improvements at 42nd Avenue and King Road	Street	Realignment of intersection to improve traffic movements between 42nd Ave and King Rd east of 42nd Ave.	Location specific	Location specific	$200	Low	No	Capital
Traffic Calming on lower King Road	Nbrhd Traffic Manage-ment	Install traffic calming measures on King Rd.	36th Ave	42nd Ave	$300	Low	No	Capital
Improved Connection from Springwater Trail to Pendleton Site (Tunnel)	Pedestrian & Bicycle	Construct tunnel under Springwater Trail to improve connection to Pendleton site at Clatsop St. (TSAP)	Location specific	Location specific	$1,200	Low	No	Capital
Crossing Improvements of McLoughlin Boulevard at Ochoco Street and Milport Road	Pedestrian & Bicycle	Construct improvements at Ochoco St and Milport Rd to improve bike-ped crossing of McLoughlin Blvd (per ODOT, this will require full intersection improvements). (TSAP)	Location specific	Location specific	$8,320	Low	No	Capital
Local Street Connections in Tacoma Station Area	Street	Connect local streets within Tacoma Station Area: 24th Ave between Ochoco St/Moores St & Clatsop St; Omark St between Mailwell Dr & Beta St (w/ mid-block connection from Main St); and Mailwell Dr to Harrison St via 26th Ave. (TSAP)	Location specific	Location specific	$8,120	Low	No	Capital
Local Street Improvements in Tacoma Station Area	Street	Construct street improvements on Stubb St, Beta St, Ochoco St, Hanna Harvester Dr, and Mailwell Dr. (TSAP)	Location specific	Location specific	$5,280	Low	No	Capital



CITY OF MILWAUKIE

Transportation System Plan

Metro Model

TRANSPORTATION ANALYSIS ZONES

December 2007

LEGEND

Original Metro Transportation Analysis Zones

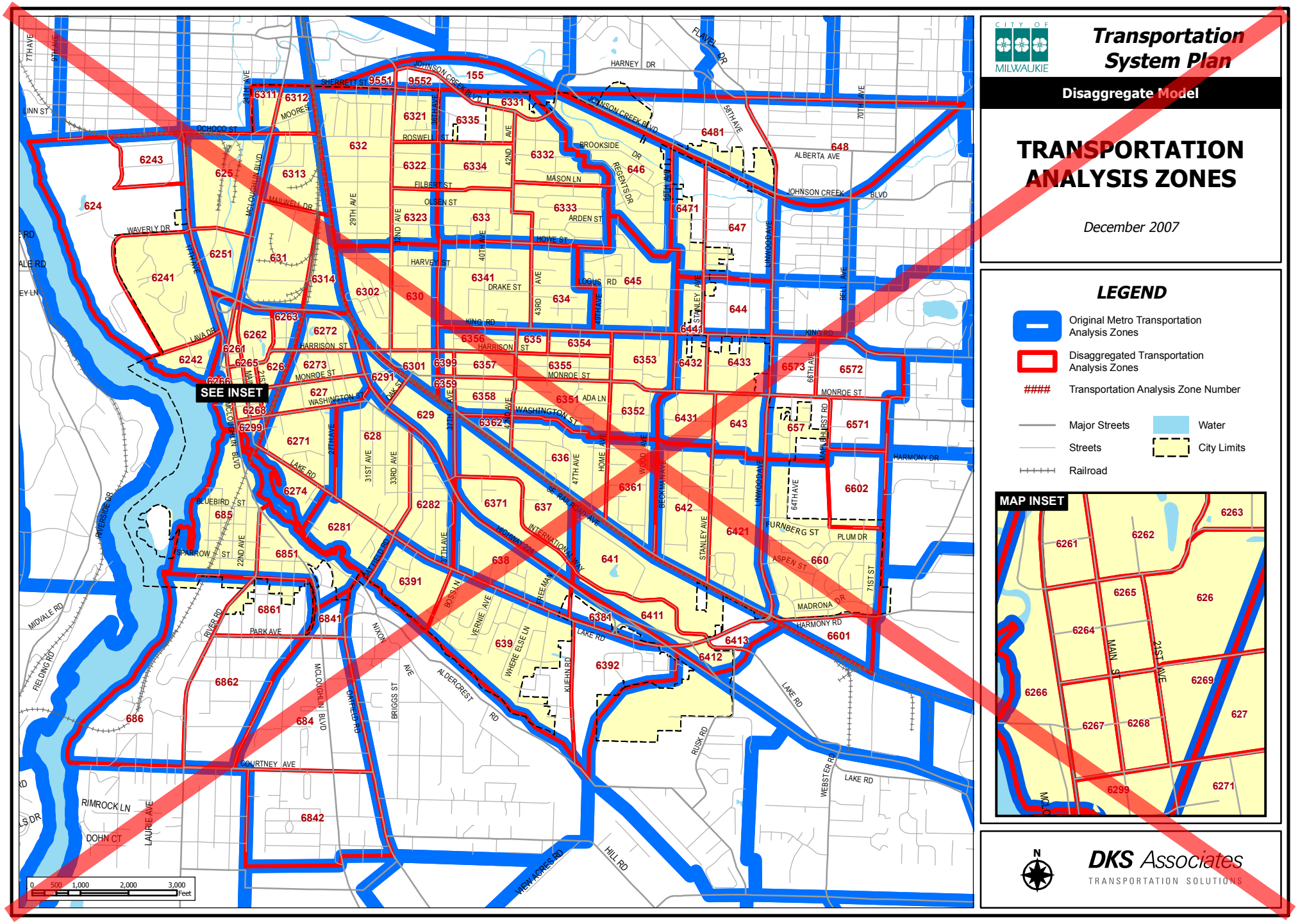
Transportation Analysis Zone Number

Other Map Features

- Major Streets
- Streets
- Railroad
- Water
- City Limits

N

DKS *Associates*
TRANSPORTATION SOLUTIONS


CITY OF MILWAUKIE
Transportation System Plan
Disaggregate Model
TRANSPORTATION ANALYSIS ZONES
December 2007
LEGEND
Original Metro Transportation Analysis Zones
Disaggregated Transportation Analysis Zones
Transportation Analysis Zone Number
Major Streets
Streets
Railroad
Water
City Limits
MAP INSET
SEE INSET
DKS Associates
TRANSPORTATION SOLUTIONS
N
0 500 1,000 2,000 3,000 Feet

2005 and 2030 Metro Land Use Data (Disaggregated)

Metro Taz	DKS TAZ		2005 HH	2005 RET	2005 OTH	2030 HH	2030 RET	2030 OTH	
155	155		1	0	13	2	0	38	
155	9551		2	0	0	4	0	5	
155	9552		8	3	2	14	6	10	
		Total	**11**	**3**	**15**	**20**	**6**	**53**	
	155	Control	11	3	15	20	6	53	← Original Metro TAZ Total
624	624		0	0	50	0	0	50	
624	6241		350	0	0	375	0	0	
624	6242		160	0	103	173	0	191	
624	6243		75	0	0	80	0	0	
		Total	**585**	**0**	**153**	**628**	**0**	**241**	
	624	Control	585	0	153	628	0	241	← Original Metro TAZ Total
625	625		0	75	645	2	100	680	
625	6251		0	50	428	0	69	452	
		Total	**0**	**125**	**1073**	**2**	**169**	**1132**	
	625	Control	0	125	1073	2	169	1132	← Original Metro TAZ Total
626	626		0	0	50	0	0	60	
626	6261		0	20	90	0	27	115	
626	6262		60	18	90	291	24	115	
626	6263		72	0	0	291	0	0	
626	6264		0	40	0	90	54	0	
626	6265		0	0	90	0	0	115	
626	6266		0	0	10	0	0	55	
626	6267		0	40	90	0	54	115	
626	6268		0	40	90	0	53	115	
626	6269		0	40	90	90	53	115	
626	6299		0	18	89	0	25	115	
		Total	**132**	**216**	**689**	**762**	**290**	**920**	
	626	Control	132	216	689	762	290	920	← Original Metro TAZ Total
627	627		63	3	50	72	5	66	
627	6271		76	18	590	86	22	795	
627	6272		208	0	0	236	0	0	
627	6273		208	0	50	236	0	66	
627	6274		76	0	295	86	0	398	
		Total	**631**	**21**	**985**	**716**	**27**	**1325**	
	627	Control	631	21	985	716	27	1325	← Original Metro TAZ Total
628	628		200	133	47	215	169	400	
628	6281		300	15	0	310	25	44	
628	6282		200	0	0	210	0	100	
		Total	**700**	**148**	**47**	**735**	**194**	**544**	
	628	Control	700	148	47	735	194	544	← Original Metro TAZ Total
629	629		0	30	30	0	60	50	
902	6291		39	312	217	60	393	346	
		Total	**39**	**342**	**247**	**60**	**453**	**396**	
	629	Control	39	342	247	60	453	396	← Original Metro TAZ Total
630	630		250	0	50	280	0	80	
630	6301		80	5	100	100	11	346	
630	6302		182	0	350	261	0	380	
		Total	**512**	**5**	**500**	**641**	**11**	**806**	
	630	Control	512	5	500	641	11	806	← Original Metro TAZ Total
631	631		0	0	410	0	0	445	
631	6311		8	20	110	27	35	119	
631	6312		0	10	175	0	16	190	
631	6313		0	0	297	0	0	322	
631	6314		0	0	175	0	0	190	
		Total	**8**	**30**	**1167**	**27**	**51**	**1266**	
	631	Control	8	30	1167	27	51	1266	← Original Metro TAZ Total
632	632		364	8	100	386	13	149	
632	6321		121	0	24	129	0	42	
632	6322		121	0	24	128	0	42	

