CITY OF MILWAUKIE

Transportation System Plan

Prepared by the City of Milwaukie
in association with DKS Associates

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Milwaukie 2007 TSP

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1 Executive Summary

The Milwaukie Transportation System Plan (TSP) is the City's long-term plan for transportation improvements and includes policies and projects that could be implemented through the City Capital Improvement Plan, development review, or grant funding. The 2007 TSP planning process was a great opportunity for the community to define its transportation goals and discuss how the whole transportation system can be improved to support livability in Milwaukie.

Milwaukie is a city of approximately 21,000 people and just under five square miles. Part of Milwaukie is designated as a Town Center in the 2040 Growth Concept. Though Milwaukie's population is expected to grow moderately (approximately one percent per year), the city lies at the intersection of several regional transportation facilities and downstream from several areas slated for significant growth in Metro's 2040 Growth Concept.

THE PURPOSE OF A TRANSPORTATION SYSTEM PLAN (TSP)

One of the primary purposes of creating a TSP (and keeping it updated) is to fulfill the State of Oregon Transportation Planning Rule (TPR) requirements for comprehensive transportation planning in the cities of Oregon. The TSP is used as a guiding policy document for long term transportation planning and presents the City's goals and policies while outlining and prioritizing proposed improvements for Pedestrian, Bicycle, Transit, and Motor Vehicle systems (as well as other nonmotorized elements). In addition, the TSP outlines the financial forecast for potential funding for the City, and ties that back to potential prioritized improvements to determine any funding shortfalls for projects. When funding shortfalls exist, potential concepts for generating additional revenue for the City are outlined to help guide the City towards policy decisions related to funding.

The TSP strives to determine existing problem areas for all modes of transportation, looks into the future to identify the needs created by growth, and provides solutions to existing and future needs along with guidelines to develop the desired multimodal transportation system. Identifying specific transportation system needs will help the City guide its future transportation system investments and determine how land use and transportation decisions can be brought together beneficially for the community.

Each section of the TSP (after the Future Forecasting Chapter) includes a long-range master plan and an action plan. The action plans address those transportation improvements that could be made using limited local funding sources. The final prioritization of transportation system improvements will be determined by the Milwaukie City Council as part of the annual capital improvements planning and budgeting process.

WHO WAS INVOLVED IN THE CITY'S TSP UPDATE?

During the TSP update process, the City of Milwaukie launched an extensive public outreach and involvement process (see Appendix A). Citizens, partner agencies, and business representatives were invited to join one or more mode-specific working groups and the TSP Advisory Committee. The working groups were created to focus on different subtasks of the TSP, including: Traffic and Street Network Solutions, Pedestrian and Bike Solutions, Street Design, Transit Solutions, Downtown Parking, and Freight Access. The Advisory Committee (AC) oversaw both technical and policy review of the TSP, and offered guidance on the final prioritization of projects and strategies.

TSP UPDATE PROCESS

In addition to data collection and public involvement, the TSP update consisted of seven main elements. The following sections describe each of these elements in more detail.

Goals

Transportation goals and policies form the basis for how the local transportation system will be developed and maintained over the next 20 years. The City's transportation goals support a multimodal approach to transportation planning and reflect how citizens think about and experience Milwaukie's transportation system. The City's nine transportation goals are:

- **GOAL 1 Livability:** Design and construct transportation facilities in a manner that enhances the livability of Milwaukie's community
- **GOAL 2 Safety:** Develop and maintain a safe and secure transportation system.
- **GOAL 3 Travel Choices:** Plan, develop, and maintain a transportation system that provides travel choices and allows people to reduce the number of trips made by single-occupant vehicles.
- **GOAL 4 Quality Design:** Establish and maintain a set of transportation design and development regulations that are sensitive to local conditions.
- **GOAL 5 Reliability and Mobility:** Develop and maintain a well-connected transportation system that reduces travel distance, improves reliability, and manages congestion.
- **GOAL 6 Sustainability:** Provide a sustainable transportation system that meets the needs of present and future generations.
- **GOAL 7 Efficient and Innovative Funding:** Efficiently allocate available funding for recommended transportation improvements, and pursue additional transportation funding that includes innovative funding methods and sources.
- **GOAL 8 Compatibility:** Develop a transportation system that is consistent with the City's Comprehensive Plan and coordinates with County, State, and regional plans.

- **GOAL 9 Economic Vitality:** Promote the development of Milwaukie's, the region's, and the state's economies through the efficient movement of people, goods, and services, and the distribution of information.

Existing Conditions

Project staff reviewed existing conditions to establish how the transportation systems within Milwaukie currently operate in terms of quality, effectiveness, accessibility, and safety. Sidewalk and pavement conditions, roadway and intersection traffic volumes, transit and freight operations, as well as parking, rail, environmental justice and natural resources were all reviewed with the goal of understanding the "bigger picture" of the City's transportation needs. Additional detail related to these topics can be found in Chapter 3.

Forecasting Future Traffic Conditions

The forecast year for this plan is 2030. The City used Metro's urban area transportation forecast model to forecast future PM peak hour traffic volumes at study area intersections. This is a complex model that takes many anticipated trends in demographics, changes in land use, population, etc. into account when forecasting future traffic volumes. Some of the more important assumptions include the projected growth in population in Clackamas County and the rest of the Metro region, residential and employment growth in downtown Milwaukie, and an increase in transit use within the Metro region. See Chapter 4 for more detail.

Identification of Needs and Potential Improvements

The traffic volume projections forecasted from the Metro model formed the basis for identifying potential roadway deficiencies, and evaluating alternative circulation improvements within Milwaukie. Needs for other modes were then identified, based on the future traffic forecasts and deficiencies in the existing infrastructure (sidewalks, bike lanes, transit stops, etc.).

Collectively, the Master Plans in Chapters 5 through 12 of the TSP describe the proposed capital and operational improvements to the transportation system between 2008 and 2030. While these potential improvements are presented as benefiting one mode, when possible, multiple modes are combined into one project. For instance, the Railroad Ave road-widening project listed in the Auto Street Network Master Plan could include new bike lanes and sidewalks, as well as improvements for freight and transit.

Ranking and Prioritizing Improvements

The Action Plans in Chapters 5 through 12 focus on the highest priority projects that are most likely to be funded over the next 15 years with limited City funds. The Action Plans are built upon the premise that, given the limited funds available, the City should prioritize funding of transportation projects that 1) effectively address identified problems, and 2) best meet the City's Goals. To prioritize the projects, project staff and the AC used three sources: the project rankings from the working groups, evaluation of each project against the nine TSP Goals, and other information regarding dependence on other projects, neighborhood support, etc. Using this approach, project staff and the AC developed a relative ranking of the projects, grouping them into three categories (high, medium, and low priority).

Financing Transportation Projects

The financially constrained Action Plan lists in Chapters 5 through 12 identify which projects the City should prioritize for funding with limited City funds. While these Action Plans will set the priorities for use of local funds, it does not assume funding sources such as state or regional grants, or contributions from local development. Therefore, the "financially constrained" lists are very constrained.

Given the limited availability of funding, the City will have to make tradeoffs when deciding how to spend the limited funds each year. The AC determined that the City should use a strategic approach that funds a range of high priority "implementable" projects. This approach encourages the City to tackle smaller projects with local funds, but also use local funds as the required local match to leverage state and federal funds for larger high priority projects.

Recommendations

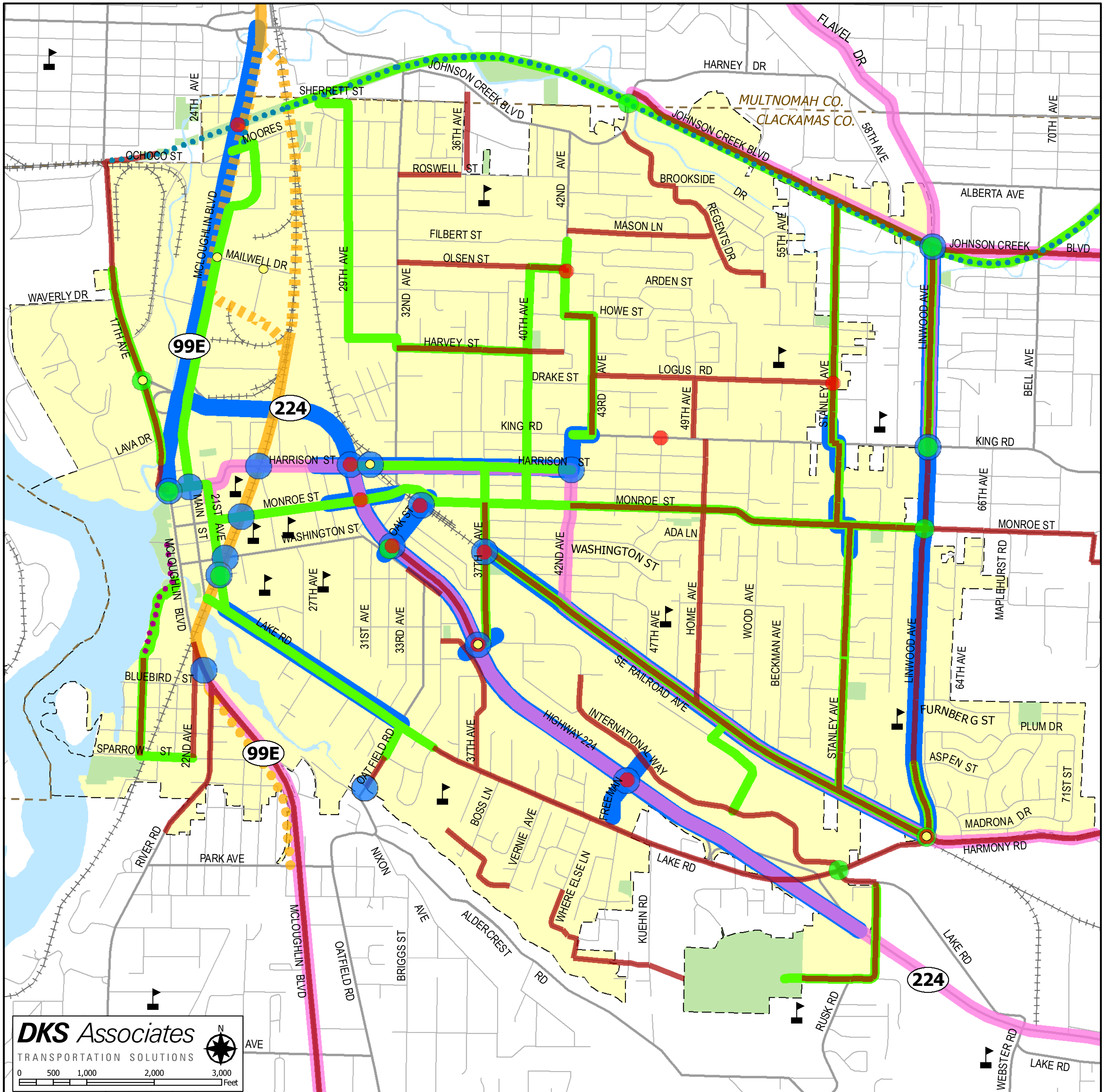
The Milwaukie TSP focuses on Milwaukie's transportation needs and decisions. Therefore, participants in the planning process created a set of recommendations that implement state and regional policies but are tailored to Milwaukie's current and future needs. From all of the input that citizens and businesses offered during the TSP process, there were some clear messages. The highest priorities for improving transportation in Milwaukie are:

- Improve pedestrian and bicycle facilities throughout the city.
- Enhance public transit service.
- Maintain existing facilities.
- Manage traffic in neighborhoods (address "cut-through" traffic) as regional traffic volumes increase.
- Improve safety and accessibility of crossings over major corridors.

Though it is common for people to be focused on their own street, neighborhood or bus line, a broad number of people identified the following areas as a priority:

- Downtown
- Milwaukie Marketplace area
- Railroad Ave
- Railroad crossings throughout the city.

The following section summarizes the specific recommendations that resulted from the analysis of each mode, including: Pedestrian, Bicycle, Public Transit, Motor Vehicle, Street Design, Neighborhood Traffic Management, and Downtown Parking. Figure 1-1, the Composite Master Plan Map, summarizes the recommended improvements on one map, showing the location of recommended Master Plan improvements for pedestrians, bicycles, transit, motor vehicles, and freight modes.



CITY OF MILWAUKIE

Transportation System Plan

FIGURE 1-1

COMPOSITE MASTER PLAN

December 2007

LEGEND

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

PROPOSED PROJECTS

- Auto Corridor Improvement
- Transit Corridor Improvement
- High Capacity Transit Corridor Improvement
- Potential High Capacity Transit Corridor Alignment
- Potential High Capacity Transit Corridor Extension
- Bicycle Corridor Improvement
- Pedestrian Corridor Improvement
- Auto Intersection Improvement
- Bicycle Intersection Improvement
- Pedestrian Intersection Improvement
- Freight Intersection Improvement

PEDESTRIAN FACILITIES

Walking is the most affordable and accessible of all transportation modes. It is also clean, low-impact, and healthy for the individual. A safe and comfortable pedestrian environment allows people of all ages and abilities to travel independently.

Milwaukie's pedestrian system is challenged by an incomplete arterial/collector sidewalk system, a lack of local street connectivity, arterial crossings with potential safety and connectivity issues, and a lack of complete multiuse trails (see Chapter 3).

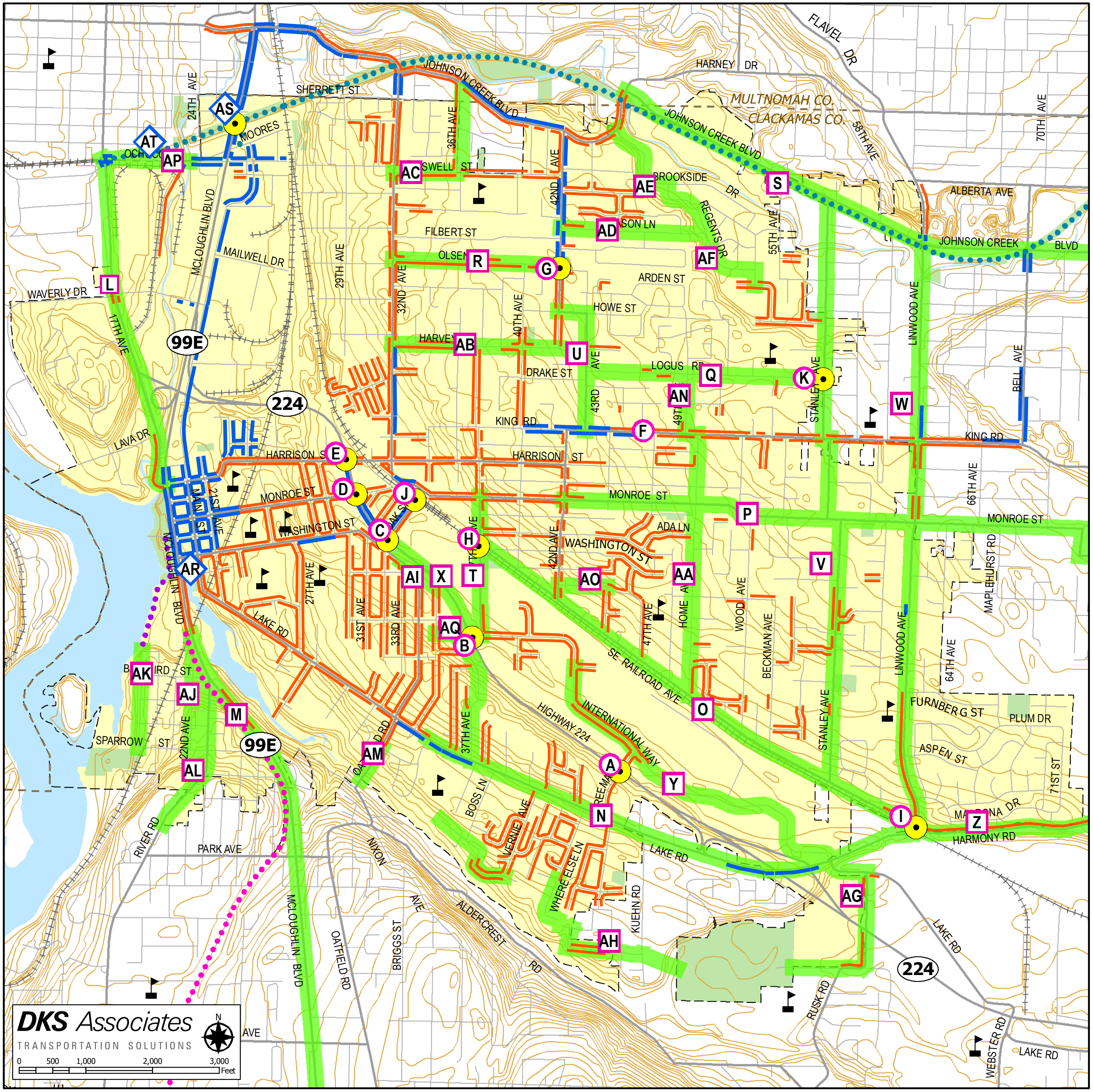
The City has several strategies for addressing pedestrian system needs and guiding project prioritization. The prioritization process helps to focus community investment on those projects that are most effective at addressing critical needs, while deferring other projects of lesser importance. The strategies for pedestrian facilities include:

- Key pedestrian corridors to connect neighborhoods with schools, parks, activity centers, and major transit stops;
- Arterial crossing and safety enhancements;
- Fill gaps in the network where some sidewalks exist;
- Pedestrian corridors that connect to major recreational uses;
- Enforcement of laws that protect pedestrians;
- Education about pedestrian safety and available walking routes.

These strategies would be implemented by projects that address needs and deficiencies.

Key Recommendations

- **Arterial and Collector Street Improvements:** Construct walkways along key collector and arterial streets, especially when project is publicly-funded:
  - Monroe St from 42nd Ave to eastern city limit
  - Stanley Ave within the city limits
  - Linwood Ave within city limits
  - 17th Ave north of downtown
  - Railroad Ave within the city limits
- **Local Street Improvements:** Walkways on local streets will be mostly constructed by new/infill development.
- **Intersection Improvements:** Construct intersection improvements to improve pedestrian safety near Highway 224 and the Milwaukie Marketplace:
  - Oak St by the railroad tracks
  - Harrison St and Highway 224
  - Railroad Ave and 37th Ave
- **Develop and distribute walking maps** that show routes to major destinations such as parks, schools, commercial areas, and trails.
- **Enforce against motorists** who speed and run stop signs.



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Transportation System Plan

FIGURE 1-2

PEDESTRIAN MASTER PLAN

December 2007

LEGEND

Existing Sidewalks
- < 5 ft. Width
- 5 ft. - 10 ft. Width
- Springwater Trail
- Kellogg Creek Trail

Proposed Improvement
- Pedestrian Facilities
- Pedestrian Intersection Safety Improvement
- Trolley Trail

- Schools
- Major Roads
- Streets
- Railroad
- 10' Contours
- County Line
- Parks
- Water
- City Limits

PROPOSED PROJECTS

Improve Intersection to Increase Pedestrian Safety

- A Freeman Way/HWY 224
- B 37th Ave/HWY 224
- C Oak St/HWY 224
- D Monroe St/HWY 224
- E Harrison St/HWY 224
- F King Rd crossing improvements
- G Olsen St/42nd Ave
- H Railroad Ave/37th Ave
- I Harmony Rd/Lake Rd
- J Oak St/railroad tracks
- K Stanley Ave/Logus Rd

Provide Pedestrian Facilities Where Not Currently Present

See Table 5-1 for L - AQ project descriptions

Enhance Existing Pedestrian Connection

- AR Construct pedestrian underpass under HWY 99E at Kellogg Creek
- AS Improve ramp at Springwater Trail/HWY 99E
- AT Complete Springwater Trail along Ochoco St

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 Improvements:** Prioritize "Bike Boulevards" as a method for providing safe bikeway connections to other transportation modes and between parks, schools, activity centers, and regional destinations.
  - 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 and Sparrow St
- **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.

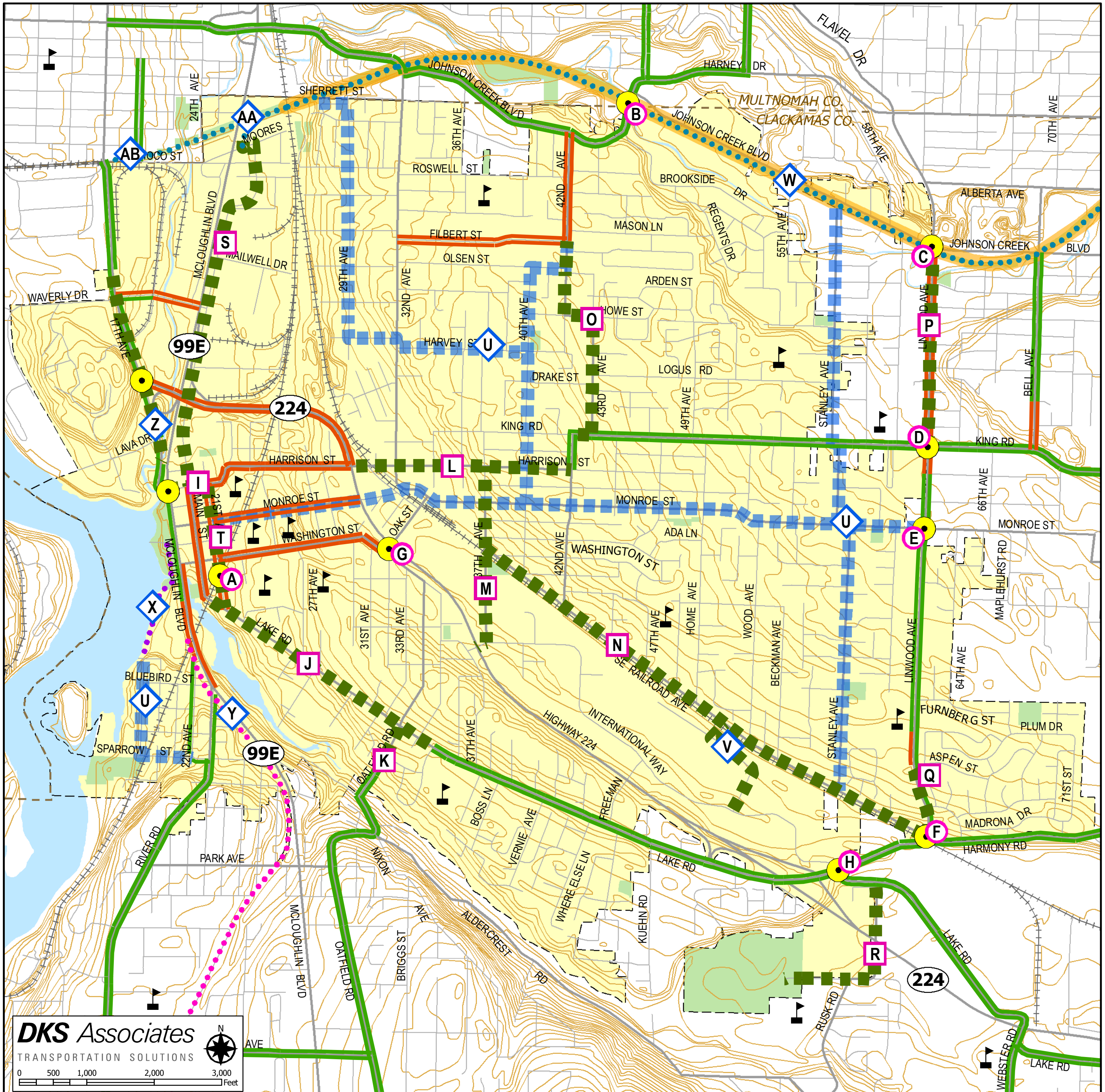
CITY OF MILWAUKIE

Transportation System Plan

FIGURE 1-3

BICYCLE MASTER PLAN

December 2007



LEGEND

Existing Bicycle Facilities	Proposed Improvements
Shared Facility	Bicycle Intersection Safety Improvement
Bicycle Lane	Bicycle Corridor Enhancement
Springwater Trail	Bike Boulevard
Kellogg Creek Trail	Bicycle Lanes
	Trolley Trail

Schools	County Line
Major Roads	Parks
Streets	Water
Railroad	City Limits
10' Contours	

PROPOSED PROJECTS

Improve Intersection to Increase Bicycle Safety

- A Adams St/21st Ave/Railroad Crossing
- B Johnson Creek Blvd/Springwater Trail
- C Johnson Creek Blvd/Linwood Ave
- D Linwood Ave/King Rd
- E Linwood Ave/Monroe St
- F Linwood Ave/Harmony Rd
- G Washington St/Oak St/HWY 224
- H International Way/Lake Rd

Provide Bicycle Lanes Where not Currently Present

- I Harrison St from HWY 99E to 21st Ave
- J Lake Rd from Main St to Guilford Dr
- K Oatfield Rd from Guilford Ct to Lake Rd
- L Harrison St from HWY 224 to 42nd Ave
- M 37th Ave from Harrison St to HWY 224
- N Railroad Ave from 37th Ave to Linwood Ave
- O 43rd Ave from King Rd to Filbert St
- P Linwood Ave from Queen Rd to Johnson Creek Blvd
- Q Linwood Ave from approximately Juniper St to Harmony Rd
- R Rusk Rd from Lake Rd to North Clackamas Park
- S Main St from Harrison St to Moores St
- T 21st Ave from Harrison St to Lake Rd

Enhance Existing Bicycle Connection

- U Install Bike Boulevard treatments at various locations
- V Construct bicycle overpass from Railroad Ave to International Way
- W Improve Springwater Trail paving
- X Improve Kellogg Creek Trail
- Y Install Trolley Trail signage
- Z Fill in gaps in exisiting bike network with bike lanes or multiuse path. Improve intersection safety on 17th Ave at HWY 224 and at 99E.
- AA Improve ramp at Springwater Trail/HWY 99E
- AB Complete Springwater Trail along Ochoco St

PUBLIC TRANSIT FACILITIES

The availability, convenience, and desirability of public transit are key aspects of a system that must support the movement of people to, from and through Milwaukie. Transit trips reduce single-occupant vehicle trips (which reduces traffic and energy consumption), serves community members who cannot drive (including the elderly, disabled, and youth), and minimizes transportation system impacts to the environment, such as vehicle emissions and soil and water pollution from impervious surface runoff.

Though transit service in Milwaukie needs to be improved in many ways, its greatest deficiencies are in the areas of service levels, safety, and convenience of service. There is a disparity between the City's goals for transit service and use, and the system's ability to meet those goals today. To close this gap, the City and TriMet should simultaneously pursue three types of improvements: service enhancements, capital improvements, and policy improvements.

Key Recommendations

- **Service Enhancements:**
  - Add a bus route on Railroad Ave (extending to Clackamas Town Center via Harmony Rd)
  - Add a bus route on Johnson Creek Blvd
  - Reduce headways to less than 30 minutes on all routes.
  - Enhance service on north-south routes.
  - Improve reliability of all routes.
- **Capital Improvements:**
  - Install shelters at bus stops that meet TriMet criteria.
  - Improve downtown bus stops and shelters, and include ample bike parking.
  - Construct a new bus layover facility at the Southgate Park-and-Ride.
- **Policy Recommendations:**
  - Eliminate the layover function of the downtown transit center.
  - Expand transit service. Provide service in "transit disadvantaged" areas. Fund local service enhancements through savings made from transit capacity improvements.
  - Provide appropriately located and sized park-and-ride facilities. Provide park-and-rides on Milwaukie's fringe for commuters and park-and-rides inside Milwaukie for Milwaukie residents.
  - Improve transit safety.
  - Reinvest transit "savings" within Milwaukie. Any savings derived from new capacity should be contained and reinvested within the Milwaukie service area.

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FIGURE 1-4

PUBLIC TRANSIT MASTER PLAN

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LEGEND

Existing Facilities	*Proposed Improvements*
Bus Stop	Park and Ride
Park and Ride	New or Rerouted Bus Route
Bus Route	Bus Rapid Transit Route
Bus Route Number	High Capacity Transit Route

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

MOTOR VEHICLE FACILITIES

The Auto Street Network element of the TSP focuses on maintaining traffic flow and mobility on arterial and collector roadways, protecting residential neighborhoods from excessive through traffic and travel speeds, providing reasonable access to and from residential areas, improving safety, and promoting efficient through-street movement.

Limited connectivity between Milwaukie neighborhoods often forces motorists to travel out of direction and increases traffic volumes and miles traveled on the few connecting streets. Regional and local traffic volumes are projected to increase on many city streets and cause many intersections to operate below jurisdictional standards.

Key Recommendations

- **Use Transportation System Management** to get the most out of the existing system.
- **Improve substandard streets and intersections** to accommodate traffic and improve safety.
- **Enhance neighborhood character and livability** through well-designed street improvements.
- **Leverage Street Surface Maintenance projects** to bring roads up to standards when possible.
- **Initiate a Hwy 99E/Hwy 224 Refinement Plan** with ODOT to define the future conditions of this corridor. Assumptions to include:
    - Primary crosstown connection is Harrison St.
    - Improve freight access to North Industrial area
    - Multiple grade-separated connections between Harrison St and Freeman Way.
    - Reduce the visual and physical "barrier" effect of the highway for nonmotorized modes of travel.
- **Implement capacity improvement projects on key corridors** as needed:
    - Harrison St/Main St
    - Harrison St/42nd Ave/King Rd
    - Johnson Creek Blvd/Linwood Ave
    - King Rd/Linwood Ave
    - Monroe St

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FIGURE 1-5

AUTO STREET NETWORK MASTER PLAN

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LEGEND

Proposed Street Network Improvements

- Roadway Widening Project
- Travel Route Improvement
- Corridor Refinement Plan
- Intersection Improvement
- Rail Crossing Improvement
- Major Roads
- Streets
- Railroad
- Springwater Trail
- Kellogg Creek Trail
- County Line
- Parks
- Water
- City Limits

PROPOSED PROJECTS

- A Prohibit left turn movement at 17th Ave/McLoughlin Blvd and include in Refinement Plan
- B Signalize Harrison St/42nd Ave
- C Conduct Refinement Plan for HWY 99E/HWY 224 focused on motor vehicle and freight mobility.
  - HWY 99E Project Limits: Tacoma St to 17th Ave
  - HWY 224 Project Limits: HWY 99E to Lake Rd Interchange
- D Reconfigure intersection to consolidate 37th Ave/ Industrial Way
- E Add eastbound/westbound right turn lanes and integrate the trail crossing
- F Create westbound shared through/right lane; or Add eastbound right turn pocket
- G Implement protected/permitted phasing for northbound and southbound left turns
- H Widen Linwood Ave to standard three lane cross section
- I Widen Railroad Ave to standard three lane cross section
- J Redesign intersections of River Rd and 22nd Ave to consolidate intersections; or Add northbound left turn pocket on River Rd
- K Widen Harrison St to standard three-lane cross section
- L Add left turn-lanes and protected signal phasing on Harrison St approaches
- M Widen Lake Rd to standard three-lane cross section
- N Replace 3-way stop with signal when warranted and appropriate. (Coordinate with the City of Portland)
- O Enhance connection between King Rd and Harrison St
- P Add protected signal phasing on Oak St approaches
- Q Improve intersection/modify access at HWY 224 and Freeman Way
- R Enhance connection along Stanley Ave at King Rd
- S Enhance connection along Stanley Ave at Monroe St
- T Implement railroad crossing safety and quiet zone project
- U Upgrade crossing to grade separated facility (dependant upon Harmony Rd Project findings)

FREIGHT PLAN

A quality local freight network facilitates movement of bulk goods and materials, and is essential to the economic health of the city. While all cities have some need for local delivery of goods to retailers and similar activities, in Milwaukie a majority of employment is in the heavy manufacturing, warehousing, and distribution sectors, which are dependent on efficient movements of large quantities of both raw materials and finished products. A well-functioning and reliable system for the movement of freight into and out of the city contributes significantly to the City's ability to attract and retain industrial investment-and the jobs and tax proceeds that come with that investment.

The city's freight network faces a few specific challenges. Access to the North Industrial area from McLoughlin Blvd is limited due to turn restrictions at Milport Rd and Ochoco St. Most rail crossings exhibit deterioration due to wear and tear and frequent train crossings, resulting in increased delay for the general public and freight haulers. The number of routes available to trucks is limited by weight limitations on certain freight routes and narrow intersections.

Key Recommendations

- **North Industrial Access:**
  - Improve access to the area, potentially with an overpass of Highway 99E at Ochoco St. This and other solutions should be evaluated through a Highway 99E/224 Refinement Plan (described in the previous section).
  - Light rail, if built on the 2003 "LPA" alignment (running along Main St or McLoughlin Blvd between Tacoma and Milport Rd), almost inevitably degrades access in and out of the east side.
- **Rail Crossings:** Improve the quality of the materials at at-grade crossings and pursue the grade separation of key crossings.
- **Street Reclassification:** Designate International Way as a freight route.

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FIGURE 1-6

FREIGHT MASTER PLAN

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LEGEND

Existing Freight Routes

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

Proposed Improvements

- Intersection Improvement
- Intersection Material Upgrade
- Corridor Refinement Plan
- Minor Preferred Freight Route (Local)*

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

**Upon adoption of this document, the functional classification for SE International Way will be upgraded to Minor Preferred Freight Route (Local).*

PROPOSED PROJECTS

Improve Corridor

A Conduct Refinement Plan for HWY 99E/HWY 224 focused on motor vehicle and freight mobility.
- HWY 99E Project Limits: Tacoma St to 17th Ave
- HWY 224 Project Limits: HWY 99E to Lake Rd Interchange

Improve Intersection

B ***17th Ave/HWY 224***
Upgrade intersection turning radii to better accommodate freight movements

C ***Main St/Mailwell Dr***
Upgrade intersection turning radii to better accommodate freight movements

D ***Mailwell Dr/Omark Dr***
Upgrade intersection turning radii to better accommodate freight movements

E ***Harrison St/Union Pacific Railroad Crossing***
Upgrade crossing to grade separated facility (outcome of crossing dependant upon 99E/224 Refinement Plan findings)

F ***HWY 224/37th Ave***
Consolidate two northern legs of 37th Ave and Industrial Way into one leg at HWY 224.

G ***Harmony Rd/Union Pacific Railroad Crossing***
Upgrade crossing to grade separated facility (outcome of crossing dependant upon Harmony Rd Project findings)

H ***At-grade Railroad Crossing Material Upgrades***
Upgrade crossing paving material to concrete or rubberized material for longevity of crossing at: Harrison St, Monroe St, Washington St, Adams St, Oak St, and 37th Ave

STREET DESIGN

A street's design determines how it will look and function. How a street looks and functions ultimately depends upon which elements are included, their dimensions, and how they relate to each other. Well-designed streets can contribute to the identity and character of a neighborhood and increase property values. They can also speed or slow traffic, reduce environmental impacts, and allow for safe multimodal use.

Problems

Milwaukie is a developed city with a largely incomplete street network. Though the community supports the completion of its streets through construction of safe pedestrian and bicycle facilities, most neighborhoods also want to maintain neighborhood character by saving existing trees and maintaining the slower traffic speeds that often accompany substandard roads. The City's current design standards limit the City's ability to sensitively improve existing streets by only allowing a few street design options. Allowing for more flexibility when determining the design of a street would allow for the City to respond to the character of the surrounding natural and built environments.

Possible Solutions

The City should update its standards and policies to allow for implementation of context-sensitive street design. The use of innovative designs, such as green streets, skinny streets, and flexible pedestrian designs are some examples of street design options that the City could incorporate into its street design standards.

Key Recommendations

- **Standards:** Develop a baseline cross section for each street functional classification and a street design prioritization approach for when the baseline design elements do not fit.
- **Flexibility:** Build more flexibility into street design standards to:
  - Allow for local design preferences.
  - Increase bicycle and pedestrian safety.
  - Avoid costly and time-consuming variance process requirements.
- **Alternative Designs:** Develop street design standards for green streets, skinny streets, and alternative pedestrian facilities.
- **Balance:** Balance the larger community's needs, local design preferences, and best practices when developing street design standards.
- **Landscaping:** Provide for landscaping (including street trees) wherever feasible.
- **Maintenance:** Consider maintenance costs and issues when developing design standards and design alternatives.

NEIGHBORHOOD TRAFFIC MANAGEMENT

The City recognizes that the vitality and feel of a neighborhood can be greatly influenced by the speed and volume of traffic traveling to and through it. Neighborhood traffic management is a way for the City and its citizens to create a dialogue about traffic concerns on a neighborhood level.

Problems

Milwaukie consists mostly of residential neighborhoods, and has a relatively small population compared to the surrounding Portland metropolitan area. Because of its proximity to the city of Portland, its many employment opportunities, and the two major regional routes that traverse the city (McLoughlin Blvd and Highway 224), cut-through traffic is an ongoing concern for Milwaukie residents. As traffic volumes increase and congestion occurs on regional routes and major streets, there is potential for traffic to spill over onto neighborhood routes and local streets in search of less congested or more direct routes. Neighborhood traffic management is a means to address the negative impacts of unchecked speed and volume on neighborhood and local streets.

Possible Solutions

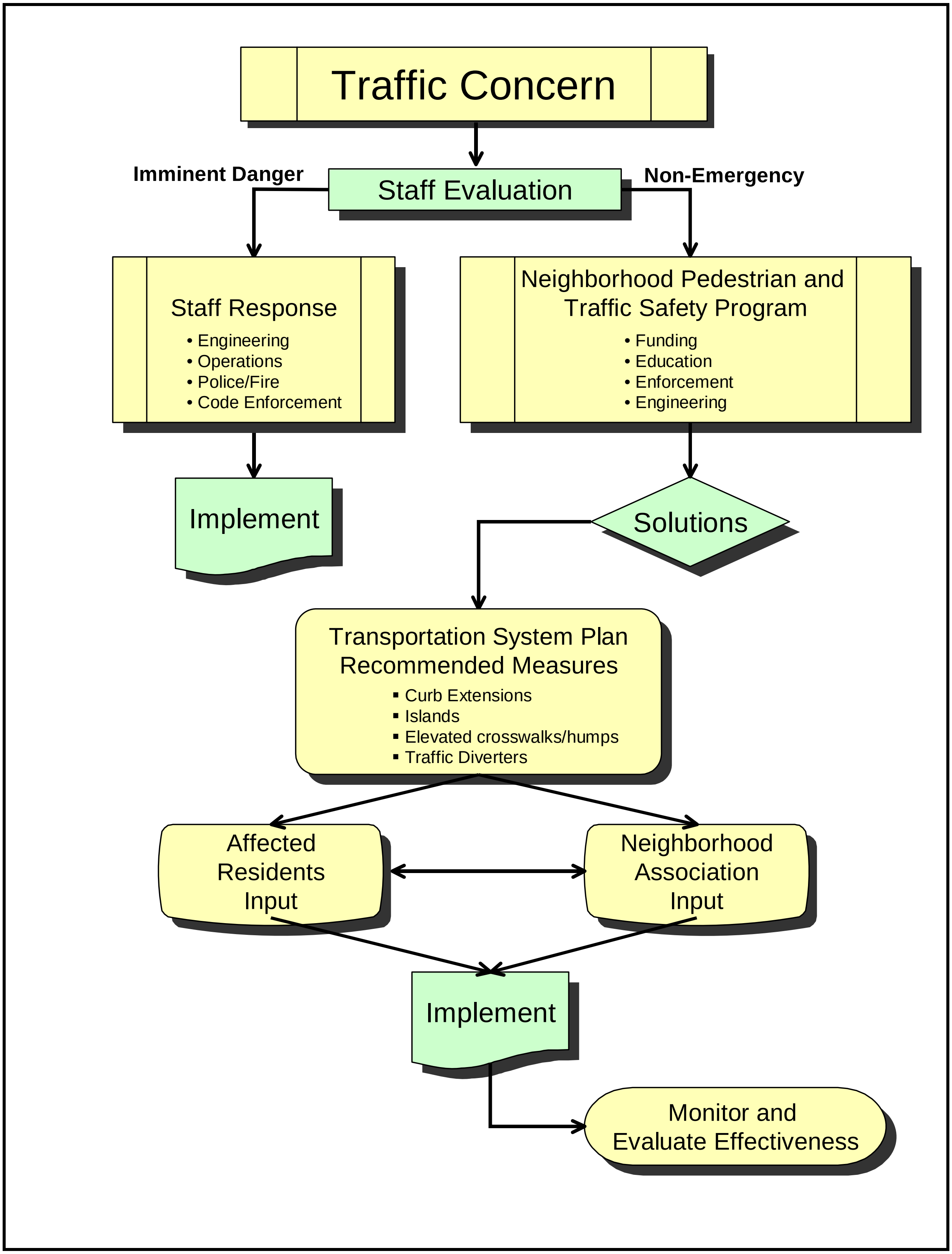
There are many different options available in the neighborhood traffic management 'tool box,' but not all of these options are appropriate for all streets. Traffic management options need to be based on the functional classification of the road, surrounding land uses, the design of the street, as well as input from emergency services and residents. Effective use of neighborhood traffic management in Milwaukie can address community needs and concerns, including, but not limited to, the following:

- Speeding
- Cut through traffic
- Pedestrian safety
- Student safety around school zones

Key Recommendations

- **Funding:** It is recommended that the City annually fund the Neighborhood Pedestrian and Traffic Safety 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 to commit to the Neighborhood Pedestrian and Traffic Safety 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.
- **Investment:** Allocate a certain amount of money per year to install selected neighborhood traffic management projects. The number of projects would be limited but coordinated with citizen involvement. Encourage implementation of neighborhood traffic management projects by private development.
- **Variety:** Allow for a wide variety of traffic management measures.
- **Effectiveness:** Ensure that the chosen measure addresses the identified problem.
- **Neighborhood Input:** Involve affected neighborhoods when designing neighborhood traffic management measures.
- **Landscaping:** Neighborhood traffic management solutions need to provide for landscaping wherever feasible.
- **Maintenance:** Consider maintenance needs and issues (including landscaping) when designing traffic management measures and ensure that the long-term maintenance needs can be met.

Figure 1-7 Neighborhood Traffic Management Process



DOWNTOWN PARKING

Properly managed downtown parking is vital for implementing and maintaining the City's 2001 *Downtown and Riverfront Land Use Framework Plan*. This plan envisions a lively downtown area with a clear sense of place and identity, comprised of an attractive mix of uses and amenities. The city's downtown area will grow as an important employment center and therefore parking must be built and managed to serve the retail core as downtown transitions to a multimodal environment.

Problems

Currently, downtown Milwaukie is vulnerable to serving as an impromptu park-and-ride for people traveling to downtown Portland. Downtown residents and employees are parking in stalls that should serve visitors, which causes parking to spill over into neighborhoods. The parking lots that are available, and some downtown streets, are not well lit and do not feel safe. Downtown employees are often not aware of their parking and transportation options and the current parking permit system does not work as well as it could. As the downtown area evolves, the existing parking lots will be developed and other parking options will need to be considered.

Possible Solutions

There are two viable solutions Milwaukie can use to improve the downtown parking situation: parking management and parking supply. Parking must be managed to assure that priority land uses are supported with an effective and efficient system of access that caters to the needs of priority users. The City and the private sector can also invest in new parking supply to support downtown development.

Key Recommendations

- **Manage parking to support downtown revitalization**, according to the vision in the Downtown and Riverfront Plan. Manage on-street parking to serve adjacent ground-floor uses.
- **Keep an updated parking inventory** and conduct periodic parking use studies to understand how parking areas are used.
- **When parking areas are over 85% full**, adjust parking management practices to make the best use of available parking (adjust parking zones, increase prices, install parking meters, etc.).
- **Require the private sector to identify sufficient parking** for residential and commercial uses, but do not ask developers to "over-build" parking. Encourage shared parking arrangements.
- **Provide public off-street parking for downtown employees** as funds and property availability allows. First priority will be given to buildings and businesses existing in 2007.
- **Work with property and business owners** to decrease employees' need for auto parking as downtown transitions to a multimodal environment.
- **Develop a plan to finance and locate a public parking structure** to support downtown.

2 Goals and Policies

OVERVIEW

Transportation goals and policies form the basis for how the local transportation system will be developed and maintained over the next 20 years. The City's transportation goals support a multimodal approach to transportation planning and reflect how citizens think about and experience Milwaukie's transportation system.

The policy framework of this plan is organized as follows:

- **Goal Statement:** A statement that describes an ideal condition that the City desires to attain over time for various aspects of the transportation system. For example: Provide access to safe, affordable, and reliable transportation choices for all Milwaukie residents and businesses.

- **Policy Statements:** Statements that are intended to outline specific measures that will be taken to achieve a goal.

The following section lists the goals and policies for the Milwaukie TSP. They are not listed in order of importance or priority, but rather are all aspects that need to be considered when developing, funding, and managing the transportation system.

GOAL 1 LIVABILITY

Design and construct transportation facilities in a manner that enhances the livability of Milwaukie's community.

Policies

a. Provide convenient walking and bicycling facilities to promote the health and physical well being of Milwaukie citizens.

b. Protect residential neighborhoods from excessive through traffic and travel speeds while providing reasonable access to and from residential areas.

c. Protect residential neighborhoods from excessive noise and pollutants associated with higher functional class streets, industrial uses, and rail activities.

d. Minimize the "barrier" effect of large transportation facilities on nonmotorized modes of travel.

e. Construct a transportation system that is accessible to all members of the community.

f. Provide a seamless and coordinated transportation system that is barrier-free, provides affordable and equitable access to travel choices, and serves the needs of all people and businesses, including citizens of low income, people with disabilities, children, and seniors.

GOAL 2 SAFETY

Develop and maintain a safe and secure transportation system.

Policies

a. Design and maintain safe and secure walkways and bikeways between parks, schools, and other activity centers in Milwaukie.

b. Design and construct transportation-related improvements to meet City standards as outlined in the City's Transportation Design Manual and the Americans with Disabilities Act (ADA).

c. Adopt and implement access control and spacing standards for all streets under the City's jurisdiction to improve safety and promote efficient through-street movement. Access control measures should be generally consistent with Clackamas County access guidelines to ensure consistency on city and county roads.

d. Improve riders' sense of safety at transit stops through lighting, design, and enforcement.

GOAL 3 TRAVEL CHOICES

Plan, develop, and maintain a transportation system that provides travel choices and allows people to reduce the number of trips made by single-occupant vehicles.

Policies

a. Provide a citywide network of convenient walkways and bikeways that are integrated with other transportation modes and regional destinations.

b. Collaborate with TriMet and other transit providers to provide convenient and accessible public transit service to all Milwaukie neighborhoods.

c. Support travel options that allow individuals to reduce single-occupant vehicle trips.

d. Establish local non-Single Occupancy Vehicle (SOV) modal targets, subject to new data and methodology made available to local governments, for all relevant design types identified in the Regional Transportation Plan. Targets must meet or exceed the regional modal targets for 2040 Growth Concept land use design types as illustrated in the following table:

2040 Regional Metro Target Non-Single Occupant Vehicle

2040 Design Type	Modal Target
Regional centers, town centers, main streets, station communities, corridors	45 to 55 percent
Industrial areas, employment areas, inner neighborhoods, outer neighborhoods	40 to 45 percent

e. Encourage local employment and commercial job creation in order to reduce the number of locally generated regional work and shopping trips.

f. Ensure bike and bus routes are well separated, marked, mapped, and marketed.

g. Ensure that savings derived from adding capacity (LRT or other) is reinvested in local service enhancements for Milwaukie.

GOAL 4 QUALITY DESIGN

Establish and maintain a set of transportation design and development regulations that are sensitive to local conditions.

Policies

a. Design streets to support their intended users.

b. Integrate bicycle and pedestrian facilities into street planning, design, construction, and maintenance activities.

c. Require developers to include pedestrian, bicycle, and transit-supportive improvements within proposed developments and adjacent rights-of-way in accordance with adopted policies and standards.

d. Promote context-sensitive transportation facility design, which fits the physical context, responds to environmental resources, and maintains safety and mobility.

e. Consider maintenance costs and issues when developing and implementing design standards.

f. Promote landscaping and pervious surfaces wherever practical and feasible.

GOAL 5 RELIABILITY AND MOBILITY

Develop and maintain a well-connected transportation system that reduces travel distance, improves reliability, and manages congestion.

Policies

a. Enhance street system connectivity wherever practical and feasible.

b. Maintain traffic flow and mobility on arterial and collector roadways.

GOAL 6 SUSTAINABILITY

Provide a sustainable transportation system that meets the needs of present and future generations.

Policies

a. Encourage an energy efficient transportation system.

b. Increase the use of walking and bicycling for all travel purposes.

c. Improve and enhance the livability of Milwaukie by decreasing reliance on automobile transportation and increasing the use of other modes to minimize transportation system impacts on the environment.

d. Practice stewardship of air, water, land, wildlife, and botanical resources. Take into account the natural environments in the planning, design, construction, and maintenance of the transportation system.

GOAL 7 EFFICIENT AND INNOVATIVE FUNDING

Efficiently allocate available funding for recommended transportation improvements, and pursue additional transportation funding that includes innovative funding methods and sources.

Policies

a. Plan for an economically viable and cost-effective transportation system.

b. Identify and develop diverse and stable funding sources to implement recommended projects in a timely fashion.

c. Prioritize maintenance of the transportation system.

d. Identify local street improvement projects that can be funded by the State of Oregon to improve the performance of the state highway system.

e. Provide funding for local match share of jointly funded capital projects with other public partners.

f. Prioritize funding of projects that are most effective at meeting the goals and policies of the Transportation System Plan.

GOAL 8 COMPATIBILITY

Develop a transportation system that is consistent with the City's Comprehensive Plan and coordinates with County, State, and regional plans.

a. Coordinate and cooperate with adjacent jurisdictions and other transportation agencies to develop transportation projects that benefit the city of Milwaukie and the region as a whole.

b. Work collaboratively with other jurisdictions and agencies so the transportation system can function as one.

c. Coordinate with other jurisdictions and community organizations to develop and distribute transportation-related information.

d. Review City transportation standards periodically to ensure consistency with regional, state, and federal standards.

e. Coordinate with TriMet, the Milwaukie Center, and adjacent jurisdictions to identify existing and future transit related needs, including placement of park-and-ride facilities.

f. With ODOT's assistance, coordinate with railroad companies to provide a viable commercial railroad system in and through Milwaukie.

g. Coordinate with ODOT to address improvements to State highways within Milwaukie to benefit all modes of transportation.

GOAL 9 ECONOMIC VITALITY

Promote the development of Milwaukie's, the region's, and the state's economies through the efficient movement of people, goods, and services, and the distribution of information.

Policies

a. Ensure a safe and efficient freight system that facilitates the movement of goods to, from, and through Milwaukie, the region, and the state while minimizing conflicts with other travel modes.

b. Consider constructing grade separation or gate control for all railroad crossings.

c. Provide transportation facilities that support land uses that are consistent with the Comprehensive Plan.

d. Evaluate land development projects to determine possible adverse traffic impacts.

e. Ensure that all new development contributes a fair share toward on-site and off-site transportation system improvements.

f. Manage parking in downtown to support revitalization, according to the vision in the *Milwaukie Downtown and Riverfront Plan*. The purpose of, and priority for, on-street parking in downtown is to support the vitality of the retail core.

3 Existing Conditions

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

OVERVIEW

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

- Pedestrian
- Bicycle
- Transit
- Motor Vehicle
- Freight
- Rail
- Parking
- Environmental Justice
- Environmental Resources

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

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

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

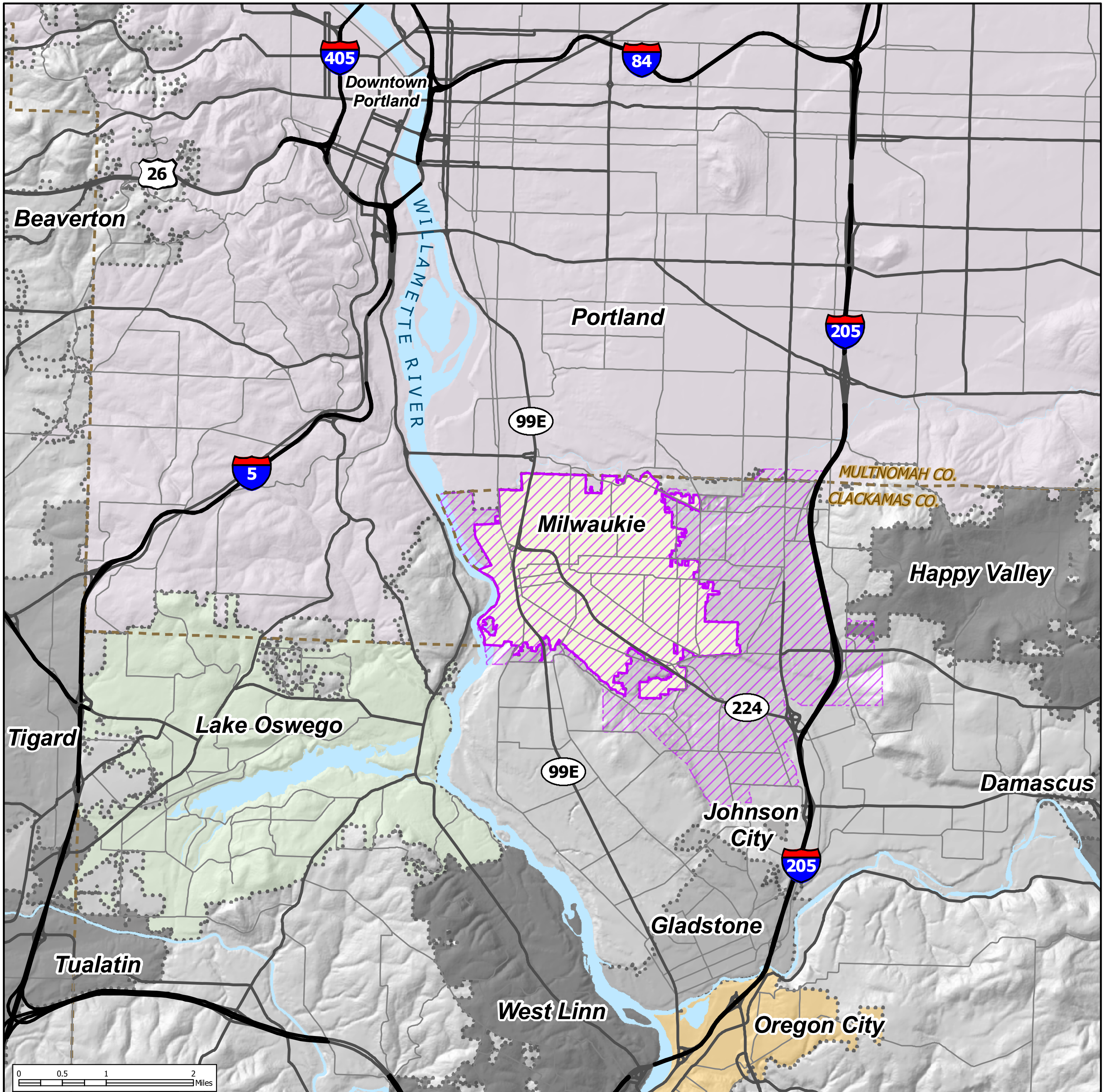
CITY OF MILWAUKIE

Transportation System Plan

FIGURE 3-1a

STUDY AREA CONTEXT

December 2007



LEGEND

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

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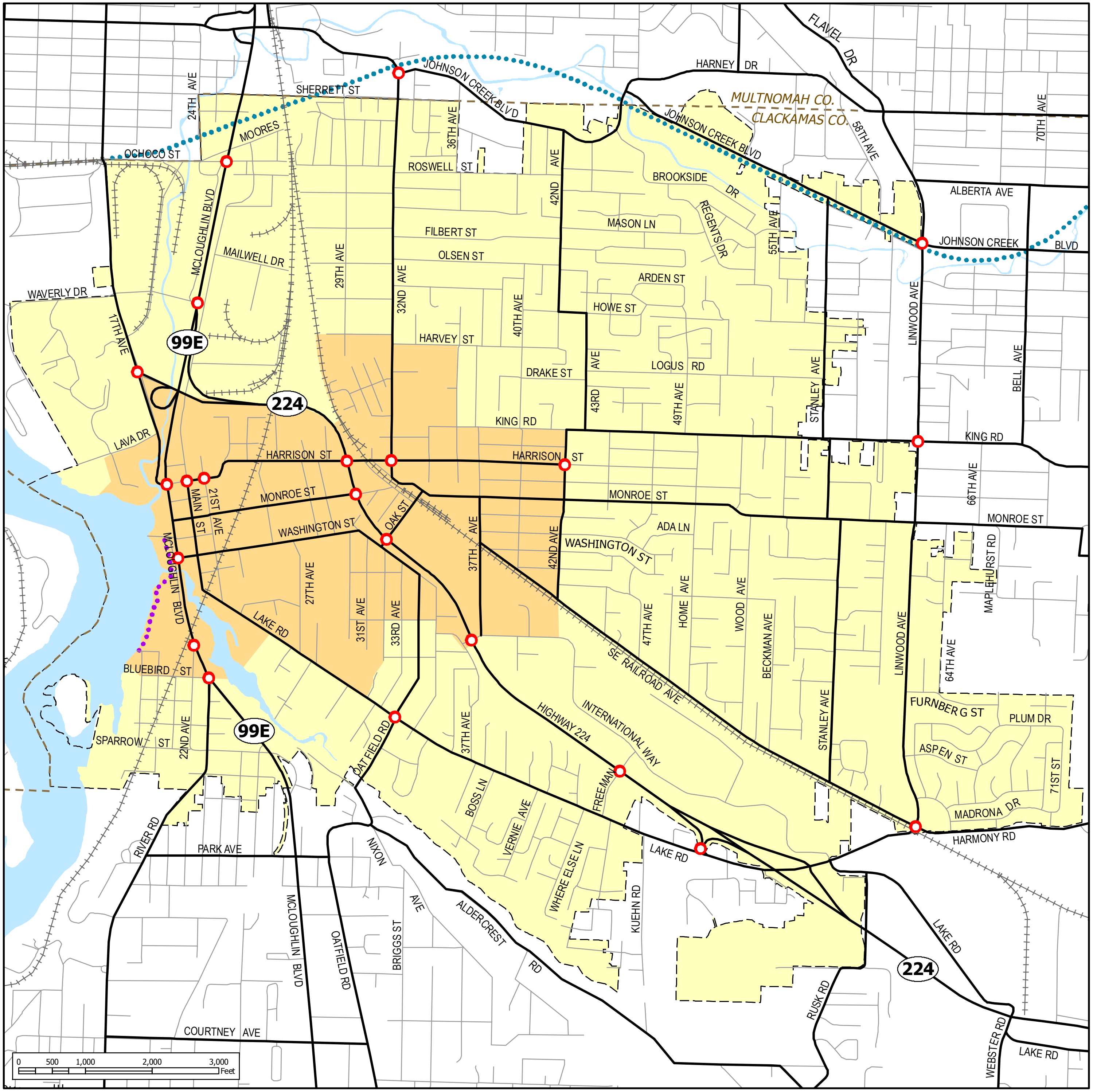
TRANSPORTATION SOLUTIONS



CITY OF MILWAUKIE

Transportation System Plan

FIGURE 3-1b

STUDY AREA

December 2007

LEGEND

- Study Intersections
- Major Roads
- Streets
- Railroad
- Springwater Trail
- Kellogg Creek Trail
- County Line
- Town Center
- Water
- City Limits

Note: "SE" street name prefix applies to all roads.

N

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TRANSPORTATION SOLUTIONS

PEDESTRIANS

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

Existing Pedestrian Facilities

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

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

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

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

Transportation System Plan

CITY OF MILWAUKIE

FIGURE 3-2

SIDEWALK INVENTORY

December 2007

LEGEND

Sidewalks

- < 5 ft. Width
- 5 ft. - 10 ft. Width

Other Map Features

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

N

DKS Associates

TRANSPORTATION SOLUTIONS

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

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

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

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

Pedestrian Volume

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

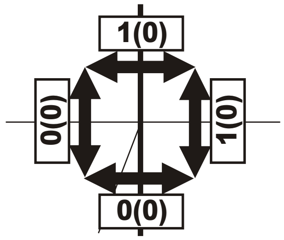
The most significant pedestrian movements occur near retail and educational areas, including downtown Milwaukie, the intersection of Linwood Ave and King Rd, and the intersection of Johnson Creek Blvd and Linwood Ave. Along major roadways, such as McLoughlin Blvd and Highway 224, pedestrian crossings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

Summary of Pedestrian Findings

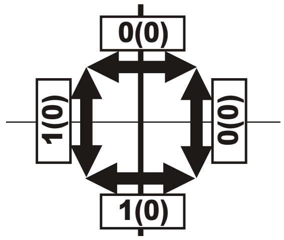
The following summarizes key pedestrian findings related to the level of activity documented as well as deficiencies for this mode of travel. These findings will be utilized to help guide future improvements to address the deficiencies for this mode of travel in the transportation network.

- The majority of study area intersections have pedestrian activity levels on individual legs of the intersections that are ten crossings or less during the p.m. peak hour. Locations with higher activity levels than this occur along the Springwater Trail and in downtown.
- There are a number of discontinuous sidewalks within Milwaukie that prohibit the ease of use for pedestrians to travel in and around the city. These occur primarily in the east and north areas of the city.
- The city contains numerous dead-end and curvilinear streets that hamper pedestrian connectivity. Travel between the northern and southern 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.

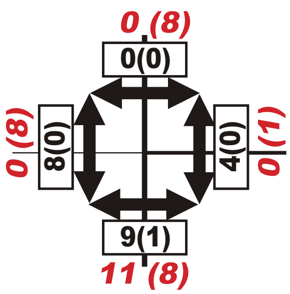
1 SE McLoughlin Blvd @ SE Ochoco St



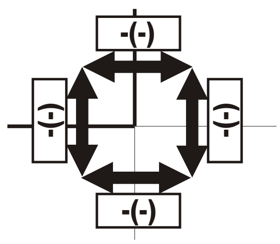
2 SE McLoughlin Blvd @ SE Milport Rd



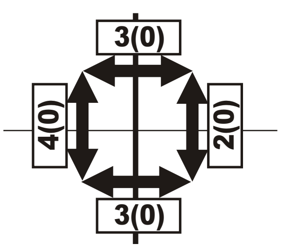
3 SE McLoughlin Blvd @ SE Harrison St/17th Av



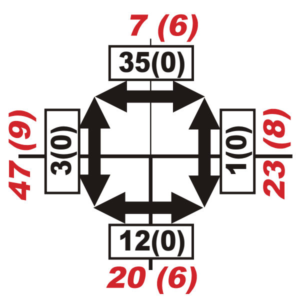
4 SE 42nd Av @ SE Harrison St



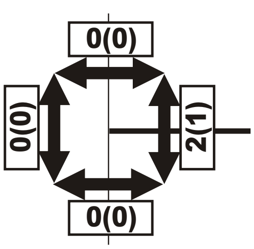
5 SE McLoughlin Blvd @ SE Washington St



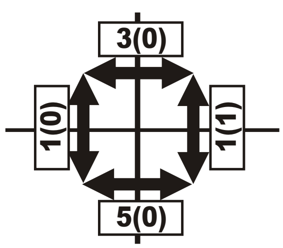
6 SE Harrison St @ SE Main St



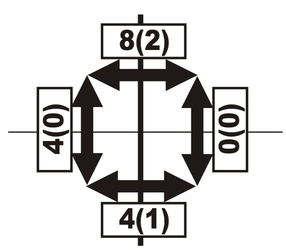
7 Hwy 224 @ SE 17th Av



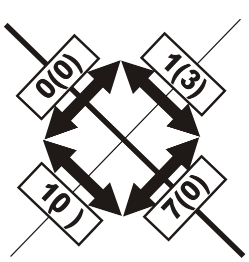
8 Hwy 224 @ SE Harrison St



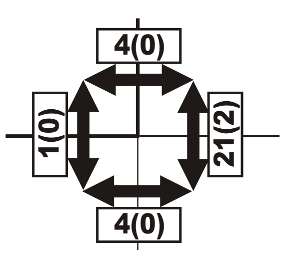
9 Hwy 224 @ SE Monroe St



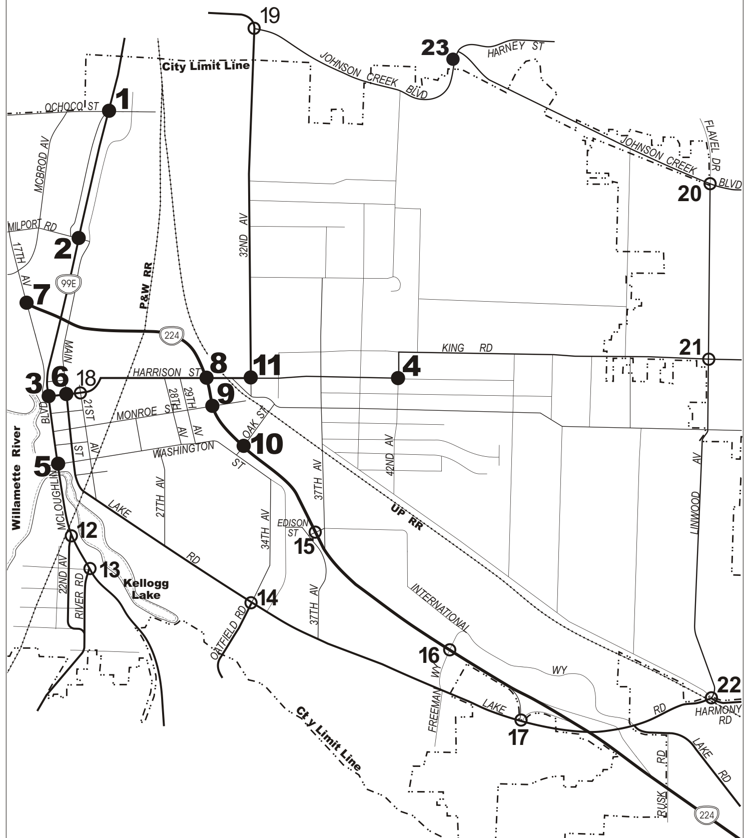
10 Hwy 224 @ SE 32nd Av



11 SE Harrison St @ SE 32nd Av



CITY OF MILWAUKIE **Transportation System Plan**



-DRAFT-

September 2007

LEGEND

X● - Study Intersection & Number (This Sheet)
X○ - Study Intersection & Number (Next Sheet)
P(B) - **P**edestrian(**B**icycle) Volume (Fall 2006)
-(-) - Indicates No Available Data
*- **P**edestrian (**B**icycle) Volume (Summer 2007)*

DKS Associates TRANSPORTATION SOLUTIONS

NO SCALE

Figure 3-3a

EXISTING PEDESTRIAN & BICYCLE PM PEAK HOUR VOLUMES

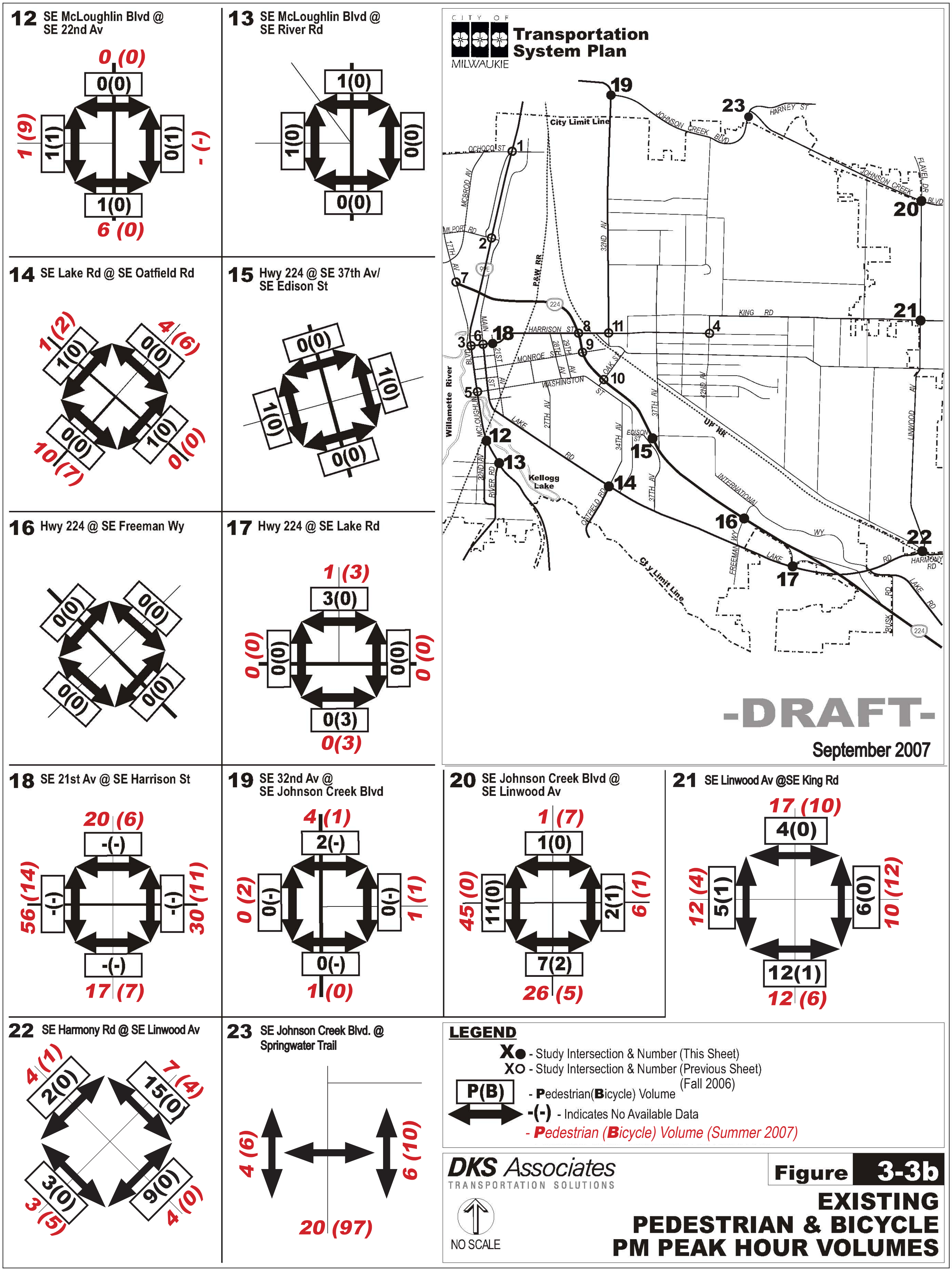


Figure 3-3b

EXISTING PEDESTRIAN & BICYCLE PM PEAK HOUR VOLUMES

BICYCLES

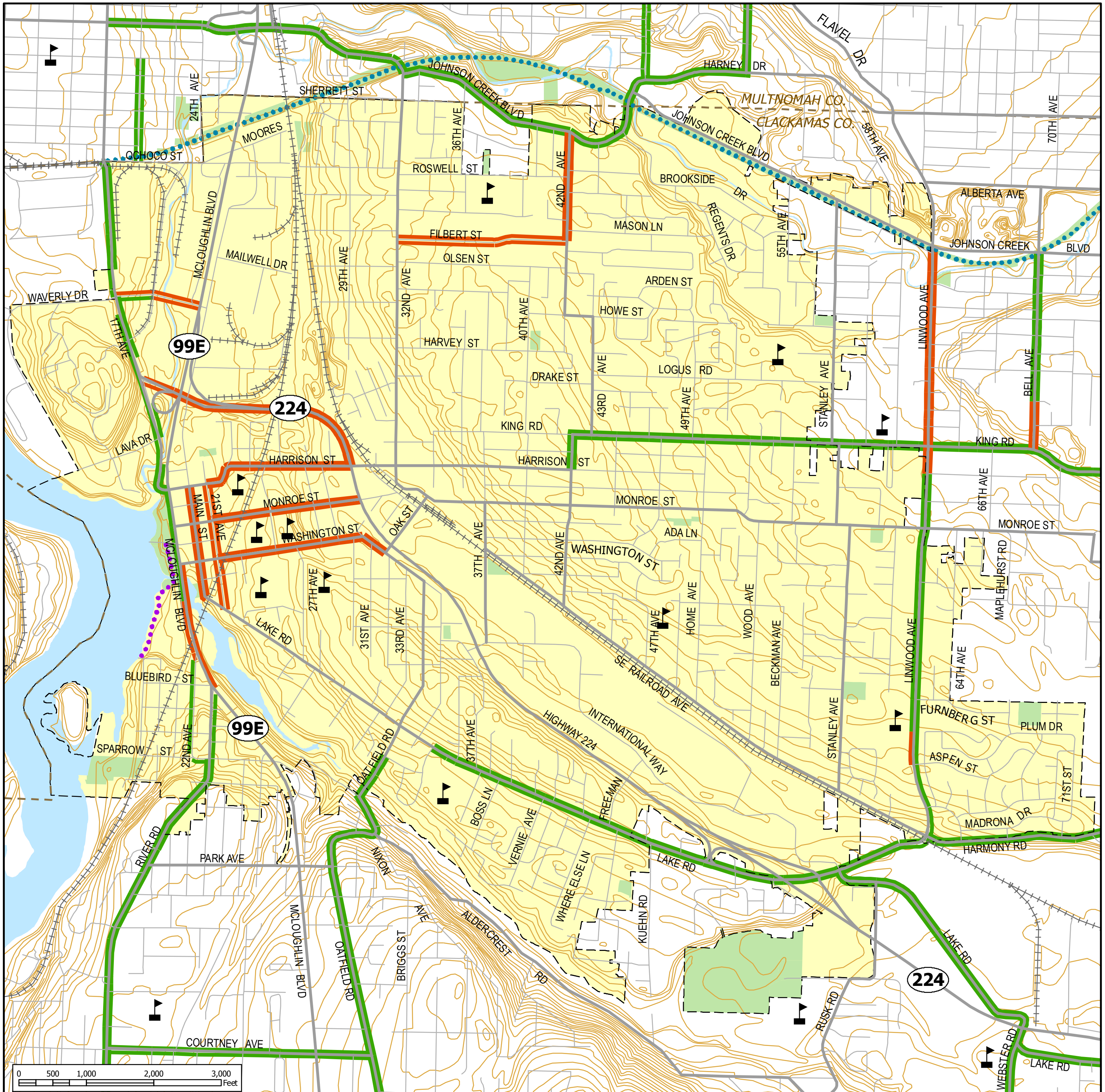
In general, designated bicycle facilities are limited in Milwaukie, making it difficult for bicyclists to safely and easily access activity centers and other local and regional destinations. The state Transportation Planning Rule requires cities to provide bikeways along roads classified as arterials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

Existing Bicycle Facilities

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

There are two off-road multiuse trails that enhance bicycle access in Milwaukie. First is the Springwater Trail, which parallels Johnson Creek Blvd in Milwaukie, and connects bicyclists to downtown Portland to the northwest and to the I-205 north-south multiuse trail to the east. Due to grade separation, there is limited access to the trail in some locations. Another off-street facility available in Milwaukie is the Kellogg Creek Trail in the downtown riverfront area, which is part of the North Clackamas Greenway. Bicyclists also have access to a portion of the Trolley Trail, which is partially constructed in downtown Milwaukie.

[1] (OAR 660-012-0020) Department of Land Conservation and Development, Division 12, Transportation Planning Rule.
[2] Oregon Bicycle and Pedestrian Plan, Oregon Department of Transportation, June 14, 1995.



CITY OF MILWAUKIE

Transportation System Plan

FIGURE 3-4

BICYCLE FACILITY INVENTORY

December 2007

LEGEND

Bicycle Lanes

- Shared Lane
- Bicycle Lane

Other Map Features

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

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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 and southern areas of the city are impeded by the location of Hwy 224 and the railroad line that parallels it to the north.

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.

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.

Table 3-1 Service Route Schedules and Destinations

Existing Public Transit Service in Milwaukie					
Line # and Name	Weekday		Weekend		Destinations Served (partial list)
	Schedule	Approx. Headway (min.)	Schedule	Approx. Headway (min.)	
28 Linwood	6:00 a.m.-7:00 p.m. Peak and Off-peak	60	No Service	NA	Milwaukie Transit Center Clackamas Town Center
29 Lake/ Webster	6:00 a.m.-7:30 p.m. Peak and Off-peak	60	No Service	NA	Milwaukie Transit Center Clackamas Town Center
31 Estacada	6:00 a.m.-10:00 p.m. Peak and Off-peak	30	Sat: 6:30 a.m.-10:00 p.m. Peak Off-peak	30 60	Milwaukie Transit Center Clack. Town Ctr. Transit Center Downtown Portland
32 Oatfield	6:00-9:30 p.m. Peak Off-peak	30 60	Sat: 9:00 a.m.-7:00 p.m. Peak and Off-peak	60	Milwaukie Transit Center Clackamas Comm. College Downtown Portland Oregon City Transit Center
33 McLoughlin	5:00 a.m.-12:30 a.m. Peak Off-peak	15 30	Sat & Sun: 6:30 a.m.-12:30 a.m. Peak Off-peak	15 30	Clackamas Comm. College Downtown Portland Oregon City Transit Center Milwaukie Transit Center
34 River Rd	6:00 a.m.-7:00 p.m. Peak Off-peak	60 30	Sat: 9:00 a.m.-7:00 p.m. Peak and Off-peak	60	Oregon City Transit Center Milwaukie Transit Center
41 Tacoma	6:00 a.m.-6:30 p.m. Peak Off-peak	30 45	No Service	NA	Milwaukie Transit Center Downtown Portland
70 12th Ave	5:00 a.m.-12:30 p.m. Peak Off-peak	15 30	Sat & Sun: 6:00 a.m.-12:30 a.m. Peak Off-peak	15 60	Milwaukie Transit Center Lloyd Center
75 39th Ave/ Lombard	5:00 a.m.-9:30 p.m. Peak Off-peak	10-15 30	Sat & Sun: 6:30 a.m.-7:00 p.m. Peak Off-peak	15 30	Milwaukie Transit Center Milwaukie Providence Hospital
99 McLoughlin Express	Peak only	20	No Service	NA	Clackamas Comm. College Downtown Portland
152 Milwaukie Shuttle	6:30 a.m.-5:00 p.m. Peak Off-peak	30 60	No Service	NA	Milwaukie Transit Center Clackamas Town Center Milwaukie Center

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

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

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Transportation System Plan

FIGURE 3-5

TRANSIT ROUTES AND SHELTERS

December 2007

LEGEND

Transit Facilities

- Bus Routes < 30 Min. Frequency
- Bus Routes > 30 Min. Frequency
- Transit Center
- Stop
- Shelter
- Park and Ride

Other Map Features

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

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Table 3-2 Neighborhood Service Routes and Transit Amenities

Neighborhood	Transit Route #'s	Stops	Facilities
Ardenwald	31, 75, 28	39	2 Shelters
Hector Campbell	31	12	No Extra Facilities
Historic Milwaukie	29, 31, 32, 33, 34, 70, 75, 99, 28, 152	36	1 Transit Center with Shelters 1 park-and-ride
Island Station	33, 34, 99	13	No Extra Facilities
Lake Rd	29, 32	30	No Extra Facilities
Lewelling	28, 31, 75	30	No Extra Facilities
Linwood	28, 31	26	No Extra Facilities
McLoughlin Industrial	31, 32, 33, 41, 99	17	3 Shelters
Milwaukie Business & Industrial	31, 152	22	No Extra Facilities

Milwaukie's bus transit center is located in downtown Milwaukie on the blocks surrounding City Hall. In addition to the transit center, a single shared-use park-and-ride is located along Lake Rd south of downtown. TriMet has plans to construct a second park-and-ride facility on Main St at the former Southgate Theater site. Currently there are only six shelters provided within Milwaukie. TriMet typically considers locating transit shelters at stops with 35 or more boardings per day.[5] One stop meets this minimum boarding threshold, but does not offer a shelter.[6] This stop is located near the intersection of Harrison St and 24th Ave.

Transit service quality, or its Level of Service (LOS), is measured as the headway between arriving buses. Headway is the average amount of time that a person could expect to wait to catch a bus. For instance, a transit service with a low headway (<10 min) provides a high LOS ("A"), because vehicles are arriving frequently (approximately 1 vehicle every 10 minutes). The average headways and corresponding LOS (based on the *Highway Capacity Manual* methodology[7]) for each of the routes serving Milwaukie are listed in Table 3-3.

[5] *Design Criteria*, TriMet, August 2002.
[6] Based on Fall 2006 weekday bus boarding information as provided by TriMet.
[7] *2000 Highway Capacity Manual*, Transportation Research Board, 2000, Chapter 27.

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

Line # and Name	Average Headway (minutes)			Level of Service (LOS) (based on headways)		
	a.m.	Midday	p.m.	a.m.	Midday	p.m.
28 Linwood	50	69	60	E	F	E
29 Lake/Webster Rd	50	69	60	E	F	E
31 Estacada EB	27	30	19	D	E	C
31 Estacada WB	20	30	30	D	E	E
32 Oatfield SB	34	60	22	E	E	D
32 Oatfield NB	17	51	33	C	E	E
33 McLoughlin	15	15	15	C	C	C
34 River Rd SB	35	50	30	E	E	E
34 River Rd NB	31	56	31	E	E	E
41 Tacoma	30	45	29	E	E	D
70 12th Ave NB	15	15	15	C	C	C
75 39th Ave/Lombard	12	15	13	B	C	B
99 McLoughlin Express SB	*	*	13	*	*	B
99 McLoughlin Express NB	18	*	*	C	*	*
152 Milwaukie SB	30	60	>60	E	E	F
152 Milwaukie NB	60	48	30	F	E	E

Note: a.m. period = 06:00-08:30, Midday period = 08:30-16:00, p.m. period = 16:00-18:00
Level of Service (LOS) for transit service based on headway:

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

*No service.

Special Transit Services

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

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

- **The Transportation Reaching People (TRP) program**, which is a volunteer service available to seniors and people with disabilities, and consists of drivers from Clackamas County Volunteer Connection. It takes people to their appointments on a donation basis.

- **The Catch-a-Ride program**, which offers similar services to residents of Hillside Manor, Hillside Park, and other Milwaukie area residents. It serves a number of different locations within the city, including the Milwaukie Transit Center and Clackamas Town Center.

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

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

Summary of Transit Findings

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

- The majority of Milwaukie is served by some form of transit that is accessible within 1/4 mile of transit stops provided by TriMet, with the exception of an area to the east bounded by Railroad Ave to the south, 42nd Ave to the west, Monroe St to the north and Stanley Ave to the east. The existing railroad line that parallels Hwy 224 in this area restricts transit accessibility to the south for this area, and existing transit routes that run along Linwood Ave and King Rd are beyond the 1/4 mile radius that a pedestrian would typically travel to access transit.
- In total, approximately 13% of land coverage in Milwaukie does not have access to transit within 1/4 mile of existing transit stops, with approximately 1/2 of that lacking coverage occurring in the area identified above.
- Generally, Milwaukie is served with headways (time between buses) along existing transit routes of 30 minutes or better. However, some roadways have headways longer than 30 minutes. These facilities are: Lake Rd, Oatfield Rd, Linwood Ave, International Way, and Harvey St/Logus Rd.
- There are currently six transit stops that have shelters. Two additional stops have existing ridership that meet TriMet's standard for placing shelters:
  - Harrison St/24th
  - 42nd Ave/Llewellyn St

MOTOR VEHICLES

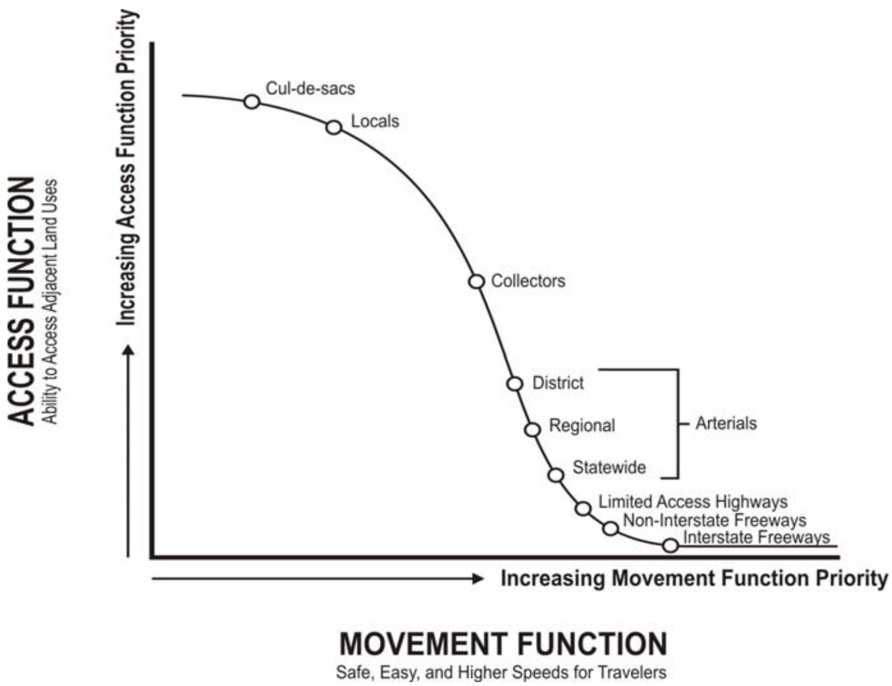
The following section addresses all aspects of the motor vehicle network throughout Milwaukie. The topics addressed include:

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

Roadway Functional Classification

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

Functionality of Access versus Movement



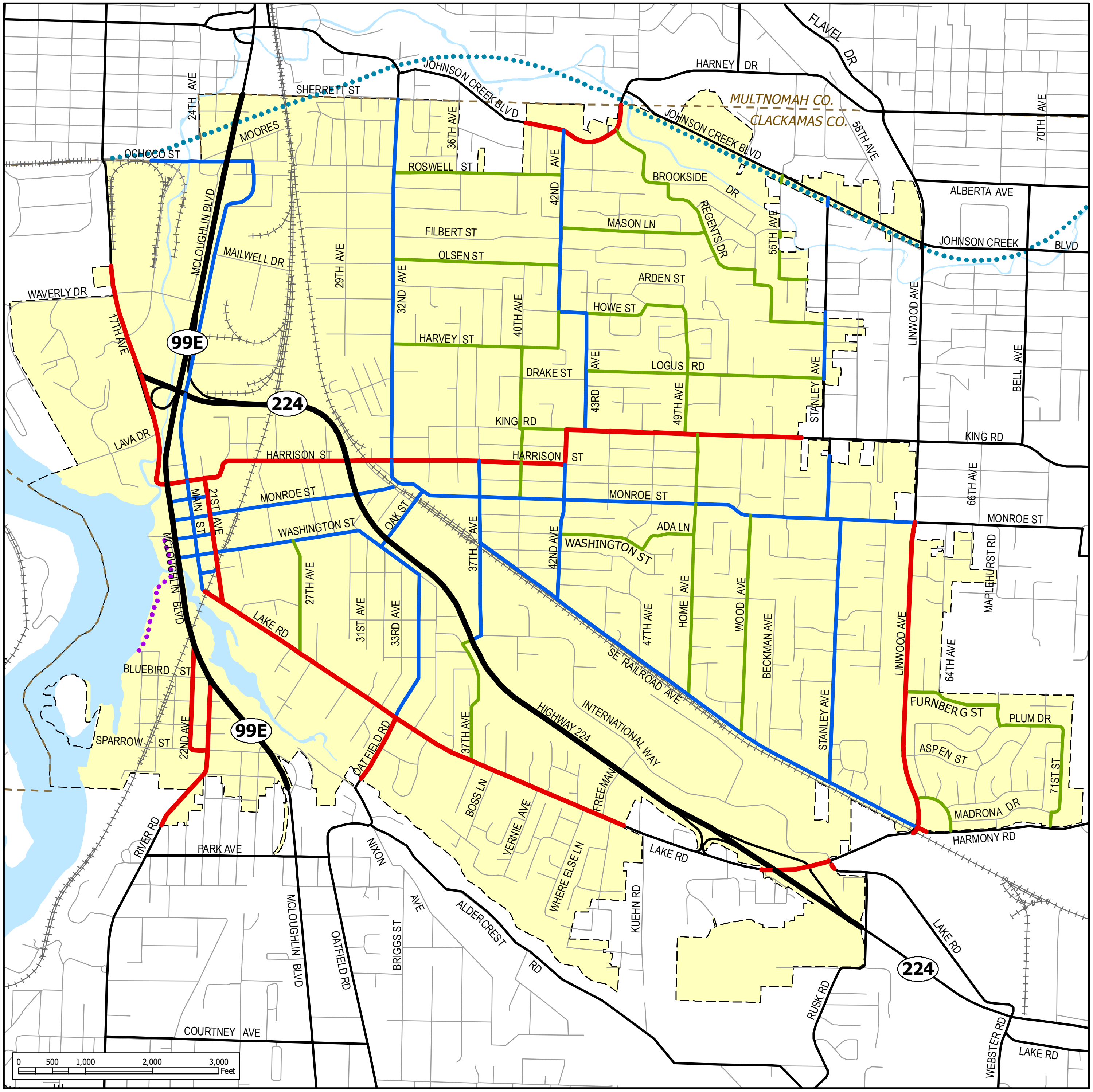
The diagram above shows that as street classifications progress from local, to collector, to arterial, to freeway (top left corner to bottom right corner) the following occurs:

- **Mobility Increases:** As the level of mobility increases, the distance between destinations as well as the proportions of freight and through traffic generally increases.
- **Integration of Pedestrian and Bicycle Facilities Decreases:** Provisions for adjoining sidewalks and bike facilities are required up through the arterial class; however, the frequency of intersection or mid-block crossings for nonmotorized vehicles steadily decreases with higher functional classes. Expressway and freeway facilities typically do not allow pedestrian and bike facilities adjacent to the roadway, and any crossings are grade-separated to enhance mobility and safety.
- **Access Decreases:** As mobility increases, access to parking, loading, and land are reduced.
- **Facility Design Standards Increase:** Roadway design standards increase in technical complexity to accommodate wider and faster facilities for exclusive use by motor vehicles.

The opposite end of the scale is the most basic two-lane roadway with unpaved shoulders that requires minimal technical design.

The existing Milwaukie functional class system for roadway facilities is shown in Figure 3-6. A street-by-street comparison to ODOT, Metro and the City of Milwaukie classifications for arterial and collector streets is shown in Table 3-4. Additionally, Table 3-4 compares the right-of-way (ROW) width to the actual pavement width for each facility.

Figure 3-7 illustrates roadway ownership and maintenance of the various roads in Milwaukie. McLoughlin Blvd and Highway 224 are state facilities. Highway 224 is classified as a Principal Arterial. McLoughlin Blvd is classified as a Principal Arterial north of Highway 224 and a Major Arterial south of Highway 224. As such, the preferred regional mobility route through Milwaukie from Portland is along McLoughlin Blvd to Highway 224, and along Highway 224 to I-205 and destinations outside of the city of Milwaukie. The majority of arterial and collector roadways outside the city limit but within the city's Urban Growth Management Area are owned and operated by Clackamas County or ODOT. The City is responsible for the majority of the roads inside the city limits.



CITY OF MILWAUKIE

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FIGURE 3-6

1997 - 2007 FUNCTIONAL CLASSIFICATION*

December 2007

LEGEND

Functional Classification

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

Other Map Features

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

*See Figure 8-3b for updated functional classification map

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FIGURE 3-7

ROADWAY OWNERSHIP/ JURISDICTION

December 2007

LEGEND

Jurisdiction

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

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

Other Map Features

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

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Table 3-4 Functional Classification Comparison Arterial and Collector Streets

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

Sources: ODOT, Oregon Highway Plan, 1999, and Metro, 1997 Milwaukie Transportation Plan, 2000 Regional Transportation Plan (RTP), Regional Motor Vehicle System. Refer to RTP for complete description of lower class roadways.

Roadway Characteristics

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

A limited inventory of the posted speeds in Milwaukie can be seen in Figure 3-8. Collector roadways such as King St, Railroad Ave, and Monroe St have posted speeds ranging from 25 to 40 miles per hour (mph). The majority of local access roadways in Milwaukie are posted at 25 mph. Arterial roadways such as McLoughlin Blvd, Highway 224, and Johnson Creek Blvd are posted at higher speeds ranging from 30 to 50 mph.

Figure 3-9 illustrates the existing intersection controls at major roads in Milwaukie. Traffic signals exist mainly along McLoughlin Blvd and Highway 224. Harrison St, Lake Rd, and Linwood Ave have a few signals and one of the intersections along Johnson Creek Blvd is also signalized. The study intersections for this TSP Update include eighteen signalized intersections and four intersections without signals.

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

A roadway is not only limited to what can be seen on the surface; there are also other aspects which can affect a roadway's performance and longevity, such as its the base, the materials and methods used in construction, and drainage features. Many of these topics go beyond the scope of a Transportation System Plan; however, the issue of drainage will be briefly touched upon.

Figure 3-10 shows the locations of the City of Milwaukie's stormwater system. This map also shows locations identified by City staff where rainwater drainage has been problematic. Many of these locations correlate to streets with no gutters, curbs, or sidewalks. In general a properly designed, constructed, and maintained stormwater drainage system, which can include a combination of gutters, curbs, storm drains, and storm sewers allows for good drainage of stormwater from city streets. Railroad Ave for instance, has drainage issues along its length from 37th Ave to nearly Linwood Ave. Many of the streets with drainage issues do not have curbs, gutters, or sidewalks. However, there are many other locations throughout the city that do not have these amenities and do not have drainage issues.

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FIGURE 3-8

POSTED SPEED INVENTORY

December 2007

LEGEND

Speed Limits

- 30 MPH
- 35 MPH
- 40 MPH
- 45 MPH
- 50 MPH

Note: all other roads assumed to be 25 MPH

Other Map Features

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

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FIGURE 3-9

INTERSECTION CONTROLS

December 2007

LEGEND

Intersection Control

- Signalized
- All-Way Stop

Note: Controls shown only on major roads. Intersections on major roads can be assumed to be stop controlled unless otherwise noted.

Other Map Features

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

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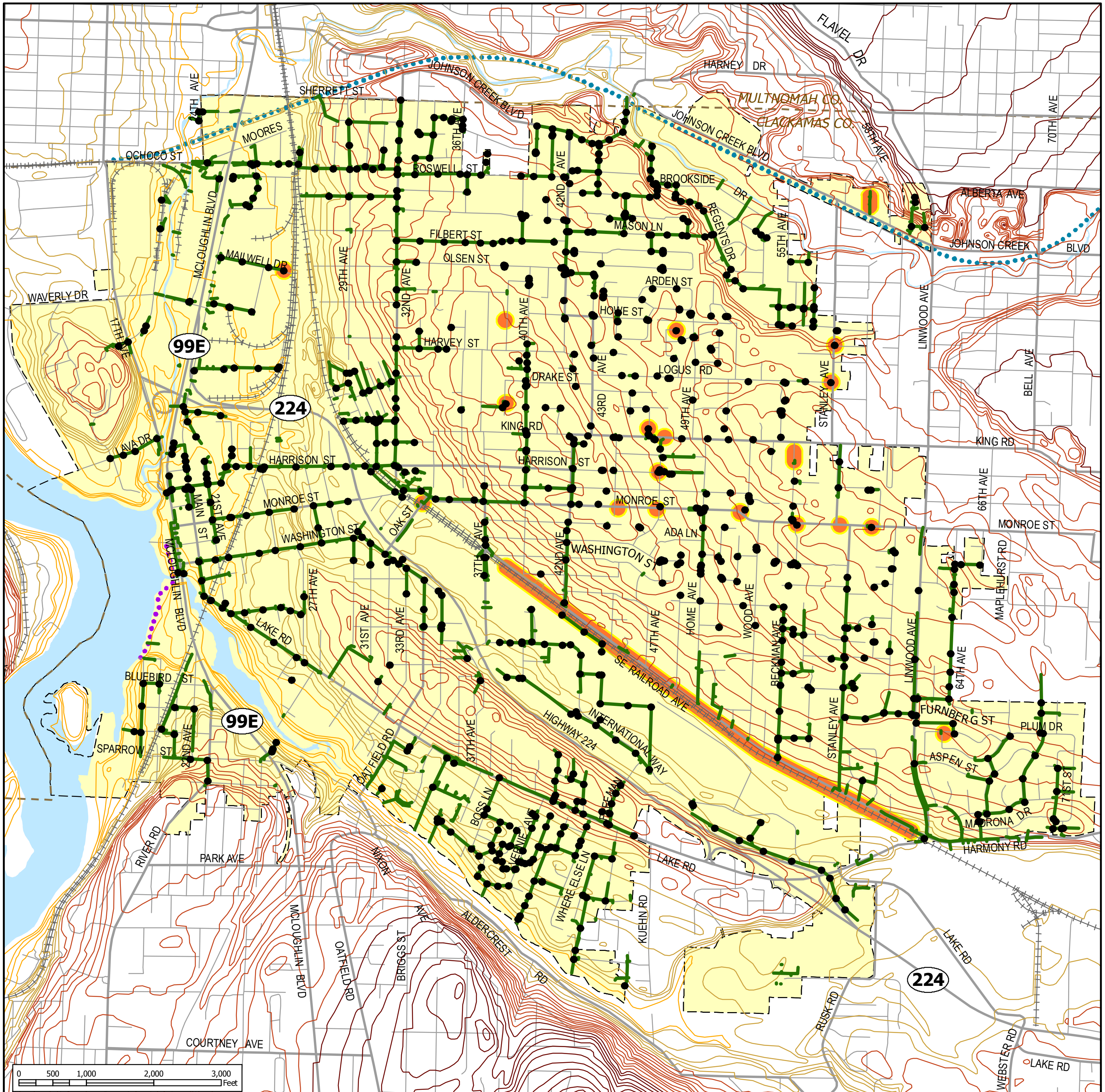

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FIGURE 3-10

STORMWATER AND TOPOGRAPHY

December 2007

LEGEND

Stormwater Features

- Manholes and Dry Wells
- Pipes
- Locations with Drainage Issues

Elevation Above Sea Level

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

Other Map Features

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

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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 for making cost-effective decisions about pavement maintenance and rehabilitation. To that effect, sections of a roadway have been rated on a Pavement Condition Index (PCI), a scale that rates a roadway's condition from 0 to 10. High numbers correlate to newer streets in good condition (8-10), while lower numbers (4 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.

A weighted average PCI[8] was calculated for the three different city street classifications—arterial, collector, and 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 streets have the highest rating, followed by local streets and then arterials.

Table 3-5 Average Pavement Condition Index

Classification	Surveyed Length (feet, citywide)	Weighted Average Pavement Condition Index
Arterial	21,460	6.2
Collector	62,659	6.9
Local	285,398	6.5

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 collector (64%) and local (58%) 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 good to excellent category. In general 24%, or nearly 12 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.

Table 3-6 Pavement Condition Index Rating by Functional Classification

Rating (PCI Score)	Street Type and Length in Feet and Percentage			
	Arterial 21,460 ft	**Collector** 62,659 ft	**Local** 284,448 ft	**Total 368,567 ft**
Excellent (8-10)	15%	31%	40%	**36%**
Good (7-7.9)	29%	33%	18%	**21%**
Fair (5-6.9)	29%	25%	17%	**18%**
Poor (4.9-4)	0%	4%	9%	**7%**
Very Poor (0-3.9)	28%	6%	18%	**17%**

Motor Vehicle Volume

Twenty-four-hour traffic count data was collected at select locations within the city. It is useful to analyze this data to determine traffic flow throughout the day on the transportation network. Figure 3-11a is an hour-by-hour breakdown of traffic volumes along Mcloughlin Blvd and Highway 224, and shows two distinct peaks in traffic volumes on the Milwaukie's two highest

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

traffic volume streets. These two peaks represent the a.m. and p.m. peak commuter traffic. The traffic volumes observed on McLoughlin Blvd show the typical a.m. and p.m. peak spike in commuter vehicular traffic demand. Highway 224 also shows a.m. and p.m. peak spikes in demand, it is however unusual that the a.m. peak hour is greater than the p.m. peak hour. This type of travel pattern is unusual, because the a.m. peak hour usually consists of commuter traffic, whereas, the p.m. peak hour traffic volume contains many of the a.m. commuters, as well as those with retail and other miscellaneous destinations.

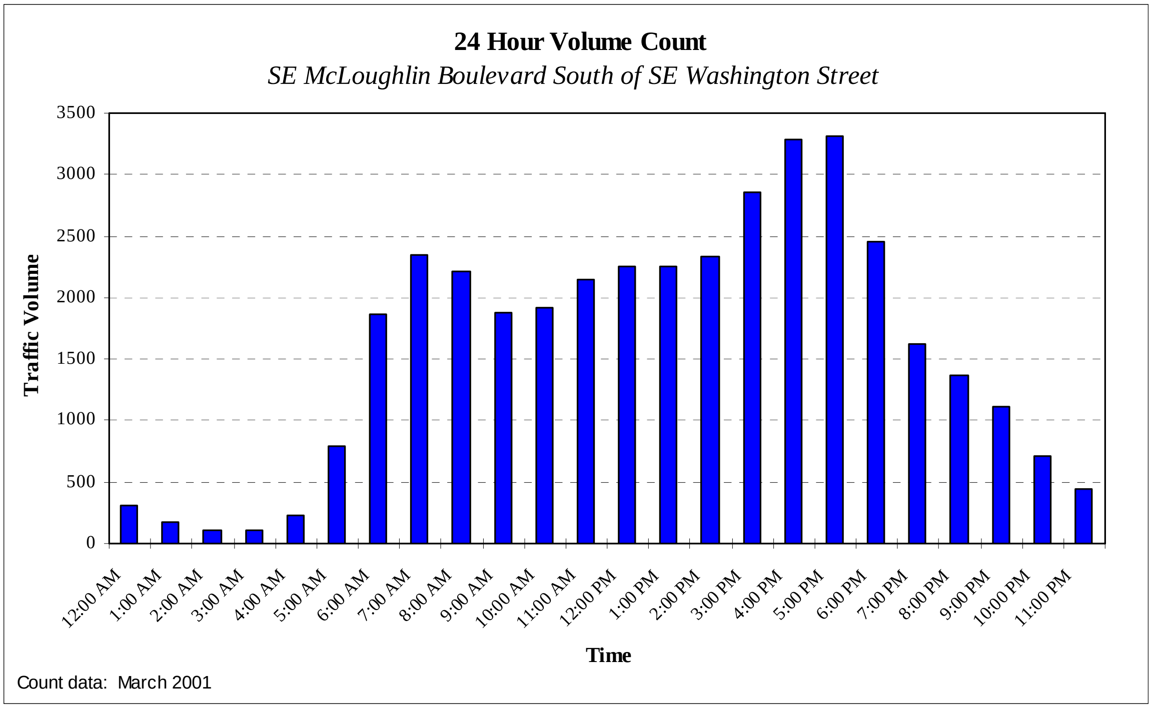
Figure 3-11b shows the 24-hour, two-way existing traffic volumes on streets in Milwaukie from 2005 and 2006. The locations of these counts correspond to locations counted on an annual basis by ODOT[9] and/or Clackamas County.[10] When compared to 24-hour traffic counts taken for the 1997 TSP, there has been growth on many of the streets within city limits. Figure 3-11c shows the location and change in traffic volume at select locations recorded in 1995 (basis for 1997 Milwaukie TSP).

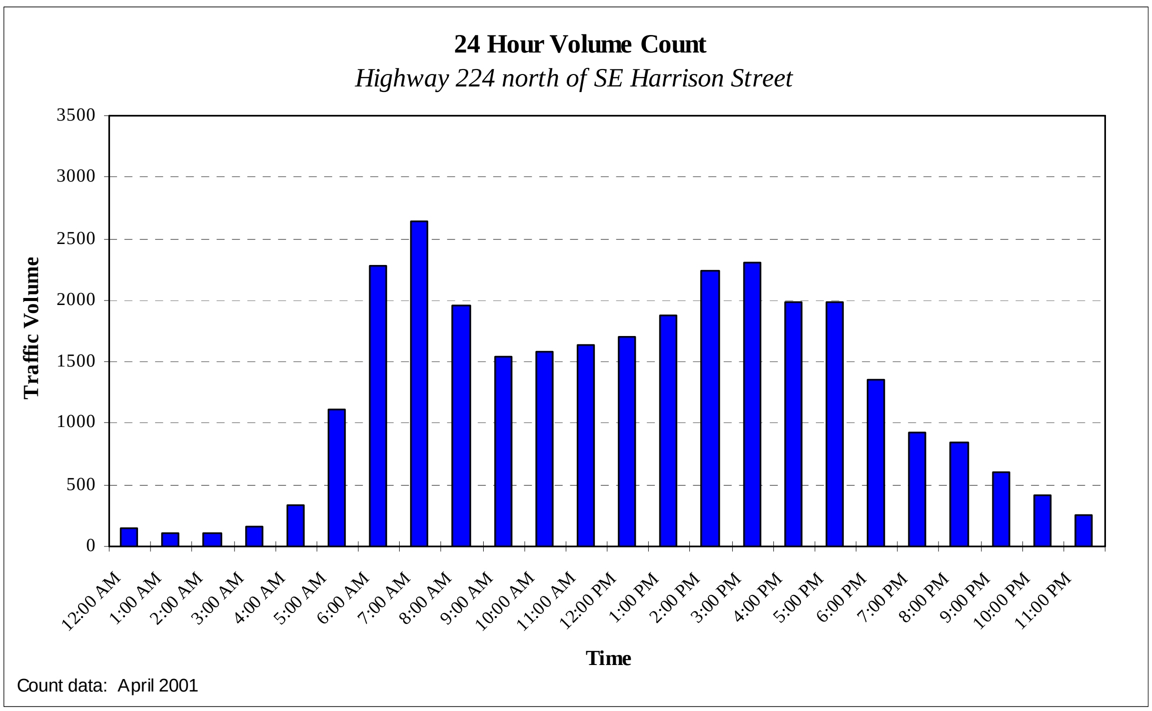
In addition, an inventory of peak hour traffic counts at study area intersections was conducted in the Fall/Winter of 2006. The traffic turn movement counts establish baseline information for future monitoring and identify current existing problem areas. Turn movement counts were conducted at twenty-two intersections during the evening peak period (4:00-6:00 p.m.) to determine existing operating conditions and are shown in Figures 3-12a and 3-12b. The p.m. peak hour turn movements are useful when analyzing the operational characteristics of an intersection, since they generally represent the hour of highest traffic volume demand. It is assumed that if an intersection operates sufficiently during the p.m. peak hour it will operate sufficiently during the rest of the day. Study intersections were chosen in coordination with the City staff to address major roadways and noted areas of concern.

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

[9] ODOT Annual Traffic Counting Program.
[10] Clackamas County Annual Traffic Counting Program.

Figure 3-11a 24-Hour Tube Count Data on McLoughlin Blvd and Highway 224





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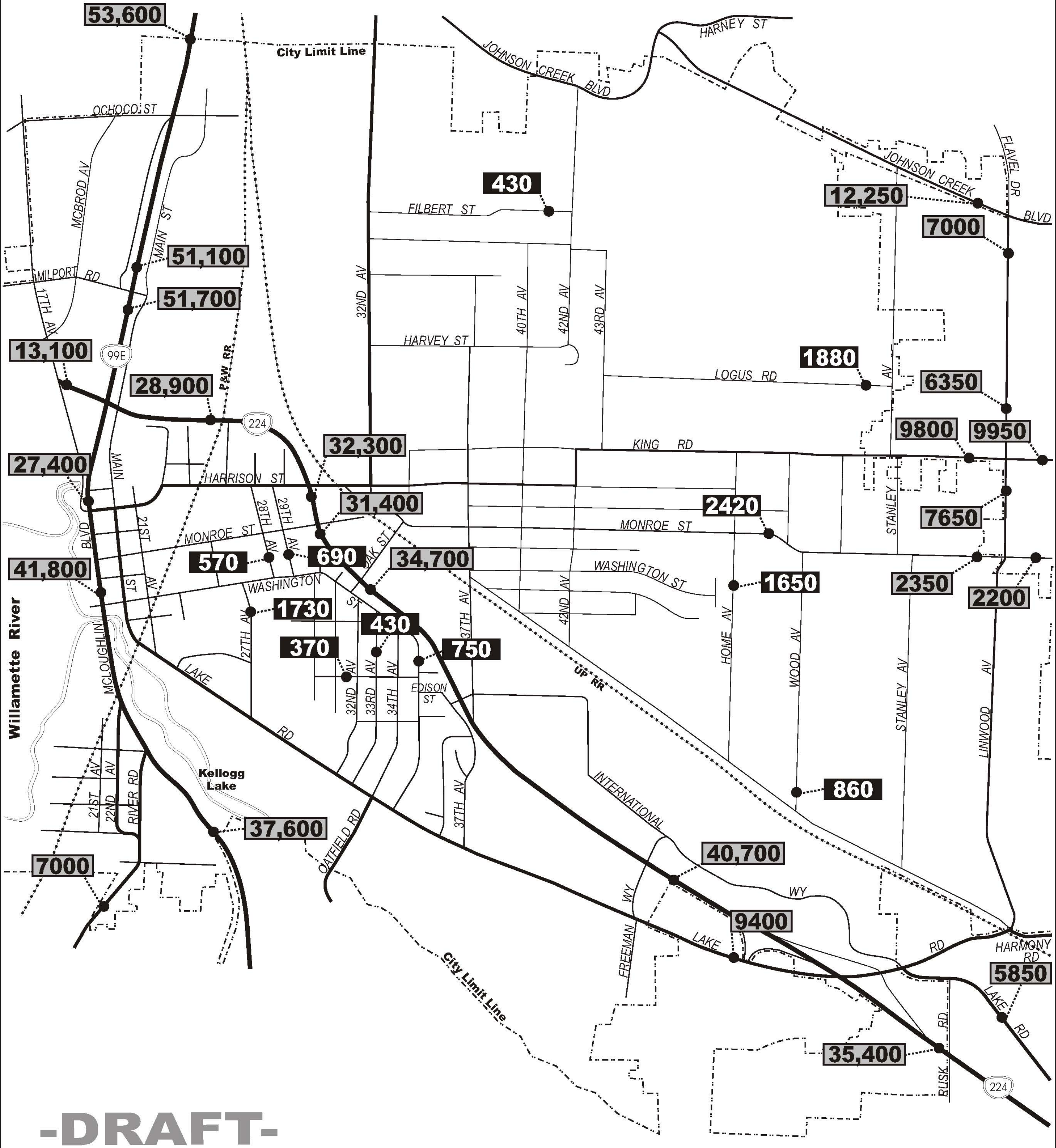

LEGEND

00 - 24 Hour Count Volume & Count Location (Fall 2006)

00 - 24 Hour Count Volume & Count Location (2005)

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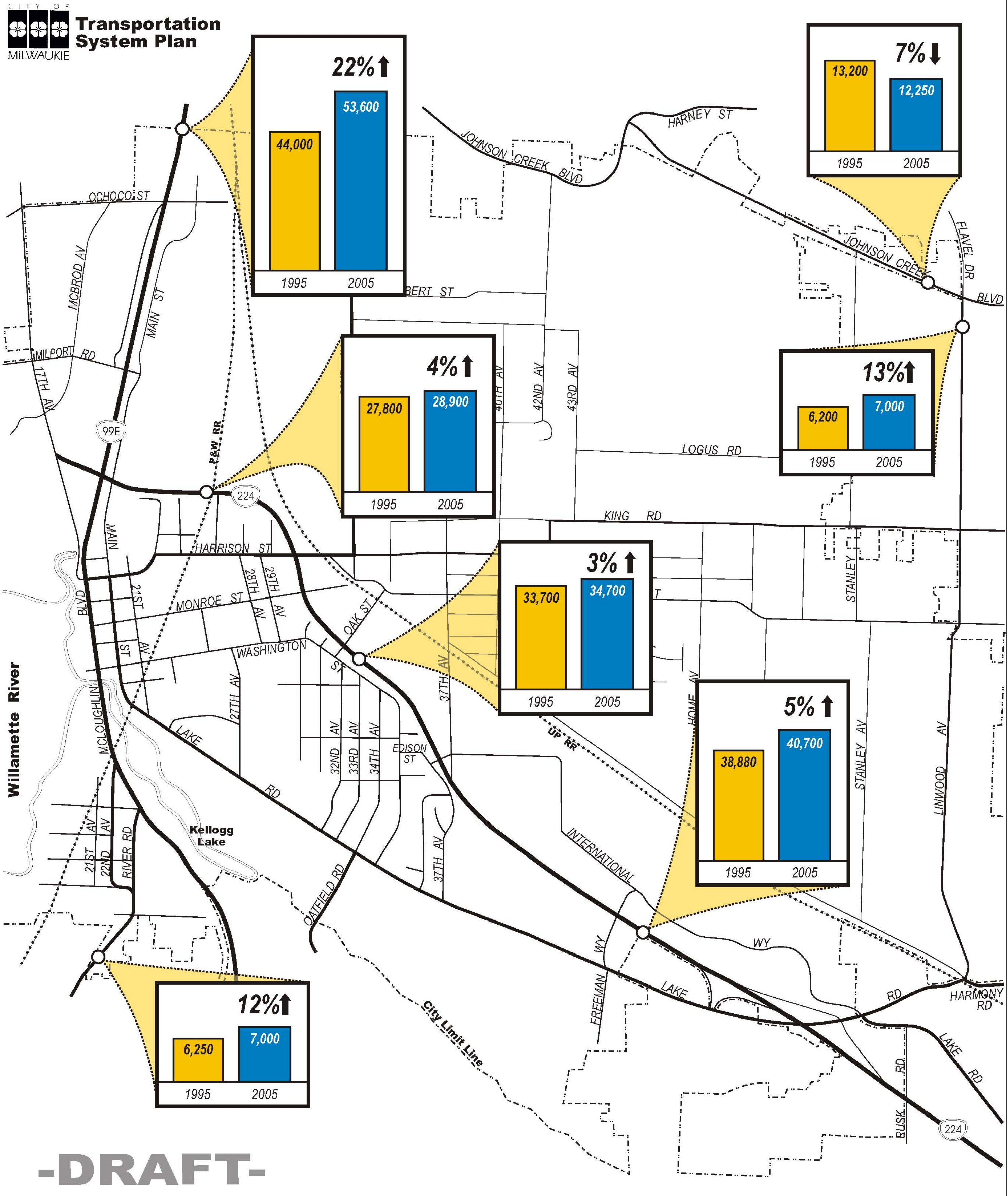
NO SCALE

Figure 3-11b

24 HOUR COUNT VOLUMES

March 2007



LEGEND

00 - 24 Hour Count Volume (1995)

00 - 24 Hour Count Volume (2005)

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NO SCALE

Figure 3-11c

24 HOUR COUNT VOLUMES HISTORIC COMPARISON

March 2007

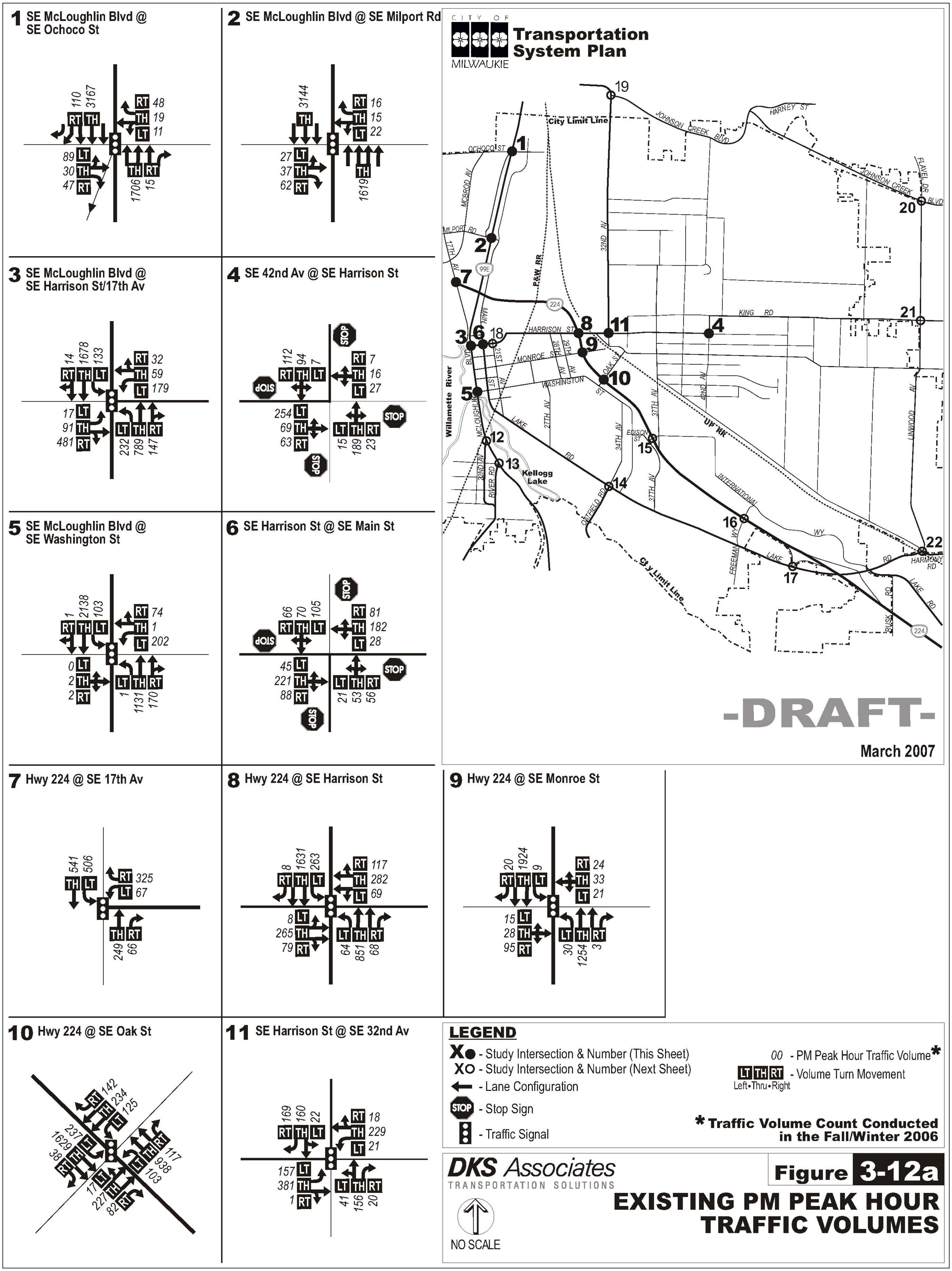
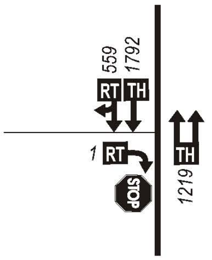


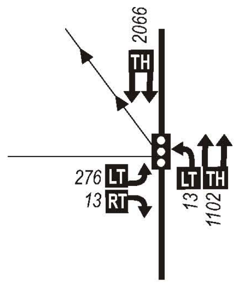
Figure 3-12a

EXISTING PM PEAK HOUR TRAFFIC VOLUMES

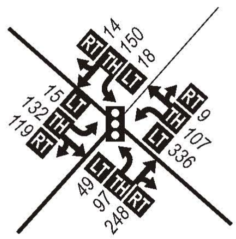
12 SE McLoughlin Blvd @ SE 22nd Av



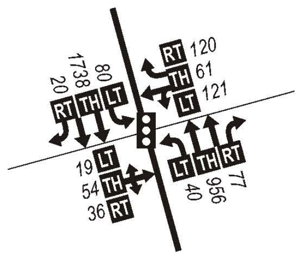
13 SE McLoughlin Blvd @ SE River Rd



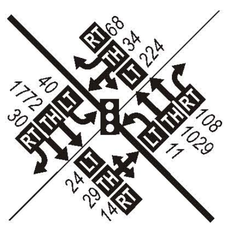
14 SE Lake Rd @ SE Oatfield Rd



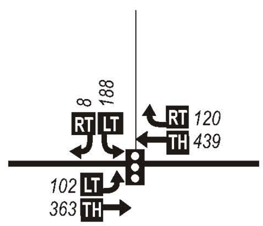
15 Hwy 224 @ SE 37th Av/ SE Edison St



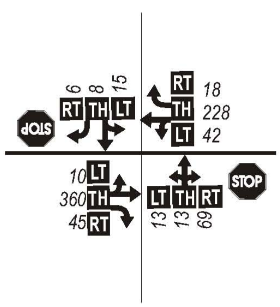
16 Hwy 224 @ SE Freeman Wy



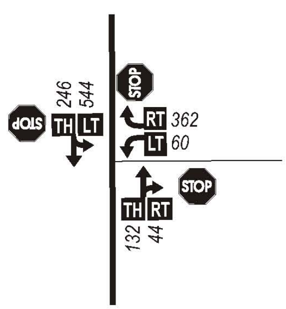
17 Hwy 224 @ SE Lake Rd



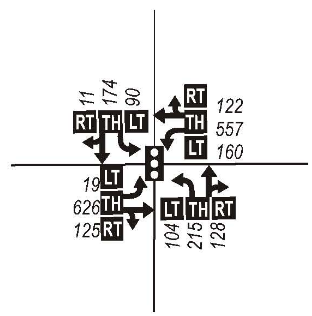
18 SE 21st Av @ SE Harrison St



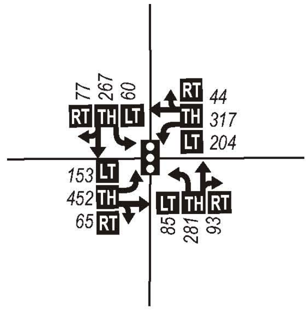
19 SE 32nd Av @ SE Johnson Creek Blvd



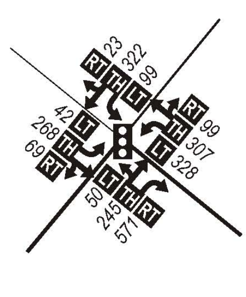
20 SE Johnson Creek Blvd @ SE Linwood Av



21 SE Linwood Av @ SE King Rd



22 SE Harmony Rd @ SE Linwwod Av



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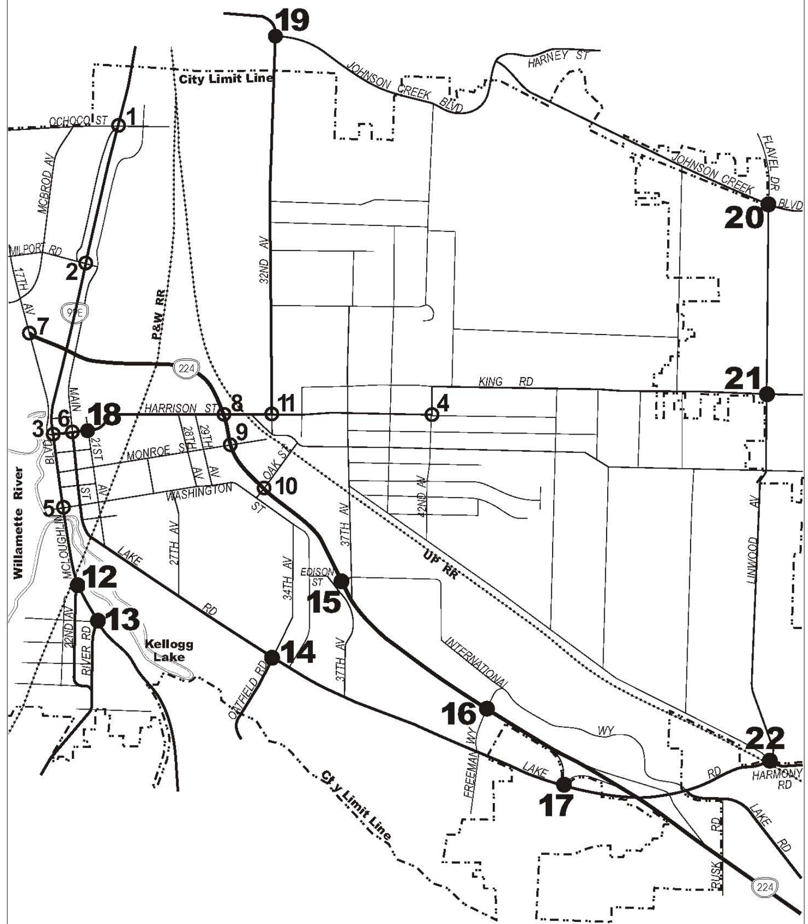

-DRAFT-

March 2007

LEGEND

- X● - Study Intersection & Number (This Sheet)
- XO - Study Intersection & Number (Previous Sheet)
- ← - Lane Configuration
- STOP - Stop Sign
- Traffic Signal
- 00 - PM Peak Hour Traffic Volume*
- LT TH RT - Volume Turn Movement (Left•Thru•Right)

* **Traffic Volume Count Conducted in the Fall/Winter 2006**

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NO SCALE

Figure 3-12b

EXISTING PM PEAK HOUR TRAFFIC VOLUMES

Land use within Milwaukie is a key factor in understanding current transportation patterns and roadway traffic volumes as it plays a large role in driving transportation choices. The adopted land use zoning designations within the city boundaries are shown in Figure 3-13.

Measures of Effectiveness

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

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

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

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

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

Turn movement counts taken at the study intersections and conducted during the evening peak periods were used to determine the existing 2006 LOS based on the 2000 Highway Capacity Manual methodology for signalized and unsignalized intersections.[13]

[11] Milwaukie Municipal Code, Section 19.1407.4(A).
[12] Regional Transportation Plan, Metro, 2000, Table 1.2.
[13] *2000 Highway Capacity Manual*, Transportation Research Board, 2000.

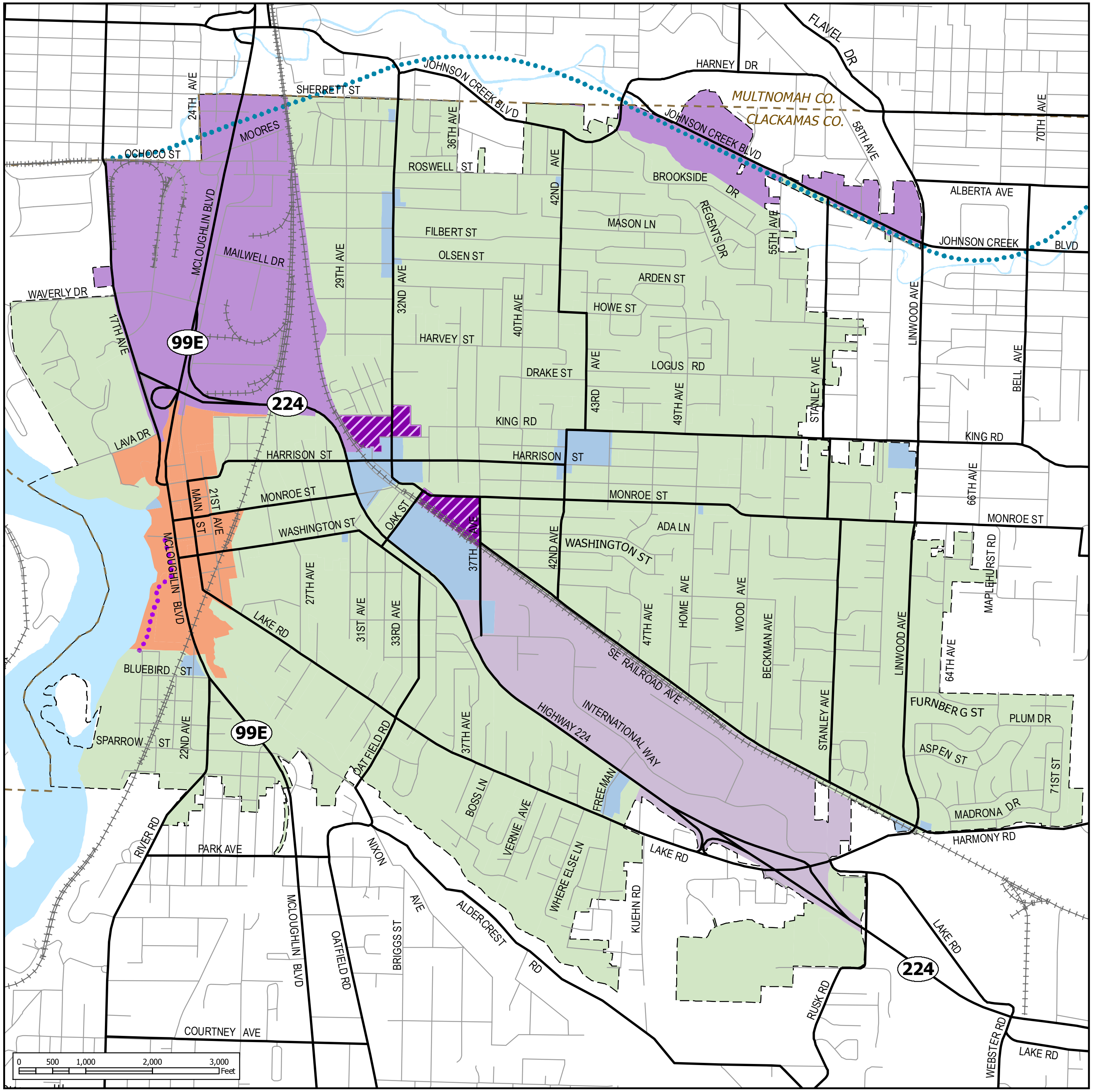

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FIGURE 3-13

ZONING MAP

December 2007

LEGEND

Zoning

- Business Industrial
- Manufacturing
- Commercial
- Downtown
- Residential
- Mixed Use

Other Map Features

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

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

Table 3-7 Existing p.m. Peak Hour Study Area Intersection Operations

Intersection	Minimum Acceptable Measure of Effectiveness (MOE)			Level of Service (LOS)	Average Delay (Seconds)	Volume/ Capacity (V/C)
	City[14]	Metro[15]	ODOT[16]			
Two-Way Stop Controlled Intersections						
McLoughlin Blvd @ 22nd Ave		F/E	0.99/0.99	A/D	26.4	0.01
Harrison St @ 21st Ave	D			A/C	18.0	0.10
All-Way Stop Controlled Intersections						
Harrison St @ Main St	D			B	13.2	0.39
42nd Ave @ Harrison St	D			B	14.3	0.22
Johnson Creek Blvd @ 32nd Ave	D			F	>50	0.77
Signalized Intersections						
McLoughlin Blvd @ Ochoco St		F/E	1.10/0.99	B	10.1	0.85
McLoughlin Blvd @ Milport Rd		F/E	1.10/0.99	A	4.4	0.78
McLoughlin Blvd@ Harrison St		F/E	1.10/0.99	D	47.1	0.99
McLoughlin Blvd @ Washington St		F/E	1.10/0.99	C	20.0	0.88
Highway 224 @ 17th Ave		F/E	0.99/0.99	C	20.7	0.59
Highway 224 @ Harrison St		F/E	0.99/0.99	D	40.0	0.89
Highway 224 @ Monroe St		F/E	0.99/0.99	B	19.0	0.75
Highway 224 @ Oak St		F/E	0.99/0.99	D	44.1	0.88
Harrison St @ 32nd Ave	D	F/E		B	10.5	0.45
McLoughlin Blvd @ River Rd		F/E	0.99/0.99	D	35.5	0.99
Lake Rd @ Oatfield Rd		F/E		D	36.0	0.62
Highway 224 @ 37th Ave		F/E	0.99/0.99	C	25.5	0.82
Highway 224 @ Freeman Way		F/E	0.99/0.99	C	30.5	0.94
Highway 224 @ Lake Rd		F/E	0.99/0.99	B	16.1	0.68
Johnson Creek Blvd @ Linwood Ave	D	F/E		D	53.6	0.97
Linwood Ave @ King Rd	D	F/E		D	47.5	0.83
Linwood Ave @ Harmony Rd	D	F/E		E	64.5	0.94

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

Unsignalized Intersection LOS:
- **A/A** = Major Street turn LOS/Minor street turn LOS

[14] Milwaukie Municipal Code, Section 19.1407.4(A).
[15] Regional Transportation Plan, Metro, 2000, Table 1.2.
[16] 1999 Oregon Highway Plan Alternative Highway, Maximum Volume to Capacity Ratios Within Portland Metropolitan Region, Oregon Department of Transportation, January 2006, Table 7.

Safety

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

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

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

Inter-section Number	ODOT SPIS Rating	Street	Cross Street	Intersection Collisions (2002-2005)[1]	Fatal	Injury	Corridor Collisions 2002-2005[2]	Collision Rate 2002-2005[3]
17	52.6	Highway 224	Lake Rd	15	1	7	21	1.12
10	51.01	Highway 224	Oak St	22	0	12	16	0.52
2	46.52	McLoughlin Blvd	Milport Rd	9	0	4	18	0.17
3	37.61	McLoughlin Blvd	Harrison St	8	0	3	24	0.19
15	34.56	Highway 224	Edison St	1	0	1	7	0.03
8	33.58	Highway 224	Harrison St	10	0	4	18	0.25
13	30.23	McLoughlin Blvd	River Rd	5	0	0	15	0.13
12	29.39	McLoughlin Blvd	22nd Ave	1	0	1	16	0.03
7	23.32	Highway 224	17th Ave	2	0	1	9	0.10
1	22.89	McLoughlin Blvd	Ochoco St	5	0	4	8	0.09
16	18.75	Highway 224	Freeman Way	4	0	3	5	0.11
5	18.18	McLoughlin Blvd	Washington St	2	0	1	6	0.05
9	16.76	Highway 224	Monroe St	5	0	2	7	0.13
4	NA	42nd Av	Harrison St	4	0	1	NA	0.42
6	NA	Harrison St	Main St	6	0	4	NA	0.53
11	NA	Harrison St	32nd Ave	12	0	8	NA	0.80
14	NA	Lake Rd	Oatfield Rd	7	0	1	NA	0.49
18	NA	21st Ave	Harrison St	3	0	2	NA	0.33
19	NA	32nd Ave	Johnson Creek Blvd	0	0	0	NA	0.00*
20	NA	Johnson Creek Blvd	Linwood Ave	7	0	6	NA	0.27
21	NA	Linwood Ave	King Rd	2	0	1	NA	0.09
22	NA	Harmony Rd	Linwood Ave	19	0	10	NA	0.72

[1] Collisions within the intersection: reported by City/County/State Police to ODOT.
[2] Collisions along McLoughlin Blvd or Highway 224 within 0.05 miles of the intersection: reported by City/County/State Police to ODOT.
[3] Collision Rate = (Number of Collisions x 1,000,000)/(Number of Years of Data x 365 x Annual Average Daily Traffic)
*No crashes were recorded at this intersection.

Heavy Vehicles

The economical movement of raw materials and finished products depends on efficient truck movement to and through urban areas. The designation of through truck routes provides for efficient movement while at the same time maintaining neighborhood livability, public safety, and minimizing maintenance costs of the roadway system. McLoughlin Blvd and Highway 224 are identified by ODOT,[17] Metro, and the City of Milwaukie as truck routes. The City identifies truck routes on roads under its jurisdiction. Truck routes are illustrated in Figure 3-14.

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

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

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Transportation System Plan

FIGURE 3-14

TRUCK ROUTES

December 2007

LEGEND

Freight Routes

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

Freight Volumes

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

Other Map Elements

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

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Summary of Motor Vehicle Findings

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

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

FREIGHT AND RAIL

There is one other mode of transportation in Milwaukie: the railway system. Figure 3-15 shows the rail facilities and crossings in Milwaukie.

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

The UPRR Tillamook line, also known as the FD line, is leased to Portland & Western Railroad (PNWR). It extends from Portland in the north through Milwaukie and exits to the south. PNWR operates three 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 Findings

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

- The maximum authorized speeds within Milwaukie for many of the existing rail lines are 45-50 miles per hour. Many of the existing crossings in the city are at-grade facilities that are gated. However, there are six at-grade crossings that do not have gates. Three occur in the north Milwaukie industrial area east and west of McLoughlin Blvd, and the other three occur in the Island Station neighborhood to the south.
- Typical vertical clearance for underpasses (whether they are roadway or railway) is 14 feet.[18] This is a typical clearance to allow for trucks to clear the underpass, even if they are not on a freight-classified facility. The three underpasses at Lake Rd, Sparrow St, and Lark St do not meet this typical vertical clearance.

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

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FIGURE 3-15

RAIL ROUTES & CROSSINGS

December 2007

LEGEND

Rail Facilities

- Existing Railroad

Rail Crossings

- At Grade - Ungated
- At Grade - Gated
- Road Overpass
- Road Underpass (with clearance)
- ## Number of Trains Daily

Other Map Features

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

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TRANSPORTATION SOLUTIONS

PARKING

City Parking Policies

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

Downtown Milwaukie Parking

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

The majority of the on-street parking in the downtown area is short-term in nature, which consists of 15 minute to 4 hour parking. The majority of the off-street parking is private surface parking serving businesses in the downtown area. Figure 3-16 illustrates the locations of on and off-street parking. Table 3-9 summarizes the parking supply, type, and public/private nature of the parking.

Since 1993 the City has operated a permit system to allow employees of downtown businesses to park in four downtown parking lots. This parking permit program includes 185 parking spaces downtown. Permits can be obtained through the City of Milwaukie for a cost of $25 per month. All off-street public parking is available on a first come, first served basis only. There are no reserved spaces.

It is the City's practice to conduct regular detailed inventory and utilization studies of the parking within the downtown core area. The October 2006 utilization study found there are many pockets of utilization in specific areas of downtown, particularly in the core commercial area along Main Street between Washington and Harrison Streets. However, there is an overall abundance of underutilized and available parking in the peak hour.

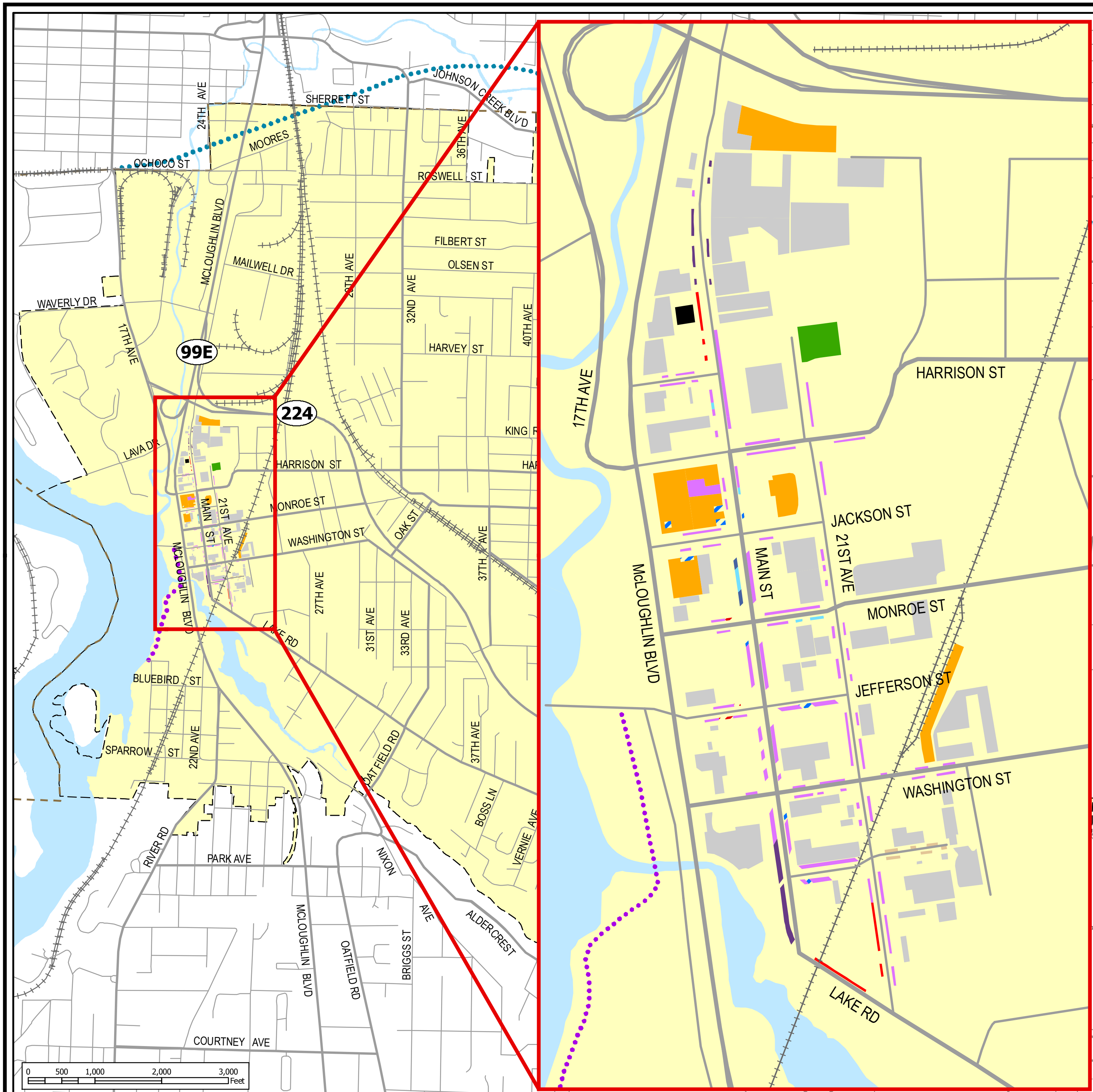
CITY OF MILWAUKIE

Transportation System Plan

FIGURE 3-16

PARKING MAP

December 2007



LEGEND

Parking Type

- 1 Hour
- 15 Min.
- 2 Hour
- 4 Hour
- 8 Hour
- Private
- City
- Disabled
- Loading Zone
- Garage
- Public
- Unmarked

Other Map Features

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

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As Table 3-9 indicates, the greatest concentration of underutilized parking spaces is in private lots, which represents 77% of all parking in downtown. Private lots comprise 1,008 total parking stalls and reach peak occupancy of just 42.4%. This leaves 593 unused spaces in the private supply.

