ORDINANCE NO. 766

AN ORDINANCE ADOPTING AN UPDATED TRANSPORTATION SYSTEM PLAN TO REPLACE THE ADOPTED 1995 TRANSPORTATION SYSTEM PLAN AND REPEALING ORDINANCE NOS. 636 AND 686

THE TROUTDALE CITY COUNCIL FINDS AS FOLLOWS:

1. The Planning Commission held a public hearing on June 15, 2005 to take public testimony on the proposed Plan and has forwarded this matter to the City Council with a recommendation for adoption.

2. The Planning Commission's findings of fact contained in its final order on this subject are adopted herein by reference.

3. The City Council held public hearings concerning this proposal on July 26, 2005 and August 23, 2005 to provide opportunity for public comment.

4. Notice of these public hearings was provided in accordance with applicable law.

5. The City Council is satisfied that this matter has been adequately considered.

NOW, THEREFORE, BE IT ORDAINED BY THE COUNCIL OF THE CITY OF TROUTDALE

Section 1. The City of Troutdale Transportation System Plan, attached hereto as Attachment A, is hereby adopted.

Section 2. This adopted Transportation System Plan supersedes and replaces the current Transportation System Plan, adopted December 12, 1995 by Ordinance No. 636 and amended on April 25, 2000 by Ordinance No. 686, both of which are hereby repealed upon the effective date of this ordinance.

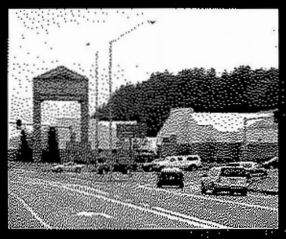
YEAS: 7
NAYS: 0
ABSTAINED: 0

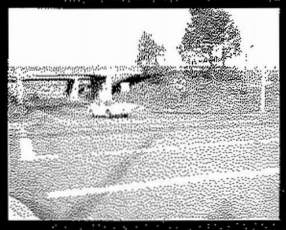
Paul Thalhofer, Mayor

August 25, 2005
Date

Debbie Stickney, City Recorder

Adopted: August 23, 2005





Final Report
For the

City of Troutdale

Transportation System Plan

Prepared by

DKS Associates
TRANSPORTATION SOLUTIONS

August 2005

Adopted:
August 23, 2005
Ordinance No. 766

DKS *Associates*
TRANSPORTATION SOLUTIONS

August 23, 2005

Richard Faith
Planning Director
City of Troutdale
104 SE Kibling
Troutdale, OR 97060-2099

Subject: **Troutdale Transportation System Plan** P04105-000

Dear Rich:

DKS Associates is pleased to submit this Transportation System Plan to the City of Troutdale. This final report reflects comments and revisions collected from the Technical Advisory Committee, the Citizen Adivisory Committee, the Planning Commission, and City Council. We are very pleased that your City Council adopted this document for your use.

It has been a pleasure to work with you, and the rest of the TSP team, in completing this document that will direct transportation investments in the City of Troutdale for the next 20 years.

Regards,

DKS *Associates*

Carl Springer, P.E.
Principal

DKS 25 YEARS

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1. Executive Summary

Introduction

In July, 1995 the City of Troutdale adopted the first Transportation System Plan (TSP) in the Portland Metropolitan area. Since that time, there have been significant changes in regional planning efforts and requirements, in addition to significant growth and planned growth in Troutdale and its surrounding communities. The primary purpose of this update is to address these changes, with focus on:

- Resolving the on-going congestion and circulation issues around the I-84 Interchange.
- Confirming consistency with latest Regional Transportation Plan and Statewide Planning Policies.
- Ensuring that system plans can adequately serve pending major growth areas; both inside the City's urban planning area (former Alcoa site) and outside the City's urban planning area (e.g., Springwater and Damascus).

This plan update is aimed at fulfilling Transportation Planning Rule (TPR) requirements for comprehensive transportation planning in the cities of Oregon, and presents the investments and priorities for the Pedestrian, Bicycle, Transit, and Motor Vehicle systems along with new transportation programs to correct existing shortfalls and enhance critical services. For each travel mode, a Master Plan project map and list are identified to support the City's transportation goals and policies. Projects that are reasonably expected to be funded over the next 20 years were identified and are referred to as Action Plans.

The TSP provides specific information regarding transportation needs to guide future transportation investment in the City and determine how land use and transportation decisions can be brought together beneficially for the City and is based on needs required to meet transportation demand based on 2025 future needs. This executive summary provides the goals and policies, modal plans and financing summaries. For a more detailed analysis, Chapters 2, 3, 4 and 5 provide more in-depth information.

Plan Process and Committees

The Troutdale TSP was developed in close coordination with Troutdale city staff and key representatives from the surrounding communities. Two formal committees were formed to participate in the plan development:

- Technical Advisory Committee (TAC) - Agency staff from Metro, Oregon Department of Transportation, TriMet, Multnomah County, the City of Troutdale, the Troutdale Transportation Management Agency (TMA), the City of Gresham, the City of Wood Village, and the City of Fairview participated in reviewing the technical methods and

findings of the study. The focus of this group was on consistency with the plans and past decisions in adjoining jurisdictions, and consensus on new recommendations.

- Citizens Advisory Committee (CAC) - The Troutdale Citizens Advisory Committee served as the representatives for citizens and community members. A series of meetings were held with the CAC to report interim study findings and any outstanding policy issues that required their direction. The meetings were open to participation by the general public.

The committees met regularly through the plan development process to review interim work products, assist in developing and ranking transportation solutions, and to refine master plan elements to ensure consistency with community goals. Additionally, a public open house was held, allowing citizens to comment on the plan, make suggestions and provide feedback.

The Troutdale Transportation System Plan process included the following steps:

- Update Goals and Policies
- Inventory/Data Collection to a year 2004 baseline
- Evaluate Existing Conditions and Future Travel Needs Through Forecasting
- Update Needs by Mode and Consider Alternatives
- Refine Improvement Lists to Mitigate Deficiencies by Mode For 2025 Conditions
- Update Planning and Cost Estimates of Improvements
- Identify Financing Sources
- Draft TSP

As with the 1995 TSP, this TSP's planning objective was to optimize each of these modes of transportation within Troutdale with the 2025 forecasted travel demand. The following sections summarize the findings of the Transportation System Plan studies. The most recent Metro RTP was complied with for every mode and existing deficiencies were addressed.

Goals and Policies

The City's Comprehensive Plan lays out a general policy framework regarding transportation services. The goals and policies of this TSP are not prioritized and are presented in Chapter 2. Goals are defined as brief guiding statements that describe a desired result. Policies associated with each of the individual goals describe the actions needed to move the community in the direction of completing each goal. These goals and policies were applied in the development of this Transportation System Plan to develop strategies and implementing measures for each of the travel modes applied in the City of Troutdale. The intent of the updated policies was to simplify and/or clarify statements from the 1995 TSP and to reflect policy information adopted by Metro and ODOT.

The policies are provided in this summary with background information and further explanation in Chapter 2.

- **Goal 1.** Transportation facilities shall be designed and constructed in a manner which enhances the livability of Troutdale.
- **Goal 2.** Provide a transportation system in Troutdale which is safe, reduces length of travel and limits congestion.
- **Goal 3.** Provide a balanced transportation system and reduce the number of trips by single occupant vehicles.
- **Goal 4.** Provide for efficient movement of goods.
- **Goal 5.** Develop transportation facilities which are accessible to all members of the community.
- **Goal 6.** Develop a transportation system that is consistent with the City's adopted comprehensive land use plan, and with the adopted plans of state, local and regional jurisdictions.
- **Goal 7.** Establish a clear and objective set of transportation design and development regulations that addresses all elements of the city transportation system and that promote access to and utilization of a multi-modal transportation system.

New policies are suggested to incorporate recent initiatives within the city and county as it relates to transportation facilities. The specific areas of the changes address the following key issues, some of which the City has already implemented:

- Parking provisions – Establishing parking maximum ratios in addition to the standard parking minimum ratios.
- Street connectivity – Metro adopted street and walkway spacing standards that should be reflected in the local street connectivity plan within the TSP to guide future connections to larger vacant lands that work towards reducing out-of-direction travel for autos, bicyclists, and pedestrians.
- Level of Service – Metro and ODOT have adopted plans with new standards for mobility during peak periods.
- Transportation modal targets – Metro vehicle occupancy goals include reductions of the single-occupant vehicle by 2040. This can be accomplished through travel demand management techniques for larger employment sites within the city.
- Street design – New street design guidelines suggest options for narrower residential streets within newer subdivisions. In addition, the city should formalize its application of neighborhood traffic management tools. Furthermore, street improvements along arterials should be constructed to allow provision of fiber optic cable that is being installed on many county roadways.
- Transit – To enhance attractiveness of transit alternatives, building and site designs should consider connectivity and accessibility to nearby transit service

Transportation Plans

The existing system network for each mode (pedestrian, bicycle, motor vehicle, truck and other modes) was updated from the 1995 TSP to reflect completed projects since the original plan was completed. A Master Plan (long term project goals that meet planning requirements) and an Action Plan (projects that are reasonably expected to be funded) were compiled for each transportation mode. These plans are designed to comply with Metro's RTP as well as relevant State and adjoining jurisdictions planning documents. The following sections summarize the Master Plan and Action Plan for each mode.

Pedestrians

The existing conditions analysis updated the pedestrian system network map from the 1995 TSP to reflect completed projects since 1995. Detailed analysis was conducted on existing collector and arterial streets to identify locations where new or in-fill facilities would be required. The analysis identified pedestrian system issues within Troutdale that include an incomplete arterial/collector sidewalk system, a lack of arterial crossings, and a lack of multi-use trails.

Metro's RTP includes designations for pedestrian districts and transit/mixed use corridors. The Pedestrian Facilities Master Plan identifies improvements to provide a connected pedestrian network to and within the RTP designated pedestrian districts and transit/mixed use corridors. The City of Troutdale Development Code designates a Town Center overlay that corresponds to the Metro RTP pedestrian districts and transit/mixed-use corridors and requires new development in these areas to comply with the RTP designations[1].

Based on the needs identified above, a Pedestrian Master Plan was created and is shown in Figure 1-1 (see Tables 4-4 and 4-5 for additional detail). The new Pedestrian Master Plan costs are the sum of the remaining projects from the 1995 TSP ($2.7 M) plus the new projects not incorporated in other system master plans ($1.4 M) for a total of $4.1 million.

The pedestrian strategies from the 1995 TSP were re-ranked by the Citizens Advisory Committee (CAC) for use in this TSP[2] to create a prioritized Action Plan, which are projects that are reasonably expected to be funded by the year 2025. The highest ranking City projects that are reasonably expected to be funded were combined with projects from other agencies identified in the RTP Financially Constrained scenario to create the project list shown in Table 1-1.

[1] Troutdale Development Code, City of Troutdale, viewed on the City's website (www.ci.troutdale.or.us) with July 2, 2004 updates.

[2] Citizens Advisory Committee Meeting, February 2, 2005.

Table 1-1: Pedestrian System Action Plan

Location	Type (1)	Side of Street	From	To	Troutdale Cost ($1,000s)
Hensley Street	S	South	262nd	Laura	$47
21st Street	S	Both	Sunrise Cir	Troutdale Rd	$105
257th Avenue	PC	N/A	Cherry Park South	Historic Columbia Riv. Hwy.	-
257th Avenue	PC	N/A	Cherry Park South	Stark	-
2nd Street	S	Both	257th	Buxton	$68*
Troutdale Road	PC	N/A	Cherry Park	Stark	$15
Halsey Street	S	Both	West City Limits	Historic Columbia Riv. Hwy.	-
Sturges Drive	T	N/A	Sturges Lane	Sturges Dr	$22**
Stark Street	S	Both	257th	Troutdale	-
	Subtotal				$257
	Less Portion Included in Motor Vehicle or Bicycle Project				($90)
	Remaining Amount of Pedestrian Only Projects				**$167**

*These project costs are included in a motor vehicle roadway improvement.
**These project costs are included in a bicycle improvement.
- These projects are under the jurisdiction of, and will be funded by, other agencies.

Note:
1. Project Types:
S = Complete sidewalks
PC = Enhanced Pedestrian Crossing
T = Multi-use Trail

Bicycles

The bicycle system network map from the 1995 TSP was updated to reflect completed projects. The majority of the collector and arterial routes in Troutdale do provide bike lanes. Consequently, the existing bike lane system provides adequate connections from neighborhoods to schools, parks, retail centers, and transit stops.

The Metro RTP includes a bicycle functional classification system with designations for Regional Access Bikeways, Regional Corridor Bikeways, Community Connector Bikeways, and Multi-use paths with bicycle transportation function. There are several routes in Troutdale with RTP designations. These routes should include bicycle lanes or multi-use paths to be consistent with the RTP. By complying with the RTP designations and completing the arterial/collector bicycle system, the Troutdale Bicycle Master Plan is consistent with plans developed by Metro, Multnomah County, and the State.

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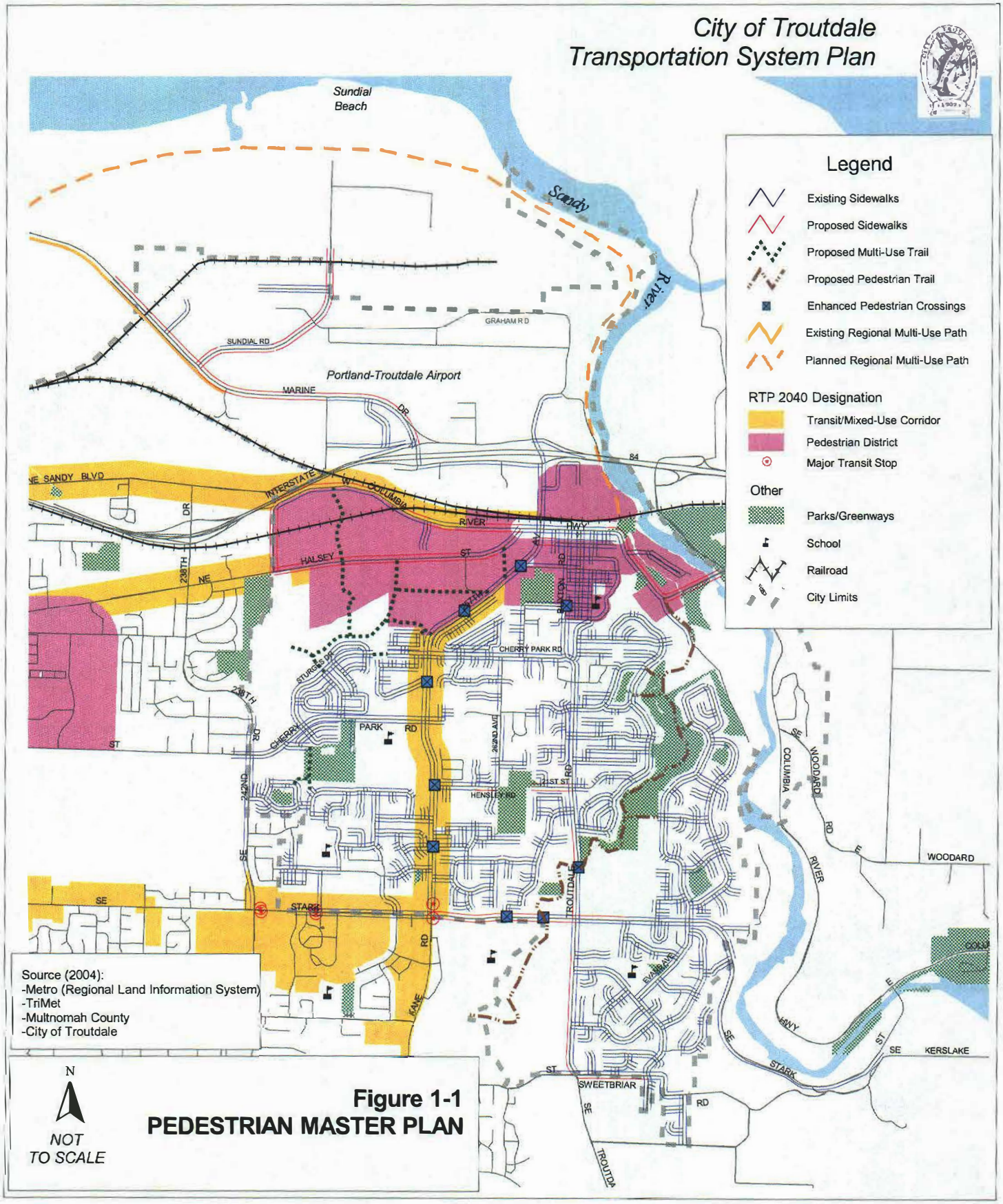


Figure 1-1
PEDESTRIAN MASTER PLAN

Based on the needs identified, a Bicycle Master Plan was created and is shown in Figure 1-2 (see Tables 4-8 and 4-9 for additional detail). The new Bicycle Master Plan costs are the sum of the remaining projects from the 1995 TSP ($3.0 M) plus the new projects not incorporated in other system master plans ($2.0 M) for a total of $5.0 million. The Bicycle Master Plan will require incremental implementation. As development occurs, streets are rebuilt and other project funding opportunities (such as grant programs) arise, projects on the Master Plan should be integrated into project development.

The bicycle strategies from the 1995 TSP were re-ranked by the Citizens Advisory Committee (CAC) for use in this TSP[3] to create a prioritized Action Plan, which are projects that are reasonably expected to be funded by the year 2025. The highest ranking City projects that are reasonably expected to be funded were combined with projects from other agencies identified in the RTP Financially Constrained scenario to create the project list shown in Table 1-2. As listed in Table 1-2, the only City project is the Sturges Multi-use Trail connection between Sturges Drive and Sturges Lane.

Table 1-2: Bicycle System Action Plan

Location	Type (1)	From	To	Troutdale Cost ($1,000s)
Stark Street	BL	257th Avenue	Troutdale	-
Sturges Drive	T	Sturges Ln	Sturges Dr	$22
257th Avenue	PC	Cherry Park South	Historic Columbia Riv. Hwy.	-
257th Avenue	PC	Cherry Park South	Stark	-
Historic Columbia River Highway	BL	Halsey	244th	-
	Subtotal			$ 22
	Less Portion Included in Motor Vehicle or Pedestrian Projects			($0)
	Remaining Amount of Bicycle Only Projects			$ 22

* These project costs are included in a motor vehicle roadway improvement.
- These projects are under the jurisdiction of, and will be funded by, other agencies.

1. Project Types:
BL = Complete bike lanes
PC = Enhanced Pedestrian Crossing
T = Multi-use Trail

[3] Citizens Advisory Committee Meeting, February 2, 2005.

Figure 1-2
BICYCLE MASTER PLAN

Transit

TriMet is the regional transit provider for the Portland metropolitan area and operates fixed route transit service in Troutdale, which is located in the northeast corner of TriMet's service area. Due to its location, Troutdale is an end point for the regional service system. Troutdale is not served by high capacity transit or frequent service routes. On-going studies for the North/South Transportation and Telecommunications Corridor Assessment are considering higher capacity transit service, such as dedicated busways, street cars, and bus rapid transit service, along routes within Troutdale. However, the higher capacity transit service is one of several alternatives under study, and no conclusions for a preferred set of improvements have been identified.

Metro's RTP transit route designations in Troutdale include Regional Bus. The existing transit routes in Troutdale are consistent with the Metro designations. Additional needs were identified for the quality of service in Troutdale, including transit route coverage, transit route frequency, reliability, and user amenities. Based on these needs, a Transit System Master Plan was created that is shown in Figure 1-3. The local component of the improvements and strategies from the 1995 TSP accounts for $120,000 for bus stop enhancements and an initial study of local park-and-ride lots.

The transit strategies from the 1995 TSP were re-ranked by the Citizens Advisory Committee (CAC) for use in this TSP[4] to create a prioritized Action Plan, which are projects that are reasonably expected to be funded by the year 2025. The highest ranking City projects that are reasonably expected to be funded include code updates and coordination with TriMet, which were combined with TriMet projects identified in the RTP Financially Constrained scenario to create the project list shown in Table 1-3.

[4] Citizens Advisory Committee Meeting, February 2, 2005.

Table 1-3: Transit System Action Plan

Location	Description	Troutdale Cost ($1,000s)
Transit Signal Priority	Coordinate with TriMet and Multnomah County to construct and implement transit signal priority on Halsey Avenue, 257th Avenue, and Stark Street.	-
RTP Designated Major Transit Stops	To meet RTP requirements, amend development code regulations to require new retail, office, and institutional buildings on sites at major transit stops to: 1. Locate buildings within 20 feet of or provide a pedestrian plaza at the major transit stops. 2. Provide reasonably direct pedestrian connections between the transit stop and building entrances on the site. 3. Provide a transit passenger landing pad accessible to disabled persons (if not already existing to transit agency standards). 4. Provide an easement or dedication for a passenger shelter and underground utility connection from the new development to the transit amenity if requested by the public transit provider. 5. Provide lighting at a transit stop (if not already existing) to transit agency standards.	$0
Bus Stop Enhancements	Coordinate with TriMet to provide bus shelters on transit streets.	-
Transit Corridors	Direct growth to increase the density of development along transit routes in the City of Troutdale in an effort to support regional transit service goals.	$0
	Subtotal	-

- These projects are under the jurisdiction of other agencies and may be funded by other agencies in partnership with the City of Troutdale

Figure 1-3
TRANSIT MASTER PLAN

Motor Vehicle

Updated base year conditions (2004) and forecasted 2025 growth were used to identify motor vehicle system needs in Troutdale. Without a significant investment in Transportation System Management (TSM), Travel Demand Management (TDM), and roadway improvements, several key facilities in the City would fail (or continue to fail) in the future. Improvement alternatives were analyzed for meeting these needs. The following sections summarize the recommended motor vehicle system plans that meet the demands of future growth and comply with local and regional planning requirements.

Transportation System Management (TSM)

Transportation System Management (TSM) focuses on low cost strategies to enhance operational performance of the transportation system by seeking solutions to immediate transportation problems, finding ways to better manage transportation, maximizing urban mobility, and treating all modes of travel as a coordinated system. TSM measures focus primarily on region wide improvements, however there are a number of TSM measures that are recommended for use in Troutdale, which include:

Intelligent Transportation Systems (ITS): ITS focuses on increasing the efficiency of existing transportation infrastructure, which enhances the overall system performance and reduces the need to add capacity (e.g. travel lanes). Efficiency is achieved by providing services and information to travelers so they can (and will) make better travel decisions and to transportation system operators so they can better manage the system and improve system reliability. The following actions should be taken as part of this TSP:

- *Adopt the Traffic Control Master Plan, which shows planned ITS devices and communications in the Troutdale area.*
- *Modify City of Troutdale standards to include installation of 3" conduit during roadway improvement projects to support the interconnect infrastructure shown in the Traffic Control Master Plan.*

Neighborhood Traffic Management (NTM): The City of Troutdale has a Speed Hump Program that establishes a process to guide speed hump installation through neighborhood involvement. This program includes considerations of street classification and emergency response needs, but it does not provide the opportunity for application of other of NTM devices. The Speed Hump Program could be updated to consider other traffic calming measures and work with the community to find the traffic calming solution that best meets their needs and maintains roadway function. Additional NTM measure descriptions that include diagrams, benefits, and costs are included in the technical appendix. Any NTM project should include coordination with emergency agency staff to assure public safety.

Access Management: Access Management is a broad set of techniques that balance the need to provide efficient, safe and timely travel with the ability to allow access to the individual destination. Proper implementation of Access Management techniques should guarantee reduced congestion, reduced accident rates, less need for highway widening, conservation of energy, and reduced air pollution.

The following recommendations are made for access management:

- *Update the City's policy statement regarding prohibition of new single-family residential access on arterials to include collectors. A design exception process should be outlined that requires mitigation of safety and NTM impacts.*
- *Use Multnomah County standards for access on arterials and collectors under their jurisdiction.* Multnomah County standards are 100-150 feet on collectors and 300-400 feet on arterials[5].
- *Specific access management plans should be developed for arterial streets in Troutdale to maximize the capacity of the existing facilities and protect their functional integrity. New development and roadway projects should meet the requirements summarized in Table 1-4. The minimum spacing of roadways and driveways listed in this table is consistent with Multnomah County's access spacing standards.*

Table 1-4: Access Management Standards

Street Facility	Maximum spacing of roadways and driveways	Minimum spacing of roadways and driveways
Arterial	1,000 feet	530 feet
Collector:	530 feet	150 feet
Neighborhood/Local:	530 feet	-
All Roads	Require an access report for new access points stating that the driveway/roadway is safe as designed meeting adequate stacking, sight distance and deceleration requirements as set by ODOT, Multnomah County and AASHTO.	

Local Street Connectivity: Much of the local street network in Troutdale is built and, in many cases, fairly well connected. In other words, multiple access opportunities exist for entering or exiting neighborhoods. The 1995 TSP was updated in April, 2000 to include additional trail connections in-lieu of additional location street connections. However, there are still a number of locations where the majority of neighborhood traffic is funneled onto one single street. This type of street network

[5] Multnomah County Design Standards, Part I – Design Manual.

results in out-of-direction travel for motorists and an imbalance of traffic volumes that impacts residential frontage.

A Local Street Connectivity Plan was developed for Troutdale, which is shown in Figure 1-4. In most cases, the connector alignments are not specific and are aimed at reducing potential neighborhood traffic impacts by better balancing traffic flows on neighborhood routes. To protect existing neighborhoods from potential traffic impacts of extending stub end streets, connector roadways should incorporate neighborhood traffic management into their design and construction. All stub streets should have signs indicating the potential for future connectivity. Additionally, new development that constructs new streets, or street extensions, are required by the current development code to meet the following connectivity standards:

- *Provides full street connections with spacing of no more than 530 feet between connections except where prevented by barriers*
- *Provides bike and pedestrian access ways in lieu of streets with spacing of no more than 330 feet except where prevented by barriers*
- *Limits use of cul-de-sacs and other closed-end street systems to situations where barriers prevent full street connections*
- *Includes no close-end street longer than 200 feet or having no more than 25 dwelling units*
- *Includes street cross-sections demonstrating dimensions of ROW improvements, with streets designed for posted or expected speed limits*

Functional Classification: In order to maintain consistency with surrounding jurisdictions, the Troutdale functional classification map was updated and is shown in Figure 1-4.

The City of Troutdale has adopted standards for street cross sections that apply citywide to local streets (32' curb-to-curb), neighborhood streets (36' curb-to-curb), and commercial/industrial streets (36' curb-to-curb). In addition, there is a special local street cross section for the town center area that allows narrower widths (28' curb-to-curb). To meet RTP street design standards, the following policies should be considered to narrow local street designs:

- *Adopt a 28' curb-to-curb cross section for local residential streets with less than 1,000 vehicles per day that are not primary emergency response routes. This cross section would allow parking on one side of the street. If curb cuts make up at least 40% of the street frontage, parking could be permitted on both sides of the street.*
- *Coordinate with the Gresham Fire Department to designate primary emergency response routes.*

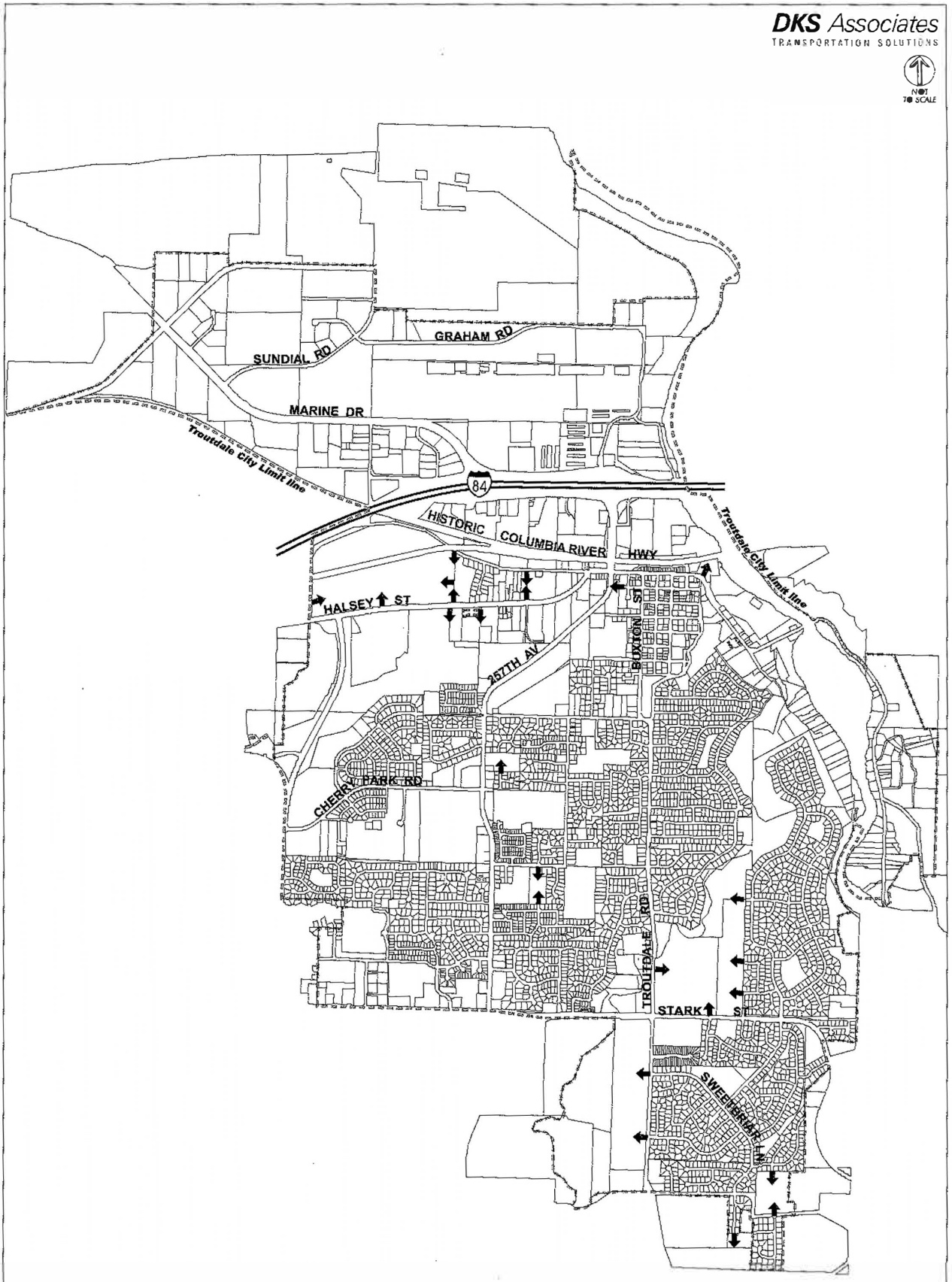


Figure 1-4
LOCAL STREET CONNECTIVITY MAP

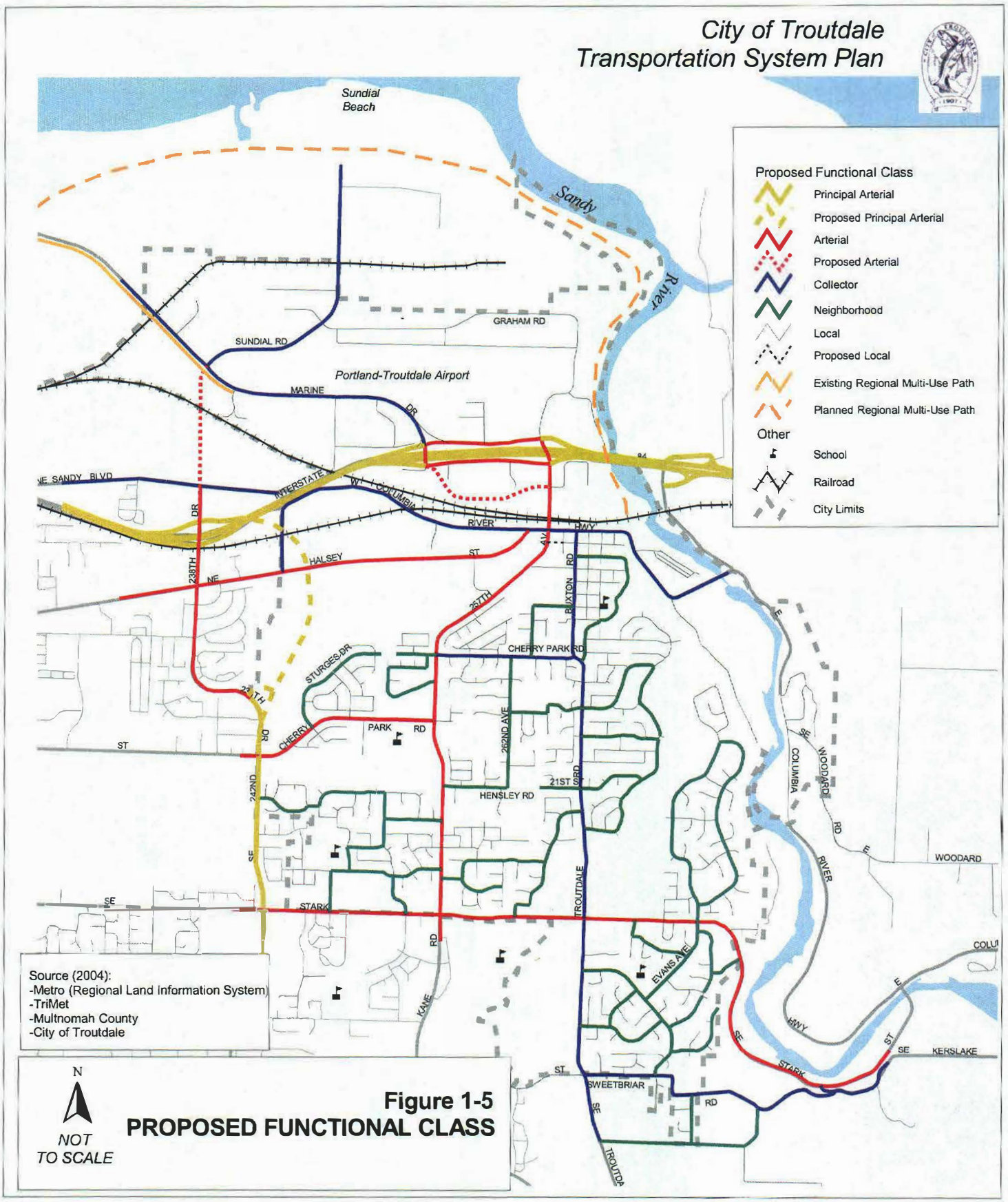


Figure 1-5
PROPOSED FUNCTIONAL CLASS

Parking Requirements: The City of Troutdale has off-street parking ratios (minimum and maximum) in Chapter 9 of the Development Code, which were adopted in 1998. While these ratios are consistent with the TPR and RTP parking ratio requirements, there are several additional parking policies that should be considered to update City Development Code to be consistent with the TPR and RTP[6]. These policies include:

- *Allow the designation of residential parking districts to protect residential areas from spillover parking generated by adjacent commercial, employment, or mixed-use areas, or other uses that generate a high demand for parking.*
- *Provide Metro annual parking data when requested that demonstrates compliance with the minimum and maximum parking ratios, including the application of any variances to the regional standards.*
- *Require parking lots more than 3 acres in size to provide street-like features along major driveways; including curbs, sidewalks, and street trees or planter strips. Major driveways in new residential and mixed-use areas shall meet connectivity standards for full street connections.*

Transportation Demand Management (TDM)

Transportation Demand Management (TDM) is the general term used to describe any action that removes single occupant vehicle trips from the roadway network during peak travel demand periods. As growth in the Troutdale area 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 accommodate this growth.

Generally, TDM focuses on reducing vehicle miles traveled and promoting alternative modes of travel for large employers of an area. 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]

The City of Troutdale and the Troutdale Transportation Management Agency (TMA) should coordinate with Multnomah County and TriMet to implement strategies to assure that the TDM assumptions in the RTP are implemented. The City of Troutdale, Multnomah County, and TriMet should coordinate to implement the pedestrian, bicycle, and transit system improvements, which offer alternative modes of travel. The recommended TDM action plan includes:

[6] *Urban Growth Management Functional Plan*, Title 2: Regional Parking Policy, Metro, September 22, 2004.

[7] *Oregon Administrative Rules, Chapter 340, Division 30.*

- *Coordinate with the Troutdale TMA to implement TDM strategies.*
- *Support continued efforts by TriMet, Metro, ODOT, and Multnomah County to develop productive TDM measures that reduce commuter vehicle miles and peak hour trips.*
- *Update the City of Troutdale Goals and Policies to adopt the 2040 Regional Non-SOV Modal Targets.*
- *Encourage the development of high speed communication in all part of the city (fiber optic, digital cable, DSL, etc). The objective would be to allow employers and residents the maximum opportunity to rely upon other systems for conducting business and activities than the transportation system during peak periods.*
- *Encourage developments that effectively mix land uses to reduce vehicle trip generation. These plans may include development linkages (particularly non-auto) that support greater use of alternative modes.*
- *Continued implementation of motor vehicle minimum and maximum parking ratios for new development.*
- *Continued implementation of street connectivity requirements.*
- *Require new development to install bicycle racks.*
- *Implementation of bicycle, pedestrian, motor vehicle and transit system action plan.*
- *Coordinate with the Troutdale TMA to monitor and manage the parking needs in the Troutdale Town Center, which could include long-term strategies such as parking pricing.*

Roadway Improvements

Based upon the evaluation of intersection capacity, the roadways in Troutdale would not meet 2025 demands without capacity improvements. Key issues to address include:

- ***Lack of north-south capacity**. The only north-south arterial route to Interstate 84 in Troutdale is via 257th Avenue. The Troutdale Road/Buxton Street parallel collector route is significantly congested. The lack of parallel routes for travel to or from the freeway system is a very significant constraint for the existing transportation system.*
- ***Frontage Road Congestion**. The existing configuration of the Troutdale interchange and the adjoining access provisions for fronting commercial properties is far below the capacity required to support peak period demands today and in the future. The interaction between truck traffic and motor vehicles significantly reduces the frontage road capacities.*

- ***Lack of direct access to the north-industrial area.*** *Access to the north-industrial area is provided through the congested I-84/257th Avenue interchange, which includes out of direction travel to Graham Road. An alternative access which was found to be attracting trips in the 2025 forecast model is the I-84/207th Avenue interchange, to Sandy Boulevard, to 223rd Avenue, to Marine Drive. However, this alternative includes significant out of direction travel.*
- ***Lack of east-west capacity.*** *The Stark Street corridor is significantly congested in 2025. The Halsey Street/Historic Columbia River Highway corridor is the only other route passing east-west through Troutdale. The lack of alternative east-west connections between neighborhoods in Troutdale increases delay on the arterial roadways and increases neighborhood cut-through traffic.*

Based on the needs identified above, a Motor Vehicle Master Plan was created and is shown in Figure 1-6. The new Motor Vehicle Master Plan costs are the sum of the remaining projects that are under the jurisdiction of different agencies, for a total of $118.4 million.

The motor vehicle strategies from the 1995 TSP were re-ranked by the Citizens Advisory Committee (CAC) for use in this TSP update[8] to create a prioritized Action Plan, which are projects that are reasonably expected to be funded by the year 2025. The highest ranking City projects that are reasonably expected to be funded were combined with projects from other agencies identified in the RTP Financially Constrained scenario to create the project list shown in Table 1-5.

[8] Citizens Advisory Committee Meeting, February 2, 2005.

Table 1-5: Motor Vehicle Action Plan

No.	Location	Description	Troutdale Cost ($1,000)
4	New Exit Roadway	Construct a 2-lane access controlled roadway from Marine Drive/South Frontage to 257th/Outlet Mall. Includes an Interchange Area Management Plan.	$952*
	Historic Columbia River Hwy/Buxton	Signalize in coordination with 257th/Historic Columbia River Highway.	$200**
12	Stark Street Widening West	Widen to 5-lane between 257th and Troutdale Road. Includes bike lanes and sidewalks.	-
14	2nd Street Extension	Construct a 2-lane roadway from Buxton Street to 257th Avenue. Right in/out at 257th.	$430
17	Halsey Widening	Widen to 3-lanes from 238th to Historic Columbia River Highway. Includes sidewalks and bike lanes.	-
		TOTAL	**$1,582**

- These projects are under the jurisdiction of, and will be funded by, other agencies.
* This cost includes the City of Troutdale's local matching funds contribution to the frontage road congestion improvement project.
** Although this project would be under the jurisdiction of Multnomah County, the City of Troutdale would provide funds to construct the project.

Trucks

Efficient truck movement plays a vital role in the economical movement of raw materials and finished products. The establishment of through truck routes provides for this efficient movement while at the same time maintaining neighborhood livability, public safety, and minimizing maintenance costs of the roadway system. The through truck route map from the 1995 TSP was updated to include the expanded study area and new roadway improvement projects identified in this TSP, which is shown in Figure 1-7. The objective of this route designation is to allow these routes to focus on design criteria that are "truck friendly"; i.e. 12-foot travel lanes, longer access spacing, 35-foot (or larger) curb returns, and pavement design that accommodates a larger share of trucks. The designated through truck routes in the TSP Study area include and exceed the coverage included in the RTP designations.

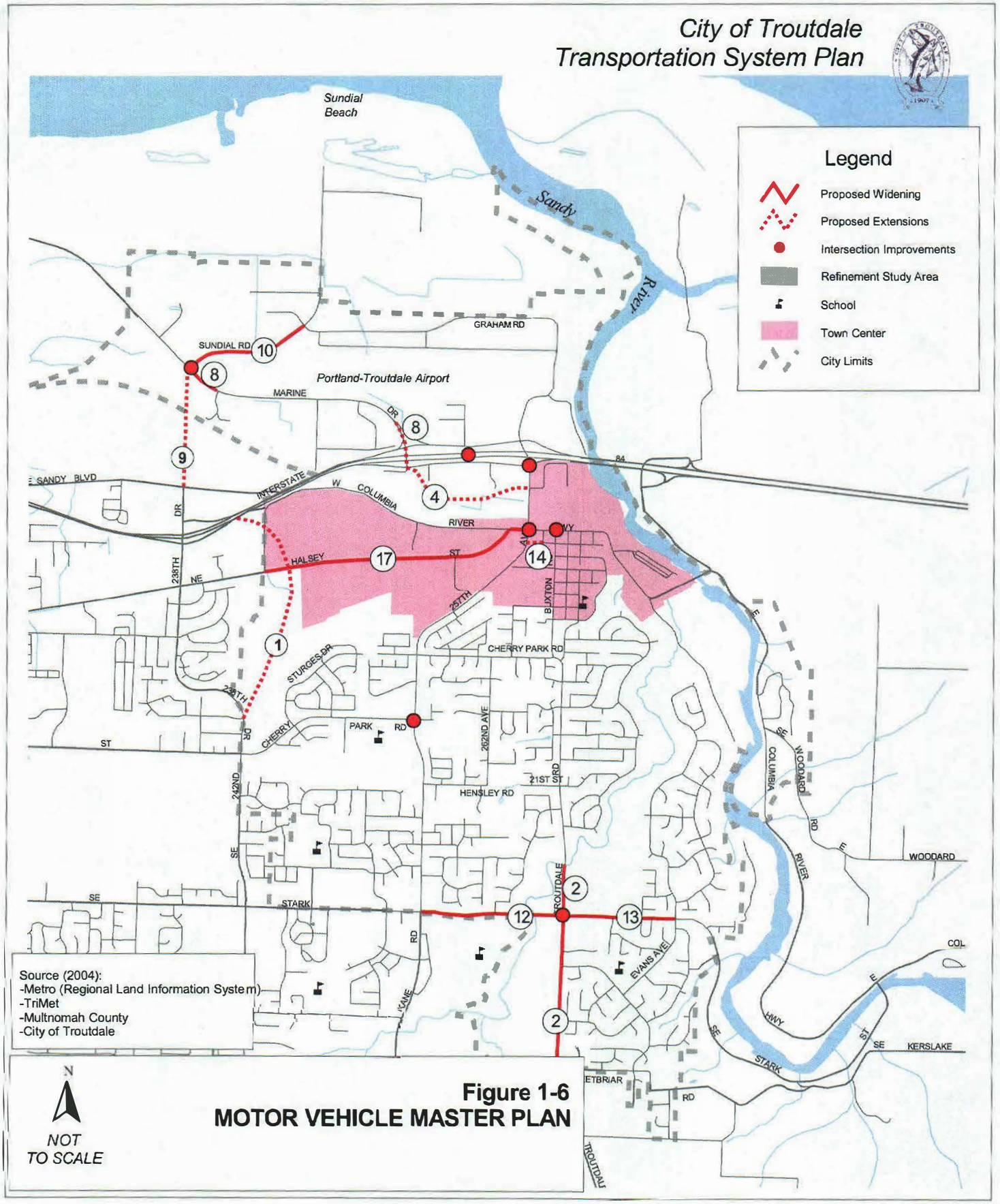
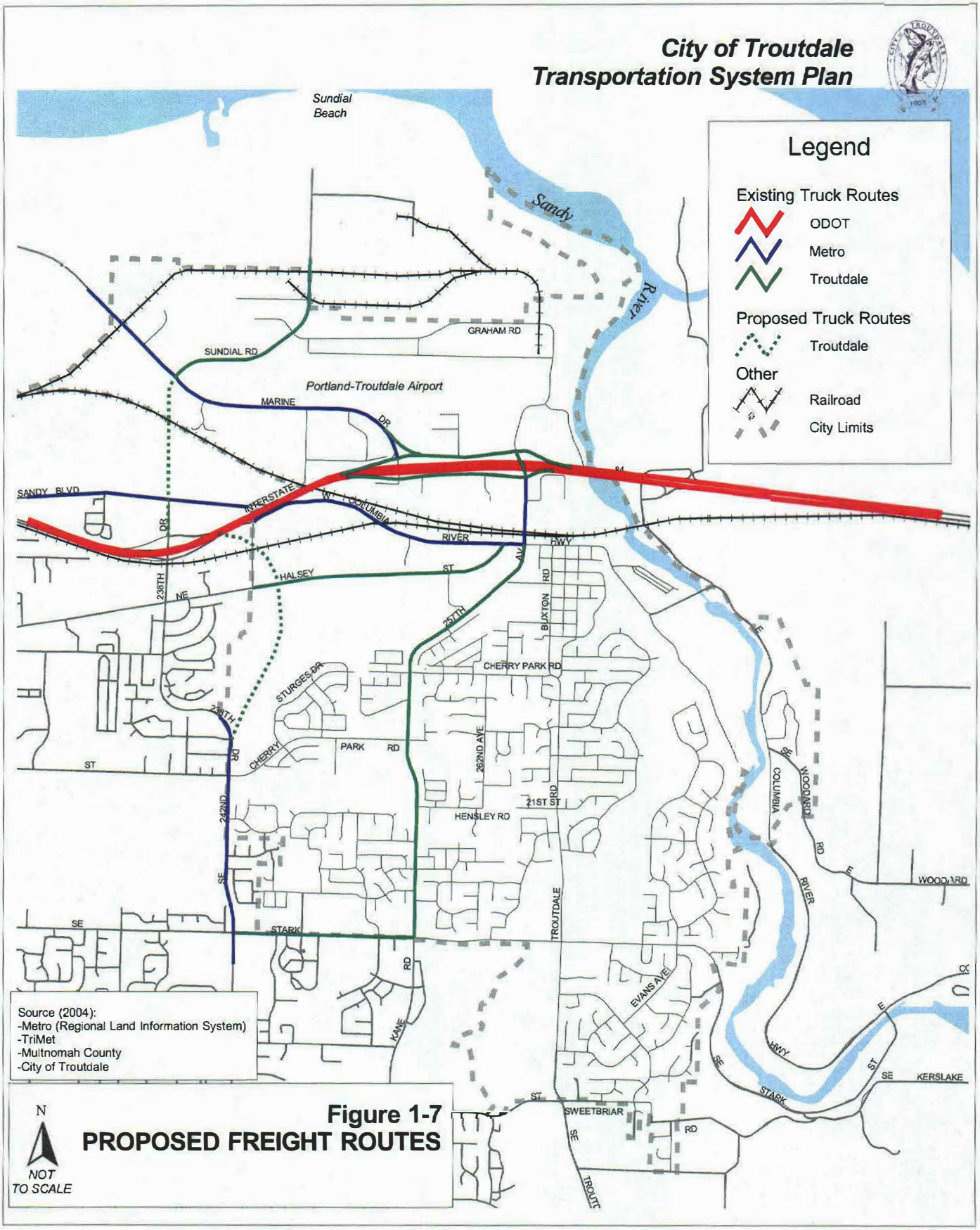


Figure 1-6
MOTOR VEHICLE MASTER PLAN


City of Troutdale
Transportation System Plan
Legend
Existing Truck Routes
ODOT
Metro
Troutdale
Proposed Truck Routes
Troutdale
Other
Railroad
City Limits
Sundial Beach
Sandy River
GRAHAM RD
SUNDIAL RD
Portland-Troutdale Airport
MARINE DR
SANDY BLVD
INTERSTATE 84
W COLUMBIA RIVER HWY
HALSEY ST
238TH DR
NE
257TH AVE
BLIXTON RD
CHERRY PARK RD
STURGES DR
CHERRY PARK RD
262ND AVE
21ST ST
HENSLEY RD
242ND DR
SE
STARK
TROUTDALE RD
KANE RD
EVANS AVE
SWEETBRIAR RD
TROUTDALE
COLUMBIA RIVER HWY
WOODARD RD
KERSLAKE
Source (2004):
-Metro (Regional Land Information System)
-TriMet
-Multnomah County
-City of Troutdale
N
NOT TO SCALE
Figure 1-7
PROPOSED FREIGHT ROUTES

Other Modes

While auto, transit, bicycle and pedestrian transportation modes have a more significant effect on the quality of life in Troutdale, other modes of transportation must be considered. Future needs for rail, air and pipeline infrastructure are identified by their providers and are summarized below.

Rail

There are two rail freight lines, the Graham (2A) and the Kenton (2AE) that currently traverse the City of Troutdale, combining to transport over 53 million gross tons of freight in 2002. There are no passenger trains currently running through Troutdale. The volume, length and schedule of the freight trains are not expected to change significantly over the 20 year planning horizon.

Gas Pipelines

Two high-pressure natural gas pipelines serve Troutdale. The future service of gas pipelines are not expected to change significantly over the 20 year planning horizon.

Air

The Troutdale Airport is located north of Interstate 84 and is classified as a Category 2 – Business or High Activity General Aviation Airport. The Troutdale Airport Master Plan predicts a modest 2 percent growth in both the number of operations and number of aircraft based in Troutdale over the next 10 years, concluding that current infrastructure is adequate to meet demand.

Financing

Transportation funding is commonly viewed as a user fee system where the users of the system pay for infrastructure through motor vehicle fees (such as gas tax and registration fees) or transit fares. However, a great share of motor vehicle user fees goes to road maintenance, operation and preservation of the system rather than construction of new system capacity. Much of what the public views as new construction is commonly funded (partially or fully) through property tax levies, traffic impact fees and fronting improvements to land development. The City of Troutdale utilizes a number of mechanisms to fund construction of its transportation infrastructure, including:

- Fuel Tax and Vehicle License Fee
- System Development Charge
- Exactions (Developer Required Improvements)

Under the above funding programs, the City of Troutdale will collect approximately $805,000 for street construction and repair each year[9]. This coming fiscal year, the city expects to spend more than the above revenues collected for transportation purposes, and replenishes these costs from city reserve funds. The difference for the current fiscal year is about $130,000.

The costs outlined in the Transportation System Plan to implement the Action Plans for Streets, Bicycles, Pedestrians, and Transit total $1.8 million, and several other recommended transportation operations and maintenance programs would add $17.0 million for a total cost over 20 years of $18.8 million, which is shown in Table 1-6. Note that additional projects are listed in the Action Plans that are expected to be funded by Multnomah County, or ODOT. These non-city costs have not been included in the estimates in Table 1-6, but are identified in Chapter 4.

[9] This higher revenue level annualizes the expected growth over 20 years, and is a higher amount than expected for the next fiscal year ($791,000).

Table 1-6: Troutdale Transportation Action Plans Costs over 20 years (2004 Dollars)

Transportation Element	Approximate Cost ($1,000)
System Improvement Projects (Action Plans projects to be funded by City)	
Motor Vehicle	$1,582
Bicycle	$22
Transit	$0
Pedestrian	$167
Total Capital Projects	**$1,771**
Operations and Maintenance Programs and Services	
Road Maintenance ($840,000 per year)	$16,800
Neighborhood Traffic Management ($10,000/yr)	$200
Total Operations and Maintenance Programs	**$17,000**
20 YEAR TOTAL in 2004 Dollars	**$18,771**

The estimated $18.8 million for capital projects and maintenance exceeds the expected 20-year revenue estimate of $16.1 million by approximately $2.7 million. Alternative solutions to address this funding deficit for the Action Plan projects were analyzed, including General Fund Revenues, Voter-Approved Local Gas Tax, Street Utility Fee Revenues, Expanded Transportation SDC, and Debt Financing. It is recommended that the City consider establishing a transportation, or street, utility as the backbone of its operations and maintenance funding approach. It is also recommended that the City consider updating its transportation SDC to cover the new City funded capital projects identified in the TSP. In addition, the City should actively pursue grant and other special program funding in order to mitigate the costs to its citizens of transportation capital construction.

We estimate that a transportation utility fee and an updated transportation SDC could generate roughly $230,000 per year, or $4.6 million over the next 20 years, and shown in Table 1-7 below. These additional funds would be expected to generate sufficient revenues to fully capitalize the Action Plan projects and maintenance programs.

Table 1-7: Recommended New Funding Sources for Troutdale Transportation

Transportation Funding Source	Estimated Additional Annual Revenues
Transportation Utility Fee	$200,000 to $250,000
Updated Transportation SDC (current rate at $598 per trip) *	$2,700
Annual New Revenues	**$202,700 to $252,700**
20 YEAR TOTAL in 2004 Dollars	**$4.1 to 5.1 Million**

* Assumes increase to $617 per trip, or $19 above the proposed $598 fee level.

Note: The trips used to calculate SDC revenue assumes annexation of land within the Troutdale Urban Planning Boundary.

2. Goals and Policies

Overview

The transportation-related goals and policies established by the 1995 TSP were adopted to guide transportation system development in Troutdale. Since 1995, there have been several changes to state and regional transportation plan policies and regulations that should be addressed as a part of this TSP. In addition to retaining previously adopted policies that are still applicable, new policies are suggested to incorporate recent initiatives within the City and county as it relates to transportation facilities. New goals and policies are suggested in the following sections, and they are noted accordingly. The specific areas of the changes address the following key issues, some of which the City has already implemented or will be accomplished by the adoption of this TSP:

- Parking provisions — Establishing a process to allow variances to standard parking ratios; allowing residential parking districts to be formed; and requiring large parking lots to provide street-like features.
- Street connectivity — Metro adopted street and walkway spacing standards that should be reflected in the local street connectivity plan within the TSP to guide future connections to larger vacant lands that work towards reducing out-of-direction travel for autos, bicyclists, and pedestrians.
- Level of Service — Metro and ODOT have adopted transportation plans with new standards for mobility during peak periods.
- Transportation modal targets — Incorporate Metro vehicle occupancy goals that include reductions of the single-occupant vehicle by 2040, and support continued efforts by other agencies to reduce commuter travel. In Troutdale, the best opportunity to reduce commute travel would be at larger employment sites within the City, and through encouraging broadband communication systems.
- Street design — New street design guidelines suggest options for narrower residential streets within new subdivisions. In addition, the City should formalize its application of neighborhood traffic management tools. Furthermore, street improvements along arterials should be constructed to allow provision of fiber optic cable that is being installed on many county roadways.

Goals and Policies

Goal 1. Transportation facilities shall be designed and constructed in a manner which enhances the livability of Troutdale.

Policy a. Minimize the "barrier" effect of large arterial streets (for example 257th Avenue).

Action: Pedestrian crossing spacing, traffic signal spacing and landscape standards for large arterial streets in Troutdale shall be developed in conjunction with Multnomah County and Metro.

Policy b. Make streets as "unobtrusive" to the community as possible.

Action: The city shall maintain design standards for local streets which address landscaping, cross section width, and provision of alternative modes for each functional classification.

Policy c. Build neighborhood streets to minimize speeding.

Action: The City shall allow for neighborhood traffic management in new development as well as existing neighborhoods for City streets. Measures to be developed may include narrower streets, humps, traffic circles, curb/sidewalk bulbs, curving streets, diverters and/or other measures.