2005 and 2030 Metro Land Use Data (Disaggregated)

Metro Taz	DKS TAZ		2005 HH	2005 RET	2005 OTH	2030 HH	2030 RET	2030 OTH	
632	6323		121	0	24	129	0	42	
		Total	**727**	**8**	**172**	**772**	**13**	**275**	
	632	Control	727	8	172	772	13	275	← Original Metro TAZ Total
633	633		162	0	0	165	0	0	
633	6331		40	0	40	53	0	55	
633	6332		145	0	0	160	0	0	
633	6333		202	0	0	210	0	0	
633	6334		145	0	69	160	0	75	
633	6335		115	0	0	125	0	0	
		Total	**809**	**0**	**109**	**873**	**0**	**130**	
	633	Control	809	0	109	873	0	130	← Original Metro TAZ Total
634	634		236	0	22	256	0	29	
634	6341		290	0	32	315	0	44	
		Total	**526**	**0**	**54**	**571**	**0**	**73**	
	634	Control	526	0	54	571	0	73	← Original Metro TAZ Total
635	635		0	180	24	0	230	85	
635	6351		171	0	0	193	0	0	
635	6352		150	0	0	160	0	0	
635	6353		150	0	20	170	0	35	
635	6354		50	0	0	60	0	0	
635	6355		83	30	40	95	58	60	
635	6356		58	0	0	66	0	0	
635	6357		50	0	10	57	0	25	
635	6358		100	0	0	115	0	0	
635	6359		0	0	0	20	0	0	
635	6399		17	0	0	20	0	0	
		Total	**829**	**210**	**94**	**956**	**288**	**205**	
	635	Control	829	210	94	956	288	205	← Original Metro TAZ Total
636	636		190	0	299	230	0	306	
636	6361		144	0	0	152	0	0	
636	6362		40	0	0	50	0	0	
		Total	**374**	**0**	**299**	**432**	**0**	**306**	
	636	Control	374	0	299	432	0	306	← Original Metro TAZ Total
637	637		1	20	900	28	82	1185	
637	6371		0	280	559	0	330	641	
		Total	**1**	**300**	**1459**	**28**	**412**	**1826**	
	637	Control	1	300	1459	28	412	1826	← Original Metro TAZ Total
638	638		25	0	67	20	1	72	
638	6381		167	0	0	152	0	0	
		Total	**192**	**0**	**67**	**172**	**1**	**72**	
	638	Control	192	0	67	172	1	72	← Original Metro TAZ Total
639	639		271	0	29	262	0	25	
639	6391		120	0	90	116	0	84	
639	6392		151	0	0	148	0	0	
		Total	**542**	**0**	**119**	**526**	**0**	**109**	
	639	Control	542	0	119	526	0	109	← Original Metro TAZ Total
641	641		0	42	1700	0	60	1780	
641	6411		0	100	465	0	137	471	
641	6412		42	0	0	70	0	0	
641	6413		0	0	110	0	0	115	
		Total	**42**	**142**	**2275**	**70**	**197**	**2366**	
	641	Control	42	142	2275	70	197	2366	← Original Metro TAZ Total
642	642		230	0	75	245	0	100	
642	6421		210	0	146	233	0	209	
		Total	**440**	**0**	**221**	**478**	**0**	**309**	
	642	Control	440	0	221	478	0	309	← Original Metro TAZ Total
643	643		100	0	0	115	0	0	
643	6431		100	0	20	115	0	30	
643	6432		85	0	0	100	0	0	

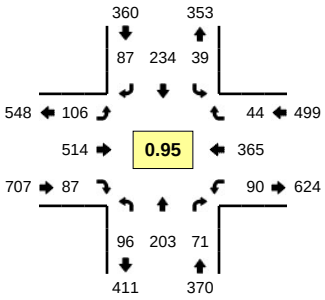
2005 and 2030 Metro Land Use Data (Disaggregated)

Metro Taz	DKS TAZ		2005 HH	2005 RET	2005 OTH	2030 HH	2030 RET	2030 OTH	
643	6433		143	53	31	160	71	52	
		Total	**428**	**53**	**51**	**490**	**71**	**82**	
	643	Control	428	53	51	490	71	82	← Original Metro TAZ Total
644	644		35	0	69	36	0	75	
644	6441		100	0	69	106	0	100	
		Total	**135**	**0**	**138**	**142**	**0**	**175**	
	644	Control	135	0	138	142	0	175	← Original Metro TAZ Total
645	645		278	0	89	304	0	104	
		Total	**278**	**0**	**89**	**304**	**0**	**104**	
	645	Control	278	0	89	304	0	104	← Original Metro TAZ Total
646	646		284	17	103	297	22	113	
		Total	**284**	**17**	**103**	**297**	**22**	**113**	
	646	Control	284	17	103	297	22	113	← Original Metro TAZ Total
647	647		186	0	424	195	0	419	
647	6471		62	0	424	68	0	420	
		Total	**248**	**0**	**848**	**263**	**0**	**839**	
	647	Control	248	0	848	263	0	839	← Original Metro TAZ Total
648	648		360	14	680	380	35	870	
648	6481		120	80	226	130	120	295	
		Total	**480**	**94**	**906**	**510**	**155**	**1165**	
	648	Control	480	94	906	510	155	1165	← Original Metro TAZ Total
657	657		80	0	0	82	0	0	
657	6571		78	0	35	85	0	40	
657	6572		80	6	21	83	8	26	
657	6573		80	0	0	80	0	0	
		Total	**318**	**6**	**56**	**330**	**8**	**66**	
	657	Control	318	6	56	330	8	66	← Original Metro TAZ Total
660	660		559	6	0	574	7	5	
660	6601		0	0	0	10	0	0	
660	6602		15	0	32	65	0	34	
		Total	**574**	**6**	**32**	**649**	**7**	**39**	
	660	Control	574	6	32	649	7	39	← Original Metro TAZ Total
684	684		565	185	247	608	248	408	
684	6841		10	20	0	20	25	0	
684	6842		565	101	247	608	150	408	
		Total	**1140**	**306**	**494**	**1236**	**423**	**816**	
	684	Control	1140	306	494	1236	423	816	← Original Metro TAZ Total
685	685		182	30	12	208	40	21	
685	6851		240	20	0	250	26	0	
		Total	**422**	**50**	**12**	**458**	**66**	**21**	
	685	Control	422	50	12	458	66	21	← Original Metro TAZ Total
686	686		545	13	600	550	28	664	
686	6861		271	0	75	274	0	125	
686	6862		545	0	62	550	0	100	
		Total	**1361**	**13**	**737**	**1374**	**28**	**889**	
	686	Control	1361	13	737	1374	28	889	← Original Metro TAZ Total

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

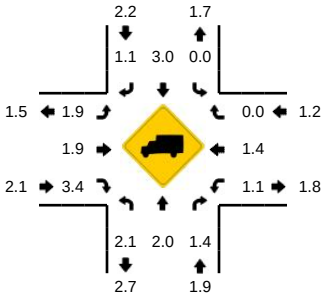
LOCATION: Linwood Ave -- King Rd | **QC JOB #:** 10776902

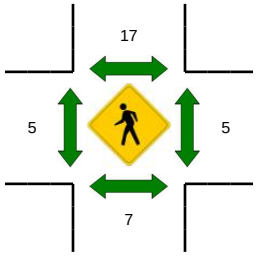
CITY/STATE: Milwaukie, OR | **DATE:** Tue, Jun 12 2012