Table 3-9 Inventory of Existing Downtown Parking

Type of Parking	Total Inventory	Percentage of Inventory
On-Street		
Short-term	303	80%
Long-term	59	16%
ADA parking	15	4%
Subtotal	**377**	**100%**
Off-Street		
Short-term (public)	11	1%
Long-term (public)	270	20%
Private parking garage	21	2%
Private surface parking	1008	77%
Subtotal	**1,310**	**100%**

Source: City of Milwaukie
Data Collected: November 13, 2006

Table 3-10 summarizes the utilization of downtown parking in October 2006.

Table 3-10 Use of Parking Stalls by Type

Type of Parking	Total Number of Stalls	Total Occupied at Peak Hour	Total Stalls Empty at Peak Hour	Peak Hour Occupancy (%)
15 Minutes	10	5	5	50.0
1 Hour	5	5	0	100.0
2 Hours	284	194	90	68.3
4 Hours	38	29	9	76.3
8 Hours	21	21	0	100.0
Disabled Stalls	15	0	15	0
City Permit Required	185	109	76	58.9
City Employee Parking	42	18	24	42.9
Private Lots	1029	436	593	42.4
Public/Library	43	20	23	46.5
Loading Zones	4	0	4	0
Unmarked on-street	11	11	0	100.0
Subtotal On-Street	***366***	***267***	***108***	***70.3***
Subtotal Public Off-Street[1]	***292***	***147***	***123***	***52.9***
Subtotal Private Off-Street	***1029***	***436***	***593***	***42.4***
All Parking	**1,687**	**850**	**824**	**50.4**

Source: City of Milwaukie. Occupancy data was collected for the peak hour (11 a.m.-noon) on October 19, 2006
[1] Public off-street parking count includes 8 ADA spaces and 14 two-hour parking spaces.

Parking Demand

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

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

- **The actual current Built Ratio** of publicly available parking stalls, in relation to total built land uses in downtown Milwaukie.

- **The actual current Demand Ratio** for parking stalls per total built land use based on actual usage data from the most recent update of parking utilization.

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

- **Built Stalls to Built Land Use:** This represents the total number of existing parking stalls correlated to total existing land use square footage (occupied or vacant) within the study area. There are approximately 399,074 square feet of commercial uses in the Downtown Zones and a total of 1,687 parking stalls. Based on these numbers, there are approximately 4.22 parking stalls per 1,000 square feet of built land.

- **Combined Demand to Built Land Use:** This represents peak hour occupancy within the Downtown Zones, combining the on and off-street supply (actual parked vehicles correlated with actual occupied building area). Parking stalls in downtown are utilized at a rate of 51.2% in the peak hour (863 vehicles parked). Building vacancy in downtown is approximately 11%, (355,176 of 399,074 gross square feet of building area occupied). Therefore, the actual current peak hour demand ratio is approximately 2.43 parking stalls per 1,000 square feet of built land use.

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

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

Sites in Downtown	Gross Square Footage (built)/ Gross Square Footage (occupied)[19]	Total Stalls Inventoried in Downtown[20]	Built Ratio of Parking (SF)	Total Stalls Parked in Peak Hour	Actual Ratio of Parking Demand/ 1,000 SF
92	399,074/355,176	1,687	4.22/1,000 SF	863	2.43/1,000 SF

[19] Assumes downtown vacancy rate of 11%, per City of Milwaukie data base.
[20] This number represents all on-street spaces, public and private off-street lots in operation within the study zone and summarized in Table 3-11, above.

To date, parking in downtown Milwaukie has been built at an average rate of over 4.00 stalls per 1,000 square feet of development. This rate appears to have been effective, though significant stall availability currently exists within the on and off-street parking system.

Land uses in downtown Milwaukie are generating parking demand ratios of 2.43 stalls per 1,000 GSF of commercial/retail development. It is important to recognize that the current parking demand number is also reflective of the current level of use by other modes (i.e., transit, bike, carpool and walking). If the City had higher expectations and success in increasing alternative mode uses in the future, the parking "demand" ratio would be influenced downward from its current level.

Summary of Parking Findings

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

- On-street parking comprises approximately 22% of the total parking supply (private and public) in the downtown area, while off-street parking comprises the remaining 78%.
- The total utilization of on-street parking in the downtown area is on average 70% throughout the day. While public off-street parking utilization is approximately 53% during the day. By comparison, the private off-street parking utilization is approximately 43% over the day.
- Parking stall types with the highest utilization throughout the day are 1-hour, 8-hour, and unmarked parking stalls. All three of these types of parking are generally 100% occupied during the day and represent approximately 10% of the total on-street parking supply. Two-hour and four-hour parking stalls are generally 65-75% occupied during the day. These usage statistics indicate a higher likely use of short term and long term parking than mid term (2-4 hours) parking.

ENVIRONMENTAL JUSTICE

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

Figure 3-17 identifies the location of low-income housing (indicating populations most likely to be dependant on public transportation), areas of Milwaukie that are outside of the public transit coverage area, as well as the location of features such as hospitals, schools, and libraries. Transit coverage is based on comparing land that has a high enough density to support transit service versus a 1/4 mile walking distance buffer around transit stops.[22] One significant gap in transit coverage area can be seen in the residential area north of Railroad Ave, stretching east/west from Stanley Ave to 42nd Ave. Other smaller gaps in transit coverage can be seen to the northeast and along the perimeter of the city.

[21] U.S. EPA, Environmental Justice, Compliance and Enforcement, Website, 2007.
[22] Planning Commission TOD Committee, Walking Distance Research, http://www.fairfaxcounty.gov/planning/tod_docs/walking_distance_abstracts.pdf, Fairfax County, Virginia.

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FIGURE 3-17

TRANSPORTATION DISADVANTAGED

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LEGEND

- Transit Disadvantaged (more than 1/4 mile walk from bus stop)
- Bus Stops
- Transit Center
- Existing Sidewalks
- Existing Bicycle Lanes
- Low-Income Housing
- Hospital
- Convalescent Care
- School
- Library
- Grocery
- City Hall

Other Map Features

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

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In addition to regular public transit services, programs run by TriMet and the Milwaukie Center provide transportation to senior citizens and disabled persons. The Milwaukie Center offers the Dial-a-Ride program that runs from Hillside Park (a Clackamas Housing Authority property shown in Figure 3-17) to the Milwaukie Center and the grocery store on a weekly basis. In addition, the Transportation Reaching People program allows the scheduling of rides from their homes to medical appointments for the disabled and citizens over the age of sixty. The Catch-a-Ride program offers similar services to those living in Hillside Park. Fees for these services are a suggested donation of $1.

Additionally, TriMet offers the LIFT Paratransit Program. This program targets those who are unable to use public transportation due to a disability or disabling health condition, and covers areas 3/4 of a mile past the outermost portions of TriMet's bus and MAX services. These services are available on appointment from 4:30 am to 2:30 am, seven days a week. Cost is $1.60 each way.

Summary of Environmental Justice Findings

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

- Almost all of the facilities and/or land uses that would typically be dependent or rely upon transit/transportation facilities have support of these types of transportation facilities. However, Campbell Elementary School located on 47th Ave just north of Railroad Ave is not adequately served by transit.
- The lack of pedestrian and bicycle connectivity within the city also contributes to the lack of transportation options for the transit dependant population in the city.

ENVIRONMENTAL RESOURCES

As a Transportation Planning Rule (TPR) requirement, a city's transportation system shall minimize adverse economic, social, environmental, and energy consequences.[23] An Environmental Resources Map is included here as Figures 3-18 through 3-20; Title 3 areas, the local Goal 5 inventory, National Wetland Inventory, identified historic properties, and known cultural resources.

The goal of Title 3 of the Metro Functional Plan is to protect water quality and floodplain areas. Since floodplains reduce flood hazards, control soil erosion, and reduce pollution of the region's waterways, the region's health and public safety are protected. It can be seen in Figure 3-18 that there are Title 3 areas dispersed throughout the city, including bands along Johnson Creek, the Willamette River, around Kellogg Lake, and along Kellogg Creek. Many of the Title 3 areas are also encompassed by floodplain, vegetation, and wetland zones. Endangered species habitat also correlates closely with the location of the Title 3 areas.

Local jurisdictions are required by Statewide Planning Goal 5 to adopt plans to protect natural resources and conserve scenic and historic areas and open spaces. Fish and wildlife habitats are among the natural resources that are protected by Goal 5. Figure 3-19 identifies the Goal 5 areas within Milwaukie.

[23] OAR 660-012-0035, Environmental Considerations for Transportation Planning.

Summary of Environmental Resources Findings

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

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

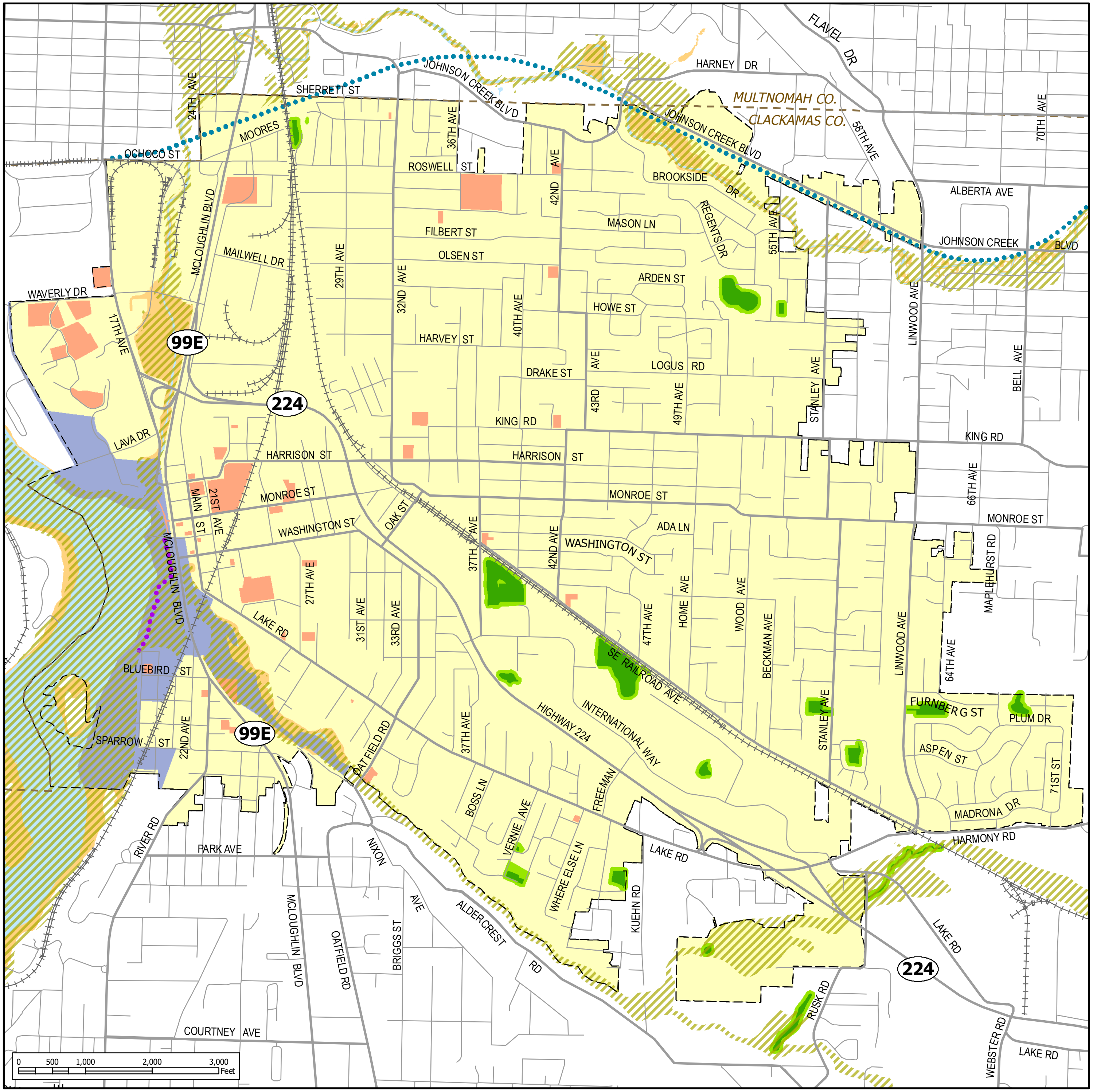

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FIGURE 3-18

WETLANDS, FLOOD & CULTURAL FEATURES

December 2007

LEGEND

- Willamette Greenway
- Wetland
- Wetland Buffer
- Historic Resource
- 100 Year Flood Plain*
- 1996 Flood Extent

Other Map Features

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

* Source: Metro RLIS; FEMA with local input.

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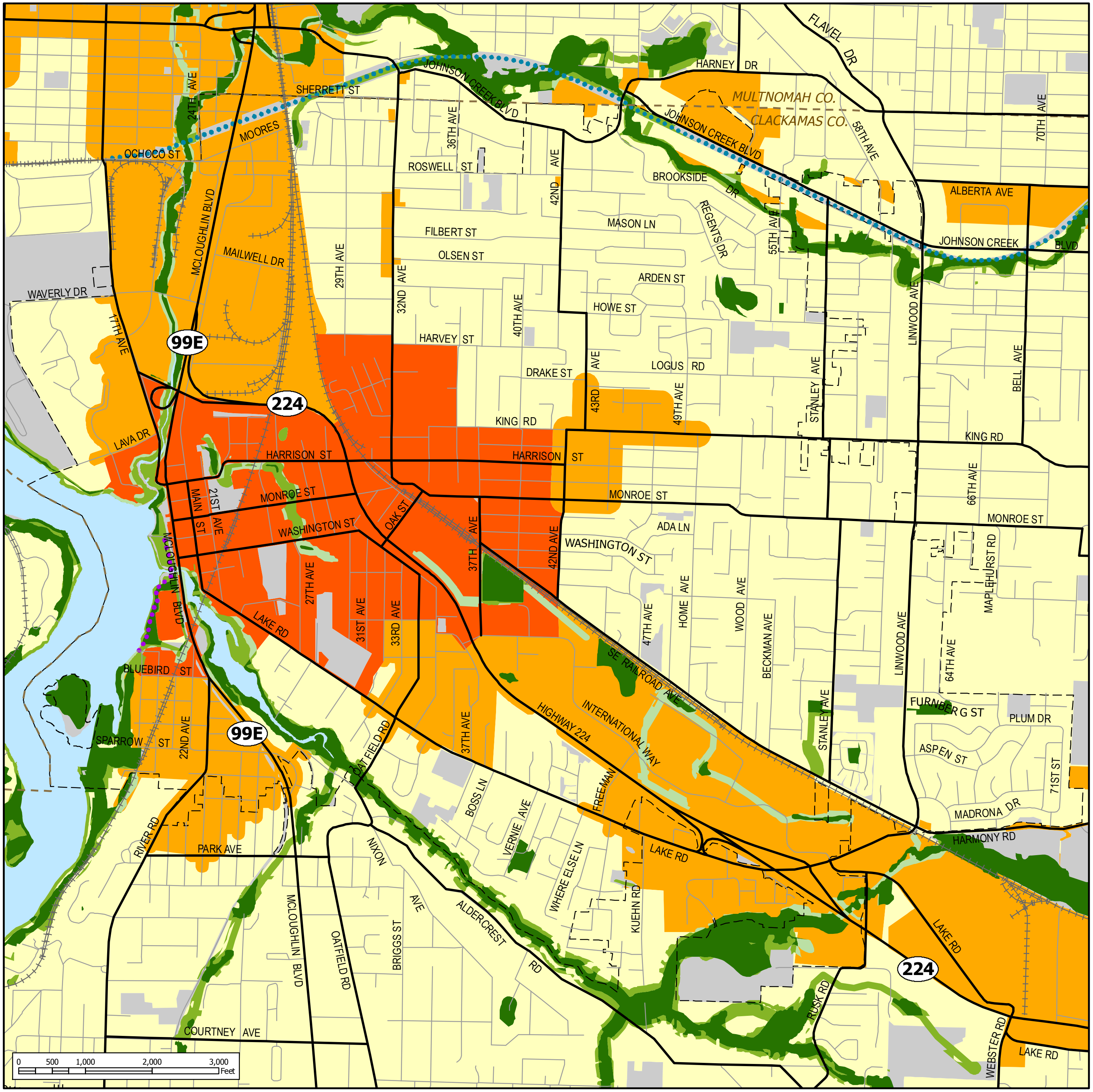

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FIGURE 3-19

ENVIRONMENTAL RESOURCES - GOAL 5

December 2007

LEGEND

Goal 5 Development Value
- High
- Medium
- Low
- Not Ranked

Goal 5 Conservation Value
- High
- Moderate
- Low

Other Map Features
- Major Roads
- Streets
- Railroad
- Springwater Trail
- Kellogg Creek Trail
- County Line
- Water
- City Limits

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FIGURE 3-20

ENVIRONMENTAL RESOURCES - ZONING & VEGETATION

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LEGEND

Vegetation

- High
- Medium
- Low

METRO Environmental Zone

- Conservation
- Protection
- Title 3

Other Map Features

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

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4 Future Forecasting Process

TRAVEL DEMAND AND LAND USE

Metro's urban area transportation forecast model is used to determine future traffic volumes in Milwaukie. This forecast model translates assumed land uses into person trips, selects travel modes and assigns motor vehicles to the roadway network. These traffic volume projections form the basis for identifying potential roadway deficiencies, and for evaluating alternative circulation improvements. This chapter will describe the forecasting process including key assumptions and the land use scenario developed from the existing Comprehensive Plan designations and allowed densities.

PROJECTED LAND USE GROWTH

Land use is a key factor in developing a functional transportation system. Considerations must include the amount of land to be developed, the type of land uses that will be developed, and the relationship between mixed land uses and associated demands on the transportation system.

Projected land uses developed for the study area reflect Milwaukie's Comprehensive Plan and Metro's land use assumptions for the year 2030.[1] Complete land use data sets have been developed for the following conditions.

- Existing 2005 (base travel forecast for the region)
- Future 2030 Conditions

The following sections summarize the forecasted growth in land uses that influence travel within the City of Milwaukie.

GROWTH WITHIN MILWAUKIE

The base year travel model is updated periodically to reflect the most current and up to date inputs related to land use for the region. For this study, the available base model provided by Metro represents land uses for 2005. This land use database includes the number of dwelling

[1] Metro works cooperatively with local agencies to determine local existing and future land uses that incorporate existing land uses and reflects input from local agencies. These land uses are then regionally adopted and updated when new travel demand models are developed.

units (housing), retail employees, service employees, and other employees. Table 4-1 summarizes the aggregated land use data for the 2005 base and future 2030 scenarios within the study area. This land use data is divided into smaller areas called Transportation Analysis Zones (TAZs), which contain a portion of the households, retail, service and other employees. This land use creates varying trip modes such as motor vehicle, pedestrian, bicycle and transit trips. A detailed summary of the uses for each Transportation Analysis Zone (TAZ) within the Milwaukie study area is provided in the Technical Appendix.

Table 4-1 Milwaukie TSP Study Area Land Use Summary

Land Use	2005	2030	Increase	Percent Increase
Households (HH)	9,209	10,791	1,582	17%
Retail Employees (RET)	1,697	2,313	616	36%
Service Employees (SER)	2,769	4,627	1,858	67%
Other Employees (OTH)	7,643	8,531	888	12%

Source: Metro

The overall operation of the transportation system is affected as land uses change in proportion to each other (i.e. a significant increase in employment relative to household growth). Retail land use generates a higher number of trips per acre of land than households and other land uses during the PM peak period. The location and design of retail land use in a community can greatly affect future transportation system operation. Additionally, if an area within the city is homogeneous in land use character (i.e. all employment or residential), the transportation system typically supports significant trips coming to or from the area rather than within the area. Integration of residential, commercial, and employment land uses within a small geographic area promotes sustainable livability, where residents can work, shop and play locally. Among other significant benefits, this reduces long-distance traveling by residents who would otherwise be seeking services outside their locality.

Table 4-1 displays the projected employment growth (approximately 3,400 jobs) in Milwaukie in the next 20 years. The transportation system should be monitored to make sure that land uses in the plan are balanced with transportation system needs. A primary purpose of a TSP is to determine those needs and help identify transportation projects for all modes that help balance future needs with the forecasted 2030 land uses.

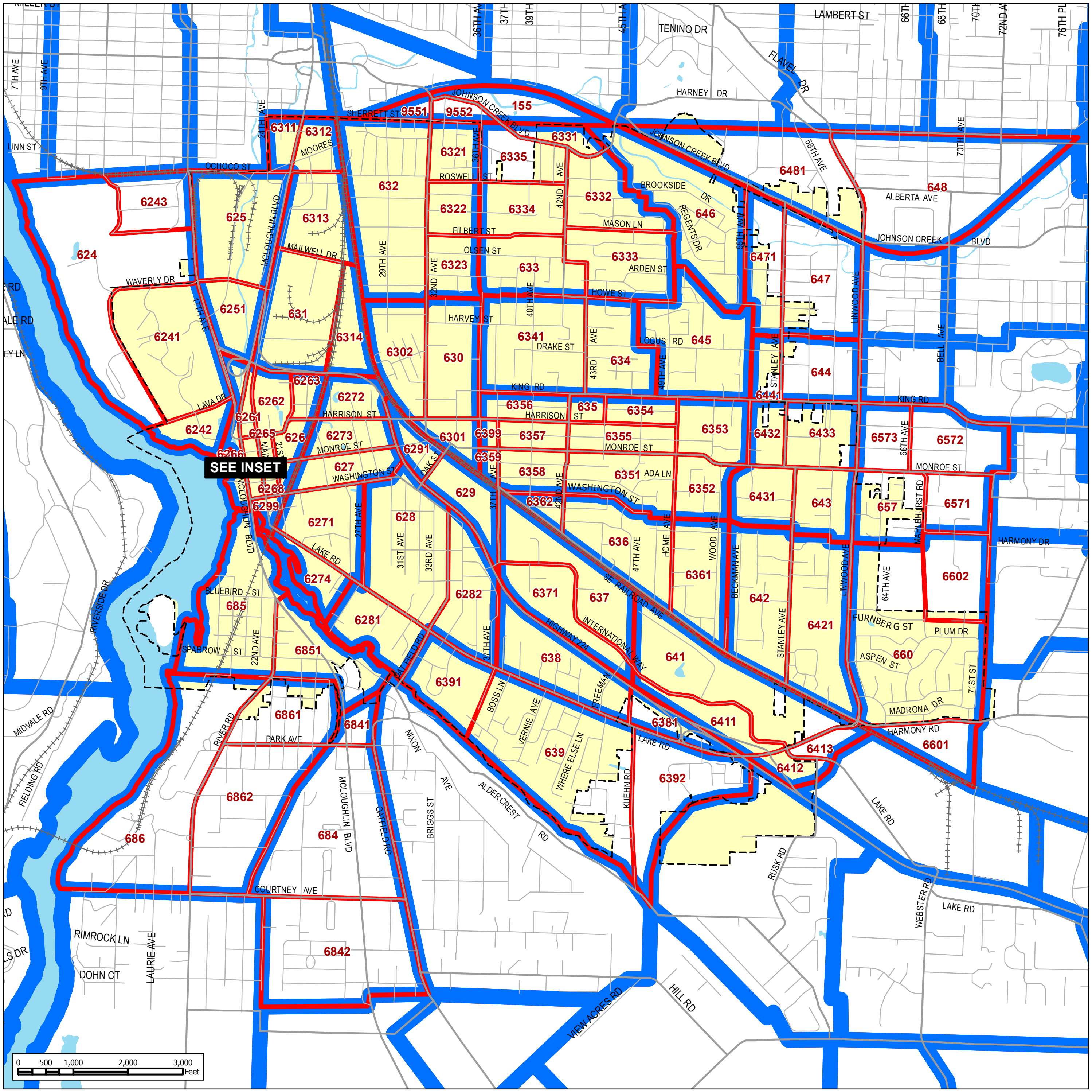
Within the study area there are approximately thirty-one (31) original TAZs. These 31 TAZs were disaggregated into 90 TAZs as part of this plan to better locate land uses (and the potential for motor vehicle trips) at a more refined level. The original and disaggregated TAZ boundaries are shown in Figure 4-1.

METRO AREA TRANSPORTATION MODEL

Accurately forecasting travel demand of estimated future population and employment is important for determining future traffic system needs. The objective of the transportation planning process is to provide necessary information to aid decision-making of where and when transportation system improvements should be made to meet future travel demand. Metro uses VISUM, a computer-based transportation modeling program to process large amounts of data related to land use and person trips for all modes of travel for the Portland Metropolitan area. The modeling process for the Milwaukie TSP uses the 2005 and 2030 travel demand models during the PM peak period to develop future forecasts within Milwaukie. These models were also used for Metro's 2004 Regional Transportation Plan (RTP).

Future travel demand forecasting can be divided into several distinct, yet integrated components that represent the logical sequence of travel behavior (see Figure 4-2). These components and their general order in the traffic forecasting process are as follows:

1. **Trip Generation:** Converts land use type into total person trips.
2. **Trip Distribution:** Determines the origins and destinations within the region.
3. **Mode Choice:** Determines which mode of travel (i.e. motor vehicle, bicycle, pedestrian, transit, carpool, etc.) each trip will use.
4. **Traffic Assignment:** Assigns the trips by mode to specific routes in the transportation network that match the trip distribution locations.



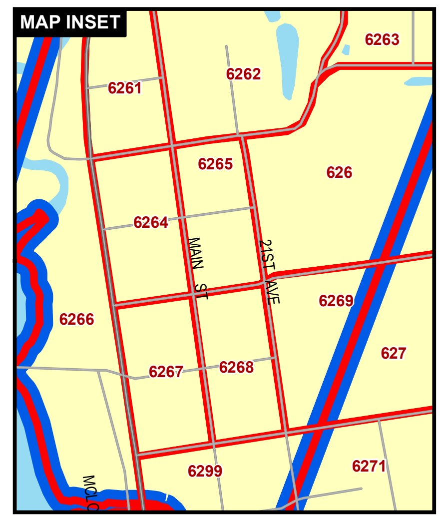


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FIGURE 4 - 1

TRANSPORTATION ANALYSIS ZONES

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LEGEND

- Original Metro Transportation Analysis Zones
- Disaggregated Transportation Analysis Zones
- #### Transportation Analysis Zone Number
- Major Streets
- Streets
- Railroad
- Water
- City Limits

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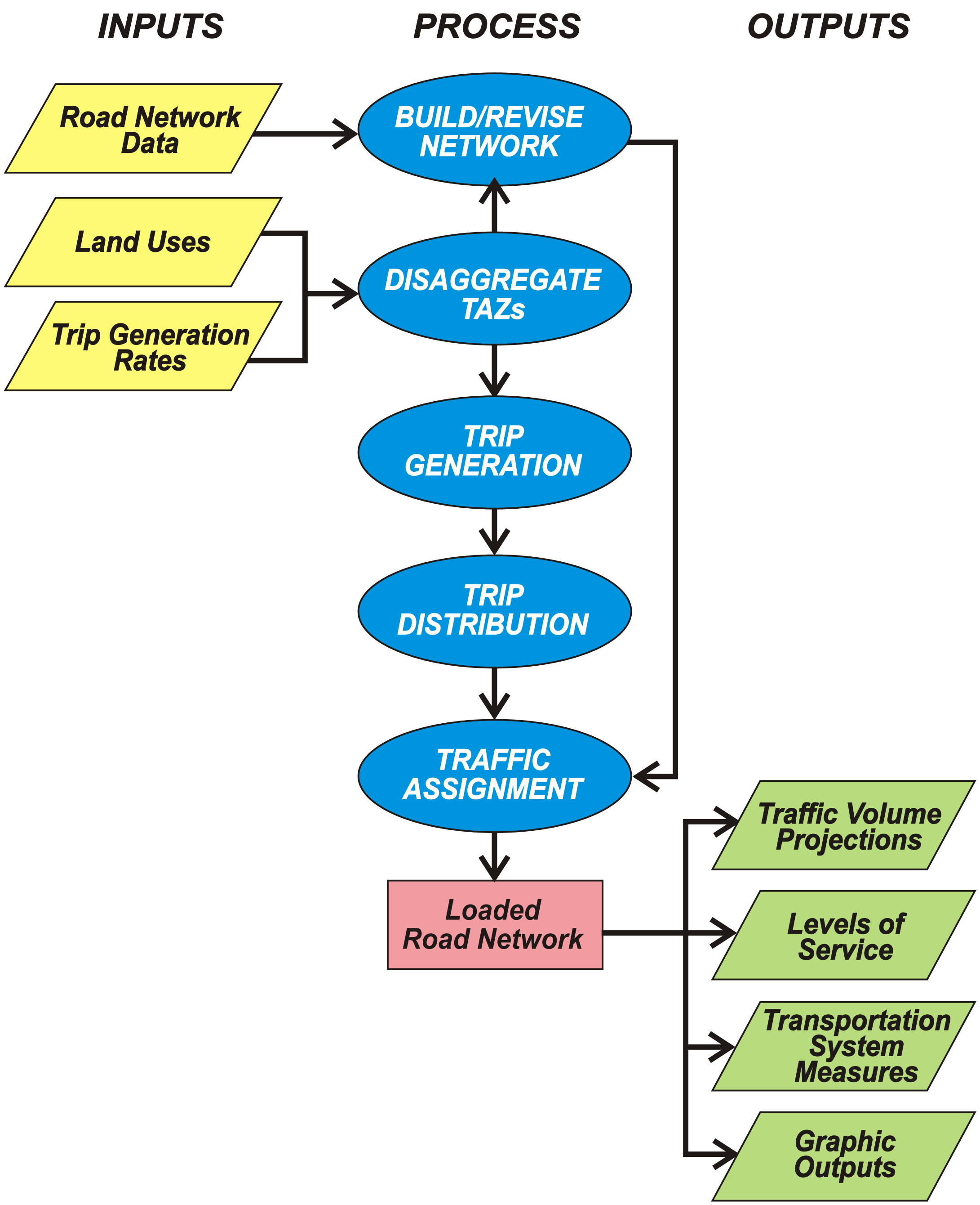
FIGURE 4-2

MODEL PROCESS

May 2007



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The base roadway network in the existing 2005 traffic model reflects the current street and roadway system. The future 2030 roadway system in the Metro model consists of the RTP financially constrained system. It includes both projects for which funding has been identified and the funded projects listed in the 1997 Milwaukie TSP. Projects in both the RTP and the TSP were then validated in the study process. Forecasts of PM peak period traffic flows were produced for every major roadway segment within Milwaukie. Traffic volumes were projected on all arterials and most collector streets. Some local streets were included in the model, but many are represented by TAZ connectors in the model process.

TRIP GENERATION

The trip generation process translates land use quantities (number of dwelling units, retail employees, service employees and other employees) into vehicle trip ends (number of vehicles entering or leaving a TAZ or sub-TAZ) using trip generation rates established during the model verification process. The Metro trip generation process is elaborate, entailing detailed trip characteristics for various types of housing, retail, service, other employment, and special activities. Typically, most traffic impact studies rely on the Institute of Transportation Engineers (ITE) research for analysis.[2] The model process is tailored to variations in travel characteristics and activities in the region. For reference, Table 4-2 provides a summary of the approximate average evening peak hour trip rates used in the Metro model. These are averaged over a broad area and, thus, are different than driveway counts represented by ITE for similar land uses. This data provides a reference for the trip generation process used in the model.

Table 4-2 Approximate Average PM Peak Period Trip Rates Used in Metro Model

		Average Trip Rate/Unit	
Unit	**In**	**Out**	**Total**
Household (HH)	0.57	0.27	0.85
Retail Employee (RET)	0.75	1.15	1.90
Service Employee (SER)	0.33	0.51	0.84
Other Employee (OTH)	0.09	0.35	0.44

Source: DKS Associates/Metro Regional Travel Demand Model

Table 4-3 summarizes the total estimated 2005 and 2030 motor vehicle trips for Milwaukie as well as the estimated growth in vehicle trips during the two-hour PM peak period. Using the forecasted land use and calculated trip rate values, the total number of in- and out-trips can be produced for each TAZ in the region. Vehicle trips in Milwaukie are expected to grow by approximately nine percent between 2005 and 2030 if the land develops according to the 2030 land use assumptions. Assuming a 25-year horizon to the 2030 scenario, this represents annualized growth rate of approximately 0.36 percent per year.

Table 4-3 Milwaukie Vehicle Trip Generation (2-Hour PM Period)

	2005 Trips	2030 Trips	Percent Increase
Milwaukie TSP update Study Area	26,166	28,530	9%

Source: Metro Regional Travel Demand Model

[2] *Trip Generation Manual*, 7th Edition, Institute of Transportation Engineers, 2003.

TRIP DISTRIBUTION

This step estimates how many trips travel from one area in the model to any other area. Distribution is based on the number of trip ends generated in each TAZ zone pair, and on factors that relate the likelihood of travel between any two TAZs to the travel time between the zones.

In projecting long-range future traffic volumes, it is important to consider potential changes in regional travel patterns. Although the location and amount of traffic generation in Milwaukie are essentially a function of future land use in the city, the distribution of trips is influenced by expected congestion on roadways and regional growth, particularly in neighboring areas such as Portland, Oregon City, and the unincorporated Clackamas County areas. The model and trip distribution can also be used to help define the number of internal, external, and through trips for Milwaukie. These types of trips are as follows:

- **Internal trips** are trips that start and end within the city limits of Milwaukie;
- **External trips** are trips that either start in Milwaukie and end outside the city, or start outside the city and end within the city; and
- **Through trips** are trips that pass through Milwaukie and have neither an origin nor a destination in Milwaukie.

Table 4-4 quantifies the internal, external, and through trips for all roadways within Milwaukie, as forecasted by the Metro regional travel demand model for 2005 and 2030. The number of internal versus external or through trips reveals that few people actually both live and work in Milwaukie. The much larger number of external than internal trips represents the people who live outside of Milwaukie and work in the city, or live in Milwaukie but work outside of the city. The high number of through trips through the city indicates that Milwaukie functions as a conduit for a significant number of people between their jobs and homes, both of which are outside the city limits of Milwaukie. Comparing the percentage of trips for the model year 2030 versus 2005 shows there is a slight decrease in the percentage of internal and external trips during the PM peak period. It also shows that the percentage of through trips increases over the 25 year time span. It is important to note that the percentage of through trips is projected to increase much faster than the external trips types and become the dominant trip form within the city during the PM peak period.

Table 4-4 Milwaukie Vehicle Trip Distribution (2-Hour PM Period)

Trip Type	2005	2030	Delta
Internal (I - I)	9%	7%	- 2%
External (X- I or I - X)	46%	43%	- 3%
Through (X - X)	45%	50%	+ 5%

Source: DKS Associates/Metro Regional Travel Demand Model

MODE CHOICE

This step in the modeling process determines how many trips will be made by various modes (single-occupant vehicle, transit, carpool, pedestrian, bicycle, etc.). The 2005 mode splits are incorporated into the base model and adjustments to that mode split may be made for a future scenario dependant upon any anticipated changes in transit or carpool use. These considerations are built into the forecasts used for 2030. Based upon analysis of the forecasted mode choice in 2030, a study was performed to determine the level of non-single occupant vehicle (SOV) mode share. The travel model provides estimates of the various modes of travel that can be generally assessed at the transportation analysis zone level. Figure 4-3 summarizes the level of non-SOV mode share estimated for 2030 using the regional travel demand forecast model in comparison to the modal targets established in the RTP through Table 1-3 of the 2004 RTP. Generally, the areas served by transit service have the highest levels of non-SOV mode choice.

TRAFFIC ASSIGNMENT

In this process, trips from one zone to another are assigned to specific travel routes in the network, and resulting trip volumes are accumulated on links of the network until all trips are assigned.

Network travel times are updated to reflect the congestion effects of the traffic assigned through an equilibrium process. Congested travel times are estimated using what are called "volume-delay functions" in VISUM. There are different forms of volume-delay functions, all of which attempt to simulate the impact of congestion on travel times (greater delay) as traffic volume increases. The volume-delay functions take into account the specific characteristics of each roadway link, such as capacity, speed and facility type. This allows the model to reflect conditions somewhat similar to driver behavior.

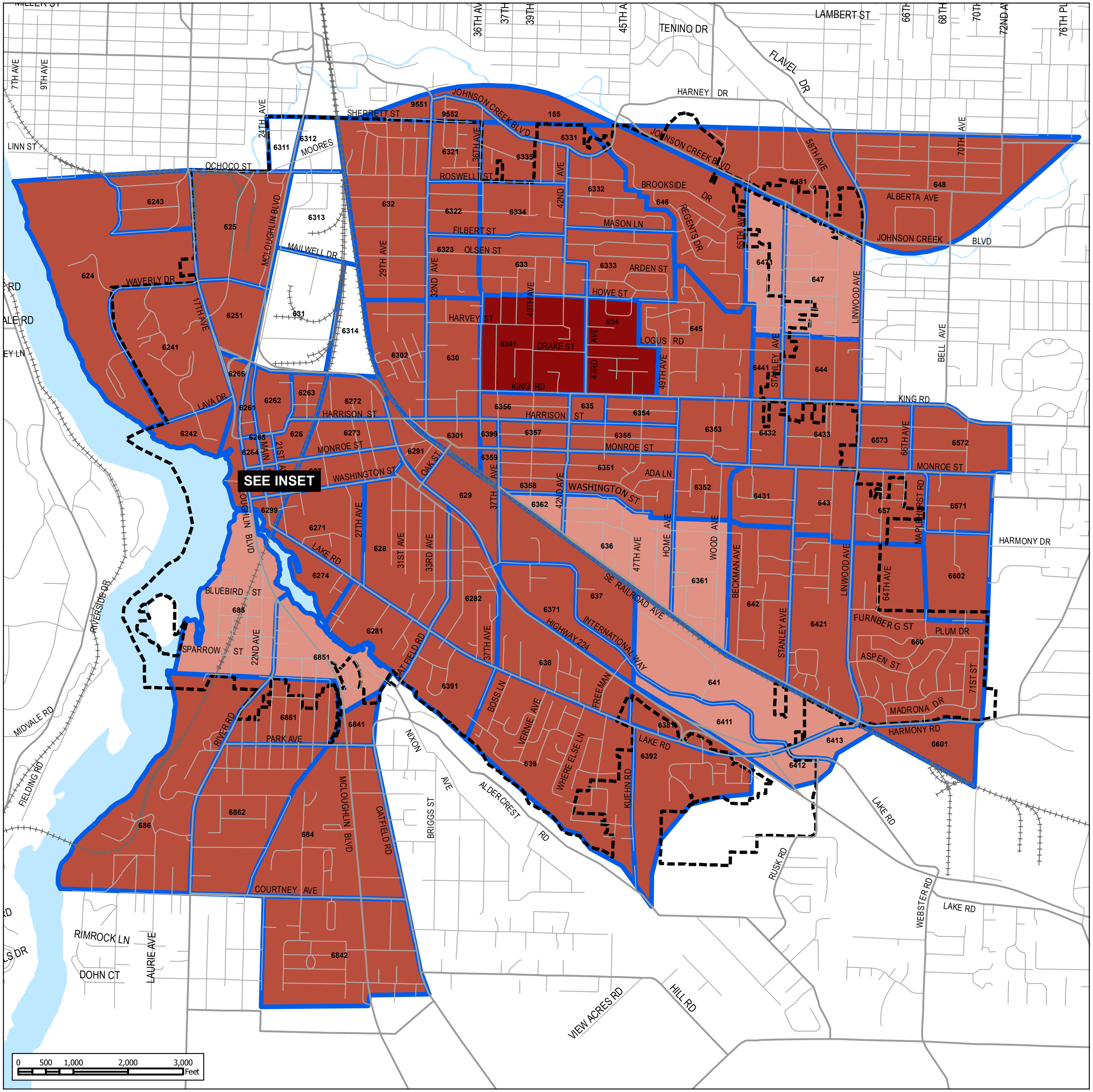

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FIGURE 4 - 3

2030 RTP FINANCIALLY CONSTRAINED NON-SOV PERCENTAGE

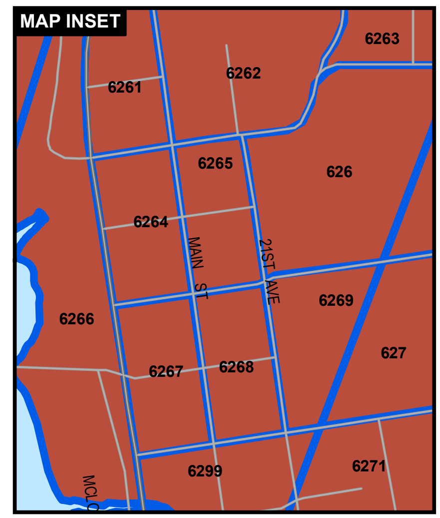
December 2007

LEGEND

- Disaggregated Metro TAZ
- #### Transportation Analysis Zone Number
- City Limits

2030 Committed Non-SOV (Single Occupancy Vehicle) Percentages by TAZ

- Less than 40 percent
- 40 to 45 percent
- 46 to 55 percent
- Greater than 55 percent



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MODEL VERIFICATION

The base 2005 traffic volumes from the regional model were compared against actual traffic volume counts at specific locations on key arterials and at key intersections. These key intersections and corridors created "screenlines" (imaginary lines drawn across the transportation system that intersect many roadways). The screenlines are used to back-check the actual volume against the model volume to make sure that the model is predicting traffic volumes and travel patterns that reflect actual existing conditions. Most arterial traffic volumes meet screenline tolerances for forecast adequacy.[3] If roadways and/or intersection volumes are not within this tolerance, modifications to the roadway network in the base model are made to help adjust and calibrate the model to bring those volumes to within acceptable tolerance levels. These same changes in the base model are made to the future model if those changes do not conflict with a planned project in the future model (i.e. a roadway being widened or improved). Based on this performance, the existing and future models are used for future forecasting and assessment of circulation change.

MODEL APPLICATION TO MILWAUKIE

Intersection turn movements were extracted from the model at study area intersections for both the base year 2005 and forecast year 2030 scenarios. A "post processing" technique is utilized to refine model travel forecasts to the volume forecasts utilized for 2030 intersection analysis. "Post processing" is a technique that uses existing traffic count data, base year model data, and future year model data to estimate future volumes by adding the increment of future traffic volume growth to the existing count data. This approach minimizes the effects of any model error by adding the increment of growth projected based on changes in land use to the base year counts.

[3] Typically within a 10% variance.

5 Pedestrian Element

Walking is the most affordable and accessible of all transportation modes. It is also clean, low-impact, and healthy for the individual. A safe and comfortable pedestrian environment allows people of all ages and abilities to travel independently. This chapter summarizes strategies used in evaluating the future needs of the city of Milwaukie's pedestrian network, recommends improvements for the network, outlines pedestrian needs for the next 20 years, and identifies projects that address the city's needs.

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 pedestrian access and connectivity:

- **Goal 1 Livability** guides the City to provide convenient, accessible and coordinated pedestrian facilities and to minimize barriers to pedestrian travel.
- **Goal 2 Safety** calls for the design and maintenance of safe and accessible walkways.
- **Goal 3 Provide Travel Choices** directs the City to provide an integrated network of walkways that connect people with transit.
- **Goal 4 Quality Design** calls for pedestrian facilities to be integrated with street and development planning in a context-sensitive manner.
- **Goal 5 Reliability and Mobility** calls for enhanced connectivity, which particularly benefits pedestrians.
- **Goal 6 Sustainability** guides the City to increase the use of walking as a low-impact form of travel.

NEEDS

There are generally three different types of pedestrian trips - residential, service, and recreational trips. The deficiencies in Milwaukie's pedestrian system affect each group differently, but common to all three are the needs for connectivity, access and safety. The most common overall need is to provide a safe and interconnected system that makes pedestrian travel a viable option, especially for residential trips less than one-half mile in length and recreational trips less than one mile in length.

Connectivity

Milwaukie's pedestrian network is disconnected, largely due to the lack of convenient crossings of large regional facilities - Highways 99E, 224, and the Union Pacific Railroad. Without direct connections across these barriers, pedestrians are forced to travel out of direction and sometimes use busy arterial and collector streets to meet their destinations. Even where pedestrian crossings do exist, many are deficient. Improvements are needed in two key areas - crossing improvements at most highways, railroads and arterials,[1] and connections to schools, parks and transit routes.

Facilities

Throughout Milwaukie, pedestrian facilities are disconnected and deficient. Although some arterial and collector streets in the city provide limited sidewalks as shown in Figure 3-2, the north and east areas have many collectors and arterials lacking sidewalks. Many of the neighborhood and local streets throughout the city do not have pedestrian facilities. The perimeter of the city is well-served by two off-street multiuse paths, the Springwater Trail and the Milwaukie Riverfront trail, though gaps in the trail network exist to the east and south. Improvements are needed throughout the city, but especially on key connecting corridors that link neighborhoods to schools, parks, and commercial centers.

Policy

City policy directs most development to fill in sidewalk gaps directly adjacent to new development. There is currently no policy to allow development to fill gaps in the pedestrian network if the gap is not adjacent to the developing site. The City should explore a different policy to collect fees from new development to help improve connections and crossings that may not be adjacent to the developing parcel.

FACILITIES

The most common type of pedestrian facility is a concrete sidewalk that is separated from the roadway by an extruded curb. Sidewalks must be built to current City of Milwaukie design standards and comply with the Americans with Disabilities Act, which requires at least four feet of unobstructed sidewalk.[2] Wider sidewalks are desirable to promote pedestrian travel on all roadways.

Some of Milwaukie's streets are not only important local connections, but are also designated as regionally important pedestrian streets. Streets identified in the Metro 2004 RTP as transit/mixed use corridors (streets in downtown Milwaukie, 17th Ave, Harrison St, King Rd, and 32nd Ave) are areas that are served by quality transit service and will generate substantial pedestrian traffic near neighborhood-oriented retail development, schools, parks, and bus stops. These corridors should include such pedestrian design features as wide sidewalks with buffering from traffic, pedestrian-scale lighting, benches, bus shelters, and street trees.

Milwaukie has three identified off-street multiuse paths in the Metro 2004 RTP regional trails and greenways system: the Springwater Trail, the Trolley Trail, and the Kellogg Creek greenway. The majority of the Springwater Trail within the city has been constructed. However, there is a gap between the Milwaukie section of the Springwater Trail and the section along the east bank of the Willamette River. The Trolley Trail, a project led by the North Clackamas Parks

[1] Any potential new crossing location would need to meet Oregon Department of Transportation (ODOT) crossing guidelines and criteria to make sure the crossing is warranted and safe.
[2] *Americans with Disabilities Act*, Uniform Building Code.

District, is currently under construction. These facilities will be designed and built according to regional standards, as well as local jurisdictional standards.

RECOMMENDATIONS

Strategies

Milwaukie's pedestrian system is challenged by an incomplete arterial/collector sidewalk system, a lack of local street connectivity, arterial crossings with potential safety and connectivity issues, and a lack of complete multiuse trails (see Chapter 3).

The City has several strategies for addressing pedestrian system needs and guiding project prioritization. The prioritization process helps to focus community investment on those projects that are most effective at addressing critical needs, while deferring other projects of lesser importance. The strategies for pedestrian facilities include:

- Key pedestrian corridors to connect neighborhoods with schools, parks, activity centers, and major transit stops;
- Arterial crossing and safety enhancements;
- Fill gaps in the network where some sidewalks exist;
- Pedestrian corridors that connect to major recreational uses;
- Enforcement of laws that protect pedestrians;
- Education about pedestrian safety and available walking routes.

These strategies would be implemented by projects that address needs and deficiencies. The projects fall into three categories:

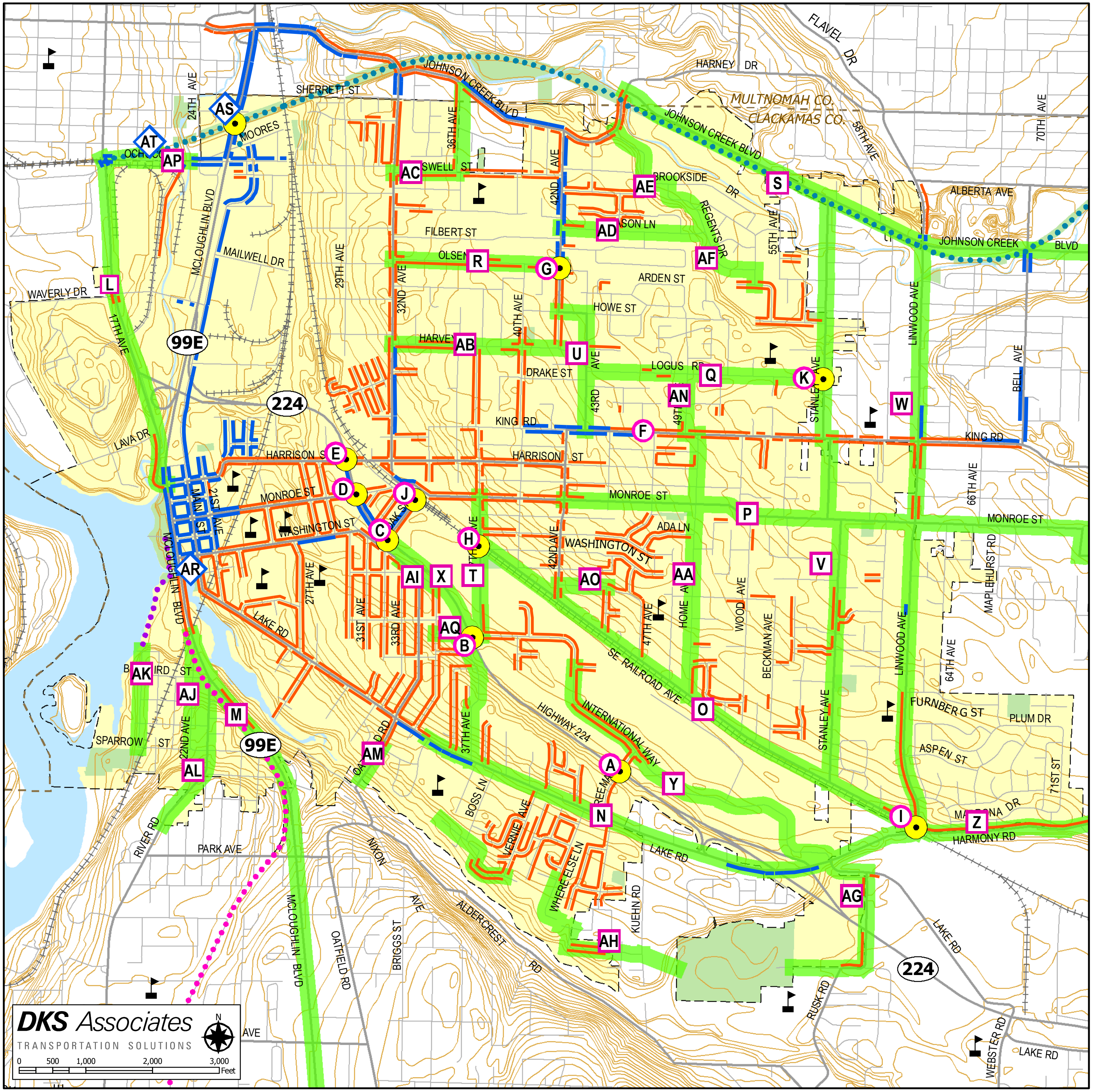
- **Capital:** projects that require construction of some sort of physical infrastructure. Capital projects typically require on-going maintenance that must be programmed into the maintenance schedule.
- **Operational:** projects which involve actions that make the existing transportation infrastructure more useable. They can 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.
- **Policy:** Projects that improve the pedestrian environment that typically do not result in a physical improvement, but rather in a fundamental change in the way pedestrian travel is perceived or treated within Milwaukie. Proposed policy projects are listed below.
    - Ensure overhanging vegetation and other sidewalk obstructions are removed; ensure sidewalk safety hazards are repaired.
    - Enforce speeding laws, utilizing tools such as photo radar, to make the streets generally safer; enforce laws related to pedestrian crossings and crosswalks.
    - Utilize safe routes to schools programs and resources to increase pedestrian safety around schools.
    - Support mixed-use development and services near residential areas to encourage walking; reexamine vehicle-centered policies, such as high amounts of required parking.

- Construct sidewalks or appropriate walkways everywhere; i.e., complete streets as development occurs or capital funds become available.
- Educate the general public about pedestrian safety; inform the general public about traffic laws related to pedestrians.

Master Plan

The Pedestrian Master Plan includes a list of projects that could address system needs and achieve the strategies for improving the pedestrian system. Some projects from the Master Plan were selected for inclusion in a Pedestrian Action Plan, which consists of projects that the community has identified for the City to give priority in allocating funding and/or pursuing additional funding. As development occurs, streets are rebuilt, and as other opportunities (grant programs) arise, projects on the Master Plan should be pursued as well.

The planning-level cost estimates provided for each project in Table 5-1 are based on general unit costs for transportation improvements but do not reflect the unique project elements that can significantly add to project costs. For each of these projects, the City will refine the cost estimate to include right-of-way requirements and costs associated with special design details.



CITY OF MILWAUKIE

Transportation System Plan

FIGURE 5-1

PEDESTRIAN MASTER PLAN

December 2007

LEGEND

Existing Sidewalks

- < 5 ft. Width
- 5 ft. - 10 ft. Width
- Springwater Trail
- Kellogg Creek Trail

Proposed Improvement

- Pedestrian Facilities
- Pedestrian Intersection Safety Improvement
- Trolley Trail

- Schools
- Major Roads
- Streets
- Railroad
- 10' Contours
- County Line
- Parks
- Water
- City Limits

PROPOSED PROJECTS

Improve Intersection to Increase Pedestrian Safety

- A Freeman Way/HWY 224
- B 37th Ave/HWY 224
- C Oak St/HWY 224
- D Monroe St/HWY 224
- E Harrison St/HWY 224
- F King Rd crossing improvements
- G Olsen St/42nd Ave
- H Railroad Ave/37th Ave
- I Harmony Rd/Lake Rd
- J Oak St/railroad tracks
- K Stanley Ave/Logus Rd

Provide Pedestrian Facilities Where Not Currently Present

See Table 5-1 for L - AQ project descriptions

Enhance Existing Pedestrian Connection

- AR Construct pedestrian underpass under HWY 99E at Kellogg Creek
- AS Improve ramp at Springwater Trail/HWY 99E
- AT Complete Springwater Trail along Ochoco St

Table 5-1 Pedestrian Master Plan Projects

Map ID[3]	Priority	Type	Project Name	Project Description[4]	From	To	Cost(s) $1,000s[5]
A	Low	C	Hwy 224 Intersection Improvements at Freeman Way	Improve pedestrian crossing.	Location specific	Location specific	$20
B	Low	C	Hwy 224 Intersection Improvements at 37th	Improve pedestrian crossing.	Location specific	Location specific	$20
C	Low	C	Hwy 224 Intersection Improvements at Oak	Improve pedestrian crossing.	Location specific	Location specific	$20
D	Low	C	Hwy 224 Intersection Improvements at Monroe	Improve pedestrian crossing.	Location specific	Location specific	$15
E	Low	C	Hwy 224 Intersection Improvements at Harrison	Improve pedestrian crossing.	Location specific	Location specific	$20
F	High	C	King Road Boulevard Treatments	Install street boulevard treatments: widen sidewalks and improve multiple crossings.	42nd Ave	Linwood Ave	$500
G	Low	C	Intersection Improvements at Olsen and 42nd	Improve pedestrian crossing.	Location specific	Location specific	$20
H	Low	C	Intersection Improvements at Railroad and 37th	Improve pedestrian crossing.	Location specific	Location specific	$10
I	Low	C	Intersection Improvements at Harmony and Lake	Improve pedestrian crossing.	Location specific	Location specific	$15
J	Med	C	Railroad Crossing Pedestrian Improvements at Oak	Improve intersection for pedestrians.	Location specific	Location specific	$15

[3] See Figure 5-1.
[4] The projects in this table assume traditional sidewalks on both sides of the street. In some cases it may be appropriate to construct a nontraditional pedestrian facility on one side of the street. See Chapter 10 Street Design for more information on the City's approach to designing pedestrian facilities.
[5] Project costs are in 2007 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[4]	From	To	Cost(s) $1,000s[5]
K	Low	C	Intersection Improvements at Stanley and Logus	Improve pedestrian crossing.	Location specific	Location specific	$15
L	High	C	17th Avenue Sidewalks	Fill in sidewalk gaps on both sides of street and improve intersections.	Ochoco St	McLoughlin Blvd	$920
M	Med	C	McLoughlin Boulevard Sidewalks	Fill in sidewalk gaps on both sides of street.	Washington St	Southern city limits	$596
N	Med	C	Lake Road Sidewalks	Fill in sidewalk gaps on both sides of street.	Kuehn Rd	Hwy 224	$2,049
O	High	C	Railroad Avenue Sidewalks	Fill in sidewalk gaps on both sides of street (part of Railroad Avenue road widening project).	37th Ave	Harmony Rd	$1,625
P	High	C	Monroe Street Sidewalks	Fill in sidewalk gaps on both sides of street.	42nd Ave	City limit	$1,631
Q	High	C	Logus Road Sidewalks	Fill in sidewalk gaps on both sides of street.	43rd Ave	49th Ave	$771
R	Low	C	Olsen Street Sidewalks	Fill in sidewalk gaps on north side of street.	32nd Ave	42nd Ave	$432
S	Low	C	Johnson Creek Blvd Sidewalks	Fill in sidewalk gaps on both sides of street.	Harney Dr	City limits	$378
T	Med	C	37th Avenue Sidewalks	Fill in sidewalk gaps on both sides of street.	Lake Rd	Harrison St	$794
U	Low	C	43rd Avenue Sidewalks	Fill in sidewalk gaps on both sides of street.	Howe St/42nd Ave	King Rd/43rd Ave	$550
V	High	C	Stanley Avenue Sidewalks	Fill in sidewalk gaps on both sides of street.	Johnson Creek Blvd	Railroad Ave	$4,304
W	Low	C	Linwood Avenue Sidewalks	Fill in sidewalk gaps on both sides of street (part of Linwood Avenue road widening project).	Johnson Creek Blvd	Railroad Ave	$2,960
X	Low	C	Hwy 224 Sidewalks	Fill in sidewalk gaps on both sides of street.	Oak St	37th Ave	$420
Y	Low	C	International Way Sidewalks	Fill in sidewalk gaps on both sides of street.	Criterion Ct	Lake Rd	$767
Z	Low	C	Harmony Road Sidewalks	Fill in sidewalk gaps on both sides of street.	Linwood Ave	City limits	$38
AA	Low	C	Home Avenue Sidewalks	Fill in sidewalk gaps on both sides of street.	Railroad Ave	King Rd	$756
AB	Low	C	Harvey Street Sidewalks	Fill in sidewalk gaps on both sides of street.	32nd Ave	42nd Ave	$534
AC	Low	C	Roswell Street Sidewalks	Fill in sidewalk gaps on both sides of street.	32nd Ave	36th Ave	$192
AD	Low	C	Mason Lane Sidewalks	Fill in sidewalk gaps on both sides of street.	42nd Ave	Regents Dr	$671

Map ID[3]	Priority	Type	Project Name	Project Description[4]	From	To	Cost(s) $1,000s[5]
AE	Med	C	Brookside Drive Sidewalks	Fill in sidewalk gaps on both sides of street.	Johnson Creek Blvd	Regents Dr	$15
AF	Low	C	Regents Drive Sidewalks	Fill in sidewalk gaps on both sides of street.	Brookside Dr	Winsor Dr	$494
AG	Low	C	Rusk Road Sidewalks	Fill in sidewalk gaps on both sides of street.	Lake Rd	North Clackamas Park	$662
AH	Low	C	Pedestrian Connection to North Clackamas Park	Create pedestrian connection between the school and the park.	North Clackamas Park	Rowe Middle School	$1,284
AI	Low	C	Washington Street Sidewalks	Fill in sidewalk gaps on both sides of street.	35th Ave	37th Ave	$115
AJ	Low	C	22nd Avenue Sidewalks	Fill in sidewalk gaps on both sides of street.	McLoughlin Blvd	Sparrow St	$325
AK	Low	C	19th Avenue Sidewalks	Fill in sidewalk gaps on both sides of street.	Kellogg Creek Trail	Sparrow St	$305
AL	Low	C	River Road Sidewalks	Fill in sidewalk gaps on both sides of street.	McLoughlin Blvd	City limits	$626
AM	Low	C	Oatfield Road Sidewalks	Fill in sidewalk gaps on both sides of street.	Guilford Ct	City limits	$132
AN	Low	C	49th Ave Sidewalks	Fill in sidewalk gaps on both sides of street.	Logus Rd	King Rd	$250
AO	Med	C	Franklin Street Sidewalks	Install sidewalks on both sides of street to connect to Hector Campbell Elementary School.	42nd Ave	45th Ave	$200
AP	Low	C	Ochoco Street Sidewalks	Construct sidewalks on Ochoco Street to connect bus stops to Goodwill.	19th Ave	McLoughlin Blvd	$$$
AQ	Low	C	Edison Street Sidewalks	Fill in sidewalk gaps on both sides of street.	35th Ave	37th Ave	$116
AR	High	C	Kellogg Creek Dam Removal and Hwy 99E Underpass	Replace 99E bridge over Kellogg Creek, remove dam, restore habitat; construct pedestrian undercrossing between downtown Milwaukie and Riverfront Park.	Site specific	Site specific	$9,000
AS	Low	C	Springwater Trail Ramp Improvement at McLoughlin	Improve ramp at Springwater Trail and McLoughlin Blvd.	Location specific	Location specific	$15
AT	High	C	Springwater Trail Completion	Contribute to regional project to complete Springwater Trail ("Sellwood Gap") along Ochoco Street.	17th Ave	19th Ave	$80

Map ID[3]	Priority	Type	Project Name	Project Description[4]	From	To	Cost(s) $1,000s[5]
NA	Med	O	Pedestrian Walkway Signage	Provide maps and wayfinding signage on streets that identify ways to get around the city.	Citywide	Citywide	$10
NA	High	C	Downtown Streetscape Improvements	Install sidewalk bulbouts, lighting, and pedestrian amenities.	Downtown	Downtown	$6,700[6]
NA	Med	O	Pedestrian Walkway Amenities	Install amenities, such as benches, along key walking routes.	Citywide	Citywide	$50
NA	Low	C	Intersection Curb Ramp Improvements	Install curb ramps at all intersections with sidewalks.	Citywide	Citywide	$5

Notes:

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

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

[6] Estimated $500,000 per block face.

The Pedestrian Master Plan project list includes several enhanced pedestrian crossing projects. These crossings are located on major roadways with volumes and speeds that would require significant crossing enhancements based on published guidelines in the *Traffic Control Devices Handbook*.[7] Table 5-2 provides a description of possible crossing enhancements.

Table 5-2 Potential Measures for Enhancing Pedestrian Crossings

Improvement	Description	Illustration	Cost Range
Marked Crosswalk	White thermoplastic markings at street corner. Alternative material could include non-white color or textured surfaces.		$1,000 to $1,500 per crossing. Textured crossing materials beyond thermoplastic markings could be more expensive depending on materials used.
New Corner Sidewalk Ramp	Construct ADA compliant wheelchair ramps consistent with City standards.		$3,000 to $5,000 per corner.
Median Refuge	Construct new raised median refuge area. Minimum width 6 feet, and minimum length of 30 feet. Curb can be mountable to allow emergency vehicles to cross, if required.		$5,000 to $15,000 depending on overall length and amenities.
Pedestrian Countdown Timer Signal	Install supplemental pedestrian signal controls to indicate the time remaining before crossing vehicles get 'green' signal indication.		$1,000 per signal head
Curb Extensions	Construct curb extension on road segments with on-street parking. Reduces pedestrian crossing area, and exposure to vehicle conflicts.		$5,000 to $8,000, depending on design amenities and aesthetic treatments.

Source: DKS Associates

[7] *Traffic Control Devices Handbook*, Institute of Transportation Engineers, 2001; Chapter 13, Table 13-2.

ACTION PLAN

The Pedestrian Action Plan identifies projects that are reasonably expected to be funded with local funds by 2030, which meets the requirements of the Transportation Planning Rule.[8] The Action Plan project list is the result of a citywide project ranking process. 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. The highest-ranking pedestrian projects that are reasonably expected to be funded (see Chapter 13) with local funds are shown in Table 5-3.

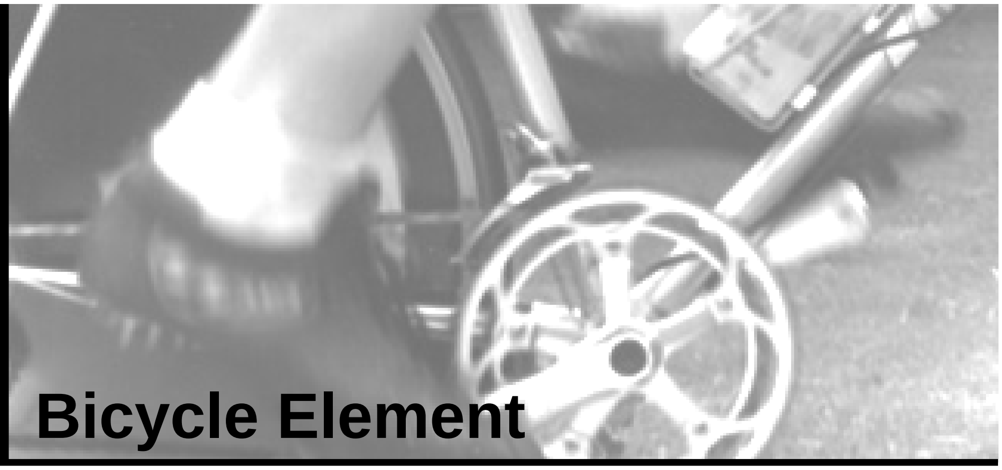
Table 5-3 Pedestrian Action Plan

Project Name	Project Description	From	To	Direct Funding or Grant Match
17th Avenue Sidewalks	Fill in sidewalk gaps on both sides of street and improve intersections.	Ochoco St	McLoughlin Blvd	Direct
Springwater Trail Completion	Contribute to regional project to complete Springwater Trail ("Sellwood Gap") along Ochoco Street.	17th Ave	19th Ave	Direct
Logus Road Sidewalks	Fill in sidewalk gaps on both sides of street.	43rd Ave	49th Ave	Match
Kellogg Creek Dam Removal and Hwy 99E Underpass	Replace 99E bridge over Kellogg Creek, remove dam, restore habitat; construct pedestrian undercrossing between downtown Milwaukie and Riverfront Park.	Site specific	Site specific	Match
Monroe Street Sidewalks	Fill in sidewalk gaps on both sides of street.	42nd Ave	City limits	Match
Railroad Avenue Sidewalks	Fill in sidewalk gaps on both sides of street.	37th Ave	Harmony Rd	Match
Downtown Streetscape Improvements	Install sidewalk bulbouts, lighting, and pedestrian amenities.	Downtown	Downtown	Match
King Road Boulevard Treatments	Install street boulevard treatments: widen sidewalks and improve crossings.	43rd Ave	Linwood Ave	Match

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

REGIONAL TRANSPORTATION PLAN (RTP) COMPLIANCE

The projects identified in the Master Plan list and further refined in the Action Plan list are compatible with the 2004 Metro RTP. Specifically, the projects identified comply with Metro's goal for regional mobility and non-SOV modal targets.



6 Bicycle Element

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

TSP GOAL AND POLICY FRAMEWORK

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

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

NEEDS

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

Connectivity

The lack of east/west and north/south on-street bicycle facilities creates significant gaps in the bicycle system for travel both in and around the city. There are two east/west roadways that include bike lanes in the city: King Rd and Lake Rd. However, neither of these facilities reach the downtown area and/or connect with other facilities that could allow for travel to other destinations. There are also two north/south roadways that have bike lanes: Linwood Ave and 17th Ave. Similar to the east/west roadways, these corridors are not continuous.

Two off-street facilities serve Milwaukie (the Springwater Corridor and the Kellogg Creek Trail) but they also are not continuous. For example, while the connectivity of the Springwater Corridor was recently upgraded 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. The Kellogg Creek Trail connects the Milwaukie Riverfront area to the Island Station neighborhood, but doesn't easily connect to points south.

Major facilities such as McLoughlin Blvd, Highway 224, and the railroads create barriers to cycling through the city. This lack of connectivity (both on-street and off-street) causes significant problems for bicyclists and limits this mode of travel.

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 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," where actual treatments to the roadway are made that enhance the bicycle environment and make additional connections to bicycle destinations.

BICYCLE FACILITY IMPROVEMENT TOOLBOX

Types of Cyclists

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

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

Table 6-1 Bikeway Types

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

Bicycle Facility Design Considerations

Multiuse Paths

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

- 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.

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

Bike Lanes

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

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 6-1 Bicycle Signs and Markings

Bicycle Warning Signs

"Share the Road" Plaque

Bike Route Signs

Bicycle Pavement Markings

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

Bike boulevards generally utilize streets with lower traffic volumes and vehicle speeds, such as minor collectors or local streets that pass through residential neighborhoods. Traffic controls along a bike boulevard 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 also incorporate treatments to facilitate safe and convenient crossings of major streets. Bike boulevards work best in well-connected street grids, where riders can follow reasonably direct and logical routes. Bike boulevards also work best when higher-order, parallel streets exist to serve through vehicle traffic.

Milwaukie's bike boulevard 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)
- **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.

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

Bicycle Parking

Bicycle parking and storage facilities are an important component of an effective bicycle system. Lack of proper storage facilities discourages potential riders from traveling by bicycle. Bike racks should be located at significant activity generators including schools, parks, and commercial areas. 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 future MAX stations, downtown bus stops, or 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.
- Improve crossing safety and connectivity.
- Designate bike boulevards on lower-volume streets that connect major bicycle facilities and/or bicycle destinations.
- Maintain bike lanes, off-street paths, signage, and other facility improvements.
- Construct and improve multiuse paths for recreational and commuter use.
- Involve cyclists in the design and planning of bicycle and road facilities.
- Educate cyclists and motorists about bicycle routes, laws, and opportunities.

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

Capital

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

Key projects

Several potential bike boulevard 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 and described below:

- Monroe St between downtown Milwaukie and Linwood Ave
- Stanley Ave between Railroad Ave and Johnson Creek Blvd
- A corridor roughly following 40th Ave north from Monroe St and then splitting into two separate corridors at Harvey St. One bike boulevard would continue north on 40th Ave and follow Olsen St and 42nd Ave to connect with Johnson Creek Blvd. The second bike boulevard 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 should connect to the south as well (see Figure 8-3a, which shows the future extension of 29th Ave).

- 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.

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

Operational

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

Key projects

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

Policy

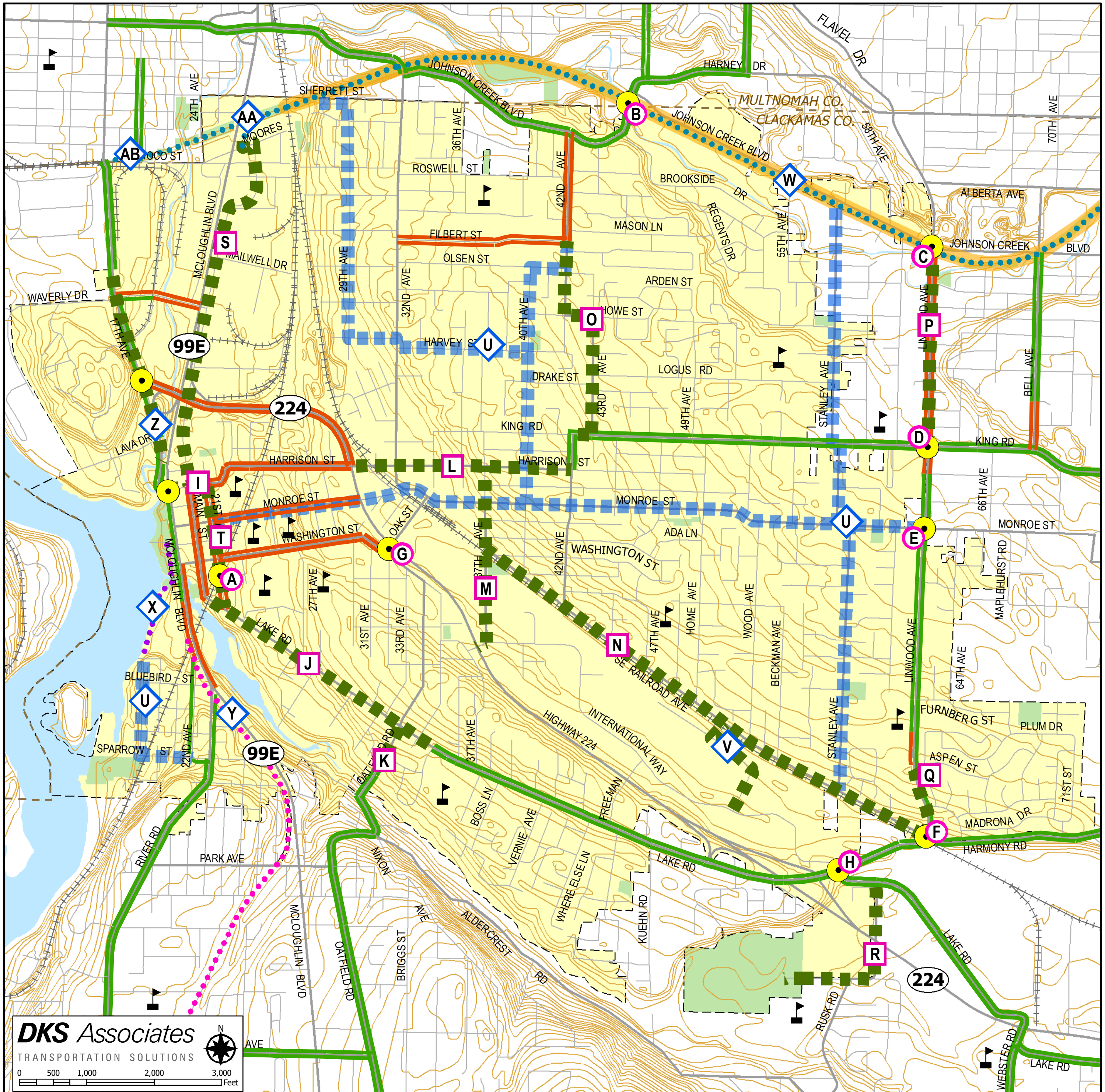
These projects do not typically improve the bicycle environment in a physical manner, but rather result in a fundamental change to the way bicycle travel is thought of and treated within the city of Milwaukie.

Key projects

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

Master Plan

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



CITY OF MILWAUKIE

Transportation System Plan

FIGURE 6-2

BICYCLE MASTER PLAN

December 2007

LEGEND

Existing Bicycle Facilities

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

Proposed Improvements

- Bicycle Intersection Safety Improvement
- Bicycle Corridor Enhancement
- Bike Boulevard
- Bicycle Lanes
- Trolley Trail

- Schools
- Major Roads
- Streets
- Railroad
- 10' Contours
- County Line
- Parks
- Water
- City Limits

PROPOSED PROJECTS

Improve Intersection to Increase Bicycle Safety

- A Adams St/21st Ave/Railroad Crossing
- B Johnson Creek Blvd/Springwater Trail
- C Johnson Creek Blvd/Linwood Ave
- D Linwood Ave/King Rd
- E Linwood Ave/Monroe St
- F Linwood Ave/Harmony Rd
- G Washington St/Oak St/HWY 224
- H International Way/Lake Rd

Provide Bicycle Lanes Where not Currently Present

- I Harrison St from HWY 99E to 21st Ave
- J Lake Rd from Main St to Guilford Dr
- K Oatfield Rd from Guilford Ct to Lake Rd
- L Harrison St from HWY 224 to 42nd Ave
- M 37th Ave from Harrison St to HWY 224
- N Railroad Ave from 37th Ave to Linwood Ave
- O 43rd Ave from King Rd to Filbert St
- P Linwood Ave from Queen Rd to Johnson Creek Blvd
- Q Linwood Ave from approximately Juniper St to Harmony Rd
- R Rusk Rd from Lake Rd to North Clackamas Park
- S Main St from Harrison St to Moores St
- T 21st Ave from Harrison St to Lake Rd

Enhance Existing Bicycle Connection

- U Install Bike Boulevard treatments at various locations
- V Construct bicycle overpass from Railroad Ave to International Way
- W Improve Springwater Trail paving
- X Improve Kellogg Creek Trail
- Y Install Trolley Trail signage
- Z Fill in gaps in exisiting bike network with bike lanes or multiuse path. Improve intersection safety on 17th Ave at HWY 224 and at 99E.
- AA Improve ramp at Springwater Trail/HWY 99E
- AB Complete Springwater Trail along Ochoco St

Table 6-2 Bicycle Master Plan Projects

Map ID[3]	Priority	Type	Project Name	Project Description	From	To	Cost(s) $1,000s[4]
A	Low	C	Intersection Improvements at Adams and 21st	Improve safety of crossing at intersection.	Location specific	Location specific	$10
B	Low	C	Springwater Corridor Intersection Improvements at 45th	Improve safety of crossing at intersection.	Location specific	Location specific	$10
C	Low	C	Intersection Improvements at Johnson Creek Blvd and Linwood	Improve safety of crossing at intersection.	Location specific	Location specific	$10
D	Low	C	Intersection Improvements at Linwood and King	Improve safety of crossing at intersection.	Location specific	Location specific	$10
E	Low	C	Intersection Improvements at Linwood and Monroe	Improve safety of crossing at intersection.	Location specific	Location specific	$10
F	Low	C	Intersection Improvements at Linwood and Harmony	Improve safety of crossing at intersection.	Location specific	Location specific	$10
G	High	C	Hwy 224 Crossing Improvements at Oak and Washington	Improve intersection crossing safety for cyclists at Washington Street and Oak Street.	Location specific	Location specific	$10
H	Low	C	Intersection Improve-ments at International Way and Lake Road	Improve safety of crossing at intersection.	Location specific	Location specific	$10
I	Med	C	Harrison Street Bike Lanes	Fill in gaps in existing bicycle network with bike lanes (cost included with Harrison Street road widening project).	Hwy 99E	21st Ave	NA
J	Low	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
K	Low	C	Oatfield Road Bike Lanes	Fill in gaps in existing bicycle network with bike lanes.	Guilford Ct	Lake Rd	$348

[3] See Figure 6-2
[4] Project costs are in 2007 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]
L	Low	C	Harrison Street Bike Lanes	Fill in gaps in existing bicycle network with bike lanes.	Hwy 224	42nd Ave	$13
M	Low	C	37th Avenue Bike Lanes	Fill in gaps in existing bicycle network with bike lanes.	Harrison St	Hwy 224	$2,900
N	High	C	Railroad Avenue Bike Lanes	Fill in gaps in existing bicycle network with bike lanes (cost included with Railroad Avenue road widening project).	37th Ave	Linwood Ave	NA
O	Low	C	43rd Avenue Bike Lanes	Fill in gaps in existing bicycle network with bike lanes.	King Rd	Filbert St	$1,014
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
Q	Low	C	Linwood Avenue Bike Lanes (south)	Fill in gaps in existing bicycle network with bike lanes.	Juniper St	Harmony Rd	$296
R	Low	C	Rusk Road Bike Lanes	Fill in gaps in existing bicycle network with bike lanes.	Lake Rd	North Clackamas Park	$936
S	Med	C	Main Street Bike Lanes	Fill in gaps in existing bicycle network with bike lanes.	Harrison St	Moores St	$2,131
T	Low	C	21st Avenue Bike Lanes	Fill in gaps in existing bicycle network with bike lanes.	Harrison St	Lake Rd	$50
U	High	C	29th/Harvey/40th Bicycle Boulevard	Designate as a Bicycle Boulevard and install bicycle boulevard improvements.	Springwater Trail	Monroe St	$200
U	High	C	Monroe Bicycle Boulevard	Designate as a Bicycle Boulevard and install bicycle boulevard improvements.	21st Ave	Linwood Ave	$300
U	Med	C	Stanley Avenue Bicycle Boulevard	Designate as a Bicycle Boulevard and install bicycle boulevard improvements.	Springwater Trail	Railroad Ave	$300
U	Med	C	19th and Sparrow Bicycle Boulevard	Designate as a Bicycle Boulevard and install bicycle boulevard improvements. This would connect the south end of Kellogg Creek Trail to River Rd.	Eagle St	River Rd	$737
V	Low	C	Bicycle and Pedestrian Overpass	Establish a dedicated bicycle and pedestrian connection across Railroad Avenue and the railroad tracks.	Railroad Ave	International Way	$2,025
W	Med	C	Springwater Trail Paving Project	Improve corridor through repaving existing trail.	29th Ave	Linwood Ave	$500
X	Low	C	Kellogg Creek Trail Improvements	Resurface trail and provide wayfinding signage to/from trail.	Milwaukie Riverfront	Treatment Plant	$623
Y	Low	C	Trolley Trail Signage	Design and install Trolley Trail signage.	Milwaukie Riverfront	Southern city limits	$54
Z	High	C	17th Avenue Bikeway and Intersection Safety Improvements	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

Map ID[3]	Priority	Type	Project Name	Project Description	From	To	Cost(s) $1,000s[4]
AA	Low	C	Springwater Trail Ramp Improvement at McLoughlin	Improve ramp at Springwater Trail and McLoughlin Blvd.	Location specific	Location specific	$15
AB	High	C	Springwater Trail Completion	Contribute to regional project to complete Spring-water Trail ("Sellwood Gap") along Ochoco Street.	17th Ave	19th Ave	$80
NA	Low	C	Kronberg Park Trail	Construct multimodal trail along Kellogg Creek connecting Kronberg Park to downtown Milwaukie.	McLoughlin Blvd	Downtown	$1,200
NA	High	C	Bike Route Signage	Install neighborhood bike route signage.	Citywide	Citywide	$150
NA	High	O	Bike Lane Maintenance	Sweep bike lanes to remove debris.	Citywide	Citywide	$1100
NA	Low	O	Bicycle-friendly Street Grates	Install bicycle-friendly street grates.	Citywide	Citywide	$50
NA	Low	O	Milwaukie Bike Map	Produce a Milwaukie Bike Map.	Citywide	Citywide	$50
NA	Low	O	Police Enforcement on Drivers	Enforce laws related to bike lanes and bicycle safety.	Citywide	Citywide	$10
NA	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
NA	Low	C	Springwater Trail Signage	Install wayfinding signage for Springwater Trail.	Citywide	Citywide	$15
NA	Low	O	North Clackamas Greenway Corridor Study	Study feasibility of corridor for multiuse path construction (possibly along Kellogg Creek).	Downtown	Clackamas Regional Center	$50
NA	Med	O	Cyclist Education	Promote cycling through bike use and route selection education.	Citywide	Citywide	$10
NA	Med	O	Community Bicycle Rides	Coordinate community bike rides to encourage bike use.	Citywide	Citywide	$5

Notes:

C = Capital Project | High = High priority
O = Operational Project | Med = Medium priority
P = Policy Project | Low = Low priority

Action Plan

The Bicycle Action Plan identifies projects that are reasonably expected to be funded with City funds by 2030, which meets the requirements of the updated Transportation Planning Rule.[5] The Action Plan project list is the result of a citywide project ranking process. 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. The highest-ranking bicycle projects that are reasonably expected to be funded (see Chapter 13) are shown in Table 6-3.

Table 6-3 Bicycle Action Plan

Project Name	Project Description	From	To	Direct Funding or Grant Match
29th/Harvey/40th Bicycle Boulevard	Designate as a Bicycle Boulevard and install bicycle boulevard improvements.	Springwater Trail	Monroe St	Direct
Bike Route Signage	Install neighborhood bike route signage.	Citywide	Citywide	Direct
Bike Lane Maintenance	Sweep bike lanes to remove debris.	Citywide	Citywide	Direct
Monroe Bicycle Boulevard	Designate as a Bicycle Boulevard and install bicycle boulevard improvements.	21st Ave	Linwood Ave	Match
17th Avenue Bikeway and Intersection Safety Improvements	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	Match

REGIONAL TRANSPORTATION PLAN (RTP) COMPLIANCE

The projects identified in the Master Plan list and further refined in the Action Plan list are inline with the Metro Regional Transportation Plan. Specifically, the projects identified are in line with Metro's goal for regional mobility and non-single occupant vehicle modal targets.

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

7 Public Transit Element

This chapter summarizes the public transit needs within the city of Milwaukie and recommends improvements for addressing those needs over the next 20 years.

INTRODUCTION

Milwaukie's public transit policies support transportation, land use, economic development, and environmental goals. The availability, convenience and desirability of public transit are key aspects of a system that must support the movement of people to, from, and through Milwaukie. Transit trips reduce single-occupant vehicle trips (which reduces traffic and energy consumption), serve community members who cannot drive (including the elderly, disabled and youth), and minimize transportation system impacts to the environment, such as vehicle emissions and soil and water pollution from impervious surface runoff.

Job creation and retention in the city are also influenced by Milwaukie's transit service. So too are the City's revitalization goals for the downtown, which rest on a moderately dense, mixed use land use pattern. The availability of high quality and dependable transit enables the development of more downtown land for new housing and commercial space with relatively less land being consumed for parking.

TSP GOALS AND POLICY FRAMEWORK

The overall transportation system and the city itself are enhanced as the public transit system improves. Several of the goals of this TSP (see Chapter 2) establish refined policies that assert the importance of transit to the success of the whole transportation system:

- **Goal 1 Livability** calls for a transportation system that is accessible to all members of the community
- **Goal 3 Provide Travel Choices** directs the City to collaborate with transit providers to improve transit service and to generally support projects that reduce dependence on single occupant vehicles.
- **Goal 4 Quality Design** requires developers to build appropriate transit-supportive improvements
- **Goal 6 Sustainability** guides the City to develop an energy efficient transportation system that minimizes environmental impacts.
- **Goal 7 Efficient and Innovative Funding** calls for a cost-effective transportation system.

- **Goal 8 Compatibility** directs the City to coordinate with TriMet and other transit providers to plan for improvements to transit service.
- **Goal 9 Economic Vitality** insists that transportation facilities be built to support the land uses outlined in the Comprehensive Plan, such as the Town Center concept for downtown.

The City's Comprehensive Plan establishes the policy framework for providing transit and integrating it with other transportation modes and adjacent land uses. These policies can be found in the Air, Water and Land Resources Quality Element, Economic Base and Industrial/Commercial Land Use Element, Neighborhood Element and the Transportation, Public Facilities and Energy Conservation Element. The Comprehensive Plan includes several specific directions for guiding the City to a complete transit system, as well as general goal statements and policies toward the same end. In sum, the policies are:

- **Travel Related:** Reduction of congestion, improved connectivity between Milwaukie and Portland.
- **Access Related:** Accommodation of elderly and disabled citizens, service to all neighborhoods, pedestrian and bicycle connections to transit stops and routes.
- **Land Use Related:** Increased density of housing and jobs near transit facilities.
- **Transit Experience Related:** Ensure transit facilities are safe, well-maintained, and convenient.
- **Environment Related:** Reduction of regional air pollution and development of a compact, walkable downtown.
- **Planning Related:** Require new development to provide transit amenities as appropriate, prioritize street improvements on transit streets, coordinate on regional transit initiatives including high-capacity transit planning and coordinate with TriMet on service delivery and facility improvements.

The TSP affirms these goals, and supports them by identifying system deficiencies and needs, new service enhancements, capital improvements and policy improvements.

NEEDS

The transit system in Milwaukie must achieve five goals for it to be a complete system. A complete transit system in Milwaukie would provide or allow for:

1. Service for the greatest number of potential users
2. Service for the neediest citizens
3. A safe experience for all users
4. Convenient service

Transit Coverage and Service

TriMet is the regional transit provider for the Portland metro area and provides transit service to and from Milwaukie, with eleven bus routes: 28, 29, 31, 32, 33, 34, 41, 70, 75, 99, and 152. These routes, their approximate headways (time between arrivals), and the locations of stops, shelters, and the transit center and park-and-rides are shown in Figure 7-1.

The preponderance of transit needs in Milwaukie can be divided into two categories: new service (where there isn't any today) and enhanced services (where more service is desired). As described in Figure 7-1, most of Milwaukie currently enjoys nearby bus service. Eleven bus routes currently run through the city, with buses making frequent stops and providing most of the city's neighborhoods with weekday service. The exceptions are in portions of the Hector

Campbell, Linwood, and Lewelling neighborhoods (shown in red on Figure 7-1) which have pockets that are outside a 1/4 mile walk distance to the nearest bus stop. These portions of Milwaukie, approximately 13 percent its land area, will only be served with the establishment of new, proximate bus routes and stops.

Figure 7-2 illustrates the second category of need, showing how service levels drop on existing routes during the weekend when the same criteria are applied (1/4 mile walk distance to nearest bus stop). Because five of the eleven bus lines do not run on the weekend, nearly the entire southern half of the city is left without convenient bus service. Even during periods of maximum service (called peak times), several lines do not run frequently enough to meet the needs of the Milwaukie transit users.[1] During peak hours, only six of the eleven bus routes operate with headways of 30 minutes or less, while the remaining five lines operate with headways greater than 30 minutes.

[1] Headways have been criticized, for example, as too great (i.e. too much waiting) for the routes serving Lake, Oatfield, and Harvey.

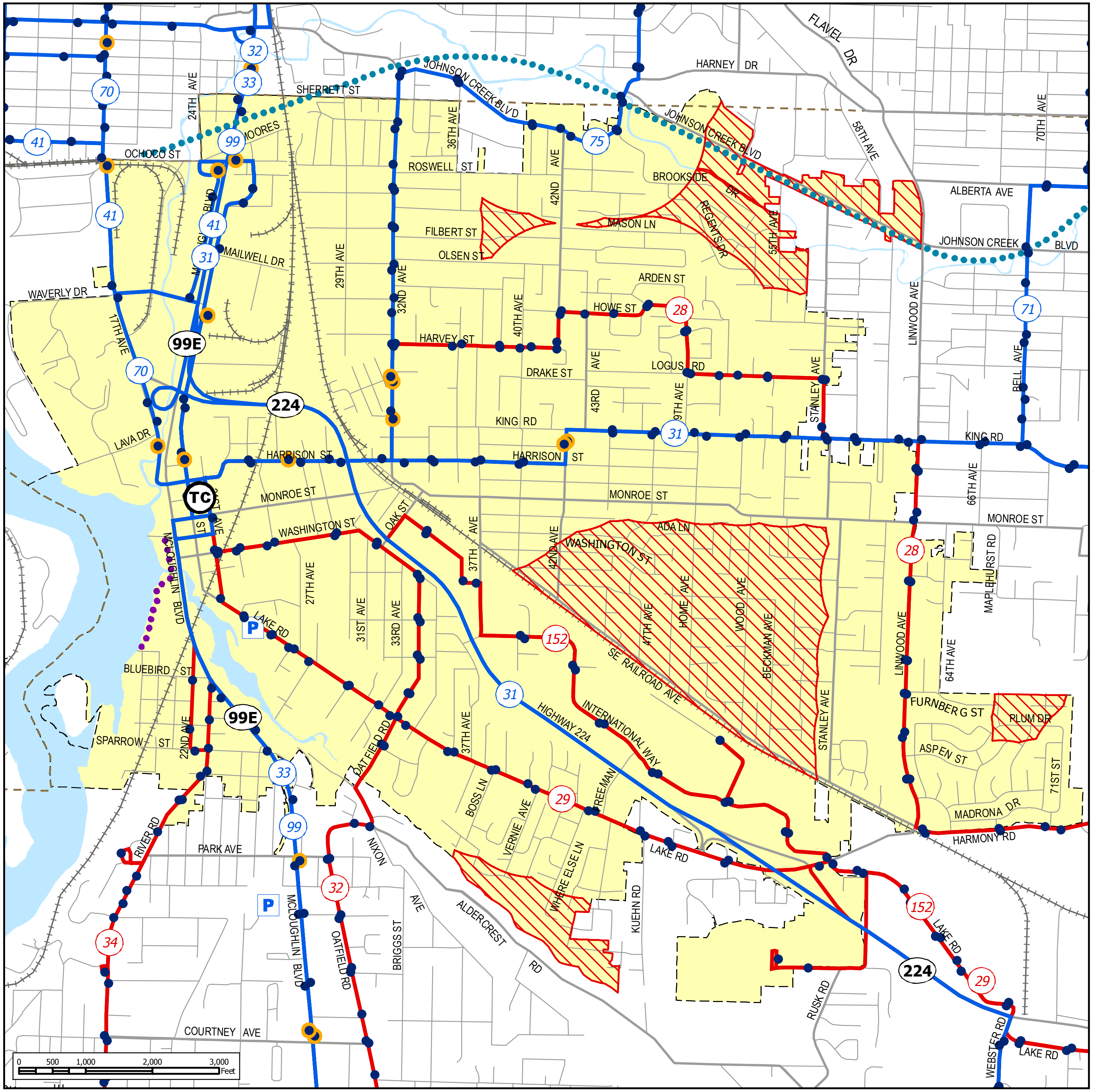
CITY OF MILWAUKIE

Transportation System Plan

FIGURE 7-1

TRANSIT COVERAGE

December 2007



LEGEND

Transit Facilities

- ## Bus Routes < 30 Min. Frequency
- ## Bus Routes > 30 Min. Frequency
- > 1/4 Mile Walk to Bus Stop during Peak Operating Hours
- TC Transit Center
- Stop
- Shelter
- P Park and Ride

Other Map Elements

- Major Roads
- Streets
- Railroad
- Springwater Corridor
- Kellogg Creek Trail
- County Line
- Water
- City Limits

N

DKS *Associates*

TRANSPORTATION SOLUTIONS

MILWAUKIE

Transportation System Plan

FIGURE 7-2

OFF-PEAK TRANSIT COVERAGE

December 2007

LEGEND

Transit Facilities

- Bus Routes, Off-Peak Hours < 60 Min. Frequency
- Bus Routes, Off-Peak Hours > 60 Min. Frequency
- > 1/4 Walk to Bus Stop during Off-Peak Hours
- Transit Center
- Stop
- Shelter
- Park and Ride

Other Map Elements

- Major Roads
- Streets
- Railroad
- Springwater Corridor
- Kellogg Creek Trail
- County Line
- Water
- City Limits

Note: Bus routes that do not run during off-peak hours are not shown.

DKS Associates
TRANSPORTATION SOLUTIONS

Transit Supportive Facilities

Many TriMet facilities in Milwaukie are in need of improvement. Certain bus stops are perceived as unsafe, either because of their proximity to unpleasant site or traffic conditions, isolated location, low ridership, lack of supporting nearby land uses, or neglected physical condition. This situation is most intensely observed at the downtown transit center, where bus riders report feeling unsafe because the physical layout of the facility is perceived as uncomfortable and conducive to loitering and other non-transit-related activities. The laying over of buses on downtown streets is viewed as part of the problem, unnecessarily expanding the presence of buses while reducing the possibility for on street parking or downtown redevelopment and related pedestrian activity.

Park-and-ride facilities in the city are insufficient for Milwaukie commuters, causing these commuters to seek parking downtown, on neighborhood and collector streets, or to dispense with transit options entirely. Bike parking facilities are also reported as inadequate at existing park-and-rides.

Gaps in city facilities, especially sidewalks, contribute to underutilization of the transit system. Every transit user is a pedestrian, since many people arrive at bus stops on foot, and all wait for buses in the pedestrian realm. While the transit system does not require sidewalks on every street in the city, it is vastly improved when sidewalks are provided on both sides of streets with bus stops, and at least one sidewalk on local streets that connect to transit stops. Good lighting is essential for safety and visibility.[2] Finally, the City should maintain clear striping of bike lanes where bus routes and bike routes are co-located on a street (although this situation should be avoided where possible).

System Deficiencies

Though transit service in Milwaukie needs to be improved in many ways, its greatest deficiencies are in the areas of Service Levels, Safety, and Convenience of Service. Several factors contribute to this perception, and point to the community's desired areas of improvement:

- New routes are needed to serve the Hector Campbell, Linwood and Lewelling neighborhoods where the nearest bus stops are more than a 1/4 mile walk away. This is an environmental justice issue as well as a livability issue for people living in these transit-deficient pockets.
- Additional runs (i.e. increased frequencies or shorter headways) are needed for many routes, especially on evenings and weekends.
- Bus shelters or improved shelters and related features are needed for certain locations, notably where daily boardings exceed TriMet's standards for shelter upgrades.
- The downtown Transit Center needs to be "dissolved," by establishing a bus layover facility somewhere outside of the downtown and improving the bus stop facilities (shelters, benches, etc.) that will remain downtown.
- More park-and-ride parking lots are needed in certain locations.

[2] Bus stop lighting is typically provided by nearby streetlights, if the street is well lit. However, nighttime illumination can still be poor or nonexistent, and the cost of hard-wiring bus stops with lights is significant and impractical in many locations. TriMet has recently started to install solar lighting systems primarily along frequent bus corridors, using environmentally friendly LED (light emitting diodes) inside select shelters. The city should work with TriMet to have these systems installed where needed in Milwaukie.

- High capacity transit (light rail) is needed for the McLoughlin corridor, extending south of downtown Milwaukie with a large park-and-ride that can intercept northbound park-and-riders before reaching the city.
- Bus rapid transit is needed for routes to connect with Oregon City and Clackamas Town Center.
- Coordination between bicycle facilities and transit services is needed.
- The expansion of Milwaukie's sidewalk system needs to consider the importance of sidewalks on transit streets and local streets adjacent to transit streets.
- Convenient service needs to serve Milwaukie's significant elderly population.

RECOMMENDATIONS

The City's policies on public transit, compared to the current state of the system, reveal a disparity between the City's goals for transit service and use, and the system's ability to meet those goals today. To close this gap, the City and TriMet should simultaneously pursue three types of improvements that will increase transit service and benefit Milwaukie residents, employees, and the greater population:

- **Service Enhancements:** Make transit more convenient for users through new routes and stops, and enhanced service on established routes.
- **Capital Improvements:** Enhance the transit experience for users. These improvements take the form of capital projects that upgrade transit facilities in the city (e.g. shelters, bus stops, park-and-rides).
- **Policy Improvements:** Establish new policies or policy direction that clarifies and expands how the City can help facilitate transit use and a transit experience that better meets the needs of local system users.

The City and TriMet are collaborators in making these improvements, although their relative interests and authorities are shared in differing proportions for each. Service Enhancements are largely in TriMet's control, with the City providing direction and little else. Policy Improvements have the opposite character, as these are within the City's realm of authority, with the transit agency providing input. Implementation of Capital Improvements is more equally shared, with the two entities working closely together to select and construct the improvements with funds from either government or a third party grantor to which either or both governments may apply.

A complete list of all three improvement types is included as Table 7-1, Master Plan Projects. The high priority Service Enhancement and Capital Improvement projects are illustrated in Figure 7-3. The high priority recommendations are also summarized below.

Service Enhancements

TriMet's service enhancements are determined through its five-year Transit Investment Plan (TIP), which lays out the agency's strategies and programs to meet regional transportation and livability goals. The Regional Transportation Plan and local Transportation System Plans guide the TIP, which is updated annually and seeks to meet current and future demands for service. Through its TIP updates, TriMet partners with jurisdictions like Milwaukie to develop criteria for expanding transit service. The City should coordinate with TriMet on the annual TIP update process on the programming of Milwaukie's desired service enhancements.

Two new east-west bus routes are envisioned for Milwaukie, one utilizing Johnson Creek Blvd east of 42nd Ave, and one utilizing Railroad Ave. The Johnson Creek line would extend to 82nd Ave to serve the numerous jobs between 42nd and 82nd Aves and connect with the I-205 MAX line.

The Railroad Ave route would require a complete upgrade of the street itself, with sidewalks, stormwater drainage, and bus shelters. The route is envisioned to connect to the east with Harmony Rd, to serve Clackamas Community College, Clackamas Town Center and the eastern suburbs. downtown Milwaukie is envisioned as the western terminus for the new line (see Figure 7-3).

A third east-west service enhancement—bus rapid transit—is requested for the Line 31 rush hour route, which utilizes Highway 224. TriMet anticipates that this part time route will convert to high frequency service with the opening of I-205 light rail in 2009, subject to available funding for operations and bus fleet expansion.

Service enhancements for north-south routes include conversion of Lines 33 and 99 in the McLoughlin Blvd corridor to high frequency service (i.e. light rail)[3] (with continued high frequency transit to Oregon City), and extending service on Linwood Ave north of King Rd, continuing on Flavel Dr into Portland.

In general, more service is desired on existing routes. Reduced headways (more frequent bus runs) are desired for the routes serving Lake Rd, Oatfield Rd, Linwood Ave, International Way, and Logus Rd. Additionally, weekend service is desired for more routes, including those serving King Rd, Oatfield Rd, McLoughlin Blvd, 17th Ave, and 32nd Ave.

Other service enhancements would improve the reliability and/or ridership on Milwaukie transit routes. These include extending the hours of service for certain routes (e.g. between 6 p.m. and 10 p.m.), adding Transit Tracker technology at more stops, and establishing transit priority intersections along transit corridors.[4] Where TriMet can improve its system efficiencies and operations, for instance through signal prioritization, interlining routes, curb extensions and other similar devices, the City will provide willing consultation and collaboration. The City acknowledges that the transit system is a regional entity and that service enhancements that benefit the overall system are generally a benefit to the City's small piece of the system.

Capital Improvements

Capital improvements within Milwaukie can be thought of as user amenities that improve the convenience and attractiveness of the transit system, which in turn bolsters ridership. Typical examples of capital improvements include Park-and-rides, bus shelters, attractive signage with timetable information, benches, bike racks, trash receptacles, and public art.

The selection of capital improvements depends on needs and availability of funds. TriMet prioritizes bus stop upgrades, for example, based on the number of boardings at the location,

[3] "High Capacity Transit" generally refers to Light Rail Transit and/or Bus Rapid Transit and typically carries more passengers with larger vehicles and/or more frequent service than a standard fixed route bus system. HCT can operate along exclusive rights-of-way such as a rail track or dedicated busway, or on existing streets with mixed traffic. The main goal of HCT is to provide faster, more convenient, and more reliable service for a larger number of passengers.

[4] "Transit Tracker" is the name of TriMet's Global Positioning System technology for tracking how far a bus or MAX train is from a stop. This real-time information is then made available to riders on the street via electronic displays installed in bus shelters and MAX stations, online, or over the phone. "Transit Priority Intersections" enable preferential treatment of buses at intersections by extending the green time along the bus route, or actuating the green light at intersections upon detection of an approaching bus.

the type of service provided at the location (e.g. local bus, express bus, frequent bus, MAX, etc.) and special circumstances such as the presence of a nearby senior center.

Most of the bus stops in Milwaukie are considered "basic stops," and currently have minimal amenities (poles with signs only and a schedule display). TriMet typically provides a shelter at a bus stop that sees an average of 35 daily boardings.[5] Based on 2006 boarding data, there is one stop in Milwaukie that should have a shelter but does not: Harrison St/24th Ave.[6] This stop should be upgraded to a shelter.

The user amenities at the transit center in downtown Milwaukie are substandard according to TriMet's Bus Stop Amenities Development Criteria and Bus Stop Classification Guidelines. Because the existing transit center sees over 4,800 weekly boardings and is a major transfer hub, the existing transit center should have a full range of both bus stop features and externally managed features (those not provided by TriMet). Bus stop features in a high use location like downtown Milwaukie would include customized shelters, trash cans, real time (Transit Tracker) displays, freestanding benches, bike racks and lockers, public phones, art work elements and ticket vending machines. Externally managed features should include crosswalks, curb extensions, low maintenance landscaping, and public restrooms.

The City and TriMet should work together to construct the complete set of bus stop features and externally managed features in downtown Milwaukie. The existing transit center would be effectively "dissolved" by adding these features, moving the downtown bus layover function out of the downtown core, and potentially disaggregating the location of the bus stops. In its place, downtown Milwaukie would see continued bus transfer activity, but at high quality stops with new, state of the art facilities. These capital improvements (a new bus layover facility and improved downtown user amenities) are Milwaukie's highest priority capital improvements for the transit system.

Park-and-ride lots are very valuable for commuters. There is currently one small shared-use park-and-ride in Milwaukie, located south of downtown on Lake Rd. This type of small, shared use park-and-ride is useful for residents making short car trips to connect with local bus service.

A second park-and-ride, the 300-plus space "Milwaukie" (Southgate) park-and-ride is scheduled to be constructed in 2008 and is located north of Highway 224 and east of McLoughlin Blvd. This type of park-and-ride is designed for regional use, attracting users from farther distances who are often seeking to connect with higher capacity transit service like frequent service bus, or light rail.

Additional park-and-ride lots of both types should be considered for better serving Milwaukie commuters and Clackamas County commuters bound for Portland. Suggested locations for large regional park-and-ride lots included McLoughlin Blvd/Park Ave and the K-Mart site at Highway 224/Johnson Rd. Potential sites for smaller park-and-ride lots, intended for Milwaukie residents, are at the southeast corner of Linwood Ave/King Rd, and on 37th Ave behind the Milwaukie Marketplace.

A downtown park-and-ride on Washington St between Main St and McLoughlin Blvd (on the former "Cash Spot" site) is a special case. A park-and-ride structure in this location could serve both local and regional transit users, as well as downtown employees and visitors. A structure of

[5] Although ridership is the primary criterion for determining shelter placement warrants, TriMet also considers other factors like LIFT service usage, funding and maintenance by others, development of adjacent property and opportunities for consolidating bus stops.
[6] The Linwood/King stop currently has 29 daily boardings, according to TriMet. The City and TriMet should track the data for this stop on an annual or semi-annual basis given the intensification of land use at the Wichita Shopping Center in 2007.

this type is envisioned to support the McLoughlin Blvd high frequency transit project (i.e. Portland-Milwaukie light rail), but under a special set of circumstances that would allow the City to share the facility for public parking, eventually phasing out the commuter parking as downtown Milwaukie develops (see Chapter 12, Downtown Parking).

Policy Improvements

By adopting policies that reinforce its transit goals and the improvements described in this TSP update, the City reaffirms its commitment to a complete transit system and takes new steps toward realizing that vision.[7] Key policy recommendations are described below. Other policy suggestions, each contributing toward establishing the complete system, are summarized in "Other Transit Policies."

"Dissolve" the Downtown Transit Center

Two transit policy recommendations received widespread support in the TSP update process. The first was discussed in the Capital Improvements section—elimination of the downtown transit center with the associated construction of a bus layover facility in a non-downtown location that creates minimal disturbance to nearby uses, and downtown bus facility improvements.

Serve the "Transit Disadvantaged" Portions of Milwaukie

The second high priority policy is the elimination of "transit disadvantaged" portions of the city, based on weekday peak hour service, by providing new transit service for these areas. The City's Comprehensive Plan currently establishes that transit service be convenient and accessible.[8] This policy improvement strengthens the City's position that underserved areas be the focus of new transit investments.

Provide Park-and-Rides Downtown and on Milwaukie's Fringe

Park-and-ride policies are suggested that would facilitate structured parking in downtown (see Downtown Parking chapter), and guide the size of new park-and-rides in other locations—smaller within the city to serve Milwaukie residents, and larger on the city's fringe to serve North Clackamas County commuters. These "fringe" park-and-rides, if associated with light rail, (such as that under study for Park Ave and McLoughlin Blvd) should be annexed to the City of Milwaukie to ensure effective and efficient policing.

Improve Transit Safety

The Milwaukie Police Department should be consulted and enlisted in the effort to ensure passengers' sense of safety at and on all TriMet facilities in the city. A policy should be adopted that specifically discourages loitering at transit facilities.

[7] The term "reaffirm" is emphasized here. The City of Milwaukie currently enacts several important transit-supportive policies and provisions located elsewhere in this TSP, in the Milwaukie Municipal Code (Section 19.1412.1) and the Comprehensive Plan. These include goals such as street connectivity (which enables bus routes and pedestrian access from neighborhood to transit streets), safe pedestrian crossings at regular intervals along principal roadways, development standards that implement state Transportation Planning Rule requirements for building entrances that face transit streets (not parking lots), and appropriate levels of density along transit streets to support transit use.

[8] This policy is included in the 2006 version of the Comprehensive Plan, as Transportation Element, Goal Statement 1. Proposed 2007 amendments to the Comprehensive Plan would list this as policy b under Goal 3, Travel Choices (see TSP Chapter 2).

Maintain Transit Facilities

The maintenance of transit facilities can be improved through the enlistment of city neighborhoods, through a policy that would enable Neighborhood District Associations to initiate improvements by contacting TriMet directly. The transit agency would, in turn, commit to make best efforts to complete the needed maintenance or repair.

Request Dedication for Bus Stop Improvements

The City already requires easements or dedications for new or upgraded bus stops when an adjacent site applies for land use or development permits. Where desired bus stop improvements are adjacent to sites being developed or redeveloped for which an easement or dedication is not required, City policy should be updated to ensure that easements or dedications are requested of project developers and property owners.[9] The NDAs can be effective advocates for the transit system in this process.

Reinvest Transit "Savings" Within Milwaukie

The city's level of transit service, while high, falls well short of achieving the goals of the community and the Comprehensive Plan. Consequently, the City takes the position that any savings derived from new capacity, (either through light rail, bus rapid transit, or other new enhancement) be contained and reinvested within the Milwaukie service area. The City would prefer that investments in service upgrades not all come in the form of route conversions to high frequency transit. Although these conversions are supported, the City's preference would be that savings associated with these conversions (from eliminated bus operations, for example), be retained and reinvested in needed bus system enhancements elsewhere in town. The ultimate goal of this policy would be to achieve a net gain of distributed service throughout the city—both through new projects like light rail, and increased bus service as a result of the new projects.

Other Transit Policies

- **Shared Use Park-and-Ride Facilities:** Explore the use of local church parking lots as park-and-ride facilities, in conjunction with a policy to suitably size these facilities based on their location.
- **Frequency of Service:** Add a policy to increase headways on all transit routes in the city so that buses run at least every 30 minutes.
- **Bike/Bus Connection:** Identify priority intersections for making connections between bike and bus transportation modes. Ensure that bike parking is installed at all park-and-ride facilities.
- **East-West Travel:** Add a policy that recognizes the need for east-west transit travel south of downtown Portland. Center-to-center commuting is an example of east-west travel.
- **Equitable Ticket Pricing:** Add a policy to ensure that ticket prices from park-and-rides south of downtown are the same as those north of downtown.
- **Interagency Coordination:** Continue to support the Milwaukie Center Bus Service and TriMet's LIFT service through interagency referrals, coordination, and signage as necessary.

[9] Frequently TriMet is unable to improve bus stops because the property required to make the improvement is privately owned.

Master Plan

TriMet's TIP includes many new services expansions in Milwaukie and the surrounding area over the next 20 years. The Transit Master Plan includes potential improvements identified by the transit working group, which included participation from TriMet. Table 7-1 summarizes the transit master plan for both capital projects and service enhancements.

CITY OF MILWAUKIE

Transportation System Plan

FIGURE 7-3

PUBLIC TRANSIT MASTER PLAN

December 2007

LEGEND

Existing Facilities

- Bus Stop
- Park and Ride
- Bus Route
- Bus Route Number

Proposed Improvements

- Park and Ride
- New or Rerouted Bus Route
- Bus Rapid Transit Route
- High Capacity Transit Route

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

Table 7-1 Public Transit Master Plan Projects

Priority	Type	Project Name	Project Description	From	To	Cost(s) $1,000s[10]
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	Identified bus route need.	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
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	Install transit shelter at Harrison and 24th, as this stop currently meets minimum boarding requirements.	Location specific	Location specific	TBD
Med	C	Bike Lane Striping	Stripe bike lanes on bus routes where bikes and buses share the road.	Citywide	Citywide	TBD
Med	SE	Weekend Service Improvements	Increase weekend bus service on bus lines #31, #32, #33, #70, and #75.	Citywide	Citywide	TBD
Low	C	Bus Shelter Safety Improvements	Add transit tracker and LED lighting units at main stops along bus routes.	Citywide	Citywide	TBD
Low	C	Hwy 224 Rapid Bus Improvements	Construct improvements that enhance rapid bus service east to Clackamas Town Center.	Milwaukie Town Center	Clackamas Town Center	TBD

[10] Project costs are in 2007 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.

Priority	Type	Project Name	Project Description	From	To	Cost(s) $1,000s[10]
Low	O	Milwaukie Transportation Management Association Program	Implement a transportation management association for employers.	Milwaukie Town Center	Milwaukie Town Center	$200
Low	O	Tualatin-Portland Commuter Rail Extension Study	Study feasibility of adding peak-hour only service on existing tracks.	Tualatin	Union Station via Lake Oswego and Milwaukie	TBD
Low	SE	Linwood/Flavel Bus Service	Identified bus route need.	Northern city limits	King Rd	TBD
Low	SE	Bus Line Service Improvements	Add frequent service to bus line #31. Add more runs to bus lines #152, #32, and #33 between 6pm and 10pm.	Location specific	Location specific	TBD
Low	SE	Transit Priority Signalization	Implement transit priority signalization along key transit corridors.	Citywide	Citywide	TBD
NA	C	Milwaukie Light Rail Extension or High Capacity Transit Improvements	Construct light rail or high capacity transit improvements between Portland and Milwaukie.	Rose Quarter MAX Station	Milwaukie Town Center	$880,000[11]
NA	C	McLoughlin Blvd Rapid Bus Improvements	Construct improvements that enhance rapid bus service south to Oregon City.	Milwaukie Town Center	Oregon City Town Center	TBD

Notes:
C = Capital Project High = High priority
SE = Service Enhancements Med = Medium priority
P = Policy Project Low = Low Priority
TBD = Costs to be determined. These projects are under the jurisdiction of and/or will be funded by TriMet.

[11] The 2004 Regional Transportation Plan (RTP) lists the cost of this project as $515,000,000.

Action Plan

The Transit Action Plan identifies projects that are reasonably expected to be funded with City funds by 2030, which meets the requirements of the updated Transportation Planning Rule.[12] The Action Plan project list is the result of a citywide project ranking process. 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. The highest-ranking public transit projects that are reasonably expected to be funded with City funds (see Chapter 13) are shown in Table 7-2.

Table 7-2 Public Transit Action Plan

Project Name	Project Description	From	To	Direct Funding or Grant Match
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	Match
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	Match

REGIONAL TRANSPORTATION PLAN (RTP) COMPLIANCE

The projects identified in the Master Plan list and further refined in the Action Plan list are in line with the Metro RTP. Specifically, the projects identified are in line with Metro's goal for regional mobility and non-SOV modal targets.

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

8 Auto Street Network Element

The Auto Street Network element of the TSP focuses on maintaining traffic flow and mobility on arterial and collector roadways, protecting residential neighborhoods from excessive through traffic and travel speeds, providing reasonable access to and from residential areas, improving safety, and promoting efficient through-street movement. This chapter summarizes strategies used to evaluate the future needs of Milwaukie's street network, and recommends projects to improve the operations of the motor vehicle system (automobiles, trucks, buses and other vehicles).

TSP GOAL AND POLICY FRAMEWORK

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

- **Goal 1 Livability** directs the City to protect residential areas from excessive speed, and minimize the "barrier" effect transportation facilities have on the community.
- **Goal 2 Safety** calls for the use of coordinated street design standards and access control measures.
- **Goal 3 Travel Choices** directs the City to integrate pedestrian and bicycle facilities into existing and new roadways.
- **Goal 4 Quality Design** addresses the need to relate the design of a street to its intended users.
- **Goal 5 Reliability and Mobility** directs the City to enhance street connectivity and maintain traffic flow, especially on arterials and collectors.
- **Goal 7 Efficient and Innovative Funding** calls for an emphasis on maintaining existing facilities.

FUNCTIONAL CLASSIFICATION

Any discussion of the City's street network should begin with the definition of the different types, or functional classifications. Functional street classifications encompass both the design characteristics of streets and the character of service the streets are intended to provide. The City's functional classifications form a hierarchy of streets ranging from those that are primarily for travel mobility (arterials) to those that are primarily for access to property (local streets). The functional classification system is developed with the recognition that individual streets do not act independently of each other but form a network of streets that work together to serve travel needs on a local, citywide and regional level.

These classifications guide design standards, levels of access, traffic control, law enforcement, and the provision for federal, state, and regional transportation funding. The City's functional classification system includes regional routes, arterials, collectors, neighborhood routes, and local streets. Figure 8-3a shows current functional classifications with proposed changes. Figure 8-3b shows updated functional classifications of all streets in Milwaukie with proposed changes. Table 8-1 described the general characteristics and functions of each of these classifications.

Table 8-1 City of Milwaukie Functional Classifications

Classification	Description	Typical Total Vehicles per Day	Typical Number of Lanes	Other Street Elements
Regional Routes	• High volume, generally high-speed facilities. • May be used for travel within the city, but typically they are used for trips between cities, especially those that are separated by a significant distance. • Rank high on the mobility scale because they have multiple travel lanes in both directions and limited access points. • Rank low on the access scale because access to private property is generally prohibited. • The City's regional route designation matches the regional definition of these roads by Metro and ODOT.	20,000	4 or more	
Arterials	• High volume, moderate speed streets that carry vehicles within the city and between adjacent cities in the surrounding metropolitan area. • Some are under the jurisdiction of and/or maintained by other agencies, such as ODOT, Clackamas County, and the City of Portland. • Rank high on the mobility scale but also provide limited access to a wide range of land uses. • Link major commercial, residential, industrial, and institutional areas. • Typically spaced about one mile apart to assure mobility and reduce the incidence of cut-through traffic on neighborhood routes and local streets. • Management objective is to provide for safe and efficient traffic flow along with pedestrian and bicycle movements. Within downtown, local access is a priority.	10,000	3 or more	Bicycle lanes and sidewalks

Classification	Description	Typical Total Vehicles per Day	Typical Number of Lanes	Other Street Elements
Collectors	• Moderate volume, moderate speed streets that provide access and circulation within and between residential neighborhoods, commercial areas, and industrial areas. • Serve a citywide function of connectivity and are typically spaced about one-half mile apart. • Distribute trips between the neighborhood street system and the arterial street system, linking a wide range of land uses. • Access control for collectors is not as high a priority as for arterials, but is especially needed near street intersections. • Since collectors often traverse residential neighborhoods, neighborhood traffic management measures are often needed to manage traffic impacts through these areas.	5,000-10,000	2-3[1]	Bike lanes or shared roadway; sidewalks
Neighborhood Routes	• Moderate volume, low speed streets. • Do not provide citywide circulation, as they mainly serve the immediate neighborhood in which they are located. Typically have residential frontage. • Connect neighborhoods to collectors and arterials. • Neighborhood routes are similar to local streets in design, but they are generally longer in length and have higher traffic volumes. In order to retain the neighborhood character and livability of these streets, additional design treatments in the form of traffic management devices are often needed to manage traffic volume impacts.	1,500 to 5,000	2	Shared roadway, sidewalks, on-street parking
Local Streets	• Low volume, low speed streets that emphasize access to adjacent land uses over mobility. • All streets that are not regional routes, arterials, collectors or neighborhood routes are classified as local streets. • Connect neighborhoods to collectors and arterials • Most local streets are adjacent to residential uses and serve residential transportation needs; however, there are a number of local streets that exclusively serve the city's two industrial areas. • Local streets rank high on the access scale, so driveways and intersections are more closely spaced than on other types of streets.	Less than 1,500	2	Shared roadway, pedestrian facilities, on-street parking.

The design of a roadway can vary from segment to segment due to adjacent land uses and demands, the objective is to have a standard that defines key characteristics provides consistency, and also defines application criteria to provide the flexibility needed to suit conditions. Street design standards and options are discussed in further detail in Chapter 10 - Street Design.

[1] As a result, these streets are likely to need turn lanes at some intersections or center left turn lanes as volumes approach 10,000 vehicles per day.

NEEDS

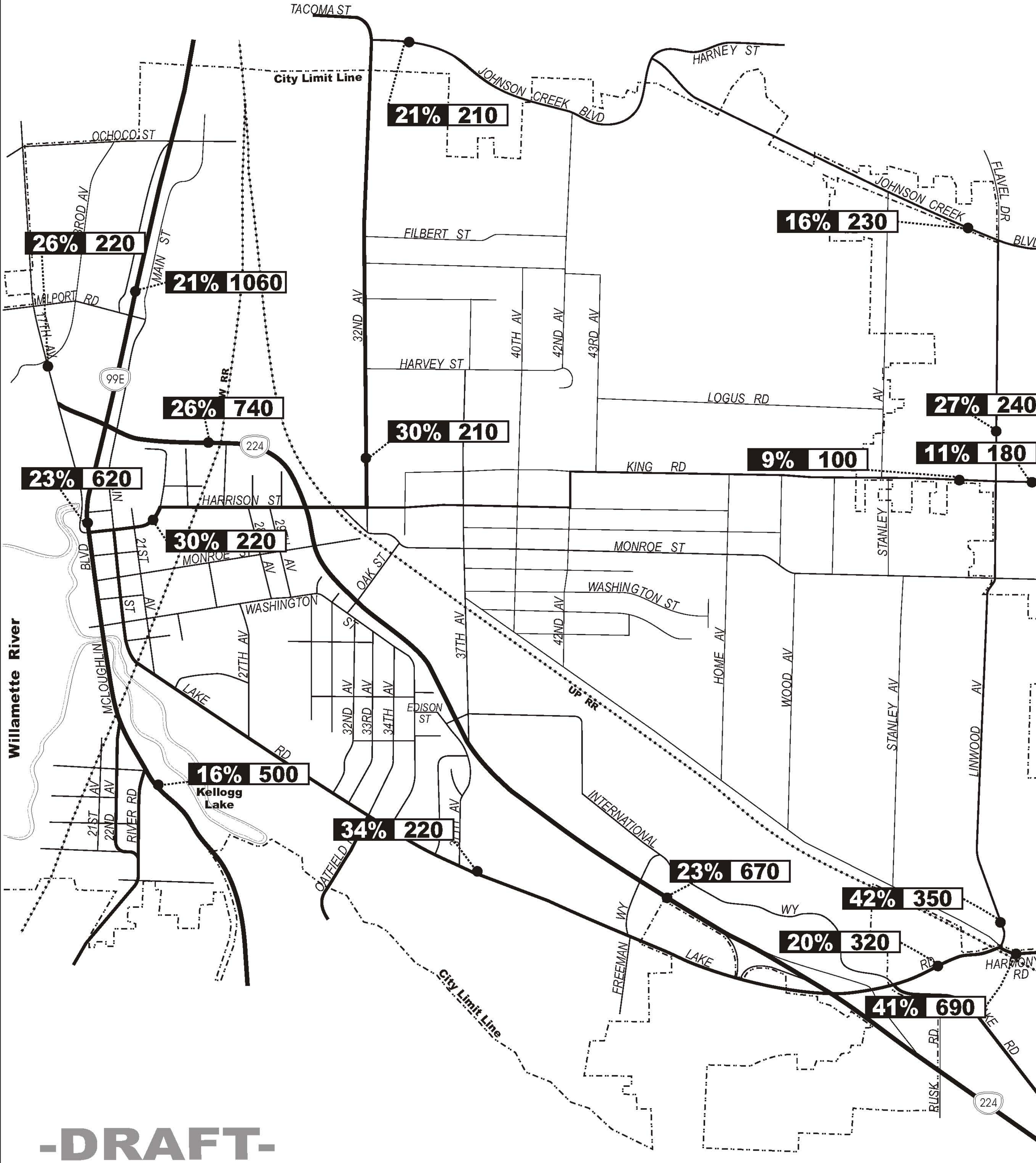
This section identifies the increase in vehicle volume as forecasted by the 2030 financially constrained Metro RTP model. It also identifies the study area intersection deficiencies for the 2030 base case scenario, and identifies Milwaukie's connectivity challenges. The 2030 base case scenario only includes transportation system improvements that are expected to be constructed and implemented with the current funding levels. Both regional and local traffic volumes are projected to increase on many of Milwaukie's streets. Figure 8-1 shows the percent increase in PM peak hour volume between 2006 and 2030.

As can be seen in Figure 8-1, traffic volumes at the study locations are projected to increase by 9 to 42 percent during the peak hour. This corresponds to increases of 100 vehicles on King Rd and 350 vehicles on Linwood Ave. The traffic volumes on McLoughlin Blvd will increase by over 1,000 vehicles north of Highway 224, and by 500 vehicles south of River Rd. On Highway 224, about 740 more vehicles are expected in the PM peak hour east of McLoughlin Blvd, and 670 vehicles are expected west of the interchange with Lake Rd. The increase in volume means that many of the study intersections will fail to meet the performance standards of the City of Milwaukie or the Oregon Department of Transportation (ODOT).

Figure 8-2 depicts the study area intersections with good, adequate, or poor operational performance during the PM peak hour in the year 2030. As can be seen in this figure, many of the study intersections will operate under poor conditions in 2030. The high growth in volumes along regional facilities such as McLoughlin Blvd (Highway 99E) and Highway 224 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.

CITY OF MILWAUKIE

Transportation System Plan



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LEGEND

00% - Percentage Increase 2006 - 2030

00 - Volume Difference 2006 - 2030

DKS Associates
TRANSPORTATION SOLUTIONS

NO SCALE

Figure 8-1

PERCENT INCREASE IN P.M. PEAK HOUR VOLUMES

LEGEND

- Good Operations (LOS A, B, or C, & V/C < 0.84)
- Acceptable Operations (LOS D & 0.84 < V/C < 0.95)
- Poor to Failed Operations (LOS E or F & V/C > 0.95)
- Unsignalized Intersection
- Signalized Intersection

*Note: Table 8-2 contains the LOS and V/C for each intersection.

DKS Associates
TRANSPORTATION SOLUTIONS

NO SCALE

Figure 8-2

2030 FUTURE NO-BUILD OPERATIONS STUDY AREA INTERSECTIONS

The local street network in Milwaukie is nearly built out and is not well connected in many neighborhoods. Access opportunities for entering or exiting neighborhoods are limited. There are many long blocks or cul-de-sacs outside of the downtown area that force out-of-direction travel when traveling between and within neighborhoods. Additionally, Milwaukie has many barriers that limit connectivity such as McLoughlin Blvd, Highway 224, and the UPRR tracks. The combination of these barriers and the lack of connectivity cause many intracity trips to travel along the few through streets that do connect across these barriers.

FUTURE INTERSECTION CAPACITY ANALYSIS

This section presents the results of the capacity analysis conducted by the City to determine the potential intersection improvements that would be necessary as part of a long-range master plan. The improvements outlined in the following section are a guide to be used in defining the specific types of rights-of-way and street improvements that will be needed as traffic growth and infill development occurs.

2030 Base Case

The 2030 base case scenario includes transportation improvements that are reasonably expected to be funded and constructed by the year 2030. This scenario includes both the Transportation Demand Management (TDM) improvements identified later in this chapter and capacity projects identified in the Regional Transportation Plan (RTP) financially constrained system, shown below in Table 8-2.

Table 8-2 RTP Financially Constrained Motor Vehicle Capacity Improvements

RTP Project #	Location	Improvement	Jurisdiction	Timeline	Cost ($1,000s)
5045	Linwood Ave/ Harmony Rd/ Lake Rd Intersection	Add NB right turn lane, add EB right turn lane, add WB left turn lane and grade separate UPRR	Clackamas Co./ Milwaukie	2010-15	$28,000
5069	Harmony Rd (Sunnyside Rd to Highway 224)	Widen to five lanes to improve safety and accessibility	Clackamas Co.	2010-15	$7,392

Clackamas County is studying both of the projects listed in Table 8-2 with the Harmony Rd Area Transportation Improvements project.[2] The Environmental Impact Study for the project began in October 2006 and is scheduled for completion in fall 2008.

Table 8-3 summarizes the results of the needs analysis to forecast how the TSP study intersections will perform, given the 2030 base case scenario. Based on the analysis, the majority of the study intersections would not meet acceptable jurisdictional operating standards in 2030. The Minimum Acceptable Measures of Effectiveness are as follows:

- City of Milwaukie = Level of Service D
- Metro = Level of Service F/E
- ODOT = 0.99/0.99, (1.10/0.99 in designated Town Centers & Specific Corridors)

[2] The widening of Harmony Road is not included in this document as a City project because it is outside of the City's jurisdiction. As such, this document does not contain a specific recommendation about this project. The City and its citizens, however, are actively working with the County on many fronts to minimize this project's physical extent. As a result, alternatives to widening continue to be evaluated as part of the Environmental Impact Study underway for this project.

Table 8-3 2030 Base Case Intersection Level of Service (PM Peak Hour)

Intersection	Existing 2006			Future 2030 Base Case		
	Level of Service (LOS)	Average Delay (Seconds)	Volume/ Capacity (V/C)	Level of Service (LOS)	Average Delay (Seconds)	Volume/ Capacity (V/C)
Two-Way Stop Controlled Intersections						
McLoughlin Blvd @ 22nd Ave	A/D	26.4	0.01	A/**E**	**45.0**	0.10
Harrison St @ 21st Ave	A/C	18.0	0.10	A/D	27.9	0.21
All-Way Stop Controlled Intersections						
Harrison St @ Main St	B	13.2	0.39	**E**	**35.7**	0.65
42nd Ave @ Harrison St	B	12.8	0.22	**E**	**47.0**	0.39
Johnson Creek Blvd @ 32nd Ave	**F**	**>50.0**	**0.77**	**F**	**>50.0**	**1.03**
Signalized Intersections						
McLoughlin Blvd @ Ochoco St	B	10.1	0.85	**D**	**39.8**	**1.02**
McLoughlin Blvd @ Milport Rd	A	4.4	0.78	B	13.8	0.98
McLoughlin Blvd@ Harrison St	D	47.1	0.99	**F**	**>80.0**	**1.21**
McLoughlin Blvd @ Washington St	C	20.0	0.88	D	50.9	1.10
Highway 224 @ 17th Ave	C	20.7	0.59	C	22.0	0.71
Highway 224 @ Harrison St	D	40.0	0.89	**F**	**>80.0**	**1.18**
Highway 224 @ Monroe St	B	19.0	0.75	D	39.3	0.98
Highway 224 @ Oak St	D	44.1	0.88	**E**	**74.6**	**1.12**
Harrison St @ 32nd Ave	B	10.5	0.45	C	24.8	0.66
McLoughlin Blvd @ River Rd	D	35.5	0.99	**E**	**75.5**	**1.13**
Lake Rd @ Oatfield Rd	D	36.0	0.62	D	46.0	0.79
Highway 224 @ 37th Ave	C	25.5	0.82	**E**	**61.1**	**1.05**
Highway 224 @ Freeman Way	C	30.5	0.94	**F**	**>80.0**	**1.17**
Highway 224 @ Lake Rd	B	16.1	0.68	C	30.5	0.87
Johnson Creek Blvd @ Linwood Ave	D	53.6	0.97	**F**	**>80.0**	**1.06**
Linwood Ave @ King Rd	D	47.5	0.83	**E**	**70.3**	**0.98**
Linwood Ave @ Harmony Rd	**E**	**64.5**	0.94	C	27.3	0.73

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 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.

STRATEGIES

The future street system needs in Milwaukie cannot be met through a single "fix-all" cure. Instead, a set of interrelated strategies need to be implemented to meet performance standards, serve future growth and conform to the city's future needs. Strategies for managing the forecasted future travel demand are multifaceted.

The impact of future growth to Milwaukie would be severe without investment in both capital improvements and operating improvements. Strategies for meeting automobile facility needs include Transportation System Management (TSM), Transportation Demand Management (TDM), and adding capacity to roads and intersections.

The following sections outline the types of improvements that could be used to manage the system given future growth. Phasing of implementation is necessary, since funding and staging constraints limit the City's ability to implement all improvements at once. This requires prioritization of projects and periodic updating to reflect current needs. Most importantly, it should be understood that as regional growth outpaces local growth, the improvements outlined in the following sections are a guide to managing the increased traffic volume in the city as it occurs over the next 20 years.

Transportation System Management (TSM)

Transportation System Management (TSM) focuses on low cost strategies within the existing transportation infrastructure to enhance operational performance. The strength of a TSM approach is it focuses on maximizing urban mobility while treating all modes of travel as a coordinated system. TSM strategies include signal improvements, traffic signal coordination, traffic calming, access management, local street connectivity, and intelligent transportation systems (ITS). Traffic signal coordination and ITS projects typically provide the most significant tangible benefits to the traveling public. The primary focus of TSM measures are improvements that result in regional-scale benefits. However, there are a number of TSM measures that could be used in a smaller scale environment such as Milwaukie.

Intelligent Transportation Systems (ITS)

ITS involves the application of advanced technologies and management techniques to relieve congestion, enhance safety, provide services to travelers, and assist transportation system operators in implementing suitable traffic management strategies. An ITS program focuses on increasing the efficiency of existing transportation infrastructure, enhancing the performance of the overall system and reducing the need to add capacity (e.g. travel lanes). Efficiency is achieved by providing services and information to travelers so they can make better travel decisions, and also to transportation system operators so they can better manage the system and improve system reliability.

Clackamas County has prepared an ITS plan for the urbanized area of Clackamas county. The Clackamas County ITS Plan[3] has identified arterial signal control ITS projects on major streets throughout the county. Within the TSP study area, McLoughlin Blvd, Highway 224, Johnson Creek Blvd, King Rd, and Harmony Rd have been identified for planned fiber optic cable, transit priority corridor status, and closed-circuit cameras at several major intersections.

[3] Clackamas County ITS Plan, DKS Associates, Inc. and Zenn Associates, February 2003.

Other ITS projects to consider within Milwaukie may include:

- Transit signal priority
- Signal coordination and optimization
- Traffic monitoring and surveillance
- Information availability
- Incident management

To support future ITS projects, including traffic signal operations, the City of Milwaukie and Clackamas County could require that roadway improvement projects include the installation of three-inch conduit along arterial and selected collector roadways to serve new ITS equipment in the corridor. A three-inch conduit would ensure adequate wiring capacity to accommodate future ITS projects.

Neighborhood Traffic Management

There are some Neighborhood Traffic Management elements, such as speed humps, in place in Milwaukie. The City should continue this effort with additional traffic calming measures (where applicable) and work with the community to find the traffic calming solution that best meets their needs and maintains roadway function. Neighborhood Traffic Management techniques are covered in more detail in Chapter 11.

Access Management

Access Management is a policy tool that seeks to balance mobility (efficient, safe, and timely travel) with property access. Proper implementation of access management techniques should result in reduced congestion, accident rates, roadway widening, air pollution, and energy consumption.

The presence of numerous driveways can erode the capacity of arterial and collector roadways. Access management is the practice of limiting the number and spacing of driveways and intersections on arterial and collector facilities to maintain the capacity of the facilities and preserve their functional integrity. Preservation of capacity is particularly important for maintaining the traffic flow on higher volume roadways such as Linwood Ave and King Rd. The city needs a balance of streets that provide access with streets that serve mobility.

Several access management strategies have been identified to improve local access and mobility in Milwaukie:

- Develop specific access management plans for regional routes, arterial and collector streets in Milwaukie to maximize the capacity of the existing facilities and protect their functional integrity.
- Work with land use development applications to consolidate driveways where feasible.
- Provide left turn lanes where warranted for access onto cross streets.
- Construct raised medians to limit driveway access to right-in/right-out turning movements, as appropriate.

New development and roadway projects on city streets should meet the City's adopted access spacing standards, which are summarized in Table 8-4.

Table 8-4 Access Spacing Standards for City Street Facilities

Access Treatment	Functional Classification	Intersection				Desirable Signal Spacing[4]	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. 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 Access Spacing Standards for ODOT Facilities

Facility	Location	Highway Classification	National Highway System	Truck Route	Freight Route	Access Spacing Standard (ft)
McLoughlin Blvd	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 224	17th Ave to Hwy 99E	District	No	No	Yes	500
	Hwy 99E 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).[5]

[4] 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.
[5] Oregon Department of Transportation (ODOT), 1999 Oregon Highway Plan (OHP).

Traffic Signal Spacing

Traffic signals that are spaced too closely on a corridor can result in poor operating conditions and safety issues due to the lack of adequate storage for queuing vehicles. Milwaukie is built-out, and as a result there will not likely be many new roads constructed within the city. However, as traffic volumes increase as a result of in-fill development and regional growth, new signals on the existing street system may be necessary to manage traffic flow. When this is the case, the City will evaluate traffic signal warrants to determine if a traffic signal is an appropriate solution. Traffic signals should only be implemented when deemed necessary by the City Engineering Director to enhance safety and promote mobility. PM peak hour signal warrants have already been met for the intersections at Johnson Creek Blvd/32nd Ave and Harrison St/42nd Ave.

Local Street Connectivity

Intracity connectivity is limited in Milwaukie because of its long blocks, cul-de-sacs, and major facilities, such as McLoughlin Blvd, Highway 224, and the UPRR tracks. Therefore many intracity trips are forced to travel the few through streets that do connect across these barriers.

Increasing connectivity between neighborhoods has many benefits, including reducing out-of-direction travel and vehicle miles traveled (VMT), enhancing accessibility between various travel modes, balancing traffic levels between streets, and reducing public safety response time.

Topography and environmental conditions limit the potential for connectivity in several areas of Milwaukie. However, in several areas there is potential to connect streets over time. Figure 8-3a shows the proposed Local Connectivity Plan for Milwaukie. Some of the localized congestion on roads such as Linwood Ave, King Rd, 32nd Ave, or Monroe St could be improved through enhanced street connectivity. Several short roadway connections are needed to connect disjointed local streets and reduce out-of-direction travel for vehicles, pedestrians, and bicyclists. In limited cases, a short length of new road would be necessary for improved connectivity. The arrows on Figure 8-3a represent potential connections and the general direction for the placement of the connection. In each case, the specific alignments and design will be determined upon development review. If a connection is made that increases neighborhood connectivity, such a change could trigger reclassification of a street from a Local to a Neighborhood Collector. When the opportunity arises during land development, the City requires new local connections that will result in a grid of vehicle access every 530 feet and bicycle/pedestrian access every 300 feet.[6]

The arrows shown on Figure 8-3a indicate priority local and neighborhood connections only. Local connections for existing stub end streets, cul-de-sacs, or extended cul-de-sacs in the road network are, for the most part, not identified on this figure. Pedestrian connections from any cul-de-sac should be considered mandatory as future development and redevelopment occurs. The goal is improved connectivity for all modes of transportation.

[6] This standard meets the Metro RTP access spacing requirements for new residential or mixed-use developments.