Policy d. Encourage pedestrian and bicycle accessibility by providing safe, secure and desirable walkway routes, with a preferred spacing of no more than 330 feet, between elements of the pedestrian network.

Action: The city shall develop and maintain a "pedestrian grid" in Troutdale, outlining pedestrian routes. Sidewalk standards shall be developed to define various widths, as necessary, for City street types.

Policy e. In residential areas, discourage extended use of on-street parking.

Action: The city shall maintain code provisions addressing extended on-street parking and on-street parking of vehicles used for commercial use or non-residential-type purposes (i.e. semi trucks or home businesses with extensive use of on-street parking).

Goal 2. Provide a transportation system in Troutdale which is safe, reduces length of travel and limits congestion.

Policy a. Design of streets should relate to their intended use.

Action: A functional classification system shall be developed for Troutdale which meets the City's needs and respects needs of other agencies (Multnomah County, ODOT, Metro, City of Gresham, City of Wood Village). Appropriate design standards for these roadways shall be developed by the appropriate jurisdictions.

Action: A primary emergency response route system shall be developed for roadways within Troutdale in coordination with the Gresham Fire Department. Appropriate traffic calming guidelines for these routes shall be developed in coordination with the Gresham Fire Department and other agencies (City of Troutdale, Multnomah County, ODOT).

Policy b. Local streets shall be designed to encourage a reduction in trip length by providing connectivity and limiting out-of-direction travel. Provide connectivity to activity centers and designations with a priority for pedestrian connections. Wherever necessary, new streets built to provide connectivity shall incorporate traffic management design elements, particularly those which inhibit speeding. New or improved local streets should comply with adopted street spacing standards.

Action: The purpose of this policy is to provide accessibility to various designations within Troutdale without creating a grid-type network with long, straight streets which encourage speeding or through traffic.

Policy c. No City of Troutdale streets shall exceed one travel lane in each direction, with turn lanes allowed to accommodate demand.

Action: To avoid impacts of land use on roadway capacity, land uses in the comprehensive plan should be followed. Unless designated and built as part of a transit oriented development (TOD), large retail land uses (greater than 20,000 SF) in areas not zoned commercial should be avoided (allowing for some commercial for adjacent uses) due to the significantly larger vehicle traffic generation. Retail developments would be responsible for improvements required to accommodate their associated traffic.

Policy d. Safe and secure pedestrian and bicycle ways shall be designed between parks and other activity centers in Troutdale.

Policy e. Monitor and participate in regional planning efforts, including the development of the Regional Transportation Plan (RTP), to secure funding for safety and capacity improvements to the City of Troutdale's arterial and collector street system that are necessary to maintain acceptable levels of service for local and through traffic.

Goal 3. Provide a balanced transportation system and reduce the number of trips by single occupant vehicles.

Policy a. Commercial, community service and high employment industrial uses shall be developed and sited to be supportive and convenient to pedestrians, bicyclists and transit riders. Pedestrians and bicycle amenities, transit facilities, ride-share programs or similar commute trip reduction measures shall be incorporated in commercial and industrial development to the maximum extent possible.

Action: Standards will be necessary for development adjacent to transit streets. Site design requirements will be needed. Pedestrian accessways, without vehicle conflicts, will need to be identified for every site for access to public right-of-way and pedestrian system (alternatives with minimum conflict may also be developed).

Policy b. Recreational trails, including the 40-Mile Loop, shall link to Troutdale's bicycle and pedestrian plans.

Action: The pedestrian plan will need to indicate linkages between recreational and basic pedestrian network. Design standards for recreational elements will need to be developed and maintained.

Policy c. Consistent with the Multnomah County Bicycle Master Plan, bicycle ways should be constructed on all arterials and collectors within Troutdale (with construction or reconstruction projects). All schools, parks, public facilities and retail areas shall have direct access to a bicycle lane or route.

Action: The bicycle plan shall be defined and needs to connect key activity centers with adjacent access. Standards for bicycle facilities within Troutdale shall be developed and maintained. Definition of needs for bicycle parking shall be required including guidelines on placement on sites. Where activity centers are on local streets, connections to bicycle lanes shall be designated.

Policy d. The City shall coordinate with Tri-Met to improve transit service to Troutdale. Fixed route Trimet transit service shall use arterial and collector streets in Troutdale.

Action: The TriMet service plan shall be the guiding transit plan for Troutdale. Adding elements such as park-and-ride lots near I-84, circulation routes linking retail to residential in Troutdale and direct service to downtown Portland (or Columbia Corridor) are samples of the input to be provided to TriMet.

Action: The City shall adopt a Transit System Master Plan that designates existing and potential transit routes, as well as transit signal priority corridors in coordination with Multnomah County.

Action: The City shall coordinate with TriMet to provide additional rider amenities (shelters, lighting, trash cans, route information) at transit stops within the City that are consistent with TriMet guidelines.

Policy e. The City and the Transit Management Agency (TMA) shall participate in trip reduction strategies developed regionally, including employment, tourist and recreational trip programs.

Action: DEQ and Metro are developing regional policies regarding trip reduction. Some of these policies are aimed at provision of parking and others are aimed at ridesharing (Employees Commute Options – ECO rules).

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

2040 Regional Metro Target Non-Single Occupant Vehicles

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

Action: The City shall work with Metro and other regional transportation partners to implement regional transportation demand management programs where appropriate.

Goal 4. Provide for efficient movement of goods.

Policy a. Grade separation or gate control should be considered for all railroad crossings.

Action: Support the upgrade of railroad grade crossings to current design standards.

Policy b. The City shall coordinate and cooperate with the Port of Portland on its plans for the Troutdale Airport.

Policy c. Designated arterial routes and freeway access areas in Troutdale are essential for efficient movement of goods. Design of these facilities and adjacent land uses should reflect the needs of goods movement.

Action: Work with ODOT to improve the Frontage Road area to reduce conflicts between truck maneuvering and through moving residents and tourists.

Policy d. Access control standards shall be preserved on arterial routes to reduce conflicts between vehicles and trucks, as well as conflicts between vehicles and pedestrians.

Goal 5. Develop transportation facilities which are accessible to all members of the community.

Policy a. Construct transportation facilities to meet the requirements of the Americans with Disabilities Act.

Goal 6: Develop a transportation system that is consistent with the City's adopted comprehensive land use plan, and with the adopted plans of state, local and regional jurisdictions.

Policy a – The City shall implement the transportation plan based on the functional classification of streets shown in Figure 4-10.

Policy b – The City transportation system plan shall be consistent with the city's adopted land use plan and with transportation plans and policies of other local jurisdictions, especially Multnomah County, City of Wood Village, City of Fairview and the City of Gresham.

Policy c – The City shall coordinate with Metro regarding implementation of the Regional Transportation Plan and related transportation sections of the Metro Functional Plan.

Policy d — The City shall work with Metro and other regional transportation partners to implement regional transportation demand management programs where appropriate.

Policy e – The City shall work cooperatively with the Port of Portland and local governments in the region to ensure sufficient air and marine passenger access.

Policy f – The City shall work cooperatively with Multnomah County, ODOT, and the Federal Highway Administration (FHWA) to support Intelligent Transportation System (ITS) implementation.

Action: The City shall adopt a Traffic Control Master Plan that identifies existing and planned ITS devices and communications infrastructure with the City.

Goal 7: Establish a clear and objective set of transportation design and development regulations that addresses all elements of the city transportation system and that promote access to and utilization of a multi-modal transportation system.

Policy a. The City shall evaluate land development projects to determine possible adverse traffic impacts and to ensure that all new development contributes a fair share toward on-site and off-site transportation system improvement remedies.

Policy b. The City shall require dedication of land for future streets when development is approved. The property developer shall be required to make street improvements for their portion of the street commensurate with the proportional benefit that the improvement provides the development.

Policy c. The City shall require applicable developments to prepare a traffic impact analysis.

Policy d. The City shall adopt a uniform set of design guidelines that provide one or more typical cross sections associated with those functional street classifications under its jurisdiction. For example, the City may allow for a standard roadway cross-section and a boulevard cross-section for arterial and collector streets.

Policy e. The City shall adopt roadway design guidelines and standards that ensure sufficient right-of-way is provided for necessary roadway, bikeway, and pedestrian improvements.

Policy f. The City shall adopt roadway design guidelines and standards that ensure sidewalks and bikeways be provided on all arterial and collector streets under its jurisdiction for the safe and efficient movement of pedestrians and bicyclists between residential areas, schools, employment, commercial and recreational areas.

Policy g. The City shall generally favor granting property access from the street with the lowest functional classification, including alleys. Additional access to arterials and collectors for single family units shall be prohibited unless no other reasonable access exists. Single family dwellings shall access from frontage roads and local streets. Frontage roads shall be designed as local streets.

Policy h.: The City shall adopt access control and spacing standards for all arterial and collector streets under its jurisdiction to improve safety and promote efficient through street movement. Access control measures shall be generally consistent with Multnomah County access guidelines to ensure consistency on city and county roads.

Policy i. The City shall adopt parking control regulations for streets as needed. On-street parking shall not be permitted on any street designated as an arterial, unless allowed by special provision within the Town Center area. Parking regulations should allow the formation of a residential permit parking district.

Policy j. The City shall adopt off-street parking regulations, as needed, to provide guidelines for large lots (over 3 acres) to incorporate street-like features such as sidewalks, street lights, etc.

Policy k. The City shall adopt road design standards that support the implementation of planned ITS improvements.

Policy l. The City shall adopt design standards that require new retail, office, and institutional buildings on sites at RTP designated major transit stops to meet RTP design requirements.

3. Existing Conditions

Overview

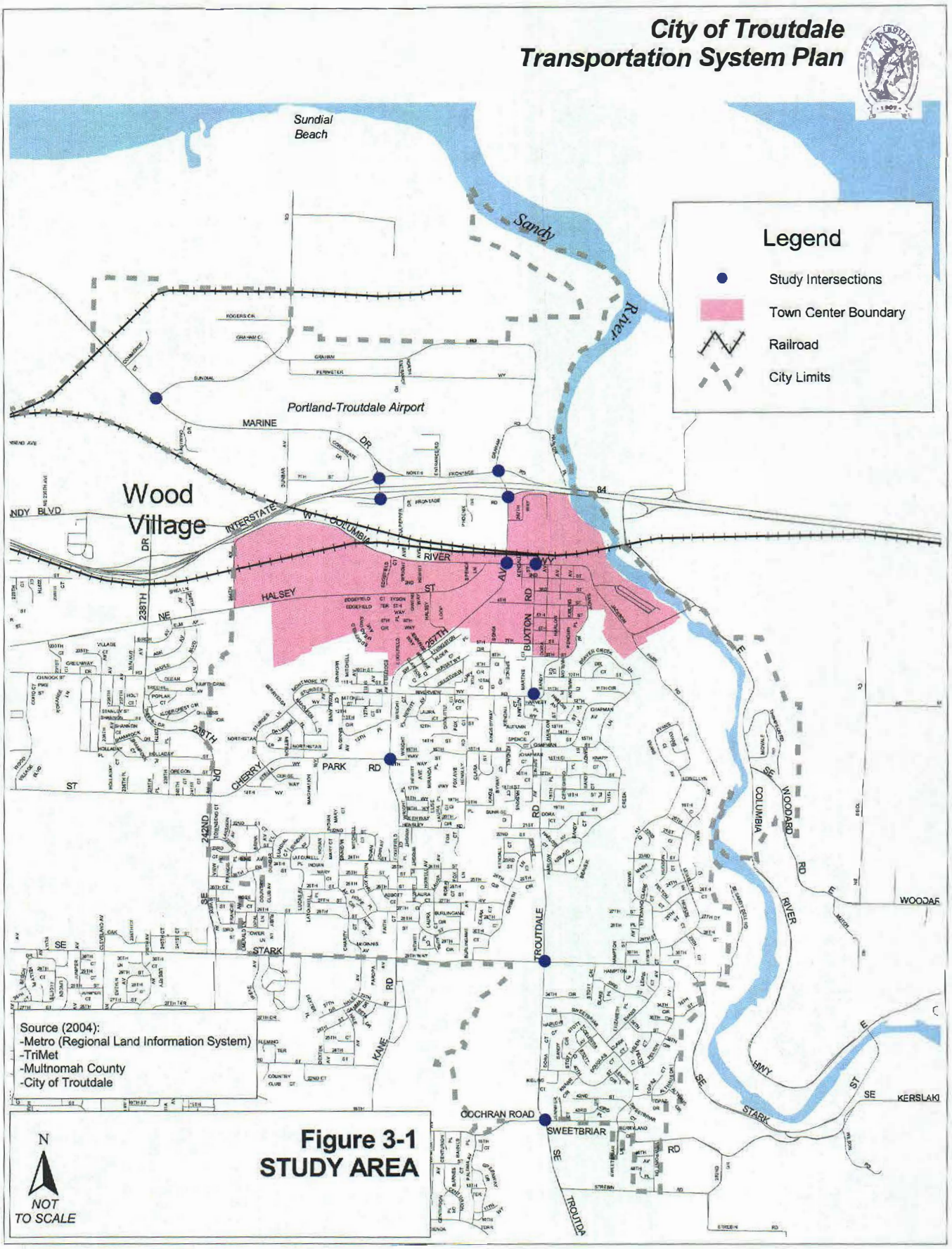
Existing transportation conditions were evaluated as part of the City of Troutdale Transportation System Plan (TSP). This chapter summarizes existing traffic and transportation operation in the City. It considers all travel modes including pedestrians, bicycles, transit, motor vehicles, freight, water, air, and pipelines. An inventory was conducted in Spring 2004 to establish base year conditions for the TSP. Much of this data provides a benchmark (basis of comparison) for future assessment of transportation performance in Troutdale relative to desired policies.

The study area is shown in Figure 3-1. Eleven intersections within the study area were selected for operational evaluation. Traffic data was gathered at these locations and analyzed in order to evaluate area traffic conditions including volumes and levels of service. In addition, regional transportation system inventories were used to map existing facilities. The following sections describe the existing systems, usage, and performance in the City of Troutdale.

Findings and Conclusions

This section highlights specific transportation issues observed today that should be addressed with this TSP. It outlines the deficiencies that are present under current (2004) conditions and identifies areas that should be considered in subsequent steps of this process.

Existing conditions analysis includes an assessment of current transportation facilities in meeting today's (2004) travel demand's based on agency standards. The major issues found after analyzing the existing transportation conditions in the Troutdale community fall into three distinct categories: connectivity, capacity and safety.


City of Troutdale
Transportation System Plan
Sundial Beach
Sandy River
Legend
Study Intersections
Town Center Boundary
Railroad
City Limits
Portland-Troutdale Airport
MARINE DR
Wood Village
INTERSTATE 84
COLUMBIA RIVER
HALSEY ST
257TH AVE
BUXTON RD
238TH DR
238TH NE
PARK RD
CHERRY ST
242ND DR
STARK ST
TROUTDALE RD
KANE RD
COCHRAN ROAD
SWEETBRIAR RD
COLUMBIA RIVER HWY
WOODARD RD
Source (2004):
-Metro (Regional Land Information System)
-TriMet
-Multnomah County
-City of Troutdale
N
NOT TO SCALE
Figure 3-1
STUDY AREA

Connectivity: A well connected transportation system provides three distinct advantages. First, it reduces travel time and miles of driving required as origins and destinations are connected through more direct routes. Secondly, local traffic is able to make trips to in-town destinations using well connected local streets as opposed to clogging up arterials. Thirdly, emergency vehicles have shorter response time to residential neighborhoods. Current connectivity issues that need to be addressed include:

- The southern I-84 frontage road has recurring issues with queuing and heavy traffic congestion. A parallel route for local commercial traffic should be considered to relive the congestion and excessive queues along this route.
- A lack of adequate east/west connectivity. Particularly, connections between Sturges Lane/ Sturges Drive and Hensley Road/ 21st Street and the extension of Marine Drive across I-84 to the Historic Columbia River Highway should be considered.
- Additional multi-use paths connecting parks, retail centers and other trip generators with residential areas, increasing the opportunities for non-motorized trips and reducing single occupied vehicle trips.

Capacity: Deficiencies of existing conditions must be addressed so the transportation system can handle the future increase in vehicular volume. The major issue affecting future capacity concerns in the City of Troutdale is:

- Development of the former Alcoa Aluminum Plant, which includes over 700 acres of developable land located north of the Troutdale Airport. Surrounding infrastructure must be analyzed to determine capacity issues once this area has been developed.

Safety: Transportation infrastructure must be safe and reliable for users of all modes, including pedestrians, bicyclists and motor vehicles. Identified safety issues in the existing conditions analysis include:

- Pedestrian crossings and overall pedestrian accommodations along 257th Avenue, the town center area, and all other corridors where pedestrian crossing spacing is too far apart.
- 242nd between Cherry Park Drive to Stark Street. There are currently no protected left turn lanes or turn pockets, which can cause both safety and operational issues.
- Four intersections are on the most recent County Safety Priority Index System (SPIS) rankings, meaning that these intersections have more severe safety issues than many other intersections in the County. Mitigation measures for these intersections should be identified.

The following sections review existing conditions associated with each mode including pedestrian, bicycle, transit, motor vehicle and other modes (such as rail, marine and pipeline).

Pedestrians

Figure 3-2 shows the existing sidewalk inventory in Troutdale. Large portions of the arterial and collector streets in Troutdale have sidewalks on at least one side of the street. There are some locations where sidewalks are not connected; however, connectivity and pedestrian linkages are relatively good, particularly to parks and schools. In addition, a majority of the residential streets have sidewalks on both sides of the street, providing connections to major roadways and other neighborhoods. There is a regional multi-use path that travels from Blue Lake Park along Marine Drive into Troutdale City limits, terminating east of Sundial Road. This trail serves as a pedestrian facility for non-motorized travel along Marine Drive as there are no sidewalks on this stretch of road. There are no other multi-use paths or trails within the City.

Issue: *Additional multi-use path connections between neighborhoods would help to complete the pedestrian grid system, and these should be considered in the TSP.*

Downtown Troutdale is classified as a Town Center in the Regional Transportation Plan (RTP). Town centers function as local activity areas and provide a range of local retail and service opportunities within a close proximately to each other and residents within a few miles of the designated area. Ideally, Town Centers offer special attractions of regional interest, simultaneously requiring and supporting a high-quality public transportation system and strong multi-modal arterial street access to regional centers and other major destinations. Troutdale's town center is characterized by a variety of small specialty retail shops, store front businesses and a historic grid street network. There are two parks and one school within the town center boundaries. The majority of streets have sidewalks on both sides. Additionally, the RTP identifies 257th Avenue, Halsey Street and Columbia River Highway transit/mixed use corridors as they radiate west from the Troutdale town center. This distinction qualifies these road segments to receive regional priority for pedestrian improvements.

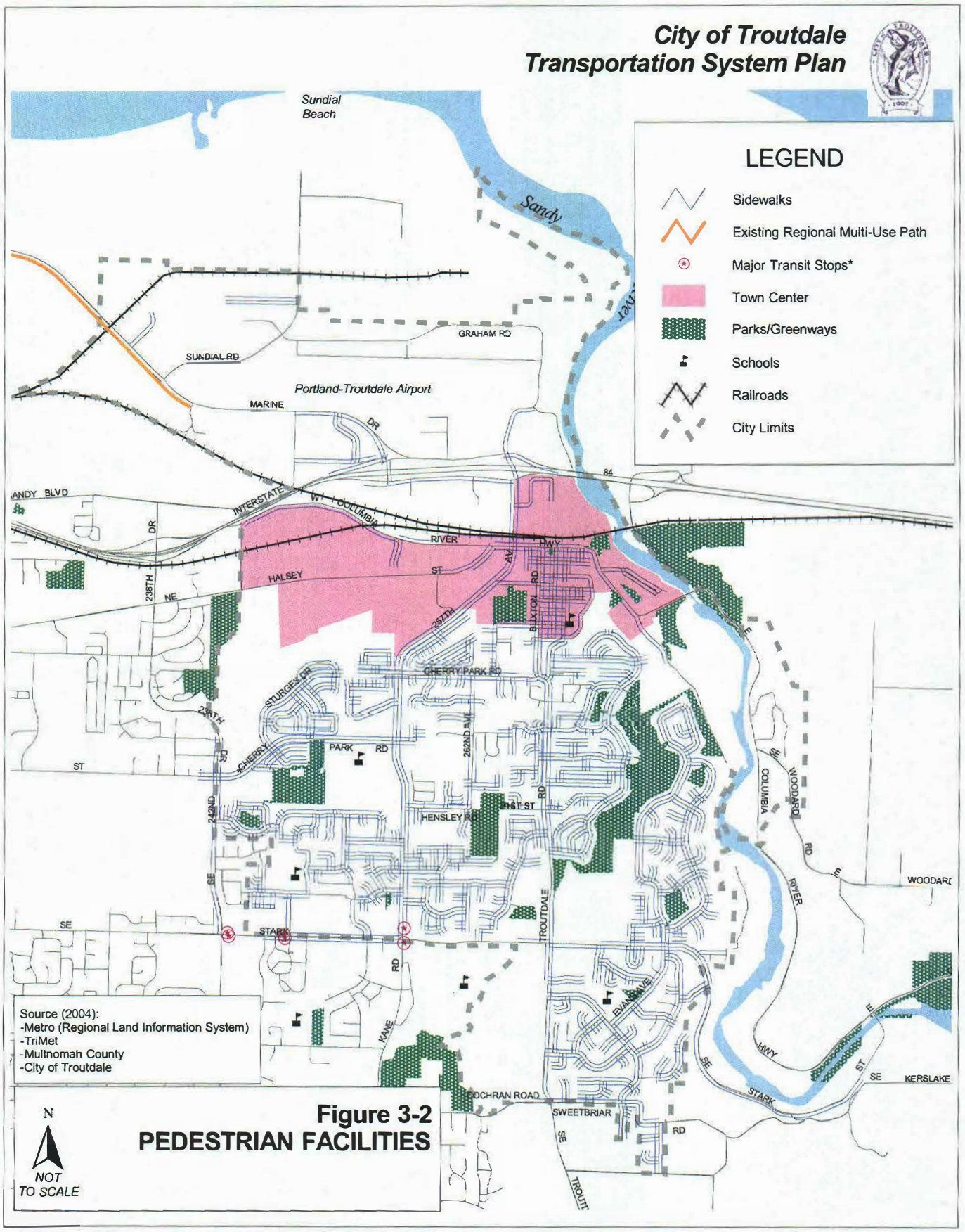
Pedestrian crossing volumes at the study intersections were counted during the PM peak hour turn movement counts. The pedestrian crossing volumes are shown in Table 3-1.

Table 3-1: PM Peak Hour Pedestrian Crossing Volumes at Study Intersections

Intersection	Pedestrian PM peak Hour Volume
Buxton Road/Historic Columbia River Highway	38
Marine Drive/Sundial Road	0
257th Drive/Cherry Park Road (south)	22
257th Drive/Historic Columbia River Highway	19
Cherry Park Road/Buxton Street	2
I-84 westbound ramps/Marine Road	2
I-84 eastbound ramps/Marine Road	0
I-84 eastbound ramps/Graham Road	0
I-84 westbound ramps/Graham Road	2
Troutdale Road/Stark Street	44
Troutdale Road/Cochran Road	0

The most significant pedestrian movements occur near retail, recreational, educational and town center areas, including Buxton Road, Troutdale Road, Cherry Park Road and 257th Avenue. Along major roadways, such as Halsey Street and 257th Avenue, and heavy freight movement routes, such as Marine Drive, pedestrian crossings are limited to locations with traffic signal controls due to high motor vehicle volumes and speeds.

Issue: *The TSP should examine providing additional crossings and connections to the pedestrian system to improve crossing spacing along 257th Avenue and Stark Street as well as expanding the multi-use path network in an effort to connect parks, retail centers and other trip generators with residential areas.*



* Major Transit Stops are defined as major bus stops, transit centers and light-rail stations on the regional transit network. They provide schedual information, lighting, benches, shelters and trash cans.

Bicycles

Figure 3-3 shows the existing bicycle facility inventory in Troutdale. The majority of the collector and arterial routes in Troutdale do provide bike lanes. Consequently, the existing bike lane system provides adequate connections from neighborhoods to schools, parks, retail centers, and transit stops. Cyclists desiring to travel through the City can use the designated routes on the major streets and can share the road with motor vehicles on the lower volume, neighborhood streets to reach destinations.

Bicycle counts were conducted during the evening peak period (4:00 to 6:00 PM) at the study intersections in Troutdale and are shown in Table 3-2. The existing bicycle volumes are generally low and can be expected to increase in residential areas during the summer months.

Table 3-2: PM Peak Hour Bicycle Crossing Volumes at Study Intersections

Intersection	Bike PM peak Hour Volume
Buxton Road/Historic Columbia River Highway	0
Marine Drive/Sundial Road	0
257th Drive/Cherry Park Road (south)	0
257th Drive/Historic Columbia River Highway	0
Cherry Park Road/Buxton Street	0
I-84 westbound ramps/Marine Road	0
I-84 eastbound ramps/Marine Road	0
I-84 eastbound ramps/Graham Road	5
I-84 westbound ramps/Graham Road	0
Troutdale Road/Stark Street	7
Troutdale Road/Cochran Road	2

DKS *Associates*
TRANSPORTATION SOLUTIONS

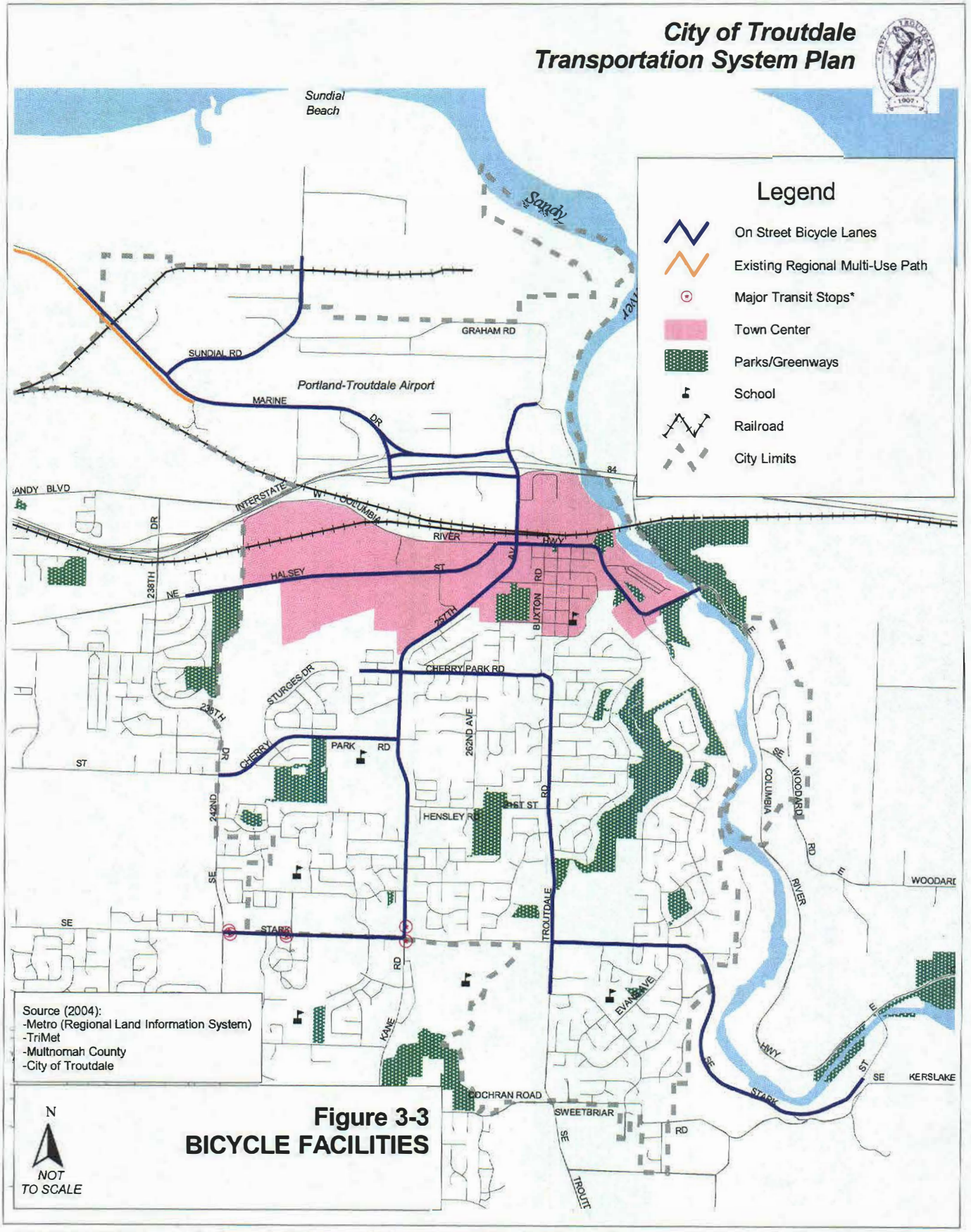


Figure 3-3
BICYCLE FACILITIES

* Major Transit Stops are defined as major bus stops, transit centers and light-rail stations on the regional transit network. They provide schedual information, lighting, benches, shelters and trash cans.

Transit

Transit service is provided to Troutdale by the Tri-County Metropolitan District of Oregon (TriMet). Figure 3-4 shows current TriMet bus routes serving Troutdale, which includes routes 20, 77, 80 and 81. These routes connect downtown Troutdale, the Interstate 84 access roads and the outlet mall to Downtown Portland and other regional centers, such as downtown Gresham and the I-205 Mall regional center. There are no park-and-ride lots provided in the City of Troutdale. Table 3-3 lists the average routes headways and corresponding level of service (based on the *Highway Capacity Manual* methodology[1]) for each of the routes serving Troutdale.

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

	Average Headways (minutes)			Level of Service		
Route	**AM**	**Midday**	**PM**	**AM**	**Midday**	**PM**
#20 Burnside/Stark	15	15	15	C	C	C
#77 Broadway/Halsey	15	15	15	C	C	C
#80 Kane Road/Troutdale Road	20	30	20	D	E	D
#81 Kane Road/257th Avenue	30	30	20	E	E	D

Note: AM Period = 06:00-08:30, Midday Period = 08:30-16:00, PM Period = 16:00-18:00
Level of Service for transit service based on headway: less than 10 minutes = LOS A;
10-14 minutes = LOS B; 14-19 minutes = LOS C; 20-29 minutes = LOS D; 30-60 minutes = LOS E;
and greater than 60 minutes = LOS F.

In addition to the headway level of service measure, transit level of service can be analyzed based on area of coverage and route reliability. Transit coverage is based on comparing land that has a high enough density to support transit service versus a ¼ mile walking distance buffer around transit stops. As land use details are complete for the travel demand forecasting for the TSP, transit coverage analysis will be added as a performance measure. Transit service reliability is primarily measured by the ability for buses to maintain schedules along corridors. Transit routes serving Troutdale depend on roadway operations in the surrounding jurisdictions to the west and south (Stark Street, Halsey Street and 257th Avenue). Reliability in these areas is addressed by the Wood Village TSP, the Fairview TSP, the Gresham TSP, the Oregon Highway Plan, and the Regional Transportation Plan. Within Troutdale, this TSP should address transit reliability by maintaining adequate travel speeds and intersection

[1] *2000 Highway Capacity Manual*, Transportation Research Board, 2000, Chapter 27.

operation along transit routes (this could include measures such as signal coordination and bus priority).

Weekday bus boarding information was received from TriMet and reflects the fall 2004 census. Figure 3-5 shows the average weekday boardings at each transit stop. In addition, Figure 3-5 shows existing transit shelters in Troutdale. TriMet typically considers locating transit shelters at stops with 35 or more boarding's per day[2]. Troutdale has a few stops that met this minimum boarding threshold, but do not currently have shelters.

[2] *Design Criteria*, TriMet, August 2002.

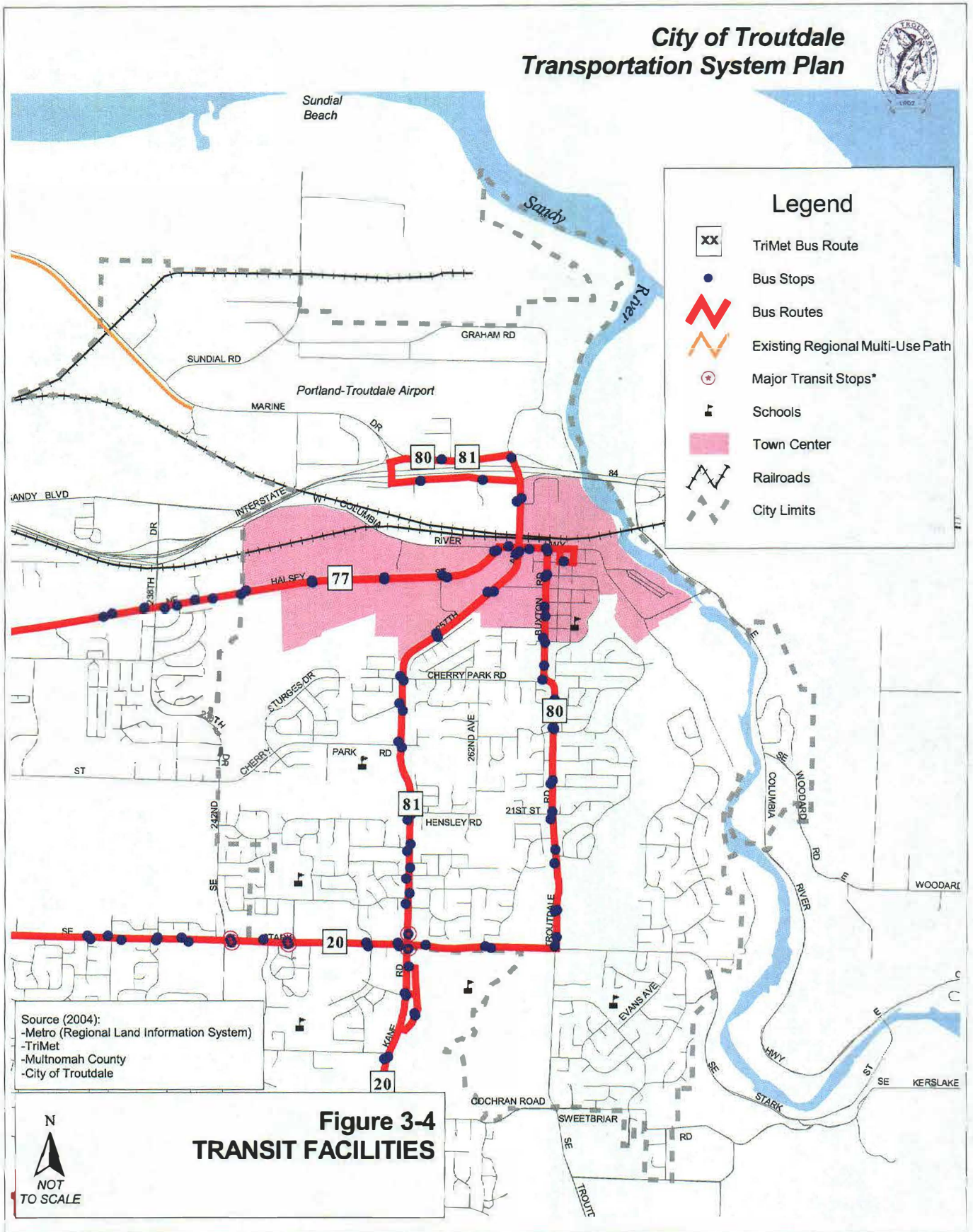
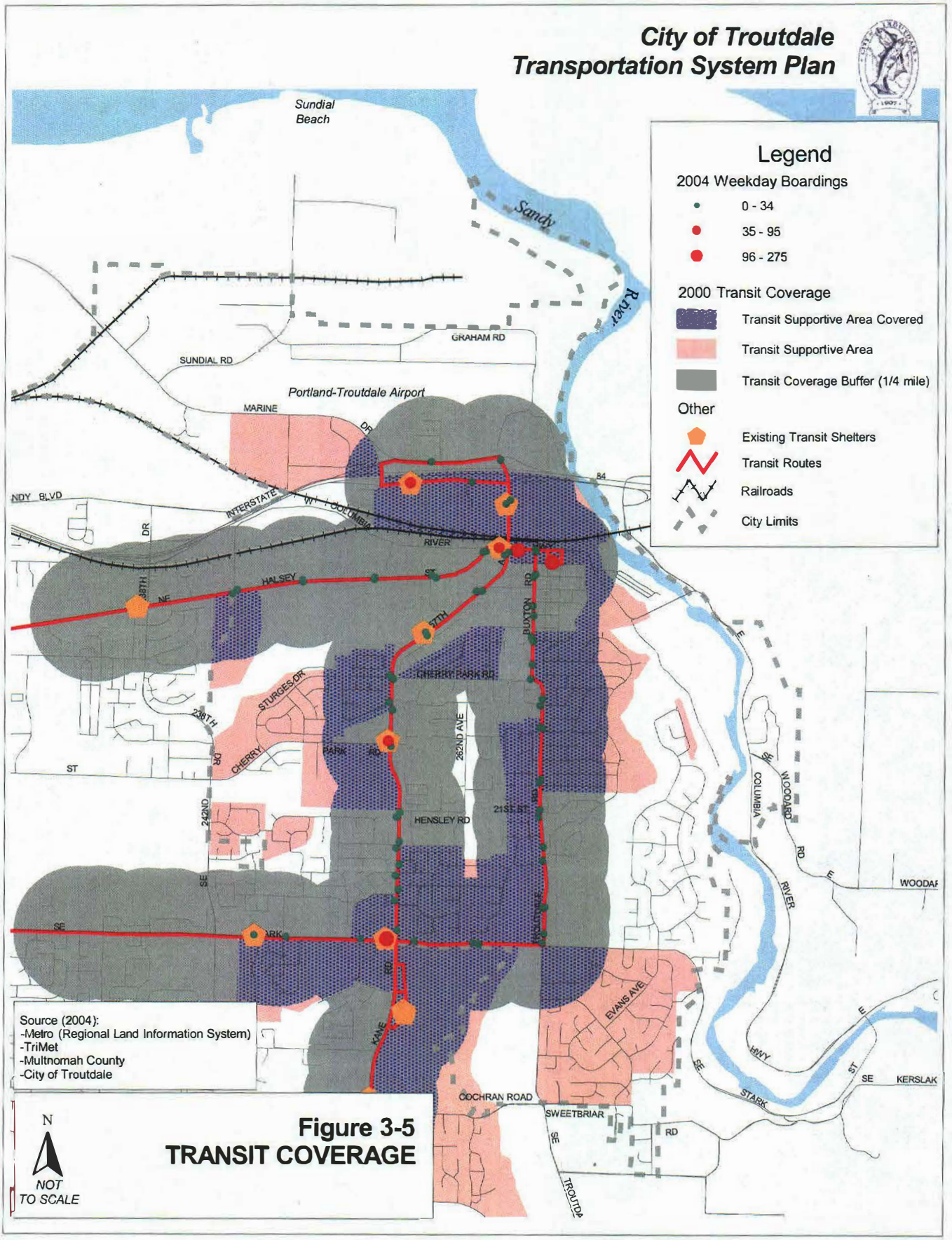


Figure 3-4
TRANSIT FACILITIES

* Major Transit Stops are defined as major bus stops, transit centers and light-rail stations on the regional transit network. They provide schedule information, lighting, benches, shelters and trash cans.


City of Troutdale
Transportation System Plan
Sundial Beach
Sandy River
Legend
2004 Weekday Boardings
0 - 34
35 - 95
96 - 275
2000 Transit Coverage
Transit Supportive Area Covered
Transit Supportive Area
Transit Coverage Buffer (1/4 mile)
Other
Existing Transit Shelters
Transit Routes
Railroads
City Limits
GRAHAM RD
SUNDIAL RD
Portland-Troutdale Airport
MARINE
INTERSTATE
COLUMBIA RIVER
HALSEY
257TH
CHERRY PARK RD
HENSLEY RD
262ND AVE
242ND
238TH
STURGES DR
CHERRY PARK RD
BUXTON RD
COLUMBIA RIVER HWY
WOODARD RD
EVANS AVE
COCHRAN ROAD
SWEETBRIAR RD
STARK ST
KERSLAKE
Source (2004):
-Metro (Regional Land Information System)
-TriMet
-Multnomah County
-City of Troutdale
N
NOT TO SCALE
Figure 3-5
TRANSIT COVERAGE

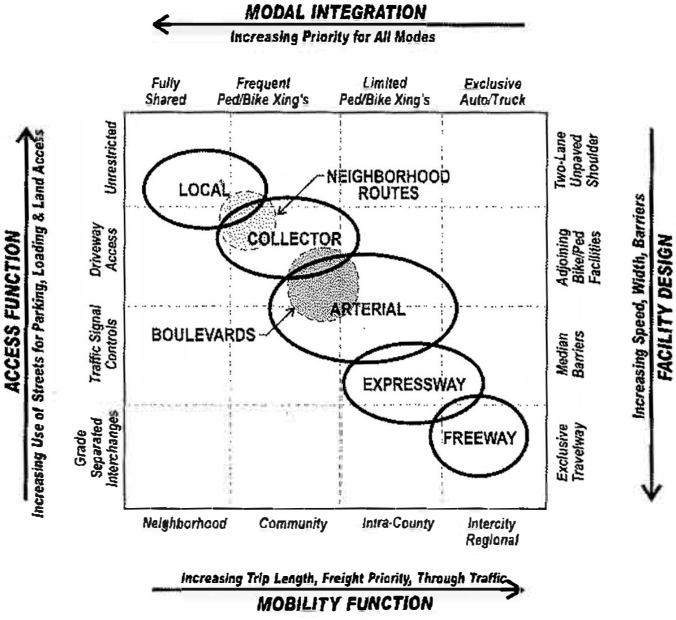
Motor Vehicles

Functional Classification

The functional classification system is designed to serve transport needs within the community. The schematic diagram illustrates the competing functional nature of roadway facilities as it relates to access, mobility, multi-modal transport, and facility design. The diagram is useful to understand how worthwhile objectives can have opposing effects. For example, as mobility is increased (bottom axis), the provision for non-motor vehicle modes (top axis) is decreased accordingly. Similarly, as access increases (left axis), the facility design (right axis) dictates slower speeds, narrower travelways, and non-exclusive facilities. The goal of selecting functional classes for particular roadways is to provide a suitable balance of these four competing objectives.

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

- *Mobility Increases* - Longer trips between destinations, greater proportion of freight traffic movement, and a higher proportion of through traffic.
- *Integration of Pedestrian and Bicycle 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 non-motorized vehicles steadily decreases with higher functional classes. The 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*- The shared uses for parking, loading, and direct land access is reduced. This occurs through parking regulation, access control and spacing standards (see opposite axis).
- *Facility Design Standards*



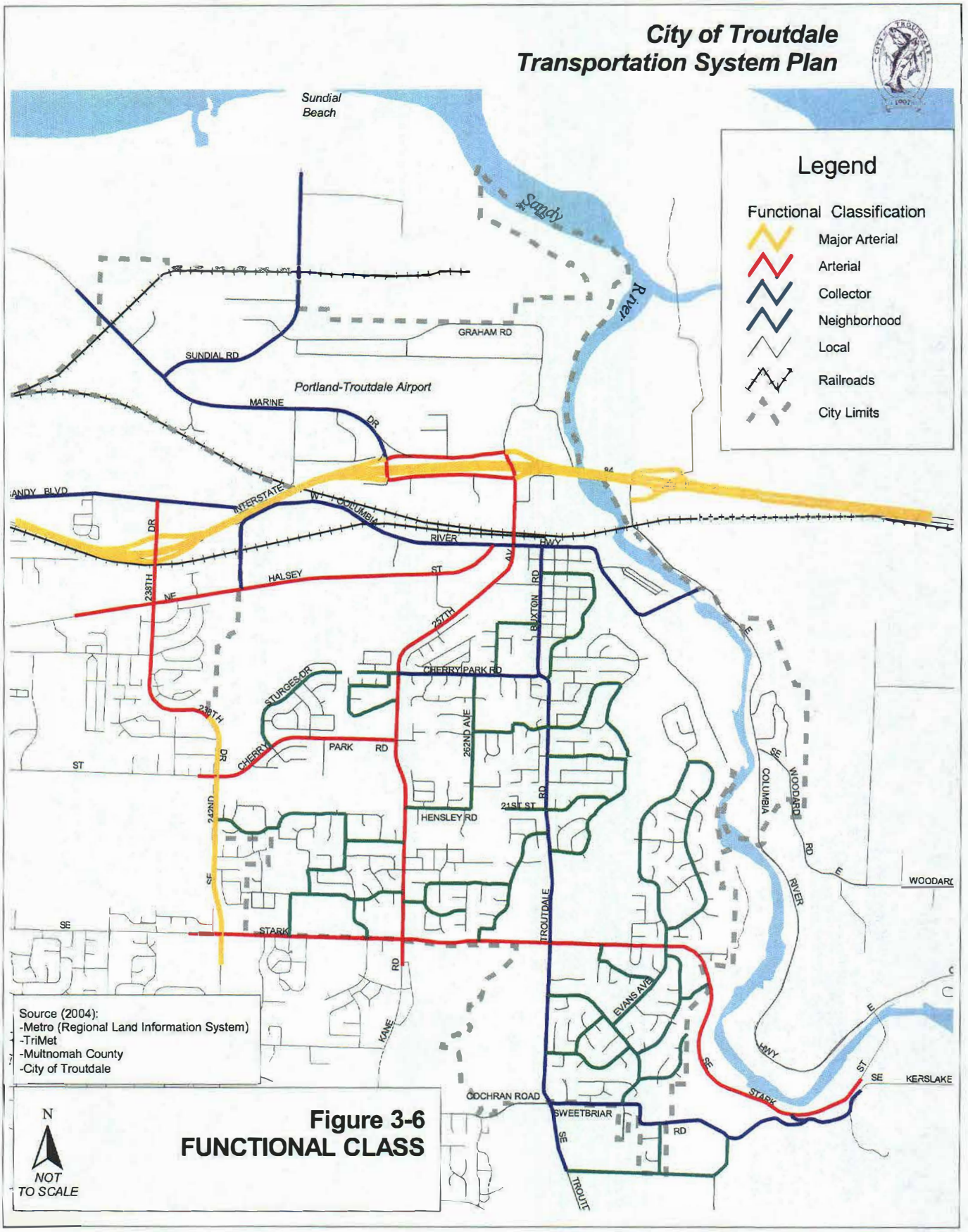
Increase - Roadway design standards require increasingly wider, faster facilities leading to exclusive travelways for autos and trucks only. The opposite end of the scale is the most basic two-lane roadway with unpaved shoulders.

Two additional areas are noted on the diagram for **Neighborhood Routes** and **Boulevards** that span two conventional street classes.

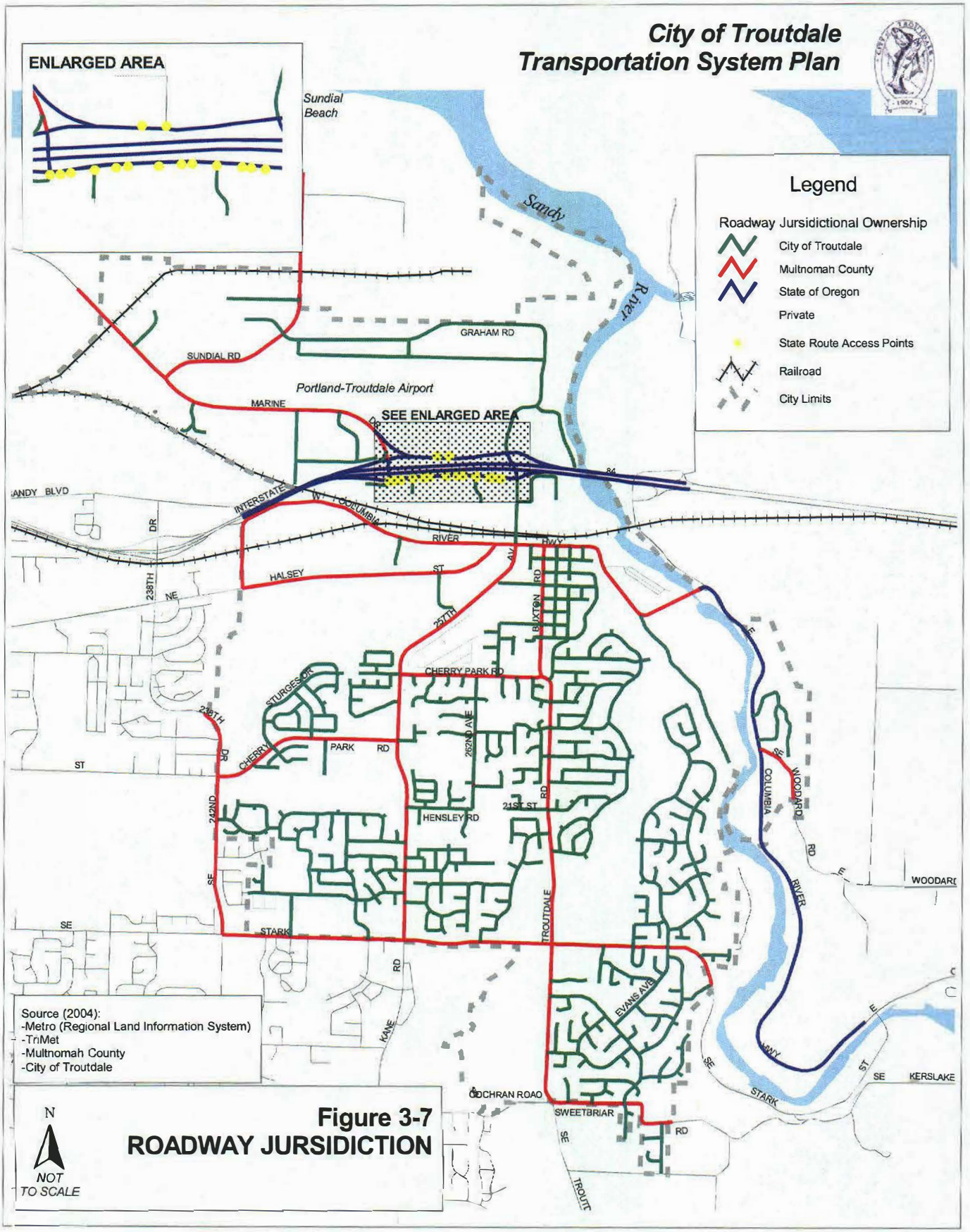
The existing Troutdale functional class system for roadway facilities is shown in Figure 3-6 (a street by street comparison to ODOT, Metro and City of Troutdale classifications is included in the appendix). The classification is discontinuous along some roadways, as the street network has not yet been completed/connected in some areas, leaving disconnected and unfinished roadways with a higher classification than their actual use. For example, Sturges Lane is classified as a Collector, but has not been connected, thus serving more as a local street. This TSP should address the limitations of the existing functional class and establish a system that better meets City and regional policy issues. A functional class system based primarily on connectivity would allow the design flexibility to handle each of the issues identified above.

A general functional classification issue not related to Troutdale specifically involves when developments are proposed within the allowed range of uses in a comprehensive plan, but the estimated added demand exceeds functional class parameters for the fronting county streets. For example, a high intensity use such as a regional shopping center, sports facility, or medical center may require more travel lanes on a collector facility than the three lanes typically allowed. The TSP should allow for the number of lanes to be determined independent of the functional classification.

Roadway ownership and maintenance responsibilities of the various roads in the City of Troutdale are identified in Figure 3-7. The majority of arterial and collector roadways are owned and operated by Multnomah County, while the City is responsible for the many local serving roads. The State facilities in the study area include I-84, the I-84 frontage roads and the Historic Columbia River Highway from the west bank of the Sandy River eastward.


City of Troutdale
Transportation System Plan
Legend
Functional Classification
Major Arterial
Arterial
Collector
Neighborhood
Local
Railroads
City Limits
Sundial Beach
Sandy River
GRAHAM RD
SUNDIAL RD
Portland-Troutdale Airport
MARINE DR
INTERSTATE 84
W COLUMBIA RIVER HWY
HALSEY ST
238TH DR NE
257TH
BUXTON RD
CHERRY PARK RD
STURGES DR
CHERRY PARK RD
252ND AVE
HENSLEY RD
21ST ST
242ND DR SE
TROUTDALE RD
STARK ST
SE
EVANS AVE
KANE RD
COCHRAN ROAD
SWEETBRIAR RD
TROUTDALE
COLUMBIA RIVER HWY
WOODARD RD
WOODARD
KERSLAKE
Source (2004):
-Metro (Regional Land Information System)
-TriMet
-Multnomah County
-City of Troutdale
N
NOT TO SCALE
Figure 3-6
FUNCTIONAL CLASS

DKS *Associates*
TRANSPORTATION SOLUTIONS



Roadway Characteristics

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

Figure 3-8 shows a limited inventory of the posted speeds in Troutdale. The majority of roadways in Troutdale are posted at 25 miles per hour (mph) as they are local access roads. Arterial roadways such as 257th Avenue, Halsey Street, Cherry Park Road and Stark are posted at higher speeds ranging from 40 to 45 mph. Collector roadways such as Troutdale Road, Sweetbriar Road and Columbia River Highway are posted at 35 to 40 mph.

Additionally, Figure 3-8 shows the existing number of lanes on each roadway in Troutdale. The widest roadways are 257th Avenue, Stark and Marine Drive, which are generally 5-lanes. A small section of 242nd Drive is 4 lanes. 238th Drive is 3 lanes as is some of the I-84 eastbound frontage road and the section of Cherry Park Road from the city limits to 257th Drive. The remaining roads in the City of Troutdale are 2 lane roadways.

Lastly, Figure 3-8 shows the existing intersection controls at the study intersections. Traffic signals exist mainly along Stark and 257th Avenue. Cherry Park Road has a few signals and the I-84 interchange frontage roads are also signalized. The study intersections for this TSP include 9 signalized intersections and 2 unsignalized intersections.

DKS Associates
TRANSPORTATION SOLUTIONS

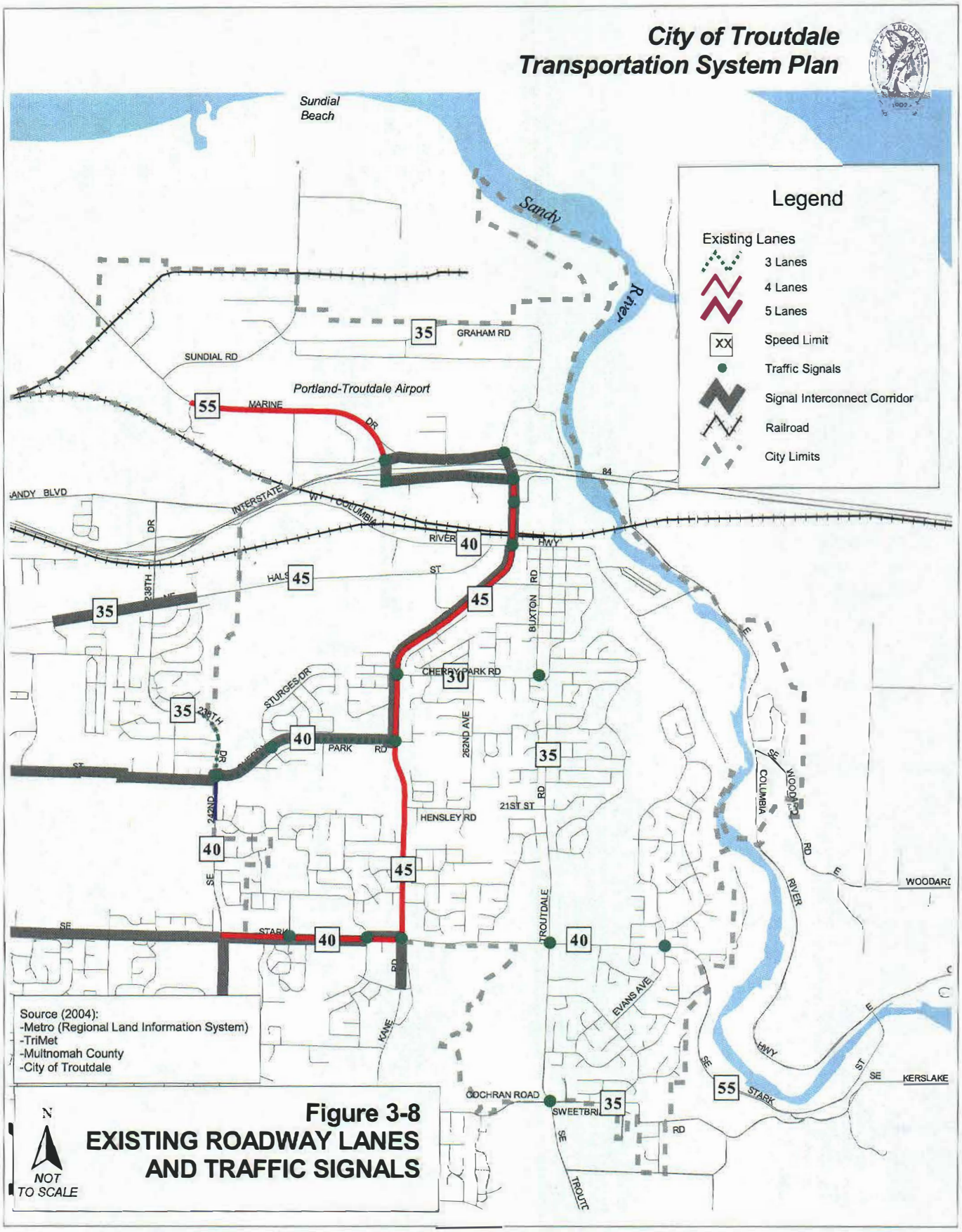


Figure 3-8
EXISTING ROADWAY LANES AND TRAFFIC SIGNALS

* Along roads that are 35 mph or less, the speed limit drops to 20 mph 24 hours a day in front of schools.