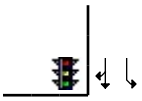


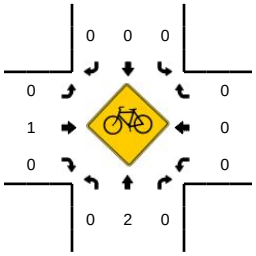
Peak-Hour: 5:00 PM -- 6:00 PM

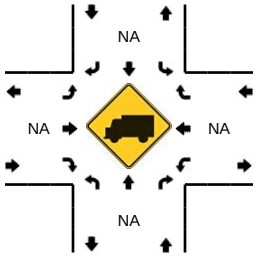
Peak 15-Min: 5:30 PM -- 5:45 PM

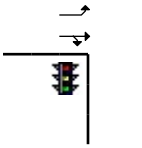


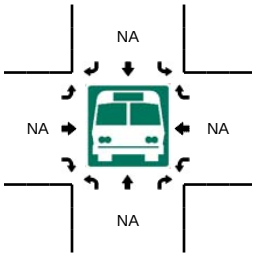












5-Min Count Period Beginning At	Linwood Ave (Northbound)				Linwood Ave (Southbound)				King Rd (Eastbound)				King Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	6	27	10	0	4	13	4	0	4	37	8	0	6	21	5	0	145	
4:05 PM	8	12	6	0	5	14	3	0	8	35	7	0	12	19	3	0	132	
4:10 PM	5	19	5	0	7	7	6	0	3	53	11	0	4	29	3	0	152	
4:15 PM	10	18	5	0	1	18	4	0	16	34	6	0	9	24	3	0	148	
4:20 PM	5	14	10	0	3	21	6	0	11	42	6	0	2	23	7	0	150	
4:25 PM	4	7	8	0	4	7	3	0	9	43	9	0	5	34	1	0	134	
4:30 PM	13	24	8	0	3	19	3	0	7	36	6	0	5	16	4	0	144	
4:35 PM	8	19	5	0	4	23	14	0	11	32	6	0	16	23	3	0	164	
4:40 PM	6	15	9	0	4	29	8	0	13	28	7	0	10	24	3	0	156	
4:45 PM	3	17	10	0	5	17	8	0	8	47	3	0	11	32	2	0	163	
4:50 PM	13	11	3	0	2	18	7	0	2	38	4	0	6	24	4	0	132	
4:55 PM	3	9	7	0	6	13	6	0	10	37	10	0	8	24	1	0	134	1754
5:00 PM	12	18	5	0	6	15	3	0	6	37	7	0	12	38	3	0	162	1771
5:05 PM	6	21	4	0	3	24	11	0	13	43	8	0	7	28	1	0	169	1808
5:10 PM	5	16	6	0	2	9	7	0	11	43	8	0	6	31	4	0	148	1804
5:15 PM	11	23	9	0	3	25	7	0	9	41	8	0	7	31	3	0	177	1833
5:20 PM	5	19	4	0	5	19	7	0	5	42	9	0	5	42	3	0	165	1848
5:25 PM	10	19	7	0	1	20	11	0	10	41	7	0	8	19	2	0	155	1869
5:30 PM	8	20	10	0	3	14	9	0	14	44	5	0	10	22	2	0	161	1886
5:35 PM	8	13	3	0	7	26	6	0	5	46	10	0	10	36	5	0	175	1897
5:40 PM	7	19	6	0	3	25	4	0	8	41	7	0	12	35	4	0	171	1912
5:45 PM	10	8	12	0	2	27	6	0	5	42	6	0	6	29	6	0	159	1908
5:50 PM	8	15	1	0	4	18	12	0	8	40	7	0	5	33	6	0	157	1933
5:55 PM	6	12	4	0	0	12	4	0	12	54	5	0	2	21	5	0	137	1936

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	92	208	76	0	52	260	76	0	108	524	88	0	128	372	44	0	2028
Heavy Trucks	0	0	0		0	12	0		4	20	0		0	0	0		36
Pedestrians		4				32				8				8			52
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 6/18/2012 11:28 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: Linwood Ave -- Monroe St

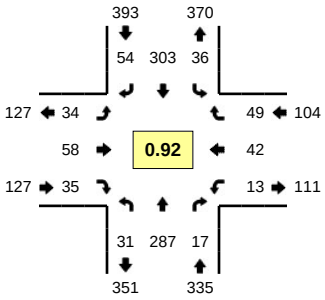
QC JOB #: 10776903

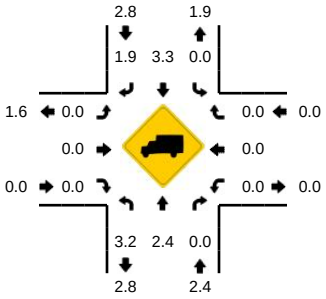
CITY/STATE: Milwaukie, OR

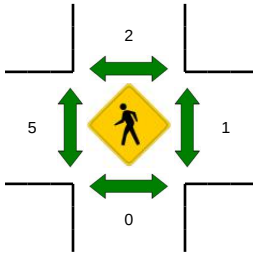
DATE: Tue, Jun 12 2012

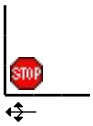
Peak-Hour: 5:00 PM -- 6:00 PM

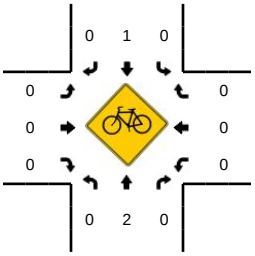
Peak 15-Min: 5:15 PM -- 5:30 PM

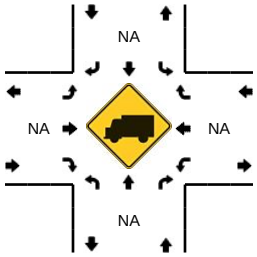


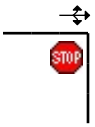


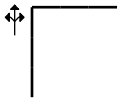


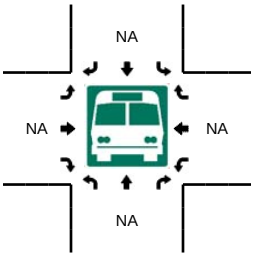












5-Min Count Period Beginning At	Linwood Ave (Northbound)				Linwood Ave (Southbound)				Monroe St (Eastbound)				Monroe St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	2	25	2	0	3	15	4	0	4	4	2	0	1	3	3	0	68	
4:05 PM	2	25	1	0	5	19	7	0	3	3	4	0	2	1	1	0	73	
4:10 PM	3	28	2	0	2	17	3	0	1	1	4	0	2	5	4	0	72	
4:15 PM	4	26	5	0	4	26	3	0	4	6	3	0	1	2	3	0	87	
4:20 PM	2	21	4	0	3	16	8	0	4	3	2	0	1	2	6	0	72	
4:25 PM	4	19	2	0	3	16	2	0	4	3	3	0	0	2	3	0	61	
4:30 PM	3	37	3	0	3	30	6	0	1	5	5	0	2	6	8	0	109	
4:35 PM	1	16	1	0	4	34	4	0	4	2	5	0	2	5	1	0	79	
4:40 PM	2	23	2	0	5	36	2	0	1	2	5	0	2	2	1	0	83	
4:45 PM	1	28	0	0	2	21	4	0	5	1	4	0	4	2	1	0	73	
4:50 PM	0	26	2	0	2	25	5	0	0	2	2	0	0	2	2	0	68	
4:55 PM	2	16	3	0	2	18	5	0	1	3	4	0	0	0	0	0	54	899
5:00 PM	1	27	1	0	5	20	5	0	4	5	2	0	0	1	6	0	77	908
5:05 PM	4	23	4	0	3	30	7	0	2	6	3	0	1	1	2	0	86	921
5:10 PM	1	27	1	0	0	17	2	0	1	3	6	0	2	5	2	0	67	916
5:15 PM	1	26	1	0	2	28	5	0	2	4	3	0	1	5	12	0	90	919
5:20 PM	3	37	1	0	4	25	2	0	1	3	2	0	1	4	4	0	87	934
5:25 PM	3	20	2	0	3	31	4	0	4	5	3	0	1	2	5	0	83	956
5:30 PM	4	25	3	0	5	17	7	0	4	9	2	0	0	4	3	0	83	930
5:35 PM	1	29	0	0	2	35	4	0	8	3	1	0	1	3	2	0	89	940
5:40 PM	2	12	2	0	4	33	5	0	2	3	3	0	0	2	4	0	72	929
5:45 PM	7	21	0	0	5	26	4	0	3	10	5	0	3	1	2	0	87	943
5:50 PM	1	17	2	0	2	27	5	0	1	3	0	0	2	5	3	0	68	943
5:55 PM	3	23	0	0	1	14	4	0	2	4	5	0	1	9	4	0	70	959

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	28	332	16	0	36	336	44	0	28	48	32	0	12	44	84	0	1040
Heavy Trucks	4	12	0		0	20	0		0	0	0		0	0	0		36
Pedestrians		0				8				4				0			12
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 6/18/2012 11:28 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: 42nd Ave -- King Rd