CITY OF MILWAUKIE

Transportation System Plan

FIGURE 8-3a

PROPOSED STREET CONNECTIVITY AND FUNCTIONAL CLASS CHANGE

December 2007

LEGEND

Functional Classification

- Regional Routes
- Arterials
- Collectors
- Neighborhood Routes
- Local
- Change to Arterial
- Change to Collector
- Change to Neighborhood Route
- Proposed Street Extension

Other Map Features

- Railroad
- Springwater Corridor
- Kellogg Creek Trail
- County Line
- Water
- City Limits

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DKS Associates

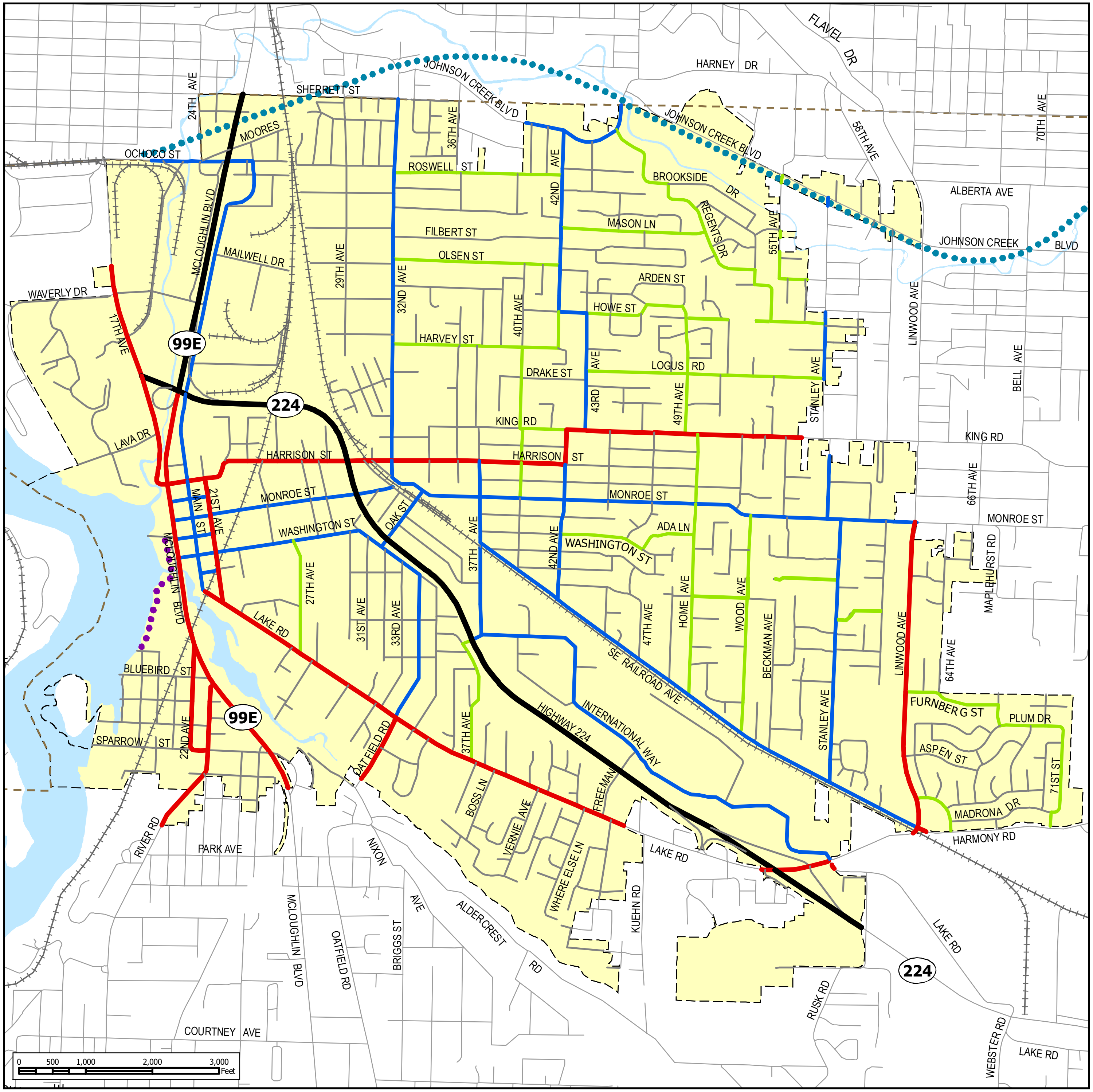
TRANSPORTATION SOLUTIONS

Transportation System Plan

FIGURE 8-3b

FUNCTIONAL CLASSIFICATION

December 2007



LEGEND

Functional Classification

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

Other Map Features

- Railroad
- Springwater Corridor
- Kellogg Creek Trail
- County Line
- Water
- City Limits

DKS Associates
TRANSPORTATION SOLUTIONS

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.[7]

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.[8] 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 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 financially constrained plan. These measures are identified in Table 8-6.

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

Table 8-6 TDM Improvements included in the RTP Financially Constrained System

RTP #	Location	Improvement	Jurisdiction	Timeline	Cost ($1,000s)
5103	Countywide	Advanced transportation system management and ITS program	Clackamas County	2004-2009	$6,514
5035	Milwaukie TC	McLoughlin Blvd Rapid Bus	TriMet	2010-2015	*
5062	Milwaukie TC	Milwaukie TMA Startup	TriMet/Milwaukie	2016-2025	$200
1003	Regionwide	Milwaukie Light Rail Extension	TriMet	2010-2015	$515,000
1009	Regionwide	Springwater Trail Access Improvements	Portland	2004-2009	$2,310
5026	Regionwide	Portland Traction Co. Shared-Use Trail	Metro	2004-0009	$1,386
8025	Regionwide	Transit Center Upgrades	TriMet/SMART	2004-2030	$20
8035	Regionwide	Frequent/Rapid Bus Improvements	TriMet/SMART	2016-2030	$26,297
8038	Regionwide	TriMet Park-and-Ride Lots	TriMet	2004-2030	$5,782
8043	Regionwide	Bus Stop Improvements	TriMet/SMART	2004-2030	$7,939
8046	Regionwide	Bus Priority Treatments	TriMet/SMART	2016-2030	$19,891
8049	Regionwide	Priority Pedestrian Access to Transit Improvements	TriMet	2004-2030	$20,000
8055	Regionwide	Transportation Management Associations Innovative Programs	Metro/TriMet	2004-2030	$3,000
8056	Regionwide	Future Transportation Management Associations Start-Up and Sustainability	Metro/TriMet	2004-2030	$4,000

*Included with RTP # 8035

The Metro regional travel model includes assumptions about which modes of transportation people choose to use. Targets for trips using non Single Occupant Vehicle (SOV) modes have been set for some 2040 Plan areas. For Milwaukie, the model forecast, assumes completion of the projects included in the RTP financially constrained scenario, with a non SOV Modal Target of 45-55 percent in the designated Town Center area and 40-45 percent in Industrial/Employment areas. All other areas within Milwaukie do not have a non-SOV target.[9] Milwaukie will only be able to achieve these targets through a continued effort to implement TDM strategies and promote alternative modes of travel.

Parking Requirements

The City of Milwaukie currently has off-street parking ratios (minimum and maximum) and standards that are consistent with the Transportation Planning Rule (TPR) and RTP parking ratio requirements. Chapter 12 outlines the specific parking strategies for downtown Milwaukie.

[9] Information related to non-SOV target percentages and designated areas can be found in the Metro Regional Transportation Plan, Table 1.3 page 1-65, and on Figure 3.5 page 3-14.

Roadway and Intersection Capacity Improvements

The TSP process identified a number of roadway and intersection capacity improvements. This section summarizes the evaluation of intersection of the three types of capacity and connectivity improvements:

- City Street and Intersection Improvements
- McLoughlin Blvd Alternatives
- Highway 224 Alternatives
- Highway 224/99E Refinement Plan

Conceptual diagrams illustrating the recommended improvements can be found in Appendix C, Conceptual Intersection Diagrams.

City Street and Intersection Improvements

Most of the study intersections that are on city streets will require improvements to meet City standards under forecasted 2030 conditions. Table 8-7 summarizes the improvements needed for these study intersections to meet City standards; more detailed descriptions of the improvements follow.

Table 8-7 Improvements Needed for City Intersections to Meet City Standards[10]

Intersection	Improvement	Before	After
42nd Ave @ Harrison St	• Signalization	E	B
Johnson Creek Blvd @ 32nd Ave*	• Signalization with bridge widening for turn lane or roundabout	F	C
Johnson Creek Blvd @ Linwood Ave	• Add Eastbound (EB) Right-Turn • Add Westbound (WB) Right-Turn	F	D
Harrison St @ Main St	• Add WB shared through/right-turn lane **OR** • Add EB Right-turn lane	E	D
Linwood Ave @ King Rd	• Protected/Permissive Left Turn Phasing Northbound (NB) and Southbound (SB)	E	E

*This intersection is in the City of Portland. As such, improvements will be determined by the City of Portland.

- **42nd Ave/Harrison St:** Installing a traffic signal at this intersection would improve the LOS from E to B; no additional lanes or other improvements would be necessary.

- **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 left-turn lane would improve the LOS at this intersection from F to C.[11] 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. This realignment would be more conducive to serve traffic demands along Johnson Creek Blvd, the primary travel corridor. A roundabout may be an alternative for this location.

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[10] The intersection of McLoughlin Blvd @ Washington St will have a v/c of 1.10 in year 2030 (see Table 8-2). Because this intersection is within the Town Center of Milwaukie, it meets ODOT's higher V/C standard for Town Centers (ODOT Oregon Highway Plan, Table 7) and no improvements are recommended.

[11] Signalization alone would improve the delay from 245 seconds to 120 seconds, and the intersection would still operate at LOS "F" in the TSP forecast year, 2030. 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).

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 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 Alternatives

While most intersections along McLoughlin Blvd (Hwy 99E) do not meet future operating standards, 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, 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 this intersection would be difficult because of the intersection's geometry[12] 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

[12] 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.

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. 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 Hwy 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 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 intersections of McLoughlin Blvd with 22nd Ave and River Rd would both operate at unacceptable levels during the PM peak hour in 2030. 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). This option would not improve the operations of the intersection (the V/C ratio) as much as with the first option, because the current geometry requires an exclusive pedestrian phase that limits the intersection operations for motor vehicles.[13] However, this alternative would be less disruptive and is preferred by the Island Station Neighborhood District Association.

- **Alternative 2:** The second alternative would involve consolidating the three intersections into one. Currently, vehicles turning from 22nd Ave onto McLoughlin Blvd are limited to right-in and right-out turns. River Rd has one shared lane to access McLoughlin Blvd, and vehicles access River Rd from McLoughlin Blvd via Bluebird St. The consolidation of the three intersections would greatly decrease the number of access points (and conflict points) to McLoughlin Blvd, and therefore result in safer, more efficient operations. To improve operations to acceptable standards, a second northbound left-turn to access McLoughlin Blvd would be necessary at this new intersection.

[13] It should be noted that ODOT STIP project titled "OR99E: Kellogg Creek - MP 9.19" (key# 12855) will eliminate the exclusive pedestrian phase and provide signal interconnection between the River Rd intersection and the intersection of McLoughlin Blvd at Washington St. This project is scheduled for construction in 2007.

Highway 224

All but two of the study intersections along Highway 224 are projected to exceed ODOT's V/C ratio requirements during 2030 peak hour operations. Both short-term and long-term solutions are necessary to achieve an acceptable level of mobility on Highway 224, while allowing for cross-city connectivity.

Short-Term Solutions

Short-term solutions are designed to relieve congestion at multiple intersections. They may not completely alleviate congestion, but can be implemented with relatively low cost at specific locations (versus the generally high cost, large-scale long-term solution). The intersections of Harrison St at Highway 224 and Oak St at Highway 224 are the two locations for short-term solutions. The short-term solution is to provide signal-protected left turns. This would require three types of changes: signal phasing, optimizing the signal timing to balance mobility and cross-street connectivity, and some physical modifications at the Harrison St intersection. The physical changes would convert the existing shared through/left turn lanes at Harrison St into left turn lanes and restripe the intersection as necessary to align the left turn lanes. The intersection of Highway 224/Oak St already has left-turn lanes on Oak St and would not require restriping. ODOT approval would be required for modifications to both intersections. A detailed traffic study would be required to ensure that the new phasing does not detrimentally affect the intersection operations and a signal progression study would be required.

Modifying the intersection of Highway 224 and 37th Ave may be an additional short-term improvement. The northern leg of the intersection of Highway 224 and 37th Ave is difficult because 37th Ave currently splits just north of the highway into 37th Ave and International Way. This geometric layout is confusing and increases the potential for possible conflicts. The consolidation of these two approaches into one would improve safety and traffic operations by creating a simpler intersection with one northern approach.

Long-Term Solutions

Long-term solutions for Highway 224 need to address mobility along the corridor and cross street connectivity within the city. A number of alternatives have been developed as a starting 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.

  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.

- **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.

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 to 17th Ave, 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 of Milwaukie. The goals of this TSP direct the City to reduce the highway's barrier effect for all modes through an increased level of connectivity across the facility.

The 2004 Regional Transportation Plan presents the regional perspective on a future Hwy 224/99E corridor Refinement Plan, which should serve as the starting point for the Refinement Plan. According to the RTP, this corridor plan should address the following design considerations:[14]

- Institute aggressive access management throughout corridor, including intersection grade separation along Highway 224 between Harrison St and I-205.
- Design access points to McLoughlin Blvd and Highway 224 to discourage traffic spillover onto Lake Rd, 34th Ave, Johnson Creek Blvd, 17th Ave and Tacoma St.
- Monitor other local collector routes and mitigate spillover effect from congestion on McLoughlin Blvd and Highway 224.
- Expand highway capacity to a total of three general purpose lanes in each direction from Harold St to I-205, with consideration of express, HOV lanes or peak period pricing for new capacity.
- Provide a more direct transition from McLoughlin Blvd to Highway 224 at Milwaukie to orient long trips and through traffic onto Highway 224 and northbound McLoughlin.
- Provide improved transit access to Milwaukie and Clackamas regional centers, including rapid bus in the short term, and light rail service from Clackamas regional center to Central City in the long term.

The goal of the Refinement Plan would be to achieve these regional goals while simultaneously meeting Milwaukie's transportation goals, as described in this TSP.

[14] See RTP; Ch. 6, p.6-36.

RECOMMENDATIONS

To meet the TSP goals and policies outlined in Chapter 2, the City should take the following steps for improving the auto street network:

- Manage and improve the entire roadway system consistent with the City's transportation policies and street classifications.
- Work with ODOT and Clackamas County to implement their access control standards on their facilities to reduce conflicts among vehicles and trucks, as well as conflicts between vehicles and pedestrians.
- Identify local street system improvements that are cost-effective in improving state facility conditions. These projects could be candidates for State financial assistance.
- Work with Metro to develop travel forecasts for the City that are used to assess future regional travel needs. The City will participate in verifying housing and employment forecasts to be used when Metro updates the Regional Transportation Plan.
- Coordinate with ODOT regarding implementation of the Oregon Highway Plan for expressways and Special Transportation Areas.

Changes to Functional Classification

Three streets are recommended to be reclassified with the adoption of this TSP. For each, the updated classification would better correspond with the existing and planned land uses surrounding each street. International Way, the primary access street in the Business Industrial zone north of Highway 224, should be upgraded from Local to Collector. Johnson Creek Blvd from 40th Ave to Brookside (the section within Milwaukie city limits) should be downgraded from Arterial to Collector to better coordinate with the street's Neighborhood Collector designation in the City of Portland and reflect the low density residential land surrounding the corridor. McLoughlin Blvd (Hwy 99E) between Hwy 224 and the southern city limits should be classified as an Arterial, instead of a Regional Route. This change complies with regional designations and has ODOT concurrence. The updated classification of each road is reflected in Figure 8-3b.

Master Plan

The Motor Vehicle Master Plan is the list of projects needed to mitigate Motor Vehicle street network deficiencies. Figure 8-4 depicts the approximate locations of the Motor Vehicle Master Plan projects, which are also summarized in Table 8-8. This list is a "wish list" of motor vehicle related projects in Milwaukie. Some projects from the Master Plan were selected for inclusion in the Motor Vehicle Action Plan, which consists of projects that the community has identified as its top priorities for allocating and/or pursuing funding. As development occurs, streets are rebuilt, or other opportunities arise, projects on the Master Plan should be addressed.

The planning-level cost estimates in Table 8-8 are based on general unit costs for transportation improvements, but do not reflect the unique project elements that can significantly add to project costs. For each of these projects, the City will refine the cost estimate to include right-of-way requirements and costs associated with special design details at the time of development.

MILWAUKEE

CITY OF

Transportation System Plan

FIGURE 8-4

AUTO STREET NETWORK MASTER PLAN

December 2007

LEGEND

Proposed Street Network Improvements

- Roadway Widening Project
- Travel Route Improvement
- Corridor Refinement Plan
- Intersection Improvement
- Rail Crossing Improvement
- Major Roads
- Streets
- Railroad
- Springwater Trail
- Kellogg Creek Trail
- County Line
- Parks
- Water
- City Limits

PROPOSED PROJECTS

- A Prohibit left turn movement at 17th Ave/McLoughlin Blvd and include in Refinement Plan
- B Signalize Harrison St/42nd Ave
- C Conduct Refinement Plan for HWY 99E/HWY 224 focused on motor vehicle and freight mobility.
  - HWY 99E Project Limits: Tacoma St to 17th Ave
  - HWY 224 Project Limits: HWY 99E to Lake Rd Interchange
- D Reconfigure intersection to consolidate 37th Ave/ Industrial Way
- E Add eastbound/westbound right turn lanes and integrate the trail crossing
- F Create westbound shared through/right lane; or Add eastbound right turn pocket
- G Implement protected/permitted phasing for northbound and southbound left turns
- H Widen Linwood Ave to standard three lane cross section
- I Widen Railroad Ave to standard three lane cross section
- J Redesign intersections of River Rd and 22nd Ave to consolidate intersections; or Add northbound left turn pocket on River Rd
- K Widen Harrison St to standard three-lane cross section
- L Add left turn-lanes and protected signal phasing on Harrison St approaches
- M Widen Lake Rd to standard three-lane cross section
- N Replace 3-way stop with signal when warranted and appropriate. (Coordinate with the City of Portland)
- O Enhance connection between King Rd and Harrison St
- P Add protected signal phasing on Oak St approaches
- Q Improve intersection/modify access at HWY 224 and Freeman Way
- R Enhance connection along Stanley Ave at King Rd
- S Enhance connection along Stanley Ave at Monroe St
- T Implement railroad crossing safety and quiet zone project
- U Upgrade crossing to grade separated facility (dependant upon Harmony Rd Project findings)

Table 8-8 Auto Street Network Master Plan Projects

Map ID[15]	Priority	Type	Project Name	Project Description	From	To	Cost(s) $1,000s[16]
A	Med	C	McLoughlin Blvd Intersection Improvements at 17th	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
B	Med	C	Intersection Improvements at 42nd and Harrison	Signalize intersection to facilitate dominant traffic flow.	Location specific	Location specific	$252
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	Hwy 224 Project Limits: Hwy 99E to Lake Rd Interchange	$250
D	High	C	Hwy 224 Intersection Improvements at 37th	Consolidate the two northern legs of 37th Ave and International Way into one leg at Hwy 224.	Location specific	Location specific	$1,946
E	Med	C	Johnson Creek Blvd Intersection Improve-ments at Linwood	Add eastbound right turn lane and westbound right turn lane.	Location specific	Location specific	$803
F	Med	C	Harrison Street Intersection Improvements at Main	Add westbound shared through/right turn lane or eastbound right turn lane.	Location specific	Location specific	$34
G	Med	C	Intersection Improvements at Linwood and King	Implement protected/permissive left turn phasing for northbound and southbound approaches.	Location specific	Location specific	$16
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
H	High	C	Linwood Avenue Capacity Improvements (south)	Widen to standard three lane cross section.	King Rd	Harmony Rd	$11,400
I	High	C	Railroad Avenue Capacity Improvements	Widen to standard three lane cross section.	37th Ave	Linwood Ave	$12,990

[15] See Figure 8-4.
[16] Project costs are in 2007 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[15]	Priority	Type	Project Name	Project Description	From	To	Cost(s) $1,000s[16]
J	Med	C	McLoughlin Blvd Intersection Improvements at 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
K	Med	C	Harrison Street Capacity Improvements	Widen to standard three lane cross section.	32nd St	42nd St	$2,565
L	Med	C	Intersection Improvements at Harrison and Hwy 224	Add left turn-lanes and protected signal phasing on Harrison St approaches.	Location specific	Location specific	$20
M	Low	C	Lake Road Capacity Improvements	Widen to standard three lane cross section.	21st Ave	Oatfield Rd	$7392
N	Low	C	Johnson Creek Blvd and 42nd Avenue Signalization	Replace 3-way stop with signal when warranted.	Location specific	Location specific	$250
O	Med	C	Harrison Street and King Road Connection	Enhance connection between King Rd and Harrison St	King Rd	Harrison St	$53
P	High	C	Hwy 224 Intersection Improvements at Oak	Add left turn-lanes and protected signal phasing on Oak St approaches.	Location specific	Location specific	$20
Q	Low	C	Hwy 224 Access Modifications at Freeman	Modify access at Freeman Way to improve intersection functioning.	Location specific	Location specific	$1313
R	Low	C	Stanley Ave Connectivity at King	Enhance connection along Stanley Ave at King Rd.	Location specific	Location specific	$53
S	Low	C	Stanley Ave Connectivity at Monroe	Enhance connection along Stanley Ave at Monroe St.	Location specific	Location specific	$53
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
U	Low	C	Harmony Road Grade Separation and Realignment at Linwood	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

Notes:

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

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

Action Plan

The Auto Street Network Action Plan identifies projects that can reasonably be expected to be funded with City funds by 2030, a requirement of the updated Transportation Planning Rule.[17] The Action Plan project list in Table 8-9 is the result of a multimodal project ranking process. All the modal master plan projects were ranked by the TSP Advisory Committee with consideration of the Working Groups' priorities, other public support for the project, and the project's implementation of the TSP goals and policies.

Table 8-9 Auto Street Network Action Plan

Project Name	Project Description	From	To	Direct Funding or Grant Match
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	Hwy 224 Project Limits: Hwy 99E to Lake Rd Interchange	Match
Railroad Avenue Capacity Improvements	Widen to standard three lane cross section.	37th Ave	Linwood Ave	Match
Hwy 224 Intersection Improvements at Oak	Add left turn-lanes and protected signal phasing on Oak St approaches.	Location specific	Location specific	Direct
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

REGIONAL TRANSPORTATION PLAN (RTP) COMPLIANCE

The projects identified in the Master Plan list and further refined in the Action Plan list are in coordination with the Metro RTP goals for regional mobility and non-SOV modal targets. It is expected that the City would continue coordination with Metro and Clackamas County as other plans are updated to maintain consistency and coordination on projects that are regionally implemented.

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

9 Freight Element

This chapter summarizes strategies to address the future needs of Milwaukie's freight system. The Freight Plan is intended to outline all freight needs over the next 20 years, develop projects to address those needs and identify costs for those projects.

The quality of the local freight network, i.e., those transportation facilities necessary for the movement of bulk goods and materials, is essential to the economic health of the city. While all cities have some need for local delivery of goods, a majority of Milwaukie's employment is in the heavy manufacturing, warehousing, and distribution sectors. These employment sectors are dependent on the efficient movement of large quantities of both raw materials and products. A well-functioning and reliable system for the movement of freight into and out of Milwaukie contributes significantly to the City's ability to attract and retain industrial investment—and the jobs and tax proceeds that come with that investment.

TSP GOAL AND POLICY FRAMEWORK

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

- **Goal 1 Livability** guides the City to protect residential neighborhoods from excessive noise and pollutants associated with freight transportation.
- **Goal 4 Quality Design** calls for street designs that to support the streets' intended uses, including truck turning movements, as applicable.
- **Goal 5 Reliability and Mobility** calls for maintaining traffic flow and mobility on arterial and collector roadways.
- **Goal 6 Compatibility** directs the City to coordinate with ODOT to address improvements to the commercial railroad system and the State highway system within Milwaukie.
- **Goal 9 Economic Vitality** calls for a safe and efficient freight system that facilitates the movement of goods.

NEEDS

This section outlines the basic needs for freight in Milwaukie, based on existing deficiencies and future forecasting.

Accessibility

In Milwaukie the land uses that are most associated with freight movement are located north of downtown along Hwy 99E and in southeast Milwaukie along Hwy 224. The function of these highways in these areas is critical to serving the movement of freight and goods. Both of these industrial areas are accessible by truck and rail. While rail access tends to function well (despite limitations due to Union Pacific's scheduling priorities), truck access is constrained and is projected to become more problematic as traffic volumes increase in the future (see Chapter 8). A third industrial area in the city along Johnson Creek Blvd, though smaller than the others, is also highly constrained by the transportation system.

The north Milwaukie industrial area (defined as the area south of city limits, west of the Union Pacific Railroad, east of 17th Ave and north of Highway 224) has limited access to and from Hwy 99E. The eastern half of the area is particularly difficult to access: automobiles can only enter via the signalized intersections of Ochoco Street/ Highway 99E and Milport Rd/ Highway 99E. Left turns from Highway 99E at both of these locations are prohibited and right turns are allowed only at Ochoco Street. Together these restrictions force trucks to use the frontage roads of Main Street (on the east side of Highway 99E) and Frontage Rd (to the west of Highway 99E). Although restricted turn movements from Highway 99E in this area improve through-vehicle performance and reduces delay on Highway 99E, it forces freight vehicles to attempt difficult turning maneuvers and to travel out of their intended direction.

The intersection configurations at and near the Hwy 99E/Milport Rd intersection limit the utility of the intersection. The two frontage roads are very close to Hwy 99E. The stacking distance on Milport Rd between Highway 99E and Frontage Rd is approximately 70 feet; the distance between Main Street and Highway 99E is just fifty feet, barely enough room to store one large trailer semi-truck. In addition, the alignment of the all-way stop control intersection of Main Street/Milport Rd makes it particularly difficult for trucks to turn from Main Street onto Highway 99E.

The International Way industrial area is north of Highway 224, between 37th Ave to the west, Lake Rd to the east, and Railroad Ave to the north. Access to and from the area is via three intersections: the signalized intersection of International Way, 37th Ave and Highway 224; a signalized intersection at Freeman Way and Highway 224; and a signalized intersection of International Way and Lake Rd, which is approximately 300 feet from the interchange of Lake Rd with Highway 224. As discussed in Chapter 8, the intersection at 37th Ave and Highway 224 is not well configured. The two intersections on 37th Ave are approximately 70 feet apart, making it difficult for trucks to access Highway 224 because there is only space for one truck to wait for the signal to turn green and allow access to Highway 224. A second concern is the curvature of the approach to Harmony Rd and Lake Rd at the eastern end of International Way, which is difficult for trucks to maneuver.

Ingress and egress to the third industrial area in Milwaukie, in the northeast corner of the city, is provided via Johnson Creek Blvd. Johnson Creek Blvd however, is limited to two axle-vehicles to the west of 45th Ave, effectively prohibiting heavy truck access to the west. The result is that trucks traveling to and from this area with origins or destinations in that direction must travel south via Linwood Ave, adding several miles of out-of-direction travel.

Connectivity

Several significant regional facilities that provide for regional movement of freight are located, in part, within Milwaukie. These are most notably the Union Pacific Railroad's (UPRR) Brooklyn Sub mainline and the Highway 99E, and Highway 224 mobility corridor. Access to these facilities allows Milwaukie businesses to connect to the national transportation network via Brooklyn Yard and I-205. Informal surveys of industrial businesses have confirmed that most out-bound and in-bound heavy truck trips use I-205. While these regional facilities do provide mobility for local users, they are operated by ODOT and UPRR primarily for the benefit of regional through-movements.

There is a need to minimize delay in accessing regional freight facilities. Milwaukie should acknowledge the need to serve those through-movements, while also striving to preserve and expand access for trips originating or terminating within the city. This is a primary concern for the north industrial area due to the out-of-direction travel required to access the area and the delays associated with leaving the area.

In addition, local and regional freight system users would benefit from improvements in the connections between these regional routes. Currently Highway 99E and Highway 224 connect with a partial interchange that facilitates direct access between southbound Highway 99E to eastbound Highway 224, and westbound Highway 224 to northbound Highway 99E. Other movements are not directly accommodated and require vehicles to utilize city streets such as 17th Ave (Highway 224 westbound to Highway 99E southbound) and Harrison Street (Highway 99E northbound to Highway 224 eastbound).

Rail Crossings

The majority of the at-grade rail crossings in Milwaukie are constructed of asphalt. This surface material becomes uneven and deteriorates more quickly than concrete or rubberized materials that are more commonly used at railroad crossings. Elderly and disabled citizens, as well as adults with baby strollers, are experiencing difficulties walking across the asphalt railroad crossings. Bicyclists may also have difficulty crossing the railroad tracks at these locations. These are of primary concern on arterials and collectors, where vehicle traffic is the heaviest and the asphalt material deteriorates at a faster rate.

As discussed in Chapter 8, all at-grade rail crossings, regardless of materials, cause interruptions to the transportation network. These are particularly acute at crossings such as the UPRR crossing of Harrison Street and the UPRR crossing of Harmony Rd, where frequent train crossings interrupt important auto circulation routes and impact emergency services.

Truck Maneuverability

Truck turning movements are difficult due to intersection alignments and/or geometries at several locations, including the Main Street and Omark Dr intersections with Mailwell Dr.

Neighborhood Livability

Heavy vehicles and trains frequently create real and perceived neighborhood impacts. The impacts include noise, vibration, safety, aesthetics, and air quality. They are particularly noticeable when trains or trucks pass through or near residential neighborhoods.

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 this 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 Street 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 Hwy 99E/Hwy 224 corridor, the Freight Working Group recommended forwarding these findings to a future Highway 99E/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 Street, 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. 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.

Master Plan

A list of potential freight projects was developed to meet the identified needs for freight. These projects form the basis for the Freight Master Plan. The Master Plan shown in Figure 9-1 and summarized in Table 9-1 is an overall plan and summarizes the "wish list" of freight related projects in Milwaukie. The projects on the Master Plan were then used to create a Freight Action Plan. The Action Plan consists of projects that the community identified as higher priority projects and that the City could reasonably expect to fund. As development occurs, streets are rebuilt and as other opportunities (grant programs) arise, other projects on the Master Plan will be pursued.

The planning level cost estimates provided for each project are based on general unit costs for transportation improvements, but do not reflect the unique project elements that can significantly add to the estimated project costs. Each of these project costs will need further refinement to detail right-of-way requirements and costs associated with specific design details as projects are pursued.

CITY OF MILWAUKIE

Transportation System Plan

FIGURE 9-1

FREIGHT MASTER PLAN

December 2007

LEGEND

Existing Freight Routes

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

Proposed Improvements

- Intersection Improvement
- Intersection Material Upgrade
- Corridor Refinement Plan
- Minor Preferred Freight Route (Local)*

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

**Upon adoption of this document, the functional classification for SE International Way will be upgraded to Minor Preferred Freight Route (Local).*

PROPOSED PROJECTS

Improve Corridor

A Conduct Refinement Plan for HWY 99E/HWY 224 focused on motor vehicle and freight mobility.
- HWY 99E Project Limits: Tacoma St to 17th Ave
- HWY 224 Project Limits: HWY 99E to Lake Rd Interchange

Improve Intersection

B ***17th Ave/HWY 224***
Upgrade intersection turning radii to better accommodate freight movements

C ***Main St/Mailwell Dr***
Upgrade intersection turning radii to better accommodate freight movements

D ***Mailwell Dr/Omark Dr***
Upgrade intersection turning radii to better accommodate freight movements

E ***Harrison St/Union Pacific Railroad Crossing***
Upgrade crossing to grade separated facility (outcome of crossing dependant upon 99E/224 Refinement Plan findings)

F ***HWY 224/37th Ave***
Consolidate two northern legs of 37th Ave and Industrial Way into one leg at HWY 224.

G ***Harmony Rd/Union Pacific Railroad Crossing***
Upgrade crossing to grade separated facility (outcome of crossing dependant upon Harmony Rd Project findings)

H ***At-grade Railroad Crossing Material Upgrades***
Upgrade crossing paving material to concrete or rubberized material for longevity of crossing at: Harrison St, Monroe St, Washington St, Adams St, Oak St, and 37th Ave

Table 9-1 Freight Master Plan Projects

Map ID[1]	Priority	Type	Project Name	Project Description	From	To	Cost(s) $1,000s[2]
A	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	Hwy 224 Project Limits: Hwy 99E to Lake Rd Interchange	$250
B	Low	C	Hwy 224 Intersection Improvements at 17th	Upgrade intersection turning radii to better accommodate freight movements.	Location specific	Location specific	$50
C	Med	C	Intersection Improvements at Main and Mailwell	Upgrade intersection turning radii to better accommodate freight movements.	Location specific	Location specific	$50
D	Low	C	Intersection Improvements at Mailwell and Omark	Upgrade intersection turning radii to better accommodate freight movements.	Location specific	Location specific	$50
E	High	C	Harrison Street Railroad Crossing Separation	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
F	High	C	Hwy 224 Intersection Improvements at 37th	Consolidate the two northern legs of 37th Ave and International Way into one leg at Hwy 224.	Location specific	Location specific	$1,946
G	Low	C	Harmony Road Grade Separation and Realign-ment at Linwood Avenue	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
H	Med	C	Railroad Crossing Improvements at 21st and Adams	Upgrade paving materials to concrete or rubberized material to improve longevity and enhance for alternative modes.	Location specific	Location specific	$50
H	Med	C	Railroad Crossing Improvements at Washington	Upgrade paving materials to concrete or rubberized material to improve longevity and enhance for alternative modes.	Location specific	Location specific	$50
H	Med	C	Railroad Crossing Improvements at Monroe	Upgrade paving materials to concrete or rubberized material to improve longevity and enhance for alternative modes.	Location specific	Location specific	$50

[1] See Figure 9-1.
[2] Project costs are in 2007 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[1]	Priority	Type	Project Name	Project Description	From	To	Cost(s) $1,000s[2]
H	Med	C	Railroad Crossing Improvements at Harrison	Upgrade paving materials to concrete or rubberized material to improve longevity and enhance for alternative modes.	Location specific	Location specific	$50
H	Med	C	Railroad Crossing Improvements at Oak	Upgrade paving materials to concrete or rubberized material to improve longevity and enhance for alternative modes.	Location specific	Location specific	$50
H	Low	C	Railroad Crossing Improvements at 37th	Upgrade paving materials to concrete or rubberized material to improve longevity and enhance for alternative modes.	Location specific	Location specific	$50

Notes:

C = Capital Project High = High priority
O = Operational Project Med = Medium priority
P = Policy Project Low = Low priority

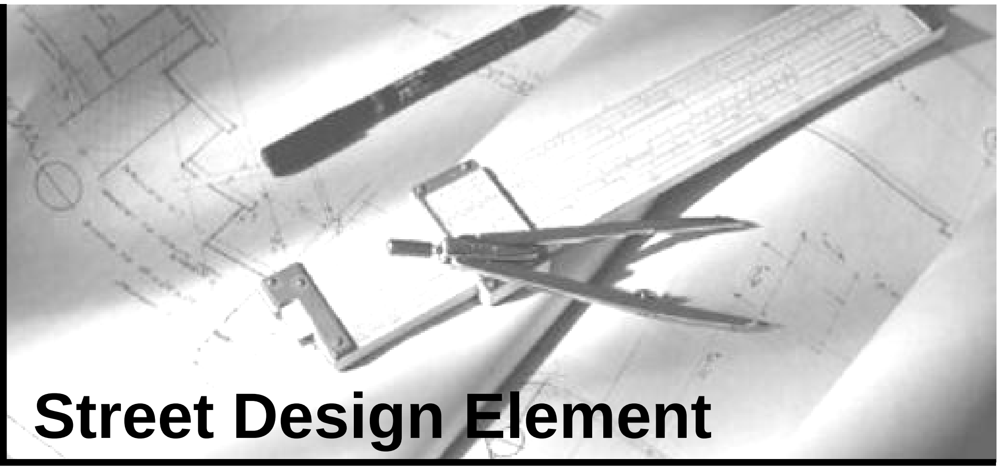
Action Plan

The Freight Action Plan identifies projects that are reasonably expected to be funded with City funds by 2030, which meets the requirements of the updated Transportation Planning Rule.[3] The Action Plan project list is the result of a citywide project ranking process. 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. The highest-ranking freight projects that are reasonably expected to be funded (see Chapter 13) are shown in Table 9-2.

Table 9-2 Freight Action Plan

Project Name	Project Description	From	To	Direct Funding or Grant Match
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	Hwy 224 Project Limits: Hwy 99E to Lake Rd Interchange	Match

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



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 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 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 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, the 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 identify which elements are most important

[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.

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, 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 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. The City should have 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 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.

Pedestrian Zone

The pedestrian zone is the public space between the development zone and the green zone. This area should support pedestrian activities by providing a comfortable space for walking, socializing, and accessing private property and buildings in the development zone. The needs for this space, its width and lighting, for example, depend upon the functional classification of the street and adjacent land uses. In general, pedestrian zones should be wider in dense commercial zones and on streets with high traffic volumes and speeds and may be narrower on local streets with low traffic volumes.

A typical pedestrian zone is at least five feet wide when adjacent to a green zone and at least six feet wide when adjacent to a street zone.

Green Zone

The green zone is the public space that separates the pedestrian zone from the street zone. It functions as a buffer between pedestrians and motor vehicle, bicycle, and other street zone users. It also offers a place to locate street trees, bike racks, street furniture, transit amenities, utilities, and plantings designed to manage stormwater runoff. The green zone can provide visual appeal for all users by balancing the hard concrete and asphalt surfaces from which a street is constructed. A green zone with mature street trees has the added benefit of framing the street and shielding pedestrians from the elements.

A typical green zone is at least five feet wide.

Street Zone

The street zone may contain many or few elements, depending on its functional classification. Typical elements include parking lane(s), turning lane(s), travel lane(s), and bike lane(s) or mixed vehicle lane(s) that include bicycles. Skinny streets or one-way streets offer different street zone variations as well. In general, the street zone serves as a conduit for mobility and access to private property. Streets that serve an important mobility function (e.g., Arterials and Collectors) are typically wider than streets that primarily exist to provide access to property (e.g., Local).

Typical lane widths:

- Parking lane, 6-8 ft
- Bicycle lane, 5-6 ft
- Travel lane, 9-12 ft[3]
- Shared travel lane, 14-16 ft

In addition to vehicle and bicycle traffic, the street zone also contains pedestrian traffic at street intersections and mid-block pedestrian crossings. To enhance pedestrian safety at intersection crosswalks and mid-block locations, crossing locations should be visible and clearly understood by both drivers and pedestrians. The street zone may also contain green street treatments or traffic management devices to slow traffic or deter cut-through traffic. (See Chapter 11 for additional discussion of neighborhood traffic management.)

[3] A typical travel lane is between 10 and 11 feet wide. Narrower lane widths are appropriate on lower-volume streets; wider lane widths are appropriate on higher-volume streets and on freight and transit routes.

STREET DESIGN CROSS SECTIONS

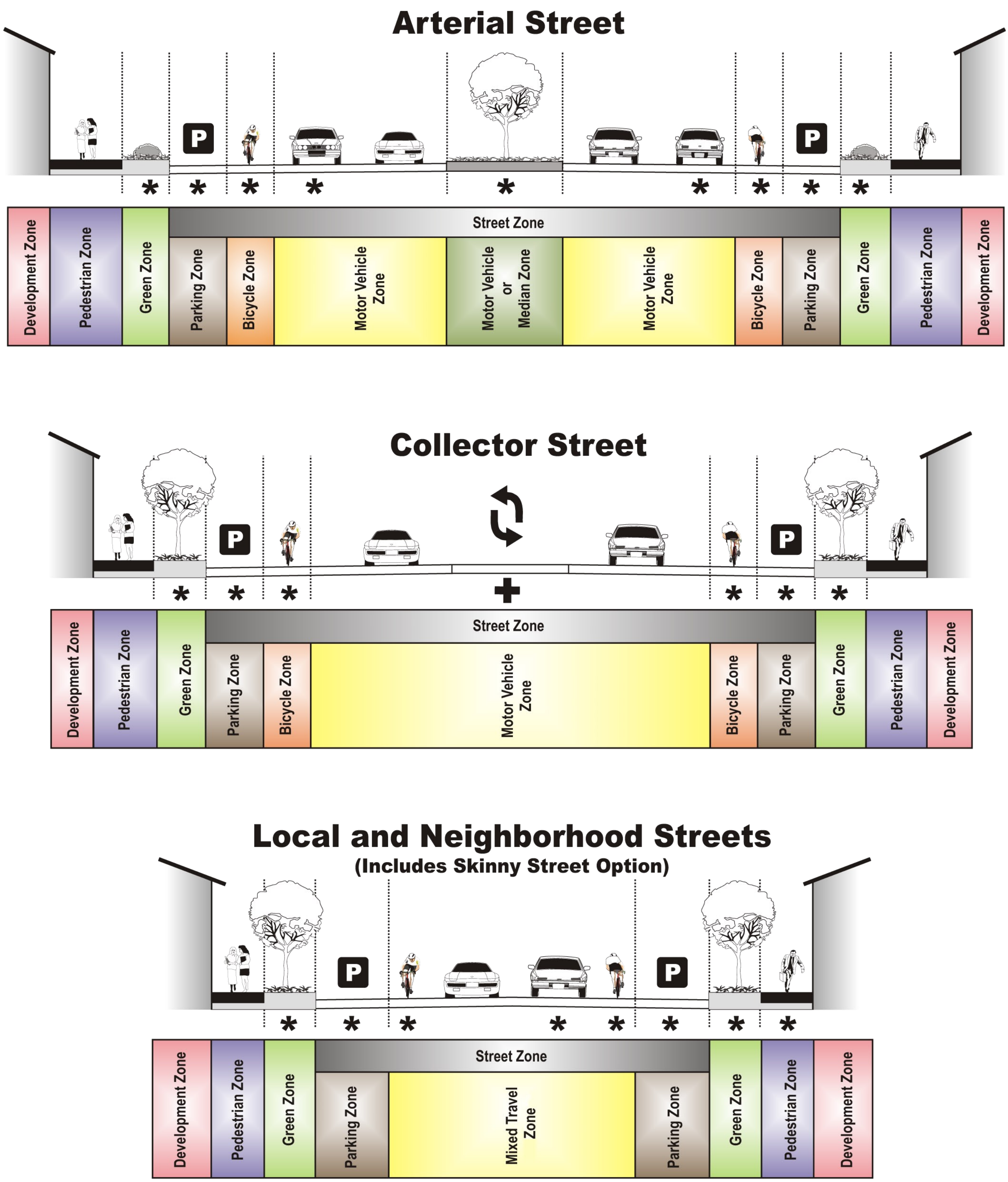
Figure 10-1 contains cross sections for four of the City's street functional classifications. Since this TSP update has identified a need for a more flexible approach to street design, this figure lays the foundation for more flexible design standards. Street design elements marked with asterisks are 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.



DKS Associates

LEGEND

* -*Constrained Right-of-Way Optional Element*

✚ -*Where Warranted*

Information Sources: DKS Associates

STREET DESIGN CROSS SECTIONS BY FUNCTIONAL CLASSIFICATION

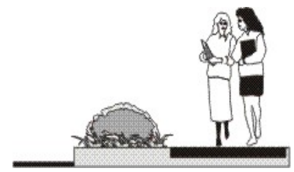
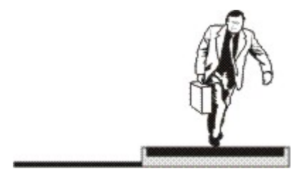
FIGURE 10-1

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 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 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

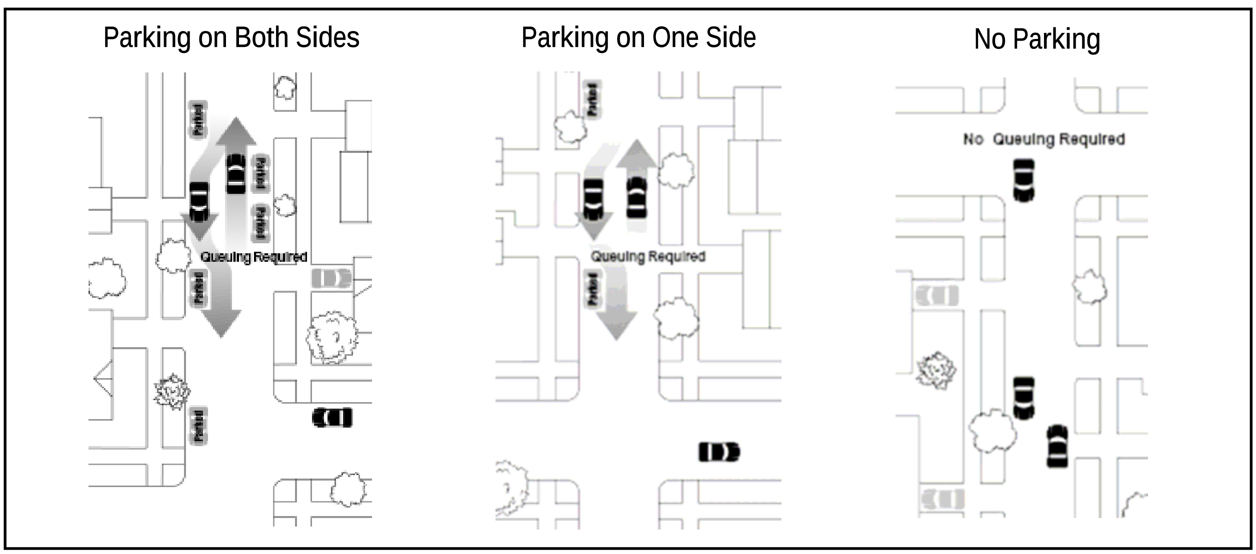
A skinny street is narrower than a normal street and is typically constructed when less paved surface area is desired or in areas with limited rights-of-way or physical constraints. Skinny street designs are typically only considered for streets that have lower traffic volumes and speeds, such as local 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 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 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 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 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 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 flexibility into 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 street design standards.
- Provide for public involvement in the development of street design standards and during the design phase of street-related Capital Improvement Projects.
- Consider maintenance costs and issues when developing design standards.
- Develop 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.

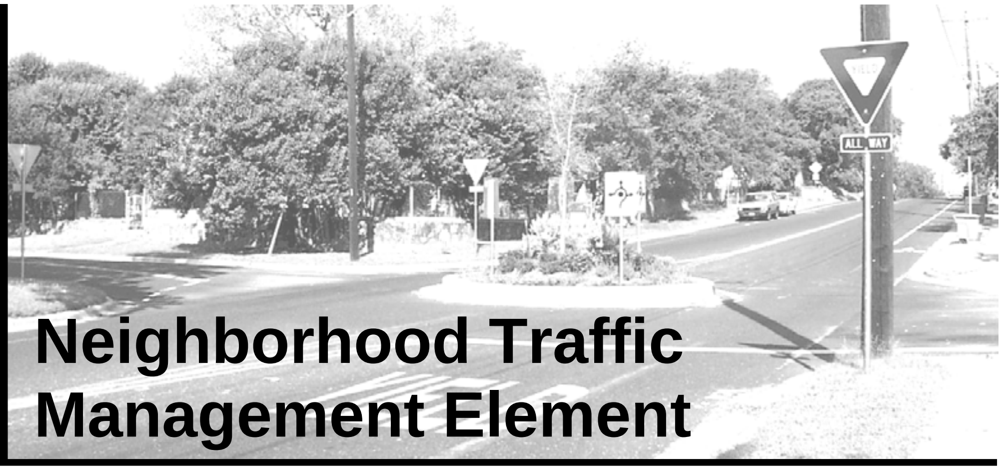
Policy Direction

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

Maintenance

Policy Direction

- Ensure that green street treatments receive ongoing maintenance to preserve their functionality and appearance.
- Ensure that landscaping in green zones and medians is properly maintained.
- Ensure that street design elements and treatments function as intended.



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
- 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

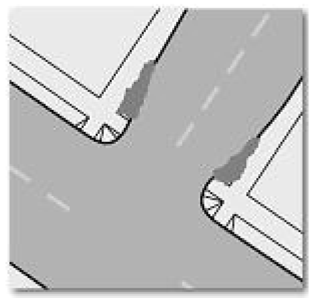
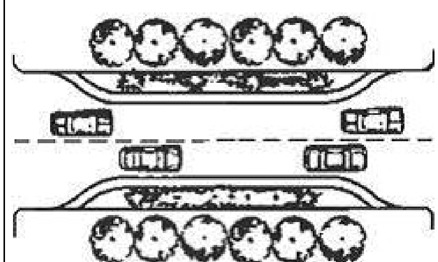
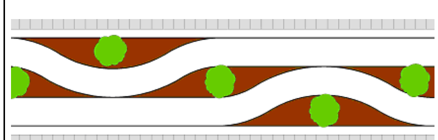
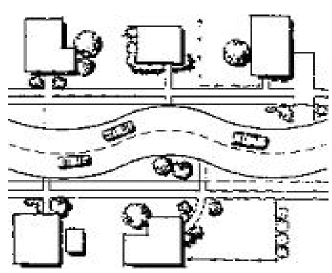
There are many different measures available in the neighborhood traffic management "tool box," but not all of these measures are appropriate for all streets or in all situations. As with street design, traffic management measures need to take street functional classification, surrounding land uses, existing 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:

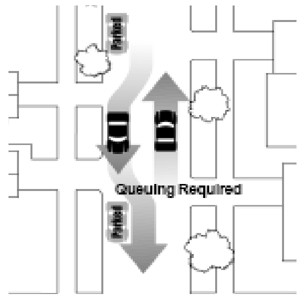
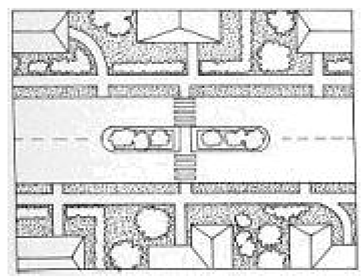
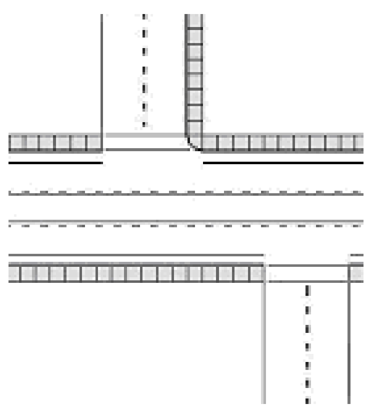
- Horizontal deflection (reduces traffic speeds)
- Vertical deflection (reduces traffic speeds)
- Volume control measures (reduces or diverts traffic volumes)
- Other measures

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.

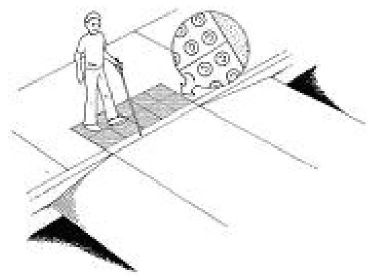
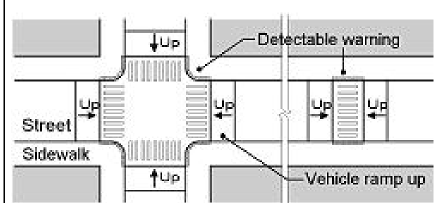
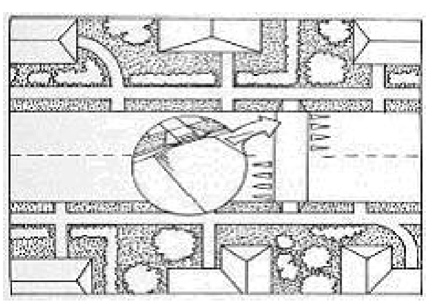
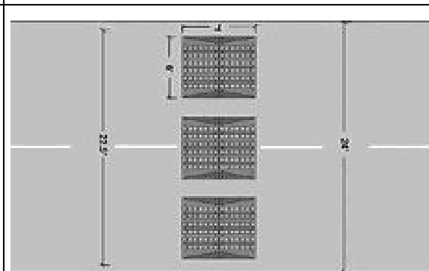
Table 11-1 Neighborhood Traffic Management (NTM) "Tool Box"

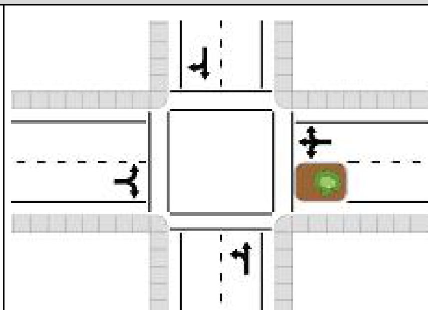
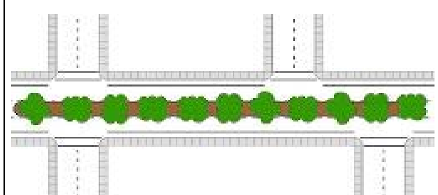
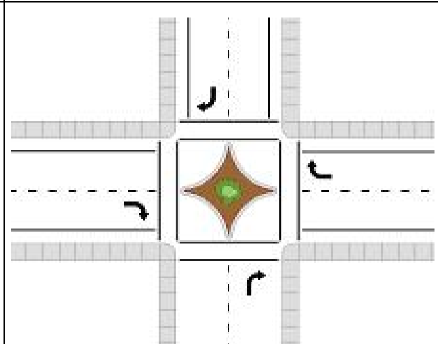
NTM Measure	Description	Example	■ Recommended ⊡ Optional ☐ Not Recommended Functional Classification				
			Arterial	Collector	Neighborhood Route	Local Street	Skinny Street
Horizontal Deflection							
Bulbout	Curb extension at an intersection that reduces the pedestrian crossing distance by bringing the curb out into the parking lane. Reduces speeds and increases pedestrian safety by reducing crossing distance.		☐	⊡	■	■	☐
Choker	Mid-block pedestrian or landscaped curb extension that narrows the roadway. Reduces speeds and, if designed for pedestrians, increases pedestrian safety by reducing crossing distance.		☐	☐	■	■	☐
Chicane	Curb extensions or offsets along a portion of a roadway. Prevents drivers from taking a "straight shot" down the street, thereby reducing speeds.		☐	⊡	■	■	☐
Curvilinear Street	Similar to a chicane. A street with a series of 25 MPH reverse curves along its length. Prevents drivers from taking a "straight shot" down the street, thereby reducing speeds.		☐	⊡	■	■	■

■ Recommended
⊡ Optional
☐ Not Recommended

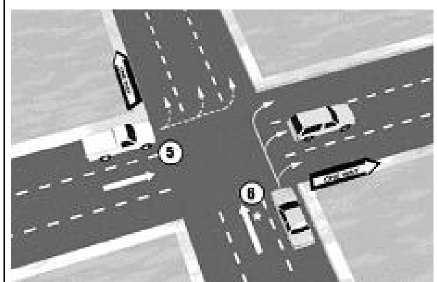
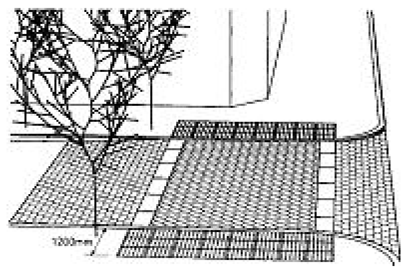
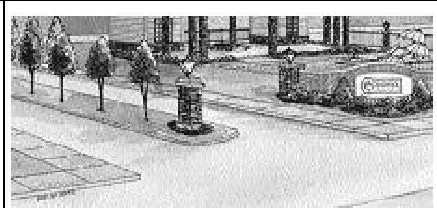
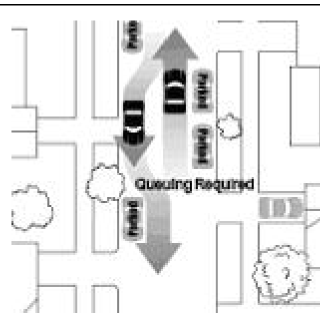
NTM Measure	Description	Example	Functional Classification				
			Arterial	Collector	Neighborhood Route	Local Street	Skinny Street
Skinny Street	Street with narrower than normal travel lane widths. May involve overlap of parking and travel lanes. Reduces speeds and increases pedestrian safety by reducing crossing distance.		⊡	⊡	■	■	☐
Center Median	Median in the middle of the roadway that narrows the adjacent travel lanes. Reduces speeds and increases pedestrian safety by providing a pedestrian refuge.		☐	⊡	■	⊡	☐
Traffic Circle	A round island in the middle of an intersection. Reduces vehicle speeds and collisions at intersections.		☐	⊡	■	■	■
Offset Intersection Alignment	Intersection alignment that requires through traffic to jog left or right. Reduces speeds and cut-through traffic by providing a less direct path.		☐	☐	⊡	■	■

■ Recommended
⊡ Optional
☐ Not Recommended

NTM Measure	Description	Example	Functional Classification: Arterial	Collector	Neighborhood Route	Local Street	Skinny Street
Vertical Deflection							
Raised Crosswalk	Raised pavement surface at a crosswalk location. Reduces speeds and increases pedestrian safety by emphasizing the pedestrian crossing and eliminating the need for pedestrians to step down into the roadway.		☐	☐	■	■	■
Raised Intersection	Raised pavement surface throughout entire intersection area. Reduces speeds and increases pedestrian safety by emphasizing pedestrian crossings and eliminating the need for pedestrians to step down into the roadway.		☐	☐	■	■	■
Speed Hump/Table	Raised pavement surface across the entire width of a roadway. Humps are designed so that a vehicle's front and rear wheels travel over the hump at different times. Tables are longer than humps and accommodate a vehicle's front and rear wheels at the same time. Reduces vehicle speeds.		☐	☐	■	■	■
Speed Cushion	Similar to speed humps but not raised across the entire width of the roadway. Reduces vehicle speeds while allowing emergency vehicles to travel unimpeded due to their wider axles.		☐	⊡	■	■	■

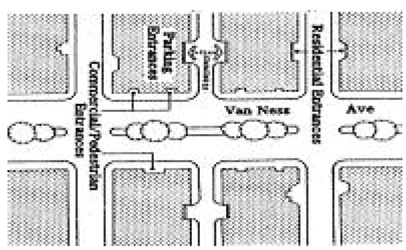
NTM Measure	Description	Example	■ Recommended ⊡ Optional □ Not Recommended Functional Classification				
			Arterial	Collector	Neighborhood Route	Local Street	Skinny Street
Volume Control Measures							
Full/Partial Closure	The complete or partial closure of a roadway to all through traffic by means of a physical barrier. Pedestrian and emergency access usually allowed. Reduces cut-through traffic.		□	□	⊡	■	■
Center Median Barrier	Median in the middle of the roadway that separates vehicles traveling in opposite directions and restricts left turn movements. Median may extend through an intersection so as to block through movements on cross streets. Prevents cut-through traffic and increases vehicular safety by reducing turning conflicts.		■	■	■	⊡	□
Diverter	A median or other barrier, such as a curb extension, that forces traffic to turn in a particular direction. Reduces cut-through traffic and decreases vehicular conflicts.		□	□	⊡	■	■

■ Recommended
⊡ Optional
□ Not Recommended

NTM Measure	Description	Example	Functional Classification: Arterial	Collector	Neighborhood Route	Local Street	Skinny Street
One-way Street	A street that accommodates vehicular travel in only one direction. Reduces the number of available travel routes.		□	□	⊡	■	■
Other Elements							
Pavement Alternatives	Use of bricks or colored pavement to emphasize pedestrian crossing locations.		⊡	⊡	■	■	■
Entry Treatments	Use of landscaping to delineate and enhance a neighborhood entrance.		□	□	⊡	■	■
On-Street Parking	Use of parked cars to buffer pedestrians from moving vehicles and to reduce speeds, particularly on skinny streets where travel lanes and parking lanes overlap and must be shared by moving and parked vehicles.		□	□	⊡	■	■

NTM Measure	Description	Example	■ Recommended ⊡ Optional ☐ Not Recommended Functional Classification				
			Arterial	Collector	Neighborhood Route	Local Street	Skinny Street
Informational Sign	Use of signs to alert drivers to various hazards.		☐	⊡	■	■	■
Stop Sign	Use of stop signs to increase safety and interrupt traffic flow making routes less desirable for cut-through traffic. Typically placed at intersections. Warrants determined by the Manual on Uniform Traffic Control Devices (MUTCD). Not a speed control measure per MUTCD.		☐	☐	⊡	■	■
Truck Restrictions	Use of "No Truck" signs at key intersections to restrict through truck trips but not local truck trips.		☐	☐	⊡	■	■
Part Time Restrictions	Use of signs to limit through and/or turn movements during key times, typically during peak hours. Reduces cut-through traffic and facilitates traffic flow during peak hours.		■	■	■	⊡	⊡

NTM Measure	Description	Example	■ Recommended ⊡ Optional ☐ Not Recommended Functional Classification				
			Arterial	Collector	Neighborhood Route	Local Street	Skinny Street
Signal Timing	Coordination of signals to reduce stops along corridors and delays at intersections. Reduced green time on side streets discourages cut-through travel.		■	■	☐	☐	☐
Police Enforcement	Use of regulatory authority to cite violators for speeding and other traffic infractions, such as illegal turning movements, to reduce such violations in the future.		■	■	■	■	■
Education	Education of the public regarding the hazards of speeding and the impacts of cut-through traffic through public service announcements, direct mailings, and driver education courses.		■	■	■	■	■
Speed Radar Trailer	Use of radar trailer to measure and display a driver's speed.		■	■	■	■	■

NTM Measure	Description	Example	■ Recommended ⊡ Optional ☐ Not Recommended Functional Classification				
			Arterial	Collector	Neighborhood Route	Local Street	Skinny Street
Neighborhood Speed Watch	Citizen-based traffic management program that allows citizens to identify speeders with speed measuring devices and send them a standardized letter regarding the hazards of speeding.		☐	☐	■	■	■
Shared Street	A street without curbs where bollards, chokers, and/or landscape elements define vehicle and pedestrian areas. Reduces speeds through shared use of roadway by all travel modes. Originated in Europe.		☐	☐	⊡	■	■
Short Blocks	Use of shorter blocks to create more intersections and more streets to distribute traffic. Closely spaced intersections reduce speeds and provide more potential locations for stop signs and signals.		☐	☐	⊡	■	■
Enhanced Major Street Performance	Provision of adequate capacity and connectivity on arterials and collectors to encourage longer trips on these facilities and to discourage cut-through trips on local streets and neighborhood routes.		■	■	☐	☐	☐

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 is responsible for administering the City's neighborhood traffic management program. This board meets once a month and has focused almost exclusively on the enforcement and education aspects of neighborhood traffic management. Engineering staff will join this board 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 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 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.

Figure 11-1 Neighborhood Traffic Management Process

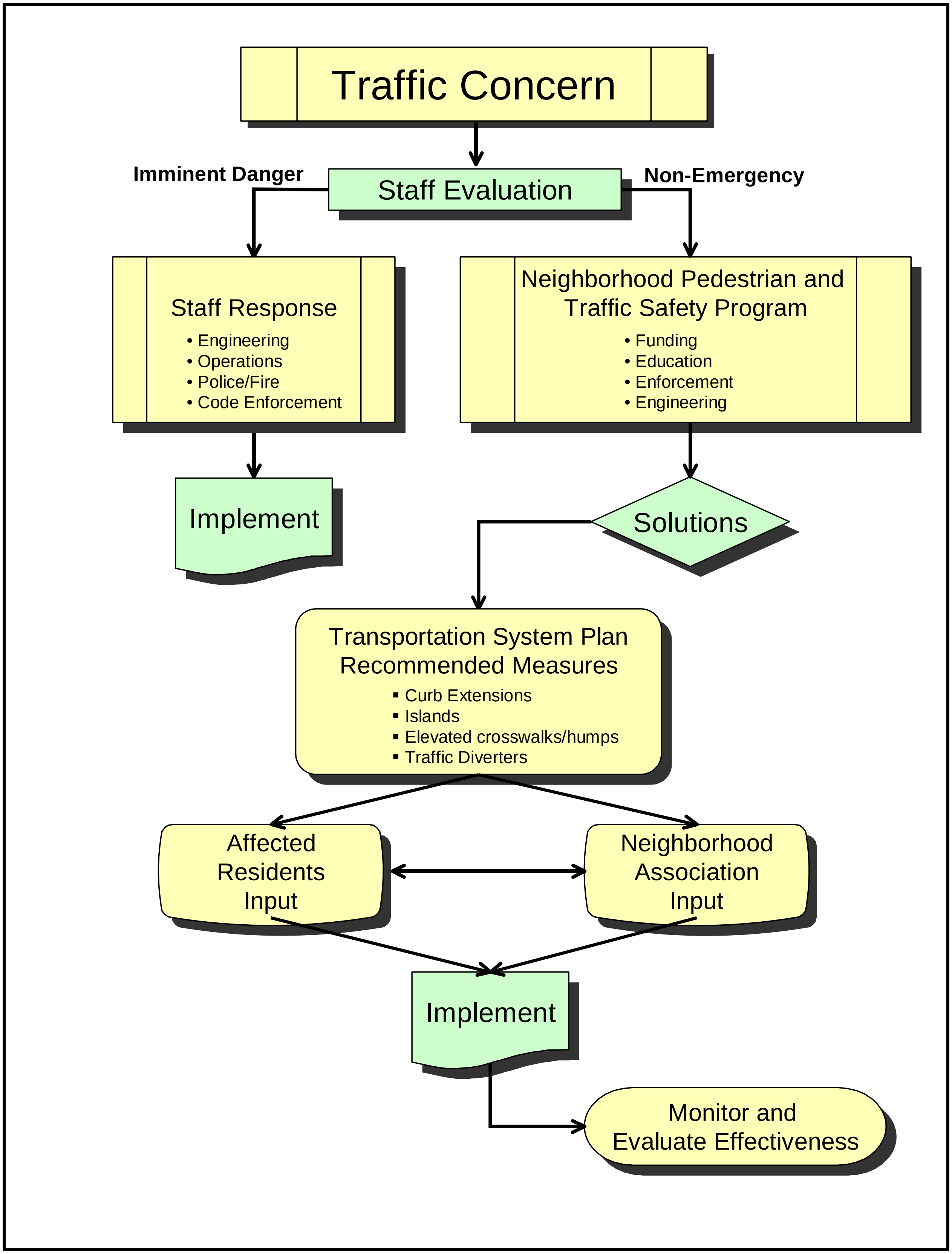


Table 11-2 Neighborhood Traffic Management Action Plan

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

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

12 Downtown Parking

The purpose of this chapter is to describe the unique parking needs in downtown Milwaukie, outline some strategies for improving how the City manages and regulates parking, and the policies by which the City will manage and develop parking. It also recommends specific actions the City and downtown businesses can take to both manage parking demand and transition downtown to a less auto-dependent environment. The focus of this chapter is downtown Milwaukie, which is defined as the area covered by the Downtown Zones, and is a subset of the regionally-designated Town Center.

The role of parking in downtown is to support the realization of the *Downtown and Riverfront Land Use Framework Plan*, which envisions a lively downtown area that is a cultural and commercial center for the community, comprised of an exciting and attractive mix of uses and amenities. Additionally, downtown is projected to be the location of significant employment growth (see Chapter 4). People will come downtown to work and to experience an environment that is unique, active and diverse. As a general principle, people do not come downtown to park.

This chapter, addresses the needs and strategies associated with several distinct types of parking users:

- Employees
- Commuters (or park-and-riders)
- Downtown residents
- Visitors/customers

TSP GOAL AND POLICY FRAMEWORK

As part of this TSP update, the community developed a set of goals to guide the development of the transportation system in Milwaukie (see Chapter 2). Several of these TSP Goals guide the City's policies on parking in downtown Milwaukie:

- **Goal 1 Livability** guides the City to address spillover parking into residential neighborhoods.

- **Goal 9 Economic Vitality** speaks to the importance of downtown as a hub of commerce and employment.

- **Goal 3 Travel Choices** directs the City to support travel options that allow individuals to reduce single-occupant vehicle trips.

- **Goal 6 Sustainability** calls for the City to decrease reliance on automobile transportation and increasing the use of other modes to minimize transportation system impacts on the environment.

- **Goal 7 Efficient and Innovative Funding** directs the City to identify and develop diverse and stable funding sources to implement recommended projects in a timely fashion.

NEEDS

Parking needs in downtown Milwaukie can be divided into four categories: improving enforcement and permitting practices; managing parking supply as downtown surface lots redevelop; modifying code requirements for parking associated with new development; and improving the parking facilities themselves.

Enforcement and Permitting Practices

Though the City has managed parking in downtown for many years, the relatively recent growth of residential units and jobs in downtown has revealed some distinct needs related to how the City permits and enforces public parking areas.

Though for many years the City's parking permit program has reserved approximately 140-180 parking stalls for permit holders, the system does not work as effectively as it could. Many of the permits are sold to Portland-bound commuters who occupy spaces that would otherwise be used by downtown Milwaukie employees. Many employees have expressed frustration that the permit system is hard to use, and the City has not aggressively marketed the permits to downtown businesses.

The City has not had clear policy direction on how to manage parking as it relates to residents of downtown and just outside of downtown. Though the 2003 *Downtown Parking and Traffic Management Plan* included many policies, it did not include guidance on how to address the parking needs of downtown residents, nor what mechanisms need to be in place to address parking overflow into the neighborhoods surrounding downtown.

It is common practice for many downtown employees to park in short-term on-street spaces and move their car from space to space throughout the day to avoid getting a parking ticket. Though the City's policy (in the Milwaukie Municipal Code) is to enforce against this type of activity (known as "moving-to-evade"), staff has not had the tools required to enforce this policy.

In 2006, the City mapped all of the parking stalls in downtown Milwaukie and began a regular practice of monitoring parking inventory and permit use. Prior to 2006, without such data, the staff could not identify problems; therefore for a long time there was no adjusting of time-limit stalls to meet adjacent purposes.

Management of Future Parking Supply

In 2003, the City's *Downtown Parking and Traffic Management Plan* included a forecast of the anticipated impact of future development on the supply of parking. Using land use growth estimates derived from the Downtown Plan, the study anticipated net growth of 68,930 gross square feet over a 10-year period. Using both 2003 and 2006 parking demand estimates, it is forecasted that new growth in downtown will generate demand for 121 to 167 new parking stalls by 2013.[1] Table 12-1 summarizes demand projections.

Table 12-1 Future Parking Demand/Supply Growth

Year	Developed Area	Net Peak Parking Demand	Rate of Demand
2006	341,670 GSF	660-831 stalls	1.9-2.43 stalls/1,000 SF
2013 Estimated	410,600 GSF*	781-998 stalls	1.9-2.43 stalls/1,000 SF
Growth	**68,930 GSF**	**121-167 stalls**	

* Represents future land use scenario established by City of Milwaukie in accordance with the Downtown Milwaukie Land Use Framework Plan. System peak hour is from 11:00 a.m. to 12:00 p.m. Demand numbers reflect demand during this peak hour.

With most of downtown's unbuilt land already in use as surface parking, future development will inevitably impact net parking resources. While public and private parking is generally abundant, it will become less so over time.[2] One of the first needs addressed in this TSP update is the sorting out of who is responsible for providing future parking in downtown Milwaukie. The answer depends on several factors: whether the parking is public or private; is replacing existing parking or serving new uses; is intended for downtown employees, residents or visitors; and is part of a structure or surface lot. This chapter attempts to clarify how these factors should be considered as the City determines its parking-related responsibilities associated with Downtown Plan implementation.

As evidenced by the North Main Village project, which was built on a former Safeway site near the corner of Main St and Harrison St, new development and infill in downtown Milwaukie will cause existing surface parking facilities to transition to new and denser land uses. The City should take a role as a developer or facilitator of new parking supply if it hopes to accomplish the urban vision outlined in the Downtown Plan. The private sector must also participate in the provision of new parking, and the City should understand how and when it could support businesses in this regard.

Development Code Modifications

The City zoning code regulates not only building form and use, but also the amount of parking that can and should be built on a site. With the exception of the Downtown Storefront Zone, the City's parking requirements for downtown development is currently the same as for other sites outside of downtown that are zoned for commercial or office development. The City's current parking standards for new development within the downtown zones are exceedingly variant and in many cases, overly burdensome. The parking requirements can be summarized as follows:

- In the Downtown Storefront Zone, no off-street parking is required. Parking is allowed, but the applicant determines how much to provide.

[1] Projections are for new demand for parking stalls. It does not include demand created due to parking stalls lost (and therefore in need of replacement) as new projects are built on existing surface parking lots.
[2] As described in Chapter 3, the City's October 2006 downtown parking inventory found 1,687 public parking spaces (377 on-street and 1,299 off-street). Of these, 1,029 are private parking spaces. During the peak hour (11a-12p), the public spaces are generally 50-60 percent full and the private spaces are 30 to 40 percent full. See Chapter 3, Figure 3-16 for a map of parking in downtown.

- In the other Downtown zones, off-street parking is required. The type of use determines the amount required.[3] Applicants are required to provide between 1 and 15 stalls per 1000 sf of retail, restaurant or office area; 1.25 stalls per unit of multifamily residential development.

Currently, the actual demand for parking is fairly evenly distributed between different land uses (e.g. retail, office, and restaurants).[4] This pattern of parking demand does reflect the multiple parking standards currently in place in the City Zoning Code, which suggests that specific uses demand specific allocations of parking. Parking utilization studies conducted in 2003 and 2006 indicate that the demand for parking in downtown Milwaukie ranges from 2.0 to 2.43 stalls per 1,000 GSF.

The development requirements that are currently in place may in fact require that a new development provide more parking than is needed by the development. On the relatively small building sites in downtown, such excessive requirements may preclude development altogether due to the high cost of building structured parking.

Parking Facility Improvements

Most of the downtown parking supply is located on private surface lots outside of the downtown core (Main Street between Scott St and Washington St). In many cases, the lots have inadequate signage, lighting, landscaping, and surface treatments. This is equally true for many of the public lots as well. The poor quality of the existing parking lots limits the ability of the City and the private sector to maximize the use of the existing inventory. Without high quality lighting, attractive physical appearance (i.e., paving, signage, landscaping) and pedestrian connectivity, the underutilization of existing stalls will continue to fuel the perception that there is a shortage of downtown parking.[5]

The issue of pedestrian connectivity should be emphasized. The decision to park in a lot is comprised both of the assessment of the lot condition and the experience of walking to and from that lot. Without a safe, attractive, and convenient sidewalk system that connects all lots to all downtown destinations, the City will miss serving a certain percentage of would-be permit parkers who elect not to participate because of perceived safety issues. In Milwaukie, which has a complete sidewalk system downtown (see Figure 3-2 in Chapter 3), the need leans more toward safety than convenience. For example, many downtown sidewalks are not well lit, and many lack pedestrian amenities like street trees, benches, and trash cans.

STRATEGIES

There are two strategies for addressing the needs described above. The first is to adopt and implement a set of Downtown Parking Guiding Principles or Parking Management Principles, which establish a policy framework for the City's decision-making on downtown parking-related issues. The second strategy is to adopt and implement a set of Parking Operating Principles, which will direct City staff or its representatives in the day-to-day operation of the parking system.

As the City is not yet prepared to abide by these principles, a set of recommendations is included in the next section of this chapter. These recommendations will enable the City to effectively transition from its current practices to those described in the two sets of principles.

[3] The parking requirements vary across approximately 59 use categories. See Milwaukie Municipal Code 19.500.
[4] See Chapter 3, Table 3-11.
[5] Private lots are not currently utilized for public parking, but shared use arrangements are recommended and the physical state of the private lot will affect its marketability to potential users.

Downtown Parking Guiding Principles (Parking Management Principles)

"Guiding Principles for Managing Downtown Parking" were initially developed in 2003 as part of the *Downtown Milwaukie Downtown Parking and Traffic Management Plan*, and were confirmed and updated during the 2007 TSP update process. Although the 2003 set of Guiding Principles provide a relatively comprehensive framework for managing downtown parking, the TSP update refined the Principles and filled in a few gaps. For example, the 2003 version did not address downtown residential parking, nor were the principles regarding downtown park-and-rides sufficiently refined. The following 23 principles describe a complete and state-of-the-industry set of principles for managing parking in downtown Milwaukie:

Customer/Client/Vendor/Visitor Parking

1. The most convenient parking spaces should be reserved to support customer/client/vendor/visitor access to downtown. Management of the on-street parking system should promote customer/visitor accessibility by prioritizing the parking of short-term patrons in downtown Milwaukie.

2. The City of Milwaukie should take the lead role in providing sufficient short-term parking to support the retail environment described in the *Downtown Plan*. The on-street system is therefore not intended for employee, resident or commuter parking during normal business hours.

3. On-street parking in the downtown core should support street level activities. The provision of on-street parking on Main Street should not be sacrificed for street capacity enhancement or vehicular through-put.

4. The City should enforce against long-term parkers (typically employees) who move their vehicles during the day to evade being cited for parking in short-term stalls.

Multimodal Access

5. The City should strive to implement downtown travel options to provide a balanced system that includes transit, automobile, bicycle, and pedestrian facilities and services for all downtown users.

6. Parking management strategies and programs should support, complement and consider the availability and use of all access modes.

Employee Parking

7. City-controlled off-street lots should be managed to meet use demand using the 85 percent full standard.[6] All parking lot management strategies should be coordinated with transportation demand management objectives to ensure that employees and customers have reasonable options for access.

8. Whether in on-street subareas or in off-street lots, wherever parking exceeds the 85 Percent Full Standard, employee parking should be eliminated/phased out first. This is so the City can accommodate visitors and customers at all times. Businesses that have designated private employee parking lots should be encouraged to do the same, wherever possible. The City should help businesses understand and utilize demand management strategies to help employees transition to alternative modes of travel over time.

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[6] Refer to page 12-7 for an explanation of the 85 Percent Full Standard.

9. The City should provide clear and consistent information about downtown parking to optimize utility and convenience for all users.

10. The City should support downtown business efforts in transitioning more downtown employees into alternative modes (i.e., transit, bike, walk, rideshare) through business-based programs and incentives.

Park-and-Ride/Transit

11. Providing parking for downtown customers, visitors and employees is a higher priority than providing parking for commuters destined for other cities.

12. Park-and-ride lots should be located outside the downtown core.

13. Bus staging in the downtown should have minimal impact to on-street visitor parking. Buses should serve downtown, but should not stage on downtown streets. The purpose and priority for transit stops in the downtown area is to provide safe, convenient, business-friendly access for downtown users, customers, and employees.

14. While transit park-and-ride structures are discouraged downtown, the City may allow for the provision of such a structure should it dedicate some stalls for downtown parking and lead to future control/ownership of the facility by the City for public parking exclusively or predominantly.

Quality of Parking

15. All downtown parking, whether public or private, should be safe, secure, well lit, and maintained to enhance the users' sense of safety and security.

Residential Parking

16. The downtown parking supply should be managed to minimize parking impacts on adjacent residential neighborhoods.

17. Downtown residential development should be responsible for providing on-site parking, or negotiating parking availability in off-street lots, for new residential units.

Publicly Managed Parking

18. Over time, the City anticipates that its off-street lots will redevelop and City-owned or leased surface parking lots will gradually disappear. The City will attempt to continue to accommodate the commercial and residential buildings whose tenants are, as of December 2007, making use of City off-street lots. The City will continue this practice as long as public off-street spaces are available.[7]

19. Downtown Milwaukie employees are the highest priority customers in the City's parking permit program. As the permit system approaches capacity (i.e., spaces become unavailable for new applicants), the City should revoke parking permits issued to commuters as necessary, and refrain from issuing new permits to commuters.

[7] The term "City lots" in this recommendation excludes the lots adjacent to the Ledding Library and City Hall.

20. The City supports the provision of a structured public parking facility for visitor and employee parking. Due to the expense of structured parking and the benefit structured parking would provide to downtown businesses, the City should commence planning for structured parking only in collaboration with the downtown business community and only after a viable funding strategy is identified.

21. The City supports shared use of parking areas, including public lots, when there is no conflict in operating hours.

Parking Requirements for New Development

22. Parking requirements for new development should contain needed parking on-site or through shared parking agreements.

23. New parking supply should be located within structures that contribute to the design and activity of downtown whenever possible.

Parking Operating Principles

Parking Operating Principles define the day-to-day operating priorities for managing parking in the Downtown Zones. The Operating Principles provide specific direction for addressing issues that will occur in the system, which should assist the City in following the Guiding Principles.

85 Percent Full Standard

The first and most important piece of the Operating Principles is the 85 Percent Full Standard (85 PFS), and is therefore discussed separately here. The 85 PFS is an industry-based management standard for understanding the sufficiency of parking supply *in a specified and limited area*. The standard establishes a rule for when to make on-the-ground adjustments: when parking stalls in specified and limited areas are routinely 85 percent full during the peak hour, the City should implement a more aggressive strategy to assist priority users in finding parking.[8]

Because downtown Milwaukie is relatively small, the 85 PFS should be applied beyond a "hot-spot" basis. That is, as small areas of downtown redevelop or become more popular, consideration should be given to parking utilization beyond the immediate parking impact area. Nearby parking utilization should also be considered, due to the compactness of downtown and the Downtown Plan's emphasis on high quality pedestrian amenities and walkability.

However, when the 85 PFS is reached, there are many Operating Principles the City can apply in electing how to respond. These are described below, and are followed by the rest of the Operating Principles.

- **At 85 PFS:** Work with downtown employers to advertise and inform employees about how to use the City permit system and where parking is available; and/or
- **At 85 PFS:** Enforce against employees or TriMet patrons who use spaces intended for visitors to downtown businesses; and/or

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[8] One possible consequence could be that no strategies need to be implemented if the utilization level is deemed acceptable. However, the trigger provides a proactive system of review and provides time to implement parking management strategies before overly constrained conditions occur.

- **At 85 PFS:** Modify the availability of on-street parking for short-term visitors or long-term permit holders, depending on the need of the adjacent building occupants; and/or
- **At 85 PFS:** Increase permit prices; and/or
- **At 85 PFS:** Invest in lighting, landscaping, and other amenities to make other parking areas, and the walk to them, more attractive; and/or
- **At 85 PFS:** Acquire or construct new parking supply; and/or
- **At 85 PFS:** Work with employers and TriMet to decrease the need for downtown employees' and patrons' need to drive to and park in downtown (implement Transportation Demand Management measures)

Additional Operating Principles are as follows:

- Short-term parking is defined as parking with time-stays less than or equal to four hours.
- Parking management may include strategies for modified pricing levels for short and long-term parking, user types, or lot locations
- The City will manage on-street parking spaces to primarily serve the ground floor use of adjacent properties
- There will be no un-regulated on-street parking in downtown zones
- 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
- 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 results in inadequate parking availability outside of the downtown zones, the City will facilitate the establishment of Residential Permit Zone programs upon the request and support of the affected neighborhood.[9]

The application of both the Guiding Principles (Management Principles) and the Operating Principles will result in 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.

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

The goal is a clear and predictable downtown parking system, as summarized in Table 12-2. 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.

Figure 12-1 Diagram of Parking Type Locations

Table 12-2 Parking Facility Priorities by Parking User Type

Parking User Types	Parking Facility Type: On-Street Parking	Parking Facility Type: Off-Street Public Parking	Parking Facility Type: Off-Street Private Parking	Transportation Demand Management Tools
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	• 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 • 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 park-and-ride to open 2008 • Existing park-and-ride on Lake Rd • Improve E-W bus connections to downtown Milwaukie

RECOMMENDATIONS

The City should move to apply the Guiding Principles and Operating Principles. This will be easier to do with the implementation of certain policy recommendations, operational improvements, and capital projects.

Policy Recommendations

Adopt new parking development standards for commercial development in the downtown zones.

Amendments should create a unified parking standard for downtown commercial and office uses that does not require more parking stalls than are needed. The revised code should encourage shared parking agreements and acknowledge on-street parking as a resource for downtown businesses.

- Amend the Code to eliminate minimum parking ratios for commercial/retail uses in Downtown zones. This will enable the market to determine minimum parking levels for new commercial development, meaning that the City will allow new office and retail to be built in downtown Milwaukie without attendant parking (which supports the Downtown Plan's emphasis on the use of precious urban space for people and activity and not parking lots).

- Amend the Code to establish maximum surface lot parking ratios of 2.5 stalls per 1,000 square feet for all commercial uses within the downtown zones (which would cover office, retail, personal service, restaurant, auto, government, bowling, church, fraternal organization, gym, and funeral home uses, which are each listed separately in the current code). This will prohibit development that requires large surface parking lots, supporting the Downtown Plan's emphasis on a compact and interesting urban environment.

  Maximum parking ratios for parking provided in structured stalls are not recommended if they meet the City's development standards and design guidelines.

Adopt new parking development standards for residential development in the downtown zones.

Given that the on-street system in downtown is prioritized for customer/visitor use, the vision to bring greater levels of new residential development (over retail) to downtown will create potential conflicts for access to on-street parking. To mitigate this and assure that residential parking is available in downtown and on-street parking remains available to customers and visitors, the City should amend the Code as follows:

- Establish a minimum surface parking lot requirement of 1 space per unit.

- Establish a maximum surface parking lot requirement of 2 spaces per unit.

- Require no maximum parking allotment within structured parking facilities.

- To accommodate residential development that cannot incorporate parking into development sites (i.e., for reasons of site size, geometries, etc.), allow for requirement exceptions through approval of a transportation management and trip reduction plan.

- 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.

As downtown grows and land uses intensify, conflicts for parking in 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 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 provided as a basis to begin discussions with neighborhoods:

- Affected neighborhoods, coordinated through Neighborhood District Associations, petition the City for creation of a RPZ by formally polling affected residents within a boundary.
- If 51 percent of affected residents within a boundary poll in favor of a 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 two hours unless by displayed permit. This would be posted by signage and enforced through the City's code enforcement.
- 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

- Create and 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.
- Create a transportation information package for downtown employees, to include public parking, transit, and biking information.

Active Parking Management

The City should dedicate appropriate resources for actively managing downtown parking. This will include tools and staffing to enforce on-street parking time limits, maintain the parking inventory map, and continue coordination between City departments.

Improve Parking Permit Program

Improvements to the City's Parking Permit Program can increase the use of off-street spaces that are currently underutilized. By moving employees who currently park on-street into off-street lots, valuable on-street stalls can be freed up for customer or visitor use.

Improve/Streamline the Process for Purchasing Permits

Make purchasing parking permits easier and more convenient. Enhancements to the permit program could include selling permits in more than one location (e.g. at City Hall, by mail, on-line), offering flexible payment options (e.g. credit card, automatic deduction) and offering customized permit packages (e.g. monthly, biannually, annual renewals).

Implement "Tiered Pricing"

Currently the City charges the same amount for all parking lots. As such, parking is not priced according to demand or proximity to "premier" destinations. Tiered pricing would set rates based on lot popularity. For example, a lot with occupancies over 85 percent would be priced higher than lots with significantly lower rates of utilization. Lots on the fringe of the downtown would be priced lower than more popular lots located in the core retail area.

Parking Utilization Monitoring Program

No less than every two years, City staff should count the parking supply and peak hour parking utilization. With the results of this information, the Parking Manager should convene a meeting of stakeholders to review the results, check areas against the 85 PFS, and evaluate the need for any actions (e.g. re-designating short-term or long-term parking, modifying short-term parking durations, or adjusting the allotment of permits for Portland-bound commuters).

Identify Locations for Future Public Supply

As City-owned parking lots transition to more dense land uses, the City should continually consider the prospects for new parking supply for downtown employees.

Engage Owners of Private Parking Facilities to Provide Shared Parking

City staff should initiate a program to develop shared use agreements with owners of off-street private parking. The agreements should be developed for both employee parking and special event parking. The City or a downtown business association can take the lead in contacting property owners or developing incentives such as facility upgrades (e.g. lighting, striping, pavement, landscaping), leasing arrangements, revenue sharing, or public purchasing. Shared parking arrangements could be arranged between two private parties, or between private parties and the City.

Evaluate Funding Strategies for New Supply

The City should begin to discuss and evaluate potential funding sources for future public parking supply. These discussions with downtown stakeholders should assure that the final recommendations have broad support within the downtown community. Most public parking facilities developed in other jurisdictions are funded with multiple sources that include urban renewal/tax increment financing, parking fees and charges, meter districts, local improvement districts, capital fund allocations, and bonding.

Capital Implementation Projects

Signage Changes

Over time, distinctive, friendly, and clear customer/visitor parking signs should be designed and installed at all short-term public parking lots. The signs should be "blade" signs with information on both sides so that downtown patrons can read the signs from either direction.

Upgrade Public Parking Lots

The City should maintain the pavement, lighting, and landscaping of its off-street public parking facilities to ensure a safe and attractive appearance.

Implement the Public Area Requirements

Implementing the Public Area Requirements of the Downtown Plan will result in wider, continuous sidewalks with appropriate lighting. These improvements will help address concerns about walking several blocks between a parking lot and a destination.

Master Plan

Table 12-3, the Downtown Parking Master Plan Project List, summarizes the key projects needed to implement the recommendations in this chapter. Many of the projects related to the operation and maintenance of the City's parking program may be self-funding through parking permit fees and parking fines.[10]

Table 12-3 Downtown Parking Master Plan Project List

Priority	Type	Project Name	Project Description	Cost(s) $1,000s[11]
High	O	Downtown Parking Enforcement	Implement parking management system, including a dedicated parking manager.	$40
High	C	Downtown Streetscape Improvements	Install sidewalk bulbouts, lighting, and pedestrian amenities.	$6,700
Med	C	Downtown Parking Signage	Install way-finding and identification signage at McLoughlin Blvd intersections and around public parking lots.	$10
Med	C	Downtown Public Parking Lot Improvements	Upgrade and maintain off-street public parking facilities with improved landscaping and lighting.	$50
Med	C	Public Parking Structure	Construct 3- to 4-story public parking structure with retail at ground floor for visitor/employee parking.	$10,000

Notes:
C = Capital Project — High = High priority
O = Operational Project — Med = Medium priority
P = Policy Project — Low = Low priority

[10] This source of funding is not included in the TSP transportation funding forecast (Chapter 13).
[11] Project costs are in 2007 dollars. Future costs may be more due to inflation. Costing details can be found in the Technical Appendix.

Action Plan

The Downtown Parking Action Plan identifies capital projects that are reasonably expected to be funded through City funding sources outlined in Chapter 13, by 2030, which meets the requirements of the updated Transportation Planning Rule.[12] The Action Plan project list is the result of a citywide project ranking process. 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 were used to rank the projects. The highest-ranking downtown parking projects that are reasonably expected to be funded with local funds (see Chapter 13) are shown in Table 12-4.

Table 12-4 Downtown Parking Action Plan

Project Name	Project Description	From	To	Direct Funding or Grant Match
Downtown Streetscape Improvements	Install sidewalk bulbouts, lighting, and pedestrian amenities.	TBD	TBD	Match

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

13 Funding and Implementation Plan

The purpose of this chapter is to describe the funding framework for considering City of Milwaukie transportation improvements between 2008 and 2030. This chapter outlines the foreseeable funding sources—and their restrictions—for both capital improvements and transportation maintenance projects. This chapter also provides a brief overview of additional funding sources.

CURRENT FUNDING SOURCES

The City of Milwaukie relies on a variety of funding sources for maintaining and improving its transportation infrastructure. Most of these sources are constrained, meaning that they can only be used for a specific function like expanding the system's capacity, paving the streets, or building bicycle facilities. The funds also flow into Milwaukie from a variety of sources, most of which are tax-based and administered through different levels of government and through different mechanisms. The City has identified 11 transportation funding sources that are currently and potentially available.[1]

Grant/Competitive Programs

- **Metropolitan Transportation Improvement Program (MTIP)** identifies how all federal transportation money is to be spent in the region in two-year increments. Each time the MTIP is developed, Milwaukie competes with other jurisdictions in the region for federal "regional flexible funds" that can be used for most aspects of the local transportation system.
- **Congressional Appropriations** make federal funds available to Milwaukie through the sponsorship of a U.S. congressperson. Such appropriations are highly sought after and are not easily secured. However, Milwaukie has had some success in receiving appropriations.
- **Statewide Transportation Improvement Program (STIP)** is ODOT's project funding and scheduling document. The STIP makes funds available to cities, through a highly competitive process, for expansion, preservation, safety, and other system enhancements. The STIP programs expenditures from both State revenues and some federal programs.

[1] This list includes federal funds that are not part of the City's regular revenue stream for transportation improvements.

City Share of State Highway Trust Fund

A portion of the taxes and fees assessed on Oregon motorists and freight haulers is paid to the City annually on a per capita basis. The primary sources are the State motor vehicle fuel tax, a weight-mile charge on heavy trucks, and vehicle registration fees. ODOT requires that cities set aside one percent of of the local share of Highway Trust Fund proceeds for the construction and maintenance of bicycle facilities.

Local Funds—Fees and Taxes

- **Franchise Fees** are paid by each of the City-owned facilities—water, wastewater, and stormwater—to the City's Street Fund for their use of the public right-of-way. The utilities are able to pay the franchise fee with some of the revenue they collect from Milwaukie utility rate-payers.
- **PGE Privilege Tax** is similar to the franchise fees, in that Portland General Electric pays the City for its use of the public right-of-way. As part of the City's Street Surface Maintenance Program, a portion of this fee is dedicated to surface maintenance for the city's most important streets.
- **Local Gas Tax** is separate and apart from the State gasoline tax. Milwaukie gas stations pay a tax on fuel sold in Milwaukie, which is sent to the City for street maintenance use only.
- **Street Surface Maintenance Fee** is similar to a utility bill, in that all Milwaukie properties are charged a monthly fee for use of the street system. These fees are dedicated for street maintenance use only.
- **Local Improvement Districts (LIDs)** are special assessment districts in which property owners benefiting from a transportation improvement pay for that improvement. These have not been frequently used by the City, but are available to interested property owners.

Local Funds—Development Contributions

- **System Development Charges** are collected from developers when new construction is expected to place heightened demand on the transportation system. The vast majority of these monies can only be used by the City for adding capacity to the system.
- **Fee In Lieu of Construction** is collected when required street frontage improvements, typically associated with residential construction, are impractical to build. These funds are limited in both how and where they can be spent.

The following section provides additional detail about most of these sources, particularly those that the City can rely on regularly. The regular revenue stream projection provides the baseline for the Funding and Implementation Plan in this TSP.

Most of these funding sources can be (and have been) used by the City to leverage one another and additional sources. As transportation improvements are expensive and the competition for transportation dollars is fierce, the City must utilize the funds it regularly receives as "match" for larger awards, which are typically available through federal grant programs. The complete transportation funding picture for the City therefore requires that regular revenues cover maintenance, operations, small projects, and matches for larger capital projects that the City cannot accomplish without an infusion of funds for the specified project. The Funding and Implementation Plan follows this premise throughout.

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 $3.75 million for capital projects, $22.9 million for maintenance projects, and $33.4 million for either capital or maintenance projects.

System Development Charges and Fee in Lieu of Construction

A transportation System Development Charge (SDC) is collected from developers when new construction or redevelopment is expected to place new demands on the transportation system. The SDC charge is based on a study-based rate and the number of new vehicle trips the development is expected to generate. The City's current SDC rate is $1,596.52 per new PM-peak hour trip. The transportation SDC consists of a reimbursement charge and an improvement charge. The improvement charge portion is roughly 95% of the total SDC and can only be used to construct transportation projects that add capacity.

Fee in Lieu of Construction (FILOC) is collected from developers in lieu of construction when required frontage improvements would not be practical, efficient, or beneficial to construct. For example, constructing an isolated sidewalk in the middle of a residential block where no sidewalks currently exist has minimal impact. However, pooling fees collected in lieu of required frontage construction enables the City to build improvements where they are most needed in the neighborhood in which they were collected, such as along identified bikeways, walkways, or school routes.

Over the past five fiscal years, SDC and FILOC revenue averaged $170,000 per year (in 2007 dollars). The projected revenue from these sources over the next 22 years is estimated to be $3.75 million.

Franchise Fees

Each of the three City-owned public utilities—water, wastewater, and stormwater—pays 8% of its net revenue to the Street Fund for the use of the public right-of-way. For the fiscal year 2006/2007, the Street Fund received $546,650 from such franchise fees. Franchise Fee projected revenue is $12 million over the next 22 years and is not restricted to either capital or maintenance projects.

State Gas Tax and Vehicle License Fees

The State of Oregon collects taxes and fees on motor vehicle fuel, licenses, and permits and then deposits the proceeds into the Highway Trust Fund. A portion of this fund is paid to cities annually on a per capita basis. By statute, the money may be used only for road-related purposes. Like most Oregon cities, Milwaukie uses its share primarily for street department operations and associated maintenance activities. Road maintenance includes a variety of activities such as striping, signage, sweeping, and shoulder maintenance.

Oregon motor vehicle fuel taxes are collected as a fixed amount per gallon of gasoline sold. The Oregon gas tax is currently 24 cents per gallon 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 increase 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 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, the City received roughly $961,000 from the Oregon Highway Trust Fund. The City's projected share of this fund is approximately $21 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, the City received $9,711 from this revenue source and expects to receive $215,000 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.

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 the estimated annual revenue of $300,000 in the first program year. Revenues for the next 22 years are projected to total nearly $6.8 million. Monies collected from this tax are dedicated to 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 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 is expected to be approximately $125,000. Over the next 22 years, the total revenue from this source will be approximately $2.8 million. Monies collected from this tax are dedicated to roadway surface preservation, including maintenance, rehabilitation, and reconstruction. They cannot be used to construct capital projects.

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

Funding Source	Capital	Unrestricted	Maintenance	TOTAL
SDC and FILOC	$3,756,273			**$ 3,756,273**
Franchise Fees		$ 12,026,300		**12,026,300**
State Gas Tax		21,151,174		**21,151,174**
Bike Path Fund		213,642		**213,642**
Street Maintenance Fee			$13,412,781	**13,412,781**
PGE Privilege Tax			6,765,000	**6,765,000**
Local Gas Tax			2,750,000	**2,750,000**
Projected Revenue (2008 to 2030)[2]	**$3,756,273**	**$33,391,116**	**$22,927,781**	**$60,075,170**

CAPITAL AND MAINTENANCE PROJECTS

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. Additionally, the City will pursue a strategy that allocates 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

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. Given current revenue sources and projections, 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.

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.

[2] 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 three years of actual revenues.

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

Projects	Capital Cost*	Operations Cost*	TOTAL Cost*
Operations & Maintenance Projects			
Traditional Maintenance Activities (sweeping, striping, signage, etc.)		$ 8,456,250	**$ 8,456,250**
Street Lighting		7,225,000	**7,225,000**
Overhead		4,510,000	**4,510,000**
Contributions to Support or Administration		9,809,250	**9,809,250**
Street Surface Maintenance Program		22,927,781	**22,927,781**
Subtotal		**$52,928,281**	**$52,928,281**
Action Plan Projects			
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)	**$5,622,400**	**$54,403,281**	**$60,025,681**

*Approximate Costs

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.

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.

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

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 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 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 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.

General Fund Revenues

At the discretion of the City Council, the City can contribute General Fund revenues to transportation projects and programs. (General Fund revenues primarily include property taxes, use taxes, and other miscellaneous taxes and fees imposed by the City.) Competing community priorities set by the City Council limit the funding potential of this approach. General Fund resources can fund any aspect of the system, from capital improvements to operations, maintenance, and administration. Additional revenues available from this source are only available to the extent that either General Fund revenues are increased or City Council diverts funding from other City programs.

Expanded SDC Rate for Transportation

The City's transportation SDC rate is $1,596.52 per PM-peak hour trip generated. A more typical transportation SDC in the Portland metro area is approximately $2,000 per single-family residence (or PM-peak trip generated). A regional examination of combined SDC and development fee costs conducted by the City of Portland found that the City of Milwaukie charges less than the majority of other jurisdictions (17th out of 21 overall) and has particularly low rates for residential uses.

Given that a large number of needs have been identified, a higher transportation SDC rate is warranted. The projects identified in this TSP will help the City maintain quality of life for its residents and businesses as the City experiences continued growth. It is appropriate to ensure that growth pays a fair and commensurate share of the costs of these new facilities.

In addition to reevaluating the SDC rate, the City may wish to consider tightening its policy on SDC credits. The City currently allows a credit against SDCs due for any privately funded transportation development that increases capacity. However, the City may wish to change this policy to allow SDC credits for only those privately funded projects that are identified in the City's adopted TSP, i.e., those improvements which have been identified as most important to the overall system. A modification of the City's municipal code would be required to implement this change.

Urban Renewal District

An Urban Renewal District (URD) is a mechanism by which the growth of tax revenues for a specific period of time is "captured" to pay for projects within the district. Typically, the sponsoring agency seeks bond financing of such projects and then repays those bonds with the "tax increment" generated in the area. The "tax increment" is the growth in tax revenue; the "frozen base," i.e., the property tax revenue already being generated, continues to flow to the appropriate taxing jurisdictions. All of the "tax increment" (the amount above the frozen base) goes towards retiring the urban renewal debt. This type of "tax increment" financing has been used in Oregon since 1960 to fund a wide variety of projects including transportation improvements.

Local Improvement District Assessment Revenue

The City may set up Local Improvement Districts (LIDs) to fund specific capital improvement projects within defined geographic areas, or zones of benefit. LIDs impose assessments on properties within its boundaries. LIDs cannot fund ongoing maintenance costs. They require separate accounting processes, and the assessments collected can only be spent on capital projects within the geographic area. Citizens representing 67 percent of the assessment can terminate an LID and overturn the planned projects, except in cases of emergency or sidewalk projects.

Direct Appropriations

The City can seek direct appropriations from the State Legislature and/or U.S. Congress for transportation capital improvements. The City has received this kind of funding for SE Lake Rd improvements in 2006 and will likely continue to pursue these special, one-time appropriations for major City projects.

Special Assessments

Special assessments allow local jurisdictions, with the agreement of property owners, to put into place additional property taxes to pay for specific capital projects or ongoing costs. A variety of special assessments are available in Oregon to fund a variety of improvements, including sidewalks, curbs, gutters, street lighting, parking structures, and downtown or commercial zone transportation improvements. For example, the local share of funding for TriMet's Westside light rail project was paid for by a special assessment with voter approval. These assessments are commonly counted as revenue towards the limitations established by Measure 50.

Debt Financing

While not a direct funding source, debt financing can be used to spread costs over the useful life of a project. Though interest costs are incurred, the use of debt financing can serve not only as a practical means of funding major improvements, but can also be a more equitable funding strategy, spreading the burden of repayment over existing and future customers who will benefit from the projects. The obvious caution in relying on debt service is that a funding source must be identified to fulfill annual repayment obligations.

Voter-Approved General Obligation Bond Proceeds

Subject to voter approval, the City can issue General Obligation (GO) bonds to debt finance capital improvement projects. GO bonds are backed by "full faith and credit" of the jurisdiction and provide increased taxing authority with which the City can generate revenues to make principal and interest repayments. For critical projects, the electorate may be willing to accept increased taxation. Proceeds may not be used for ongoing maintenance.

Revenue Bonds

Revenue bonds are debt instruments secured by rate revenue. In order for the City to issue revenue bonds for transportation projects, it would need to identify a stable source of ongoing rate funding. Interest costs for revenue bonds are slightly higher than for general obligation bonds, due to the perceived stability offered by the "full faith and credit" of a jurisdiction.

Oregon Transportation Infrastructure Bank Loans

The Oregon Transportation Infrastructure Bank Loan program is a statewide revolving loan fund designed to promote innovative transportation funding solutions. The Financial Services Branch of ODOT provides State support for the program. In general, eligible projects include highway, transit, bikeway, and pedestrian access projects. Projects are rated on established criteria and recommended based on the rankings. Repayment of loans must begin within five years of project completion and must be complete within 30 years or at the end of the useful life of the project.

TSP IMPLEMENTATION AND UPDATE STEPS

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 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 Prioritized Master Plan Project List

Project Name	Project Description	From	To	Estimated Cost ($1,000s)[4]	Priority Ranking[5]	Is Project Funded?[6]	Project Type	TSP Chapter
HIGH PRIORITY PROJECTS								
17th Avenue Sidewalks	Fill in sidewalk gaps on both sides of street and improve intersections.	Ochoco St	McLoughlin Blvd	$920	High	Yes	Capital	Pedestrian
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	Yes	Capital	Transit
17th Avenue Bikeway and Intersection Safety Improvements	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	Bicycle
Logus Road Sidewalks	Fill in sidewalk gaps on both sides of street.	43rd Ave	49th Ave	$771	High	Yes	Capital	Pedestrian
Kellogg Creek Dam Removal and Hwy 99E Underpass	Replace 99E bridge over Kellogg Creek, remove dam, restore habitat; construct pedestrian undercrossing between downtown Milwaukie and Riverfront Park.	Site Specific	Site Specific	$9,000	High	Yes	Capital	Pedestrian
Springwater Trail Completion	Contribute to regional project to complete Springwater Trail ("Sellwood Gap") along Ochoco Street.	17th Ave	19th Ave	$80	High	Yes	Capital	Bicycle & Pedestrian
Railroad Avenue Sidewalks	Fill in sidewalk gaps on both sides of street.	37th Ave	Harmony Rd	$1,625	High	Yes	Capital	Pedestrian & Transit
Monroe Bicycle Boulevard	Designate as a Bicycle Boulevard and install bicycle boulevard improvements.	21st Ave	Linwood Ave	$300	High	Yes	Capital	Bicycle
29th/Harvey/40th Bicycle Boulevard	Designate as a Bicycle Boulevard and install bicycle boulevard improvements.	Springwater Trail	Monroe St	$200	High	Yes	Capital	Bicycle
Bike Lane Maintenance	Sweep bike lanes to remove debris.	Citywide	Citywide	$1,100	High	Yes	Operational	Bicycle
Monroe Street Sidewalks	Fill in sidewalk gaps on both sides of street.	42nd Ave	City limits	$1,631	High	Yes	Capital	Pedestrian
Railroad Avenue Capacity Improvements	Widen SE Railroad Avenue to standard three lane cross section. Accommodate future bus service.	37th Ave	Linwood Ave	$12,990	High	Yes	Capital	Automobile & Transit

[4] In the case of operational projects, estimated costs are for entire 22-year planning period.
[5] Projects are ranked as either high, medium, or low. They are in no particular order within their ranking.
[6] 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	Project Description	From	To	Estimated Cost ($1,000s)[4]	Priority Ranking[5]	Is Project Funded?[6]	Project Type	TSP Chapter
Downtown Streetscape Improvements	Install sidewalk bulbouts, lighting, and pedestrian amenities.	Downtown	Downtown	$6,700	High	Yes	Capital	Parking & Pedestrian
Bike Route Signage	Install neighborhood bike route signage.	Citywide	Citywide	$150	High	Yes	Operational	Bicycle
Hwy 224 Intersection Improvements at Oak	Add left turn-lanes and protected signal phasing on Oak Street approaches.	Location specific	Location specific	$20	High	Yes	Capital	Automobile
King Road Boulevard Treatments	Install street boulevard treatments: widen sidewalks and improve crossings.	43rd Ave	Linwood	$500	High	Yes	Capital	Pedestrian
Neighborhood Pedestrian and Traffic Safety Program	Complete a few small traffic calming and pedestrian safety projects throughout the city each year.	Citywide	Citywide	$300	High	Yes	Capital	Nbrhd Traffic Manage-ment
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	Hwy 224 Project Limits: Hwy 99E to Lake Rd Interchange	$250	High	Yes	Capital	Automobile & Freight
Railroad Crossing Safety and Quiet Zone Project	Construct railroad crossing safety improvements at Oak Street, Harrison Street, and 37th Avenue.	Location specific	Location specific	$285	High	Yes	Capital	Automobile & Pedestrian
Stanley Avenue Sidewalks	Fill in sidewalk gaps on both sides of street.	Johnson Creek Blvd	Railroad Ave	$4,304	High	No	Capital	Pedestrian
Harrison Street Railroad Crossing Separation	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	High	No	Capital	Freight
Hwy 224 Intersection Improvements at 37th	Consolidate the two northern legs of 37th Avenue and International Way into one leg at Hwy 224.	Location specific	Location specific	$1,946	High	No	Capital	Automobile & Freight
Railroad Avenue Bike Lanes	Fill in gaps in existing bicycle network with bike lanes.	37th Ave	Linwood Ave	$4,364	High	No	Capital	Bicycle
Linwood Avenue Capacity Improvements (north)	Widen to standard three lane cross section. Widen bridge over Johnson Creek.	Johnson Creek Blvd	King Rd	$8,500	High	No	Capital	Automobile
Linwood Avenue Capacity Improvements (south)	Widen to standard three lane cross section.	King Rd	Harmony Rd	$11,400	High	No	Capital	Automobile
Hwy 224 Crossing Improvements at Oak and Washington	Improve intersection crossing safety for cyclists at Washington Street and Oak Street.	Location specific	Location specific	$10	High	No	Capital	Bicycle
Downtown Parking Enforcement	Implement parking management system, including a dedicated parking manager.	Downtown	Downtown	$40	High	No	Operational	Parking

Project Name	Project Description	From	To	Estimated Cost ($1,000s)[4]	Priority Ranking[5]	Is Project Funded?[6]	Project Type	TSP Chapter
MEDIUM PRIORITY PROJECTS								
Lake Road Sidewalks	Fill in sidewalk gaps on both sides of street.	Kuehn Rd	Hwy 224	$2,049	Medium	No	Capital	Pedestrian
Stanley Avenue Bicycle Boulevard	Designate as a Bicycle Boulevard and install bicycle boulevard improvements.	Springwater Trail	Railroad Ave	$300	Medium	No	Capital	Bicycle
19th and Sparrow Bicycle Boulevard	Designate as a Bicycle Boulevard and install bicycle boulevard improvements. This would connect the south end of Kellogg Creek Trail to River Rd.	Eagle St	River Rd	$737	Medium	No	Capital	Bicycle
Franklin Street Sidewalks	Install sidewalks on both sides of street to connect to Hector Campbell Elementary School.	42nd Ave	45th Ave	$200	Medium	No	Capital	Pedestrian
Intersection Improvements at Main and Mailwell	Upgrade intersection turning radii to better accommodate freight movements.	Location specific	Location specific	$50	Medium	No	Capital	Freight
McLoughlin Boulevard Sidewalks	Fill in sidewalk gaps on both sides of street.	Washington St	Southern city limits	$596	Medium	No	Capital	Pedestrian
Downtown Parking Signage	Install wayfinding and identification signage at McLoughlin Blvd. intersections and around public parking lots.	Downtown	Downtown	$10	Medium	No	Capital	Parking
Railroad Crossing Improvements at Harrison	Upgrade paving materials to concrete or rubberized material to improve longevity and enhance for alternative modes.	Location specific	Location specific	$50	Medium	No	Capital	Freight
Railroad Crossing Improvements at 21st and Adams	Upgrade paving materials to concrete or rubberized material to improve longevity and enhance for alternative modes.	Location specific	Location specific	$50	Medium	No	Capital	Freight
Railroad Crossing Improvements at Monroe	Upgrade paving materials to concrete or rubberized material to improve longevity and enhance for alternative modes.	Location specific	Location specific	$50	Medium	No	Capital	Freight
Railroad Crossing Improvements at Washington	Upgrade paving materials to concrete or rubberized material to improve longevity and enhance for alternative modes.	Location specific	Location specific	$50	Medium	No	Capital	Freight
Railroad Crossing Improvements at Oak	Upgrade paving materials to concrete or rubberized material to improve longevity and enhance for alternative modes.	Location specific	Location specific	$50	Medium	No	Capital	Freight
Railroad Crossing Improvements at 37th	Upgrade paving materials to concrete or rubberized material to improve longevity and enhance for alternative modes.	Location specific	Location specific	$50	Medium	No	Capital	Freight
Pedestrian Walkway Amenities	Install amenities, such as benches, along key walking routes.	Citywide	Citywide	$50	Medium	No	Capital	Pedestrian

Project Name	Project Description	From	To	Estimated Cost ($1,000s)[4]	Priority Ranking[5]	Is Project Funded?[6]	Project Type	TSP Chapter
Main Street Bike Lanes	Fill in gaps in existing bicycle network with bike lanes.	Harrison St	Moores St	$2,131	Medium	No	Capital	Bicycle
McLoughlin Blvd Intersection Improvements at 17th	Prohibit left turn movement from 17th Avenue to northbound McLoughlin Blvd and include in Hwy 224 & Hwy 99E Refinement Plan.	Location specific	Location specific	$15	Medium	No	Capital	Automobile
Intersection Improvements at 42nd and Harrison	Signalize intersection to facilitate dominant traffic flow.	Location specific	Location specific	$252	Medium	No	Capital	Automobile
McLoughlin Boulevard Intersection Improvements at River Road	Consolidate a single access point for the area at Bluebird Street with full intersection treatment and signalization or add second northbound left-turn lane at River Road.	Location specific	Location specific	$898	Medium	No	Capital	Automobile
Harrison and King Connection	Enhance connection between King Road and Harrison Street at 42nd Avenue.	Location specific	Location specific	$53	Medium	No	Capital	Automobile
37th Avenue Sidewalks	Fill in sidewalk gaps on both sides of street.	Lake Rd	Harrison St	$794	Medium	No	Capital	Pedestrian
Intersection Improvements at 42nd and King	Enhance intersection function.	Location specific	Location specific	$15	Medium	No	Capital	Pedestrian
Pedestrian Walkway Signage	Provide maps and wayfinding signage on streets that identify ways to get around the city.	Citywide	Citywide	$10	Medium	No	Operational	Pedestrian
Downtown Public Parking Lot Improvements	Upgrade and maintain off-street public parking facilities with improved landscaping and lighting.	Downtown	Downtown	$50	Medium	No	Capital	Parking
Community Bicycle Rides	Coordinate community bike rides to encourage bike use.	Citywide	Citywide	$5	Medium	No	Operational	Bicycle
Intersection Improvements at Harrison and Hwy 224	Add left turn-lanes and protected signal phasing on Harrison Street approaches.	Location specific	Location specific	$20	Medium	No	Capital	Automobile
Cyclist Education	Promote cycling through bike use and route selection education.	Citywide	Citywide	$10	Medium	No	Operational	Bicycle
Railroad Crossing Pedestrian Improvements at Oak	Improve intersection for pedestrians.	Location specific	Location specific	$15	Medium	No	Capital	Pedestrian
Harrison Street Bike Lanes	Fill in gaps in existing bicycle network with bike lanes.	Hwy 99E	21st Ave	$273	Medium	No	Capital	Bicycle
Intersection Improvements at Linwood and King	Implement protected/permissive left turn phasing for northbound and southbound approaches.	Location specific	Location specific	$16	Medium	No	Capital	Automobile
Brookside Drive Sidewalks	Fill in sidewalk gaps on both sides of street.	Johnson Creek Blvd	Regents Dr	$15	Medium	No	Capital	Pedestrian

Project Name	Project Description	From	To	Estimated Cost ($1,000s)[4]	Priority Ranking[5]	Is Project Funded? [6]	Project Type	TSP Chapter
Springwater Trail Paving Project	Improve corridor through repaving existing trail.	29th Ave	Linwood Ave	$500	Medium	No	Capital	Bicycle
Lake Road Capacity Improvements	Widen to standard three lane cross section.	21st Ave	Oatfield Rd	$7,392	Medium	No	Capital	Automobile
Harrison Street Capacity Improvements	Widen to standard three lane cross section.	32nd St	42nd St	$2,565	Medium	No	Capital	Automobile
Johnson Creek Blvd Intersection Improvements at Linwood	Add eastbound right turn lanes and westbound right turn lanes.	Location specific	Location specific	$803	Medium	No	Capital	Automobile
Harrison Street Intersection Improvements at Main	Add westbound shared through/right turn lane or eastbound right turn lane.	Location specific	Location specific	$34	Medium	No	Capital	Automobile
Public Parking Structure	Construct 3 to 4 story public parking structure with retail at ground floor for visitor/employee parking.	Location specific	Location specific	$10,000	Medium	No	Capital	Parking
LOW PRIORITY PROJECTS								
Ochoco Street Sidewalks	Construct sidewalks on Ochoco Street to connect bus stops to Goodwill.	19th Ave	McLoughlin Blvd	$$$	Low	No	Capital	Pedestrian
Kronberg Park Trail	Construct multimodal trail along Kellogg Creek connecting Kronberg Park to downtown Milwaukie.	McLoughlin Blvd	Downtown	$1,200	Low	No	Capital	Bicycle
Springwater Corridor Intersection Improvements at 45th	Improve safety of crossing at intersection.	Location specific	Location specific	$10	Low	No	Capital	Bicycle
Johnson Creek Blvd and 42nd Avenue Signalization	Replace 3-way stop with signal when warranted.	Location specific	Location specific	$250	Low	No	Capital	Automobile
Springwater Trail Ramp Improvement	Improve ramp at Springwater Trail and McLoughlin Blvd.	Location specific	Location specific	$15	Low	Yes	Capital	Bicycle & Pedestrian
19th Avenue Sidewalks	Fill in sidewalk gaps on both sides of street.	Kellogg Creek Trail	Sparrow St	$305	Low	No	Capital	Pedestrian
22nd Avenue Sidewalks	Fill in sidewalk gaps on both sides of street.	McLoughlin Blvd	Sparrow St	$325	Low	No	Capital	Pedestrian
43rd Avenue Sidewalks	Fill in sidewalk gaps on both sides of street.	Howe St/ 42nd Ave	King Rd/ 43rd Ave	$550	Low	No	Capital	Pedestrian
Edison Street Sidewalks	Fill in sidewalk gaps on both sides of street.	35th Ave	37th Ave	$116	Low	No	Capital	Pedestrian
Harmony Road Sidewalks	Fill in sidewalk gaps on both sides of street.	Linwood Ave	City limits	$38	Low	No	Capital	Pedestrian
Harvey Street Sidewalks	Fill in sidewalk gaps on both sides of street.	32nd Ave	42nd Ave	$534	Low	No	Capital	Pedestrian
Home Avenue Sidewalks	Fill in sidewalk gaps on both sides of street.	Railroad Ave	King Rd	$756	Low	No	Capital	Pedestrian
International Way Sidewalks	Fill in sidewalk gaps on both sides of street	Criterion Ct	Lake Rd	$767	Low	No	Capital	Pedestrian
Johnson Creek Boulevard Sidewalks	Fill in sidewalk gaps on both sides of street.	Harney Dr	City limits	$378	Low	No	Capital	Pedestrian

Project Name	Project Description	From	To	Estimated Cost ($1,000s)[4]	Priority Ranking[5]	Is Project Funded?[6]	Project Type	TSP Chapter
Linwood Avenue Sidewalks	Fill in sidewalk gaps on both sides of street.	Johnson Creek Blvd	Railroad Ave	$2,960	Low	No	Capital	Pedestrian
Mason Lane Sidewalks	Fill in sidewalk gaps on both sides of street.	42nd Ave	Regents Dr	$671	Low	No	Capital	Pedestrian
Oatfield Road Sidewalks	Fill in sidewalk gaps on both sides of street.	Guilford Ct	City limits	$132	Low	No	Capital	Pedestrian
Regents Drive Sidewalks	Fill in sidewalk gaps on both sides of street.	Brookside Dr	Winsor Dr	$494	Low	No	Capital	Pedestrian
River Road Sidewalks	Fill in sidewalk gaps on both sides of street.	McLoughlin Blvd	City limits	$626	Low	No	Capital	Pedestrian
Roswell Street Sidewalks	Fill in sidewalk gaps on both sides of street.	32nd Ave	36th Ave	$192	Low	No	Capital	Pedestrian
Rusk Road Sidewalks	Fill in sidewalk gaps on both sides of street.	Lake Rd	North Clackamas Park	$662	Low	No	Capital	Pedestrian
Olsen Street Sidewalks	Fill in sidewalk gaps on north side of street.	32nd Ave	43rd Ave	$432	Low	No	Capital	Pedestrian
49th Avenue Sidewalks	Fill in sidewalk gaps on both sides of street.	Logus Rd	King Rd	$250	Low	No	Capital	Pedestrian
Hwy 224 Sidewalks	Fill in sidewalk gaps on both sides of street.	Oak St	37th Ave	$420	Low	No	Capital	Pedestrian
Intersection Curb Ramp Improvements	Install curb ramps at all intersections with sidewalks.	Citywide	Citywide	$5	Low	No	Capital	Pedestrian
Hwy 224 Intersection Improvements at 37th	Improve pedestrian crossing.	Location specific	Location specific	$20	Low	No	Capital	Pedestrian
Hwy 224 Intersection Improvements at Freeman	Improve pedestrian crossing.	Location specific	Location specific	$20	Low	No	Capital	Pedestrian
Hwy 224 Intersection Improvements at Harrison	Improve pedestrian crossing.	Location specific	Location specific	$20	Low	No	Capital	Pedestrian
Hwy 224 Intersection Improvements at Monroe	Improve pedestrian crossing.	Location specific	Location specific	$15	Low	No	Capital	Pedestrian
Hwy 224 Intersection Improvements at Oak	Improve pedestrian crossing.	Location specific	Location specific	$20	Low	No	Capital	Pedestrian
Intersection Improvements at Olsen and 42nd	Improve pedestrian crossing.	Location specific	Location specific	$20	Low	No	Capital	Pedestrian
Intersection Improvements at Harmony and Lake	Improve pedestrian crossing.	Location specific	Location specific	$15	Low	No	Capital	Pedestrian
Intersection Improvements at Railroad and 37th	Improve pedestrian crossing.	Location specific	Location specific	$10	Low	No	Capital	Pedestrian
Intersection Improvements at Stanley and Logus	Improve pedestrian crossing.	Location specific	Location specific	$15	Low	No	Capital	Pedestrian

Project Name	Project Description	From	To	Estimated Cost ($1,000s)[4]	Priority Ranking[5]	Is Project Funded?[6]	Project Type	TSP Chapter
Springwater Trail Ramp Improvement at McLoughlin	Improve ramp at Springwater Trail and McLoughlin Blvd.	Location specific	Location specific	$15	Low	No	Capital	Pedestrian
Pedestrian Connection to North Clackamas Park	Create pedestrian connection between the school and the park.	Rowe Middle School	North Clackamas Park	$1,284	Low	No	Capital	Pedestrian
Hwy 224 Intersection Improvements at 17th	Upgrade intersection turning radii to better accommodate freight movements.	Location specific	Location specific	$50	Low	No	Capital	Freight
Intersection Improvements at Mailwell and Omark	Upgrade intersection turning radii to better accommodate freight movements.	Location specific	Location specific	$50	Low	No	Capital	Freight
Bicycle and Pedestrian Overpass	Establish a dedicated bicycle and pedestrian connection across Railroad Avenue and the railroad tracks.	Railroad Ave	Interna-tional Way	$2,025	Low	No	Capital	Bicycle
Bicycle-friendly Street Grates	Install bicycle-friendly street grates.	Citywide	Citywide	$50	Low	No	Operational	Bicycle
Milwaukie Bike Map	Produce a Milwaukie Bike Map.	Citywide	Citywide	$50	Low	No	Operational	Bicycle
Trolley Trail Signage	Design and install Trolley Trail signage.	Milwaukie Riverfront	Southern city limits	$54	Low	No	Capital	Bicycle
Springwater Trail Signage	Install wayfinding signage for Springwater Trail.	Citywide	Citywide	$15	Low	No	Operational	Bicycle
Intersection Improvements at Johnson Creek Blvd and Linwood	Improve safety of crossing at intersection.	Location specific	Location specific	$10	Low	No	Capital	Bicycle
Intersection Improvements at Linwood and King	Improve safety of crossing at intersection.	Location specific	Location specific	$10	Low	No	Capital	Bicycle
Intersection Improvements at Linwoodand Harmony	Improve safety of crossing at intersection.	Location specific	Location specific	$10	Low	No	Capital	Bicycle
Intersection Improvements at Linwood and Monroe	Improve safety of crossing at intersection.	Location specific	Location specific	$10	Low	No	Capital	Bicycle
Intersection Improvements at International Way and Lake Road	Improve safety of crossing at intersection.	Location specific	Location specific	$10	Low	No	Capital	Bicycle
Intersection Improvements at Adams and 21st	Improve safety of crossing at intersection.	Location specific	Location specific	$10	Low	No	Capital	Bicycle
Lake Road Bike Lanes	Fill in gaps in existing bicycle network with bike lanes.	Main St	Guilford Dr	$3,142	Low	No	Capital	Bicycle
Harrison Street Bike Lanes	Fill in gaps in existing bicycle network with bike lanes.	Hwy 224	42nd Ave	$13	Low	No	Capital	Bicycle
37th Avenue Bike Lanes	Fill in gaps in existing bicycle network with bike lanes.	Harrison St	Hwy 224	$2,900	Low	No	Capital	Bicycle

Project Name	Project Description	From	To	Estimated Cost ($1,000s)[4]	Priority Ranking[5]	Is Project Funded?[6]	Project Type	TSP Chapter
43rd Avenue Bike Lanes	Fill in gaps in existing bicycle network with bike lanes.	King Rd	Filbert St	$1,014	Low	No	Capital	Bicycle
Oatfield Road Bike Lanes	Fill in gaps in existing bicycle network with bike lanes.	Guilford Ct	Lake Rd	$348	Low	No	Capital	Bicycle
Linwood Avenue Bike Lanes (north)	Fill in gaps in existing bicycle network with bike lanes.	Queen Rd	Johnson Creek Blvd	$1,692	Low	No	Capital	Bicycle
Linwood Avenue Bike Lanes (south)	Fill in gaps in existing bicycle network with bike lanes.	Juniper St	Harmony Rd	$296	Low	No	Capital	Bicycle
Rusk Road Bike Lanes	Fill in gaps in existing bicycle network with bike lanes.	Lake Rd	North Clackamas Park	$936	Low	No	Capital	Bicycle
21st Avenue Bike Lanes	Fill in gaps in existing bicycle network with bike lanes.	Harrison St	Lake Rd	$50	Low	No	Capital	Bicycle
Police Enforcement on Drivers	Enforce laws related to bike lanes and bicycle safety.	Citywide	Citywide	$10	Low	No	Operational	Bicycle
Bike Lane Striping	Re-stripe existing bike lanes and stripe bike lanes on streets where buses and bicyclists share the road.	Citywide	Citywide	$20	Low	No	Operational	Bicycle & Transit
Kellogg Creek Trail Improvements	Resurface trail and provide wayfinding signage to/from trail.	Milwaukie Riverfront	Treatment Plant	$623	Low	No	Capital	Bicycle
Hwy 224 Access Modifications at Freeman Way	Modify access at Freeman Way to improve intersection functioning.	Location specific	Location specific	$1,313	Low	No	Capital	Automobile
Stanley Ave Connectivity at King	Enhance connection along Stanley Ave at King Road.	Location specific	Location specific	$53	Low	No	Capital	Automobile
Stanley Ave Connectivity at Monroe	Enhance connection along Stanley Avenue at Monroe Street.	Location specific	Location specific	$53	Low	No	Capital	Automobile
Harmony Road Grade Separation and Realignment at Linwood	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	Freight & Automobile

Project Name	Project Description	From	To	Estimated Cost ($1,000s)[4]	Priority Ranking[5]	Is Project Funded?[6]	Project Type	TSP Chapter
REGIONAL PROJECTS WITHIN OR THROUGH THE CITY OF MILWAUKIE[7]								
Milwaukie Light Rail Extension or High Capacity Transit Improvements	Construct light rail or high capacity transit improvements between Milwaukie and Portland.	Rose Quarter MAX Station	Milwaukie Town Center	$515,000	—	No	Capital	Transit
Oregon City Light Rail Extension or High Capacity Transit Improvements	Construct light rail or high capacity transit improvements between Milwaukie and Oregon City.	Milwaukie Town Center	Oregon City	$577,500	—	No	Capital	—
Milwaukie Transportation Management Association Program	Implement a transportation management association for employers.	Milwaukie Town Center	Milwaukie Town Center	$200	—	No	Operational	Transit
Portland Traction Company Multiuse Trail	Plan, engineer, and construct multiuse trail along Portland Traction Company right-of-way.	Milwaukie	Gladstone	$1,386	—	No	Capital	—
North Clackamas Greenway Corridor Study	Study feasibility of corridor for multiuse path construction (possibly along Kellogg Creek).	Milwaukie	Clackamas Regional Center	—	—	No	Capital	—
Linwood/Harmony /Lake Road Intersection Improvements	Add northbound right turn lane and eastbound right turn lane.	Location specific	Location specific	$28,000	—	No	Capital	—
McLoughlin Boulevard Improvements	Complete boulevard design improvements.	Scott St	Harrison St	$3,300	—	No	Capital	—
Tillamook Branch Trestle Trail Study	Study feasibility of east-west multiuse trail construction.	Milwaukie Town Center	Lake Oswego Town Center	—	—	No	Capital	—
Railroad Junction Improvements	Implement track and signal improvements to allow for increased track speeds between UP Willsburg Junction and UP Albina Yards.	Milwaukie	UP Railroad Albina Yards	$8,800	—	No	Capital	—
Railroad Track Extension	Extend two tracks from Willsburg Junction to Clackamas.	Milwaukie	I-205	$19,000	—	No	Capital	—

Key:
NDA = Neighborhood District Association
NTMP = Neighborhood Traffic Management Program
CIP = Capital Improvement Program
STSP = Safe Trips to School Program
RTP = Regional Transportation Plan

[7] 2004 Regional Transportation Plan (RTP) projects in the Milwaukie area that may or may not be shown on mode-specific master plans or project lists.

14 Transportation Planning Rule Implementation

The purpose of this chapter is to provide an overview of recommended changes to the Milwaukie Municipal Code with the objective of complying with Oregon's Transportation Planning Rule (TPR) and Metro's Regional Transportation Plan (RTP).

OREGON TRANSPORTATION PLANNING RULE OVERVIEW

The Oregon Transportation Planning Rule ("TPR", or Oregon Administrative Rule Chapter 660, Division 12) requires local governments to implement a transportation system plan that is supported by local land use regulations. The rule sets requirements to protect transportation facilities and enhance pedestrian and bicycle travel.

TPR requirements are fairly broad and allow local governments flexibility in how they comply with the rule. For example, OAR 660-012-0045(2)(b) requires local governments to "protect transportation facilities . . . for their identified functions." The TPR does not define a standard to protect a facility or restrict local governments from self-identifying the function of their facilities.

TPR rules for ODOT-regulated facilities, such as Oregon State Highways 99E and 224, are more restrictive and are regulated by the State in coordination with the City. State, regional, and County facilities within the city are regulated by the respective owner of the facility but are also subject to City regulations.

The Milwaukie Municipal Code has been periodically updated to comply with the TPR, with the most recent updates occurring in 1994 and 2002. To remain TPR compliant, one comprehensive plan amendment and three zoning code amendments are recommended as part of the 2007 TSP update. Adoption of these amendments is expected to occur concurrently with TSP adoption, unless otherwise noted.

RECOMMENDED CHANGES

The four recommended amendments are summarized below. Proposed language is shown in **boldface** in the grey-shaded boxes.

1. Transportation projects exempt from design standards and procedures.

The TPR requires that local codes separate transportation projects into three categories for review purposes. The categories are: those that are exempt from design standards and procedures, those that are subject to limited review (e.g., Type I) under objective standards, and those that are subject to more extensive review (e.g., Type II) because they are significant or require discretionary decision-making.

The Milwaukie zoning code clearly identifies which projects are in the second and third categories in Milwaukie Municipal Code (MMC) sections 19.1405.1 and 19.405.2. However, no projects are explicitly categorized as exempt. The City has interpreted its current code as exempting activities such as public agency maintenance of, repair to, or operational changes to an existing transportation facility from land use regulations. Since this is not explicit in the code, some of these activities could qualify as "development" per MMC section 19.103, and would therefore be subject to all the transportation planning, design standards, and procedures of MMC Chapter 19.1400, per the catch-all category "other," listed in MMC section 19.1403.A. The City would like to explicitly exempt these types of projects.

Proposed change/addition:

MMC Section 19.1403.1 Limitations

D. The following activities and uses are exempt from the requirements of this section:

1. Operation, maintenance, and repair of existing transportation facilities.

2. Public capital improvement projects.

2. Carpool/vanpool spaces.

According to the TPR, employee parking in new developments must provide "preferential parking for carpools and vanpools." The Milwaukie code has a provision that quantifies the number of carpool/vanpool spaces that must be provided (10 percent) but it does not require that the carpool spaces have preferential status. Other jurisdictions typically satisfy this provision through a spatial directive. That is, carpool/vanpool spaces must be closer to the main entrance to the building than general-purpose spaces.

Proposed change/addition:

MMC Section 19.506 Carpool and Vanpool Parking

1. **Applicability.** New industrial, institutional, and commercial development with fifty (50) or more employees shall provide carpool/vanpool parking.

2. **Number of Spaces.** Carpool/vanpool parking shall be provided for at least ten percent (10%) of the required parking.

3. **Location. Parking for carpools/vanpools shall be closer to the main entrances of the building than other employee or student parking, except parking spaces designated for use by the disabled.**

4. **Standards. Carpool/vanpool spaces shall be regular-sized, per requirements in Section 19.503.10, and shall be clearly designated with signs or pavement markings for use only by carpools/vanpools.**

3. Redevelop parking for transit uses.

The TPR states that a portion of parking areas in existing development "shall be allowed" to redevelop for transit-oriented uses, such as bus stops, shelters, and stations. While Milwaukie's code does not appear to prohibit the redevelopment of parking areas to support transit-oriented uses, neither does it provide an explicit allowance for this.

The following change/addition is an example of how the City could meet this TPR requirement. The City should incorporate such a change in its next regular code update when it reviews all of MMC Section 19.503.8 to ensure that the new proposed change is compatible with this section's existing requirements.

> **Proposed change/addition:**
>
> MMC Section Modification of Minimum and Maximum Parking
>
> **E.** **The planning director is authorized to reduce up to 10 percent of existing required parking spaces at a conversion ratio of one parking space for each 100 square feet of transit facility for developments which incorporate transit-related facilities such as bus stops and pull-outs, bus shelters, or other transit-related facilities. The procedure for planning director review shall be in accordance with subsection 19.1011.1, Type I Administrative Review.**
>
> **F.** Maximum parking allowed may be increased **up to fifteen percent of the applicable standard, subject to subsection A above, and further subject to compliance with all zoning standards and management of related stormwater runoff**.

4. Transit-supportive land uses.

The TPR requires that "types and densities of land uses" along existing or planned transit routes be supportive of transit. The rule does not specify which land uses are required or what level of density could be considered supportive of transit. The City's zoning map shows generally higher densities and commercial development along the designated transit corridors. Explicit policy direction supporting higher densities along transit corridors would ensure compliance. The following change/addition is an example of how the City could provide this policy direction. Such a change could be implemented in a number of places in the Comprehensive Plan and should be discussed during the City's Periodic Review process.

> **Proposed change/addition:**
>
> Milwaukie Comprehensive Plan
>
> Chapter 5-Transportation, Public Facilities, and Energy Conservation
>
> Transportation Element
>
> Transportation Planning Rule
>
> Land uses and transportation improvements along all corridors should be designed to promote transit, bicycling and walking. **Specifically, land uses and densities along existing or planned transit routes should be planned to support transit.**

Appendix A

Public Involvement Summary

INTRODUCTION

Milwaukie has some of the most organized and active communities, neighborhoods and citizen activists in the Portland Metro area. Residents have a high expectation to be involved in City business. Recognizing this, the City developed a public involvement program that was likely the most extensive public outreach and involvement process-to-date in the State of Oregon for a Transportation System Plan (TSP). The program included opportunities for citizens to participate at both a mode-specific and broad policy level, resulting in a TSP that reflects the needs and priorities of the community.

POLICY REQUIREMENTS

State, regional, and City policies require that citizen input be part of the transportation system planning process. Oregon's Statewide Planning Goal #1 mandates the following:

- Provide widespread citizen involvement, including the establishment of a citizen advisory committee (CAC) broadly representative of geographic areas and interests.
- Assure effective two-way communication with citizens.
- Assure technical information is available in an understandable form.
- Assure that citizens receive a response from policymakers.
- Ensure adequate funding for citizen involvement in a planning budget.

As outlined in the Comprehensive Plan Chapter 1, City policy requires the following:

- **Objective #1:** "The City will promote citizen participation in the planning process primarily through the nine Milwaukie Neighborhood Areas..."
- **Objective #2:** "To encourage broadly based public participation involving a cross section of citizens from a variety of geographic and interest areas, solicited through an open, well-publicized process."
- **Objective #3:** "Promote informed public participation in planning decisions by providing readily available publications and printed materials regarding current issues and proposed policies and providing for two-way communication between policy-makers and citizens."

OUTREACH AND INVOLVEMENT PROGRAM

At the beginning of the TSP Update Project the City set the following goal:

> *The public involvement process for the Milwaukie TSP update will encourage and provide opportunities for citizens to participate in all phases of the planning process and keep citizens informed through open lines of communication for the sharing of questions, problems and suggestions.*

To reach this goal, staff designed the TSP public outreach and involvement program to include the following elements:

- Community Briefings
- Advisory Committee
- Working Groups
- Web Survey
- Open Houses
- Information

Community Briefings

The City hosted four Community Briefings in different locations around Milwaukie between November 30 and December 6, 2006 to:

- Introduce and describe the TSP and the TSP update process.
- Invite future participation in upcoming Working Groups and Workshops.
- Solicit public input in a focused way on existing conditions and key issues.
- Inform the public about how to stay updated on TSP news and events.

The City Planning Director began each two-hour Community Briefing with a short slide show presentation explaining the TSP project and process. Participants were invited to write their concerns, questions, or statements about what the City should study during the TSP process. Posters in the room provided information about involvement opportunities, and participants were invited to indicate their interest in upcoming working groups and workshops.

Community Briefings were widely advertised:

- A special 2-page insert was featured in the November 2006, Pilot and sent to every household in Milwaukie (about 8,000 households).
- Flyers were hand-delivered to every business in downtown Milwaukie.
- The *Oregonian*, *Clackamas Review*, and North Clackamas School District newsletter listed the briefings in their calendars and ran short stories.
- The City's Transportation Liaison notified parent-teacher groups, local churches, and other interested individuals.
- The Community Services Department announced the Community Briefings in weekly e-mail updates to interested citizens.

Advisory Committee


Advisory Committee members discuss TSP goals

The City formed the TSP Advisory Committee (AC) by inviting appointed representatives and also advertising an open application process. The group included representatives of partner agencies and local businesses, as well as interested citizens (there was at least one resident of each Neighborhood District Association). The AC met six times between January and August 2007. All of these meetings were advertised in advance and open to the broader community, and meeting packets were available on the City's website.

The AC meetings were well attended, with an average attendance of 20 people at each meeting. AC members contributed over thirty hours of their time participating in meetings and reviewing materials in advance. In addition, many of the AC members each participated in one or more Working Groups, Workshops, and Open Houses.

The AC was instrumental in developing the City's transportation goals, identifying new or revised policies, reviewing and consolidating the recommendations from the working groups, and guiding project prioritization. Exit surveys conducted with the AC members indicate that the participants were highly satisfied with the process.

City of Milwaukie Transportation System Plan Update Advisory Committee Members*

Citizen Representatives	
David Aschenbrenner	Citizen Member (Hector Campbell)
Scott Churchill	Citizen Member (Historic Milwaukie)
Nick Dougher	Citizen Member (Linwood)
Forris Frick	Citizen Member (Lake Road)
Ben Horner-Johnson	Citizen Member (Lake Road)
Michole Jensen	Citizen Member (Ardenwald)
Paul Klein	Citizen Member (Lewelling)
Dolly Macken-Hambright	Citizen Member (Linwood)
Charlie Stephens	Citizen Member (Oak Grove)
Ed Zumwalt	Citizen Member (Historic Milwaukie)
Business Representatives	
Greg Chaimov	Chamber of Commerce Representative
Neil Hankerson	Downtown Business Representative
Gary Hunt	Industrial Business Representative
Bill Lake	Industrial Business Representative
Todd E. Mobley	Hospital Representative
Mike Wells	Real Estate Development Representative
Agency Representatives	
Kelly Carlisle	School District Representative
Gail Curtis	ODOT Contract Manager
Shari Gilevich	Clackamas County Representative
Marty Hanley	Milwaukie Center Representative
Stacy Humphrey & Bill Holmstrom	State of Oregon DLCD Representative
John Mermin	Metro Representative
Young Park	TriMet Representative
Ron Schumacher / Mace Childs	Fire Department Representatives
Mike Swanson / Kenny Asher	City of Milwaukie Representatives

* Members are defined as having submitted an application and participated in at least three of the six meetings.

Working Groups and Workshops

Street Design participants discuss "context sensitive" design options

The Working Groups and Workshops were created to focus on different subtasks of the TSP. The Working Groups included; Downtown Parking, Freight, Street Design, Traffic and Street Network, and Transit. The Workshops included; Bike and Pedestrian. The introduction of Working Groups and Workshops into the planning process allowed for specific aspects of the TSP to be discussed and resolved to a greater level of detail than usually occurs at the TSP level providing valuable policy and project direction. The City was faced with several areas of their transportation system that either were minimally addressed in the previous TSP (such as bicycle/pedestrian planning and street design), required innovative solutions (such as freight), and/or were complicated or historically unresolved (such as transit and downtown parking).

Community members, businesses, and participants in the Advisory Committee were invited to join one or more mode-specific Working Groups or attend a Workshop on specific transportation issues. Anyone who was interested in participating attended an orientation meeting in February 2007, which outlined the overall process and opportunities for involvement. The orientation event was taped and televised on Milwaukie Cable Access channel 30 throughout the months of February and March 2007.