Emergency Response Routes

Emergency fire services are provided in Troutdale by the City of Gresham. The Troutdale fire station is located at the corner of Cherry Park Road and Hensley Road. Response times are a high priority for emergency services, as patient care is time-sensitive. Arterial and collector roadways are utilized by the Gresham Fire Department as emergency routes[3] in providing service to Troutdale. Figure 3-9 shows the preliminary primary and secondary response routes in Troutdale in conjunction with existing traffic calming devices. Generally, restrictive or deflective traffic calming devices (e.g. speed humps, raised intersections, and diverters) should not be located on primary emergency response routes.

Issue: *A lack of adequate east/west connectivity should be addressed in this TSP.*

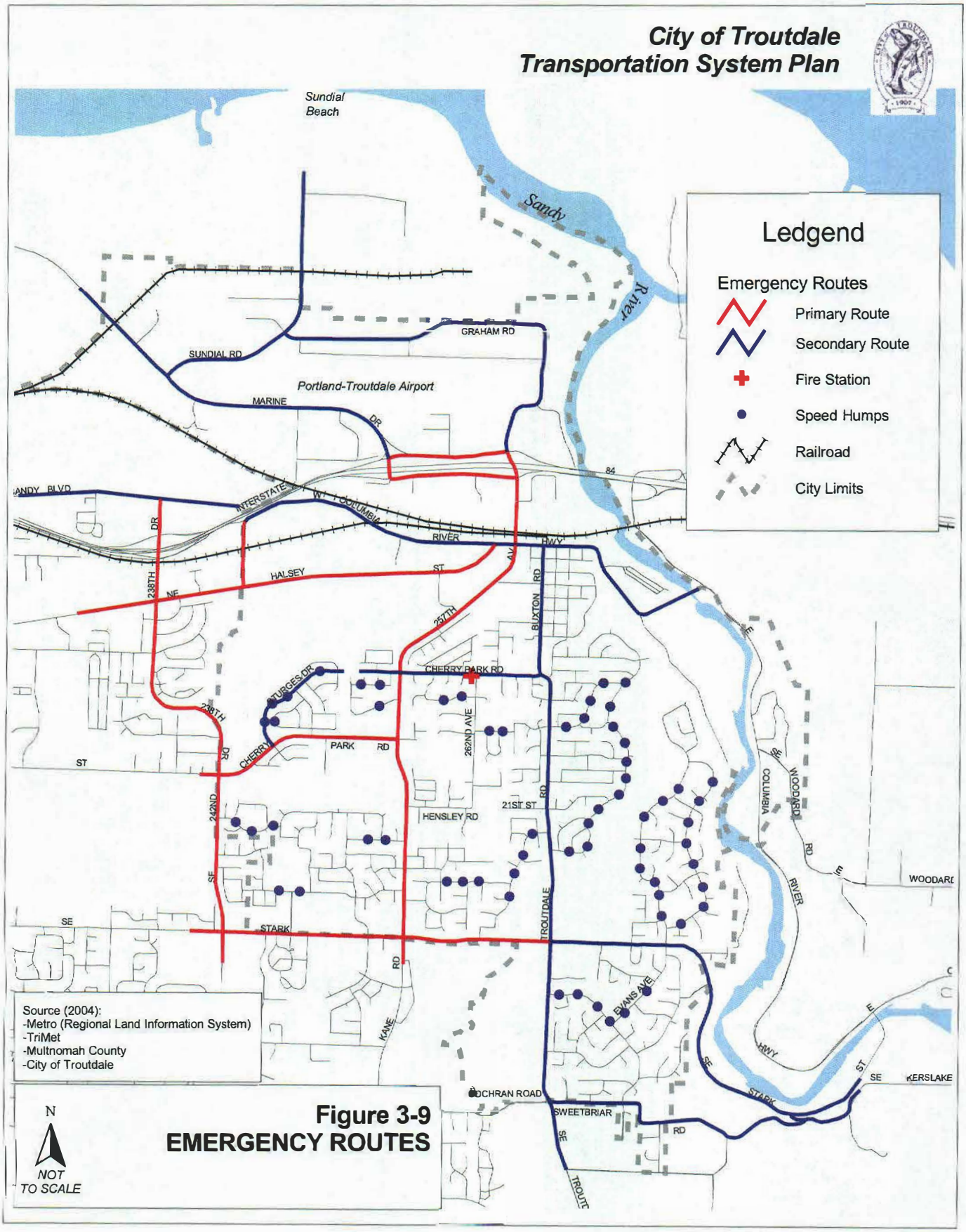
Motor Vehicle Volume

An inventory of peak hour traffic conditions was performed in the spring of 2004 as part of the Troutdale TSP and was augmented by traffic conditions calculated for the Troutdale Industrial Zoning District Traffic Study completed in August, 2002. The traffic turn movement counts conducted as part of this inventory provides the basis for analyzing existing problem areas as well as establishing a base condition for future monitoring. Turn movement counts were conducted at 11 intersections during the weekday evening (4-6 PM) peak period to determine existing operating conditions. In addition, counts were conducted at 3 intersections during the weekend peak period. Study intersections were chosen in coordination with the City of Troutdale staff in order to address major roadways and noted areas of concern.

Figure 3-10 shows the two-way existing traffic volumes on streets in the Troutdale area. These two-way traffic volumes can vary from day to day and month to month based on weather, surrounding roadway conditions, and holidays. In addition, seasonal recreational traffic can vary the traffic volumes in the City.

Land use plays a large role in driving transportation choices. Consequently, land use within the City of Troutdale is a key ingredient in understanding current transportation patterns and roadway traffic volumes. Figure 3-11 shows the current land use zoning designations adopted within the city boundaries.

[3] Conversation with Rich Faith, City of Troutdale, August 20, 2004.


City of Troutdale
Transportation System Plan
Sundial Beach
Sandy River
Ledgend
Emergency Routes
Primary Route
Secondary Route
Fire Station
Speed Humps
Railroad
City Limits
GRAHAM RD
SUNDIAL RD
Portland-Troutdale Airport
MARINE DR
INTERSTATE 84
W COLUMBIA RIVER HWY
HALSEY ST
238TH DR NE
257TH AVE
BUXTON RD
CHERRY PARK RD
STURGES DR
238TH DR
CHERRY PARK RD
262ND AVE
HENSLEY RD
21ST ST RD
242ND DR SE
STARK ST
TROUTDALE RD
KANE RD
EVANS AVE
COLUMBIA RIVER HWY
WOODARD RD
COCHRAN ROAD
SWEETBRIAR RD
TROUTE
Source (2004):
-Metro (Regional Land Information System)
-TriMet
-Multnomah County
-City of Troutdale
N
NOT TO SCALE
Figure 3-9
EMERGENCY ROUTES

DKS Associates
TRANSPORTATION SOLUTIONS

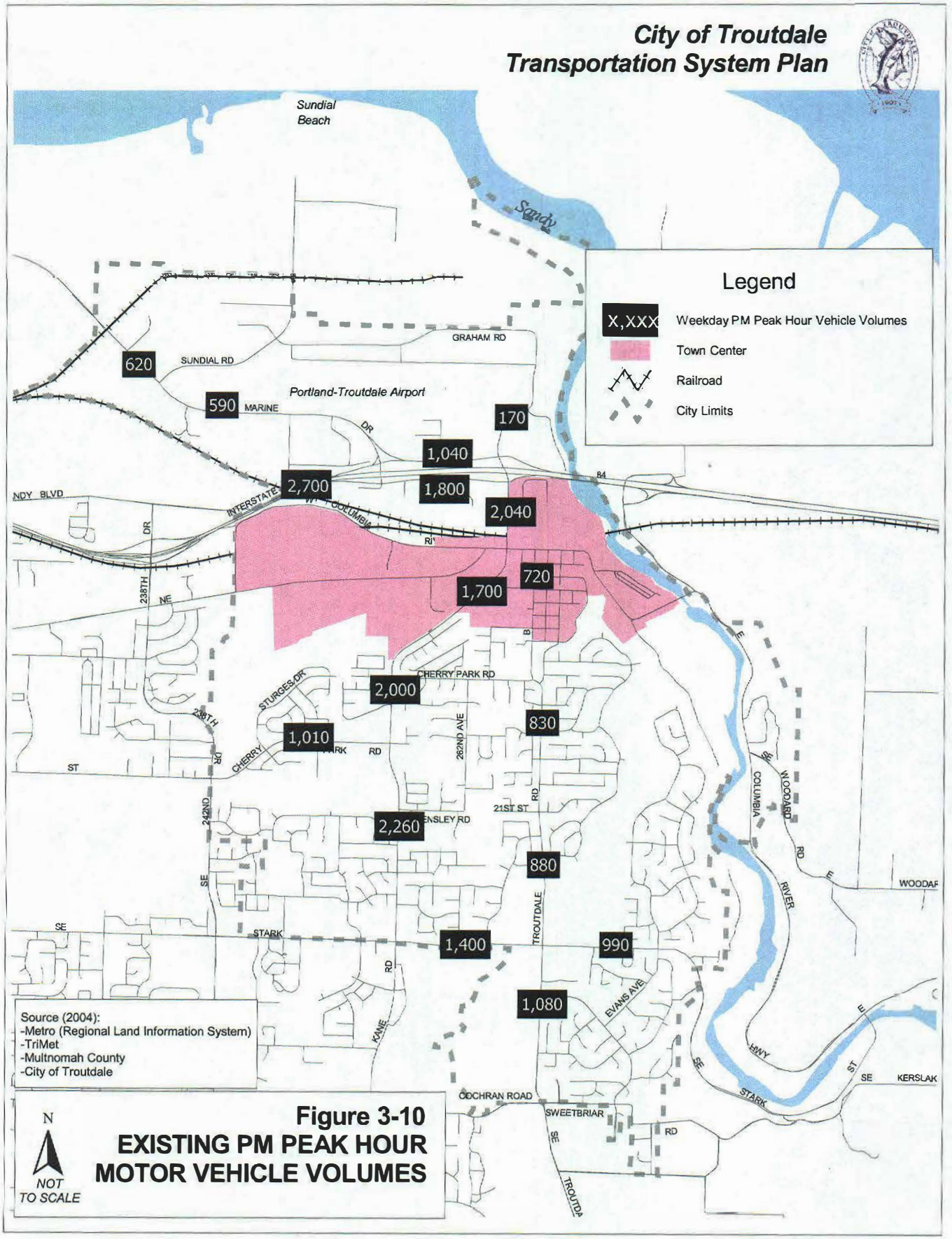
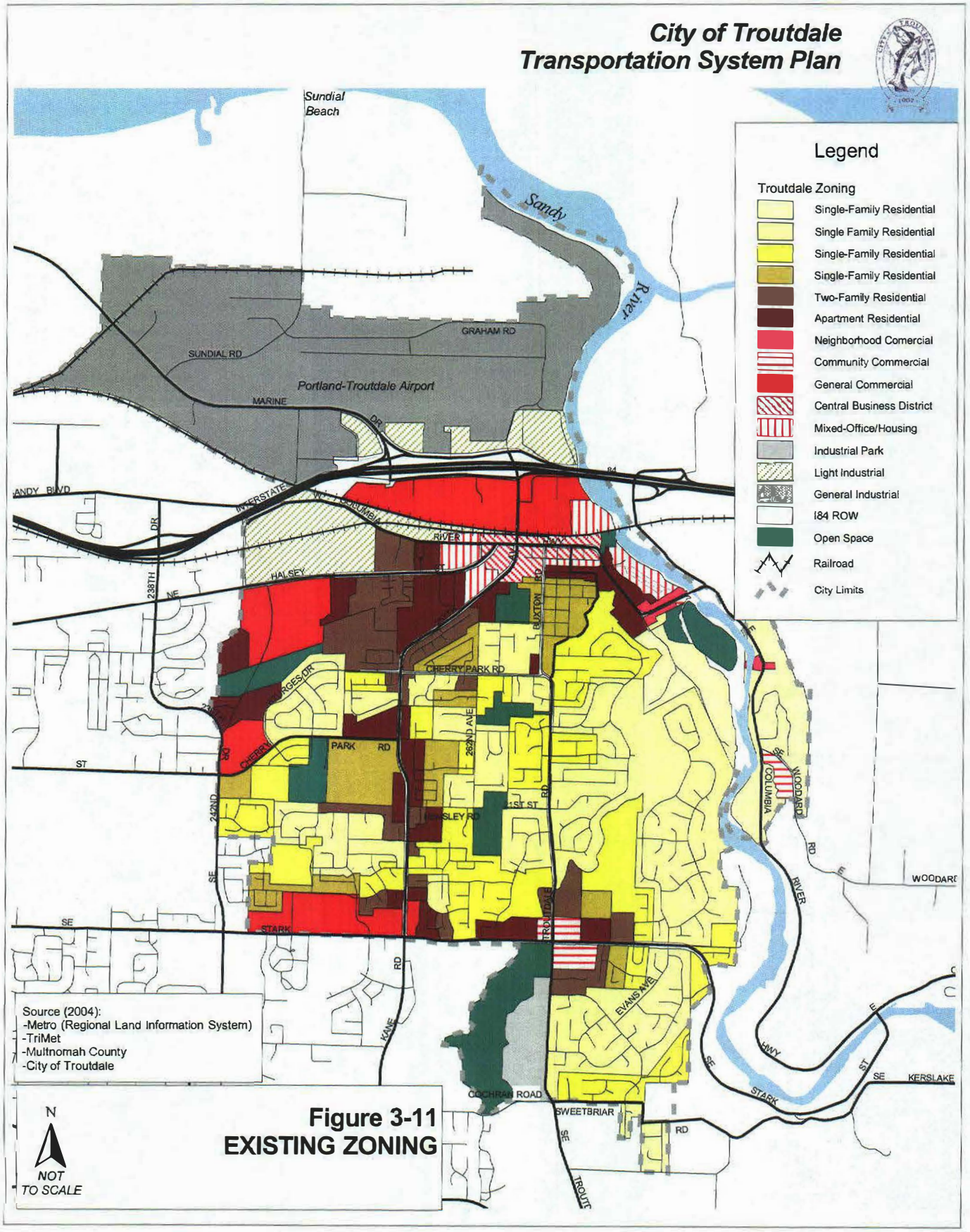


Figure 3-10
EXISTING PM PEAK HOUR MOTOR VEHICLE VOLUMES


City of Troutdale
Transportation System Plan
Legend
Troutdale Zoning
Single-Family Residential
Single Family Residential
Single-Family Residential
Single-Family Residential
Two-Family Residential
Apartment Residential
Neighborhood Comercial
Community Commercial
General Commercial
Central Business District
Mixed-Office/Housing
Industrial Park
Light Industrial
General Industrial
I84 ROW
Open Space
Railroad
City Limits
Sundial Beach
Sandy River
GRAHAM RD
SUNDIAL RD
Portland-Troutdale Airport
MARINE DR
ANDY BLVD
INTERSTATE
HALSEY
CHERRY PARK RD
PARK RD
BUXTON RD
262ND AVE
257TH
242ND
238TH
ST
SE
NE
STARK
HISLEY RD
1ST ST
TROUTDALE RD
EVANS AVE
COLUMBIA RIVER HWY
WOODARD RD
KANE RD
COCHRAN ROAD
SWEETBRIAR RD
TROUTDALE
KERSLAKE
Source (2004):
-Metro (Regional Land Information System)
-TriMet
-Multnomah County
-City of Troutdale
N
NOT TO SCALE
Figure 3-11
EXISTING ZONING

Traffic Levels of Service

Level of Service (LOS) and volume to capacity (v/c) ratios are both used as a measure of effectiveness for intersection operation. LOS is similar to a "report card" rating based upon average vehicle delay. Level of Service A, B, and C indicate conditions where traffic moves without significant delays over periods of peak hour travel demand. Level of Service D and E are progressively worse peak hour operating conditions. Level of Service F represents conditions where average vehicle delay exceeds 80 seconds per vehicle entering a signalized intersection and demand has exceeded capacity. This condition is typically evident in long queues and delays. Unsignalized intersections provide levels of service for major and minor street turning movements. For this reason, 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). LOS E or F conditions at unsignalized intersections generally provide a basis to study intersections further to determine availability of acceptable gaps, safety and traffic signal warrants. A volume to capacity ratio (v/c) is the peak hour traffic volume at an intersection divided by the maximum volume that intersection can handle. For example, when a v/c is 0.80, peak hour traffic is using 80 percent of the intersections capacity. If traffic volumes exceed capacity, queues will form and will lengthen until demand subsides below the available capacity. When v/c is less than, but close to 1.0, intersection operation becomes unstable and small disruptions can cause traffic flow to break down.

The intersection turn movement counts conducted during the evening peak periods were used to determine the existing 2004 LOS based on the *2000 Highway Capacity Manual* methodology for signalized and unsignalized intersections[4]. Traffic counts and level of service calculation sheets can be found in the appendix. Table 3-4 lists the existing weekday PM peak hour intersection operation at the 11 study intersections. Each of the study intersections operates at a LOS of D or better and has an acceptable v/c ratio. Figure 3-12 provides a visual summary of the study intersection operating conditions.

[4] *2000 Highway Capacity Manual*, Transportation Research Board, 2000.

Table 3-4: Existing Weekday PM Peak Hour Intersection Level of Service

Intersection	Level of Service	Average Delay (Sec.)	Volume / Capacity
Unsignalized Intersections			
Buxton Road/Historic Columbia River Highway	A/C	—	—
Marine Drive/Sundial Road	A/B	—	—
Signalized Intersections			
257th Drive/Cherry Park Road (south)	D	39.4	0.91
257th Drive/Historic Columbia River Highway	C	31.5	0.68
Cherry Park Road/Buxton Street	B	11.8	0.44
I-84 westbound ramps/Marine Road	B	11.0	0.45
I-84 eastbound ramps/Marine Road	B	15.4	0.69
I-84 eastbound ramps/Graham Road	B	18.3	0.88
I-84 westbound ramps/Graham Road	B	12.6	0.45
Troutdale Road/Stark Street	C	31.0	0.76
Troutdale Road/Cochran Road	B	13.8	0.53

Notes: Unsignalized Intersection Level of Service:
A/A=Major Street turn LOS/Minor street turn LOS
Signalized and All-Way Stop Intersections:
Delay = Average vehicle delay in the peak hour for entire intersection in seconds.

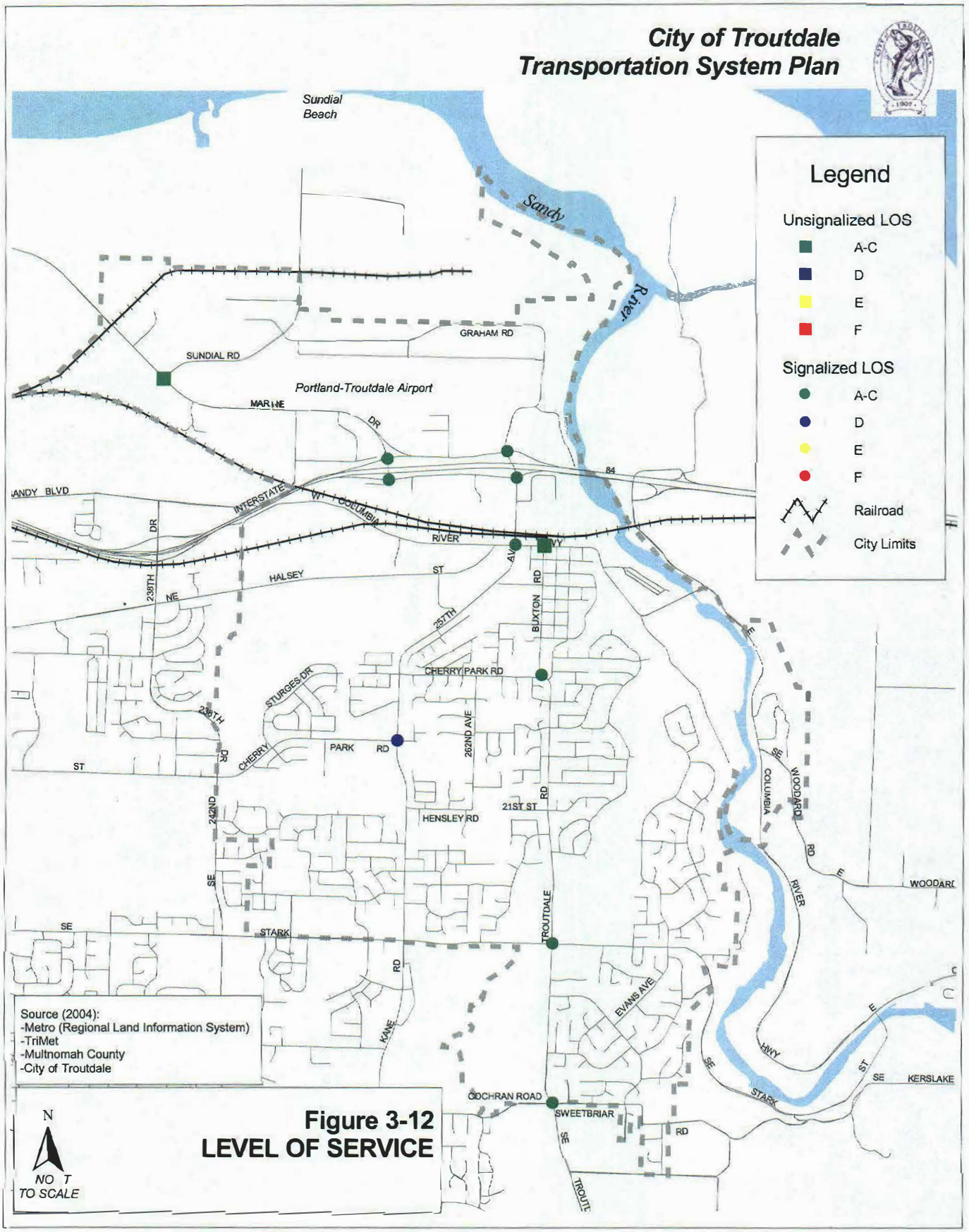


Figure 3-12
LEVEL OF SERVICE

Data was also collected for the weekend peak period for I-84 eastbound ramps/Graham Road, I-84 westbound ramps/Graham Road and 257th Drive/Historic Columbia River Highway intersections. Table 3-5 lists the existing weekend PM peak hour intersection operation at the 3 study intersections mentioned above.

Table 3-5: Existing Weekend PM Peak Hour Intersection Level of Service

Intersection	Level of Service	Average Delay	Volume / Capacity
Signalized Intersections			
I-84 eastbound ramps/Graham Road	B	14.6	0.73
I-84 westbound ramps/Graham Road	B	12.4	0.48
257th Drive/Historic Columbia River Highway	C	29.5	0.58

The analysis conducted for this report does not include adequate detail or simulation to address the I-84 interchange/frontage road/outlet mall access and queuing issues that commonly occur during midday or weekend periods. This issue will be addressed in supplemental work focused on the Troutdale interchange with I-84, which will be conducted concurrent with the TSP. Findings from this study will be included in the future systems plans within this TSP.

Traffic Safety

Collision data was obtained from Multnomah County and used to create a high collision intersection list for intersections within Troutdale. The County ranks intersections in their Safety Priority Index System (SPIS) based on the most current three years of collision data. The SPIS rankings are derived from factors such as the number of collisions, the type of collisions, the collision severity, and traffic volumes. The collision data only includes those collisions reported to the Oregon Department of Transportation. In addition, the County SPIS list only includes intersections that have at least one county controlled approach. Troutdale has four intersections on the most recent County SPIS list (2000-2002). Table 3-6 lists each intersection.

Issue: *The safety at these four intersections should be considered in this TSP. Additionally, safety issues are present on 242nd between Cherry Park Drive and Stark Street that need to be addressed.*

Table 3-6: SPIS Ranking of Troutdale TSP Study Area Intersections (1999-2001)

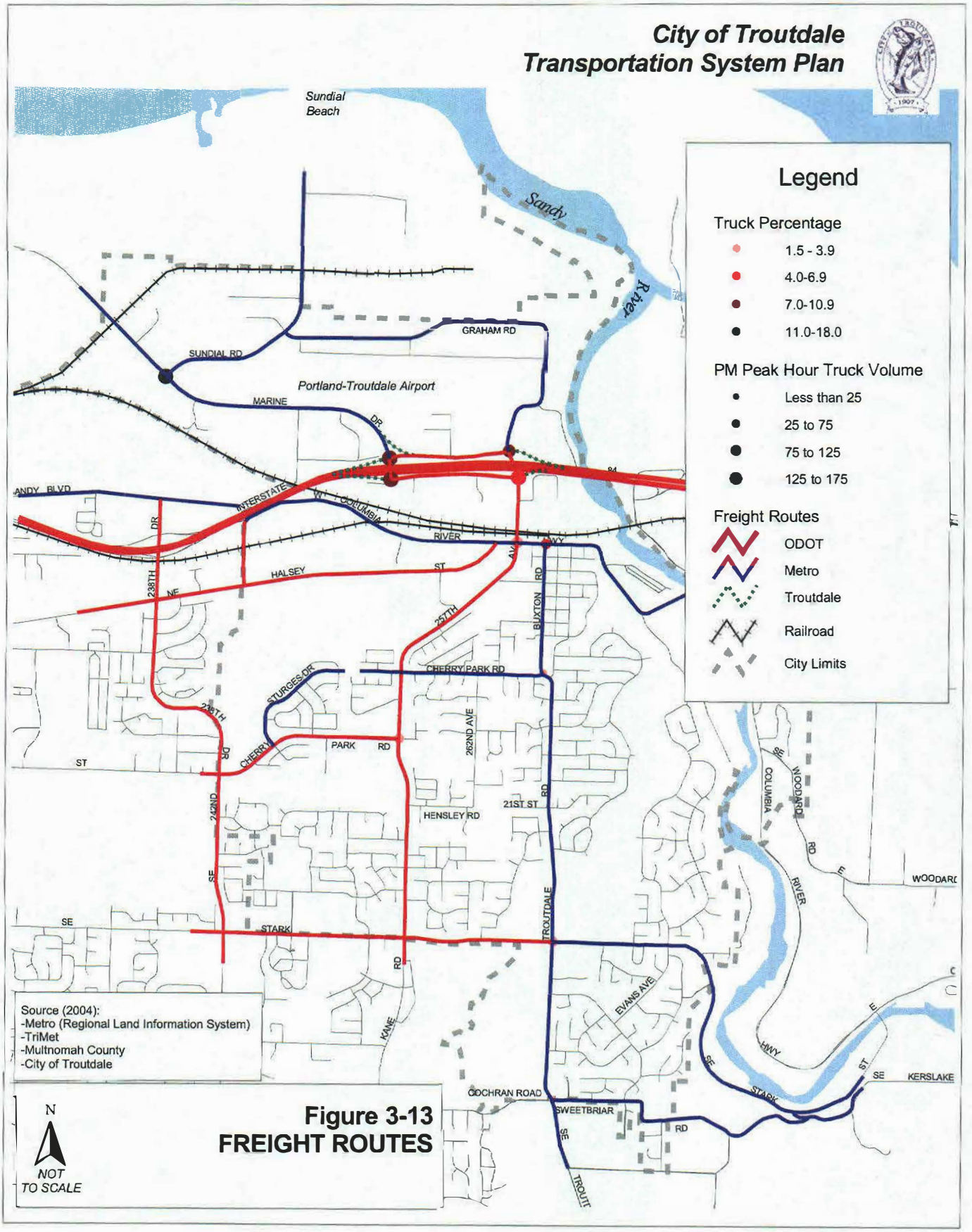
Ranking	Street	Cross Street	Number of Collisions	Fatal Collisions	Injury Collisions
24	257th Drive	Historic Columbia River Highway	20	0	7
23	Stark Street	Troutdale Road	21	0	9
19	Stark Street	257th Drive	42	0	19
17	Cherry Park Road	242nd Avenue	31	0	13

Truck Freight

Efficient truck movement plays a vital role in the economical movements of raw materials and finished products. The designation of through truck routes provides for this efficient movement while at the same time maintaining neighborhood livability, public safety, and minimizing maintenance costs of the roadway system. ODOT[5], Metro and the City of Troutdale all identify I-84 as a freight route. Metro and the City of Troutdale both identify Marine Drive, a small section of 257th Drive and a small section of Columbia River Highway as freight routes. Metro also classifies Historic Columbia River Highway between I-84 and 257th Drive as a freight route. The City of Troutdale identifies through truck routes in Troutdale such as Stark Street, 257th Drive, Sundial Road and Graham Road.

The truck (heavy vehicle) volumes and percentages of the traffic stream were collected as part of the intersection turn movement counts. Figure 3-13 shows the PM peak hour truck volume and percentages at each of the study intersections. Truck volumes exceed 100 vehicles per hour (vph) along Marine Drive and the I-84 interchange intersections.

[5] *1999 Oregon Highway Plan*, The Oregon Department of Transportation, May 1999.


City of Troutdale
Transportation System Plan
Sundial Beach
Sandy River
GRAHAM RD
SUNDIAL RD
Portland-Troutdale Airport
MARINE DR
ANDY BLVD
INTERSTATE 84
COLUMBIA RIVER HWY
HALSEY ST
238TH DR NE
257TH AVE
BUXTON RD
CHERRY PARK RD
STURGES DR
PARK RD
262ND AVE
HENSLEY RD
21ST ST RD
242ND DR SE
STARK ST
TROUTDALE RD
EVANS AVE
KANE RD
COCHRAN ROAD
SWEETBRIAR RD
TROUTDALE
COLUMBIA RIVER HWY
WOODARD RD
KERSLAKE
Legend
Truck Percentage
1.5 - 3.9
4.0-6.9
7.0-10.9
11.0-18.0
PM Peak Hour Truck Volume
Less than 25
25 to 75
75 to 125
125 to 175
Freight Routes
ODOT
Metro
Troutdale
Railroad
City Limits
Source (2004):
-Metro (Regional Land Information System)
-TriMet
-Multnomah County
-City of Troutdale
N
NOT TO SCALE
Figure 3-13
FREIGHT ROUTES

Other Travel Modes

There are four other modes of transportation in Troutdale included in the TSP: rail, pipeline, air, and water. The Columbia River is located approximately ¾ of a mile north of the Troutdale city limits and serves as a major freight movement waterway, however, there is no port facility located within the Troutdale TSP study area. Figure 3-14 shows the rail, and air facilities in Troutdale.

Rail Freight

There are two rail freight lines, the Graham (2A) and the Kenton (2AE) that currently traverse the City of Troutdale, combining to transport over 53 million gross tons of freight in 2002. Both lines are owned and operated as a Class 1 Railroad by Union Pacific (UPRR). The Graham (2A) line runs 17 trains a day with a maximum authorized speed of 50 mph. It has one grade crossing in the study area at 244th Avenue. The Kenton (2AE) line runs 30 trains a day at a maximum authorized speed of 50 mph. The Kenton has two grade crossings in the study area, both located on a spur track off of the main line that serves the former aluminum plant. There are no passenger trains currently running through Troutdale.

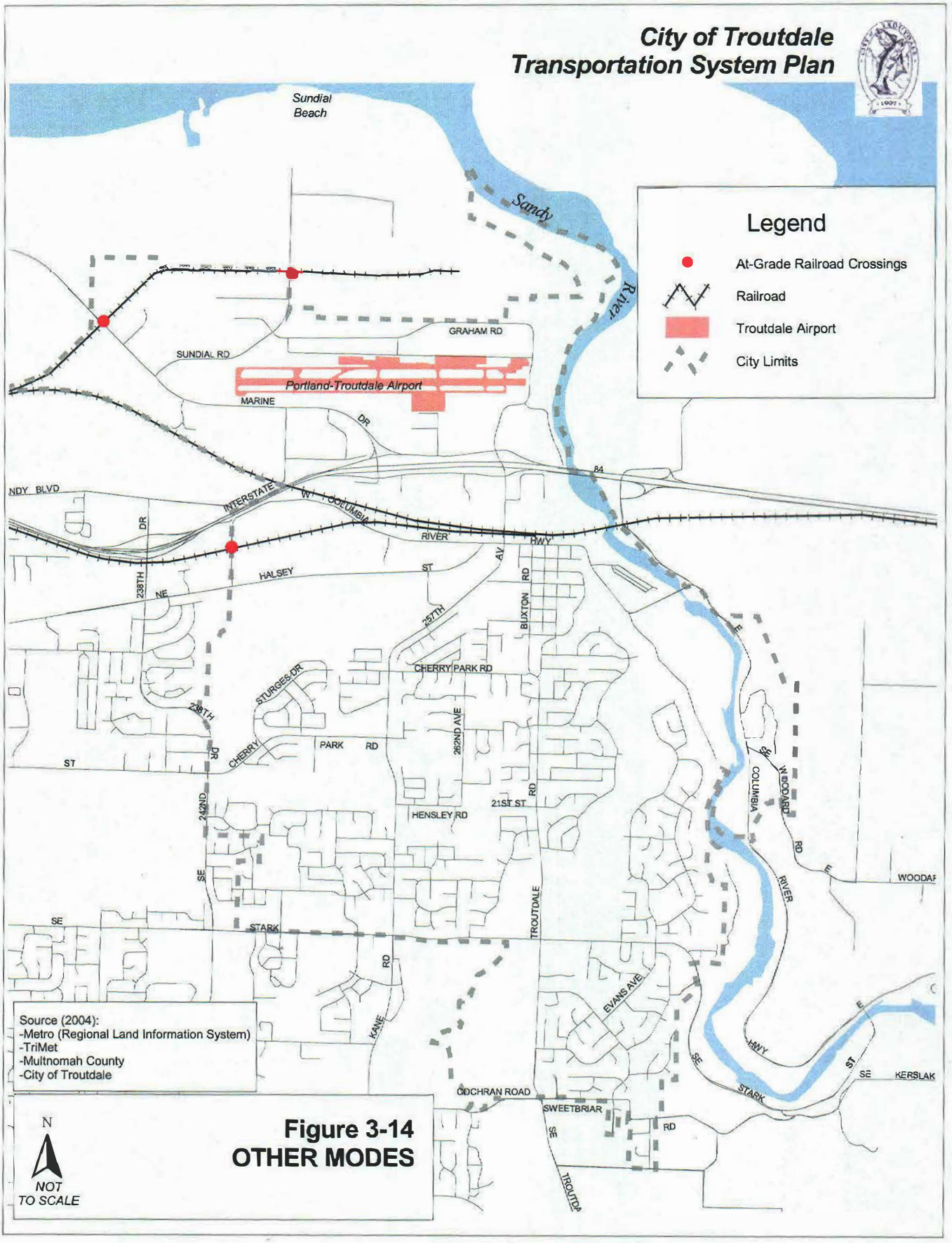
Gas Pipelines

Two high-pressure natural gas pipelines serve Troutdale. One line runs north-south adjacent to 242nd Drive, crossing I-84 and continuing across the Columbia River into Washington. The second line runs east-west along Sandy Boulevard, until turning north at I-84 before terminating at the Kenton (2AE) UPRR rail line.

Airport

The Troutdale Airport is located north of Interstate 84 and is classified as a Category 2 – Business or High Activity General Aviation Airport. The runway is 150 feet wide by 5,400 feet long, and has over 30,000 annual aircraft operations (take offs and landings). Pavement condition varies over the length of the runway and was found to be deficient in meeting runway pavement strength by the Oregon Aviation Plan[6]. However, reconstruction is not planned for several years. The Troutdale Airport Master Plan predicts a modest 2 percent growth in both the number of operations and number of aircraft based in Troutdale over the next 10 years, concluding that current infrastructure is adequate to meet demand. Consequently, the airport is considering leasing some of the land it does not currently require to "airport conducive" land uses.

[6] *Oregon Aviation Plan*, Oregon Department of Transportation, February, 2000.


City of Troutdale
Transportation System Plan
Sundial Beach
Sandy River
Legend
At-Grade Railroad Crossings
Railroad
Troutdale Airport
City Limits
GRAHAM RD
SUNDIAL RD
Portland-Troutdale Airport
MARINE DR
INTERSTATE 84
W COLUMBIA RIVER HWY
HALSEY ST
NE 238TH DR
257TH AV
BUXTON RD
CHERRY PARK RD
STURGES DR
CHERRY PARK RD
262ND AVE
HENSLEY RD
21ST ST RD
242ND DR
SE STARK
TROUTDALE RD
EVANS AVE
KANE RD
COCHRAN ROAD
SWEETBRIAR RD
COLUMBIA RIVER HWY
WOODARD RD
Source (2004):
-Metro (Regional Land Information System)
-TriMet
-Multnomah County
-City of Troutdale
N
NOT TO SCALE
Figure 3-14
OTHER MODES

4. Future Needs & Improvements

Travel Demand and Land Use

The Troutdale Transportation System Plan (TSP) Update addresses existing system needs and additional facilities that are required to serve future growth beyond the 2015 forecast year of the existing TSP. Metro's urban area transportation forecast model was used to determine future traffic volumes in Troutdale. This forecast model translates assumed land uses into person travel, selects 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 section describes 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. The amount of land that is planned to be developed, the type of land uses, and how the land uses are mixed together have a direct relationship to expected demands on the transportation system. Understanding the amount and type of land use is critical to taking actions to maintain or enhance transportation system operation.

Projected land uses were developed for areas within the urban growth boundary and reflect the Comprehensive Plan and Metro's land use assumptions for the year 2025. Complete land use data sets were developed for the following conditions.

- Existing 2000 Conditions (base travel forecast for the region)
- Year 2025 Conditions

The following sections summarize the growth within Troutdale city limits and within East Multnomah County that will influence travel within the city. Both growth components are included in the travel demand forecasts, but the location and magnitude of the expected growth are significantly different, especially compared to historical growth patterns. For example, future forecasts will reflect new job centers that are being planned in Springwater and in Damascus, which are essentially rural lands today with very little employment opportunities. This change in commute patterns will be incorporated into the 2025 forecasts.

Growth within Troutdale

The base year travel model is updated periodically and for this study effort, the available base model provided by Metro was for 2000. Land uses were inventoried throughout Troutdale by Metro. This land use database includes the number of dwelling units, the number of retail employees, and the number of other employees. Table 4-1 summarizes the land uses for existing conditions and the future 2025 scenario within the Troutdale TSP study area. These land use projections are significantly higher than the previous 2015 forecasts, reflecting the interchange area and north industrial area development potential. A detailed summary of the uses for each Transportation Analysis Zone (TAZ) within the Troutdale study area is provided in the Appendix.

Table 4-1: Troutdale TSP Study Area Land Use Summary

Land Use	2000	2025	Increase	Percent Increase
Households (HH)	5,511	7,621	2,110	38%
Retail Employees (RET)	2,057	4,422	2,365	115%
Other Employees (OTH)	6,779	14,235	7,456	110%

At the existing level of land development, the transportation system generally operates without significant deficiencies in the study area. As land uses are changed in proportion to each other (i.e. there is a significant increase in employment relative to household growth), there will be a shift in the overall operation of the transportation system. Retail land uses generate higher amounts of trips per acre of land than households do and other land uses. The location and design of retail land uses in a community can greatly affect transportation system operation. Additionally, if a community is homogeneous in land use character (i.e. all employment or residential), the transportation system must support significant trips coming to or from the community rather than within the community. Typically, there should be a mix of residential, commercial, and employment type land uses so that some residents may work and shop locally, reducing the need for residents to travel long distances.

Table 4-1 indicates that significant employment growth (about 10,000 jobs) is expected in Troutdale in the coming decades. The transportation system should be monitored to make sure that land uses in the plan are balanced with transportation system capacity. This TSP balances needs with the forecasted 2025 land uses.

For transportation forecasting, the land use data is stratified into geographical areas called transportation analysis zones (TAZs), which represent the sources of vehicle trip generation. There are approximately 20 Metro TAZs within the Troutdale TSP study area. These 20 TAZs were subdivided, as part of this plan, into approximately 80 TAZs to more specifically represent land use and access to the transportation

system in Troutdale. The disaggregated model zone boundaries are shown in Figure 4-1.

Growth in East Multnomah County

Another important aspect of growth in East Multnomah County, and the adjoining portion of Clackamas County, is the recent expansions to the Urban Growth Boundary that are now being planned for urban growth. The most significant planned areas are Pleasant Valley, Springwater, and Damascus/Boring. Pleasant Valley Master Plan was recently approved by the City of Gresham. As new development occurs there, the lands will likely be annexed to the City of Gresham. The total development planned for Pleasant Valley is 5,000 housing units and about 5,000 jobs. The master plan development for Springwater is expected to conclude in 2005, and the land use mix currently expects about 18,000 new jobs with about 2,000 residential households. In addition, Clackamas County is currently developing urban plans for the Damascus and Boring areas, which include over 25,000 new residential households and 1,600 acres from employment within the planning horizon of this TSP. Taken together, the combination of recent UGB expansions in East Multnomah County could have a significant influence on travel demands within Troutdale, in terms of through traffic on the arterial facilities and the development of more local employment centers closer to the city.

Metro Area Transportation Model

A determination of future traffic system needs in Troutdale requires the ability to accurately forecast travel demand resulting from estimates of future population and employment for the City. The objective of the transportation planning process is to provide the information necessary for making decisions on when and where improvements should be made to the transportation system to meet travel demand as developed in an urban area travel demand model as part of the Regional Transportation Plan update process. Metro uses EMME/2, a computer based program for transportation planning, to process the large amounts of data for the Portland Metropolitan area. For the Troutdale TSP, the regional 2025 model used for the 2004 RTP update was used to develop future forecasts.

Traffic forecasting can be divided into several distinct but 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:

- Trip Generation
- Trip Distribution
- Mode Choice
- Traffic Assignment

Figure 4-1
TRANSPORTATION ANALYSIS ZONES

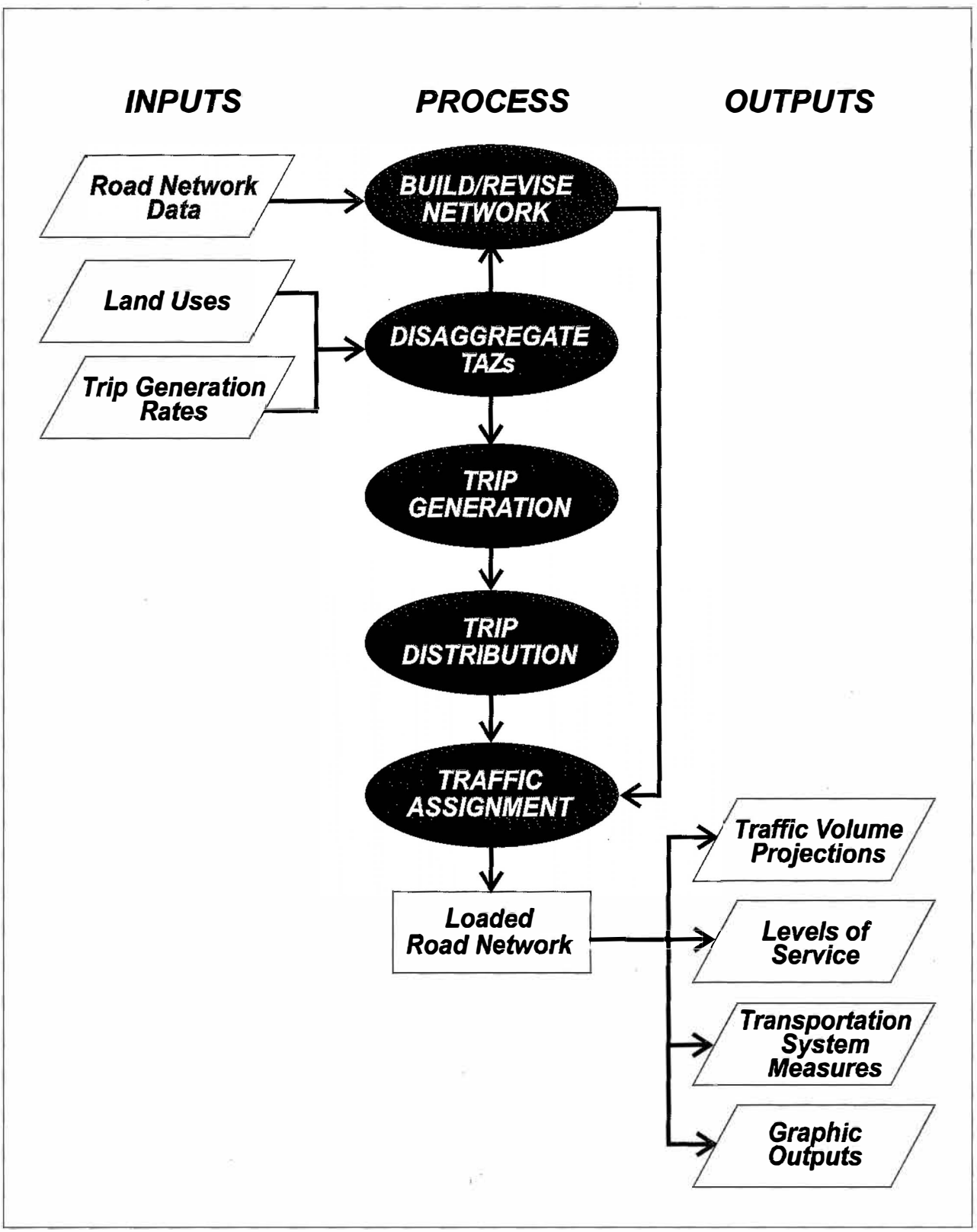


Figure 4-2
MODEL PROCESS

The initial roadway network used in the traffic model was the existing streets and roadways. Future 2025 land use scenarios were tested and roadway improvements were added to mitigate the impacts of motor vehicle traffic growth, using the RTP Priority System and the 2015 Troutdale TSP improvements as a starting basis. Improvements in each of these plans (the RTP and TSP) were validated in the study process. Forecasts of PM peak period traffic flows were produced for every major roadway segment within Troutdale. Traffic volumes were projected on all arterials and most collector streets. Some local streets were included in the model, but many are represented by centroid connectors in the model process.

Trip Generation

The trip generation process translates land use quantities (number of dwelling units, retail, and other employment) 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 employment, non-retail employment, and special activities. Typically, most traffic impact studies rely on the Institute of Transportation Engineers (ITE) research for analysis1. 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. 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)	0.43	0.19	0.62
Retail Employee (RET)	0.78	0.69	1.47
Other Employee (OTH)	0.07	0.29	0.36

Source: DKS Associates/Metro

Table 4-3 illustrates the estimated growth in vehicle trips generated within the Troutdale study area during the PM peak period (2-hr peak) between 2000 and 2025. It indicates that vehicle trips in Troutdale would grow by approximately 53 percent between 2000 and 2025 if the land develops according to Metro's 2025 land use assumptions. Assuming a 25-year horizon to the 2025 scenario, this represents annualized growth rate of about 1.7 percent per year.

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

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

	2000 Trips	2025 Trips	Percent Increase
Troutdale TSP Study Area	24,500	37,600	53%

Trip Distribution

This step estimates how many trips travel from one zone in the model to any other zone. Distribution is based on the number of trip ends generated in each zone pair and on factors that relate the likelihood of travel between any two zones to the travel time between zones. In projecting long-range future traffic volumes, it is important to consider potential changes in regional travel patterns. Although the locations and amounts of traffic generation in Troutdale are essentially a function of future land use in the city, the distribution of trips is influenced by regional growth, particularly in neighboring areas such as Portland and Gresham as well as the unincorporated north-industrial area. External trips (trips that have either an origin and not a destination in Troutdale or have a destination but not an origin in Troutdale) and through trips (trips that pass through Troutdale and have neither an origin nor a destination there) were projected using trip distribution patterns based upon census data and traffic counts performed at gateways into the Metro area Urban Growth Boundary (UGB) calibration.

Mode Choice

This is the step where it is determined how many trips will be by various modes (single-occupant vehicle, transit, carpool, pedestrian, bicycle, etc.). The 2000 mode splits are incorporated into the base model and adjustments to that mode split may be made for the future scenario, depending on any expected changes in transit or carpool use. These considerations are built into the forecasts used for 2025.

Based upon analysis of the forecasted mode choice in 2025, an analysis was performed to determine the level of non-single occupant vehicle (SOV) mode share in Troutdale. The travel model provides estimates of the various modes of travel that can be generally assessed at the transportation analysis zone level. Figure 4-12 summarizes the level of non-SOV mode share estimated for 2025 using the regional travel demand forecast model in comparison to the modal targets established in the RTP through Table 1-3 of the RTP. Generally, the areas served by bus service have the highest levels of non-SOV mode use.

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 EMME/2. 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.

Model Verification

The base 2000 modeled traffic volumes were compared against actual traffic volume counts across screenlines, on key arterials, and at key intersections. Most arterial traffic volumes meet screenline tolerances for forecast adequacy. Based on this performance, the model was used for future forecasting and assessment of circulation change.

Model Application to Troutdale

Intersection turn movements were extracted from the model at key intersections for both the base year 2000 and forecast year 2025 scenarios. These intersection turn movements were not used directly, but a portion of the increment of the year 2025 turn movements over the 2000 turn movements was applied (added) to existing (actual 2004) turn movement counts in Troutdale. A post processing technique is utilized to refine model travel forecasts to the volume forecasts utilized for 2025 intersection analysis. The turn movement volumes used for future year intersection analysis can be found in the technical appendix for the TSP.

Pedestrians

The existing conditions analysis (Chapter 3) updated the pedestrian system network map from the 1995 Transportation System Plan (TSP) to reflect completed projects since the TSP adoption. The 1995 Troutdale Pedestrian Plan should be amended based on the updated mapping and the needs discussed in the sections below.

Regional Plan Designations

Metro's 2000 Regional Transportation System Plan (RTP) includes designations for pedestrian districts and transit/mixed use corridors. The RTP defines pedestrian districts as areas of high or potentially high pedestrian activity where regional policy places priority on creating a safe, direct, and attractive pedestrian environment. In general, these are areas planned for compact, mixed-use development served by transit and correspond to the town center 2040 design type designations. These areas are characterized by buildings oriented to the street and by boulevard street design features such as wider sidewalks with buffering from traffic, marked street crossing at intersections, pedestrian-scale lighting, benches, bus shelters, and street trees. Transit/mixed-use corridors are defined as priority areas for pedestrian travel that are served by good quality transit service and that will generate substantial pedestrian traffic near neighborhood-oriented retail development, schools, parks, and bus stops.

The Metro 2040 Corridor design type generally corresponds with the transit/mixed-use corridors areas on the RTP Pedestrian System. In Troutdale, 257th Avenue, Halsey Street, Historic Columbia River Highway, and Stark Street are designated as "Corridors". The Pedestrian Facilities Master Plan identifies improvements to provide a connected pedestrian network to and within the RTP designated pedestrian districts and transit/mixed use corridors. The City of Troutdale Development Code designates a Town Center overlay that corresponds to the Metro RTP pedestrian districts and transit/mixed-use corridors and requires new development in these areas to comply with the RTP designations[2].

Strategies

The existing conditions analysis identified pedestrian system issues within Troutdale that include an incomplete arterial/collector sidewalk system, a lack of arterial crossings, and a lack of multi-use trails. These needs correspond with those identified in the 1995 TSP.

Several strategies were identified in the 1995 TSP to address pedestrian system needs and to guide project prioritization. This prioritization process helps to focus community investment

[2] Troutdale Development Code, City of Troutdale, viewed on the City's website (www.ci.troutdale.or.us) with July 2, 2004 updates.

on those projects that are most effective at meeting critical needs, while deferring other projects of lesser value. The strategies from the 1995 TSP were re-ranked by the Citizens Advisory Committee (CAC) for use in this TSP[3].

The strategies for pedestrian facilities (listed in order of importance) are:

- Connect key pedestrian corridors to schools, parks, and activity centers
- Pedestrian corridors that connect neighborhoods
- Arterial crossing enhancements
- Pedestrian corridors that connect to major transit locations
- Fill in gaps in the network where some sidewalks exist
- Reconstruct all sidewalks to City of Troutdale standards
- Pedestrian corridors that connect to major recreational uses
- Pedestrian corridors that commuters might use

Master Plan

Based on the needs identified above, the Pedestrian Master Plan was updated as shown in Figure 4-3 and listed in Table 4-4 and Table 4-5. These projects and a revised strategy ranking will be used to create an updated Pedestrian Action Plan. The remaining pedestrian projects from the 1995 TSP account for approximately $2.7 million, while this update suggests an additional list of sidewalks, pedestrian crossing enhancements and multi-use trails that would add $1.4 million. Portions of the pedestrian projects are incorporated into improvement on other mode master plans, including the bicycle and motor vehicle master plans. The new Pedestrian Master Plan costs are the sum of the remaining projects from the 1995 TSP ($2.7 M) plus the new projects not incorporated in other system master plans ($1.4 M) for a total of $4.1 million.

[3] Citizens Advisory Committee Meeting, February 2, 2005.

Table 4-4: Projects Remaining from 1995 Pedestrian System Action Plan

Location	Type (1)	Side of Street	From	To	Cost ($1,000s)
257th Avenue	PC	N/A	Cherry Park South	Stark	$1,859
Troutdale Road	PC	N/A	Cherry Park	Stark	$15
Troutdale Road	S	Both	Sweetbriar	Beaver Creek	$704*
Stark Street	S	Both	257th	Troutdale Rd	$588*
Stark Street	S	North	Troutdale Rd	Stott	$105*
Halsey Street	S	Both	West City Limits	Historic Columbia Riv. Hwy.	$959*
Historic Columbia Riv. Hwy./244th	S	Both	Halsey	244th	$987*/ $745
Hensley Street	S	South	262nd	Laura	$47
	Subtotal				$6,009
	Less Portion Included in Motor Vehicle Project				($3,343)
	Remaining Amount of Pedestrian Only Projects				**$2,666**

*These project costs are included in a motor vehicle roadway improvement.

Note:
1. Project Types:
S = Complete sidewalks
PC = Enhanced Pedestrian Crossing
T = Multi-use Trail

Table 4-5: Proposed New Pedestrian Projects

Location	Type (1)	Side of Street	From	To	Cost ($1,000s)
Sundial Road	S	Both	Marine Drive	N. City Limits	$724*
Marine Drive	S	Both	West City Limits	Frontage Road	$1,040*
Sweetbriar Road	S	South	Troutdale	East City Limits	$147
Sturges Drive	T	N/A	Sturges Lane	Sturges Dr	$22**
2nd Street	S	Both	257th	Buxton	$68*
21st Street	S	Both	Sunrise Cir	Troutdale Rd	$105
257th Avenue	PC	N/A	Cherry Park South	Historic Columbia Riv. Hwy.	$225
Stark Street	PC	N/A	257th	Troutdale	$150
Buxton Road	PC	N/A	Historic Columbia Riv. Hwy.	Cherry Park	$15
40 Mile Trail	T	N/A	Marine Drive	Historic Columbia Riv. Hwy	$2,910**
Beaver Creek Trail	P	N/A	Mt. Hood CC	Historic Columbia Riv. Hwy	$1,174
Columbia Park Trail	T	N/A	18th Way	22nd Ct	$189**

Location	Type (1)	Side of Street	From	To	Cost ($1,000s)
Sturges Trail E/W	T	N/A	257th	Sturges Trail N/S	$218**
Sturges Trail N/S	T	N/A	Sturges Ln	242nd Extension	$69**
Edgefield Trail N. of Halsey	T	N/A	Historic Columbia River Highway	Halsey	$120**
Edgefield Trail S. of Halsey	T	N/A	Halsey	Sturges Trail E/W	$128**
Halsey/Sturges Connector Trail	T	N/A	Halsey	Sturges Trail E/W	$98**
Troutdale Terrace Trail	T	N/A	257th	Off-Street Trail	$142**
Halsey/257th Connector Trail	T	N/A	257th	Halsey	$49**
	New Sidewalks Connections				$2,084
	New Pedestrian Crossing Enhancements				$390
	New Multi-use Trails				$3,945
	New Pedestrian Trails				$1,174
	Less Amount Funded in Roadway or Bike Improvement Projects				($6,227)
	Total Remaining Funding Required for New Pedestrian Projects				**$1,366**

* These project costs are included in a motor vehicle roadway improvement.
** These project costs are included in the bicycle improvement plan.