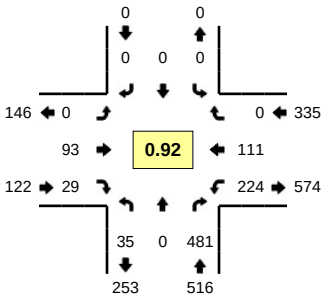
QC JOB #: 10776901

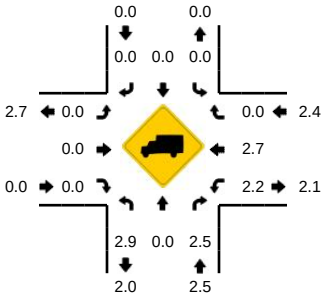
CITY/STATE: Milwaukie, OR

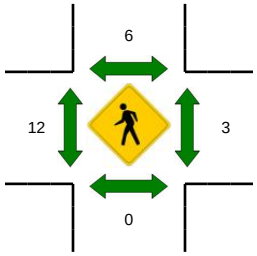
DATE: Tue, Jun 12 2012

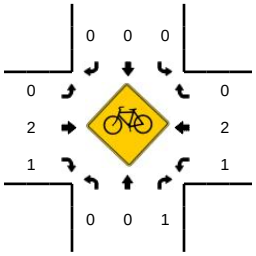
Peak-Hour: 4:55 PM -- 5:55 PM

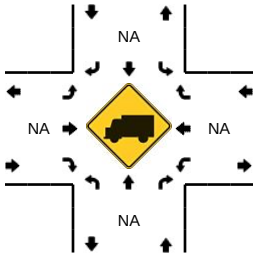
Peak 15-Min: 5:05 PM -- 5:20 PM

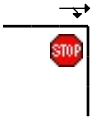


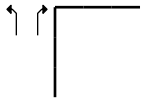


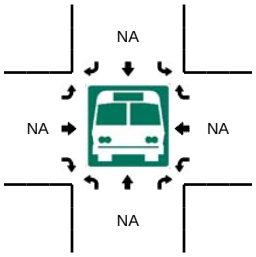












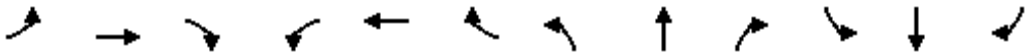
5-Min Count Period Beginning At	42nd Ave (Northbound)				42nd Ave (Southbound)				King Rd (Eastbound)				King Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	3	0	31	0	0	0	0	0	0	6	0	0	20	4	0	0	64	
4:05 PM	1	0	33	0	0	0	0	0	0	15	4	0	18	3	0	0	74	
4:10 PM	2	0	40	0	0	0	0	0	0	8	2	0	20	6	0	0	78	
4:15 PM	0	0	39	0	0	0	0	0	0	3	0	0	14	1	0	0	57	
4:20 PM	4	0	35	0	0	0	0	0	0	5	1	0	23	3	0	0	71	
4:25 PM	6	0	39	0	0	0	0	0	0	4	1	0	23	4	0	0	77	
4:30 PM	2	0	41	0	0	0	0	0	0	9	7	0	15	2	0	0	76	
4:35 PM	2	0	36	0	0	0	0	0	0	8	0	0	14	4	0	0	64	
4:40 PM	1	0	45	0	0	0	0	0	0	9	2	0	19	6	0	0	82	
4:45 PM	2	0	34	0	0	0	0	0	0	7	3	0	21	8	0	0	75	
4:50 PM	1	0	32	0	0	0	0	0	0	11	1	0	20	8	0	0	73	
4:55 PM	1	0	38	0	0	0	0	0	0	11	6	0	10	7	0	0	73	864
5:00 PM	4	0	27	0	0	0	0	0	0	6	3	0	16	14	0	0	70	870
5:05 PM	5	0	44	0	0	0	0	0	0	10	1	0	14	13	0	0	87	883
5:10 PM	2	0	55	0	0	0	0	0	0	7	4	0	15	5	0	0	88	893
5:15 PM	0	0	45	0	0	0	0	0	0	5	3	0	20	16	0	0	89	925
5:20 PM	4	0	35	0	0	0	0	0	0	8	0	0	30	8	0	0	85	939
5:25 PM	4	0	36	0	0	0	0	0	0	8	3	0	13	7	0	0	71	933
5:30 PM	2	0	45	0	0	0	0	0	0	7	4	0	17	9	0	0	84	941
5:35 PM	5	0	34	0	0	0	0	0	0	6	2	0	23	7	0	0	77	954
5:40 PM	5	0	38	0	0	0	0	0	0	7	1	0	22	7	0	0	80	952
5:45 PM	2	0	40	0	0	0	0	0	0	7	2	0	21	5	0	0	77	954
5:50 PM	1	0	44	0	0	0	0	0	0	11	0	0	23	13	0	0	92	973
5:55 PM	1	0	37	0	0	0	0	0	0	6	1	0	8	6	0	0	59	959

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	28	0	576	0	0	0	0	0	0	88	32	0	196	136	0	0	1056
Heavy Trucks	0	0	8		0	0	0		0	0	0		0	4	0		12
Pedestrians		0				0				0				4			4
Bicycles	0	0	0		0	0	0		0	2	0		1	1	0		4
Railroad																	
Stopped Buses																	

Comments:

Report generated on 6/18/2012 11:28 AM

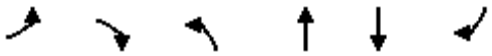
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	110	515	90	90	365	45	100	205	75	40	235	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	0.96		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1808		1787	1839		1770	1777		1805	1760	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1808		1787	1839		1770	1777		1805	1760	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	116	542	95	95	384	47	105	216	79	42	247	95
RTOR Reduction (vph)	0	7	0	0	5	0	0	13	0	0	15	0
Lane Group Flow (vph)	116	630	0	95	426	0	105	282	0	42	327	0
Confl. Peds. (#/hr)	17		7	7		17	5		5	5		5
Confl. Bikes (#/hr)						1						2
Heavy Vehicles (%)	2%	2%	3%	1%	1%	0%	2%	2%	1%	0%	3%	1%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	8.5	31.2		8.3	31.0		6.0	29.0		2.9	25.9	
Effective Green, g (s)	8.5	31.2		8.3	31.0		6.0	29.0		2.9	25.9	
Actuated g/C Ratio	0.10	0.36		0.09	0.35		0.07	0.33		0.03	0.30	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	172	645		170	652		122	590		60	522	
v/s Ratio Prot	c0.07	c0.35		0.05	0.23		c0.06	c0.16		0.02	c0.19	
v/s Ratio Perm												
v/c Ratio	0.67	0.98		0.56	0.65		0.86	0.48		0.70	0.63	
Uniform Delay, d1	38.1	27.7		37.8	23.7		40.3	23.2		41.8	26.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	10.0	29.3		3.9	2.4		42.2	2.8		30.0	5.6	
Delay (s)	48.1	57.1		41.7	26.0		82.5	25.9		71.8	32.2	
Level of Service	D	E		D	C		F	C		E	C	
Approach Delay (s)		55.7			28.9			40.8			36.5	
Approach LOS		E			C			D			D	

Intersection Summary			
HCM Average Control Delay	42.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	87.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	74.5%	ICU Level of Service	D
Analysis Period (min)	15		

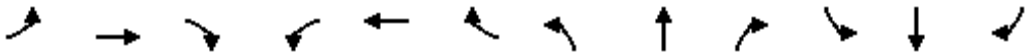
c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	95	30	35	485	225	115
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	103	33	38	527	245	125
Pedestrians	12				3	
Lane Width (ft)	12.0				12.0	
Walking Speed (ft/s)	4.0				4.0	
Percent Blockage	1				0	
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	925	319	382			
vC1, stage 1 conf vol	319					
vC2, stage 2 conf vol	606					
vCu, unblocked vol	925	319	382			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	78	95	97			
cM capacity (veh/h)	479	719	1160			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	136	38	527	370
Volume Left	103	38	0	0
Volume Right	33	0	0	125
cSH	521	1160	1700	1700
Volume to Capacity	0.26	0.03	0.31	0.22
Queue Length 95th (ft)	26	3	0	0
Control Delay (s)	14.3	8.2	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	14.3	0.6		0.0
Approach LOS	B			