Each Working Group met three or four times each with many participants involved in several groups. Workshops met two to three times each to discuss pedestrian and bike solutions as well as downtown parking. In total there were:

The TSP Bicycle Solutions group takes a bike tour through Milwaukie

- Two Pedestrian workshops
- Three Bike workshops--including a guided bike tour
- Two Downtown Parking workshops
- Four Freight Access meetings
- Four Traffic & Auto Circulation Solutions meetings
- Three Street Design Alternatives meetings
- Four Transit Solutions meetings

Business owners and residents discuss downtown parking needs and solutions

Over one hundred people participated in the Working Groups and Workshops. The focused nature of the Working Groups and Workshops allowed for a greater level of technical detail to be presented and discussed. Many working group members contributed countless hours reviewing existing conditions, identifying problems, developing innovative solutions, proposing policy changes and recommendations, and establishing both community and modal priorities. Each Working Group and Workshop created a draft "modal plan," which was brought to the Advisory Committee to be compiled into one set of citywide priorities. While time consuming and at times complicated for the staff to implement, the Working Groups and Workshops were well received by the community and proved to be an extremely valuable tool for developing mode-specific plans that reflect the priorities of the community.

Bike and Pedestrian Workshop Participants

Heather Andrews
David Aschenbrenner, **AC**, **WG**
Cheryl Ausmann-Moreno
Lisa Batey
Jerry Bitz
John Climaldi
Noah Cowgill
Debbie Cronk
David DeVore
Nick Dougher
Sherri Dow
Parker Fitzpatrick, **WG**
Forris Frick, **AC**, **WG**
Mark Gamba
Emily Gardner
Willi Horner-Johnson, **WG**
Steven Kung
Matt Menely, **WG**
Renee Moog
Keith Neubauer
Anne Nottingham
Connie Ottoboni
Susanna Pai
Matt Picio, **WG**
Jon Stoll
Paul Sylvester
Aaron Tarfman
Dottie Teeple
Ann Wilson

Downtown Parking Working Group Participants

Melissa Arne
David Aschenbrenner, **AC**, **WG**
Jean Baker
Jim Bernard
Ray Bryan, **WG**
Jill Chapman
Tim Clouse
Charmane Coleman
Lanice Coleman
Parker Fitzpatrick, **WG**
Neil Hankerson, **AC**
Greg Hemer
Lee Holzman
Jason Jenkins
Tom Kemper
Jeff Klein
Ed Parecki
Ray Peck
Zach Rogers
Joe Sandfort
Nancy Wittig
Ed Zumwalt, **AC**, **WG**

Freight Working Group Participants

George Anderson
Lorenzo Araque
Charles Bishop
Libby Clark-Agosti
Steve Flury
Brian Heiberg
Gary Hunt, **AC**
Bill Lake, **AC**
Bernadine Moore
Cara Nolam
Pat Russel, **WG**
Dick Samuels
Todd Schwartz
Charlie Stephens, **AC**

Street Design Working Group Participants

David Aschenbrenner, **AC**, **WG**
Ray Bryan, **WG**
Kathy Buss, **WG**
Bruce Conachan
Alicia Hamilton
Ben Horner-Johnson, **AC**, **WG**
Willi Horner-Johnson, **WG**
Virginia Pai, **WG**
Matt Picio, **WG**
Cami Waner

Traffic and Street Network Working Group Participants

David Aschenbrenner, AC
Ray Bryan, **WG**
Kathy Buss, **WG**
Gail Curtis, **AC**
Forris Frick, **AC**, **WG**
Ben Horner-Johnson, **AC**, **WG**
Tom MacFarlane
Matt Menely, **WG**
Matt Picio, **WG**
Pat Russel, **WG**
Leslie Schockner
Julie Wisner, **AC**
Ed Zumwalt, **AC**

Transit Working Group Participants

David Aschenbrenner, **AC**, **WG**
Ray Bryan, **WG**
Sandi Burns
Kathy Buss, **WG**
Phil Favorite
Forris Frick, **AC**, **WG**
Ben Horner-Johnson, **AC**, **WG**
Lynda Hunter
Chistopher Hunterman
Dolly Macken-Hambright, **AC**
Sarah Maier
Gary Michael
Tim Morris
Virginia Pai, **WG**
Young Park
Phil Selinger
Pam Shea
Dion Shepard, **AC**
Ron Swanson
Marge Tipton
Ed Zumwalt, **AC**, **WG**

Web Survey

The City posted a twelve-question self-selected survey on its website between March 1, 2007 and March 25, 2007 to both inform the community about the TSP process and to learn more about the issues and concerns of the community. One hundred and fifty eight people completed the survey including over 80% of respondents completing several open ended, narrative questions. In addition to learning about basic demographics, the questions were designed to gather information regarding how they use the transportation system and how they think it could be improved.

Paper surveys were made available; however all responses came via the internet. To make the survey more widely available to those without internet access, the survey was advertised at the Ledding Library's computer stations. Outreach in advertisement of the survey included:

- Advertised in the front page of the March Pilot
- Story and link on home page of City website
- Posters put in all bus stops at the Milwaukie Transit Center
- Emails sent to all TSP interested person's list
- Emails sent to all NDA members
- Emailed to Waldorf School
- Sent to all Milwaukie area North Clackamas Schools, including distribution to over 1300 recipients via the Milwaukie High School "E-News."
- Hand-delivered to Downtown Milwaukie businesses
- Article on BikePortland.org
- The TSP survey flyer was provided (in print copy or electronically, depending on preference) to: Dark Horse Comics, Albertsons (at Milwaukie Marketplace, handouts distributed with paychecks to all 87 associates), Pendleton Woolen Mills, Reliable Credit, Hoya, OECO, Bob's Red Mill, Johnson Controls.

Open Houses

An Open House was held July 12, 2007 to present all the recommendations of the Working Groups and Workshops to the broader community. Participants at the Open House were encouraged to offer their input on the recommendations and discuss their questions with staff. The material presented at the open house was also made available at the Farmer's Market on July 15, 2007, and posted on the TSP website.

Participant Exit Survey Results

All advisory committee and working group members were given exit surveys at the conclusion of their work. Respondents were asked to rate their group based on the following statements:

- The meeting facilitators encouraged and allowed all participants to share their ideas.
- My input was used to shape recommendations.
- I was given enough information to be prepared for each meeting.
- The information presented in meetings was clear and understandable.
- I now have a better understanding of transportation issues in Milwaukie.
- Meetings were efficient and made good use of my time.
- This Working Group/Workshop was worthwhile and out of it came good recommendations.
- I am glad I participated in this Working Group/Workshop.
- The overall TSP process was worthwhile and out of it came good recommendations.

Thirty-six participants completed exit surveys. Ninety-seven percent (35 of the 36 respondents) rated the TSP process high or very high for all aspects. Respondents were also provided space to leave general comments. A sampling of comments follows:

> *"I appreciated everyone's willingness to expand the meeting schedule to meet the needs of the bike community--including a bike boulevard assessment ride."*

> *"The Milwaukie personnel were great to work with and from the sounds of things, they listened to the great ideas of the citizens. I look forward to the final outcome of our efforts through the remainder of planning."*

> *"You (Alex), Katie and the team all did a great job. Thank you for including me, thoughtfully considering my comments, and working towards the initiatives of the North Industrial representatives. I hope to work with you again."*

> *"Great job of public outreach. I've never seen that much outreach for a TSP before."*

Information

The City used the public outreach communication methods listed below to announce special events and inform citizens about ongoing activities.

- The Pilot newsletter was mailed to every household in the city monthly.
- Flyers were posted at City facilities and the Milwaukie Farmers Market
- Community Services sent weekly email updates to over 100 people including all neighborhood association members and City board members.
- The City's Transportation Liaison sent updates to his contacts-including Parent-Teacher Organizations, churches, businesses, and individuals. This list currently includes over 100 contacts.
- Information was given through the video "bulletin boards" on the government and public access channels (23 and 30).
- A section dedicated to the TSP process was featured on the City's homepage. This section contained ongoing updates, meeting information, documents, and survey results.
- Staff visited all 7 Neighborhood District Associations to inform them about the project, both before it began and throughout the process.
- Flyers were sent to principals of all public and private Milwaukie schools.
- Updates were sent to the North Clackamas Chamber of Commerce to include in their newsletter.

The public came to rely on the City's website for the most up-to-date information about the project. All meeting materials, meeting announcements, survey results, and draft chapters were available for public review on the website.

Appendix B

Prioritized Master Plan Project List

The Prioritized Master Plan Project List contains all projects identified in the TSP update process. Projects came from many sources including, but not limited to, the following: 2007 TSP Working Groups, Milwaukie's Downtown Plan, Milwaukie's Capital Improvement Plan, 1997 TSP, and Metro's Regional Transportation Plan. All projects were vetted by staff, Working Group members, and Advisory Committee members.

The following process was used to prioritize the TSP projects.

- Working Group participants ranked projects as high, medium, or low.
- Staff evaluated each project against the TSP Goals using the Project Evaluation Questions. The idea behind the project evaluation questions is that, given the limited funds available, the City should prioritize funding of transportation projects that 1) effectively address identified problems, and 2) best meet the City's transportation goals. Projects that were ranked as low priority by the working groups were not evaluated unless other public involvement efforts (e.g. TSP Community Briefings or Open Houses), citizen groups (e.g. Neighborhood District Associations), or programs (e.g. Safe Trips to Schools Program or Capital Improvement Program) identified them as a priority.
- Staff also took other information into consideration before grouping the projects into high, medium, and low categories such as dependence on other projects or neighborhood support.
- Advisory Committee members reviewed staff's proposed project ranking and recommended some minor changes to the ranking of individual projects.

In addition to identifying the projects that are most important to the City, the Advisory Committee advised staff on which funding strategy to pursue in the development of the City's Action Plan. The Action Plan is the City's financially constrained project list that contains only those high priority projects that are likely to be funded with limited City funds within the 22-year planning period. The projects on the City's Action Plan are divided up by mode and appear in Chapters 5, 6, 7, 8, 9, 11, and 12 respectively. Action Plan projects are identified on the Prioritized Master Plan Project List by a "Yes" response in the column entitled "Is Project Funded?"

The Advisory Committee considered the following funding strategies.

- **Emphasis on direct City funding of projects.** This approach would encourage the City to fund projects itself and not use local funds to leverage outside funding. Taking this approach would require the City to save up for years to construct one or two projects (like widening Railroad Avenue) to the exclusion of many other projects.
- **Emphasis on leveraging City funds.** This approach would encourage the City to fund less expensive projects with local funds and to leverage state or federal funds with local match dollars for more expensive high priority projects. Taking this approach would theoretically enable the City to fund more projects than it could otherwise do on its own.

- **Emphasis on funding a range of high priority "implementable" projects.** This approach would encourage the City to strategically choose those projects that would provide the most benefit for the least cost and that had a realistic funding source. Taking this approach would enable the City to better respond to market conditions, grant opportunities, geographic equity issues, and economies of scale. It would also enable the City to fund a wide range of projects in the high priority category but not necessarily the highest priority projects.
- **Emphasis on funding high priority projects.** This approach would encourage the City to fund the highest priority projects, which would ensure that the highest priority projects were funded and not passed over due to high construction costs.
- **Emphasis on maintaining the existing system.** This approach would encourage the City to focus on maintenance and operations activities and not on capital improvements. Taking this approach would mean that very few identified high priority projects would be funded.

Staff recommended a combined strategy of emphasizing the funding of a range of high priority "implementable" projects and leveraging City funds as much as possible, and the Advisory Committee concurred with staff's recommendation. The projects identified as being funded on the Prioritized Master Plan Project List reflect this funding strategy.

TSP Project Evaluation Questions

"Which projects best meet Milwaukie's goals?"

Goals		Project	Score (0,1,2,3)
Goal 1	Livability. Design and construct transportation facilities in a manner that enhances the livability of Milwaukie's community.	Will the investment improve the health and physical well being of Milwaukie citizens? Will the investment protect residential neighborhoods from transportation-related impacts? Will the investment reduce barriers to mobility?	
Goal 2	Safety. Develop and maintain a safe and secure transportation system.	Will the investment improve an unsafe location or situation?	
Goal 3	Travel Choices. Plan, develop, and maintain a transportation system that provides travel choices and allows people to reduce the number of trips made by single-occupant vehicles.	Will the investment make it easier to move around without a car?	
Goal 4	Quality Design. Establish and maintain a set of transportation design and development regulations that are sensitive to local conditions.	Will the investment reinforce the character of a neighborhood? Will it reinforce the functional qualities of a street's classification?	
Goal 5	Reliability and Mobility. Develop and maintain a well-connected transportation system that reduces travel distance, improves reliability, and manages congestion.	Will the investment facilitate a better flow of traffic through or within Milwaukie?	
Goal 6	Sustainability. Provide a sustainable transportation system that meets the needs of present and future generations.	Will the investment improve the health of natural systems? Does the investment use resources wisely?	
Goal 7	Efficient and Innovative Funding. Efficiently allocate available funding for recommended transportation improvements, and pursue additional transportation funding that includes innovative funding methods and sources.	Will the investment use scarce City funds wisely?	
Goal 8	Compatibility. Develop a transportation system that is consistent with the City's Comprehensive Plan and that coordinates with County, State, and regional plans.	Will the investment support the city's vision while respecting those of other jurisdictions?	
Goal 9	Economic Vitality. Promote the development of Milwaukie's, the region's, and the state's economies through the efficient movement of people, goods, and services, and the distribution of information.	Will the investment support commercial interests in the city?	

Project Name	Project Description	From	To	Estimated Cost ($1,000s)[1]	Priority Ranking[2]	Is Project Funded?[3]	Project Type	TSP Chapter	Citizen Working Group Ranking	Other Input	How well does project meet TSP Goals? (3 = very well, 0= not at all) Livability	Safety	Travel Choices	Quality Design	Reliability/Mobility	Sustainability	Efficient Funding	Compatibility	Economic Vitality	TOTAL SCORE
HIGH PRIORITY PROJECTS																				
17th Avenue Sidewalks	Fill in sidewalk gaps on both sides of street and improve intersections.	Ochoco St	McLoughlin Blvd	$920	High	Yes	Capital	Pedestrian	High		2	3	3	2	0	1	2	3	1	17
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	Yes	Capital	Transit	High	Council, NDAs	3	2	2	3	0	0	1	2	3	16
17th Avenue Bikeway and Intersection Safety Improvements	Fill in gaps in existing bicycle network with bike lanes or multi-use 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	Bicycle	High		1	3	3	2	0	1	3	2	1	16
Logus Road Sidewalks	Fill in sidewalk gaps on both sides of street.	43rd Ave	49th Ave	$771	High	Yes	Capital	Pedestrian	Low	Lewelling NDA, TSP Comments, STSP	2	3	3	2	0	2	2	2	0	16
Kellogg Creek Dam Removal and Hwy 99E Underpass	Replace 99E bridge over Kellogg Creek, remove dam, restore habitat; construct pedestrian undercrossing between downtown Milwaukie and Riverfront Park.	Site Specific	Site Specific	$9,000	High	Yes	Capital	Pedestrian	N/A	Downtown Plan	3	1	1	2	0	3	1	3	2	16
Springwater Trail Completion	Contribute to regional project to complete Springwater Trail ("Sellwood Gap") along Ochoco Street.	17th Ave	19th Ave	$80	High	Yes	Capital	Bicycle & Pedestrian	N/A	TSP Comments	3	3	3	0	0	1	3	3	0	16
Railroad Avenue Sidewalks	Fill in sidewalk gaps on both sides of street.	37th Ave	Harmony Rd	$1,625	High	Yes	Capital	Pedestrian & Transit	High		3	3	3	2	0	1	1	2	0	15
Monroe Bicycle Boulevard	Designate as a Bicycle Boulevard and install bicycle boulevard improvements.	21st Ave	Linwood Ave	$300	High	Yes	Capital	Bicycle	High		3	2	3	1	0	2	2	2	0	15
29th/Harvey/40th Bicycle Boulevard	Designate as a Bicycle Boulevard and install bicycle boulevard improvements.	Springwater Trail	Monroe St	$200	High	Yes	Capital	Bicycle	High		3	2	3	1	0	2	2	2	0	15
Bike Lane Maintenance	Sweep bike lanes to remove debris.	Citywide	Citywide	$1,100	High	Yes	Operational	Bicycle	High		2	3	2	1	0	2	3	2	0	15
Monroe Street Sidewalks	Fill in sidewalk gaps on both sides of street.	42nd Ave	City Limits	$1,631	High	Yes	Capital	Pedestrian	High		2	3	3	2	0	1	1	2	0	14
Railroad Avenue Capacity Improvements	Widen SE Railroad Avenue to standard three lane cross section. Accommodate future bus service.	37th Ave	Linwood Ave	$12,990	High	Yes	Capital	Automobile & Transit	High		1	2	0	2	3	1	1	3	1	14
Downtown Streetscape Improvements	Install sidewalk bulbouts, lighting, and pedestrian amenities.	Downtown	Downtown	$6,700	High	Yes	Capital	Parking & Pedestrian	N/A	Downtown Plan	3	1	1	3	0	1	0	3	2	14

Project Name	Project Description	From	To	Estimated Cost ($1,000s)[1]	Priority Ranking[2]	Is Project Funded?[3]	Project Type	TSP Chapter	Citizen Working Group Ranking	Other Input	How well does project meet TSP Goals? (3 = very well, 0= not at all)									
											Livability	Safety	Travel Choices	Quality Design	Reliability/Mobility	Sustainability	Efficient Funding	Compatibility	Economic Vitality	TOTAL SCORE
Bike Route Signage	Install neighborhood bike route signage.	Citywide	Citywide	$150	High	Yes	Operational	Bicycle	High		1	2	2	0	0	1	3	3	1	13
Hwy 224 Intersection Improvements at Oak	Add left turn-lanes and protected signal phasing on Oak Street approaches.	Location specific	Location specific	$20	High	Yes	Capital	Automobile	Low	TSP Comments, NDAs	3	1	0	0	2	1	2	1	3	13
King Road Boulevard Treatments	Install street boulevard treatments: widen sidewalks and improve multiple crossings.	42nd Ave	Linwood	$500	High	Yes	Capital	Pedestrian	N/A		2	2	1	2	0	1	2	2	1	13
Neighborhood Pedestrian and Traffic Safety Program	Complete a few small traffic calming and pedestrian safety projects throughout the city each year.	Citywide	Citywide	$300	High	Yes	Capital	Nbrhd Traffic Management	N/A	NTMP, NDAs	3	2	1	2	0	1	2	2	0	13
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	Hwy 224 Project Limits: Hwy 99E to Lake Rd Interchange	$250	High	Yes	Capital	Automobile & Freight	High		0	0	0	3	1	0	3	3	1	11
Railroad Crossing Safety and Quiet Zone Project	Construct railroad crossing safety improvements at Oak Street, Harrison Street, and 37th Avenue.	Location specific	Location specific	$285	High	Yes	Capital	Automobile & Pedestrian	Med	NDAs, TSP Comments, Quiet Zone	3	3	0	0	0	0	3	2	0	11
Stanley Avenue Sidewalks	Fill in sidewalk gaps on both sides of street.	Johnson Creek Blvd	Railroad Ave	$4,304	High	No	Capital	Pedestrian	High		2	3	3	2	0	1	1	2	0	14
Harrison Street Railroad Crossing Separation	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	High	No	Capital	Freight	High		3	2	0	1	3	1	0	2	2	14
Hwy 224 Intersection Improvements at 37th	Consolidate the two northern legs of 37th Avenue and International Way into one leg at Hwy 224.	Location specific	Location specific	$1,946	High	No	Capital	Automobile & Freight	High		1	2	0	1	3	0	1	1	3	12
Railroad Avenue Bike Lanes	Fill in gaps in existing bicycle network with bike lanes.	37th Ave	Linwood Ave	$4,364	High	No	Capital	Bicycle	Low		2	2	2	2	1	1	1	1	0	12
Linwood Avenue Capacity Improvements (north)	Widen to standard three lane cross section. Widen bridge over Johnson Creek.	Johnson Creek Blvd	King Rd	$8,500	High	No	Capital	Automobile	High		0	1	1	2	3	0	0	3	1	11
Linwood Avenue Capacity Improvements (south)	Widen to standard three lane cross section.	King Rd	Harmony Rd	$11,400	High	No	Capital	Automobile	High		1	1	0	2	3	0	0	3	1	11
Hwy 224 Crossing Improvements at Oak and Washington	Improve intersection crossing safety for cyclists at Washington Street and Oak Street.	Location specific	Location specific	$10	High	No	Capital	Bicycle	Med		1	1	2	0	0	1	3	1	0	9
Downtown Parking Enforcement	Implement parking management system, including a dedicated parking manager.	Downtown	Downtown	$40	High	No	Operational	Parking	High		1	0	0	0	0	0	3	1	3	8

Project Name	Project Description	From	To	Estimated Cost ($1,000s)[1]	Priority Ranking[2]	Is Project Funded?[3]	Project Type	TSP Chapter	Citizen Working Group Ranking	Other Input	How well does project meet TSP Goals? (3 = very well, 0= not at all) Livability	Safety	Travel Choices	Quality Design	Reliability/Mobility	Sustainability	Efficient Funding	Compatibility	Economic Vitality	TOTAL SCORE
MEDIUM PRIORITY PROJECTS																				
Lake Road Sidewalks	Fill in sidewalk gaps on both sides of street.	Kuehn Rd	Hwy 224	$2,049	Medium	No	Capital	Pedestrian	High		2	3	3	2	0	1	1	1	1	14
Stanley Avenue Bicycle Boulevard	Designate as a Bicycle Boulevard and install bicycle boulevard improvements.	Springwater Trail	Railroad Ave	$300	Medium	No	Capital	Bicycle	High		3	2	3	1	0	1	1	2	0	13
19th and Sparrow Bicycle Boulevard	Designate as a Bicycle Boulevard and install bicycle boulevard improvements. This would connect the south end of Kellogg Creek Trail to River Rd.	Eagle St	River Rd	$737	Medium	No	Capital	Bicycle	Med		2	2	3	1	0	1	2	2	0	13
Franklin Street Sidewalks	Install sidewalks on both sides of street to connect to Hector Campbell Elementary School.	42nd Ave	45th Ave	$200	Medium	No	Capital	Pedestrian	N/A	STSP, CIP (04-05)	2	3	3	1	0	1	1	2	0	13
Intersection Improvements at Main and Mailwell	Upgrade intersection turning radii to better accommodate freight movements.	Location specific	Location specific	$50	Medium	No	Capital	Freight	High		0	1	0	3	2	0	1	2	3	12
McLoughlin Boulevard Sidewalks	Fill in sidewalk gaps on both sides of street.	Washington St	Southern City Limits	$596	Medium	No	Capital	Pedestrian	Med		1	3	2	1	0	1	1	2	1	12
Downtown Parking Signage	Install wayfinding and identification signage at McLoughlin Blvd. intersections and around public parking lots.	Downtown	Downtown	$10	Medium	No	Capital	Parking	High		1	0	0	2	0	0	3	2	3	11
Railroad Crossing Improvements at Harrison	Upgrade paving materials to concrete or rubberized material to improve longevity and enhance for alternative modes.	Location specific	Location specific	$50	Medium	No	Capital	Freight	Low		1	2	2	2	0	0	2	1	1	11
Railroad Crossing Improvements at 21st and Adams	Upgrade paving materials to concrete or rubberized material to improve longevity and enhance for alternative modes.	Location specific	Location specific	$50	Medium	No	Capital	Freight	Low		1	2	2	2	0	0	2	1	1	11
Railroad Crossing Improvements at Monroe	Upgrade paving materials to concrete or rubberized material to improve longevity and enhance for alternative modes.	Location specific	Location specific	$50	Medium	No	Capital	Freight	Low		1	2	2	2	0	0	2	1	1	11
Railroad Crossing Improvements at Washington	Upgrade paving materials to concrete or rubberized material to improve longevity and enhance for alternative modes.	Location specific	Location specific	$50	Medium	No	Capital	Freight	Low		1	2	2	2	0	0	2	1	1	11
Railroad Crossing Improvements at Oak	Upgrade paving materials to concrete or rubberized material to improve longevity and enhance for alternative modes.	Location specific	Location specific	$50	Medium	No	Capital	Freight	Low		1	2	2	2	0	0	2	1	1	11

Project Name	Project Description	From	To	Estimated Cost ($1,000s)[1]	Priority Ranking[2]	Is Project Funded?[3]	Project Type	TSP Chapter	Citizen Working Group Ranking	Other Input	How well does project meet TSP Goals? (3 = very well, 0= not at all)									
											Livability	Safety	Travel Choices	Quality Design	Reliability/Mobility	Sustainability	Efficient Funding	Compatibility	Economic Vitality	TOTAL SCORE
Railroad Crossing Improvements at 37th	Upgrade paving materials to concrete or rubberized material to improve longevity and enhance for alternative modes.	Location specific	Location specific	$50	Medium	No	Capital	Freight	Low		1	2	2	2	0	0	2	1	1	11
Pedestrian Walkway Amenities	Install amenities, such as benches, along key walking routes.	Citywide	Citywide	$50	Medium	No	Capital	Pedestrian	Med		2	0	1	3	0	1	2	1	1	11
Main Street Bike Lanes	Fill in gaps in existing bicycle network with bike lanes.	Harrison St	Moores St	$2,131	Medium	No	Capital	Bicycle	Med		1	1	2	1	0	1	2	1	2	11
McLoughlin Blvd Intersection Improvements at 17th	Prohibit left turn movement from 17th Avenue to northbound McLoughlin Blvd and include in Hwy 224 & Hwy 99E Refinement Plan.	Location specific	Location specific	$15	Medium	No	Capital	Automobile	Med		1	1	0	0	3	0	3	2	1	11
Intersection Improvements at 42nd and Harrison	Signalize intersection to facilitate dominant traffic flow.	Location specific	Location specific	$252	Medium	No	Capital	Automobile	Med		1	1	1	0	3	1	2	1	1	11
McLoughlin Boulevard Intersection Improvements at River Road	Consolidate a single access point for the area at Bluebird Street with full intersection treatment and signalization or add second northbound left-turn lane at River Road.	Location specific	Location specific	$898	Medium	No	Capital	Automobile	Med		1	2	1	1	3	0	1	1	0	10
Harrison and King Connection	Enhance connection between King Road and Harrison Street at 42nd Avenue.	Location specific	Location specific	$53	Medium	No	Capital	Automobile	Med		0	2	0	0	3	0	2	1	2	10
37th Avenue Sidewalks	Fill in sidewalk gaps on both sides of street.	Lake Rd	Harrison St	$794	Medium	No	Capital	Pedestrian	Low		2	2	2	2	0	0	1	1	0	10
Intersection Improvements at 42nd and King	Enhance intersection function.	Location specific	Location specific	$15	Medium	No	Capital	Pedestrian	Med		0	1	1	0	3	0	2	1	2	10
Pedestrian Walkway Signage	Provide maps and wayfinding signage on streets that identify ways to get around the city.	Citywide	Citywide	$10	Medium	No	Operational	Pedestrian	Med		1	0	2	0	0	2	2	2	0	9
Downtown Public Parking Lot Improvements	Upgrade and maintain off-street public parking facilities with improved landscaping and lighting.	Downtown	Downtown	$50	Medium	No	Capital	Parking	Med		2	2	0	1	0	0	1	0	3	9
Community Bicycle Rides	Coordinate community bike rides to encourage bike use.	Citywide	Citywide	$5	Medium	No	Operational	Bicycle	Med		3	2	2	0	0	1	1	0	0	9
Intersection Improvements at Harrison and Hwy 224	Add left turn-lanes and protected signal phasing on Harrison Street approaches.	Location specific	Location specific	$20	Medium	No	Capital	Automobile	Med		1	1	2	0	0	1	3	1	0	9
Cyclist Education	Promote cycling through bike use and route selection education.	Citywide	Citywide	$10	Medium	No	Operational	Bicycle	High		1	3	2	0	0	0	1	1	0	8
Railroad Crossing Pedestrian Improvements at Oak	Improve intersection for pedestrians.	Location specific	Location specific	$15	Medium	No	Capital	Pedestrian	Med		1	3	2	0	0	0	1	1	0	8
Harrison Street Bike Lanes	Fill in gaps in existing bicycle network with bike lanes.	Hwy 99E	21st Ave	$273	Medium	No	Capital	Bicycle	Med		1	2	2	1	0	0	1	1	0	8

											How well does project meet TSP Goals? (3 = very well, 0= not at all)									
Project Name	Project Description	From	To	Estimated Cost ($1,000s)[1]	Priority Ranking[2]	Is Project Funded?[3]	Project Type	TSP Chapter	Citizen Working Group Ranking	Other Input	Livability	Safety	Travel Choices	Quality Design	Reliability/Mobility	Sustainability	Efficient Funding	Compatibility	Economic Vitality	TOTAL SCORE
Intersection Improvements at Linwood and King	Implement protected/permissive left turn phasing for northbound and southbound approaches.	Location specific	Location specific	$16	Medium	No	Capital	Automobile	Med		0	2	0	0	3	1	1	1	0	8
Brookside Drive Sidewalks	Fill in sidewalk gaps on both sides of street.	Johnson Creek Blvd	Regents Dr	$15	Medium	No	Capital	Pedestrian	Med		2	1	1	2	0	0	1	1	0	8
Springwater Trail Paving Project	Improve corridor through repaving existing trail.	29th Ave	Linwood Ave	$500	Medium	No	Capital	Bicycle	Med		2	0	2	1	0	0	1	1	0	7
Lake Road Capacity Improvements	Widen to standard three lane cross section.	21st Ave	Oatfield Rd	$7,392	Medium	No	Capital	Automobile	Med	NDAs, TSP Comments	0	2	0	2	1	0	0	1	1	7
Harrison Street Capacity Improvements	Widen to standard three lane cross section.	32nd St	42nd St	$2,565	Medium	No	Capital	Automobile	Med		0	1	0	1	3	0	0	1	1	7
Johnson Creek Blvd Intersection Improvements at Linwood	Add eastbound right turn lane and westbound right turn lane.	Location specific	Location specific	$803	Medium	No	Capital	Automobile	Med		0	1	0	0	3	1	1	1	0	7
Harrison Street Intersection Improvements at Main	Add westbound shared through/right turn lane or eastbound right turn lane.	Location specific	Location specific	$34	Medium	No	Capital	Automobile	Med		0	0	0	0	2	0	1	2	1	6
Public Parking Structure	Construct 3 to 4 story public parking structure with retail at ground floor for visitor/employee parking.	Location specific	Location specific	$10,000	Medium	No	Capital	Parking	Low		1	0	0	0	0	1	0	1	3	6
LOW PRIORITY PROJECTS																				
Ochoco Street Sidewalks	Construct sidewalks on Ochoco Street to connect bus stops to Goodwill.	19th Ave	McLoughlin Blvd	$$$	Low	No	Capital	Pedestrian	NA		1	3	2	1	0	0	0	2	1	10
Kronberg Park Trail	Construct multi-modal trail along Kellogg Creek connecting Kronberg Park to downtown Milwaukie.	McLoughlin Blvd	Downtown	$1,200	Low	No	Capital	Bicycle	NA	Regional Trail Plan	2	2	1	1	0	0	1	2	1	10
Springwater Corridor Intersection Improvements at 45th	Improve safety of crossing at intersection.	Location specific	Location specific	$10	Low	No	Capital	Bicycle	Med		2	1	1	1	0	1	0	1	0	7
Johnson Creek Blvd and 42nd Avenue Signalization	Replace 3-way stop with signal when warranted.	Location specific	Location specific	$250	Low	No	Capital	Automobile	NA		0	1	0	0	1	1	1	1	0	5
Springwater Trail Ramp Improvement	Improve ramp at Springwater Trail and McLoughlin Blvd.	Location specific	Location specific	$15	Low	Yes	Capital	Bicycle & Pedestrian	N/A	TSP Comments	Project not evaluated.									0
19th Avenue Sidewalks	Fill in sidewalk gaps on both sides of street.	Kellogg Creek Trail	Sparrow St	$305	Low	No	Capital	Pedestrian	Low		Project not evaluated.									0
22nd Avenue Sidewalks	Fill in sidewalk gaps on both sides of street.	McLoughlin Blvd	Sparrow St	$325	Low	No	Capital	Pedestrian	Low		Project not evaluated.									0
43rd Avenue Sidewalks	Fill in sidewalk gaps on both sides of street.	Howe St/42nd Ave	King Rd/43rd Ave	$550	Low	No	Capital	Pedestrian	Low		Project not evaluated.									0
Edison Street Sidewalks	Fill in sidewalk gaps on both sides of street.	35th Ave	37th Ave	$116	Low	No	Capital	Pedestrian	Low		Project not evaluated.									0
Harmony Road Sidewalks	Fill in sidewalk gaps on both sides of street.	Linwood Ave	City Limits	$38	Low	No	Capital	Pedestrian	Low		Project not evaluated.									0

											How well does project meet TSP Goals? (3 = very well, 0= not at all)									
Project Name	Project Description	From	To	Estimated Cost ($1,000s)[1]	Priority Ranking[2]	Is Project Funded?[3]	Project Type	TSP Chapter	Citizen Working Group Ranking	Other Input	Livability	Safety	Travel Choices	Quality Design	Reliability/Mobility	Sustainability	Efficient Funding	Compatibility	Economic Vitality	TOTAL SCORE
Harvey Street Sidewalks	Fill in sidewalk gaps on both sides of street.	32nd Ave	42nd Ave	$534	Low	No	Capital	Pedestrian	Low		Project not evaluated.									0
Home Avenue Sidewalks	Fill in sidewalk gaps on both sides of street.	Railroad Ave	King Rd	$756	Low	No	Capital	Pedestrian	Low		Project not evaluated.									0
International Way Sidewalks	Fill in sidewalk gaps on both sides of street	Criterion Ct	Lake Rd	$767	Low	No	Capital	Pedestrian	Low		Project not evaluated.									0
Johnson Creek Boulevard Sidewalks	Fill in sidewalk gaps on both sides of street.	Harney Dr	City Limits	$378	Low	No	Capital	Pedestrian	Low		Project not evaluated.									0
Linwood Avenue Sidewalks	Fill in sidewalk gaps on both sides of street.	Johnson Creek Blvd	Railroad Ave	$2,960	Low	No	Capital	Pedestrian	Low		Project not evaluated.									0
Mason Lane Sidewalks	Fill in sidewalk gaps on both sides of street.	42nd Ave	Regents Dr	$671	Low	No	Capital	Pedestrian	Low		Project not evaluated.									0
Oatfield Road Sidewalks	Fill in sidewalk gaps on both sides of street.	Guilford Ct	City Limits	$132	Low	No	Capital	Pedestrian	Low		Project not evaluated.									0
Regents Drive Sidewalks	Fill in sidewalk gaps on both sides of street.	Brookside Dr	Winsor Dr	$494	Low	No	Capital	Pedestrian	Low		Project not evaluated.									0
River Road Sidewalks	Fill in sidewalk gaps on both sides of street.	McLoughlin Blvd	City Limits	$626	Low	No	Capital	Pedestrian	Low		Project not evaluated.									0
Roswell Street Sidewalks	Fill in sidewalk gaps on both sides of street.	32nd Ave	36th Ave	$192	Low	No	Capital	Pedestrian	Low		Project not evaluated.									0
Rusk Road Sidewalks	Fill in sidewalk gaps on both sides of street.	Lake Rd	North Clackamas Park	$662	Low	No	Capital	Pedestrian	Low		Project not evaluated.									0
Olsen Street Sidewalks	Fill in sidewalk gaps on north side of street.	32nd Ave	42nd Ave	$432	Low	No	Capital	Pedestrian	Low		Project not evaluated.									0
49th Avenue Sidewalks	Fill in sidewalk gaps on both sides of street.	Logus Rd	King Rd	$250	Low	No	Capital	Pedestrian	Low		Project not evaluated.									0
Hwy 224 Sidewalks	Fill in sidewalk gaps on both sides of street.	Oak St	37th Ave	$420	Low	No	Capital	Pedestrian	Low		Project not evaluated.									0
Intersection Curb Ramp Improvements	Install curb ramps at all intersections with sidewalks.	Citywide	Citywide	$5	Low	No	Capital	Pedestrian	Low		Project not evaluated.									0
Hwy 224 Intersection Improvements at 37th	Improve pedestrian crossing.	Location specific	Location specific	$20	Low	No	Capital	Pedestrian	Low		Project not evaluated.									0
Hwy 224 Intersection Improvements at Freeman	Improve pedestrian crossing.	Location specific	Location specific	$20	Low	No	Capital	Pedestrian	Low		Project not evaluated.									0
Hwy 224 Intersection Improvements at Harrison	Improve pedestrian crossing.	Location specific	Location specific	$20	Low	No	Capital	Pedestrian	Low		Project not evaluated.									0
Hwy 224 Intersection Improvements at Monroe	Improve pedestrian crossing.	Location specific	Location specific	$15	Low	No	Capital	Pedestrian	Low		Project not evaluated.									0
Hwy 224 Intersection Improvements at Oak	Improve pedestrian crossing.	Location specific	Location specific	$20	Low	No	Capital	Pedestrian	Low		Project not evaluated.									0
Intersection Improvements at Olsen and 42nd	Improve pedestrian crossing.	Location specific	Location specific	$20	Low	No	Capital	Pedestrian	Low		Project not evaluated.									0
Intersection Improvements at Harmony and Lake	Improve pedestrian crossing.	Location specific	Location specific	$15	Low	No	Capital	Pedestrian	Low		Project not evaluated.									0

Project Name	Project Description	From	To	Estimated Cost ($1,000s)[1]	Priority Ranking[2]	Is Project Funded?[3]	Project Type	TSP Chapter	Citizen Working Group Ranking	Other Input	How well does project meet TSP Goals? (3 = very well, 0= not at all) Livability	Safety	Travel Choices	Quality Design	Reliability/Mobility	Sustainability	Efficient Funding	Compatibility	Economic Vitality	TOTAL SCORE
Intersection Improvements at Railroad and 37th	Improve pedestrian crossing.	Location specific	Location specific	$10	Low	No	Capital	Pedestrian	Low		Project not evaluated.									0
Intersection Improvements at Stanley and Logus	Improve pedestrian crossing.	Location specific	Location specific	$15	Low	No	Capital	Pedestrian	Low		Project not evaluated.									0
Springwater Trail Ramp Improvement at McLoughlin	Improve ramp at Springwater Trail and McLoughlin Blvd.	Location specific	Location specific	$15	Low	No	Capital	Pedestrian	Low		Project not evaluated.									0
Pedestrian Connection to North Clackamas Park	Create pedestrian connection between the school and the park.	Rowe Middle School	North Clackamas Park	$1,284	Low	No	Capital	Pedestrian	Low		Project not evaluated.									0
Hwy 224 Intersection Improvements at 17th	Upgrade intersection turning radii to better accommodate freight movements.	Location specific	Location specific	$50	Low	No	Capital	Freight	Low		Project not evaluated.									0
Intersection Improvements at Mailwell and Omark	Upgrade intersection turning radii to better accommodate freight movements.	Location specific	Location specific	$50	Low	No	Capital	Freight	Low		Project not evaluated.									0
Bicycle and Pedestrian Overpass	Establish a dedicated bicycle and pedestrian connection across Railroad Avenue and the railroad tracks.	Railroad Ave	International Way	$2,025	Low	No	Capital	Bicycle	Low		Project not evaluated.									0
Bicycle-friendly Street Grates	Install bicycle-friendly street grates.	Citywide	Citywide	$50	Low	No	Operational	Bicycle	Low		Project not evaluated.									0
Milwaukie Bike Map	Produce a Milwaukie Bike Map.	Citywide	Citywide	$50	Low	No	Operational	Bicycle	Low		Project not evaluated.									0
Trolley Trail Signage	Design and install Trolley Trail signage.	Milwaukie Riverfront	Southern City Limits	$54	Low	No	Capital	Bicycle	Low		Project not evaluated.									0
Springwater Trail Signage	Install wayfinding signage for Springwater Trail.	Citywide	Citywide	$15	Low	No	Operational	Bicycle	Low		Project not evaluated.									0
Intersection Improvements at Johnson Creek Blvd and Linwood	Improve safety of crossing at intersection.	Location specific	Location specific	$10	Low	No	Capital	Bicycle	Low		Project not evaluated.									0
Intersection Improvements at Linwood and King	Improve safety of crossing at intersection.	Location specific	Location specific	$10	Low	No	Capital	Bicycle	Low		Project not evaluated.									0
Intersection Improvements at Linwoodand Harmony	Improve safety of crossing at intersection.	Location specific	Location specific	$10	Low	No	Capital	Bicycle	Low		Project not evaluated.									0
Intersection Improvements at Linwood and Monroe	Improve safety of crossing at intersection.	Location specific	Location specific	$10	Low	No	Capital	Bicycle	Low		Project not evaluated.									0
Intersection Improvements at International Way and Lake Road	Improve safety of crossing at intersection.	Location specific	Location specific	$10	Low	No	Capital	Bicycle	Low		Project not evaluated.									0
Intersection Improvements at Adams and 21st	Improve safety of crossing at intersection.	Location specific	Location specific	$10	Low	No	Capital	Bicycle	Low		Project not evaluated.									0
Lake Road Bike Lanes	Fill in gaps in existing bicycle network with bike lanes.	Main St	Guilford Dr	$3,142	Low	No	Capital	Bicycle	Low		Project not evaluated.									0
Harrison Street Bike Lanes	Fill in gaps in existing bicycle network with bike lanes.	Hwy 224	42nd Ave	$13	Low	No	Capital	Bicycle	Low		Project not evaluated.									0
37th Avenue Bike Lanes	Fill in gaps in existing bicycle network with bike lanes.	Harrison St	Hwy 224	$2,900	Low	No	Capital	Bicycle	Low		Project not evaluated.									0

											How well does project meet TSP Goals? (3 = very well, 0= not at all)									
Project Name	Project Description	From	To	Estimated Cost ($1,000s)[1]	Priority Ranking[2]	Is Project Funded?[3]	Project Type	TSP Chapter	Citizen Working Group Ranking	Other Input	Livability	Safety	Travel Choices	Quality Design	Reliability/Mobility	Sustainability	Efficient Funding	Compatibility	Economic Vitality	TOTAL SCORE
43rd Avenue Bike Lanes	Fill in gaps in existing bicycle network with bike lanes.	King Rd	Filbert St	$1,014	Low	No	Capital	Bicycle	Low		Project not evaluated.									0
Oatfield Road Bike Lanes	Fill in gaps in existing bicycle network with bike lanes.	Guilford Ct	Lake Rd	$348	Low	No	Capital	Bicycle	Low		Project not evaluated.									0
Linwood Avenue Bike Lanes (north)	Fill in gaps in existing bicycle network with bike lanes.	Queen Rd	Johnson Creek Blvd	$1,692	Low	No	Capital	Bicycle	Low		Project not evaluated.									0
Linwood Avenue Bike Lanes (south)	Fill in gaps in existing bicycle network with bike lanes.	Juniper St	Harmony Rd	$296	Low	No	Capital	Bicycle	Low		Project not evaluated.									0
Rusk Road Bike Lanes	Fill in gaps in existing bicycle network with bike lanes.	Lake Rd	North Clackamas Park	$936	Low	No	Capital	Bicycle	Low		Project not evaluated.									0
21st Avenue Bike Lanes	Fill in gaps in existing bicycle network with bike lanes.	Harrison St	Lake Rd	$50	Low	No	Capital	Bicycle	NA	Downtown Plan	Project not evaluated.									0
Police Enforcement on Drivers	Enforce laws related to bike lanes and bicycle safety.	Citywide	Citywide	$10	Low	No	Operational	Bicycle	Low		Project not evaluated.									0
Bike Lane Striping	Re-stripe existing bike lanes and stripe bike lanes on streets where buses and bicyclists share the road.	Citywide	Citywide	$20	Low	No	Operational	Bicycle & Transit	Low		Project not evaluated.									0
Kellogg Creek Trail Improvements	Resurface trail and provide wayfinding signage to/from trail.	Milwaukie Riverfront	Treatment Plant	$623	Low	No	Capital	Bicycle	Low		Project not evaluated.									0
Hwy 224 Access Modifications at Freeman Way	Modify access at Freeman Way to improve intersection functioning.	Location specific	Location specific	$1,313	Low	No	Capital	Automobile	Low		Project not evaluated.									0
Stanley Ave Connectivity at King	Enhance connection along Stanley Ave at King Road.	Location specific	Location specific	$53	Low	No	Capital	Automobile	Low		Project not evaluated.									0
Stanley Ave Connectivity at Monroe	Enhance connection along Stanley Avenue at Monroe Street.	Location specific	Location specific	$53	Low	No	Capital	Automobile	Low		Project not evaluated.									0
Harmony Road Grade Separation and Realignment at Linwood	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	Freight & Automobile	Low		Project not evaluated.									0
Regional Projects within or through the City of Milwaukie[4]																				
Milwaukie Light Rail Extension or High Capacity Transit Improvements	Construct light rail or high capacity transit improvements between Milwaukie and Portland.	Rose Quarter MAX Station	Milwaukie Town Center	$515,000	—	No	Capital	Transit	—	2004 RTP	Project not evaluated.									0
Oregon City Light Rail Extension or High Capacity Transit Improvements	Construct light rail or high capacity transit improvements between Milwaukie and Oregon City.	Milwaukie Town Center	Oregon City	$577,500	—	No	Capital	—	—	2004 RTP	Project not evaluated.									0
Milwaukie Transportation Management Association Program	Implement a transportation management association for employers.	Milwaukie Town Center	Milwaukie Town Center	$200	—	No	Operational	Transit	—	2004 RTP	Project not evaluated.									0

Project Name	Project Description	From	To	Estimated Cost ($1,000s)[1]	Priority Ranking[2]	Is Project Funded?[3]	Project Type	TSP Chapter	Citizen Working Group Ranking	Other Input	How well does project meet TSP Goals? (3 = very well, 0= not at all)									
											Livability	Safety	Travel Choices	Quality Design	Reliability/Mobility	Sustainability	Efficient Funding	Compatibility	Economic Vitality	TOTAL SCORE
Portland Traction Company Multi-Use Trail	Plan, engineer, and construct multi-use trail along Portland Traction Company right-of-way.	Milwaukie	Gladstone	$1,386	—	No	Capital	—	—	2004 RTP	Project not evaluated.									0
North Clackamas Greenway Corridor Study	Study feasibility of corridor for multi-use path construction (possibly along Kellogg Creek).	Milwaukie	Clackamas Regional Center	—	—	No	Capital	—	—	2004 RTP	Project not evaluated.									0
Linwood/Harmony/Lake Road Intersection Improvements	Add northbound right turn lane and eastbound right turn lane.	Location specific	Location specific	$28,000	—	No	Capital	—	—	2004 RTP	Project not evaluated.									0
McLoughlin Boulevard Improvements	Complete boulevard design improvements.	Scott St	Harrison St	$3,300	—	No	Capital	—	—	2004 RTP	Project not evaluated.									0
Tillamook Branch Trestle Trail Study	Study feasibility of east-west multi-use trail construction.	Milwaukie Town Center	Lake Oswego Town Center	—	—	No	Capital	—	—	2004 RTP	Project not evaluated.									0
Railroad Junction Improvements	Implement track and signal improvements to allow for increased track speeds between UP Willsburg Junction and UP Albina Yards.	Milwaukie	UP Railroad Albina Yards	$8,800	—	No	Capital	—	—	2004 RTP	Project not evaluated.									0
Railroad Track Extension	Extend two tracks from Willsburg Junction to Clackamas.	Milwaukie	I-205	$19,000	—	No	Capital	—	—	2004 RTP	Project not evaluated.									0

[1] In the case of operational projects, estimated costs are for entire 22-year planning period.

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

[3] 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.

[4] 2004 Regional Transportation Plan (RTP) projects in the Milwaukie area that may or may not be shown on mode-specific master plans or project lists.

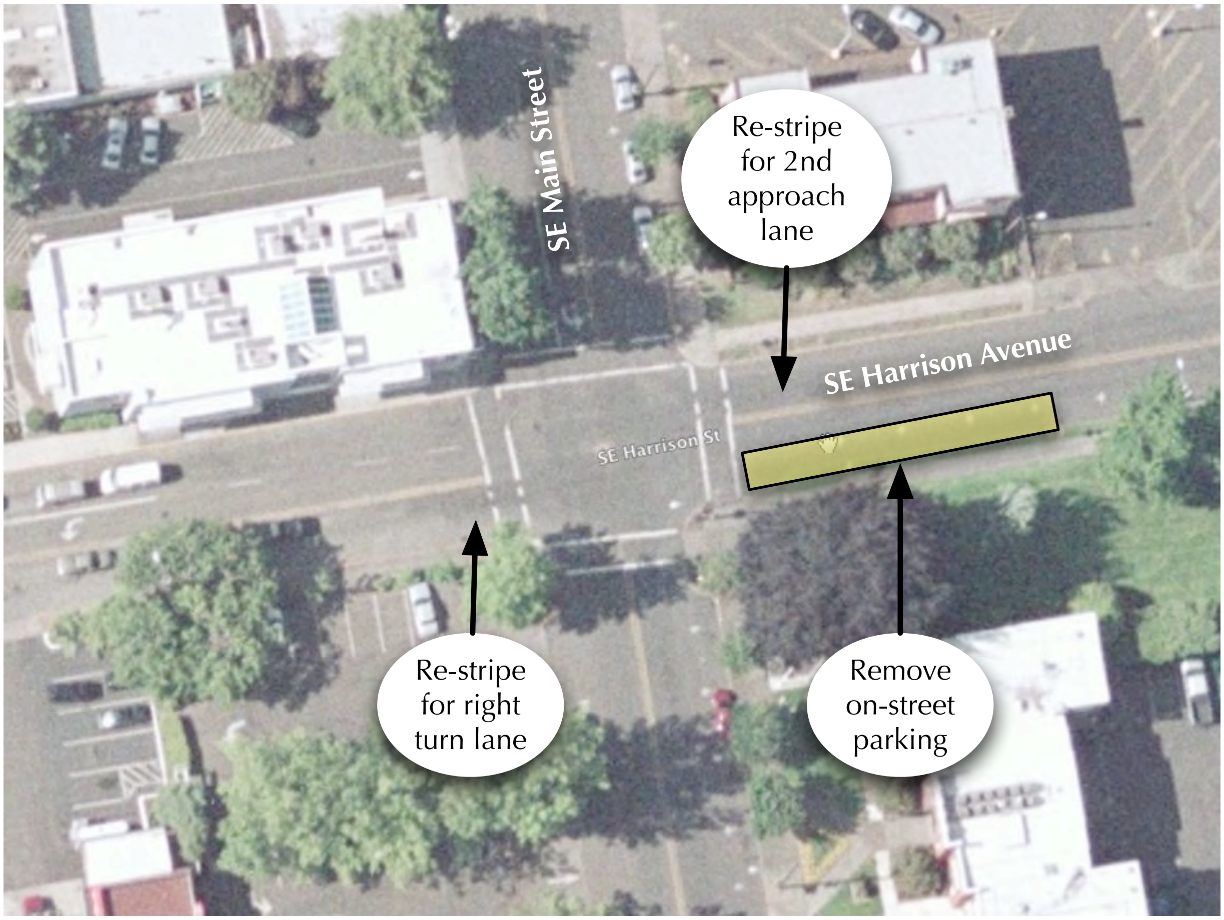
Key:
NDA = Neighborhood District Association
NTMP = Neighborhood Traffic Management Program
CIP = Capital Improvement Program
STSP = Safe Trips to School Program
RTP = Regional Transportation Plan

Appendix C

Conceptual Design Options

The Street Auto Network Working Group discussed the following design options during the TSP update process. These design options were developed to address current and/or future operational deficiencies at TSP study intersections.

1. SE Harrison Avenue / SE Main Street

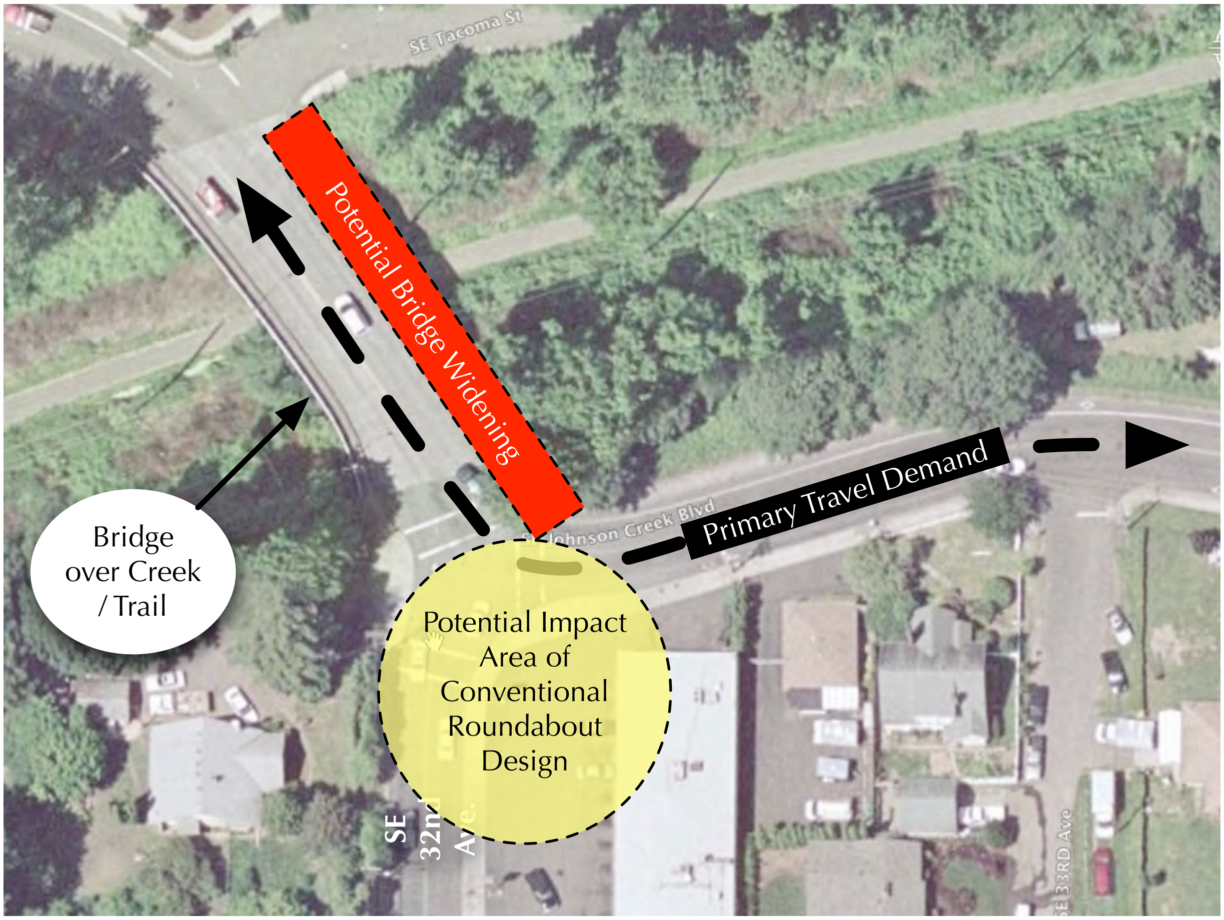


Measure of Effectiveness	Alt. 1: Reconfigure Existing Intersection	Alt. 2: Modify LOS Policy
Traffic Operations City standard = LOS D	Re-stripe Harrison Ave. approaches to provide space for right-turn lanes. Lanes line up with next block downstream.	No change
Safety	More lanes crossing crosswalk; could degrade pedestrian safety	No change
Cost	$	$
	PREFERRED	

2. SE Harrison Ave. / SE 42nd Avenue

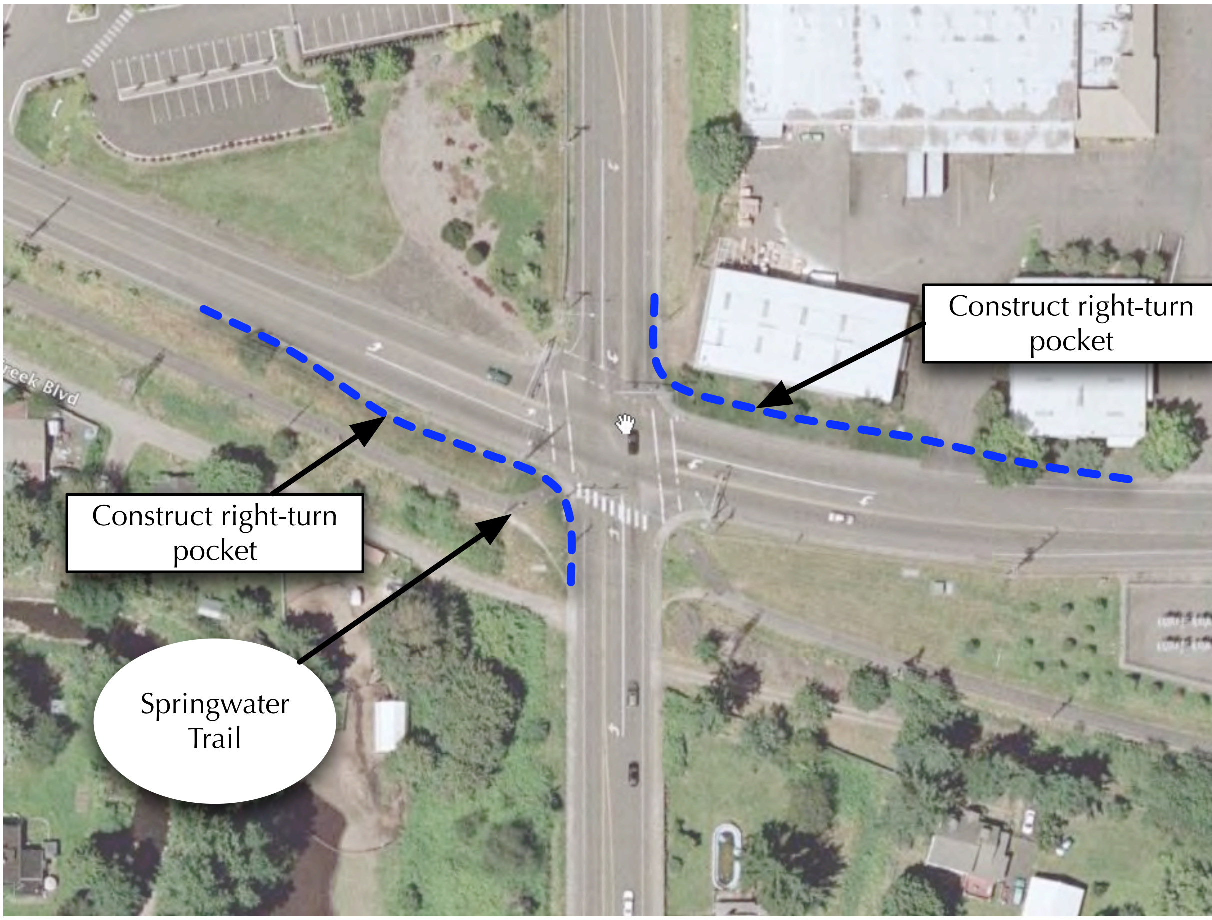
Measure of Effectiveness	Alt. 1: Do Nothing	Alt. 2: Install Traffic Signal	Alt. 3: Re-direct Through Route Traffic & Signals
Traffic Operations City Standard = LOS D	Significant vehicle queues and delays for major approaches (SB 42nd and EB Harrison) during peak hours.	Install traffic and pedestrian signals. No street widening required.	Install traffic and pedestrian signals. Modify Harrison / 42nd and King / 42nd to favor through route.
Safety	No change.	Pedestrian crossings should be safer and more convenient during peak hours.	Curb extensions on minor legs would shorten crossing area for pedestrians, and help to indicate through route.
Cost	None.	$$	$$$

3. SE Johnson Creek Blvd. / SE 32nd Avenue



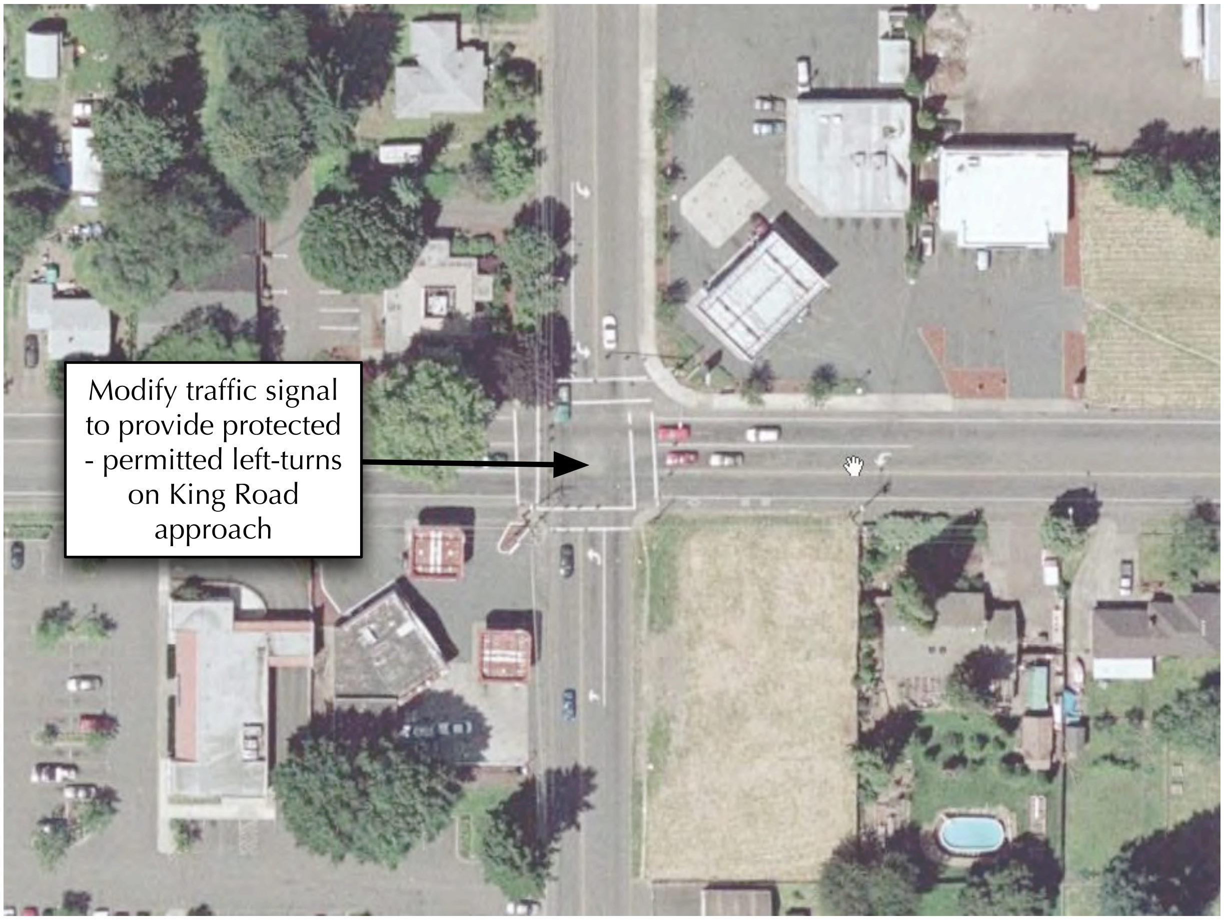
Measure of Effectiveness	Alt. 1: Roundabout	Alt. 2: Traffic Signal
Traffic Operations Portland Standard = LOS D	Design roundabout at existing intersection. Requires property acquisition and impacts to private building.	Install traffic and pedestrian signals at existing intersection. Requires additional EB approach lane beginning west of bridge and possible bridge widening
Safety	Effective design would substantially reduce vehicle queues and blockage of minor side streets. Proximity to bridge makes design more complex.	Effective design would reduce delays and vehicle queues.
Cost	$$$	$$$

4. SE Johnson Creek Blvd. / SE Linwood Avenue



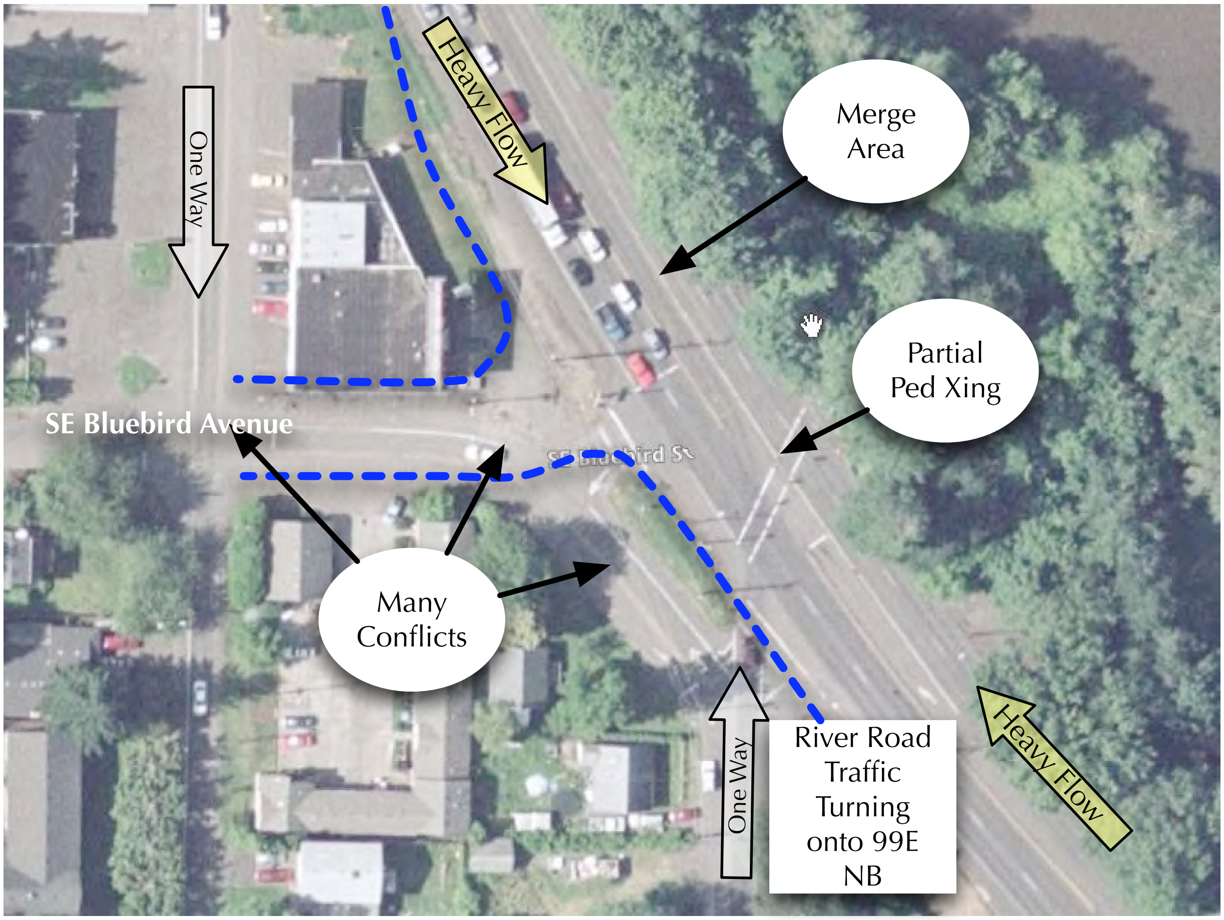
Measure of Effectiveness	Alt. 1: Do Nothing	Alt. 2: Add Right-turn lanes
Traffic Operations Portland Standard = LOS D	2030 conditions drop to LOS E. Vehicle queues and delays during peak hours could be excessive.	Widen JCB approaches to provide for standard right-turn pockets. May need to acquire ROW. Relocate traffic signal poles, as needed.
Safety	No change.	Widening will extend crosswalk lengths and time to cross. Need to integrate for trail crossing on south leg into design.
Cost	None.	$$
		PREFERRED

5. SE King Road / SE Linwood Avenue



Measure of Effectiveness	Alt. 1: Modify Traffic Signal Phasing on King Road	Alt. 2: Reduce City LOS Mobility Standard
Traffic Operations City Standard = LOS D	Modify traffic controls to provide protect left-turn (green arrow) and protected left-turn (flashing yellow arrow) on King Road approaches Does not attain LOS D.	Modify city standard to allow for LOS E conditions during peak hours at traffic signals.
Safety	No change	No change
Cost	$$	$
	PREFERRED	

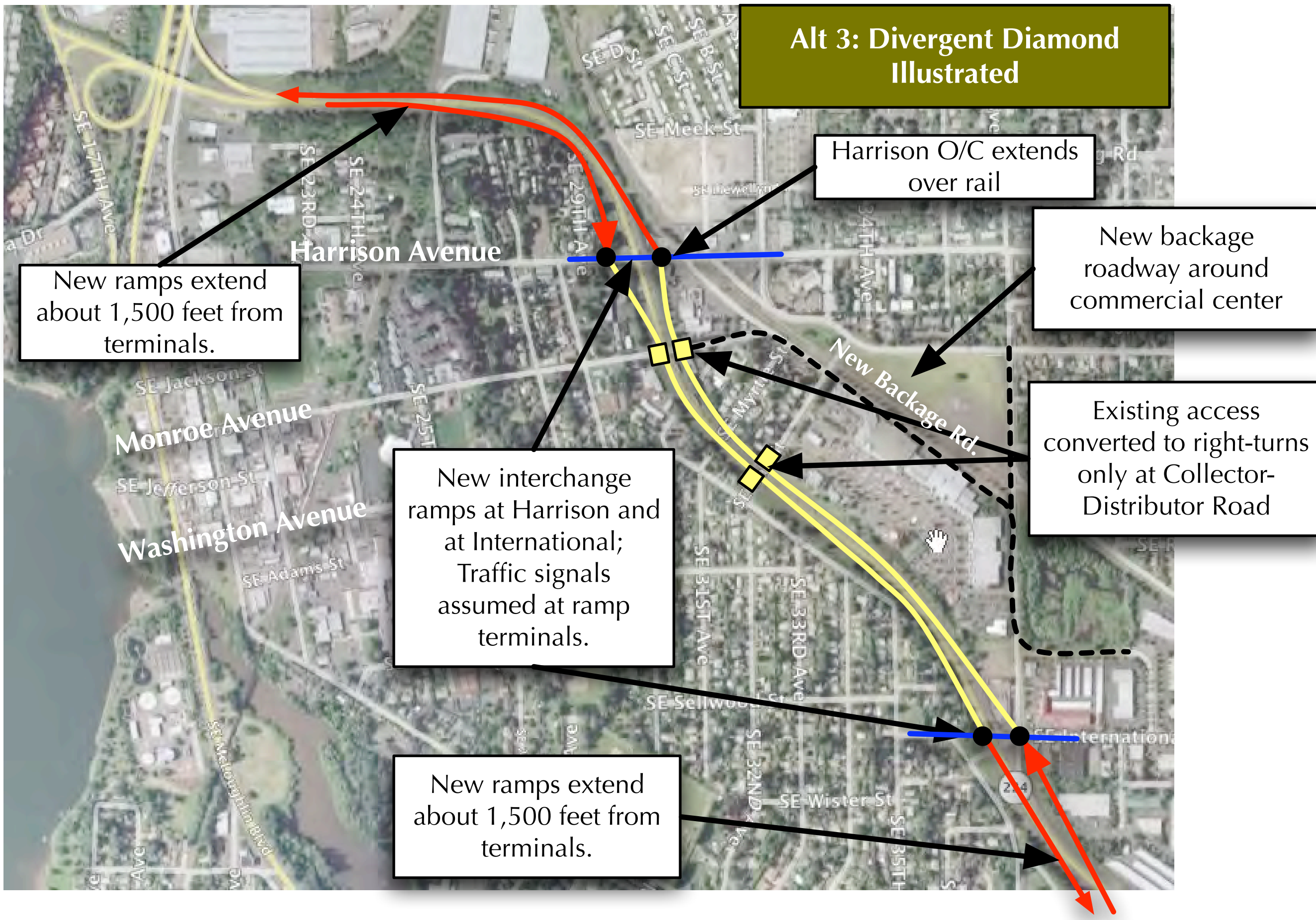
6. ORE 99E / River Road



Measure of Effectiveness	Alt. 1: Reconfigure Existing Intersection	Alt. 2: Reconstruct Intersection	Alt. 3: Defer Decision
Traffic Operations Standard: v/c = 0.99	Widen River /Road approach to add 2nd NB left turn lane	Consolidate 22nd Avenue, River Road & Bluebird legs, possibly acquire building north of Bluebird; shown.	Make no specific recommendations; defer improvement plan to other ODOT studies underway.
Safety	Re-design NB River Road approach to move Ped Xing to full signal control; Make NB 99E traffic stop at signal	Make conventional intersection near existing Bluebird Lane connection.	No change
Cost	$$	$$$	

All projects on state facilities require review and approval by ODOT.

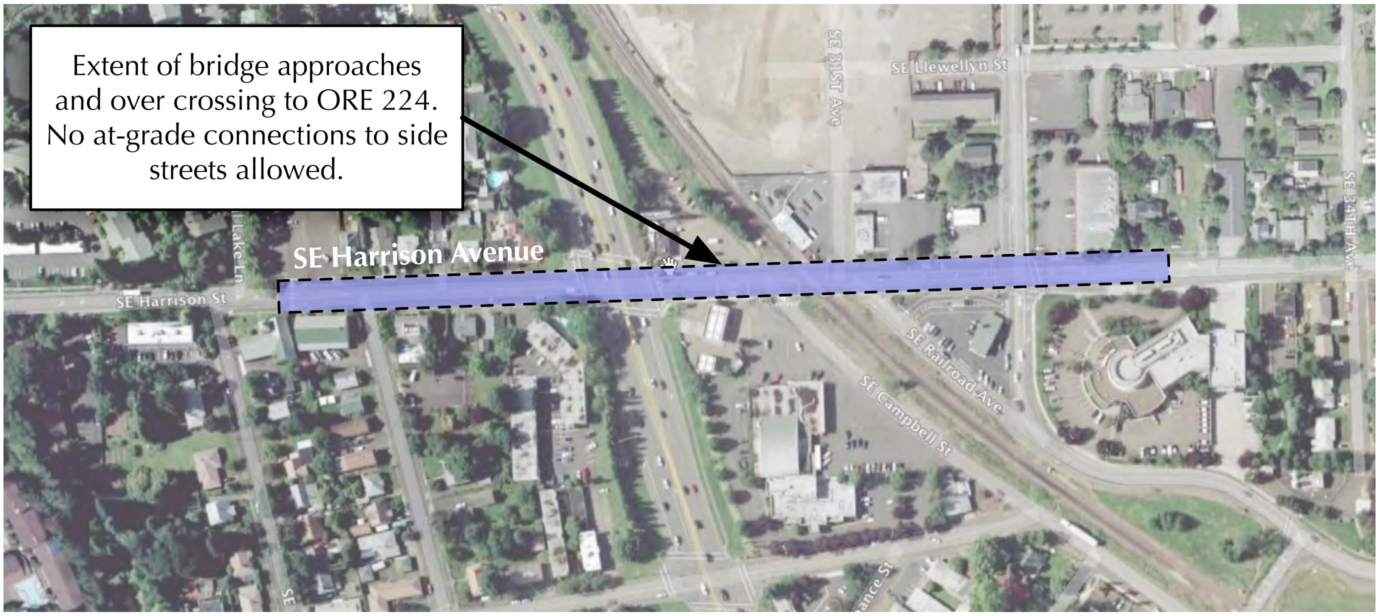
7. ORE 224 / Harrison to Oak



Measure of Effectiveness	Alt. 1: 7-Lane ORE 224	Alt. 2: 7-Lanes Plus Harrison O/C	Alt. 3: Divergent Diamond
Traffic Operations ODOT Standard = v/c 0.99	Complies with Mobility standards for highway traffic; status quo for cross-city travel	Less interruptions of ORE 224; superior circulation for cross-city trips on Harrison	Construct freeway ramps and collector distributor roads (yellow); Construct over (under) crossings to highway at Harrison and at International. Construct backage road from 37th to Monroe for commercial area.. Limit access at Monroe and Oak to new C-D road.
Safety	Extends pedestrian and bike crossing length; same barrier issues as today.	Provide grade separated crossing option for non-auto travel. Better safety and less delays.	Provides two grade separated crossings. Would need access management plan on city street approaches to I/C
Cost	$$$	$$$	$$$$

All projects on state facilities require review and approval by ODOT.

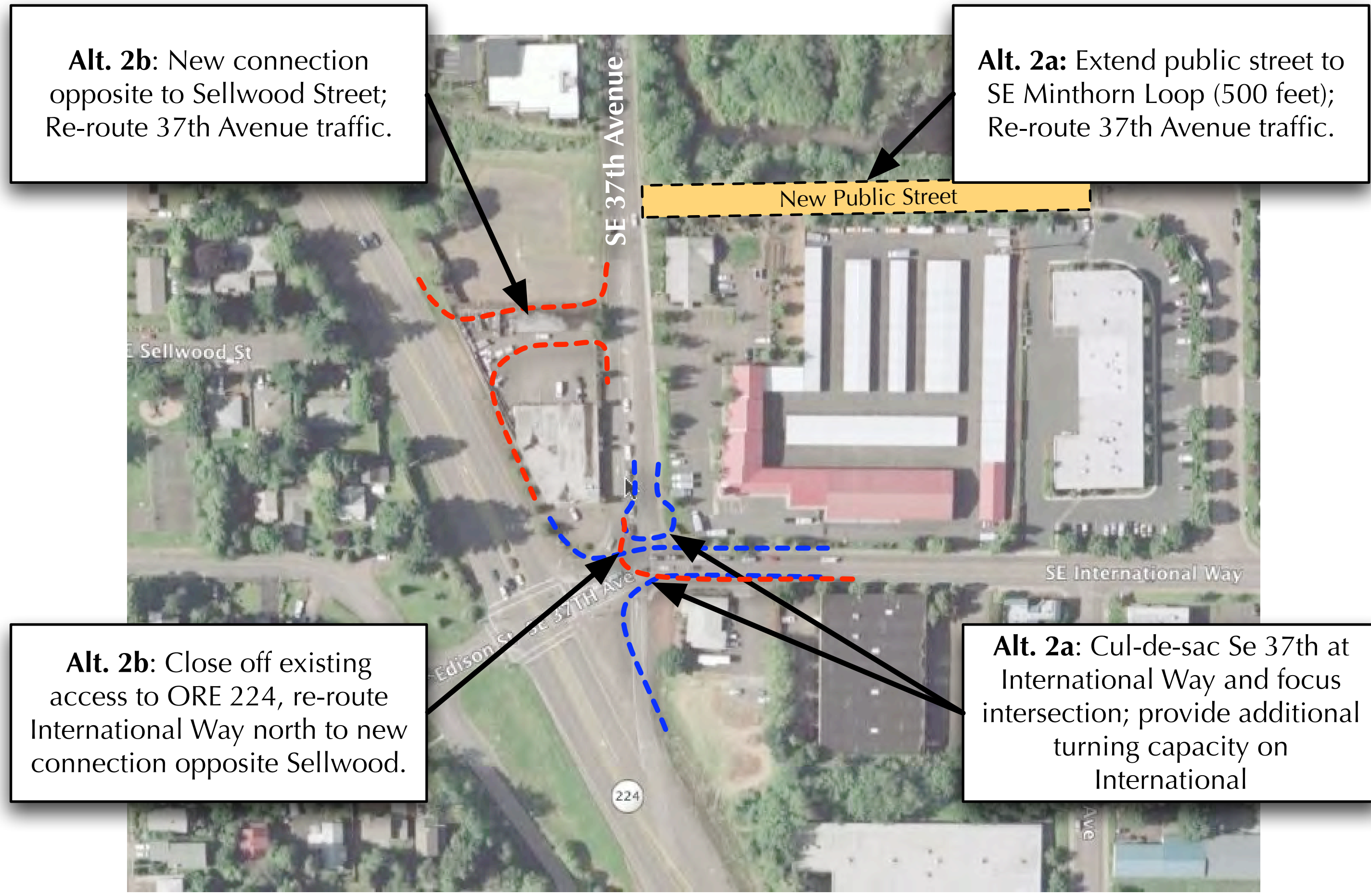
8. Harrison Avenue / ORE 224



Measure of Effectiveness	Alt. 1: At-Grade	Alt. 2: Cross Over ORE 224 with No Ramps
Traffic Operations ODOT Standard = v/c 0.99	Assumes seven-lane section on ORE 224. Complies with minimum mobility standard.	Removal of at-grade intersection and access to King Road. Highway operates same as mainline section.
Safety	Wider approaches on ORE 224 extend crossing times for pedestrians and bikes.	Uninterrupted flow of pedestrians and bikes to either side of city. Bridge structure would also cross RR tracks.
Cost	$$$	$$$

All projects on state facilities require review and approval by ODOT.

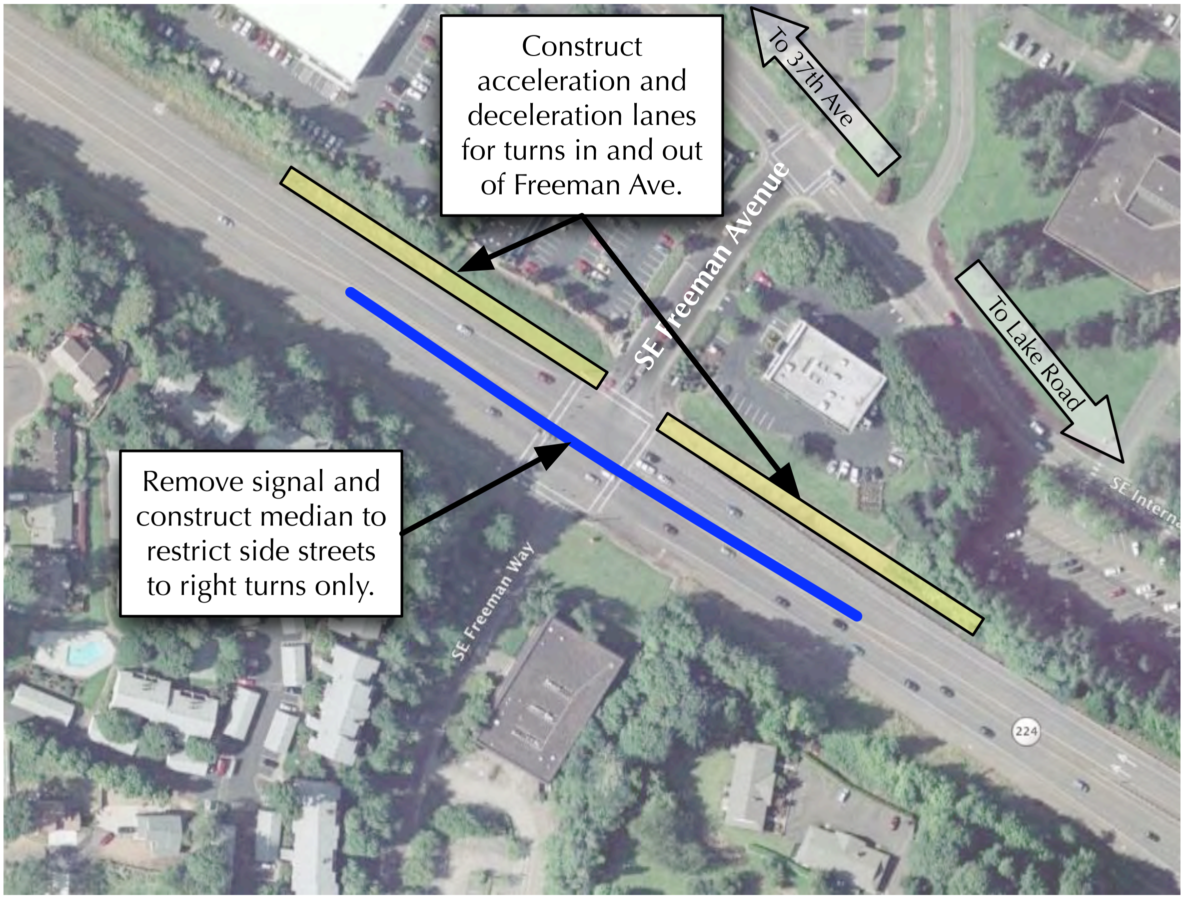
9. International Way - 37th Ave. / ORE 224



Measure of Effectiveness	Alt. 1: Do Nothing	Alt. 2a: Re-Route 37th Connection	Alt. 2b: Re-Route International Way Connection
Traffic Operations ODOT Standard = v/c 0.99	Highway marginally exceeds peak hour standard (1.05)	The reconfigured intersection more efficient. Extension of Winthorp impacts wetlands area. Could add turn lanes on International Way.	The reconfigured intersection more efficient. Primary connection to 37th Ave. Re-route of International Way traffic north.
Safety	High level of conflicts with two closely spaced full access intersections. Vehicle queues and truck operations compound safety issues.	Significant safety improvements for autos, trucks and pedestrians.	Significant safety improvements for autos, trucks and pedestrians.
Cost	None	$$$	$$

All projects on state facilities require review and approval by ODOT.

10. ORE 224 / SE Freeman Avenue



Measure of Effectiveness	Alt. 1: Do Nothing	Alt. 2: Restrict Access on Freeman to Right-turns only
Traffic Operations ODOT Standard = v/c 0.99	Exceeds highway maximum congestion level (1.12 during peak hours..	Eliminating traffic signal would reduce interruptions for regional and freight traffic; some local traffic re-routed to Lake Rd. or Edison or 37th
Safety	No change	Vehicle conflicts and safety should be improved. Removal of pedestrian facilities could reduce safety.
Cost	None	$$

All projects on state facilities require review and approval by ODOT.

DKS Associates
TRANSPORTATION SOLUTIONS

MEMORANDUM

DATE: August 3, 2007

TO: Freight Working Group, City of Milwaukie

FROM: Alan Snook, AICP
Michael Tomasini, E.I.T.

SUBJECT: **Milwaukie TSP Update Task 8 Freight Access Alternatives** P06097x008x008

The purpose of this Memorandum is to outline different freight access alternatives for the northern industrial area in the City of Milwaukie. An alternatives analysis was done to look at the potential impacts to freight operations resulting from different combinations of access management, bridge construction and roadway realignment projects, as well as the impact of two potential light rail transit (LRT) alignments. This memorandum contains a short description of the methodology used to compare the quantitative and qualitative impacts of each alternative, a brief account of the common themes between each alternative, and an overview of the special aspects of each alternative and an evaluation matrix which compares the alternatives based on criteria developed earlier in the evaluation phase of this project.

Study Area and Methodology

A total of nine alternatives were looked at for this analysis and a study area included the city's northern industrial lands. The northern industrial area of Milwaukie is bounded by the city's northern city limit, Highway 224 to the south, the Tillamook Line railroad tracks to the east and 17th Avenue to the west. Figure 1 shows the study area in relation to surrounding regional facilities, such as SE McLoughlin Boulevard (Highway 99E) and Highway 224.

Although nine alternatives were analyzed, there were, in essence four main alternatives, A, B, C, and D, which contained different roadway alignment options and/or a slight modification to the alternative alignment. The remaining five alternatives came about as a result of having two light rail alignment options. Therefore, each main alternative was analyzed twice, once with the Locally Preferred Alternative (LPA) light rail alignment and a second time with the Tillamook Branch alignment. The exception to this is with Alternate B, in which the LPA option was analyzed with two different roadway alignment options.

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www.dksassociates.com

-Study Area

1 -Study Sub Area

N

Approximate Scale

0 100 200 feet

Information Sources: *DKS Associates*

STUDY AREA

FIGURE 1

For each alternative, key criteria were analyzed, including:

- Freight operations;
- Traffic throughput on SE McLoughlin Boulevard (Highway 99E);
- Local side street traffic operations, access, crossing improvements, and safety;
- Resource limitations;
- Out of direction travel;
- Pedestrian connectivity;
- Bicycle connectivity;
- Transit access/egress and conflicts; and
- Robustness of the alternative.

Synchro traffic analysis software was used to measure the effects of the different roadway alignments and the impact of the light rail operations for many of the qualitative criteria, such as traffic and freight operations. ArcGIS (Geographic Information Systems) software was used in part to measure the amount of out of direction travel that would be experienced for each subgroup within the study area. While engineering judgment was used for the remaining qualitative criteria (side street crossing, safety, bicycle and pedestrian connectivity, and transit access/egress and conflicts), a quantitative assessment was conducted for the other criteria. All of the data from the technical analysis for each alternative is located in the Freight Technical Appendix.

Alternatives Described

The following gives a brief description of each alternative that was developed and analyzed for this assessment.

Alternates A1 and A2

The only difference between alternates A1 (LPA LRT) and A2 (Tillamook LRT), as can be seen in Figures A1 and A2 are the LRT alignments. The main themes for Alternates A1 and A2 are the construction of an overpass at SE Ochoco Street with auxiliary lanes connecting SE Ochoco Street to SE McLoughlin Boulevard and the complete closure of the SE McLoughlin Boulevard/SE Milport Road intersection for all movements except through traffic on SE McLoughlin Boulevard. As a result of this closure, the intersection of SE Milport Road/SE Main Street would also be closed, leaving SE Main Street as a through street. SE Frontage Road would be converted to a cul-de-sac at the north and the intersection of SE Milport Road/SE Frontage Road would be turned into a through street. The intersection of SE Ochoco Street/SE Main Street would be closed and SE Main Street would be converted to cul-de-sacs on either side of SE Ochoco Street. Finally, a new roadway extension of SE 25th Avenue would connect SE Main Street to SE Ochoco Street.

Alternates B1, B2, and B1a

Alternates B1 and B2 are similar to the “A” Alternates in that they involve the construction of an overpass for SE Ochoco Street with auxiliary lanes accessing SE McLoughlin Boulevard. The difference is that the auxiliary lanes are located further north of the overpass, and the auxiliary lane for southbound traffic on SE McLoughlin Boulevard connects with SE Frontage Road and does not require this roadway to become a cul-de-sac. Furthermore, the intersection of SE Ochoco Street/SE Main Street remains open and the intersection of SE McLoughlin Boulevard/SE Milport Road is only subject to a partial closure. Through movements on SE McLoughlin Boulevard and right turning traffic would be allowed to access SE McLoughlin Boulevard from SE Milport Road.

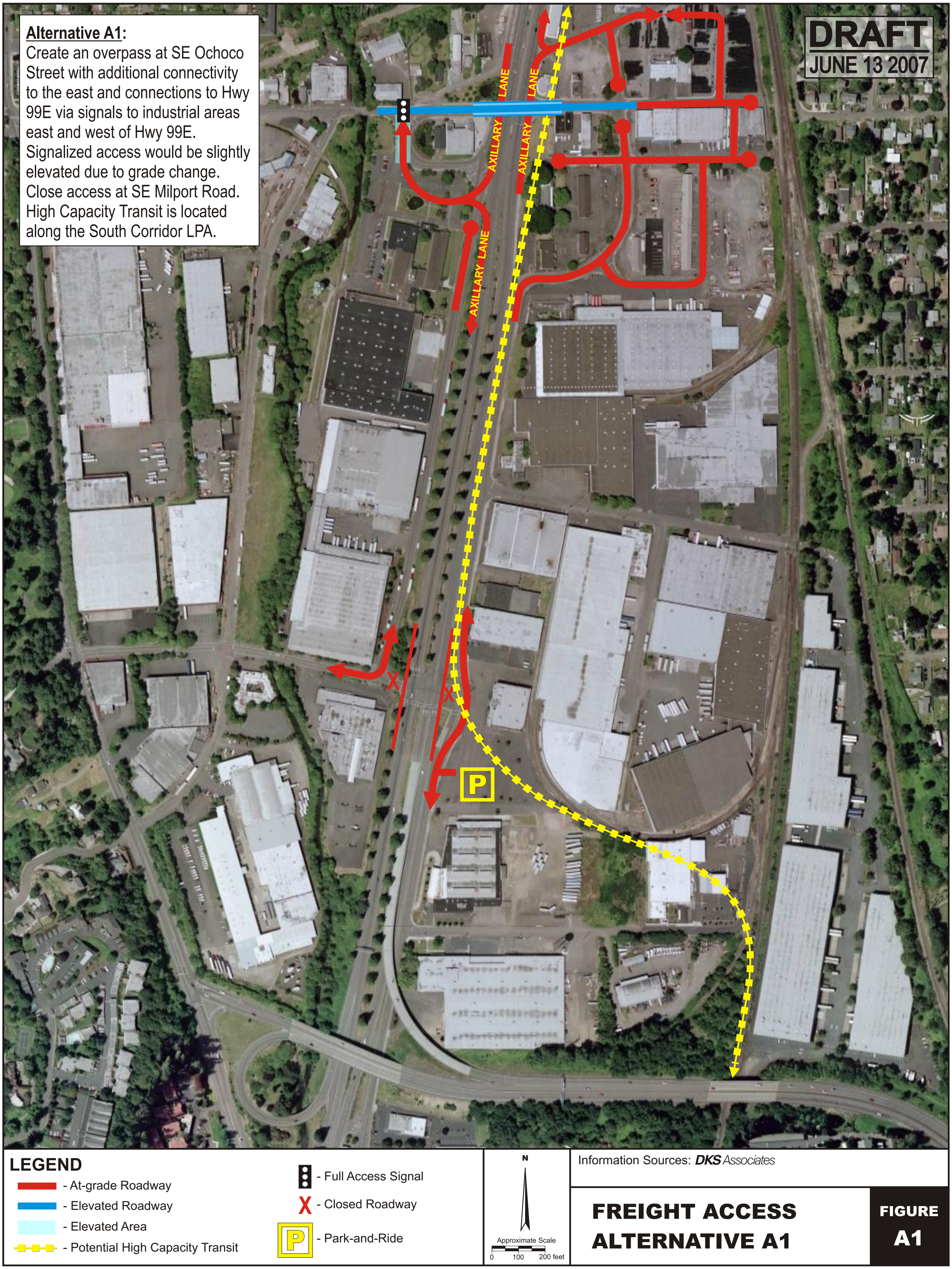
Alternates B1 and B2 differ only by the LRT alignment. Alternate B1a and B1 both have the LPA LRT alignment, their only difference is in the road network. The auxiliary lane in Alternate B1a connects with SE McBrod Avenue instead of SE Frontage Road. A cul-de-sac is also created at SE Frontage Road in this alternative. Figures B1, B1a, and B2 show the alignments for the different alternatives.

Alternates C1 and C2

Alternates C1 and C2 would include the construction of a Highway 224 overpass with Highway 224 being grade separated from the full access intersection of SE McLoughlin Boulevard/SE Milport Road. The intersection of SE Milport Road/SE Main Street would be moved and SE Main Street would be realigned to allow for more storage space and increased intersection spacing. Auxiliary lanes would be constructed to allow right-in/right-out access from north of SE Ochoco Street (SE Moores Street). The partial closure of the intersection of SE McLoughlin Boulevard/SE Ochoco Street would only allow north/south through movements on SE McLoughlin Boulevard. These alternatives can be seen in Figures C1 and C2.

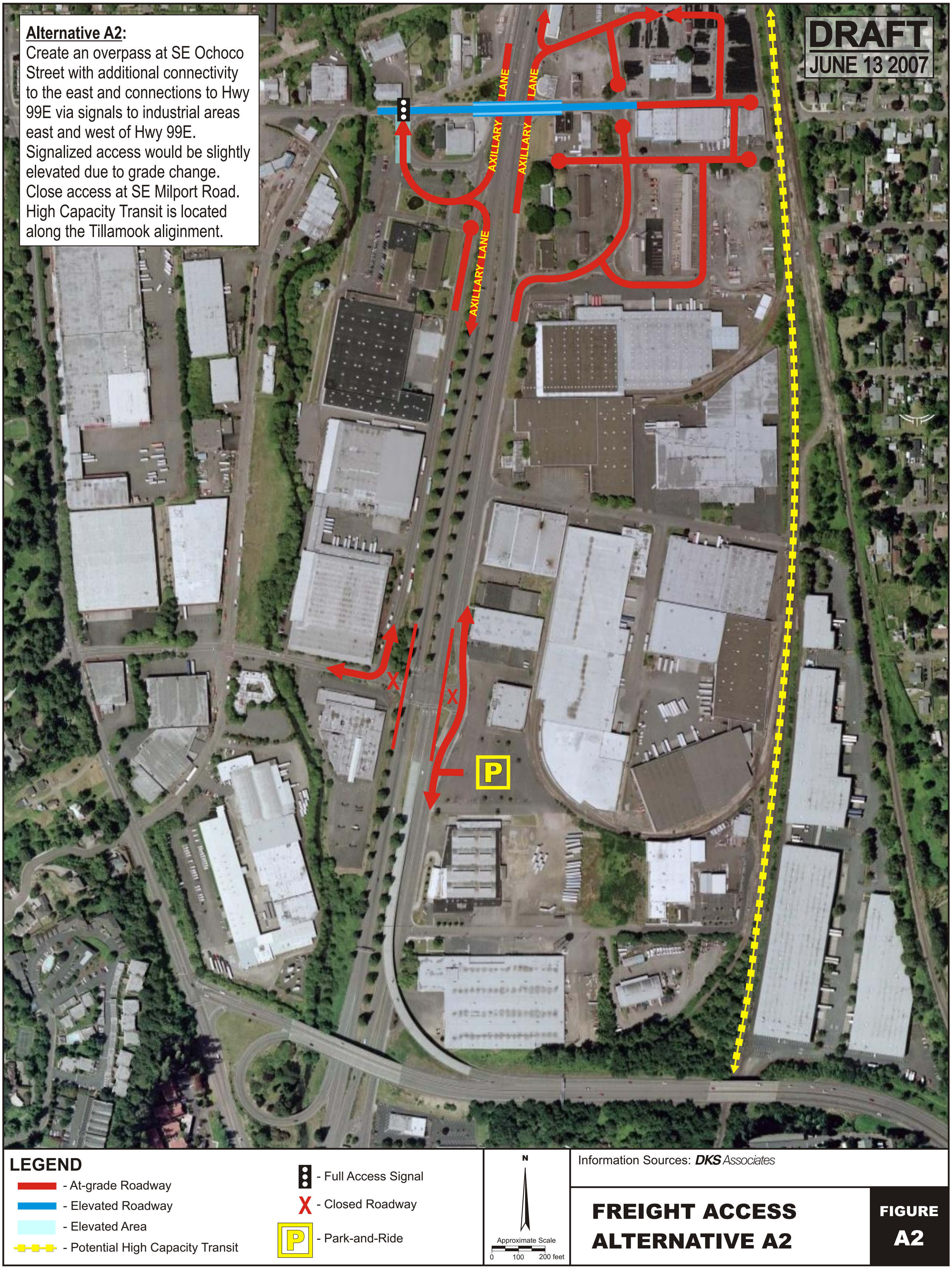
Alternates D1 and D2

The “D” Alternatives would include the construction of an overpass of SE McLoughlin Boulevard at SE Ochoco Street with no direct access to SE McLoughlin Boulevard. The intersection of SE McLoughlin Boulevard/SE Milport Road would be converted into a full access intersection with. A cul-de-sac would be constructed at the southern end of SE Frontage Road, and the intersection of SE Milport Road/SE Frontage Road would be closed to access onto SE Frontage Road. As with Alternate C1 and C2, the intersection of SE Milport Road/SE Main Street would be moved to the southeast and SE Main Street would be realigned to allow for increased intersection spacing and increased storage length for both of the “D” Alternatives. Figures D1 and D2 show the proposed roadway alignments for both alternatives.



FREIGHT ACCESS ALTERNATIVE A1

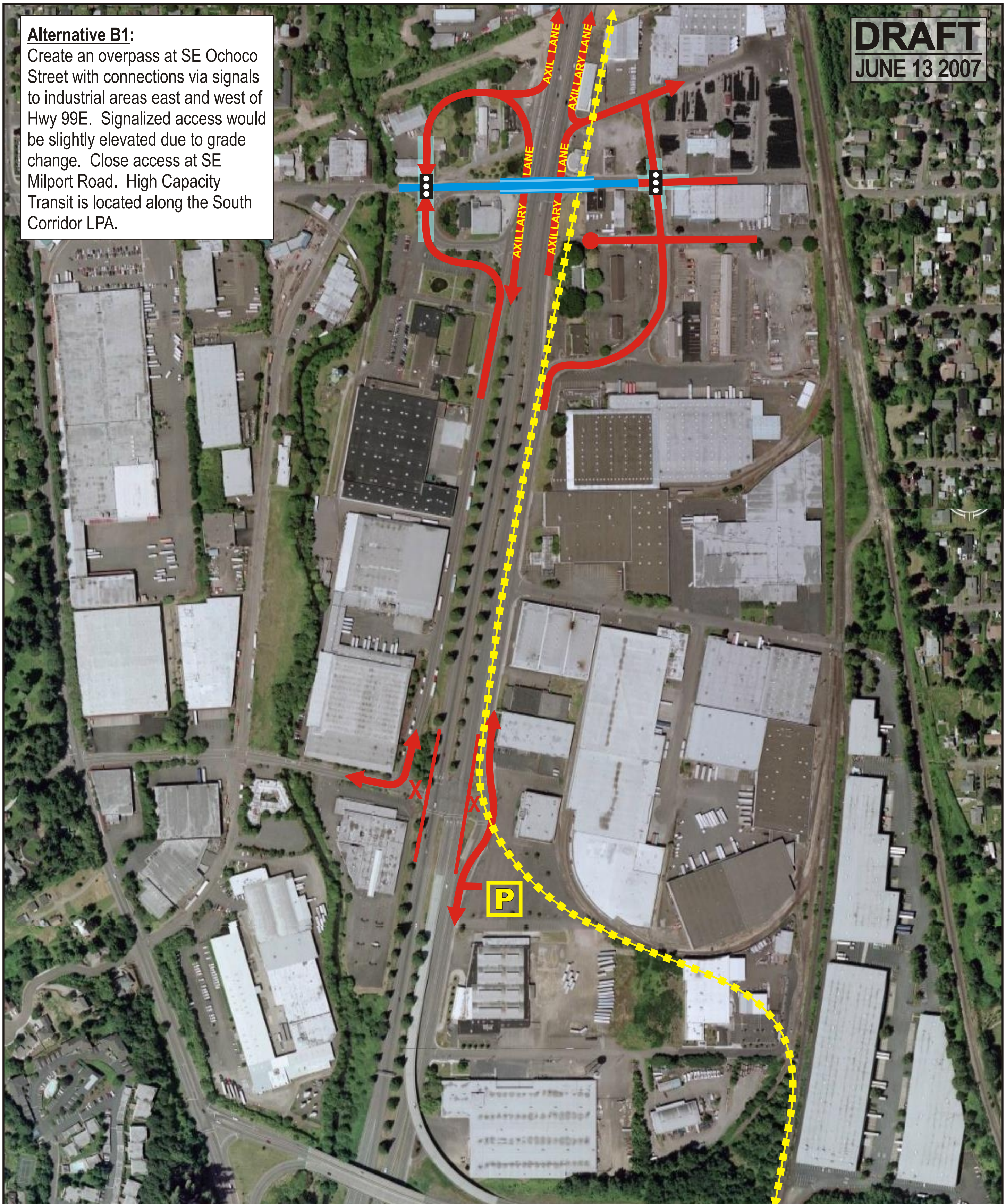
FIGURE A1



FREIGHT ACCESS ALTERNATIVE A2

FIGURE A2

Alternative B1:
Create an overpass at SE Ochoco Street with connections via signals to industrial areas east and west of Hwy 99E. Signalized access would be slightly elevated due to grade change. Close access at SE Milport Road. High Capacity Transit is located along the South Corridor LPA.



LEGEND

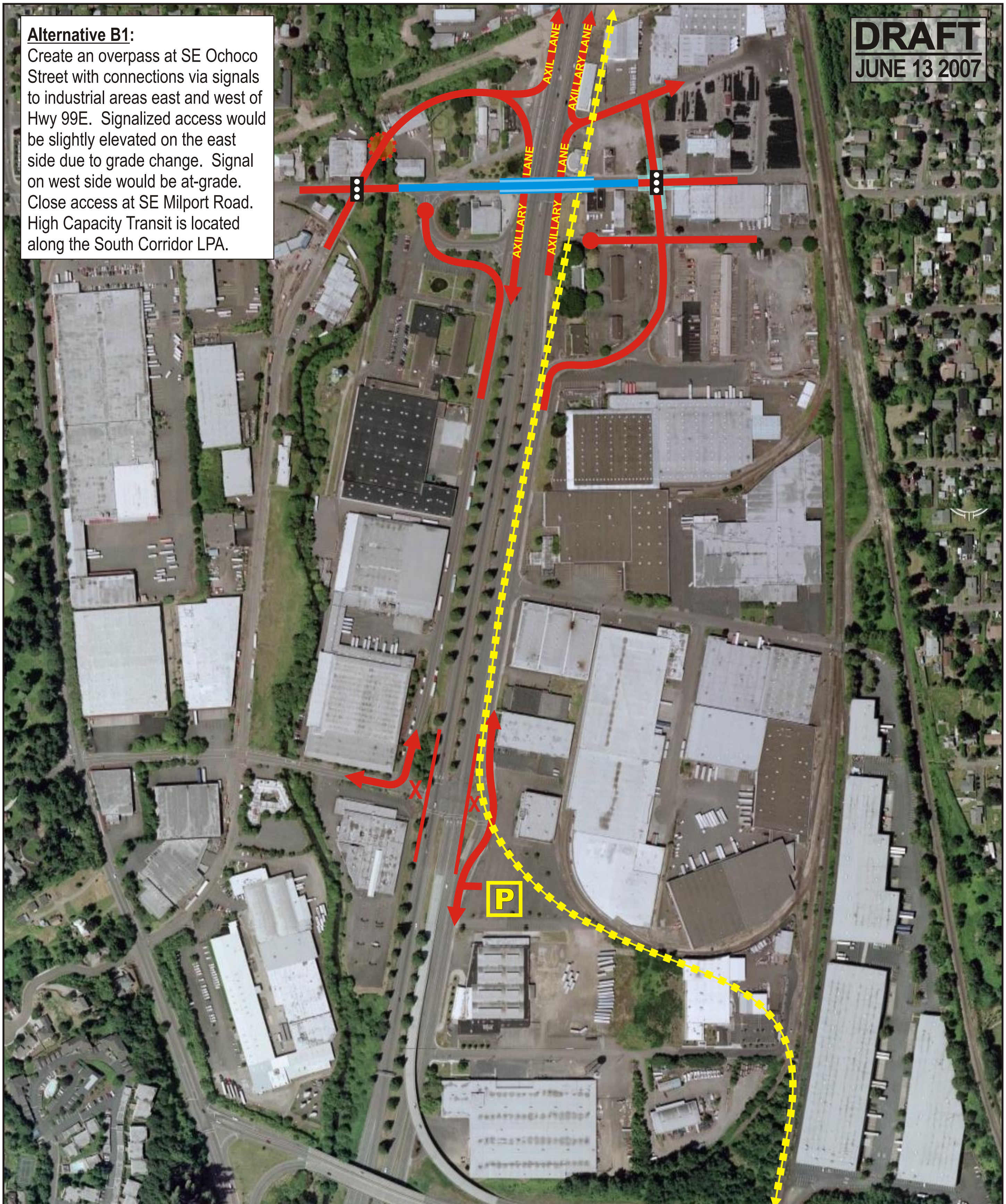
- At-grade Roadway
- Elevated Roadway
- Elevated Area
- Potential High Capacity Transit
- Full Access Signal
- X - Closed Roadway
- P - Park-and-Ride

N
Approximate Scale
0 100 200 feet

Information Sources: *DKS Associates*

FREIGHT ACCESS ALTERNATIVE B1

FIGURE B1



LEGEND

- At-grade Roadway
- Elevated Roadway
- Elevated Area
- New Crossing Over Creek
- Full Access Signal
- Closed Roadway
- Park-and-Ride
- Potential High Capacity Transit

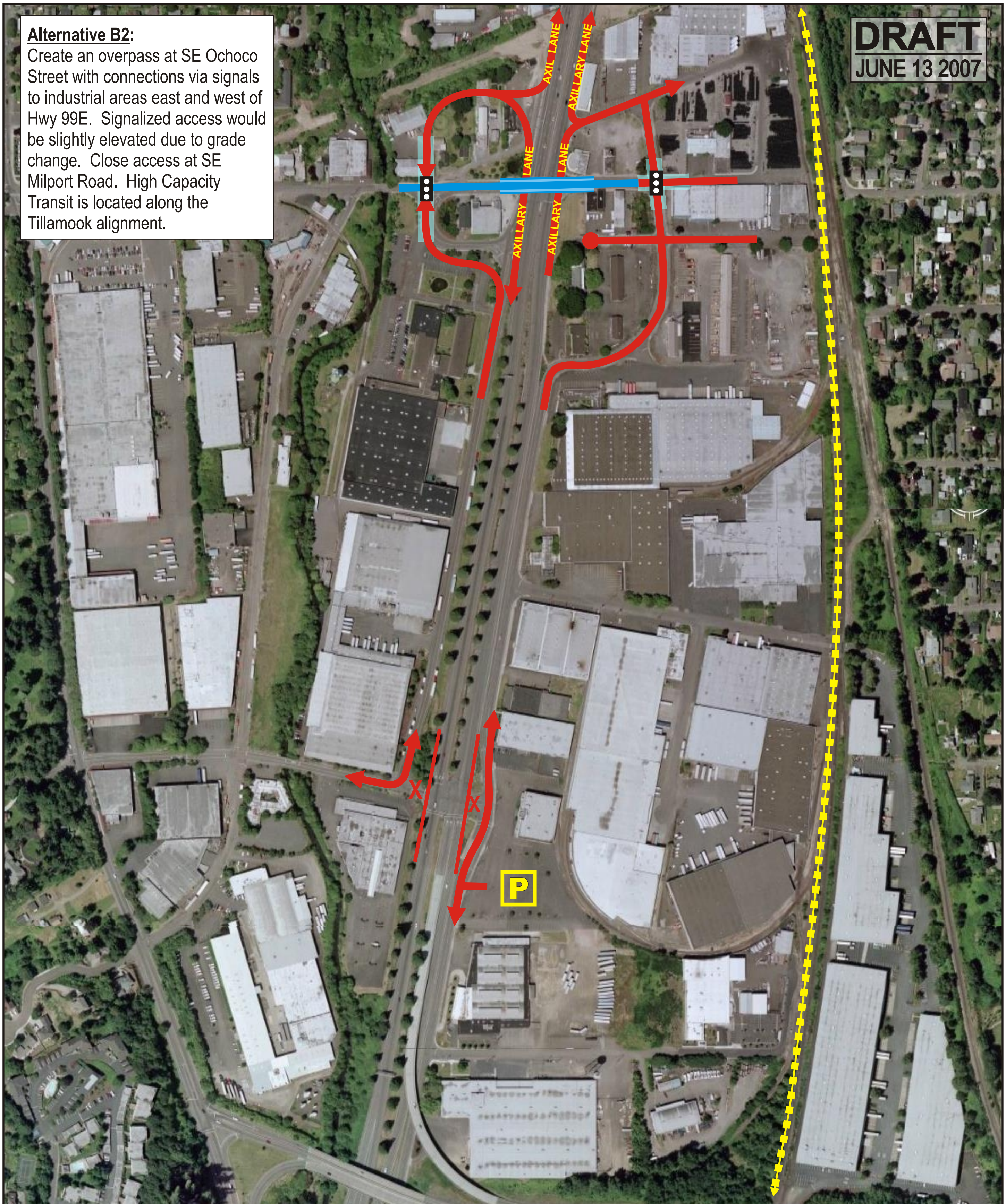
N

Approximate Scale
0 100 200 feet

Information Sources: *DKS Associates*

FREIGHT ACCESS ALTERNATIVE B1a

FIGURE B1a



Alternative B2:
Create an overpass at SE Ochoco Street with connections via signals to industrial areas east and west of Hwy 99E. Signalized access would be slightly elevated due to grade change. Close access at SE Milport Road. High Capacity Transit is located along the Tillamook alignment.

DRAFT
JUNE 13 2007

LEGEND

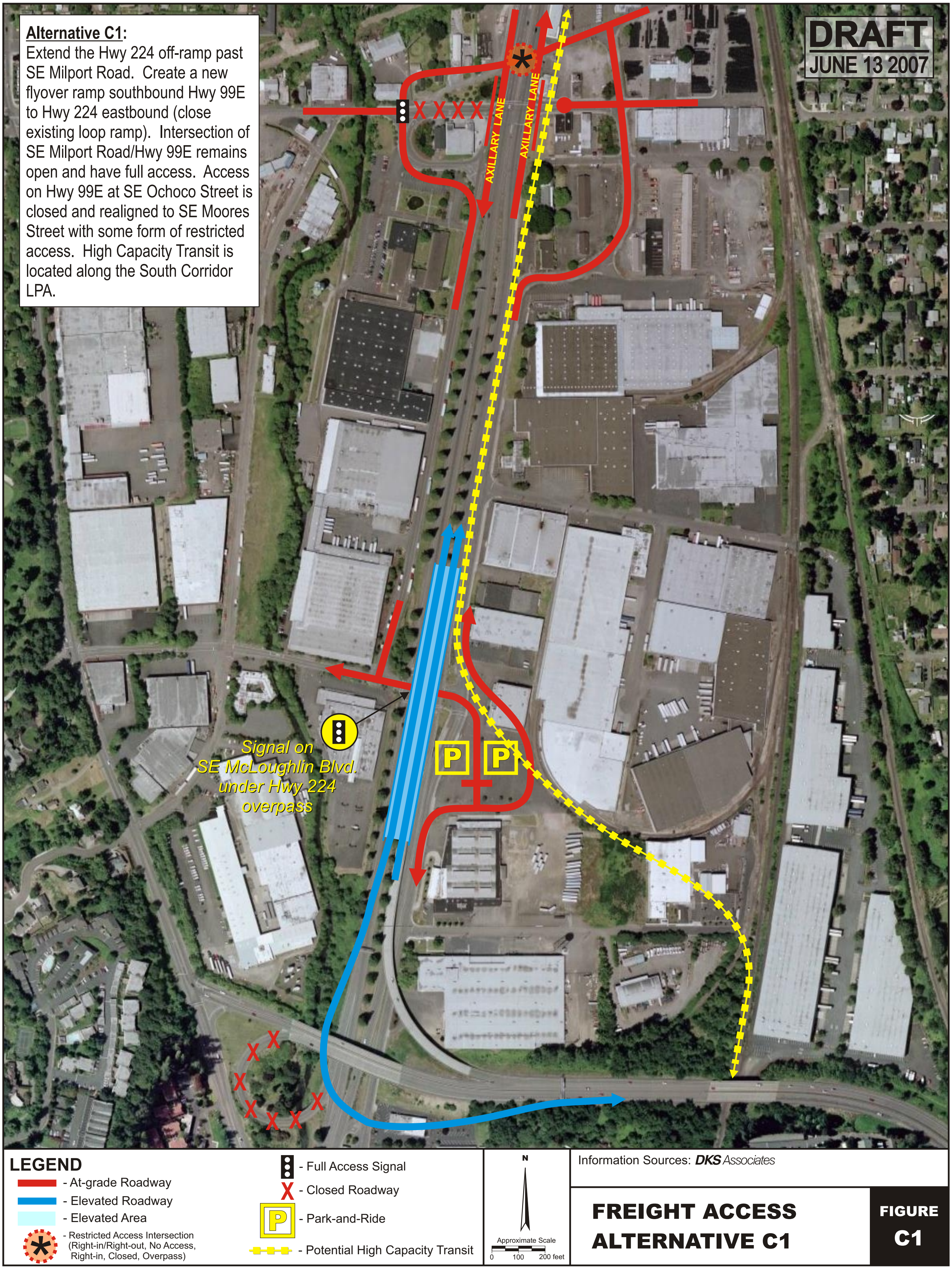
- At-grade Roadway
- Elevated Roadway
- Elevated Area
- Potential High Capacity Transit
- Full Access Signal
- Closed Roadway
- Park-and-Ride

N
Approximate Scale
0 100 200 feet

Information Sources: *DKS Associates*

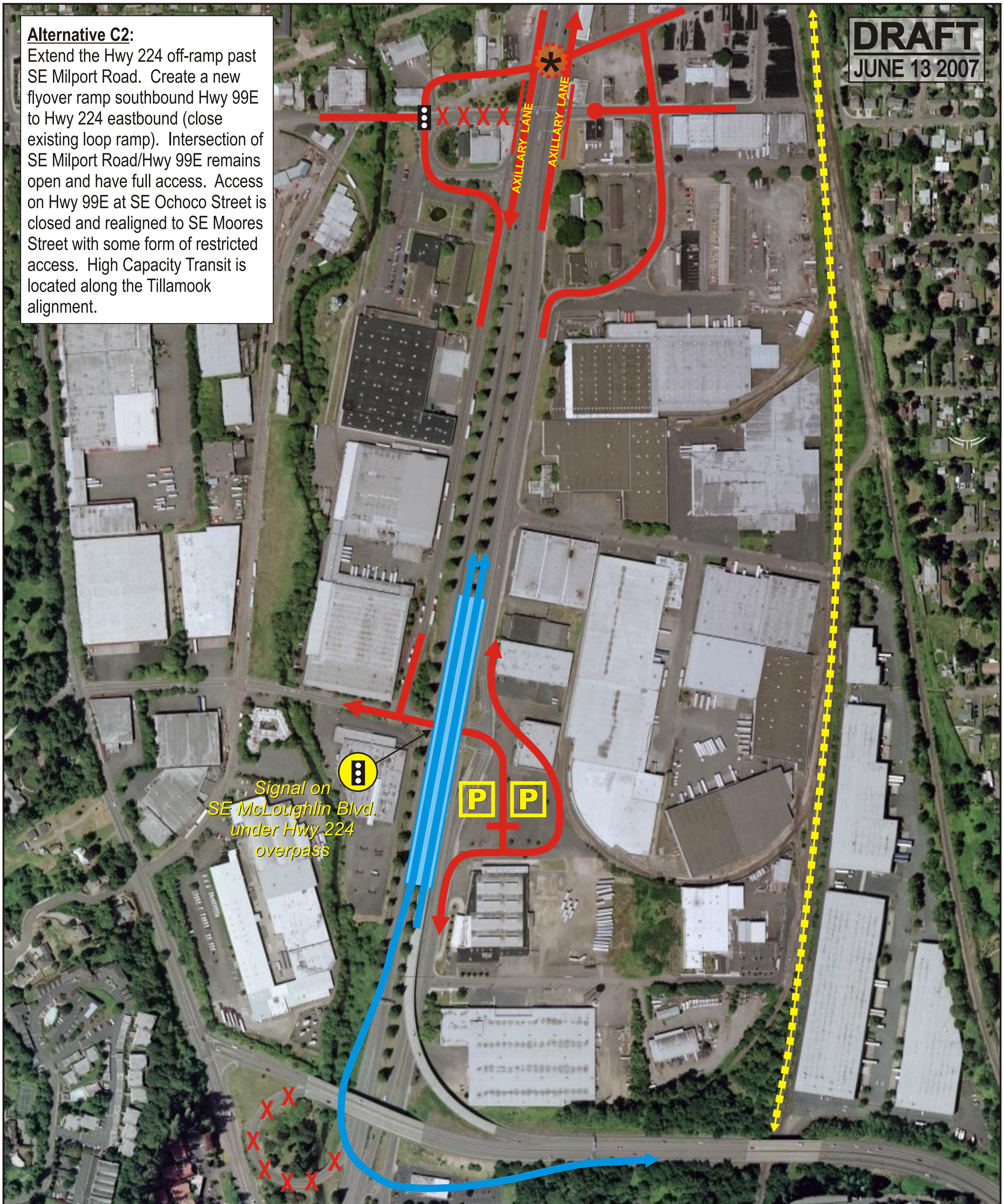
FREIGHT ACCESS ALTERNATIVE B2

FIGURE B2



FREIGHT ACCESS ALTERNATIVE C1

FIGURE C1



LEGEND

- At-grade Roadway
- Elevated Roadway
- Elevated Area
- Restricted Access Intersection (Right-in/Right-out, No Access, Right-in, Closed, Overpass)
- Full Access Signal
- Closed Roadway
- Park-and-Ride
- Potential High Capacity Transit

N

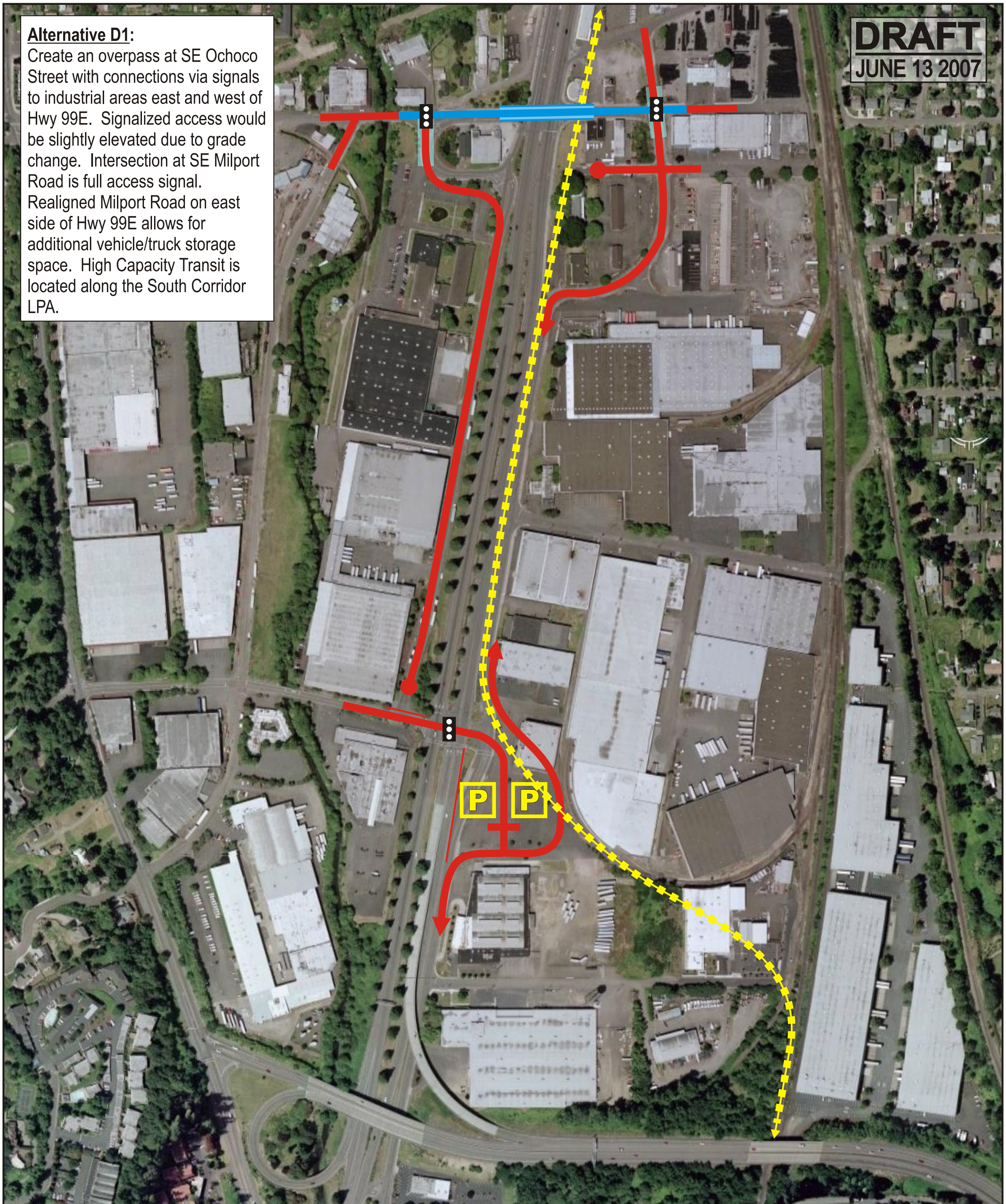
Approximate Scale

0 100 200 feet

Information Sources: DKS Associates

FREIGHT ACCESS ALTERNATIVE C2

FIGURE C2



LEGEND

- At-grade Roadway
- Elevated Roadway
- Elevated Area
- Potential High Capacity Transit
- Full Access Signal
- Closed Roadway
- Park-and-Ride

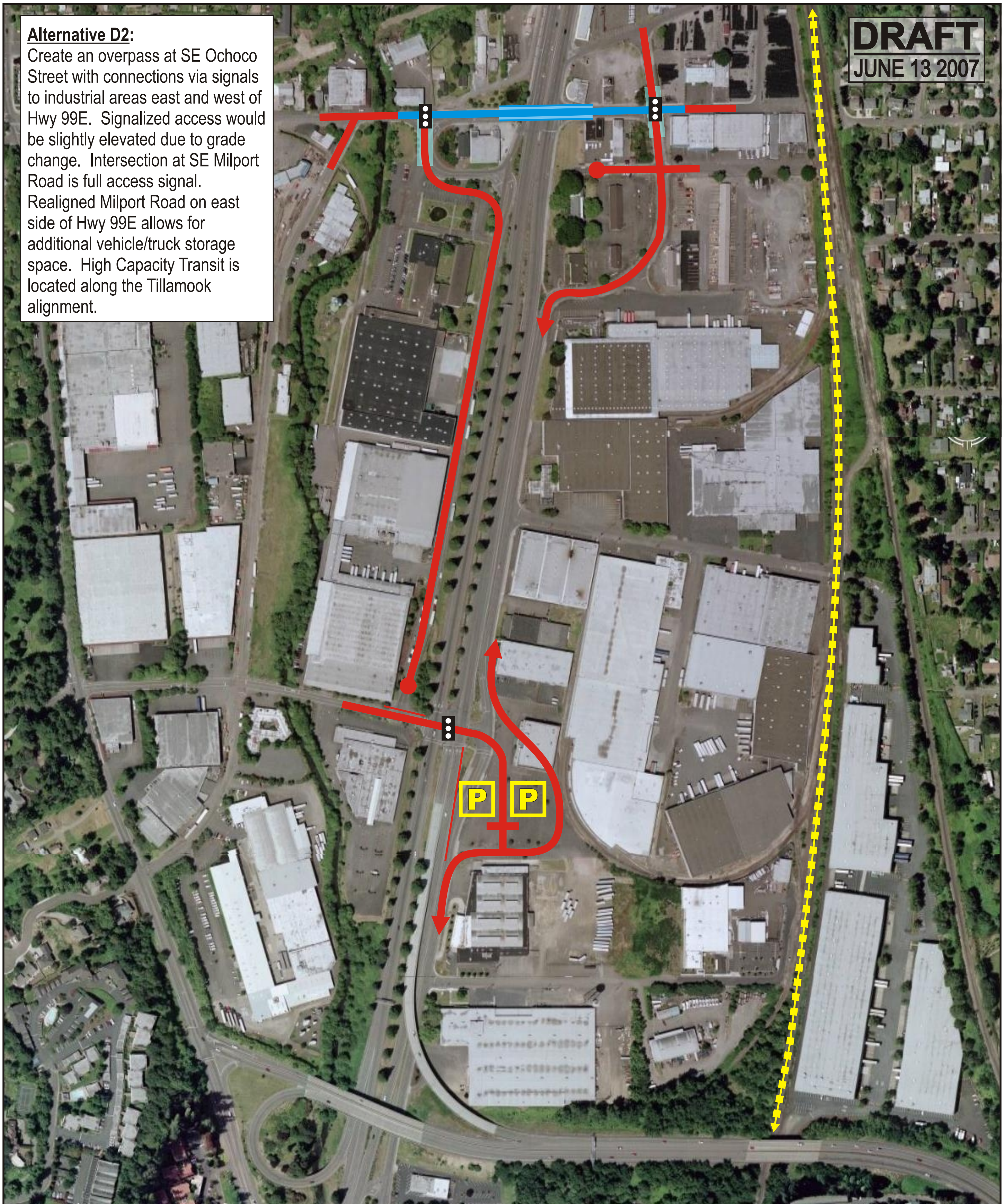
N

Approximate Scale
0 100 200 feet

Information Sources: ***DKS** Associates*

FREIGHT ACCESS ALTERNATIVE D1

FIGURE D1



LEGEND

- At-grade Roadway
- Elevated Roadway
- Elevated Area
- Potential High Capacity Transit
- Full Access Signal
- Closed Roadway
- Park-and-Ride

N

Approximate Scale
0 100 200 feet

Information Sources: *DKS Associates*

FREIGHT ACCESS ALTERNATIVE D2

FIGURE D2

Table 1-1: Freight Evaluation Comparison Matrix

	Evaluation Criteria \ Alternative	A1	A2	B1	B1a	B2	C1	C2	D1	D2
		Ochoco overpass with closure at Milport. LRT on LPA alignment	Ochoco overpass with closure at Milport. LRT on Tillamook alignment	Ochoco overpass with full connection to frontage road. Right-out at Milport. LRT on LPA alignment.	Ochoco overpass with access at McBroad. Right-out at Milport. LRT on LPA alignment.	Ochoco overpass with full connection to frontage road. LRT on Tillamook alignment.	Hwy 224 overpass, full access intersection at Milport. Ochoco closed with right-in/right-out access at Moores. LRT on LPA alignment.	Hwy 224 overpass, full access intersection at Milport. Ochoco closed with right-in/right-out access at Moores. LRT on Tillamook alignment.	Ochoco overpass, with no access at 99E. Full access intersection at Milport. LRT on LPA alignment.	Ochoco overpass, with no access at 99E. Full access intersection at Milport. LRT on Tillamook alignment.
Primary Criteria	Freight operations	☐	☐	◘	▣	◘	▣	▣	⊡	⊡
Primary Criteria	Traffic operations 99E throughput	■	■	◘	◘	◘	▣	▣	☐	☐
Primary Criteria	Traffic operations local access and crossing improvements	☐	☐	◘	◘	◘	▣	▣	☐	☐
Primary Criteria	Safety	◘	◘	▣	⊡	▣	⊡	⊡	⊡	⊡
Primary Criteria	Resource limitations	▣	▣	◘	◘	◘	☐	☐	⊡	⊡
Primary Criteria	Out of direction travel for access to/from sub-areas	☐	☐	⊡	⊡	⊡	⊡	⊡	☐	☐
Secondary Criteria	Pedestrian connectivity	⊡	⊡	⊡	⊡	⊡	⊡	⊡	▣	▣
Secondary Criteria	Bicycle connectivity	⊡	⊡	⊡	⊡	⊡	⊡	⊡	▣	▣
Secondary Criteria	Transit access/egress and conflicts	⊡	▣	⊡	⊡	▣	⊡	▣	⊡	⊡
Secondary Criteria	Robust solution	☐	☐	▣	▣	▣	⊡	⊡	☐	☐
	Overall Rating	▣	▣	◘	▣	◘	⊡	⊡	⊡	⊡

Evaluation Scale

☐ ⊡ ▣ ◘ ■

Poor Medium Good

Appendix D

Glossary of Technical Terms

Access Management: Measures regulating access to streets, roads, and highways from public roads and private driveways. Measures may include, but are not limited to: restrictions on the type and amount of access to roadways and use of physical controls (such as signals and channelization) to reduce impacts of approach traffic on the main facility.

Accessway: A facility that provides pedestrian and/or bicycle passage between streets, from a street to a building, or to other destinations such as schools, parks, or transit stops.

Average Daily Traffic (ADT): Measurement of the average number of vehicles passing a certain point each day on a highway, road, or street.

Alternative Modes: Transportation alternatives other than single-occupant automobiles. Alternative travel modes include travel by rail, transit, bicycle, and walking.

Arterial Street: High-volume, moderate-speed streets that carry vehicles within a city and between adjacent cities in surrounding metropolitan area. Arterials link major commercial, residential, industrial, and institutional areas. They are typically spaced about one mile apart to assure mobility and reduce the incidence of cut-through traffic on neighborhood routes and local streets.

Bicycle Facility: Any facility provided for the benefit of bicycle travel, including bikeways and parking facilities.

Bicycle Network: A system of connected bikeways that provide access to and from local and regional destinations.

Bike Lane: A portion of the roadway that has been designated by striping and pavement markings for the preferential or exclusive use of bicyclists.

Capacity: The maximum number of vehicles or individuals that can traverse a given segment of a transportation facility with prevailing roadway and traffic conditions.

Central Business District (CBD): Traditional downtown area. Usually characterized by slow traffic speeds, on-street parking, and a compact street grid system.

Collector Street: Moderate-volume, moderate-speed streets that provide access and circulation within and between residential neighborhoods, commercial areas, and industrial areas. They serve a citywide function of connectivity and are typically spaced about one-half mile apart. They distribute trips between a neighborhood street system and an arterial street system, linking a wide range of land uses.

Congestion Mitigation/Air Quality (CMAQ) Program: Jointly administered by the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA), was reauthorized in 2005 under the Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). The SAFETEA-LU CMAQ program provides over $8.6 billion in funds to state and transit agencies to invest in projects that reduce criteria air pollutants regulated from transportation-related sources.

Crosswalk: Portion of a roadway designated for pedestrian crossing. Can be either marked or unmarked. Unmarked crosswalks are the natural extension of the shoulder, curb line, or sidewalk at an intersection.

Demand Management: Actions that are designed to change travel behavior in order to improve performance of transportation facilities and to reduce need for additional road capacity. Methods may include subsidizing transit for the journey to work trip, charging for parking, starting a van or car pool system, or instituting flexible work hours.

Grade: A measure of the steepness of a roadway, bikeway, or walkway, usually expressed in a percentage form of the ratio between vertical rise to horizontal distance. A 5% grade, for example, means that the facility rises 5 feet in height over 100 feet in length.

Grade Separation: Vertical separation of one transportation facility from another at the point of intersection that prevents conflicts between modes and/or traffic moving at different speeds.

Impervious Surfaces: Hard surfaces that do not allow water to soak into the ground, increasing the amount of stormwater running into the drainage system.

Level of Service (LOS): A qualitative measure describing the perception of operation conditions within a traffic stream by motorists and/or passengers. An LOS rating of "A" to "F" describes the traffic flow on streets and at intersections, ranging from LOS A (representing virtually free flowing conditions) to LOS F (representing forced flow conditions and congestion).

Local Street: Low-volume, low-speed streets that emphasize access to adjacent land uses over mobility. Most local streets in a city are adjacent to residential uses and serve residential transportation needs; however, local streets can also serve industrial areas.

Metropolitan Planning Organization (MPO): An organization in each federally recognized urbanized area (population over 50,000) designated by the Governor, which has the responsibility for planning, programming, and coordinating the distribution of federal transportation resources.

Multimodal: A street or path designed for use by several modes of travel.

Multiuse Path: A path separated from motor vehicle traffic by an open space or barrier used by bicyclists, pedestrians, joggers, skaters, and other nonmotorized travelers.

National Highway System (NHS): Interconnected urban and rural principal arterial streets and highways that serve major population centers, ports, airports, and other major travel destinations and that meet national defense requirements and serve interstate and interregional travel.

Neighborhood Route: Moderate-volume, low-speed streets. They do not provide citywide circulation, as they mainly serve the immediate neighborhood in which they are located. They typically have residential frontage. Neighborhood routes are similar to local streets in design, but they are generally longer in length and have higher traffic volumes.

Peak Period or Peak Hour: The period of the day with the highest number of travelers. This is normally between 4-6 PM on weekdays.

Pedestrian Connection: A continuous, unobstructed, reasonably direct route between two points that is intended and suitable for pedestrian use. These connections could include sidewalks, walkways, accessways, stairways, and pedestrian bridges.

Pedestrian Facility: A facility that facilitates pedestrian travel, including walkways, crosswalks, signs, and signals.

Pedestrian Scale: Site and building design elements that are oriented and scaled to the pedestrian.

Regional Routes: High-volume, generally high-speed facilities. These routes may be used for travel within a city, but typically they are used for trips between cities, especially those that are separated by a significant distance.

Right-of-way (ROW): A general term denoting publicly owned land or property upon which public facilities and infrastructure is placed.

Shared Roadway: A type of bikeway where bicyclists and motor vehicles share a travel lane.

Sight Distance: The distance a person can see along an unobstructed line of site.

Traffic Control Device: Sign, signal, or other fixture placed on or adjacent to a roadway that regulates, warns, or guides traffic. Can be either permanent or temporary.

Transportation Analysis Zone (TAZ): A geographic sub-area used to assess travel demands using a travel-demand forecasting model. Often defined by the transportation network and US Census blocks.

Transportation Disadvantaged: Individuals who have difficulty obtaining transportation because of their age, income, physical, or mental disability.

Transportation System Plan: A long-range plan that contains a city's long-term transportation goals and policies for pedestrians, cyclists, drivers, transit users, and freight carriers. It also provides for the coordination of transportation improvements at the local level and the integration of the local transportation system with the regional transportation system.

Urban Area: The area immediately surrounding an incorporated city or rural community that is urban in character, regardless of size.

Appendix E

Levels of Service (LOS) Descriptions

TRAFFIC LEVELS OF SERVICE

Analysis of traffic volumes is useful to understand the general nature of traffic in an area, but, by itself, does not indicate the ability of the street network to carry additional traffic or the quality of service afforded by specific facilities. To this end, the concept of level of service (LOS) was developed to subjectively describe street and/or intersection performance. Bottlenecks are most often found at intersections, and the ability of the street network to carry traffic efficiently is generally diminished in their vicinities. As a result, LOS is most often evaluated at intersections, but key corridors can be evaluated as well.

LOS categories are similar to report card ratings. Levels of Service A, B, and C indicate conditions where traffic moves without significant delays over periods of peak travel demand. Levels of service D, E, and F represent progressively worse peak hour operating conditions. Most urban communities set level of service D as the minimum acceptable level of service for peak hour operation and plan for level of service C or better for all other times of the day. The Highway Capacity Manual provides LOS calculation methodologies for both intersections and arterials.[1]

[1] *Highway Capacity Manual 2000*, Transportation Research Board, Washington D.C., 2000, Chapters 16 and 17.

UNSIGNALIZED INTERSECTIONS

All-Way Stop Controlled

Level of service for all-way stop controlled intersection operations are reported for each intersection leg. This method calculates a delay value for each approach to the intersection.

The following table describes the amount of delay associated with each level of service for all-way stop controlled intersections.

Level of Service	Delay (seconds/vehicle)
A	0-10
B	>10-15
C	>15-25
D	>25-35
E	>35-50
F	>50

Source: Highway Capacity Manual 2000, Exhibit 17-22

Two-Way Stop Controlled

For two-way stop controlled intersections, level of service is reported for both major and minor streets. The LOS evaluation assesses available and critical gaps in the traffic stream, which are necessary for minor street traffic to be able to enter the major street traffic flow. It is not unusual for an intersection to experience level of service E or F conditions for the minor street left turn movement. However, poor level of service experienced by a few vehicles does not necessarily mean that the intersection as a whole is not operating within acceptable parameters.

The following table describes the amount of delay associated with each level of service for two-way stop controlled intersections.