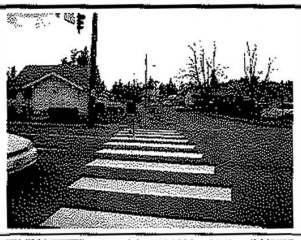
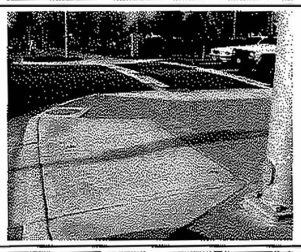
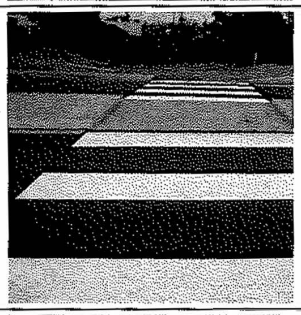
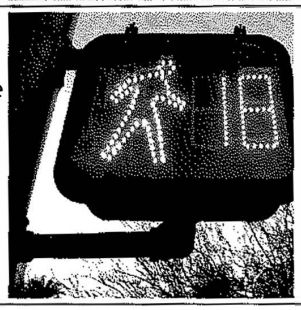
Note
1. Project Types:
S = Complete sidewalks
PC = Enhanced Pedestrian Crossing
T = Multi-use Trail
P = Pedestrian Trail

As development occurs, streets are rebuilt, and other opportunities (such as grant programs) arise, projects on the Master Plan should be pursued as well. In addition, all development projects should include an inventory of local street sidewalk conditions in order to populate the City database of sidewalk locations.

Several enhanced pedestrian crossings were identified in the Pedestrian Master Plan project list. 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*[4]. Table 4-6 provides a description of possible crossing enhancements. Crossings on 257th Avenue and Stark Street could require significant enhancements (e.g. signalization), while crossings on Troutdale Road and Buxton Road could require less expensive treatments (e.g. median refuge).

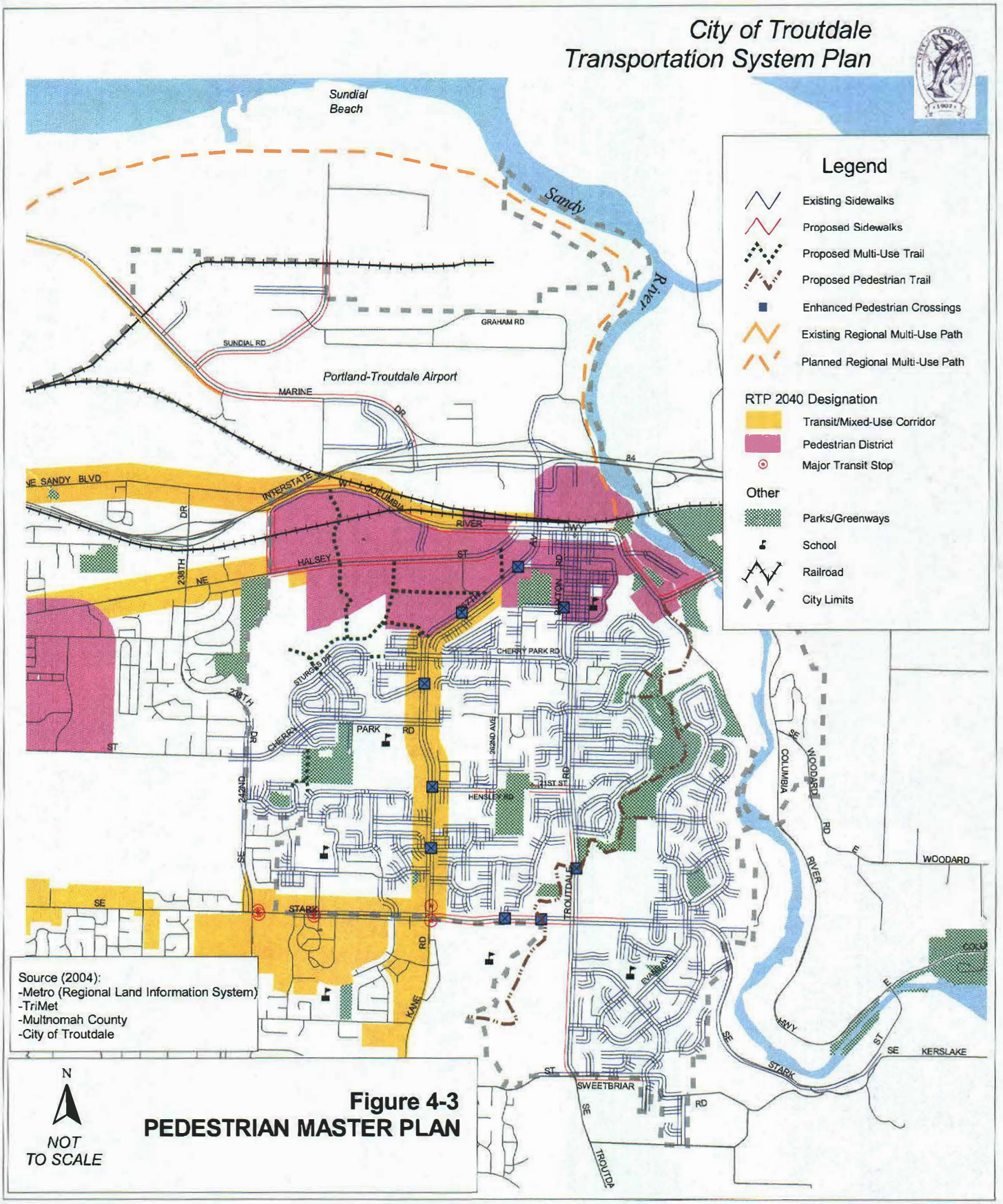
[4] *Traffic Control Devices Handbook*, Institute of Transportation Engineers, 2001;.Chapter 13, Table 13-2.

Table 4-6: 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.		$500 to $1,000 each crossing
Raised Crosswalk	Crosswalks that are level with the adjacent sidewalks, making pedestrians more visible to approaching traffic.		$4,000
New Corner Sidewalk Ramp	Construct ADA compliant wheelchair ramps consistent with city standards		$3,000 to $5,000 each 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.		$3,000 to $10,000 depending on overall length and amenities.
Pedestrian Count Down Timer Signal	Install supplemental pedestrian signal controls to indicate the time remaining before crossing vehicles get 'green' signal indication.		$500 each signal head

Improvement	Description	Illustration	Cost Range
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.
Mid-Block Pedestrian Signal and Crossing	Construct new pedestrian signal that is synchronized with major street traffic progression to reduce interruption of through traffic. Appropriate near high pedestrian generators.		$100,000 to $150,000

DKS Associates
TRANSPORTATION SOLUTIONS



Action Plan

A pedestrian system action plan project list was created to identify pedestrian projects that are reasonably expected to be funded by the year 2025, which meets the requirements of the updated Transportation Planning Rule[5]. The pedestrian improvement strategies were used to rank the pedestrian projects. The highest ranking City projects that are reasonably expected to be funded (see Chapter 5) were combined with projects from other agencies identified in the RTP Financially Constrained scenario to create the project list shown in Table 4-7.

Table 4-7: Pedestrian System Action Plan

Location	Type (1)	Side of Street	From	To	Troutdale Cost ($1,000s)
Hensley Street	S	South	262nd	Laura	$47
21st Street	S	Both	Sunrise Cir	Troutdale Rd	$105
257th Avenue	PC	N/A	Cherry Park South	Historic Columbia Riv. Hwy.	-
257th Avenue	PC	N/A	Cherry Park South	Stark	-
2nd Street	S	Both	257th	Buxton	$68*
Troutdale Road	PC	N/A	Cherry Park	Stark	$15
Halsey Street	S	Both	West City Limits	Historic Columbia Riv. Hwy.	-
Sturges Drive	T	N/A	Sturges Lane	Sturges Dr	$22**
Stark Street	S	Both	257th	Troutdale	-
	Subtotal				$257
	Less Portion Included in Motor Vehicle or Bicycle Project				($90)
	Remaining Amount of Pedestrian Only Projects				**$167**

*These project costs are included in a motor vehicle roadway improvement.
**These project costs are included in a bicycle improvement.
- These projects are under the jurisdiction of, and will be funded by, other agencies.

Note:
1. Project Types:
S = Complete sidewalks
PC = Enhanced Pedestrian Crossing
T = Multi-use Trail

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

Bicycles

The existing conditions analysis updated the bicycle system network map from the 1995 TSP to reflect recent improvements. Based on the updated mapping and the needs discussed below, the Troutdale Bicycle Plan should be updated from the 1995 TSP.

Regional Plan Designations

The 2000 Metro RTP includes a bicycle functional classification system with the following designations:

- Regional Access Bikeway: Function focuses on accessibility to and within the central city, regional centers, and larger town centers. Travel time is an important factor as these bikeways generally have high volumes.
- Regional Corridor Bikeway: Functions as longer routes that provide point-to-point connection between the central city, regional centers, and larger town centers. Generally higher automobile speeds and volumes than community connector bikeways.
- Community Connector Bikeway: Connect smaller town centers, main streets, station areas, industrial areas, and other regional attractions.
- Multi-use paths with bicycle transportation function: Likely to be used for commuting to work or school, accessing transit, or traveling to a store, library, or other local destination. Bicycle/pedestrian sidewalks on bridges are included in this classification. Design includes physical separation from motor vehicle traffic by open space or barrier.

There are several routes in Troutdale with RTP designations, as shown in Figure 4-4. These routes should include bicycle lanes or multi-use paths to be consistent with the RTP. By complying with the RTP designations and completing the arterial/collector bicycle system, the Troutdale Bicycle Master Plan is consistent with plans developed by Metro, Multnomah County, and the State.

Strategies

Bikeway improvements are aimed at closing the gaps in the bicycle network along arterial and collector roadways, in additional to providing multi-modal links to improve livability. Several strategies were identified in the 1995 TSP to address bicycle system needs and to guide project prioritization. This prioritization process helps to focus community investment on those projects that are most effective at meeting critical needs, while deferring other

projects of lesser value. The strategies from the 1995 TSP were re-ranked by the Citizens Advisory Committee (CAC) for use in this TSP[6].

The strategies for bicycle facilities (listed in order of importance) are:

- Connect key bicycle corridors to schools, parks, and activity centers
- Finish the 40-mile Loop in Troutdale
- Bicycle corridors that connect neighborhoods
- Bicycle corridors that connect to major recreational facilities
- Fill in gaps in the network where some bikeways exist (arterials and collectors)
- Arterial Crossing Enhancements
- Bicycle corridors that commuters might use
- Bicycle corridors that access retail areas
- Reconstruct all bikeways to Multnomah County standards

Master Plan

The remaining bicycle projects from the 1995 TSP account for approximately $3.0 million, while this update suggests an additional list of bike lanes, pedestrian crossing enhancements and multi-use trails that would add $2.0 million. Portions of the bike projects are incorporated into improvements on other mode master plans, including the pedestrian and motor vehicle master plans. The new Bicycle Master Plan (which is listed in Table 4-8 and Table 4-9 and is shown on Figure 4-4) costs are the sum of the remaining projects from the 1995 TSP ($3.0 M) plus the new projects not incorporated in other system master plans ($2.0 M) for a total of $5.0 million. The Bicycle Master Plan will require incremental implementation. As development occurs, streets are rebuilt and other project funding opportunities (such as grant programs) arise, projects on the Master Plan should be integrated into project development.

Table 4-8: Remaining Projects on 1995 Bicycle Action Plan

Location	Type (1)	From	To	Cost ($1,000s)
40-Mile Loop	T	Marine Drive	Historic Columbia River Hwy	$2,910
Stark Street	BL	257th Avenue	Troutdale Road	$435*
Buxton Road	BL	Historic Columbia Riv. Hwy.	3rd Street	$117*
	Subtotal			$ 3,462
	Less Portion Included in Motor Vehicle or Pedestrian Projects			($435)
	Remaining Amount of Bicycle Only Projects			**$3,027**

*These project costs are included in a motor vehicle roadway improvement.

1. Project Types:

BL = Complete bike lanes

T = Multi-use Trail

[6] Citizens Advisory Committee Meeting, February 2, 2005.

Table 4-9: Proposed New Bicycle Projects

Location	Type (1)	From	To	Cost ($1,000s)
Historic Columbia River Highway	BL	Halsey	244th	$800*
Troutdale Road	BL	Stark	Sweetbriar	$315*
Sturges Drive	T	Sturges Ln	Sturges Dr	$22
3rd Street/Sandy Avenue	BL	Buxton	Troutdale	$610
Sweetbriar Road	BL	Troutdale	East City Limits	$375
Columbia Park Trail	T	18th Way	22nd Ct	$189
Sturges Trail E/W	T	257th	Sturges Trail N/S	$218
Sturges Trail N/S	T	Sturges Ln	242nd Extension	$69
Edgefield Trail N. of Halsey	T	Historic Columbia River Highway	Halsey	$120
Edgefield Trail S. of Halsey	T	Halsey	Sturges Trail E/W	$128
Halsey/Sturges Connector Trail	T	Halsey	Sturges Trail E/W	$98
Troutdale Terrace Trail	T	257th	Off-Street Trail	$142
Halsey/257th Connector Trail	T	257th	Halsey	$49
257th Avenue	PC	Cherry Park South	Historic Columbia Riv. Hwy.	$225**
257th Avenue	PC	Cherry Park South	Stark	$1,859**
Stark Street	PC	257th	Troutdale	$150**
Buxton Road	PC	Historic Columbia Riv. Hwy.	Cherry Park	$15**
	Subtotal			$ 5,384
	Less Portion Included in Motor Vehicle or Pedestrian Projects			($3,364)
	Remaining Amount of Bicycle Only Projects			**$2,020**

* These project costs are included in a motor vehicle roadway improvement.
** These project costs are included in the pedestrian system plan.

1. Project Types:
BL = Complete bike lanes
PC = Enhanced Pedestrian Crossing
T = Multi-use Trail


City of Troutdale
Transportation System Plan
Legend
Bicycle Facilities
Existing Bike Lanes
Proposed Bike Lanes
Existing Regional Multi-Use Path
Planned Regional Multi-Use Path
Proposed Multi-Use Trail
RTP Bicycle System Designations
Regional Access
Regional Corridor On-Street
Community Connector
RTP Major Transit Stop
Other
Parks/Greenways
Schools
Railroads
Sundial Beach
Sandy River
GRAHAM RD
SUNDIAL RD
Portland-Troutdale Airport
MARINE DR
NE SANDY BLVD
INTERSTATE 84
W COLUMBIA RIVER HWY
HALSEY ST
NE 238TH DR
CHERRY PARK RD
STURGES DR
CHERRY PARK RD
PARK RD
ST
242ND DR
SE
262ND AVE
HENSLEY RD
21ST DR
BUXTON RD
TROUTDALE RD
SE STARK ST
SE COLUMBIA RIVER HWY
SE WOODARD RD
WOODARD
KANE RD
EVANS AVE
SE STARK ST
SE KERSLAKE
SWEETBRIAR RD
SE TROUTDALE
Source (2004):
-Metro (Regional Land Information System)
-TriMet
-Multnomah County
-City of Troutdale
N
NOT TO SCALE
Figure 4-4
BICYCLE MASTER PLAN

Action Plan

A bicycle system action plan project list was created to identify bicycle projects that are reasonably expected to be funded by the year 2025, which meets the requirements of the updated Transportation Planning Rule[7]. The bicycle improvement strategies were used to rank the bicycle projects. The highest ranking City projects that are reasonably expected to be funded (see Chapter 5) were combined with projects from other agencies identified in the RTP Financially Constrained scenario to create the project list shown in Table 4-10.

Table 4-10: Bicycle System Action Plan

Location	Type (1)	From	To	Troutdale Cost ($1,000s)
Stark Street	BL	257th Avenue	Troutdale	-
Sturges Drive	T	Sturges Ln	Sturges Dr	$22
257th Avenue	PC	Cherry Park South	Historic Columbia Riv. Hwy.	-
257th Avenue	PC	Cherry Park South	Stark	-
Historic Columbia River Highway	BL	Halsey	244th	-
	Subtotal			$ 22
	Less Portion Included in Motor Vehicle or Pedestrian Projects			($0)
	Remaining Amount of Bicycle Only Projects			$ 22

* These project costs are included in a motor vehicle roadway improvement.
- These projects are under the jurisdiction of, and will be funded by, other agencies.

1. Project Types:
BL = Complete bike lanes
PC = Enhanced Pedestrian Crossing
T = Multi-use Trail

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

Transit

TriMet is the regional transit provider for the Portland metropolitan area and operates fixed route transit service in Troutdale, which is located in the northeast corner of TriMet's service area. Due to its location, Troutdale is an end point for the regional service system. TriMet's Transit Investment Plan (TIP) identifies strategies for meeting regional public transportation needs, focusing on investments and improvements to the total transit system, such as improvements on existing lines. Therefore the TIP focuses on targeted, strategic improvements to the system, with priorities in the following order:

- Maintain the quality of the existing system
- Expand the high capacity transit system (MAX light rail or bus rapid transit)
- Expand the Frequent Service system
- Improve local service

Troutdale is not served by high capacity transit or frequent service routes. On-going studies for the North/South Transportation and Telecommunications Corridor Assessment are considering higher capacity transit service, such as dedicated busways, street cars, and bus rapid transit service, along routes within Troutdale. However, the higher capacity transit service is one of several alternatives under study, and no conclusions for a preferred set of improvements have been identified. Therefore, for the purpose of this TSP, the transit services analysis should consider needs that focus on the quality of the existing transit service and local service enhancements.

Regional Plan Designations

In addition to the performance based needs discussed in the following section, the Troutdale TSP needs to consider Metro RTP designations for consistency. The RTP includes transit route designations along corridors defined as follows[8]:

- Rapid Bus. Regional rapid bus service emulates LRT service in speed, frequency and comfort, serving major transit routes with limited stops. This service runs as least every 15 minutes during the weekday and weekend mid-day base periods.
- Frequent Bus. Frequent Bus service provides slightly slower, but more frequent, local bus service than rapid bus along selected transit corridors. This service runs at least every 10 minutes and includes transit preferential treatments such as reserved bus lanes and signal preemption.

[8] Based on the *2000 Regional Transportation Plan*, Metro, August 12, 2000.

- Regional Bus. Regional bus service is provided on most major urban streets. This type of bus service operates with maximum frequencies of 15 minutes with conventional stop spacing along the route.

The existing transit routes in Troutdale are consistent with the Metro designations. No changes are recommended.

Needs Assessment

The quality of transit service within Troutdale can be characterized by the following indicators:

- Transit route coverage,
- Frequency,
- Reliability, and
- User amenities.

The following sections present the analysis and findings for each of these service characteristics, and identify potential needs for future transit service improvements in Troutdale.

Transit Coverage

The minimum land use density[9] required to support a fixed route transit bus service with 1-hour scheduled between arrivals is about four (4) housing units per acre or three (3) employees per acre. Figure 4-5 shows those areas in Troutdale that meet this transit supportive density threshold with the 2025 development forecasts, as well as the transit coverage area represented by a 0.25 mile radius from transit stops.

Although the majority of the transit supportive areas are covered by transit, the industrial area north of I-84, the area surrounding Cherry Park between 257th Avenue and 242nd Avenue, and the area surrounding Stark Street between Sweetbriar and Evans Avenue show a need for future transit coverage. The Cherry Park coverage area already was addressed by an action item in the 1995 TSP under the transit policy section. A new action item is needed to address services along Marine Drive and Graham Road into the north industrial area and Stark Street in the Evans/Sweetbriar area.

Transit Frequency

In addition to providing service to a geographic area, transit route frequency is a measure of transit quality of service and mode attractiveness. Existing transit headways (time between successive buses on the same route) in Troutdale range from level of service C to E during peak periods. While TriMet has not identified specific

[9] Thresholds for minimum land use density to support fixed-route transit service are based on definitions in the 2000 *Highway Capacity Manual*, Chapter 27 for Transit service analysis methodologies.

route frequency increases in Troutdale, Metro's RTP Priority system incorporates region-wide increases in transit frequencies. Troutdale should coordinate with TriMet to improve route frequency and increase the quality of transit service within the City.

Transit Reliability

Transit service reliability is a key performance characteristic for retaining riders. Congested roadways, bottlenecks, and traffic signals can delay transit vehicles and cause vehicle bunching (vehicles arriving off schedule arriving close together). The transit corridors in Troutdale are on arterial roadways with signal controls and forecasted congestion (257th Avenue, Stark Street, Halsey Street).

In order to improve transit vehicle schedule adherence, transit signal priority can be implemented, which can extend a bus approach green phase (or truncate a side street green phase) if an approaching bus is behind schedule. Multnomah County has identified long-range signal system improvements that could support these types of added features, which includes the transit signal priority corridors shown in Figure 4-6[10]. The installation of equipment on traffic signals in Troutdale could be accelerated by provision of local funds. A total of $100,000 has been allocated in the Transit Master Plan for this purpose.

User Amenities

One of the most significant user amenities for bus services is a shelter at the transit stop. TriMet typically recommends installation of transit shelters where daily transit boarding passengers exceed 35. The existing conditions analysis found that two stops in downtown Troutdale exceed this level, but they did not have a transit shelter. These stops are located on Historic Columbia River Highway east of 257th Avenue, and 2nd Street east of Dora Street. Although future transit ridership was not analyzed for this TSP, Metro's RTP designates several major transit stops along Stark Street. These locations should be considered for transit shelter installation in coordination with TriMet.

In addition to providing shelters at transit stops throughout the City, the need for a transit center was also analyzed. TriMet defines a transit center as "a fixed location where passengers interchange from one route or vehicle mode to another."[11] A transit center could include amenities such as a waiting room, benches, and ticket or pass vending machines. The benefits of these amenities are an increase in transit operating efficiencies, encouragement of intensive land use in the surrounding area, and rider attractiveness[12]. The annual costs for operating and maintaining a transit center is

[10] *Gresham/East Multnomah County Traffic Signal System and Communications Master Plan Update*, DKS Associates, September 2001.

[11] Email from Young Park, TriMet, March 8, 2005.

[12] Tool 8: Transit Center, TriMet Transit Toolbox, TriMet.

approximately $275,000[13]. In Troutdale, the downtown area is proposed to have 3 routes, which would warrant consideration of a transit center. However, because Troutdale is at the edge of the service area and there is no park-and-ride facility downtown, rider transfers between routes and modes is not expected to be at a level that would warrant a transit center. Therefore, a transit center is not recommended for downtown Troutdale. If a park-and-ride were to be located in Troutdale that provided access to several routes, the need for a transit center should be re-examined.

Strategies

The 1995 TSP identified strategies to meet transit needs in Troutdale. These strategies have not changed, but were re-ranked as part of this TSP[14]. The strategies, which rely on coordination with TriMet, include (listed in order of importance):

- Provide direct/express access to MAX
- Provide access to employment areas
- Provide park-and-ride lots
- Provide express routes to regional employment centers
- Provide frequent service in peak commute periods
- Provide access to commercial areas
- Provide access to activity and service centers
- Provide bus shelters

Transit system enhancements with the TriMet service area are ultimately decided based on regional transit goals. As such, Troutdale has limited control over dictating the expansion of local service or increasing route frequency. These decisions can be influenced if the proper density is achieved along transit corridors or if roadway infrastructure is built to serve transit routes, a decision over which the City has more control. Another tactic for increasing transit service to the City of Troutdale is through inter-governmental agreements and funding strategies between Troutdale and TriMet in order to leverage transit dollars for local projects, providing better connections to transit facilities and supply transit amenities at transit locations.

[13] Tool 8: Transit Center, TriMet Transit Toolbox, TriMet.

[14] Citizens Advisory Committee Meeting, February 2, 2005.

Master Plan

Based on the needs identified above, TriMet strategies, and Troutdale TSP strategies, a Transit System Master Plan was created and is listed in Table 4-11 and Table 4-12 and is shown in Figure 4-6. The local component of the improvements and strategies from the 1995 TSP accounts for $120,000 for bus stop enhancements and an initial study of local park-and-ride lots. In Table 4-12, new action items and improvements are noted for incorporation into the goals and policies section of the Comprehensive Plan, and as a new traffic operations project for major street corridors.

Table 4-11: Transit System Projects and Action Items from 1995 TSP

Location	Description	Cost ($1,000s)
Halsey/Graham Road	Coordinate with TriMet to provide a new route connecting the Outlet Mall to Rockwood MAX Station	-
Cherry Park Road	Coordinate with TriMet to provide a new route between 242nd and 257th	-
Bus Stop Enhancements	Coordinate with TriMet to provide bus shelters on transit streets.	$70
Park-and-Ride Lot	Coordinate with TriMet to study the feasibility of a Park-and-Ride lot in the I-84 interchange area that would serve Troutdale and communities to the east. This lot should provide access to the planned 40-Mile Regional Multi-Use Trail.	$50
	Subtotal	**$120**

- These projects are under the jurisdiction of, and will be funded by, other agencies.

Table 4-12: Proposed New Transit Projects and Action Items

Location	Description	Cost ($1,000s)
Transit Signal Priority	Coordinate with TriMet and Multnomah County to construct and implement transit signal priority on Halsey Avenue, 257th Avenue, and Stark Street.	$100
Marine/Sundial/Graham	Coordinate with TriMet to provide a new route serving the north industrial area.	-
Troutdale/17th St	Coordinate with TriMet to provide a new route serving the southeast Troutdale area.	-
Historic Columbia River Highway/Glenn Otto Park	Coordinate with TriMet to provide a new route serving Glenn Otto Park.	-
Stark/Sweetbriar/Evans	Study the feasibility of a local shuttle service to serve neighborhoods not covered by TriMet routes (including the Stark/Sweetbriar/Evans area).	$50
Existing Transit Routes	Coordinate with TriMet to reduce transit route headways.	-
Transit Corridors	Direct growth to increase the density of development along transit routes in the City of Troutdale in an effort to support regional transit service goals.	-
RTP Designated Major Transit Stops	To meet RTP requirements, amend development code regulations to require new retail, office, and institutional buildings on sites at major transit stops to: 1. Locate buildings within 20 feet of or provide a pedestrian plaza at the major transit stops. 2. Provide reasonably direct pedestrian connections between the transit stop and building entrances on the site. 3. Provide a transit passenger landing pad accessible to disabled persons (if not already existing to transit agency standards). 4. Provide an easement or dedication for a passenger shelter and underground utility connection from the new development to the transit amenity if requested by the public transit provider. 5. Provide lighting at a transit stop (if not already existing) to transit agency standards.	-
	Subtotal	**$150**

- These projects are under the jurisdiction of other agencies and may be funded by other agencies in partnership with the City of Troutdale

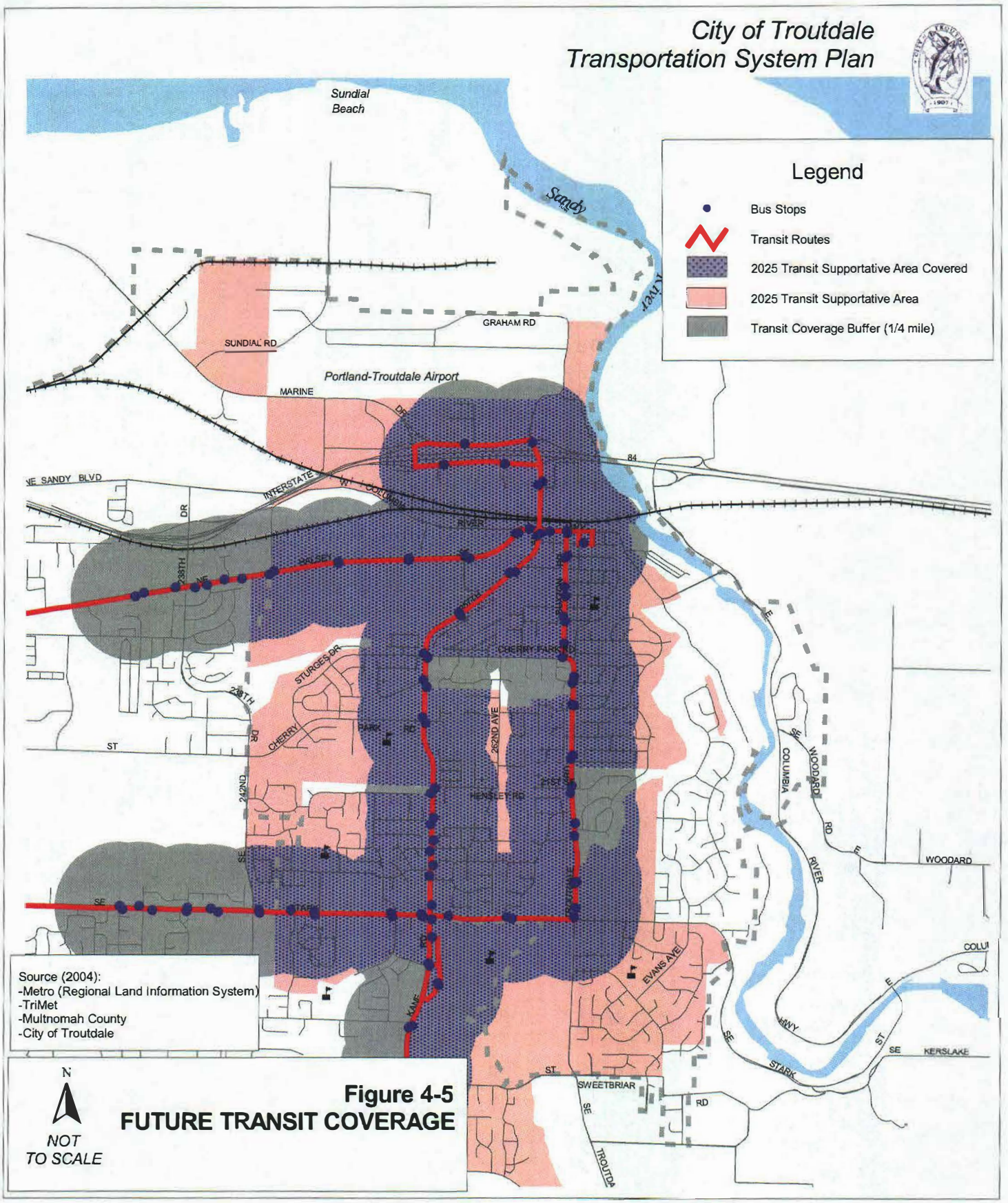


Figure 4-5
FUTURE TRANSIT COVERAGE

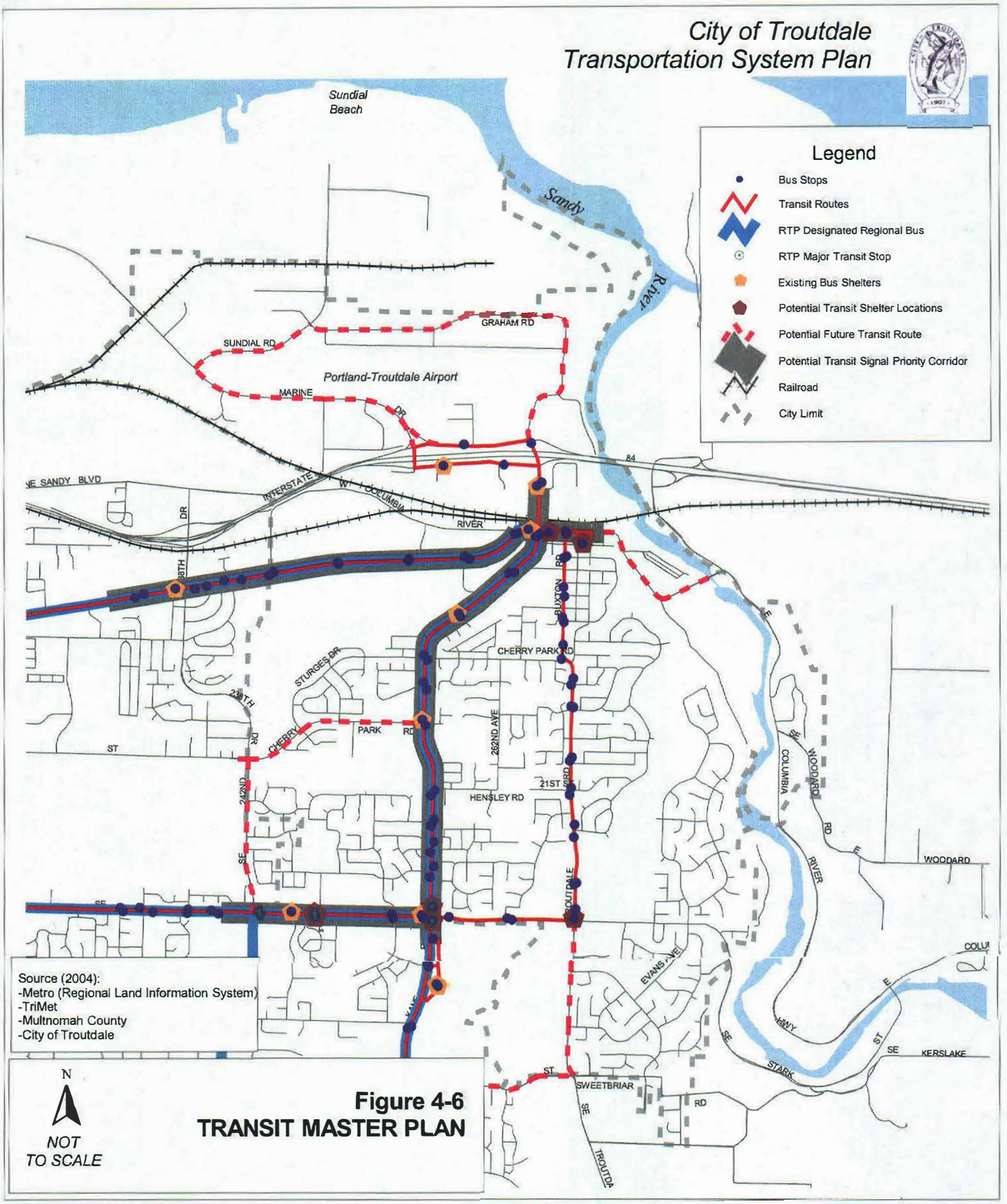


Figure 4-6
TRANSIT MASTER PLAN

Action Plan

A transit system action plan project list was created to identify transit projects that are reasonably expected to be funded by the year 2025, which meets the requirements of the updated Transportation Planning Rule[15]. The transit improvement strategies were used to rank the transit projects. The highest ranking City projects that are reasonably expected to be funded (see Chapter 5) were combined with projects from other agencies identified in the RTP Financially Constrained scenario to create the project list shown in Table 4-13.

Table 4-13: Transit System Action Plan

Location	Description	Troutdale Cost ($1,000s)
Transit Signal Priority	Coordinate with TriMet and Multnomah County to construct and implement transit signal priority on Halsey Avenue, 257th Avenue, and Stark Street.	-
RTP Designated Major Transit Stops	To meet RTP requirements, amend development code regulations to require new retail, office, and institutional buildings on sites at major transit stops to: 1. Locate buildings within 20 feet of or provide a pedestrian plaza at the major transit stops. 2. Provide reasonably direct pedestrian connections between the transit stop and building entrances on the site. 3. Provide a transit passenger landing pad accessible to disabled persons (if not already existing to transit agency standards). 4. Provide an easement or dedication for a passenger shelter and underground utility connection from the new development to the transit amenity if requested by the public transit provider. 5. Provide lighting at a transit stop (if not already existing to transit agency standards).	-
Bus Stop Enhancements	Coordinate with TriMet to provide bus shelters on transit streets.	-
Transit Corridors	Direct growth to increase the density of development along transit routes in the City of Troutdale in an effort to support regional transit service goals.	-
	Subtotal	-

- These projects are under the jurisdiction of other agencies and may be funded by other agencies in partnership with the City of Troutdale

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

Motor Vehicles

Future Capacity Deficiencies

The base case analysis for the forecasted 2025 growth was essentially a no-build scenario based on the RTP Financially Constrained funding scenario. This scenario only includes transportation system improvements outside of Troutdale that are expected to be constructed/implemented with the current funding levels. Figure 4-7 shows the forecasted demand/capacity on roadways with the Troutdale 2025 TSP Study Area for the no-build scenario. As shown in the figure, the no-build scenario transportation system does not have adequate roadway capacity to serve the expected future travel needs. Demand/Capacity (D/C) ratios exceed 1.0 on multiple key corridors in the study area.

Strategies

There are several corridors within the Troutdale TSP study area that do not meet performance standards, including 238th/242nd, 257th/Kane, Troutdale/Buxton, Stark, and the Troutdale Interchange. To meet performance standards and serve future growth, the future transportation system needs significant multi-modal improvements and strategies to manage the forecasted travel demand. The extent and nature of the multi-modal improvements for Troutdale are significant. The impact of future growth would be severe without significant investment in transportation improvements. The 1995 TSP created strategies for meeting automobile facility needs. These strategies were updated to include Transportation System Management (TSM) and were re-ranked in this TSP[16].The strategies include (listed in order of importance):

- Provision of left turning lanes on collectors
- Regional Circulation
- Adopt TSM measures to improve system efficiency (including ITS, NTM, access management, local street connectivity, and functional classification)
- Circulation Enhancements
- Mitigate all Intersections to Level of Service D in the PM Peak Hour
- Intersection Modifications
- Additional Signals on Arterial/Collector Intersections
- Improve Circulation of Residential Areas
- Develop TDM Programs to Reduce Peak Traffic for Employers in Troutdale
- Neighborhood Traffic Management

[16] Citizens Advisory Committee Meeting, February 2, 2005.

Figure 4-7
2025 NO-BUILD PM PEAK VOLUME/CAPACITY

The following sections outlines the type of improvements that would be necessary as part of a long-range master plan. Phasing of implementation will be necessary since all of the improvements cannot be done at once. This will require prioritization of projects and periodic updating to reflect current needs. Most importantly, it should be understood that the improvements outlined in the following sections are a guide to managing growth in Troutdale as it occurs over the next 20 years.

Transportation System Management (TSM)

Transportation System Management (TSM) focuses on low cost strategies to enhance operational performance of the transportation system by seeking solutions to immediate transportation problems, finding ways to better manage transportation, maximizing urban mobility, and treating all modes of travel as a coordinated system. These types of measures include such things as signal improvements, ramp metering, traffic calming, access management, local street connectivity, intelligent transportation systems (ITS) and programs that enhance and smooth transit operations. Typically, the most significant measures that can provide tangible benefits to the traveling public are traffic signal coordination and systems. Measures that are more difficult to measure but provide system reliability to maintain transportation flows include transit signal priority and incident management.

TSM measures focus primarily on region wide improvements, however there are a number of TSM measures that could be used in a smaller scale environment such as the Troutdale area. The following sections discuss TSM measures that could be appropriate for the Troutdale 2025 TSP study area.

Intelligent Transportation Systems (ITS)

ITS involves the application of advanced technologies and proven management techniques to relieve congestion, enhance safety, provide services to travelers, and assist transportation system operators in implementing suitable traffic management strategies. ITS focuses on increasing the efficiency of existing transportation infrastructure, which enhances the overall system performance and reduces the need to add capacity (e.g. travel lanes). Efficiency is achieved by providing services and information to travelers so they can (and will) make better travel decisions and to transportation system operators so they can better manage the system and improve system reliability. Multnomah County has developed an ITS deployment plan[17] that includes projects in the Troutdale area, such as:

[17] *Gresham/East Multnomah county Traffic Signal System and Communications Master Plan Update*, DKS Associates, September 2001.

- Traffic monitoring and Surveillance
- Signal coordination and optimization
- Signal priority
- Information availability
- Incident management

The devices and communications planned to implement these projects are shown in the Traffic Control Master Plan (Figure 4-8). Signal priority corridors are shown in the Transit System Master Plan (Figure 4-6). In order to support these planned projects, the following actions should be taken as part of this TSP:

- *Adopt the Traffic Control Master Plan, which shows planned ITS devices and communications in the Troutdale area.*
- *Modify City of Troutdale standards to include installation of 3" conduit during roadway improvement projects to support the interconnect infrastructure shown in the Traffic Control Master Plan.*

Note: This map does not show all potential traffic signal locations. Additional signals may be installed if approved by the appropriate agency (ODOT, Multnomah County, Troutdale).

City of Troutdale Transportation System Plan

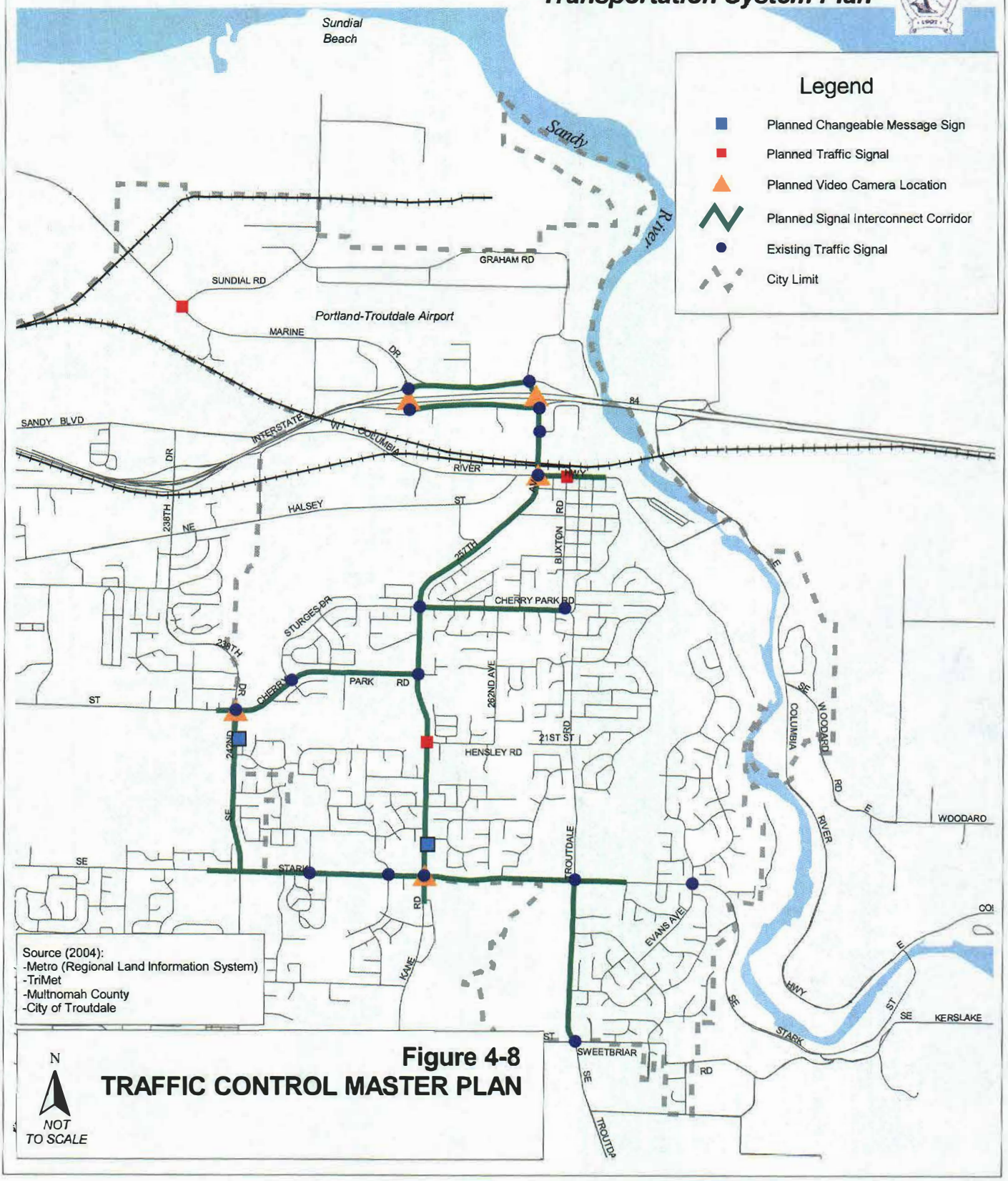


Figure 4-8
TRAFFIC CONTROL MASTER PLAN

Neighborhood Traffic Management (NTM)

The City of Troutdale has a Speed Hump Program that establishes a process to guide speed hump installation through neighborhood involvement. This program includes considerations of street classification and emergency response needs, but it does not provide the opportunity for application of other NTM devices. The Speed Hump Program could be updated to consider other traffic calming measures and work with the community to find the traffic calming solution that best meets their needs and maintains roadway function. Table 4-14 lists common NTM applications and suggests which devices might be supported by the Gresham Fire Department. Additional NTM measure descriptions that include diagrams, benefits, and costs are included in the technical appendix. Any NTM project should include coordination with emergency agency staff to assure public safety.

Table 4-14: Traffic Calming Measures by Roadway Functional Classification[18]

Traffic Calming Measure	Roadway Classification		
	Arterial	Collector	Neighborhood/Local Street
Curb Extensions			
Medians			
Pavement Texture			
Speed Hump	Not Supported	Not Supported	Calming measures are okay on lesser response routes that have connectivity (more than two accesses) and are accepted and field tested by the Gresham Fire Department.
Roundabout			
Raised Crosswalk	Not Supported	Not Supported	
Speed Cushion (provides emergency pass-through with no vertical deflection)	Not Supported		
Choker[19]	Not Supported	Not Supported	
On-Street Parking			
Traffic Circle	Not Supported	Not Supported	
Diverter (with emergency vehicle pass through)	Not Supported	Not Supported	

Note: It is desired to have all traffic calming measures meet Gresham Fire Department guidelines including minimum street width, emergency vehicle turning radius, and accessibility/connectivity.

[18] *Tualatin Valley Fire & Rescue Neighborhood Traffic Calming Measure Policy,* DKS Associates, October 2003.

[19] Chokers are not supported when they do not shadow parking. If parking is shadowed, see curb extensions.

Access Management

Access Management is a broad set of techniques that balance the need to provide efficient, safe and timely travel with the ability to allow access to the individual destination. ODOT and Multnomah County have clear access management policies and the supporting documentation to ensure that the highway system is managed as wisely as possible for the traveling public. Proper implementation of Access Management techniques should guarantee reduced congestion, reduced accident rates, less need for highway widening, conservation of energy, and reduced air pollution.

Access management is control or limiting of access on arterial and collector facilities to preserve their functional capacity. Numerous driveways erode the capacity of arterial and collector roadways. Preservation of capacity is particularly important on higher volume roadways for maintaining traffic flow and mobility. Whereas local and neighborhood streets function to provide access, collector and arterial streets serve greater traffic volume. Numerous driveways or street intersections increase the number of conflicts and potential for accidents and decrease mobility and traffic flow. Troutdale, as with every city, needs a balance of streets that provide access with streets that serve mobility.

Several access management strategies were identified to improve access and mobility in Troutdale:

- Provide left turn lanes where warranted for access onto cross streets
- Work with land use development applications to consolidate driveways where feasible
- Meet Multnomah County access requirements on arterials and collectors
- Establish City access standards for new developments on collectors and arterials

The following recommendations are made for access management:

- *Update the City's policy statement regarding prohibition of new single-family residential access on arterials to include collectors. A design exception process should be outlined that requires mitigation of safety and NTM impacts.*
- *Use Multnomah County standards for access on arterials and collectors under their jurisdiction.* Multnomah County standards are 100-150 feet on collectors and 300-400 feet on arterials[20].
- *Specific access management plans should be developed for arterial streets in Troutdale to maximize the capacity of the existing facilities and protect their functional integrity. New development and roadway projects should meet the requirements summarized in Table 4-15.* The minimum spacing of roadways and driveways listed in this table is consistent with Multnomah County's access spacing standards.

[20] Multnomah County Design Standards, Part I – Design Manual.

Table 4-15: Recommended Access Spacing Standards for City Street Facilities

Street Facility	Maximum spacing of roadways and driveways	Minimum spacing of roadways and driveways
Arterial	1,000 feet	530 feet
Collector:	530 feet	150 feet
Neighborhood/Local:	530 feet	-
All Roads	Require an access report for new access points stating that the driveway/roadway is safe as designed meeting adequate stacking, sight distance and deceleration requirements as set by ODOT, Multnomah County and AASHTO.	

Access management is not easy to implement and requires long institutional memory of the impacts of short access spacing – increased collisions, reduced capacity, poor sight distance and greater pedestrian exposure to vehicle conflicts. The most common opposition response to access control is that "there are driveways all over the place at closer spacing than mine – just look out there". These statements are commonly made without historical reference. Many of the pre-existing driveways that do not meet access spacing requirements were put in when traffic volumes were substantially lower and no access spacing criteria were mandated. With higher and higher traffic volume in the future, the need for access control on all arterial roadways is critical – the outcome of not managing access properly is additional wider roadways which have much greater impact than access control.

Staff will have to come back at a later date to propose revisions to the development code to reflect the standards being developed in the Transportation System Plan and Comprehensive Plan. At that time, additional attention can be given to the specific standards and whether exceptions are appropriate to be written into the code or if variances are the action needed. Four standards are recommended.

First, a restriction of direct access of new single-family units on arterials and collectors (this would include an exception process that addresses safety and neighborhood traffic management needs).

Second, an access report with new land development that requires applicants to verify design of their driveways and streets are safe meeting adequate stacking needs, sight distance and deceleration standards as set by ODOT, Multnomah County, the City and AASHTO (utilizing future traffic volumes from this plan as a future base for evaluation). Where possible, new developments should be required to provide "cross-over easements" as a condition to approval, thus insuring shared driveway access points.

Third, driveways should not be placed in the influence area of intersections. The influence area is that area where queues of traffic commonly form on the approach to an intersection (typically between 150 to 300 feet). In a case where a project has less than 150 feet of frontage, the site would need to explore potential shared access, or if that were not practical, place driveways as far from the intersection as the frontage would allow (permitting for 5 feet from the property line).

Fourth, access to principal arterials should only be from public roads. When a site that has private access onto a principal arterial is redeveloped, the private access will be eliminated if alternate access exists to the site.

Local Street Connectivity

Much of the local street network in Troutdale is built and, in many cases, fairly well connected. In other words, multiple access opportunities exist for entering or exiting neighborhoods. However, there are a number of locations where, the majority of neighborhood traffic is funneled onto one single street. This type of street network results in out-of-direction travel for motorists and an imbalance of traffic volumes that impacts residential frontage. The outcome can result in the need for wider roads, traffic signals and turn lanes (all of which negatively impact traffic flow and degrade safety). By providing connectivity between neighborhoods, out-of-direction travel and vehicle miles traveled (VMT) can be reduced, accessibility between various modes can be enhanced and traffic levels can be balanced out between various streets. Additionally, public safety response time is reduced.

In Troutdale, some of these local connections can contribute with other street improvements to mitigate capacity deficiencies by better dispersing traffic. Several roadway connections will be needed within neighborhood areas to reduce out of direction travel for vehicles, pedestrians and bicyclists. This is most important in the areas where a significant amount of new development is possible.

Figure 4-9 shows the proposed Local Street Connectivity Plan for Troutdale. In most cases, the connector alignments are not specific and are aimed at reducing potential neighborhood traffic impacts by better balancing traffic flows on neighborhood routes. The arrows shown in the figures represent potential connections and the general direction for the placement of the connection. In each case, the specific alignments and design will be better determined upon development review. The criteria used for providing connections are as follows:

- Every 300 feet, a grid for pedestrians and bicycles
- Every 530 feet, a grid for automobiles

To protect existing neighborhoods from potential traffic impacts of extending stub end streets, connector roadways should incorporate neighborhood traffic management into their design and construction. All stub streets should have signs indicating the potential for future connectivity. Additionally, new development that constructs new streets, or street extensions, are required by the current development code to meet the following connectivity standards:

- Provides full street connections with spacing of no more than 530 feet between connections except where prevented by barriers
- Provides bike and pedestrian access ways in lieu of streets with spacing of no more than 330 feet except where prevented by barriers
- Limits use of cul-de-sacs and other closed-end street systems to situations where barriers prevent full street connections
- Includes no close-end street longer than 200 feet or having no more than 25 dwelling units
- Includes street cross-sections demonstrating dimensions of ROW improvements, with streets designed for posted or expected speed limits

The arrows shown on Figure 4-9 indicate priority connections only. Topography, railroads and environmental conditions limit the level of connectivity in some areas of Troutdale. Other stub end streets in the City's road network may become cul-de-sacs, extended cul-de-sacs or provide local connections. Pedestrian connections from the end of any stub end street that results in a cul-de-sac should be considered mandatory as future development occurs. The goal would continue to be improved city connectivity for all modes of transportation.

Two street extensions were evaluated as a part of the network alternatives development. Both extensions were previously tested in the 1995 TSP, but were excluded as recommended improvements. The two extensions are:

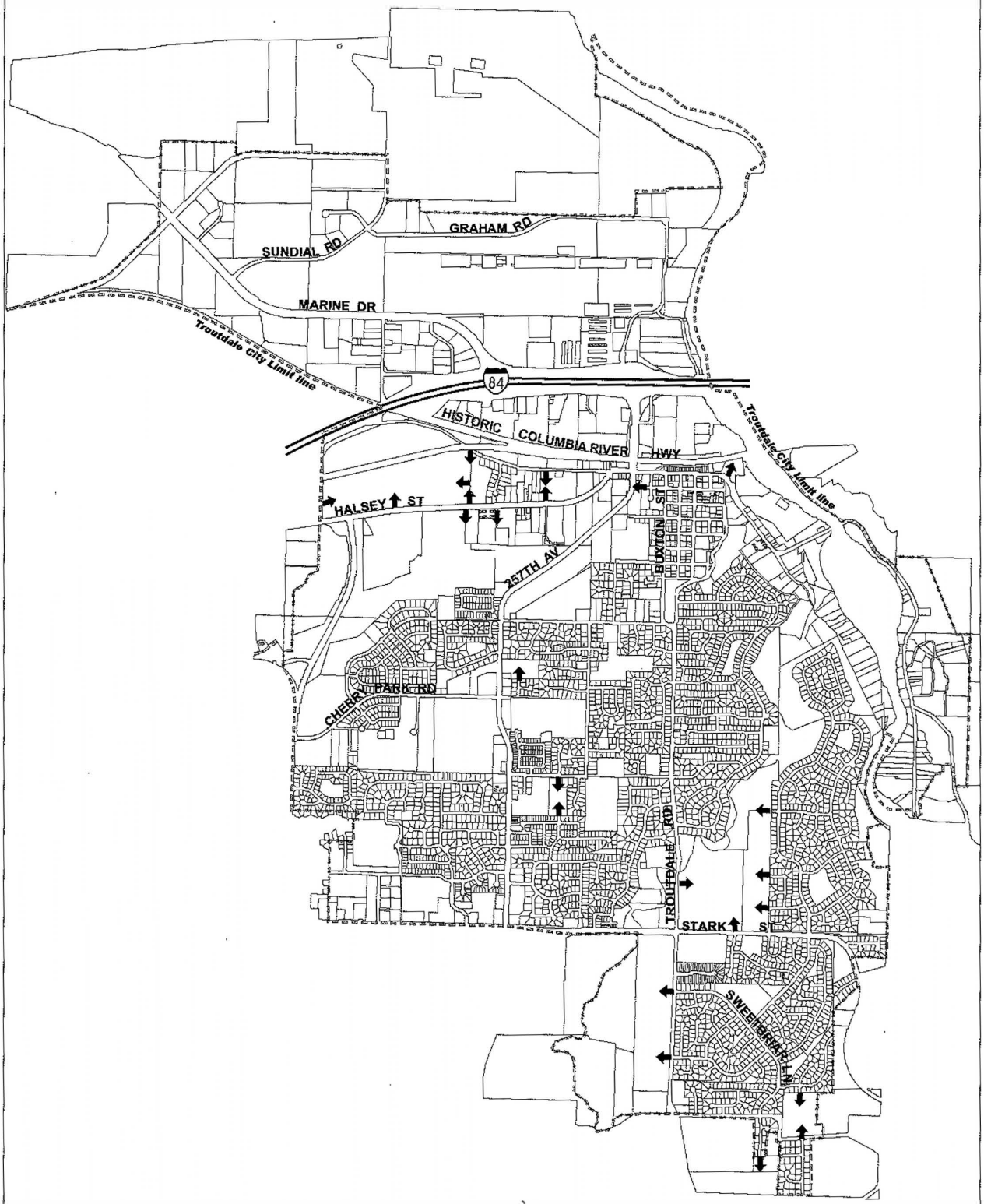
- Sturges Drive – Connect the 300 foot gap between Sturges Drive and Sturges Lane and,
- Hensley Road – Connect a neighborhood street across Sunrise Park to 21st Street

The Sturges Drive connect was shown to carry minor amount of traffic with the connection in place. The expected daily volume was under 500 vehicles, which is not a significant benefit to reduce volumes on other routes in and out of these neighborhoods. However, the provision of a basic connection limited to pedestrians and bicycle is clearly useful for the neighborhood, given that these types of trips are usually much shorter than motor vehicle trips, and the impact of a multi-use trail is much less that a standard local street.