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	39.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	35	60	35	15	45	55	35	290	20	40	315	60
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	38	65	38	16	49	60	38	315	22	43	342	65
Pedestrians		1			5						2	
Lane Width (ft)		12.0			12.0						12.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		0			0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											1218	
pX, platoon unblocked												
vC, conflicting volume	951	881	376	940	903	333	409			342		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	951	881	376	940	903	333	409			342		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	79	76	94	91	81	92	97			96		
cM capacity (veh/h)	178	267	674	178	259	709	1144			1223		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	141	125	375	451
Volume Left	38	16	38	43
Volume Right	38	60	22	65
cSH	275	343	1144	1223
Volume to Capacity	0.51	0.36	0.03	0.04
Queue Length 95th (ft)	68	41	3	3
Control Delay (s)	31.2	21.4	1.1	1.1
Lane LOS	D	C	A	A
Approach Delay (s)	31.2	21.4	1.1	1.1
Approach LOS	D	C		

Intersection Summary				
Average Delay	7.3			
Intersection Capacity Utilization	49.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Milwaukie TSP Update

Future Volume Forecasts

Scenario: 2035 PM "Low Build" (Financially Committed)

Date 6/29/2012 DRAFT

N/S	E/W	#	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
McLoughlin Blvd	Ochoco St	1	0	2000	20	0	3290	220	120	40	200	10	270	160
McLoughlin Blvd	Milport Road	2	280	2020	100	0	3540	20	20	20	270	250	30	20
McLoughlin Blvd	Harrison St	3	20	1120	170	100	2290	20	20	20	20	190	20	10
42nd Avenue	Harrison St	4	20	20	20	10	20	50	240	10	20	10	20	10
McLoughlin Blvd	Washington St	5	10	1050	30	100	2200	10	0	10	10	20	10	140
Main Street	Harrison St	6	20	20	20	20	20	80	70	10	10	20	110	60
17th Avenue	Hwy 224	7	0	20	100	370	20	0	0	0	0	110	0	20
Hwy 224	Harrison St	8	60	1190	250	20	2250	180	90	200	20	310	210	20
Hwy 224	Monroae Street	9	60	1920	10	20	2770	10	20	20	160	20	30	20
Hwy 224	Oak Street	10	200	1470	20	260	2290	260	140	140	110	20	110	180
32nd Avenue	Harrison St	11	40	20	20	20	40	400	420	530	10	20	430	10
McLoughlin Blvd	22nd Ave	12	110	990	0	0	1400	780	0	0	10	0	0	0
McLoughlin Blvd	River Road	13	10	950	0	0	1680	0	310	0	130	0	0	0
Oatfield Rd	Lake Road	14	70	190	180	140	320	10	20	20	90	180	30	70
Hwy 224	37th Ave	15	70	1240	20	220	1870	50	50	90	440	290	270	380
Freeman Way	Hwy 224	16	20	30	10	510	30	140	30	2420	30	10	1450	240
Hwy 224 off/on ramp	Lake Road	17	170	0	160	110	820	10	100	240	100	0	70	120
21st Ave	Harrison St	18	20	10	30	20	10	10	10	140	20	20	150	20
32nd Avenue	Johnson Creek Blvd	19	20	130	30	540	250	0	0	70	90	40	20	360
Linwood Ave	Johnson Creek Blvd	20	140	220	50	180	310	120	140	860	230	10	820	230
Linwood Ave	King Road	21	50	420	150	20	520	20	20	100	50	230	20	20
Linwood Ave	Harmony Rd	22	50	450	1660	270	570	20	40	270	70	1460	310	280

Rte.	Rdwy	BMP	EMP	ADT	Crsh	Fatal	A	B	C	PDO	City	County	Connection in Group	Percentile	SPIS
081	**PACIFIC HIGHWAY EAST**														
OR-99E	I	4.41	4.50	42,300	14			1	6	7		MULTNOMAH		70	29.50
OR-99E	I	4.42	4.51	42,300	13			1	6	6		MULTNOMAH		70	28.79
OR-99E	I	4.43	4.52	42,300	11			1	6	4		MULTNOMAH		65	27.27
OR-99E	I	4.44	4.53	42,300	11			1	6	4		MULTNOMAH	081BP CONN (TACOMA S	65	27.27
OR-99E	I	4.45	4.54	42,300	3				1	2		MULTNOMAH			9.66
OR-99E	I	4.66	4.75	42,300	3		1		2			CLACKAMAS		70	27.66
OR-99E	I	4.67	4.76	42,300	4		1		2	1		CLACKAMAS		70	29.19
OR-99E	I	4.68	4.77	42,300	6		1		3	2		CLACKAMAS		80	33.16
OR-99E	I	4.69	4.78	42,300	14		1	1	5	7		CLACKAMAS		90	44.50
OR-99E	I	4.70	4.79	42,300	14		1	1	4	8		CLACKAMAS		90	43.00
OR-99E	I	4.71	4.80	42,300	14		1	1	3	9		CLACKAMAS		85	41.50
OR-99E	I	4.72	4.81	42,300	14		1	1	3	9		CLACKAMAS		85	41.50
OR-99E	I	4.73	4.82	42,300	14		1	1	3	9		CLACKAMAS		85	41.50
OR-99E	I	4.74	4.83	42,300	15		1	1	3	10		CLACKAMAS		85	42.19
OR-99E	I	4.75	4.84	42,300	15		1	1	3	10		CLACKAMAS		85	42.19
OR-99E	I	4.76	4.85	42,300	14			1	3	10		CLACKAMAS		60	25.00
OR-99E	I	4.77	4.86	42,300	13			1	3	9		CLACKAMAS		60	24.29
OR-99E	I	4.78	4.87	42,300	11			1	2	8		CLACKAMAS	ACCESS (DECREASING R	50	21.27
OR-99E	I	4.78	4.87	42,300	11			1	2	8		CLACKAMAS	OCHOCO ST.	50	21.27
OR-99E	I	4.79	4.88	51,100	4					4		CLACKAMAS			9.52
OR-99E	I	4.80	4.89	51,100	3					3		CLACKAMAS			8.04
OR-99E	I	4.91	5.00	51,100	3				1	2		CLACKAMAS			9.54
OR-99E	I	4.92	5.01	51,100	3				1	2		CLACKAMAS			9.54
OR-99E	I	4.93	5.02	51,100	3				1	2		CLACKAMAS			9.54
OR-99E	I	4.94	5.03	51,100	3				1	2		CLACKAMAS			9.54
OR-99E	I	4.95	5.04	51,100	3				1	2		CLACKAMAS			9.54
OR-99E	I	4.96	5.05	51,100	3				1	2		CLACKAMAS			9.54
OR-99E	I	4.97	5.06	51,100	3				1	2		CLACKAMAS			9.54
OR-99E	I	4.98	5.07	51,100	3				1	2		CLACKAMAS			9.54
OR-99E	I	4.99	5.08	51,100	3				1	2		CLACKAMAS			9.54
OR-99E	I	5.08	5.17	51,100	3			1	2			CLACKAMAS		15	12.54
OR-99E	I	5.09	5.18	51,100	5			1	3	1		CLACKAMAS		35	16.79
OR-99E	I	5.10	5.19	51,100	7			1	5	1		CLACKAMAS		55	21.95
OR-99E	I	5.11	5.20	51,100	20	1		2	10	7		CLACKAMAS		95	56.67
OR-99E	I	5.12	5.21	51,100	20	1		2	10	7		CLACKAMAS		95	56.67
OR-99E	I	5.13	5.22	51,100	22	1		2	11	8		CLACKAMAS		95	59.28
OR-99E	I	5.14	5.23	51,100	23	1		2	12	8		CLACKAMAS		95	61.31
OR-99E	I	5.15	5.24	51,100	23	1		2	12	8		CLACKAMAS		95	61.31
OR-99E	I	5.16	5.25	51,100	23	1		2	12	8		CLACKAMAS		95	61.31
OR-99E	I	5.17	5.26	51,100	22	1		2	11	8		CLACKAMAS		95	59.28