Level of Service	Delay (seconds/vehicle)	Description
A	0-10	Little or no delay
B	>10-15	Short traffic delays
C	>15-25	Average traffic delays
D	>25-35	Long traffic delays
E	>35-50	Very long traffic delays
F	>50	Extreme delays potentially affecting other traffic movements in the intersection

Source: Highway Capacity Manual 2000, Exhibit 17-2

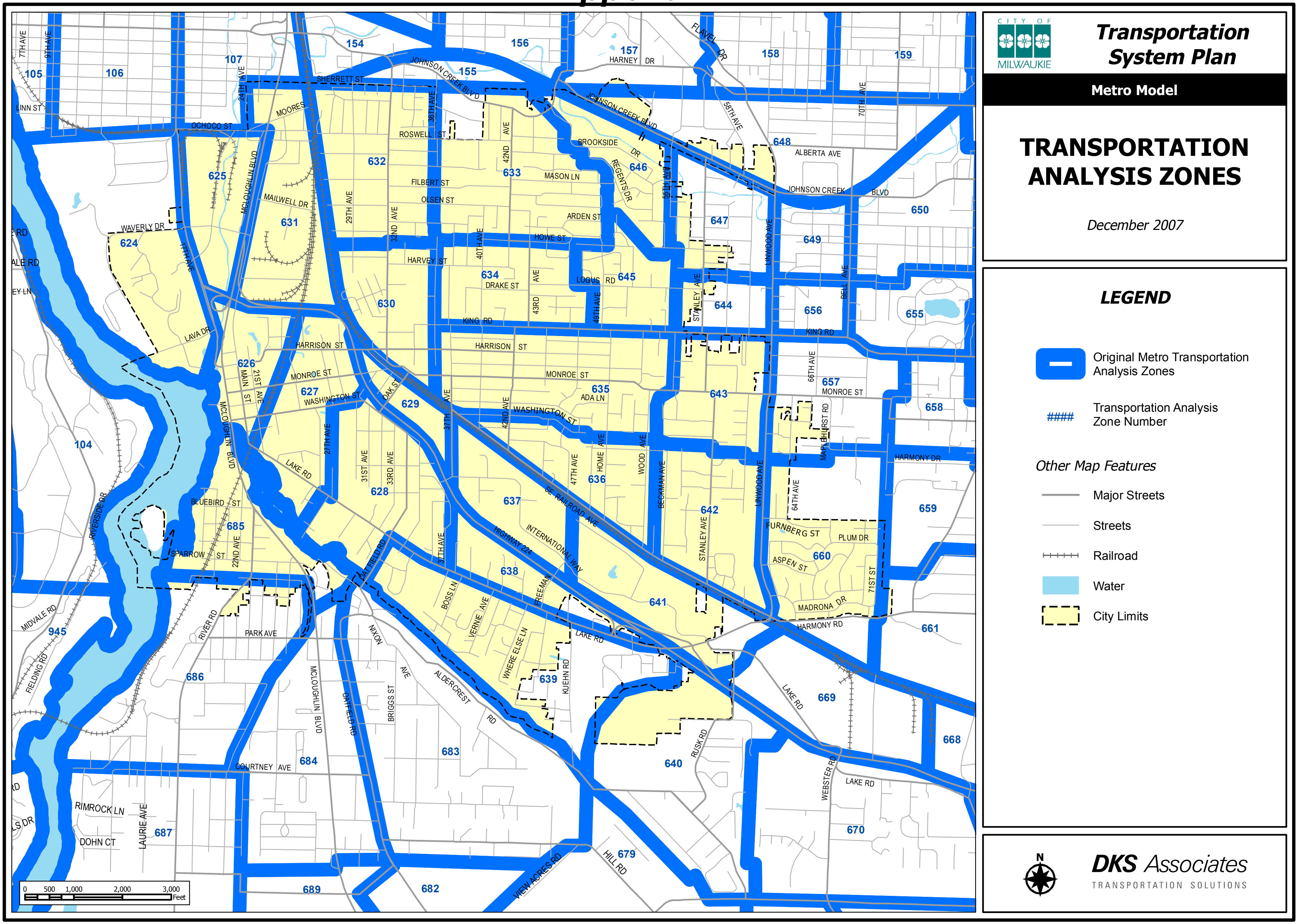
SIGNALIZED INTERSECTIONS

For signalized intersections, level of service is evaluated based upon average vehicle delay experienced by vehicles entering the intersection. Per the Highway Capacity Manual 2000, control delay (or signal delay) includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. As delay increases, the level of service decreases. Calculations for signalized and unsignalized intersections are different due to variations in traffic flow that are caused by different traffic control devices.

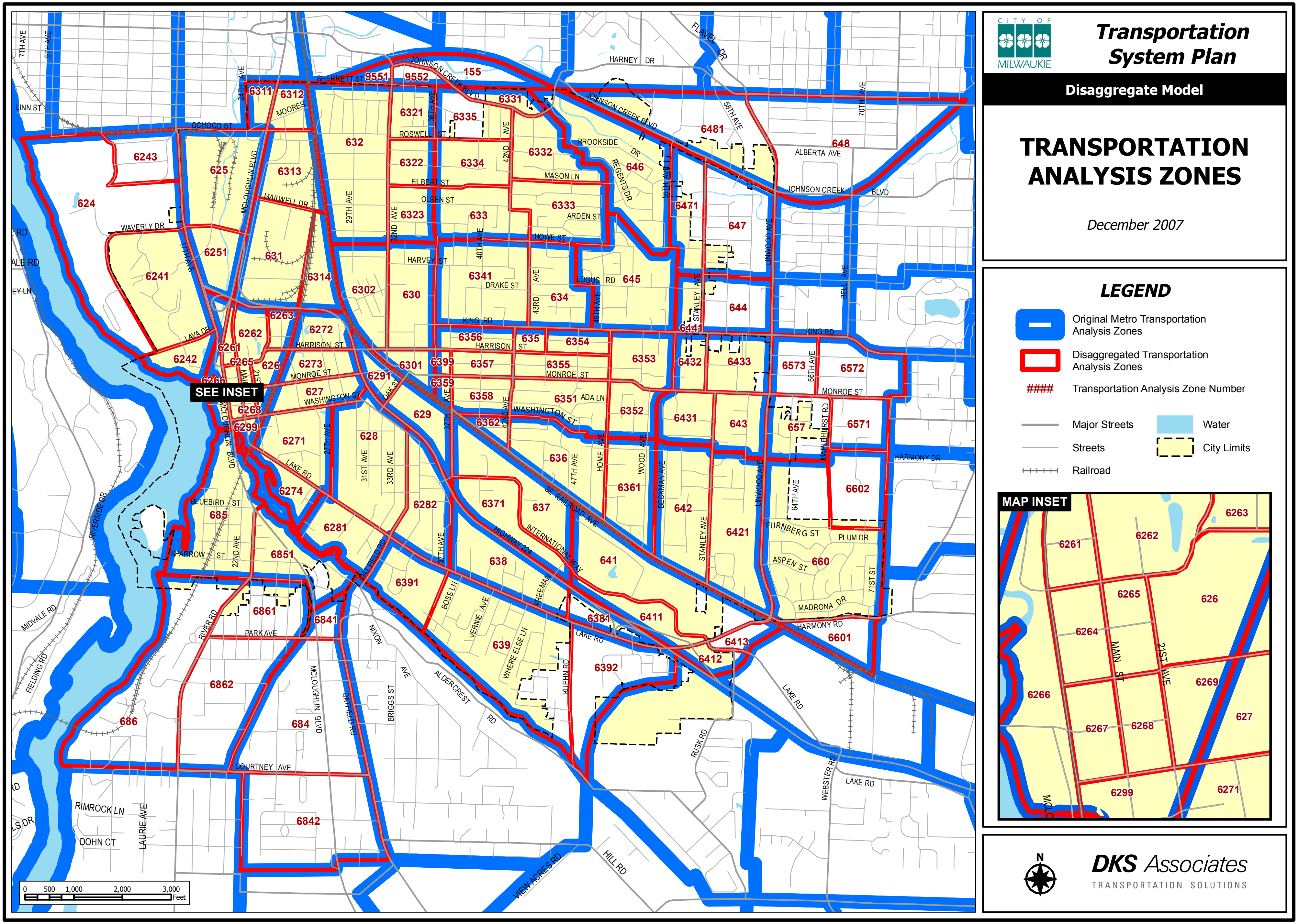
Level of Service	Delay (seconds/vehicle)	Description
A	0-10	**Free Flow/Insignificant Delays:** No approach phase is fully utilized by traffic and no vehicle waits longer than one red indication. Most vehicles do not stop at all. Progression is extremely favorable and most vehicles arrive during the green phase.
B	>10-20	**Stable Operation/Minimal Delays:** An occasional approach phase is fully utilized. Many drivers begin to feel somewhat restricted within platoons of vehicles. This level generally occurs with good progression, short cycle lengths, or both.
C	>20-35	**Stable Operation/Acceptable Delays:** Major approach phases fully utilized. Most drivers feel somewhat restricted. Higher delays may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level, and the number of vehicles stopping is significant.
D	>35-55	**Approaching Unstable/Tolerable Delays:** The influence of congestion becomes more noticeable. Drivers may have to wait through more than one red signal indication. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high v/c ratios. The proportion of vehicles not stopping declines, and individual cycle failures are noticeable.
E	>55-80	**Unstable Operation/Significant Delays:** Volumes at or near capacity. Vehicles may wait though several signal cycles. Long queues form upstream from intersection. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are a frequent occurrence.
F	>80	**Forced Flow/Excessive Delays:** Represents jammed conditions. Queues may block upstream intersections. This level occurs when arrival flow rates exceed intersection capacity, and is considered to be unacceptable to most drivers. Poor progression, long cycle lengths, and v/c ratios approaching 1.0 may contribute to these high delay levels.

Source: Highway Capacity Manual 2000, Exhibit 16-2

Appendix F



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
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
0 500 1,000 2,000 3,000 Feet
N
DKS Associates
TRANSPORTATION SOLUTIONS

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)

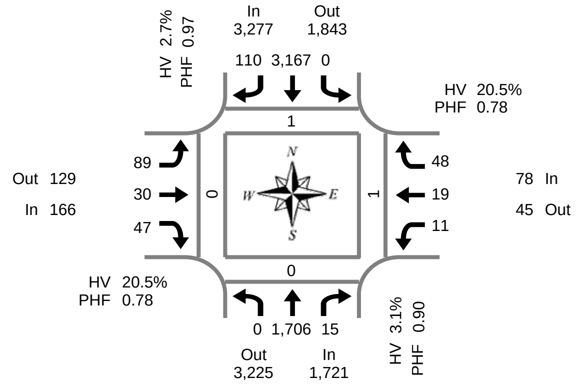
Metro Taz	DKS TAZ		2005 HH	2005 RET	2005 OTH	2030 HH	2030 RET	2030 OTH	
632	6323		121	0	24	129	0	42	
		Total	**727**	**8**	**172**	**772**	**13**	**275**	
	632	Control	727	8	172	772	13	275	Original Metro TAZ Total
633	633		162	0	0	165	0	0	
633	6331		40	0	40	53	0	55	
633	6332		145	0	0	160	0	0	
633	6333		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

Total Vehicle Summary

Clay Carney
(503) 833-2740



Hwy 99E & SE Ochoco St

Wednesday, November 29, 2006
3:00 PM to 6:00 PM

Peak Hour Summary
4:30 PM to 5:30 PM

15-Minute Interval Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 99E L	T	R	Bikes	Southbound Hwy 99E L	T	R	Bikes	Eastbound SE Ochoco St L	T	R	Bikes	Westbound SE Ochoco St L	T	R	Bikes	Interval Total	Pedestrians Crosswalk North	South	East	West
3:00 PM	0	350	12	0	0	537	44	0	21	8	13	0	6	6	13	0	1,010	0	0	0	0
3:15 PM	0	334	5	0	0	642	36	0	18	6	8	0	5	5	10	0	1,069	0	0	0	0
3:30 PM	0	389	7	0	0	691	45	0	32	9	18	0	8	2	32	0	1,233	1	0	0	0
3:45 PM	0	393	3	0	0	779	39	0	16	8	5	0	6	2	12	0	1,263	0	1	1	0
4:00 PM	0	393	4	0	0	760	46	0	25	7	18	0	16	5	20	0	1,294	0	0	0	0
4:15 PM	0	378	8	0	0	805	30	0	18	5	6	0	5	4	12	0	1,271	0	0	1	2
4:30 PM	0	407	7	0	0	792	37	0	24	11	18	0	4	8	10	0	1,318	0	0	0	0
4:45 PM	0	432	6	0	0	767	33	0	18	7	9	0	2	4	6	0	1,284	0	0	0	0
5:00 PM	0	474	2	0	0	790	15	0	26	8	14	0	4	4	17	0	1,354	0	0	0	0
5:15 PM	0	393	0	0	0	818	25	0	21	4	6	0	1	3	15	0	1,286	1	0	1	0
5:30 PM	0	349	3	0	0	683	22	0	14	6	13	0	5	2	10	0	1,107	0	0	0	0
5:45 PM	0	353	4	0	0	690	28	0	9	5	3	0	3	4	4	0	1,103	0	0	0	1
Total Survey	0	4,645	61	0	0	8,754	400	0	242	84	131	0	65	49	161	0	14,592	2	1	3	3

Peak Hour Summary
4:30 PM to 5:30 PM

By Approach	Northbound Hwy 99E In	Out	Total	Bikes	Southbound Hwy 99E In	Out	Total	Bikes	Eastbound SE Ochoco St In	Out	Total	Bikes	Westbound SE Ochoco St In	Out	Total	Bikes	Total	Pedestrians Crosswalk North	South	East	West
Volume	1,721	3,225	4,946	0	3,277	1,843	5,120	0	166	129	295	0	78	45	123	0	5,242	1	0	1	0
%HV	3.1%				2.7%				20.5%				20.5%				3.6%				
PHF	0.90				0.97				0.78				0.78				0.97				

By Movement	Northbound Hwy 99E L	T	R	Total	Southbound Hwy 99E L	T	R	Total	Eastbound SE Ochoco St L	T	R	Total	Westbound SE Ochoco St L	T	R	Total	Total
Volume	0	1,706	15	1,721	0	3,167	110	3,277	89	30	47	166	11	19	48	78	5,242
%HV	0.0%	2.8%	33.3%	3.1%	0.0%	1.8%	27.3%	2.7%	10.1%	66.7%	10.6%	20.5%	36.4%	5.3%	22.9%	20.5%	3.6%
PHF	0.00	0.90	0.54	0.90	0.00	0.97	0.74	0.97	0.86	0.68	0.65	0.78	0.69	0.59	0.71	0.78	0.97

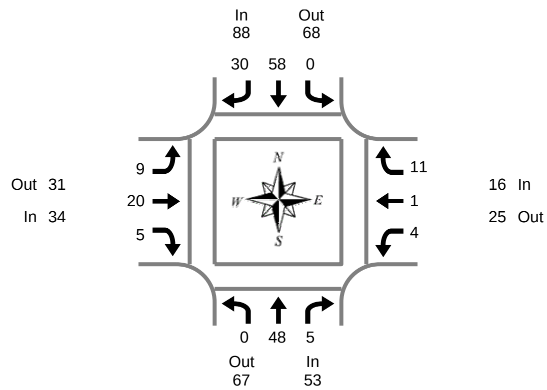
Rolling Hour Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 99E L	T	R	Bikes	Southbound Hwy 99E L	T	R	Bikes	Eastbound SE Ochoco St L	T	R	Bikes	Westbound SE Ochoco St L	T	R	Bikes	Interval Total	Pedestrians Crosswalk North	South	East	West
3:00 PM	0	1,466	27	0	0	2,649	164	0	87	31	44	0	25	15	67	0	4,575	1	1	1	0
3:15 PM	0	1,509	19	0	0	2,872	166	0	91	30	49	0	35	14	74	0	4,859	1	1	1	0
3:30 PM	0	1,553	22	0	0	3,035	160	0	91	29	47	0	35	13	76	0	5,061	1	1	2	2
3:45 PM	0	1,571	22	0	0	3,136	152	0	83	31	47	0	31	19	54	0	5,146	0	1	2	2
4:00 PM	0	1,610	25	0	0	3,124	146	0	85	30	51	0	27	21	48	0	5,167	0	0	1	2
4:15 PM	0	1,691	23	0	0	3,154	115	0	86	31	47	0	15	20	45	0	5,227	0	0	1	2
4:30 PM	0	1,706	15	0	0	3,167	110	0	89	30	47	0	11	19	48	0	5,242	1	0	1	0
4:45 PM	0	1,648	11	0	0	3,058	95	0	79	25	42	0	12	13	48	0	5,031	1	0	1	0
5:00 PM	0	1,569	9	0	0	2,981	90	0	70	23	36	0	13	13	46	0	4,850	1	0	1	1

Heavy Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



Peak Hour Summary
_4:30 PM to 5:30 PM_

Hwy 99E & SE Ochoco St

Wednesday, November 29, 2006
3:00 PM to 6:00 PM

Heavy Vehicle 15-Minute Interval Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 99E				Southbound Hwy 99E				Eastbound SE Ochoco St				Westbound SE Ochoco St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
3:00 PM	0	18	5	23	0	21	10	31	1	5	0	6	2	2	3	7	67
3:15 PM	0	19	1	20	0	19	8	27	0	2	3	5	1	2	3	6	58
3:30 PM	0	16	5	21	0	29	9	38	5	3	0	8	1	0	5	6	73
3:45 PM	0	18	0	18	0	37	8	45	1	2	1	4	1	1	2	4	71
4:00 PM	0	18	2	20	0	23	12	35	1	2	0	3	3	1	6	10	68
4:15 PM	0	23	2	25	0	18	3	21	3	3	0	6	0	1	4	5	57
4:30 PM	0	13	2	15	0	16	11	27	4	8	0	12	2	1	2	5	59
4:45 PM	0	10	2	12	0	20	7	27	3	4	2	9	1	0	3	4	52
5:00 PM	0	18	1	19	0	11	5	16	0	5	3	8	1	0	3	4	47
5:15 PM	0	7	0	7	0	11	7	18	2	3	0	5	0	0	3	3	33
5:30 PM	0	5	0	5	0	13	7	20	0	6	0	6	0	1	3	4	35
5:45 PM	0	17	1	18	0	13	8	21	1	4	1	6	0	1	1	2	47
Total Survey	0	182	21	203	0	231	95	326	21	47	10	78	12	10	38	60	667

Heavy Vehicle Peak Hour Summary
4:30 PM to 5:30 PM

By Approach	Northbound Hwy 99E			Southbound Hwy 99E			Eastbound SE Ochoco St			Westbound SE Ochoco St			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	53	67	120	88	68	156	34	31	65	16	25	41	191
PHF	0.21			0.19			0.29			0.20			0.23

By Movement	Northbound Hwy 99E				Southbound Hwy 99E				Eastbound SE Ochoco St				Westbound SE Ochoco St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	48	5	53	0	58	30	88	9	20	5	34	4	1	11	16	191
PHF	0.00	0.20	0.11	0.21	0.00	0.16	0.26	0.19	0.23	0.29	0.25	0.29	0.20	0.06	0.21	0.20	0.23

Heavy Vehicle Rolling Hour Summary
3:00 PM to 6:00 PM

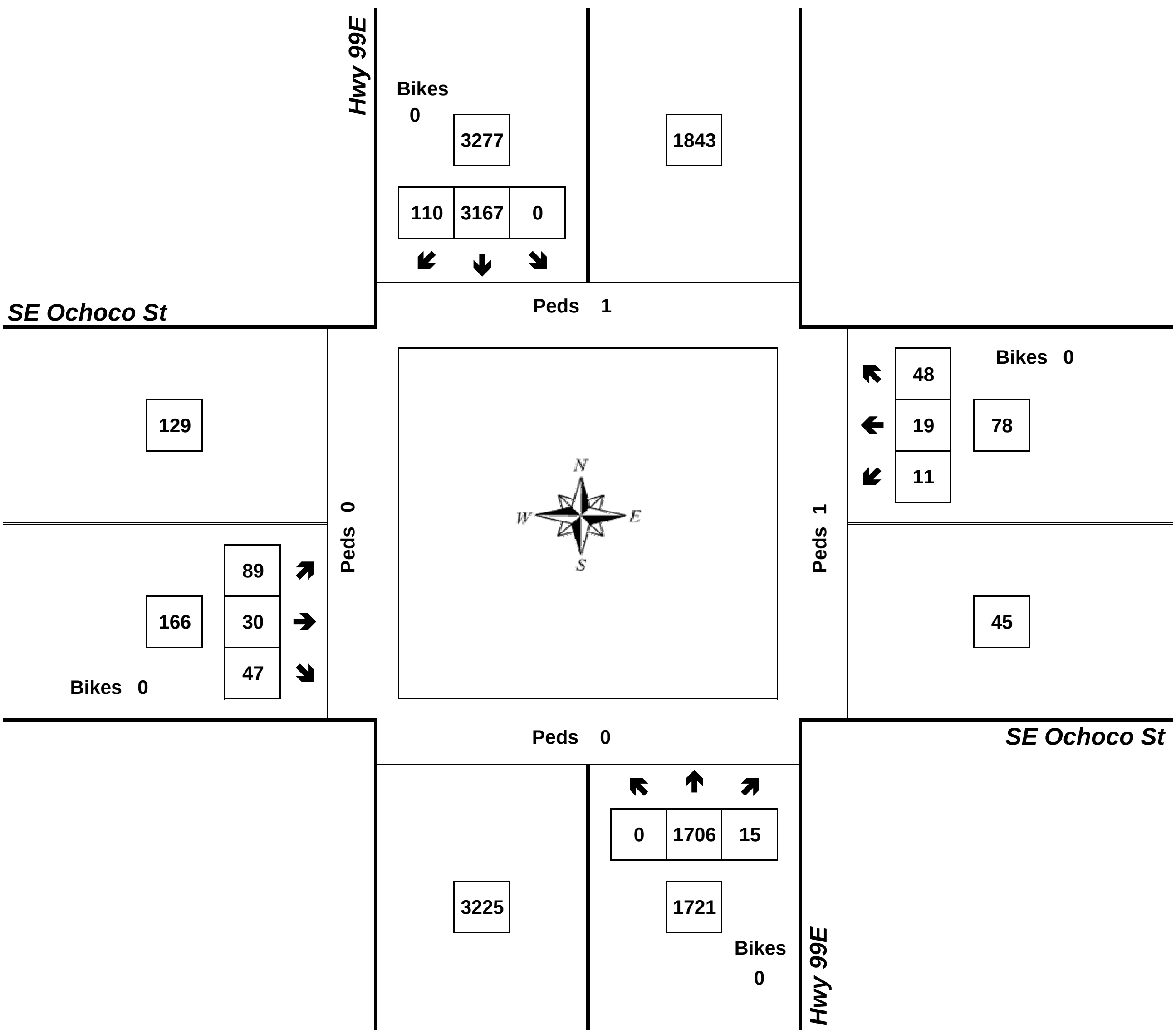
Interval Start Time	Northbound Hwy 99E				Southbound Hwy 99E				Eastbound SE Ochoco St				Westbound SE Ochoco St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
3:00 PM	0	71	11	82	0	106	35	141	7	12	4	23	5	5	13	23	269
3:15 PM	0	71	8	79	0	108	37	145	7	9	4	20	6	4	16	26	270
3:30 PM	0	75	9	84	0	107	32	139	10	10	1	21	5	3	17	25	269
3:45 PM	0	72	6	78	0	94	34	128	9	15	1	25	6	4	14	24	255
4:00 PM	0	64	8	72	0	77	33	110	11	17	2	30	6	3	15	24	236
4:15 PM	0	64	7	71	0	65	26	91	10	20	5	35	4	2	12	18	215
4:30 PM	0	48	5	53	0	58	30	88	9	20	5	34	4	1	11	16	191
4:45 PM	0	40	3	43	0	55	26	81	5	18	5	28	2	1	12	15	167
5:00 PM	0	47	2	49	0	48	27	75	3	18	4	25	1	2	10	13	162

Peak Hour Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

Hwy 99E & SE Ochoco St

4:30 PM to 5:30 PM
Wednesday, November 29, 2006

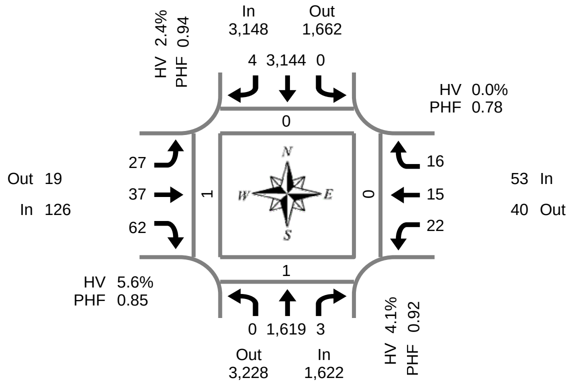


Approach	PHF	HV%	Volume
EB	0.78	20.5%	166
WB	0.78	20.5%	78
NB	0.90	3.1%	1,721
SB	0.97	2.7%	3,277
Intersection	0.97	3.6%	5,242

Count Period: 3:00 PM to 6:00 PM

Total Vehicle Summary

Clay Carney
(503) 833-2740



Hwy 99E & SE Milport Rd

Wednesday, November 29, 2006
3:00 PM to 6:00 PM

Peak Hour Summary
4:15 PM to 5:15 PM

15-Minute Interval Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 99E				Southbound Hwy 99E				Eastbound SE Milport Rd				Westbound SE Milport Rd				Interval Total
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	
3:00 PM	0	323	0	0	0	599	1	0	8	8	11	0	12	5	9	0	976
3:15 PM	0	370	0	0	0	621	0	0	4	14	11	0	8	5	7	0	1,040
3:30 PM	0	329	1	0	0	761	1	0	6	7	10	0	15	9	8	0	1,147
3:45 PM	0	387	0	0	0	795	1	0	2	11	7	0	3	4	3	0	1,213
4:00 PM	0	349	0	0	0	813	1	0	9	11	17	0	10	5	5	0	1,220
4:15 PM	0	402	2	0	0	776	0	0	4	11	11	0	5	7	5	0	1,223
4:30 PM	0	339	1	0	0	835	1	0	8	9	16	0	9	2	3	0	1,223
4:45 PM	0	442	0	0	0	734	3	0	7	14	9	0	3	5	3	0	1,220
5:00 PM	0	436	0	0	0	799	0	0	8	3	26	0	5	1	5	0	1,283
5:15 PM	0	390	3	0	0	737	1	0	7	7	22	0	8	1	2	0	1,178
5:30 PM	0	349	0	0	0	747	1	0	3	7	12	0	5	3	2	0	1,129
5:45 PM	0	368	1	0	0	635	1	0	4	10	6	0	1	5	2	0	1,033
Total Survey	0	4,484	8	0	0	8,852	11	0	70	112	158	0	84	52	54	0	13,885

Interval Start Time	Pedestrians Crosswalk			
	North	South	East	West
3:00 PM	0	0	0	0
3:15 PM	0	0	0	0
3:30 PM	1	1	0	0
3:45 PM	1	0	0	0
4:00 PM	0	0	0	2
4:15 PM	0	1	0	0
4:30 PM	0	0	0	0
4:45 PM	0	0	0	0
5:00 PM	0	0	0	1
5:15 PM	0	0	0	2
5:30 PM	0	0	0	1
5:45 PM	0	0	0	0
Total Survey	2	2	0	6

Peak Hour Summary
4:15 PM to 5:15 PM

By Approach	Northbound Hwy 99E				Southbound Hwy 99E				Eastbound SE Milport Rd				Westbound SE Milport Rd				Total
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	
Volume	1,622	3,228	4,850	0	3,148	1,662	4,810	0	126	19	145	0	53	40	93	0	4,949
%HV	4.1%				2.4%				5.6%				0.0%				3.0%
PHF	0.92				0.94				0.85				0.78				0.96

Pedestrians Crosswalk			
North	South	East	West
0	1	0	1

By Movement	Northbound Hwy 99E				Southbound Hwy 99E				Eastbound SE Milport Rd				Westbound SE Milport Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	1,619	3	1,622	0	3,144	4	3,148	27	37	62	126	22	15	16	53	4,949
%HV	0.0%	4.1%	0.0%	4.1%	0.0%	2.3%	75.0%	2.4%	11.1%	8.1%	1.6%	5.6%	0.0%	0.0%	0.0%	0.0%	3.0%
PHF	0.00	0.92	0.38	0.92	0.00	0.94	0.33	0.94	0.84	0.66	0.60	0.85	0.61	0.54	0.80	0.78	0.96

Rolling Hour Summary
3:00 PM to 6:00 PM

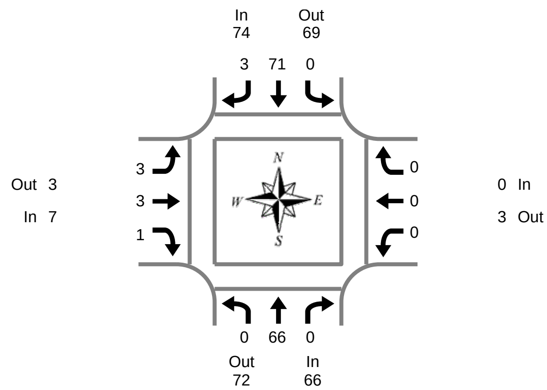
Interval Start Time	Northbound Hwy 99E				Southbound Hwy 99E				Eastbound SE Milport Rd				Westbound SE Milport Rd				Interval Total
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	
3:00 PM	0	1,409	1	0	0	2,776	3	0	20	40	39	0	38	23	27	0	4,376
3:15 PM	0	1,435	1	0	0	2,990	3	0	21	43	45	0	36	23	23	0	4,620
3:30 PM	0	1,467	3	0	0	3,145	3	0	21	40	45	0	33	25	21	0	4,803
3:45 PM	0	1,477	3	0	0	3,219	3	0	23	42	51	0	27	18	16	0	4,879
4:00 PM	0	1,532	3	0	0	3,158	5	0	28	45	53	0	27	19	16	0	4,886
4:15 PM	0	1,619	3	0	0	3,144	4	0	27	37	62	0	22	15	16	0	4,949
4:30 PM	0	1,607	4	0	0	3,105	5	0	30	33	73	0	25	9	13	0	4,904
4:45 PM	0	1,617	3	0	0	3,017	5	0	25	31	69	0	21	10	12	0	4,810
5:00 PM	0	1,543	4	0	0	2,918	3	0	22	27	66	0	19	10	11	0	4,623

Interval Start Time	Pedestrians Crosswalk			
	North	South	East	West
3:00 PM	2	1	0	0
3:15 PM	2	1	0	2
3:30 PM	2	2	0	2
3:45 PM	1	1	0	2
4:00 PM	0	1	0	2
4:15 PM	0	1	0	1
4:30 PM	0	0	0	3
4:45 PM	0	0	0	4
5:00 PM	0	0	0	4

Heavy Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



Peak Hour Summary
4:15 PM to 5:15 PM

Hwy 99E & SE Milport Rd

Wednesday, November 29, 2006
3:00 PM to 6:00 PM

Heavy Vehicle 15-Minute Interval Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 99E				Southbound Hwy 99E				Eastbound SE Milport Rd				Westbound SE Milport Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
3:00 PM	0	22	0	22	0	23	0	23	0	0	1	1	3	1	0	4	50
3:15 PM	0	19	0	19	0	23	0	23	1	1	0	2	1	0	0	1	45
3:30 PM	0	18	0	18	0	31	0	31	3	0	1	4	0	0	0	0	53
3:45 PM	0	18	0	18	0	39	0	39	0	1	1	2	0	0	0	0	59
4:00 PM	0	19	0	19	0	27	0	27	1	1	0	2	0	0	0	0	48
4:15 PM	0	24	0	24	0	18	0	18	1	2	1	4	0	0	0	0	46
4:30 PM	0	12	0	12	0	18	1	19	1	0	0	1	0	0	0	0	32
4:45 PM	0	12	0	12	0	21	2	23	0	0	0	0	0	0	0	0	35
5:00 PM	0	18	0	18	0	14	0	14	1	1	0	2	0	0	0	0	34
5:15 PM	0	7	0	7	0	10	1	11	0	0	0	0	1	0	0	1	19
5:30 PM	0	5	0	5	0	13	0	13	0	0	0	0	0	0	0	0	18
5:45 PM	0	17	0	17	0	14	0	14	1	0	0	1	0	0	0	0	32
Total Survey	0	191	0	191	0	251	4	255	9	6	4	19	5	1	0	6	471

Heavy Vehicle Peak Hour Summary
4:15 PM to 5:15 PM

By Approach	Northbound Hwy 99E			Southbound Hwy 99E			Eastbound SE Milport Rd			Westbound SE Milport Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	66	72	138	74	69	143	7	3	10	0	3	3	147
PHF	0.27			0.19			0.22			0.00			0.23

By Movement	Northbound Hwy 99E				Southbound Hwy 99E				Eastbound SE Milport Rd				Westbound SE Milport Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	66	0	66	0	71	3	74	3	3	1	7	0	0	0	0	147
PHF	0.00	0.27	0.00	0.27	0.00	0.18	0.25	0.19	0.19	0.19	0.13	0.22	0.00	0.00	0.00	0.00	0.23

Heavy Vehicle Rolling Hour Summary
3:00 PM to 6:00 PM

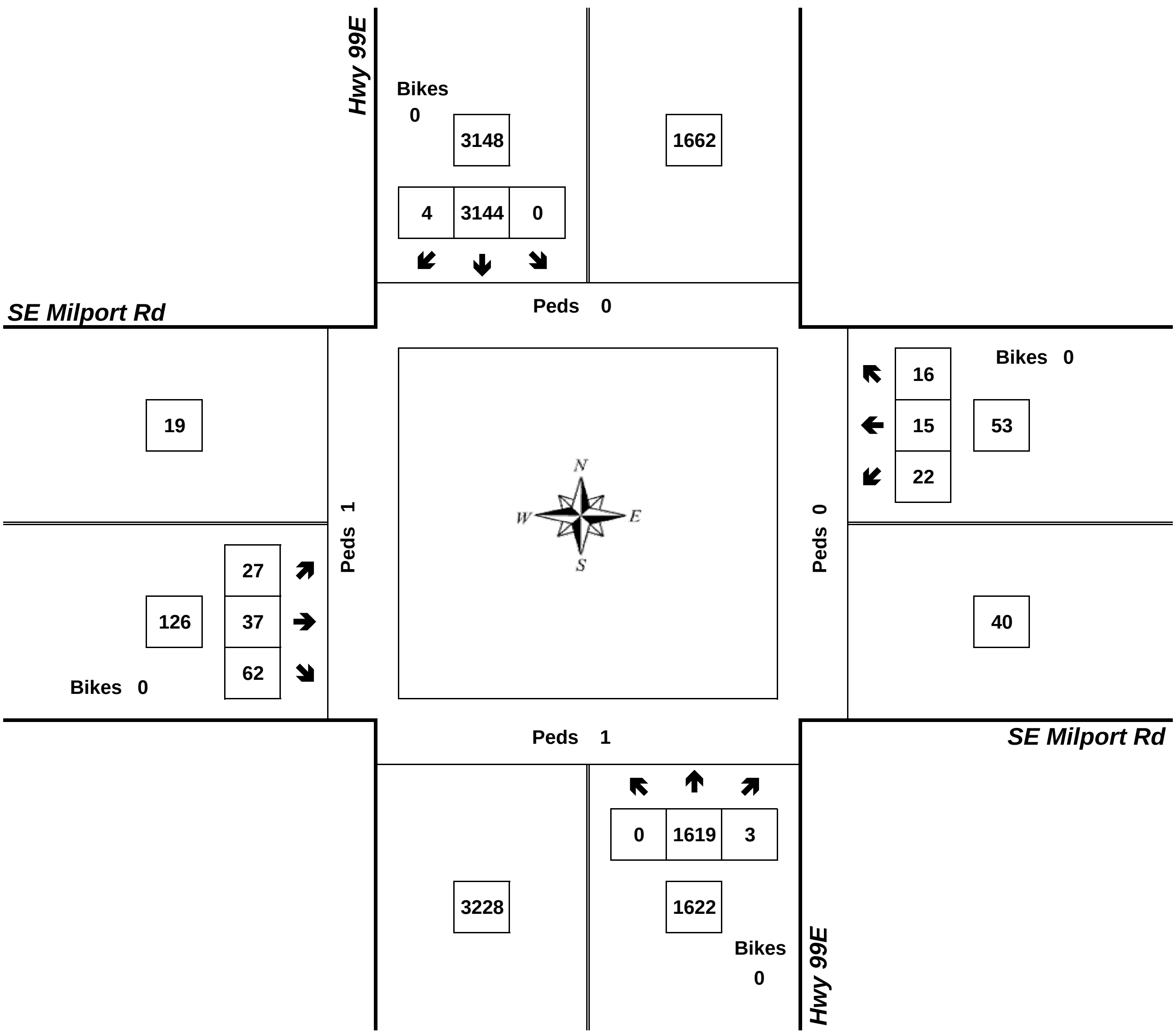
Interval Start Time	Northbound Hwy 99E				Southbound Hwy 99E				Eastbound SE Milport Rd				Westbound SE Milport Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
3:00 PM	0	77	0	77	0	116	0	116	4	2	3	9	4	1	0	5	207
3:15 PM	0	74	0	74	0	120	0	120	5	3	2	10	1	0	0	1	205
3:30 PM	0	79	0	79	0	115	0	115	5	4	3	12	0	0	0	0	206
3:45 PM	0	73	0	73	0	102	1	103	3	4	2	9	0	0	0	0	185
4:00 PM	0	67	0	67	0	84	3	87	3	3	1	7	0	0	0	0	161
4:15 PM	0	66	0	66	0	71	3	74	3	3	1	7	0	0	0	0	147
4:30 PM	0	49	0	49	0	63	4	67	2	1	0	3	1	0	0	1	120
4:45 PM	0	42	0	42	0	58	3	61	1	1	0	2	1	0	0	1	106
5:00 PM	0	47	0	47	0	51	1	52	2	1	0	3	1	0	0	1	103

Peak Hour Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

Hwy 99E & SE Milport Rd

4:15 PM to 5:15 PM
Wednesday, November 29, 2006

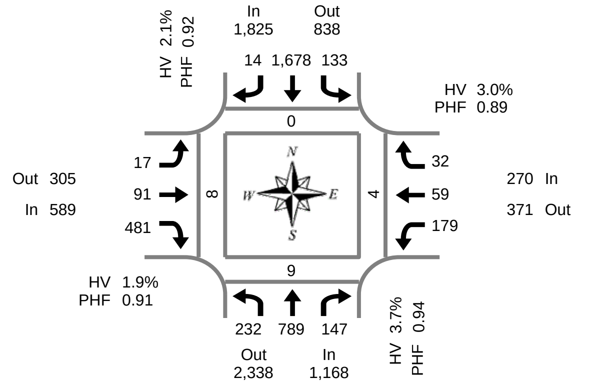


Approach	PHF	HV%	Volume
EB	0.85	5.6%	126
WB	0.78	0.0%	53
NB	0.92	4.1%	1,622
SB	0.94	2.4%	3,148
Intersection	0.96	3.0%	4,949

Count Period: 3:00 PM to 6:00 PM

Total Vehicle Summary

Clay Carney
(503) 833-2740



Peak Hour Summary
4:15 PM to 5:15 PM

Hwy 99E & SE Harrison St

Wednesday, November 29, 2006
3:00 PM to 6:00 PM

15-Minute Interval Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 99E				Southbound Hwy 99E				Eastbound SE Harrison St				Westbound SE Harrison St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
3:00 PM	63	164	41	0	34	266	2	0	8	19	90	0	40	10	14	0	751	0	1	0	4
3:15 PM	53	188	28	0	45	359	6	0	0	12	67	0	27	14	15	0	814	0	0	0	1
3:30 PM	59	183	43	0	31	358	1	0	7	15	103	0	44	9	18	0	871	0	2	1	1
3:45 PM	50	188	39	0	30	423	7	0	3	23	83	0	44	9	16	0	915	0	1	0	7
4:00 PM	57	190	40	0	39	390	5	0	9	13	131	0	54	15	9	0	952	0	2	0	2
4:15 PM	57	186	31	0	43	446	3	0	3	16	113	0	44	13	8	0	963	0	4	1	2
4:30 PM	64	174	49	0	36	367	5	0	4	26	132	1	41	16	7	0	921	0	3	3	1
4:45 PM	57	206	35	0	33	461	0	0	5	24	114	0	41	15	9	0	1,000	0	0	0	1
5:00 PM	54	223	32	0	21	404	6	0	5	25	122	0	53	15	8	0	968	0	2	0	4
5:15 PM	58	168	38	0	51	438	2	0	4	23	98	0	39	15	10	0	944	0	1	0	0
5:30 PM	54	168	30	0	24	403	1	0	3	18	111	0	45	14	16	0	887	0	0	0	4
5:45 PM	47	164	30	0	22	404	2	0	3	17	92	0	37	14	8	0	840	0	0	0	1
Total Survey	673	2,202	436	0	409	4,719	40	0	54	231	1,256	1	509	159	138	0	10,826	0	16	5	28

Peak Hour Summary
4:15 PM to 5:15 PM

By Approach	Northbound Hwy 99E				Southbound Hwy 99E				Eastbound SE Harrison St				Westbound SE Harrison St				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	1,168	2,338	3,506	0	1,825	838	2,663	0	589	305	894	1	270	371	641	0	3,852	0	9	4	8
%HV	3.7%				2.1%				1.9%				3.0%				2.6%				
PHF	0.94				0.92				0.91				0.89				0.96				

By Movement	Northbound Hwy 99E				Southbound Hwy 99E				Eastbound SE Harrison St				Westbound SE Harrison St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	232	789	147	1,168	133	1,678	14	1,825	17	91	481	589	179	59	32	270	3,852
%HV	1.7%	4.6%	2.0%	3.7%	3.0%	2.0%	0.0%	2.1%	5.9%	6.6%	0.8%	1.9%	1.7%	6.8%	3.1%	3.0%	2.6%
PHF	0.91	0.88	0.75	0.94	0.77	0.91	0.58	0.92	0.85	0.88	0.91	0.91	0.84	0.92	0.89	0.89	0.96

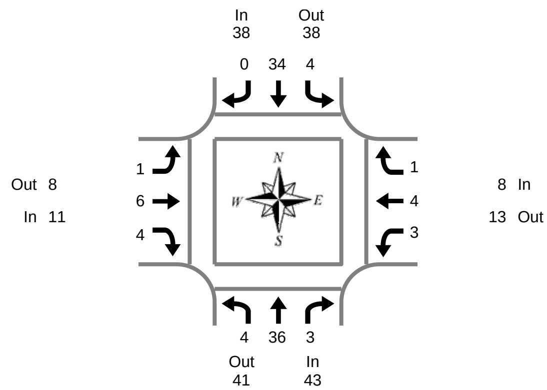
Rolling Hour Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 99E				Southbound Hwy 99E				Eastbound SE Harrison St				Westbound SE Harrison St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
3:00 PM	225	723	151	0	140	1,406	16	0	18	69	343	0	155	42	63	0	3,351	0	4	1	13
3:15 PM	219	749	150	0	145	1,530	19	0	19	63	384	0	169	47	58	0	3,552	0	5	1	11
3:30 PM	223	747	153	0	143	1,617	16	0	22	67	430	0	186	46	51	0	3,701	0	9	2	12
3:45 PM	228	738	159	0	148	1,626	20	0	19	78	459	1	183	53	40	0	3,751	0	10	4	12
4:00 PM	235	756	155	0	151	1,664	13	0	21	79	490	1	180	59	33	0	3,836	0	9	4	6
4:15 PM	232	789	147	0	133	1,678	14	0	17	91	481	1	179	59	32	0	3,852	0	9	4	8
4:30 PM	233	771	154	0	141	1,670	13	0	18	98	466	1	174	61	34	0	3,833	0	6	3	6
4:45 PM	223	765	135	0	129	1,706	9	0	17	90	445	0	178	59	43	0	3,799	0	3	0	9
5:00 PM	213	723	130	0	118	1,649	11	0	15	83	423	0	174	58	42	0	3,639	0	3	0	9

Heavy Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



Hwy 99E & SE Harrison St

Wednesday, November 29, 2006
3:00 PM to 6:00 PM

Peak Hour Summary
4:15 PM to 5:15 PM

Heavy Vehicle 15-Minute Interval Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 99E				Southbound Hwy 99E				Eastbound SE Harrison St				Westbound SE Harrison St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
3:00 PM	1	5	1	7	0	12	1	13	1	1	2	4	2	1	1	4	28
3:15 PM	0	8	0	8	0	14	0	14	0	1	3	4	1	1	1	3	29
3:30 PM	0	10	1	11	0	14	0	14	0	2	1	3	0	1	0	1	29
3:45 PM	2	10	3	15	1	15	0	16	0	2	3	5	3	1	1	5	41
4:00 PM	2	14	1	17	4	10	1	15	0	2	6	8	3	1	0	4	44
4:15 PM	2	9	1	12	2	11	0	13	0	2	1	3	0	1	1	2	30
4:30 PM	2	10	1	13	0	7	0	7	1	1	2	4	2	1	0	3	27
4:45 PM	0	8	0	8	2	7	0	9	0	1	1	2	0	1	0	1	20
5:00 PM	0	9	1	10	0	9	0	9	0	2	0	2	1	1	0	2	23
5:15 PM	2	2	1	5	1	6	0	7	0	1	1	2	0	1	0	1	15
5:30 PM	0	3	0	3	0	8	0	8	0	0	0	0	0	1	0	1	12
5:45 PM	1	4	2	7	0	2	1	3	0	1	1	2	1	1	0	2	14
Total Survey	12	92	12	116	10	115	3	128	2	16	21	39	13	12	4	29	312

Heavy Vehicle Peak Hour Summary
4:15 PM to 5:15 PM

By Approach	Northbound Hwy 99E			Southbound Hwy 99E			Eastbound SE Harrison St			Westbound SE Harrison St			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	43	41	84	38	38	76	11	8	19	8	13	21	100
PHF	0.24			0.21			0.17			0.18			0.22

By Movement	Northbound Hwy 99E				Southbound Hwy 99E				Eastbound SE Harrison St				Westbound SE Harrison St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	4	36	3	43	4	34	0	38	1	6	4	11	3	4	1	8	100
PHF	0.17	0.26	0.15	0.24	0.14	0.20	0.00	0.21	0.25	0.25	0.10	0.17	0.13	0.33	0.13	0.18	0.22

Heavy Vehicle Rolling Hour Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 99E				Southbound Hwy 99E				Eastbound SE Harrison St				Westbound SE Harrison St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
3:00 PM	3	33	5	41	1	55	1	57	1	6	9	16	6	4	3	13	127
3:15 PM	4	42	5	51	5	53	1	59	0	7	13	20	7	4	2	13	143
3:30 PM	6	43	6	55	7	50	1	58	0	8	11	19	6	4	2	12	144
3:45 PM	8	43	6	57	7	43	1	51	1	7	12	20	8	4	2	14	142
4:00 PM	6	41	3	50	8	35	1	44	1	6	10	17	5	4	1	10	121
4:15 PM	4	36	3	43	4	34	0	38	1	6	4	11	3	4	1	8	100
4:30 PM	4	29	3	36	3	29	0	32	1	5	4	10	3	4	0	7	85
4:45 PM	2	22	2	26	3	30	0	33	0	4	2	6	1	4	0	5	70
5:00 PM	3	18	4	25	1	25	1	27	0	4	2	6	2	4	0	6	64

Peak Hour Summary

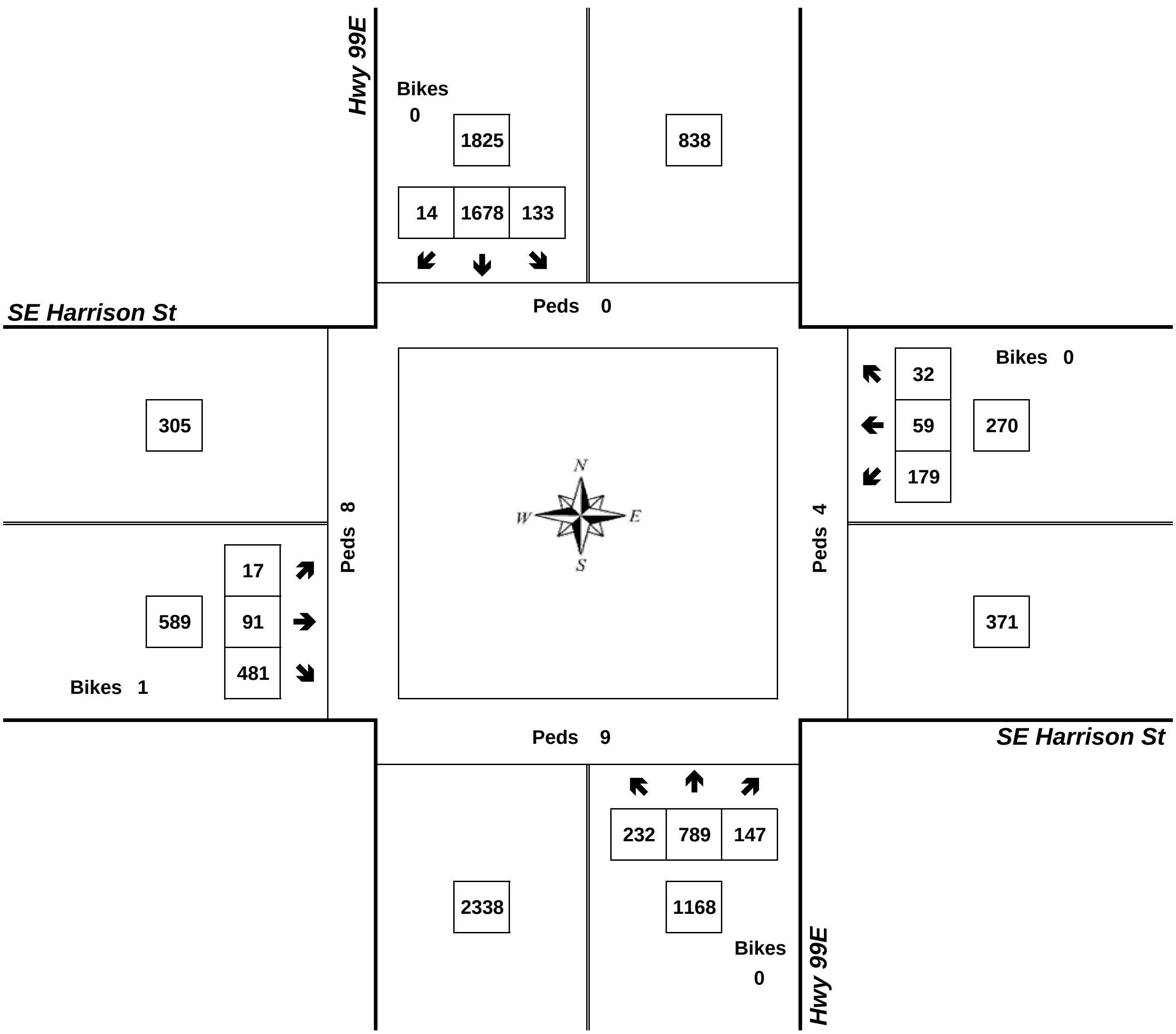
All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

Hwy 99E & SE Harrison St

4:15 PM to 5:15 PM

Wednesday, November 29, 2006

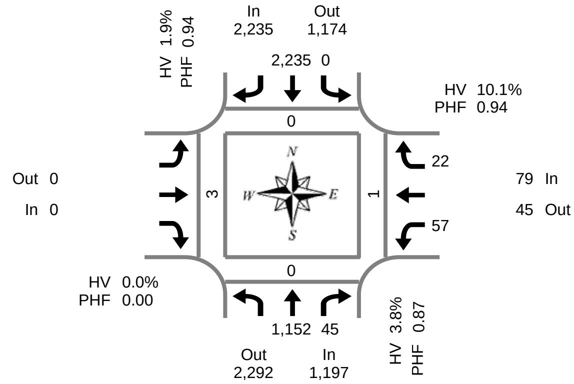


Approach	PHF	HV%	Volume
EB	0.91	1.9%	589
WB	0.89	3.0%	270
NB	0.94	3.7%	1,168
SB	0.92	2.1%	1,825
Intersection	0.96	2.6%	3,852

Count Period: 3:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
4:15 PM to 5:15 PM

Hwy 99E & SE Monroe St

Wednesday, November 29, 2006
3:00 PM to 6:00 PM

15-Minute Interval Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 99E				Southbound Hwy 99E				Eastbound SE Monroe St				Westbound SE Monroe St				Interval Total	Pedestrians Crosswalk			
		T	R	Bikes	L	T		Bikes				Bikes	L		R	Bikes		North	South	East	West
3:00 PM		280	16	0	0	415		0				0	14		14	0	739	0	3	0	0
3:15 PM		240	14	0	0	434		0				0	17		10	0	715	0	0	0	0
3:30 PM		298	13	0	0	520		0				0	7		13	0	851	0	0	1	1
3:45 PM		226	5	0	0	536		0				0	12		14	0	793	0	0	0	0
4:00 PM		296	13	0	0	583		0				0	10		4	0	906	0	0	0	0
4:15 PM		276	10	0	0	591		1				0	13		5	0	895	0	0	0	0
4:30 PM		289	5	0	0	540		0				0	16		4	0	854	0	0	0	0
4:45 PM		263	11	1	0	512		0				0	10		10	0	806	0	0	1	3
5:00 PM		324	19	0	0	592		0				0	18		3	0	956	0	0	0	0
5:15 PM		242	14	0	0	544		0				0	19		8	0	827	0	0	0	0
5:30 PM		254	12	0	0	558		0				0	12		7	0	843	0	0	0	0
5:45 PM		234	8	0	0	543		0				0	13		7	0	805	0	0	0	0
Total Survey		3,222	140	1	0	6,368		1				0	161		99	0	9,990	0	3	2	4

Peak Hour Summary
4:15 PM to 5:15 PM

By Approach	Northbound Hwy 99E				Southbound Hwy 99E				Eastbound SE Monroe St				Westbound SE Monroe St				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	1,197	2,292	3,489	1	2,235	1,174	3,409	1	0	0	0	0	79	45	124	0	3,511	0	0	1	3
%HV	3.8%				1.9%				0.0%				10.1%				2.7%				
PHF	0.87				0.94				0.00				0.94				0.92				

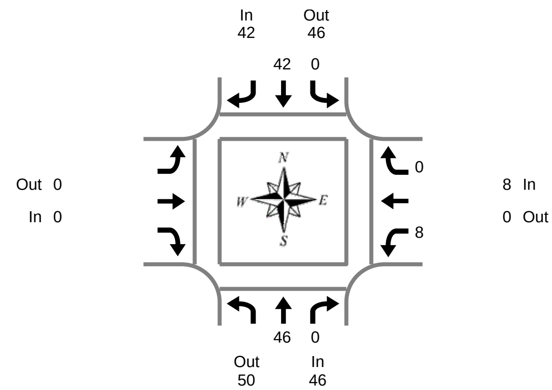
By Movement	Northbound Hwy 99E				Southbound Hwy 99E				Eastbound SE Monroe St				Westbound SE Monroe St				Total
		T	R	Total	L	T		Total				Total	L		R	Total	
Volume		1,152	45	1,197	0	2,235		2,235				0	57		22	79	3,511
%HV	NA	4.0%	0.0%	3.8%	0.0%	1.9%	NA	1.9%	NA	NA	NA	0.0%	14.0%	NA	0.0%	10.1%	2.7%
PHF		0.89	0.59	0.87	0.00	0.94		0.94				0.00	0.79		0.55	0.94	0.92

Rolling Hour Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 99E				Southbound Hwy 99E				Eastbound SE Monroe St				Westbound SE Monroe St				Interval Total	Pedestrians Crosswalk			
		T	R	Bikes	L	T		Bikes				Bikes	L		R	Bikes		North	South	East	West
3:00 PM		1,044	48	0	0	1,905		0				0	50		51	0	3,098	0	3	1	1
3:15 PM		1,060	45	0	0	2,073		0				0	46		41	0	3,265	0	0	1	1
3:30 PM		1,096	41	0	0	2,230		1				0	42		36	0	3,445	0	0	1	1
3:45 PM		1,087	33	0	0	2,250		1				0	51		27	0	3,448	0	0	0	0
4:00 PM		1,124	39	1	0	2,226		1				0	49		23	0	3,461	0	0	1	3
4:15 PM		1,152	45	1	0	2,235		1				0	57		22	0	3,511	0	0	1	3
4:30 PM		1,118	49	1	0	2,188		0				0	63		25	0	3,443	0	0	1	3
4:45 PM		1,083	56	1	0	2,206		0				0	59		28	0	3,432	0	0	1	3
5:00 PM		1,054	53	0	0	2,237		0				0	62		25	0	3,431	0	0	0	0

Heavy Vehicle Summary

Clay Carney
(503) 833-2740



Peak Hour Summary
4:15 PM to 5:15 PM

Hwy 99E & SE Monroe St

Wednesday, November 29, 2006
3:00 PM to 6:00 PM

Heavy Vehicle 15-Minute Interval Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 99E				Southbound Hwy 99E				Eastbound SE Monroe St				Westbound SE Monroe St				Interval Total
		T	R	Total	L	T		Total				Total	L		R	Total	
3:00 PM		8	0	8	0	15		15				0	2		0	2	25
3:15 PM		9	1	10	0	18		18				0	2		0	2	30
3:30 PM		12	0	12	0	15		15				0	2		0	2	29
3:45 PM		13	0	13	0	20		20				0	2		0	2	35
4:00 PM		13	1	14	0	19		19				0	3		0	3	36
4:15 PM		13	0	13	0	14		14				0	1		0	1	28
4:30 PM		13	0	13	0	12		12				0	3		0	3	28
4:45 PM		8	0	8	0	10		10				0	2		0	2	20
5:00 PM		12	0	12	0	6		6				0	2		0	2	20
5:15 PM		6	0	6	0	10		10				0	4		0	4	20
5:30 PM		2	0	2	0	8		8				0	4		0	4	14
5:45 PM		6	1	7	0	5		5				0	2		0	2	14
Total Survey		115	3	118	0	152		152				0	29		0	29	299

Heavy Vehicle Peak Hour Summary
4:15 PM to 5:15 PM

By Approach	Northbound Hwy 99E			Southbound Hwy 99E			Eastbound SE Monroe St			Westbound SE Monroe St			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	46	50	96	42	46	88	0	0	0	8	0	8	96
PHF	0.29			0.19			0.00			0.20			0.24

By Movement	Northbound Hwy 99E				Southbound Hwy 99E				Eastbound SE Monroe St				Westbound SE Monroe St				Total
		T	R	Total	L	T		Total				Total	L		R	Total	
Volume		46	0	46	0	42		42				0	8		0	8	96
PHF		0.29	0.00	0.29	0.00	0.19		0.19				0.00	0.20		0.00	0.20	0.24

Heavy Vehicle Rolling Hour Summary
3:00 PM to 6:00 PM

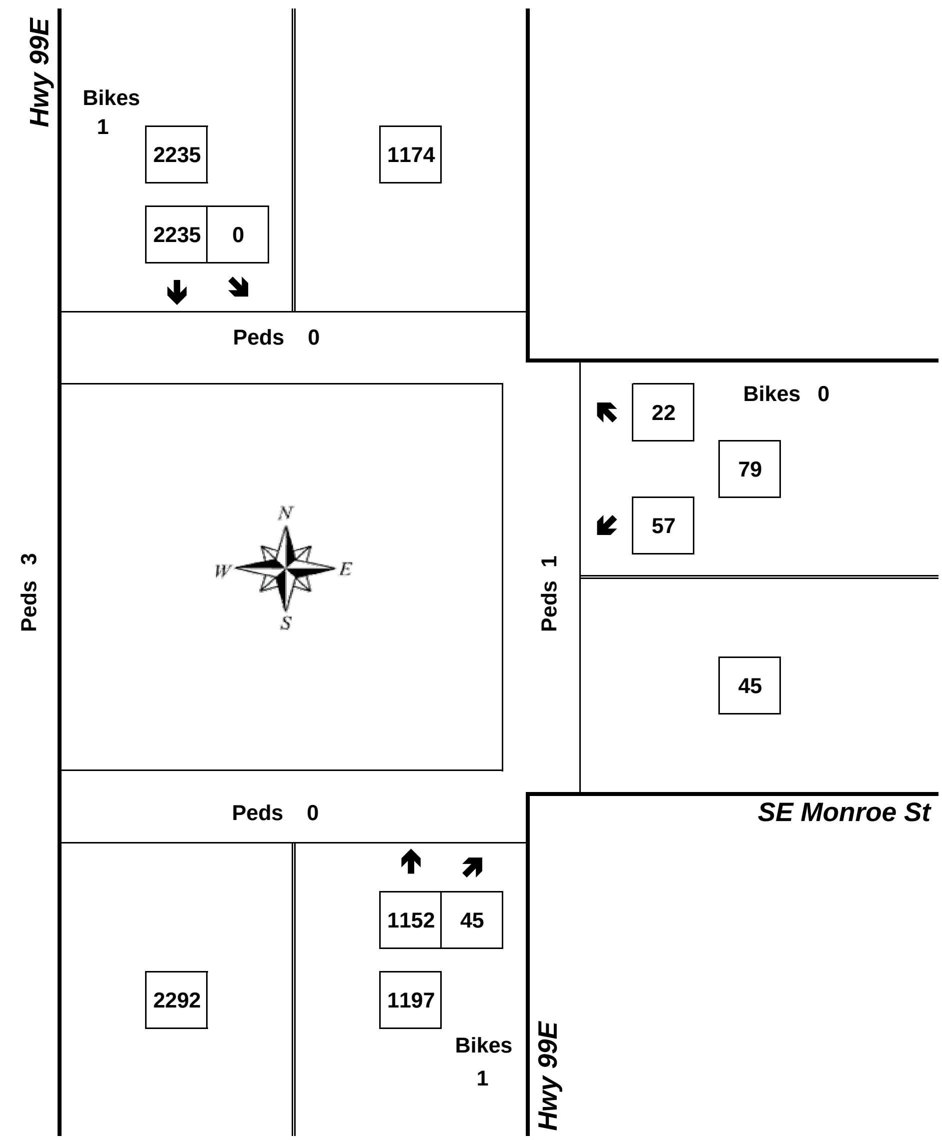
Interval Start Time	Northbound Hwy 99E				Southbound Hwy 99E				Eastbound SE Monroe St				Westbound SE Monroe St				Interval Total
		T	R	Total	L	T		Total				Total	L		R	Total	
3:00 PM		42	1	43	0	68		68				0	8		0	8	119
3:15 PM		47	2	49	0	72		72				0	9		0	9	130
3:30 PM		51	1	52	0	68		68				0	8		0	8	128
3:45 PM		52	1	53	0	65		65				0	9		0	9	127
4:00 PM		47	1	48	0	55		55				0	9		0	9	112
4:15 PM		46	0	46	0	42		42				0	8		0	8	96
4:30 PM		39	0	39	0	38		38				0	11		0	11	88
4:45 PM		28	0	28	0	34		34				0	12		0	12	74
5:00 PM		26	1	27	0	29		29				0	12		0	12	68

Peak Hour Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

Hwy 99E & SE Monroe St

4:15 PM to 5:15 PM
Wednesday, November 29, 2006

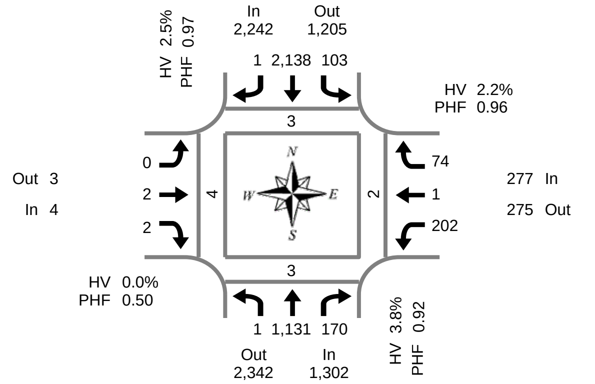


Approach	PHF	HV%	Volume
EB	0.00	0.0%	0
WB	0.94	10.1%	79
NB	0.87	3.8%	1,197
SB	0.94	1.9%	2,235
Intersection	0.92	2.7%	3,511

Count Period: 3:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Hwy 99E & SE Washington St

Tuesday, December 05, 2006
3:00 PM to 6:00 PM

Peak Hour Summary
3:45 PM to 4:45 PM

15-Minute Interval Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 99E				Southbound Hwy 99E				Eastbound SE Washington St				Westbound SE Washington St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
3:00 PM	0	274	43	0	19	387	1	0	2	0	0	0	43	0	15	0	784	0	1	1	0
3:15 PM	0	265	47	0	27	461	2	0	0	0	2	0	45	0	14	0	863	0	1	1	0
3:30 PM	0	255	37	0	33	455	0	0	0	2	1	0	56	0	18	0	857	0	3	1	0
3:45 PM	0	293	48	0	32	528	0	0	0	0	0	0	57	0	15	0	973	0	1	0	0
4:00 PM	0	263	30	0	29	543	1	0	0	0	0	0	43	0	21	0	930	1	0	1	0
4:15 PM	1	302	51	0	19	512	0	0	0	1	1	0	52	1	19	0	959	1	0	0	4
4:30 PM	0	273	41	0	23	555	0	0	0	1	1	0	50	0	19	0	963	1	2	1	0
4:45 PM	0	279	25	0	26	516	0	0	0	0	0	0	38	0	23	0	907	2	1	0	1
5:00 PM	0	273	30	0	32	533	1	0	0	1	0	0	42	0	20	0	932	0	0	0	1
5:15 PM	0	289	40	0	22	570	1	0	0	0	0	0	36	0	21	0	979	3	3	3	0
5:30 PM	0	274	32	0	29	518	0	0	0	0	0	0	50	0	14	0	917	0	3	0	0
5:45 PM	0	250	25	0	24	508	0	0	0	0	1	0	30	0	9	0	847	0	0	0	0
Total Survey	1	3,290	449	0	315	6,086	6	0	2	5	6	0	542	1	208	0	10,911	8	15	8	6

Peak Hour Summary
3:45 PM to 4:45 PM

By Approach	Northbound Hwy 99E				Southbound Hwy 99E				Eastbound SE Washington St				Westbound SE Washington St				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	1,302	2,342	3,644	0	2,242	1,205	3,447	0	4	3	7	0	277	275	552	0	3,825	3	3	2	4
%HV	3.8%				2.5%				0.0%				2.2%				3.0%				
PHF	0.92				0.97				0.50				0.96				0.98				

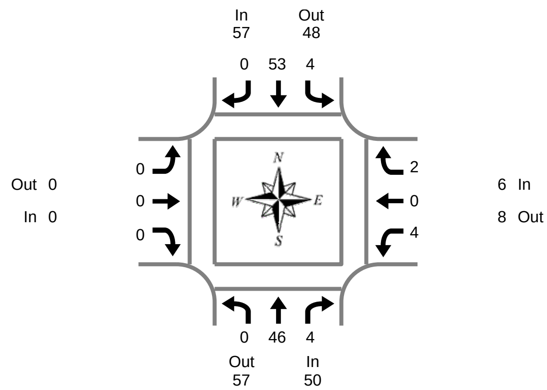
By Movement	Northbound Hwy 99E				Southbound Hwy 99E				Eastbound SE Washington St				Westbound SE Washington St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	1	1,131	170	1,302	103	2,138	1	2,242	0	2	2	4	202	1	74	277	3,825
%HV	0.0%	4.1%	2.4%	3.8%	3.9%	2.5%	0.0%	2.5%	0.0%	0.0%	0.0%	0.0%	2.0%	0.0%	2.7%	2.2%	3.0%
PHF	0.25	0.94	0.83	0.92	0.80	0.96	0.25	0.97	0.00	0.50	0.50	0.50	0.89	0.25	0.88	0.96	0.98

Rolling Hour Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 99E				Southbound Hwy 99E				Eastbound SE Washington St				Westbound SE Washington St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
3:00 PM	0	1,087	175	0	111	1,831	3	0	2	2	3	0	201	0	62	0	3,477	0	6	3	0
3:15 PM	0	1,076	162	0	121	1,987	3	0	0	2	3	0	201	0	68	0	3,623	1	5	3	0
3:30 PM	1	1,113	166	0	113	2,038	1	0	0	3	2	0	208	1	73	0	3,719	2	4	2	4
3:45 PM	1	1,131	170	0	103	2,138	1	0	0	2	2	0	202	1	74	0	3,825	3	3	2	4
4:00 PM	1	1,117	147	0	97	2,126	1	0	0	2	2	0	183	1	82	0	3,759	5	3	2	5
4:15 PM	1	1,127	147	0	100	2,116	1	0	0	3	2	0	182	1	81	0	3,761	4	3	1	6
4:30 PM	0	1,114	136	0	103	2,174	2	0	0	2	1	0	166	0	83	0	3,781	6	6	4	2
4:45 PM	0	1,115	127	0	109	2,137	2	0	0	1	0	0	166	0	78	0	3,735	5	7	3	2
5:00 PM	0	1,086	127	0	107	2,129	2	0	0	1	1	0	158	0	64	0	3,675	3	6	3	1

Heavy Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
3:45 PM to 4:45 PM

Hwy 99E & SE Washington St

Tuesday, December 05, 2006
3:00 PM to 6:00 PM

Heavy Vehicle 15-Minute Interval Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 99E				Southbound Hwy 99E				Eastbound SE Washington St				Westbound SE Washington St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
3:00 PM	0	20	0	20	1	12	1	14	0	0	0	0	2	0	0	2	36
3:15 PM	0	11	1	12	3	13	1	17	0	0	0	0	1	0	0	1	30
3:30 PM	0	9	1	10	1	20	0	21	0	0	0	0	0	0	1	1	32
3:45 PM	0	12	1	13	4	14	0	18	0	0	0	0	0	0	0	0	31
4:00 PM	0	12	0	12	0	19	0	19	0	0	0	0	1	0	0	1	32
4:15 PM	0	12	2	14	0	9	0	9	0	0	0	0	0	0	0	0	23
4:30 PM	0	10	1	11	0	11	0	11	0	0	0	0	3	0	2	5	27
4:45 PM	0	9	1	10	0	11	0	11	0	0	0	0	0	0	1	1	22
5:00 PM	0	10	2	12	0	12	0	12	0	0	0	0	1	0	1	2	26
5:15 PM	0	9	0	9	2	8	0	10	0	0	0	0	0	0	0	0	19
5:30 PM	0	5	1	6	0	8	0	8	0	0	0	0	0	0	1	1	15
5:45 PM	0	5	1	6	0	8	0	8	0	0	0	0	0	0	1	1	15
Total Survey	0	124	11	135	11	145	2	158	0	0	0	0	8	0	7	15	308

Heavy Vehicle Peak Hour Summary
3:45 PM to 4:45 PM

By Approach	Northbound Hwy 99E			Southbound Hwy 99E			Eastbound SE Washington St			Westbound SE Washington St			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	50	57	107	57	48	105	0	0	0	6	8	14	113
PHF	0.30			0.25			0.00			0.19			0.29

By Movement	Northbound Hwy 99E				Southbound Hwy 99E				Eastbound SE Washington St				Westbound SE Washington St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	46	4	50	4	53	0	57	0	0	0	0	4	0	2	6	113
PHF	0.00	0.29	0.25	0.30	0.13	0.25	0.00	0.25	0.00	0.00	0.00	0.00	0.25	0.00	0.13	0.19	0.29

Heavy Vehicle Rolling Hour Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 99E				Southbound Hwy 99E				Eastbound SE Washington St				Westbound SE Washington St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
3:00 PM	0	52	3	55	9	59	2	70	0	0	0	0	3	0	1	4	129
3:15 PM	0	44	3	47	8	66	1	75	0	0	0	0	2	0	1	3	125
3:30 PM	0	45	4	49	5	62	0	67	0	0	0	0	1	0	1	2	118
3:45 PM	0	46	4	50	4	53	0	57	0	0	0	0	4	0	2	6	113
4:00 PM	0	43	4	47	0	50	0	50	0	0	0	0	4	0	3	7	104
4:15 PM	0	41	6	47	0	43	0	43	0	0	0	0	4	0	4	8	98
4:30 PM	0	38	4	42	2	42	0	44	0	0	0	0	4	0	4	8	94
4:45 PM	0	33	4	37	2	39	0	41	0	0	0	0	1	0	3	4	82
5:00 PM	0	29	4	33	2	36	0	38	0	0	0	0	1	0	3	4	75

Peak Hour Summary

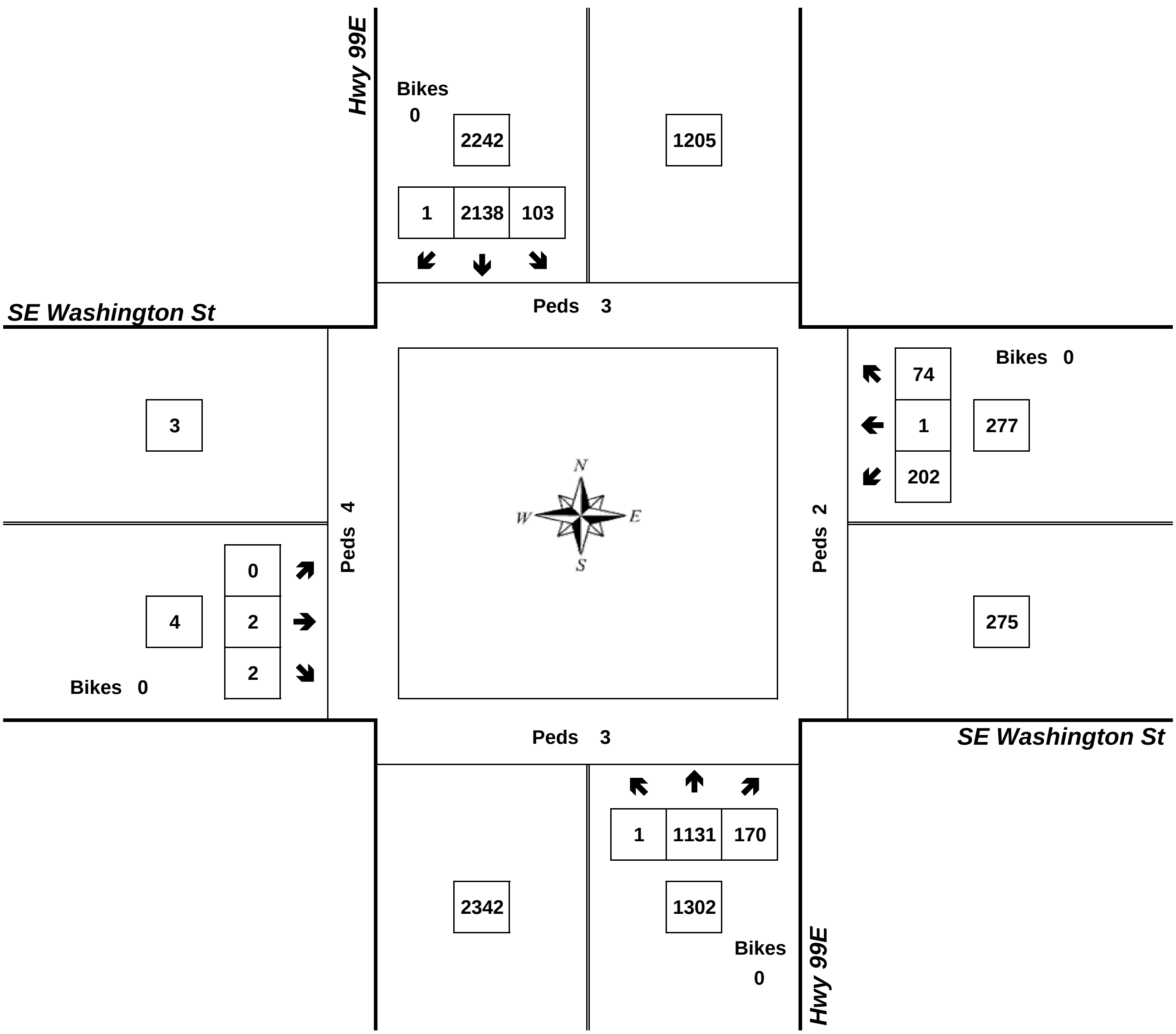
All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

Hwy 99E & SE Washington St

3:45 PM to 4:45 PM

Tuesday, December 05, 2006

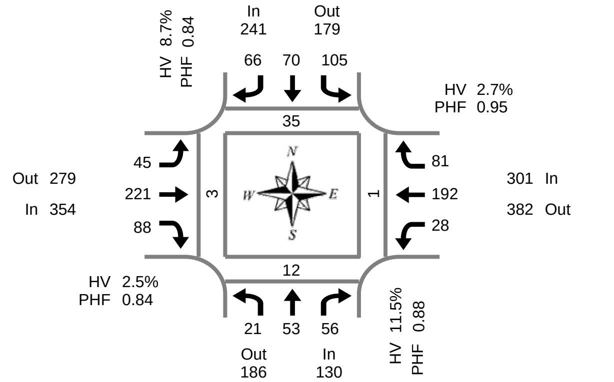


Approach	PHF	HV%	Volume
EB	0.50	0.0%	4
WB	0.96	2.2%	277
NB	0.92	3.8%	1,302
SB	0.97	2.5%	2,242
Intersection	0.98	3.0%	3,825

Count Period: 3:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
4:45 PM to 5:45 PM

SE Main St & SE Harrison St

Wednesday, November 29, 2006
3:00 PM to 6:00 PM

15-Minute Interval Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound SE Main St				Southbound SE Main St				Eastbound SE Harrison St				Westbound SE Harrison St				Interval Total
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	
3:00 PM	5	7	6	0	22	19	9	0	14	56	21	0	12	46	18	0	235
3:15 PM	6	8	11	0	17	15	16	0	12	54	20	0	11	39	21	0	230
3:30 PM	6	12	14	0	19	17	13	2	11	67	13	0	9	50	26	0	257
3:45 PM	4	14	11	0	10	14	11	0	13	61	21	0	16	50	21	0	246
4:00 PM	13	15	7	0	18	22	25	0	13	53	23	0	12	49	24	0	274
4:15 PM	7	11	9	0	19	20	12	0	14	53	22	0	9	43	14	0	233
4:30 PM	5	9	11	1	29	22	11	0	9	67	24	0	8	43	17	0	255
4:45 PM	5	16	13	0	15	15	15	0	18	58	17	0	13	49	16	0	250
5:00 PM	4	11	14	0	31	23	18	0	10	52	21	0	6	50	23	0	263
5:15 PM	6	13	11	0	29	14	10	0	5	71	29	0	2	46	21	0	257
5:30 PM	6	13	18	0	30	18	23	0	12	40	21	0	7	47	21	0	256
5:45 PM	6	10	7	0	22	15	14	0	14	41	17	0	13	40	12	0	211
Total Survey	73	139	132	1	261	214	177	2	145	673	249	0	118	552	234	0	2,967

Interval Start Time	Pedestrians Crosswalk			
	North	South	East	West
3:00 PM	7	1	2	7
3:15 PM	5	7	3	1
3:30 PM	4	9	8	1
3:45 PM	11	9	6	3
4:00 PM	0	4	7	3
4:15 PM	7	3	3	1
4:30 PM	5	1	5	3
4:45 PM	0	3	0	0
5:00 PM	6	5	0	1
5:15 PM	2	3	0	1
5:30 PM	27	1	1	1
5:45 PM	4	2	2	0
Total Survey	78	48	37	22

Peak Hour Summary
4:45 PM to 5:45 PM

By Approach	Northbound SE Main St				Southbound SE Main St				Eastbound SE Harrison St				Westbound SE Harrison St				Total
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	
Volume	130	186	316	0	241	179	420	0	354	279	633	0	301	382	683	0	1,026
%HV	11.5%				8.7%				2.5%				2.7%				5.2%
PHF	0.88				0.84				0.84				0.95				0.98

	Pedestrians Crosswalk			
	North	South	East	West
Volume	35	12	1	3

By Movement	Northbound SE Main St				Southbound SE Main St				Eastbound SE Harrison St				Westbound SE Harrison St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	21	53	56	130	105	70	66	241	45	221	88	354	28	192	81	301	1,026
%HV	19.0%	18.9%	1.8%	11.5%	6.7%	18.6%	1.5%	8.7%	0.0%	3.6%	1.1%	2.5%	14.3%	1.0%	2.5%	2.7%	5.2%
PHF	0.88	0.83	0.78	0.88	0.85	0.76	0.72	0.84	0.63	0.78	0.76	0.84	0.54	0.96	0.88	0.95	0.98

Rolling Hour Summary
3:00 PM to 6:00 PM

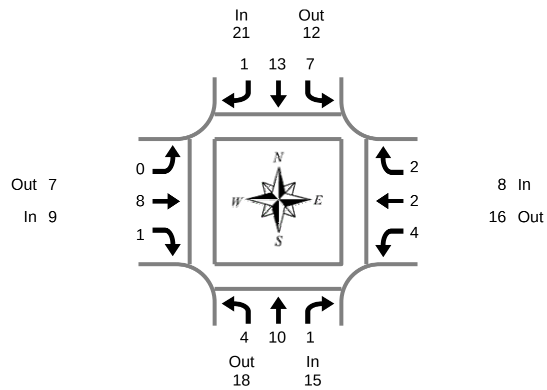
Interval Start Time	Northbound SE Main St				Southbound SE Main St				Eastbound SE Harrison St				Westbound SE Harrison St				Interval Total
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	
3:00 PM	21	41	42	0	68	65	49	2	50	238	75	0	48	185	86	0	968
3:15 PM	29	49	43	0	64	68	65	2	49	235	77	0	48	188	92	0	1,007
3:30 PM	30	52	41	0	66	73	61	2	51	234	79	0	46	192	85	0	1,010
3:45 PM	29	49	38	1	76	78	59	0	49	234	90	0	45	185	76	0	1,008
4:00 PM	30	51	40	1	81	79	63	0	54	231	86	0	42	184	71	0	1,012
4:15 PM	21	47	47	1	94	80	56	0	51	230	84	0	36	185	70	0	1,001
4:30 PM	20	49	49	1	104	74	54	0	42	248	91	0	29	188	77	0	1,025
4:45 PM	21	53	56	0	105	70	66	0	45	221	88	0	28	192	81	0	1,026
5:00 PM	22	47	50	0	112	70	65	0	41	204	88	0	28	183	77	0	987

Interval Start Time	Pedestrians Crosswalk			
	North	South	East	West
3:00 PM	27	26	19	12
3:15 PM	20	29	24	8
3:30 PM	22	25	24	8
3:45 PM	23	17	21	10
4:00 PM	12	11	15	7
4:15 PM	18	12	8	5
4:30 PM	13	12	5	5
4:45 PM	35	12	1	3
5:00 PM	39	11	3	3

Heavy Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



Peak Hour Summary
4:45 PM to 5:45 PM

SE Main St & SE Harrison St

Wednesday, November 29, 2006
3:00 PM to 6:00 PM

Heavy Vehicle 15-Minute Interval Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound SE Main St				Southbound SE Main St				Eastbound SE Harrison St				Westbound SE Harrison St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
3:00 PM	1	2	0	3	1	2	1	4	1	1	0	2	2	3	0	5	14
3:15 PM	1	1	1	3	0	2	1	3	0	1	0	1	1	1	1	3	10
3:30 PM	1	1	1	3	0	2	0	2	0	2	0	2	0	0	2	2	9
3:45 PM	1	3	1	5	2	3	0	5	3	3	1	7	3	3	1	7	24
4:00 PM	1	0	1	2	1	2	1	4	0	5	2	7	1	1	2	4	17
4:15 PM	2	2	0	4	0	2	0	2	2	1	2	5	2	0	1	3	14
4:30 PM	1	3	0	4	2	3	2	7	0	3	0	3	0	0	0	0	14
4:45 PM	1	5	0	6	0	4	0	4	0	3	1	4	1	1	0	2	16
5:00 PM	1	2	1	4	3	4	1	8	0	3	0	3	1	0	0	1	16
5:15 PM	1	1	0	2	1	1	0	2	0	2	0	2	1	1	1	3	9
5:30 PM	1	2	0	3	3	4	0	7	0	0	0	0	1	0	1	2	12
5:45 PM	1	1	0	2	0	3	0	3	0	2	0	2	1	1	0	2	9
Total Survey	13	23	5	41	13	32	6	51	6	26	6	38	14	11	9	34	164

Heavy Vehicle Peak Hour Summary
4:45 PM to 5:45 PM

By Approach	Northbound SE Main St			Southbound SE Main St			Eastbound SE Harrison St			Westbound SE Harrison St			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	15	18	33	21	12	33	9	7	16	8	16	24	53
PHF	0.27			0.28			0.12			0.14			0.24

By Movement	Northbound SE Main St				Southbound SE Main St				Eastbound SE Harrison St				Westbound SE Harrison St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	4	10	1	15	7	13	1	21	0	8	1	9	4	2	2	8	53
PHF	0.25	0.25	0.08	0.27	0.25	0.30	0.08	0.28	0.00	0.20	0.05	0.12	0.17	0.13	0.10	0.14	0.24

Heavy Vehicle Rolling Hour Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound SE Main St				Southbound SE Main St				Eastbound SE Harrison St				Westbound SE Harrison St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
3:00 PM	4	7	3	14	3	9	2	14	4	7	1	12	6	7	4	17	57
3:15 PM	4	5	4	13	3	9	2	14	3	11	3	17	5	5	6	16	60
3:30 PM	5	6	3	14	3	9	1	13	5	11	5	21	6	4	6	16	64
3:45 PM	5	8	2	15	5	10	3	18	5	12	5	22	6	4	4	14	69
4:00 PM	5	10	1	16	3	11	3	17	2	12	5	19	4	2	3	9	61
4:15 PM	5	12	1	18	5	13	3	21	2	10	3	15	4	1	1	6	60
4:30 PM	4	11	1	16	6	12	3	21	0	11	1	12	3	2	1	6	55
4:45 PM	4	10	1	15	7	13	1	21	0	8	1	9	4	2	2	8	53
5:00 PM	4	6	1	11	7	12	1	20	0	7	0	7	4	2	2	8	46

Peak Hour Summary

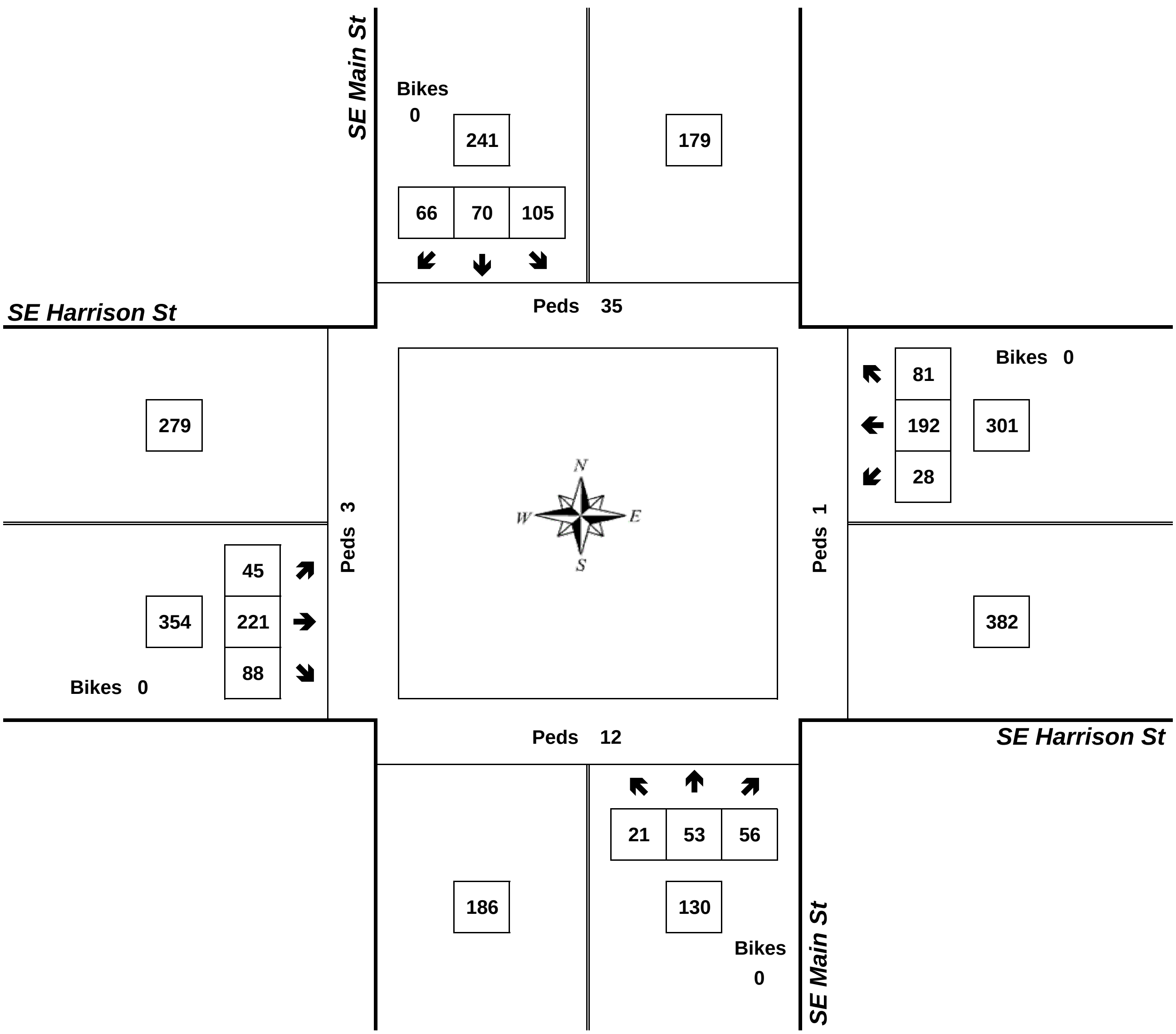
All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

SE Main St & SE Harrison St

4:45 PM to 5:45 PM

Wednesday, November 29, 2006

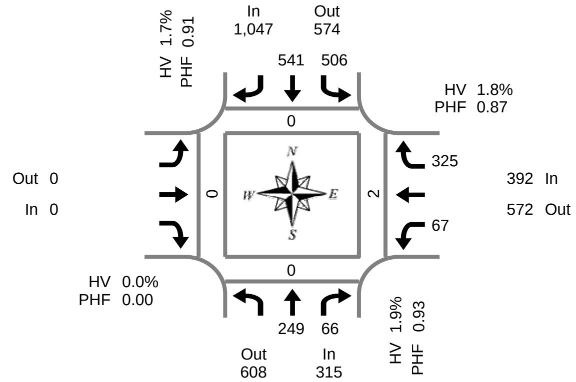


Approach	PHF	HV%	Volume
EB	0.84	2.5%	354
WB	0.95	2.7%	301
NB	0.88	11.5%	130
SB	0.84	8.7%	241
Intersection	0.98	5.2%	1,026

Count Period: 3:00 PM to 6:00 PM

Total Vehicle Summary

Clay Carney
(503) 833-2740



Peak Hour Summary
4:30 PM to 5:30 PM

SE 17th Ave & Hwy 224

Wednesday, November 29, 2006
3:00 PM to 6:00 PM

15-Minute Interval Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound SE 17th Ave				Southbound SE 17th Ave				Eastbound Hwy 224				Westbound Hwy 224				Interval Total	Pedestrians Crosswalk			
		T	R	Bikes	L	T		Bikes				Bikes	L		R	Bikes		North	South	East	West
3:00 PM		64	18	0	84	89		0				0	18		64	0	337	0	0	0	0
3:15 PM		63	17	0	86	72		0				0	20		78	0	336	0	0	0	0
3:30 PM		55	11	1	113	104		0				0	13		95	0	391	0	0	1	0
3:45 PM		59	15	0	107	102		0				0	19		78	0	380	0	0	0	0
4:00 PM		68	15	0	111	135		1				0	18		81	0	428	0	0	0	0
4:15 PM		63	16	0	100	142		0				0	17		56	0	394	0	0	1	0
4:30 PM		67	18	0	126	146		0				0	24		67	0	448	0	0	0	0
4:45 PM		63	15	0	113	138		0				0	14		78	0	421	0	0	0	0
5:00 PM		59	20	0	152	137		0				0	13		100	0	481	0	0	1	0
5:15 PM		60	13	1	115	120		0				0	16		80	0	404	0	0	1	0
5:30 PM		57	19	0	108	116		0				0	20		53	0	373	0	0	0	0
5:45 PM		62	10	0	128	111		0				0	17		64	0	392	0	0	1	0
Total Survey		740	187	2	1,343	1,412		1				0	209		894	0	4,785	0	0	5	0

Peak Hour Summary
4:30 PM to 5:30 PM

By Approach	Northbound SE 17th Ave				Southbound SE 17th Ave				Eastbound Hwy 224				Westbound Hwy 224				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	315	608	923	1	1,047	574	1,621	0	0	0	0	0	392	572	964	0	1,754	0	0	2	0
%HV	1.9%				1.7%				0.0%				1.8%				1.8%				
PHF	0.93				0.91				0.00				0.87				0.91				

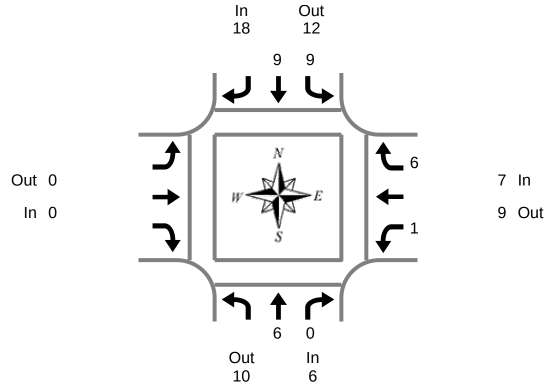
By Movement	Northbound SE 17th Ave				Southbound SE 17th Ave				Eastbound Hwy 224				Westbound Hwy 224				Total
		T	R	Total	L	T		Total				Total	L		R	Total	
Volume		249	66	315	506	541		1,047				0	67		325	392	1,754
%HV	NA	2.4%	0.0%	1.9%	1.8%	1.7%	NA	1.7%	NA	NA	NA	0.0%	1.5%	NA	1.8%	1.8%	1.8%
PHF		0.93	0.83	0.93	0.83	0.93		0.91				0.00	0.70		0.81	0.87	0.91

Rolling Hour Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound SE 17th Ave				Southbound SE 17th Ave				Eastbound Hwy 224				Westbound Hwy 224				Interval Total	Pedestrians Crosswalk			
		T	R	Bikes	L	T		Bikes				Bikes	L		R	Bikes		North	South	East	West
3:00 PM		241	61	1	390	367		0				0	70		315	0	1,444	0	0	1	0
3:15 PM		245	58	1	417	413		1				0	70		332	0	1,535	0	0	1	0
3:30 PM		245	57	1	431	483		1				0	67		310	0	1,593	0	0	2	0
3:45 PM		257	64	0	444	525		1				0	78		282	0	1,650	0	0	1	0
4:00 PM		261	64	0	450	561		1				0	73		282	0	1,691	0	0	1	0
4:15 PM		252	69	0	491	563		0				0	68		301	0	1,744	0	0	2	0
4:30 PM		249	66	1	506	541		0				0	67		325	0	1,754	0	0	2	0
4:45 PM		239	67	1	488	511		0				0	63		311	0	1,679	0	0	2	0
5:00 PM		238	62	1	503	484		0				0	66		297	0	1,650	0	0	3	0

Heavy Vehicle Summary

Clay Carney
(503) 833-2740



Peak Hour Summary
4:30 PM to 5:30 PM

SE 17th Ave & Hwy 224

Wednesday, November 29, 2006
3:00 PM to 6:00 PM

Heavy Vehicle 15-Minute Interval Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound SE 17th Ave				Southbound SE 17th Ave				Eastbound Hwy 224				Westbound Hwy 224				Interval Total
		T	R	Total	L	T		Total				Total	L		R	Total	
3:00 PM		1	2	3	3	2		5				0	1		3	4	12
3:15 PM		1	0	1	3	1		4				0	3		4	7	12
3:30 PM		1	1	2	1	3		4				0	0		2	2	8
3:45 PM		1	3	4	1	4		5				0	1		1	2	11
4:00 PM		2	0	2	1	6		7				0	1		1	2	11
4:15 PM		4	1	5	3	4		7				0	0		1	1	13
4:30 PM		2	0	2	3	5		8				0	0		3	3	13
4:45 PM		1	0	1	3	0		3				0	0		1	1	5
5:00 PM		1	0	1	0	2		2				0	0		1	1	4
5:15 PM		2	0	2	3	2		5				0	1		1	2	9
5:30 PM		1	0	1	2	0		2				0	0		0	0	3
5:45 PM		3	0	3	1	3		4				0	0		1	1	8
Total Survey		20	7	27	24	32		56				0	7		19	26	109

Heavy Vehicle Peak Hour Summary
4:30 PM to 5:30 PM

By Approach	Northbound SE 17th Ave			Southbound SE 17th Ave			Eastbound Hwy 224			Westbound Hwy 224			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	6	10	16	18	12	30	0	0	0	7	9	16	31
PHF	0.14			0.20			0.00			0.13			0.21

By Movement	Northbound SE 17th Ave				Southbound SE 17th Ave				Eastbound Hwy 224				Westbound Hwy 224				Total
		T	R	Total	L	T		Total				Total	L		R	Total	
Volume		6	0	6	9	9		18				0	1		6	7	31
PHF		0.19	0.00	0.14	0.25	0.15		0.20				0.00	0.06		0.17	0.13	0.21

Heavy Vehicle Rolling Hour Summary
3:00 PM to 6:00 PM

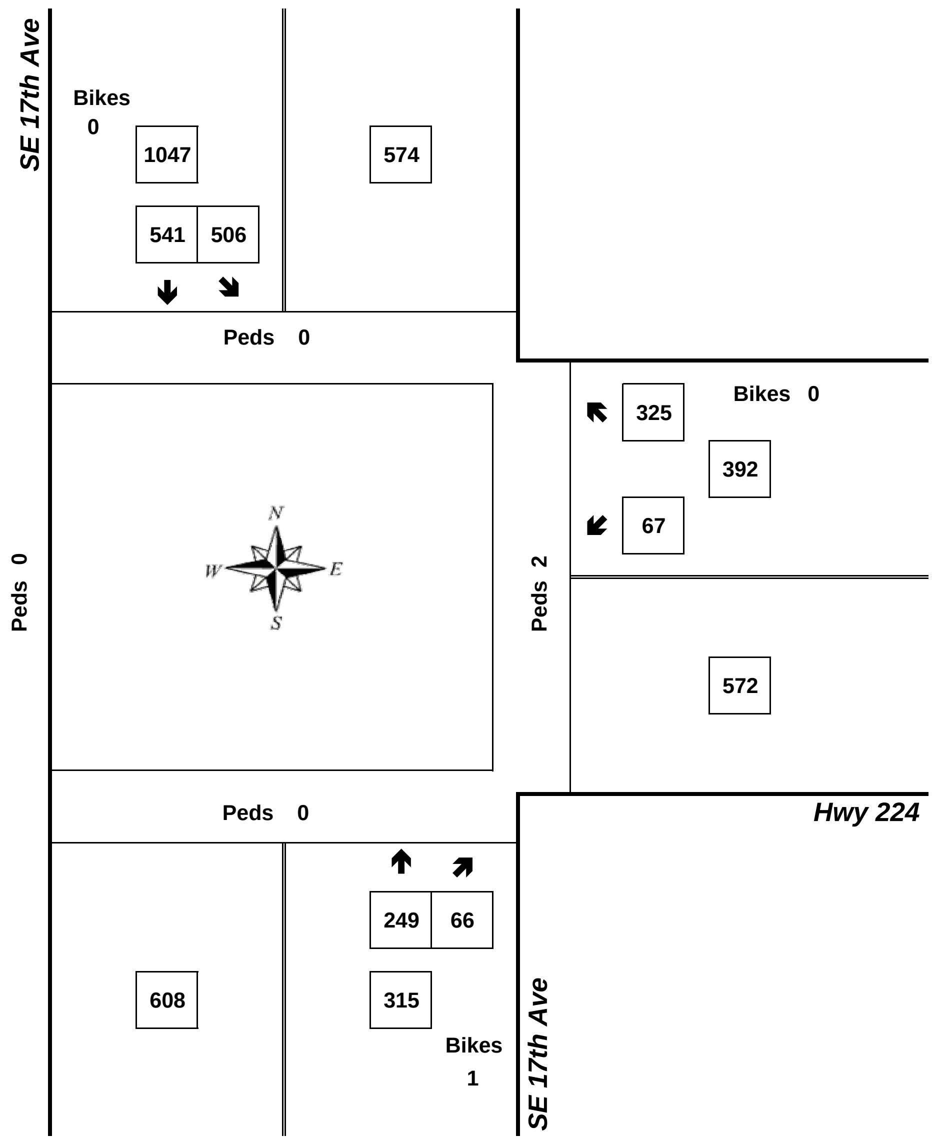
Interval Start Time	Northbound SE 17th Ave				Southbound SE 17th Ave				Eastbound Hwy 224				Westbound Hwy 224				Interval Total
		T	R	Total	L	T		Total				Total	L		R	Total	
3:00 PM		4	6	10	8	10		18				0	5		10	15	43
3:15 PM		5	4	9	6	14		20				0	5		8	13	42
3:30 PM		8	5	13	6	17		23				0	2		5	7	43
3:45 PM		9	4	13	8	19		27				0	2		6	8	48
4:00 PM		9	1	10	10	15		25				0	1		6	7	42
4:15 PM		8	1	9	9	11		20				0	0		6	6	35
4:30 PM		6	0	6	9	9		18				0	1		6	7	31
4:45 PM		5	0	5	8	4		12				0	1		3	4	21
5:00 PM		7	0	7	6	7		13				0	1		3	4	24

Peak Hour Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

SE 17th Ave & Hwy 224

4:30 PM to 5:30 PM
Wednesday, November 29, 2006



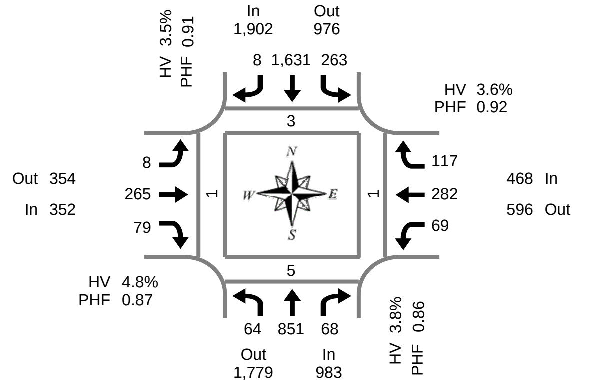
Approach	PHF	HV%	Volume
EB	0.00	0.0%	0
WB	0.87	1.8%	392
NB	0.93	1.9%	315
SB	0.91	1.7%	1,047
Intersection	0.91	1.8%	1,754

Count Period: 3:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



Peak Hour Summary
3:45 PM to 4:45 PM

Hwy 224 & SE Harrison St

Thursday, December 07, 2006
3:00 PM to 6:00 PM

15-Minute Interval Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 224 L	T	R	Bikes	Southbound Hwy 224 L	T	R	Bikes	Eastbound SE Harrison St L	T	R	Bikes	Westbound SE Harrison St L	T	R	Bikes	Interval Total
3:00 PM	26	190	22	0	44	276	8	0	0	80	32	0	23	62	30	0	793
3:15 PM	20	180	19	0	41	328	6	0	5	77	19	0	28	66	22	0	811
3:30 PM	20	207	25	0	36	324	6	0	1	89	20	0	19	50	42	0	839
3:45 PM	23	212	25	0	66	359	3	0	4	57	25	0	12	82	27	0	895
4:00 PM	13	197	19	0	74	449	1	0	0	58	17	0	17	76	34	0	955
4:15 PM	12	261	14	0	53	435	1	0	0	71	19	0	19	62	30	1	977
4:30 PM	16	181	10	0	70	388	3	0	4	79	18	0	21	62	26	0	878
4:45 PM	19	171	14	0	74	367	3	0	2	78	23	0	22	64	32	0	869
5:00 PM	9	232	17	0	59	398	3	0	3	72	27	0	23	46	26	1	915
5:15 PM	10	176	18	0	51	389	3	0	1	75	18	0	29	40	29	0	839
5:30 PM	9	219	15	1	51	421	2	0	3	83	17	0	15	61	19	0	915
5:45 PM	14	144	16	0	65	348	0	0	0	69	18	0	16	60	31	0	781
Total Survey	191	2,370	214	1	684	4,482	39	0	23	888	253	0	244	731	348	2	10,467

Interval Start Time	Pedestrians Crosswalk North	South	East	West
3:00 PM	1	5	0	0
3:15 PM	4	1	0	0
3:30 PM	1	3	1	0
3:45 PM	1	2	0	0
4:00 PM	0	1	0	0
4:15 PM	0	0	0	0
4:30 PM	2	2	1	1
4:45 PM	0	0	0	0
5:00 PM	3	1	1	0
5:15 PM	0	1	1	0
5:30 PM	0	1	0	0
5:45 PM	1	2	0	0
Total Survey	13	19	4	1

Peak Hour Summary
3:45 PM to 4:45 PM

By Approach	Northbound Hwy 224 In	Out	Total	Bikes	Southbound Hwy 224 In	Out	Total	Bikes	Eastbound SE Harrison St In	Out	Total	Bikes	Westbound SE Harrison St In	Out	Total	Bikes	Total
Volume	983	1,779	2,762	0	1,902	976	2,878	0	352	354	706	0	468	596	1,064	1	3,705
%HV	3.8%				3.5%				4.8%				3.6%				3.7%
PHF	0.86				0.91				0.87				0.92				0.95

	Pedestrians Crosswalk North	South	East	West
Volume	3	5	1	1

By Movement	Northbound Hwy 224 L	T	R	Total	Southbound Hwy 224 L	T	R	Total	Eastbound SE Harrison St L	T	R	Total	Westbound SE Harrison St L	T	R	Total	Total
Volume	64	851	68	983	263	1,631	8	1,902	8	265	79	352	69	282	117	468	3,705
%HV	6.3%	3.9%	0.0%	3.8%	1.5%	3.7%	12.5%	3.5%	0.0%	5.3%	3.8%	4.8%	4.3%	3.5%	3.4%	3.6%	3.7%
PHF	0.70	0.82	0.68	0.86	0.89	0.91	0.67	0.91	0.50	0.84	0.79	0.87	0.82	0.86	0.86	0.92	0.95

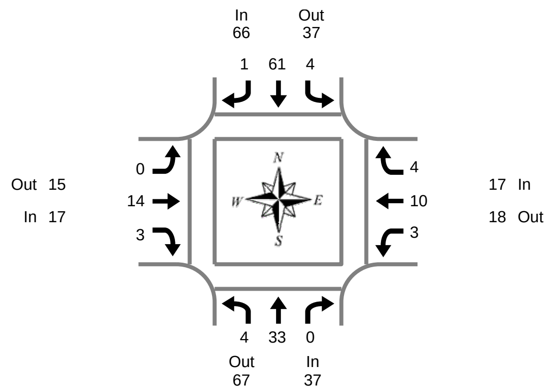
Rolling Hour Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 224 L	T	R	Bikes	Southbound Hwy 224 L	T	R	Bikes	Eastbound SE Harrison St L	T	R	Bikes	Westbound SE Harrison St L	T	R	Bikes	Interval Total
3:00 PM	89	789	91	0	187	1,287	23	0	10	303	96	0	82	260	121	0	3,338
3:15 PM	76	796	88	0	217	1,460	16	0	10	281	81	0	76	274	125	0	3,500
3:30 PM	68	877	83	0	229	1,567	11	0	5	275	81	0	67	270	133	1	3,666
3:45 PM	64	851	68	0	263	1,631	8	0	8	265	79	0	69	282	117	1	3,705
4:00 PM	60	810	57	0	271	1,639	8	0	6	286	77	0	79	264	122	1	3,679
4:15 PM	56	845	55	0	256	1,588	10	0	9	300	87	0	85	234	114	2	3,639
4:30 PM	54	760	59	0	254	1,542	12	0	10	304	86	0	95	212	113	1	3,501
4:45 PM	47	798	64	1	235	1,575	11	0	9	308	85	0	89	211	106	1	3,538
5:00 PM	42	771	66	1	226	1,556	8	0	7	299	80	0	83	207	105	1	3,450

Interval Start Time	Pedestrians Crosswalk North	South	East	West
3:00 PM	7	11	1	0
3:15 PM	6	7	1	0
3:30 PM	2	6	1	0
3:45 PM	3	5	1	1
4:00 PM	2	3	1	1
4:15 PM	5	3	2	1
4:30 PM	5	4	3	1
4:45 PM	3	3	2	0
5:00 PM	4	5	2	0

Heavy Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Hwy 224 & SE Harrison St

Thursday, December 07, 2006
3:00 PM to 6:00 PM

Peak Hour Summary
3:45 PM to 4:45 PM

Heavy Vehicle 15-Minute Interval Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 224				Southbound Hwy 224				Eastbound SE Harrison St				Westbound SE Harrison St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
3:00 PM	2	13	1	16	2	25	1	28	0	5	0	5	1	4	3	8	57
3:15 PM	2	16	2	20	3	27	0	30	0	3	2	5	2	6	0	8	63
3:30 PM	1	16	0	17	1	14	0	15	0	3	2	5	1	0	2	3	40
3:45 PM	1	16	0	17	1	16	0	17	0	2	2	4	1	5	0	6	44
4:00 PM	0	4	0	4	0	25	0	25	0	5	1	6	1	1	2	4	39
4:15 PM	1	6	0	7	2	10	0	12	0	3	0	3	0	1	2	3	25
4:30 PM	2	7	0	9	1	10	1	12	0	4	0	4	1	3	0	4	29
4:45 PM	1	6	0	7	1	4	1	6	0	5	0	5	0	2	0	2	20
5:00 PM	1	7	0	8	0	8	0	8	0	4	0	4	0	3	0	3	23
5:15 PM	0	6	0	6	0	6	0	6	0	3	0	3	0	5	0	5	20
5:30 PM	0	8	0	8	0	7	0	7	0	4	0	4	0	2	1	3	22
5:45 PM	0	2	0	2	0	9	0	9	0	2	0	2	0	4	1	5	18
Total Survey	11	107	3	121	11	161	3	175	0	43	7	50	7	36	11	54	400

Heavy Vehicle Peak Hour Summary
3:45 PM to 4:45 PM

By Approach	Northbound Hwy 224			Southbound Hwy 224			Eastbound SE Harrison St			Westbound SE Harrison St			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	37	67	104	66	37	103	17	15	32	17	18	35	137
PHF	0.17			0.23			0.28			0.22			0.21

By Movement	Northbound Hwy 224				Southbound Hwy 224				Eastbound SE Harrison St				Westbound SE Harrison St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	4	33	0	37	4	61	1	66	0	14	3	17	3	10	4	17	137
PHF	0.20	0.17	0.00	0.17	0.17	0.23	0.13	0.23	0.00	0.27	0.13	0.28	0.19	0.23	0.20	0.22	0.21

Heavy Vehicle Rolling Hour Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 224				Southbound Hwy 224				Eastbound SE Harrison St				Westbound SE Harrison St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
3:00 PM	6	61	3	70	7	82	1	90	0	13	6	19	5	15	5	25	204
3:15 PM	4	52	2	58	5	82	0	87	0	13	7	20	5	12	4	21	186
3:30 PM	3	42	0	45	4	65	0	69	0	13	5	18	3	7	6	16	148
3:45 PM	4	33	0	37	4	61	1	66	0	14	3	17	3	10	4	17	137
4:00 PM	4	23	0	27	4	49	2	55	0	17	1	18	2	7	4	13	113
4:15 PM	5	26	0	31	4	32	2	38	0	16	0	16	1	9	2	12	97
4:30 PM	4	26	0	30	2	28	2	32	0	16	0	16	1	13	0	14	92
4:45 PM	2	27	0	29	1	25	1	27	0	16	0	16	0	12	1	13	85
5:00 PM	1	23	0	24	0	30	0	30	0	13	0	13	0	14	2	16	83

Peak Hour Summary

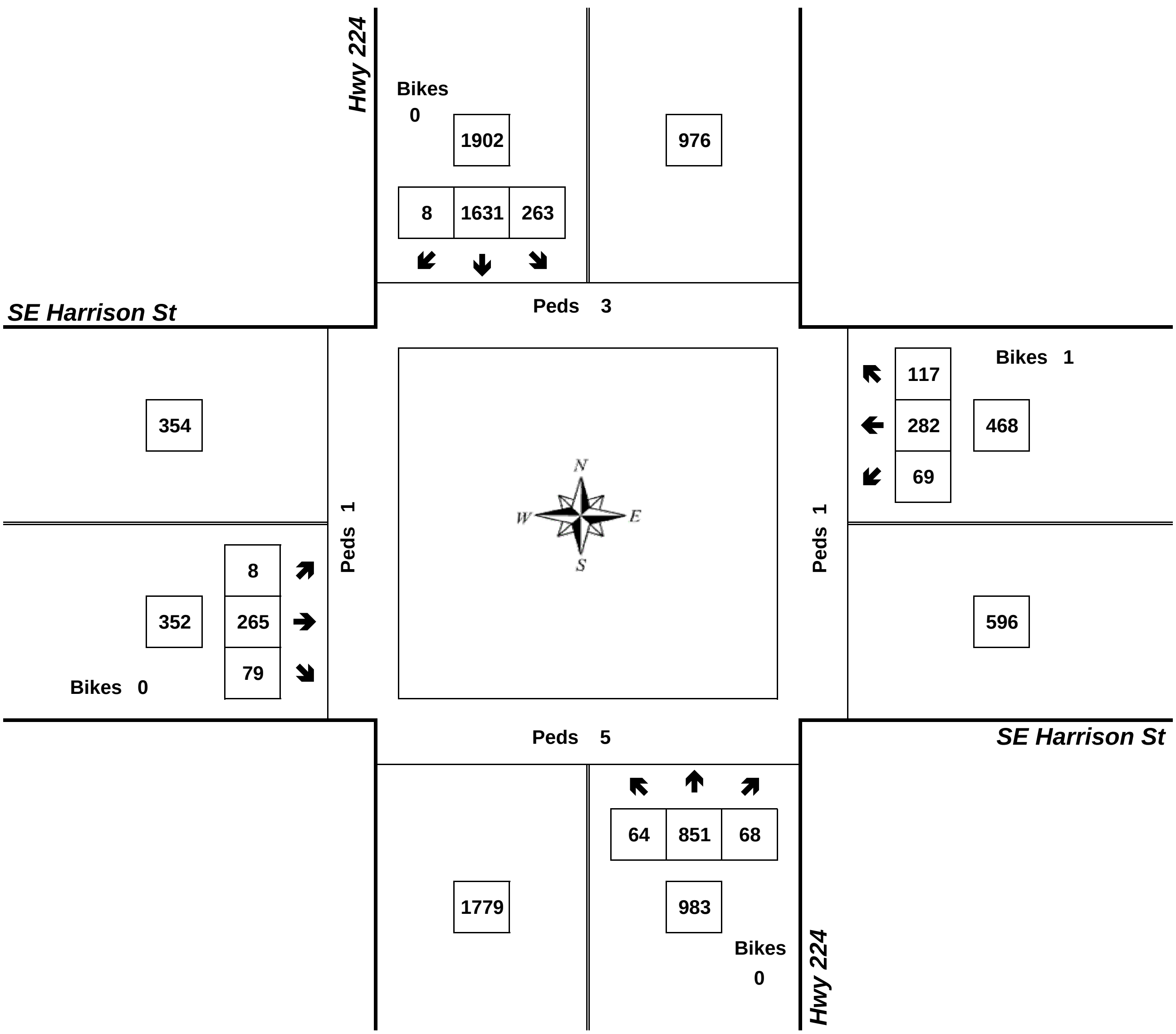
All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

Hwy 224 & SE Harrison St

3:45 PM to 4:45 PM

Thursday, December 07, 2006



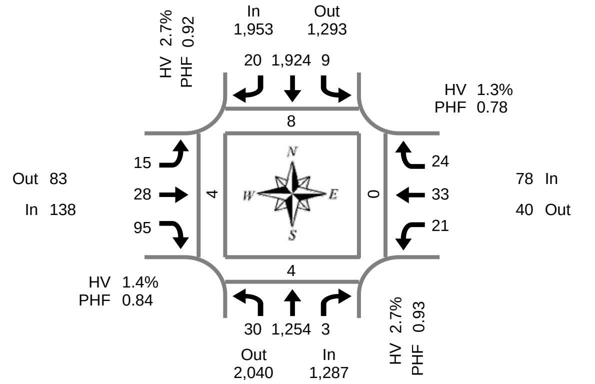
Approach	PHF	HV%	Volume
EB	0.87	4.8%	352
WB	0.92	3.6%	468
NB	0.86	3.8%	983
SB	0.91	3.5%	1,902
Intersection	0.95	3.7%	3,705

Count Period: 3:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



Peak Hour Summary
4:30 PM to 5:30 PM

Hwy 224 & SE Monroe St

Tuesday, December 05, 2006
3:00 PM to 6:00 PM

15-Minute Interval Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 224				Southbound Hwy 224				Eastbound SE Monroe St				Westbound SE Monroe St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
3:00 PM	4	221	0	0	3	367	3	0	4	3	16	0	5	5	9	0	640	0	0	0	0
3:15 PM	16	181	3	0	3	393	3	0	6	11	32	0	4	16	15	1	683	1	0	0	2
3:30 PM	7	234	5	0	3	382	5	0	2	13	30	0	12	12	19	0	724	0	1	0	0
3:45 PM	9	236	7	0	7	422	5	0	3	8	14	0	9	8	9	0	737	2	0	0	0
4:00 PM	8	296	3	0	2	469	2	0	3	8	12	1	4	6	7	0	820	1	1	0	1
4:15 PM	9	268	2	0	8	395	4	0	5	9	19	0	2	10	9	0	740	4	0	0	0
4:30 PM	9	281	2	0	3	451	3	0	1	4	26	0	7	10	8	2	805	4	1	0	0
4:45 PM	8	299	0	0	3	454	7	0	7	8	22	0	2	11	5	0	826	1	1	0	0
5:00 PM	8	334	0	0	2	492	5	0	5	11	25	1	8	7	4	0	901	3	1	0	0
5:15 PM	5	340	1	0	1	527	5	0	2	5	22	0	4	5	7	0	924	0	1	0	4
5:30 PM	7	268	1	0	1	454	3	0	3	9	18	0	6	6	10	0	786	2	0	0	3
5:45 PM	8	257	1	0	2	413	4	0	4	7	24	0	6	7	1	0	734	0	1	0	5
Total Survey	98	3,215	25	0	38	5,219	49	0	45	96	260	2	69	103	103	3	9,320	18	7	0	15

Peak Hour Summary
4:30 PM to 5:30 PM

By Approach	Northbound Hwy 224				Southbound Hwy 224				Eastbound SE Monroe St				Westbound SE Monroe St				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	1,287	2,040	3,327	0	1,953	1,293	3,246	0	138	83	221	1	78	40	118	2	3,456	8	4	0	4
%HV	2.7%				2.7%				1.4%				1.3%				2.6%				
PHF	0.93				0.92				0.84				0.78				0.94				

By Movement	Northbound Hwy 224				Southbound Hwy 224				Eastbound SE Monroe St				Westbound SE Monroe St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	30	1,254	3	1,287	9	1,924	20	1,953	15	28	95	138	21	33	24	78	3,456
%HV	0.0%	2.8%	0.0%	2.7%	11.1%	2.6%	5.0%	2.7%	0.0%	0.0%	2.1%	1.4%	0.0%	0.0%	4.2%	1.3%	2.6%
PHF	0.83	0.92	0.38	0.93	0.75	0.91	0.71	0.92	0.54	0.64	0.91	0.84	0.66	0.75	0.75	0.78	0.94

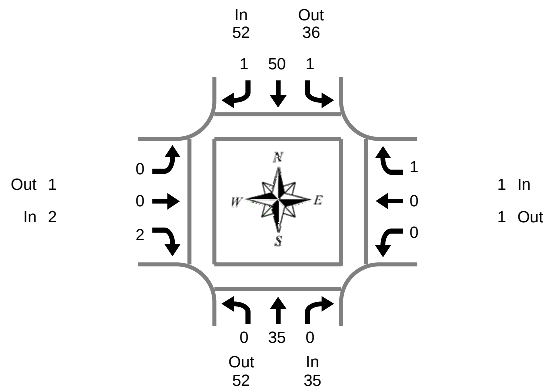
Rolling Hour Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 224				Southbound Hwy 224				Eastbound SE Monroe St				Westbound SE Monroe St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
3:00 PM	36	872	15	0	16	1,564	16	0	15	35	92	0	30	41	52	1	2,784	3	1	0	2
3:15 PM	40	947	18	0	15	1,666	15	0	14	40	88	1	29	42	50	1	2,964	4	2	0	3
3:30 PM	33	1,034	17	0	20	1,668	16	0	13	38	75	1	27	36	44	0	3,021	7	2	0	1
3:45 PM	35	1,081	14	0	20	1,737	14	0	12	29	71	1	22	34	33	2	3,102	11	2	0	1
4:00 PM	34	1,144	7	0	16	1,769	16	0	16	29	79	1	15	37	29	2	3,191	10	3	0	1
4:15 PM	34	1,182	4	0	16	1,792	19	0	18	32	92	1	19	38	26	2	3,272	12	3	0	0
4:30 PM	30	1,254	3	0	9	1,924	20	0	15	28	95	1	21	33	24	2	3,456	8	4	0	4
4:45 PM	28	1,241	2	0	7	1,927	20	0	17	33	87	1	20	29	26	0	3,437	6	3	0	7
5:00 PM	28	1,199	3	0	6	1,886	17	0	14	32	89	1	24	25	22	0	3,345	5	3	0	12

Heavy Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



Hwy 224 & SE Monroe St

Tuesday, December 05, 2006
3:00 PM to 6:00 PM

Peak Hour Summary
4:30 PM to 5:30 PM

Heavy Vehicle 15-Minute Interval Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 224				Southbound Hwy 224				Eastbound SE Monroe St				Westbound SE Monroe St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
3:00 PM	0	13	0	13	0	21	0	21	0	0	0	0	1	0	0	1	35
3:15 PM	1	17	0	18	0	19	0	19	1	0	1	2	2	0	1	3	42
3:30 PM	0	16	0	16	1	20	1	22	0	0	1	1	0	0	1	1	40
3:45 PM	0	12	1	13	0	15	1	16	0	0	0	0	1	0	0	1	30
4:00 PM	0	17	0	17	0	24	0	24	0	0	0	0	0	0	1	1	42
4:15 PM	0	16	0	16	0	15	0	15	0	0	0	0	0	0	0	0	31
4:30 PM	0	15	0	15	0	12	0	12	0	0	1	1	0	0	1	1	29
4:45 PM	0	7	0	7	1	13	0	14	0	0	0	0	0	0	0	0	21
5:00 PM	0	5	0	5	0	12	1	13	0	0	1	1	0	0	0	0	19
5:15 PM	0	8	0	8	0	13	0	13	0	0	0	0	0	0	0	0	21
5:30 PM	0	7	0	7	0	6	0	6	0	0	0	0	0	0	0	0	13
5:45 PM	0	8	0	8	0	7	0	7	0	0	1	1	0	0	0	0	16
Total Survey	1	141	1	143	2	177	3	182	1	0	5	6	4	0	4	8	339

Heavy Vehicle Peak Hour Summary
4:30 PM to 5:30 PM

By Approach	Northbound Hwy 224			Southbound Hwy 224			Eastbound SE Monroe St			Westbound SE Monroe St			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	35	52	87	52	36	88	2	1	3	1	1	2	90
PHF	0.18			0.21			0.17			0.05			0.19

By Movement	Northbound Hwy 224				Southbound Hwy 224				Eastbound SE Monroe St				Westbound SE Monroe St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	35	0	35	1	50	1	52	0	0	2	2	0	0	1	1	90
PHF	0.00	0.18	0.00	0.18	0.25	0.21	0.13	0.21	0.00	0.00	0.25	0.17	0.00	0.00	0.13	0.05	0.19

Heavy Vehicle Rolling Hour Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 224				Southbound Hwy 224				Eastbound SE Monroe St				Westbound SE Monroe St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
3:00 PM	1	58	1	60	1	75	2	78	1	0	2	3	4	0	2	6	147
3:15 PM	1	62	1	64	1	78	2	81	1	0	2	3	3	0	3	6	154
3:30 PM	0	61	1	62	1	74	2	77	0	0	1	1	1	0	2	3	143
3:45 PM	0	60	1	61	0	66	1	67	0	0	1	1	1	0	2	3	132
4:00 PM	0	55	0	55	1	64	0	65	0	0	1	1	0	0	2	2	123
4:15 PM	0	43	0	43	1	52	1	54	0	0	2	2	0	0	1	1	100
4:30 PM	0	35	0	35	1	50	1	52	0	0	2	2	0	0	1	1	90
4:45 PM	0	27	0	27	1	44	1	46	0	0	1	1	0	0	0	0	74
5:00 PM	0	28	0	28	0	38	1	39	0	0	2	2	0	0	0	0	69

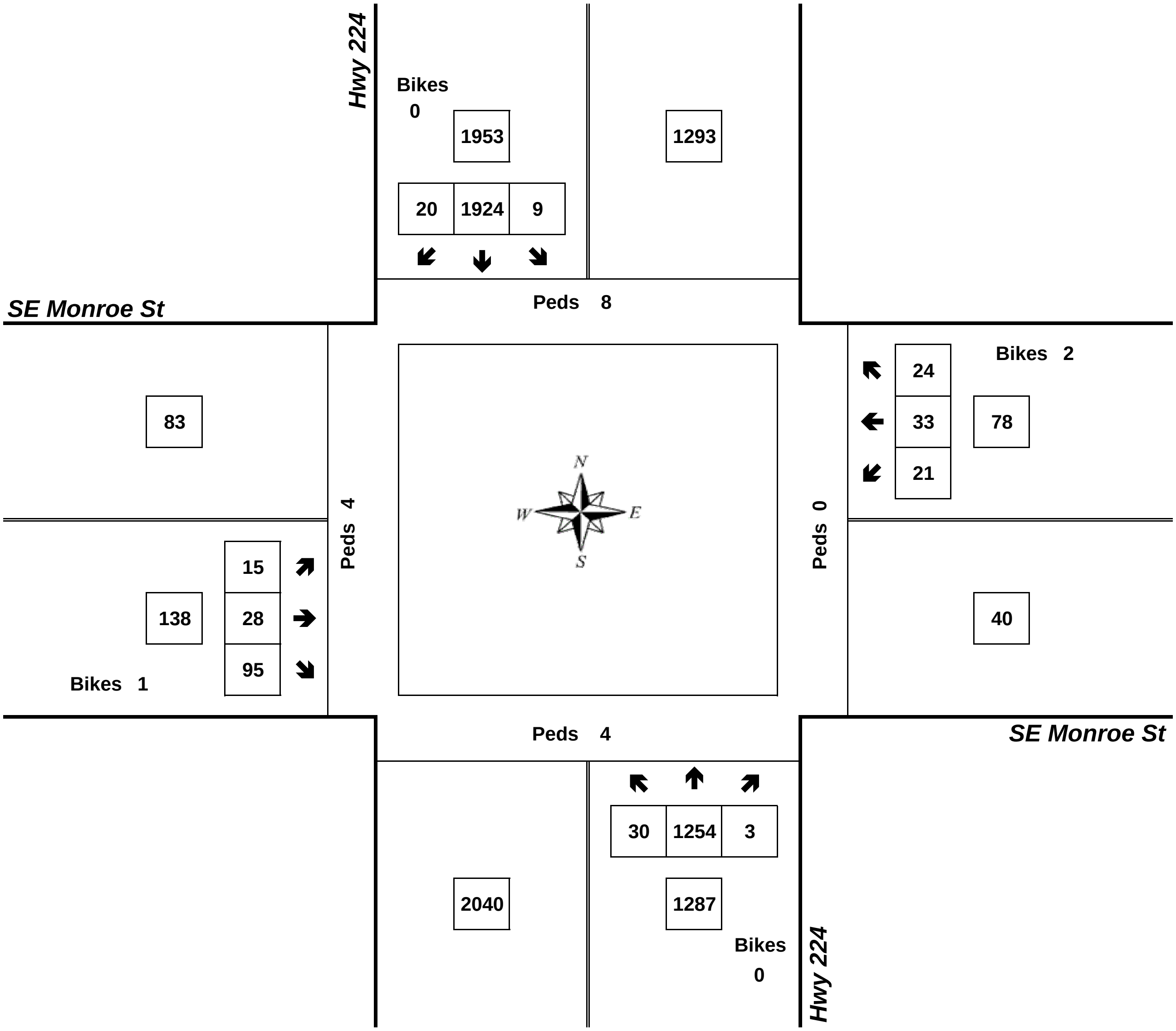
Peak Hour Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

Hwy 224 & SE Monroe St

4:30 PM to 5:30 PM
Tuesday, December 05, 2006



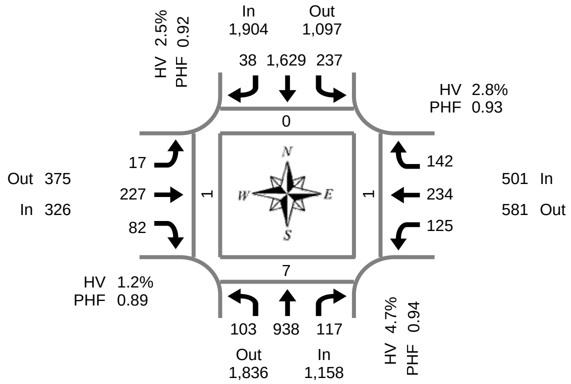
Approach	PHF	HV%	Volume
EB	0.84	1.4%	138
WB	0.78	1.3%	78
NB	0.93	2.7%	1,287
SB	0.92	2.7%	1,953
Intersection	0.94	2.6%	3,456

Count Period: 3:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



Peak Hour Summary
4:15 PM to 5:15 PM

Hwy 224 & SE Oak St

Thursday, November 30, 2006
3:00 PM to 6:00 PM

15-Minute Interval Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 224				Southbound Hwy 224				Eastbound SE Oak St				Westbound SE Oak St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
3:00 PM	25	197	39	0	39	317	12	0	1	37	18	1	26	72	27	0	810	0	0	2	0
3:15 PM	31	165	29	0	39	344	11	0	6	56	22	0	40	62	18	0	823	0	0	0	1
3:30 PM	25	210	29	0	54	306	6	0	2	89	22	0	32	82	32	0	889	0	2	0	1
3:45 PM	21	181	26	0	42	375	7	0	6	56	20	0	33	54	24	1	845	0	1	0	4
4:00 PM	24	228	42	0	51	442	5	0	1	55	22	0	32	48	18	0	968	0	4	1	1
4:15 PM	30	240	29	0	64	444	8	0	0	63	22	0	33	56	45	0	1,034	0	3	0	0
4:30 PM	32	215	30	0	60	360	11	0	7	50	21	0	34	50	41	0	911	0	0	1	1
4:45 PM	20	223	32	0	50	395	13	0	3	64	25	0	25	74	29	2	953	0	4	0	0
5:00 PM	21	260	26	0	63	430	6	0	7	50	14	0	33	54	27	1	991	0	0	0	0
5:15 PM	22	222	33	0	73	400	9	0	0	48	16	0	32	78	31	0	964	0	1	0	0
5:30 PM	22	231	37	0	55	416	10	0	4	60	17	0	22	63	22	0	959	0	0	0	0
5:45 PM	18	188	37	0	58	389	5	0	0	53	17	1	27	70	28	0	890	0	0	0	0
Total Survey	291	2,560	389	0	648	4,618	103	0	37	681	236	2	369	763	342	4	11,037	0	15	4	8

Peak Hour Summary
4:15 PM to 5:15 PM

By Approach	Northbound Hwy 224				Southbound Hwy 224				Eastbound SE Oak St				Westbound SE Oak St				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	1,158	1,836	2,994	0	1,904	1,097	3,001	0	326	375	701	0	501	581	1,082	3	3,889	0	7	1	1
%HV	4.7%				2.5%				1.2%				2.8%				3.1%				
PHF	0.94				0.92				0.89				0.93				0.94				

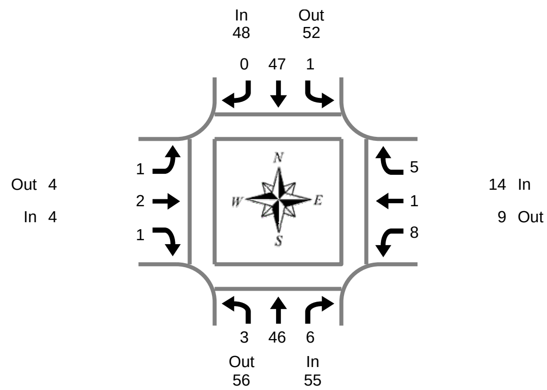
By Movement	Northbound Hwy 224				Southbound Hwy 224				Eastbound SE Oak St				Westbound SE Oak St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	103	938	117	1,158	237	1,629	38	1,904	17	227	82	326	125	234	142	501	3,889
%HV	2.9%	4.9%	5.1%	4.7%	0.4%	2.9%	0.0%	2.5%	5.9%	0.9%	1.2%	1.2%	6.4%	0.4%	3.5%	2.8%	3.1%
PHF	0.80	0.90	0.91	0.94	0.93	0.92	0.73	0.92	0.61	0.89	0.82	0.89	0.92	0.79	0.79	0.93	0.94

Rolling Hour Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 224				Southbound Hwy 224				Eastbound SE Oak St				Westbound SE Oak St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
3:00 PM	102	753	123	0	174	1,342	36	0	15	238	82	1	131	270	101	1	3,367	0	3	2	6
3:15 PM	101	784	126	0	186	1,467	29	0	15	256	86	0	137	246	92	1	3,525	0	7	1	7
3:30 PM	100	859	126	0	211	1,567	26	0	9	263	86	0	130	240	119	1	3,736	0	10	1	6
3:45 PM	107	864	127	0	217	1,621	31	0	14	224	85	0	132	208	128	1	3,758	0	8	2	6
4:00 PM	106	906	133	0	225	1,641	37	0	11	232	90	0	124	228	133	2	3,866	0	11	2	2
4:15 PM	103	938	117	0	237	1,629	38	0	17	227	82	0	125	234	142	3	3,889	0	7	1	1
4:30 PM	95	920	121	0	246	1,585	39	0	17	212	76	0	124	256	128	3	3,819	0	5	1	1
4:45 PM	85	936	128	0	241	1,641	38	0	14	222	72	0	112	269	109	3	3,867	0	5	0	0
5:00 PM	83	901	133	0	249	1,635	30	0	11	211	64	1	114	265	108	1	3,804	0	1	0	0

Heavy Vehicle Summary

Clay Carney
(503) 833-2740



Peak Hour Summary
4:15 PM to 5:15 PM

Hwy 224 & SE Oak St

Thursday, November 30, 2006
3:00 PM to 6:00 PM

Heavy Vehicle 15-Minute Interval Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 224				Southbound Hwy 224				Eastbound SE Oak St				Westbound SE Oak St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
3:00 PM	1	10	2	13	1	24	1	26	0	0	3	3	3	1	2	6	48
3:15 PM	2	14	0	16	0	25	0	25	0	0	0	0	2	2	0	4	45
3:30 PM	2	14	0	16	2	19	0	21	0	2	0	2	2	1	2	5	44
3:45 PM	2	15	0	17	0	15	0	15	0	0	0	0	1	2	0	3	35
4:00 PM	0	4	2	6	4	22	0	26	0	8	0	8	1	2	0	3	43
4:15 PM	2	9	4	15	0	10	0	10	0	1	1	2	4	0	2	6	33
4:30 PM	1	14	0	15	0	12	0	12	0	0	0	0	2	0	3	5	32
4:45 PM	0	15	1	16	1	15	0	16	0	1	0	1	1	0	0	1	34
5:00 PM	0	8	1	9	0	10	0	10	1	0	0	1	1	1	0	2	22
5:15 PM	0	8	0	8	1	11	0	12	0	0	0	0	1	0	1	2	22
5:30 PM	0	6	0	6	0	7	1	8	0	0	0	0	0	0	0	0	14
5:45 PM	0	6	0	6	0	12	0	12	0	0	0	0	0	0	0	0	18
Total Survey	10	123	10	143	9	182	2	193	1	12	4	17	18	9	10	37	390

Heavy Vehicle Peak Hour Summary
4:15 PM to 5:15 PM

By Approach	Northbound Hwy 224			Southbound Hwy 224			Eastbound SE Oak St			Westbound SE Oak St			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	55	56	111	48	52	100	4	4	8	14	9	23	121
PHF	0.28			0.17			0.10			0.23			0.22

By Movement	Northbound Hwy 224				Southbound Hwy 224				Eastbound SE Oak St				Westbound SE Oak St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	3	46	6	55	1	47	0	48	1	2	1	4	8	1	5	14	121
PHF	0.13	0.27	0.25	0.28	0.04	0.17	0.00	0.17	0.25	0.05	0.08	0.10	0.29	0.05	0.25	0.23	0.22

Heavy Vehicle Rolling Hour Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 224				Southbound Hwy 224				Eastbound SE Oak St				Westbound SE Oak St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
3:00 PM	7	53	2	62	3	83	1	87	0	2	3	5	8	6	4	18	172
3:15 PM	6	47	2	55	6	81	0	87	0	10	0	10	6	7	2	15	167
3:30 PM	6	42	6	54	6	66	0	72	0	11	1	12	8	5	4	17	155
3:45 PM	5	42	6	53	4	59	0	63	0	9	1	10	8	4	5	17	143
4:00 PM	3	42	7	52	5	59	0	64	0	10	1	11	8	2	5	15	142
4:15 PM	3	46	6	55	1	47	0	48	1	2	1	4	8	1	5	14	121
4:30 PM	1	45	2	48	2	48	0	50	1	1	0	2	5	1	4	10	110
4:45 PM	0	37	2	39	2	43	1	46	1	1	0	2	3	1	1	5	92
5:00 PM	0	28	1	29	1	40	1	42	1	0	0	1	2	1	1	4	76

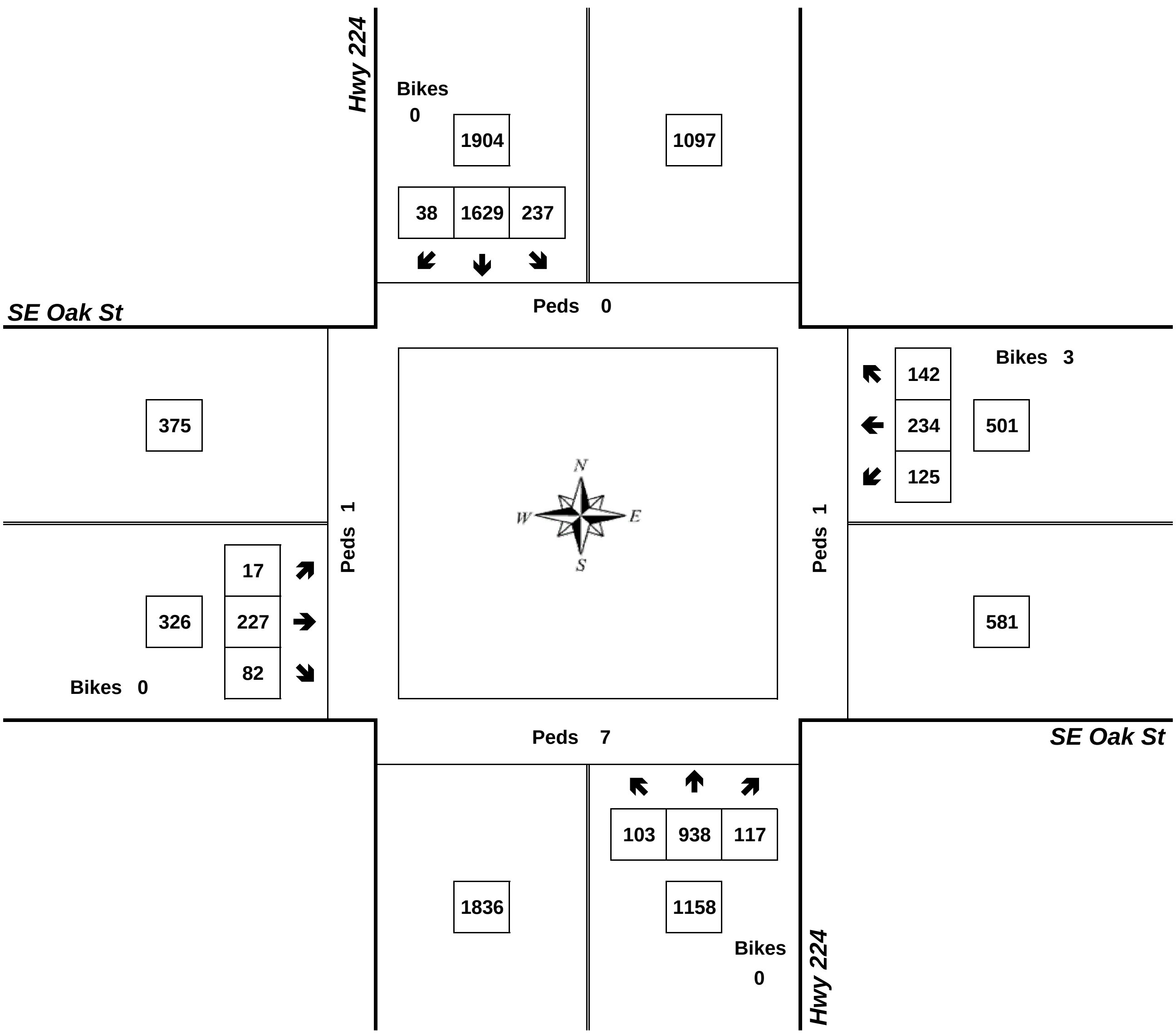
Peak Hour Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