The Hensley Road connection was more attractive as an alternative route, with roughly 2,000 vehicle daily expected to use it. This level is typical for a neighborhood route or minor collector that serves a larger residential area, and has value to that portion of the community. The Hensley Road extension would reduce traffic volume on Stark Street and would reduce out-of-direction travel on the intervening streets. This connection would be classified as a neighborhood route, and could include traffic calming solutions if the needs arose.

DKS Associates
TRANSPORTATION SOLUTIONS

NOT TO SCALE



LEGEND

⬅ - Conceptual Street Connection
(Connections are theoretical, additional studies should be completed for specific alignments)

Figure 4-9
LOCAL STREET CONNECTIVITY MAP

Functional Classification

The 1995 TSP established a functional classification for Troutdale that included arterials, collectors, neighborhood streets, and local streets. The background document review completed for the TSP (see Appendix) included a comparison of the Troutdale functional classification to designations made by Metro, ODOT, and Multnomah County. In order to maintain consistency with these other jurisdictions, the Troutdale functional classification map was updated and is shown in Figure 4-10. Changes made to roadways within Troutdale include:

- A Principal Arterial class was added for consistency with the RTP. Roadways with this designation include I-84 and 242nd Avenue.
- Stark Street was changed from collector to arterial east of 257th Avenue. This change is for consistency with Metro and Multnomah County designations and does not require changes to the existing nature of the roadway (e.g. width or posted speed). If development were to occur on this roadway, more stringent access spacing standards would be in place.
- Sturges Drive/Lane was changed from a collector to a neighborhood street.

The City of Troutdale has adopted standards for street cross sections that apply citywide to local streets (32' curb-to-curb), neighborhood streets (36' curb-to-curb), and commercial/industrial streets (36' curb-to-curb). In addition, there is a special local street cross section for the town center area that allows narrower widths (28' curb-to-curb). To meet RTP street design standards, the following policies should be considered to narrow local street designs:

- Adopt a 28' curb-to-curb cross section for local residential streets with less than 1,000 vehicles per day that are not primary emergency response routes. This cross section would allow parking on one side of the street. If curb cuts make up at least 40% of the street frontage, parking could be permitted on both sides of the street.
- Coordinate with the Gresham Fire Department to designate primary emergency response routes.

Street Right-of-Way Needs

Wherever arterial or collectors cross each other, planning for additional right-of-way to accommodate turn lanes should be considered within 500 feet of the intersection. Figure 4-11 summarizes the Troutdale streets that are anticipated within the Transportation System Plan horizon to require right-of-way for more than two lanes. Planning level right-of-way needs can be determined utilizing street cross-sections and the lane geometry outlined later in this chapter. Specific right-of-way needs will need to be monitored continuously through the development review process to reflect current needs and conditions. This will be necessary since more specific detail may become evident in development review which requires improvements other than these outlined in this 20 year general planning assessment of street needs.

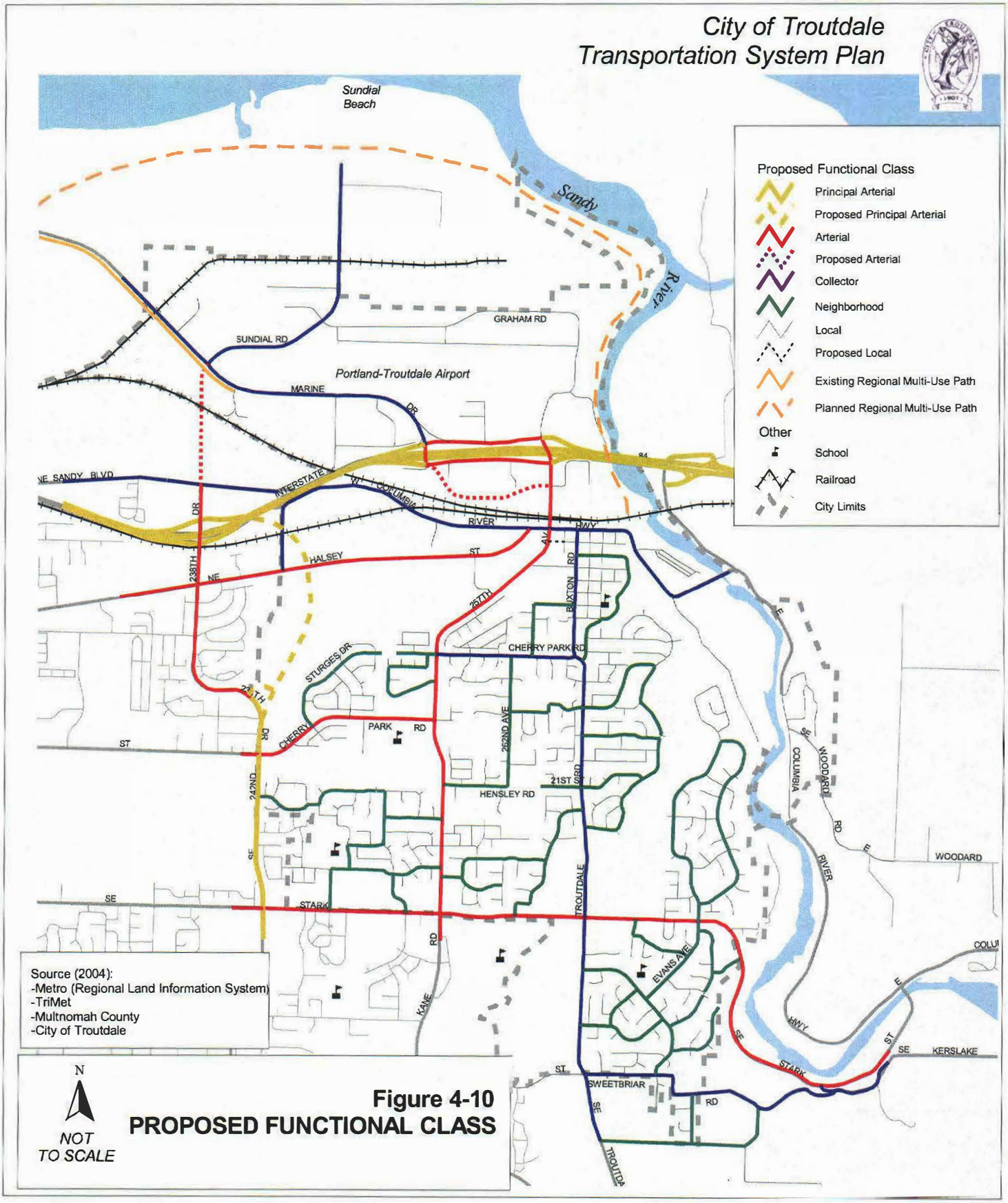


Figure 4-10
PROPOSED FUNCTIONAL CLASS

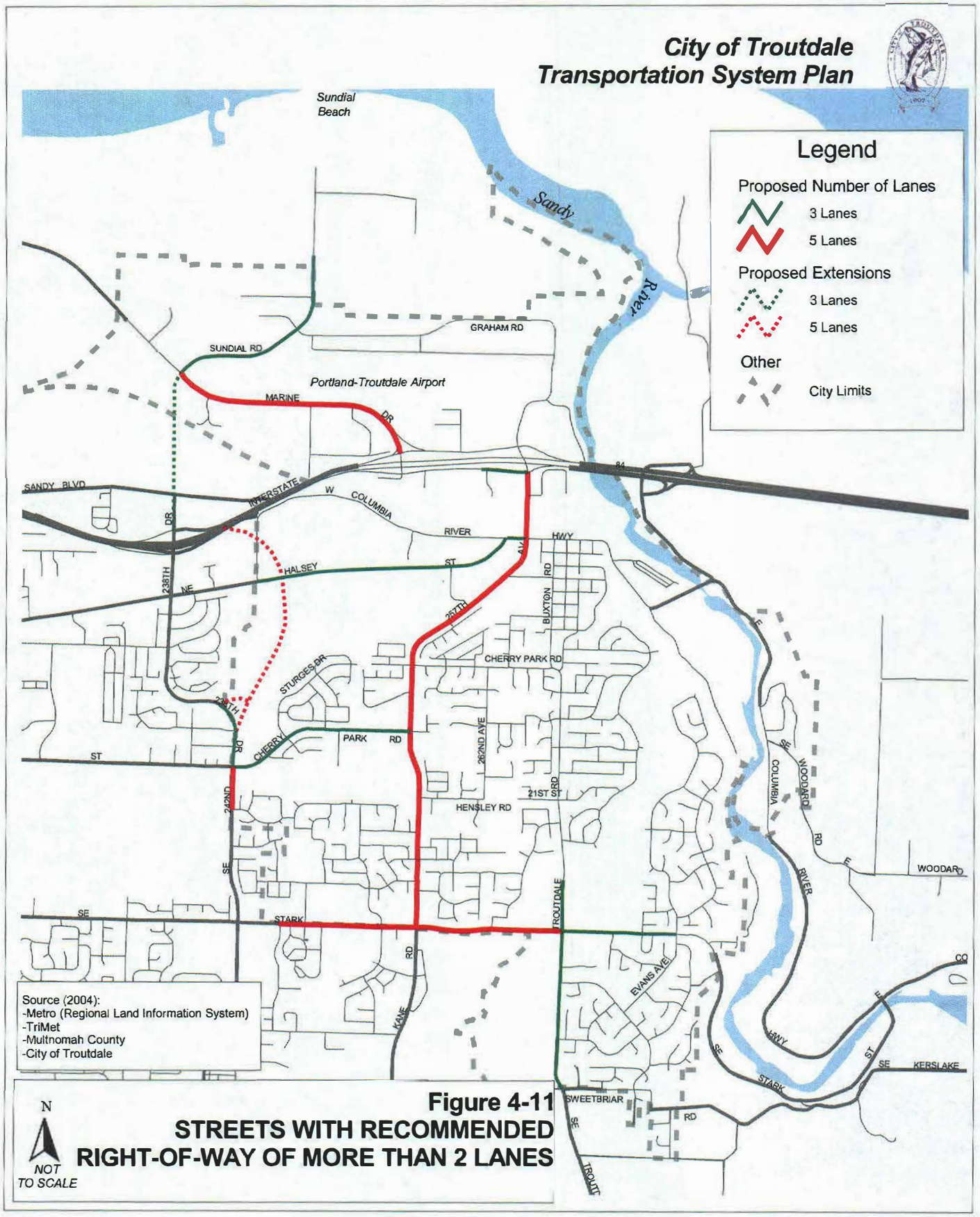


Figure 4-11
STREETS WITH RECOMMENDED RIGHT-OF-WAY OF MORE THAN 2 LANES

Parking Requirements

The City of Troutdale has off-street parking ratios (minimum and maximum) in Chapter 9 of the Development Code, which were adopted in 1998. While these ratios are consistent with the TPR and RTP parking ratio requirements, there are several additional parking policies that should be considered to update City Development Code to be consistent with the TPR and RTP[21]. These policies include:

- Allow the designation of residential parking districts to protect residential areas from spillover parking generated by adjacent commercial, employment, or mixed-use areas, or other uses that generate a high demand for parking.
- Provide Metro annual parking data when requested that demonstrates compliance with the minimum and maximum parking ratios, including the application of any variances to the regional standards.
- Require parking lots more than 3 acres in size to provide street-like features along major driveways; including curbs, sidewalks, and street trees or planter strips. Major driveways in new residential and mixed-use areas shall meet connectivity standards for full street connections.

[21] *Urban Growth Management Functional Plan*, Title 2: Regional Parking Policy, Metro, September 22, 2004.

Transportation Demand Management (TDM)

Transportation Demand Management (TDM) is the general term used to describe any action that removes single occupant vehicle trips from the roadway network during peak travel demand periods. As growth in the Troutdale area 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 accommodate this growth.

Generally, TDM focuses on reducing vehicle miles traveled and promoting alternative modes of travel for large employers of an area. 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.[22]

Research has shown that a comprehensive set of complementary policies implemented over a large geographic area can have an effect on the number of vehicle miles traveled to/from that area.[23] However, the same research indicates that in order for TDM measures to be effective, they should go beyond the low-cost, uncontroversial measures commonly used such as carpooling, transportation coordinators/associations, priority parking spaces, etc.

The more effective TDM measures include elements related to 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. Table 4-16 provides a list of several strategies outlined in the ECO program that could be applicable to the Troutdale area.

Table 4-16: Transportation Demand Management Strategies

Strategy	Description	Potential Trip Reduction
Telecommuting	Employees perform regular work duties at home or at a work center closer to home, rather than commuting from home to work. This can be full time or on selected workdays. This can require computer equipment to be most effective.	82-91% (Full Time) 14-36% (1-2 day/wk)
Compressed Work Week	Schedule where employees work their regular scheduled number of hours in fewer days per week.	7-9% (9 day/80 hr) 16-18% (4 day/40 hr) 32-36% (3 day/36 hr)

[22] Oregon Administrative Rules, Chapter 340, Division 30.

[23] *The Potential for Land Use Demand Management Policies to Reduce Automobile Trips*, ODOT, by ECO Northwest, June 1992.

Strategy	Description	Potential Trip Reduction
Transit Pass Subsidy	For employees who take transit to work on a regular basis, the employer pays for all or part of the cost of a monthly transit pass.	19-32% (full subsidy, high transit service) 2-3% (half subsidy, medium transit service)
Cash Out Employee Parking	An employer that has been subsidizing parking (free parking) discontinues the subsidy and charges all employees for parking. An amount equivalent to the previous subsidy is then provided to each employee, who then can decide which mode of travel to use.	Reduction / Transit 8-20% High 5-9% Medium 2-4% Low
Reduced Parking Cost for HOVs	Parking costs charged to employees are reduced for high occupancy vehicles (HOV) such as carpools and vanpools.	1-3%
Alternative Mode Subsidy	For employees that commute to work by modes other than driving alone, the employer provides a monetary bonus to the employee.	21-34% (full subsidy of cost, high alternative modes) 2-4% (half subsidy of cost, medium alternative modes)
Bicycle Program	Provides support services to those employees that bicycle to work. Examples include: safe/secure bicycle storage, shower facilities and subsidy of commute bicycle purchase.	0-10%
On-site Rideshare Matching for HOVs	Employees who are interested in carpooling or vanpooling provide information to a transportation coordinator regarding their work hours, availability of a vehicle and place of residence. The coordinator then matches employees who can reasonably rideshare together.	1-2%
Provide Vanpools	Employees that live near each other are organized into a vanpool for their trip to work. The employer may subsidize the cost of operation and maintaining the van.	15-25% (company provided van with fee) 30-40% (company subsidized van)
Gift/Awards for Alternative Mode Use	Employees are offered the opportunity to receive a gift or an award for using modes other than driving alone.	0-3%
Walking Program	Provide support services for those who walk to work. This could include buying walking shoes or providing lockers and showers.	0-3%

Strategy	Description	Potential Trip Reduction
Company Cars for Business Travel	Employees are allowed to use company cars for business-related travel during the day	0-1%
Guaranteed Ride Home Program	A company owned or leased vehicle or taxi fare is provided in the case of an emergency for employees that use alternative modes.	1-3%
Time off with Pay for Alternative Mode Use	Employees are offered time off with pay as an incentive to use alternative modes.	1-2%

Source: *Guidance for Estimating Trip Reductions from Commute Options*, Oregon Department of Environmental Quality, August 1996.

Employment development north of I-84 will allow for TDM friendly development. Setting TDM goals and policies for new development will be necessary to help implement TDM measures in the future.

With many regional trips destined to, or traveling through, the Troutdale area, region wide TDM measures should help to reduce congestion. Metro has established non-SOV (Single Occupancy Vehicle) mode share targets to be achieved by 2040. The 2040 non-SOV model target for town centers and mainstreets (downtown Troutdale) is 45-55%.[24]

The Metro 2025 Regional Demand Model provides an analysis tool for monitoring non-SOV trip percentages between the various RTP funding scenarios. The forecasted non-SOV trip percentages take into account all RTP improvement projects (including transit, pedestrian, and bicycle system improvements), as well as the TAZ performance factors (which includes an increase in parking pricing and a decrease in transit pass fees paid by individual riders). Parking factors are based on a ratio of parking costs in comparison to a South/North Draft Environmental Impact Study (DEIS) parking survey. Transit Pass factors represent the amount of full transit fare that a transit rider is expected to pay (considering ECO rule and discount downtown fares). The RTP projects included in the 2025 financially constrained and priority models are shown in Table 4-17 and Table 4-18, respectively.

[24] Based on the *2000 Metro Regional Transportation Plan*, Ordinance No. 00-869A (August 10, 2000), page 1-62.

Table 4-17: TDM Improvements included in the RTP Financially Constrained System

RTP #	Location	Improvement	Jurisdiction	Time-Line	Cost ($1,000s)
	Troutdale Town Center	Implement Parking Pricing	Troutdale	-	-
2120	Sandy Boulevard Bicycle and Pedestrian Improvements	Retrofit bike lanes and sidewalks on existing street between 162nd to Troutdale Road.	Multnomah Co.	2016-25	$8,316
2124	Halsey Street Improvements - Troutdale	Improve Halsey Street to 3 lanes and complete boulevard design improvements	Multnomah Co.	2010-15	$3,742
2125	Troutdale TC Pedestrian Improvements	Improve sidewalks, lighting, crossings, bus shelters and benches	Multnomah Co./ Troutdale	2016-25	$116
2126	257th Avenue Pedestrian Improvements	Improve sidewalks, lighting, crossings, bus shelters and benches	Troutdale	2004-09	$1,155
8028	Region-wide	Vehicle purchases to provide for expanded service - 1.5% per year	TriMet	2004-25	$169,785
8032	Region-wide	Bus operating facilities	TriMet	2004-25	$75,000
8043	Region-wide	Bus stop improvements	TriMet	2004-25	$7,939
8046	Region-wide	Transit Signal Priority	TriMet	2004-25	$19,892
8049	Region-wide	Construct improvements that enhance pedestrian access to transit - sidewalks, crosswalks, ADA improvements	TriMet	2004-25	$20,000
8050	Region-wide	Regional employer outreach, transit marketing, vanpool and carpool, station cars and car sharing program	TriMet	2004-25	$1,500
8052	Region-wide	Regional Travel Options TDM Program	TriMet	2004-25	$16,978
			TOTAL		**$324,423**

Note: These improvements are assumed in Metro's RTP Financially Constrained System and do not necessarily correspond with the action plan of this TSP.

Table 4-18: Additional TDM Improvements included in the RTP Priority System

RTP #	Location	Improvement	Jurisdiction	Time-Line	Cost ($1,000s)
	Troutdale	50% increase of parking costs in the Town Center	Troutdale	2004-25	
	Troutdale	Increase in street connectivity (from >8 per mile to >10 per mile)	Troutdale	2004-25	
8030	Region-wide	Vehicle purchases to provide for expanded service - 3.8% per year	TriMet	2004-25	$546,000
8033	Region-wide	Bus operating facilities	TriMet	2004-25	$152,062
8045	Region-wide	Bus stop improvements	TriMet	2004-25	$13,212
8048	Region-wide	Transit Signal Priority	TriMet	2004-25	$83,746
8051	Region-wide	Regional Travel Options TDM Program	TriMet	2004-25	$47,124
			TOTAL		**$842,114**

Note: These improvements are assumed in Metro's RTP Priority System and do not necessarily correspond with the action plan of this TSP.

The overall Troutdale study area forecasted non-SOV percentage with the RTP financially constrained improvements is 37.6%. Additional improvements in the RTP priority scenario increase the overall non-SOV percentage to 39.4%, which corresponds to an increase of approximately 2%.

Figure 4-12 shows the non-SOV percentage increase at the TAZ level, which shows the areas with the greatest growth toward meeting the 2040 targets.

These forecasted non-SOV percentages can only be achieved with significant improvements to the transportation system and implementation of trip reduction strategies. The City of Troutdale and the Troutdale Transportation Management Agency (TMA) should coordinate with Multnomah County and TriMet to implement strategies to assure that the TDM assumptions in the RTP are implemented. The City of Troutdale, Multnomah County, and TriMet should coordinate to implement the pedestrian, bicycle, and transit system improvements, which offer alternative modes of travel. The recommended TDM action plan includes:

- Coordinate with the Troutdale TMA to implement TDM strategies.
- Support continued efforts by TriMet, Metro, ODOT, and Multnomah County to develop productive TDM measures that reduce commuter vehicle miles and peak hour trips.
- Update the City of Troutdale Goals and Policies to adopt the 2040 Regional Non-SOV Modal Targets.
- Encourage the development of high speed communication in all part of the city (fiber optic, digital cable, DSL, etc). The objective would be to allow employers and residents the maximum opportunity to rely upon other systems for conducting business and activities than the transportation system during peak periods.
- Encourage developments that effectively mix land uses to reduce vehicle trip generation. These plans may include development linkages (particularly non-auto) that support greater use of alternative modes.
- Continued implementation of motor vehicle minimum and maximum parking ratios for new development.
- Continued implementation of building orientation and transit planning requirements for new development.
- Continued implementation of street connectivity requirements.
- Require new employment development to install bicycle racks.
- Implementation of bicycle, pedestrian, motor vehicle and transit system action plan.
- Coordinate with the Troutdale TMA to monitor and manage the parking needs in the Troutdale Town Center, which could include long-term strategies such as parking pricing.

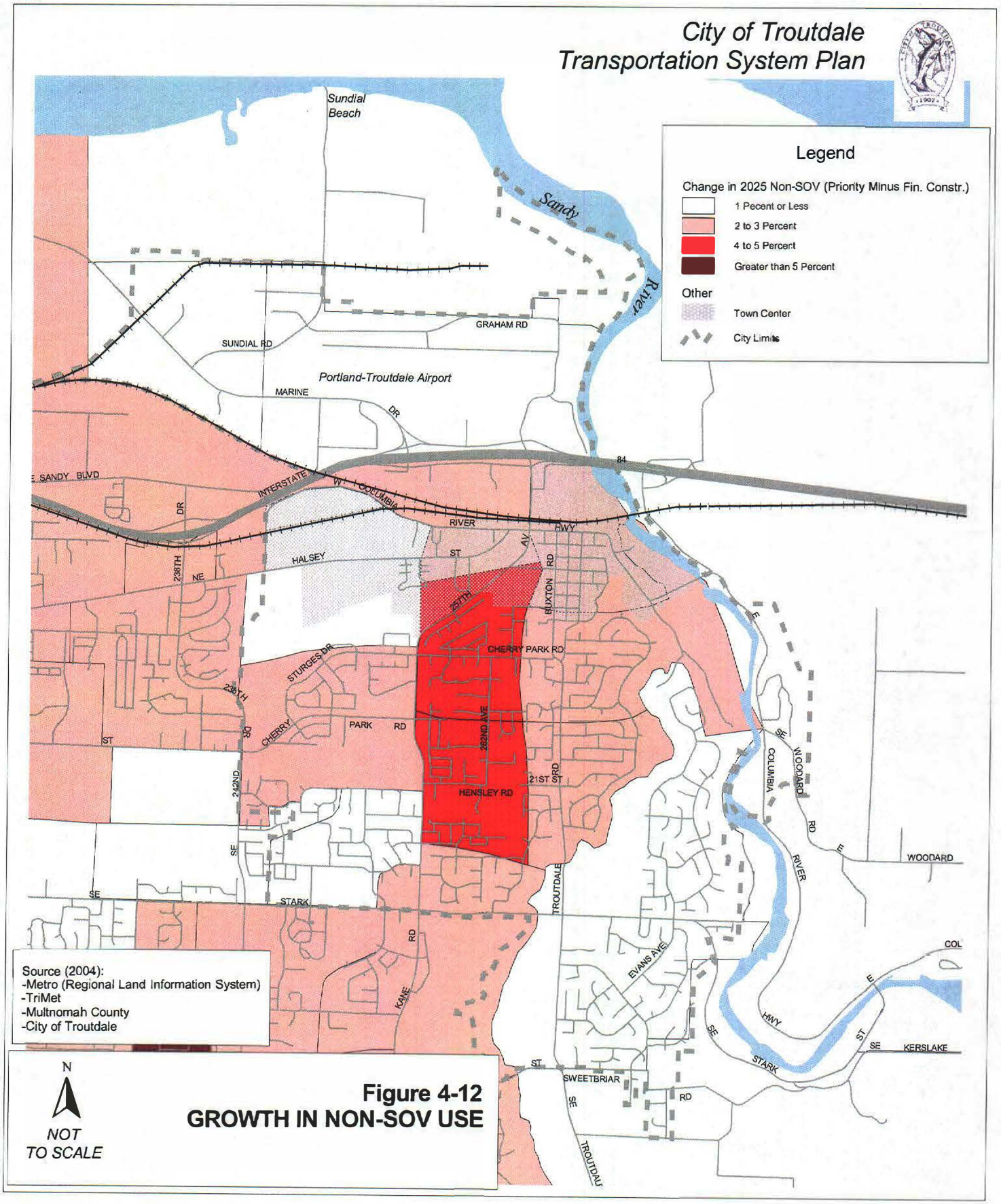


Figure 4-12
GROWTH IN NON-SOV USE

Alternatives Analysis

The 2025 no-build traffic forecasts for Troutdale found that the existing infrastructure is insufficient to handle future capacity needs. This section includes an analysis of alternatives to meet future capacity needs. Based on the strategies developed for this TSP, the following alternative scenarios were developed:

- 2025 Multi-Modal Enhancements
- 2025 Build

Year 2025 forecasts were developed at each of the study intersections to provide a performance measure for comparing these scenarios. The following sections summarize these scenarios and present a recommended TSP Motor Vehicle Improvement Plan.

2025 Multi-Modal Enhancements

The system improvements that make up this scenario include build-out of each of the multi-modal plans presented in this chapter (pedestrians, bicycles, transit, TSM, TDM). The 2025 forecasts for this scenario are based on the RTP Priority scenario, without capacity improvements in Troutdale. Table 4-19 lists the study intersection performance with this scenario. As listed, 6 of the 11 study intersections fail to meet either level of service (LOS) or v/c ratio performance standards. Therefore, additional capacity improvements are needed to meet regional standards.

Table 4-19: 2025 No-Build + Multi-Modal PM Peak Hour Intersection Level of Service

Intersection	Level of Service	Average Delay (Sec.)	Volume / Capacity	Standard Met?
Stop Controlled Intersections				
Buxton Road/Historic Columbia River Highway	A/F	—	—	No
Marine Drive/Sundial Road	A/F	—	—	No
Signalized Intersections				
257th Drive/Cherry Park Road (south)	F	>100	1.32	No
257th Drive/Historic Columbia River Highway	E	59.0	0.98	No
Cherry Park Road/Buxton Street	B	19.9	0.62	Yes
I-84 westbound ramps/Marine Road	B	14.6	0.70	Yes
I-84 eastbound ramps/Marine Road	D	37.0	0.97	Yes
I-84 eastbound ramps/Graham Road	D	45.2	1.18	No
I-84 westbound ramps/Graham Road	C	20.2	0.78	Yes
Troutdale Road/Stark Street	D	53.9	1.04	No
Troutdale Road/Sweetbriar Road	C	24.7	0.84	Yes

Notes: Stop sign controlled intersection Level of Service:
X/X=Major Street turn LOS/Minor street turn LOS
Signalized and All-Way Stop Intersections:
Delay = Average vehicle delay in the peak hour for entire intersection in seconds.

2025 Build

Based upon the evaluation of intersection capacity, the roadways in Troutdale would not meet 2025 demands without capacity improvements. This scenario includes all improvements included in the 2025 Multi-Modal Enhancements scenario. In addition, this scenario develops alternatives for addressing the following capacity needs:

- **Lack of north-south capacity.** The only north-south arterial route to Interstate 84 in Troutdale is via 257th Avenue. The Troutdale Road/Buxton Street parallel collector route is significantly congested. The lack of parallel routes for travel to or from the freeway system is a very significant constraint for the existing transportation system. The 242nd Avenue extension to Halsey Street and I-84 was included in Metro's RTP to provide additional north/south capacity. However, recent Multnomah County land use actions have reduced the feasibility of this improvement.
- **Frontage Road Congestion.** The existing configuration of the Troutdale interchange and the adjoining access provisions for fronting commercial properties is far below the capacity required to support peak period demands today and in the future. The interaction between truck traffic and motor vehicles significantly reduces the frontage road capacities.
- **Lack of direct access to the north-industrial area.** Access to the north-industrial area is provided through the congested I-84/257th Avenue interchange, which includes out of direction travel to Graham Road. An alternative route from I-84 to the N. Industrial area, which was found to be attracting trips in the 2025 forecast model, starts at the I-84/207th Avenue interchange, heads north to Sandy Boulevard, heads east to 223rd Avenue, and heads north to Marine Drive. However, this alternative includes significant out of direction travel. The potential 238th Avenue extension to Marine Drive is another route option. However, this option is not currently supported by the City of Wood Village[25] and is not included in the City of Wood Village TSP, the Multnomah County TSP, or Metro's RTP.
- **Lack of east-west capacity.** The Stark Street corridor is significantly congested in 2025. The Halsey Street/Historic Columbia River Highway corridor is the only other route passing east-west through Troutdale. The lack of alternative east-west connections between neighborhoods in Troutdale increases delay on the arterial roadways and increases neighborhood cut-through traffic.

Table 4-20 lists capacity improvements identified in the RTP within Troutdale. Table 4-21 lists additional capacity improvements considered in the 1995 TSP.

[25] Conversation with Karl Malone, City of Wood Village, Technical Advisory Committee meeting, October 6, 2004.

Table 4-20: Motor Vehicle System Capacity Improvements included in the RTP System*

RTP #	Location	Improvement	Jurisdiction	Time-Line	Cost ($1.000s)
2123	Stark Street Improvements	Widens street to five lanes between 257th Avenue and Troutdale Road.	Multnomah Co.	2004-09	$3,465
2124	Halsey Street Improvements - Troutdale	Improve Halsey Street to 3 lanes and complete boulevard design improvements from 238th Avenue to 257th Avenue	Multnomah Co.	2010-15	$3,742
			TOTAL		$7,207

*This project list is based on the *2004 Federal Regional Transportation Plan Update*, and includes projects in the Financially Constrained Motor Vehicle System

Table 4-21: Motor Vehicle Improvements in the 1995 TSP not identified in the RTP Financially Constrained Scenario

1995 TSP Project No.	Location	Description
1	257th Drive/North Frontage Road	Specific design alternatives to be subject of future studies conducted with ODOT, City, and County
2	Marine Drive/North Frontage Road	Specific design alternatives to be subject of future studies conducted with ODOT, City, and County
3	Marine Drive/Frontage Road	Specific design alternatives to be subject of future studies conducted with ODOT, City, and County
4	257th Drive/Frontage Road	Specific design alternatives to be subject of future studies conducted with ODOT, City, and County
9	Frontage Road between Marine Drive and 257th Drive	Specific design alternatives to be subject of future studies conducted with ODOT, City, and County
11	Hensley Road Extension	Connect Hensley Road between 257th and Troutdale Road
12	242nd/244th Extension	Extend 242nd north to Halsey and Sandy. Connect Sandy to Historic Columbia River Highway. Study linkage between I-84 Exit 16A and 242nd Avenue Extension.
14	Sturges Drive	Complete roadway.

Based on the projects identified in the 1995 TSP and the RTP, a series of motor vehicle improvements were analyzed and are summarized in Table 4-22.

Table 4-22: Motor Vehicle Capacity Improvement Alternatives Summary

Number	Name	Description	Projected ADT	Issues	Cost ($1,000s)
		North-South Capacity Improvements			
1	242nd Extension	Construct a 5-lane high capacity facility from Glisan to I-84. Braid ramps to the I-84/238th interchange.	30,000	▪ Dependant on Multnomah County and Wood Village – project currently placed on hold ▪ Provides an additional north/south corridor for regional capacity ▪ Reduces traffic through the 257th interchange ▪ Identified in the 2000 RTP as a Priority System Project – although the County has currently put the project on hold	$27,720
2	Troutdale/Buxton	Widen to three lanes from Historic Columbia River Highway to Sweetbriar	10,000	▪ Provides left-turn lanes at side streets and access points ▪ Allows construction of median refuge islands for pedestrian crossings	$10,533
3	Marine Drive Extension	Extend Marine Drive to Halsey Street and to 257th Avenue near Cherry Park	14,000	▪ Significant design issues with railroad crossing and elevation change ▪ Impacts residential units ▪ Provides alternate route through the 257th interchange – separates motor vehicles from trucks	$19,000
		Frontage Road Congestion Improvements			
4	New Exit Roadway	Construct a 2-lane access controlled roadway from Marine Drive/South Frontage to 257th/Outlet Mall.	12,000	▪ Requires reconfiguration of truck stop parking areas ▪ Separates motor vehicle traffic from trucks ▪ Provides a direct connection to the Outlet Mall	$8,500

Number	Name	Description	Projected ADT	Issues	Cost ($1,000s)
5	Marine Drive Extension	Extend Marine Drive to Halsey Street	8,000	▪ Significant design issues with railroad crossing and elevation change ▪ Out-of direction access to 257th	$15,400
6	Frontage Road Improvements	Construct a new 2-lane frontage road between the existing frontage road and I-84	TBD	▪ Does not solve capacity issue at South Frontage/Graham Road ▪ Requires significant retaining walls along I-84	$3,700
7	242nd to Marine Drive	Construct a 3-lane access controlled roadway from Glisan Street to Marine Drive/South Frontage	20,000	▪ Impacts the Edgefield Property ▪ Significant design issues with railroad crossing and elevation change	$24,900
		North-Industrial Access Improvements			
8	Marine Drive Widening	Widen to 5-lanes from south frontage to Sundial Road	10,000	▪ Require replacement of the I-84 bridges over Marine Drive ▪ Provides direct access to industrial area	$9,346
9	238th Extension	Construct a 3-lane roadway from Sandy to Marine Drive	11,000	▪ Dependant on Wood Village and Multnomah County ▪ Significant design issues with railroad crossing ▪ Provides direct access to industrial area outside of Troutdale	$15,342
10	Sundial Road Widening	Widen to 3-lanes from Marine Drive to N. City limits	10,000	▪ Provides circulation for heavy vehicle traffic	$2,278
11	Graham Road Widening	Widen to 3-lanes from I-84 to Sundial Road	5,000	▪ Provides circulation for heavy vehicle traffic ▪ Right of way restricted by the neighboring airfield and berm.	$5,834

Number	Name	Description	Projected ADT	Issues	Cost ($1,000s)
		East-West Capacity Improvements			
12	Stark Street Widening West	Widen to 5-lane between 257th and Troutdale Road	22,000	▪ Provides east-west capacity	$2,853
13	Stark Street Widening East	Widen to 3-lanes between Troutdale Road and Evans	13,000	▪ Provides east-west capacity ▪ Provides left turn lanes at side streets and access points	$1,448
14	2nd Street Extension	Construct a 2-lane roadway from Buxton Street to 257th Avenue. Right in/out at 257th.	4,000	▪ Eliminates the need for a traffic signal at Buxton/Historic Columbia River Hwy. ▪ Requires an access spacing deviation from Multnomah County	$430
15	Sturges Extension	Complete 2-lane roadway	300	▪ Provides connectivity and emergency vehicle access ▪ Low forecasted demand	$442
16	Hensley Extension	Construct a 2-lane roadway between 262nd Avenue and 21st Street.	2,000	▪ Provides east-west connectivity	$455
17	Halsey Widening	Widen to 3-lanes from 238th to Historic Columbia River Highway	11,000	▪ Provides left turn lanes at side streets and access points	$5,663
18	Historic Columbia River Widening	Connect over I-84 to Sandy. Widen to 3 lanes from 238th to 257th.	6,000	▪ Requires a new crossing over I-84 ▪ Requires railroad under-crossing widening ▪ Low forecasted demand	$15,237

Based on the analysis summarized in Table 4-22, a 2025 Build scenario was analyzed at the intersection level. The improvements selected for this analysis include:

- 1 - 242nd Extension
- 2- Troutdale/Buxton
- 4- New Exit Roadway
- 8- Marine Drive Widening
- 9 - 238th Extension
- 10- Sundial Road Widening
- 12- Stark Street Widening West
- 13- Stark Street Widening East
- 16- Hensley Extension
- 17- Halsey Widening
- Signalization of Marine Drive/Sundial Road
- Signalization of Historic Columbia River Highway/Buxton

These improvement projects address capacity issues within Troutdale and comply with projects identified in regional plans for regional circulation. The New Exit Roadway (Improvement #4) is a placeholder for a recommended project from the focused Troutdale Interchange Study.

Table 4-23 lists the study intersection performance with this scenario. As listed, 2 of the 11 study intersections fail to meet LOS and v/c ratio performance standards. Therefore, additional intersection capacity improvements (turn lanes or signalization) were considered to meet performance standards. Table 4-24 lists the 2025 Build Mitigated intersection performance. The intersection capacity improvements are listed in the recommended improvement plan.

Table 4-23: 2025 Build PM Peak Hour Intersection Level of Service

Intersection	Level of Service	Average Delay (Sec.)	Volume / Capacity	Standard Met?
Signalized Intersections				
Buxton Road/Historic Columbia River Highway	B	10.4	0.63	Yes
Marine Drive/Sundial Road	C	34.9	0.79	Yes
257th Drive/Cherry Park Road (south)	F	>100	1.40	No
257th Drive/Historic Columbia River Highway	D	38.8	0.82	Yes
Cherry Park Road/Buxton Street	B	12.6	0.51	Yes
I-84 westbound ramps/Marine Road	B	17.0	0.53	Yes
I-84 eastbound ramps/Marine Road	C	33.0	0.90	Yes
I-84 eastbound ramps/Graham Road	B	12.6	0.77	Yes
I-84 westbound ramps/Graham Road	C	20.8	0.50	Yes
Troutdale Road/Stark Street	E	57.8	1.02	No
Troutdale Road/Sweetbriar Road	B	18.7	0.80	Yes

Notes: Stop sign controlled Intersection Level of Service:
A/A=Major Street turn LOS/Minor street turn LOS
Signalized and All-Way Stop Intersections:
Delay = Average vehicle delay in the peak hour for entire intersection in seconds.

Table 4-24: 2025 Mitigated PM Peak Hour Intersection Level of Service

Intersection	Level of Service	Average Delay (Sec.)	Volume / Capacity	Standard Met?
Signalized Intersections				
Buxton Road/Historic Columbia River Highway	B	10.4	0.63	Yes
Marine Drive/Sundial Road	C	34.9	0.79	Yes
257th Drive/Cherry Park Road (south)	C	33.9	0.86	Yes
257th Drive/Historic Columbia River Highway	D	38.8	0.82	Yes
Cherry Park Road/Buxton Street	B	12.6	0.51	Yes
I-84 westbound ramps/Marine Road	B	17.0	0.53	Yes
I-84 eastbound ramps/Marine Road	C	33.0	0.90	Yes
I-84 eastbound ramps/Graham Road	B	12.6	0.77	Yes
I-84 westbound ramps/Graham Road	C	20.8	0.50	Yes
Troutdale Road/Stark Street	D	44.1	0.96	Yes
Troutdale Road/Sweetbriar Road	B	18.7	0.80	Yes

Notes: Stop sign controlled Intersection Level of Service:
A/A=Major Street turn LOS/Minor street turn LOS
Signalized and All-Way Stop Intersections:
Delay = Average vehicle delay in the peak hour for entire intersection in seconds.

Master Plan

The improvements identified to meet 2025 system demand combine those identified in prior plans (Troutdale TSP, Metro's RTP), those determined as the outcome of the TSP analysis, and those approved by the City Council. These improvements are shown in Figure 4-13 and listed in Table 4-25. The cost estimates shown in these tables are taken from prior plan documents, or are estimated by DKS Associates using standard assumptions for new facilities. Further refinements should be made of these estimates prior to capital budgeting.

Table 4-25: Recommended Motor Vehicle Master Plan

No.	Location	Description	Cost ($1,000)
1	242nd Extension	Construct a 5-lane high capacity facility from Glisan to I-84. Braid ramps to the I-84/238th interchange.	$27,720
2	Troutdale Road	Widen to three lanes from Beaver Creek to Sweetbriar. Includes sidewalks and bike lanes.	$3,303
4	New Exit Roadway	Construct a 2-lane access controlled roadway from Marine Drive/South Frontage to 257th/Outlet Mall. Includes an Interchange Area Management Plan.	$8,650
8	Marine Drive Widening	Widen to 5-lanes from south frontage to Sundial Road. Includes bike lanes and sidewalks.	$9,346
9	238th Extension	Construct a 3-lane roadway from Sandy to Marine Drive	$15,342
10	Sundial Road Widening	Widen to 3-lanes from Marine Drive to N. City limits. Includes bike lanes and sidewalks.	$2,278
12	Stark Street Widening West	Widen to 5-lane between 257th and Troutdale Road. Includes bike lanes and sidewalks.	$2,853
13	Stark Street Widening East	Widen to 3-lanes between Troutdale Road and Evans. Includes bike lanes and sidewalks.	$1,448
14	2nd Street Extension	Construct a 2-lane roadway from Buxton Street to 257th Avenue. Right in/out at 257th.	$430
17	Halsey Widening	Widen to 3-lanes from 238th to Historic Columbia River Highway. Includes sidewalks and bike lanes.	$5,663
	Historic Columbia River Hwy/Buxton	Signalize in coordination with 257th/Historic Columbia River Highway.	$200
	Marine/Sundial	Signalize with protected left-turn phasing.	$150
	257th/Cherry Park S.	Add dual eastbound right turn lanes. Overlap the eastbound right turn.	$500

No.	Location	Description	Cost ($1,000)
	Stark/Troutdale	Add a southbound right turn lane.	$250
	South Frontage Road/ Graham	Extend the eastbound right turn lanes.	$250
	I-84 Interchange	Re-construct the I-84 interchange.	$40,000
		TOTAL	**$118,383**

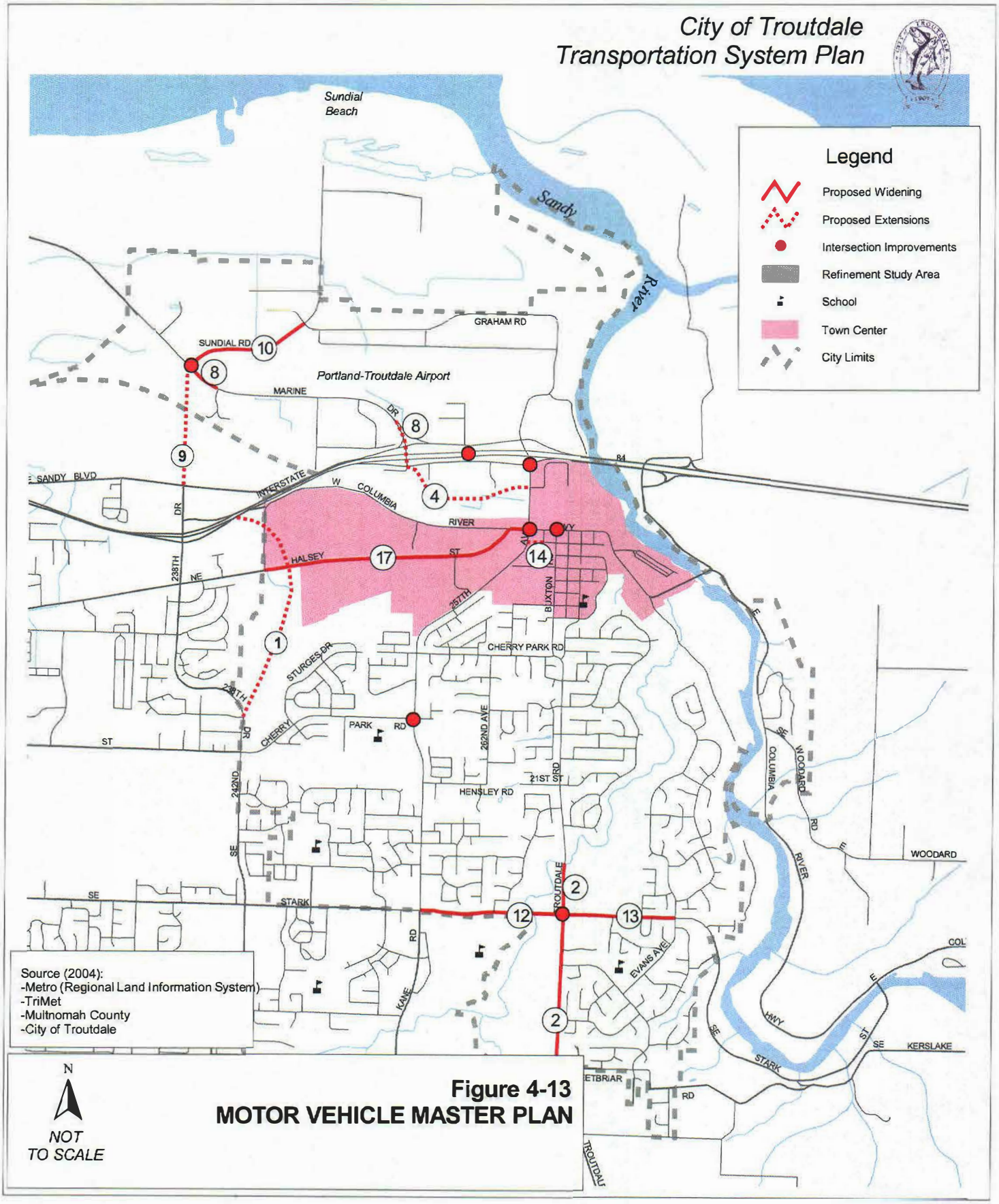


Figure 4-13
MOTOR VEHICLE MASTER PLAN

Action Plan

A motor vehicle system action plan project list was created to identify roadway projects that are reasonably expected to be funded by the year 2025, which meets the requirements of the updated Transportation Planning Rule[26]. The motor vehicle improvement strategies were used to rank the roadway projects. The highest ranking City projects that are reasonably expected to be funded (see Chapter 5) were combined with projects from other agencies identified in the RTP Financially Constrained scenario to create the project list shown in Table 4-26.

Table 4-26: Motor Vehicle Action Plan

No.	Location	Description	Troutdale Cost ($1,000)
4	New Exit Roadway	Construct a 2-lane access controlled roadway from Marine Drive/South Frontage to 257th/Outlet Mall. Includes an Interchange Area Management Plan.	$952*
	Historic Columbia River Hwy/Buxton	Signalize in coordination with 257th/Historic Columbia River Highway.	$200**
12	Stark Street Widening West	Widen to 5-lane between 257th and Troutdale Road. Includes bike lanes and sidewalks.	-
14	2nd Street Extension	Construct a 2-lane roadway from Buxton Street to 257th Avenue. Right in/out at 257th.	$430
17	Halsey Widening	Widen to 3-lanes from 238th to Historic Columbia River Highway. Includes sidewalks and bike lanes.	-
		TOTAL	**$1,582**

- These projects are under the jurisdiction of, and will be funded by, other agencies.
* This cost includes the City of Troutdale's local matching funds contribution to the frontage road congestion improvement project.
** Although this project would be under the jurisdiction of Multnomah County, the City of Troutdale would provide funds to construct the project.

Table 4-27 lists the study intersection performance with this scenario. As listed, 3 of the 11 study intersection fail to meet LOS and v/c ratio performance standards.

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

Table 4-27: 2025 Mitigated PM Peak Hour Intersection Level of Service

Intersection	Level of Service	Average Delay (Sec.)	Volume / Capacity	Standard Met?
Stop Controlled Intersections				
Marine Drive/Sundial Road	A/F	—	—	No
Signalized Intersections				
Buxton Road/Historic Columbia River Highway	B	14.8	0.70	Yes
257th Drive/Cherry Park Road (south)	F	>100.0	1.28	No
257th Drive/Historic Columbia River Highway	E	60.1	0.99	Yes
Cherry Park Road/Buxton Street	B	13.4	0.54	Yes
I-84 westbound ramps/Marine Road	B	15.5	0.74	Yes
I-84 eastbound ramps/Marine Road	C	29.5	0.94	Yes
I-84 eastbound ramps/Graham Road	B	13.9	0.34	Yes
I-84 westbound ramps/Graham Road	C	20.8	0.79	Yes
Troutdale Road/Stark Street	E	61.7	1.04	No
Troutdale Road/Sweetbriar Road	B	17.7	0.75	Yes

Notes: Stop sign controlled Intersection Level of Service:
A/A=Major Street turn LOS/Minor street turn LOS
Signalized and All-Way Stop Intersections:
Delay = Average vehicle delay in the peak hour for entire intersection in seconds.

Trucks

Efficient truck movement plays a vital role in the economical movement of raw materials and finished products. The establishment of through truck routes provides for this efficient movement while at the same time maintaining neighborhood livability, public safety, and minimizing maintenance costs of the roadway system. The through truck route map from the 1995 TSP was updated to include the expanded study area and new roadway improvement projects identified in this TSP (see Figure 4-14). The objective of this route designation is to allow these routes to focus on design criteria that are "truck friendly"; i.e. 12-foot travel lanes, longer access spacing, 35-foot (or larger) curb returns, and pavement design that accommodates a larger share of trucks. The designated through truck routes in the TSP Study area include and exceed the coverage included in the RTP designations.

Other Modes

While auto, transit, bicycle and pedestrian transportation modes have a more significant effect on the quality of life in Troutdale, other modes of transportation must be considered. Future needs for rail, air and pipeline infrastructure are identified by their providers and are summarized below.

Rail

There are two rail freight lines, the Graham (2A) and the Kenton (2AE) that currently traverse the City of Troutdale, combining to transport over 53 million gross tons of freight in 2002. Both lines are owned and operated as a Class 1 Railroad by Union Pacific (UPRR). The Graham (2A) line runs 17 trains a day with a maximum authorized speed of 50 mph. It has one grade crossing in the study area at 244th Avenue. The Kenton (2AE) line runs 30 trains a day at a maximum authorized speed of 50 mph. The Kenton has two grade crossings in the study area, both located on a spur track off of the main line that serves the former aluminum plant. There are no passenger trains currently running through Troutdale. The volume, length and schedule of the freight trains are not expected to change significantly over the 20 year planning horizon.

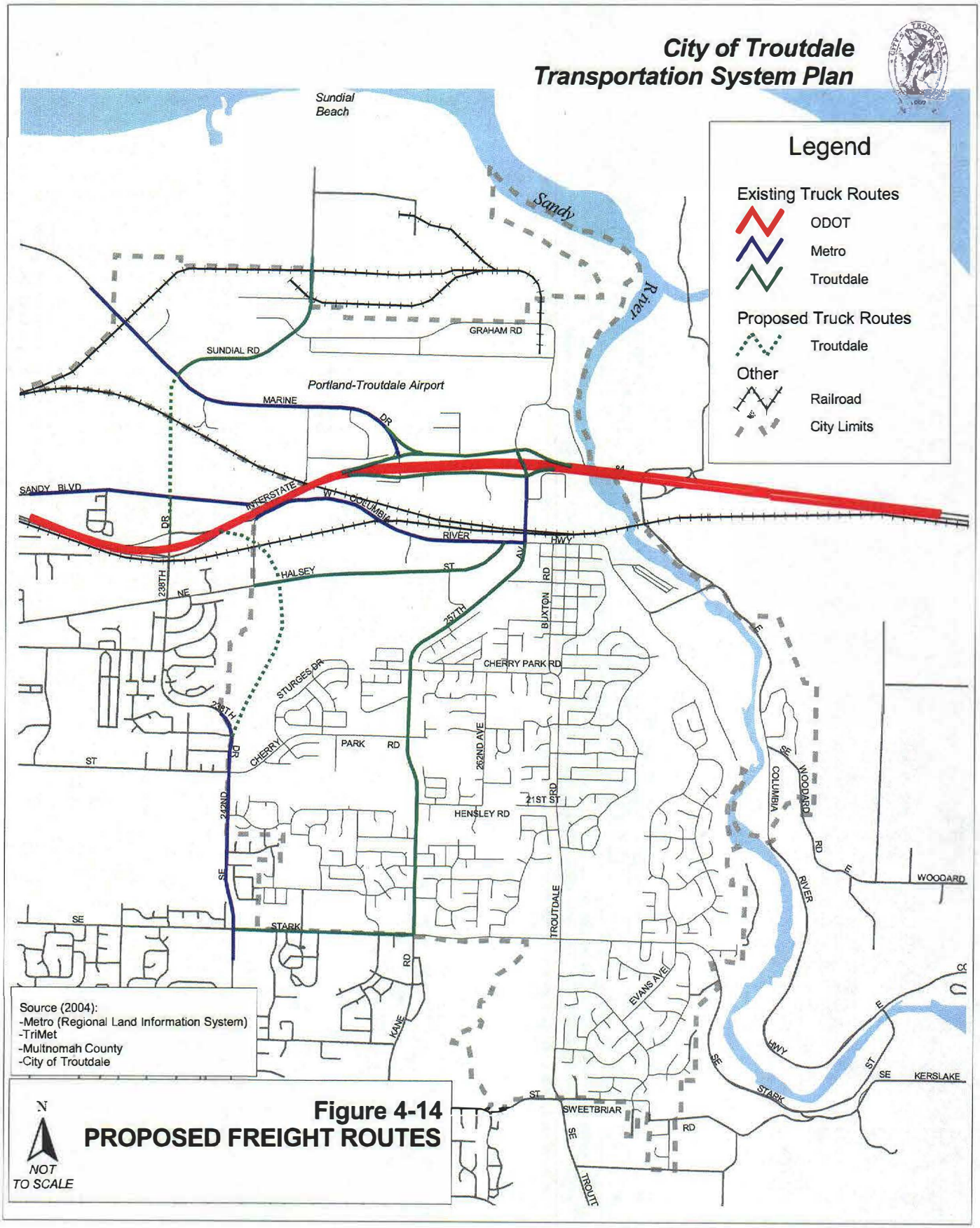


Figure 4-14
PROPOSED FREIGHT ROUTES

Gas Pipelines

Two high-pressure natural gas pipelines serve Troutdale. One line runs north-south adjacent to 242nd Drive, crossing I-84 and continuing across the Columbia River into Washington. The second line runs east-west along Sandy Boulevard, until turning north at I-84 before terminating at the Kenton (2AE) UPRR rail line. The future service of gas pipelines are not expected to change significantly over the 20 year planning horizon.

Air

The Troutdale Airport is located north of Interstate 84 and is classified as a Category 2 – Business or High Activity General Aviation Airport. The runway is 150 feet wide by 5,400 feet long, and has over 30,000 annual aircraft operations (take offs and landings). Pavement condition varies over the length of the runway and was found to be deficient in meeting runway pavement strength by the Oregon Aviation Plan[27]. However, reconstruction is not planned for several years. The Troutdale Airport Master Plan predicts a modest 2 percent growth in both the number of operations and number of aircraft based in Troutdale over the next 10 years, concluding that current infrastructure is adequate to meet demand. Consequently, the airport is considering leasing some of the land it does not currently require for their operations.

[27] *Oregon Aviation Plan*, Oregon Department of Transportation, February, 2000.