Rte.	Rdwy	BMP	EMP	ADT	Crsh	Fatal	A	B	C	PDO	City	County	Connection in Group	Percentile	SPIS
081	**PACIFIC HIGHWAY EAST**														
OR-99E	1	5.18	5.27	51,100	21	1		2	10	8		CLACKAMAS		95	57.23
OR-99E	1	5.19	5.28	51,100	19	1		2	9	7		CLACKAMAS		95	54.61
OR-99E	1	5.20	5.29	51,100	17	1		2	7	7		CLACKAMAS	ACCESS (DECREASING R	90	50.42
OR-99E	1	5.20	5.29	51,100	17	1		2	7	7		CLACKAMAS	SE MILPORT RD.	90	50.42
OR-99E	1	5.21	5.30	39,200	3				2	1		CLACKAMAS		5	11.22
OR-99E	1	5.22	5.31	39,200	3				2	1		CLACKAMAS		5	11.22
OR-99E	1	5.62	5.71	25,100	4			1	2	1		CLACKAMAS		25	14.82
OR-99E	1	5.63	5.72	25,100	23			2	13	8		CLACKAMAS		90	49.48
OR-99E	1	5.64	5.73	25,100	25			3	13	9		CLACKAMAS		90	52.18
OR-99E	1	5.65	5.74	25,100	25			3	13	9		CLACKAMAS		90	52.18
OR-99E	1	5.66	5.75	25,100	25			3	13	9		CLACKAMAS		90	52.18
OR-99E	1	5.67	5.76	25,100	26			4	13	9		CLACKAMAS		95	54.25
OR-99E	1	5.68	5.77	25,100	27			4	13	10		CLACKAMAS		95	54.83
OR-99E	1	5.69	5.78	25,100	28			4	13	11		CLACKAMAS		95	55.40
OR-99E	1	5.70	5.79	25,100	28			4	13	11		CLACKAMAS		95	55.40
OR-99E	1	5.71	5.80	25,100	29			3	13	13		CLACKAMAS		95	54.44
OR-99E	1	5.72	5.81	32,500	27			3	11	13		CLACKAMAS	HWY. 081 M.P. (2)5.72	90	48.89
OR-99E	1	5.72	5.81	32,500	27			3	11	13		CLACKAMAS	17TH AVE.	90	48.89
OR-99E	1	5.73	5.82	32,500	8			2		6		CLACKAMAS		40	17.72
OR-99E	1	5.74	5.83	32,500	7			1		6		CLACKAMAS		30	15.19
OR-99E	1	5.75	5.84	32,500	7			1		6		CLACKAMAS		30	15.19
OR-99E	1	5.76	5.85	32,500	8			1		7		CLACKAMAS		35	16.22
OR-99E	1	5.77	5.86	32,500	7					7		CLACKAMAS	JACKSON ST.	20	13.69
OR-99E	1	5.78	5.87	32,500	5					5		CLACKAMAS		5	11.34
OR-99E	1	5.79	5.88	32,500	4					4		CLACKAMAS			9.97
OR-99E	1	5.80	5.89	32,500	4					4		CLACKAMAS			9.97
OR-99E	1	5.81	5.90	32,500	5				2	3		CLACKAMAS		25	14.34
OR-99E	1	5.82	5.91	32,500	6				2	4		CLACKAMAS		30	15.57
OR-99E	1	5.83	5.92	32,500	6				2	4		CLACKAMAS	SE MONROE ST.	30	15.57
OR-99E	1	5.84	5.93	32,500	9		1		4	4		CLACKAMAS		85	38.18
OR-99E	1	5.85	5.94	32,500	10		1	1	4	4		CLACKAMAS		85	40.60
OR-99E	1	5.86	5.95	32,500	9		1	1	4	3		CLACKAMAS		85	39.68
OR-99E	1	5.87	5.96	32,500	10		1	1	4	4		CLACKAMAS		85	40.60
OR-99E	1	5.88	5.97	32,500	11		1	1	4	5		CLACKAMAS	SE JEFFERSON ST.	85	41.45
OR-99E	1	5.88	5.97	32,500	11		1	1	4	5		CLACKAMAS	ROAD (BOAT LANDING)	85	41.45
OR-99E	1	5.89	5.98	32,500	11		1	1	4	5		CLACKAMAS		85	41.45
OR-99E	1	5.90	5.99	32,500	11		1	1	4	5		CLACKAMAS		85	41.45
OR-99E	1	5.91	6.00	32,500	9		1	1	3	4		CLACKAMAS		85	38.18
OR-99E	1	5.92	6.01	32,500	9		1	1	4	3		CLACKAMAS		85	39.68
OR-99E	1	5.93	6.02	32,500	9		1	1	4	3		CLACKAMAS	WASHINGTON ST.	85	39.68

Rte.	Rdwy	BMP	EMP	ADT	Crsh	Fatal	A	B	C	PDO	City	County	Connection in Group	Percentile	SPIS
081	**PACIFIC HIGHWAY EAST**														
OR-99E	I	5.94	6.03	32,500	5		1	2	2			CLACKAMAS		30	15.84
OR-99E	I	5.95	6.04	32,500	4			2	2			CLACKAMAS		15	12.97
OR-99E	I	5.96	6.05	32,500	4			2	2			CLACKAMAS		15	12.97
OR-99E	I	5.97	6.06	32,500	3			2	1			CLACKAMAS		5	11.38
OR-99E	I	6.12	6.21	32,500	3			2	1			CLACKAMAS		5	11.38
OR-99E	I	6.13	6.22	32,500	3			2	1			CLACKAMAS		5	11.38
OR-99E	I	6.14	6.23	32,500	3			2	1			CLACKAMAS		5	11.38
OR-99E	I	6.15	6.24	32,500	3			2	1			CLACKAMAS		5	11.38
OR-99E	I	6.16	6.25	32,500	3			2	1			CLACKAMAS		5	11.38
OR-99E	I	6.17	6.26	32,500	3			2	1			CLACKAMAS		5	11.38
OR-99E	I	6.18	6.27	32,500	3			2	1			CLACKAMAS		5	11.38
OR-99E	I	6.21	6.30	32,500	4			3	1			CLACKAMAS	22ND AVE.	25	14.47
OR-99E	I	6.22	6.31	32,500	6			5	1			CLACKAMAS		45	20.07
OR-99E	I	6.23	6.32	32,500	7			6	1			CLACKAMAS		55	22.69
OR-99E	I	6.24	6.33	32,500	8			6	2			CLACKAMAS		60	23.72
OR-99E	I	6.25	6.34	32,500	8			6	2			CLACKAMAS		60	23.72
OR-99E	I	6.26	6.35	32,500	8			6	2			CLACKAMAS		60	23.72
OR-99E	I	6.27	6.36	32,500	8			6	2			CLACKAMAS		60	23.72
OR-99E	I	6.28	6.37	32,500	8			6	2			CLACKAMAS		60	23.72
OR-99E	I	6.29	6.38	32,500	8			6	2			CLACKAMAS		60	23.72
OR-99E	I	6.30	6.39	32,500	8			6	2			CLACKAMAS	BLUE BIRD ST.	60	23.72
OR-99E	I	6.30	6.39	32,500	8			6	2			CLACKAMAS	RIVER RD. (2ND RT.)	60	23.72
OR-99E	I	6.31	6.40	27,100	5			4	1			CLACKAMAS	LEG (FROM RIVER RD.)	40	17.63
OR-99E	I	6.45	6.54	27,100	3			2	1			CLACKAMAS		10	11.57
OR-99E	I	6.46	6.55	27,100	3			2	1			CLACKAMAS		10	11.57
OR-99E	I	6.66	6.75	27,100	3				3			CLACKAMAS			8.57
OR-99E	I	6.67	6.76	27,100	3				3			CLACKAMAS			8.57
OR-99E	I	6.68	6.77	27,100	3				3			CLACKAMAS			8.57
OR-99E	I	6.69	6.78	27,100	3				3			CLACKAMAS			8.57
OR-99E	I	6.70	6.79	27,100	3				3			CLACKAMAS			8.57
OR-99E	I	6.71	6.80	27,100	3				3			CLACKAMAS			8.57
OR-99E	I	6.72	6.81	27,100	5			2	3			CLACKAMAS		25	14.63
OR-99E	I	6.73	6.82	27,100	5			3	2			CLACKAMAS		35	16.13
OR-99E	I	6.74	6.83	27,100	5			3	2			CLACKAMAS		35	16.13
OR-99E	I	6.75	6.84	27,100	5			3	2			CLACKAMAS		35	16.13
OR-99E	I	6.76	6.85	27,100	5			4	1			CLACKAMAS		40	17.63
OR-99E	I	6.77	6.86	27,100	5			4	1			CLACKAMAS		40	17.63
OR-99E	I	6.78	6.87	27,100	10			7	3			CLACKAMAS		70	27.61
OR-99E	I	6.79	6.88	27,100	12			8	4			CLACKAMAS		75	30.86