Hwy 224 & SE Oak St

4:15 PM to 5:15 PM
Thursday, November 30, 2006

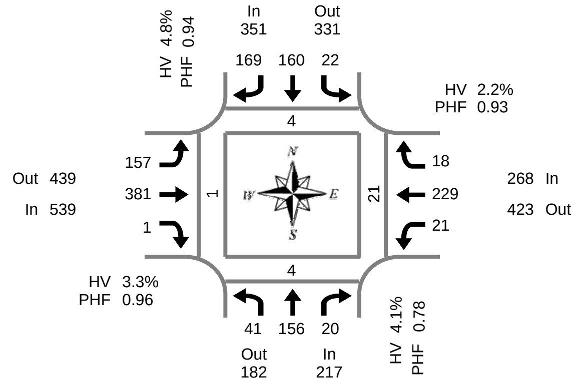


Approach	PHF	HV%	Volume
EB	0.89	1.2%	326
WB	0.93	2.8%	501
NB	0.94	4.7%	1,158
SB	0.92	2.5%	1,904
Intersection	0.94	3.1%	3,889

Count Period: 3:00 PM to 6:00 PM

Total Vehicle Summary

Clay Carney
(503) 833-2740



Peak Hour Summary
4:00 PM to 5:00 PM

SE 32nd Ave & SE Harrison St

Thursday, December 07, 2006
3:00 PM to 6:00 PM

15-Minute Interval Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound SE 32nd Ave				Southbound SE 32nd Ave				Eastbound SE Harrison St				Westbound SE Harrison St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
3:00 PM	10	29	7	0	6	35	45	0	41	93	1	0	7	54	5	0	333	2	1	7	0
3:15 PM	11	47	8	0	9	47	46	0	43	79	2	0	4	55	5	0	356	6	6	4	0
3:30 PM	12	35	3	0	11	33	42	0	47	91	4	0	4	52	9	0	343	0	4	8	0
3:45 PM	4	42	5	0	6	55	45	0	37	56	0	0	4	44	6	0	304	5	2	12	1
4:00 PM	14	52	4	0	2	36	51	0	45	95	0	0	5	60	2	0	366	1	0	7	0
4:15 PM	11	38	6	0	8	40	36	0	39	97	0	0	4	57	2	0	338	0	1	3	0
4:30 PM	6	31	5	2	4	49	40	0	37	103	1	0	6	58	8	0	348	3	1	7	0
4:45 PM	10	35	5	0	8	35	42	0	36	86	0	0	6	54	6	0	323	0	2	4	1
5:00 PM	11	26	3	0	11	35	32	0	37	85	0	0	3	31	1	0	275	8	1	6	0
5:15 PM	16	52	4	0	7	36	46	0	28	95	1	0	7	39	6	0	337	4	2	7	2
5:30 PM	9	46	3	0	3	45	40	0	32	99	0	0	4	50	5	0	336	0	1	5	0
5:45 PM	11	33	4	0	6	32	35	0	24	100	1	0	7	49	5	0	307	1	1	1	0
Total Survey	125	466	57	2	81	478	500	0	446	1,079	10	0	61	603	60	0	3,966	30	22	71	4

Peak Hour Summary
4:00 PM to 5:00 PM

By Approach	Northbound SE 32nd Ave				Southbound SE 32nd Ave				Eastbound SE Harrison St				Westbound SE Harrison St				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	217	182	399	2	351	331	682	0	539	439	978	0	268	423	691	0	1,375	4	4	21	1
%HV	4.1%				4.8%				3.3%				2.2%				3.6%				
PHF	0.78				0.94				0.96				0.93				0.94				

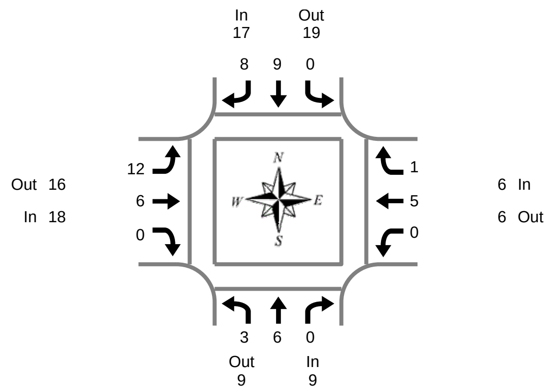
By Movement	Northbound SE 32nd Ave				Southbound SE 32nd Ave				Eastbound SE Harrison St				Westbound SE Harrison St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	41	156	20	217	22	160	169	351	157	381	1	539	21	229	18	268	1,375
%HV	7.3%	3.8%	0.0%	4.1%	0.0%	5.6%	4.7%	4.8%	7.6%	1.6%	0.0%	3.3%	0.0%	2.2%	5.6%	2.2%	3.6%
PHF	0.73	0.75	0.83	0.78	0.69	0.82	0.83	0.94	0.87	0.92	0.25	0.96	0.88	0.95	0.56	0.93	0.94

Rolling Hour Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound SE 32nd Ave				Southbound SE 32nd Ave				Eastbound SE Harrison St				Westbound SE Harrison St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
3:00 PM	37	153	23	0	32	170	178	0	168	319	7	0	19	205	25	0	1,336	13	13	31	1
3:15 PM	41	176	20	0	28	171	184	0	172	321	6	0	17	211	22	0	1,369	12	12	31	1
3:30 PM	41	167	18	0	27	164	174	0	168	339	4	0	17	213	19	0	1,351	6	7	30	1
3:45 PM	35	163	20	2	20	180	172	0	158	351	1	0	19	219	18	0	1,356	9	4	29	1
4:00 PM	41	156	20	2	22	160	169	0	157	381	1	0	21	229	18	0	1,375	4	4	21	1
4:15 PM	38	130	19	2	31	159	150	0	149	371	1	0	19	200	17	0	1,284	11	5	20	1
4:30 PM	43	144	17	2	30	155	160	0	138	369	2	0	22	182	21	0	1,283	15	6	24	3
4:45 PM	46	159	15	0	29	151	160	0	133	365	1	0	20	174	18	0	1,271	12	6	22	3
5:00 PM	47	157	14	0	27	148	153	0	121	379	2	0	21	169	17	0	1,255	13	5	19	2

Heavy Vehicle Summary

Clay Carney
(503) 833-2740



Peak Hour Summary
4:00 PM to 5:00 PM

SE 32nd Ave & SE Harrison St

Thursday, December 07, 2006
3:00 PM to 6:00 PM

Heavy Vehicle 15-Minute Interval Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound SE 32nd Ave				Southbound SE 32nd Ave				Eastbound SE Harrison St				Westbound SE Harrison St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
3:00 PM	0	1	1	2	1	1	4	6	3	4	0	7	0	3	0	3	18
3:15 PM	0	0	2	2	1	3	5	9	6	2	0	8	0	2	0	2	21
3:30 PM	0	1	0	1	0	0	2	2	5	4	0	9	0	1	1	2	14
3:45 PM	0	0	0	0	0	3	2	5	2	1	0	3	0	3	0	3	11
4:00 PM	0	3	0	3	0	3	1	4	3	1	0	4	0	1	1	2	13
4:15 PM	3	2	0	5	0	4	3	7	1	2	0	3	0	2	0	2	17
4:30 PM	0	0	0	0	0	1	4	5	3	2	0	5	0	1	0	1	11
4:45 PM	0	1	0	1	0	1	0	1	5	1	0	6	0	1	0	1	9
5:00 PM	0	1	0	1	0	0	2	2	2	1	0	3	0	1	0	1	7
5:15 PM	0	1	0	1	0	2	3	5	3	4	0	7	0	1	1	2	15
5:30 PM	0	0	0	0	0	0	3	3	3	2	0	5	0	2	0	2	10
5:45 PM	0	0	0	0	0	0	2	2	2	1	0	3	0	1	0	1	6
Total Survey	3	10	3	16	2	18	31	51	38	25	0	63	0	19	3	22	152

Heavy Vehicle Peak Hour Summary
4:00 PM to 5:00 PM

By Approach	Northbound SE 32nd Ave			Southbound SE 32nd Ave			Eastbound SE Harrison St			Westbound SE Harrison St			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	9	9	18	17	19	36	18	16	34	6	6	12	50
PHF	0.28			0.25			0.19			0.21			0.24

By Movement	Northbound SE 32nd Ave				Southbound SE 32nd Ave				Eastbound SE Harrison St				Westbound SE Harrison St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	3	6	0	9	0	9	8	17	12	6	0	18	0	5	1	6	50
PHF	0.25	0.30	0.00	0.28	0.00	0.23	0.18	0.25	0.21	0.15	0.00	0.19	0.00	0.21	0.13	0.21	0.24

Heavy Vehicle Rolling Hour Summary
3:00 PM to 6:00 PM

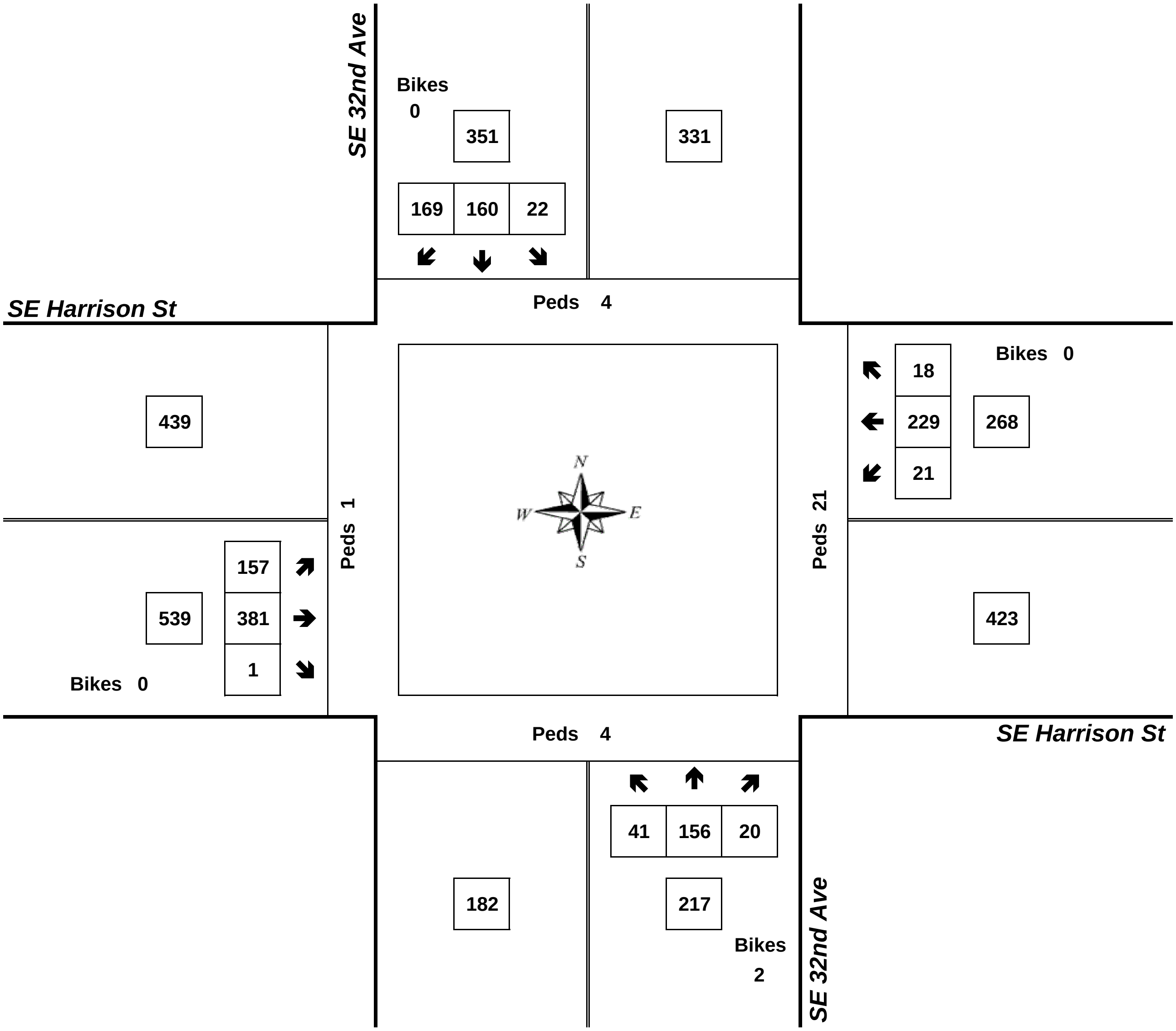
Interval Start Time	Northbound SE 32nd Ave				Southbound SE 32nd Ave				Eastbound SE Harrison St				Westbound SE Harrison St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
3:00 PM	0	2	3	5	2	7	13	22	16	11	0	27	0	9	1	10	64
3:15 PM	0	4	2	6	1	9	10	20	16	8	0	24	0	7	2	9	59
3:30 PM	3	6	0	9	0	10	8	18	11	8	0	19	0	7	2	9	55
3:45 PM	3	5	0	8	0	11	10	21	9	6	0	15	0	7	1	8	52
4:00 PM	3	6	0	9	0	9	8	17	12	6	0	18	0	5	1	6	50
4:15 PM	3	4	0	7	0	6	9	15	11	6	0	17	0	5	0	5	44
4:30 PM	0	3	0	3	0	4	9	13	13	8	0	21	0	4	1	5	42
4:45 PM	0	3	0	3	0	3	8	11	13	8	0	21	0	5	1	6	41
5:00 PM	0	2	0	2	0	2	10	12	10	8	0	18	0	5	1	6	38

Peak Hour Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

SE 32nd Ave & SE Harrison St

4:00 PM to 5:00 PM
Thursday, December 07, 2006

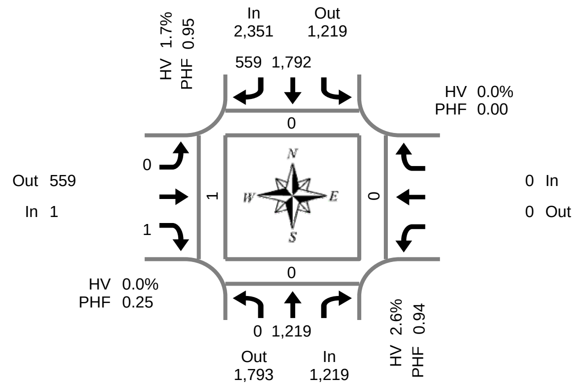


Approach	PHF	HV%	Volume
EB	0.96	3.3%	539
WB	0.93	2.2%	268
NB	0.78	4.1%	217
SB	0.94	4.8%	351
Intersection	0.94	3.6%	1,375

Count Period: 3:00 PM to 6:00 PM

Total Vehicle Summary

Clay Carney
(503) 833-2740



Peak Hour Summary
4:45 PM to 5:45 PM

Hwy 99E & SE 22nd Ave

Tuesday, December 05, 2006
3:00 PM to 6:00 PM

15-Minute Interval Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 99E				Southbound Hwy 99E				Eastbound SE 22nd Ave				Westbound SE 22nd Ave				Interval Total	Pedestrians Crosswalk			
	L	T		Bikes		T	R	Bikes	L		R	Bikes				Bikes		North	South	East	West
3:00 PM	0	296		0		337	75	0	0		0	0				0	708	0	0	0	0
3:15 PM	0	316		0		398	97	0	0		2	0				0	813	0	0	0	0
3:30 PM	0	316		0		415	104	0	0		0	0				0	835	0	0	0	0
3:45 PM	0	341		0		415	138	0	0		0	0				0	894	0	0	0	0
4:00 PM	0	299		0		490	110	1	0		2	0				0	901	0	0	0	0
4:15 PM	0	337		0		411	118	0	0		1	0				0	867	0	0	0	0
4:30 PM	0	284		0		471	149	0	0		0	0				0	904	0	0	0	0
4:45 PM	0	269		1		393	134	0	0		1	0				0	797	0	0	0	1
5:00 PM	0	308		0		463	154	0	0		0	0				0	925	0	0	0	0
5:15 PM	0	318		0		476	134	1	0		0	0				0	928	0	0	0	0
5:30 PM	0	324		0		460	137	0	0		0	0				0	921	0	0	0	0
5:45 PM	0	265		0		431	94	0	0		0	0				0	790	0	0	0	0
Total Survey	0	3,673		1		5,160	1,444	2	0		6	0				0	10,283	0	0	0	1

Peak Hour Summary
4:45 PM to 5:45 PM

By Approach	Northbound Hwy 99E				Southbound Hwy 99E				Eastbound SE 22nd Ave				Westbound SE 22nd Ave				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	1,219	1,793	3,012	1	2,351	1,219	3,570	1	1	559	560	0	0	0	0	0	3,571	0	0	0	1
%HV	2.6%				1.7%				0.0%				0.0%				2.0%				
PHF	0.94				0.95				0.25				0.00				0.96				

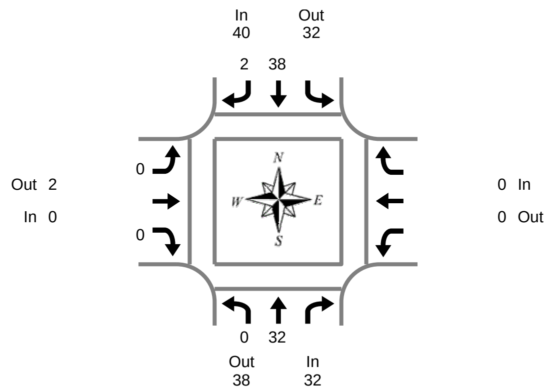
By Movement	Northbound Hwy 99E				Southbound Hwy 99E				Eastbound SE 22nd Ave				Westbound SE 22nd Ave				Total
	L	T		Total		T	R	Total	L		R	Total				Total	
Volume	0	1,219		1,219		1,792	559	2,351	0		1	1				0	3,571
%HV	0.0%	2.6%	NA	2.6%	NA	2.1%	0.4%	1.7%	0.0%	NA	0.0%	0.0%	NA	NA	NA	0.0%	2.0%
PHF	0.00	0.94		0.94		0.94	0.91	0.95	0.00		0.25	0.25				0.00	0.96

Rolling Hour Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 99E				Southbound Hwy 99E				Eastbound SE 22nd Ave				Westbound SE 22nd Ave				Interval Total	Pedestrians Crosswalk			
	L	T		Bikes		T	R	Bikes	L		R	Bikes				Bikes		North	South	East	West
3:00 PM	0	1,269		0		1,565	414	0	0		2	0				0	3,250	0	0	0	0
3:15 PM	0	1,272		0		1,718	449	1	0		4	0				0	3,443	0	0	0	0
3:30 PM	0	1,293		0		1,731	470	1	0		3	0				0	3,497	0	0	0	0
3:45 PM	0	1,261		0		1,787	515	1	0		3	0				0	3,566	0	0	0	0
4:00 PM	0	1,189		1		1,765	511	1	0		4	0				0	3,469	0	0	0	1
4:15 PM	0	1,198		1		1,738	555	0	0		2	0				0	3,493	0	0	0	1
4:30 PM	0	1,179		1		1,803	571	1	0		1	0				0	3,554	0	0	0	1
4:45 PM	0	1,219		1		1,792	559	1	0		1	0				0	3,571	0	0	0	1
5:00 PM	0	1,215		0		1,830	519	1	0		0	0				0	3,564	0	0	0	0

Heavy Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
4:45 PM to 5:45 PM

Hwy 99E & SE 22nd Ave

Tuesday, December 05, 2006
3:00 PM to 6:00 PM

Heavy Vehicle 15-Minute Interval Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 99E				Southbound Hwy 99E				Eastbound SE 22nd Ave				Westbound SE 22nd Ave				Interval Total
	L	T		Total		T	R	Total	L		R	Total				Total	
3:00 PM	0	20		20		12	2	14	0		0	0				0	34
3:15 PM	0	12		12		14	0	14	0		0	0				0	26
3:30 PM	0	10		10		19	1	20	0		0	0				0	30
3:45 PM	0	13		13		14	0	14	0		0	0				0	27
4:00 PM	0	12		12		14	5	19	0		0	0				0	31
4:15 PM	0	14		14		9	0	9	0		0	0				0	23
4:30 PM	0	15		15		14	0	14	0		0	0				0	29
4:45 PM	0	5		5		11	0	11	0		0	0				0	16
5:00 PM	0	12		12		12	1	13	0		0	0				0	25
5:15 PM	0	9		9		7	1	8	0		0	0				0	17
5:30 PM	0	6		6		8	0	8	0		0	0				0	14
5:45 PM	0	6		6		7	0	7	0		0	0				0	13
Total Survey	0	134		134		141	10	151	0		0	0				0	285

Heavy Vehicle Peak Hour Summary
4:45 PM to 5:45 PM

By Approach	Northbound Hwy 99E			Southbound Hwy 99E			Eastbound SE 22nd Ave			Westbound SE 22nd Ave			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	32	38	70	40	32	72	0	2	2	0	0	0	72
PHF	0.19			0.19			0.00			0.00			0.20

By Movement	Northbound Hwy 99E				Southbound Hwy 99E				Eastbound SE 22nd Ave				Westbound SE 22nd Ave				Total
	L	T		Total		T	R	Total	L		R	Total				Total	
Volume	0	32		32		38	2	40	0		0	0				0	72
PHF	0.00	0.19		0.19		0.20	0.08	0.19	0.00		0.00	0.00				0.00	0.20

Heavy Vehicle Rolling Hour Summary
3:00 PM to 6:00 PM

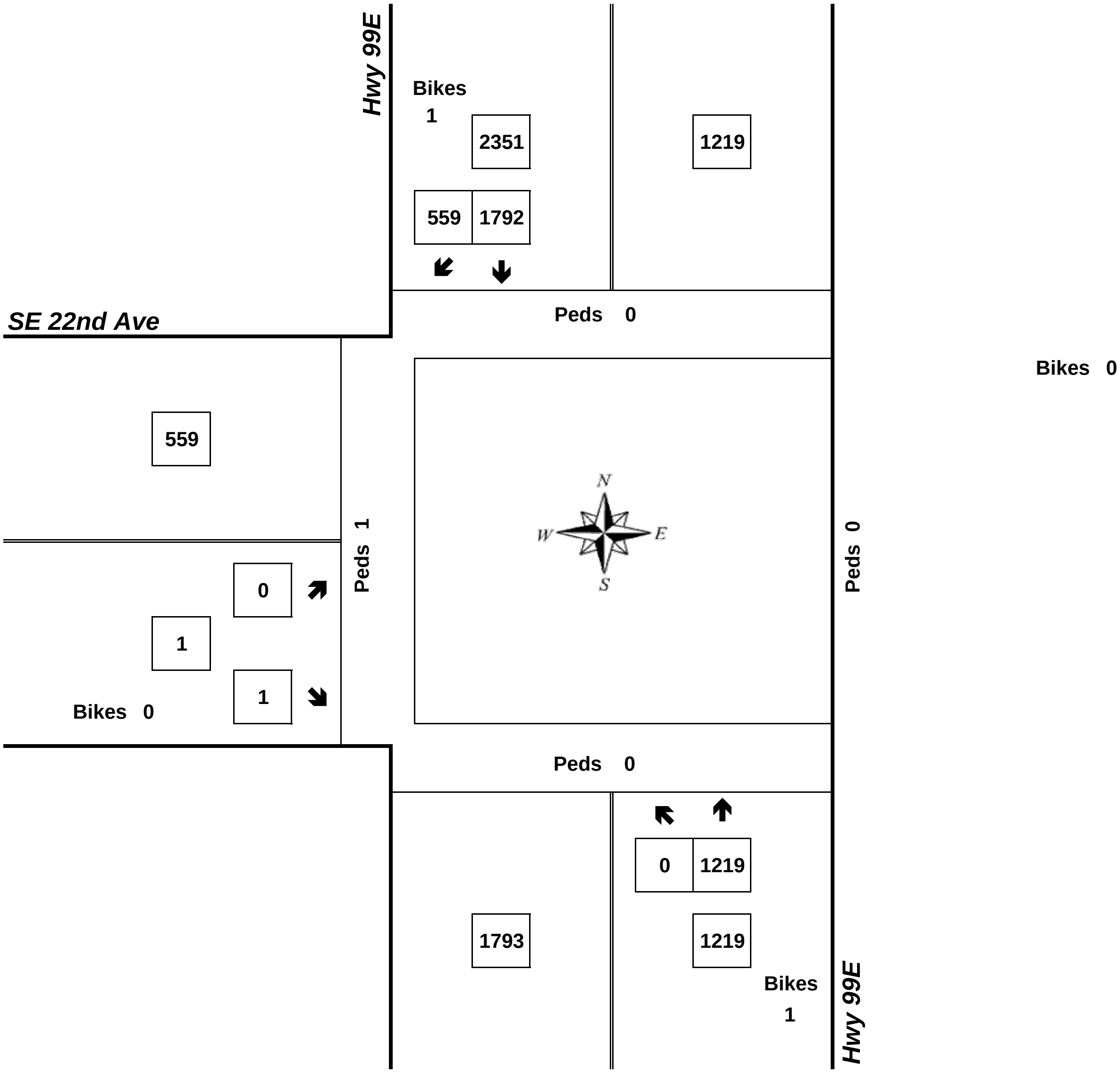
Interval Start Time	Northbound Hwy 99E				Southbound Hwy 99E				Eastbound SE 22nd Ave				Westbound SE 22nd Ave				Interval Total
	L	T		Total		T	R	Total	L		R	Total				Total	
3:00 PM	0	55		55		59	3	62	0		0	0				0	117
3:15 PM	0	47		47		61	6	67	0		0	0				0	114
3:30 PM	0	49		49		56	6	62	0		0	0				0	111
3:45 PM	0	54		54		51	5	56	0		0	0				0	110
4:00 PM	0	46		46		48	5	53	0		0	0				0	99
4:15 PM	0	46		46		46	1	47	0		0	0				0	93
4:30 PM	0	41		41		44	2	46	0		0	0				0	87
4:45 PM	0	32		32		38	2	40	0		0	0				0	72
5:00 PM	0	33		33		34	2	36	0		0	0				0	69

Peak Hour Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

Hwy 99E & SE 22nd Ave

4:45 PM to 5:45 PM
Tuesday, December 05, 2006

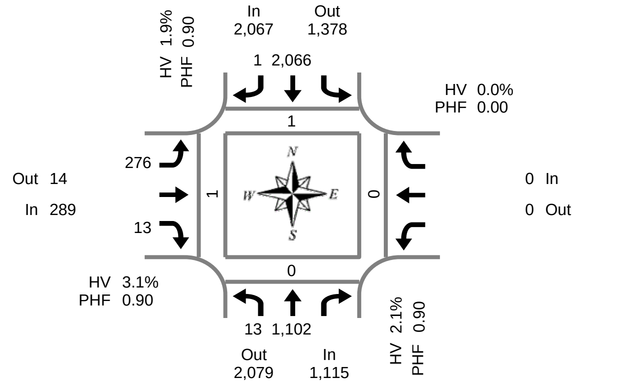


Approach	PHF	HV%	Volume
EB	0.25	0.0%	1
WB	0.00	0.0%	0
NB	0.94	2.6%	1,219
SB	0.95	1.7%	2,351
Intersection	0.96	2.0%	3,571

Count Period: 3:00 PM to 6:00 PM

Total Vehicle Summary

Clay Carney
(503) 833-2740



Peak Hour Summary
4:30 PM to 5:30 PM

Hwy 99E & SE River Rd

Wednesday, December 06, 2006
3:00 PM to 6:00 PM

15-Minute Interval Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 99E L	T		Bikes	Southbound Hwy 99E	T	R	Bikes	Eastbound SE River Rd L		R	Bikes	Westbound SE River Rd			Bikes	Interval Total
3:00 PM	5	202		0		361	0	0	69		2	0				0	639
3:15 PM	5	262		0		371	0	0	61		4	0				0	703
3:30 PM	8	256		0		422	0	0	55		5	0				0	746
3:45 PM	4	288		0		457	0	0	74		3	0				0	826
4:00 PM	8	258		0		532	1	0	70		1	0				0	870
4:15 PM	1	249		0		508	1	0	59		15	0				0	833
4:30 PM	3	290		0		539	0	0	74		6	0				0	912
4:45 PM	3	271		0		462	0	0	64		1	0				0	801
5:00 PM	3	235		0		495	0	0	67		0	0				0	800
5:15 PM	4	306		0		570	1	0	71		6	0				0	958
5:30 PM	5	244		0		485	0	0	74		4	0				0	812
5:45 PM	6	271		0		517	0	0	60		2	0				0	856
Total Survey	55	3,132		0		5,719	3	0	798		49	0				0	9,756

Interval Start Time	Pedestrians Crosswalk North	South	East	West
3:00 PM	0	0	0	1
3:15 PM	0	1	0	0
3:30 PM	0	0	0	0
3:45 PM	0	0	0	1
4:00 PM	0	1	0	2
4:15 PM	2	0	0	3
4:30 PM	0	0	0	0
4:45 PM	1	0	0	1
5:00 PM	0	0	0	0
5:15 PM	0	0	0	0
5:30 PM	0	0	0	0
5:45 PM	0	0	0	2
Total Survey	3	2	0	10

Peak Hour Summary
4:30 PM to 5:30 PM

By Approach	Northbound Hwy 99E In	Out	Total	Bikes	Southbound Hwy 99E In	Out	Total	Bikes	Eastbound SE River Rd In	Out	Total	Bikes	Westbound SE River Rd In	Out	Total	Bikes	Total
Volume	1,115	2,079	3,194	0	2,067	1,378	3,445	0	289	14	303	0	0	0	0	0	3,471
%HV	2.1%				1.9%				3.1%				0.0%				2.0%
PHF	0.90				0.90				0.90				0.00				0.91

	Pedestrians Crosswalk North	South	East	West
Volume	1	0	0	1

By Movement	Northbound Hwy 99E L	T		Total	Southbound Hwy 99E	T	R	Total	Eastbound SE River Rd L		R	Total	Westbound SE River Rd			Total	Total
Volume	13	1,102		1,115		2,066	1	2,067	276		13	289				0	3,471
%HV	7.7%	2.0%	NA	2.1%	NA	1.9%	0.0%	1.9%	3.3%	NA	0.0%	3.1%	NA	NA	NA	0.0%	2.0%
PHF	0.81	0.90		0.90		0.91	0.25	0.90	0.93		0.54	0.90				0.00	0.91

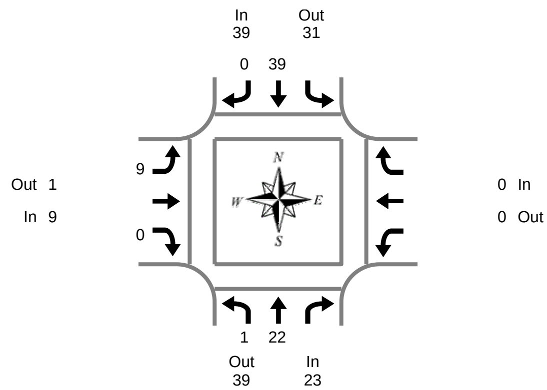
Rolling Hour Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 99E L	T		Bikes	Southbound Hwy 99E	T	R	Bikes	Eastbound SE River Rd L		R	Bikes	Westbound SE River Rd			Bikes	Interval Total
3:00 PM	22	1,008		0		1,611	0	0	259		14	0				0	2,914
3:15 PM	25	1,064		0		1,782	1	0	260		13	0				0	3,145
3:30 PM	21	1,051		0		1,919	2	0	258		24	0				0	3,275
3:45 PM	16	1,085		0		2,036	2	0	277		25	0				0	3,441
4:00 PM	15	1,068		0		2,041	2	0	267		23	0				0	3,416
4:15 PM	10	1,045		0		2,004	1	0	264		22	0				0	3,346
4:30 PM	13	1,102		0		2,066	1	0	276		13	0				0	3,471
4:45 PM	15	1,056		0		2,012	1	0	276		11	0				0	3,371
5:00 PM	18	1,056		0		2,067	1	0	272		12	0				0	3,426

Interval Start Time	Pedestrians Crosswalk North	South	East	West
3:00 PM	0	1	0	2
3:15 PM	0	2	0	3
3:30 PM	2	1	0	6
3:45 PM	2	1	0	6
4:00 PM	3	1	0	6
4:15 PM	3	0	0	4
4:30 PM	1	0	0	1
4:45 PM	1	0	0	1
5:00 PM	0	0	0	2

Heavy Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
4:30 PM to 5:30 PM

Hwy 99E & SE River Rd

Wednesday, December 06, 2006
3:00 PM to 6:00 PM

Heavy Vehicle 15-Minute Interval Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 99E				Southbound Hwy 99E				Eastbound SE River Rd				Westbound SE River Rd				Interval Total
	L	T		Total		T	R	Total	L		R	Total				Total	
3:00 PM	0	13		13		10	0	10	1		0	1				0	24
3:15 PM	0	17		17		14	0	14	1		0	1				0	32
3:30 PM	1	6		7		10	0	10	1		1	2				0	19
3:45 PM	1	15		16		12	0	12	0		0	0				0	28
4:00 PM	1	11		12		6	0	6	2		0	2				0	20
4:15 PM	0	11		11		8	0	8	4		1	5				0	24
4:30 PM	1	4		5		10	0	10	4		0	4				0	19
4:45 PM	0	10		10		11	0	11	3		0	3				0	24
5:00 PM	0	3		3		9	0	9	1		0	1				0	13
5:15 PM	0	5		5		9	0	9	1		0	1				0	15
5:30 PM	1	6		7		10	0	10	2		0	2				0	19
5:45 PM	0	7		7		6	0	6	1		0	1				0	14
Total Survey	5	108		113		115	0	115	21		2	23				0	251

Heavy Vehicle Peak Hour Summary
4:30 PM to 5:30 PM

By Approach	Northbound Hwy 99E			Southbound Hwy 99E			Eastbound SE River Rd			Westbound SE River Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	23	39	62	39	31	70	9	1	10	0	0	0	71
PHF	0.14			0.27			0.19			0.00			0.22

By Movement	Northbound Hwy 99E				Southbound Hwy 99E				Eastbound SE River Rd				Westbound SE River Rd				Total
	L	T		Total		T	R	Total	L		R	Total				Total	
Volume	1	22		23		39	0	39	9		0	9				0	71
PHF	0.08	0.14		0.14		0.27	0.00	0.27	0.20		0.00	0.19				0.00	0.22

Heavy Vehicle Rolling Hour Summary
3:00 PM to 6:00 PM

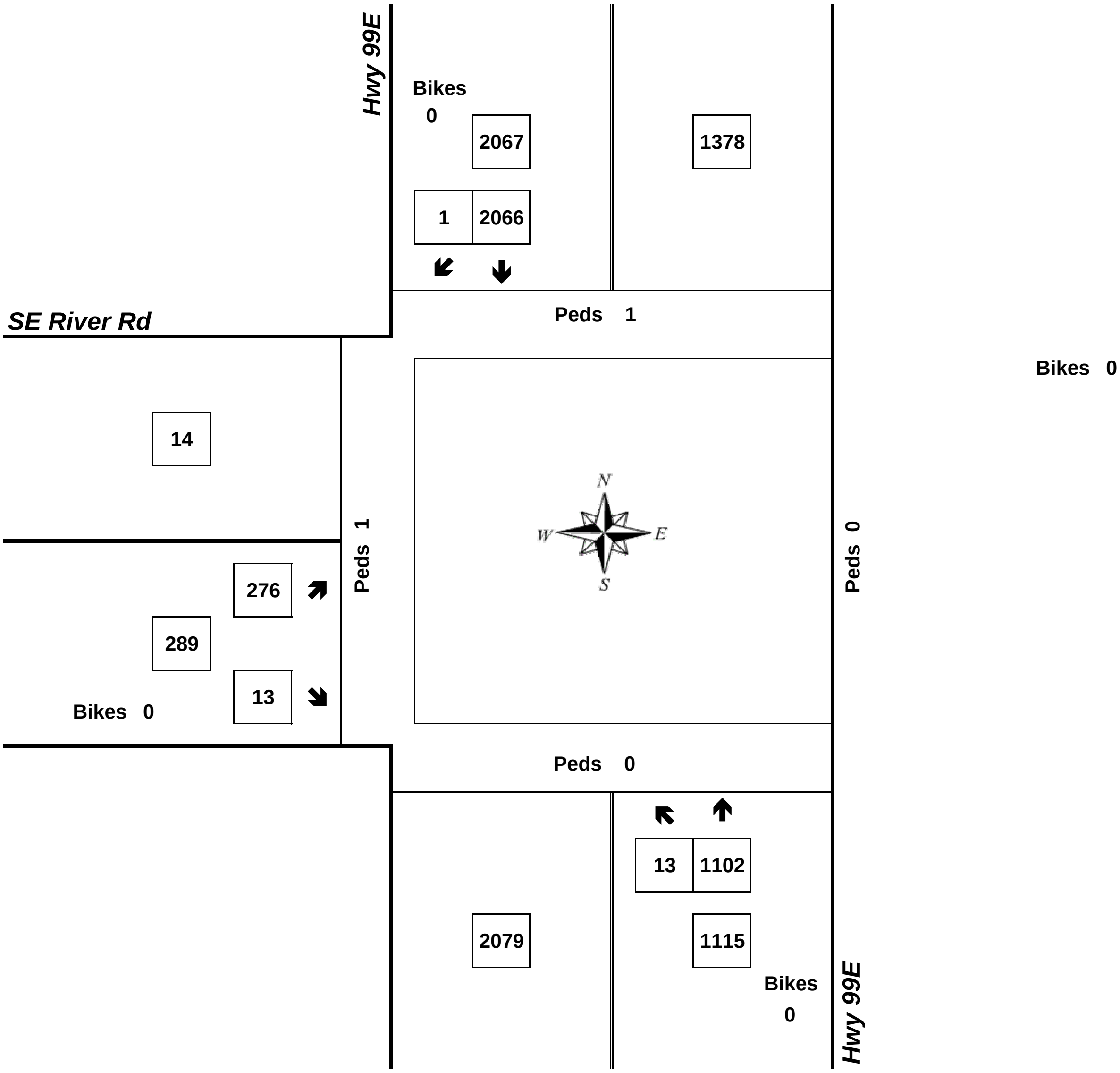
Interval Start Time	Northbound Hwy 99E				Southbound Hwy 99E				Eastbound SE River Rd				Westbound SE River Rd				Interval Total
	L	T		Total		T	R	Total	L		R	Total				Total	
3:00 PM	2	51		53		46	0	46	3		1	4				0	103
3:15 PM	3	49		52		42	0	42	4		1	5				0	99
3:30 PM	3	43		46		36	0	36	7		2	9				0	91
3:45 PM	3	41		44		36	0	36	10		1	11				0	91
4:00 PM	2	36		38		35	0	35	13		1	14				0	87
4:15 PM	1	28		29		38	0	38	12		1	13				0	80
4:30 PM	1	22		23		39	0	39	9		0	9				0	71
4:45 PM	1	24		25		39	0	39	7		0	7				0	71
5:00 PM	1	21		22		34	0	34	5		0	5				0	61

Peak Hour Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

Hwy 99E & SE River Rd

4:30 PM to 5:30 PM
Wednesday, December 06, 2006



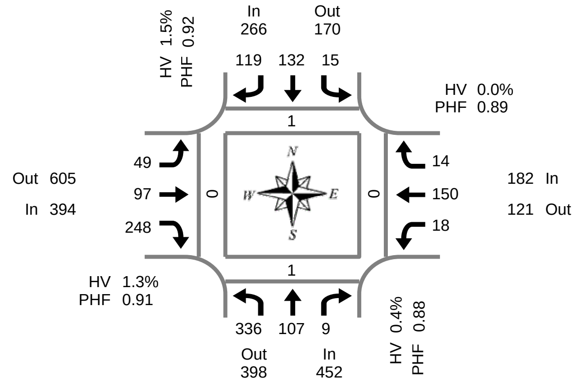
Approach	PHF	HV%	Volume
EB	0.90	3.1%	289
WB	0.00	0.0%	0
NB	0.90	2.1%	1,115
SB	0.90	1.9%	2,067
Intersection	0.91	2.0%	3,471

Count Period: 3:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



Peak Hour Summary
4:45 PM to 5:45 PM

SE Lake Rd & SE Oatfield Rd

Tuesday, December 05, 2006
3:00 PM to 6:00 PM

15-Minute Interval Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound SE Lake Rd				Southbound SE Lake Rd				Eastbound SE Oatfield Rd				Westbound SE Oatfield Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
3:00 PM	62	29	2	0	3	31	11	0	14	20	53	0	2	28	1	0	256	0	1	1	0
3:15 PM	74	35	5	0	5	54	26	0	19	24	49	0	2	28	6	0	327	2	0	0	0
3:30 PM	66	24	5	0	7	53	35	0	7	25	60	0	10	18	1	0	311	8	1	2	0
3:45 PM	67	17	6	0	2	45	23	0	10	31	72	0	5	30	3	0	311	3	1	0	0
4:00 PM	71	36	8	0	2	32	27	0	10	27	62	0	6	35	5	0	321	2	9	0	12
4:15 PM	99	22	7	0	5	38	18	1	9	20	59	0	8	35	2	0	322	0	0	0	1
4:30 PM	95	24	4	0	7	27	18	0	9	27	55	0	6	36	2	0	310	0	4	0	0
4:45 PM	98	24	2	0	1	27	28	0	11	24	63	0	3	35	2	0	318	0	0	0	0
5:00 PM	102	25	2	0	5	25	37	0	5	26	53	0	2	44	5	0	331	0	1	0	0
5:15 PM	60	27	4	0	4	42	26	0	19	21	64	0	8	33	2	0	310	0	0	0	0
5:30 PM	76	31	1	0	5	38	28	0	14	26	68	0	5	38	5	0	335	1	0	0	0
5:45 PM	65	17	0	0	5	25	15	0	15	19	44	0	3	25	1	0	234	0	0	0	1
Total Survey	935	311	46	0	51	437	292	1	142	290	702	0	60	385	35	0	3,686	16	17	3	14

Peak Hour Summary
4:45 PM to 5:45 PM

By Approach	Northbound SE Lake Rd				Southbound SE Lake Rd				Eastbound SE Oatfield Rd				Westbound SE Oatfield Rd				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	452	398	850	0	266	170	436	0	394	605	999	0	182	121	303	0	1,294	1	1	0	0
%HV	0.4%				1.5%				1.3%				0.0%				0.9%				
PHF	0.88				0.92				0.91				0.89				0.97				

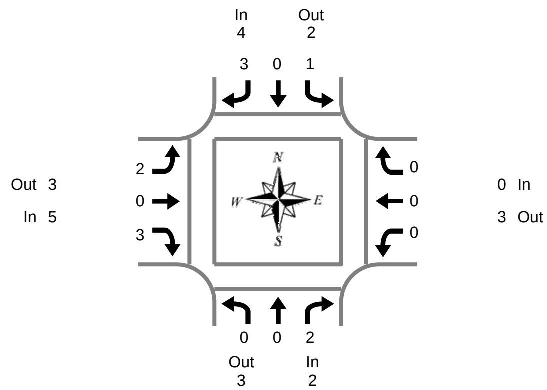
By Movement	Northbound SE Lake Rd				Southbound SE Lake Rd				Eastbound SE Oatfield Rd				Westbound SE Oatfield Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	336	107	9	452	15	132	119	266	49	97	248	394	18	150	14	182	1,294
%HV	0.0%	0.0%	22.2%	0.4%	6.7%	0.0%	2.5%	1.5%	4.1%	0.0%	1.2%	1.3%	0.0%	0.0%	0.0%	0.0%	0.9%
PHF	0.82	0.86	0.56	0.88	0.75	0.79	0.80	0.92	0.64	0.93	0.91	0.91	0.56	0.85	0.70	0.89	0.97

Rolling Hour Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound SE Lake Rd				Southbound SE Lake Rd				Eastbound SE Oatfield Rd				Westbound SE Oatfield Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
3:00 PM	269	105	18	0	17	183	95	0	50	100	234	0	19	104	11	0	1,205	13	3	3	0
3:15 PM	278	112	24	0	16	184	111	0	46	107	243	0	23	111	15	0	1,270	15	11	2	12
3:30 PM	303	99	26	0	16	168	103	1	36	103	253	0	29	118	11	0	1,265	13	11	2	13
3:45 PM	332	99	25	0	16	142	86	1	38	105	248	0	25	136	12	0	1,264	5	14	0	13
4:00 PM	363	106	21	0	15	124	91	1	39	98	239	0	23	141	11	0	1,271	2	13	0	13
4:15 PM	394	95	15	0	18	117	101	1	34	97	230	0	19	150	11	0	1,281	0	5	0	1
4:30 PM	355	100	12	0	17	121	109	0	44	98	235	0	19	148	11	0	1,269	0	5	0	0
4:45 PM	336	107	9	0	15	132	119	0	49	97	248	0	18	150	14	0	1,294	1	1	0	0
5:00 PM	303	100	7	0	19	130	106	0	53	92	229	0	18	140	13	0	1,210	1	1	0	1

Heavy Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
4:45 PM to 5:45 PM

SE Lake Rd & SE Oatfield Rd

Tuesday, December 05, 2006
3:00 PM to 6:00 PM

Heavy Vehicle 15-Minute Interval Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound SE Lake Rd L	T	R	Total	Southbound SE Lake Rd L	T	R	Total	Eastbound SE Oatfield Rd L	T	R	Total	Westbound SE Oatfield Rd L	T	R	Total	Interval Total
3:00 PM	2	2	0	4	0	3	0	3	1	1	2	4	0	1	0	1	12
3:15 PM	1	4	1	6	0	3	0	3	3	0	1	4	0	2	0	2	15
3:30 PM	3	1	0	4	1	6	2	9	0	0	1	1	1	1	0	2	16
3:45 PM	2	1	0	3	0	0	0	0	1	1	5	7	1	0	0	1	11
4:00 PM	1	0	0	1	0	0	0	0	1	1	2	4	0	0	0	0	5
4:15 PM	0	0	2	2	0	0	1	1	1	1	1	3	1	1	0	2	8
4:30 PM	1	1	0	2	1	0	0	1	0	0	2	2	2	1	0	3	8
4:45 PM	0	0	0	0	0	0	1	1	1	0	1	2	0	0	0	0	3
5:00 PM	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1
5:15 PM	0	0	2	2	0	0	1	1	1	0	2	3	0	0	0	0	6
5:30 PM	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1
5:45 PM	0	0	0	0	0	0	0	0	1	0	1	2	0	0	0	0	2
Total Survey	10	9	5	24	3	12	6	21	10	4	18	32	5	6	0	11	88

Heavy Vehicle Peak Hour Summary
4:45 PM to 5:45 PM

By Approach	Northbound SE Lake Rd In	Out	Total	Southbound SE Lake Rd In	Out	Total	Eastbound SE Oatfield Rd In	Out	Total	Westbound SE Oatfield Rd In	Out	Total	Total
Volume	2	3	5	4	2	6	5	3	8	0	3	3	11
PHF	0.04			0.07			0.09			0.00			0.06

By Movement	Northbound SE Lake Rd L	T	R	Total	Southbound SE Lake Rd L	T	R	Total	Eastbound SE Oatfield Rd L	T	R	Total	Westbound SE Oatfield Rd L	T	R	Total	Total
Volume	0	0	2	2	1	0	3	4	2	0	3	5	0	0	0	0	11
PHF	0.00	0.00	0.25	0.04	0.13	0.00	0.38	0.07	0.13	0.00	0.09	0.09	0.00	0.00	0.00	0.00	0.06

Heavy Vehicle Rolling Hour Summary
3:00 PM to 6:00 PM

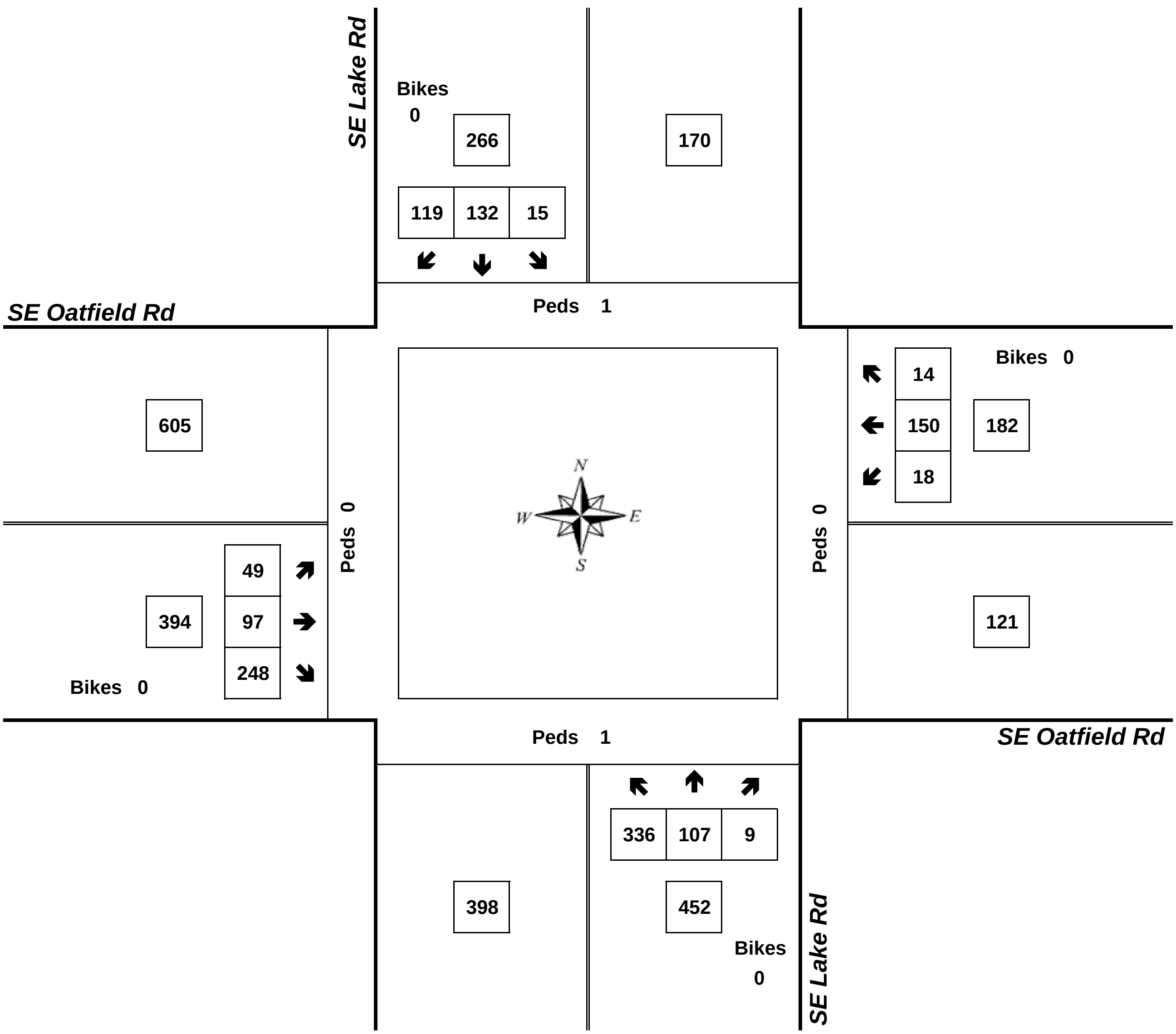
Interval Start Time	Northbound SE Lake Rd L	T	R	Total	Southbound SE Lake Rd L	T	R	Total	Eastbound SE Oatfield Rd L	T	R	Total	Westbound SE Oatfield Rd L	T	R	Total	Interval Total
3:00 PM	8	8	1	17	1	12	2	15	5	2	9	16	2	4	0	6	54
3:15 PM	7	6	1	14	1	9	2	12	5	2	9	16	2	3	0	5	47
3:30 PM	6	2	2	10	1	6	3	10	3	3	9	15	3	2	0	5	40
3:45 PM	4	2	2	8	1	0	1	2	3	3	10	16	4	2	0	6	32
4:00 PM	2	1	2	5	1	0	2	3	3	2	6	11	3	2	0	5	24
4:15 PM	1	1	2	4	2	0	2	4	2	1	4	7	3	2	0	5	20
4:30 PM	1	1	2	4	2	0	2	4	2	0	5	7	2	1	0	3	18
4:45 PM	0	0	2	2	1	0	3	4	2	0	3	5	0	0	0	0	11
5:00 PM	0	0	2	2	1	0	2	3	2	0	3	5	0	0	0	0	10

Peak Hour Summary

Clay Carney
(503) 833-2740

SE Lake Rd & SE Oatfield Rd

4:45 PM to 5:45 PM
Tuesday, December 05, 2006

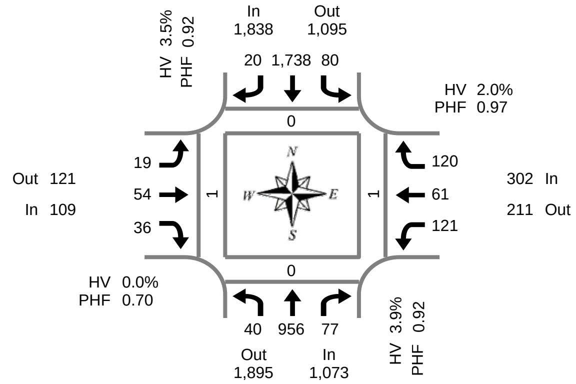


Approach	PHF	HV%	Volume
EB	0.91	1.3%	394
WB	0.89	0.0%	182
NB	0.88	0.4%	452
SB	0.92	1.5%	266
Intersection	0.97	0.9%	1,294

Count Period: 3:00 PM to 6:00 PM

Total Vehicle Summary

Clay Carney
(503) 833-2740



Hwy 224 & SE 37th Ave

Thursday, November 30, 2006
3:00 PM to 6:00 PM

Peak Hour Summary
4:00 PM to 5:00 PM

15-Minute Interval Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 224				Southbound Hwy 224				Eastbound SE 37th Ave				Westbound SE 37th Ave				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
3:00 PM	10	228	17	0	14	338	1	0	3	10	13	0	29	8	21	0	692	0	0	0	0
3:15 PM	5	229	27	0	14	402	4	0	2	11	8	0	28	10	19	0	759	0	0	0	1
3:30 PM	8	235	26	0	12	331	0	0	1	20	13	0	45	9	25	0	725	0	0	0	0
3:45 PM	7	252	22	0	23	426	2	0	0	13	4	0	27	9	10	0	795	0	0	2	0
4:00 PM	12	252	17	0	18	448	7	0	2	25	12	0	25	20	32	0	870	0	0	0	1
4:15 PM	13	258	21	0	22	472	4	0	8	8	4	0	31	10	33	0	884	0	0	0	0
4:30 PM	8	201	20	0	21	398	4	0	3	13	13	0	35	15	28	0	759	0	0	0	0
4:45 PM	7	245	19	0	19	420	5	0	6	8	7	0	30	16	27	0	809	0	0	1	0
5:00 PM	5	234	22	0	23	453	1	0	3	12	2	0	31	21	45	0	852	0	0	0	0
5:15 PM	11	261	17	0	19	424	6	0	5	10	5	0	29	12	23	0	822	0	0	0	1
5:30 PM	9	249	21	0	15	406	3	0	5	3	7	0	36	18	32	0	804	0	0	0	0
5:45 PM	9	202	19	0	17	427	2	0	0	11	4	0	21	17	18	0	747	0	0	0	0
Total Survey	104	2,846	248	0	217	4,945	39	0	38	144	92	0	367	165	313	0	9,518	0	0	3	3

Peak Hour Summary
4:00 PM to 5:00 PM

By Approach	Northbound Hwy 224				Southbound Hwy 224				Eastbound SE 37th Ave				Westbound SE 37th Ave				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	1,073	1,895	2,968	0	1,838	1,095	2,933	0	109	121	230	0	302	211	513	0	3,322	0	0	1	1
%HV	3.9%				3.5%				0.0%				2.0%				3.4%				
PHF	0.92				0.92				0.70				0.97				0.94				

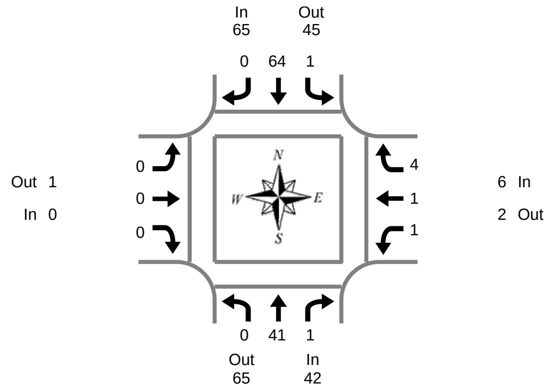
By Movement	Northbound Hwy 224				Southbound Hwy 224				Eastbound SE 37th Ave				Westbound SE 37th Ave				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	40	956	77	1,073	80	1,738	20	1,838	19	54	36	109	121	61	120	302	3,322
%HV	0.0%	4.3%	1.3%	3.9%	1.3%	3.7%	0.0%	3.5%	0.0%	0.0%	0.0%	0.0%	0.8%	1.6%	3.3%	2.0%	3.4%
PHF	0.77	0.93	0.92	0.92	0.91	0.92	0.71	0.92	0.59	0.54	0.69	0.70	0.86	0.76	0.91	0.97	0.94

Rolling Hour Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 224				Southbound Hwy 224				Eastbound SE 37th Ave				Westbound SE 37th Ave				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
3:00 PM	30	944	92	0	63	1,497	7	0	6	54	38	0	129	36	75	0	2,971	0	0	2	1
3:15 PM	32	968	92	0	67	1,607	13	0	5	69	37	0	125	48	86	0	3,149	0	0	2	2
3:30 PM	40	997	86	0	75	1,677	13	0	11	66	33	0	128	48	100	0	3,274	0	0	2	1
3:45 PM	40	963	80	0	84	1,744	17	0	13	59	33	0	118	54	103	0	3,308	0	0	2	1
4:00 PM	40	956	77	0	80	1,738	20	0	19	54	36	0	121	61	120	0	3,322	0	0	1	1
4:15 PM	33	938	82	0	85	1,743	14	0	20	41	26	0	127	62	133	0	3,304	0	0	1	0
4:30 PM	31	941	78	0	82	1,695	16	0	17	43	27	0	125	64	123	0	3,242	0	0	1	1
4:45 PM	32	989	79	0	76	1,703	15	0	19	33	21	0	126	67	127	0	3,287	0	0	1	1
5:00 PM	34	946	79	0	74	1,710	12	0	13	36	18	0	117	68	118	0	3,225	0	0	0	1

Heavy Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
4:00 PM to 5:00 PM

Hwy 224 & SE 37th Ave

Thursday, November 30, 2006
3:00 PM to 6:00 PM

Heavy Vehicle 15-Minute Interval Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 224				Southbound Hwy 224				Eastbound SE 37th Ave				Westbound SE 37th Ave				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
3:00 PM	0	12	1	13	3	19	0	22	0	0	0	0	0	0	1	1	36
3:15 PM	0	21	0	21	2	25	0	27	0	0	0	0	1	0	1	2	50
3:30 PM	0	16	2	18	3	18	0	21	0	0	1	1	1	0	1	2	42
3:45 PM	0	14	1	15	3	18	0	21	0	1	0	1	3	0	0	3	40
4:00 PM	0	8	0	8	1	23	0	24	0	0	0	0	0	0	0	0	32
4:15 PM	0	12	0	12	0	18	0	18	0	0	0	0	1	0	2	3	33
4:30 PM	0	11	1	12	0	14	0	14	0	0	0	0	0	1	1	2	28
4:45 PM	0	10	0	10	0	9	0	9	0	0	0	0	0	0	1	1	20
5:00 PM	0	11	0	11	1	12	0	13	0	0	0	0	0	0	0	0	24
5:15 PM	0	12	0	12	0	11	1	12	0	0	0	0	0	0	0	0	24
5:30 PM	0	5	0	5	0	7	0	7	0	0	0	0	0	0	0	0	12
5:45 PM	0	6	0	6	0	14	0	14	0	0	0	0	0	0	0	0	20
Total Survey	0	138	5	143	13	188	1	202	0	1	1	2	6	1	7	14	361

Heavy Vehicle Peak Hour Summary
4:00 PM to 5:00 PM

By Approach	Northbound Hwy 224			Southbound Hwy 224			Eastbound SE 37th Ave			Westbound SE 37th Ave			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	42	65	107	65	45	110	0	1	1	6	2	8	113
PHF	0.19			0.23			0.00			0.21			0.21

By Movement	Northbound Hwy 224				Southbound Hwy 224				Eastbound SE 37th Ave				Westbound SE 37th Ave				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	41	1	42	1	64	0	65	0	0	0	0	1	1	4	6	113
PHF	0.00	0.20	0.08	0.19	0.03	0.26	0.00	0.23	0.00	0.00	0.00	0.00	0.05	0.25	0.25	0.21	0.21

Heavy Vehicle Rolling Hour Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 224				Southbound Hwy 224				Eastbound SE 37th Ave				Westbound SE 37th Ave				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
3:00 PM	0	63	4	67	11	80	0	91	0	1	1	2	5	0	3	8	168
3:15 PM	0	59	3	62	9	84	0	93	0	1	1	2	5	0	2	7	164
3:30 PM	0	50	3	53	7	77	0	84	0	1	1	2	5	0	3	8	147
3:45 PM	0	45	2	47	4	73	0	77	0	1	0	1	4	1	3	8	133
4:00 PM	0	41	1	42	1	64	0	65	0	0	0	0	1	1	4	6	113
4:15 PM	0	44	1	45	1	53	0	54	0	0	0	0	1	1	4	6	105
4:30 PM	0	44	1	45	1	46	1	48	0	0	0	0	0	1	2	3	96
4:45 PM	0	38	0	38	1	39	1	41	0	0	0	0	0	0	1	1	80
5:00 PM	0	34	0	34	1	44	1	46	0	0	0	0	0	0	0	0	80

Peak Hour Summary

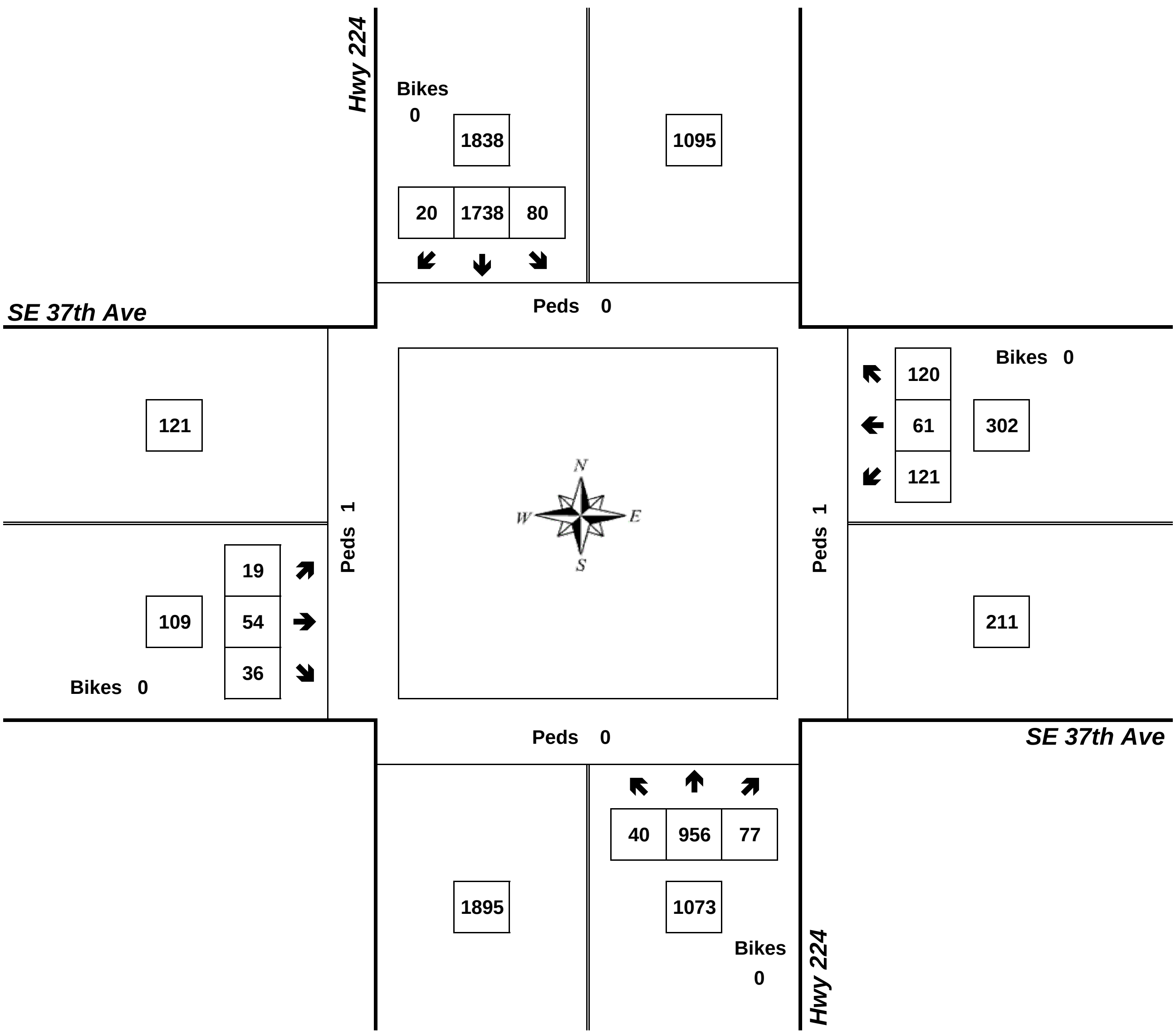
All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

Hwy 224 & SE 37th Ave

4:00 PM to 5:00 PM

Thursday, November 30, 2006



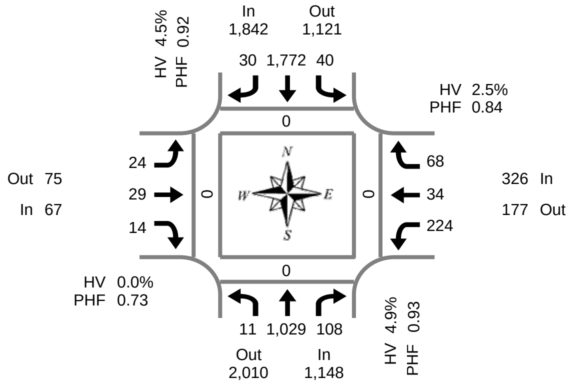
Approach	PHF	HV%	Volume
EB	0.70	0.0%	109
WB	0.97	2.0%	302
NB	0.92	3.9%	1,073
SB	0.92	3.5%	1,838
Intersection	0.94	3.4%	3,322

Count Period: 3:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



Peak Hour Summary
3:30 PM to 4:30 PM

Hwy 224 & SE Freeman Way

Thursday, November 30, 2006
3:00 PM to 6:00 PM

15-Minute Interval Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 224				Southbound Hwy 224				Eastbound SE Freeman Way				Westbound SE Freeman Way				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
3:00 PM	1	269	20	0	8	389	7	0	2	2	4	0	41	6	11	0	760	0	0	0	0
3:15 PM	2	244	19	0	16	387	7	0	5	7	1	0	33	13	17	0	751	0	0	0	0
3:30 PM	0	248	42	0	14	385	2	0	3	10	3	0	55	5	13	0	780	0	0	0	0
3:45 PM	3	266	24	0	12	426	11	0	6	13	4	0	38	5	16	0	824	0	0	0	0
4:00 PM	3	226	27	0	7	473	10	0	5	5	2	0	68	7	22	0	855	0	0	0	0
4:15 PM	5	289	15	0	7	488	7	0	10	1	5	0	63	17	17	0	924	0	0	0	0
4:30 PM	10	188	23	0	8	428	13	0	2	4	1	0	54	10	20	0	761	0	0	0	0
4:45 PM	2	262	21	0	10	444	8	0	1	5	3	0	46	10	23	0	835	0	0	0	0
5:00 PM	4	256	15	0	7	443	7	0	1	3	1	0	69	9	16	0	831	0	0	0	0
5:15 PM	13	239	16	0	2	403	12	0	7	3	1	0	63	15	20	0	794	0	0	0	0
5:30 PM	4	283	14	0	8	448	7	0	6	0	1	0	57	8	9	0	845	0	0	0	0
5:45 PM	2	205	14	0	5	422	10	0	6	2	2	0	40	9	9	0	726	0	0	0	0
Total Survey	49	2,975	250	0	104	5,136	101	0	54	55	28	0	627	114	193	0	9,686	0	0	0	0

Peak Hour Summary
3:30 PM to 4:30 PM

By Approach	Northbound Hwy 224				Southbound Hwy 224				Eastbound SE Freeman Way				Westbound SE Freeman Way				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	1,148	2,010	3,158	0	1,842	1,121	2,963	0	67	75	142	0	326	177	503	0	3,383	0	0	0	0
%HV	4.9%				4.5%				0.0%				2.5%				4.3%				
PHF	0.93				0.92				0.73				0.84				0.92				

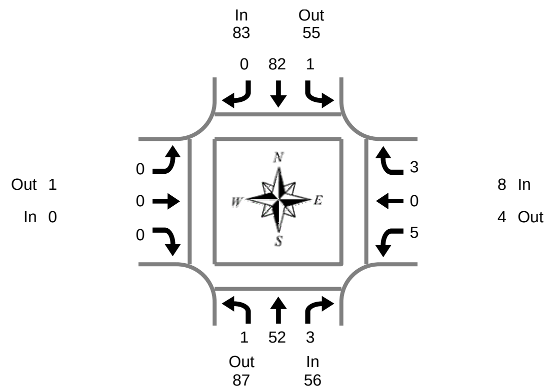
By Movement	Northbound Hwy 224				Southbound Hwy 224				Eastbound SE Freeman Way				Westbound SE Freeman Way				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	11	1,029	108	1,148	40	1,772	30	1,842	24	29	14	67	224	34	68	326	3,383
%HV	9.1%	5.1%	2.8%	4.9%	2.5%	4.6%	0.0%	4.5%	0.0%	0.0%	0.0%	0.0%	2.2%	0.0%	4.4%	2.5%	4.3%
PHF	0.55	0.89	0.64	0.93	0.71	0.91	0.68	0.92	0.60	0.56	0.70	0.73	0.82	0.50	0.77	0.84	0.92

Rolling Hour Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 224				Southbound Hwy 224				Eastbound SE Freeman Way				Westbound SE Freeman Way				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
3:00 PM	6	1,027	105	0	50	1,587	27	0	16	32	12	0	167	29	57	0	3,115	0	0	0	0
3:15 PM	8	984	112	0	49	1,671	30	0	19	35	10	0	194	30	68	0	3,210	0	0	0	0
3:30 PM	11	1,029	108	0	40	1,772	30	0	24	29	14	0	224	34	68	0	3,383	0	0	0	0
3:45 PM	21	969	89	0	34	1,815	41	0	23	23	12	0	223	39	75	0	3,364	0	0	0	0
4:00 PM	20	965	86	0	32	1,833	38	0	18	15	11	0	231	44	82	0	3,375	0	0	0	0
4:15 PM	21	995	74	0	32	1,803	35	0	14	13	10	0	232	46	76	0	3,351	0	0	0	0
4:30 PM	29	945	75	0	27	1,718	40	0	11	15	6	0	232	44	79	0	3,221	0	0	0	0
4:45 PM	23	1,040	66	0	27	1,738	34	0	15	11	6	0	235	42	68	0	3,305	0	0	0	0
5:00 PM	23	983	59	0	22	1,716	36	0	20	8	5	0	229	41	54	0	3,196	0	0	0	0

Heavy Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Hwy 224 & SE Freeman Way

Thursday, November 30, 2006
3:00 PM to 6:00 PM

Peak Hour Summary
3:30 PM to 4:30 PM

Heavy Vehicle 15-Minute Interval Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 224				Southbound Hwy 224				Eastbound SE Freeman Way				Westbound SE Freeman Way				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
3:00 PM	0	13	0	13	0	29	0	29	0	0	0	0	2	0	3	5	47
3:15 PM	0	15	2	17	3	24	0	27	0	0	0	0	2	0	4	6	50
3:30 PM	0	20	1	21	0	20	0	20	0	0	0	0	2	0	1	3	44
3:45 PM	0	12	0	12	1	18	0	19	0	0	0	0	0	0	2	2	33
4:00 PM	0	9	1	10	0	23	0	23	0	0	0	0	1	0	0	1	34
4:15 PM	1	11	1	13	0	21	0	21	0	0	0	0	2	0	0	2	36
4:30 PM	0	9	2	11	0	13	0	13	0	0	0	0	0	0	2	2	26
4:45 PM	0	10	0	10	0	9	0	9	0	0	0	0	1	0	0	1	20
5:00 PM	0	11	1	12	1	9	0	10	0	0	0	0	0	0	0	0	22
5:15 PM	0	7	0	7	0	12	0	12	0	0	0	0	1	0	1	2	21
5:30 PM	0	6	0	6	0	6	0	6	0	0	0	0	0	0	0	0	12
5:45 PM	0	6	0	6	0	8	0	8	0	0	0	0	0	0	0	0	14
Total Survey	1	129	8	138	5	192	0	197	0	0	0	0	11	0	13	24	359

Heavy Vehicle Peak Hour Summary
3:30 PM to 4:30 PM

By Approach	Northbound Hwy 224			Southbound Hwy 224			Eastbound SE Freeman Way			Westbound SE Freeman Way			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	56	87	143	83	55	138	0	1	1	8	4	12	147
PHF	0.27			0.27			0.00			0.14			0.26

By Movement	Northbound Hwy 224				Southbound Hwy 224				Eastbound SE Freeman Way				Westbound SE Freeman Way				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	1	52	3	56	1	82	0	83	0	0	0	0	5	0	3	8	147
PHF	0.25	0.27	0.19	0.27	0.06	0.28	0.00	0.27	0.00	0.00	0.00	0.00	0.21	0.00	0.09	0.14	0.26

Heavy Vehicle Rolling Hour Summary
3:00 PM to 6:00 PM

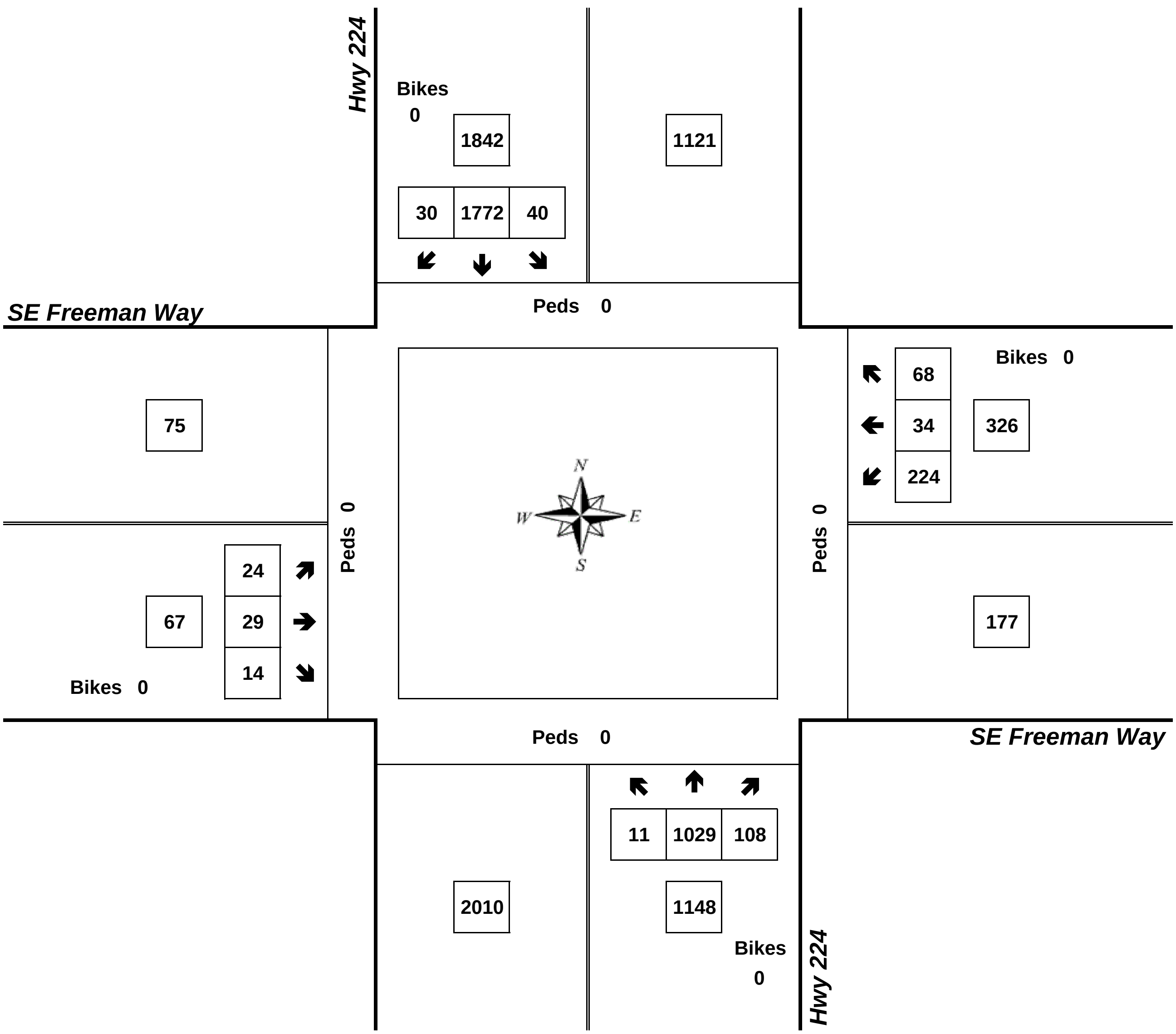
Interval Start Time	Northbound Hwy 224				Southbound Hwy 224				Eastbound SE Freeman Way				Westbound SE Freeman Way				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
3:00 PM	0	60	3	63	4	91	0	95	0	0	0	0	6	0	10	16	174
3:15 PM	0	56	4	60	4	85	0	89	0	0	0	0	5	0	7	12	161
3:30 PM	1	52	3	56	1	82	0	83	0	0	0	0	5	0	3	8	147
3:45 PM	1	41	4	46	1	75	0	76	0	0	0	0	3	0	4	7	129
4:00 PM	1	39	4	44	0	66	0	66	0	0	0	0	4	0	2	6	116
4:15 PM	1	41	4	46	1	52	0	53	0	0	0	0	3	0	2	5	104
4:30 PM	0	37	3	40	1	43	0	44	0	0	0	0	2	0	3	5	89
4:45 PM	0	34	1	35	1	36	0	37	0	0	0	0	2	0	1	3	75
5:00 PM	0	30	1	31	1	35	0	36	0	0	0	0	1	0	1	2	69

Peak Hour Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

Hwy 224 & SE Freeman Way

3:30 PM to 4:30 PM
Thursday, November 30, 2006

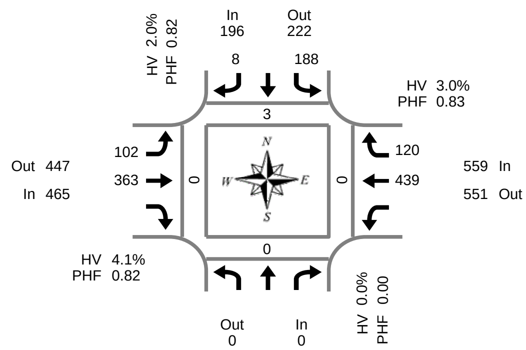


Approach	PHF	HV%	Volume
EB	0.73	0.0%	67
WB	0.84	2.5%	326
NB	0.93	4.9%	1,148
SB	0.92	4.5%	1,842
Intersection	0.92	4.3%	3,383

Count Period: 3:00 PM to 6:00 PM

Total Vehicle Summary

Clay Carney
(503) 833-2740



Peak Hour Summary
4:55 PM to 5:55 PM

Hwy 212 EB Ramps & SE Lake Rd

Wednesday, October 11, 2006
4:00 PM to 6:00 PM

5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 212 EB Ramps				Southbound Hwy 212 EB Ramps				Eastbound SE Lake Rd				Westbound SE Lake Rd				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
4:00 PM				0	5		1	0	7	29		0		26	8	0	76	0	0	0	0
4:05 PM				0	8		1	0	8	30		0		21	7	0	75	1	0	0	0
4:10 PM				0	8		2	0	8	32		0		34	12	0	96	0	0	0	0
4:15 PM				0	6		0	0	10	21		0		43	7	0	87	0	0	0	0
4:20 PM				0	13		0	0	8	20		0		41	6	0	88	0	0	0	0
4:25 PM				0	15		1	0	11	25		0		35	4	0	91	0	0	0	0
4:30 PM				0	10		0	0	6	22		1		39	3	0	80	0	0	0	0
4:35 PM				0	10		1	0	12	24		0		43	8	0	98	0	0	0	0
4:40 PM				0	24		0	0	10	30		0		33	10	0	107	0	0	0	0
4:45 PM				0	10		0	0	15	40		0		27	18	0	110	0	0	0	0
4:50 PM				0	14		0	0	8	26		0		30	7	0	85	1	0	0	0
4:55 PM				0	12		1	0	6	35		0		49	11	0	114	1	0	0	0
5:00 PM				0	9		0	0	8	31		2		29	10	0	87	0	0	0	0
5:05 PM				0	15		1	0	5	30		0		40	7	0	98	0	0	0	0
5:10 PM				0	11		0	0	13	28		0		37	6	0	95	0	0	0	0
5:15 PM				0	18		2	0	6	17		1		34	8	0	85	0	0	0	0
5:20 PM				0	18		1	0	10	24		0		54	10	0	117	1	0	0	0
5:25 PM				0	21		0	0	6	26		0		52	11	0	116	0	0	0	0
5:30 PM				0	17		0	0	10	31		0		23	17	0	98	0	0	0	0
5:35 PM				0	17		2	0	6	38		0		28	8	0	99	0	0	0	0
5:40 PM				0	13		1	0	13	43		0		27	9	0	106	1	0	0	0
5:45 PM				0	18		0	0	8	30		0		31	12	0	99	0	0	0	0
5:50 PM				0	19		0	0	11	30		0		35	11	0	106	0	0	0	0
5:55 PM				0	20		1	0	11	29		0		39	8	0	108	0	0	0	0
Total Survey				0	331		15	0	216	691		4		850	218	0	2,321	5	0	0	0

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 212 EB Ramps				Southbound Hwy 212 EB Ramps				Eastbound SE Lake Rd				Westbound SE Lake Rd				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
4:00 PM				0	21		4	0	23	91		0		81	27	0	247	1	0	0	0
4:15 PM				0	34		1	0	29	66		0		119	17	0	266	0	0	0	0
4:30 PM				0	44		1	0	28	76		1		115	21	0	285	0	0	0	0
4:45 PM				0	36		1	0	29	101		0		106	36	0	309	2	0	0	0
5:00 PM				0	35		1	0	26	89		2		106	23	0	280	0	0	0	0
5:15 PM				0	57		3	0	22	67		1		140	29	0	318	1	0	0	0
5:30 PM				0	47		3	0	29	112		0		78	34	0	303	1	0	0	0
5:45 PM				0	57		1	0	30	89		0		105	31	0	313	0	0	0	0
Total Survey				0	331		15	0	216	691		4		850	218	0	2,321	5	0	0	0

Peak Hour Summary
4:55 PM to 5:55 PM

By Approach	Northbound Hwy 212 EB Ramps				Southbound Hwy 212 EB Ramps				Eastbound SE Lake Rd				Westbound SE Lake Rd				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	0	0	0	0	196	222	418	0	465	447	912	3	559	551	1,110	0	1,220	3	0	0	0
%HV	0.0%				2.0%				4.1%				3.0%				3.3%				
PHF	0.00				0.82				0.82				0.83				0.92				

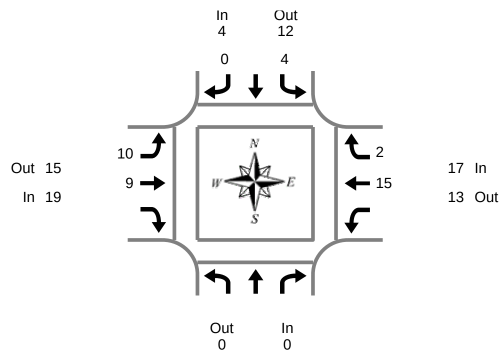
By Movement	Northbound Hwy 212 EB Ramps				Southbound Hwy 212 EB Ramps				Eastbound SE Lake Rd				Westbound SE Lake Rd				Total
				Total	L		R	Total	L	T		Total		T	R	Total	
Volume				0	188		8	196	102	363		465		439	120	559	1,220
%HV	NA	NA	NA	0.0%	2.1%	NA	0.0%	2.0%	9.8%	2.5%	NA	4.1%	NA	3.4%	1.7%	3.0%	3.3%
PHF				0.00	0.82		0.67	0.82	0.80	0.81		0.82		0.78	0.79	0.83	0.92

Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 212 EB Ramps				Southbound Hwy 212 EB Ramps				Eastbound SE Lake Rd				Westbound SE Lake Rd				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
4:00 PM				0	135		7	0	109	334		1		421	101	0	1,107	3	0	0	0
4:15 PM				0	149		4	0	112	332		3		446	97	0	1,140	2	0	0	0
4:30 PM				0	172		6	0	105	333		4		467	109	0	1,192	3	0	0	0
4:45 PM				0	175		8	0	106	369		3		430	122	0	1,210	4	0	0	0
5:00 PM				0	196		8	0	107	357		3		429	117	0	1,214	2	0	0	0

Heavy Vehicle Summary

Clay Carney
(503) 833-2740



Hwy 212 EB Ramps & SE Lake Rd

Wednesday, October 11, 2006
4:00 PM to 6:00 PM

Peak Hour Summary
4:55 PM to 5:55 PM

Heavy Vehicle 5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 212 EB Ramps				Southbound Hwy 212 EB Ramps				Eastbound SE Lake Rd				Westbound SE Lake Rd				Interval Total
				Total	L		R	Total	L	T		Total		T	R	Total	
4:00 PM				0	0		0	0	0	3		3		0	0	0	3
4:05 PM				0	0		0	0	0	6		6		0	0	0	6
4:10 PM				0	0		0	0	2	2		4		1	0	1	5
4:15 PM				0	0		0	0	0	1		1		2	0	2	3
4:20 PM				0	0		0	0	0	1		1		1	0	1	2
4:25 PM				0	2		0	2	1	0		1		0	0	0	3
4:30 PM				0	1		0	1	2	0		2		2	0	2	5
4:35 PM				0	0		0	0	2	2		4		4	1	5	9
4:40 PM				0	2		0	2	1	0		1		2	0	2	5
4:45 PM				0	0		0	0	0	1		1		2	1	3	4
4:50 PM				0	0		0	0	1	0		1		0	0	0	1
4:55 PM				0	0		0	0	1	1		2		1	0	1	3
5:00 PM				0	0		0	0	0	1		1		1	0	1	2
5:05 PM				0	1		0	1	1	1		2		2	0	2	5
5:10 PM				0	0		0	0	2	1		3		1	0	1	4
5:15 PM				0	2		0	2	0	0		0		1	0	1	3
5:20 PM				0	0		0	0	0	0		0		2	0	2	2
5:25 PM				0	0		0	0	1	0		1		2	0	2	3
5:30 PM				0	0		0	0	2	0		2		1	1	2	4
5:35 PM				0	1		0	1	0	1		1		1	0	1	3
5:40 PM				0	0		0	0	1	3		4		1	0	1	5
5:45 PM				0	0		0	0	0	0		0		1	0	1	1
5:50 PM				0	0		0	0	2	1		3		1	1	2	5
5:55 PM				0	0		0	0	0	2		2		2	0	2	4
Total Survey				0	9		0	9	19	27		46		31	4	35	90

Heavy Vehicle 15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 212 EB Ramps				Southbound Hwy 212 EB Ramps				Eastbound SE Lake Rd				Westbound SE Lake Rd				Interval Total
				Total	L		R	Total	L	T		Total		T	R	Total	
4:00 PM				0	0		0	0	2	11		13		1	0	1	14
4:15 PM				0	2		0	2	1	2		3		3	0	3	8
4:30 PM				0	3		0	3	5	2		7		8	1	9	19
4:45 PM				0	0		0	0	2	2		4		3	1	4	8
5:00 PM				0	1		0	1	3	3		6		4	0	4	11
5:15 PM				0	2		0	2	1	0		1		5	0	5	8
5:30 PM				0	1		0	1	3	4		7		3	1	4	12
5:45 PM				0	0		0	0	2	3		5		4	1	5	10
Total Survey				0	9		0	9	19	27		46		31	4	35	90

Heavy Vehicle Peak Hour Summary
4:55 PM to 5:55 PM

By Approach	Northbound Hwy 212 EB Ramps			Southbound Hwy 212 EB Ramps			Eastbound SE Lake Rd			Westbound SE Lake Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	0	0	0	4	12	16	19	15	34	17	13	30	40
PHF	0.00			0.33			0.68			0.71			0.83

By Movement	Northbound Hwy 212 EB Ramps				Southbound Hwy 212 EB Ramps				Eastbound SE Lake Rd				Westbound SE Lake Rd				Total
				Total	L		R	Total	L	T		Total		T	R	Total	
Volume				0	4		0	4	10	9		19		15	2	17	40
PHF				0.00	0.33		0.00	0.33	0.83	0.56		0.68		0.75	0.50	0.71	0.83

Heavy Vehicle Rolling Hour Summary
4:00 PM to 6:00 PM

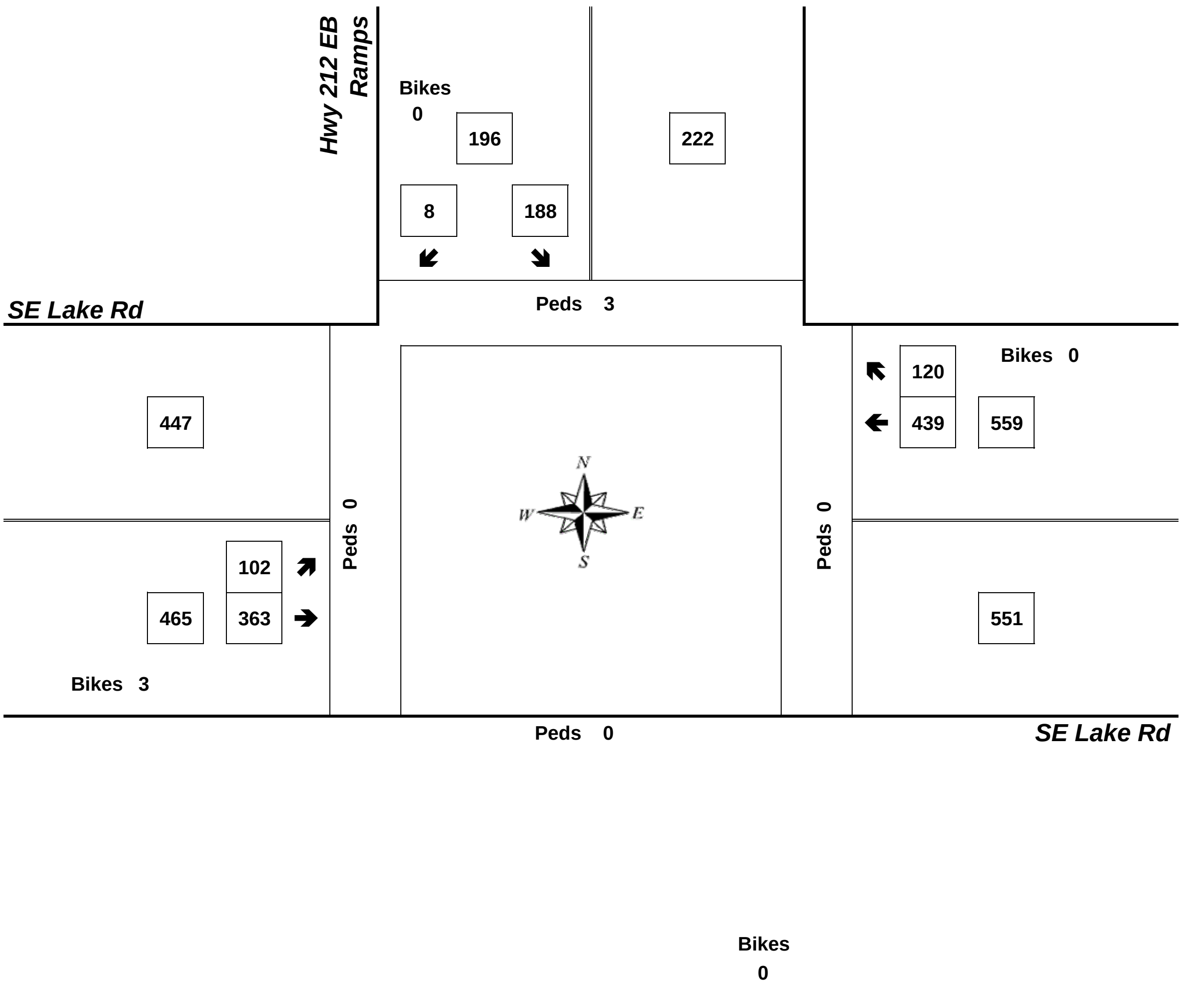
Interval Start Time	Northbound Hwy 212 EB Ramps				Southbound Hwy 212 EB Ramps				Eastbound SE Lake Rd				Westbound SE Lake Rd				Interval Total
				Total	L		R	Total	L	T		Total		T	R	Total	
4:00 PM				0	5		0	5	10	17		27		15	2	17	49
4:15 PM				0	6		0	6	11	9		20		18	2	20	46
4:30 PM				0	6		0	6	11	7		18		20	2	22	46
4:45 PM				0	4		0	4	9	9		18		15	2	17	39
5:00 PM				0	4		0	4	9	10		19		16	2	18	41

Peak Hour Summary

Clay Carney
(503) 833-2740

Hwy 212 EB Ramps & SE Lake Rd

4:55 PM to 5:55 PM
Wednesday, October 11, 2006

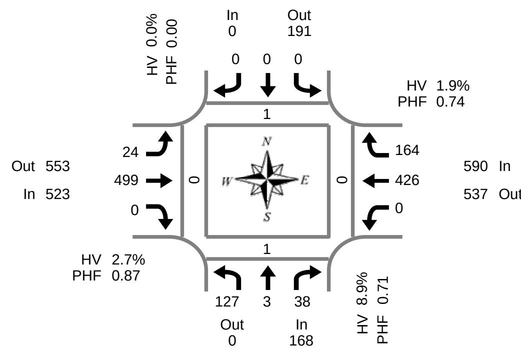


Approach	PHF	HV%	Volume
EB	0.82	4.1%	465
WB	0.83	3.0%	559
NB	0.00	0.0%	0
SB	0.82	2.0%	196
Intersection	0.92	3.3%	1,220

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
4:55 PM to 5:55 PM

Hwy 212 WB Ramps & SE Lake Rd

Wednesday, October 11, 2006
4:00 PM to 6:00 PM

5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 212 WB Ramps				Southbound Hwy 212 WB Ramps				Eastbound SE Lake Rd				Westbound SE Lake Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	9	0	1	0	0	0	0	0	1	42	0	0	0	37	9	0	99	0	0	0	0
4:05 PM	7	0	0	0	0	0	0	0	2	47	0	0	0	34	10	0	100	0	0	0	0
4:10 PM	3	0	1	0	0	0	0	0	0	31	0	0	0	33	15	0	83	0	0	0	0
4:15 PM	7	2	6	0	0	0	0	0	1	33	0	0	0	73	14	0	136	0	0	0	0
4:20 PM	10	0	2	0	0	0	0	0	3	46	0	0	0	38	15	0	114	0	0	0	0
4:25 PM	9	0	3	0	0	0	0	0	0	22	0	0	0	20	9	1	63	0	0	0	0
4:30 PM	5	1	1	0	0	0	0	0	4	38	0	1	0	27	8	0	84	0	0	0	0
4:35 PM	11	0	0	0	0	0	0	0	2	33	0	0	0	37	12	0	95	0	0	0	0
4:40 PM	7	0	3	0	0	0	0	0	1	46	0	0	0	33	14	0	104	0	0	0	0
4:45 PM	7	0	3	0	0	0	0	0	0	39	0	0	0	32	10	0	91	0	0	0	0
4:50 PM	7	1	0	0	0	0	0	0	3	34	0	0	0	46	13	0	104	0	0	0	0
4:55 PM	9	0	3	0	0	0	0	0	4	49	0	0	0	34	19	0	118	0	0	0	0
5:00 PM	12	0	2	0	0	0	0	0	2	38	0	0	0	31	17	0	102	0	0	0	0
5:05 PM	7	0	3	0	0	0	0	0	1	36	0	2	0	33	13	0	93	0	0	0	0
5:10 PM	8	0	2	0	0	0	0	0	0	44	0	0	0	40	12	0	106	0	1	0	0
5:15 PM	4	0	1	0	0	0	0	0	2	33	0	0	0	51	20	0	111	0	0	0	0
5:20 PM	11	0	4	0	0	0	0	0	3	44	0	0	0	57	19	0	138	0	0	0	0
5:25 PM	15	0	2	0	0	0	0	0	1	43	0	0	0	31	13	0	105	0	0	0	0
5:30 PM	11	1	6	0	0	0	0	0	2	29	0	0	0	29	8	0	86	1	0	0	0
5:35 PM	5	0	3	0	0	0	0	0	1	49	0	0	0	25	11	0	94	0	0	0	0
5:40 PM	18	1	1	0	0	0	0	0	3	52	0	0	0	36	11	0	122	0	0	0	0
5:45 PM	9	1	5	0	0	0	0	0	4	42	0	0	0	23	13	0	97	0	0	0	0
5:50 PM	18	0	6	0	0	0	0	0	1	40	0	0	0	36	8	0	109	0	0	0	0
5:55 PM	17	0	2	0	0	0	0	0	0	51	0	0	0	34	10	0	114	0	0	0	0
Total Survey	226	7	60	0	0	0	0	0	41	961	0	3	0	870	303	1	2,468	1	1	0	0

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 212 WB Ramps				Southbound Hwy 212 WB Ramps				Eastbound SE Lake Rd				Westbound SE Lake Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	19	0	2	0	0	0	0	0	3	120	0	0	0	104	34	0	282	0	0	0	0
4:15 PM	26	2	11	0	0	0	0	0	4	101	0	0	0	131	38	1	313	0	0	0	0
4:30 PM	23	1	4	0	0	0	0	0	7	117	0	1	0	97	34	0	283	0	0	0	0
4:45 PM	23	1	6	0	0	0	0	0	7	122	0	0	0	112	42	0	313	0	0	0	0
5:00 PM	27	0	7	0	0	0	0	0	3	118	0	2	0	104	42	0	301	0	1	0	0
5:15 PM	30	0	7	0	0	0	0	0	6	120	0	0	0	139	52	0	354	0	0	0	0
5:30 PM	34	2	10	0	0	0	0	0	6	130	0	0	0	90	30	0	302	1	0	0	0
5:45 PM	44	1	13	0	0	0	0	0	5	133	0	0	0	93	31	0	320	0	0	0	0
Total Survey	226	7	60	0	0	0	0	0	41	961	0	3	0	870	303	1	2,468	1	1	0	0

Peak Hour Summary
4:55 PM to 5:55 PM

By Approach	Northbound Hwy 212 WB Ramps				Southbound Hwy 212 WB Ramps				Eastbound SE Lake Rd				Westbound SE Lake Rd				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	168	0	168	0	0	191	191	0	523	553	1,076	2	590	537	1,127	0	1,281	1	1	0	0
%HV	8.9%				0.0%				2.7%				1.9%				3.1%				
PHF	0.71				0.00				0.87				0.74				0.90				

By Movement	Northbound Hwy 212 WB Ramps				Southbound Hwy 212 WB Ramps				Eastbound SE Lake Rd				Westbound SE Lake Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	127	3	38	168	0	0	0	0	24	499	0	523	0	426	164	590	1,281
%HV	6.3%	0.0%	18.4%	8.9%	0.0%	0.0%	0.0%	0.0%	0.0%	2.8%	0.0%	2.7%	0.0%	1.9%	1.8%	1.9%	3.1%
PHF	0.71	0.38	0.79	0.71	0.00	0.00	0.00	0.00	0.75	0.87	0.00	0.87	0.00	0.72	0.79	0.74	0.90

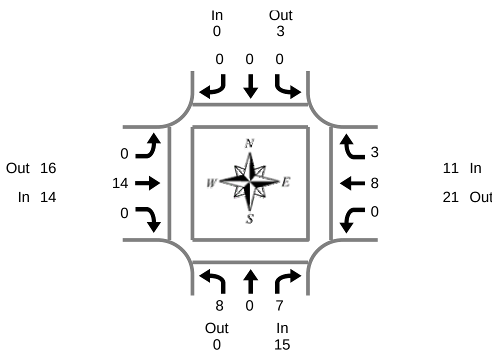
Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 212 WB Ramps				Southbound Hwy 212 WB Ramps				Eastbound SE Lake Rd				Westbound SE Lake Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	91	4	23	0	0	0	0	0	21	460	0	1	0	444	148	1	1,191	0	0	0	0
4:15 PM	99	4	28	0	0	0	0	0	21	458	0	3	0	444	156	1	1,210	0	1	0	0
4:30 PM	103	2	24	0	0	0	0	0	23	477	0	3	0	452	170	0	1,251	0	1	0	0
4:45 PM	114	3	30	0	0	0	0	0	22	490	0	2	0	445	166	0	1,270	1	1	0	0
5:00 PM	135	3	37	0	0	0	0	0	20	501	0	2	0	426	155	0	1,277	1	1	0	0

Heavy Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



Peak Hour Summary
4:55 PM to 5:55 PM

Hwy 212 WB Ramps & SE Lake Rd

Wednesday, October 11, 2006
4:00 PM to 6:00 PM

Heavy Vehicle 5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 212 WB Ramps L	T	R	Total	Southbound Hwy 212 WB Ramps L	T	R	Total	Eastbound SE Lake Rd L	T	R	Total	Westbound SE Lake Rd L	T	R	Total	Interval Total
4:00 PM	0	0	0	0	0	0	0	0	0	4	0	4	0	1	0	1	5
4:05 PM	0	0	0	0	0	0	0	0	0	6	0	6	0	0	0	0	6
4:10 PM	0	0	0	0	0	0	0	0	0	3	0	3	0	0	0	0	3
4:15 PM	1	0	2	3	0	0	0	0	0	0	0	0	0	1	0	1	4
4:20 PM	0	0	1	1	0	0	0	0	0	0	0	0	0	1	2	3	4
4:25 PM	1	0	1	2	0	0	0	0	0	2	0	2	0	0	0	0	4
4:30 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	3	0	3	4
4:35 PM	0	0	0	0	0	0	0	0	0	2	0	2	0	3	1	4	6
4:40 PM	2	0	0	2	0	0	0	0	0	4	0	4	0	0	0	0	6
4:45 PM	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1
4:50 PM	1	0	0	1	0	0	0	0	0	1	0	1	0	1	1	2	4
4:55 PM	0	0	2	2	0	0	0	0	0	1	0	1	0	0	0	0	3
5:00 PM	0	0	0	0	0	0	0	0	0	2	0	2	0	2	0	2	4
5:05 PM	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	2
5:10 PM	0	0	1	1	0	0	0	0	0	0	0	0	0	2	1	3	4
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
5:20 PM	1	0	0	1	0	0	0	0	0	1	0	1	0	2	1	3	5
5:25 PM	2	0	0	2	0	0	0	0	0	1	0	1	0	0	0	0	3
5:30 PM	1	0	1	2	0	0	0	0	0	1	0	1	0	1	0	1	4
5:35 PM	3	0	2	5	0	0	0	0	0	5	0	5	0	0	0	0	10
5:40 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	1	0	1	2	0	0	0	0	0	1	0	1	0	1	0	1	4
5:50 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:55 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	2
Total Survey	13	0	12	25	0	0	0	0	0	38	0	38	0	19	7	26	89

Heavy Vehicle 15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 212 WB Ramps L	T	R	Total	Southbound Hwy 212 WB Ramps L	T	R	Total	Eastbound SE Lake Rd L	T	R	Total	Westbound SE Lake Rd L	T	R	Total	Interval Total
4:00 PM	0	0	0	0	0	0	0	0	0	13	0	13	0	1	0	1	14
4:15 PM	2	0	4	6	0	0	0	0	0	2	0	2	0	2	2	4	12
4:30 PM	2	0	0	2	0	0	0	0	0	7	0	7	0	6	1	7	16
4:45 PM	1	0	3	4	0	0	0	0	0	2	0	2	0	1	1	2	8
5:00 PM	0	0	1	1	0	0	0	0	0	4	0	4	0	4	1	5	10
5:15 PM	3	0	0	3	0	0	0	0	0	2	0	2	0	2	2	4	9
5:30 PM	4	0	3	7	0	0	0	0	0	6	0	6	0	1	0	1	14
5:45 PM	1	0	1	2	0	0	0	0	0	2	0	2	0	2	0	2	6
Total Survey	13	0	12	25	0	0	0	0	0	38	0	38	0	19	7	26	89

Heavy Vehicle Peak Hour Summary
4:55 PM to 5:55 PM

By Approach	Northbound Hwy 212 WB Ramps In	Out	Total	Southbound Hwy 212 WB Ramps In	Out	Total	Eastbound SE Lake Rd In	Out	Total	Westbound SE Lake Rd In	Out	Total	Total
Volume	15	0	15	0	3	3	14	16	30	11	21	32	40
PHF	0.42			0.00			0.50			0.39			0.59

By Movement	Northbound Hwy 212 WB Ramps L	T	R	Total	Southbound Hwy 212 WB Ramps L	T	R	Total	Eastbound SE Lake Rd L	T	R	Total	Westbound SE Lake Rd L	T	R	Total	Total
Volume	8	0	7	15	0	0	0	0	0	14	0	14	0	8	3	11	40
PHF	0.33	0.00	0.58	0.42	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.50	0.00	0.50	0.25	0.39	0.59

Heavy Vehicle Rolling Hour Summary
4:00 PM to 6:00 PM

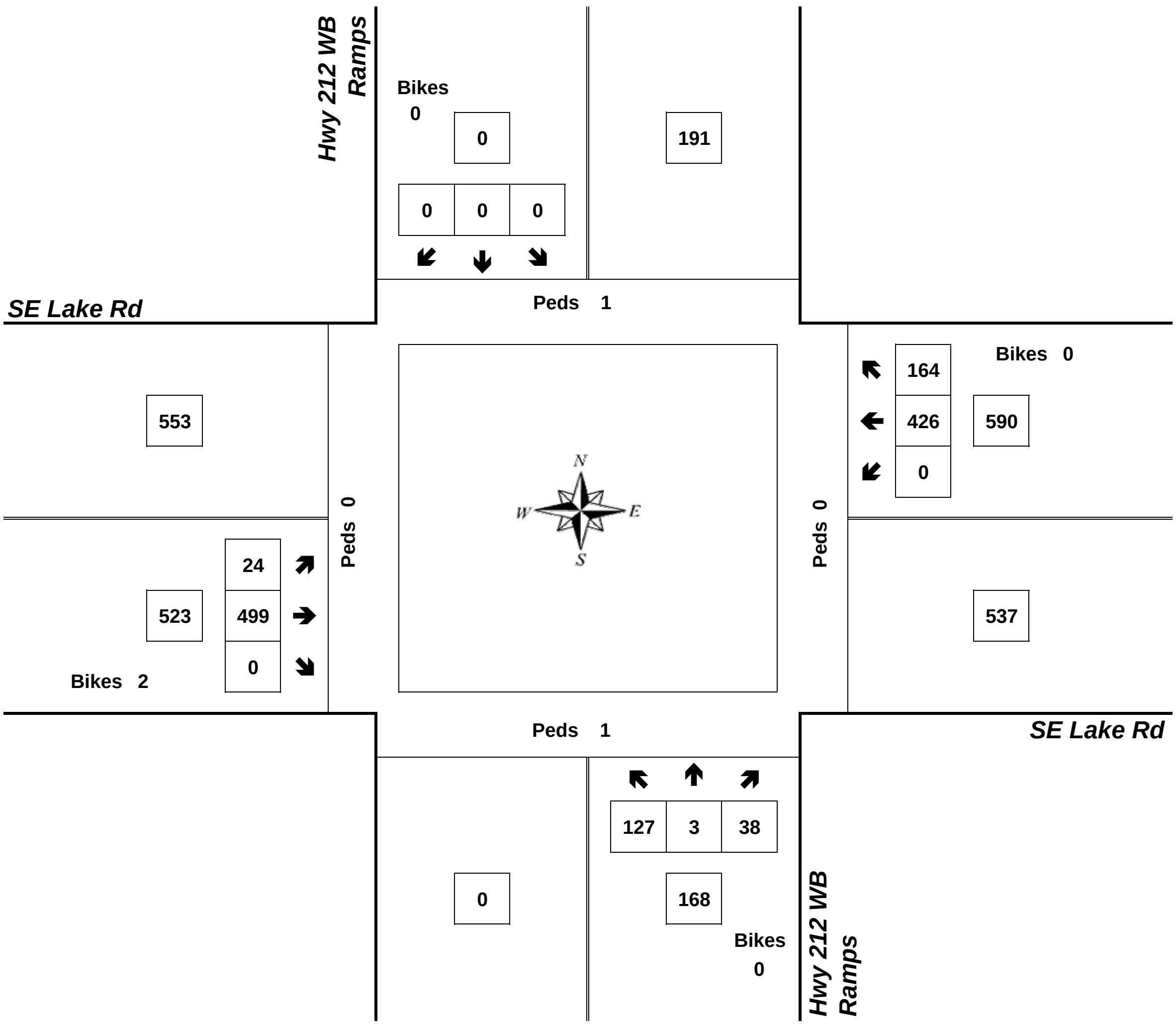
Interval Start Time	Northbound Hwy 212 WB Ramps L	T	R	Total	Southbound Hwy 212 WB Ramps L	T	R	Total	Eastbound SE Lake Rd L	T	R	Total	Westbound SE Lake Rd L	T	R	Total	Interval Total
4:00 PM	5	0	7	12	0	0	0	0	0	24	0	24	0	10	4	14	50
4:15 PM	5	0	8	13	0	0	0	0	0	15	0	15	0	13	5	18	46
4:30 PM	6	0	4	10	0	0	0	0	0	15	0	15	0	13	5	18	43
4:45 PM	8	0	7	15	0	0	0	0	0	14	0	14	0	8	4	12	41
5:00 PM	8	0	5	13	0	0	0	0	0	14	0	14	0	9	3	12	39

Peak Hour Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

Hwy 212 WB Ramps & SE Lake Rd

4:55 PM to 5:55 PM
Wednesday, October 11, 2006

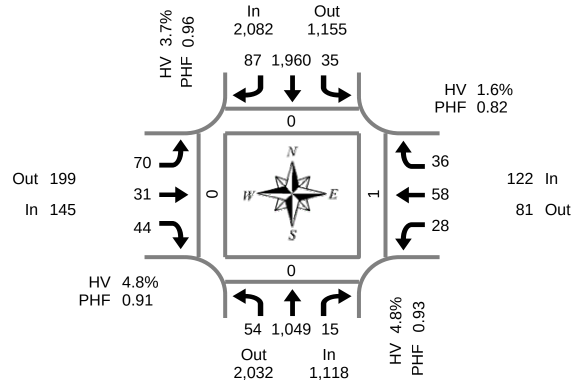


Approach	PHF	HV%	Volume
EB	0.87	2.7%	523
WB	0.74	1.9%	590
NB	0.71	8.9%	168
SB	0.00	0.0%	0
Intersection	0.90	3.1%	1,281

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

Clay Carney
(503) 833-2740



Peak Hour Summary
_4:00 PM to 5:00 PM_

Hwy 224 & SE Rusk Rd

Thursday, November 30, 2006
3:00 PM to 6:00 PM

15-Minute Interval Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 224				Southbound Hwy 224				Eastbound SE Rusk Rd				Westbound SE Rusk Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
3:00 PM	16	283	3	0	3	403	12	0	17	1	12	0	0	14	3	0	767	0	0	0	0
3:15 PM	14	266	5	0	5	403	20	0	15	3	10	0	5	8	1	0	755	0	0	0	0
3:30 PM	19	267	2	0	2	403	22	0	21	4	22	1	7	17	5	0	791	0	0	0	0
3:45 PM	12	294	0	0	2	471	19	0	15	10	29	0	6	9	3	0	870	0	0	1	0
4:00 PM	13	262	2	0	5	516	20	0	20	6	13	0	10	14	12	0	893	0	0	0	0
4:15 PM	10	285	4	0	10	512	16	0	14	7	10	0	6	11	6	0	891	0	0	0	0
4:30 PM	13	223	5	0	12	447	22	0	19	9	12	0	9	19	9	1	799	0	0	1	0
4:45 PM	18	279	4	0	8	485	29	0	17	9	9	0	3	14	9	0	884	0	0	0	0
5:00 PM	18	249	6	0	2	459	22	0	23	8	16	0	5	16	9	0	833	0	0	0	0
5:15 PM	13	310	4	0	3	484	15	0	13	6	15	0	6	6	5	0	880	0	0	0	0
5:30 PM	11	263	0	0	4	436	22	0	16	4	6	0	4	11	7	0	784	0	0	0	0
5:45 PM	9	219	1	0	1	452	21	0	11	4	5	0	6	4	5	0	738	0	0	0	0
Total Survey	166	3,200	36	0	57	5,471	240	0	201	71	159	1	67	143	74	1	9,885	0	0	2	0

Peak Hour Summary
4:00 PM to 5:00 PM

By Approach	Northbound Hwy 224				Southbound Hwy 224				Eastbound SE Rusk Rd				Westbound SE Rusk Rd				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	1,118	2,032	3,150	0	2,082	1,155	3,237	0	145	199	344	0	122	81	203	1	3,467	0	0	1	0
%HV	4.8%				3.7%				4.8%				1.6%				4.0%				
PHF	0.93				0.96				0.91				0.82				0.97				

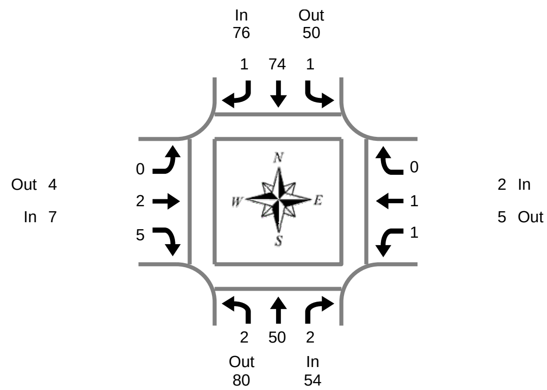
By Movement	Northbound Hwy 224				Southbound Hwy 224				Eastbound SE Rusk Rd				Westbound SE Rusk Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	54	1,049	15	1,118	35	1,960	87	2,082	70	31	44	145	28	58	36	122	3,467
%HV	3.7%	4.8%	13.3%	4.8%	2.9%	3.8%	1.1%	3.7%	0.0%	6.5%	11.4%	4.8%	3.6%	1.7%	0.0%	1.6%	4.0%
PHF	0.75	0.92	0.75	0.93	0.73	0.95	0.75	0.96	0.88	0.86	0.85	0.91	0.70	0.76	0.75	0.82	0.97

Rolling Hour Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 224				Southbound Hwy 224				Eastbound SE Rusk Rd				Westbound SE Rusk Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
3:00 PM	61	1,110	10	0	12	1,680	73	0	68	18	73	1	18	48	12	0	3,183	0	0	1	0
3:15 PM	58	1,089	9	0	14	1,793	81	0	71	23	74	1	28	48	21	0	3,309	0	0	1	0
3:30 PM	54	1,108	8	0	19	1,902	77	0	70	27	74	1	29	51	26	0	3,445	0	0	1	0
3:45 PM	48	1,064	11	0	29	1,946	77	0	68	32	64	0	31	53	30	1	3,453	0	0	2	0
4:00 PM	54	1,049	15	0	35	1,960	87	0	70	31	44	0	28	58	36	1	3,467	0	0	1	0
4:15 PM	59	1,036	19	0	32	1,903	89	0	73	33	47	0	23	60	33	1	3,407	0	0	1	0
4:30 PM	62	1,061	19	0	25	1,875	88	0	72	32	52	0	23	55	32	1	3,396	0	0	1	0
4:45 PM	60	1,101	14	0	17	1,864	88	0	69	27	46	0	18	47	30	0	3,381	0	0	0	0
5:00 PM	51	1,041	11	0	10	1,831	80	0	63	22	42	0	21	37	26	0	3,235	0	0	0	0

Heavy Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
4:00 PM to 5:00 PM

Hwy 224 & SE Rusk Rd

Thursday, November 30, 2006
3:00 PM to 6:00 PM

Heavy Vehicle 15-Minute Interval Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 224				Southbound Hwy 224				Eastbound SE Rusk Rd				Westbound SE Rusk Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
3:00 PM	2	15	0	17	0	33	0	33	0	0	0	0	0	0	0	0	50
3:15 PM	0	20	0	20	1	23	0	24	1	0	1	2	3	0	0	3	49
3:30 PM	0	14	0	14	0	26	0	26	0	1	0	1	1	0	0	1	42
3:45 PM	0	16	0	16	0	17	0	17	0	0	2	2	1	0	0	1	36
4:00 PM	0	12	0	12	0	21	1	22	0	0	1	1	0	0	0	0	35
4:15 PM	1	18	2	21	0	21	0	21	0	1	2	3	0	0	0	0	45
4:30 PM	1	11	0	12	1	16	0	17	0	0	2	2	1	1	0	2	33
4:45 PM	0	9	0	9	0	16	0	16	0	1	0	1	0	0	0	0	26
5:00 PM	0	10	1	11	0	8	0	8	0	0	0	0	0	0	0	0	19
5:15 PM	0	8	1	9	0	13	0	13	0	0	0	0	1	0	0	1	23
5:30 PM	0	9	0	9	0	10	0	10	0	0	0	0	0	0	0	0	19
5:45 PM	0	8	1	9	0	8	0	8	0	0	0	0	1	0	0	1	18
Total Survey	4	150	5	159	2	212	1	215	1	3	8	12	8	1	0	9	395

Heavy Vehicle Peak Hour Summary
4:00 PM to 5:00 PM

By Approach	Northbound Hwy 224			Southbound Hwy 224			Eastbound SE Rusk Rd			Westbound SE Rusk Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	54	80	134	76	50	126	7	4	11	2	5	7	139
PHF	0.26			0.23			0.29			0.10			0.25

By Movement	Northbound Hwy 224				Southbound Hwy 224				Eastbound SE Rusk Rd				Westbound SE Rusk Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	2	50	2	54	1	74	1	76	0	2	5	7	1	1	0	2	139
PHF	0.25	0.25	0.25	0.26	0.25	0.23	0.25	0.23	0.00	0.25	0.25	0.29	0.05	0.25	0.00	0.10	0.25

Heavy Vehicle Rolling Hour Summary
3:00 PM to 6:00 PM

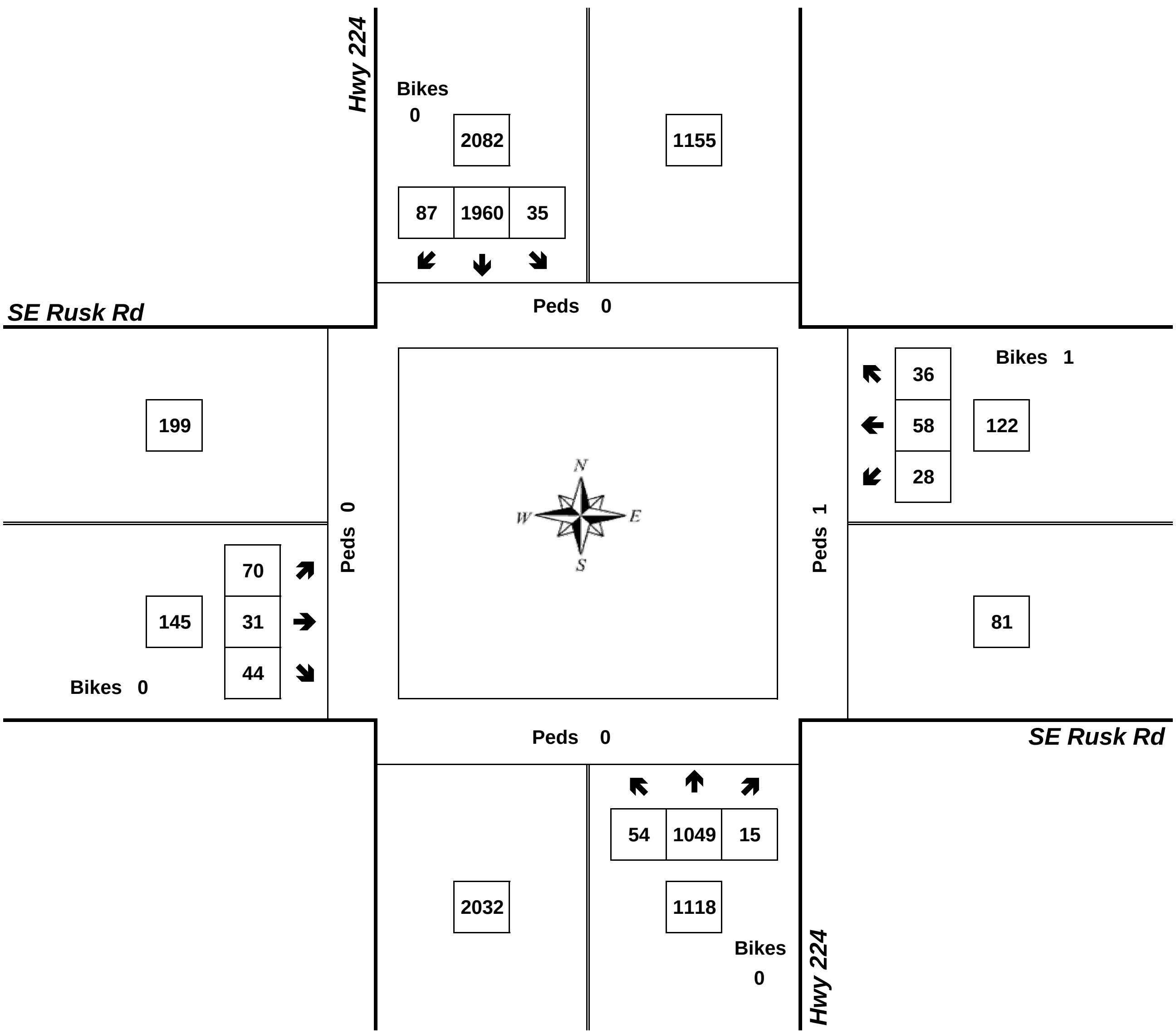
Interval Start Time	Northbound Hwy 224				Southbound Hwy 224				Eastbound SE Rusk Rd				Westbound SE Rusk Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
3:00 PM	2	65	0	67	1	99	0	100	1	1	3	5	5	0	0	5	177
3:15 PM	0	62	0	62	1	87	1	89	1	1	4	6	5	0	0	5	162
3:30 PM	1	60	2	63	0	85	1	86	0	2	5	7	2	0	0	2	158
3:45 PM	2	57	2	61	1	75	1	77	0	1	7	8	2	1	0	3	149
4:00 PM	2	50	2	54	1	74	1	76	0	2	5	7	1	1	0	2	139
4:15 PM	2	48	3	53	1	61	0	62	0	2	4	6	1	1	0	2	123
4:30 PM	1	38	2	41	1	53	0	54	0	1	2	3	2	1	0	3	101
4:45 PM	0	36	2	38	0	47	0	47	0	1	0	1	1	0	0	1	87
5:00 PM	0	35	3	38	0	39	0	39	0	0	0	0	2	0	0	2	79

Peak Hour Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

Hwy 224 & SE Rusk Rd

4:00 PM to 5:00 PM
Thursday, November 30, 2006

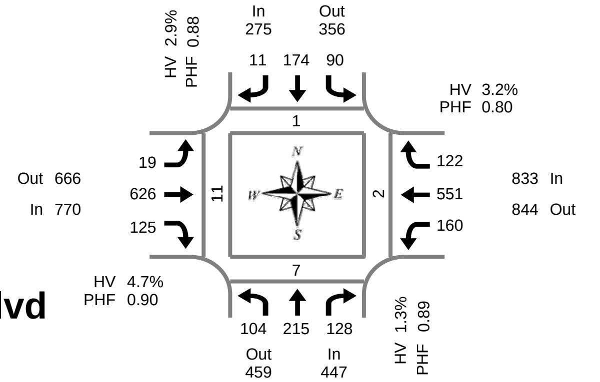


Approach	PHF	HV%	Volume
EB	0.91	4.8%	145
WB	0.82	1.6%	122
NB	0.93	4.8%	1,118
SB	0.96	3.7%	2,082
Intersection	0.97	4.0%	3,467

Count Period: 3:00 PM to 6:00 PM

Total Vehicle Summary

Clay Carney
(503) 833-2740



SE Linwood Ave & SE Johnson Creek Blvd

Tuesday, December 05, 2006
3:00 PM to 6:00 PM

Peak Hour Summary
4:30 PM to 5:30 PM

15-Minute Interval Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound SE Linwood Ave				Southbound SE Linwood Ave				Eastbound SE Johnson Creek Blvd				Westbound SE Johnson Creek Blvd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
3:00 PM	28	26	24	0	15	19	4	0	6	145	22	0	32	135	0	0	456	0	1	1	2
3:15 PM	24	30	28	0	18	29	3	0	5	149	19	0	27	113	0	0	445	0	2	0	2
3:30 PM	15	32	21	0	27	38	3	1	4	160	31	0	33	129	0	0	493	0	2	0	2
3:45 PM	26	46	33	0	20	39	3	0	7	150	22	0	25	139	0	0	510	0	2	0	4
4:00 PM	30	46	39	0	15	39	1	0	4	135	29	0	29	133	0	0	500	0	3	0	2
4:15 PM	19	42	45	1	16	30	4	0	4	175	22	0	38	126	40	0	561	0	3	0	2
4:30 PM	29	61	36	0	25	47	6	0	7	135	36	0	59	162	38	0	641	0	1	1	3
4:45 PM	26	51	35	1	22	38	1	0	2	179	33	1	30	135	35	0	587	1	3	0	2
5:00 PM	26	54	33	0	22	43	3	0	7	166	26	1	29	107	16	0	532	0	2	1	2
5:15 PM	23	49	24	0	21	46	1	0	3	146	30	0	42	147	33	0	565	0	1	0	4
5:30 PM	15	46	39	0	13	45	2	0	2	145	21	0	35	133	23	0	519	1	0	0	0
5:45 PM	15	28	24	0	24	27	4	0	3	136	24	0	47	120	20	0	472	0	0	0	0
Total Survey	276	511	381	2	238	440	35	1	54	1,821	315	2	426	1,579	205	0	6,281	2	20	3	25

Peak Hour Summary
4:30 PM to 5:30 PM

By Approach	Northbound SE Linwood Ave				Southbound SE Linwood Ave				Eastbound SE Johnson Creek Blvd				Westbound SE Johnson Creek Blvd				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	447	459	906	1	275	356	631	0	770	666	1,436	2	833	844	1,677	0	2,325	1	7	2	11
%HV	1.3%				2.9%				4.7%				3.2%				3.3%				
PHF	0.89				0.88				0.90				0.80				0.91				

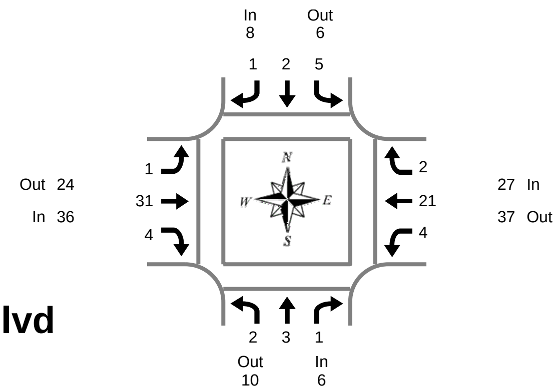
By Movement	Northbound SE Linwood Ave				Southbound SE Linwood Ave				Eastbound SE Johnson Creek Blvd				Westbound SE Johnson Creek Blvd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	104	215	128	447	90	174	11	275	19	626	125	770	160	551	122	833	2,325
%HV	1.9%	1.4%	0.8%	1.3%	5.6%	1.1%	9.1%	2.9%	5.3%	5.0%	3.2%	4.7%	2.5%	3.8%	1.6%	3.2%	3.3%
PHF	0.90	0.88	0.89	0.89	0.90	0.93	0.46	0.88	0.68	0.87	0.87	0.90	0.68	0.85	0.80	0.80	0.91

Rolling Hour Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound SE Linwood Ave				Southbound SE Linwood Ave				Eastbound SE Johnson Creek Blvd				Westbound SE Johnson Creek Blvd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
3:00 PM	93	134	106	0	80	125	13	1	22	604	94	0	117	516	0	0	1,904	0	7	1	10
3:15 PM	95	154	121	0	80	145	10	1	20	594	101	0	114	514	0	0	1,948	0	9	0	10
3:30 PM	90	166	138	1	78	146	11	1	19	620	104	0	125	527	40	0	2,064	0	10	0	10
3:45 PM	104	195	153	1	76	155	14	0	22	595	109	0	151	560	78	0	2,212	0	9	1	11
4:00 PM	104	200	155	2	78	154	12	0	17	624	120	1	156	556	113	0	2,289	1	10	1	9
4:15 PM	100	208	149	2	85	158	14	0	20	655	117	2	156	530	129	0	2,321	1	9	2	9
4:30 PM	104	215	128	1	90	174	11	0	19	626	125	2	160	551	122	0	2,325	1	7	2	11
4:45 PM	90	200	131	1	78	172	7	0	14	636	110	2	136	522	107	0	2,203	2	6	1	8
5:00 PM	79	177	120	0	80	161	10	0	15	593	101	1	153	507	92	0	2,088	1	3	1	6

Heavy Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
4:30 PM to 5:30 PM

SE Linwood Ave & SE Johnson Creek Blvd

Tuesday, December 05, 2006
3:00 PM to 6:00 PM

Heavy Vehicle 15-Minute Interval Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound SE Linwood Ave				Southbound SE Linwood Ave				Eastbound SE Johnson Creek Blvd				Westbound SE Johnson Creek Blvd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
3:00 PM	3	0	0	3	1	1	0	2	2	8	1	11	3	9	0	12	28
3:15 PM	3	1	2	6	0	1	0	1	0	14	2	16	0	7	0	7	30
3:30 PM	0	2	1	3	0	0	0	0	0	11	1	12	2	6	0	8	23
3:45 PM	0	1	1	2	0	1	0	1	0	11	1	12	1	4	0	5	20
4:00 PM	1	2	2	5	0	2	0	2	0	8	0	8	1	7	0	8	23
4:15 PM	1	0	4	5	0	0	0	0	0	9	0	9	1	10	3	14	28
4:30 PM	1	1	0	2	1	2	1	4	0	10	1	11	2	9	0	11	28
4:45 PM	0	0	1	1	1	0	0	1	1	8	1	10	0	6	0	6	18
5:00 PM	1	1	0	2	1	0	0	1	0	9	1	10	1	2	0	3	16
5:15 PM	0	1	0	1	2	0	0	2	0	4	1	5	1	4	2	7	15
5:30 PM	1	2	0	3	0	0	0	0	0	3	0	3	1	1	0	2	8
5:45 PM	0	0	0	0	0	0	0	0	0	3	1	4	2	1	0	3	7
Total Survey	11	11	11	33	6	7	1	14	3	98	10	111	15	66	5	86	244

Heavy Vehicle Peak Hour Summary
4:30 PM to 5:30 PM

By Approach	Northbound SE Linwood Ave			Southbound SE Linwood Ave			Eastbound SE Johnson Creek Blvd			Westbound SE Johnson Creek Blvd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	6	10	16	8	6	14	36	24	60	27	37	64	77
PHF	0.13			0.33			0.23			0.20			0.24

By Movement	Northbound SE Linwood Ave				Southbound SE Linwood Ave				Eastbound SE Johnson Creek Blvd				Westbound SE Johnson Creek Blvd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	2	3	1	6	5	2	1	8	1	31	4	36	4	21	2	27	77
PHF	0.08	0.15	0.04	0.13	0.31	0.13	0.25	0.33	0.13	0.22	0.25	0.23	0.20	0.20	0.17	0.20	0.24

Heavy Vehicle Rolling Hour Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound SE Linwood Ave				Southbound SE Linwood Ave				Eastbound SE Johnson Creek Blvd				Westbound SE Johnson Creek Blvd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
3:00 PM	6	4	4	14	1	3	0	4	2	44	5	51	6	26	0	32	101
3:15 PM	4	6	6	16	0	4	0	4	0	44	4	48	4	24	0	28	96
3:30 PM	2	5	8	15	0	3	0	3	0	39	2	41	5	27	3	35	94
3:45 PM	3	4	7	14	1	5	1	7	0	38	2	40	5	30	3	38	99
4:00 PM	3	3	7	13	2	4	1	7	1	35	2	38	4	32	3	39	97
4:15 PM	3	2	5	10	3	2	1	6	1	36	3	40	4	27	3	34	90
4:30 PM	2	3	1	6	5	2	1	8	1	31	4	36	4	21	2	27	77
4:45 PM	2	4	1	7	4	0	0	4	1	24	3	28	3	13	2	18	57
5:00 PM	2	4	0	6	3	0	0	3	0	19	3	22	5	8	2	15	46

Peak Hour Summary

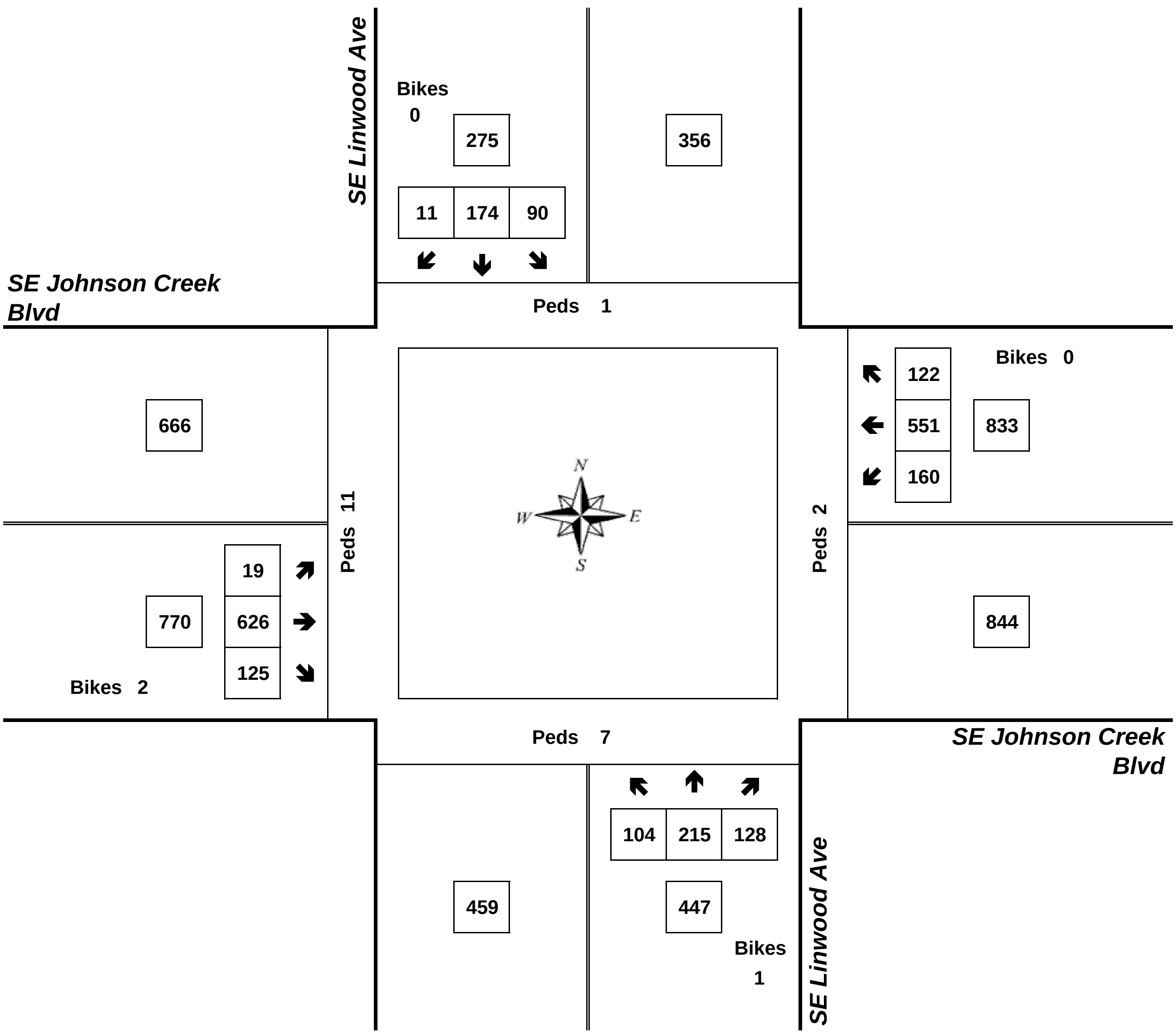
All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

SE Linwood Ave & SE Johnson Creek Blvd

4:30 PM to 5:30 PM

Tuesday, December 05, 2006

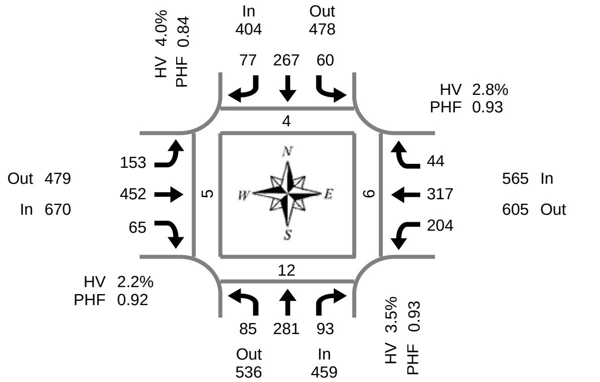


Approach	PHF	HV%	Volume
EB	0.90	4.7%	770
WB	0.80	3.2%	833
NB	0.89	1.3%	447
SB	0.88	2.9%	275
Intersection	0.91	3.3%	2,325

Count Period: 3:00 PM to 6:00 PM

Total Vehicle Summary

Clay Carney
(503) 833-2740



Peak Hour Summary
3:45 PM to 4:45 PM

SE Linwood Ave & SE King Rd

Tuesday, December 05, 2006
3:00 PM to 6:00 PM

15-Minute Interval Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound SE Linwood Ave				Southbound SE Linwood Ave				Eastbound SE King Rd				Westbound SE King Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
3:00 PM	15	54	19	1	17	52	15	0	24	71	15	0	53	76	6	0	417	0	1	0	4
3:15 PM	16	53	25	1	9	58	13	0	28	94	15	0	59	77	12	0	459	0	0	1	0
3:30 PM	33	39	24	0	10	59	15	1	14	112	17	0	50	74	9	0	456	0	1	0	3
3:45 PM	29	73	22	0	11	64	17	0	41	117	24	0	57	80	15	0	550	0	4	2	2
4:00 PM	24	68	27	0	16	57	16	1	36	110	10	1	62	69	11	0	506	1	6	2	2
4:15 PM	15	67	18	0	19	64	20	0	37	114	13	0	50	77	8	0	502	1	1	0	0
4:30 PM	17	73	26	0	14	82	24	0	39	111	18	0	35	91	10	0	540	2	1	2	1
4:45 PM	29	69	34	0	19	66	22	0	41	108	14	0	34	81	19	0	536	0	0	0	5
5:00 PM	32	61	20	0	11	71	12	2	34	114	17	0	35	74	13	0	494	0	0	1	1
5:15 PM	27	68	29	1	15	60	24	0	26	116	10	0	28	81	12	0	496	3	4	3	1
5:30 PM	31	64	23	0	20	55	23	0	30	98	20	0	44	73	11	1	492	3	0	1	3
5:45 PM	19	41	10	0	6	55	21	0	25	94	16	0	23	68	16	0	394	0	1	0	1
Total Survey	287	730	277	3	167	743	222	4	375	1,259	189	1	530	921	142	1	5,842	10	19	12	23

Peak Hour Summary
3:45 PM to 4:45 PM

By Approach	Northbound SE Linwood Ave				Southbound SE Linwood Ave				Eastbound SE King Rd				Westbound SE King Rd				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	459	536	995	0	404	478	882	1	670	479	1,149	1	565	605	1,170	0	2,098	4	12	6	5
%HV	3.5%				4.0%				2.2%				2.8%				3.0%				
PHF	0.93				0.84				0.92				0.93				0.95				