5. Financing & Implementation

This chapter outlines the funding sources that can be used to meet the needs of the transportation system. The costs for the elements of the transportation system plan are outlined and compared to the potential revenue sources. Options are discussed regarding how costs of the plan and revenues can be balanced.

Current Funding Strategies

Transportation funding is commonly viewed as a user fee system where the users of the system pay for infrastructure through motor vehicle fees (such as gas tax and registration fees) or transit fares. However, a great share of motor vehicle user fees goes to road maintenance, operation and preservation of the system rather than construction of new system capacity. Much of what the public views as new construction is commonly funded (partially or fully) through local improvement districts (LIDs), traffic impact fees and fronting improvements to land development.

The City of Troutdale utilizes a number of mechanisms to fund construction of its transportation infrastructure as described below. The first two sources collect revenue each year that is used to repair street facilities or construct new streets, with some restrictions on the type and location of projects. The last program is different in that it does not generate on-going revenue, but is a means to acquire needed property (Exaction) as development occurs.

Fuel Tax and Vehicle License Fee

The State of Oregon Highway Trust Fund collects various taxes and fees on fuel, vehicle licenses, and permits. A portion is paid to cities annually on a per capita basis. By statute, the money may be used for any road-related purpose. Troutdale uses it for street operating needs.

Oregon gas taxes are collected as a fixed amount per gallon of gasoline served. Gas tax in Oregon has not increased since 1992 (currently 24 cents per gallon), and this tax does not vary with changes in gasoline prices. There is no adjustment for inflation tied to the gas tax, so the lack of change since 1992 means that the net revenue collected has gradually eroded over time as the cost to construct and repair transport systems increase. Fuel efficiency in new vehicles has further reduced the total dollars collected through this system.

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. There is no adjustment for inflation tied to vehicle registration fees.

Troutdale gets about $675,000 per year in gas tax and vehicle license fee revenue for streets, bikeways and sidewalks. Essentially all of these funds are spent on surface restoration of

local streets. Multnomah County does not have a local gas tax that is distributed to cities, so all of the gas tax received by Troutdale is distributed from the State of Oregon. This fiscal year the revenue increased about $130,000 as a result of statewide increases in vehicle registration fees. Because there is no index for cost inflation, this revenue level will increase only proportionate with the city's population growth relative to the rest of the county, which is expected to be minimal.

System Development Charge

The System Development Charge (SDC) fee for streets is used as a funding source for all capacity adding projects for the transportation system. The funds can be used to construct or improve portions of the 38 miles of local streets within the city, or be used as a partial match on county street projects within the city limits. The SDC fee is collected from new development based on the afternoon peak hour vehicle trips that are expected from a proposed development. The current SDC rate is $598 per trip, which is among the lowest transportation SDC rates in the State of Oregon. By comparison, the City of Gresham charges $1,963 per trip for their transportation SDC, which is about average for the Portland-Vancouver Metropolitan area.

For fiscal year 2004/2005, the estimated income from the Street SDC is $70,000. However, the estimated growth in vehicle trips in the horizon of the TSP is 2,872 within the City of Troutdale based on land use forecasts for buildout (assuming annexation of land within the Troutdale Urban Planning Boundary).[1] Applying the SDC fee rate of $598 to that amount of growth would generate $1.7 million over 20 years, or about $84,000 each year for the next 20 years. This is slightly higher than the current year's estimate, but it accounts for substantial available land development, particularly north of I-84. The higher rate was used to estimate future revenues since it reflects average expected land development over the next 20 years, and not just the rate of development over the current year, which is the basis used for the current fiscal year estimate.

Exactions

These are improvements that are obtained when development is permitted. Developers are required to improve their frontage and, in some cases, provide off site improvements depending upon their level of traffic generation and the impact to the transportation system.

Summary

Under the above funding programs, the City of Troutdale will collect approximately $805,000 for street construction and repair each year[2], with the previously noted restrictions. Total revenues collected over 20 years would be $16.1 million with the current sources.

Table 5-1 summarizes the current funding sources, including recent annual revenues and any unallocated balances or available funds, as applies to the SDC. This coming fiscal year, the City expects to spend more than the above revenues collected for transportation purposes,

[1] Phone conversation with Jim Galloway, City of Troutdale, June 2, 2005.

[2] This higher revenue level annualizes the expected growth over 20 years, and is a higher amount than expected for the next fiscal year ($716,000).

and replenishes these costs from City reserve funds. The difference for the current fiscal year is about $130,000. It is reasonable to expect that adding more capital or maintenance responsibilities to the city will require new or expanded revenue sources since there is already a funding deficit for these services.

Table 5-1: Summary of Current Revenues for Transportation

Funding Category	Annual Amount	Estimated 2004 Balance
State Fuel Apportionment & Vehicle License Fee	$675,000	
System Development Charge (Streets) **	$84,000	$655,000
County Road	$12,000	
Other (Interest, etc.)	$34,000	
Total Revenues	**$805,000**	
	20 Year Total	
Estimated 20 Year Revenues	**$16,100,000**	

Source: City of Troutdale, Adopted Budget, Fiscal Year 2004-005.
* Balance of funds drawn from city street reserve funds for current fiscal year.
** FY 2004/2005 estimate for Street SDC is $70,000; but annualized estimated income based on remaining growth to 2025 using current SDC rate would be $84,000.

Projects and Programs

This section presents the recommended projects and programs developed for the City of Troutdale to serve local travel for the coming 20 years. The Pedestrian, Bicycle, Transit, and Motor Vehicle projects were identified in the Action Plan for each mode, and represent those projects that have the highest short-term need for implementation to satisfy performance standards, or other policies established for the Troutdale Transportation System Plan. The costs for the remaining motor vehicle projects noted in the Motor Vehicle Master Plan are identified, but these have not been included in the funding needs analysis for the city because the Action Plan is limited to projects most likely to be funded within the planning horizon. Other projects on the Master Plan list require additional funding, and they are expected to be built beyond the 20 year horizon.

Project Cost Estimates

Cost estimates (general, order of magnitude) were developed for the projects identified in the motor vehicle, bicycle, transit, and pedestrian elements. Cost estimates from the existing RTP, County and/or City projects in Troutdale were used in this study, if available. Other projects were estimated using general unit costs for transportation improvements, but do not reflect the unique project elements that can significantly add to project costs[3]. Development of more detailed project costs can be prepared in the future with more refined financial analysis. Since many of the projects overlap elements of various modes, the 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 of undertaking a combined, overall project. Each of these project costs will need further refinement to detail right-of-way requirements and costs associated with special design details as projects are pursued.

All cost estimates are based on 2004 dollars. Historical construction costs price index has increased by 2.5 to 2.75 percent per year according to Engineering News Record research[4] . Construction costs have increased 100 percent in the 20 years from 1979 to 1999.

[3] General plan level cost estimates do not reflect specific project construction costs, but represent an average estimate. Further preliminary engineering evaluation is required to determine impacts to right-of-way, environmental mitigation and/or utilities. Experience has shown that individual projects costs can increase by 25 to 75 percent as a result of the above factors.

[4] Engineering News Record Construction Cost Index as reported for the past ten years for 20 cities around the United States. Reference: http://www.enr.com/features/conEco/costIndexes/constIndexHist.asp

Other Transportation Programs and Services

In addition to the physical system improvements identified in the previous section, the transportation facilities will require on-going operation and maintenance improvements across a variety of areas. These other transportation programs are recommended to respond to the specific policies and needs in maintaining roadway pavement quality, allocations for implementing neighborhood traffic management, and on-going update and support of related planning documents.

Roadway Maintenance

The annual cost of maintaining the 38 miles of streets within Troutdale was estimated at $840,000, a portion of which is paid for by gas tax revenues from the state. This does not include road maintenance responsibilities on the arterial streets that are serviced by Multnomah County. Over 20 years, the City's road maintenance responsibility accounts for $16.8 million, which is the highest cost component of the transportation plan. The actual maintenance costs could vary from this estimate.

Neighborhood Traffic Management (NTM)

Specific NTM projects are not defined. These projects will be subject to neighborhood consensus based upon City placement and design criteria. A City-wide NTM program, if desired, should be developed with criteria and policies adopted by the City Council. Speed humps can cost $2,000 to $4,000 each and traffic circles can cost $3,000 to $8,000 each. A speed trailer can cost about $10,000. It is important, where appropriate, that any new development incorporate elements of NTM as part of its on-site mitigation of traffic impacts. Annual allocation of $10,000 is identified for the program development, and implementation of NTM projects.

Troutdale Costs for TSP Action Plans

The costs outlined in the Transportation System Plan to implement the Action Plans for Streets, Transit, Bicycles, and Pedestrians total $1.8 million, and several other recommended transportation operations and maintenance programs would add $17.0 million for a total cost over 20 years of $18.8 million. Refer to Chapter 4 for details on the individual projects by travel mode. Note that additional projects are listed in the Action Plans that are expected to be funded by Multnomah County, or ODOT. These non-City costs have not been included in the estimates in Table 5-2, but are identified in Chapter 4.

Table 5-2: Troutdale Transportation Action Plans Costs over 20 years (2004 Dollars)

Transportation Element	Approximate Cost ($1,000)
System Improvement Projects (Action Plans projects to be funded by City)	
Motor Vehicle	$1,582
Bicycle	$22
Transit	$0
Pedestrian	$167
Total Capital Projects	**$1,771**
Operations and Maintenance Programs and Services	
Road Maintenance ($840,000 per year)	$16,800
Neighborhood Traffic Management ($10,000/yr)	$200
Total Operations and Maintenance Programs	**$17,000**
20 YEAR TOTAL in 2004 Dollars	**$18,771**

The estimated $18.8 million for capital projects and maintenance exceeds the expected 20-year revenue estimate of $16.1 million (see Table 5-1) by approximately $2.7 million. Alternative solutions to address this funding deficit for the Action Plan projects are discussed in the next section.

New Funding Sources and Opportunities

The new transportation improvement projects and recommended programs will require funding beyond the levels currently collected by the City. There are several potential funding sources for transportation improvements. This section summarizes several funding options available for transportation improvements. These are sources that have been used in the past by agencies in Oregon. In most cases, these funding sources, when used collectively, are sufficient to fund transportation improvements for local communities. Due to the complexity of today's transportation projects, it is necessary to seek several avenues of funding projects. Unique or hybrid funding of projects generally will include these funding sources combined in a new package.

Within the Portland region, funding for major transportation projects often is brought to a vote of the public for approval. This is usually for a large project or list of projects. Examples of this public funding include the Major Streets Transportation Improvement Program (MSTIP) in Washington County or the Westside Light Rail Project. Because of the need to gain public approval for transportation funding, it is important to develop a consensus in the community that supports needed transportation improvements. That is the value of the Transportation System Plan. In most communities where time is taken to build a consensus regarding a transportation plan, funding sources can be developed to meet the needs of the community.

Transportation program funding options range from local taxes, assessments, and charges to state and federal appropriations, grants, and loans. All of these resources can be constrained based on a variety of factors, including the willingness of local leadership and the electorate to burden citizens and businesses; the availability of local funds to be dedicated or diverted to transportation issues from other competing City programs; and the availability and competitiveness of state and federal funds. Nonetheless, it is important for the City to consider all of its options and understand where its power may exist to provide and enhance funding for its Transportation programs.

The following funding sources have been used by cities to fund the capital and maintenance aspects of their transportation programs. There may be means to begin to or further utilize these sources, as described below, to address new needs identified in the Transportation System Plan.

General Fund Revenues

At the discretion of the City Council, the City can allocate General Fund revenues to pay for its Transportation program. (General Fund revenues primarily include property taxes, use taxes, and any other miscellaneous taxes and fees imposed by the City.) This allocation is completed as a part of the City's annual budget process, but the funding potential of this approach is constrained by competing community priorities set by the City Council. General Fund resources can fund any aspect of the program, from capital improvements to operations, maintenance, and administration. Additional revenues available from this source to fund new aspects of the Transportation program are only available to the extent that either General

Fund revenues are increased or City Council directs and diverts funding from other City programs.

Voter-Approved Local Gas Tax

Communities such as Sandy, Woodburn, and Tillamook have adopted local gas taxes by public vote. In Sandy, the tax is 1 cent per gallon, paid to the city monthly by distributors of fuel. The process for presenting such a tax to voters will need to be consistent with Oregon State law as well as the laws of the City of Troutdale.

Street Utility Fee Revenue

A number of Oregon cities supplement their street funds with street utility fees. Local cities with adopted street utility fees include Lake Oswego, Wilsonville and Tualatin. Establishing user fees to fund applicable transportation activities and/or capital construction ensures that those who create the demand for service pay for it proportionate to their use. The street utility fees are recurring monthly or bi-monthly charges that are paid by all residential, commercial, industrial, and institutional users. The fees are charged proportionate with the amount of traffic generated, so a retail commercial user pays a higher rate than a residential user. Typically, there are provisions for reduced fees for those that can demonstrate they use less than the average rate implies, for example, a resident that does not own an automobile or truck.

From a system health perspective, forming a utility also helps to support the ongoing viability of the program by establishing a source of reliable, dedicated funding for that specific function. Fee revenues can be used to secure revenue bond debt used to finance capital construction. A street utility can be formed by Council action and does not require a public vote.

A preliminary estimate for street utility fee revenue in Troutdale ranges between $200,000 to $250,000 annually, based on the average rates charged around the state. A specific fee study would be required to establish a fee program for the City of Troutdale to determine specific allocations to its residents and merchants.

Expanded SDC Rate for Transportation

As noted previously, the City's transportation SDC rate is among the lowest in the State of Oregon. However, it is not expected that the transportation SDC will increase to the local average of approximately $2,000 per trip, as other Troutdale SDC rates (e.g. sewer) are higher than average and the net total SDC rate for development in Troutdale is roughly average for the region.[5] At the current rate of $598 per trip, the SDC program would provide funding for the Motor Vehicle Action Plan listed in Table 5-2 (assuming annexation of land within the Troutdale Urban Planning Boundary). However, the funds collected at this rate would not provide adequate funding for the non-auto transportation plans identified in Table 5-2, which provide connectivity and capacity for pedestrian and bicycle modes of travel. It is suggested that the SDC program and rate be re-examined to adjust for the additional TSP

[5] Based on meeting with Jim Galloway, City of Troutdale, May 25, 2005.

recommended Action Plans (an increase from $598 per trip to $617 per trip would provide adequate funding for the non-auto Action Plans).

Other Funding Sources

Urban Renewal District

An Urban Renewal District (URD) would be a tax-funded district within the City. The URD would be funded with the incremental increases in property taxes that result from construction of applicable improvements. This type of tax increment financing has been used in Oregon since 1960. Uses of the funding include, but are not limited to, transportation. It is tax-increment funded rather than fee funded and the URD could provide for renewal that includes, but is not limited to, transportation projects.

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 may not fund ongoing maintenance costs. They require separate accounting, and the assessments collected may only be spent on capital projects within the geographic area. Citizens representing 33% of the assessment can terminate a LID and overturn the planned projects so projects and costs of a LID must meet with broad approval of those within the boundaries of the LID.

Direct Appropriations

The City can seek direct appropriations from the State Legislature and / or U.S. Congress for transportation capital improvements. There may be projects identified in the Plan for which the City may want to pursue these special, one-time appropriations.

Special Assessments

A variety of special assessments are available in Oregon to defray costs of sidewalks, curbs, gutters, street lighting, parking and CBD or commercial zone transportation improvements. These assessments would likely fall within the Measure 50 limitations. A regional example would be the Westside LRT where the local share of funding was voter approved as an addition to property tax.

Employment Taxes

TriMet collects a tax for transit operations in the Portland region through payroll and self employment taxes. Approximately $145 million are collected annually in the Portland region for transit.

Debt Financing

Also, while not direct funding sources, debt financing can be used to mitigate the immediate impacts of significant capital improvement projects and 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 is also viewed as an 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 still be identified to fulfill annual repayment obligations.

Voter-Approved General Obligation Bond Proceeds: Subject to voter approval, the City can issue General Obligation (G.O.) bonds to debt finance capital improvement projects. G.O. bonds are backed by the increased taxing authority of the City, and the annual principal and interest repayment is funded through a new, voter-approved assessment on property City-wide (a property tax increase). Depending on the critical nature of any projects identified in the Transportation Plan, and the willingness of the electorate to accept increased taxation for transportation improvements, voter-approved G.O. bonds may be a feasible funding option for specific projects. 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.

Recommendations for New Transportation Funds

It is recommended that the City consider establishing a transportation, or street, utility as the backbone of its operations and maintenance funding approach. Street utility fees can provide a stable source of dedicated revenue useable for transportation system operations and maintenance and / or capital construction. Rate revenues can also secure revenue bond debt if used to finance capital improvements. Street utilities can be formed by Council action, and billed through the City utility billing system.

It is also recommended that the City consider updating its transportation SDC to cover the new City funded non-auto capital projects identified in the TSP. This would help to ensure that local growth pays its fair share of new transportation facilities that are required to serve this planned development.

In addition, the City should actively pursue grant and other special program funding in order to mitigate the costs to its citizens of transportation capital construction.

We estimate that a transportation utility fee and an updated transportation SDC could generate roughly $230,000 per year, or $4.6 million over the next 20 years, as shown in Table 5-3. These additional funds would be expected to generate sufficient revenues to fully capitalize the Action Plan projects and maintenance programs.

Table 5-3: Recommended New Funding Sources for Troutdale Transportation

Transportation Funding Source	Estimated Additional Annual Revenues
Transportation Utility Fee	$200,000 to $250,000
Updated Transportation SDC (current rate at $598 per trip) *	$2,700
Annual New Revenues	**$202,700 to $252,700**
20 YEAR TOTAL in 2004 Dollars	**$4.1 to 5.1 Million**

* Assumes increase to $617 per trip, or $19 above the proposed $598 fee level.

Note: The trips used to calculate SDC revenue assumes annexation of land within the Troutdale Urban Planning Boundary.

TECHNICAL APPENDIX

A- Background Document Review

DKS *Associates*
TRANSPORTATION SOLUTIONS

Memorandum

TO:	Troutdale TSP Update TAC Members		
FROM:	Carl Springer, P.E.; Chris Maciejewski; Sean Kennedy		
DATE:	September 3, 2004		
SUBJECT:	Memo 1 – Background Document Review	P/A No.	04105-000

This is the first in a series of memorandums that presents technical findings and recommendations for the Troutdale Transportation System Plan (TSP) update project. The purpose of these memorandums are to provide Technical Advisory Committee (TAC) and Citizen Advisory Committee (CAC) members with a progress report on current planning activities. Feedback from the TAC and CAC members on these technical memorandums will be incorporated into subsequent analysis and the actual TSP report chapters.

This memorandum summarizes a series of past plans and studies that have findings or guidelines relevant to the Troutdale transportation system. This background review is useful throughout the Transportation System Plan (TSP) project, but initially it identifies conflicts and discrepancies between previous planning documents and identifies how local plans fit into the larger regional context.

Key Findings

Our review of the background transportation planning documents revealed a long list of issues that should be considered in this update, as discussed in later sections. The key findings that appear to be most prominent in this study are noted below.

1. The majority of the plans reviewed for this memorandum pointed to a lack of north-south connectivity, especially the lack of transport links across Troutdale to Interstate 84. Alternative routes, such as a more connected local street network and off street, non-motorized trails, are recommended by many of the reviewed plans.
2. Recent re-development activity north of Interstate 84 emphasized needs for new north-south connections to Marine Drive, and, potentially, alternative circulation or access plans for the frontage roads parallel to Interstate 84.
3. The state planning guidelines emphasized that cooperation and information sharing among jurisdictions located adjacent to each other is of paramount importance when trying to provide for a seamless, integrated, regional transportation system.

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Background Plan and Document Review

The documents reviewed are listed below, along with their page number within this document.

Other reports addressing specific area master plans or feasibility studies will be considered through the process, as appropriate, but the land development and travel forecasts done in conjunction with the TSP will generally supersede these studies.

Adopted Troutdale Transportation System Plan (TSP)

The adopted Troutdale TSP was produced to provide an extensive review of the current transportation system, evaluate gaps in the system and plan for future system improvements. The objective was to optimize each mode of transportation (pedestrian, bicycle, transit, auto/truck and other). Additionally, as land use and transportation are closely related, a section on land use was included.

The plan establishes the City's goals in developing its transportation facilities for both the short and long term and identifies existing and future needs based on growth assumptions. The plan is not adequate to deal with issues expected to be generated by future economic engines driving the areas future industrial development. Therefore, this update will continue the same themes as was developed in the original document, while responding to policy and demographic changes.

The original TSP was adopted in December 1995 and was amended in April 2000. Items that were amended from the original document include:

- Addition of a proposed trail network to the Bicycle Master Plan between Cherry Park Road and Halsey Street.
- Leaving the future Sturges Drive extension unconnected in the Automobile Master and Action Plans.
- Removal of project 14 (Sturges Drive Road extension) from the 2015 project list.
- Add a connection stemming from Latourell Place, Wright Place, Harlow Place and Holladay Street and removing the Sturges Drive extension from the Functional Road Classification map.

The TSP update will consider and incorporate all findings and projects from the adopted TSP that are still relevant in addition to adding new projects.

Troutdale Capital Improvement Plan

Prepared on February 4, 2004, the Troutdale Capital Improvement Plan identifies eight transportation projects with a total estimated cost of over $2.2 million including public transit, pedestrian, bicycle and motor vehicle projects. The identified funding years for these projects span from 2003 to 2016. These projects will be funded through the collection of Troutdale's system development charge levied against new development in the city. Projects included it the capital improvement plan are as follows:

Table 1: Troutdale Transportation CIP List

Project Description	*Estimated Cost*	*Funding Year*
Improve SW Hensley Road	$85,000	2003-2004
Public Transit Improvements	$416,000	2005-2006
Construct pedestrian accessways at various locations	$26,000	2005-2006
Construct SW 2nd Street access to 257th Drive	$156,000	2005-2006
Improve Stark Street from 257th to Troutdale Road	$130,000	2005-2006
Improve SW 21st Street from Hensley Road to Troutdale Road	$248,800	2007-2008
Improve NW Dunbar Avenue	$826,700	2014-2015
Improve NW 7th Street from Dunbar Avenue to dead end	$338,600	2015-2016
Total	***$2,227,100***	

These projects will be reviewed and included with this TSP update as appropriate.

Gresham TSP

The Gresham TSP provides a framework for addressing the transportation needs of the City of Gresham over the next twenty years, and works within the framework provided by the related state,

regional and local plans. As the plan was created through an extensive citizen involvement process, it represents the vision and goals of the community. After considering three development alternatives for the City of Gresham (status quo, street expansion, travel choices) the preferred plan adopted in the TSP is a combination of all three, resulting in balancing arterial corridor improvements to facilitate through traffic with strategic investment in transit, bicycle, and pedestrian facilities to improve community accessibility.

Issues addressed in the preferred plan of the Gresham TSP that have the most significant impact on transportation issues within the City of Troutdale include:

- 257th/Stark: add second NB left turn lane and exclusive EB right turn lane.
- Springwater Trail to Marine Drive: construction of new multi-use path.
- Hogan Road/Stark Street: add right turn lanes on all approaches and second northbound and southbound left turn lanes.
- Hogan Road from Glisan Street to Stark Street: construct bike lane and sidewalk on west side of roadway.
- Stark Street from Kane Road to Troutdale Road: add two additional traffic lanes, a continuous left turn lane, bike lanes, sidewalks and intersection improvements.

Troutdale is bordered to the south and west by Gresham, meaning transportation investment choices in one jurisdiction will affect the adjacent jurisdiction. In a effort to provide as seamless a transportation system as possible, the Troutdale TSP will take into account transportation improvements and design changes from the adopted Gresham TSP when making network analysis decisions.

Wood Village TSP

The purpose of this plan is to assist the City in planning and developing an efficient, multi-modal, coordinated method of traveling within and beyond the city's limits. The plan addresses local street connectivity, pedestrian and bicycle travel and intends to improve accessibility for the transportation disadvantaged and protects the operation of transportation facilities. The motor vehicle section was updated in 2001. Since Wood Village is the western boarder of Troutdale, transportation projects in either municipality will impact the other. Therefore, the TSP will consider implementing similar upgrades to the current system (such as bike-lanes, cross-sections and transit stops) on existing streets, and will consider continuity implications when addressing future roadway standards, to best align both Wood Village and Troutdale transportation infrastructure. The projects that most affect the Troutdale transportation system include:

Table 2: Projects from the Wood Village TSP

Location	*Description*	*Project Status*
242nd Avenue/Glisan Street	Add northbound right turn lane and increase cycle length	TSP
238th Avenue/Sandy Boulevard	Install traffic signal	TSP
242nd Connector/Hogan Corridor*	Construct a new interchange at I-84 and extend new interchange connection south to Stark Street (pending the outcome of the on-going 242nd Avenue Environmental Assessment)	Metro RTP
I-84 Widening	Widens I-84 to six lanes from 238th to the Sandy River Bridge	Metro RTP
Hogan Corridor Improvements*	Move the regional freight route designation from 181st/Burnside to 242nd Avenue from I-84 to US 26 and revise road signs in that corridor (this project is dependent upon 242nd Connector/Hogan Corridor construction)	Metro RTP
Sandy Boulevard Widening	Widen to three lanes, including sidewalks and bike lanes from west City Limits to 238th	Metro RTP
Halsey Street Improvements	Widen to three lanes from west City Limits to 238th, including sidewalks and bike lanes	Metro RTP Multnomah County CIP
Halsey Street Improvements	Widen to three lanes with a boulevard design from 238th to east City Limits, including bike lanes, wider sidewalks, curb extensions and safer street crossings	Metro RTP Multnomah County CIP
Arata Road Improvements	Improve to include sidewalks, bike lanes and street lighting between 223rd and 238th Avenue	Multnomah County CIP

* It is noted that the City of Wood Village does not support these projects as stated.

Fairview TSP

The current Fairview TSP is comprised of six components, five of which are the modal elements (pedestrian, bicycle, transit, automobile and freight) and one of which is land use. Seven transportation specific goals were developed for the city. Policies for each of these goals were identified as well as a number of implementing actions suggested to bring the policies to fruition. Coordination with adjacent jurisdictions as well as ODOT, Metro and TriMet and an involved public planning process contributed to the completion of this document. While the document does identify funding mechanisms available for projects described in the plan, it is noted that much of the plan will have to be built by fronting development and/or sources of funding which are not currently used in Fairview.

Issues addressed in the Fairview TSP Action Plan that have the most significant impact on transportation issues with the City of Troutdale include:

- 223rd Avenue: widen to three lanes between Halsey Street and Marine Drive.

- 223rd Avenue: add bicycle lanes from Halsey Street to Blue Lake Road.
- Halsey Street: add bicycle lanes from 223rd Avenue to East City Limits.

These projects are important from a continuity aspect, even if they do not directly intersect with the City of Troutdale jurisdictional boundaries. Therefore, the TSP will consider similar cross-sections and non-motorized facilities on adjacent and intersecting arterials, with those mentioned above, in the City of Troutdale.

Fairview Sandy Boulevard Corridor Study

The purpose of this report was to prepare a corridor plan for the section of N.E. Sandy Boulevard that traverses the cities of both Fairview and Wood Village, including adjacent property to Sandy Boulevard between the Union Pacific Railroad and Interstate 84. With the plan information, the City of Fairview updated its zoning code. Through the planning process, transportation solutions were identified to enhance capacity, atheistic appeal and multi-modal function of Sandy Boulevard within the study area. As land use and transportation functions go hand in hand, the study also considered alternative land uses in an effort to improve urban form and maximize utility for property owners. This plan is to serve the cities of Fairview and Wood Village as a tool to guide new development, redevelopment and public investments along Sandy Boulevard to complement and enhance the transportation solutions identified.

The projects included in the plan that could affect the City of Troutdale include:

- Commercial/industrial land use designation between Marine Drive and Sandy Boulevard.
- The design of Sandy Boulevard to be a three-lane cross-section with no on-street parking and bicycle lanes as well as expanded transit service on Sandy Boulevard east of 223rd Avenue.

As the City of Fairview has updated their zoning code from recommendations in this report, the Troutdale TSP must consider similar measures for the Historic Columbia River Highway, if Sandy Boulevard/Historic Columbia River Highway are connected, in an effort to provide continuity between jurisdictions.

Multnomah County's Comprehensive Framework Plan

The Framework Plan attempts to establish a County-wide policy framework for the development and maintenance of individualized community plans and the review of development proposals as well as set appropriate land use standards that will protect both land and developments. The plan lays out policies in a wide array of subjects related to development, including citizen involvement and inter-governmental coordination, economic development, land use and environmental areas. The policies stress that in planning for transportation infrastructure, the environmental impacts and social consequences must be mitigated and cost, safety and efficiency factors emphasized.

The plan establishes a criteria for the County to use in evaluating alternative transportation proposals in order to achieve its objective of a balanced, safe and efficient system. However, sub-areas within the County that have adopted a transportation system plan specific to their jurisdiction take priority over the Multnomah County Comprehensive Framework Plan and should be used for their specific area. The Counties rural area plan should only be used in areas that do not have an adopted TSP. Thus, the Troutdale TSP update, while incorporating ideas found within the Framework Plan, will render it non-applicable to the City of Troutdale due to the TSP adoption and alignment of the TSP policies and goals with the TRP and Metro RTP.

Metro Regional Transportation Plan, August 10, 2000

The Regional Transportation Plan (RTP) is a 20-year blueprint for regional transportation investments. The current RTP (originally adopted August 10, 2000) was updated in 2003 to address federal planning requirements. Under federal regulations, the RTP must be updated every three years to ensure that the plan adequately addresses future travel needs and is consistent with the federal Clean Air Act. The 2004 Interim Federal Regional Transportation Plan (RTP) was approved on Dec. 11, 2003. Until the next RTP update is completed in 2007, the 2000 RTP will continue to serve as the basis for making land use decisions and the 2004 Federal RTP will serve as the basis for making federal funding decisions.

The RTP classifies downtown Troutdale as an urban center/town center, meaning that downtown Troutdale should offer special attractions of regional interest and provide close access to a full range of local retail and service amities within a few miles of most residents. Streets within the town center classification should be designed with a multi-modal emphasis, and provide a strong connection to regional centers (such as downtown Gresham) and other major destinations. Transportation facilities that have a regional designation in the RTP include:

Table 3: Comparison of functional class designations

Street	*Federal*	*ODOT*	*Metro*	*Multnomah Co.*	*Troutdale*
242nd Avenue	Principal Arterial	Principal Arterial	Principle Arterial	Major Arterial	Arterial
257th Avenue	Minor Arterial	Minor Arterial	Major Arterial	Major Arterial	Arterial
Stark Street (Between 242nd and 257th)	Minor Arterial	Minor Arterial	Major Arterial	Major Arterial	Arterial
Stark Street (Between 257th and Troutdale Road)	Minor Arterial	Minor Arterial	Collector of Regional Significance	Major Arterial	Arterial
Troutdale Road	Urban Collector	Urban Collector	Collector of Regional Significance	Major Collector	Collector
Halsey Street	Minor Arterial	Minor Arterial	Minor Arterial	Minor Arterial	Arterial
Cherry Park Road	Minor Arterial	Minor Arterial	Minor Arterial	Major Collector	Arterial
Historic Columbia River Highway (Between 257th and Sandy River)	Minor Arterial	Minor Arterial	Collector of Regional Significance	Major Collector	Collector
Historic Columbia River Highway	Urban Collector	Urban Collector	Collector of Regional Significance	Major Collector	Collector

(Between I-84 and 257th) – State Highway					
Historic Columbia River Highway (East of Sandy River)	Minor Arterial	Minor Arterial	Rural Arterial	N/A	N/A
Marine Drive	Urban Collector	Urban Collector	Collector of Regional Significance	Major Collector	Collector

The RTP establishes regional transportation policies and functional class designations for all forms of travel including motor vehicle, transit, pedestrian, bicycle and freight. Facilities that are designated as such are the following:

Table 4: RTP modal designations

	Designation				
Facility	***Motor Vehicle***	***Transit***	***Pedestrian***	***Bicycle***	***Freight***
242nd Avenue	Principal arterial	N/A	N/A	Community connector	Road connector
257th Avenue	Major arterial	N/A	Mixed-use corridor	Regional corridor, on-street	Road connector
Stark Street	Major arterial	N/A	Mixed-use corridor	Community connector	N/A
Cherry Park Road	Minor arterial	N/A	N/A	Community connector	N/A
Marine Drive	Collector of regional significance	N/A	N/A	Community connector	Road connector
Troutdale Road	Collector of regional significance	Regional bus	N/A	Community connector	N/A
Halsey Street	Minor arterial	Regional bus	Mixed-use corridor	Regional corridor, on-street	N/A
Historic Columbia River Highway	Collector of regional significance	N/A	Mixed-use corridor	Regional corridor, on-street	Road connector

The plan then establishes priority projects for each mode based on the stated policies. The needs used to determine the plan projects are based on forecasts of growth in population, households and jobs as well as future travel patterns and analysis of travel conditions. In identifying priority projects, the plan estimates availability of federal, state and local funding for transportation improvements. Cost estimates for each project are also developed, as well as funding strategies identified. Local transportation plans are required by state law to be consistent with the RTP. Key

ways the Troutdale TSP must comply with the RTP is summarized below along with Table 6 that lists the RTP projects in the Troutdale area.

Table 5: Key Compliance Areas for the TSP Update to comply with the RTP

Issue	*Existing TSP Complies*	*Update Must Address*
Local TSP Development (Identify needs for 20 year planning period)	Chapters 3-9	Yes
System level planning (by mode)	Chapters 5-9	Yes
Project level planning (by mode)	Chapters 5-9	Yes
Design Standards for Street Connectivity	Chapter 8	Yes
Alternative Mode Analysis	Chapters 5-7, 9	Yes
Motor Vehicle Congestion Analysis	Chapter 8	Yes
Future RTP Refinements	Chapters 5-9	Yes
Transit Service Planning	Chapter 7	Yes
Project Development	Chapters 5-9	Yes
Specific Corridor Refinements		None
Specific Corridor Studies (Sandy Boulevard)		Yes
Area of Special Concern		None

Table 6 : RTP Projects in Troutdale

Project Name	**Project Location**	**Project Description**	**RTP Program Years**
Hogan Corridor Improvements*	Stark Street to Palmquist	Interim capacity improvements and access controls	2004-2009
Hogan Corridor Improvements	I-84 to Glisan Street	Construct new I-84 interchange	2010-2015
I-84 Widening	238th Avenue to Sandy River Bridge	Widen I-84	2016-2025
I-84 Troutdale Interchange Improvement	Troutdale interchange (exit 17)	Improve Troutdale interchange	2016-2025
Hogan Corridor Improvements*	Glisan Street to Stark Street	Upgrade to include bicycle and pedestrian facilities and center turn lane/median	2004-2009
Hogan Corridor Improvements	Hogan/Burnside from I-84 to US 26	Move freight from existing 181st/Burnside route	2016-2025
I-84 to US 26 Corridor Study	I-84 to US 26	Study to identify additional access management strategies, define long-term freight route in corridor and evaluate potential new	2010-2025

Project Name	Project Location	Project Description	RTP Program Years
		alignment south Powell Boulevard to US 26	
Gresham/Fairview Trail*	Springwater Trail to Marine Drive	Springwater Trail connection	2004-2009
Columbia River Highway Railroad Crossing Improvement	Columbia River Highway east of I-84	Replacing railroad bridge to allow for road widening	2016-2025
Sandy Boulevard Overpass	Sandy Boulevard at I-84	Construct overpass to reconnect Sandy Boulevard over I-84	2016-2025
Marine Drive Safety Corridor Plan	Marine Drive from Troutdale to Rivergate	Long-term traffic management plan	2016-2025
MKC Collector*	Halsey Street to Arata Road	Construct new collector of regional significance	2016-2025
Sandy Boulevard Bicycle and Pedestrian Improvements*	162nd to Troutdale	Retrofit bike lanes and sidewalks on existing street	2016-2025
Columbia River Highway Improvements	Kibling Avenue to Sandy River	Upgrade to include bicycle and pedestrian facilities	2016-2025
Troutdale Road Improvements	Cherry Park Road to Strebin Road	Upgrade to include bicycle and pedestrian facilities	2016-2025
Stark Street Improvements*	257th Avenue to Troutdale Road	Widen street to five lanes	2004-2009
Halsey Street Improvements*	238th to 257th	Improve Halsey Street to 3 lanes and complete boulevard design improvements	2010-2015
Troutdale TC Pedestrian Improvements*	Old Columbia River Highway, 257th/Graham, Buxton Road	Improve sidewalks, lighting, crossings, bus shelters and benches	2016-2025
257th Avenue Pedestrian Improvements*	Cherry Park Road to Stark Street	Improve sidewalks, lighting, crossings, bus shelters and benches	2004-2009
Edgefield Station Recreational Intermodal Facility	249th and Halsey	Develop Edgefield Station as a recreational intermodal facility	2016-2025
40-mile Loop Trail	223rd Avenue/Marine Drive to Troutdale TC	Study feasibility of corridor	2016-2025

* 2025 financially constrained system

TriMet Transit Investment Plan

The Transit Investment Plan (TIP) describes TriMet's strategies to meet regional transportation and livability goals through annual investments in service improvements, capital projects and customer information. The TIP is a rolling five-year plan that is updated annually and was first adopted in June 2002. The TIP implements the transit portion of the regional long term goals and strategies outlined in the 2040 Functional Plan and the most recent Regional Transportation Plan (RTP) for the Portland metro region and serves as a guide to focus TriMet, local, regional, state and federal money into specific needs identified in the regional plans.

One of the main concepts in TriMet's TIP is the emphasis on focused investments and improving the total transit system, such as improvements on existing lines. Therefore the TIP focuses targeted, strategic improvements to the system. The priorities are set forth in the TIP in the following order:

- Maintain the quality of the existing system
- Expand the high capacity transit system (MAX light rail or bus rapid transit)
- Expand the Frequent Service system
- Improve local service

TriMet currently has no plans for transit enhancement projects to take place within the City of Troutdale. Because there are many more local areas than TriMet can review in a year, the TIP identifies areas where transit planning will be reviewed over the next five years (Hillsboro, Tigard/Tualatin, Lake Oswego, North Macadam, Interstate MAX corridor and Gresham). TriMet will work with communities on local service needs such as bus re-routing and line additions, vanpools and shuttle operations and bike and pedestrian projects. In completion of the TSP, dialogue will take place with TriMet regarding possible service enhancements in the area, as well as ways the City of Troutdale can leverage transportation funds for transit improvements that might encourage TriMet to make investments in the City of Troutdale.

OSTP Transportation Concept System Planning Study

The purpose of this study was to consider transportation opportunities and constrains of the existing road system and adjoining developmental patterns associated with the vacated 540 acre Reynolds Aluminum manufacturing facility, located north of the Troutdale Airport. Transportation issues with this site were analyzed for both the short term and long term (2020) conditions and were evaluated under two scenarios. The first scenario minimized transportation infrastructure investment (only minor roadway improvements were recommended) and the second scenario maximized site development (the land use associated with the highest level of traffic generation was assumed as was the transportation infrastructure required to support it). Conclusions of the study were:

- The majority of the site can be developed without requiring huge investments in transportation infrastructure for an additional 2,000 PM peak hour trips (approximately $4 million required in transportation infrastructure to maintain acceptable service levels during the peak periods)
- Maximum development of the site would require 4 to 5 lanes of arterial roadway additions in each travel direction to handle the increased traffic.

It should be noted that system impacts to surrounding jurisdictions were not analyzed as part of this study, and future studies were recommended.

This study verified that substantial development could take place in the area north of the Troutdale Airport with relatively minimal infrastructure investment. The Troutdale TSP update will utilize the methodology and infrastructure improvements suggested as actual development decisions are made regarding this property, however, final recommendations for transportation infrastructure will be based on analysis related to the TSP update.

OSTP Study II

The cities of Gresham, Troutdale, Fairview and Wood Village are collaborating in proposing the redevelopment of the Oregon Science and Technology Park (OSTP) area as a center of technology and high-value industries. The cities believe that this investment will attract high quality jobs and develop new economic activities in east Multnomah County. The OSTP campus is envisioned to occupy 290 acres of the current Alcoa Aluminum property (a sub area of the original OSTP site referenced in the OSTP Transportation Concept System Planning Study referenced above) and would include a major technology company, a cluster of related industries and research linkages to the Oregon University system. This particular study focuses on development and urban design issues of both the OSTP site and the area surrounding the site. It also offers a plan for transportation enhancements for the study area. Transportation enhancements noted in the study include:

- Extension of 238th Drive north to Marine Drive to create a "Parkway" entrance to OSTP.
- Extension of Sandy Boulevard to the Historic Columbia River Highway over I-84.
- A "green Parkway" design overlay for: Sandy Boulevard, Marine Drive, Graham Road, 238th Drive, 223rd Avenue, 207th Avenue, 181st Avenue.
- All new streets designed using Metro's "Green Streets" as a guide.
- Strengthen north-south circulation linkages at 181st, 201st, 233rd, 238th Avenues and Graham Road for auto, public transit and bicyclists.

The plan also notes that alternative forms of transportation should be encouraged in the area, such as increased pedestrian and bicycle connectivity, public transportation access (including the addition of bus shelters) and transportation demand management strategies such as transit incentive programs and carpooling.

The conclusions reached in the report will be considered in completion of the Troutdale TSP update as a solid foundation of transportation infrastructure and urban design ideals were presented. However, the specific roadway alignments and off-street path networks could be adjusted as a larger view of the transportation system for the entire City of Troutdale is considered.

Transportation Management Association Feasibility Study

This study was produced in order to identify the institutional willingness and established need for a Troutdale Area Transportation Management Association (TMA). The context of the plan involved answering the basic question of what the stakeholders (business owners in the area) identified as the greatest challenges to doing business in the Troutdale area. The majority of the respondents answered with transportation related issues, including a lack of linkage between Troutdale and the regional transportation system (ie light rail), physical barriers to movement (ie, truck stops, railroad

tracks and Interstate 84), increasing congestion and a lack of a transportation vision/leader for the Troutdale area. The issue of access and its potential impact on the economic vitality and vision for the Troutdale area was identified as a major impediment to future economic growth. This report provides a work plan that can serve as a template for initiating the work for the new TMA. The City Council endorsed the findings of this report and recommended the formation of a TMA on June 10, 2003. The most relevant goals and objectives presented in this document include:

Improving and enhancing linkages to the regional transportation system/TDM.

Short term action items include:

- Working with TriMet to plan , add, upgrade and enhance bus shelters along NE 257th Avenue.
- Hire a TDM manager to develop program/system awareness.
- Identify major inbound populations.

Long term action items include:

- The establishment of transit links between Downtown Troutdale and Gateway Transit Center and Gresham Station.
- Increase the use of TDM programs and provide more frequent transit headways.
- Create an eastside bus route to connect major commercial activity centers with Downtown Troutdale.

Mitigate or eliminate congestion impediments (physical barriers)

Action items include:

- Support 257th Avenue connection to Springwater.
- Add exit 16B to Interstate 84.
- Reconnect Sandy Boulevard with Columbia River Highway.

Mitigate or eliminate congestion impediments.

Short term action items include:

- Place more visible signs on the Interstate system.
- Study development of trolley/shuttle system for internal circulation linkages.

Long term action items include:

- Extension of Marine Drive south to West Columbia River Highway.
- Support 238th Avenue extension north to Marine Drive.

Transportation Demand Management can have a positive affect on decreasing travel time, reducing environmental impacts and increasing transit ridership. Therefore, the TSP update will consider and incorporate the findings from this report.

Troutdale Airport Master Plan Update

Aviation master plans are typically updated every 5 – 10 years. The recently completed Troutdale Airport Master Plan update will help the Port select land use patterns on the airfield and adjoining Port properties that will complement the future vision for airport operations based on forecasts of demand for aviation services. The Troutdale Airport Master Plan is a 20 year planning document that forecasts based on two criteria:

- Number of operations (how many take offs and landings).
- Number and type of aircraft.

The Troutdale Master Plan update predicts a 2 percent growth in both areas. Due to this modest growth rate, the current infrastructure at the airport (runway length, parking spaces, hanger space) is adequate. Consequently, some land adjacent to the runway might be leased to conducive land uses (not residential or institutional).

Additionally an updated capital improvement plan (CIP) will allow the Port to receive Federal Aviation Administration (FAA) funds to make investments in projects that will benefit the overall vision for the airfield.

The Troutdale TSP will consider the impacts of additional, trip generating land uses locating near the airport.

Transportation Planning Rule (OAR 660-012)

The State of Oregon adopted 19 statewide planning goals that must be implemented in a comprehensive plan for each city (with a population over 2,500 individuals) and county in the state. In addition to identifying how land, air and water resources of each specific jurisdiction will be utilized, a review and needs analysis must be completed for improving public facilities.

One of the 19 goals is the Transportation Planning Rule (Goal 12). To comply with this rule, Troutdale must adopt a Transportation System Plan (TSP) that complies with the State TSP and Metro's regional transportation plan (RTP). The overarching goals to be accomplished by the TPR are to:

- Reduce dependence on the automobile and the number of people driving alone.
- Establish a stronger connection between land use and transportation planning.

Local TSP's are expected to examine possible land use solutions to transportation problems and identify multi-modal, system management and demand management strategies to address transportation needs. This entails the development of modal plans, including pedestrian, bicycle, motor vehicle and transit. These plans must strive to provide a integrated transportation network and include an inventory of current infrastructure, provide a gap analysis and identify how these gaps are going to be filled. The areas of analysis addressed in the TPR for a transportation system plan include:

- Roadway capacity and level of service
- Transit capacity and capacity utilization
- Bicycle and pedestrian system capacity
- Adjustment of turning movement volumes produced by travel demand forecasting models
- Estimation of future transportation needs (person travel), reflecting:

- Population and employment forecasts consistent with comprehensive plans
- Measures to reduce reliance on the automobile
- Increased residential, commercial and retail development densities
- Location of neighborhood shopping centers near residential areas
- Better balance between jobs and housing
- Maximum parking limits for office and institutional developments
- Appropriate levels of transportation facilities to serve land uses identified in transportation plans
- Increases in average automobile occupancy
- Increases in modal shares of non-automobile modes
- TDM programs
- Land use and subdivision regulation

- Estimation of future goods movement
- Access management

These strategies were incorporated into the adopted TSP and will be carried forward in the update.

Access Management Rules (OAR 734-051)

The purpose of Oregon's Access Management Rule is to control the issuing of permits for access to state highways, state highway rights of way and other properties under the State's jurisdiction. In addition, the ability to close existing approaches, set spacing standards and establish a formal appeals process in relation to access issues is also identified.

These rules enable the State to set policy and direct location and spacing of intersections and approaches on state highways, ensuring the relevance of the functional classification system and preserving the efficient operation of state routes. Regulating access can:

- Protect resource lands
- Preserve highway capacity
- Ensure safety for segments of state routes with sharp curves, steep grades or obstructed sight distance.

The access management standards adopted by ODOT are summarized in the table below.

Table 7: ODOT Access Management Standards

	Posted Speed (MPH)				
Facility	***>55***	***50***	***40,45***	***30,35***	***<20***
Statewide Highway (feet)	1320	1100	990	770	550
Regional Highway (feet)	990	830	750	600	450
District Highway (feet)	700	550	500	400	400

These standards will be used in the TSP to establish a connectivity plan, verify access spacing for any proposed highway interchanges and analyze current access conditions on congested state highways. These standards will be applied to all rights of way under the States jurisdiction in the City of Troutdale.

Oregon Transportation Plan

The Oregon Transportation Plan sets the general direction for transportation development statewide for the next twenty years and provides overall direction for allocating resources and coordinating modes of transportation. It provides policies to increase livability in the State of Oregon by emphasizing alternative forms of transportation to the single occupant vehicle. The plan seeks to develop public transit, rail lines, bicycling and pedestrians facilities, airports and pipelines, while also emphasizing the maintenance and improvement of highways, roads and bridges. Thus, the plan calls for a transportation system that has a modal balance, is both efficient and accessible, provides connectivity among rural and urban places and between modes, and is environmentally and financially stable. The Troutdale TSP currently incorporates these goals and strategies and they will be carried forward in the update.

Oregon Highway Plan

The basic framework for the Oregon Highway Plan is a refinement and application of the goals and policies stated in the Oregon Transportation Plan applied to the state highway system. These afore mentioned goals include:

- Increasing safety and capacity as well as preserving capital investments previously made on the state highway system.
- Fostering cooperation with both regional and local governments.
- Increasing linkages between land use and transportation.
- Access management development and adherence.
- Providing linkages with other transportation modes.
- Creating a sustainable and environmentally friendly system.

The Highway Plan gives policy and investment direction to large scale corridor plans and TSP's, but is not intended to direct specific projects and modal alternatives. Relevant to Troutdale is the access spacing standards and maximum volume to capacity (v/c) benchmarks.

The highways of statewide importance that are specifically identified in The Highway Plan in the City of Troutdale include:

- Interstate 84, which is classified as a Interstate Highway and Major Fright Route with the primary objective being to provide mobility between urban areas and a secondary objective being to provide mobility for regional trips *within* a metropolitan area. The operations of this facility should be safe and efficient high-speed continuous flow. The maximum volume to capacity ratios for two hour peak hour operating conditions is .99. One mile is required for access spacing between the start and end of tapers of adjacent intersections.
- Historic Columbia River Highway, which is classified as a District Highway. This facility functions as a city arterial or collector, but is of county wide significance (west of

Troutdale City limits this facility is Highway 30/Sandy Boulevard providing access to downtown Portland). In urban areas, such as the City of Troutdale, this facility should provide moderate to low-speed operation for traffic flow to allow for significant pedestrian and bicycle movements. Mobility is to be balanced with local access. The maximum volume to capacity ratios for two hour peak hour operating conditions ranges from .95 (segments not in the 2040 Concept Area) to 1.0 (segments that are in the 2040 Concept Area).

Oregon Public Transportation Plan

The Oregon Public Transportation Plan develops transit, rideshare and transportation demand management services as well as forming the public transportation system envisioned in the Oregon Transportation Plan. The plan describes the roles and responsibilities of key players, provides a financial investment strategy and identifies both short and long term implementation steps. The Plan provides minimum levels of service standards for public transportation operations. These criteria include peak and off-peak frequencies, vehicle maintenance programs and replacement schedules, intermodal connections and ridesharing. The Troutdale TSP will incorporate all relevant aspects of this plan.

Oregon Bicycle and Pedestrian Plan

The provision of safe and accessible bicycling and walking facilities in an effort to encourage increased levels of bicycling and walking is the goal of the Oregon Bicycle and Pedestrian Plan. The Plan provides actions that will assist local jurisdictions understand the principals and policies that ODOT follows in providing bike and walkways along state highways. In order to reach the plan's objectives, the strategies for system design are outlined, including:

- Providing bikeway and walkway systems that are integrated with other transportation systems.
- Providing a safe and accessible biking and walking environment.
- Development of education programs that improve bicycle and pedestrian safety.

The document includes two sections, including the Policy & Action Plan and the Bikeway & Walkway Planning Design, Maintenance & Safety. The first section contains background information, legal mandates and current conditions, goals, actions and implementation strategies ODOT proposes to improve bicycle and pedestrian transportation. The second section assist ODOT, cities and counties in designing, constructing and maintaining pedestrian and bicycle facilities. Design standards are recommended and information on safety is provided.

The Troutdale TSP will implement the design standards for all bicycling and pedestrian facilities located in the City of Troutdale in accordance with the Oregon Bicycle and Pedestrian Plan. Additionally, needs assessment and possible alignment alternatives will be based on the goals espoused in the Policy and Action section of the Oregon Bicycle and Pedestrian Plan.

Oregon Transportation Safety Action Plan

The Oregon Transportation Safety Action Plan further establishes the goals, policies and actions that provide for a safe multimodal transportation plan outlined in the afore mentioned Oregon Transportation Plan. The plan is broken into four main sections including:

- The Transportation Safety Picture: an overview of the current transportation safety environment
- The Vision: the vision of changes that will occur by 2012 that will result in a safer transportation system for Oregon.
- The Actions: details current status of transportation safety problems, countermeasures now in place and the expected outcome of implementing each of the actions included in this plan.
- The Implementation Strategy: legislation and investment requirements needed to implement the actions and recommendations for organizational changes needed to implement the plan.

This Plan encourages the development of partnerships between state and local governments and provides 70 action plan items that can help make the transportation system safer. Each one of the action items fits into the following categories: Interagency cooperation, facility design, construction and maintenance, public awareness, education and training, enforcement, impaired and high risk operators, transportation system user safety and security, truck safety, rail safety, navigational conflicts, transit, pedestrian and bicycle safety. Many of the key actions will require legislative action, however local transportation plans should consider the following:

- Safety objectives.
- Resolution of goal conflicts between safety and other issues.
- Involvement in the planning process of engineering, enforcement and emergency service personal with local transportation safety groups.

The Troutdale TSP will incorporate the safety objectives, organizational characteristics and an overall safety priority in evaluating alternatives in the transportation system for the City of Troutdale with a special emphasis placed on transportation system user safety.

Oregon Aviation Plan

The Oregon Aviation Plan establishes five categories of airports based in their functional roles and provides a statewide perspective relating to airport planning decisions while further refining the goals and policies of the OTP. The Plan provides both forecasts and inventories for the public access airports in the state, with key issues being that :

- Local governments own most airports.
- The federal government owns most of the navigational system.
- The FFA determines funding levels and prioritization of expenditures.

With over 70 core system public use airports in the state of Oregon (there are 101 total public use airports in the state), Troutdale is classified as a Category 2 – Business or High Activity General Aviation airport (the same designation as Hillsboro, Bend Municipal, Corvallis Municipal and Salem McNary Field, among others). A needs evaluation found that the Troutdale airport was deficient in meeting runway pavement strength, taxiway access, runway protection zones and parallel taxiway separation. The Troutdale TSP will consider the findings from the Oregon Aviation Plan in assessing the current deficiencies with the air transport mode for Troutdale and incorporate findings and suggestions from the plan in the air modal plan.

Oregon Rail

This plan serves as a combination of the State's rail planning, freight rail and passenger rail systems and contains three elements:

- Summary of the state's goals and objectives related to passenger and freight rail.
- Quantify and measure the state's performance to-date.
- Identifies projected costs, revenues and investment needs for rail transportation of people and goods.

The plan also establishes a system of integration between freight and passenger elements into the land use and transportation planning processes and calls for cooperation between state, regional and local jurisdictions in completing the plan. The Troutdale TSP will incorporate the recommendations of the Oregon Rail Plan in the rail modal plan, as well as consider the implications of recommendations to other modal projects in the City.

Willamette Valley Transportation Strategy

The Willamette Valley Transportation Strategy was developed to provide a coordinated transportation strategy to diversify and interconnect the transportation system in the Willamette Valley. Three goals were developed for the transportation system:

- Mobility
- Industrial growth
- Livability

The strategy recognizes highways as the backbone of the Valley's transportation system for both people and freight movements, however it places increasing emphasis on the development of urban transit, intercity passenger rail systems, travel demand management and user fees.

The plan is not specific on future projects, however, it does outline a goal of having more communication between jurisdictions and "Improvements to east-west and north-south connections to the I-5 corridor", both of which could directly affect the City of Troutdale.

Freight Moves the Oregon Economy

The movement of freight has a far reaching effect on the Oregon economy. This report attempts to identify some of the concerns and needs about maintaining and enhancing current and future freight mobility. The report simply reports information about freight from numerous federal, state, regional, local, and other sources. Therefore, it serves as a compendium to these documents rather than an independent document that develops new data or ideas. It provides an overview of:

- Importance of freight to the national and Oregon economy
- Freight transportation planning and programming
- Oregon's freight transportation system
- Freight performance, concerns and needs
- Possible future directions for freight capacity

Interstate 84 is one of the most important east-west highways for moving freight in the state of Oregon and is designated as a facility in the National Highway System as well as a State System Route. Truck volumes on I-84 average between 5,000-8,000 trucks a day. Additionally, Union Pacific operated two rail lines through the I-84 corridor and a natural gas line extends from the Oregon-Idaho border to the Oregon-Washington boarder. It should be noted that volume/capacity standards within the Portland Area highest hour is .85 to .95, which is slightly lower (generally 5 percent) than for other, non designated freight route, highways. This means that slightly more congestion would be acceptable on non-freight routes. Additionally, I-84 by Troutdale, is considered to have poor pavement conditions (as of 1998) and have congestion problems.