Rte.	Rdwy	BMP	EMP	ADT	Crsh	Fatal	A	B	C	PDO	City	County	Connection in Group	Percentile	SPIS
161	**WOODBURN-ESTACADA**														
OR-211	I	33.35	33.44	6,300	3				1	2		CLACKAMAS	S CADONAU RD.	15	13.25
OR-211	I	33.36	33.45	6,300	3				1	2		CLACKAMAS		15	13.25
OR-211	I	33.37	33.46	6,300	3				1	2		CLACKAMAS		15	13.25
OR-211	I	33.39	33.48	6,300	3					3		CLACKAMAS		10	11.75
OR-211	I	33.40	33.49	6,300	9		2	3		4		CLACKAMAS		75	30.51
171	**CLACKAMAS**														
	I	0.02	0.11	7,800	3					3		CLACKAMAS	LEG (FROM 17TH AVE.)	5	11.03
	I	0.03	0.12	7,800	3					3		CLACKAMAS		5	11.03
	I	0.04	0.13	7,800	3					3		CLACKAMAS		5	11.03
	I	0.05	0.14	7,800	5				1	4		CLACKAMAS		35	16.80
	I	0.06	0.15	7,800	5				1	4		CLACKAMAS		35	16.80
	I	0.07	0.16	7,800	5				1	4		CLACKAMAS		35	16.80
	I	0.08	0.17	7,800	5				1	4		CLACKAMAS		35	16.80
OR-224	I	0.09	0.18	7,800	5				1	4		CLACKAMAS		35	16.80
OR-224	I	0.10	0.19	7,800	4				1	3		CLACKAMAS		25	14.81
OR-224	I	0.11	0.20	7,800	3				1	2		CLACKAMAS		15	12.53
OR-224	I	0.58	0.67	24,800	3				1	2		CLACKAMAS			10.17
OR-224	I	0.59	0.68	24,800	25		5	10		10		CLACKAMAS		90	50.75
OR-224	I	0.60	0.69	24,800	26		5	11		10		CLACKAMAS		90	52.82
OR-224	I	0.61	0.70	24,800	26		5	11		10		CLACKAMAS		90	52.82
OR-224	I	0.62	0.71	24,800	26		5	11		10		CLACKAMAS		90	52.82
OR-224	I	0.63	0.72	24,800	26		5	11		10		CLACKAMAS		90	52.82
OR-224	I	0.64	0.73	24,800	26		5	11		10		CLACKAMAS		90	52.82
OR-224	I	0.65	0.74	24,800	26		5	11		10		CLACKAMAS		90	52.82
OR-224	I	0.66	0.75	24,800	26		5	11		10		CLACKAMAS		90	52.82
OR-224	I	0.67	0.76	24,800	26		5	11		10		CLACKAMAS		90	52.82
OR-224	I	0.68	0.77	24,800	24		6	10		8		CLACKAMAS	171AB CONN. (SE HARRI	90	51.65
OR-224	I	0.69	0.78	24,500	10		2	6		2		CLACKAMAS		70	29.43
OR-224	I	0.70	0.79	24,500	9		2	5		2		CLACKAMAS		65	26.95
OR-224	I	0.71	0.80	24,500	9		2	5		2		CLACKAMAS		65	26.95
OR-224	I	0.72	0.81	24,500	9		2	5		2		CLACKAMAS		65	26.95
OR-224	I	0.73	0.82	24,500	9		2	5		2		CLACKAMAS		65	26.95
OR-224	I	0.74	0.83	24,500	10		3	5		2		CLACKAMAS		70	29.43
OR-224	I	0.75	0.84	24,500	10		3	5		2		CLACKAMAS		70	29.43
OR-224	I	0.76	0.85	24,500	10		3	5		2		CLACKAMAS		70	29.43
OR-224	I	0.77	0.86	24,500	10		3	5		2		CLACKAMAS		70	29.43
OR-224	I	0.78	0.87	24,500	9		2	5		2		CLACKAMAS	171AC CONN. (SE MONR	65	26.95
OR-224	I	0.82	0.91	25,100	3		1	1		1		CLACKAMAS		10	11.66
OR-224	I	0.83	0.92	25,100	6		1	3		2		CLACKAMAS		45	19.07
OR-224	I	0.84	0.93	25,100	19		2	5		12		CLACKAMAS		80	34.92

Rte.	Rdwy	BMP	EMP	ADT	Crsh	Fatal	A	B	C	PDO	City	County	Connection in Group	Percentile	SPIS
171	**CLACKAMAS**														
OR-224	I	0.85	0.94	25,100	20			2	5	13		CLACKAMAS		80	35.57
OR-224	I	0.86	0.95	25,100	21			2	5	14		CLACKAMAS		80	36.22
OR-224	I	0.87	0.96	25,100	21			2	5	14		CLACKAMAS		80	36.22
OR-224	I	0.88	0.97	25,100	21			2	5	14		CLACKAMAS		80	36.22
OR-224	I	0.89	0.98	25,100	21			2	4	15		CLACKAMAS		80	34.72
OR-224	I	0.90	0.99	25,100	21			2	4	15		CLACKAMAS		80	34.72
OR-224	I	0.91	1.00	25,100	21			2	4	15		CLACKAMAS		80	34.72
OR-224	I	0.92	1.01	25,100	21			2	4	15		CLACKAMAS		80	34.72
OR-224	I	0.93	1.02	25,100	18			2	2	14		CLACKAMAS	171AD CONN. (OAK ST.) I	70	29.73
OR-224	I	0.94	1.03	25,700	4					4		CLACKAMAS			10.29
OR-224	I	0.95	1.04	25,700	3					3		CLACKAMAS			8.63
OR-224	I	1.23	1.32	25,700	8			2	2	4		CLACKAMAS		50	21.29
OR-224	I	1.24	1.33	25,700	8			2	2	4		CLACKAMAS		50	21.29
OR-224	I	1.25	1.34	25,700	8			2	2	4		CLACKAMAS		50	21.29
OR-224	I	1.26	1.35	25,700	8			2	2	4		CLACKAMAS		50	21.29
OR-224	I	1.27	1.36	25,700	8			2	2	4		CLACKAMAS		50	21.29
OR-224	I	1.28	1.37	25,700	8			2	2	4		CLACKAMAS	LEG (FROM 171AE CONN.	50	21.29
OR-224	I	1.29	1.38	25,700	8			2	2	4		CLACKAMAS		50	21.29
OR-224	I	1.30	1.39	25,700	8			2	2	4		CLACKAMAS		50	21.29
OR-224	I	1.31	1.40	25,700	7			2	2	3		CLACKAMAS		45	20.20
OR-224	I	1.32	1.41	25,700	7			2	2	3		CLACKAMAS	171AE CONN. (SE EDISO	45	20.20
OR-224	I	1.80	1.89	25,700	8			2	3	3		CLACKAMAS		55	22.79
OR-224	I	1.81	1.90	25,700	8			2	3	3		CLACKAMAS		55	22.79
OR-224	I	1.82	1.91	25,700	8			2	3	3		CLACKAMAS		55	22.79
OR-224	I	1.83	1.92	25,700	8			2	3	3		CLACKAMAS		55	22.79
OR-224	I	1.84	1.93	25,700	8			2	3	3		CLACKAMAS		55	22.79
OR-224	I	1.85	1.94	25,700	8			2	3	3		CLACKAMAS		55	22.79
OR-224	I	1.86	1.95	25,700	8			2	3	3		CLACKAMAS		55	22.79
OR-224	I	1.87	1.96	25,700	8			2	3	3		CLACKAMAS		55	22.79
OR-224	I	1.88	1.97	25,700	8			2	3	3		CLACKAMAS		55	22.79
OR-224	I	1.89	1.98	25,700	7			2	3	2		CLACKAMAS	SE FREEMAN WAY	55	21.70
OR-224	I	2.63	2.72	27,300	6				4	2		CLACKAMAS		45	18.90
OR-224	I	2.64	2.73	27,300	7				4	3		CLACKAMAS		45	20.06
OR-224	I	2.65	2.74	27,300	7				4	3		CLACKAMAS		45	20.06
OR-224	I	2.66	2.75	27,300	8		1		4	3		CLACKAMAS		85	37.63
OR-224	I	2.67	2.76	27,300	8		1		4	3		CLACKAMAS		85	37.63
OR-224	I	2.68	2.77	27,300	9		1		4	4		CLACKAMAS		85	38.63
OR-224	I	2.69	2.78	27,300	10		1		4	5		CLACKAMAS	171AI CONN. M.P. 3C2.69	85	39.59
OR-224	I	2.70	2.79	26,900	9		1		4	4		CLACKAMAS		85	38.68
OR-224	I	2.71	2.80	26,900	9		1		4	4		CLACKAMAS		85	38.68