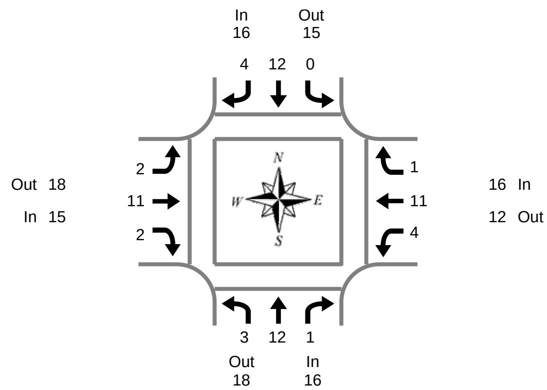
By Movement	Northbound SE Linwood Ave				Southbound SE Linwood Ave				Eastbound SE King Rd				Westbound SE King Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	85	281	93	459	60	267	77	404	153	452	65	670	204	317	44	565	2,098
%HV	3.5%	4.3%	1.1%	3.5%	0.0%	4.5%	5.2%	4.0%	1.3%	2.4%	3.1%	2.2%	2.0%	3.5%	2.3%	2.8%	3.0%
PHF	0.73	0.96	0.86	0.93	0.79	0.81	0.80	0.84	0.93	0.97	0.68	0.92	0.82	0.87	0.73	0.93	0.95

Rolling Hour Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound SE Linwood Ave				Southbound SE Linwood Ave				Eastbound SE King Rd				Westbound SE King Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
3:00 PM	93	219	90	2	47	233	60	1	107	394	71	0	219	307	42	0	1,882	0	6	3	9
3:15 PM	102	233	98	1	46	238	61	2	119	433	66	1	228	300	47	0	1,971	1	11	5	7
3:30 PM	101	247	91	0	56	244	68	2	128	453	64	1	219	300	43	0	2,014	2	12	4	7
3:45 PM	85	281	93	0	60	267	77	1	153	452	65	1	204	317	44	0	2,098	4	12	6	5
4:00 PM	85	277	105	0	68	269	82	1	153	443	55	1	181	318	48	0	2,084	4	8	4	8
4:15 PM	93	270	98	0	63	283	78	2	151	447	62	0	154	323	50	0	2,072	3	2	3	7
4:30 PM	105	271	109	1	59	279	82	2	140	449	59	0	132	327	54	0	2,066	5	5	6	8
4:45 PM	119	262	106	1	65	252	81	2	131	436	61	0	141	309	55	1	2,018	6	4	5	10
5:00 PM	109	234	82	1	52	241	80	2	115	422	63	0	130	296	52	1	1,876	6	5	5	6

Heavy Vehicle Summary

Clay Carney
(503) 833-2740



Peak Hour Summary
3:45 PM to 4:45 PM

SE Linwood Ave & SE King Rd

Tuesday, December 05, 2006
3:00 PM to 6:00 PM

Heavy Vehicle 15-Minute Interval Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound SE Linwood Ave				Southbound SE Linwood Ave				Eastbound SE King Rd				Westbound SE King Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
3:00 PM	3	3	1	7	0	4	0	4	2	3	1	6	3	4	0	7	24
3:15 PM	1	3	0	4	1	3	0	4	2	5	0	7	1	4	0	5	20
3:30 PM	1	2	0	3	0	0	0	0	1	1	1	3	2	0	0	2	8
3:45 PM	0	4	1	5	0	3	1	4	1	4	0	5	2	3	0	5	19
4:00 PM	2	1	0	3	0	4	1	5	1	2	0	3	1	3	0	4	15
4:15 PM	0	6	0	6	0	1	1	2	0	4	2	6	1	4	1	6	20
4:30 PM	1	1	0	2	0	4	1	5	0	1	0	1	0	1	0	1	9
4:45 PM	0	1	2	3	0	1	1	2	0	2	1	3	3	1	0	4	12
5:00 PM	2	3	1	6	1	1	0	2	0	1	0	1	1	0	0	1	10
5:15 PM	0	1	1	2	1	1	0	2	0	4	0	4	0	2	0	2	10
5:30 PM	0	1	2	3	0	0	0	0	1	1	1	3	0	0	1	1	7
5:45 PM	0	1	1	2	0	2	1	3	1	1	2	4	0	0	0	0	9
Total Survey	10	27	9	46	3	24	6	33	9	29	8	46	14	22	2	38	163

Heavy Vehicle Peak Hour Summary
3:45 PM to 4:45 PM

By Approach	Northbound SE Linwood Ave			Southbound SE Linwood Ave			Eastbound SE King Rd			Westbound SE King Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	16	18	34	16	15	31	15	18	33	16	12	28	63
PHF	0.29			0.33			0.23			0.27			0.29

By Movement	Northbound SE Linwood Ave				Southbound SE Linwood Ave				Eastbound SE King Rd				Westbound SE King Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	3	12	1	16	0	12	4	16	2	11	2	15	4	11	1	16	63
PHF	0.15	0.27	0.06	0.29	0.00	0.33	0.33	0.33	0.10	0.28	0.17	0.23	0.17	0.28	0.25	0.27	0.29

Heavy Vehicle Rolling Hour Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound SE Linwood Ave				Southbound SE Linwood Ave				Eastbound SE King Rd				Westbound SE King Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
3:00 PM	5	12	2	19	1	10	1	12	6	13	2	21	8	11	0	19	71
3:15 PM	4	10	1	15	1	10	2	13	5	12	1	18	6	10	0	16	62
3:30 PM	3	13	1	17	0	8	3	11	3	11	3	17	6	10	1	17	62
3:45 PM	3	12	1	16	0	12	4	16	2	11	2	15	4	11	1	16	63
4:00 PM	3	9	2	14	0	10	4	14	1	9	3	13	5	9	1	15	56
4:15 PM	3	11	3	17	1	7	3	11	0	8	3	11	5	6	1	12	51
4:30 PM	3	6	4	13	2	7	2	11	0	8	1	9	4	4	0	8	41
4:45 PM	2	6	6	14	2	3	1	6	1	8	2	11	4	3	1	8	39
5:00 PM	2	6	5	13	2	4	1	7	2	7	3	12	1	2	1	4	36

Peak Hour Summary

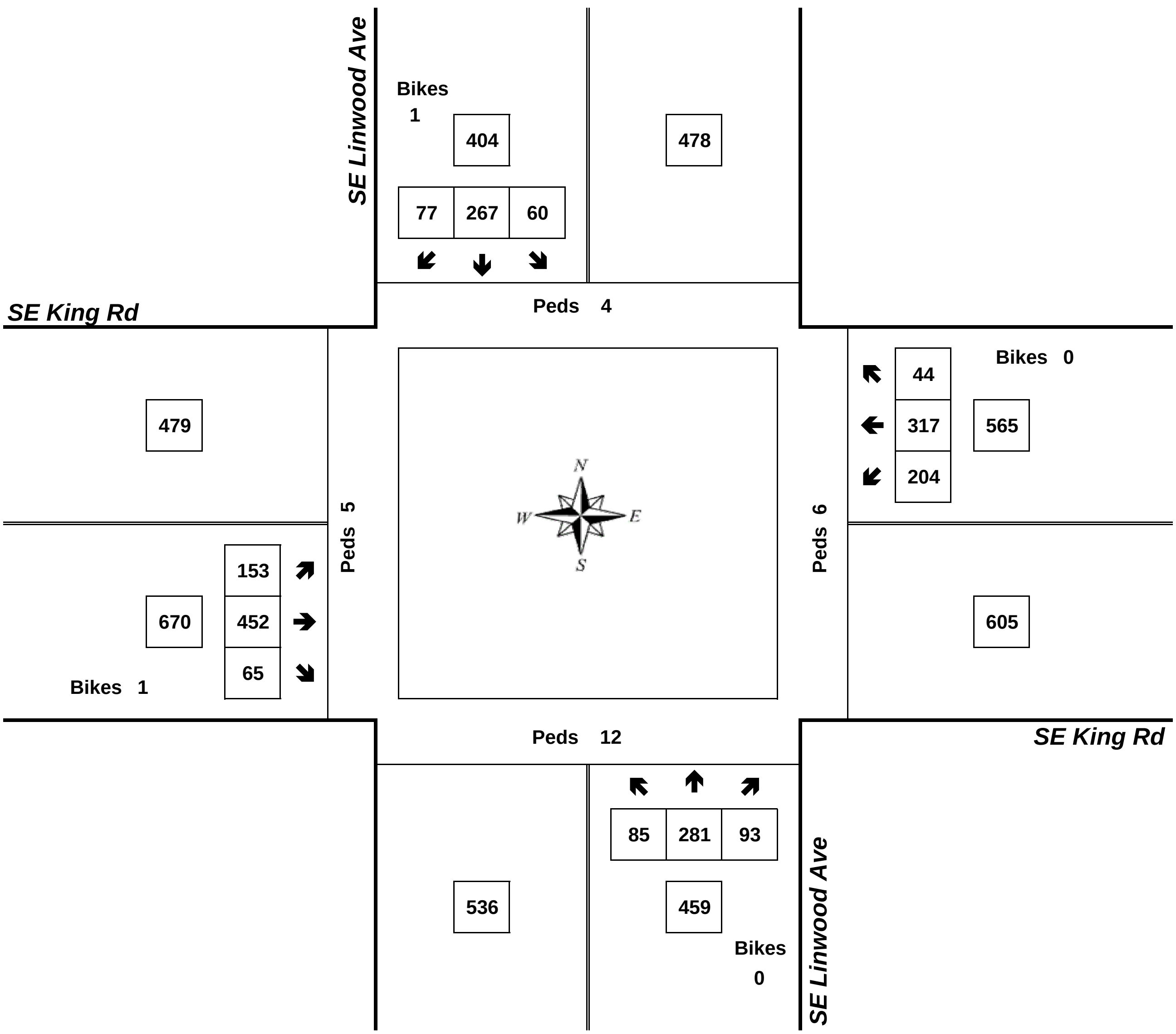
All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

SE Linwood Ave & SE King Rd

3:45 PM to 4:45 PM

Tuesday, December 05, 2006

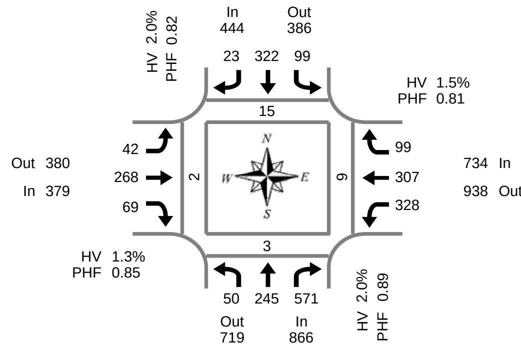


Approach	PHF	HV%	Volume
EB	0.92	2.2%	670
WB	0.93	2.8%	565
NB	0.93	3.5%	459
SB	0.84	4.0%	404
Intersection	0.95	3.0%	2,098

Count Period: 3:00 PM to 6:00 PM

Total Vehicle Summary

Clay Carney
(503) 833-2740



Peak Hour Summary
4:50 PM to 5:50 PM

SE Linwood Ave & SE Harmony Rd

Wednesday, October 11, 2006
4:00 PM to 6:00 PM

5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Linwood Ave L	T	R	Bikes	Southbound SE Linwood Ave L	T	R	Bikes	Eastbound SE Harmony Rd L	T	R	Bikes	Westbound SE Harmony Rd L	T	R	Bikes	Interval Total	Pedestrians Crosswalk North	South	East	West
4:00 PM	5	25	40	0	8	16	0	0	1	23	5	0	28	25	13	0	189	0	0	0	0
4:05 PM	3	26	47	0	4	12	2	0	2	20	5	0	33	17	6	0	177	0	0	0	0
4:10 PM	6	24	47	0	3	26	2	0	4	13	2	0	35	20	11	0	193	0	0	2	0
4:15 PM	6	18	40	0	8	29	1	0	2	20	8	0	26	22	9	0	189	1	1	1	0
4:20 PM	15	16	52	0	4	15	0	0	9	21	1	0	20	30	10	0	193	0	0	9	0
4:25 PM	1	15	29	0	8	19	0	0	2	15	1	0	18	24	6	0	138	0	1	1	0
4:30 PM	4	21	28	0	20	35	0	0	3	20	4	0	20	35	7	0	197	0	1	0	0
4:35 PM	2	27	43	0	9	14	2	0	3	18	10	0	30	26	10	0	194	0	0	0	0
4:40 PM	5	21	26	0	5	17	0	0	5	12	0	0	27	21	5	0	144	0	0	0	0
4:45 PM	2	15	16	0	15	31	2	0	2	16	7	0	22	22	12	1	162	1	1	0	1
4:50 PM	4	20	71	0	2	37	2	0	3	10	5	0	29	26	5	0	214	0	0	0	0
4:55 PM	5	22	44	0	11	29	4	0	2	22	6	0	28	35	9	0	217	0	0	0	0
5:00 PM	3	14	34	0	5	12	2	0	10	28	5	0	22	34	8	0	177	2	0	0	0
5:05 PM	6	20	39	0	13	22	3	0	1	19	4	0	26	10	4	0	167	2	0	0	0
5:10 PM	3	16	53	0	10	15	1	0	7	27	10	0	48	36	13	0	239	2	0	0	0
5:15 PM	5	37	44	0	6	37	3	0	5	16	2	0	31	26	4	0	216	1	0	1	0
5:20 PM	1	18	41	0	10	40	3	0	1	22	11	0	29	31	9	0	216	3	0	0	1
5:25 PM	3	31	63	0	10	25	2	0	3	25	7	0	27	24	15	0	235	0	0	4	1
5:30 PM	6	15	53	0	9	30	0	0	3	33	4	0	14	23	9	0	199	0	0	2	0
5:35 PM	4	18	44	0	1	21	1	0	3	21	4	0	35	23	9	0	184	2	0	0	0
5:40 PM	3	16	50	0	10	27	1	0	4	21	2	0	17	12	0	0	163	3	0	0	0
5:45 PM	7	18	35	0	12	27	1	0	0	24	9	0	22	27	14	0	196	0	3	2	0
5:50 PM	6	25	39	0	8	15	0	0	3	23	8	0	39	30	16	0	212	1	0	0	0
5:55 PM	4	27	44	0	7	24	5	0	0	19	4	0	36	19	13	0	202	0	1	0	0
Total Survey	109	505	1,022	0	198	575	37	0	78	488	124	0	662	598	217	1	4,613	18	8	22	3

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Linwood Ave L	T	R	Bikes	Southbound SE Linwood Ave L	T	R	Bikes	Eastbound SE Harmony Rd L	T	R	Bikes	Westbound SE Harmony Rd L	T	R	Bikes	Interval Total	Pedestrians Crosswalk North	South	East	West
4:00 PM	14	75	134	0	15	54	4	0	7	56	12	0	96	62	30	0	559	0	0	2	0
4:15 PM	22	49	121	0	20	63	1	0	13	56	10	0	64	76	25	0	520	1	2	11	0
4:30 PM	11	69	97	0	34	66	2	0	11	50	14	0	77	82	22	0	535	0	1	0	0
4:45 PM	11	57	131	0	28	97	8	0	7	48	18	0	79	83	26	1	593	1	1	0	1
5:00 PM	12	50	126	0	28	49	6	0	18	74	19	0	96	80	25	0	583	6	0	0	0
5:15 PM	9	86	148	0	26	102	8	0	9	63	20	0	87	81	28	0	667	4	0	5	2
5:30 PM	13	49	147	0	20	78	2	0	10	75	10	0	66	58	18	0	546	5	0	2	0
5:45 PM	17	70	118	0	27	66	6	0	3	66	21	0	97	76	43	0	610	1	4	2	0
Total Survey	109	505	1,022	0	198	575	37	0	78	488	124	0	662	598	217	1	4,613	18	8	22	3

Peak Hour Summary
4:50 PM to 5:50 PM

By Approach	Northbound SE Linwood Ave In	Out	Total	Bikes	Southbound SE Linwood Ave In	Out	Total	Bikes	Eastbound SE Harmony Rd In	Out	Total	Bikes	Westbound SE Harmony Rd In	Out	Total	Bikes	Total	Pedestrians Crosswalk North	South	East	West
Volume	866	719	1,585	0	444	386	830	0	379	380	759	0	734	938	1,672	0	2,423	15	3	9	2
%HV	2.0%				2.0%				1.3%				1.5%				1.7%				
PHF	0.89				0.82				0.85				0.81				0.90				

By Movement	Northbound SE Linwood Ave L	T	R	Total	Southbound SE Linwood Ave L	T	R	Total	Eastbound SE Harmony Rd L	T	R	Total	Westbound SE Harmony Rd L	T	R	Total	Total
Volume	50	245	571	866	99	322	23	444	42	268	69	379	328	307	99	734	2,423
%HV	2.0%	2.0%	1.9%	2.0%	2.0%	2.2%	0.0%	2.0%	0.0%	1.5%	1.4%	1.3%	1.2%	1.0%	4.0%	1.5%	1.7%
PHF	0.89	0.71	0.89	0.89	0.85	0.79	0.64	0.82	0.58	0.84	0.75	0.85	0.76	0.81	0.75	0.81	0.90

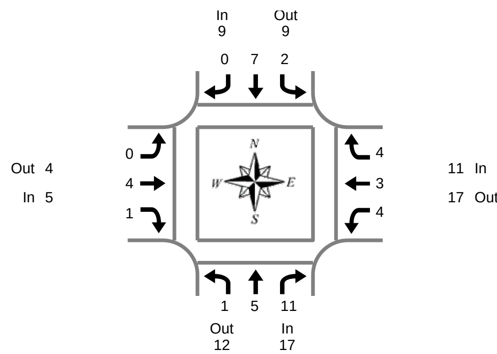
Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Linwood Ave L	T	R	Bikes	Southbound SE Linwood Ave L	T	R	Bikes	Eastbound SE Harmony Rd L	T	R	Bikes	Westbound SE Harmony Rd L	T	R	Bikes	Interval Total	Pedestrians Crosswalk North	South	East	West
4:00 PM	58	250	483	0	97	280	15	0	38	210	54	0	316	303	103	1	2,207	2	4	13	1
4:15 PM	56	225	475	0	110	275	17	0	49	228	61	0	316	321	98	1	2,231	8	4	11	1
4:30 PM	43	262	502	0	116	314	24	0	45	235	71	0	339	326	101	1	2,378	11	2	5	3
4:45 PM	45	242	552	0	102	326	24	0	44	260	67	0	328	302	97	1	2,389	16	1	7	3
5:00 PM	51	255	539	0	101	295	22	0	40	278	70	0	346	295	114	0	2,406	16	4	9	2

Heavy Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



Peak Hour Summary
4:50 PM to 5:50 PM

SE Linwood Ave & SE Harmony Rd

Wednesday, October 11, 2006
4:00 PM to 6:00 PM

Heavy Vehicle 5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Linwood Ave				Southbound SE Linwood Ave				Eastbound SE Harmony Rd				Westbound SE Harmony Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	1	1	2	0	2	0	2	0	0	0	0	0	1	0	1	5
4:05 PM	1	4	4	9	0	1	0	1	0	0	0	0	0	0	2	2	12
4:10 PM	0	4	1	5	0	2	0	2	0	1	1	2	1	0	0	1	10
4:15 PM	0	0	0	0	0	1	0	1	0	0	1	1	0	0	0	0	2
4:20 PM	0	0	0	0	0	0	0	0	1	0	0	1	1	0	1	2	3
4:25 PM	0	0	1	1	0	2	0	2	0	0	0	0	1	0	0	1	4
4:30 PM	1	2	0	3	1	4	0	5	0	0	0	0	1	0	0	1	9
4:35 PM	0	1	0	1	0	2	0	2	0	1	0	1	2	0	0	2	6
4:40 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
4:45 PM	0	1	1	2	1	1	0	2	0	1	1	2	0	0	0	0	6
4:50 PM	0	1	1	2	0	3	0	3	0	0	0	0	0	0	0	0	5
4:55 PM	0	0	0	0	0	0	0	0	0	2	1	3	0	0	0	0	3
5:00 PM	0	1	2	3	1	2	0	3	0	0	0	0	0	1	0	1	7
5:05 PM	0	0	1	1	0	1	0	1	0	0	0	0	0	0	1	1	3
5:10 PM	0	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	2
5:15 PM	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1
5:20 PM	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	2	3
5:25 PM	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1	2	3
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
5:35 PM	0	1	1	2	0	1	0	1	0	0	0	0	0	0	0	0	3
5:40 PM	0	0	3	3	0	0	0	0	0	0	0	0	0	1	0	1	4
5:45 PM	1	1	1	3	1	0	0	1	0	0	0	0	1	0	2	3	7
5:50 PM	0	1	0	1	0	0	0	0	0	1	0	1	0	0	0	0	2
5:55 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	3	19	19	41	4	22	0	26	1	8	4	13	10	4	8	22	102

Heavy Vehicle 15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Linwood Ave				Southbound SE Linwood Ave				Eastbound SE Harmony Rd				Westbound SE Harmony Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	1	9	6	16	0	5	0	5	0	1	1	2	1	1	2	4	27
4:15 PM	0	0	1	1	0	3	0	3	1	0	1	2	2	0	1	3	9
4:30 PM	1	3	0	4	1	6	0	7	0	1	0	1	3	0	1	4	16
4:45 PM	0	2	2	4	1	4	0	5	0	3	2	5	0	0	0	0	14
5:00 PM	0	2	4	6	1	3	0	4	0	0	0	0	0	1	1	2	12
5:15 PM	0	0	1	1	0	0	0	0	0	2	0	2	2	1	1	4	7
5:30 PM	0	1	4	5	0	1	0	1	0	0	0	0	1	1	0	2	8
5:45 PM	1	2	1	4	1	0	0	1	0	1	0	1	1	0	2	3	9
Total Survey	3	19	19	41	4	22	0	26	1	8	4	13	10	4	8	22	102

Heavy Vehicle Peak Hour Summary
4:50 PM to 5:50 PM

By Approach	Northbound SE Linwood Ave			Southbound SE Linwood Ave			Eastbound SE Harmony Rd			Westbound SE Harmony Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	17	12	29	9	9	18	5	4	9	11	17	28	42
PHF	0.53			0.38			0.42			0.55			0.70

By Movement	Northbound SE Linwood Ave				Southbound SE Linwood Ave				Eastbound SE Harmony Rd				Westbound SE Harmony Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	1	5	11	17	2	7	0	9	0	4	1	5	4	3	4	11	42
PHF	0.25	0.63	0.55	0.53	0.50	0.35	0.00	0.38	0.00	0.50	0.25	0.42	0.33	0.75	0.50	0.55	0.70

Heavy Vehicle Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Linwood Ave				Southbound SE Linwood Ave				Eastbound SE Harmony Rd				Westbound SE Harmony Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	2	14	9	25	2	18	0	20	1	5	4	10	6	1	4	11	66
4:15 PM	1	7	7	15	3	16	0	19	1	4	3	8	5	1	3	9	51
4:30 PM	1	7	7	15	3	13	0	16	0	6	2	8	5	2	3	10	49
4:45 PM	0	5	11	16	2	8	0	10	0	5	2	7	3	3	2	8	41
5:00 PM	1	5	10	16	2	4	0	6	0	3	0	3	4	3	4	11	36

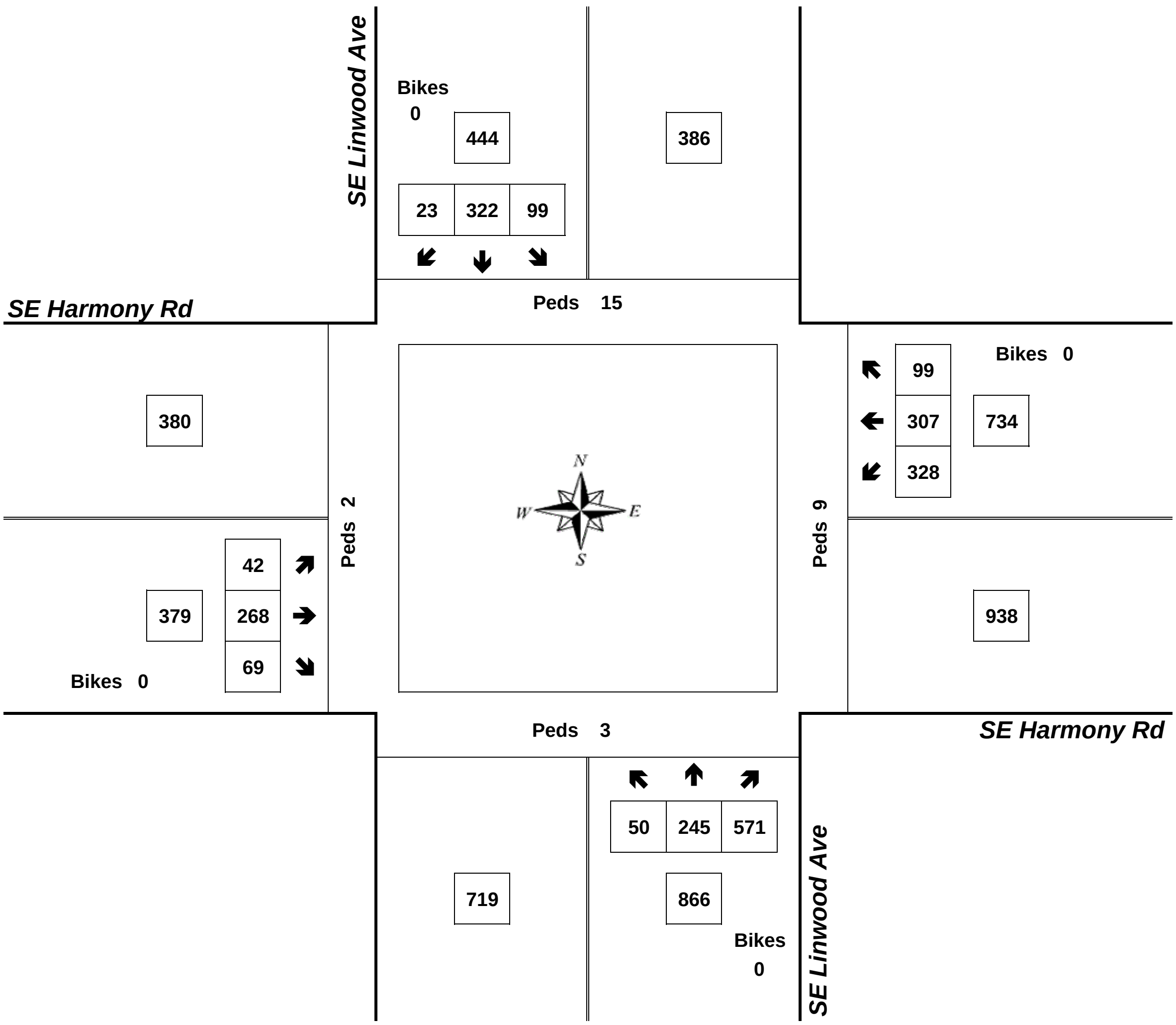
Peak Hour Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

SE Linwood Ave & SE Harmony Rd

4:50 PM to 5:50 PM
Wednesday, October 11, 2006

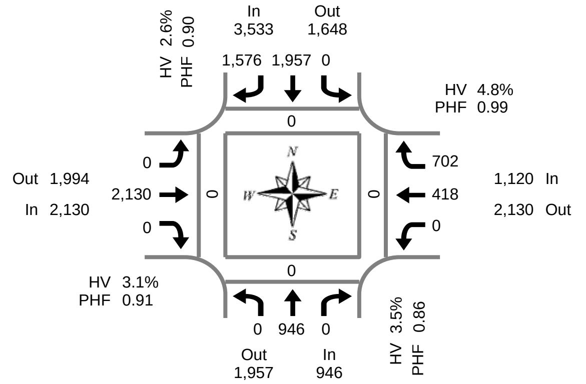


Approach	PHF	HV%	Volume
EB	0.85	1.3%	379
WB	0.81	1.5%	734
NB	0.89	2.0%	866
SB	0.82	2.0%	444
Intersection	0.90	1.7%	2,423

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

Clay Carney
(503) 833-2740



Peak Hour Summary
3:45 PM to 4:45 PM

Hwy 99E & Hwy 224

Wednesday, December 06, 2006
3:00 PM to 6:00 PM

15-Minute Interval Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 99E L	T	R	Bikes	Southbound Hwy 99E L	T	R	Bikes	Eastbound Hwy 224 L	T	R	Bikes	Westbound Hwy 224 L	T	R	Bikes	Interval Total	Pedestrians Crosswalk North	South	East	West
3:00 PM	0	166	0	0	0	337	181	0	0	295	0	0	0	89	127	0	1,195	0	0	0	0
3:15 PM	0	201	0	0	0	298	248	0	0	355	0	0	0	84	144	0	1,330	0	0	0	0
3:30 PM	0	183	0	0	0	400	330	0	0	350	0	0	0	97	152	0	1,512	0	0	0	0
3:45 PM	0	274	0	0	0	448	355	0	0	511	0	0	0	116	166	0	1,870	0	0	0	0
4:00 PM	0	244	0	0	0	538	443	0	0	585	0	0	0	112	165	0	2,087	0	0	0	0
4:15 PM	0	218	0	0	0	457	390	0	0	523	0	0	0	96	184	0	1,868	0	0	0	0
4:30 PM	0	210	0	0	0	514	388	0	0	511	0	0	0	94	187	0	1,904	0	0	0	0
4:45 PM	0	198	0	0	0	439	340	0	0	483	0	0	0	102	175	0	1,737	0	0	0	0
5:00 PM	0	237	0	0	0	494	367	0	0	336	0	0	0	110	177	0	1,721	0	0	0	0
5:15 PM	0	230	0	0	0	384	314	0	0	471	0	0	0	104	216	0	1,719	0	0	0	0
5:30 PM	0	212	0	0	0	487	336	0	0	503	0	0	0	90	175	0	1,803	0	0	0	0
5:45 PM	0	236	0	0	0	442	259	0	0	409	0	0	0	96	150	0	1,592	0	0	0	0
Total Survey	0	2,609	0	0	0	5,238	3,951	0	0	5,332	0	0	0	1,190	2,018	0	20,338	0	0	0	0

Peak Hour Summary
3:45 PM to 4:45 PM

By Approach	Northbound Hwy 99E In	Out	Total	Bikes	Southbound Hwy 99E In	Out	Total	Bikes	Eastbound Hwy 224 In	Out	Total	Bikes	Westbound Hwy 224 In	Out	Total	Bikes	Total	Pedestrians Crosswalk North	South	East	West
Volume	946	1,957	2,903	0	3,533	1,648	5,181	0	2,130	1,994	4,124	0	1,120	2,130	3,250	0	7,729	0	0	0	0
%HV	3.5%				2.6%				3.1%				4.8%				3.2%				
PHF	0.86				0.90				0.91				0.99				0.93				

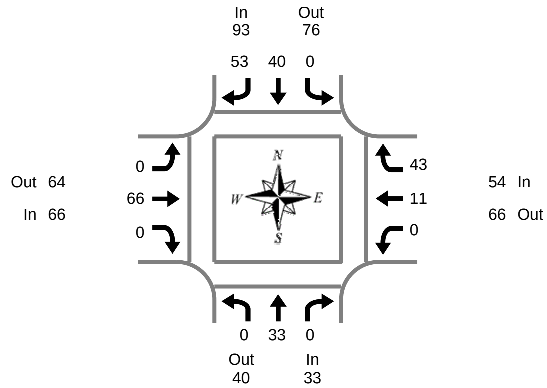
By Movement	Northbound Hwy 99E L	T	R	Total	Southbound Hwy 99E L	T	R	Total	Eastbound Hwy 224 L	T	R	Total	Westbound Hwy 224 L	T	R	Total	Total
Volume	0	946	0	946	0	1,957	1,576	3,533	0	2,130	0	2,130	0	418	702	1,120	7,729
%HV	0.0%	3.5%	0.0%	3.5%	0.0%	2.0%	3.4%	2.6%	0.0%	3.1%	0.0%	3.1%	0.0%	2.6%	6.1%	4.8%	3.2%
PHF	0.00	0.86	0.00	0.86	0.00	0.91	0.89	0.90	0.00	0.91	0.00	0.91	0.00	0.90	0.94	0.99	0.93

Rolling Hour Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 99E L	T	R	Bikes	Southbound Hwy 99E L	T	R	Bikes	Eastbound Hwy 224 L	T	R	Bikes	Westbound Hwy 224 L	T	R	Bikes	Interval Total	Pedestrians Crosswalk North	South	East	West
3:00 PM	0	824	0	0	0	1,483	1,114	0	0	1,511	0	0	0	386	589	0	5,907	0	0	0	0
3:15 PM	0	902	0	0	0	1,684	1,376	0	0	1,801	0	0	0	409	627	0	6,799	0	0	0	0
3:30 PM	0	919	0	0	0	1,843	1,518	0	0	1,969	0	0	0	421	667	0	7,337	0	0	0	0
3:45 PM	0	946	0	0	0	1,957	1,576	0	0	2,130	0	0	0	418	702	0	7,729	0	0	0	0
4:00 PM	0	870	0	0	0	1,948	1,561	0	0	2,102	0	0	0	404	711	0	7,596	0	0	0	0
4:15 PM	0	863	0	0	0	1,904	1,485	0	0	1,853	0	0	0	402	723	0	7,230	0	0	0	0
4:30 PM	0	875	0	0	0	1,831	1,409	0	0	1,801	0	0	0	410	755	0	7,081	0	0	0	0
4:45 PM	0	877	0	0	0	1,804	1,357	0	0	1,793	0	0	0	406	743	0	6,980	0	0	0	0
5:00 PM	0	915	0	0	0	1,807	1,276	0	0	1,719	0	0	0	400	718	0	6,835	0	0	0	0

Heavy Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Hwy 99E & Hwy 224

Wednesday, December 06, 2006
3:00 PM to 6:00 PM

Peak Hour Summary
3:45 PM to 4:45 PM

Heavy Vehicle 15-Minute Interval Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 99E				Southbound Hwy 99E				Eastbound Hwy 224				Westbound Hwy 224				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
3:00 PM	0	14	0	14	0	11	12	23	0	16	0	16	0	4	3	7	60
3:15 PM	0	12	0	12	0	12	20	32	0	25	0	25	0	3	9	12	81
3:30 PM	0	8	0	8	0	15	19	34	0	22	0	22	0	2	7	9	73
3:45 PM	0	11	0	11	0	13	12	25	0	18	0	18	0	5	10	15	69
4:00 PM	0	6	0	6	0	8	15	23	0	19	0	19	0	2	13	15	63
4:15 PM	0	8	0	8	0	11	15	26	0	16	0	16	0	1	11	12	62
4:30 PM	0	8	0	8	0	8	11	19	0	13	0	13	0	3	9	12	52
4:45 PM	0	9	0	9	0	7	7	14	0	10	0	10	0	2	8	10	43
5:00 PM	0	6	0	6	0	6	13	19	0	14	0	14	0	1	7	8	47
5:15 PM	0	4	0	4	0	7	7	14	0	11	0	11	0	1	5	6	35
5:30 PM	0	1	0	1	0	8	6	14	0	9	0	9	0	1	8	9	33
5:45 PM	0	3	0	3	0	16	15	31	0	17	0	17	0	2	9	11	62
Total Survey	0	90	0	90	0	122	152	274	0	190	0	190	0	27	99	126	680

Heavy Vehicle Peak Hour Summary
3:45 PM to 4:45 PM

By Approach	Northbound Hwy 99E			Southbound Hwy 99E			Eastbound Hwy 224			Westbound Hwy 224			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	33	40	73	93	76	169	66	64	130	54	66	120	246
PHF	0.24			0.26			0.25			0.32			0.28

By Movement	Northbound Hwy 99E				Southbound Hwy 99E				Eastbound Hwy 224				Westbound Hwy 224				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	33	0	33	0	40	53	93	0	66	0	66	0	11	43	54	246
PHF	0.00	0.24	0.00	0.24	0.00	0.25	0.26	0.26	0.00	0.25	0.00	0.25	0.00	0.28	0.32	0.32	0.28

Heavy Vehicle Rolling Hour Summary
3:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 99E				Southbound Hwy 99E				Eastbound Hwy 224				Westbound Hwy 224				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
3:00 PM	0	45	0	45	0	51	63	114	0	81	0	81	0	14	29	43	283
3:15 PM	0	37	0	37	0	48	66	114	0	84	0	84	0	12	39	51	286
3:30 PM	0	33	0	33	0	47	61	108	0	75	0	75	0	10	41	51	267
3:45 PM	0	33	0	33	0	40	53	93	0	66	0	66	0	11	43	54	246
4:00 PM	0	31	0	31	0	34	48	82	0	58	0	58	0	8	41	49	220
4:15 PM	0	31	0	31	0	32	46	78	0	53	0	53	0	7	35	42	204
4:30 PM	0	27	0	27	0	28	38	66	0	48	0	48	0	7	29	36	177
4:45 PM	0	20	0	20	0	28	33	61	0	44	0	44	0	5	28	33	158
5:00 PM	0	14	0	14	0	37	41	78	0	51	0	51	0	5	29	34	177

Peak Hour Summary

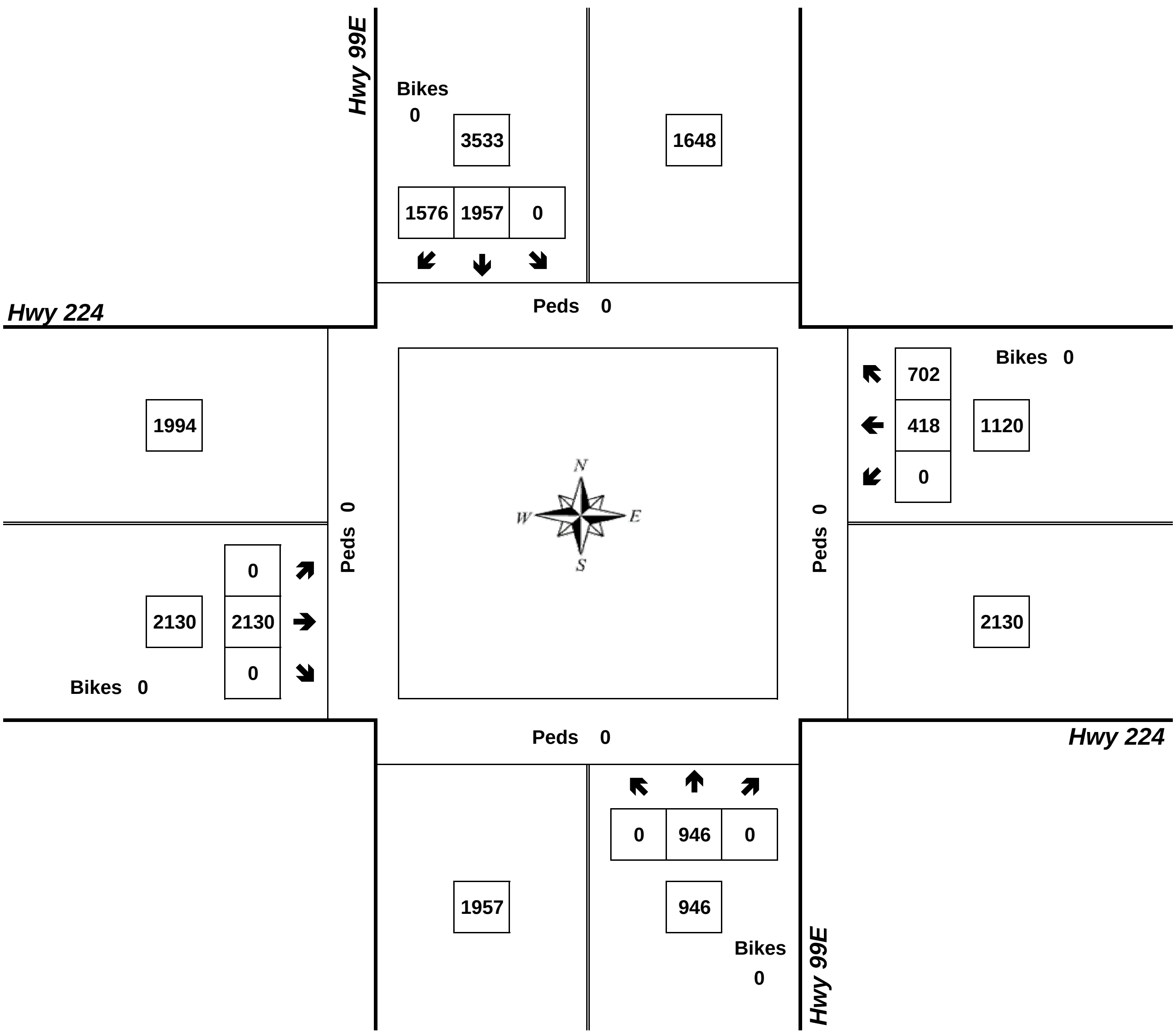
All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

Hwy 99E & Hwy 224

3:45 PM to 4:45 PM

Wednesday, December 06, 2006

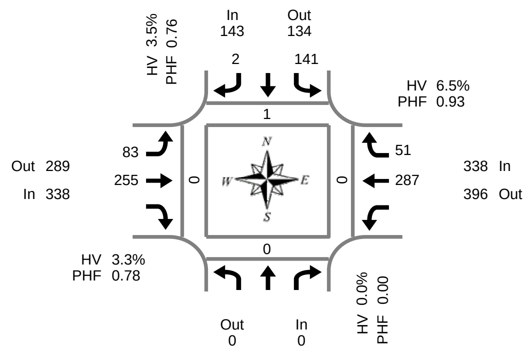


Approach	PHF	HV%	Volume
EB	0.91	3.1%	2,130
WB	0.99	4.8%	1,120
NB	0.86	3.5%	946
SB	0.90	2.6%	3,533
Intersection	0.93	3.2%	7,729

Count Period: 3:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Hwy 212 EB Ramps & SE Lake Rd

Wednesday, October 11, 2006
7:00 AM to 9:00 AM

Peak Hour Summary
7:35 AM to 8:35 AM

5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 212 EB Ramps				Southbound Hwy 212 EB Ramps				Eastbound SE Lake Rd				Westbound SE Lake Rd				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
7:00 AM				0	8		0	0	12	12		0		17	3	0	52	0	0	0	0
7:05 AM				0	5		0	0	7	8		0		10	1	0	31	0	0	0	0
7:10 AM				0	5		2	0	12	15		0		13	6	0	53	0	0	0	0
7:15 AM				0	10		0	0	7	15		0		14	2	0	48	0	0	0	0
7:20 AM				0	10		0	0	11	16		0		15	1	0	53	0	0	0	0
7:25 AM				0	8		0	0	11	15		0		28	1	0	63	0	0	0	0
7:30 AM				0	16		0	0	7	7		0		28	1	0	59	0	0	0	0
7:35 AM				0	11		0	0	4	24		0		31	7	0	77	0	0	0	0
7:40 AM				0	21		0	0	10	22		0		22	5	0	80	0	0	0	0
7:45 AM				0	13		0	0	9	35		0		21	4	0	82	0	0	0	0
7:50 AM				0	13		0	0	6	27		0		25	3	0	74	0	0	0	0
7:55 AM				0	16		0	0	3	18		0		25	4	0	66	0	0	0	0
8:00 AM				0	10		1	0	6	17		0		24	4	0	62	0	0	0	0
8:05 AM				0	5		0	0	5	12		0		26	2	0	50	0	0	0	0
8:10 AM				0	13		0	0	5	22		0		23	3	0	66	0	0	0	0
8:15 AM				0	6		1	0	9	21		0		13	5	0	55	1	0	0	0
8:20 AM				0	13		0	0	7	24		0		22	4	0	70	0	0	0	0
8:25 AM				0	9		0	0	9	22		0		28	4	0	72	0	0	0	0
8:30 AM				0	11		0	0	10	11		0		27	6	0	65	0	0	0	0
8:35 AM				0	10		0	0	7	28		0		13	2	0	60	0	0	0	0
8:40 AM				0	12		0	0	4	20		0		19	3	0	58	0	0	0	0
8:45 AM				0	9		0	0	7	24		0		30	6	0	76	0	0	0	0
8:50 AM				0	3		1	0	11	18		0		22	2	0	57	0	0	0	0
8:55 AM				0	10		3	0	6	25		0		24	2	0	70	0	0	0	0
Total Survey				0	247		8	0	185	458		0		520	81	0	1,499	1	0	0	0

15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 212 EB Ramps				Southbound Hwy 212 EB Ramps				Eastbound SE Lake Rd				Westbound SE Lake Rd				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
7:00 AM				0	18		2	0	31	35		0		40	10	0	136	0	0	0	0
7:15 AM				0	28		0	0	29	46		0		57	4	0	164	0	0	0	0
7:30 AM				0	48		0	0	21	53		0		81	13	0	216	0	0	0	0
7:45 AM				0	42		0	0	18	80		0		71	11	0	222	0	0	0	0
8:00 AM				0	28		1	0	16	51		0		73	9	0	178	0	0	0	0
8:15 AM				0	28		1	0	25	67		0		63	13	0	197	1	0	0	0
8:30 AM				0	33		0	0	21	59		0		59	11	0	183	0	0	0	0
8:45 AM				0	22		4	0	24	67		0		76	10	0	203	0	0	0	0
Total Survey				0	247		8	0	185	458		0		520	81	0	1,499	1	0	0	0

Peak Hour Summary
7:35 AM to 8:35 AM

By Approach	Northbound Hwy 212 EB Ramps				Southbound Hwy 212 EB Ramps				Eastbound SE Lake Rd				Westbound SE Lake Rd				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	0	0	0	0	143	134	277	0	338	289	627	0	338	396	734	0	819	1	0	0	0
%HV	0.0%				3.5%				3.3%				6.5%				4.6%				
PHF	0.00				0.76				0.78				0.93				0.86				

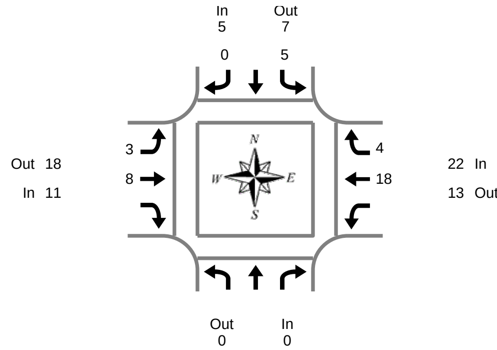
By Movement	Northbound Hwy 212 EB Ramps				Southbound Hwy 212 EB Ramps				Eastbound SE Lake Rd				Westbound SE Lake Rd				Total
				Total	L		R	Total	L	T		Total		T	R	Total	
Volume				0	141		2	143	83	255		338		287	51	338	819
%HV	NA	NA	NA	0.0%	3.5%	NA	0.0%	3.5%	3.6%	3.1%	NA	3.3%	NA	6.3%	7.8%	6.5%	4.6%
PHF				0.00	0.75		0.50	0.76	0.80	0.76		0.78		0.93	0.80	0.93	0.86

Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 212 EB Ramps				Southbound Hwy 212 EB Ramps				Eastbound SE Lake Rd				Westbound SE Lake Rd				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
7:00 AM				0	136		2	0	99	214		0		249	38	0	738	0	0	0	0
7:15 AM				0	146		1	0	84	230		0		282	37	0	780	0	0	0	0
7:30 AM				0	146		2	0	80	251		0		288	46	0	813	1	0	0	0
7:45 AM				0	131		2	0	80	257		0		266	44	0	780	1	0	0	0
8:00 AM				0	111		6	0	86	244		0		271	43	0	761	1	0	0	0

Heavy Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
7:35 AM to 8:35 AM

Hwy 212 EB Ramps & SE Lake Rd

Wednesday, October 11, 2006
7:00 AM to 9:00 AM

Heavy Vehicle 5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 212 EB Ramps Total	Southbound Hwy 212 EB Ramps L	Southbound R	Southbound Total	Eastbound SE Lake Rd L	Eastbound T	Eastbound Total	Westbound SE Lake Rd T	Westbound R	Westbound Total	Interval Total
7:00 AM	0	1	0	1	2	0	2	4	1	5	8
7:05 AM	0	0	0	0	2	0	2	1	0	1	3
7:10 AM	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	1	0	1	0	0	0	2	0	2	3
7:20 AM	0	0	0	0	0	0	0	5	1	6	6
7:25 AM	0	1	0	1	0	1	1	4	0	4	6
7:30 AM	0	1	0	1	0	2	2	2	0	2	5
7:35 AM	0	0	0	0	0	1	1	2	0	2	3
7:40 AM	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	2	0	2	2
7:50 AM	0	0	0	0	0	0	0	0	2	2	2
7:55 AM	0	0	0	0	0	0	0	1	0	1	1
8:00 AM	0	1	0	1	0	0	0	1	0	1	2
8:05 AM	0	2	0	2	0	2	2	1	0	1	5
8:10 AM	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	1	0	1	0	0	0	1
8:20 AM	0	1	0	1	0	1	1	3	1	4	6
8:25 AM	0	0	0	0	0	1	1	5	0	5	6
8:30 AM	0	1	0	1	2	3	5	3	1	4	10
8:35 AM	0	1	0	1	2	1	3	1	0	1	5
8:40 AM	0	0	0	0	1	1	2	0	1	1	3
8:45 AM	0	0	0	0	1	1	2	0	1	1	3
8:50 AM	0	0	0	0	4	0	4	0	0	0	4
8:55 AM	0	1	0	1	1	1	2	0	0	0	3
Total Survey	0	11	0	11	16	15	31	37	8	45	87

Heavy Vehicle 15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 212 EB Ramps Total	Southbound Hwy 212 EB Ramps L	Southbound R	Southbound Total	Eastbound SE Lake Rd L	Eastbound T	Eastbound Total	Westbound SE Lake Rd T	Westbound R	Westbound Total	Interval Total
7:00 AM	0	1	0	1	4	0	4	5	1	6	11
7:15 AM	0	2	0	2	0	1	1	11	1	12	15
7:30 AM	0	1	0	1	0	3	3	4	0	4	8
7:45 AM	0	0	0	0	0	0	0	3	2	5	5
8:00 AM	0	3	0	3	0	2	2	2	0	2	7
8:15 AM	0	1	0	1	1	2	3	8	1	9	13
8:30 AM	0	2	0	2	5	5	10	4	2	6	18
8:45 AM	0	1	0	1	6	2	8	0	1	1	10
Total Survey	0	11	0	11	16	15	31	37	8	45	87

Heavy Vehicle Peak Hour Summary
7:35 AM to 8:35 AM

By Approach	Northbound Hwy 212 EB Ramps In	Out	Total	Southbound Hwy 212 EB Ramps In	Out	Total	Eastbound SE Lake Rd In	Out	Total	Westbound SE Lake Rd In	Out	Total	Total
Volume	0	0	0	5	7	12	11	18	29	22	13	35	38
PHF	0.00			0.42			0.39			0.42			0.43

By Movement	Northbound Hwy 212 EB Ramps Total	Southbound Hwy 212 EB Ramps L	Southbound R	Southbound Total	Eastbound SE Lake Rd L	Eastbound T	Eastbound Total	Westbound SE Lake Rd T	Westbound R	Westbound Total	Total
Volume	0	5	0	5	3	8	11	18	4	22	38
PHF	0.00	0.42	0.00	0.42	0.38	0.40	0.39	0.41	0.50	0.42	0.43

Heavy Vehicle Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 212 EB Ramps Total	Southbound Hwy 212 EB Ramps L	Southbound R	Southbound Total	Eastbound SE Lake Rd L	Eastbound T	Eastbound Total	Westbound SE Lake Rd T	Westbound R	Westbound Total	Interval Total
7:00 AM	0	4	0	4	4	4	8	23	4	27	39
7:15 AM	0	6	0	6	0	6	6	20	3	23	35
7:30 AM	0	5	0	5	1	7	8	17	3	20	33
7:45 AM	0	6	0	6	6	9	15	17	5	22	43
8:00 AM	0	7	0	7	12	11	23	14	4	18	48

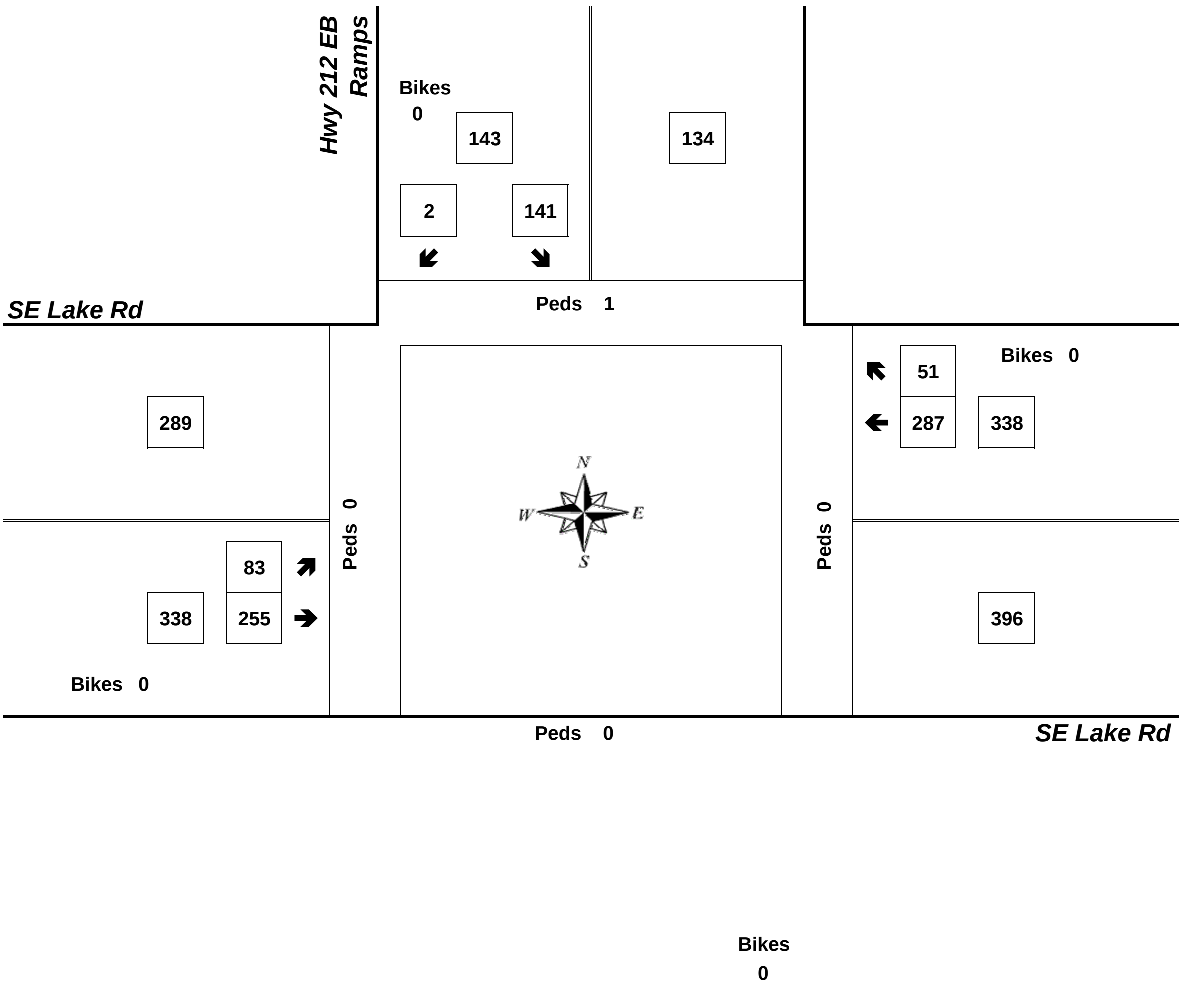
Peak Hour Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

Hwy 212 EB Ramps & SE Lake Rd

7:35 AM to 8:35 AM
Wednesday, October 11, 2006

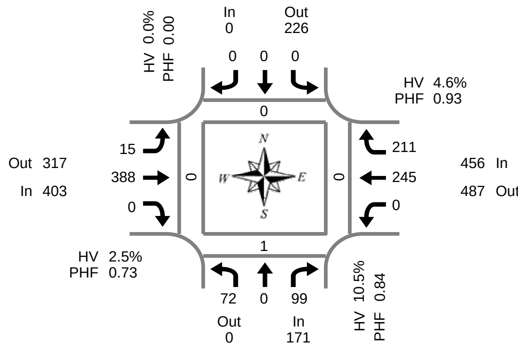


Approach	PHF	HV%	Volume
EB	0.78	3.3%	338
WB	0.93	6.5%	338
NB	0.00	0.0%	0
SB	0.76	3.5%	143
Intersection	0.86	4.6%	819

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary

Clay Carney
(503) 833-2740



Peak Hour Summary
7:20 AM to 8:20 AM

Hwy 212 WB Ramps & SE Lake Rd

Wednesday, October 11, 2006
7:00 AM to 9:00 AM

5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 212 WB Ramps L	T	R	Bikes	Southbound Hwy 212 WB Ramps L	T	R	Bikes	Eastbound SE Lake Rd L	T	R	Bikes	Westbound SE Lake Rd L	T	R	Bikes	Interval Total	Pedestrians Crosswalk North	South	East	West
7:00 AM	7	0	9	0	0	0	0	0	1	24	0	0	0	12	13	0	66	0	0	0	0
7:05 AM	1	0	10	0	0	0	0	0	1	12	0	0	0	9	23	0	56	0	0	0	0
7:10 AM	5	0	9	0	0	0	0	0	0	14	0	0	0	16	7	0	51	0	0	0	0
7:15 AM	4	0	6	0	0	0	0	0	1	30	0	0	0	10	21	0	72	0	0	0	0
7:20 AM	2	0	14	0	0	0	0	0	0	28	0	0	0	18	28	0	90	0	0	0	0
7:25 AM	5	0	8	0	0	0	0	0	2	21	0	0	0	21	16	0	73	0	0	0	0
7:30 AM	11	0	9	0	0	0	0	0	2	25	0	0	0	16	18	0	81	0	0	0	0
7:35 AM	8	0	8	0	0	0	0	0	0	34	0	0	0	28	23	1	101	0	0	0	0
7:40 AM	9	0	6	0	0	0	0	0	0	39	0	0	0	23	11	0	88	0	0	0	0
7:45 AM	4	0	7	0	0	0	0	0	1	56	0	0	0	15	14	0	97	0	0	0	0
7:50 AM	6	0	13	0	0	0	0	0	3	36	0	0	0	20	14	0	92	0	0	0	0
7:55 AM	4	0	8	0	0	0	0	0	2	40	0	0	0	24	14	0	92	0	1	0	0
8:00 AM	10	0	8	0	0	0	0	0	1	27	0	0	0	20	16	1	82	0	0	0	0
8:05 AM	8	0	8	0	0	0	0	0	2	21	0	0	0	19	18	0	76	0	0	0	0
8:10 AM	3	0	4	0	0	0	0	0	1	29	0	0	0	24	22	0	83	0	0	0	0
8:15 AM	2	0	6	0	0	0	0	0	1	32	0	0	0	17	17	0	75	0	0	0	0
8:20 AM	1	0	3	0	0	0	0	0	1	35	0	0	0	24	8	0	72	0	0	0	0
8:25 AM	6	0	7	0	0	0	0	0	1	34	0	0	0	27	14	0	89	0	0	0	0
8:30 AM	6	0	5	0	0	0	0	0	2	21	0	0	0	28	20	0	82	0	0	0	0
8:35 AM	3	0	10	0	0	0	0	0	1	35	0	0	0	19	10	0	78	0	0	0	0
8:40 AM	4	0	3	0	0	0	0	0	1	32	0	0	0	13	7	0	60	0	0	0	0
8:45 AM	8	0	5	0	0	0	0	0	2	27	0	0	0	27	6	0	75	0	0	0	0
8:50 AM	5	0	6	0	0	0	0	0	1	33	0	0	0	18	17	0	80	0	0	0	0
8:55 AM	12	0	9	0	0	0	0	0	1	27	0	0	0	14	12	0	75	0	0	0	0
Total Survey	134	0	181	0	0	0	0	0	28	712	0	0	0	462	369	2	1,886	0	1	0	0

15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 212 WB Ramps L	T	R	Bikes	Southbound Hwy 212 WB Ramps L	T	R	Bikes	Eastbound SE Lake Rd L	T	R	Bikes	Westbound SE Lake Rd L	T	R	Bikes	Interval Total	Pedestrians Crosswalk North	South	East	West
7:00 AM	13	0	28	0	0	0	0	0	2	50	0	0	0	37	43	0	173	0	0	0	0
7:15 AM	11	0	28	0	0	0	0	0	3	79	0	0	0	49	65	0	235	0	0	0	0
7:30 AM	28	0	23	0	0	0	0	0	2	98	0	0	0	67	52	1	270	0	0	0	0
7:45 AM	14	0	28	0	0	0	0	0	6	132	0	0	0	59	42	0	281	0	1	0	0
8:00 AM	21	0	20	0	0	0	0	0	4	77	0	0	0	63	56	1	241	0	0	0	0
8:15 AM	9	0	16	0	0	0	0	0	3	101	0	0	0	68	39	0	236	0	0	0	0
8:30 AM	13	0	18	0	0	0	0	0	4	88	0	0	0	60	37	0	220	0	0	0	0
8:45 AM	25	0	20	0	0	0	0	0	4	87	0	0	0	59	35	0	230	0	0	0	0
Total Survey	134	0	181	0	0	0	0	0	28	712	0	0	0	462	369	2	1,886	0	1	0	0

Peak Hour Summary
7:20 AM to 8:20 AM

By Approach	Northbound Hwy 212 WB Ramps In	Out	Total	Bikes	Southbound Hwy 212 WB Ramps In	Out	Total	Bikes	Eastbound SE Lake Rd In	Out	Total	Bikes	Westbound SE Lake Rd In	Out	Total	Bikes	Total	Pedestrians Crosswalk North	South	East	West
Volume	171	0	171	0	0	226	226	0	403	317	720	0	456	487	943	2	1,030	0	1	0	0
%HV	10.5%				0.0%				2.5%				4.6%				4.8%				
PHF	0.84				0.00				0.73				0.93				0.90				

By Movement	Northbound Hwy 212 WB Ramps L	T	R	Total	Southbound Hwy 212 WB Ramps L	T	R	Total	Eastbound SE Lake Rd L	T	R	Total	Westbound SE Lake Rd L	T	R	Total	Total
Volume	72	0	99	171	0	0	0	0	15	388	0	403	0	245	211	456	1,030
%HV	9.7%	0.0%	11.1%	10.5%	0.0%	0.0%	0.0%	0.0%	0.0%	2.6%	0.0%	2.5%	0.0%	5.3%	3.8%	4.6%	4.8%
PHF	0.64	0.00	0.80	0.84	0.00	0.00	0.00	0.00	0.63	0.73	0.00	0.73	0.00	0.91	0.85	0.93	0.90

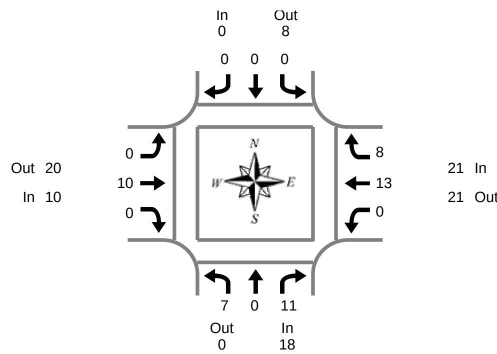
Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 212 WB Ramps L	T	R	Bikes	Southbound Hwy 212 WB Ramps L	T	R	Bikes	Eastbound SE Lake Rd L	T	R	Bikes	Westbound SE Lake Rd L	T	R	Bikes	Interval Total	Pedestrians Crosswalk North	South	East	West
7:00 AM	66	0	107	0	0	0	0	0	13	359	0	0	0	212	202	1	959	0	1	0	0
7:15 AM	74	0	99	0	0	0	0	0	15	386	0	0	0	238	215	2	1,027	0	1	0	0
7:30 AM	72	0	87	0	0	0	0	0	15	408	0	0	0	257	189	2	1,028	0	1	0	0
7:45 AM	57	0	82	0	0	0	0	0	17	398	0	0	0	250	174	1	978	0	1	0	0
8:00 AM	68	0	74	0	0	0	0	0	15	353	0	0	0	250	167	1	927	0	0	0	0

Heavy Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



Peak Hour Summary
7:20 AM to 8:20 AM

Hwy 212 WB Ramps & SE Lake Rd

Wednesday, October 11, 2006
7:00 AM to 9:00 AM

Heavy Vehicle 5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 212 WB Ramps				Southbound Hwy 212 WB Ramps				Eastbound SE Lake Rd				Westbound SE Lake Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	3	0	0	3	0	0	0	0	0	1	0	1	0	1	0	1	5
7:05 AM	1	0	3	4	0	0	0	0	0	0	0	0	0	0	0	0	4
7:10 AM	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	2
7:15 AM	1	0	1	2	0	0	0	0	0	1	0	1	0	1	1	2	5
7:20 AM	2	0	2	4	0	0	0	0	0	0	0	0	0	5	0	5	9
7:25 AM	2	0	2	4	0	0	0	0	0	2	0	2	0	1	1	2	8
7:30 AM	0	0	1	1	0	0	0	0	0	3	0	3	0	2	3	5	9
7:35 AM	2	0	1	3	0	0	0	0	0	0	0	0	0	0	1	1	4
7:40 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
7:50 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2
7:55 AM	0	0	2	2	0	0	0	0	0	0	0	0	0	1	0	1	3
8:00 AM	1	0	1	2	0	0	0	0	0	1	0	1	0	0	1	1	4
8:05 AM	0	0	0	0	0	0	0	0	0	4	0	4	0	1	0	1	5
8:10 AM	0	0	2	2	0	0	0	0	0	0	0	0	0	0	1	1	3
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:20 AM	0	0	1	1	0	0	0	0	0	0	0	0	0	4	0	4	5
8:25 AM	1	0	1	2	0	0	0	0	0	1	0	1	0	4	1	5	8
8:30 AM	1	0	2	3	0	0	0	0	0	3	0	3	0	4	2	6	12
8:35 AM	0	0	1	1	0	0	0	0	0	3	0	3	0	1	0	1	5
8:40 AM	0	0	1	1	0	0	0	0	0	2	0	2	0	1	0	1	4
8:45 AM	0	0	1	1	0	0	0	0	0	1	0	1	0	1	1	2	4
8:50 AM	0	0	4	4	0	0	0	0	0	0	0	0	0	0	0	0	4
8:55 AM	0	0	1	1	0	0	0	0	0	2	0	2	0	0	2	2	5
Total Survey	14	0	29	43	0	0	0	0	0	24	0	24	0	30	15	45	112

Heavy Vehicle 15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 212 WB Ramps				Southbound Hwy 212 WB Ramps				Eastbound SE Lake Rd				Westbound SE Lake Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	4	0	5	9	0	0	0	0	0	1	0	1	0	1	0	1	11
7:15 AM	5	0	5	10	0	0	0	0	0	3	0	3	0	7	2	9	22
7:30 AM	2	0	2	4	0	0	0	0	0	3	0	3	0	2	5	7	14
7:45 AM	0	0	2	2	0	0	0	0	0	0	0	0	0	4	0	4	6
8:00 AM	1	0	3	4	0	0	0	0	0	5	0	5	0	1	2	3	12
8:15 AM	1	0	2	3	0	0	0	0	0	1	0	1	0	8	1	9	13
8:30 AM	1	0	4	5	0	0	0	0	0	8	0	8	0	6	2	8	21
8:45 AM	0	0	6	6	0	0	0	0	0	3	0	3	0	1	3	4	13
Total Survey	14	0	29	43	0	0	0	0	0	24	0	24	0	30	15	45	112

Heavy Vehicle Peak Hour Summary
7:20 AM to 8:20 AM

By Approach	Northbound Hwy 212 WB Ramps			Southbound Hwy 212 WB Ramps			Eastbound SE Lake Rd			Westbound SE Lake Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	18	0	18	0	8	8	10	20	30	21	21	42	49
PHF	0.50			0.00			0.50			0.44			0.47

By Movement	Northbound Hwy 212 WB Ramps				Southbound Hwy 212 WB Ramps				Eastbound SE Lake Rd				Westbound SE Lake Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	7	0	11	18	0	0	0	0	0	10	0	10	0	13	8	21	49
PHF	0.44	0.00	0.55	0.50	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.50	0.00	0.41	0.40	0.44	0.47

Heavy Vehicle Rolling Hour Summary
7:00 AM to 9:00 AM

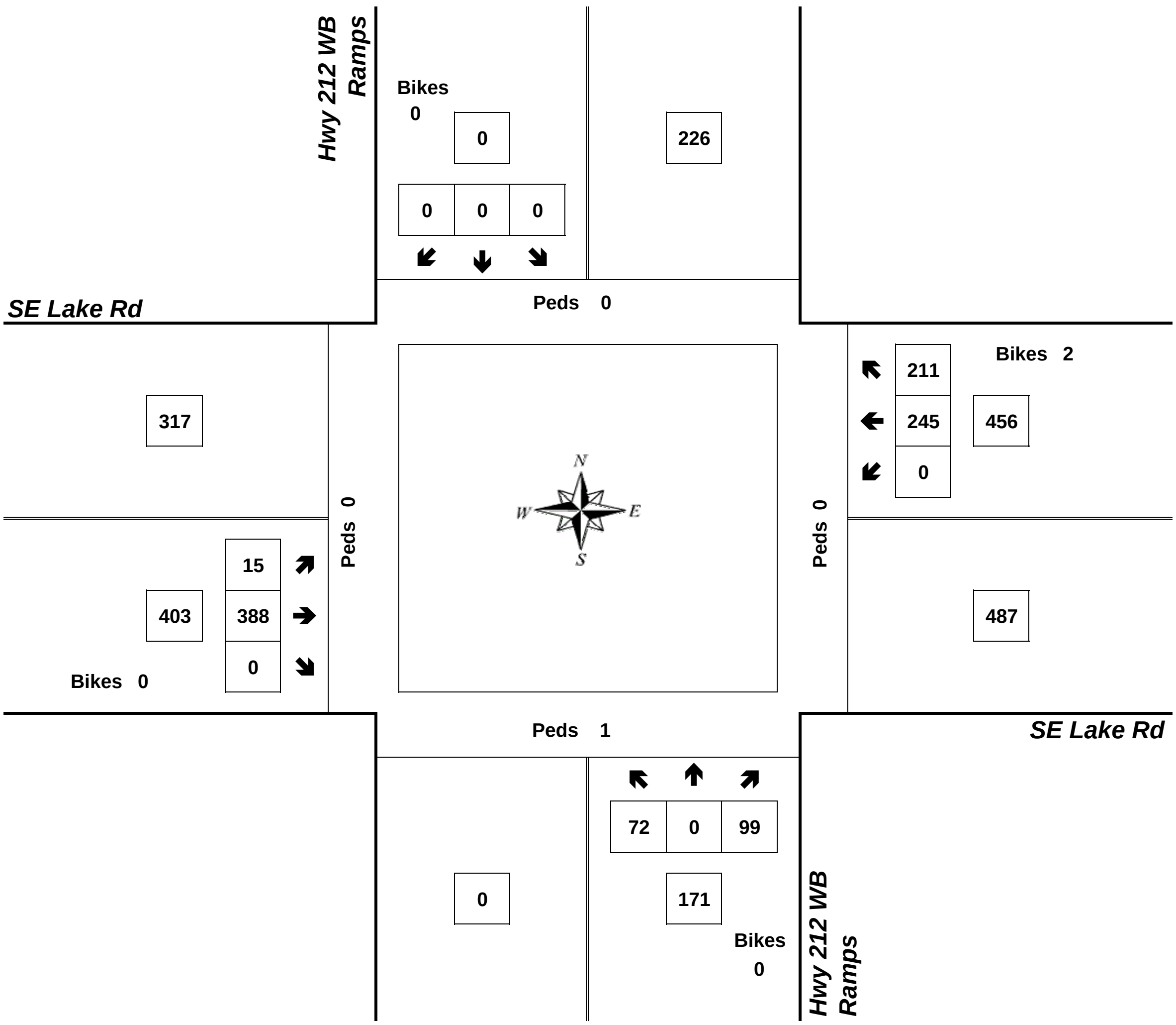
Interval Start Time	Northbound Hwy 212 WB Ramps				Southbound Hwy 212 WB Ramps				Eastbound SE Lake Rd				Westbound SE Lake Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	11	0	14	25	0	0	0	0	0	7	0	7	0	14	7	21	53
7:15 AM	8	0	12	20	0	0	0	0	0	11	0	11	0	14	9	23	54
7:30 AM	4	0	9	13	0	0	0	0	0	9	0	9	0	15	8	23	45
7:45 AM	3	0	11	14	0	0	0	0	0	14	0	14	0	19	5	24	52
8:00 AM	3	0	15	18	0	0	0	0	0	17	0	17	0	16	8	24	59

Peak Hour Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

Hwy 212 WB Ramps & SE Lake Rd

7:20 AM to 8:20 AM
Wednesday, October 11, 2006

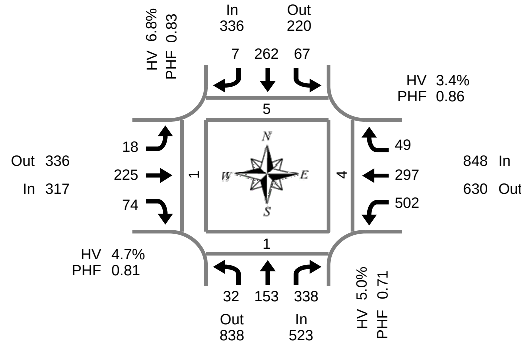


Approach	PHF	HV%	Volume
EB	0.73	2.5%	403
WB	0.93	4.6%	456
NB	0.84	10.5%	171
SB	0.00	0.0%	0
Intersection	0.90	4.8%	1,030

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



SE Linwood Ave & SE Harmony Rd

Wednesday, October 11, 2006
7:00 AM to 9:00 AM

Peak Hour Summary
7:15 AM to 8:15 AM

5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Linwood Ave L	T	R	Bikes	Southbound SE Linwood Ave L	T	R	Bikes	Eastbound SE Harmony Rd L	T	R	Bikes	Westbound SE Harmony Rd L	T	R	Bikes	Interval Total	Pedestrians Crosswalk North	South	East	West
7:00 AM	0	5	15	0	3	18	0	0	0	12	4	0	43	16	6	0	122	0	0	0	0
7:05 AM	2	5	10	0	0	20	0	0	0	17	3	0	24	13	1	0	95	0	0	0	0
7:10 AM	0	10	11	0	5	30	1	0	1	18	3	0	26	18	1	0	124	0	0	0	0
7:15 AM	3	15	20	0	5	29	1	0	0	8	4	0	52	38	3	0	178	0	0	0	1
7:20 AM	0	12	27	0	2	21	0	0	0	19	5	0	48	20	5	0	159	1	0	0	0
7:25 AM	5	13	20	0	10	16	1	0	0	17	8	0	48	30	2	0	170	0	0	2	0
7:30 AM	1	13	22	0	9	18	0	0	0	21	4	0	53	23	9	0	173	1	0	0	0
7:35 AM	5	16	56	0	7	16	0	0	0	18	1	0	23	18	8	0	168	0	0	0	0
7:40 AM	3	18	45	0	9	17	0	0	1	19	8	0	32	25	5	0	182	0	0	1	0
7:45 AM	1	10	31	0	1	19	0	0	3	21	7	0	38	19	5	0	155	1	0	0	0
7:50 AM	4	15	37	0	2	28	0	0	5	11	4	0	46	22	2	0	176	1	0	1	0
7:55 AM	1	9	25	0	5	39	2	0	7	29	11	0	33	24	1	0	186	0	0	0	0
8:00 AM	5	10	20	0	6	19	0	0	1	10	6	1	41	29	1	0	148	0	1	0	0
8:05 AM	1	10	12	0	6	22	1	0	0	23	7	0	51	20	5	0	158	1	0	0	0
8:10 AM	3	12	23	0	5	18	2	0	1	29	9	0	37	29	3	0	171	0	0	0	0
8:15 AM	5	14	25	0	7	11	3	0	0	15	5	0	29	13	4	0	131	0	0	0	0
8:20 AM	5	11	38	0	9	21	2	0	0	7	1	0	28	19	6	0	147	0	0	0	0
8:25 AM	2	15	20	0	6	27	1	0	0	12	6	0	22	10	0	0	121	1	0	0	0
8:30 AM	3	7	14	0	9	22	0	0	0	22	9	0	30	19	4	0	139	0	0	0	0
8:35 AM	4	11	32	0	4	14	1	0	0	10	4	0	15	11	2	1	108	0	0	0	0
8:40 AM	2	10	16	0	4	8	1	0	1	8	1	0	13	15	1	0	80	1	0	0	0
8:45 AM	0	17	23	0	8	17	1	0	0	17	9	0	29	17	3	0	141	0	0	0	0
8:50 AM	3	8	20	0	6	12	1	0	3	10	6	0	34	11	4	0	118	0	0	0	0
8:55 AM	3	11	16	0	5	13	0	0	2	9	1	0	14	12	3	0	89	0	0	0	0
Total Survey	61	277	578	0	133	475	18	0	25	382	126	1	809	471	84	1	3,439	7	1	4	1

15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Linwood Ave L	T	R	Bikes	Southbound SE Linwood Ave L	T	R	Bikes	Eastbound SE Harmony Rd L	T	R	Bikes	Westbound SE Harmony Rd L	T	R	Bikes	Interval Total	Pedestrians Crosswalk North	South	East	West
7:00 AM	2	20	36	0	8	68	1	0	1	47	10	0	93	47	8	0	341	0	0	0	0
7:15 AM	8	40	67	0	17	66	2	0	0	44	17	0	148	88	10	0	507	1	0	2	1
7:30 AM	9	47	123	0	25	51	0	0	1	58	13	0	108	66	22	0	523	1	0	1	0
7:45 AM	6	34	93	0	8	86	2	0	15	61	22	0	117	65	8	0	517	2	0	1	0
8:00 AM	9	32	55	0	17	59	3	0	2	62	22	1	129	78	9	0	477	1	1	0	0
8:15 AM	12	40	83	0	22	59	6	0	0	34	12	0	79	42	10	0	399	1	0	0	0
8:30 AM	9	28	62	0	17	44	2	0	1	40	14	0	58	45	7	1	327	1	0	0	0
8:45 AM	6	36	59	0	19	42	2	0	5	36	16	0	77	40	10	0	348	0	0	0	0
Total Survey	61	277	578	0	133	475	18	0	25	382	126	1	809	471	84	1	3,439	7	1	4	1

Peak Hour Summary
7:15 AM to 8:15 AM

By Approach	Northbound SE Linwood Ave In	Out	Total	Bikes	Southbound SE Linwood Ave In	Out	Total	Bikes	Eastbound SE Harmony Rd In	Out	Total	Bikes	Westbound SE Harmony Rd In	Out	Total	Bikes	Total	Pedestrians Crosswalk North	South	East	West
Volume	523	838	1,361	0	336	220	556	0	317	336	653	1	848	630	1,478	0	2,024	5	1	4	1
%HV	5.0%				6.8%				4.7%				3.4%				4.6%				
PHF	0.71				0.83				0.81				0.86				0.97				

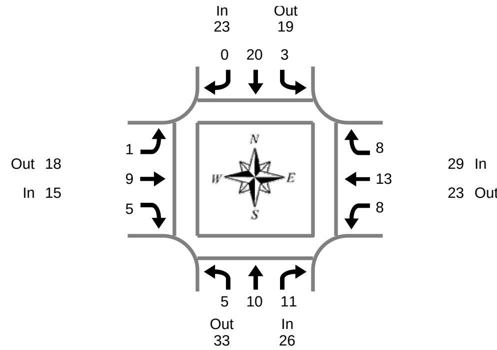
By Movement	Northbound SE Linwood Ave L	T	R	Total	Southbound SE Linwood Ave L	T	R	Total	Eastbound SE Harmony Rd L	T	R	Total	Westbound SE Harmony Rd L	T	R	Total	Total
Volume	32	153	338	523	67	262	7	336	18	225	74	317	502	297	49	848	2,024
%HV	15.6%	6.5%	3.3%	5.0%	4.5%	7.6%	0.0%	6.8%	5.6%	4.0%	6.8%	4.7%	1.6%	4.4%	16.3%	3.4%	4.6%
PHF	0.73	0.81	0.64	0.71	0.64	0.76	0.58	0.83	0.30	0.91	0.77	0.81	0.84	0.84	0.56	0.86	0.97

Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Linwood Ave L	T	R	Bikes	Southbound SE Linwood Ave L	T	R	Bikes	Eastbound SE Harmony Rd L	T	R	Bikes	Westbound SE Harmony Rd L	T	R	Bikes	Interval Total	Pedestrians Crosswalk North	South	East	West
7:00 AM	25	141	319	0	58	271	5	0	17	210	62	0	466	266	48	0	1,888	4	0	4	1
7:15 AM	32	153	338	0	67	262	7	0	18	225	74	1	502	297	49	0	2,024	5	1	4	1
7:30 AM	36	153	354	0	72	255	11	0	18	215	69	1	433	251	49	0	1,916	5	1	2	0
7:45 AM	36	134	293	0	64	248	13	0	18	197	70	1	383	230	34	1	1,720	5	1	1	0
8:00 AM	36	136	259	0	75	204	13	0	8	172	64	1	343	205	36	1	1,551	3	1	0	0

Heavy Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
7:15 AM to 8:15 AM

SE Linwood Ave & SE Harmony Rd

Wednesday, October 11, 2006
7:00 AM to 9:00 AM

Heavy Vehicle 5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Linwood Ave				Southbound SE Linwood Ave				Eastbound SE Harmony Rd				Westbound SE Harmony Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	2	1	3	0	0	0	0	0	1	1	2	1	0	0	1	6
7:05 AM	1	1	1	3	0	0	0	0	0	0	0	0	1	1	1	3	6
7:10 AM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
7:15 AM	1	1	0	2	0	2	0	2	0	0	1	1	1	1	0	2	7
7:20 AM	0	0	3	3	0	1	0	1	0	0	0	0	1	1	2	4	8
7:25 AM	1	2	3	6	0	3	0	3	0	0	1	1	2	1	0	3	13
7:30 AM	0	0	1	1	0	0	0	0	0	1	0	1	1	1	0	2	4
7:35 AM	2	2	0	4	1	0	0	1	0	0	0	0	0	0	1	1	6
7:40 AM	0	1	0	1	0	3	0	3	1	1	1	3	0	1	1	2	9
7:45 AM	1	1	0	2	0	2	0	2	0	2	0	2	0	0	2	2	8
7:50 AM	0	0	0	0	0	3	0	3	0	1	0	1	0	1	0	1	5
7:55 AM	0	1	2	3	1	1	0	2	0	1	0	1	0	0	0	0	6
8:00 AM	0	0	0	0	0	3	0	3	0	0	1	1	2	0	0	2	6
8:05 AM	0	1	2	3	0	0	0	0	0	2	0	2	0	2	1	3	8
8:10 AM	0	1	0	1	1	2	0	3	0	1	1	2	1	5	1	7	13
8:15 AM	0	1	1	2	0	0	0	0	0	1	2	3	3	0	0	3	8
8:20 AM	1	1	0	2	0	3	0	3	0	1	0	1	1	1	0	2	8
8:25 AM	0	2	0	2	0	4	0	4	0	1	0	1	1	0	0	1	8
8:30 AM	1	0	1	2	1	0	0	1	0	1	0	1	0	0	0	0	4
8:35 AM	0	0	3	3	0	0	0	0	0	0	0	0	1	2	0	3	6
8:40 AM	1	1	0	2	1	0	0	1	0	0	0	0	0	0	0	0	3
8:45 AM	0	1	0	1	1	1	0	2	0	1	1	2	0	0	2	2	7
8:50 AM	0	0	0	0	0	0	0	0	0	1	0	1	2	2	0	4	5
8:55 AM	1	1	2	4	0	0	0	0	0	0	1	1	0	0	0	0	5
Total Survey	10	21	20	51	6	28	0	34	1	16	10	27	18	19	11	48	160

Heavy Vehicle 15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Linwood Ave				Southbound SE Linwood Ave				Eastbound SE Harmony Rd				Westbound SE Harmony Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	1	4	2	7	0	0	0	0	0	1	1	2	2	1	1	4	13
7:15 AM	2	3	6	11	0	6	0	6	0	0	2	2	4	3	2	9	28
7:30 AM	2	3	1	6	1	3	0	4	1	2	1	4	1	2	2	5	19
7:45 AM	1	2	2	5	1	6	0	7	0	4	0	4	0	1	2	3	19
8:00 AM	0	2	2	4	1	5	0	6	0	3	2	5	3	7	2	12	27
8:15 AM	1	4	1	6	0	7	0	7	0	3	2	5	5	1	0	6	24
8:30 AM	2	1	4	7	2	0	0	2	0	1	0	1	1	2	0	3	13
8:45 AM	1	2	2	5	1	1	0	2	0	2	2	4	2	2	2	6	17
Total Survey	10	21	20	51	6	28	0	34	1	16	10	27	18	19	11	48	160

Heavy Vehicle Peak Hour Summary
7:15 AM to 8:15 AM

By Approach	Northbound SE Linwood Ave			Southbound SE Linwood Ave			Eastbound SE Harmony Rd			Westbound SE Harmony Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	26	33	59	23	19	42	15	18	33	29	23	52	93
PHF	0.59			0.72			0.63			0.60			0.83

By Movement	Northbound SE Linwood Ave				Southbound SE Linwood Ave				Eastbound SE Harmony Rd				Westbound SE Harmony Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	5	10	11	26	3	20	0	23	1	9	5	15	8	13	8	29	93
PHF	0.42	0.63	0.39	0.59	0.75	0.63	0.00	0.72	0.25	0.56	0.63	0.63	0.50	0.46	0.50	0.60	0.83

Heavy Vehicle Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Linwood Ave				Southbound SE Linwood Ave				Eastbound SE Harmony Rd				Westbound SE Harmony Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	6	12	11	29	2	15	0	17	1	7	4	12	7	7	7	21	79
7:15 AM	5	10	11	26	3	20	0	23	1	9	5	15	8	13	8	29	93
7:30 AM	4	11	6	21	3	21	0	24	1	12	5	18	9	11	6	26	89
7:45 AM	4	9	9	22	4	18	0	22	0	11	4	15	9	11	4	24	83
8:00 AM	4	9	9	22	4	13	0	17	0	9	6	15	11	12	4	27	81

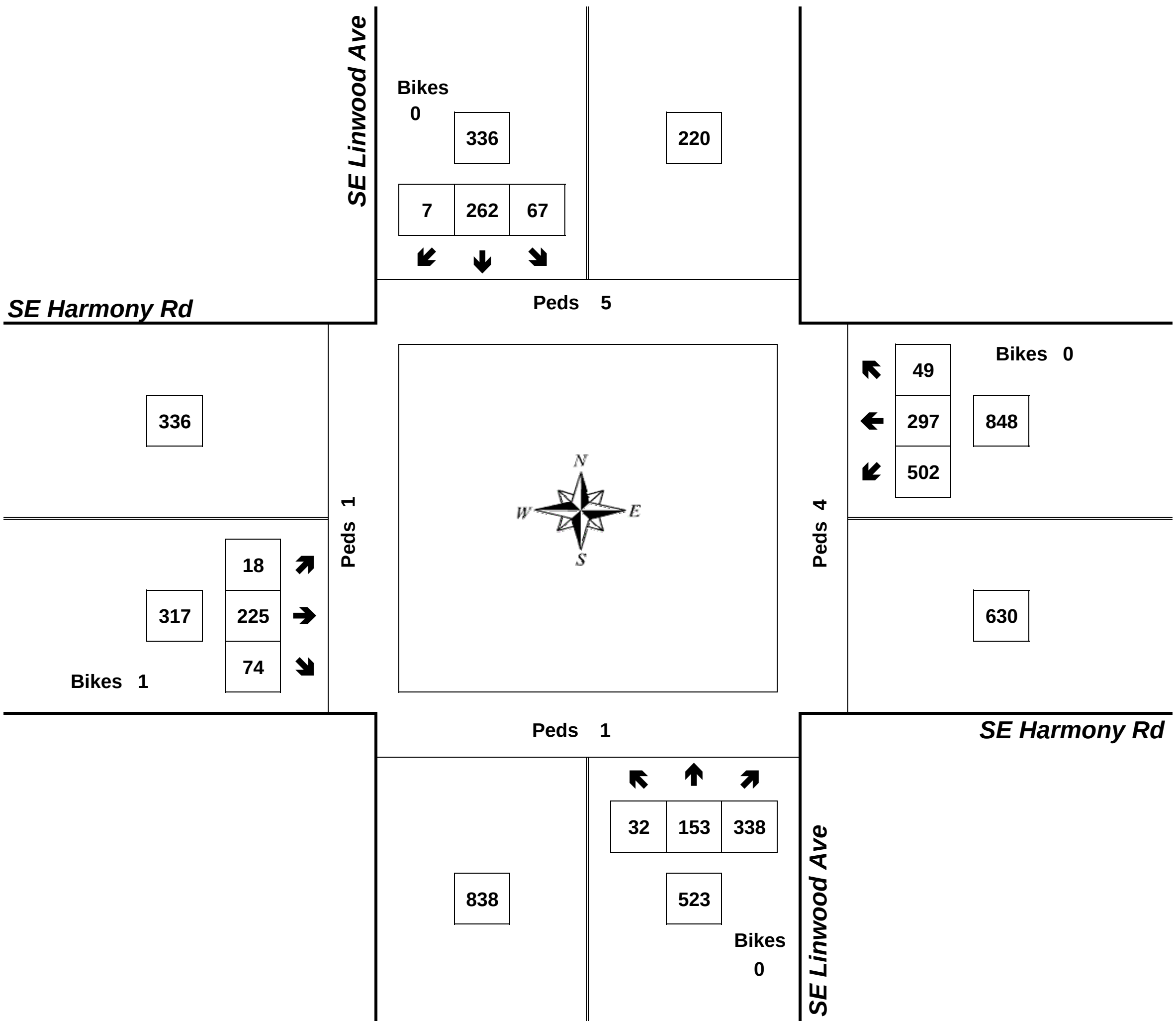
Peak Hour Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

SE Linwood Ave & SE Harmony Rd

7:15 AM to 8:15 AM
Wednesday, October 11, 2006



Approach	PHF	HV%	Volume
EB	0.81	4.7%	317
WB	0.86	3.4%	848
NB	0.71	5.0%	523
SB	0.83	6.8%	336
Intersection	0.97	4.6%	2,024

Count Period: 7:00 AM to 9:00 AM

NE 35th Ave N/O SE Sellwood St

Start Time	07-Dec-06 Thu	NB	SB	Total
12:00 AM		0	1	1
12:15		0	0	0
12:30		0	0	0
12:45		0	1	1
01:00		0	0	0
01:15		0	1	1
01:30		0	1	1
01:45		0	0	0
02:00		0	0	0
02:15		0	0	0
02:30		1	1	2
02:45		0	0	0
03:00		0	0	0
03:15		0	0	0
03:30		0	1	1
03:45		0	0	0
04:00		0	1	1
04:15		0	0	0
04:30		0	1	1
04:45		0	0	0
05:00		2	2	4
05:15		0	0	0
05:30		4	0	4
05:45		1	2	3
06:00		1	1	2
06:15		2	0	2
06:30		2	2	4
06:45		5	2	7
07:00		2	3	5
07:15		**7**	2	9
07:30		**4**	**7**	**11**
07:45		**5**	**5**	**10**
08:00		**7**	**16**	**23**
08:15		6	**12**	**18**
08:30		2	4	6
08:45		1	8	9
09:00		8	10	18
09:15		4	5	9
09:30		3	4	7
09:45		1	3	4
10:00		6	9	15
10:15		2	6	8
10:30		2	4	6
10:45		6	4	10
11:00		5	6	11
11:15		4	5	9
11:30		8	3	11
11:45		2	7	9
Total		103	140	243
Percent		42.4%	57.6%	
Peak		07:15	07:30	07:30
Vol.		23	40	62
P.H.F.		0.719	0.625	0.674

NE 35th Ave N/O SE Sellwood St

Start Time	07-Dec-06 Thu	NB	SB	Total
12:00 PM		9	4	13
12:15		8	9	17
12:30		6	6	12
12:45		3	6	9
01:00		2	7	9
01:15		2	3	5
01:30		**5**	9	14
01:45		**9**	6	15
02:00		**7**	8	15
02:15		**6**	6	12
02:30		5	6	11
02:45		5	10	15
03:00		5	3	8
03:15		4	**12**	**16**
03:30		6	**13**	**19**
03:45		6	**16**	**22**
04:00		11	**10**	**21**
04:15		1	10	11
04:30		7	8	15
04:45		4	10	14
05:00		4	17	21
05:15		6	12	18
05:30		4	4	8
05:45		8	10	18
06:00		4	8	12
06:15		9	13	22
06:30		4	12	16
06:45		6	10	16
07:00		3	7	10
07:15		2	2	4
07:30		6	4	10
07:45		3	9	12
08:00		2	5	7
08:15		0	7	7
08:30		4	3	7
08:45		2	2	4
09:00		2	5	7
09:15		3	3	6
09:30		5	3	8
09:45		1	2	3
10:00		2	1	3
10:15		0	3	3
10:30		1	5	6
10:45		0	3	3
11:00		0	0	0
11:15		0	0	0
11:30		0	0	0
11:45		0	2	2
Total		192	314	506
Percent		37.9%	62.1%	
Peak		13:30	15:15	15:15
Vol.		27	51	78
P.H.F.		0.614	0.750	0.886
Grand Total		295	454	749
Percent		39.4%	60.6%	
ADT	Not Calculated			

All Traffic Data Services, Inc.
3209 SE 147th PL # 97
Vancouver, WA. 98683
PH. 503-833-2740

Site Code: 2

SE 33rd Ave N/O SE Sellwood St

Start Time	07-Dec-06 Thu	NB	SB	Total
12:00 AM		0	1	1
12:15		2	0	2
12:30		0	0	0
12:45		0	0	0
01:00		0	0	0
01:15		1	1	2
01:30		0	0	0
01:45		0	2	2
02:00		0	1	1
02:15		0	0	0
02:30		1	0	1
02:45		0	0	0
03:00		0	0	0
03:15		0	0	0
03:30		0	0	0
03:45		0	0	0
04:00		0	0	0
04:15		0	0	0
04:30		0	0	0
04:45		0	0	0
05:00		1	1	2
05:15		0	0	0
05:30		2	1	3
05:45		1	0	1
06:00		1	1	2
06:15		3	0	3
06:30		3	0	3
06:45		3	2	5
07:00		**6**	2	8
07:15		**3**	0	3
07:30		**3**	3	6
07:45		**7**	4	11
08:00		2	5	7
08:15		2	2	4
08:30		7	3	10
08:45		5	4	9
09:00		1	1	2
09:15		2	2	4
09:30		1	0	1
09:45		0	1	1
10:00		4	1	5
10:15		2	3	5
10:30		0	0	0
10:45		0	1	1
11:00		2	**6**	**8**
11:15		2	**4**	**6**
11:30		4	**5**	**9**
11:45		8	**4**	**12**
Total		79	61	140
Percent		56.4%	43.6%	
Peak		07:00	11:00	11:00
Vol.		19	19	35
P.H.F.		0.594	0.792	0.729

SE 33rd Ave N/O SE Sellwood St

Start Time	07-Dec-06 Thu	NB	SB	Total
12:00 PM		0	4	4
12:15		3	3	6
12:30		2	8	10
12:45		5	5	10
01:00		2	2	4
01:15		3	6	9
01:30		4	4	8
01:45		4	4	8
02:00		2	2	4
02:15		5	4	9
02:30		**3**	7	**10**
02:45		**5**	8	**13**
03:00		**2**	**5**	**7**
03:15		**6**	**8**	**14**
03:30		3	**4**	7
03:45		4	**12**	16
04:00		2	1	3
04:15		2	7	9
04:30		2	4	6
04:45		1	5	6
05:00		5	8	13
05:15		2	4	6
05:30		0	0	0
05:45		2	9	11
06:00		6	6	12
06:15		0	7	7
06:30		5	5	10
06:45		1	6	7
07:00		1	3	4
07:15		0	2	2
07:30		1	1	2
07:45		2	3	5
08:00		0	4	4
08:15		1	2	3
08:30		0	1	1
08:45		4	6	10
09:00		4	2	6
09:15		1	3	4
09:30		2	3	5
09:45		1	2	3
10:00		1	1	2
10:15		0	2	2
10:30		0	1	1
10:45		0	1	1
11:00		0	0	0
11:15		0	0	0
11:30		1	0	1
11:45		0	1	1
Total		100	186	286
Percent		35.0%	65.0%	
Peak		14:30	15:00	14:30
Vol.		16	29	44
P.H.F.		0.667	0.604	0.688
Grand Total		179	247	426
Percent		42.0%	58.0%	
ADT	Not Calculated			

SE 28th Ave S/O SE Monroe St

Start Time	07-Dec-06 Thu	NB	SB	Total
12:00 AM		0	0	0
12:15		1	1	2
12:30		0	0	0
12:45		0	0	0
01:00		0	0	0
01:15		0	0	0
01:30		1	1	2
01:45		0	0	0
02:00		1	1	2
02:15		0	0	0
02:30		1	1	2
02:45		0	0	0
03:00		1	0	1
03:15		0	0	0
03:30		0	0	0
03:45		0	0	0
04:00		0	1	1
04:15		0	0	0
04:30		0	0	0
04:45		2	0	2
05:00		0	0	0
05:15		0	0	0
05:30		1	1	2
05:45		1	1	2
06:00		0	0	0
06:15		2	2	4
06:30		2	4	6
06:45		5	3	8
07:00		2	3	5
07:15		4	3	7
07:30		5	7	12
07:45		4	**7**	11
08:00		**5**	**1**	**6**
08:15		**12**	**10**	**22**
08:30		**8**	**14**	**22**
08:45		**7**	6	**13**
09:00		4	2	6
09:15		1	2	3
09:30		2	2	4
09:45		3	3	6
10:00		2	4	6
10:15		3	1	4
10:30		5	4	9
10:45		4	4	8
11:00		2	3	5
11:15		1	1	2
11:30		5	4	9
11:45		10	7	17
Total		107	104	211
Percent		50.7%	49.3%	
Peak		08:00	07:45	08:00
Vol.		32	32	63
P.H.F.		0.667	0.571	0.716

SE 28th Ave S/O SE Monroe St

Start Time	07-Dec-06 Thu	NB	SB	Total
12:00 PM		2	3	5
12:15		5	5	10
12:30		5	3	8
12:45		2	1	3
01:00		4	4	8
01:15		4	5	9
01:30		2	4	6
01:45		5	4	9
02:00		**2**	3	5
02:15		**12**	10	**22**
02:30		**6**	4	**10**
02:45		**8**	6	**14**
03:00		2	10	**12**
03:15		6	8	14
03:30		9	6	15
03:45		4	1	5
04:00		9	6	15
04:15		4	**8**	12
04:30		6	**8**	14
04:45		5	**8**	13
05:00		6	**10**	16
05:15		2	6	8
05:30		4	2	6
05:45		6	4	10
06:00		4	2	6
06:15		4	5	9
06:30		2	3	5
06:45		4	2	6
07:00		3	2	5
07:15		10	12	22
07:30		1	1	2
07:45		0	2	2
08:00		2	2	4
08:15		7	3	10
08:30		1	1	2
08:45		2	2	4
09:00		3	2	5
09:15		2	3	5
09:30		3	3	6
09:45		1	0	1
10:00		1	0	1
10:15		0	0	0
10:30		0	0	0
10:45		2	1	3
11:00		1	0	1
11:15		0	1	1
11:30		3	1	4
11:45		3	1	4
Total		179	178	357
Percent		50.1%	49.9%	
Peak		14:00	16:15	14:15
Vol.		28	34	58
P.H.F.		0.583	0.708	0.659
Grand Total		286	282	568
Percent		50.4%	49.6%	
ADT	Not Calculated			

SE 29th Ave S/O SE Monroe St

Start Time	07-Dec-06 Thu	NB	SB	Total
12:00 AM		0	0	0
12:15		1	2	3
12:30		0	0	0
12:45		2	2	4
01:00		0	0	0
01:15		1	2	3
01:30		2	2	4
01:45		0	2	2
02:00		0	0	0
02:15		0	0	0
02:30		0	0	0
02:45		0	0	0
03:00		0	0	0
03:15		0	0	0
03:30		0	0	0
03:45		0	0	0
04:00		0	1	1
04:15		0	0	0
04:30		0	0	0
04:45		0	0	0
05:00		1	0	1
05:15		0	0	0
05:30		0	0	0
05:45		1	1	2
06:00		1	2	3
06:15		2	0	2
06:30		0	0	0
06:45		2	0	2
07:00		4	3	7
07:15		8	5	13
07:30		4	4	8
07:45		**10**	**9**	**19**
08:00		**7**	**10**	**17**
08:15		**10**	**14**	**24**
08:30		**7**	**12**	**19**
08:45		5	5	10
09:00		7	1	8
09:15		3	5	8
09:30		1	1	2
09:45		6	6	12
10:00		3	6	9
10:15		3	2	5
10:30		4	1	5
10:45		4	3	7
11:00		6	4	10
11:15		3	4	7
11:30		2	4	6
11:45		6	2	8
Total		116	115	231
Percent		50.2%	49.8%	
Peak		07:45	07:45	07:45
Vol.		34	45	79
P.H.F.		0.850	0.804	0.823

SE 29th Ave S/O SE Monroe St

Start Time	07-Dec-06 Thu	NB	SB	Total
12:00 PM		4	4	8
12:15		8	6	14
12:30		4	5	9
12:45		7	8	15
01:00		7	8	15
01:15		8	5	13
01:30		8	6	14
01:45		3	2	5
02:00		4	4	8
02:15		8	10	18
02:30		7	6	13
02:45		4	6	10
03:00		**4**	**8**	**12**
03:15		**15**	**8**	**23**
03:30		**13**	**7**	**20**
03:45		**10**	**9**	**19**
04:00		2	6	8
04:15		13	10	23
04:30		2	3	5
04:45		6	9	15
05:00		8	6	14
05:15		8	7	15
05:30		8	7	15
05:45		8	8	16
06:00		9	8	17
06:15		11	5	16
06:30		5	3	8
06:45		2	6	8
07:00		6	5	11
07:15		4	4	8
07:30		4	4	8
07:45		1	1	2
08:00		5	1	6
08:15		1	0	1
08:30		5	2	7
08:45		3	5	8
09:00		4	4	8
09:15		3	0	3
09:30		2	3	5
09:45		1	1	2
10:00		0	0	0
10:15		0	1	1
10:30		1	2	3
10:45		0	1	1
11:00		0	0	0
11:15		0	0	0
11:30		0	0	0
11:45		2	2	4
Total		238	216	454
Percent		52.4%	47.6%	
Peak		15:00	15:00	15:00
Vol.		42	32	74
P.H.F.		0.700	0.800	0.804
Grand Total		354	331	685
Percent		51.7%	48.3%	
ADT	Not Calculated			

SE Filbert St W/O SE 42nd Ave

Start Time	07-Dec-06 Thu	EB	WB	Total
12:00 AM		0	0	0
12:15		1	2	3
12:30		0	1	1
12:45		0	0	0
01:00		0	0	0
01:15		1	2	3
01:30		1	0	1
01:45		0	0	0
02:00		0	0	0
02:15		1	0	1
02:30		0	0	0
02:45		0	0	0
03:00		0	1	1
03:15		0	0	0
03:30		1	0	1
03:45		0	0	0
04:00		1	0	1
04:15		0	0	0
04:30		1	0	1
04:45		0	0	0
05:00		3	3	6
05:15		0	0	0
05:30		0	0	0
05:45		0	0	0
06:00		3	1	4
06:15		2	2	4
06:30		**6**	**6**	**12**
06:45		**2**	**2**	**4**
07:00		**7**	**4**	**11**
07:15		**6**	**6**	**12**
07:30		1	2	3
07:45		4	4	8
08:00		4	1	5
08:15		2	2	4
08:30		4	4	8
08:45		5	1	6
09:00		1	0	1
09:15		2	0	2
09:30		0	1	1
09:45		5	5	10
10:00		1	2	3
10:15		0	1	1
10:30		4	5	9
10:45		2	2	4
11:00		5	2	7
11:15		1	1	2
11:30		2	3	5
11:45		2	3	5
Total		81	69	150
Percent		54.0%	46.0%	
Peak		06:30	06:30	06:30
Vol.		21	18	39
P.H.F.		0.750	0.750	0.813

SE Filbert St W/O SE 42nd Ave

Start Time	07-Dec-06 Thu	EB	WB	Total
12:00 PM		1	4	5
12:15		1	2	3
12:30		6	4	10
12:45		2	4	6
01:00		5	6	11
01:15		4	2	6
01:30		2	2	4
01:45		1	2	3
02:00		**6**	4	10
02:15		**7**	6	13
02:30		**5**	0	5
02:45		**5**	2	7
03:00		4	5	9
03:15		2	3	5
03:30		6	2	8
03:45		2	4	6
04:00		7	5	**12**
04:15		6	4	**10**
04:30		2	**5**	**7**
04:45		7	**7**	**14**
05:00		5	**3**	8
05:15		6	**7**	13
05:30		3	1	4
05:45		6	7	13
06:00		4	1	5
06:15		5	1	6
06:30		5	3	8
06:45		4	3	7
07:00		2	3	5
07:15		3	1	4
07:30		5	2	7
07:45		0	3	3
08:00		1	0	1
08:15		3	2	5
08:30		1	3	4
08:45		1	2	3
09:00		2	2	4
09:15		4	4	8
09:30		4	4	8
09:45		1	0	1
10:00		2	0	2
10:15		1	1	2
10:30		2	2	4
10:45		0	0	0
11:00		2	0	2
11:15		0	0	0
11:30		1	1	2
11:45		0	1	1
Total		154	130	284
Percent		54.2%	45.8%	
Peak		14:00	16:30	16:00
Vol.		23	22	43
P.H.F.		0.821	0.786	0.768
Grand Total		235	199	434
Percent		54.1%	45.9%	
ADT	Not Calculated			

All Traffic Data Services, Inc.
3209 SE 147th PL # 97
Vancouver, WA. 98683
PH. 503-833-2740

Site Code: 6

SE Sellwood St W/O SE 32nd Ave

Start Time	07-Dec-06 Thu	EB	WB	Total
12:00 AM		0	0	0
12:15		0	0	0
12:30		0	0	0
12:45		0	0	0
01:00		0	0	0
01:15		0	0	0
01:30		0	0	0
01:45		0	0	0
02:00		0	0	0
02:15		0	0	0
02:30		0	0	0
02:45		0	0	0
03:00		0	0	0
03:15		0	0	0
03:30		0	0	0
03:45		1	1	2
04:00		0	0	0
04:15		0	0	0
04:30		0	0	0
04:45		1	1	2
05:00		1	1	2
05:15		0	0	0
05:30		0	0	0
05:45		0	0	0
06:00		0	0	0
06:15		0	0	0
06:30		1	1	2
06:45		1	1	2
07:00		3	**4**	7
07:15		1	**2**	3
07:30		**3**	**4**	**7**
07:45		**8**	**11**	**19**
08:00		**3**	2	**5**
08:15		**4**	4	**8**
08:30		0	0	0
08:45		2	2	4
09:00		4	2	6
09:15		5	2	7
09:30		2	2	4
09:45		2	4	6
10:00		2	3	5
10:15		1	1	2
10:30		2	3	5
10:45		2	2	4
11:00		2	2	4
11:15		3	2	5
11:30		2	1	3
11:45		1	1	2
Total		57	59	116
Percent		49.1%	50.9%	
Peak		07:30	07:00	07:30
Vol.		18	21	39
P.H.F.		0.563	0.477	0.513

All Traffic Data Services, Inc.
3209 SE 147th PL # 97
Vancouver, WA. 98683
PH. 503-833-2740

Site Code: 6

SE Sellwood St W/O SE 32nd Ave

Start Time	07-Dec-06 Thu	EB	WB	Total
12:00 PM		2	1	3
12:15		2	3	5
12:30		1	1	2
12:45		2	3	5
01:00		2	2	4
01:15		4	4	8
01:30		5	5	10
01:45		0	0	0
02:00		1	3	4
02:15		6	6	12
02:30		8	6	14
02:45		4	4	8
03:00		3	2	5
03:15		4	2	6
03:30		3	4	7
03:45		2	3	5
04:00		**8**	**10**	**18**
04:15		**8**	**9**	**17**
04:30		**3**	**3**	**6**
04:45		**5**	**7**	**12**
05:00		2	2	4
05:15		3	4	7
05:30		3	7	10
05:45		3	4	7
06:00		5	5	10
06:15		6	4	10
06:30		2	3	5
06:45		0	0	0
07:00		3	4	7
07:15		3	2	5
07:30		0	0	0
07:45		4	3	7
08:00		3	3	6
08:15		2	3	5
08:30		1	1	2
08:45		2	3	5
09:00		2	2	4
09:15		0	2	2
09:30		2	3	5
09:45		0	0	0
10:00		0	0	0
10:15		1	0	1
10:30		0	0	0
10:45		1	1	2
11:00		0	0	0
11:15		0	0	0
11:30		1	1	2
11:45		0	0	0
Total		122	135	257
Percent		47.5%	52.5%	
Peak		16:00	16:00	16:00
Vol.		24	29	53
P.H.F.		0.750	0.725	0.736
Grand Total		179	194	373
Percent		48.0%	52.0%	
ADT	Not Calculated			

All Traffic Data Services, Inc.
3209 SE 147th PL # 97
Vancouver, WA. 98683
PH. 503-833-2740

Site Code: 7

SE 27th Ave N/O SE Willard St

Start Time	07-Dec-06 Thu	NB	SB	Total
12:00 AM		2	2	4
12:15		0	0	0
12:30		0	0	0
12:45		0	1	1
01:00		1	0	1
01:15		0	1	1
01:30		0	0	0
01:45		0	1	1
02:00		0	2	2
02:15		0	0	0
02:30		0	1	1
02:45		0	0	0
03:00		0	0	0
03:15		0	0	0
03:30		1	0	1
03:45		1	1	2
04:00		0	0	0
04:15		0	0	0
04:30		0	1	1
04:45		1	1	2
05:00		0	1	1
05:15		0	0	0
05:30		4	3	7
05:45		1	0	1
06:00		2	2	4
06:15		4	4	8
06:30		1	2	3
06:45		4	2	6
07:00		10	8	18
07:15		10	8	18
07:30		**46**	**49**	**95**
07:45		**58**	**67**	**125**
08:00		**64**	**62**	**126**
08:15		**24**	**28**	**52**
08:30		42	46	88
08:45		9	16	25
09:00		8	9	17
09:15		2	4	6
09:30		9	9	18
09:45		6	8	14
10:00		5	4	9
10:15		10	14	24
10:30		12	11	23
10:45		8	10	18
11:00		10	9	19
11:15		11	10	21
11:30		10	9	19
11:45		12	21	33
Total		388	427	815
Percent		47.6%	52.4%	
Peak		07:30	07:30	07:30
Vol.		192	206	398
P.H.F.		0.750	0.769	0.790

SE 27th Ave N/O SE Willard St

Start Time	07-Dec-06 Thu	NB	SB	Total
12:00 PM		11	14	25
12:15		8	10	18
12:30		3	1	4
12:45		9	10	19
01:00		14	18	32
01:15		9	12	21
01:30		14	14	28
01:45		**15**	**16**	**31**
02:00		**20**	**20**	**40**
02:15		**27**	**51**	**78**
02:30		**16**	**16**	**32**
02:45		10	11	21
03:00		12	14	26
03:15		12	19	31
03:30		26	30	56
03:45		13	23	36
04:00		12	13	25
04:15		6	9	15
04:30		8	14	22
04:45		7	8	15
05:00		8	16	24
05:15		6	12	18
05:30		5	14	19
05:45		11	17	28
06:00		4	7	11
06:15		10	17	27
06:30		7	9	16
06:45		8	14	22
07:00		5	4	9
07:15		6	5	11
07:30		5	6	11
07:45		7	6	13
08:00		8	6	14
08:15		4	7	11
08:30		6	10	16
08:45		4	7	11
09:00		5	10	15
09:15		4	6	10
09:30		6	6	12
09:45		6	9	15
10:00		1	1	2
10:15		1	0	1
10:30		2	5	7
10:45		1	1	2
11:00		0	2	2
11:15		1	3	4
11:30		3	2	5
11:45		0	1	1
Total		386	526	912
Percent		42.3%	57.7%	
Peak		13:45	13:45	13:45
Vol.		78	103	181
P.H.F.		0.722	0.505	0.580
Grand Total		774	953	1727
Percent		44.8%	55.2%	

ADT Not Calculated

All Traffic Data Services, Inc.
3209 SE 147th PL # 97
Vancouver, WA. 98683
PH. 503-833-2740

Site Code: 8

SE Monroe St E/O SE Home Ave

Start Time	07-Dec-06 Thu	EB	WB	Total
12:00 AM		2	0	2
12:15		4	1	5
12:30		2	0	2
12:45		0	1	1
01:00		1	0	1
01:15		0	5	5
01:30		0	0	0
01:45		1	1	2
02:00		0	0	0
02:15		0	2	2
02:30		2	2	4
02:45		0	0	0
03:00		0	1	1
03:15		0	0	0
03:30		4	3	7
03:45		1	1	2
04:00		2	0	2
04:15		0	2	2
04:30		0	3	3
04:45		0	4	4
05:00		0	3	3
05:15		1	3	4
05:30		1	6	7
05:45		2	5	7
06:00		5	17	22
06:15		3	21	24
06:30		6	14	20
06:45		3	11	14
07:00		4	23	27
07:15		7	**24**	**31**
07:30		9	**24**	**33**
07:45		15	**34**	**49**
08:00		14	**25**	**39**
08:15		10	19	29
08:30		11	20	31
08:45		12	14	26
09:00		12	11	23
09:15		24	18	42
09:30		7	10	17
09:45		10	8	18
10:00		13	18	31
10:15		16	14	30
10:30		11	10	21
10:45		**18**	17	35
11:00		**15**	17	32
11:15		**11**	8	19
11:30		**18**	13	31
11:45		16	15	31
Total		293	448	741
Percent		39.5%	60.5%	
Peak		10:45	07:15	07:15
Vol.		62	107	152
P.H.F.		0.646	0.787	0.776

SE Monroe St E/O SE Home Ave

Start Time	07-Dec-06 Thu	EB	WB	Total
12:00 PM		17	14	31
12:15		13	13	26
12:30		20	12	32
12:45		24	30	54
01:00		17	10	27
01:15		26	16	42
01:30		21	16	37
01:45		10	14	24
02:00		30	23	53
02:15		22	26	48
02:30		22	24	46
02:45		20	12	32
03:00		32	19	51
03:15		20	24	44
03:30		35	16	51
03:45		44	23	67
04:00		27	22	49
04:15		38	18	56
04:30		32	25	57
04:45		**27**	20	47
05:00		**37**	**19**	**56**
05:15		**55**	**24**	**79**
05:30		**38**	**29**	**67**
05:45		27	**22**	**49**
06:00		37	15	52
06:15		22	21	43
06:30		26	20	46
06:45		27	24	51
07:00		14	14	28
07:15		21	11	32
07:30		18	11	29
07:45		18	10	28
08:00		16	12	28
08:15		18	6	24
08:30		14	12	26
08:45		16	10	26
09:00		21	12	33
09:15		16	9	25
09:30		13	6	19
09:45		8	1	9
10:00		10	5	15
10:15		4	2	6
10:30		6	8	14
10:45		7	2	9
11:00		3	1	4
11:15		0	4	4
11:30		2	0	2
11:45		2	1	3
Total		993	688	1681
Percent		59.1%	40.9%	
Peak		16:45	17:00	17:00
Vol.		157	94	251
P.H.F.		0.714	0.783	0.794
Grand Total		1286	1136	2422
Percent		53.1%	46.9%	
ADT	Not Calculated			

All Traffic Data Services, Inc.
3209 SE 147th PL # 97
Vancouver, WA. 98683
PH. 503-833-2740

Site Code: 8.5

SE Home Ave S/O SE Monroe St

Start Time	07-Dec-06 Thu	NB	SB	Total
12:00 AM		2	0	2
12:15		1	3	4
12:30		1	0	1
12:45		2	2	4
01:00		2	0	2
01:15		0	1	1
01:30		0	0	0
01:45		0	0	0
02:00		1	1	2
02:15		0	0	0
02:30		2	1	3
02:45		0	0	0
03:00		0	0	0
03:15		0	0	0
03:30		2	2	4
03:45		0	2	2
04:00		2	0	2
04:15		1	0	1
04:30		2	2	4
04:45		1	1	2
05:00		1	3	4
05:15		2	2	4
05:30		5	1	6
05:45		3	2	5
06:00		6	0	6
06:15		10	6	16
06:30		8	5	13
06:45		6	1	7
07:00		**16**	5	21
07:15		**24**	16	40
07:30		**15**	14	29
07:45		**16**	**16**	**32**
08:00		12	**8**	**20**
08:15		14	**21**	**35**
08:30		23	**24**	**47**
08:45		8	10	18
09:00		12	12	24
09:15		10	20	30
09:30		10	4	14
09:45		10	6	16
10:00		12	7	19
10:15		14	10	24
10:30		10	5	15
10:45		12	12	24
11:00		5	8	13
11:15		12	6	18
11:30		6	7	13
11:45		4	9	13
Total		305	255	560
Percent		54.5%	45.5%	
Peak		07:00	07:45	07:45
Vol.		71	69	134
P.H.F.		0.740	0.719	0.713

SE Home Ave S/O SE Monroe St

Start Time	07-Dec-06 Thu	NB	SB	Total
12:00 PM		8	8	16
12:15		11	14	25
12:30		13	12	25
12:45		12	9	21
01:00		10	17	27
01:15		12	10	22
01:30		11	17	28
01:45		6	17	23
02:00		22	21	43
02:15		21	24	45
02:30		6	17	23
02:45		13	11	24
03:00		24	14	38
03:15		18	15	33
03:30		9	9	18
03:45		12	16	28
04:00		20	24	44
04:15		18	19	37
04:30		14	24	38
04:45		16	19	35
05:00		12	18	30
05:15		**18**	**24**	**42**
05:30		**20**	**18**	**38**
05:45		**17**	**28**	**45**
06:00		**16**	**22**	**38**
06:15		14	16	30
06:30		8	9	17
06:45		23	16	39
07:00		6	6	12
07:15		4	12	16
07:30		10	12	22
07:45		9	8	17
08:00		6	10	16
08:15		8	5	13
08:30		12	9	21
08:45		8	9	17
09:00		6	4	10
09:15		4	10	14
09:30		1	4	5
09:45		6	5	11
10:00		4	4	8
10:15		2	6	8
10:30		2	5	7
10:45		3	6	9
11:00		0	2	2
11:15		2	1	3
11:30		4	5	9
11:45		1	1	2
Total		502	592	1094
Percent		45.9%	54.1%	
Peak		17:15	17:15	17:15
Vol.		71	92	163
P.H.F.		0.740	0.821	0.906
Grand Total		807	847	1654
Percent		48.8%	51.2%	
ADT	Not Calculated			

All Traffic Data Services, Inc.
3209 SE 147th PL # 97
Vancouver, WA. 98683
PH. 503-833-2740

Site Code: 9

SE Wood Ave N/O SE Railroad Ave

Start Time	07-Dec-06 Thu	NB	SB	Total
12:00 AM		0	0	0
12:15		2	2	4
12:30		0	1	1
12:45		1	0	1
01:00		2	0	2
01:15		0	0	0
01:30		1	1	2
01:45		0	0	0
02:00		0	0	0
02:15		0	1	1
02:30		0	0	0
02:45		0	0	0
03:00		0	0	0
03:15		0	0	0
03:30		0	0	0
03:45		0	1	1
04:00		0	0	0
04:15		0	0	0
04:30		0	0	0
04:45		2	4	6
05:00		3	6	9
05:15		0	1	1
05:30		0	6	6
05:45		1	0	1
06:00		0	2	2
06:15		0	3	3
06:30		3	8	11
06:45		2	8	10
07:00		1	6	7
07:15		5	11	16
07:30		0	6	6
07:45		3	**10**	13
08:00		**6**	**9**	**15**
08:15		**6**	**11**	**17**
08:30		**7**	**7**	**14**
08:45		**6**	8	**14**
09:00		2	7	9
09:15		2	6	8
09:30		4	4	8
09:45		0	3	3
10:00		2	3	5
10:15		4	0	4
10:30		6	8	14
10:45		3	3	6
11:00		6	11	17
11:15		7	8	15
11:30		4	4	8
11:45		8	7	15
Total		99	176	275
Percent		36.0%	64.0%	
Peak		08:00	07:45	08:00
Vol.		25	37	60
P.H.F.		0.781	0.841	0.882

SE Wood Ave N/O SE Railroad Ave

Start Time	07-Dec-06 Thu	NB	SB	Total
12:00 PM		6	12	18
12:15		4	6	10
12:30		6	6	12
12:45		3	4	7
01:00		10	4	14
01:15		2	4	6
01:30		4	6	10
01:45		9	3	12
02:00		6	11	17
02:15		8	7	15
02:30		4	11	15
02:45		**10**	6	16
03:00		**6**	11	17
03:15		**7**	4	11
03:30		**14**	13	27
03:45		4	6	10
04:00		8	2	10
04:15		10	6	16
04:30		8	9	17
04:45		7	9	16
05:00		10	6	16
05:15		5	5	10
05:30		8	**6**	14
05:45		4	**12**	16
06:00		9	**8**	17
06:15		10	**14**	24
06:30		6	4	10
06:45		6	8	14
07:00		8	13	**21**
07:15		10	10	**20**
07:30		4	6	**10**
07:45		14	8	**22**
08:00		4	6	10
08:15		6	4	10
08:30		2	1	3
08:45		8	6	14
09:00		10	8	18
09:15		4	3	7
09:30		2	4	6
09:45		6	5	11
10:00		1	2	3
10:15		4	5	9
10:30		2	2	4
10:45		3	4	7
11:00		0	1	1
11:15		0	0	0
11:30		3	1	4
11:45		5	2	7
Total		290	294	584
Percent		49.7%	50.3%	
Peak		14:45	17:30	19:00
Vol.		37	40	73
P.H.F.		0.661	0.714	0.676
Grand Total		389	470	859
Percent		45.3%	54.7%	
ADT	Not Calculated			

SE Logus Rd W/O SE Stanley Ave

Start Time	07-Dec-06 Thu	EB	WB	Total
12:00 AM		1	1	2
12:15		1	2	3
12:30		0	0	0
12:45		0	3	3
01:00		0	0	0
01:15		1	0	1
01:30		0	0	0
01:45		0	0	0
02:00		2	0	2
02:15		1	0	1
02:30		0	0	0
02:45		0	1	1
03:00		0	0	0
03:15		0	1	1
03:30		0	1	1
03:45		0	0	0
04:00		4	4	8
04:15		1	0	1
04:30		2	0	2
04:45		1	2	3
05:00		5	3	8
05:15		1	1	2
05:30		2	0	2
05:45		7	0	7
06:00		6	2	8
06:15		5	2	7
06:30		13	4	17
06:45		13	10	23
07:00		8	14	22
07:15		**14**	**15**	**29**
07:30		**28**	**36**	**64**
07:45		**99**	**98**	**197**
08:00		**57**	**39**	**96**
08:15		14	10	24
08:30		7	3	10
08:45		11	8	19
09:00		7	6	13
09:15		12	13	25
09:30		10	7	17
09:45		6	7	13
10:00		6	8	14
10:15		6	8	14
10:30		11	7	18
10:45		4	5	9
11:00		8	7	15
11:15		11	10	21
11:30		10	9	19
11:45		10	11	21
Total		405	358	763
Percent		53.1%	46.9%	
Peak		07:15	07:15	07:15
Vol.		198	188	386
P.H.F.		0.500	0.480	0.490

Start Time	07-Dec-06 Thu	EB	WB	Total
12:00 PM		15	10	25
12:15		8	6	14
12:30		10	4	14
12:45		7	10	17
01:00		10	5	15
01:15		12	12	24
01:30		15	13	28
01:45		**21**	**26**	**47**
02:00		**60**	**54**	**114**
02:15		**84**	**74**	**158**
02:30		**19**	**16**	**35**
02:45		13	10	23
03:00		18	13	31
03:15		10	14	24
03:30		18	17	35
03:45		17	24	41
04:00		12	10	22
04:15		7	4	11
04:30		14	12	26
04:45		8	18	26
05:00		11	20	31
05:15		18	24	42
05:30		17	20	37
05:45		7	13	20
06:00		10	9	19
06:15		11	10	21
06:30		8	10	18
06:45		10	6	16
07:00		9	10	19
07:15		8	10	18
07:30		8	4	12
07:45		16	20	36
08:00		4	5	9
08:15		4	3	7
08:30		1	7	8
08:45		4	4	8
09:00		4	8	12
09:15		6	11	17
09:30		3	5	8
09:45		4	3	7
10:00		4	2	6
10:15		0	6	6
10:30		3	1	4
10:45		0	2	2
11:00		3	1	4
11:15		0	1	1
11:30		0	3	3
11:45		0	0	0
Total		551	570	1121
Percent		49.2%	50.8%	
Peak		13:45	13:45	13:45
Vol.		184	170	354
P.H.F.		0.548	0.574	0.560
Grand Total		956	928	1884
Percent		50.7%	49.3%	
ADT	Not Calculated			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
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		0.91	1.00		0.91	1.00
Frpb, ped/bikes		1.00	1.00		1.00	0.99		1.00	0.98		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Frt		1.00	0.85		1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		0.96	1.00		0.98	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)		1394	1378		1525	1227		4771	1123		4818	1205
Flt Permitted		0.76	1.00		0.88	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)		1099	1378		1368	1227		4771	1123		4818	1205
Volume (vph)	89	30	47	11	19	48	0	1706	15	0	3167	110
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	92	31	48	11	20	49	0	1759	15	0	3265	113
RTOR Reduction (vph)	0	0	4	0	0	43	0	0	3	0	0	21
Lane Group Flow (vph)	0	123	44	0	31	6	0	1759	12	0	3265	92
Confl. Peds. (#/hr)	1					1			1	1		
Heavy Vehicles (%)	10%	67%	11%	36%	5%	23%	0%	3%	33%	0%	2%	27%
Turn Type	Perm		Perm	Perm		Perm			Perm			Perm
Protected Phases		8			4			6			2	
Permitted Phases	8		8	4		4			6			2
Actuated Green, G (s)		13.0	13.0		13.0	13.0		96.5	96.5		96.5	96.5
Effective Green, g (s)		14.5	14.5		14.5	14.5		97.5	97.5		97.5	97.5
Actuated g/C Ratio		0.12	0.12		0.12	0.12		0.81	0.81		0.81	0.81
Clearance Time (s)		5.5	5.5		5.5	5.5		5.0	5.0		5.0	5.0
Vehicle Extension (s)		4.5	4.5		4.5	4.5		4.4	4.4		4.4	4.4
Lane Grp Cap (vph)		133	167		165	148		3876	912		3915	979
v/s Ratio Prot								0.37			c0.68	
v/s Ratio Perm		c0.11	0.03		0.02	0.00			0.01			0.08
v/c Ratio		0.92	0.27		0.19	0.04		0.45	0.01		0.83	0.09
Uniform Delay, d1		52.2	47.9		47.5	46.6		3.3	2.1		6.5	2.3
Progression Factor		1.00	1.00		1.00	1.00		0.89	0.01		1.00	1.00
Incremental Delay, d2		56.4	1.5		1.0	0.2		0.4	0.0		2.2	0.2
Delay (s)		108.6	49.4		48.4	46.8		3.3	0.1		8.8	2.5
Level of Service		F	D		D	D		A	A		A	A
Approach Delay (s)		92.0			47.4			3.3			8.6	
Approach LOS		F			D			A			A	

Intersection Summary			
HCM Average Control Delay	10.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	85.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.0	4.0		4.0	4.0		4.0			4.0	
Lane Util. Factor		1.00	1.00		1.00	1.00		0.86			0.91	
Frpb, ped/bikes		1.00	0.99		1.00	1.00		1.00			1.00	
Flpb, ped/bikes		1.00	1.00		1.00	1.00		1.00			1.00	
Frt		1.00	0.85		1.00	0.85		1.00			1.00	
Flt Protected		0.98	1.00		0.97	1.00		1.00			1.00	
Satd. Flow (prot)		1614	1479		1746	1530		5954			4818	
Flt Permitted		0.86	1.00		0.80	1.00		1.00			1.00	
Satd. Flow (perm)		1409	1479		1444	1530		5954			4818	
Volume (vph)	27	37	62	22	15	16	0	1619	0	0	3144	0
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	28	39	65	23	16	17	0	1686	0	0	3275	0
RTOR Reduction (vph)	0	0	4	0	0	16	0	0	0	0	0	0
Lane Group Flow (vph)	0	67	61	0	39	1	0	1686	0	0	3275	0
Confl. Peds. (#/hr)			1	1			1					1
Heavy Vehicles (%)	11%	8%	2%	0%	0%	0%	0%	4%	0%	0%	2%	75%
Turn Type	Perm		Perm	Perm		Perm						
Protected Phases		4			4			6			2	
Permitted Phases	4		4	4	4	4		6				
Actuated Green, G (s)		10.4	10.4		10.4	10.4		101.1			101.1	
Effective Green, g (s)		9.9	9.9		9.9	9.9		102.1			102.1	
Actuated g/C Ratio		0.08	0.08		0.08	0.08		0.85			0.85	
Clearance Time (s)		3.5	3.5		3.5	3.5		5.0			5.0	
Vehicle Extension (s)		2.5	2.5		2.5	2.5		4.5			4.5	
Lane Grp Cap (vph)		116	122		119	126		5066			4099	
v/s Ratio Prot								0.28			c0.68	
v/s Ratio Perm		c0.05	0.04		0.03	0.00						
v/c Ratio		0.58	0.50		0.33	0.01		0.33			0.80	
Uniform Delay, d1		53.0	52.7		51.9	50.6		1.9			4.2	
Progression Factor		1.00	1.00		1.00	1.00		1.98			0.19	
Incremental Delay, d2		5.6	2.4		1.2	0.0		0.2			0.9	
Delay (s)		58.6	55.1		53.1	50.6		3.8			1.7	
Level of Service		E	E		D	D		A			A	
Approach Delay (s)		56.9			52.3			3.8			1.7	
Approach LOS		E			D			A			A	

Intersection Summary			
HCM Average Control Delay	4.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	84.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
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	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85	1.00	0.95		1.00	0.98		1.00	1.00	
Flt Protected		0.99	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1751	1733	1660	1656		1840	3337		1800	3539	
Flt Permitted		0.99	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1751	1733	1660	1656		1840	3337		1800	3539	
Volume (vph)	17	91	481	179	59	32	232	789	147	133	1678	14
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	18	95	501	186	61	33	242	822	153	139	1748	15
RTOR Reduction (vph)	0	0	16	0	16	0	0	10	0	0	0	0
Lane Group Flow (vph)	0	113	485	186	78	0	242	965	0	139	1763	0
Confl. Peds. (#/hr)			9	9			8		4	4		8
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	4%	4%	4%	2%	2%	2%
Turn Type	Split		pt+ov	Split			Prot			Prot		
Protected Phases	8	8	8 1	4	4		1	6		5	2	
Permitted Phases												
Actuated Green, G (s)		11.0	34.0	11.5	11.5		19.0	67.9		13.1	62.0	
Effective Green, g (s)		11.0	34.0	11.5	11.5		19.0	68.4		13.1	62.5	
Actuated g/C Ratio		0.09	0.28	0.10	0.10		0.16	0.57		0.11	0.52	
Clearance Time (s)		4.0		4.0	4.0		4.0	4.5		4.0	4.5	
Vehicle Extension (s)		2.5		2.5	2.5		2.5	6.0		2.3	6.0	
Lane Grp Cap (vph)		161	491	159	159		291	1902		197	1843	
v/s Ratio Prot		0.06	c0.28	c0.11	0.05		0.13	0.29		0.08	c0.50	
v/s Ratio Perm												
v/c Ratio		0.70	0.99	1.17	0.49		0.83	0.51		0.71	0.96	
Uniform Delay, d1		52.9	42.8	54.2	51.5		48.9	15.6		51.6	27.4	
Progression Factor		1.00	1.00	1.00	1.00		0.93	1.07		0.89	0.97	
Incremental Delay, d2		12.1	37.2	124.3	1.7		16.4	0.9		6.8	9.8	
Delay (s)		65.0	80.0	178.6	53.2		62.1	17.6		52.6	36.3	
Level of Service		E	E	F	D		E	B		D	D	
Approach Delay (s)		77.2			136.5			26.4			37.5	
Approach LOS		E			F			C			D	

Intersection Summary			
HCM Average Control Delay	47.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	102.3%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	254	69	63	27	16	7	15	189	23	7	94	112
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	262	71	65	28	16	7	15	195	24	7	97	115

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total (vph)	333	65	44	7	234	104	115
Volume Left (vph)	262	0	28	0	15	7	0
Volume Right (vph)	0	65	0	7	24	0	115
Hadj (s)	0.43	-0.67	0.35	-0.67	-0.01	0.07	-0.67
Departure Headway (s)	6.3	5.2	6.8	5.8	6.1	6.3	5.5
Degree Utilization, x	0.59	0.09	0.08	0.01	0.40	0.18	0.18
Capacity (veh/h)	549	656	479	556	551	535	603
Control Delay (s)	16.7	7.6	9.3	7.7	13.1	9.5	8.5
Approach Delay (s)	15.2		9.0		13.1	9.0	
Approach LOS	C		A		B	A	

Intersection Summary			
Delay	12.8		
HCM Level of Service	B		
Intersection Capacity Utilization	51.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	1.00		0.95		1.00	0.95
Frpb, ped/bikes	0.99		1.00		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.96		0.98		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	1620		3221		1644	3353
Flt Permitted	0.96		1.00		0.95	1.00
Satd. Flow (perm)	1620		3221		1644	3353
Volume (vph)	202	74	1131	170	103	2138
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	206	76	1154	173	105	2182
RTOR Reduction (vph)	12	0	9	0	0	0
Lane Group Flow (vph)	270	0	1318	0	105	2182
Confl. Peds. (#/hr)	3	3		2	2	
Heavy Vehicles (%)	2%	3%	4%	2%	4%	2%
Turn Type					Prot	
Protected Phases			2		1	6
Permitted Phases	8					
Actuated Green, G (s)	23.9		72.5		11.6	88.1
Effective Green, g (s)	23.9		72.5		11.6	88.1
Actuated g/C Ratio	0.20		0.60		0.10	0.73
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	323		1946		159	2462
v/s Ratio Prot			0.41		0.06	c0.65
v/s Ratio Perm	c0.17					
v/c Ratio	0.84		0.68		0.66	0.89
Uniform Delay, d1	46.2		15.9		52.3	12.1
Progression Factor	1.00		1.00		0.91	0.93
Incremental Delay, d2	16.8		1.9		5.5	2.9
Delay (s)	63.0		17.8		53.3	14.2
Level of Service	E		B		D	B
Approach Delay (s)	63.0		17.8			16.0
Approach LOS	E		B			B

Intersection Summary			
HCM Average Control Delay	20.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	85.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	45	221	88	28	192	81	21	53	56	105	70	66
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	46	226	90	29	196	83	21	54	57	107	71	67

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total (vph)	361	307	133	107	139
Volume Left (vph)	46	29	21	107	0
Volume Right (vph)	90	83	57	0	67
Hadj (s)	-0.08	-0.10	-0.02	0.62	-0.16
Departure Headway (s)	5.5	5.6	6.4	7.3	6.5
Degree Utilization, x	0.56	0.48	0.24	0.22	0.25
Capacity (veh/h)	614	601	483	451	504
Control Delay (s)	15.3	13.7	11.4	11.1	10.4
Approach Delay (s)	15.3	13.7	11.4	10.7	
Approach LOS	C	B	B	B	

Intersection Summary			
Delay	13.2		
HCM Level of Service	B		
Intersection Capacity Utilization	57.0%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	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
Frpb, ped/bikes	1.00	1.00	1.00	0.97	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1676	1515	1765	1488	1676	1765
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1676	1515	1765	1488	1676	1765
Volume (vph)	67	325	249	66	506	541
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	74	357	274	73	556	595
RTOR Reduction (vph)	0	109	0	44	0	0
Lane Group Flow (vph)	74	248	274	29	556	595
Confl. Peds. (#/hr)				2	2	
Confl. Bikes (#/hr)				1		
Heavy Vehicles (%)	2%	1%	2%	0%	2%	2%
Turn Type		pm+ov		Perm	Prot	
Protected Phases	8	1	2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	9.0	53.3	42.6	42.6	44.3	91.4
Effective Green, g (s)	9.5	54.3	42.6	42.6	44.8	91.4
Actuated g/C Ratio	0.09	0.50	0.39	0.39	0.41	0.84
Clearance Time (s)	4.5	4.5	4.0	4.0	4.5	4.0
Vehicle Extension (s)	3.0	4.5	2.3	2.3	4.5	2.3
Lane Grp Cap (vph)	146	811	690	582	689	1481
v/s Ratio Prot	c0.04	0.13	0.16		c0.33	c0.34
v/s Ratio Perm		0.04		0.02		
v/c Ratio	0.51	0.31	0.40	0.05	0.81	0.40
Uniform Delay, d1	47.5	16.2	23.9	20.6	28.2	2.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.8	0.4	1.7	0.2	7.6	0.8
Delay (s)	50.2	16.5	25.6	20.7	35.9	2.9
Level of Service	D	B	C	C	D	A
Approach Delay (s)	22.3		24.6			18.8
Approach LOS	C		C			B

Intersection Summary			
HCM Average Control Delay	20.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	108.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		0.95			0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes		1.00			1.00		1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.97			0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00			0.99		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		2956			3135		1613	3288	1509	1676	3288	1336
Flt Permitted		0.94			0.71		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		2785			2253		1613	3288	1509	1676	3288	1336
Volume (vph)	8	265	79	69	282	117	64	851	68	263	1631	8
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)	8	279	83	73	297	123	67	896	72	277	1717	8
RTOR Reduction (vph)	0	22	0	0	27	0	0	0	35	0	0	2
Lane Group Flow (vph)	0	348	0	0	466	0	67	896	37	277	1717	6
Confl. Peds. (#/hr)	3		5	5		3	1		1	1		1
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	0%	14%	3%	4%	4%	3%	6%	4%	0%	2%	4%	13%
Turn Type	Perm			Perm			Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)		24.5			24.5		7.9	60.0	60.0	19.0	71.1	71.1
Effective Green, g (s)		26.0			26.0		8.9	62.0	62.0	20.0	73.1	73.1
Actuated g/C Ratio		0.22			0.22		0.07	0.52	0.52	0.17	0.61	0.61
Clearance Time (s)		5.5			5.5		5.0	6.0	6.0	5.0	6.0	6.0
Vehicle Extension (s)		2.5			2.5		2.3	4.0	4.0	2.3	4.0	4.0
Lane Grp Cap (vph)		603			488		120	1699	780	279	2003	814
v/s Ratio Prot							0.04	0.27		c0.17	c0.52	
v/s Ratio Perm		0.12			c0.21				0.02			0.00
v/c Ratio		0.58			0.95		0.56	0.53	0.05	0.99	0.86	0.01
Uniform Delay, d1		42.1			46.4		53.7	19.3	14.4	49.9	19.2	9.2
Progression Factor		1.00			1.00		0.80	1.89	3.73	1.13	0.79	0.69
Incremental Delay, d2		1.1			29.2		3.4	1.0	0.1	47.8	4.4	0.0
Delay (s)		43.2			75.6		46.4	37.4	53.7	104.2	19.5	6.4
Level of Service		D			E		D	D	D	F	B	A
Approach Delay (s)		43.2			75.6			39.1			31.2	
Approach LOS		D			E			D			C	

Intersection Summary			
HCM Average Control Delay	40.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	93.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
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	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes		0.98			0.99		1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.91			0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99			0.99		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1576			1665		1710	3320	1530	1541	3320	1431
Flt Permitted		0.97			0.85		0.07	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1530			1432		122	3320	1530	1541	3320	1431
Volume (vph)	15	28	95	21	33	24	30	1254	3	9	1924	20
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	16	30	101	22	35	26	32	1334	3	10	2047	21
RTOR Reduction (vph)	0	15	0	0	15	0	0	0	1	0	0	3
Lane Group Flow (vph)	0	132	0	0	68	0	32	1334	2	10	2047	18
Confl. Peds. (#/hr)	8		4	4		8	4					4
Confl. Bikes (#/hr)			1			2						
Heavy Vehicles (%)	0%	0%	2%	0%	0%	4%	0%	3%	0%	11%	3%	5%
Turn Type	Perm			Perm			Perm		Perm	Prot		Perm
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2		2			6
Actuated Green, G (s)		17.2			17.2		88.4	88.4	88.4	1.4	93.8	93.8
Effective Green, g (s)		17.2			17.2		89.4	89.4	89.4	1.4	94.8	94.8
Actuated g/C Ratio		0.14			0.14		0.74	0.74	0.74	0.01	0.79	0.79
Clearance Time (s)		4.0			4.0		5.0	5.0	5.0	4.0	5.0	5.0
Vehicle Extension (s)		3.0			2.5		5.2	5.2	5.2	2.5	5.2	5.2
Lane Grp Cap (vph)		219			205		91	2473	1140	18	2623	1130
v/s Ratio Prot								0.40		0.01	c0.62	
v/s Ratio Perm		c0.09			0.05		0.26		0.00			0.01
v/c Ratio		0.60			0.33		0.35	0.54	0.00	0.56	0.78	0.02
Uniform Delay, d1		48.2			46.2		5.3	6.5	3.9	59.0	6.9	2.7
Progression Factor		0.90			1.00		2.36	3.09	2.45	0.73	1.88	1.94
Incremental Delay, d2		4.6			0.7		8.9	0.7	0.0	17.5	1.5	0.0
Delay (s)		48.1			46.9		21.4	20.9	9.6	60.5	14.5	5.2
Level of Service		D			D		C	C	A	E	B	A
Approach Delay (s)		48.1			46.9			20.9			14.6	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM Average Control Delay	19.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.0	4.0		4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		0.95	1.00		0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes		1.00	0.99		1.00		1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00	1.00		0.99		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		3363	1495		3133		1710	3320	1510	1660	3257	1438
Flt Permitted		0.84	1.00		0.73		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		2838	1495		2329		1710	3320	1510	1660	3257	1438
Volume (vph)	17	227	82	125	234	142	237	1629	38	103	938	117
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	18	241	87	133	249	151	252	1733	40	110	998	124
RTOR Reduction (vph)	0	0	11	0	34	0	0	0	16	0	0	58
Lane Group Flow (vph)	0	259	76	0	499	0	252	1733	24	110	998	66
Confl. Peds. (#/hr)	1		7	7		1	1		1	1		1
Confl. Bikes (#/hr)						3						
Heavy Vehicles (%)	6%	1%	1%	6%	0%	4%	0%	3%	0%	3%	5%	5%
Turn Type	Perm		pm+ov	Perm			Prot		Perm	Prot		Perm
Protected Phases		4	5		8		1	6		5	2	
Permitted Phases	4		4	8					6			2
Actuated Green, G (s)		25.5	40.0		25.5		17.5	65.5	65.5	14.5	62.5	62.5
Effective Green, g (s)		26.0	41.0		26.0		18.0	67.0	67.0	15.0	64.0	64.0
Actuated g/C Ratio		0.22	0.34		0.22		0.15	0.56	0.56	0.12	0.53	0.53
Clearance Time (s)		4.5	4.5		4.5		4.5	5.5	5.5	4.5	5.5	5.5
Vehicle Extension (s)		2.5	2.3		2.5		2.3	5.0	5.0	2.3	5.0	5.0
Lane Grp Cap (vph)		615	561		505		257	1854	843	208	1737	767
v/s Ratio Prot			0.02				0.15	c0.52		0.07	c0.31	
v/s Ratio Perm		0.09	0.03		c0.21				0.02			0.05
v/c Ratio		0.42	0.14		0.99		0.98	0.93	0.03	0.53	0.57	0.09
Uniform Delay, d1		40.5	27.3		46.8		50.8	24.5	11.9	49.2	18.8	13.7
Progression Factor		1.00	1.00		1.00		0.93	0.89	0.62	1.38	1.87	5.53
Incremental Delay, d2		0.3	0.1		36.4		38.7	6.9	0.0	1.4	1.3	0.2
Delay (s)		40.9	27.3		83.2		86.0	28.7	7.4	69.2	36.4	76.0
Level of Service		D	C		F		F	C	A	E	D	E
Approach Delay (s)		37.5			83.2			35.4			43.3	
Approach LOS		D			F			D			D	

Intersection Summary			
HCM Average Control Delay	44.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	93.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
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	1.00		1.00	1.00			1.00	0.97		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	1.00		1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.99	1.00		0.99	1.00
Satd. Flow (prot)	1578	1764		1706	1738			1702	1486		1697	1439
Flt Permitted	0.59	1.00		0.43	1.00			0.92	1.00		0.96	1.00
Satd. Flow (perm)	985	1764		764	1738			1575	1486		1633	1439
Volume (vph)	157	381	1	21	229	18	41	156	20	22	160	169
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	167	405	1	22	244	19	44	166	21	23	170	180
RTOR Reduction (vph)	0	0	0	0	7	0	0	0	13	0	0	108
Lane Group Flow (vph)	167	406	0	22	256	0	0	210	8	0	193	72
Confl. Peds. (#/hr)	4		4	4		4	1		21	21		1
Confl. Bikes (#/hr)									2			
Heavy Vehicles (%)	8%	2%	0%	0%	2%	6%	7%	4%	0%	0%	6%	5%
Turn Type	Perm			Perm			Perm		Perm	Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	16.0	16.0		16.0	16.0			16.0	16.0		16.0	16.0
Effective Green, g (s)	16.0	16.0		16.0	16.0			16.0	16.0		16.0	16.0
Actuated g/C Ratio	0.40	0.40		0.40	0.40			0.40	0.40		0.40	0.40
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	394	706		306	695			630	594		653	576
v/s Ratio Prot		c0.23			0.15							
v/s Ratio Perm	0.17			0.03				c0.13	0.01		0.12	0.05
v/c Ratio	0.42	0.58		0.07	0.37			0.33	0.01		0.30	0.12
Uniform Delay, d1	8.7	9.4		7.4	8.4			8.3	7.2		8.2	7.6
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	3.3	3.4		0.5	1.5			1.4	0.0		1.2	0.4
Delay (s)	12.0	12.7		7.9	9.9			9.7	7.3		9.3	8.0
Level of Service	B	B		A	A			A	A		A	A
Approach Delay (s)		12.5			9.8			9.5			8.7	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	10.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	1219	1792	559	0	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	1270	1867	582	0	1
Pedestrians					1	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		507				
pX, platoon unblocked					1.00	
vC, conflicting volume	2450				2794	1225
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2450				2798	1225
tC, single (s)	4.1				6.8	7.0
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	99
cM capacity (veh/h)	194				15	169

Direction, Lane #	NB 1	NB 2	SB 1	SB 2	NE 1
Volume Total	635	635	1244	1205	1
Volume Left	0	0	0	0	0
Volume Right	0	0	0	582	1
cSH	1700	1700	1700	1700	169
Volume to Capacity	0.37	0.37	0.73	0.71	0.01
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	26.4
Lane LOS					D
Approach Delay (s)	0.0		0.0		26.4
Approach LOS					D

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	81.2%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations						
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	1.00		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1660	1530	3353		1583	3353
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1660	1530	3353		1583	3353
Volume (vph)	276	13	2066	0	13	1102
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	303	14	2270	0	14	1211
RTOR Reduction (vph)	0	6	0	0	0	0
Lane Group Flow (vph)	303	8	2270	0	14	1211
Heavy Vehicles (%)	3%	0%	2%	0%	8%	2%
Turn Type		Prot			Prot	
Protected Phases	7	7	6		5	
Permitted Phases			6			2 7
Actuated Green, G (s)	27.4	27.4	100.1		2.9	139.4
Effective Green, g (s)	27.4	27.4	101.1		2.9	139.4
Actuated g/C Ratio	0.18	0.18	0.68		0.02	0.93
Clearance Time (s)	4.0	4.0	5.0		4.0	
Vehicle Extension (s)	2.3	2.3	8.0		2.3	
Lane Grp Cap (vph)	304	280	2266		31	3124
v/s Ratio Prot	c0.18	0.01	c0.68		0.01	
v/s Ratio Perm						c0.36
v/c Ratio	1.00	0.03	1.00		0.45	0.39
Uniform Delay, d1	61.1	50.2	24.2		72.6	0.5
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	50.4	0.0	19.3		6.0	0.0
Delay (s)	111.4	50.2	43.6		78.5	0.6
Level of Service	F	D	D		E	A
Approach Delay (s)	108.7		43.6			1.5
Approach LOS	F		D			A

Intersection Summary			
HCM Average Control Delay	35.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	149.6	Sum of lost time (s)	18.2
Intersection Capacity Utilization	83.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
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	1.00		1.00	1.00		1.00	0.98		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	0.99		1.00	0.89		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1676	1648		1710	1780		1710	1580		1613	1744	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1676	1648		1710	1780		1710	1580		1613	1744	
Volume (vph)	15	132	119	336	107	9	49	97	248	18	150	14
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	15	136	123	346	110	9	51	100	256	19	155	14
RTOR Reduction (vph)	0	36	0	0	3	0	0	94	0	0	3	0
Lane Group Flow (vph)	15	223	0	346	116	0	51	262	0	19	166	0
Confl. Peds. (#/hr)							1		1	1		1
Heavy Vehicles (%)	2%	0%	3%	0%	0%	0%	0%	0%	0%	6%	0%	21%
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	0.7	17.5		19.3	36.1		3.7	27.5		1.4	25.2	
Effective Green, g (s)	0.7	17.5		19.3	36.1		3.7	27.5		1.4	25.2	
Actuated g/C Ratio	0.01	0.21		0.24	0.44		0.05	0.34		0.02	0.31	
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)	14	353		404	787		77	532		28	538	
v/s Ratio Prot	0.01	c0.14		c0.20	0.06		c0.03	c0.17		0.01	0.09	
v/s Ratio Perm												
v/c Ratio	1.07	0.63		0.86	0.15		0.66	0.49		0.68	0.31	
Uniform Delay, d1	40.5	29.2		29.9	13.6		38.4	21.5		39.9	21.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	265.6	3.7		16.2	0.1		19.4	3.2		49.7	1.5	
Delay (s)	306.1	32.8		46.0	13.7		57.7	24.8		89.6	23.1	
Level of Service	F	C		D	B		E	C		F	C	
Approach Delay (s)		47.8			37.8			28.9			29.8	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	36.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	81.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.0			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	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes		1.00			1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.96			1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99			0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1705			1697	1515	1710	3420	1466	1613	3420	1235
Flt Permitted		0.93			0.65	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1599			1139	1515	1710	3420	1466	1613	3420	1235
Volume (vph)	19	54	36	121	61	120	40	956	77	80	1738	20
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	20	57	38	129	65	128	43	1017	82	85	1849	21
RTOR Reduction (vph)	0	14	0	0	0	103	0	0	31	0	0	5
Lane Group Flow (vph)	0	101	0	0	194	25	43	1017	51	85	1849	16
Confl. Peds. (#/hr)							1		1	1		1
Heavy Vehicles (%)	0%	0%	0%	3%	2%	1%	0%	0%	2%	6%	0%	21%
Turn Type	Perm			Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4			4		4			2			6
Actuated Green, G (s)		23.4			23.4	23.4	4.3	73.0	73.0	10.1	78.8	78.8
Effective Green, g (s)		23.4			23.4	23.4	4.3	74.5	74.5	10.1	80.3	80.3
Actuated g/C Ratio		0.19			0.19	0.19	0.04	0.62	0.62	0.08	0.67	0.67
Clearance Time (s)		4.0			4.0	4.0	4.0	5.5	5.5	4.0	5.5	5.5
Vehicle Extension (s)		2.5			2.5	2.5	0.5	4.6	4.6	2.5	2.6	2.6
Lane Grp Cap (vph)		312			222	295	61	2123	910	136	2289	826
v/s Ratio Prot							c0.03	0.30		0.05	c0.54	
v/s Ratio Perm		0.06			c0.17	0.02			0.03			0.01
v/c Ratio		0.32			0.87	0.08	0.70	0.48	0.06	0.62	0.81	0.02
Uniform Delay, d1		41.5			46.9	39.5	57.2	12.3	8.9	53.1	14.3	6.7
Progression Factor		1.00			1.00	1.00	0.89	1.60	2.72	1.12	1.24	0.59
Incremental Delay, d2		0.4			29.2	0.1	22.8	0.7	0.1	3.1	0.9	0.0
Delay (s)		41.9			76.0	39.6	73.6	20.3	24.4	62.9	18.6	3.9
Level of Service		D			E	D	E	C	C	E	B	A
Approach Delay (s)		41.9			61.6			22.6			20.3	
Approach LOS		D			E			C			C	

Intersection Summary			
HCM Average Control Delay	25.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	81.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.97			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.98			0.96	1.00
Satd. Flow (prot)	1660	3196	1530	1660	3257	1404		1719			1696	1471
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.75			0.71	1.00
Satd. Flow (perm)	1660	3196	1530	1660	3257	1404		1317			1249	1471
Volume (vph)	40	1772	20	11	1029	108	24	29	14	224	34	68
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	1926	22	12	1118	117	26	32	15	243	37	74
RTOR Reduction (vph)	0	0	5	0	0	47	0	8	0	0	0	56
Lane Group Flow (vph)	43	1926	17	12	1118	70	0	65	0	0	280	18
Heavy Vehicles (%)	3%	7%	0%	3%	5%	9%	0%	0%	0%	2%	0%	4%
Turn Type	Prot		Perm	Prot		Perm	Perm			Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8			4		4
Actuated Green, G (s)	7.4	74.5	74.5	2.8	69.9	69.9		29.2			29.2	29.2
Effective Green, g (s)	7.4	76.0	76.0	2.8	71.4	71.4		29.2			29.2	29.2
Actuated g/C Ratio	0.06	0.63	0.63	0.02	0.60	0.60		0.24			0.24	0.24
Clearance Time (s)	4.0	5.5	5.5	4.0	5.5	5.5		4.0			4.0	4.0
Vehicle Extension (s)	2.5	4.6	4.6	2.5	4.6	4.6		3.0			3.0	3.0
Lane Grp Cap (vph)	102	2024	969	39	1938	835		320			304	358
v/s Ratio Prot	0.03	c0.60		0.01	c0.34							
v/s Ratio Perm			0.01			0.05		0.05			c0.22	0.01
v/c Ratio	0.42	0.95	0.02	0.31	0.58	0.08		0.20			0.92	0.05
Uniform Delay, d1	54.2	20.3	8.2	57.6	15.0	10.4		36.1			44.3	34.8
Progression Factor	1.14	1.36	1.84	1.14	0.73	0.60		1.00			1.00	1.00
Incremental Delay, d2	1.2	7.2	0.0	3.0	1.2	0.2		0.3			31.8	0.1
Delay (s)	62.9	34.8	15.0	68.9	12.2	6.4		36.4			76.1	34.8
Level of Service	E	C	B	E	B	A		D			E	C
Approach Delay (s)		35.2			12.2			36.4			67.4	
Approach LOS		D			B			D			E	

Intersection Summary			
HCM Average Control Delay	30.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	WBR2	SBL	SBR	SWL	SWR
Lane Configurations									
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	4.0	4.0			4.0			
Lane Util. Factor	1.00	1.00	1.00			1.00			
Frt	1.00	1.00	0.97			0.99			
Flt Protected	0.95	1.00	1.00			0.95			
Satd. Flow (prot)	1555	1765	1701			1676			
Flt Permitted	0.95	1.00	1.00			0.95			
Satd. Flow (perm)	1555	1765	1701			1676			
Volume (vph)	102	363	439	0	120	188	8	0	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	111	395	477	0	130	204	9	0	0
RTOR Reduction (vph)	0	0	11	0	0	2	0	0	0
Lane Group Flow (vph)	111	395	596	0	0	211	0	0	0
Heavy Vehicles (%)	10%	2%	3%	0%	2%	2%	0%	0%	0%
Turn Type	Prot								
Protected Phases	5	2	6			4			
Permitted Phases									
Actuated Green, G (s)	8.0	38.4	26.4			13.1			
Effective Green, g (s)	8.0	39.4	27.4			13.1			
Actuated g/C Ratio	0.13	0.65	0.45			0.22			
Clearance Time (s)	4.0	5.0	5.0			4.0			
Vehicle Extension (s)	3.0	3.0	3.0			3.0			
Lane Grp Cap (vph)	206	1149	770			363			
v/s Ratio Prot	c0.07	0.22	c0.35			c0.13			
v/s Ratio Perm									
v/c Ratio	0.54	0.34	0.77			0.58			
Uniform Delay, d1	24.5	4.7	13.9			21.2			
Progression Factor	1.00	1.00	1.00			1.00			
Incremental Delay, d2	2.7	0.2	4.9			2.4			
Delay (s)	27.2	4.9	18.8			23.6			
Level of Service	C	A	B			C			
Approach Delay (s)		9.8	18.8			23.6		0.0	
Approach LOS		A	B			C		A	

Intersection Summary			
HCM Average Control Delay	16.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	60.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	360	45	42	228	18	13	13	69	15	8	6
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	10	371	46	43	235	19	13	13	71	15	8	6
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	254			418			756	755	394	824	769	244
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	254			418			756	755	394	824	769	244
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			96			96	96	89	94	97	99
cM capacity (veh/h)	1312			1142			305	322	655	243	316	794

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	428	297	98	30
Volume Left	10	43	13	15
Volume Right	46	19	71	6
cSH	1312	1142	504	307
Volume to Capacity	0.01	0.04	0.19	0.10
Queue Length 95th (ft)	1	3	18	8
Control Delay (s)	0.3	1.5	13.9	18.0
Lane LOS	A	A	B	C
Approach Delay (s)	0.3	1.5	13.9	18.0
Approach LOS			B	C

Intersection Summary			
Average Delay	2.9		
Intersection Capacity Utilization	49.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBL	NBR	SEL	SER
Lane Configurations						
Sign Control	Stop		Stop		Stop	
Volume (vph)	60	362	132	44	544	245
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	62	373	136	45	561	253

Direction, Lane #	WB 1	NB 1	SE 1
Volume Total (vph)	435	181	813
Volume Left (vph)	62	0	561
Volume Right (vph)	373	45	0
Hadj (s)	-0.45	-0.12	0.17
Departure Headway (s)	5.7	6.2	5.8
Degree Utilization, x	0.69	0.31	1.31
Capacity (veh/h)	616	559	620
Control Delay (s)	20.3	11.9	167.7
Approach Delay (s)	20.3	11.9	167.7
Approach LOS	C	B	F

Intersection Summary			
Delay	103.1		
HCM Level of Service	F		
Intersection Capacity Utilization	95.3%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
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	1.00		1.00	0.99		1.00	1.00	
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	0.97		1.00	0.94		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1629	1664		1660	1682		1676	1664		1613	1752	
Flt Permitted	0.22	1.00		0.08	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	377	1664		134	1682		1676	1664		1613	1752	
Volume (vph)	19	626	125	160	551	122	104	215	128	90	174	11
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	21	688	137	176	605	134	114	236	141	99	191	12
RTOR Reduction (vph)	0	10	0	0	7	0	0	19	0	0	2	0
Lane Group Flow (vph)	21	815	0	176	732	0	114	358	0	99	201	0
Confl. Peds. (#/hr)	1		7	7		1	11		2	2		11
Confl. Bikes (#/hr)			2						1			
Heavy Vehicles (%)	5%	5%	3%	3%	4%	2%	2%	1%	1%	6%	1%	9%
Turn Type	pm+pt			pm+pt			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	58.0	56.4		68.4	62.8		9.7	25.0		7.0	22.3	
Effective Green, g (s)	58.0	56.4		68.4	62.8		9.7	25.0		7.0	22.3	
Actuated g/C Ratio	0.52	0.50		0.61	0.56		0.09	0.22		0.06	0.20	
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)	212	835		190	940		145	370		100	348	
v/s Ratio Prot	0.00	c0.49		c0.07	0.44		0.07	c0.21		c0.06	0.11	
v/s Ratio Perm	0.05			0.50								
v/c Ratio	0.10	0.98		0.93	0.78		0.79	0.97		0.99	0.58	
Uniform Delay, d1	16.0	27.3		29.7	19.4		50.3	43.3		52.7	40.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	25.1		44.4	4.1		23.9	39.0		86.6	6.8	
Delay (s)	16.2	52.5		74.1	23.5		74.2	82.3		139.3	47.6	
Level of Service	B	D		E	C		E	F		F	D	
Approach Delay (s)		51.6			33.2			80.4			77.6	
Approach LOS		D			C			F			E	

Intersection Summary			
HCM Average Control Delay	53.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	112.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	91.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
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	1.00		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	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1693	1718		1676	1711		1644	1663		1710	1656	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1693	1718		1676	1711		1644	1663		1710	1656	
Volume (vph)	153	452	65	204	317	44	85	281	93	60	267	77
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)	161	476	68	215	334	46	89	296	98	63	281	81
RTOR Reduction (vph)	0	6	0	0	6	0	0	13	0	0	12	0
Lane Group Flow (vph)	161	538	0	215	374	0	89	381	0	63	350	0
Confl. Peds. (#/hr)	4		12	12		4	5		6	6		5
Confl. Bikes (#/hr)			1									1
Heavy Vehicles (%)	1%	2%	3%	2%	3%	2%	4%	4%	1%	0%	4%	5%
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	11.2	29.5		12.8	31.1		6.0	27.0		3.9	24.9	
Effective Green, g (s)	11.2	29.5		12.8	31.1		6.0	27.0		3.9	24.9	
Actuated g/C Ratio	0.13	0.33		0.14	0.35		0.07	0.30		0.04	0.28	
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)	213	568		241	597		111	503		75	462	
v/s Ratio Prot	0.10	c0.31		c0.13	0.22		c0.05	c0.23		0.04	0.21	
v/s Ratio Perm												
v/c Ratio	0.76	0.95		0.89	0.63		0.80	0.76		0.84	0.76	
Uniform Delay, d1	37.7	29.1		37.5	24.2		41.0	28.1		42.3	29.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	14.1	25.0		31.0	2.1		32.7	10.3		53.7	11.1	
Delay (s)	51.8	54.1		68.6	26.3		73.7	38.4		96.0	40.5	
Level of Service	D	D		E	C		E	D		F	D	
Approach Delay (s)		53.6			41.6			44.9			48.7	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	47.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	89.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
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	1.00		1.00	1.00			1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	
Frt	1.00	0.97		1.00	0.96			1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.99	1.00	0.95	1.00	
Satd. Flow (prot)	1710	1727		1676	1700			1750	1485	1676	1741	
Flt Permitted	0.95	1.00		0.95	1.00			0.99	1.00	0.95	1.00	
Satd. Flow (perm)	1710	1727		1676	1700			1750	1485	1676	1741	
Volume (vph)	42	268	69	328	307	99	50	245	571	99	322	23
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	47	298	77	364	341	110	56	272	634	110	358	26
RTOR Reduction (vph)	0	6	0	0	8	0	0	0	227	0	2	0
Lane Group Flow (vph)	47	369	0	364	443	0	0	328	407	110	382	0
Confl. Peds. (#/hr)	5			1								7
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	0%	1%	1%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot			Prot			Split		pm+ov	Split		
Protected Phases	5	2		1	6		8	8	1	4	4	
Permitted Phases									8			
Actuated Green, G (s)	6.2	34.1		32.4	60.3			28.1	60.5	32.5	32.5	
Effective Green, g (s)	7.2	35.1		33.4	61.3			29.1	62.5	33.5	33.5	
Actuated g/C Ratio	0.05	0.24		0.23	0.42			0.20	0.42	0.23	0.23	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	84	412		381	708			346	671	382	396	
v/s Ratio Prot	0.03	c0.21		c0.22	0.26			c0.19	0.14	0.07	c0.22	
v/s Ratio Perm									0.14			
v/c Ratio	0.56	0.90		0.96	0.63			0.95	0.61	0.29	0.97	
Uniform Delay, d1	68.4	54.2		56.1	33.9			58.3	32.8	46.9	56.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	7.9	21.2		34.3	1.7			34.6	1.6	0.4	36.0	
Delay (s)	76.3	75.5		90.5	35.6			92.8	34.3	47.4	92.2	
Level of Service	E	E		F	D			F	C	D	F	
Approach Delay (s)		75.5			60.1			54.3			82.2	
Approach LOS		E			E			D			F	

Intersection Summary			
HCM Average Control Delay	64.5	HCM Level of Service	E
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	147.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	87.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
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		0.91	1.00		0.91	1.00
Frpb, ped/bikes		1.00	1.00		1.00	0.99		1.00	0.98		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Frt		1.00	0.85		1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		0.96	1.00		0.98	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)		1396	1378		1501	1227		4771	1123		4818	1205
Flt Permitted		0.75	1.00		0.86	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)		1080	1378		1310	1227		4771	1123		4818	1205
Volume (vph)	120	40	80	20	30	80	0	1970	30	0	3750	150
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	124	41	82	21	31	82	0	2031	31	0	3866	155
RTOR Reduction (vph)	0	0	1	0	0	20	0	0	8	0	0	34
Lane Group Flow (vph)	0	165	81	0	52	62	0	2031	23	0	3866	121
Confl. Peds. (#/hr)	1					1			1	1		
Heavy Vehicles (%)	10%	67%	11%	36%	5%	23%	0%	3%	33%	0%	2%	27%
Turn Type	Perm		Perm	Perm		Perm			Perm			Perm
Protected Phases		8			4			6			2	
Permitted Phases	8		8	4		4			6			2
Actuated Green, G (s)		21.2	21.2		21.2	21.2		88.3	88.3		88.3	88.3
Effective Green, g (s)		22.7	22.7		22.7	22.7		89.3	89.3		89.3	89.3
Actuated g/C Ratio		0.19	0.19		0.19	0.19		0.74	0.74		0.74	0.74
Clearance Time (s)		5.5	5.5		5.5	5.5		5.0	5.0		5.0	5.0
Vehicle Extension (s)		4.5	4.5		4.5	4.5		4.4	4.4		4.4	4.4
Lane Grp Cap (vph)		204	261		248	232		3550	836		3585	897
v/s Ratio Prot								0.43			c0.80	
v/s Ratio Perm		c0.15	0.06		0.04	0.05			0.02			0.10
v/c Ratio		0.81	0.31		0.21	0.27		0.57	0.03		1.08	0.13
Uniform Delay, d1		46.6	41.9		41.1	41.5		6.8	4.0		15.4	4.4
Progression Factor		1.00	1.00		1.00	1.00		1.16	0.44		1.00	1.00
Incremental Delay, d2		22.5	1.2		0.7	1.1		0.6	0.1		41.2	0.3
Delay (s)		69.1	43.1		41.8	42.6		8.6	1.8		56.5	4.7
Level of Service		E	D		D	D		A	A		E	A
Approach Delay (s)		60.4			42.3			8.5			54.5	
Approach LOS		E			D			A			D	

Intersection Summary			
HCM Average Control Delay	39.8	HCM Level of Service	D
HCM Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	99.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.0	4.0		4.0	4.0		4.0			4.0	
Lane Util. Factor		1.00	1.00		1.00	1.00		0.86			0.91	
Frpb, ped/bikes		1.00	0.99		1.00	1.00		1.00			1.00	
Flpb, ped/bikes		1.00	1.00		1.00	1.00		1.00			1.00	
Frt		1.00	0.85		1.00	0.85		1.00			1.00	
Flt Protected		0.98	1.00		0.97	1.00		1.00			1.00	
Satd. Flow (prot)		1624	1479		1746	1530		5954			4818	
Flt Permitted		0.87	1.00		0.64	1.00		1.00			1.00	
Satd. Flow (perm)		1443	1479		1145	1530		5954			4818	
Volume (vph)	40	80	110	30	20	40	0	1920	0	0	3850	0
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	42	83	115	31	21	42	0	2000	0	0	4010	0
RTOR Reduction (vph)	0	0	1	0	0	36	0	0	0	0	0	0
Lane Group Flow (vph)	0	125	114	0	52	6	0	2000	0	0	4010	0
Confl. Peds. (#/hr)			1	1			1					1
Heavy Vehicles (%)	11%	8%	2%	0%	0%	0%	0%	4%	0%	0%	2%	75%
Turn Type	Perm		Perm	Perm		Perm						
Protected Phases		4			4			6			2	
Permitted Phases	4		4	4	4	4		6				
Actuated Green, G (s)		13.4	13.4		13.4	13.4		98.1			98.1	
Effective Green, g (s)		12.9	12.9		12.9	12.9		99.1			99.1	
Actuated g/C Ratio		0.11	0.11		0.11	0.11		0.83			0.83	
Clearance Time (s)		3.5	3.5		3.5	3.5		5.0			5.0	
Vehicle Extension (s)		2.5	2.5		2.5	2.5		4.5			4.5	
Lane Grp Cap (vph)		155	159		123	164		4917			3979	
v/s Ratio Prot								0.34			c0.83	
v/s Ratio Perm		c0.09	0.08		0.05	0.00						
v/c Ratio		0.81	0.72		0.42	0.04		0.41			1.01	
Uniform Delay, d1		52.3	51.8		50.1	48.0		2.7			10.5	
Progression Factor		1.00	1.00		1.00	1.00		2.90			0.57	
Incremental Delay, d2		24.8	13.4		1.7	0.1		0.2			6.4	
Delay (s)		77.2	65.2		51.8	48.1		8.1			12.4	
Level of Service		E	E		D	D		A			B	
Approach Delay (s)		71.4			50.1			8.1			12.4	
Approach LOS		E			D			A			B	

Intersection Summary			
HCM Average Control Delay	13.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	101.0%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
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	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85	1.00	0.95		1.00	0.98		1.00	1.00	
Flt Protected		0.99	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1583	1733	1676	1478		1840	3337		1800	3539	
Flt Permitted		0.99	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1583	1733	1676	1478		1840	3337		1800	3539	
Volume (vph)	20	130	580	200	100	50	250	1100	160	180	1990	30
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	21	135	604	208	104	52	260	1146	167	188	2073	31
RTOR Reduction (vph)	0	0	10	0	15	0	0	9	0	0	1	0
Lane Group Flow (vph)	0	156	594	208	141	0	260	1304	0	188	2103	0
Confl. Peds. (#/hr)			9	9			8		4	4		8
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	0%	15%	1%	2%	17%	13%	2%	4%	0%	3%	4%	7%
Turn Type	Split		pt+ov	Split			Prot			Prot		
Protected Phases	8	8	8 1	4	4		1	6		5	2	
Permitted Phases												
Actuated Green, G (s)		14.0	35.0	12.0	12.0		17.0	63.1		14.4	60.5	
Effective Green, g (s)		14.0	35.0	12.0	12.0		17.0	63.6		14.4	61.0	
Actuated g/C Ratio		0.12	0.29	0.10	0.10		0.14	0.53		0.12	0.51	
Clearance Time (s)		4.0		4.0	4.0		4.0	4.5		4.0	4.5	
Vehicle Extension (s)		2.5		2.5	2.5		2.5	6.0		2.3	6.0	
Lane Grp Cap (vph)		185	505	168	148		261	1769		216	1799	
v/s Ratio Prot		0.10	c0.34	c0.12	0.10		0.14	c0.39		0.10	c0.59	
v/s Ratio Perm												
v/c Ratio		0.84	1.18	1.24	0.95		1.00	0.74		0.87	1.17	
Uniform Delay, d1		51.9	42.5	54.0	53.7		51.5	21.7		51.9	29.5	
Progression Factor		1.00	1.00	1.00	1.00		0.98	0.87		0.85	1.07	
Incremental Delay, d2		27.6	98.5	147.6	59.0		45.5	2.0		12.1	78.3	
Delay (s)		79.5	141.0	201.6	112.7		95.8	21.0		56.3	109.9	
Level of Service		E	F	F	F		F	C		E	F	
Approach Delay (s)		128.4			163.5			33.4			105.5	
Approach LOS		F			F			C			F	

Intersection Summary			
HCM Average Control Delay	90.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.21		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	119.6%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	420	110	80	40	20	20	20	230	40	20	120	210
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	433	113	82	41	21	21	21	237	41	21	124	216

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total (vph)	546	82	62	21	299	144	216
Volume Left (vph)	433	0	41	0	21	21	0
Volume Right (vph)	0	82	0	21	41	0	216
Hadj (s)	0.43	-0.67	0.37	-0.67	-0.03	0.11	-0.67
Departure Headway (s)	7.2	6.1	8.2	7.2	7.2	7.5	6.7
Degree Utilization, x	1.10	0.14	0.14	0.04	0.60	0.30	0.40
Capacity (veh/h)	491	574	407	461	482	469	524
Control Delay (s)	95.4	8.9	11.4	9.3	20.5	12.4	13.0
Approach Delay (s)	84.1		10.9		20.5	12.8	
Approach LOS	F		B		C	B	

Intersection Summary			
Delay	47.0		
HCM Level of Service	E		
Intersection Capacity Utilization	67.2%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		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	0.95		1.00	0.95	
Frpb, ped/bikes		1.00		1.00	0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt		0.93		1.00	0.86		1.00	0.98		1.00	1.00	
Flt Protected		1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1646		1665	1485		1676	3224		1644	3351	
Flt Permitted		1.00		0.74	1.00		0.05	1.00		0.95	1.00	
Satd. Flow (perm)		1646		1305	1485		93	3224		1644	3351	
Volume (vph)	0	10	10	250	10	100	10	1350	190	110	2730	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.98	0.97	0.98	0.97	0.98	0.98	0.98	0.98	0.97
Adj. Flow (vph)	0	10	10	255	10	102	10	1378	194	112	2786	10
RTOR Reduction (vph)	0	5	0	0	83	0	0	9	0	0	0	0
Lane Group Flow (vph)	0	15	0	255	29	0	10	1563	0	112	2796	0
Confl. Peds. (#/hr)				3		3			2	2		
Heavy Vehicles (%)	2%	2%	2%	2%	2%	3%	2%	4%	2%	4%	2%	2%
Turn Type	Perm			Perm			Perm			Prot		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2					
Actuated Green, G (s)		22.0		22.0	22.0		75.5	75.5		10.5	90.0	
Effective Green, g (s)		22.0		22.0	22.0		75.5	75.5		10.5	90.0	
Actuated g/C Ratio		0.18		0.18	0.18		0.63	0.63		0.09	0.75	
Clearance Time (s)		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	
Lane Grp Cap (vph)		302		239	272		59	2028		144	2513	
v/s Ratio Prot		0.01			0.02			0.48		0.07	c0.83	
v/s Ratio Perm				c0.20			0.11					
v/c Ratio		0.05		1.07	0.11		0.17	0.77		0.78	1.11	
Uniform Delay, d1		40.4		49.0	40.8		9.2	16.0		53.6	15.0	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.01	0.74	
Incremental Delay, d2		0.1		77.1	0.2		6.1	2.9		2.5	51.3	
Delay (s)		40.5		126.1	41.0		15.4	18.9		56.8	62.3	
Level of Service		D		F	D		B	B		E	E	
Approach Delay (s)		40.5			100.1			18.9			62.1	
Approach LOS		D			F			B			E	

Intersection Summary			
HCM Average Control Delay	50.9	HCM Level of Service	D
HCM Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	114.6%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	50	280	140	80	200	110	60	90	70	130	100	90
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	51	286	143	82	204	112	61	92	71	133	102	92

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total (vph)	480	398	224	133	194
Volume Left (vph)	51	82	61	133	0
Volume Right (vph)	143	112	71	0	92
Hadj (s)	-0.11	-0.06	0.11	0.62	-0.15
Departure Headway (s)	7.1	7.4	8.5	9.1	8.3
Degree Utilization, x	0.95	0.82	0.53	0.34	0.45
Capacity (veh/h)	496	459	401	382	409
Control Delay (s)	55.7	36.1	20.8	15.5	16.7
Approach Delay (s)	55.7	36.1	20.8	16.2	
Approach LOS	F	E	C	C	

Intersection Summary			
Delay	35.7		
HCM Level of Service	E		
Intersection Capacity Utilization	74.6%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	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
Frpb, ped/bikes	1.00	1.00	1.00	0.97	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1676	1515	1765	1488	1676	1765
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1676	1515	1765	1488	1676	1765
Volume (vph)	80	370	350	80	550	650
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	88	407	385	88	604	714
RTOR Reduction (vph)	0	53	0	39	0	0
Lane Group Flow (vph)	88	354	385	49	604	714
Confl. Peds. (#/hr)				2	2	
Confl. Bikes (#/hr)				1		
Heavy Vehicles (%)	2%	1%	2%	0%	2%	2%
Turn Type		pm+ov		Perm	Prot	
Protected Phases	8	1	2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	9.6	56.5	40.0	40.0	46.9	91.4
Effective Green, g (s)	10.1	57.5	40.0	40.0	47.4	91.4
Actuated g/C Ratio	0.09	0.53	0.37	0.37	0.43	0.83
Clearance Time (s)	4.5	4.5	4.0	4.0	4.5	4.0
Vehicle Extension (s)	3.0	4.5	2.3	2.3	4.5	2.3
Lane Grp Cap (vph)	155	851	645	544	726	1473
v/s Ratio Prot	c0.05	0.18	c0.22		c0.36	0.40
v/s Ratio Perm		0.05		0.03		
v/c Ratio	0.57	0.42	0.60	0.09	0.83	0.48
Uniform Delay, d1	47.6	15.8	28.2	22.8	27.5	2.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.7	0.6	4.0	0.3	8.8	1.1
Delay (s)	52.3	16.4	32.2	23.1	36.3	3.7
Level of Service	D	B	C	C	D	A
Approach Delay (s)	22.8		30.6			18.6
Approach LOS	C		C			B

Intersection Summary			
HCM Average Control Delay	22.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	109.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		0.95			0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes		1.00			1.00		1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.97			0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00			0.99		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		2967			3140		1613	3288	1509	1676	3288	1336
Flt Permitted		0.80			0.62		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		2384			1965		1613	3288	1509	1676	3288	1336
Volume (vph)	20	350	90	80	330	130	100	1050	80	350	2050	20
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)	21	368	95	84	347	137	105	1105	84	368	2158	21
RTOR Reduction (vph)	0	18	0	0	25	0	0	0	39	0	0	5
Lane Group Flow (vph)	0	466	0	0	543	0	105	1105	45	368	2158	16
Confl. Peds. (#/hr)	3		5	5		3	1		1	1		1
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	0%	14%	3%	4%	4%	3%	6%	4%	0%	2%	4%	13%
Turn Type	Perm			Perm			Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)		24.5			24.5		11.5	60.0	60.0	19.0	67.5	67.5
Effective Green, g (s)		26.0			26.0		12.5	62.0	62.0	20.0	69.5	69.5
Actuated g/C Ratio		0.22			0.22		0.10	0.52	0.52	0.17	0.58	0.58
Clearance Time (s)		5.5			5.5		5.0	6.0	6.0	5.0	6.0	6.0
Vehicle Extension (s)		2.5			2.5		2.3	4.0	4.0	2.3	4.0	4.0
Lane Grp Cap (vph)		517			426		168	1699	780	279	1904	774
v/s Ratio Prot							0.07	0.34		c0.22	c0.66	
v/s Ratio Perm		0.20			c0.28				0.03			0.01
v/c Ratio		0.90			1.27		0.62	0.65	0.06	1.32	1.13	0.02
Uniform Delay, d1		45.8			47.0		51.5	21.1	14.4	50.0	25.2	10.8
Progression Factor		1.00			1.00		0.74	1.84	3.53	1.11	0.82	0.80
Incremental Delay, d2		18.8			140.7		5.0	1.7	0.1	160.3	65.2	0.0
Delay (s)		64.5			187.7		43.3	40.6	51.1	215.7	86.1	8.6
Level of Service		E			F		D	D	D	F	F	A
Approach Delay (s)		64.5			187.7			41.5			104.1	
Approach LOS		E			F			D			F	

Intersection Summary			
HCM Average Control Delay	93.4	HCM Level of Service	F
HCM Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	112.4%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
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	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes		0.98			0.99		1.00	1.00	1.00	1.00	1.00	0.97
Flpb, ped/bikes		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.90			0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1560			1641		1710	3320	1530	1541	3320	1413
Flt Permitted		0.97			0.58		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1521			962		1710	3320	1530	1541	3320	1413
Volume (vph)	20	40	180	40	40	50	40	1160	10	20	2170	30
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	21	43	191	43	43	53	43	1234	11	21	2309	32
RTOR Reduction (vph)	0	54	0	0	21	0	0	0	3	0	0	6
Lane Group Flow (vph)	0	201	0	0	118	0	43	1234	8	21	2309	26
Confl. Peds. (#/hr)	8		4	4		8	4					4
Confl. Bikes (#/hr)			1			2						
Heavy Vehicles (%)	0%	0%	2%	0%	0%	4%	0%	3%	0%	11%	3%	5%
Turn Type	Perm			Perm			Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)		20.5			20.5		6.4	83.7	83.7	2.8	80.1	80.1
Effective Green, g (s)		20.5			20.5		6.4	84.7	84.7	2.8	81.1	81.1
Actuated g/C Ratio		0.17			0.17		0.05	0.71	0.71	0.02	0.68	0.68
Clearance Time (s)		4.0			4.0		4.0	5.0	5.0	4.0	5.0	5.0
Vehicle Extension (s)		3.0			2.5		3.0	5.2	5.2	2.5	5.2	5.2
Lane Grp Cap (vph)		260			164		91	2343	1080	36	2244	955
v/s Ratio Prot							c0.03	c0.37		0.01	c0.70	
v/s Ratio Perm		c0.13			0.12				0.01			0.02
v/c Ratio		0.77			0.72		0.47	0.53	0.01	0.58	1.03	0.03
Uniform Delay, d1		47.5			47.0		55.2	8.3	5.2	58.0	19.5	6.4
Progression Factor		1.00			1.00		0.87	2.40	1.66	0.71	1.58	2.10
Incremental Delay, d2		13.3			13.6		2.6	0.6	0.0	1.8	15.2	0.0
Delay (s)		60.9			60.7		50.4	20.4	8.7	43.2	45.9	13.5
Level of Service		E			E		D	C	A	D	D	B
Approach Delay (s)		60.9			60.7			21.3			45.5	
Approach LOS		E			E			C			D	

Intersection Summary			
HCM Average Control Delay	39.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	90.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes		1.00	0.99		1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		3369	1493		3304	1448	1710	3320	1510	1660	3257	1438
Flt Permitted		0.91	1.00		0.62	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		3085	1493		2085	1448	1710	3320	1510	1660	3257	1438
Volume (vph)	20	380	100	140	320	160	310	2020	60	200	1030	130
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	21	404	106	149	340	170	330	2149	64	213	1096	138
RTOR Reduction (vph)	0	0	3	0	0	127	0	0	20	0	0	78
Lane Group Flow (vph)	0	425	103	0	489	43	330	2149	44	213	1096	60
Confl. Peds. (#/hr)	1		7	7		1	1		1	1		1
Confl. Bikes (#/hr)						3						
Heavy Vehicles (%)	6%	1%	1%	6%	0%	4%	0%	3%	0%	3%	5%	5%
Turn Type	Perm		pm+ov	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4	5		8		1	6		5	2	
Permitted Phases	4		4	8		8			6			2
Actuated Green, G (s)		29.7	41.2		29.7	29.7	25.3	64.3	64.3	11.5	50.5	50.5
Effective Green, g (s)		30.2	42.2		30.2	30.2	25.8	65.8	65.8	12.0	52.0	52.0
Actuated g/C Ratio		0.25	0.35		0.25	0.25	0.22	0.55	0.55	0.10	0.43	0.43
Clearance Time (s)		4.5	4.5		4.5	4.5	4.5	5.5	5.5	4.5	5.5	5.5
Vehicle Extension (s)		2.5	2.3		2.5	2.5	2.3	5.0	5.0	2.3	5.0	5.0
Lane Grp Cap (vph)		776	575		525	364	368	1820	828	166	1411	623
v/s Ratio Prot			0.02				0.19	c0.65		c0.13	0.34	
v/s Ratio Perm		0.14	0.05		c0.23	0.03			0.03			0.04
v/c Ratio		0.55	0.18		0.94dl	0.12	0.90	1.18	0.05	1.28	0.78	0.10
Uniform Delay, d1		39.0	26.9		43.9	34.6	45.8	27.1	12.6	54.0	29.0	20.1
Progression Factor		1.00	1.00		1.00	1.00	0.91	0.70	0.22	1.09	1.13	2.77
Incremental Delay, d2		0.6	0.1		23.5	0.1	7.0	82.8	0.0	157.0	3.2	0.2
Delay (s)		39.6	27.0		67.4	34.7	48.6	101.7	2.8	216.0	36.0	56.0
Level of Service		D	C		E	C	D	F	A	F	D	E
Approach Delay (s)		37.1			59.0			92.4			64.4	
Approach LOS		D			E			F			E	

Intersection Summary			
HCM Average Control Delay	74.6	HCM Level of Service	E
HCM Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	112.4%	ICU Level of Service	H
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
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	1.00		1.00	1.00			1.00	0.93		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	1.00		1.00	0.98			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.99	1.00		0.99	1.00
Satd. Flow (prot)	1583	1760		1710	1724			1706	1425		1694	1438
Flt Permitted	0.95	1.00		0.95	1.00			0.91	1.00		0.93	1.00
Satd. Flow (perm)	1583	1760		1710	1724			1571	1425		1591	1438
Volume (vph)	170	580	10	30	250	30	50	230	60	30	190	240
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	181	617	11	32	266	32	53	245	64	32	202	255
RTOR Reduction (vph)	0	1	0	0	6	0	0	0	31	0	0	156
Lane Group Flow (vph)	181	627	0	32	292	0	0	298	33	0	234	99
Confl. Peds. (#/hr)	4		4	4		4	1		21	21		1
Confl. Bikes (#/hr)									2			
Heavy Vehicles (%)	8%	2%	0%	0%	2%	6%	7%	4%	0%	0%	6%	5%
Turn Type	Prot			Prot			Perm		Perm	Perm		Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2		2	6		6
Actuated Green, G (s)	10.8	30.8		2.0	22.0			28.2	28.2		28.2	28.2
Effective Green, g (s)	10.8	30.8		2.0	22.0			28.2	28.2		28.2	28.2
Actuated g/C Ratio	0.15	0.42		0.03	0.30			0.39	0.39		0.39	0.39
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)	234	743		47	520			607	550		615	556
v/s Ratio Prot	c0.11	c0.36		0.02	0.17							
v/s Ratio Perm								c0.19	0.02		0.15	0.07
v/c Ratio	0.77	0.84		0.68	0.56			0.49	0.06		0.38	0.18
Uniform Delay, d1	29.9	18.9		35.2	21.5			17.0	14.1		16.1	14.8
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	14.7	8.7		33.6	1.4			2.8	0.2		1.8	0.7
Delay (s)	44.6	27.7		68.8	22.8			19.8	14.3		17.9	15.5
Level of Service	D	C		E	C			B	B		B	B
Approach Delay (s)		31.4			27.3			18.8			16.6	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	24.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	73.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	1550	2350	640	0	10
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	1615	2448	667	0	10
Pedestrians					1	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		507				
pX, platoon unblocked					0.96	
vC, conflicting volume	3116				3590	1558
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	3116				3649	1558
tC, single (s)	4.1				6.8	7.0
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	90
cM capacity (veh/h)	105				4	100

Direction, Lane #	NB 1	NB 2	SB 1	SB 2	NE 1
Volume Total	807	807	1632	1483	10
Volume Left	0	0	0	0	0
Volume Right	0	0	0	667	10
cSH	1700	1700	1700	1700	100
Volume to Capacity	0.47	0.47	0.96	0.87	0.10
Queue Length 95th (ft)	0	0	0	0	8
Control Delay (s)	0.0	0.0	0.0	0.0	45.0
Lane LOS					E
Approach Delay (s)	0.0		0.0		45.0
Approach LOS					E

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	100.2%	ICU Level of Service	G
Analysis Period (min)	15		

Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations						
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	1.00		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1660	1530	3353		1583	3353
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1660	1530	3353		1583	3353
Volume (vph)	300	60	2360	0	20	1250
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	330	66	2593	0	22	1374
RTOR Reduction (vph)	0	23	0	0	0	0
Lane Group Flow (vph)	330	43	2593	0	22	1374
Heavy Vehicles (%)	3%	0%	2%	0%	8%	2%
Turn Type		Prot			Prot	
Protected Phases	7	7	6		5	
Permitted Phases			6			2 7
Actuated Green, G (s)	28.1	28.1	97.4		4.7	139.2
Effective Green, g (s)	28.1	28.1	98.4		4.7	139.2
Actuated g/C Ratio	0.19	0.19	0.66		0.03	0.93
Clearance Time (s)	4.0	4.0	5.0		4.0	
Vehicle Extension (s)	2.3	2.3	8.0		2.3	
Lane Grp Cap (vph)	312	288	2208		50	3124
v/s Ratio Prot	c0.20	0.03	c0.77		0.01	
v/s Ratio Perm						c0.41
v/c Ratio	1.06	0.15	1.17		0.44	0.44
Uniform Delay, d1	60.6	50.7	25.5		71.1	0.6
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	67.0	0.1	83.6		3.6	0.1
Delay (s)	127.6	50.8	109.1		74.6	0.6
Level of Service	F	D	F		E	A
Approach Delay (s)	114.8		109.1			1.8
Approach LOS	F		F			A

Intersection Summary			
HCM Average Control Delay	75.5	HCM Level of Service	E
HCM Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	149.4	Sum of lost time (s)	18.2
Intersection Capacity Utilization	93.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
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	1.00		1.00	1.00		1.00	0.98		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	0.98		1.00	0.90		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1676	1669		1710	1755		1710	1585		1613	1738	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1676	1669		1710	1755		1710	1585		1613	1738	
Volume (vph)	30	230	160	360	150	30	80	120	280	50	200	20
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	31	237	165	371	155	31	82	124	289	52	206	21
RTOR Reduction (vph)	0	27	0	0	8	0	0	92	0	0	4	0
Lane Group Flow (vph)	31	375	0	371	178	0	82	321	0	52	223	0
Confl. Peds. (#/hr)							1		1	1		1
Heavy Vehicles (%)	2%	0%	3%	0%	0%	0%	0%	0%	0%	6%	0%	21%
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	3.4	22.9		20.5	40.0		5.3	25.4		3.0	23.1	
Effective Green, g (s)	3.4	22.9		20.5	40.0		5.3	25.4		3.0	23.1	
Actuated g/C Ratio	0.04	0.26		0.23	0.46		0.06	0.29		0.03	0.26	
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)	65	435		399	800		103	459		55	457	
v/s Ratio Prot	0.02	c0.22		c0.22	0.10		c0.05	c0.20		0.03	0.13	
v/s Ratio Perm												
v/c Ratio	0.48	0.86		0.93	0.22		0.80	0.70		0.95	0.49	
Uniform Delay, d1	41.3	30.9		32.9	14.5		40.7	27.8		42.3	27.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.4	15.9		27.7	0.1		33.3	8.6		100.6	3.7	
Delay (s)	46.8	46.8		60.7	14.6		74.1	36.4		142.9	31.1	
Level of Service	D	D		E	B		E	D		F	C	
Approach Delay (s)		46.8			45.3			42.6			51.9	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	46.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	87.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.0			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	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes		1.00			1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.96			1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99			0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1711			1699	1515	1710	3420	1466	1613	3420	1235
Flt Permitted		0.77			0.65	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1340			1142	1515	1710	3420	1466	1613	3420	1235
Volume (vph)	30	70	40	180	100	150	50	1180	90	130	2100	30
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	32	74	43	191	106	160	53	1255	96	138	2234	32
RTOR Reduction (vph)	0	12	0	0	0	117	0	0	47	0	0	7
Lane Group Flow (vph)	0	137	0	0	297	43	53	1255	49	138	2234	25
Confl. Peds. (#/hr)							1		1	1		1
Heavy Vehicles (%)	0%	0%	0%	3%	2%	1%	0%	0%	2%	6%	0%	21%
Turn Type	Perm			Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4			4		4			2			6
Actuated Green, G (s)		32.1			32.1	32.1	4.5	60.2	60.2	14.2	69.9	69.9
Effective Green, g (s)		32.1			32.1	32.1	4.5	61.7	61.7	14.2	71.4	71.4
Actuated g/C Ratio		0.27			0.27	0.27	0.04	0.51	0.51	0.12	0.60	0.60
Clearance Time (s)		4.0			4.0	4.0	4.0	5.5	5.5	4.0	5.5	5.5
Vehicle Extension (s)		2.5			2.5	2.5	0.5	4.6	4.6	2.5	2.6	2.6
Lane Grp Cap (vph)		358			305	405	64	1758	754	191	2035	735
v/s Ratio Prot							0.03	c0.37		0.09	c0.65	
v/s Ratio Perm		0.10			c0.26	0.03			0.03			0.02
v/c Ratio		0.38			0.97	0.11	0.83	0.71	0.07	0.72	1.10	0.03
Uniform Delay, d1		35.9			43.5	33.1	57.4	22.4	14.7	51.0	24.3	10.0
Progression Factor		1.00			1.00	1.00	0.67	1.57	3.68	1.11	1.26	0.75
Incremental Delay, d2		0.5			44.1	0.1	43.5	1.9	0.1	1.2	44.9	0.0
Delay (s)		36.3			87.6	33.2	82.1	37.1	54.1	57.8	75.4	7.6
Level of Service		D			F	C	F	D	D	E	E	A
Approach Delay (s)		36.3			68.6			39.9			73.5	
Approach LOS		D			E			D			E	

Intersection Summary			
HCM Average Control Delay	61.1	HCM Level of Service	E
HCM Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	97.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.96			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.98			0.96	1.00
Satd. Flow (prot)	1660	3196	1530	1660	3257	1404		1702			1696	1471
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.62			0.64	1.00
Satd. Flow (perm)	1660	3196	1530	1660	3257	1404		1079			1139	1471
Volume (vph)	60	2210	50	30	1200	120	40	40	30	250	40	80
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	2402	54	33	1304	130	43	43	33	272	43	87
RTOR Reduction (vph)	0	0	12	0	0	50	0	12	0	0	0	64
Lane Group Flow (vph)	65	2402	42	33	1304	80	0	107	0	0	315	23
Heavy Vehicles (%)	3%	7%	0%	3%	5%	9%	0%	0%	0%	2%	0%	4%
Turn Type	Prot		Perm	Prot		Perm	Perm			Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8			4		4
Actuated Green, G (s)	9.2	71.8	71.8	2.7	65.3	65.3		32.0			32.0	32.0
Effective Green, g (s)	9.2	73.3	73.3	2.7	66.8	66.8		32.0			32.0	32.0
Actuated g/C Ratio	0.08	0.61	0.61	0.02	0.56	0.56		0.27			0.27	0.27
Clearance Time (s)	4.0	5.5	5.5	4.0	5.5	5.5		4.0			4.0	4.0
Vehicle Extension (s)	2.5	4.6	4.6	2.5	4.6	4.6		3.0			3.0	3.0
Lane Grp Cap (vph)	127	1952	935	37	1813	782		288			304	392
v/s Ratio Prot	0.04	c0.75		0.02	c0.40							
v/s Ratio Perm			0.03			0.06		0.10			c0.28	0.02
v/c Ratio	0.51	1.23	0.04	0.89	0.72	0.10		0.37			1.04	0.06
Uniform Delay, d1	53.2	23.4	9.3	58.5	19.7	12.5		35.8			44.0	32.8
Progression Factor	1.27	1.64	2.02	1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	0.2	104.2	0.0	104.7	2.5	0.3		0.8			61.3	0.1
Delay (s)	68.0	142.4	18.9	163.2	22.2	12.8		36.6			105.3	32.8
Level of Service	E	F	B	F	C	B		D			F	C
Approach Delay (s)		137.9			24.5			36.6			89.6	
Approach LOS		F			C			D			F	

Intersection Summary			
HCM Average Control Delay	94.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	94.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	WBR2	SBL	SBR	SWL	SWR
Lane Configurations									
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	4.0	4.0			4.0			
Lane Util. Factor	1.00	1.00	1.00			1.00			
Frt	1.00	1.00	0.97			0.99			
Flt Protected	0.95	1.00	1.00			0.96			
Satd. Flow (prot)	1555	1765	1704			1672			
Flt Permitted	0.95	1.00	1.00			0.96			
Satd. Flow (perm)	1555	1765	1704			1672			
Volume (vph)	150	480	600	0	150	240	20	0	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	163	522	652	0	163	261	22	0	0
RTOR Reduction (vph)	0	0	9	0	0	3	0	0	0
Lane Group Flow (vph)	163	522	806	0	0	280	0	0	0
Heavy Vehicles (%)	10%	2%	3%	0%	2%	2%	0%	0%	0%
Turn Type	Prot								
Protected Phases	5	2	6			4			
Permitted Phases									
Actuated Green, G (s)	13.0	57.9	40.9			16.6			
Effective Green, g (s)	13.0	58.9	41.9			16.6			
Actuated g/C Ratio	0.16	0.71	0.50			0.20			
Clearance Time (s)	4.0	5.0	5.0			4.0			
Vehicle Extension (s)	3.0	3.0	3.0			3.0			
Lane Grp Cap (vph)	242	1245	855			332			
v/s Ratio Prot	c0.10	0.30	c0.47			c0.17			
v/s Ratio Perm									
v/c Ratio	0.67	0.42	0.94			0.84			
Uniform Delay, d1	33.2	5.1	19.7			32.2			
Progression Factor	1.00	1.00	1.00			1.00			
Incremental Delay, d2	7.2	0.2	18.2			17.4			
Delay (s)	40.4	5.4	37.9			49.6			
Level of Service	D	A	D			D			
Approach Delay (s)		13.7	37.9			49.6		0.0	
Approach LOS		B	D			D		A	

Intersection Summary			
HCM Average Control Delay	30.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	83.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	20	400	60	70	350	30	30	20	80	20	10	10
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	21	412	62	72	361	31	31	21	82	21	10	10
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	392			474			1021	1021	443	1098	1036	376
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	392			474			1021	1021	443	1098	1036	376
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			93			84	90	87	86	95	98
cM capacity (veh/h)	1167			1088			191	217	614	143	212	670

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	495	464	134	41
Volume Left	21	72	31	21
Volume Right	62	31	82	10
cSH	1167	1088	342	198
Volume to Capacity	0.02	0.07	0.39	0.21
Queue Length 95th (ft)	1	5	45	19
Control Delay (s)	0.5	2.0	22.1	27.9
Lane LOS	A	A	C	D
Approach Delay (s)	0.5	2.0	22.1	27.9
Approach LOS			C	D

Intersection Summary			
Average Delay	4.7		
Intersection Capacity Utilization	67.1%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	WBL	WBR	NBL	NBR	SEL	SER
Lane Configurations						
Sign Control	Stop		Stop		Stop	
Volume (vph)	80	390	160	100	650	390
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	82	402	165	103	670	402

Direction, Lane #	WB 1	NB 1	SE 1
Volume Total (vph)	485	268	1072
Volume Left (vph)	82	0	670
Volume Right (vph)	402	103	0
Hadj (s)	-0.43	-0.20	0.16
Departure Headway (s)	5.9	6.3	6.2
Degree Utilization, x	0.80	0.47	1.84
Capacity (veh/h)	598	539	587
Control Delay (s)	28.1	14.9	401.0
Approach Delay (s)	28.1	14.9	401.0
Approach LOS	D	B	F

Intersection Summary			
Delay	245.2		
HCM Level of Service	F		
Intersection Capacity Utilization	119.1%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
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	1.00		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	0.97		1.00	0.97		1.00	0.95		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1629	1660		1660	1681		1676	1666		1613	1699	
Flt Permitted	0.13	1.00		0.06	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	229	1660		104	1681		1676	1666		1613	1699	
Volume (vph)	80	660	140	200	620	140	120	260	150	90	260	50
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	88	725	154	220	681	154	132	286	165	99	286	55
RTOR Reduction (vph)	0	10	0	0	6	0	0	16	0	0	5	0
Lane Group Flow (vph)	88	869	0	220	829	0	132	435	0	99	336	0
Confl. Peds. (#/hr)	1		7	7		1	11		2	2		11
Confl. Bikes (#/hr)			2						1			
Heavy Vehicles (%)	5%	5%	3%	3%	4%	2%	2%	1%	1%	6%	1%	9%
Turn Type	pm+pt			pm+pt			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	67.0	63.0		79.0	71.0		11.0	31.0		8.0	28.0	
Effective Green, g (s)	67.0	63.0		79.0	71.0		11.0	31.0		8.0	28.0	
Actuated g/C Ratio	0.52	0.48		0.61	0.55		0.08	0.24		0.06	0.22	
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)	161	804		207	918		142	397		99	366	
v/s Ratio Prot	0.02	0.52		c0.10	0.49		c0.08	c0.26		0.06	0.20	
v/s Ratio Perm	0.26			c0.55								
v/c Ratio	0.55	1.08		1.06	0.90		0.93	1.10		1.00	0.92	
Uniform Delay, d1	23.0	33.5		43.8	26.4		59.1	49.5		61.0	49.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.8	55.7		80.1	12.0		54.0	73.5		90.5	30.0	
Delay (s)	26.8	89.2		123.9	38.4		113.1	123.0		151.5	79.9	
Level of Service	C	F		F	D		F	F		F	E	
Approach Delay (s)		83.6			56.2			120.8			96.0	
Approach LOS		F			E			F			F	

Intersection Summary			
HCM Average Control Delay	83.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	100.2%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
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	1.00		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	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1693	1709		1676	1708		1644	1652		1710	1676	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1693	1709		1676	1708		1644	1652		1710	1676	
Volume (vph)	180	480	80	220	340	50	90	310	120	80	420	80
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)	189	505	84	232	358	53	95	326	126	84	442	84
RTOR Reduction (vph)	0	5	0	0	5	0	0	11	0	0	5	0
Lane Group Flow (vph)	189	584	0	232	406	0	95	441	0	84	521	0
Confl. Peds. (#/hr)	4		12	12		4	5		6	6		5
Confl. Bikes (#/hr)			1									1
Heavy Vehicles (%)	1%	2%	3%	2%	3%	2%	4%	4%	1%	0%	4%	5%
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	16.0	41.0		17.0	42.0		7.0	40.0		6.0	39.0	
Effective Green, g (s)	16.0	41.0		17.0	42.0		7.0	40.0		6.0	39.0	
Actuated g/C Ratio	0.13	0.34		0.14	0.35		0.06	0.33		0.05	0.32	
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)	226	584		237	598		96	551		86	545	
v/s Ratio Prot	0.11	c0.34		c0.14	0.24		c0.06	0.27		0.05	c0.31	
v/s Ratio Perm												
v/c Ratio	0.84	1.00		0.98	0.68		0.99	0.80		0.98	0.96	
Uniform Delay, d1	50.7	39.5		51.3	33.3		56.5	36.4		56.9	39.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	22.7	36.8		51.9	3.1		87.6	11.6		88.5	28.9	
Delay (s)	73.4	76.3		103.2	36.3		144.1	47.9		145.4	68.6	
Level of Service	E	E		F	D		F	D		F	E	
Approach Delay (s)		75.6			60.5			64.6			79.2	
Approach LOS		E			E			E			E	

Intersection Summary			
HCM Average Control Delay	70.3	HCM Level of Service	E
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	92.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1676	3353	3353	1500	3252	1500
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1676	3353	3353	1500	3252	1500
Volume (vph)	380	650	420	610	710	460
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	422	722	467	678	789	511
RTOR Reduction (vph)	0	0	0	523	0	339
Lane Group Flow (vph)	422	722	467	155	789	172
Confl. Bikes (#/hr)		1				
Turn Type	Prot			Perm		Prot
Protected Phases	6	1 6	5		8	8
Permitted Phases		1		5		
Actuated Green, G (s)	28.0	53.5	20.5	20.5	30.7	30.7
Effective Green, g (s)	29.0	54.5	21.5	21.5	31.7	31.7
Actuated g/C Ratio	0.31	0.58	0.23	0.23	0.34	0.34
Clearance Time (s)	5.0		5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	516	1940	765	342	1094	505
v/s Ratio Prot	c0.25	0.22	c0.14		c0.24	0.11
v/s Ratio Perm				0.10		
v/c Ratio	0.82	0.37	0.61	0.45	0.72	0.34
Uniform Delay, d1	30.2	10.7	32.6	31.3	27.4	23.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.7	0.1	1.4	1.0	2.4	0.4
Delay (s)	39.9	10.8	34.0	32.2	29.8	23.8
Level of Service	D	B	C	C	C	C
Approach Delay (s)		21.5	33.0		27.4	
Approach LOS		C	C		C	

Intersection Summary			
HCM Average Control Delay	27.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	94.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Milwaukie Transportation System Plan 2006 PM Peak Hour Traffic Counts
Peak Hour Traffic Signal Warrant Analysis

No.	Intersection	Urban (1) or Rural (2)*	Major Street Lanes (1 or 2)	Minor Street Lanes (1 or 2)	Major Volume	Minor TH and LT Volume	Minor RT Volume	RT Reduction	Minor Volume	Warrant Volume	Warrant Met?
1	SE 42nd Avenue @ SE Harrison Street	1	1	1	440	366	70	1.00	366	446	No
2	SE HarrisonStreet @ SE Main Street	1	1	1	655	175	66	1.00	175	349	No
4	SE Mcloughlin Boulevard @ SE 22nd Avenue	1	1	1	3570	0	1	1.00	0	100	No
5	SE 21street @ SE Harrison Street	1	1	1	703	49	75	1.00	49	327	No
6	SE 32nd Avenue @ SE Johnson Creek Boulevard	1	1	1	966	60	362	0.13	375	216	Yes

Milwaukie Transportation System Plan 2030 PM Peak Hour Traffic Forecasts
Peak Hour Traffic Signal Warrant Analysis

No.	Intersection	Urban (1) or Rural (2)*	Major Street Lanes (1 or 2)	Minor Street Lanes (1 or 2)	Major Volume	Minor TH and LT Volume	Minor RT Volume	RT Reduction	Minor Volume	Warrant Volume	Warrant Met?
1	SE 42nd Avenue @ SE Harrison Street	1	1	1	640	530	80	0.00	610	353	Yes
2	SE HarrisonStreet @ SE Main Street	1	1	1	860	230	90	1.00	230	256	No
4	SE Mcloughlin Boulevard @ SE 22nd Avenue	1	1	1	4540	0	10	1.00	0	100	No
5	SE 21street @ SE Harrison Street	1	1	1	930	50	80	1.00	50	227	No
6	SE 32nd Avenue @ SE Johnson Creek Boulevard	1	1	1	1510	160	100	1.00	160	100	Yes

Rte.	Rdwy	BMP	EMP	ADT	Crsh	Fatal	A	B	C	PDO	City	County	Connection in	Percentile	SPIS
081	**PACIFIC HIGHWAY EAST**														
OR-99E	1	4.45	4.54	53,600	1	1					Portland	MULTNOMAH			20.32
OR-99E	1	4.46	4.55	53,600	1	1					Portland	MULTNOMAH	LEG, FROM 081BP		20.32
OR-99E	1	4.47	4.56	53,600	1	1					Portland	MULTNOMAH			20.32
OR-99E	1	4.48	4.57	53,600	1	1					Portland	MULTNOMAH			20.32
OR-99E	1	4.49	4.58	53,600	1	1					Portland	MULTNOMAH	S.E. UMATILLA ST		20.32
OR-99E	1	4.50	4.59	53,600	1	1					Portland	MULTNOMAH			20.32
OR-99E	1	4.56	4.65	53,600	3			1	1	1	Portland	MULTNOMAH			11.01
OR-99E	1	4.57	4.66	53,600	3			1	1	1	Portland	MULTNOMAH			11.01
OR-99E	1	4.58	4.67	53,600	3			1	1	1	Portland	MULTNOMAH			11.01
OR-99E	1	4.59	4.68	53,600	3			1	1	1	Portland	MULTNOMAH			11.01
OR-99E	1	4.60	4.69	53,600	3			1	1	1	Milwaukie	CLACKAMAS			11.01
OR-99E	1	4.65	4.74	53,600	3				1	2	Milwaukie	CLACKAMAS			9.51
OR-99E	1	4.67	4.76	53,600	5				1	4	Milwaukie	CLACKAMAS			12.24
OR-99E	1	4.68	4.77	53,600	5				1	4	Milwaukie	CLACKAMAS			12.24
OR-99E	1	4.69	4.78	53,600	10			1	4	5	Milwaukie	CLACKAMAS			23.01
OR-99E	1	4.70	4.79	53,600	11			1	5	5	Milwaukie	CLACKAMAS			25.28
OR-99E	1	4.71	4.80	53,600	12			1	5	6	Milwaukie	CLACKAMAS			26.02
OR-99E	1	4.72	4.81	53,600	13			1	6	6	Milwaukie	CLACKAMAS			28.23
OR-99E	1	4.73	4.82	53,600	12			1	6	5	Milwaukie	CLACKAMAS			27.52
OR-99E	1	4.74	4.83	53,600	12			1	6	5	Milwaukie	CLACKAMAS			27.52
OR-99E	1	4.75	4.84	53,600	11			1	6	4	Milwaukie	CLACKAMAS			26.78
OR-99E	1	4.76	4.85	51,100	11			1	6	4	Milwaukie	CLACKAMAS			26.87
OR-99E	1	4.77	4.86	51,100	8			1	5	2	Milwaukie	CLACKAMAS			22.89
OR-99E	1	4.78	4.87	51,100	8			1	5	2	Milwaukie	CLACKAMAS	ACCESS, TO/FROM		22.89
OR-99E	1	4.79	4.88	51,100	4				3	1	Milwaukie	CLACKAMAS			14.02
OR-99E	1	4.80	4.89	51,100	3				2	1	Milwaukie	CLACKAMAS			11.04
OR-99E	1	4.81	4.90	51,100	3				2	1	Milwaukie	CLACKAMAS			11.04
OR-99E	1	5.09	5.18	51,100	3				1	2	Milwaukie	CLACKAMAS			9.54
OR-99E	1	5.10	5.19	51,100	4			1	1	2	Milwaukie	CLACKAMAS			12.52
OR-99E	1	5.11	5.20	51,100	17		1	3	2	11	Milwaukie	CLACKAMAS		85	44.42
OR-99E	1	5.12	5.21	51,100	21		1	4	3	13	Milwaukie	CLACKAMAS		90	49.73
OR-99E	1	5.13	5.22	51,100	22		1	4	4	13	Milwaukie	CLACKAMAS		90	51.78
OR-99E	1	5.14	5.23	51,100	22		1	4	4	13	Milwaukie	CLACKAMAS		90	51.78
OR-99E	1	5.15	5.24	51,100	22		1	4	4	13	Milwaukie	CLACKAMAS		90	51.78
OR-99E	1	5.16	5.25	51,100	22		1	4	4	13	Milwaukie	CLACKAMAS		90	51.78
OR-99E	1	5.17	5.26	51,100	21		1	4	3	13	Milwaukie	CLACKAMAS		90	49.73
OR-99E	1	5.18	5.27	51,100	21		1	4	3	13	Milwaukie	CLACKAMAS		90	49.73
OR-99E	1	5.19	5.28	51,100	19		1	4	3	11	Milwaukie	CLACKAMAS		90	48.61
OR-99E	1	5.20	5.29	51,100	18		1	3	3	11	Milwaukie	CLACKAMAS	ACCESS, TO/FROM	90	46.52
OR-99E	1	5.21	5.30	51,700	5			1	2	2	Milwaukie	CLACKAMAS			15.28
OR-99E	1	5.37	5.46	51,700	3					3	Milwaukie	CLACKAMAS			8.03
OR-99E	1	5.38	5.47	51,700	3					3	Milwaukie	CLACKAMAS			8.03
OR-99E	1	5.39	5.48	51,700	4				1	3	Milwaukie	CLACKAMAS			11.01
OR-99E	1	5.40	5.49	51,700	4				1	3	Milwaukie	CLACKAMAS			11.01
OR-99E	1	5.41	5.50	51,700	4				1	3	Milwaukie	CLACKAMAS			11.01
OR-99E	1	5.42	5.51	51,700	4				1	3	Milwaukie	CLACKAMAS			11.01
OR-99E	1	5.43	5.52	51,700	4				1	3	Milwaukie	CLACKAMAS	081AJ CONN.		11.01
OR-99E	1	5.44	5.53	51,700	4				1	3	Milwaukie	CLACKAMAS			11.01
OR-99E	1	5.45	5.54	51,700	3				1	2	Milwaukie	CLACKAMAS			9.53
OR-99E	1	5.61	5.70	27,400	3					3	Milwaukie	CLACKAMAS			8.56
OR-99E	1	5.62	5.71	27,400	3					3	Milwaukie	CLACKAMAS			8.56

081 PACIFIC HIGHWAY EAST

Rte.	Rdwy	BMP	EMP	ADT	Crsh	Fatal	A	B	C	PDO	City	County	Connection in	Percentile	SPIS
OR-99E	1	5.63	5.72	27,400	15			3	2	10	Milwaukie	CLACKAMAS			28.69
OR-99E	1	5.64	5.73	27,400	16			3	3	10	Milwaukie	CLACKAMAS			30.93
OR-99E	1	5.65	5.74	27,400	22			3	4	15	Milwaukie	CLACKAMAS		80	36.40
OR-99E	1	5.66	5.75	27,400	22			3	4	15	Milwaukie	CLACKAMAS		80	36.40
OR-99E	1	5.67	5.76	27,400	22			3	4	15	Milwaukie	CLACKAMAS		80	36.40
OR-99E	1	5.68	5.77	27,400	23			3	4	16	Milwaukie	CLACKAMAS		80	37.01
OR-99E	1	5.69	5.78	27,400	25			3	4	18	Milwaukie	CLACKAMAS		80	38.19
OR-99E	1	5.70	5.79	27,400	26			3	4	19	Milwaukie	CLACKAMAS		85	38.75
OR-99E	1	5.71	5.80	27,400	23			3	4	16	Milwaukie	CLACKAMAS		80	37.01
OR-99E	1	5.72	5.81	27,400	24			3	4	17	Milwaukie	CLACKAMAS	17TH AVE.	80	37.61
OR-99E	1	5.73	5.82	41,800	12				2	10	Milwaukie	CLACKAMAS			20.58
OR-99E	1	5.74	5.83	41,800	12				1	11	Milwaukie	CLACKAMAS			19.08
OR-99E	1	5.75	5.84	41,800	6					6	Milwaukie	CLACKAMAS			12.18
OR-99E	1	5.76	5.85	41,800	7					7	Milwaukie	CLACKAMAS			13.24
OR-99E	1	5.77	5.86	41,800	7					7	Milwaukie	CLACKAMAS	JACKSON ST.		13.24
OR-99E	1	5.78	5.87	41,800	7					7	Milwaukie	CLACKAMAS			13.24
OR-99E	1	5.79	5.88	41,800	12		1	2	2	7	Milwaukie	CLACKAMAS		85	40.08
OR-99E	1	5.80	5.89	41,800	14		1	2	3	8	Milwaukie	CLACKAMAS		85	43.03
OR-99E	1	5.81	5.90	41,800	16		1	2	5	8	Milwaukie	CLACKAMAS		90	47.39
OR-99E	1	5.82	5.91	41,800	15		1	2	5	7	Milwaukie	CLACKAMAS		90	46.73
OR-99E	1	5.83	5.92	41,800	15		1	2	5	7	Milwaukie	CLACKAMAS	S.E. MONROE ST.	90	46.73
OR-99E	1	5.84	5.93	41,800	16		1	2	6	7	Milwaukie	CLACKAMAS		90	48.89
OR-99E	1	5.85	5.94	41,800	18		1	2	7	8	Milwaukie	CLACKAMAS		90	51.66
OR-99E	1	5.86	5.95	41,800	17		1	2	7	7	Milwaukie	CLACKAMAS		90	51.03
OR-99E	1	5.87	5.96	41,800	17		1	2	7	7	Milwaukie	CLACKAMAS		90	51.03
OR-99E	1	5.88	5.97	41,800	16		1	2	7	6	Milwaukie	CLACKAMAS	ROAD, TO BOAT	90	50.39
OR-99E	1	5.89	5.98	41,800	10				6	4	Milwaukie	CLACKAMAS			25.00
OR-99E	1	5.90	5.99	41,800	8				6	2	Milwaukie	CLACKAMAS			23.22
OR-99E	1	5.91	6.00	41,800	6				4	2	Milwaukie	CLACKAMAS			18.18
OR-99E	1	5.92	6.01	41,800	6				4	2	Milwaukie	CLACKAMAS			18.18
OR-99E	1	5.93	6.02	41,800	6				4	2	Milwaukie	CLACKAMAS	WASHINGTON ST.		18.18
OR-99E	1	5.94	6.03	41,800	4				3	1	Milwaukie	CLACKAMAS			14.20

Rte.	Rdwy	BMP	EMP	ADT	Crsh	Fatal	A	B	C	PDO	City	County	Connection in	Percentile	SPIS
OR-99E	1	6.15	6.24	41,800	3				2	1	Milwaukie	CLACKAMAS			11.17
OR-99E	1	6.16	6.25	41,800	4			1	2	1	Milwaukie	CLACKAMAS			14.20
OR-99E	1	6.17	6.26	41,800	5			1	2	2	Milwaukie	CLACKAMAS			15.51
OR-99E	1	6.18	6.27	41,800	6			2	2	2	Milwaukie	CLACKAMAS			18.18
OR-99E	1	6.19	6.28	41,800	7			2	2	3	Milwaukie	CLACKAMAS			19.24
OR-99E	1	6.20	6.29	41,800	7			2	2	3	Milwaukie	CLACKAMAS			19.24
OR-99E	1	6.21	6.30	41,800	16			2	4	10	Milwaukie	CLACKAMAS	22ND AVE.		29.39
OR-99E	1	6.22	6.31	41,800	18			2	5	11	Milwaukie	CLACKAMAS		75	32.16
OR-99E	1	6.23	6.32	41,800	18			2	5	11	Milwaukie	CLACKAMAS		75	32.16
OR-99E	1	6.24	6.33	41,800	18			2	6	10	Milwaukie	CLACKAMAS		75	33.66
OR-99E	1	6.25	6.34	41,800	18			3	5	10	Milwaukie	CLACKAMAS		75	33.66
OR-99E	1	6.26	6.35	41,800	17			2	5	10	Milwaukie	CLACKAMAS		75	31.53
OR-99E	1	6.27	6.36	41,800	16			2	5	9	Milwaukie	CLACKAMAS			30.89
OR-99E	1	6.28	6.37	41,800	15			1	5	9	Milwaukie	CLACKAMAS			28.73
OR-99E	1	6.29	6.38	41,800	15			1	6	8	Milwaukie	CLACKAMAS			30.23
OR-99E	1	6.30	6.39	41,800	15			1	6	8	Milwaukie	CLACKAMAS	ACCESS, FROM		30.23
OR-99E	1	6.31	6.40	37,600	6			1	4	1	Milwaukie	CLACKAMAS	LEG, FROM RIVER		19.84
OR-99E	1	6.32	6.41	37,600	4			1	3		Milwaukie	CLACKAMAS			15.80
OR-99E	1	6.33	6.42	37,600	4			1	3		Milwaukie	CLACKAMAS			15.80
OR-99E	1	6.34	6.43	37,600	3			1	2		Milwaukie	CLACKAMAS			12.76

Rte.	Rdwy	BMP	EMP	ADT	Crsh	Fatal	A	B	C	PDO	City	County	Connection in	Percentile	SPIS
OR-99E	1	6.76	6.85	37,600	4			1	1	2		CLACKAMAS			12.80
OR-99E	1	6.77	6.86	37,600	6			1	1	4		CLACKAMAS			15.34

161 WOODBURN-ESTACADA

Rte.	Rdwy	BMP	EMP	ADT	Crsh	Fatal	A	B	C	PDO	City	County	Connection in	Percentile	SPIS
OR-211	1	23.78	23.87	2,400	1	1						CLACKAMAS			24.00
OR-211	1	23.79	23.88	2,400	1	1						CLACKAMAS			24.00
OR-211	1	23.80	23.89	2,400	1	1						CLACKAMAS			24.00
OR-211	1	23.81	23.90	2,400	1	1						CLACKAMAS			24.00
OR-211	1	23.82	23.91	2,400	1	1						CLACKAMAS			24.00
OR-211	1	28.71	28.80	2,300	3		1		2			CLACKAMAS		80	36.34
OR-211	1	28.72	28.81	2,300	3		1		2			CLACKAMAS		80	36.34
OR-211	1	28.73	28.82	2,300	3		1		2			CLACKAMAS		80	36.34
OR-211	1	28.74	28.83	2,300	3		1		2			CLACKAMAS		80	36.34
OR-211	1	28.75	28.84	2,300	3		1		2			CLACKAMAS		80	36.34
OR-211	1	28.76	28.85	2,300	3		1		2			CLACKAMAS		80	36.34
OR-211	1	28.77	28.86	2,300	3		1		2			CLACKAMAS	HILLOCKBURN RD.	80	36.34
OR-211	1	32.44	32.53	3,300	5			1		4		CLACKAMAS			21.70
OR-211	1	32.45	32.54	3,300	5			1		4		CLACKAMAS			21.70
OR-211	1	32.46	32.55	3,300	6			1		5		CLACKAMAS			23.96
OR-211	1	32.47	32.56	3,300	6			1		5		CLACKAMAS			23.96
OR-211	1	32.48	32.57	3,300	6			1		5		CLACKAMAS			23.96
OR-211	1	32.49	32.58	3,300	6			1		5		CLACKAMAS			23.96
OR-211	1	32.50	32.59	3,300	6			1		5		CLACKAMAS			23.96
OR-211	1	32.51	32.60	3,300	6			1		5		CLACKAMAS			23.96
OR-211	1	32.52	32.61	3,300	6			1		5		CLACKAMAS			23.96
OR-211	1	32.53	32.62	3,300	4			1		3		CLACKAMAS	S.HAYDEN RD.		19.15
OR-211	1	32.66	32.75	5,700	4		1	1	1	1		CLACKAMAS		75	34.14
OR-211	1	32.67	32.76	5,700	4		1	1	1	1		CLACKAMAS		75	34.14
OR-211	1	32.68	32.77	5,700	4		1	1	1	1		CLACKAMAS		75	34.14
OR-211	1	32.69	32.78	5,700	4		1	1	1	1		CLACKAMAS		75	34.14
OR-211	1	32.70	32.79	5,700	4		1	1	1	1		CLACKAMAS		75	34.14
OR-211	1	32.71	32.80	5,700	4		1	1	1	1		CLACKAMAS		75	34.14
OR-211	1	32.72	32.81	5,700	4		1	1	1	1		CLACKAMAS		75	34.14
OR-211	1	32.73	32.82	5,700	4		1	1	1	1		CLACKAMAS		75	34.14
OR-211	1	32.74	32.83	5,700	4		1	1	1	1		CLACKAMAS	S. REID RD.	75	34.14
OR-211	1	32.75	32.84	5,700	3			1	1	1		CLACKAMAS			15.13
OR-211	1	33.40	33.49	6,800	3				1	2		CLACKAMAS			12.98

171 CLACKAMAS

Rte.	Rdwy	BMP	EMP	ADT	Crsh	Fatal	A	B	C	PDO	City	County	Connection in	Percentile	SPIS
	1	-0.01	0.08	13,100	9				3	6	Milwaukie	CLACKAMAS	17TH AVE.		23.32
	1	0.00	0.09	13,100	9				3	6	Milwaukie	CLACKAMAS			23.32
	1	0.01	0.10	13,100	13			1	5	7	Milwaukie	CLACKAMAS		75	32.08
	1	0.02	0.11	13,100	12			1	5	6	Milwaukie	CLACKAMAS	LEG, FROM 17TH	75	31.09
	1	0.03	0.12	13,100	9			1	4	4	Milwaukie	CLACKAMAS			26.32
	1	0.04	0.13	13,100	9			1	4	4	Milwaukie	CLACKAMAS			26.32
	1	0.05	0.14	13,100	8			1	3	4	Milwaukie	CLACKAMAS			23.61
	1	0.06	0.15	13,100	7			1	2	4	Milwaukie	CLACKAMAS			20.81
	1	0.07	0.16	13,100	7			1	2	4	Milwaukie	CLACKAMAS			20.81
	1	0.08	0.17	13,100	7			1	2	4	Milwaukie	CLACKAMAS			20.81
OR-224	1	0.09	0.18	13,100	6			1	3	2	Milwaukie	CLACKAMAS			20.90
OR-224	1	0.10	0.19	13,100	6			1	3	2	Milwaukie	CLACKAMAS			20.90
OR-224	1	0.58	0.67	28,900	4				1	3	Milwaukie	CLACKAMAS			11.62
OR-224	1	0.59	0.68	28,900	17			2	5	10	Milwaukie	CLACKAMAS		75	32.90
OR-224	1	0.60	0.69	28,900	19			2	5	12	Milwaukie	CLACKAMAS		80	34.25
OR-224	1	0.61	0.70	28,900	20			2	5	13	Milwaukie	CLACKAMAS		80	34.89
OR-224	1	0.62	0.71	28,900	20			2	5	13	Milwaukie	CLACKAMAS		80	34.89

171 CLACKAMAS

Rte.	Rdwy	BMP	EMP	ADT	Crsh	Fatal	A	B	C	PDO	City	County	Connection in	Percentile	SPIS
OR-224	1	0.63	0.72	28,900	21			2	5	14	Milwaukie	CLACKAMAS		80	35.52
OR-224	1	0.64	0.73	28,900	21			2	5	14	Milwaukie	CLACKAMAS		80	35.52
OR-224	1	0.65	0.74	28,900	20			2	5	13	Milwaukie	CLACKAMAS		80	34.89
OR-224	1	0.66	0.75	28,900	21			3	5	13	Milwaukie	CLACKAMAS		80	37.02
OR-224	1	0.67	0.76	28,900	20			3	4	13	Milwaukie	CLACKAMAS		80	34.89
OR-224	1	0.68	0.77	28,900	18			3	4	11	Milwaukie	CLACKAMAS	171AB CONN. (S.E.	75	33.58
OR-224	1	0.69	0.78	32,300	11			2	1	8	Milwaukie	CLACKAMAS			21.97
OR-224	1	0.70	0.79	32,300	9			2	1	6	Milwaukie	CLACKAMAS			20.20
OR-224	1	0.71	0.80	32,300	8			2	1	5	Milwaukie	CLACKAMAS			19.23
OR-224	1	0.72	0.81	32,300	8			2	1	5	Milwaukie	CLACKAMAS			19.23
OR-224	1	0.73	0.82	32,300	7			2	1	4	Milwaukie	CLACKAMAS			18.20
OR-224	1	0.74	0.83	32,300	7			2	1	4	Milwaukie	CLACKAMAS			18.20
OR-224	1	0.75	0.84	32,300	8			2	1	5	Milwaukie	CLACKAMAS			19.23
OR-224	1	0.76	0.85	32,300	7			1	1	5	Milwaukie	CLACKAMAS			16.70
OR-224	1	0.77	0.86	32,300	7			1	1	5	Milwaukie	CLACKAMAS			16.70
OR-224	1	0.78	0.87	31,400	7			1	1	5	Milwaukie	CLACKAMAS	171AC CONN. (S.E.		16.76

Rte.	Rdwy	BMP	EMP	ADT	Crsh	Fatal	A	B	C	PDO	City	County	Connection in	Percentile	SPIS
OR-224	1	0.83	0.92	31,400	3				1	2	Milwaukie	CLACKAMAS			9.92
OR-224	1	0.84	0.93	31,400	14		1	2	5	6	Milwaukie	CLACKAMAS		90	46.93
OR-224	1	0.85	0.94	31,400	14		1	2	6	5	Milwaukie	CLACKAMAS		90	48.43
OR-224	1	0.86	0.95	31,400	14		1	2	6	5	Milwaukie	CLACKAMAS		90	48.43
OR-224	1	0.87	0.96	31,400	14		1	2	6	5	Milwaukie	CLACKAMAS		90	48.43
OR-224	1	0.88	0.97	31,400	15		1	2	6	6	Milwaukie	CLACKAMAS		90	49.17
OR-224	1	0.89	0.98	31,400	15		1	2	6	6	Milwaukie	CLACKAMAS		90	49.17
OR-224	1	0.90	0.99	31,400	15		1	2	6	6	Milwaukie	CLACKAMAS		90	49.17
OR-224	1	0.91	1.00	31,400	16		1	2	7	6	Milwaukie	CLACKAMAS		90	51.38
OR-224	1	0.92	1.01	31,400	17		1	2	7	7	Milwaukie	CLACKAMAS		90	52.06
OR-224	1	0.93	1.02	34,700	16		1	2	7	6	Milwaukie	CLACKAMAS	171AD CONN.	90	51.01
OR-224	1	0.94	1.03	34,700	5				3	2	Milwaukie	CLACKAMAS			15.75
OR-224	1	0.95	1.04	34,700	4				2	2	Milwaukie	CLACKAMAS			12.89
OR-224	1	0.96	1.05	34,700	4				2	2	Milwaukie	CLACKAMAS			12.89
OR-224	1	0.97	1.06	34,700	4				2	2	Milwaukie	CLACKAMAS			12.89
OR-224	1	0.98	1.07	34,700	3				2	1	Milwaukie	CLACKAMAS			11.32
OR-224	1	0.99	1.08	34,700	3				2	1	Milwaukie	CLACKAMAS			11.32
OR-224	1	1.00	1.09	34,700	3				2	1	Milwaukie	CLACKAMAS			11.32

Rte.	Rdwy	BMP	EMP	ADT	Crsh	Fatal	A	B	C	PDO	City	County	Connection in	Percentile	SPIS
OR-224	1	1.26	1.35	34,700	3		1	1		1	Milwaukie	CLACKAMAS			26.32
OR-224	1	1.27	1.36	34,700	4		1	1		2	Milwaukie	CLACKAMAS			27.89
OR-224	1	1.28	1.37	34,700	6		1	3		2	Milwaukie	CLACKAMAS	LEG, FROM 171AE	75	33.46
OR-224	1	1.29	1.38	34,700	6		1	3		2	Milwaukie	CLACKAMAS		75	33.46
OR-224	1	1.30	1.39	34,700	6		1	3		2	Milwaukie	CLACKAMAS		75	33.46
OR-224	1	1.31	1.40	34,700	7		1	3		3	Milwaukie	CLACKAMAS		80	34.56
OR-224	1	1.32	1.41	34,700	7		1	3		3	Milwaukie	CLACKAMAS	171AE CONN. (S.E.	80	34.56
OR-224	1	1.33	1.42	34,700	6		1	2		3	Milwaukie	CLACKAMAS		75	31.96
OR-224	1	1.34	1.43	34,700	6		1	2		3	Milwaukie	CLACKAMAS		75	31.96
OR-224	1	1.35	1.44	34,700	5		1	2		2	Milwaukie	CLACKAMAS			30.75
OR-224	1	1.36	1.45	34,700	4			2		2	Milwaukie	CLACKAMAS			12.89
OR-224	1	1.37	1.46	34,700	3			2		1	Milwaukie	CLACKAMAS	171AF CONN.		11.32

Rte.	Rdwy	BMP	EMP	ADT	Crsh	Fatal	A	B	C	PDO	City	County	Connection in	Percentile	SPIS
OR-224	1	1.78	1.87	34,700	3			1	1	1	Milwaukie	CLACKAMAS			11.32
OR-224	1	1.79	1.88	34,700	3			1	1	1	Milwaukie	CLACKAMAS			11.32
OR-224	1	1.80	1.89	34,700	5			1	3	1	Milwaukie	CLACKAMAS			17.25
OR-224	1	1.81	1.90	34,700	7			2	4	1	Milwaukie	CLACKAMAS			22.56
OR-224	1	1.82	1.91	34,700	7			2	4	1	Milwaukie	CLACKAMAS			22.56
OR-224	1	1.83	1.92	34,700	7			2	4	1	Milwaukie	CLACKAMAS			22.56
OR-224	1	1.84	1.93	34,700	7			2	4	1	Milwaukie	CLACKAMAS			22.56

Rte.	Rdwy	BMP	EMP	ADT	Crsh	Fatal	A	B	C	PDO	City	County	Connection in	Percentile	SPIS
171	**CLACKAMAS**														
OR-224	1	1.85	1.94	34,700	7			2	4	1	Milwaukie	CLACKAMAS			22.56
OR-224	1	1.86	1.95	34,700	6			1	4	1	Milwaukie	CLACKAMAS			19.96
OR-224	1	1.87	1.96	34,700	6			1	4	1	Milwaukie	CLACKAMAS			19.96
OR-224	1	1.88	1.97	34,700	5			1	4		Milwaukie	CLACKAMAS			18.75
OR-224	1	1.89	1.98	34,700	5			1	4		Milwaukie	CLACKAMAS	S.E. FREEMAN WAY		18.75
OR-224	1	2.63	2.72	40,700	6			2	1	3	Milwaukie	CLACKAMAS	HWY. 171		16.72
OR-224	1	2.64	2.73	40,700	8			2	2	4	Milwaukie	CLACKAMAS			20.26
OR-224	1	2.65	2.74	40,700	8			2	2	4	Milwaukie	CLACKAMAS			20.26
OR-224	1	2.66	2.75	40,700	8			2	2	4	Milwaukie	CLACKAMAS			20.26
OR-224	1	2.67	2.76	40,700	8			2	2	4	Milwaukie	CLACKAMAS			20.26
OR-224	1	2.68	2.77	40,700	8			2	2	4	Milwaukie	CLACKAMAS			20.26
OR-224	1	2.69	2.78	40,700	8			2	2	4	Milwaukie	CLACKAMAS	171AI CONN.		20.26
OR-224	1	2.70	2.79	35,400	8			2	2	4	Milwaukie	CLACKAMAS			20.54
OR-224	1	2.71	2.80	35,400	8			2	2	4	Milwaukie	CLACKAMAS			20.54
OR-224	1	2.72	2.81	35,400	9			3	2	4		CLACKAMAS	RUSK RD.		22.98
OR-224	1	2.73	2.82	35,400	3			1	1	1		CLACKAMAS			11.31
OR-224	1	3.10	3.19	35,400	4				1	3		CLACKAMAS			11.37
OR-224	1	3.11	3.20	35,400	20	1		3	4	12		CLACKAMAS		90	50.50
OR-224	1	3.12	3.21	35,400	24	1		3	6	14		CLACKAMAS		90	55.83
OR-224	1	3.13	3.22	35,400	24	1		3	6	14		CLACKAMAS		90	55.83
OR-224	1	3.14	3.23	35,400	25	1		3	6	15		CLACKAMAS		95	56.38
OR-224	1	3.15	3.24	35,400	24	1		3	6	14		CLACKAMAS		90	55.83
OR-224	1	3.16	3.25	35,400	24	1		3	6	14		CLACKAMAS		90	55.83
OR-224	1	3.17	3.26	35,400	23	1		3	5	14		CLACKAMAS		90	53.77
OR-224	1	3.18	3.27	35,400	23	1		3	5	14		CLACKAMAS		90	53.77
OR-224	1	3.19	3.28	35,400	23	1		3	5	14		CLACKAMAS		90	53.77
OR-224	1	3.20	3.29	35,400	21	1		3	5	12		CLACKAMAS	LAKE RD.	90	52.60
OR-224	1	3.21	3.30	37,800	6				3	3		CLACKAMAS			16.83
OR-224	1	3.24	3.33	37,800	8			3	3	2		CLACKAMAS			23.40
OR-224	1	3.25	3.34	37,800	10			3	5	2		CLACKAMAS			28.22
OR-224	1	3.26	3.35	37,800	11			4	5	2		CLACKAMAS			30.54
OR-224	1	3.27	3.36	37,800	11			4	5	2		CLACKAMAS			30.54
OR-224	1	3.28	3.37	37,800	11			4	5	2		CLACKAMAS			30.54
OR-224	1	3.29	3.38	37,800	11			4	5	2		CLACKAMAS			30.54
OR-224	1	3.30	3.39	37,800	11			4	5	2		CLACKAMAS			30.54
OR-224	1	3.31	3.40	37,800	10			4	4	2		CLACKAMAS			28.22
OR-224	1	3.32	3.41	37,800	10			4	4	2		CLACKAMAS			28.22
OR-224	1	3.33	3.42	39,800	10			4	4	2		CLACKAMAS	PHEASANT COURT		28.10
OR-224	1	3.34	3.43	39,800	3			1	2			CLACKAMAS			12.71
OR-224	1	3.56	3.65	39,800	3			2		1		CLACKAMAS			11.21
OR-224	1	3.57	3.66	39,800	3			2		1		CLACKAMAS			11.21
OR-224	1	3.58	3.67	39,800	3			2		1		CLACKAMAS			11.21
OR-224	1	3.59	3.68	39,800	4			2		2		CLACKAMAS			12.75
OR-224	1	3.60	3.69	39,800	4			2		2		CLACKAMAS			12.75
OR-224	1	3.61	3.70	39,800	6			2		4		CLACKAMAS			15.25
OR-224	1	3.62	3.71	39,800	9			2	1	6		CLACKAMAS			19.73
OR-224	1	3.63	3.72	39,800	13			3	2	8		CLACKAMAS			25.96
OR-224	1	3.64	3.73	39,800	31		1	4	11	15		CLACKAMAS		95	67.90
OR-224	1	3.65	3.74	39,800	32		1	3	11	17		CLACKAMAS		95	66.87
OR-224	1	3.66	3.75	39,800	33		1	2	11	19		CLACKAMAS		95	65.85
OR-224	1	3.67	3.76	39,800	33		1	2	11	19		CLACKAMAS		95	65.85
OR-224	1	3.68	3.77	39,800	33		1	2	11	19		CLACKAMAS		95	65.85
OR-224	1	3.69	3.78	39,800	32		1	2	11	18		CLACKAMAS		95	65.37

CRASH SUMMARIES BY YEAR BY COLLISION TYPE

All crashes in Milwaukie

1-1-2003 through available 2006 2006 data could change

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR: 2006														
ANGLE	0	5	11	16	0	10	0	12	4	13	3	16	0	0
BACKING	0	1	1	2	0	1	0	2	0	2	0	0	0	0
FIXED / OTHER OBJECT	0	4	8	12	0	4	1	5	7	4	8	0	0	7
MISCELLANEOUS	0	1	0	1	0	1	0	0	0	1	0	0	0	0
PEDESTRIAN	0	1	0	1	0	1	0	0	1	1	0	1	0	0
REAR-END	0	12	18	30	0	18	0	20	10	22	8	4	5	0
SIDESWIPE - OVERTAKING	0	1	4	5	0	1	0	3	2	3	2	0	0	1
TURNING MOVEMENTS	0	11	17	28	0	17	2	20	8	23	5	17	0	2
2006 TOTAL	0	36	59	95	0	53	3	62	32	69	26	38	5	10
YEAR: 2005														
ANGLE	0	20	4	24	0	28	1	22	2	20	4	21	0	1
BACKING	0	0	4	4	0	0	0	2	2	3	1	0	0	1
FIXED / OTHER OBJECT	0	8	6	14	0	9	0	8	6	6	8	1	0	9
HEAD-ON	0	3	0	3	0	6	0	2	1	1	1	0	0	1
PEDESTRIAN	0	3	0	3	0	3	0	2	0	1	1	1	1	0
REAR-END	0	36	36	72	0	56	1	59	13	56	16	13	6	3
SIDESWIPE - MEETING	0	0	2	2	0	0	0	1	1	1	1	0	0	0
SIDESWIPE - OVERTAKING	0	3	2	5	0	5	0	4	1	3	2	0	0	0
TURNING MOVEMENTS	0	10	19	29	0	13	0	20	8	18	11	17	0	0
2005 TOTAL	0	83	73	156	0	120	2	120	34	109	45	53	7	15
YEAR: 2004														
ANGLE	0	11	13	24	0	18	0	22	2	20	4	21	0	0
BACKING	0	3	3	6	0	4	1	2	4	4	2	0	2	0
FIXED / OTHER OBJECT	0	4	9	13	0	4	0	9	4	6	7	2	1	10
HEAD-ON	0	1	1	2	0	1	0	1	1	1	1	0	0	0
MISCELLANEOUS	0	1	1	2	0	2	0	2	0	1	1	0	0	0
PEDESTRIAN	0	1	0	1	0	1	0	1	0	1	0	1	0	0
REAR-END	0	35	34	69	0	47	0	49	20	56	13	6	20	0
SIDESWIPE - MEETING	0	1	1	2	0	1	0	0	2	2	0	0	0	0
SIDESWIPE - OVERTAKING	0	2	4	6	0	2	0	6	0	6	0	0	1	0
TURNING MOVEMENTS	0	16	14	30	0	21	0	22	8	19	11	19	2	0
2004 TOTAL	0	75	80	155	0	101	1	114	41	116	39	49	26	10
YEAR: 2003														
ANGLE	0	18	25	43	0	29	0	34	9	38	5	32	1	1
BACKING	0	2	9	11	0	2	0	9	2	8	3	0	2	1
FIXED / OTHER OBJECT	0	6	8	14	0	7	0	10	4	5	9	1	0	14
HEAD-ON	0	1	1	2	0	2	0	2	0	2	0	0	0	1
NON-COLLISION	0	1	0	1	0	1	1	1	0	1	0	0	0	0
PARKING MOVEMENTS	0	0	1	1	0	0	0	1	0	1	0	0	0	1
PEDESTRIAN	0	3	0	3	0	3	0	1	2	0	3	1	2	0
REAR-END	0	35	34	69	0	48	4	42	26	60	9	26	12	0
SIDESWIPE - MEETING	0	0	2	2	0	0	0	2	0	1	1	0	0	0
SIDESWIPE - OVERTAKING	0	5	12	17	0	8	4	15	2	15	1	0	1	2
TURNING MOVEMENTS	0	10	18	28	0	13	2	19	9	24	4	19	0	1
2003 TOTAL	0	81	110	191	0	113	11	136	54	155	35	79	18	21

All crashes in Milwaukie
1-1-2003 through available 2006 2006 data could change

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
FINAL TOTAL	0	275	322	597	0	387	17	432	161	449	145	219	56	56

Note: Legislative changes to DMV's vehicle crash reporting requirements, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT

CRASH SUMMARIES BY YEAR BY COLLISION TYPE

McLoughlin Blvd (Route 99E, Hwy 81 at SE Ochoco Street in Milwaukie

1-1-2003 through 12-31-2005

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR: 2005														
ANGLE	0	0	1	1	0	0	1	1	0	1	0	1	0	0
TURNING MOVEMENTS	0	1	0	1	0	1	0	1	0	1	0	1	0	0
2005 TOTAL	0	1	1	2	0	1	1	2	0	2	0	2	0	0
YEAR: 2004														
ANGLE	0	1	0	1	0	3	0	1	0	1	0	1	0	0
2004 TOTAL	0	1	0	1	0	3	0	1	0	1	0	1	0	0
YEAR: 2003														
REAR-END	0	2	0	2	0	4	0	1	1	2	0	2	0	0
2003 TOTAL	0	2	0	2	0	4	0	1	1	2	0	2	0	0
FINAL TOTAL	0	4	1	5	0	8	1	4	1	5	0	5	0	0

Note: Legislative changes to DMV's vehicle crash reporting requirements, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CRASH SUMMARIES BY YEAR BY COLLISION TYPE

McLoughlin Blvd (Route 99E, Hwy 81) at SE Milport Road in Milwaukie
1-1-2003 through 12-31-2005

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR: 2004														
ANGLE	0	2	1	3	0	5	0	3	0	2	1	3	0	0
2004 TOTAL	0	2	1	3	0	5	0	3	0	2	1	3	0	0
YEAR: 2003														
ANGLE	0	1	1	2	0	3	0	1	1	1	1	2	0	0
REAR-END	0	1	1	2	0	1	0	0	1	2	0	2	0	0
TURNING MOVEMENTS	0	0	2	2	0	0	1	2	0	1	1	2	0	0
2003 TOTAL	0	2	4	6	0	4	1	3	2	4	2	6	0	0
FINAL TOTAL	0	4	5	9	0	9	1	6	2	6	3	9	0	0

Note: Legislative changes to DMV's vehicle crash reporting requirements, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CRASH SUMMARIES BY YEAR BY COLLISION TYPE

McLoughlin Blvd (Route 99E, Hwy 81) at SE Monroe Street in Milwaukie
1-1-2003 through 12-31-2005

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR:														
TOTAL														
FINAL TOTAL														

Note: Legislative changes to DMV's vehicle crash reporting requirements, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CRASH SUMMARIES BY YEAR BY COLLISION TYPE

McLoughlin Blvd (Route 99E, Hwy 81) at SE Washington Street in Milwaukie
1-1-2003 through 12-31-2005

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR: 2005														
FIXED / OTHER OBJECT	0	0	1	1	0	0	0	1	0	1	0	1	0	1
2005 TOTAL	0	0	1	1	0	0	0	1	0	1	0	1	0	1
YEAR: 2003														
REAR-END	0	1	0	1	0	1	0	0	1	1	0	1	0	0
2003 TOTAL	0	1	0	1	0	1	0	0	1	1	0	1	0	0
FINAL TOTAL	0	1	1	2	0	1	0	1	1	2	0	2	0	1

Note: Legislative changes to DMV's vehicle crash reporting requirements, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT

CRASH SUMMARIES BY YEAR BY COLLISION TYPE

McLoughlin Blvd (Route 99E, Hwy 81) at SE River Road in Milwaukie

1-1-2003 through 12-31-2005

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR: 2005														
REAR-END	0	0	2	2	0	0	0	0	2	2	0	2	0	0
2005 TOTAL	0	0	2	2	0	0	0	0	2	2	0	2	0	0
YEAR: 2004														
ANGLE	0	0	1	1	0	0	0	1	0	0	1	1	0	0
FIXED / OTHER OBJECT	0	0	1	1	0	0	0	1	0	1	0	1	0	1
REAR-END	0	0	1	1	0	0	0	1	0	1	0	1	0	0
2004 TOTAL	0	0	3	3	0	0	0	3	0	2	1	3	0	1
FINAL TOTAL	0	0	5	5	0	0	0	3	2	4	1	5	0	1

Note: Legislative changes to DMV's vehicle crash reporting requirements, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CRASH SUMMARIES BY YEAR BY COLLISION TYPE

Clackamas Hwy (Route 224, Hwy 171) at SE 17th Avenue in Milwaukie
1-1-2003 through 12-31-2005

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR: 2004														
REAR-END	0	1	0	1	0	3	0	1	0	1	0	1	0	0
2004 TOTAL	0	1	0	1	0	3	0	1	0	1	0	1	0	0
YEAR: 2003														
REAR-END	0	0	1	1	0	0	0	1	0	1	0	1	0	0
2003 TOTAL	0	0	1	1	0	0	0	1	0	1	0	1	0	0
FINAL TOTAL	0	1	1	2	0	3	0	2	0	2	0	2	0	0

Note: Legislative changes to DMV's vehicle crash reporting requirements, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CRASH SUMMARIES BY YEAR BY COLLISION TYPE

Clackamas Hwy (Route 224, Hwy 171) at SE Harrison Street in Milwaukie
1-1-2003 through 12-31-2005

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR: 2005														
ANGLE	0	0	1	1	0	0	0	0	1	0	1	1	0	0
REAR-END	0	0	1	1	0	0	0	0	1	0	1	1	0	0
TURNING MOVEMENTS	0	3	1	4	0	4	0	4	0	2	2	4	0	0
2005 TOTAL	0	3	3	6	0	4	0	4	2	2	4	6	0	0
YEAR: 2003														
ANGLE	0	1	0	1	0	1	0	1	0	1	0	1	0	0
REAR-END	0	0	2	2	0	0	0	2	0	2	0	2	0	0
TURNING MOVEMENTS	0	0	1	1	0	0	0	0	1	0	1	1	0	0
2003 TOTAL	0	1	3	4	0	1	0	3	1	3	1	4	0	0
FINAL TOTAL	0	4	6	10	0	5	0	7	3	5	5	10	0	0

Note: Legislative changes to DMV's vehicle crash reporting requirements, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT

CRASH SUMMARIES BY YEAR BY COLLISION TYPE

Clackamas Hwy (Route 224, Hwy 171) at SE Monroe Street in Milwaukie

1-1-2003 through 12-31-2005

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR: 2005														
ANGLE	0	2	0	2	0	3	0	2	0	2	0	2	0	0
TURNING MOVEMENTS	0	0	1	1	0	0	0	1	0	0	1	1	0	0
2005 TOTAL	0	2	1	3	0	3	0	3	0	2	1	3	0	0
YEAR: 2003														
REAR-END	0	0	1	1	0	0	0	0	1	1	0	1	0	0
TURNING MOVEMENTS	0	0	1	1	0	0	0	1	0	1	0	1	0	0
2003 TOTAL	0	0	2	2	0	0	0	1	1	2	0	2	0	0
FINAL TOTAL	0	2	3	5	0	3	0	4	1	4	1	5	0	0

Note: Legislative changes to DMV's vehicle crash reporting requirements, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CRASH SUMMARIES BY YEAR BY COLLISION TYPE

Clackamas Hwy (Route 224, Hwy 171) at SE 37th Avenue and SE Edison Street in Milwaukie
1-1-2003 through 12-31-2005

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR: 2004														
ANGLE	0	1	0	1	0	2	0	1	0	1	0	1	0	0
2004 TOTAL	0	1	0	1	0	2	0	1	0	1	0	1	0	0
FINAL TOTAL	0	1	0	1	0	2	0	1	0	1	0	1	0	0

Note: Legislative changes to DMV's vehicle crash reporting requirements, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CRASH SUMMARIES BY YEAR BY COLLISION TYPE

Clackamas Hwy (Route 224, Hwy 171) at SE Freeman Way in Milwaukie
1-1-2003 through 12-31-2005

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR: 2005														
REAR-END	0	1	0	1	0	2	0	1	0	1	0	1	0	0
2005 TOTAL	0	1	0	1	0	2	0	1	0	1	0	1	0	0
YEAR: 2003														
REAR-END	0	2	1	3	0	3	2	2	1	3	0	3	0	0
2003 TOTAL	0	2	1	3	0	3	2	2	1	3	0	3	0	0
FINAL TOTAL	0	3	1	4	0	5	2	3	1	4	0	4	0	0

Note: Legislative changes to DMV's vehicle crash reporting requirements, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CRASH SUMMARIES BY YEAR BY COLLISION TYPE

Clackamas Hwy (Route 224, Hwy 171) at SE Harmony Road in/near Milwaukie
1-1-2003 through 12-31-2005

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR: 2005														
TURNING MOVEMENTS	0	0	1	1	0	0	1	1	0	1	0	1	0	0
2005 TOTAL	0	0	1	1	0	0	1	1	0	1	0	1	0	0
FINAL TOTAL	0	0	1	1	0	0	1	1	0	1	0	1	0	0

Note: Legislative changes to DMV's vehicle crash reporting requirements, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT

CRASH SUMMARIES BY YEAR BY COLLISION TYPE

Clackamas Hwy (Route 224, Hwy 171) at SE Lake Road in/near Milwaukie

1-1-2003 through 12-31-2005

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR: 2005														
ANGLE	0	1	0	1	0	1	0	0	1	1	0	1	0	0
REAR-END	0	1	1	2	0	3	0	2	0	1	1	2	0	0
TURNING MOVEMENTS	1	0	2	3	1	1	0	3	0	1	2	3	0	0
2005 TOTAL	1	2	3	6	1	5	0	5	1	3	3	6	0	0
YEAR: 2004														
ANGLE	0	1	1	2	0	3	0	2	0	2	0	2	0	0
2004 TOTAL	0	1	1	2	0	3	0	2	0	2	0	2	0	0
YEAR: 2003														
ANGLE	0	3	0	3	0	4	0	2	1	2	1	3	0	0
REAR-END	0	1	3	4	0	3	0	3	1	3	1	4	0	0
2003 TOTAL	0	4	3	7	0	7	0	5	2	5	2	7	0	0
FINAL TOTAL	1	7	7	15	1	15	0	12	3	10	5	15	0	0

Note: Legislative changes to DMV's vehicle crash reporting requirements, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

Milwaukie TSP Cost Estimate
6/27/07

DRAFT CONCEPT PLAN (JULY 2007)

Pedestrian Master Plan

												Contingency (construction, design, admin)		Bridge Cost/SF			ROW Cost/SF	staff+appraisals	
												75%		$275			$17	22%	
Total Length [ft]	Number of Bridges	Total Bridge Length (ft)	Net Road Length	Name	Improvement	From	To	Functional Classification	Lanes	Cost/LF	Road Cost	w/ Contingency	Bridge Width (ft)	Bridge Cost	w/ Contingency	ROW Width (ft)	ROW Cost	w/ staff costs & appraisals	Cost
4380			4380	SE 17th Avenue	Fill in sidewalk gaps on both sides of street.	SE Ochoco Street	SE McLoughlin Boulevard	Arterial		$120	$525,600	$919,800				0	$0	$0	$919,800
4910			4910	SE Lake Road	Fill in sidewalk gaps on both sides of street.	SE Oatfield Road	Hwy 224	Arterial		$120	$589,200	$1,031,100				10	$834,700	$1,018,334	$2,049,434
5200			5200	SE Monroe Street	Fill in sidewalk gaps on both sides of street.	SE 42nd Avenue	City limit	Collector		$120	$624,000	$1,092,000				5	$442,000	$539,240	$1,631,240
8260			8260	SE Stanley Avenue	Fill in sidewalk gaps on both sides of street.	SE Johnson Creek Boulevard	SE Railroad Avenue	Collector		$120	$991,200	$1,734,600				15	$2,106,300	$2,569,686	$4,304,286
7740			7740	SE Railroad Avenue	Fill in sidewalk gaps on both sides of street.	SE 37th Avenue	SE Harmony Road	Collector		$120	$928,800	$1,625,400							$1,625,400
				Sidewalk maintenance	Clear overhanging vegetation and other obstructions from sidewalks; Repair of safety hazards on existing sidewalks	Citywide	Citywide												$20,000
				SE 43rd Avenue/SE King Road	Intersection enhancements	Location specific	Location specific			N/A	$10,000						$0	$0	$15,000
3660			3660	SE Brookside Drive	Fill in sidewalk gaps on both sides of street.	SE Johnson Creek Boulevard	SE Regents Drive	Local Street		$120	$439,200	$768,600					$0	$0	$15,000
2840			2840	SE McLoughlin Boulevard	Fill in sidewalk gaps on both sides of street.	SE Washington Street	City limits	Regional Route		$120	$340,800	$596,400				0	$0	$0	$596,400
				SE Railroad Avenue/SE Oak Street	Intersection enhancements	Location specific	Location specific												$15,000
				Identify walkways	Provide maps and signage on streets to identify ways to get through the city	Citywide	Citywide												$10,000
				Pedestrian Amenities along routes	Install amenities, such as benches, and similar improvements along key walking routes	Citywide	Citywide												$50,000
				Policy to develop walkways on essential routes	Focus on construct sidewalk or appropriate walkways on important pedestrian routes	Citywide	Citywide												$0
				Police enforcement on automobiles	Enforcement of speeding violations, including photo radar, to make the streets generally safer; Enforcement of laws related to pedestrian crossings and crosswalks	Citywide	Citywide												$0
				Pedestrian safety at schools	Utilize safe routes to schools programs and resources	Citywide	Citywide												$0
				Policies that encourage walking	Support mixed-use development and services near residential areas; Re-examine automobile centered policies, such as high amounts of required parking	Citywide	Citywide												$0
1450			1450	SE 19th Avenue	Fill in sidewalk gaps on both sides of street.	SE Eagle Street	SE Sparrow Street	Arterial		$120	$174,000	$304,500				0	$0	$0	$304,500
1550			1550	SE 22nd Avenue	Fill in sidewalk gaps on both sides of street.	Hwy 99E	SE Sparrow Street	Arterial		$120	$186,000	$325,500				0	$0	$0	$325,500
3780			3780	SE 37th Avenue	Fill in sidewalk gaps on both sides of street.	SE Lake Road	SE Harrison Street	Collector		$120	$453,600	$793,800				0	$0	$0	$793,800
2620			2620	SE 43rd Avenue	Fill in sidewalk gaps on both sides of street.	SE Olsen Street	SE King Road	Collector		$120	$314,400	$550,200				0	$0	$0	$550,200
550			550	SE Edison Street	Fill in sidewalk gaps on both sides of street.	SE 35th Avenue	SE 37th Avenue	Local Street		$120	$66,000	$115,500				0	$0	$0	$115,500
180			180	SE Harmony Road	Fill in sidewalk gaps on both sides of street.	SE Linwood Avenue	City limits	Arterial		$120	$21,600	$37,800				0	$0	$0	$37,800
1280			1280	SE Harvey Street	Fill in sidewalk gaps on both sides of street.	SE 32nd Avenue	SE 42nd Avenue	Neighborhood Route		$120	$153,600	$268,800				10	$217,600	$265,472	$534,272
3600			3600	SE Home Avenue	Fill in sidewalk gaps on both sides of street.	SE Railroad Avenue	SE King Road	Neighborhood Route		$120	$432,000	$756,000				0	$0	$0	$756,000
3650			3650	SE International Way	Fill in sidewalk gaps on both sides of street.	SE Freeman Way	SE Lake Road	Local Street		$120	$438,000	$766,500				0	$0	$0	$766,500
1800			1800	SE Johnson Creek Boulevard	Fill in sidewalk gaps on both sides of street.	SE Harney Drive	City limits	Arterial		$120	$216,000	$378,000				0	$0	$0	$378,000
6450			6450	SE Linwood Avenue	Fill in sidewalk gaps on both sides of street.	SE Johnson Creek Boulevard	SE Railroad Avenue	Arterial		$120	$774,000	$1,354,500				12	$1,315,800	$1,605,276	$2,959,776
3360			3360	SE Logus Road	Fill in sidewalk gaps on both sides of street.	SE 43rd Avenue	SE Stanley Road	Neighborhood Route		$120	$403,200	$705,600				8	$456,960	$557,491	$1,263,091
2140			2140	SE Mason Lane	Fill in sidewalk gaps on both sides of street.	SE 42nd Avenue	SE Regents Drive	Neighborhood Route		$120	$256,800	$449,400				5	$181,900	$221,918	$671,318
630			630	SE Oatfield Road	Fill in sidewalk gaps on both sides of street.	SE Guilford Court	City Limits	Arterial		$120	$75,600	$132,300				0	$0	$0	$132,300
2350			2350	SE Regents Drive	Fill in sidewalk gaps on both sides of street.	SE Brookeside Drive	SE Winsor Drive	Neighborhood Route		$120	$282,000	$493,500				0	$0	$0	$493,500
1500			1500	SE River Road	Fill in sidewalk gaps on both sides of street.	Hwy 99E	SE Lark Street	Arterial		$120	$180,000	$315,000				10	$255,000	$311,100	$626,100
460			460	SE Roswell Street	Fill in sidewalk gaps on both sides of street.	SE 32nd Avenue	SE 36th Avenue	Neighborhood Route		$120	$55,200	$96,600				10	$78,200	$95,404	$192,004
2110			2110	SE Rusk Road	Fill in sidewalk gaps on both sides of street.	SE Lake Road	North Clackamas Park	Collector		$120	$253,200	$443,100				5	$179,350	$218,807	$661,907
1035			1035	SE Olsen Street	Fill in sidewalk gaps on north side of street.	SE 32nd Avenue	SE 43rd Avenue	Neighborhood Route		$120	$124,200	$217,350				10	$175,950	$214,659	$432,009
				Intersections throughout the City	Install curb ramps at all intersections with sidewalks*	Citywide	Citywide			N/A	$5,000	5,000 per ramp					$0	$0	$5,000
				SE 37th Avenue/Hwy 224	Intersection enhancements	Location specific	Location specific			N/A	$20,000						$0	$0	$20,000
				SE Freeman Way/Hwy 224	Intersection enhancements	Location specific	Location specific			N/A	$20,000						$0	$0	$20,000
				SE Harmony Road/SE Lake Road	Intersection enhancements	Location specific	Location specific			N/A	$20,000						$0	$0	$15,000
				SE Harrison Street/Hwy 224	Intersection enhancements	Location specific	Location specific			N/A	$20,000						$0	$0	$20,000
				SE Monroe Street/Hwy 224	Intersection enhancements	Location specific	Location specific			N/A	$20,000						$0	$0	$15,000
2000			2000	Hwy 224	Fill in sidewalk gaps on both sides of street.	SE Oak Street	SE 37th Avenue	Regional Route		$120	$240,000	$420,000				0	$0	$0	$420,000
				SE Oak Street/Hwy 224	Intersection enhancements	Location specific	Location specific			N/A	$20,000						$0	$0	$20,000
				SE Olsen Street/SE 42nd Avenue	Intersection enhancements	Location specific	Location specific			N/A	$10,000						$0	$0	$20,000
				SE Railroad Avenue/SE 37th Avenue	Intersection enhancements	Location specific	Location specific			N/A	$10,000						$0	$0	$10,000
3840			3840	North Clackamas Park	Provide sidewalks to connect park to school.	North Clackamas Park	Rowe Middle School	Arterial		$120	$460,800	$806,400				6	$391,680	$477,850	$1,284,250
				SE Stanley Avenue/SE Logus Road	Intersection enhancements	Location specific	Location specific												$15,000
				Improved Ramp at Springwater Trail/SE McLoughlin Boulevard	Intersection enhancements	Location specific	Location specific												$15,000
				SE 49th Avenue	Fill in sidewalk gaps on both sides of street.	SE Logus Road	SE King Road	Neighborhood Route											$250,000
				Policy to develop walkways throughout the City	Construct sidewalks or appropriate walkways everywhere as development occurs or capital funds become available.	Citywide	Citywide												$10,000
				Police enforcement on pedestrians	Enforce laws related to pedestrians and street crossings	Citywide	Citywide												$10,000
				Improved Education	Educate general public about pedestrian safety; Inform general public about traffic laws related to pedestrians	Citywide	Citywide												$10,000
										subtotal	$10,154,000	$17,498,250		$0	$0		$6,635,440	$8,095,237	
													construction subtotal	$10,154,000					
													contingency	$7,615,500					
																		Total	$25,404,887

Milwaukie TSP Cost Estimate
6/27/07

Contingency (construction, design, admin) 75% | Bridge Cost/SF $275 | ROW Cost/SF $17 | staff+appraisals 22%

DRAFT CONCEPT PLAN (JULY 2007)

Bike Master Plan

Total Length [ft]	Number of Bridges	Total Bridge Length (ft)	Net Road Length	Name	Improvement	From	To	Functional Classification	Lanes		Cost/LF	Road Cost	w/ Contingency	Bridge Width (ft)	Bridge Cost	w/ Contingency	ROW Width (ft)	ROW Cost	w/ staff costs & appraisals	Cost
			0	Citywide	Signage for neighborhood bike routes	Citywide	Citywide			TSP	N/A									$150,000
			0	Citywide	Sweeping of bike lanes to remove debris	Citywide	Citywide			TSP	N/A									$50,000
			0	Citywide	Education for bike use and route selection	Citywide	Citywide			TSP	N/A									$10,000
			0	SE 17th Avenue/Hwy 99E	Improve safety of crossing at intersection and connection westbound on SE 17th Avenue.	Location specific	Location specific			TSP	N/A									$10,000
			0	SE 17th Avenue/Hwy 224	Improve safety of crossing at intersection.	Location specific	Location specific			TSP	N/A									$10,000
			0	SE Washington Street/SE Oak Street/Hwy 224	Improve safety of crossing at intersection.	Location specific	Location specific			TSP	N/A									$10,000
			0	Citywide	Coordination of community rides to encourage bike use.	Citywide	Citywide			TSP	N/A									$5,000
2340			2340	SE 19th Avenue and SE Sparrow Street	Enhance corridor for bicycle travel. This would connect the south end of Kellog Creek Trail to SE River Road	SE Eagle Street	SE River Road	Local		TSP	$180	$421,200	$737,100				0	$0	$0	$737,100
1310			1310	SE 17th Avenue	Fill in gaps in existing bicycle network with bike lanes.	SE Waverly Drive	SE Harrison Street	Arterial		TSP	$50	$65,500	$114,625				0	$0	$0	$114,625
			0	Citywide	Multi-jurisdictional coordination	Citywide	Citywide			TSP	N/A									$10,000
			0	SE Johnson Creek Boulevard/Springwater Corridor	Improve safety of crossing at intersection.	Location specific	Location specific			TSP	N/A									$10,000
520			520	SE Harrison Street	Fill in gaps in existing bicycle network with bike lanes.	Hwy 99E	SE 21st Avenue	Arterial		TSP	$300	$156,000	$273,000				0	$0	$0	$273,000
16510	0	0	16510	Springwater Corridor	Improve corridor through repaving	"Three Bridges" area	SE 82nd Avenue	Trail		TSP	$100	$1,651,000	$2,889,250				0	$0	$0	$2,889,250
7740			7740	SE Railroad Avenue	Fill in gaps in existing bicycle network with bike lanes.	SE 37th Avenue	SE Linwood Avenue	Collector		TSP	$180	$1,393,200	$2,438,100				12	$1,578,960	$1,926,331	$4,364,431
300	1	200	175	Bicycle Overpass	Fill in gaps in existing bicycle network with bike lanes.	SE Railroad Avenue	SE International Way	Bridge/trail		TSP	$90	$15,750	$27,563	20	$1,100,000	$1,925,000	20	$59,500	$72,590	$2,025,153
			0	Citywide	Bike friendly street grate design and installation	Citywide	Citywide			TSP	N/A									$50,000
			0	Citywide	Production and updating of a Milwaukie Bike Map	Citywide	Citywide			TSP	N/A									$50,000
4720			4720	Trolley Trail	Deisgn/Plan and implement signage	Milwaukie Riverfront	South to City limits	Trail		TSP	$7	$30,680	$53,690				0	$0	$0	$53,690
			0	SE Johnson Creek Boulevard/SE Linwood Avenue	Improve safety of crossing at intersection.	Location specific	Location specific			TSP	N/A									$10,000
			0	SE Linwood Avenue/SE King Road	Improve safety of crossing at intersection.	Location specific	Location specific			TSP	N/A									$10,000
4060			4060	SE Lake Road	Fill in gaps in existing bicycle network with bike lanes.	SE Main Street	SE Guilford Drive	Arterial		TSP	$300	$1,218,000	$2,131,500				12	$828,240	$1,010,453	$3,141,953
1140			1140	SE Harrison Street	Fill in gaps in existing bicycle network with bike lanes.	Hwy 224	SE 42nd Avenue	Arterial		TSP	$7	$7,410	$12,968				0	$0	$0	$12,968
			0	SE Linwood Avenue/SE Harmony Road	Improve safety of crossing at intersection.	Location specific	Location specific			TSP	N/A									$10,000
			0	SE International Way/SE Lake Road	Improve safety of crossing at intersection.	Location specific	Location specific			TSP	N/A									$10,000
3220			3220	SE 43rd Avenue	Fill in gaps in existing bicycle network with bike lanes.	SE King Road	SE Filbert Street	Collector		TSP	$180	$579,600	$1,014,300				0	$0	$0	$1,014,300
			0	Citywide	Enhanced enforcement	Citywide	Citywide			TSP	N/A									$10,000
			0	Citywide	Re-striping of existing bike facilities	Citywide	Citywide			TSP	N/A									$20,000
			0	Citywide	Signage for Springwater Corridor	Citywide	Citywide			TSP	N/A									$15,000
450			450	SE Oatfield Road	Fill in gaps in existing bicycle network with bike lanes	SE Guilford Court	SE Lake Road	Arterial		TSP	$300	$135,000	$236,250				12	$91,800	$111,996	$348,246
3000			3000	SE Linwood Avenue	Fill in gaps in existing bicycle network with bike lanes.	SE Queen Road	SE Johnson Creek Blvd	Arterial		TSP	$180	$540,000	$945,000				12	$612,000	$746,640	$1,691,640
			0	SE Linwood Avenue/SE Monroe Street	Improve safety of crossing at intersection.	Location specific	Location specific			TSP	N/A									$10,000
			0	SE Adams Street/SE 21st Avenue/Railroad crossing	Improve safety of crossing at intersection.	Location specific	Location specific			TSP	N/A									$10,000
525			525	SE Linwood Avenue	Fill in gaps in existing bicycle network with bike lanes.	SE Juniper Street	SE Harmony Road	Arterial		TSP	$180	$94,500	$165,375				12	$107,100	$130,662	$296,037
1400			1400	SE Rusk Road	Fill in gaps in existing bicycle network with bike lanes.	SE Lake Road	North Clackamas Park	Arterial		TSP	$240	$336,000	$588,000				12	$285,600	$348,432	$936,432
1330			1330	Kellog Creek Trail	Improve connection of corridor	Milwaukie Riverfront	Treatment Plant	Trail		TSP	$90	$119,700	$209,475				15	$339,150	$413,763	$623,238
			0	Monroe Street	Designation of Bike Boulevard streets and implementation of specific treatments for bicycles.	Citywide	Citywide	Collector		TSP	N/A									$20,000
			0	SE 29th Avenue/SE 37th Avenue/Harvey Street/SE 40th Avenue	Designation of Bike Boulevard streets and implementation of specific treatments for bicycles.	Citywide	Citywide			TSP	N/A									$20,000
			0	SE Stanley Avenue	Designation of Bike Boulevard streets and implementation of specific treatments for bicycles.	Citywide	Citywide	Collector		TSP	N/A									$20,000
2680			2680	37th Ave. Bike/Ped Improvement	Construct sidewalks and bike lanes. Key connection between Highway 224 and Harrison Street (Arterial).	Hwy. 224	Harrison Street	Collector		RTP	$300	$804,000	$1,407,000							$1,407,000
1330			1330	Kellogg Creek Trail	Construct low-impact trail-type sidewalk.	99-E	Miramonte Lodge			RTP	$120	$159,600	$279,300				12	$271,320	$331,010	$610,310
			0	Downtown Station Area Streetscaping (21st & Main)	Reconstruct streetscape, including street trees, rain gardens, ADA ramps, street furniture, parking meters, and pedestrian-scale lighting.	TBD	TBD			RTP										$0
			0	Harrison Street Bikeway	Construct bike boulevard.	OR 99-E	King Road	Arterial		RTP										$0
			0	Kellogg Creek Dam Removal/Bridge Replacment/Milwaukie TC River Access Improvements	Remove dam and bridge; replace bridge with full bike and pedestrain facilities and a multi-use path undercrossing.	Washington	Adams			RTP										$0
5260			5260	King Road Boulevard Project	Construct boulevard, including new sidewalks, bus stop shelters, planter strips, medians, pedestrian scale lighting.	42nd Ave.	Linwood Ave.	Arterial		RTP	$300	$1,578,000	$2,761,500							$2,761,500
1640			1640	OR 99-E Boulevard	Construct sidewalks and bike lanes, median strips, planter strips, and pedestrian scale lighting. Reconfigure or construct new signal for entrance to Riverfront Park.	Kellogg Creek Bridge	River Road	Regional Route		RTP	$120	$196,800	$344,400							$344,400
9070			9070	Stanley N/S bike/ped route	Construct sidewalks and bike lanes. Key connection between Johnson Creek Boulevard, Harrison Street, and Harmony Road (Arterials).	Johnson Creek Blvd.	Railroad Ave.	Collector		RTP	$300	$2,721,000	$4,761,750							$4,761,750
5650			5650	Main N/S Bike route	Construct	Harrison	Moores	Collector		TSP	$180	$1,017,000	$1,779,750				3	$288,150	$351,543	$2,131,293
											subtotal	$13,239,940	$23,169,895		$1,100,000	$1,925,000	subtotal	$4,461,820	$5,443,420	
														construction subtotal	$14,339,940					
														contingency	$10,754,955					
																			Total	$31,068,315

Milwaukie TSP Cost Estimate
6/27/07

DRAFT CONCEPT PLAN (JULY 2007)

Auto Master Plan

Contingency (construction, design, admin) 75% | Bridge Cost/SF $275 | ROW Cost/SF $17 | staff+appraisals 22%

Total Length [ft]	Number of Bridges	Total Bridge Length (ft)	Net Road Length	Name	Improvement	From	To	Functional Classification	Lanes		Cost/LF	Road Cost	w/ Contingency	Bridge Width (ft)	Bridge Cost	w/ Contingency	ROW Width (ft)	ROW Cost	w/ staff costs & appraisals	Cost
			0	SE 17th Avenue/SE McLoughlin Boulevard	Prohibit left turn movement at SE 17th/SE McLoughlin Blvd and include in Refinement Plan	Location specific	Location specific	Regional Route	Auto	TSP	N/A									$15,000
600			600	SE 42nd Avenue/Harrison St	Signalization of intersection	Location specific	Location specific	Arterial	Auto	TSP	$240	$144,000	$252,000					$0	$0	$252,000
1200	1	160	1040	SE Johnson Creek Boulevard/32nd Avenue	Signalization and new bridge structure	Location specific	Location specific	Arterial	Auto	TSP	$240	$249,600	$436,800	60	$2,640,000	$4,620,000	0	$0	$0	$5,056,800
1600	1	1000	0	SE Harrison Street Overpass	Refinement Plan Option: Grade Separate from 224 and Railroad	SE 28th Avenue	SE 34th Street	Arterial	3	TSP	$900	$0	$0	60	$16,500,000	$28,875,000				$28,875,000
				Highway 224 and SE McLoughlin Boulevard Refinement Plan	Conduct Refinement Plan for ORE 99E/ORE 224 focused on motor vehicle and freight mobility.	ORE 99E Project Limits: SE Tacoma Street to SE 17th Avenue	ORE 224 Project Limits: ORE 99E to SE Lake Road Interchange	Regional Route	Auto	TSP	N/A									TBD
10500			10500	Highway 224 7-Lanes	Refinement Plan Option: Upgrade Highway 224 to a 7-lane facility	SE Harrison	SE Lake Road	Regional Route	7	TSP	$1,300	$13,650,000	$23,887,500							$23,887,500
650			650	Highway 224/37th Avenue (Alt a)	Consolidate the two northern legs of SE 37th Avenue and SE Industrial Way into one leg.	Location specific	Location specific	Regional Route	3	TSP	$1,000	$650,000	$1,137,500				60	$663,000	$808,860	$1,946,360
300			300	Highway 224/37th Avenue (Alt b)	Consolidate the two northern legs of SE 37th Avenue and SE Industrial Way into one leg.	Location specific	Location specific	Regional Route	3	TSP	$1,000	$300,000	$525,000				60	$306,000	$373,320	$898,320
1200			1200	SE Johnson Creek Boulevard/Linwood Avenue	Add eastbound right turn, add westbound right turn	Location specific	Location specific	Arterial	Auto	TSP	$240	$288,000	$504,000				12	$244,800	$298,656	$802,656
300			300	SE Johnson Creek Boulevard/SE 32nd Avenue	Install roundabout and Approaches	Location Specific	Location Specific	Arterial	Auto	TSP	$1,000	$300,000	$525,000				3	$15,300	$18,666	$543,666
650			650	SE Harrison Street/Main Street	Add westbound shared through/right turn lane; or (Striping only)	Location specific	Location specific	Arterial	Auto	TSP	$30	$19,500	$34,125				0	$0	$0	$34,125
650			650	SE Harrison Street/Main Street	Add eastbound right turn lane (Striping Only)	Location specific	Location specific	Arterial	Auto	TSP	$30	$19,500	$34,125				0	$0	$0	$34,125
			0	SE Linwood Avenue/King Road	Implement protected/permissive left turn phasing for northbound and southbound approaches	Location specific	Location specific	Arterial	Auto	TSP	N/A						0	$0	$0	$15,500
8740	1	100	8640	SE Linwood Avenue	Upgrade to current city standards for 3-lane arterial	SE Johnson Creek Boulevard	SE Harmony Road	Arterial	3	TSP	$900	$7,776,000	$13,608,000	60	$1,650,000	$2,887,500	19	$2,790,720	$3,404,678	$19,900,178
7780			7780	SE Rail Road Avenue	Upgrade to current city standards for 3-lane collector	SE Linwood Avenue	SE 37th Avenue	Collector	3	TSP	$800	$6,224,000	$10,892,000				13	$1,719,380	$2,097,644	$12,989,644
300			300	SE River Road/SE McLoughlin Boulevard	Consolidate a single access point for the area at SE Bluebird Road with full intersection treatment and signalization; or	Location specific	Location specific	Regional Route	3	TSP	$1,000	$300,000	$525,000				60	$306,000	$373,320	$898,320
300			300	SE River Road/SE McLoughlin Boulevard	Add second NB Left-turn lane at SE River Road	Location specific	Location specific	Arterial	3	TSP	$240	$72,000	$126,000				31.2	$159,120	$194,126	$320,126
1270	3		1270	SE Harrison Street	Capacity improvement project to upgrade SE Harrison Street to a three-lane arterial cross section standard from SE 21st Avenue to SE Oatfield Road	SE 32nd Street	SE 42nd Street	Arterial	3	TSP	$1,000	$1,270,000	$2,222,500				13	$280,670	$342,417	$2,564,917
			0	SE Harrison/Highway 224	Add left turn-lanes and protected signal phasing on SE Harrison Street approaches	Location specific	Location specific	Regional Route	Auto	TSP	N/A									$20,000
3660			3660	SE Lake Road	Capacity improvement project to upgrade SE Lake Road to a three-lane arterial cross section standard from SE 21st Avenue to SE Oatfield Road	SE 21st Avenue	SE Oatfield Road	Arterial	3	TSP	$1,000	$3,660,000	$6,405,000				13	$808,860	$986,809	$7,391,809
2670			2670	SE Johnson Creek Boulevard Capacity & Signalization	Replace 3-way stops with signals, add turn pockets.	SE 32nd Street	SE 42nd Street	Arterial	3	TSP	From RTP									$1,500,000
100			250	SE Harrison Street/SE King Road Connection	Enhance connection along SE Linwood Avenue at SE King Road	Location Specific	Location Specific	Arterial	Auto	TSP	$120	$30,000	$52,500							$52,500
			0	SE Oak Street/Highway 224	Add left turn-lanes and protected signal phasing on SE Oak Street approaches	Location specific	Location specific	Regional Route	Auto	TSP	N/A									$20,000
750			750	Highway 224/ Freeman Way	Remove Signal and Implement Right in Right out access restrictions	Location Specific	Location Specific	Regional Route	Auto	TSP	$1,000	$750,000	$1,312,500				0	$0	$0	$1,312,500
250			250	SE Linwood Avenue Connectivity	Enhance connection along SE Linwood Avenue at SE King Road	Location Specific	Location Specific	Collector	2	TSP	$120	$30,000	$52,500							$52,500
250			250	SE Linwood Avenue Connectivity	Enhance connection along SE Linwood Avenue at SE Monroe Street	Location Specific	Location Specific	Collector	2	TSP	$120	$30,000	$52,500							$52,500
			0	SE Harrison Street Rail Crossing	Railroad crossing safety project at SE Harrison Street	Location specific	Location specific	Arterial	Auto	TSP	N/A									$50,000
			0	SE Oak Street Rail Crossing	Railroad crossing safety project at SE Oak Street	Location specific	Location specific	Collector	Auto	TSP	N/A									$50,000
			0	Se 37th Avenue Rail Crossing	Railroad crossing safety project at SE 37th Avenue	Location specific	Location specific	Collector	Auto	TSP	N/A									$50,000
			0	SE Linwood Avenue/Harmony Road/Lake Road	This intersection is currently undergoing an environmental assessment to determine appropriate long term mitigation. Improvements assumed in this study included:	Location specific	Location specific	Arterial	Auto	RTP	From RTP									$20,000,000
			0	SE Linwood Avenue/Harmony Road/Lake Road	· Grade separate Harmony Road from Union Pacific Railroad and align Harmony Road as a through east west movement;	Location specific	Location specific	Arterial	Auto	RTP	From RTP									
			0	SE Linwood Avenue/Harmony Road/Lake Road	· Align Linwood Road as a T-intersection with the realigned Harmony Road.	Location specific	Location specific	Arterial	Auto	RTP	From RTP									
			0	SE Johnson Creek Boulevard	Widen to three to five lanes and widen bridge over Johnson Creek	SE 45th Avenue	SE 82nd Avenue	Arterial	Auto	RTP	From RTP									$40,783,000
			0	Harmony Road	Widen to five lanes to improve safety and accessibility	SE Sunnyside Road	Hwy 224		Auto	RTP	From RTP									$23,400,000
			0	Kellogg Creek (Oatfield Road) Bridge Replacement	construct two lane bridge with sidewalks and bike lanes	Kellogg Creek	n/a	Arterial	Auto	RTP	From RTP									$4,703,000
											subtotal	$15,281,600	$26,742,800		$20,790,000	$36,382,500		$7,293,850	$8,898,497	
														construction subtotal	$36,071,600					
														contingency	$27,053,700					
																			Total	$61,733,636