Rte.	Rdwy	BMP	EMP	ADT	Crsh	Fatal	A	B	C	PDO	City	County	Connection in Group	Percentile	SPIS
171	**CLACKAMAS**														
OR-224	I	2.72	2.81	26,900	9		1		4	4		CLACKAMAS	RUSK RD.	85	38.68
OR-224	I	2.73	2.82	26,900	5		1			4		CLACKAMAS		70	28.14
OR-224	I	2.74	2.83	26,900	4		1			3		CLACKAMAS		65	26.72
OR-224	I	2.75	2.84	26,900	4		1			3		CLACKAMAS		65	26.72
OR-224	I	2.76	2.85	26,900	3					3		CLACKAMAS			8.58
OR-224	I	2.77	2.86	26,900	3					3		CLACKAMAS			8.58
OR-224	I	3.06	3.15	26,900	3				3			CLACKAMAS		15	13.08
OR-224	I	3.07	3.16	26,900	4				3	1		CLACKAMAS		25	14.72
OR-224	I	3.08	3.17	26,900	4				3	1		CLACKAMAS		25	14.72
OR-224	I	3.09	3.18	26,900	4				3	1		CLACKAMAS		25	14.72
OR-224	I	3.10	3.19	26,900	9				6	3		CLACKAMAS		65	25.18
OR-224	I	3.11	3.20	26,900	25		1	2	9	13		CLACKAMAS		95	60.79
OR-224	I	3.12	3.21	26,900	31		2	2	10	17		CLACKAMAS		95	75.91
OR-224	I	3.13	3.22	26,900	32		2	2	11	17		CLACKAMAS		95	76.26
OR-224	I	3.14	3.23	26,900	34		2	2	12	18		CLACKAMAS		95	76.95
OR-224	I	3.15	3.24	26,900	34		2	2	12	18		CLACKAMAS		95	76.95
OR-224	I	3.16	3.25	26,900	33		2	2	11	18		CLACKAMAS		95	76.61
OR-224	I	3.17	3.26	26,900	32		2	2	11	17		CLACKAMAS		95	76.26
OR-224	I	3.18	3.27	26,900	32		2	2	11	17		CLACKAMAS		95	76.26
OR-224	I	3.19	3.28	26,900	32		2	2	11	17		CLACKAMAS		95	76.26
OR-224	I	3.20	3.29	26,900	28		2	2	9	15		CLACKAMAS	LAKE RD.	95	74.81
OR-224	I	3.21	3.30	29,200	11		1		5	5		CLACKAMAS		85	41.76
OR-224	I	3.22	3.31	29,200	5				4	1		CLACKAMAS		40	17.51
OR-224	I	3.23	3.32	29,200	6				4	2		CLACKAMAS		45	18.77
OR-224	I	3.24	3.33	29,200	9				7	2		CLACKAMAS		65	26.45
OR-224	I	3.25	3.34	29,200	9				7	2		CLACKAMAS		65	26.45
OR-224	I	3.26	3.35	29,200	10				7	3		CLACKAMAS		70	27.39
OR-224	I	3.27	3.36	29,200	10				7	3		CLACKAMAS		70	27.39
OR-224	I	3.28	3.37	29,200	10				7	3		CLACKAMAS		70	27.39
OR-224	I	3.29	3.38	29,200	10				7	3		CLACKAMAS		70	27.39
OR-224	I	3.30	3.39	29,200	8				5	3		CLACKAMAS		55	22.46
OR-224	I	3.31	3.40	29,200	8				5	3		CLACKAMAS		55	22.46
OR-224	I	3.32	3.41	29,200	8				5	3		CLACKAMAS		55	22.46
OR-224	I	3.33	3.42	29,200	6				4	2		CLACKAMAS	PHEASANT CT.	45	18.77
OR-224	I	3.60	3.69	35,100	4		1		1	2		CLACKAMAS		70	27.88
OR-224	I	3.61	3.70	35,100	6		1		2	3		CLACKAMAS		75	31.94
OR-224	I	3.62	3.71	35,100	10		1	1	3	5		CLACKAMAS		85	38.90
OR-224	I	3.63	3.72	35,100	10		1	1	3	5		CLACKAMAS		85	38.90
OR-224	I	3.64	3.73	35,100	30		2	3	12	13		CLACKAMAS		95	74.05
OR-224	I	3.65	3.74	35,100	32		2	3	13	14		CLACKAMAS		95	74.70
OR-224	I	3.66	3.75	35,100	37		2	4	15	16		CLACKAMAS		95	76.24

Responses to Public Comments

Provided in Public Testimony at September 10, 2013
Planning Commission public hearing

There were a number of comments taken in as part of public testimony at the September 10, 2013 Planning Commission public hearing. Staff believes that the most substantive comments that could result in additional changes to the proposed TSP amendments have been identified and are addressed in the Staff Report for the September 24, 2013, hearing. In this document, staff will provide short responses to remaining significant comments or questions from public testimony

1. **School zone speeding issues**

   Issue: Public testimony identified school zone speeding as an issue that did not seem to be adequately addressed in the TSP.

   In Chapter 11 (Neighborhood Traffic Management) on page 11-2, the TSP identifies student safety around school zones as one concern that can be addressed through the use of the neighborhood traffic management process and tools. This chapter does not identify the use of specific traffic calming measures at specific locations, however. The Neighborhood Traffic Management Process (Figure 11-1 on page 11-12) describes the process for addressing neighborhood traffic concerns. The process stipulates that, in non-emergency situations, traffic concerns should be routed through the Walk Safely Milwaukie program. No traffic calming projects around school zones were proposed during the public involvement process for updating the TSP.

   Staff Conclusion: No traffic calming measures around specific school zones have been proposed for inclusion in the TSP. Staff recommends that these concerns be addressed through the Neighborhood Traffic Management Process outlined on page 11-12.

2. **Efficacy of TSP in achieving Metro's Regional Transportation Plan (RTP) goals**

   Issue: Public testimony questioned the efficacy of the TSP in achieving the goals set out by Metro's Regional Transportation plan, which include reducing single-occupancy vehicle trips, congestion and vehicle trips per person.

   The TSP aims to achieve these goals by identifying and prioritizing projects that improve the pedestrian, bicycle and public transit network. The TSP is the guiding policy document that sets direction for how the City will increase trips by these modes. Strengthening these networks and systems provide viable alternatives to vehicle use and therefore decrease individual vehicle trips and congestion.

   The TSP also addresses congestion, without reducing vehicle use, by forecasting vehicular traffic and identifying street network improvements needed to manage future traffic volumes.

   Staff Conclusion: The stated goals, policies, and recommendations of the TSP align to Metro's Regional Transportation Plan (RTP) goals. Public comment did not identify specific project proposals or concerns that would either advance or hinder these goals, so staff does not recommend any changes to the TSP. Most of the 120-plus projects in the TSP contribute in some way to advancing toward the various targets set in the RTP.

3. **Definition of Environmental Justice**

   Issue: Public testimony expressed confusion about the meaning of the term "Environmental Justice" as referenced in Chapter 3 on page 3-53.

Environmental Justice is defined on page 3-52; "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."[1] Additional language in this section describes the relationship of Environmental Justice to the TSP.

Staff Conclusion: The TSP clearly defines Environmental Justice. Further questions and clarification can be handled through individual discussion with staff, if needed.

4. Concern that Railroad Ave street improvements will lead to higher driving speeds

Issue: Public testimony expressed concern that improvements to Railroad Ave will lead to faster driving speeds and make the road more dangerous for pedestrians and bicyclists.

The priority ranking of each mode within the Railroad Ave Capacity Improvements project reflect the public desire for a street that is more welcoming to pedestrians, bicyclists and transit users. The TSP ranks improvements to the facilities for these three modes as High. Simultaneously, the TSP ranks street capacity improvements to Railroad Ave as Low.

Staff Conclusion: The priority ranking in the TSP captures the public desire for improvements to the road to enhance facilities for all users while keeping auto speeds down and ensuring a welcoming and safe environment for pedestrians, bicyclists, and transit users. This goal is something that can be addressed by considering the specific design of the project.

5. Dissatisfaction with proposed design for Harmony/Lake/Linwood overpass structure

Issue: Public testimony expressed concern about the design of the Harmony/Lake/Linwood intersection improvement proposed by Clackamas County.

The Harmony/Lake/Linwood intersection improvement is listed as a regional project in the TSP because it has the potential to affect transportation conditions in the City. Clackamas County has jurisdiction over this intersection.

Staff Conclusion: Concerns and feedback about this project are better directed to Clackamas County through its current TSP update project.

6. Proposal to establish a process for projects to be added to the TSP through the Walk Safely Milwaukie program

Issue: Public testimony expressed desire for a process to be established under which projects that are identified by the Walk Safely Milwaukie program can be added to the TSP.

The Walk Safely Milwaukie Program identifies specific pedestrian safety improvement projects. The TSP is a broad planning document that captures the citywide transportation system needs every 5 years. The need for improvement may be identified by the TSP, but then a specific project proposal can be made through the Walk Safely Milwaukie Program.

Staff Conclusion: It is not within the scope of the TSP to track the status of each Walk Safely Milwaukie project because the TSP is only updated every 5 years and is not intended to document project proposals as they occur.

[1] U.S. EPA, Environmental Justice, Compliance and Enforcement, Website, 2007.