The Troutdale TSP will strive to develop alternative routes and connectivity measures to reduce local traffic on Interstate 84 in an effort to keep the v/c ratio of a designated freight route at acceptable ODOT standards. Additionally, the location of alternative freight routes in the City of Troutdale will be considered, as well as capacity improvements required, to handle the future truck traffic.

Intercity Passenger Policy and Program

The Intercity Passenger Policy & Program's main goal is to enhance bus, rail and air intercity passenger transportation services in the state of Oregon. Through this multimodal intercity passenger policy, the plan takes inventory of the current intercity system and identifies service and policy gaps in that system with the goal of filling those needs.

It was found through gap analysis that Troutdale, as well as the rest of the Portland Metro area, meets the minimum service level for all of the intercity modes (air, rail and bus). None the less, the plan still calls for maintaining access and mobility through:

- developing information dissemination channels regarding multimodal choices.
- coordination of the facilities and stakeholders.
- developing financial assistance for projects identified in local plans and serving statewide goals.

The following table depicts modal level of service thresholds and identifies if the current transportation system provided by the City of Troutdale meets those thresholds.

Table 8: Intercity level of service standards

Mode	*Minimum Level of Service*	*Troutdale Meets LOS*
Bus	Passenger service available for cities or groups of cites within five miles of one another having a combined population over 2,500 and located 20 miles or more from the nearest Oregon city with a larger population and economy and should allow for a round trip to be made within one day.	Yes
Rail	Regional rail service should offer frequent schedules, extensive feeder bus service and reliable on time arrivals with the goal of reducing per capital highway travel.	Yes
Air	Availability of an airport with commercial service where the population is greater than 50,000 and the distance to the nearest other commercial air service is greater than 70 miles.	Yes

State Transportation Improvement Program (STIP)

The current (2004-2007) Statewide Transportation Improvement Program (STIP) serves as ODOT's short term capital improvement program and provides funding and scheduling information for transportation projects for both ODOT and the metropolitan planning organizations in the state. Projects funded in the STIP reflect and advance the Oregon Transportation Plan for highways, public transportation, freight and passenger rail and bicycle and pedestrian facilities. Additionally, monies obtained from the sale of state bonds authorized in the 2003 Oregon Transportation Investment Act (OTIA III) and placed in the STIP coffers have been dedicated to modernization, bridge and pavement preservation projects. Therefore, many of the projects in the 2004-2007 STIP are preservation oriented.

The following projects will have an impact on the Troutdale transportation system:

- Replacement of the current Corbett Hill Road Viaduct with construction scheduled to begin in 2006. (total cost $1.1 million).
- The bridge spanning Beaver Creek on the Historic Columbia River Highway is scheduled to be renovated and a separate pedestrian bridge added, with construction beginning in 2005. (total cost $1.7 million).
- Reconstruction of the rail road crossing and vehicle approaches at Sandy Boulevard/223rd Avenue intersection, scheduled to begin construction in 2005. (total cost over $5.8 million).

Transportation System Planning Guidelines

The 2001 Transportation System Planning Guidelines updates the Oregon Department of Transportation's 1995 guidelines and is designed to provide assistance to local jurisdictions in the preparation and update of TSP's to comply with requirements associated with:

- Transportation Planning Rule 1999, OAR 660
- Access Management Rules, 2000 OAR 734
- Oregon Public Transportation Plan,, 1997
- Oregon Highway Plan, 1999
- Oregon Aviation Plan, 2000
- Executive Order 12898 on Environmental Justice for Minority and Low Income Populations: USDOT Order 56102 and FHWA Order 6640.23.
- Executive Order EO-23 on Quality Development
- Executive Order EO-00-07 on Sustainability

The Troutdale TSP update will include responses to transportation, land use, environmental, economic and social changes that have occurred in the community since the TSP was first prepared. The update will also attempt to anticipate emerging issues.

Troutdale Comprehensive Plan Goal 5 Resources

Goal 5 of the Troutdale Comprehensive Plan refers to open spaces, scenic and historic areas, and natural resources. The City strongly supports preservation of its open spaces. The Goal separates the current resources the City has into two categories: Community Resources and Natural Resources. Community Resources include:

- The Sandy River Delta (currently the Alcoa Aluminum property)
- Broughton Bluff (just east of Troutdale across the Sandy River)
- Harlow House (on the National Register of Historic Places), Troutdale Methodist Evangelical Church, Douglass Cemetery, Mountainview Cemetery and the Alfred Baker Copper Beech Tree.
- The Troutdale Railroad Depot (located across from City Hall and houses a railroad history museum).

In addition to the community resources, the City has a policy to mitigate detrimental environmental impacts and limit encroachment on environmentally sensitive areas. Natural resources include:

- Water – since the municipal water supply is drawn from wells, any activity that might affect water quality is regulated to minimizing adverse impacts. All streams having perennial or intermittent flows are considered sensitive areas (most notably, the stream corridors of the Sandy River, Beaver Creek and Arata Creek).
- Wetlands – The U.S. Fish and Wildlife has identified wetlands on a map with the City currently consults. Applications for development projects that occur within one of these sites are referred to the Division of State Lands.
- Aggregate – There are no active extraction sites in Troutdale, however inactive sites include the Thompson Villa Quarry and the Obrist Pit. Obtrist Pit has been filled and is now used as a 16-acre community park.
- Wildlife – Beaver Creek and Sandy River corridors are identified by the City as open space and will be retained in their natural state to protect wildlife habitats.

The Troutdale TSP will incorporate the sensitive areas, both environmental and community based, into modal and land use plans.

Metro Title 3 Protected Resource Inventories

The purpose of Title 3 is to protect water quality and floodplain areas as well as fish and wildlife habit. Cities and counties are required to amend their plans and implementing ordinances to ensure they comply with Title 3 by adopting applicable provisions of the Metro Water Quality and Flood Management Area modal ordnance and map (they can either adopt the Metro Water Quality and Flood Management Area Map, or a city or county field verified map that substantially complies with the Metro map).

The Troutdale TSP will incorporate the required environmental provisions to meet the Metro Title 3 and Goal 5 provisions.

B- Land Use

Troutdale TSP Forecast Model Land Use
Based on Metro Forecasts for the 2004 RTP Update
Base Year 2000 and Future Year 2025
HH = Household, RET = Retail Employee, OTH = Non-Retail Employee

Metro Taz	TSP TAZ	00 HH	00 RET	00 OTH	25 HH	25 RET	25 OTH	HH Growth	RET Growth	OTH Growth
673	673	75	4	10	75	30	10	0	26	0
673	1400	75	4	69	93	66	645	18	62	576
673	1401	63	0	0	63	0	0	0	0	0
677	677	0	0	40	0	10	93	0	10	53
677	1402	0	0	40	0	10	303	0	10	263
677	1403	0	0	166	0	11	377	0	11	211
678	678	0	0	618	0	17	1185	0	17	567
678	1404	0	0	10	0	18	35	0	18	25
678	1405	3	0	50	456	17	368	453	17	318
679	679	0	0	425	0	43	680	0	43	255
679	1406	0	26	20	0	100	321	0	74	301
679	1407	0	0	75	0	43	382	0	43	307
679	1408	0	0	450	0	0	881	0	0	431
680	680	0	0	18	9	11	90	9	11	72
681	681	10	0	0	10	0	0	0	0	0
681	1409	80	0	10	80	0	10	0	0	0
681	1410	20	0	0	65	0	0	45	0	0
681	1411	63	257	90	332	325	180	269	68	90
681	1412	0	0	10	0	0	642	0	0	632
681	1413	0	0	417	5	195	600	5	195	183
682	682	0	203	0	0	356	0	0	153	0
682	1414	0	0	0	5	0	0	5	0	0
682	1415	0	0	40	33	0	60	33	0	20
682	1416	239	0	10	239	0	10	0	0	0
682	1417	90	0	0	90	0	0	0	0	0
682	1418	30	0	0	30	0	0	0	0	0
682	1419	90	0	0	90	0	0	0	0	0
682	1420	0	0	429	0	0	652	0	0	223
682	1421	30	0	10	105	0	10	75	0	0
683	683	0	48	68	0	113	301	0	65	233
683	1422	233	0	0	309	0	0	76	0	0

Troutdale TSP Forecast Model Land Use
Based on Metro Forecasts for the 2004 RTP Update
Base Year 2000 and Future Year 2025
HH = Household, RET = Retail Employee, OTH = Non-Retail Employee

Metro Taz	TSP TAZ	00 HH	00 RET	00 OTH	25 HH	25 RET	25 OTH	HH Growth	RET Growth	OTH Growth
684	684	150	0	798	150	121	1473	0	121	675
684	1423	360	245	100	631	300	100	271	55	0
694	694	545	0	127	565	10	256	20	10	129
694	1424	650	143	127	658	250	256	8	107	129
694	1425	545	0	126	645	24	255	100	24	129
694	1426	650	0	126	950	10	255	300	10	129
695	695	50	39	91	50	68	180	0	29	89
695	1427	300	0	20	300	0	34	0	0	14
696	696	10	0	667	10	0	667	0	0	0
696	1428	11	0	700	11	1	722	0	1	22
697	697	194	4	0	220	4	50	26	0	50
697	1429	30	0	0	35	0	0	5	0	0
697	1430	0	0	59	0	28	135	0	28	76
697	1431	130	0	0	135	0	0	5	0	0
698	698	97	0	10	170	0	10	73	0	0
698	1432	100	4	97	170	7	232	70	3	135
698	1433	150	0	0	150	0	0	0	0	0
699	699	150	0	0	150	0	0	0	0	0
699	1434	121	0	0	121	0	0	0	0	0
699	1435	180	0	323	182	0	145	2	0	-178
700	700	9	0	11	25	0	59	16	0	48
700	1436	50	0	12	124	14	160	74	14	148
700	1437	100	0	11	100	0	15	0	0	4
700	1438	75	0	11	75	0	15	0	0	4
700	1439	75	9	11	100	18	30	25	9	19
701	701	160	0	18	180	0	20	20	0	2
701	1440	126	0	20	154	0	62	28	0	42
701	1441	25	0	0	35	3	20	10	3	20
701	1442	40	0	0	40	0	0	0	0	0
701	1443	40	0	0	40	0	0	0	0	0
701	1444	15	0	0	15	0	0	0	0	0

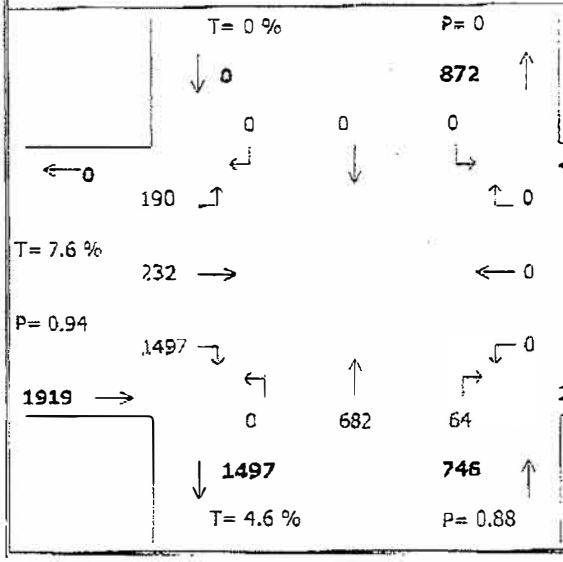
Troutdale TSP Forecast Model Land Use
Based on Metro Forecasts for the 2004 RTP Update
Base Year 2000 and Future Year 2025
HH = Household, RET = Retail Employee, OTH = Non-Retail Employee

Metro Taz	TSP TAZ	00 HH	00 RET	00 OTH	25 HH	25 RET	25 OTH	HH Growth	RET Growth	OTH Growth
701	1445	175	0	0	175	0	0	0	0	0
702	702	10	0	65	57	20	350	47	20	285
702	1446	0	480	21	0	842	155	0	362	134
702	1447	0	30	10	0	60	60	0	30	50
702	1448	70	0	65	350	20	200	280	20	135
703	703	0	624	50	50	1070	360	50	446	310
703	1449	150	10	20	175	15	25	25	5	5
703	1450	20	150	250	20	307	412	0	157	162
703	1451	91	0	50	105	0	100	14	0	50
704	704	1	0	5	113	161	220	112	161	215
704	1452	535	0	25	545	0	50	10	0	25
704	1453	0	0	5	5	0	507	5	0	502
704	1454	90	0	5	90	0	10	0	0	5
704	1455	315	144	127	315	300	200	0	156	73
704	1456	225	0	10	225	0	15	0	0	5
704	1457	60	25	15	60	40	50	0	15	35
705	705	115	14	150	232	24	140	117	10	-10
705	1458	40	0	10	65	0	10	25	0	0
705	1459	70	0	75	188	0	71	118	0	-4

C- Traffic Counts

INTERSECTION TURN MOVEMENT SUMMARY REPORT

File: LTQY



Peak Hour
16:45-17:45

Total Entry Volume
2665

T=% Trucks By Approach

P = PHF By Approach

LOCATION:

257TH/GRAHAM AT S. FRONTAGE RD/I-84 EB ON-RAMP
TROUTDALE, OR

Date: **05/25/04** Day: **TUE**
Time: **16:00 - 18:00**

Report Prepared for:
DKS ASSOCIATES

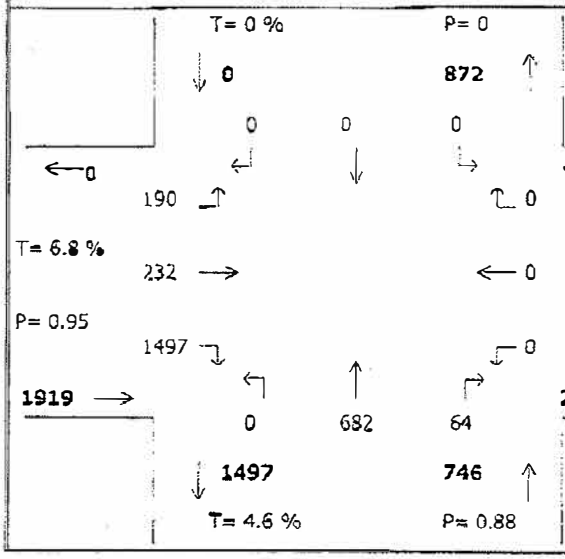
Surveyed By:
TRAFFIC SMITHY, INC
1225 NW Murray Blvd Suite 111
Portland, OR 97229
Phone: 503-641-6333 Fax: 503-643-8866

Report Reviewed by: JG

TIME PERIOD	EASTBOUND			SOUTHBOUND			NORTHBOUND			WESTBOUND			ALL
	↴	→	↱	↲	↓	↳	←	↑	→	↓	←	↰	
16:00-16:05	107	24	14	0	0	0	0	56	5	0	0	0	206
16:05-16:10	100	29	14	0	0	0	0	59	9	0	0	0	211
16:10-16:15	95	16	12	0	0	0	0	85	9	0	0	0	217
16:15-16:20	112	20	13	0	0	0	0	62	6	0	0	0	213
16:20-16:25	89	20	10	0	0	0	0	74	7	0	0	0	200
16:25-16:30	119	22	18	0	0	0	0	60	10	0	0	0	229
16:30-16:35	119	17	21	0	0	0	0	71	7	0	0	0	235
16:35-16:40	115	14	21	0	0	0	0	45	3	0	0	0	198
16:40-16:45	87	17	13	0	0	0	0	55	4	0	0	0	176
16:45-16:50	112	18	20	0	0	0	0	55	4	0	0	0	209
16:50-16:55	112	15	16	0	0	0	0	61	6	0	0	0	210
16:55-17:00	115	21	16	0	0	0	0	59	5	0	0	0	216
17:00-17:05	116	21	18	0	0	0	0	50	7	0	0	0	212
17:05-17:10	121	20	28	0	0	0	0	64	4	0	0	0	237
17:10-17:15	125	26	16	0	0	0	0	82	5	0	0	0	254
17:15-17:20	140	15	19	0	0	0	0	47	4	0	0	0	225
17:20-17:25	114	17	19	0	0	0	0	50	4	0	0	0	204
17:25-17:30	129	20	3	0	0	0	0	50	9	0	0	0	211
17:30-17:35	139	19	9	0	0	0	0	51	8	0	0	0	226
17:35-17:40	148	25	18	0	0	0	0	61	2	0	0	0	254
17:40-17:45	126	15	8	0	0	0	0	52	6	0	0	0	207
17:45-17:50	121	15	14	0	0	0	0	33	3	0	0	0	186
17:50-17:55	96	16	9	0	0	0	0	57	3	0	0	0	181
17:55-18:00	95	15	16	0	0	0	1	41	3	0	0	0	171
TOTALS	2752	457	365	0	0	0	1	1380	133	0	0	0	5088
PHF	0.9	0.87	0.75	0	0	0	0	0.87	0.76	0	0	0	0.93
% Trucks	2.4	24.1	26	0	0	0	0	4.5	5.3	0	0	0	6.7
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	
Pedestrians		0			1			0			0		

INTERSECTION TURN MOVEMENT PEAK HOUR REPORT

File: LTQY



LOCATION:

257TH/GRAHAM AT S. FRONTAGE RD/I-84 EB ON-RAMP
TROUTDALE, OR

Date: **05/25/04** Day: **TUE**
Time: **16:00 - 18:00**

Report Prepared for:
DKS ASSOCIATES

Surveyed By:
TRAFFIC SMITHY, INC
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Portland, OR 97229
Phone: 503-641-6333 Fax: 503-643-8866

Report Reviewed by: JG

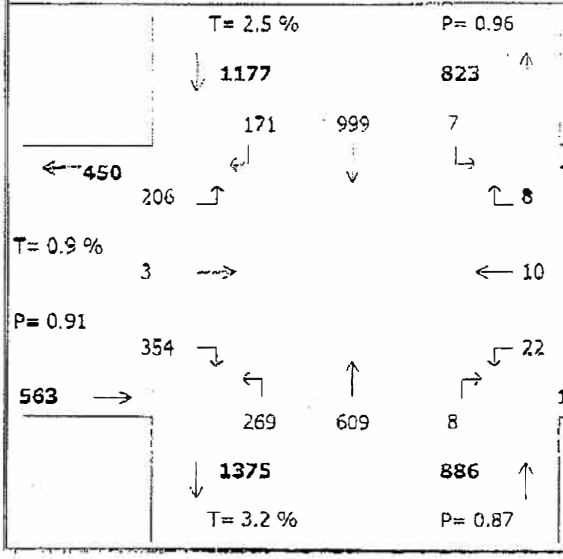
TIME PERIOD	EASTBOUND ↴	EASTBOUND →	EASTBOUND ↱	SOUTHBOUND ↲	SOUTHBOUND ↓	SOUTHBOUND ↳	NORTHBOUND ↰	NORTHBOUND ↑	NORTHBOUND ↱	WESTBOUND ↴	WESTBOUND ←	WESTBOUND ↰	ALL
ALL VEHICLES													
16:45-17:00	339	54	52	0	0	0	0	175	15	0	0	0	635
17:00-17:15	362	67	62	0	0	0	0	196	16	0	0	0	703
17:15-17:30	383	52	41	0	0	0	0	147	17	0	0	0	640
17:30-17:45	413	59	35	0	0	0	0	164	16	0	0	0	687
LIGHT TRUCKS (SINGLE UNIT 2 AXLES)													
16:45-17:00	4	0	1	0	0	0	0	1	1	0	0	0	7
17:00-17:15	6	0	3	0	0	0	0	6	0	0	0	0	15
17:15-17:30	7	0	1	0	0	0	0	5	1	0	0	0	14
17:30-17:45	2	0	1	0	0	0	0	5	0	0	0	0	8
MEDIUM TRUCKS (SINGLE UNIT >2 AXLES)													
16:45-17:00	2	1	3	0	0	0	0	2	0	0	0	0	8
17:00-17:15	2	1	1	0	0	0	0	1	0	0	0	0	5
17:15-17:30	1	2	0	0	0	0	0	2	0	0	0	0	5
17:30-17:45	0	1	1	0	0	0	0	0	0	0	0	0	2
HEAVY TRUCKS (SEMI-TRACTOR TRAILER)													
16:45-17:00	3	13	15	0	0	0	0	4	0	0	0	0	35
17:00-17:15	3	7	14	0	0	0	0	2	0	0	0	0	26
17:15-17:30	2	9	6	0	0	0	0	1	0	0	0	0	18
17:30-17:45	0	10	9	0	0	0	0	3	0	0	0	0	22
BICYCLES													
16:45-17:00	1	0	0	0	0	0	0	0	0	0	0	0	1
17:00-17:15	0	0	1	0	0	0	0	0	0	0	0	0	1
17:15-17:30	1	0	0	0	0	0	0	1	0	0	0	0	2
17:30-17:45	0	0	0	0	0	0	0	1	0	0	0	0	1

PEDESTRIANS Crosswalk	SOUTH	WEST	EAST	NORTH	ALL
16:45-17:00	0	0	0	0	0
17:00-17:15	0	0	0	0	0
17:15-17:30	0	0	0	0	0
17:30-17:45	0	0	0	0	0

Peak Hour By Movement													
PHF	0.91	0.87	0.77	0	0	0	0	0.87	0.94	0	0	0	0.95
% Trucks(All)	2.1	19	28.9	0	0	0	0	4.7	3.1	0	0	0	6.2
% Trucks(M+H)	0.9	19	25.8	0	0	0	0	2.2	0	0	0	0	4.5
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Hourly Totals													
16:00-17:00	1282	233	188	0	0	0	0	742	75	0	0	0	2520
16:15-17:15	1342	231	210	0	0	0	0	738	68	0	0	0	2589
16:30-17:30	1405	221	210	0	0	0	0	689	62	0	0	0	2587
16:45-17:45	1497	232	190	0	0	0	0	682	64	0	0	0	2665
17:00-18:00	1470	224	177	0	0	0	1	638	58	0	0	0	2568

INTERSECTION TURN MOVEMENT SUMMARY REPORT

File: DGBM



LOCATION:

257TH DR AT CHERRY PARK RD (SOUTH)/16TH WAY
TROUTDALE, OR

Date: **05/26/04** Day: **WED**
Time: **16:00 - 18:00**

Report Prepared for:
DKS ASSOCIATES

Surveyed By:
TRAFFIC SMITHY, INC
1225 NW Murray Blvd Suite 111
Portland, OR 97229
Phone: 503-641-6333 Fax: 503-643-8866

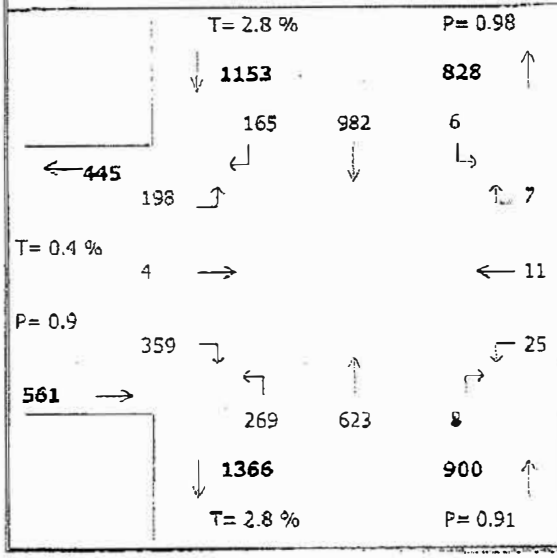
Report Reviewed by: JG

TIME PERIOD	EASTBOUND			SOUTHBOUND			NORTHBOUND			WESTBOUND			ALL
16:00-16:05	25	1	9	9	91	0	17	63	2	1	1	0	219
16:05-16:10	27	0	19	13	54	0	17	52	1	0	0	0	183
16:10-16:15	27	0	12	8	75	0	22	58	1	0	1	1	205
16:15-16:20	24	1	18	21	90	0	15	60	2	3	0	0	234
16:20-16:25	34	0	15	13	76	1	13	43	1	0	1	2	199
16:25-16:30	21	1	8	11	74	0	16	57	0	2	1	0	191
16:30-16:35	35	1	14	8	68	0	22	48	0	3	1	0	200
16:35-16:40	29	1	15	12	105	2	26	49	0	1	0	0	240
16:40-16:45	25	1	25	13	78	0	17	51	0	3	1	1	215
16:45-16:50	26	0	11	21	70	0	21	56	0	1	1	0	207
16:50-16:55	40	0	20	13	86	0	13	49	0	2	0	1	224
16:55-17:00	43	0	15	11	92	0	20	39	0	2	0	0	222
17:00-17:05	22	0	14	17	61	0	28	46	5	2	3	1	199
17:05-17:10	21	0	12	12	101	2	27	61	2	2	0	2	242
17:10-17:15	29	0	21	15	72	1	24	53	0	2	4	1	222
17:15-17:20	30	0	16	17	85	0	20	69	0	2	0	0	239
17:20-17:25	34	1	22	16	90	1	26	58	1	3	0	0	252
17:25-17:30	25	0	13	10	74	0	25	44	0	2	1	1	195
17:30-17:35	30	0	22	14	85	1	22	34	0	0	0	1	209
17:35-17:40	32	1	9	9	103	1	19	36	0	0	0	1	211
17:40-17:45	19	0	16	10	84	0	12	54	1	1	0	2	199
17:45-17:50	32	0	12	11	89	0	16	20	1	1	0	0	182
17:50-17:55	29	0	7	8	69	1	15	41	1	2	0	0	173
17:55-18:00	34	0	16	12	91	0	11	47	0	0	0	0	211

TOTALS	693	8	361	304	1963	10	464	1188	18	35	15	14	5073
PHF	0.81	0.38	0.87	0.89	0.97	0.58	0.85	0.83	0.29	0.79	0.36	0.5	0.93
% Trucks	0.4	12.5	1.7	1.3	2.6	10	1.3	4	0	0	0	7.1	2.4
Stopped Buses	0	0	0	0	3	0	0	1	0	0	0	0	
Pedestrians		11			15			6			7		

INTERSECTION TURN MOVEMENT PEAK HOUR REPORT

File: DGBM



LOCATION:

257TH DR AT CHERRY PARK RD (SOUTH)/16TH WAY
TROUTDALE, OR

Date: **05/26/04** Day: **WED**
Time: **16:00 - 18:00**

Report Prepared for:
DKS ASSOCIATES

Surveyed By:
TRAFFIC SMITHY, INC
1225 NW Murray Blvd Suite 111
Portland, OR 97229
Phone: 503-641-6333 Fax: 503-643-8866

Report Reviewed by: JG

TIME PERIOD	EASTBOUND			SOUTHBOUND			NORTHBOUND			WESTBOUND			ALL
ALL VEHICLES													
16:30-16:45	89	3	54	33	251	2	65	148	0	7	2	1	655
16:45-17:00	109	0	46	45	248	0	54	144	0	5	1	1	653
17:00-17:15	72	0	47	44	234	3	79	160	7	6	7	4	663
17:15-17:30	89	1	51	43	249	1	71	171	1	7	1	1	686
LIGHT TRUCKS (SINGLE UNIT 2 AXLES)													
16:30-16:45	0	0	2	0	7	0	1	4	0	0	0	0	14
16:45-17:00	0	0	0	1	5	0	0	5	0	0	0	0	11
17:00-17:15	0	0	0	1	3	1	0	2	0	0	0	1	8
17:15-17:30	0	0	0	0	4	0	0	3	0	0	0	0	7
MEDIUM TRUCKS (SINGLE UNIT >2 AXLES)													
16:30-16:45	0	0	0	0	2	0	0	0	0	0	0	0	2
16:45-17:00	0	0	0	0	0	0	0	2	0	0	0	0	2
17:00-17:15	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15-17:30	0	0	0	0	1	0	0	1	0	0	0	0	2
HEAVY TRUCKS (SEMI-TRACTOR TRAILER)													
16:30-16:45	0	0	0	0	1	0	0	1	0	0	0	0	2
16:45-17:00	0	0	0	0	0	0	0	1	0	0	0	0	1
17:00-17:15	0	0	0	0	2	0	0	2	0	0	0	0	4
17:15-17:30	0	0	0	0	4	0	0	3	0	0	0	0	7
BICYCLES													
16:30-16:45	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45-17:00	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00-17:15	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15-17:30	0	0	0	0	0	0	0	0	0	0	0	0	0

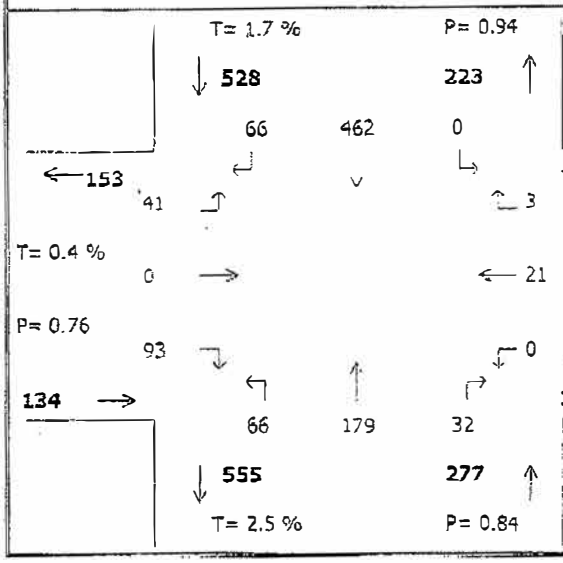
PEDESTRIANS					
Crosswalk	SOUTH	WEST	EAST	NORTH	ALL
16:30-16:45	1	2	0	1	4
16:45-17:00	1	6	0	2	9
17:00-17:15	0	1	2	0	3
17:15-17:30	0	2	2	2	6

Peak Hour By Movement													
PHF	0.82	0.33	0.92	0.92	0.98	0.5	0.85	0.91	0.29	0.89	0.39	0.44	0.97
% Trucks(All)	0	0	1	1.2	3	16.7	0.4	3.9	0	0	0	14.3	2.3
% Trucks(M+H)	0	0	0	0	1	0	0	1.6	0	0	0	0	0.8
Stopped Buses	0	0	0	0	1	0	0	1	0	0	0	0	2

Hourly Totals													
16:00-17:00	356	6	181	153	959	3	219	625	7	18	7	5	2539
16:15-17:15	349	5	188	167	973	6	242	612	10	23	12	8	2595
16:30-17:30	359	4	198	165	982	6	269	623	8	25	11	7	2657
16:45-17:45	351	2	191	165	1003	6	257	599	9	19	9	10	2621
17:00-18:00	337	2	180	151	1004	7	245	563	11	17	8	9	2534

INTERSECTION TURN MOVEMENT SUMMARY REPORT

File: LTRD



Peak Hour
16:30-17:30

Total Entry Volume
963

T=% Trucks By Approach

P = PHF By Approach

LOCATION:

BUXTON ST/TROUTDALE RD AT CHERRY PARK RD
TROUTDALE, OR

Date: **06/02/04** Day: **WED**
Time: **16:00 - 18:00**

Report Prepared for:
DKS ASSOCIATES

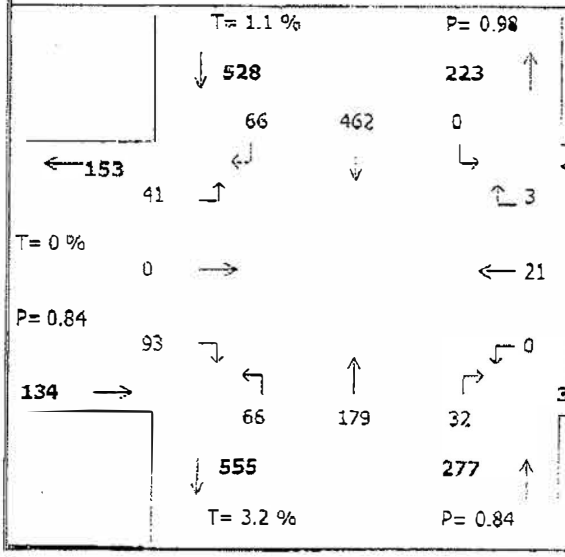
Surveyed By:
TRAFFIC SMITHY, INC
1225 NW Murray Blvd Suite 111
Portland, OR 97229
Phone: 503-641-6333 Fax: 503-643-8866

Report Reviewed by: JG

TIME PERIOD	EASTBOUND			SOUTHBOUND			NORTHBOUND			WESTBOUND			ALL
16:00-16:05	6	0	4	3	32	0	5	19	3	0	3	1	76
16:05-16:10	9	0	2	0	34	0	7	18	0	0	2	0	72
16:10-16:15	9	0	4	7	28	0	4	19	1	0	1	1	74
16:15-16:20	2	0	2	5	20	0	4	20	5	0	2	0	60
16:20-16:25	13	0	1	4	32	0	6	20	3	0	1	0	80
16:25-16:30	8	0	5	3	26	0	2	17	6	0	1	1	69
16:30-16:35	4	0	2	7	35	0	6	15	0	0	3	0	72
16:35-16:40	8	0	3	5	40	0	7	18	0	0	1	0	82
16:40-16:45	8	0	3	5	39	0	6	14	2	0	2	1	80
16:45-16:50	8	0	3	8	36	0	6	14	5	0	0	0	80
16:50-16:55	11	0	7	6	44	0	5	13	5	0	1	0	92
16:55-17:00	4	0	2	7	36	0	2	13	4	0	4	0	70
17:00-17:05	13	0	7	5	33	0	4	16	1	0	2	0	81
17:05-17:10	6	0	1	6	45	0	5	13	4	0	1	0	81
17:10-17:15	10	0	3	6	39	0	3	11	3	0	2	0	77
17:15-17:20	5	0	1	4	40	0	12	17	2	0	0	1	82
17:20-17:25	5	0	7	4	28	0	2	18	2	0	4	0	70
17:25-17:30	11	0	2	3	49	0	8	17	4	0	1	1	96
17:30-17:35	5	0	3	3	32	0	0	13	3	1	1	1	62
17:35-17:40	7	0	5	4	37	0	2	11	3	0	4	0	73
17:40-17:45	8	0	1	1	39	0	5	18	1	0	3	1	77
17:45-17:50	7	0	2	2	31	0	1	18	4	0	1	0	66
17:50-17:55	1	0	4	6	24	0	6	15	1	0	2	1	60
17:55-18:00	9	0	2	1	26	0	4	12		0	2	0	58
TOTALS	177	0	76	105	823	0	112	379	64	1	44	9	1790
PHF	0.8	0	0.64	0.79	0.93	0	0.75	0.86	0.57	0	0.75	0.38	0.96
% Trucks	0.6	0	0	0	1.9	0	0.9	3.4	0	0	0	0	1.7
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	
Pedestrians		0			4			0			3		

INTERSECTION TURN MOVEMENT PEAK HOUR REPORT

File: LTRD



Peak Hour
16:30-17:30

Total Entry Volume
963

T=% Trucks By Approach

P = PHF By Approach

LOCATION:

BUXTON ST/TROUTDALE RD AT CHERRY PARK RD
TROUTDALE, OR

Date: **06/02/04** Day: **WED**
Time: **16:00 - 18:00**

Report Prepared for:
DKS ASSOCIATES

Surveyed By:
TRAFFIC SMITHY, INC
1225 NW Murray Blvd Suite 111
Portland, OR 97229
Phone: 503-641-6333 Fax: 503-643-8866

Report Reviewed by: JG

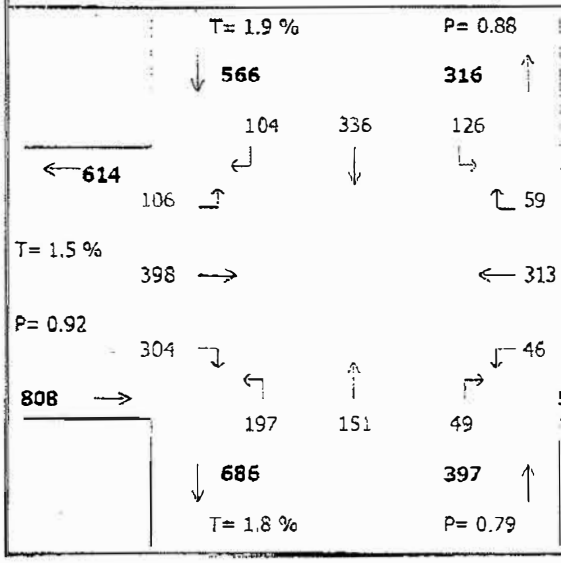
TIME PERIOD	EASTBOUND			SOUTHBOUND			NORTHBOUND			WESTBOUND			ALL
ALL VEHICLES													
16:30-16:45	20	0	8	17	114	0	19	47	2	0	6	1	234
16:45-17:00	23	0	12	21	114	0	13	40	14	0	5	0	242
17:00-17:15	29	0	11	17	117	0	12	40	8	0	5	0	239
17:15-17:30	21	0	10	11	117	0	22	52	8	0	5	2	248
LIGHT TRUCKS (SINGLE UNIT 2 AXLES)													
16:30-16:45	0	0	0	0	1	0	0	1	0	0	0	0	2
16:45-17:00	0	0	0	0	2	0	0	1	0	0	0	0	3
17:00-17:15	0	0	0	0	0	0	0	1	0	0	0	0	1
17:15-17:30	0	0	0	0	2	0	0	1	0	0	0	0	3
MEDIUM TRUCKS (SINGLE UNIT >2 AXLES)													
16:30-16:45	0	0	0	0	0	0	0	1	0	0	0	0	1
16:45-17:00	0	0	0	0	0	0	0	1	0	0	0	0	1
17:00-17:15	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15-17:30	0	0	0	0	1	0	1	1	0	0	0	0	3
HEAVY TRUCKS (SEMI-TRACTOR TRAILER)													
16:30-16:45	0	0	0	0	0	0	0	1	0	0	0	0	1
16:45-17:00	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00-17:15	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15-17:30	0	0	0	0	0	0	0	0	0	0	0	0	0
BICYCLES													
16:30-16:45	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45-17:00	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00-17:15	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15-17:30	0	0	0	0	0	0	0	0	0	0	0	0	0

PEDESTRIANS Crosswalk	SOUTH	WEST	EAST	NORTH	ALL
16:30-16:45	0	0	0	1	1
16:45-17:00	0	0	0	0	0
17:00-17:15	0	0	0	1	1
17:15-17:30	0	0	0	0	0

Peak Hour By Movement													
PHF	0.8	0	0.85	0.79	0.99	0	0.75	0.86	0.57	0	0.88	0.38	0.97
% Trucks(All)	0	0	0	0	1.3	0	1.5	4.5	0	0	0	0	1.6
% Trucks(M+H)	0	0	0	0	0.2	0	1.5	2.2	0	0	0	0	0.6
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Hourly Totals													
16:00-17:00	90	0	38	60	400	0	60	200	34	0	21	4	907
16:15-17:15	95	0	39	67	423	0	56	184	38	0	20	2	924
16:30-17:30	93	0	41	66	462	0	66	179	32	0	21	3	963
16:45-17:45	93	0	42	57	456	0	54	174	37	1	23	4	941
17:00-18:00	87	0	38	45	423	0	52	179	30	1	23	5	883

INTERSECTION TURN MOVEMENT SUMMARY REPORT

File: DEFG



Peak Hour
16:55-17:55

Total Entry Volume
2189

T=% Trucks By Approach

P = PHF By Approach

LOCATION:

TROUTDALE RD AT STARK ST
TROUTDALE, OR

Date: **05/25/04** Day: **TUE**
Time: **16:00 - 18:00**

Report Prepared for:
DKS ASSOCIATES

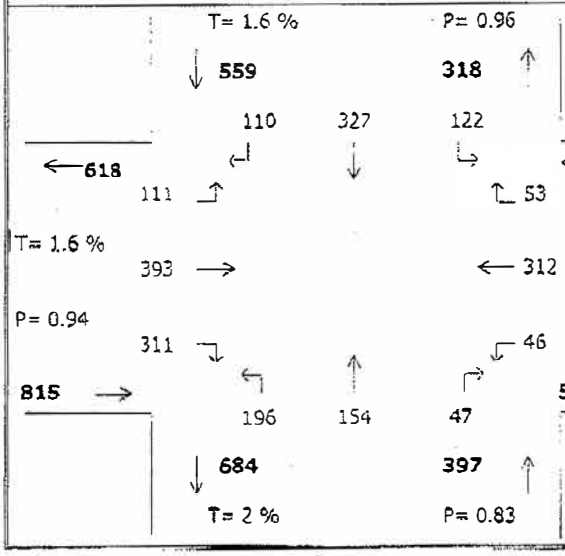
Surveyed By:
TRAFFIC SMITHY, INC
1225 NW Murray Blvd Suite 111
Portland, OR 97229
Phone: 503-641-6333 Fax: 503-643-8866

Report Reviewed by: JG

TIME PERIOD	EASTBOUND			SOUTHBOUND			NORTHBOUND			WESTBOUND			ALL
	↰	→	↱	↲	↓	↳	↰	↑	↱	↰	←	↱	
16:00-16:05	16	23	11	4	24	9	16	19	2	7	13	6	150
16:05-16:10	26	34	14	8	22	10	15	20	2	3	31	2	187
16:10-16:15	19	26	7	10	15	7	16	16	3	2	22	5	148
16:15-16:20	22	44	9	3	20	14	17	23	4	4	17	7	184
16:20-16:25	26	30	10	4	29	10	21	16	2	2	23	2	175
16:25-16:30	19	31	8	4	23	9	20	8	4	4	27	13	170
16:30-16:35	26	27	8	7	24	15	16	15	3	2	21	1	166
16:35-16:40	24	22	4	9	29	9	18	10	2	6	19	6	158
16:40-16:45	21	26	8	5	22	5	7	14	1	2	15	7	137
16:45-16:50	39	37	9	5	17	17	11	15	0	0	24	4	178
16:50-16:55	25	34	9	5	17	10	12	14	1	2	18	4	151
16:55-17:00	19	33	3	4	25	15	16	6	6	3	32	9	171
17:00-17:05	27	27	11	10	26	11	14	10	7	6	21	5	175
17:05-17:10	29	32	9	7	27	9	17	8	3	5	26	4	176
17:10-17:15	30	41	11	9	35	7	11	10	1	3	31	3	192
17:15-17:20	21	31	8	9	37	11	1 8	15	3	5	30	3	191
17:20-17:25	36	30	10	6	23	8	19	16	3	6	28	6	191
17:25-17:30	24	34	5	8	38	6	17	22	7	0	21	4	186
17:30-17:35	30	25	6	6	36	15	23	15	4	4	17	5	186
17:35-17:40	24	36	16	8	26	17	20	12	1	7	22	4	193
17:40-17:45	19	25	9	6	12	11	10	12	7	0	23	5	139
17:45-17:50	23	59	8	18	21	5	10	11	3	4	41	5	208
17:50-17:55	22	25	10	13	30	11	22	14	4	3	21	6	181
17:55-18:00	26	28	8	10	16	11	15	9	4	3	31	3	164
TOTALS	593	760	211	178	594	252	381	331	77	83	578	119	4157
PHF	0.84	0.83	0.8	0.7	0.84	0.73	0.82	0.71	0.77	0.82	0.88	0.82	0.95
% Trucks	1.3	1.2	3.3	2.8	1.7	1.6	1.8	1.8	1.3	4.8	2.1	3.4	1.9
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	
Pedestrians		23			15			21			7		

INTERSECTION TURN MOVEMENT PEAK HOUR REPORT

File: DEFG



LOCATION:

TROUTDALE RD AT STARK ST
TROUTDALE, OR

Date: **05/25/04** Day: **TUE**
Time: **16:00 - 18:00**

Report Prepared for:
DKS ASSOCIATES

Surveyed By:
TRAFFIC SMITHY, INC
1225 NW Murray Blvd Suite 111
Portland, OR 97229
Phone: 503-641-6333 Fax: 503-643-8866

Report Reviewed by: JG

TIME PERIOD	EASTBOUND ↴	EASTBOUND →	EASTBOUND ↱	SOUTHBOUND ↲	SOUTHBOUND ↓	SOUTHBOUND ↳	NORTHBOUND ↰	NORTHBOUND ↑	NORTHBOUND ↱	WESTBOUND ↴	WESTBOUND ←	WESTBOUND ↰	ALL
ALL VEHICLES													
17:00-17:15	86	100	31	26	88	27	42	28	11	14	78	12	543
17:15-17:30	81	95	23	23	98	25	54	53	13	11	79	13	568
17:30-17:45	73	86	31	20	74	43	53	39	12	11	62	14	518
17:45-18:00	71	112	26	41	67	27	47	34	11	10	93	14	553
LIGHT TRUCKS (SINGLE UNIT 2 AXLES)													
17:00-17:15	1	0	1	0	1	0	2	1	0	1	0	2	9
17:15-17:30	2	0	1	1	3	0	0	2	0	1	0	0	10
17:30-17:45	0	1	3	0	2	0	2	0	0	0	1	0	9
17:45-18:00	2	0	1	1	0	0	0	0	0	0	3	0	7
MEDIUM TRUCKS (SINGLE UNIT >2 AXLES)													
17:00-17:15	0	0	0	0	1	0	0	0	0	0	0	0	1
17:15-17:30	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30-17:45	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45-18:00	0	0	0	0	0	0	0	0	0	0	0	0	0
HEAVY TRUCKS (SEMI-TRACTOR TRAILER)													
17:00-17:15	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15-17:30	0	1	0	0	0	0	1	0	0	0	0	0	2
17:30-17:45	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45-18:00	0	0	0	0	0	0	0	0	0	0	0	0	0
BICYCLES													
17:00-17:15	0	0	0	0	0	0	0	0	0	0	1	0	1
17:15-17:30	1	0	0	0	0	0	0	0	0	0	0	0	1
17:30-17:45	0	0	0	0	0	0	0	2	0	0	0	0	2
17:45-18:00	1	0	0	0	0	0	0	0	1	0	1	0	3

PEDESTRIANS

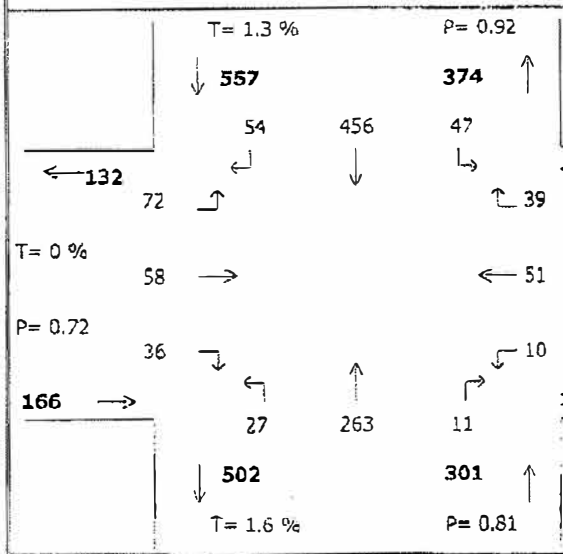
Crosswalk	SOUTH	WEST	EAST	NORTH	ALL
17:00-17:15	4	2	3	0	9
17:15-17:30	8	1	1	1	11
17:30-17:45	1	1	9	4	15
17:45-18:00	3	3	2	1	9

Peak Hour By Movement													
PHF	0.9	0.88	0.9	0.67	0.83	0.71	0.91	0.73	0.9	0.82	0.84	0.95	0.96
% Trucks(All)	1.6	0.5	5.4	1.8	2.1	0	2.6	1.9	0	4.3	1.3	3.8	1.7
% Trucks(M+H)	0	0.3	0	0	0.3	0	0.5	0	0	0	0	0	0.1
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0

Hourly Totals													
16:00-17:00	282	367	100	68	267	130	185	177	30	37	266	66	1975
16:15-17:15	307	384	99	72	294	131	180	150	34	39	278	65	2033
16:30-17:30	321	374	95	84	320	123	176	156	37	40	290	56	2072
16:45-17:45	323	385	106	83	319	137	188	155	43	41	293	56	2129
17:00-18:00	311	393	111	110	327	122	196	154	47	46	312	53	2182

INTERSECTION TURN MOVEMENT SUMMARY REPORT

File: LIEO



Peak Hour
16:20-17:20

Total Entry Volume
1124

T=% Trucks By Approach

P = PHF By Approach

LOCATION:

TROUTDALE RD AT 17TH ST/COCHRANE DR/SWEETBRIAR RD
TROUTDALE, OR

Date: **05/25/04** Day: **TUE**
Time: **16:00 - 18:00**

Report Prepared for:
DKS ASSOCIATES

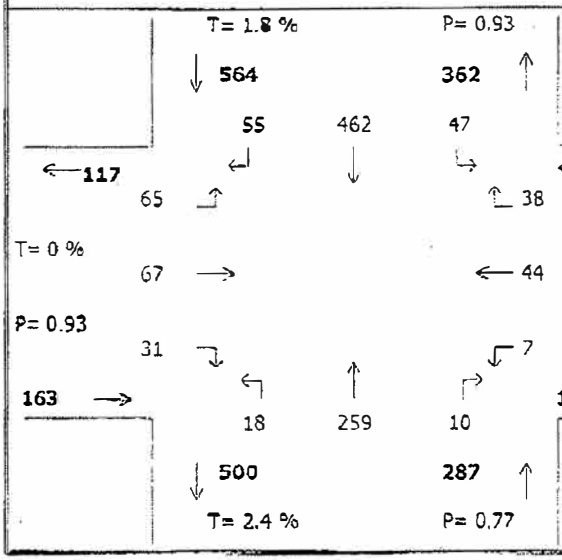
Surveyed By:
TRAFFIC SMITHY, INC
1225 NW Murray Blvd Suite 111
Portland, OR 97229
Phone: 503-641-6333 Fax: 503-643-8866

Report Reviewed by: JG

TIME PERIOD	EASTBOUND			SOUTHBOUND			NORTHBOUND			WESTBOUND			ALL
16:00-16:05	3	7	2	7	38	3	1	16	1	1	7	1	87
16:05-16:10	0	8	3	4	39	2	0	15	0	0	1	1	73
16:10-16:15	0	5	5	6	27	5	0	25	0	0	5	4	82
16:15-16:20	2	5	3	4	29	3	0	16	1	0	2	4	69
16:20-16:25	4	6	9	3	42	6	2	24	1	1	4	4	106
16:25-16:30	3	3	7	2	51	5	3	25	1	1	3	3	107
16:30-16:35	1	2	0	4	37	1	0	14	1	1	1	4	66
16:35-16:40	4	9	4	5	31	5	1	25	1	1	5	2	93
16:40-16:45	2	9	13	4	44	5	2	19	0	1	1	5	105
16:45-16:50	1	6	7	9	43	3	4	32	1	1	4	3	114
16:50-16:55	10	3	7	4	35	4	1	27	2	0	5	4	102
16:55-17:00	1	4	5	3	46	5	4	21	1	0	6	3	99
17:00-17:05	1	6	5	7	21	3	2	22	2	1	1	3	74
17:05-17:10	2	4	4	2	31	4	1	17	1	1	5	0	72
17:10-17:15	0	3	4	8	39	1	3	18	0	2	8	4	90
17:15-17:20	7	3	7	3	36	5	4	19	0	0	8	4	96
17:20-17:25	4	6	3	4	37	3	6	26	1	0	3	0	93
17:25-17:30	5	7	3	5	33	6	2	10	2	3	6	2	84
17:30-17:35	2	6	5	6	36	4	0	20	4	2	3	4	92
17:35-17:40	2	13	3	1	28	5	0	22	4	2	8	2	90
17:40-17:45	2	11	4	1	31	3	1	25	4	0	5	2	89
17:45-17:50	2	3	5	8	26	3	0	14	4	1	4	1	71
17:50-17:55	5	6	2	8	24	1	3	17	6	0	4	2	78
17:55-18:00	5	7	1	2	17	0	0	13	6	3	6	2	62
TOTALS	68	142	111	110	821	85	40	482	44	22	105	69	2094
PHF	0.69	0.6	0.67	0.75	0.88	0.9	0.75	0.82	0.55	0.63	0.61	0.81	0.88
% Trucks	0	0	0	0.9	1.3	1.2	0	1.9	0	0	0	0	1.1
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	
Pedestrians		1			0			0			0		

INTERSECTION TURN MOVEMENT PEAK HOUR REPORT

File: LIEO



Peak Hour
16:00-17:00

Total Entry Volume
1103

T=% Trucks By Approach

P = PHF By Approach

LOCATION:

TROUTDALE RD AT 17TH ST/COCHRANE DR/SWEETBRIAR RD
TROUTDALE, OR

Date: **05/25/04** Day: **TUE**
Time: **16:00 - 18:00**

Report Prepared for:
DKS ASSOCIATES

Surveyed By:
TRAFFIC SMITHY, INC
1225 NW Murray Blvd Suite 111
Portland, OR 97229
Phone: 503-641-6333 Fax: 503-643-8866

Report Reviewed by: JG

TIME PERIOD	EASTBOUND ↴	EASTBOUND →	EASTBOUND ↱	SOUTHBOUND ↵	SOUTHBOUND ↓	SOUTHBOUND ↳	NORTHBOUND ↰	NORTHBOUND ↑	NORTHBOUND ↱	WESTBOUND ↶	WESTBOUND ←	WESTBOUND ↰	ALL
ALL VEHICLES													
16:00-16:15	3	20	10	17	104	10	1	56	1	1	13	6	242
16:15-16:30	9	14	19	9	122	14	5	65	3	2	9	11	282
16:30-16:45	7	20	17	13	112	11	3	58	2	3	7	11	264
16:45-17:00	12	13	19	16	124	12	9	80	4	1	15	10	315
LIGHT TRUCKS (SINGLE UNIT 2 AXLES)													
16:00-16:15	0	0	0	0	1	0	0	0	0	0	0	0	1
16:15-16:30	0	0	0	0	2	0	0	4	0	0	0	0	6
16:30-16:45	0	0	0	1	3	0	0	2	0	0	0	0	6
16:45-17:00	0	0	0	0	1	0	0	1	0	0	0	0	2
MEDIUM TRUCKS (SINGLE UNIT >2 AXLES)													
16:00-16:15	0	0	0	0	1	0	0	0	0	0	0	0	1
16:15-16:30	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30-16:45	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45-17:00	0	0	0	0	0	0	0	0	0	0	0	0	0
HEAVY TRUCKS (SEMI-TRACTOR TRAILER)													
16:00-16:15	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15-16:30	0	0	0	0	1	0	0	0	0	0	0	0	1
16:30-16:45	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45-17:00	0	0	0	0	0	0	0	0	0	0	0	0	0
BICYCLES													
16:00-16:15	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15-16:30	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30-16:45	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45-17:00	0	1	0	0	0	0	0	1	0	0	0	0	2

PEDESTRIANS

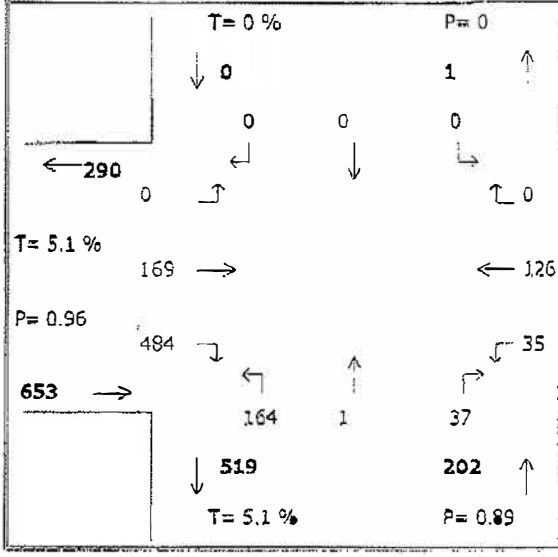
Crosswalk	SOUTH	WEST	EAST	NORTH	ALL
16:00-16:15	0	0	0	0	0
16:15-16:30	0	0	0	0	0
16:30-16:45	0	0	0	0	0
16:45-17:00	0	0	0	0	0

Peak Hour By Movement													
PHF	0.65	0.84	0.86	0.81	0.93	0.84	0.5	0.81	0.63	0.58	0.73	0.86	0.88
% Trucks(All)	0	0	0	1.8	1.9	0	0	2.7	0	0	0	0	1.5
% Trucks(M+H)	0	0	0	0	0.4	0	0	0	0	0	0	0	0.2
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0

Hourly Totals													
16:00-17:00	31	67	65	55	462	47	18	259	10	7	44	38	1103
16:15-17:15	31	60	68	55	449	45	23	260	12	10	45	39	1097
16:30-17:30	38	62	62	58	433	45	30	250	12	11	53	34	1088
16:45-17:45	37	72	57	53	416	46	28	259	22	12	62	31	1095
17:00-18:00	37	75	46	55	359	38	22	223	34	15	61	26	991

INTERSECTION TURN MOVEMENT SUMMARY REPORT

File: CABL06



LOCATION:

BUXTON ST AT HISTORIC COLUMBIA RIVER HIGHWAY
TROUTDALE, OR

Date: **05/26/04** Day: **WED**
Time: **16:00 - 18:00**

Report Prepared for:
DKS ASSOCIATES

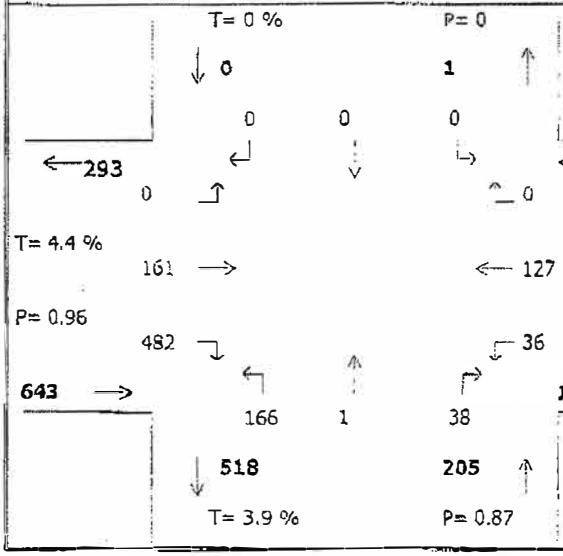
Surveyed By:
TRAFFIC SMITHY, INC
1225 NW Murray Blvd Suite 111
Portland, OR 97229
Phone: 503-641-6333 Fax: 503-643-8866

Report Reviewed by: JG

	EASTBOUND			SOUTHBOUND			NORTHBOUND			WESTBOUND			
TIME PERIOD	↰	→	↱	↲	↓	↳	↰	↑	↱	↰	←	↱	ALL
16:00-16:05	27	11	0	0	0	0	19	0	5	4	16	0	82
16:05-16:10	30	12	0	0	0	0	14	0	0	4	10	0	70
16:10-16:15	32	9	0	0	0	0	14	0	3	1	6	0	65
16:15-16:20	40	12	0	0	0	0	13	0	2	4	10	0	81
16:20-16:25	31	16	0	0	0	0	12	0	3	2	14	0	78
16:25-16:30	31	15	0	0	0	0	15	0	4	5	13	0	83
16:30-16:35	30	16	0	0	0	0	10	0	0	3	7	0	66
16:35-16:40	34	11	0	0	0	0	11	0	3	1	11	0	71
16:40-16:45	41	19	0	0	0	0	14	0	1	2	9	0	86
16:45-16:50	31	16	0	0	0	0	12	0	2	1	13	0	75
16:50-16:55	41	15	0	0	0	0	15	0	5	4	6	0	86
16:55-17:00	47	16	0	0	0	0	15	0	2	1	9	0	90
17:00-17:05	33	15	0	0	0	0	15	0	1	3	14	0	81
17:05-17:10	41	15	0	0	0	0	15	0	3	4	13	0	91
17:10-17:15	50	14	0	0	0	0	12	0	2	2	9	0	89
17:15-17:20	40	10	0	0	0	0	14	0	2	6	12	0	84
17:20-17:25	26	14	0	0	0	0	12	0	3	2	10	0	67
17:25-17:30	49	8	0	0	0	0	12	0	4	4	10	0	87
17:30-17:35	43	13	0	0	0	0	15	1	4	3	10	0	89
17:35-17:40	42	14	0	0	0	0	13	0	8	3	11	0	91
17:40-17:45	39	11	0	0	0	0	16	0	2	3	10	0	81
17:45-17:50	37	19	0	0	0	0	9	0	3	1	5	0	74
17:50-17:55	26	10	0	0	0	0	10	0	5	3	9	0	63
17:55-18:00	40	12	0	0	0	0	15	0	3	7	9	0	86
TOTALS	881	323	0	0	0	0	322	1	70	73	246	0	1916
PHF	0.9	0.85	0	0	0	0	0.91	0.25	0.58	0.73	0.88	0	0.95
% Trucks	5.1	5	0	0	0	0	6.2	0	0	2.7	6.9	0	5.2
Stopped Buses	0	0	0	0	0	0	0	1	0	0	0	0	
Pedestrians		9			7			10			45		

INTERSECTION TURN MOVEMENT PEAK HOUR REPORT

File: CABL06



LOCATION:

BUXTON ST AT HISTORIC COLUMBIA RIVER HIGHWAY
TROUTDALE, OR

Date: **05/26/04** Day: **WED**
Time: **16:00 - 18:00**

Report Prepared for:
DKS ASSOCIATES

Surveyed By:
TRAFFIC SMITHY, INC
1225 NW Murray Blvd Suite 111
Portland, OR 97229
Phone: 503-641-6333 Fax: 503-643-8866

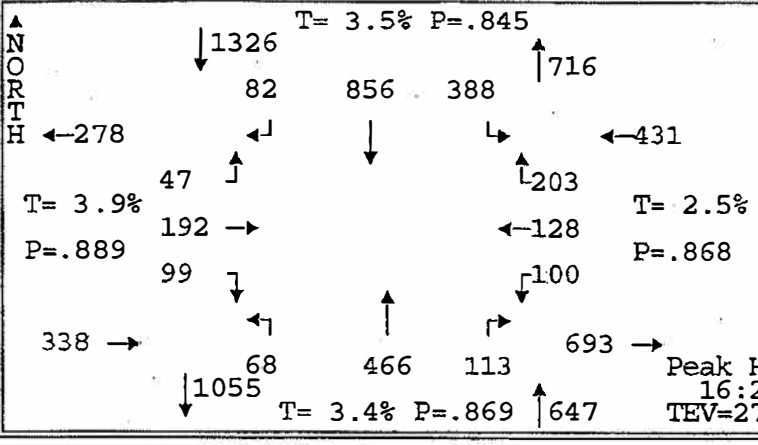
Report Reviewed by: JG

TIME PERIOD	EASTBOUND			SOUTHBOUND			NORTHBOUND			WESTBOUND			ALL
ALL VEHICLES													
16:45-17:00	119	47	0	0	0	0	42	0	9	6	28	0	251
17:00-17:15	124	44	0	0	0	0	42	0	6	9	36	0	261
17:15-17:30	115	32	0	0	0	0	38	0	9	12	32	0	238
17:30-17:45	124	38	0	0	0	0	44	1	14	9	31	0	261
LIGHT TRUCKS (SINGLE UNIT 2 AXLES)													
16:45-17:00	4	3	0	0	0	0	1	0	0	0	2	0	10
17:00-17:15	3	2	0	0	0	0	1	0	0	0	2	0	8
17:15-17:30	7	0	0	0	0	0	3	0	0	1	1	0	12
17:30-17:45	3	3	0	0	0	0	1	0	0	0	2	0	9
MEDIUM TRUCKS (SINGLE UNIT >2 AXLES)													
16:45-17:00	0	0	0	0	0	0	0	0	0	0	1	0	1
17:00-17:15	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15-17:30	1	1	0	0	0	0	2	0	0	0	2	0	6
17:30-17:45	1	0	0	0	0	0	0	0	0	0	1	0	2
HEAVY TRUCKS (SEMI-TRACTOR TRAILER)													
16:45-17:00	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00-17:15	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15-17:30	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30-17:45	0	0	0	0	0	0	0	0	0	0	0	0	0
BICYCLES													
16:45-17:00	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00-17:15	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15-17:30	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30-17:45	0	0	0	0	0	0	0	0	0	0	0	0	0

PEDESTRIANS Crosswalk	SOUTH	WEST	EAST	NORTH	ALL
16:45-17:00	2	2	2	10	16
17:00-17:15	1	3	0	6	10
17:15-17:30	1	0	0	8	9
17:30-17:45	1	0	2	0	3

Peak Hour By Movement													
PHF	0.97	0.86	0	0	0	0	0.94	0.25	0.68	0.75	0.88	0	0.97
% Trucks(All)	3.9	5.6	0	0	0	0	4.8	0	0	2.8	8.7	0	4.7
% Trucks(M+H)	0.4	0.6	0	0	0	0	1.2	0	0	0	3.1	0	0.9
Stopped Buses	0	0	0	0	0	0	0	1	0	0	0	0	1
Hourly Totals													
16:00-17:00	415	168	0	0	0	0	164	0	30	32	124	0	933
16:15-17:15	450	180	0	0	0	0	159	0	28	32	128	0	977
16:30-17:30	463	169	0	0	0	0	157	0	28	33	123	0	973
16:45-17:45	482	161	0	0	0	0	166	1	38	36	127	0	1011
17:00-18:00	466	155	0	0	0	0	158	1	40	41	122	0	983

INTERSECTION TURN MOVEMENT COUNT SUMMARY REPORT
257TH DRIVE AT HISTORIC COLUMBIA RIVER HIGHWAY



DATE OF COUNT: 06/13/02
DAY OF WEEK: Thu
TIME STARTED: 16:00
TIME ENDED: 18:00

TEV=TOTAL ENTRY VOLUME
T=%TRUCKS BY APPROACH
P=PHF BY APPROACH

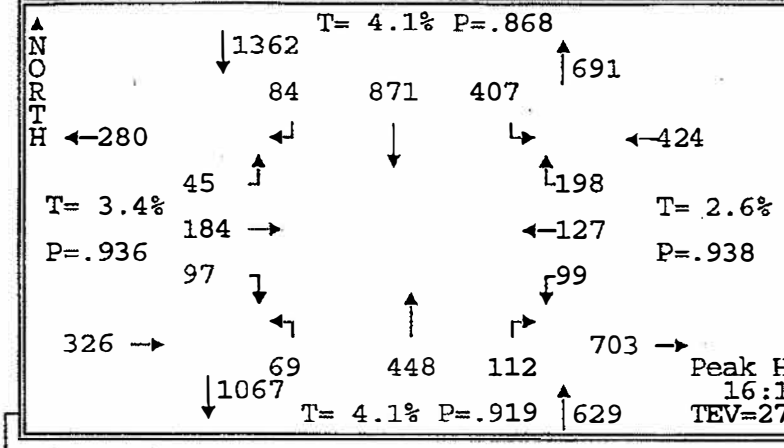
DLHS

Peak Hour
16:20-17:20
TEV=2742

Traffic Smithy
(503) 641-6333

TIME PERIOD FROM - TO	EAST BOUND ↓	EAST BOUND →	EAST BOUND ↑	SOUTH BOUND ↵	SOUTH BOUND ↓	SOUTH BOUND ↳	NORTH BOUND ↰	NORTH BOUND ↑	NORTH BOUND ↱	WEST BOUND ↓	WEST BOUND ←	WEST BOUND ↑	ALL
16:00-16:05	6	11	1	8	53	27	4	43	5	15	7	20	200
16:05-16:10	6	14	4	5	78	25	5	34	8	6	8	16	209
16:10-16:15	5	11	2	9	78	38	11	49	15	12	17	15	262
16:15-16:20	5	20	3	5	73	39	10	33	9	8	8	17	230
16:20-16:25	15	16	3	6	55	35	6	48	8	10	8	17	227
16:25-16:30	9	13	3	5	62	26	6	43	8	11	7	25	218
16:30-16:35	11	14	2	5	81	35	12	48	7	6	9	16	246
16:35-16:40	10	11	2	7	77	44	8	40	10	7	13	12	241
16:40-16:45	8	14	7	6	61	34	4	30	10	8	11	16	209
16:45-16:50	4	10	4	8	81	30	4	32	9	9	17	18	226
16:50-16:55	7	18	6	5	78	30	5	36	7	4	5	12	213
16:55-17:00	5	16	4	4	54	24	1	40	14	9	10	18	199
17:00-17:05	9	20	2	9	68	26	6	44	13	4	10	15	226
17:05-17:10	4	10	7	11	87	38	6	35	6	6	13	14	237
17:10-17:15	10	22	2	13	94	46	1	19	11	17	16	18	269
17:15-17:20	7	28	5	3	58	20	9	51	10	9	9	22	231
17:20-17:25	3	6	2	7	61	38	9	41	9	3	15	16	210
17:25-17:30	1	14	4	5	86	34	8	31	11	10	10	18	232
17:30-17:35	5	8	2	6	74	39	7	33	0	13	14	18	219
17:35-17:40	1	15	1	3	49	40	5	43	9	11	11	18	206
17:40-17:45	5	12	1	6	69	29	8	42	10	4	9	19	214
17:45-17:50	3	8	3	5	58	33	6	35	10	8	12	18	199
17:50-17:55	3	24	4	4	69	28	7	33	4	14	6	15	211
17:55-18:00	4	13	1	6	75	26	3	27	15	7	15	15	207
Total Survey	146	348	75	151	1679	784	151	910	218	211	260	408	5341
PHF	.71	.8	.69	.62	.86	.86	.65	.84	.83	.78	.78	.88	.930
% Trucks	4.1	3.7	4	6	3.9	2.3	1.3	4.5	.5	.5	3.8	2.7	3.4
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	
Peds	0	8	0	0	1	0	0	4	0	0	6	0	
Hourly Totals													
16:00-17:00	91	168	41	73	831	387	76	476	110	105	120	202	2680
16:15-17:15	97	184	45	84	871	407	69	448	112	99	127	198	2741
16:30-17:30	79	183	47	83	886	399	73	447	117	92	138	195	2739
16:45-17:45	61	179	40	80	859	394	69	447	109	99	139	206	2682
17:00-18:00	55	180	34	78	848	397	75	434	108	106	140	206	2661

INTERSECTION TURN MOVEMENT COUNT PEAK HOUR REPORT
257TH DRIVE AT HISTORIC COLUMBIA RIVER HIGHWAY



DATE OF COUNT: 06/13/02
DAY OF WEEK: Thu
TIME STARTED: 16:00
TIME ENDED: 18:00

TEV=TOTAL ENTRY VOLUME
T=%TRUCKS BY APPROACH
P=PHF BY APPROACH

DLHS

Peak Hour
16:15-17:15
TEV=2741

Traffic Smithy
(503)641-6333

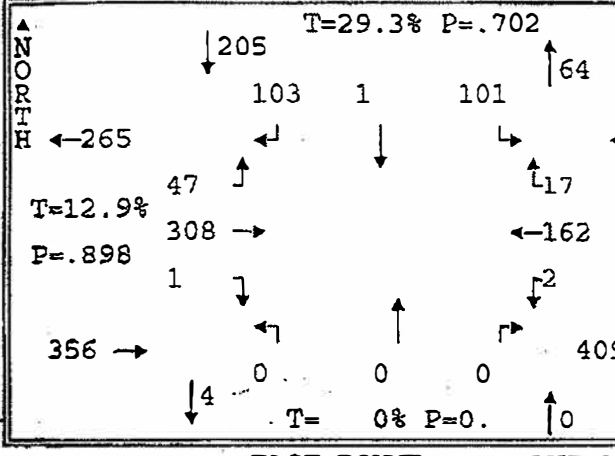
TIME PERIOD FROM - TO	EAST BOUND ↓	EAST BOUND →	EAST BOUND ↑	SOUTH BOUND ↵	SOUTH BOUND ↓	SOUTH BOUND ↳	NORTH BOUND ↰	NORTH BOUND ↑	NORTH BOUND ↱	WEST BOUND ↓	WEST BOUND ←	WEST BOUND ↑	ALL
ALL VEHICLES													
16:15-16:30	29	49	9	16	190	100	22	124	25	29	23	59	675
16:30-16:45	29	39	11	18	219	113	24	118	27	21	33	44	696
16:45-17:00	16	44	14	17	213	84	10	108	30	22	32	48	638
17:00-17:15	23	52	11	33	249	110	13	98	30	27	39	47	732
LIGHT TRUCKS (SINGLE UNIT 2 AXLES)													
16:15-16:30	0	1	0	0	5	3	0	3	0	0	2	0	14
16:30-16:45	1	3	0	2	5	3	1	3	0	0	1	3	22
16:45-17:00	1	1	1	0	8	0	0	2	0	0	1	1	15
17:00-17:15	0	0	0	1	4	4	0	2	1	0	1	2	15
MEDIUM TRUCKS (SINGLE UNIT > 2 AXLES)													
16:15-16:30	1	0	0	1	2	0	0	0	0	0	0	0	4
16:30-16:45	0	0	0	1	1	0	0	0	0	0	0	0	2
16:45-17:00	0	0	1	0	0	0	0	1	0	0	0	0	2
17:00-17:15	0	0	0	0	0	0	0	0	0	0	0	0	0
HEAVY TRUCKS (SEMI-TRACTOR TRAILER)													
16:15-16:30	0	0	0	1	2	0	1	5	0	0	0	0	9
16:30-16:45	0	0	0	0	8	0	0	4	0	0	0	0	12
16:45-17:00	0	0	0	0	2	0	0	3	0	0	0	0	5
17:00-17:15	0	0	1	1	1	1	0	0	0	0	0	0	4
BICYCLES													
16:15-16:30	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30-16:45	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45-17:00	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00-17:15	0	0	0	0	0	0	0	0	0	0	0	0	0

PEDESTRIANS	CROSSWALK USEAGE				ALL
	SOUTH	WEST	EAST	NORTH	
16:15-16:30	0	0	2	1	3
16:30-16:45	1	0	0	0	1
16:45-17:00	0	0	0	0	0
17:00-17:15	0	0	0	1	1

Peak Hour by Movement													
PHF	.84	.88	.8	.64	.87	.9	.72	.9	.93	.85	.81	.84	.936
% Trucks(all)	3.1	2.7	6.7	8.3	4.4	2.7	2.9	5.1	.9	0	3.9	3	3.8
% Trucks(M+H)	1	0	4.4	4.8	1.8	.2	1.4	2.9	0	0	0	0	1.4
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	

Hourly Totals													
16:00-17:00	91	168	41	73	831	387	76	476	110	105	120	202	2680
16:15-17:15	97	184	45	84	871	407	69	448	112	99	127	198	2741
16:30-17:30	79	183	47	83	886	399	73	447	117	92	138	195	2739
16:45-17:45	61	179	40	80	859	394	69	447	109	99	139	206	2682
17:00-18:00	55	180	34	78	848	397	75	434	108	106	140	206	2661

INTERSECTION TURN MOVEMENT COUNT SUMMARY REPORT
SUNDIAL ROAD AT MARINE DRIVE



DATE OF COUNT: 10/17/01
DAY OF WEEK: Wed
TIME STARTED: 16:00
TIME ENDED: 18:00

TEV=TOTAL ENTRY VOLUME
T=%TRUCKS BY APPROACH
P=PHF BY APPROACH

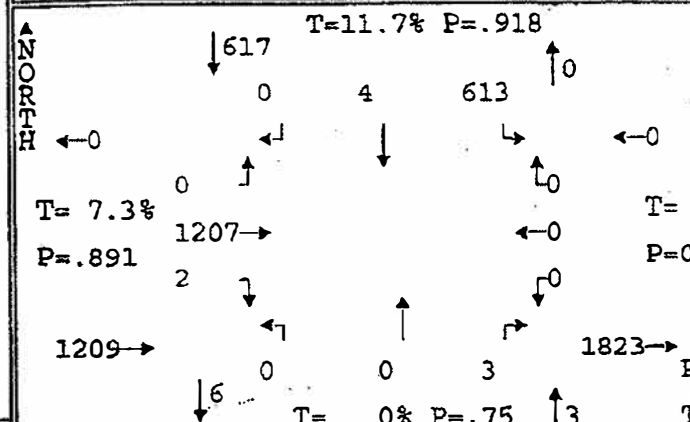
TSAH

Peak Hour
16:00-17:00
TEV=742

Traffic Smithy
(503) 641-6333

TIME PERIOD FROM - TO	EAST BOUND ↓	EAST BOUND →	EAST BOUND ↑	SOUTH BOUND ↲	SOUTH BOUND ↓	SOUTH BOUND ↳	NORTH BOUND ↰	NORTH BOUND ↑	NORTH BOUND ↱	WEST BOUND ↓	WEST BOUND ←	WEST BOUND ↑	ALL
16:00-16:05	0	27	7	9	0	2	0	0	0	0	10	2	57
16:05-16:10	0	27	4	18	0	13	0	0	0	0	16	3	81
16:10-16:15	0	32	2	5	0	17	0	0	0	0	19	0	75
16:15-16:20	0	21	4	9	0	11	0	0	0	0	19	2	66
16:20-16:25	0	21	8	7	0	13	0	0	0	1	12	1	63
16:25-16:30	0	27	4	9	0	11	0	0	0	0	15	0	66
16:30-16:35	0	26	1	10	0	9	0	0	0	0	13	0	59
16:35-16:40	0	19	3	10	0	9	0	0	0	1	7	3	52
16:40-16:45	0	29	2	8	0	1	0	0	0	0	13	1	54
16:45-16:50	0	25	6	8	0	5	0	0	0	0	13	1	58
16:50-16:55	0	26	6	4	0	4	0	0	0	0	14	0	54
16:55-17:00	1	28	0	6	1	6	0	0	0	0	11	4	57
17:00-17:05	0	18	6	3	0	11	0	0	0	0	9	2	49
17:05-17:10	0	24	2	5	0	11	0	0	0	1	10	0	53
17:10-17:15	0	37	5	4	0	10	0	0	0	2	18	1	77
17:15-17:20	0	24	4	3	0	5	0	0	0	0	14	2	52
17:20-17:25	0	34	1	5	0	4	0	0	0	0	10	1	55
17:25-17:30	0	35	3	1	0	8	0	0	0	2	10	0	59
17:30-17:35	0	20	1	5	0	7	0	0	0	1	11	0	45
17:35-17:40	0	30	3	1	0	3	0	0	0	0	13	2	52
17:40-17:45	0	17	0	4	0	4	0	0	0	0	16	0	41
17:45-17:50	0	25	0	4	0	3	0	0	0	0	10	0	42
17:50-17:55	0	19	1	2	0	3	0	0	0	0	11	1	37
17:55-18:00	0	15	1	0	0	3	0	0	0	0	7	0	26
Total Survey	1	606	74	140	1	173	0	0	0	8	301	26	1330
PHF	.25	.9	.73	.8	.25	.62	0	0	0	.5	.75	.85	.835
% Trucks	0	7.1	60.8	30.7	0	28.3	0	0	0	37.5	13.6	57.7	18
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	
Peds	0	0	0	0	0	0	0	0	0	0	0	0	
Hourly Totals													
16:00-17:00	1	308	47	103	1	101	0	0	0	2	162	17	742
16:15-17:15	1	301	47	83	1	101	0	0	0	5	154	15	708
16:30-17:30	1	325	39	67	1	83	0	0	0	6	142	15	679
16:45-17:45	1	318	37	49	1	78	0	0	0	6	149	13	652
17:00-18:00	0	298	27	37	0	72	0	0	0	6	139	9	588

INTERSEC ON TURN MOVEMENT COUNT SUMMA REPORT
I-84 EB OFFRAMP AT MARINE DRIVE



DATE OF COUNT: 11/07/01
DAY OF WEEK: Wed
TIME STARTED: 16:36
TIME ENDED: 18:06

TEV=TOTAL ENTRY VOLUME
T=%TRUCKS BY APPROACH
P=PHF BY APPROACH

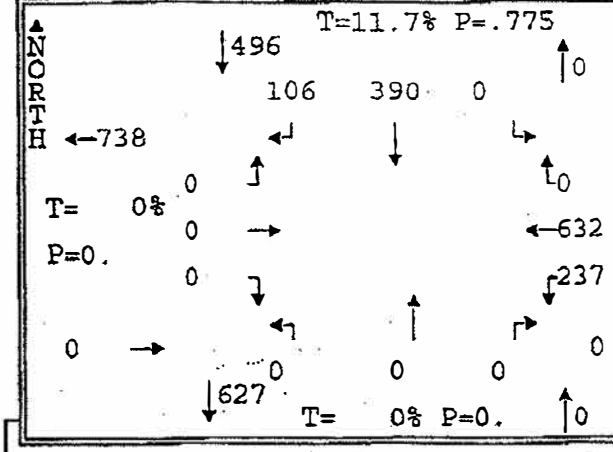
JLDL

Peak Hour
16:41-17:41
TEV=1829

Traffic Smithy
(503) 641-6333

TIME PERIOD FROM - TO	EAST BOUND ↓	EAST BOUND →	EAST BOUND ↑	SOUTH BOUND ↵	SOUTH BOUND ↓	SOUTH BOUND ↳	NORTH BOUND ↰	NORTH BOUND ↑	NORTH BOUND ↱	WEST BOUND ↓	WEST BOUND ←	WEST BOUND ↑	ALL
16:36-16:41	0	90	0	0	0	48	0	0	1	0	0	0	139
16:41-16:46	0	98	0	0	0	45	0	0	0	0	0	0	143
16:46-16:51	0	99	0	0	0	45	0	0	0	0	0	0	144
16:51-16:56	1	96	0	0	1	55	0	0	1	0	0	0	154
16:56-17:01	0	89	0	0	0	61	0	0	0	0	0	0	150
17:01-17:06	0	100	0	0	1	45	0	0	0	0	0	0	146
17:06-17:11	0	112	0	0	0	55	0	0	0	0	0	0	167
17:11-17:16	1	106	0	0	0	55	0	0	1	0	0	0	163
17:16-17:21	0	120	0	0	0	49	0	0	0	0	0	0	169
17:21-17:26	0	92	0	0	0	61	0	0	0	0	0	0	153
17:26-17:31	0	94	0	0	0	58	0	0	1	0	0	0	153
17:31-17:36	0	92	0	0	1	33	0	0	0	0	0	0	126
17:36-17:41	0	109	0	0	1	51	0	0	0	0	0	0	161
17:41-17:46	2	97	0	0	3	32	0	0	0	0	0	0	134
17:46-17:51	0	88	0	0	0	50	0	0	1	0	0	0	139
17:51-17:56	1	94	0	0	0	44	0	0	0	0	0	0	139
17:56-18:01	0	79	0	0	2	43	0	0	1	0	0	0	125
18:01-18:06	0	74	0	0	0	38	0	0	1	0	0	0	113
Total Survey	5	1729	0	0	9	868	0	0	7	0	0	0	2618
PHF	.5	.89	0	0	.5	.91	0	0	.75	0	0	0	.916
% Trucks	0	7.3	0	0	11.1	11.8	0	0	0	0	0	0	8.7
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	
Peds	0	0	0	0	0	0	0	0	0	0	0	0	
Hourly Totals													
16:36-17:36	2	1188	0	0	3	610	0	0	4	0	0	0	1807
16:51-17:51	4	1195	0	0	7	605	0	0	4	0	0	0	1815
17:06-18:06	4	1157	0	0	7	569	0	0	5	0	0	0	1742

INTERSECTION TURN MOVEMENT COUNT SUMMARY REPORT
I-84 WB ON RAMP AT MARINE DRIVE



DATE OF COUNT: 11/07/01
DAY OF WEEK: Wed
TIME STARTED: 16:00
TIME ENDED: 18:00

TEV=TOTAL ENTRY VOLUME
T=%TRUCKS BY APPROACH
P=PHF BY APPROACH

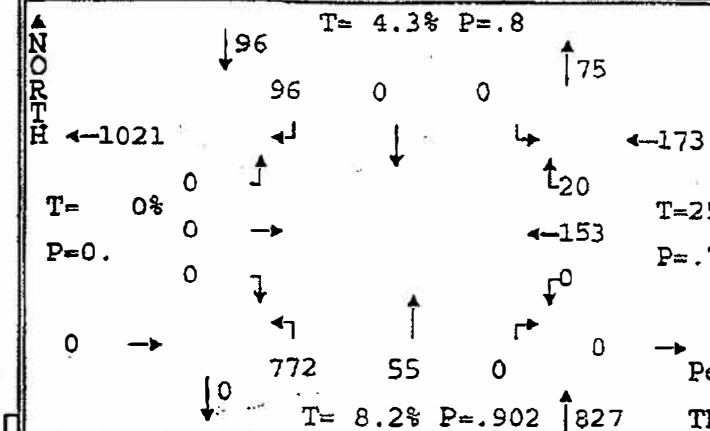
CABP

Peak Hour
16:05-17:05
TEV=1365

Traffic Smithy
(503) 641-6333

TIME PERIOD FROM - TO	EAST BOUND ↓	EAST BOUND →	EAST BOUND ↑	SOUTH BOUND ↵	SOUTH BOUND ↓	SOUTH BOUND ↳	NORTH BOUND ↰	NORTH BOUND ↑	NORTH BOUND ↱	WEST BOUND ↓	WEST BOUND ←	WEST BOUND ↑	ALL
16:00-16:05	0	0	0	6	13	0	0	0	0	16	41	0	76
16:05-16:10	0	0	0	18	37	0	0	0	0	15	65	0	135
16:10-16:15	0	0	0	16	34	0	0	0	0	19	53	0	122
16:15-16:20	0	0	0	12	43	0	0	0	0	20	45	0	120
16:20-16:25	0	0	0	0	30	0	0	0	0	26	63	0	119
16:25-16:30	0	0	0	6	22	0	0	0	0	10	57	0	95
16:30-16:35	0	0	0	9	28	0	0	0	0	28	46	0	111
16:35-16:40	0	0	0	15	36	0	0	0	0	28	55	0	134
16:40-16:45	0	0	0	12	23	0	0	0	0	15	45	0	95
16:45-16:50	0	0	0	1	36	0	0	0	0	14	45	0	96
16:50-16:55	0	0	0	3	29	0	0	0	0	19	61	0	112
16:55-17:00	0	0	0	6	44	0	0	0	0	24	49	0	123
17:00-17:05	0	0	0	8	28	0	0	0	0	19	48	0	103
17:05-17:10	0	0	0	11	32	0	0	0	0	25	55	0	123
17:10-17:15	0	0	0	9	37	0	0	0	0	16	43	0	105
17:15-17:20	0	0	0	8	25	0	0	0	0	19	65	0	117
17:20-17:25	0	0	0	7	42	0	0	0	0	18	61	0	128
17:25-17:30	0	0	0	4	36	0	0	0	0	21	51	0	112
17:30-17:35	0	0	0	8	21	0	0	0	0	21	44	0	94
17:35-17:40	0	0	0	4	34	0	0	0	0	17	45	0	100
17:40-17:45	0	0	0	6	22	0	0	0	0	14	39	1	82
17:45-17:50	0	0	0	5	28	1	0	0	0	23	50	0	107
17:50-17:55	0	0	0	3	25	0	0	0	0	22	45	0	95
17:55-18:00	0	0	0	3	15	0	0	0	0	25	44	0	87
Total Survey	0	0	0	180	720	1	0	0	0	474	1215	1	2591
PHF	0	0	0	.58	.86	0	0	0	0	.83	.95	0	.905
% Trucks	0	0	0	22.8	8.8	100	0	0	0	19.6	7.7	0	11.3
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	
Peds	0	0	0	0	1	0	0	1	0	0	0	0	
Hourly Totals													
16:00-17:00	0	0	0	104	375	0	0	0	0	234	625	0	1338
16:15-17:15	0	0	0	92	388	0	0	0	0	244	612	0	1336
16:30-17:30	0	0	0	93	396	0	0	0	0	246	624	0	1359
16:45-17:45	0	0	0	75	386	0	0	0	0	227	606	1	1295
17:00-18:00	0	0	0	76	345	1	0	0	0	240	590	1	1253

INTERSEC ON TURN MOVEMENT COUNT SUMMA REPORT
I-84 WB OFF RAMP AT GRAHAM RO



DATE OF COUNT: 11/07/01
DAY OF WEEK: Wed
TIME STARTED: 16:00
TIME ENDED: 18:00

TEV=TOTAL ENTRY VOLUME
T=%TRUCKS BY APPROACH
P=PHF BY APPROACH

EEFK

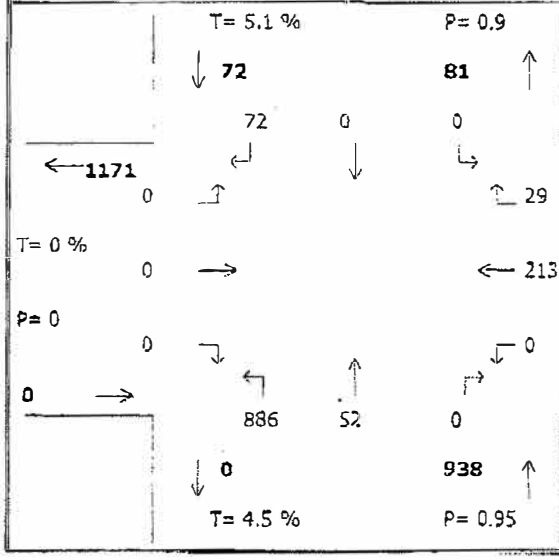
Peak Hour
16:00-17:00
TEV=1096

Traffic Smithy
(503) 641-6333

TIME PERIOD FROM - TO	EAST BOUND ↓	EAST BOUND →	EAST BOUND ↑	SOUTH BOUND ↵	SOUTH BOUND ↓	SOUTH BOUND ↳	NORTH BOUND ↰	NORTH BOUND ↑	NORTH BOUND ↱	WEST BOUND ↓	WEST BOUND ←	WEST BOUND ↑	ALL
16:00-16:05	0	0	0	6	0	0	68	8	0	0	14	1	97
16:05-16:10	0	0	0	7	0	0	65	4	0	0	11	2	89
16:10-16:15	0	0	0	9	0	0	66	4	0	0	12	2	93
16:15-16:20	0	0	0	10	0	0	81	3	0	0	12	0	106
16:20-16:25	0	0	0	7	0	0	59	1	0	0	3	2	72
16:25-16:30	0	0	0	10	0	0	83	2	0	0	20	2	117
16:30-16:35	0	0	0	13	0	0	64	5	0	0	16	0	98
16:35-16:40	0	0	0	5	0	0	55	2	0	0	11	1	74
16:40-16:45	0	0	0	8	0	0	45	6	0	0	9	0	68
16:45-16:50	0	0	0	5	0	0	66	6	0	0	16	3	96
16:50-16:55	0	0	0	8	0	0	59	5	0	0	16	0	88
16:55-17:00	0	0	0	8	0	0	61	9	0	0	13	7	98
17:00-17:05	0	0	0	8	0	0	57	8	0	0	14	1	88
17:05-17:10	0	0	0	13	0	0	47	6	0	0	14	2	82
17:10-17:15	0	0	0	6	0	0	73	4	0	0	9	1	93
17:15-17:20	0	0	0	5	0	0	62	5	0	0	5	3	80
17:20-17:25	0	0	0	6	0	0	62	4	0	0	9	4	85
17:25-17:30	0	0	0	6	0	0	52	4	0	0	23	1	86
17:30-17:35	0	0	0	7	0	0	59	5	0	0	12	1	84
17:35-17:40	0	0	0	6	0	0	43	2	0	0	10	1	62
17:40-17:45	0	0	0	6	0	0	56	5	0	0	15	0	82
17:45-17:50	0	0	0	7	0	0	59	4	0	0	15	3	88
17:50-17:55	0	0	0	11	0	0	51	1	0	0	7	1	71
17:55-18:00	0	0	0	10	0	0	43	3	0	0	13	4	73
Total Survey	0	0	0	187	0	0	1436	106	0	0	299	42	2070
PHF	0	0	0	.8	0	0	.87	.69	0	0	.81	.5	.928
% Trucks	0	0	0	4.3	0	0	7.5	17.9	0	0	27.8	9.5	10.7
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	
Peds	0	0	0	0	0	0	0	2	0	0	0	0	
Hourly Totals													
16:00-17:00	0	0	0	96	0	0	772	55	0	0	153	20	1096
16:15-17:15	0	0	0	101	0	0	750	57	0	0	153	19	1080
16:30-17:30	0	0	0	91	0	0	703	64	0	0	155	23	1036
16:45-17:45	0	0	0	84	0	0	697	63	0	0	156	24	1024
17:00-18:00	0	0	0	91	0	0	664	51	0	0	146	22	974

INTERSECTION TURN MOVEMENT SUMMARY REPORT

File: LTQX.mod



Peak Hour
14:35-15:35

Total Entry Volume
1252

T=% Trucks By Approach

P = PHF By Approach

LOCATION:

257TH/GRAHAM AT N. FRONTAGE RD/I-84 WB OFF-RAMP
TROUTDALE, OR

Date: **05/22/04** Day: **SAT**
Time: **13:00 - 16:00**

Report Prepared for:
DKS ASSOCIATES

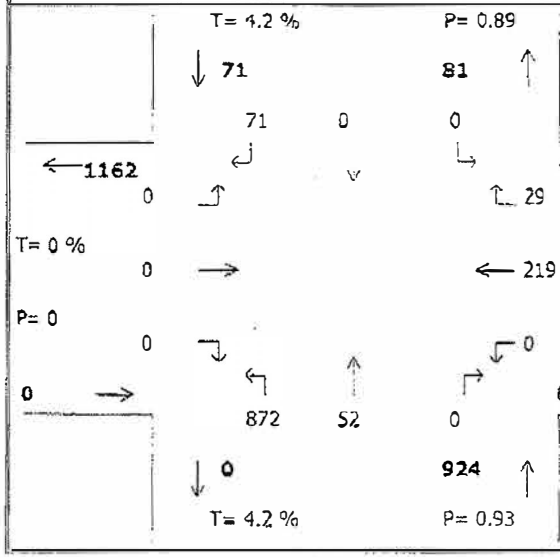
Surveyed By:
TRAFFIC SMITHY, INC
1225 NW Murray Blvd Suite 111
Portland, OR 97229
Phone: 503-641-6333 Fax: 503-643-8866

Report Reviewed by: JG

	EASTBOUND			SOUTHBOUND			NORTHBOUND			WESTBOUND			
TIME PERIOD	↴	→	↱	↲	↓	↳	↰	↑	↱	↶	←	↰	ALL
13:00-13:05	0	0	0	4	0	0	41	8	0	0	16	0	69
13:05-13:10	0	0	0	9	0	0	86	5	0	0	11	5	116
13:10-13:15	0	0	0	8	0	0	63	4	0	0	8	2	85
13:15-13:20	0	0	0	10	0	0	68	2	0	0	13	8	101
13:20-13:25	0	0	0	8	0	0	81	5	0	0	14	5	113
13:25-13:30	0	0	0	8	0	0	79	4	0	0	12	3	106
13:30-13:35	0	0	0	8	0	0	62	7	0	0	18	4	99
13:35-13:40	0	0	0	8	0	0	81	4	0	0	9	2	104
13:40-13:45	0	0	0	7	0	0	73	6	0	0	22	0	108
13:45-13:50	0	0	0	11	0	0	67	5	0	0	7	3	93
13:50-13:55	0	0	0	4	0	0	62	7	0	0	14	2	89
13:55-14:00	0	0	0	7	0	0	70	5	0	0	12	4	98
14:00-14:05	0	0	0	3	0	0	74	8	0	0	16	2	103
14:05-14:10	0	0	0	11	0	0	71	2	0	0	13	3	100
14:10-14:15	0	0	0	4	0	0	66	3	0	0	16	5	94
14:15-14:20	0	0	0	5	0	0	78	5	0	0	20	0	108
14:20-14:25	0	0	0	7	0	0	75	2	0	0	16	2	102
14:25-14:30	0	0	0	4	0	0	75	5	0	0	10	2	96
14:30-14:35	0	0	0	8	0	0	63	2	0	0	15	1	89
14:35-14:40	0	0	0	6	0	0	74	2	0	0	23	1	106
14:40-14:45	0	0	0	5	0	0	68	5	0	0	16	2	96
14:45-14:50	0	0	0	5	0	0	78	3	0	0	10	4	100
14:50-14:55	0	0	0	6	0	0	62	6	0	0	28	3	105
14:55-15:00	0	0	0	6	0	0	61	8	0	0	19	3	97
15:00-15:05	0	0	0	8	0	0	89	5	0	0	14	0	116
15:05-15:10	0	0	0	5	0	0	75	5	0	0	13	2	100
15:10-15:15	0	0	0	4	0	0	68	6	0	0	17	6	101
15:15-15:20	0	0	0	7	0	0	82	3	0	0	26	1	119
15:20-15:25	0	0	0	5	0	0	70	2	0	0	26	4	107
15:25-15:30	0	0	0	5	0	0	75	4	0	0	6	1	91
15:30-15:35	0	0	0	10	0	0	84	3	0	0	15	2	114
15:35-15:40	0	0	0	4	0	0	53	3	0	0	25	2	87
15:40-15:45	0	0	0	6	0	0	75	4	0	0	20	1	106
15:45-15:50	0	0	0	7	0	0	67	2	0	0	10	1	87
15:50-15:55	0	0	0	8	0	0	55	5	0	0	19	2	89
15:55-16:00	0	0	0	5	0	0	71	5	0	0	11	1	93
TOTALS	0	0	0	236	0	0	2542	160	0	0	560	89	3587
PHF	0	0	0	0.9	0	0	0.95	0.68	0	0	0.77	0.66	0.96
% Trucks	0	0	0	5.1	0	0	4.3	7.5	0	0	10.9	2 2	5.5
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	
Pedestrians		0			0			4			0		

INTERSECTION TURN MOVEMENT PEAK HOUR REPORT

File: LTQX.mod



Peak Hour
14:45-15:45

Total Entry Volume
1243

LOCATION:

257TH/GRAHAM AT N. FRONTAGE RD/I-84 WB OFF-RAMP
TROUTDALE, OR

Date: **05/22/04** Day: **SAT**
Time: **13:00 - 16:00**

Report Prepared for:
DKS ASSOCIATES

Surveyed By:
TRAFFIC SMITHY, INC
1225 NW Murray Blvd Suite 111
Portland, OR 97229
Phone: 503-641-6333 Fax: 503-643-8866

Report Reviewed by: JG

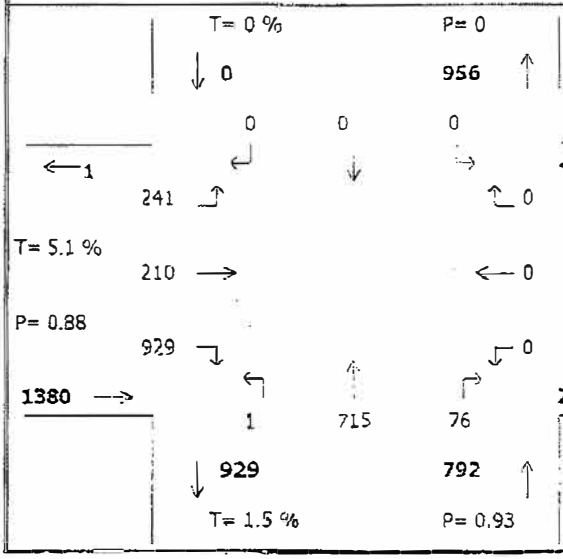
TIME PERIOD	EASTBOUND			SOUTHBOUND			NORTHBOUND			WESTBOUND			ALL
ALL VEHICLES													
14:45-15:00	0	0	0	17	0	0	201	17	0	0	57	10	302
15:00-15:15	0	0	0	17	0	0	232	16	0	0	44	8	317
15:15-15:30	0	0	0	17	0	0	227	9	0	0	58	6	317
15:30-15:45	0	0	0	20	0	0	212	10	0	0	60	5	307
LIGHT TRUCKS (SINGLE UNIT 2 AXLES)													
14:45-15:00	0	0	0	1	0	0	4	0	0	0	3	0	8
15:00-15:15	0	0	0	0	0	0	5	0	0	0	3	0	8
15:15-15:30	0	0	0	0	0	0	3	0	0	0	1	0	4
15:30-15:45	0	0	0	0	0	0	4	0	0	0	2	0	6
MEDIUM TRUCKS (SINGLE UNIT >2 AXLES)													
14:45-15:00	0	0	0	0	0	0	2	0	0	0	1	0	3
15:00-15:15	0	0	0	0	0	0	0	0	0	0	0	0	0
15:15-15:30	0	0	0	0	0	0	1	0	0	0	0	0	1
15:30-15:45	0	0	0	0	0	0	2	0	0	0	0	0	2
HEAVY TRUCKS (SEMI-TRACTOR TRAILER)													
14:45-15:00	0	0	0	1	0	0	7	0	0	0	4	0	12
15:00-15:15	0	0	0	0	0	0	4	0	0	0	1	0	5
15:15-15:30	0	0	0	0	0	0	1	0	0	0	2	0	3
15:30-15:45	0	0	0	1	0	0	4	2	0	0	3	0	10
BICYCLES													
14:45-15:00	0	0	0	0	0	0	0	0	0	0	2	0	2
15:00-15:15	0	0	0	0	0	0	0	0	0	0	0	0	0
15:15-15:30	0	0	0	0	0	0	1	0	0	0	0	0	1
15:30-15:45	0	0	0	0	0	0	0	1	0	0	0	0	1

PEDESTRIANS Crosswalk	SOUTH	WEST	EAST	NORTH	ALL
14:45-15:00	0	0	0	0	0
15:00-15:15	0	0	0	0	0
15:15-15:30	0	0	0	0	0
15:30-15:45	0	0	2	0	2

Peak Hour By Movement													
PHF	0	0	0	0.89	0	0	0.94	0.76	0	0	0.91	0.73	0.98
% Trucks(All)	0	0	0	4.2	0	0	4.2	3.8	0	0	9.1	0	5
% Trucks(M+H)	0	0	0	2.8	0	0	2.4	3.8	0	0	5	0	2.9
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Hourly Totals													
13:00-14:00	0	0	0	92	0	0	833	62	0	0	156	38	1181
13:15-14:15	0	0	0	89	0	0	854	58	0	0	166	41	1208
13:30-14:30	0	0	0	79	0	0	854	59	0	0	173	29	1194
13:45-14:45	0	0	0	75	0	0	843	51	0	0	178	27	1174
14:00-15:00	0	0	0	70	0	0	845	51	0	0	202	28	1196
14:15-15:15	0	0	0	69	0	0	866	54	0	0	201	26	1216
14:30-15:30	0	0	0	70	0	0	865	51	0	0	213	28	1227
14:45-15:45	0	0	0	71	0	0	872	52	0	0	219	29	1243
15:00-16:00	0	0	0	74	0	0	864	47	0	0	202	23	1210

INTERSECTION TURN MOVEMENT SUMMARY REPORT

File: GTAH



LOCATION:

257TH/GRAHAM AT S. FRONTAGE RD/I-84 EB ON-RAMP
TROUTDALE, OR

Date: **05/22/04** Day: **SAT**
Time: **13:15 - 16:15**

Report Prepared for:
DKS ASSOCIATES

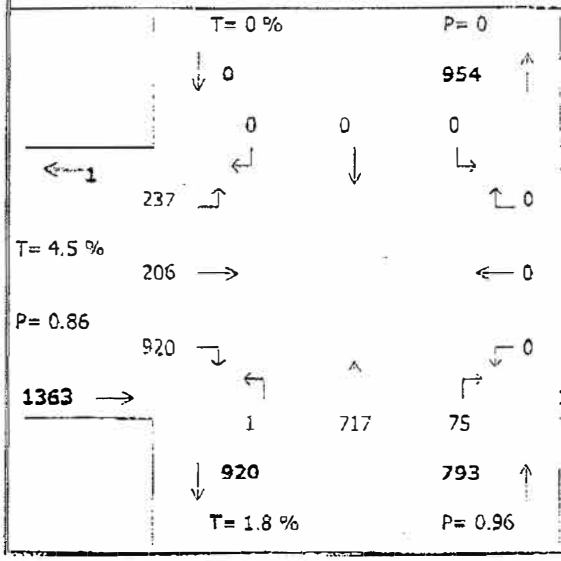
Surveyed By:
TRAFFIC SMITHY, INC
1225 NW Murray Blvd Suite 111
Portland, OR 97229
Phone: 503-641-6333 Fax: 503-643-8866

Report Reviewed by: JG

TIME PERIOD	EASTBOUND ↴	EASTBOUND →	EASTBOUND ↑	SOUTHBOUND ↵	SOUTHBOUND ↓	SOUTHBOUND ↳	NORTHBOUND ↰	NORTHBOUND ↑	NORTHBOUND ↱	WESTBOUND ↲	WESTBOUND ←	WESTBOUND ↖	ALL
13:15-13:20	81	20	11	0	0	0	0	49	10	0	0	0	171
13:20-13:25	78	18	17	0	0	0	0	69	5	0	0	0	187
13:25-13:30	71	25	19	0	0	0	0	62	3	0	0	0	180
13:30-13:35	82	15	13	0	0	0	0	69	8	0	0	0	187
13:35-13:40	70	15	12	0	0	0	0	75	7	0	0	0	179
13:40-13:45	73	21	18	0	0	0	0	56	4	0	0	0	172
13:45-13:50	60	7	20	0	0	0	0	54	8	0	0	0	149
13:50-13:55	79	21	14	0	0	0	0	64	4	0	0	0	182
13:55-14:00	79	15	21	0	0	0	0	50	7	0	0	0	172
14:00-14:05	56	26	20	0	0	0	0	48	9	0	0	0	159
14:05-14:10	58	9	15	0	0	0	0	71	8	0	0	0	161
14:10-14:15	73	13	25	0	0	0	0	51	3	0	0	0	165
14:15-14:20	64	18	18	0	0	0	0	64	6	0	0	0	170
14:20-14:25	83	16	15	0	0	0	0	54	6	0	0	0	174
14:25-14:30	51	15	23	0	0	0	0	55	8	0	0	0	152
14:30-14:35	60	19	17	0	0	0	0	72	2	0	0	0	170
14:35-14:40	74	23	7	0	0	0	0	57	8	0	0	0	169
14:40-14:45	77	14	23	0	0	0	0	49	6	0	0	0	169
14:45-14:50	80	16	16	0	0	0	1	51	7	0	0	0	171
14:50-14:55	90	17	18	0	0	0	0	59	9	0	0	0	193
14:55-15:00	74	9	21	0	0	0	0	62	3	0	0	0	169
15:00-15:05	58	22	14	0	0	0	0	48	7	0	0	0	149
15:05-15:10	54	16	22	0	0	0	0	70	2	0	0	0	164
15:10-15:15	67	22	25	0	0	0	0	64	3	0	0	0	181
15:15-15:20	99	22	16	0	0	0	0	57	7	0	0	0	201
15:20-15:25	81	14	26	0	0	0	0	75	6	0	0	0	202
15:25-15:30	98	17	21	0	0	0	0	53	2	0	0	0	191
15:30-15:35	71	24	15	0	0	0	0	52	8	0	0	0	170
15:35-15:40	80	17	24	0	0	0	0	75	16	0	0	0	212
15:40-15:45	68	10	19	0	0	0	0	51	5	0	0	0	153
15:45-15:50	81	17	15	0	0	0	0	43	5	0	0	0	161
15:50-15:55	89	10	13	0	0	0	0	61	6	0	0	0	179
15:55-16:00	76	12	12	0	0	0	0	50	3	0	0	0	153
16:00-16:05	71	11	20	0	0	0	1	52	9	0	0	0	164
16:05-16:10	68	21	14	0	0	0	0	57	8	0	0	0	168
16:10-16:15	81	11	15	0	0	0	0	62	6	0	0	0	175
TOTALS	2655	598	634	0	0	0	2	2111	224	0	0	0	6224
PHF	0.84	0.68	0.9	0	0	0	0.25	0.91	0.73	0	0	0	0.91
% Trucks	1.6	11.4	14	0	0	0	0	1.2	4	0	0	0	3.8
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	
Pedestrians		10			1			3			0		

INTERSECTION TURN MOVEMENT PEAK HOUR REPORT

File: GTAH



LOCATION:

257TH/GRAHAM AT S. FRONTAGE RD/I-84 EB ON-RAMP
TROUTDALE, OR

Date: **05/22/04** Day: **SAT**
Time: **13:15 - 16:15**

Report Prepared for:
DKS ASSOCIATES

Surveyed By:
TRAFFIC SMITHY, INC
1225 NW Murray Blvd Suite 111
Portland, OR 97229
Phone: 503-641-6333 Fax: 503-643-8866

Report Reviewed by: JG

TIME PERIOD	EASTBOUND			SOUTHBOUND			NORTHBOUND			WESTBOUND			ALL
ALL VEHICLES													
14:45-15:00	244	42	55	0	0	0	1	172	19	0	0	0	533
15:00-15:15	179	60	61	0	0	0	0	182	12	0	0	0	494
15:15-15:30	278	53	63	0	0	0	0	185	15	0	0	0	594
15:30-15:45	219	51	58	0	0	0	0	178	29	0	0	0	535
LIGHT TRUCKS (SINGLE UNIT 2 AXLES)													
14:45-15:00	1	1	0	0	0	0	0	2	1	0	0	0	5
15:00-15:15	2	3	3	0	0	0	0	1	0	0	0	0	9
15:15-15:30	4	2	3	0	0	0	0	0	0	0	0	0	9
15:30-15:45	0	1	1	0	0	0	0	2	1	0	0	0	5
MEDIUM TRUCKS (SINGLE UNIT >2 AXLES)													
14:45-15:00	0	0	3	0	0	0	0	1	0	0	0	0	4
15:00-15:15	2	1	0	0	0	0	0	1	0	0	0	0	4
15:15-15:30	1	1	1	0	0	0	0	0	0	0	0	0	3
15:30-15:45	0	0	1	0	0	0	0	0	0	0	0	0	1
HEAVY TRUCKS (SEMI-TRACTOR TRAILER)													
14:45-15:00	2	4	6	0	0	0	0	2	1	0	0	0	15
15:00-15:15	1	5	4	0	0	0	0	0	0	0	0	0	10
15:15-15:30	0	1	2	0	0	0	0	0	0	0	0	0	3
15:30-15:45	1	2	3	0	0	0	0	0	2	0	0	0	8
BICYCLES													
14:45-15:00	0	0	0	0	0	0	0	0	0	0	0	0	0
15:00-15:15	0	0	0	0	0	0	0	0	0	0	0	0	0
15:15-15:30	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30-15:45	0	0	0	0	0	0	0	1	0	0	0	0	1

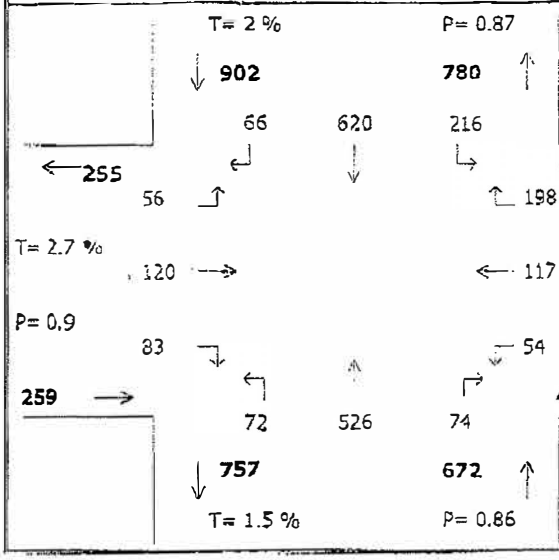
PEDESTRIANS					
Crosswalk	SOUTH	WEST	EAST	NORTH	ALL
14:45-15:00	0	0	0	0	0
15:00-15:15	0	0	0	0	0
15:15-15:30	1	0	0	0	1
15:30-15:45	1	1	0	0	2

Peak Hour By Movement													
PHF	0.83	0.86	0.94	0	0	0	0.25	0.97	0.65	0	0	0	0.91
% Trucks(All)	1.5	10.2	11.4	0	0	0	0	1.3	6.7	0	0	0	3.5
% Trucks(M+H)	0.8	6.8	8.4	0	0	0	0	0.6	4	0	0	0	2.2
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0

Hourly Totals													
13:15-14:15	860	205	205	0	0	0	0	718	76	0	0	0	2064
13:30-14:30	828	191	214	0	0	0	0	711	78	0	0	0	2022
13:45-14:45	814	196	218	0	0	0	0	689	75	0	0	0	1992
14:00-15:00	840	195	218	0	0	0	1	693	75	0	0	0	2022
14:15-15:15	832	207	219	0	0	0	1	705	67	0	0	0	2031
14:30-15:30	912	211	226	0	0	0	1	717	62	0	0	0	2129
14:45-15:45	920	206	237	0	0	0	1	717	75	0	0	0	2156
15:00-16:00	922	203	222	0	0	0	0	699	70	0	0	0	2116
15:15-16:15	963	186	210	0	0	0	1	688	81	0	0	0	2129

INTERSECTION TURN MOVEMENT SUMMARY REPORT

File DE A1



LOCATION:

SW 257TH DR AT HISTORIC COLUMBIA RIVER HWY
TROUTDALE, OR

Date: **05/22/04** Day: **SAT**
Time: **13:00 - 16:00**

Report Prepared for:
DKS ASSOCIATES

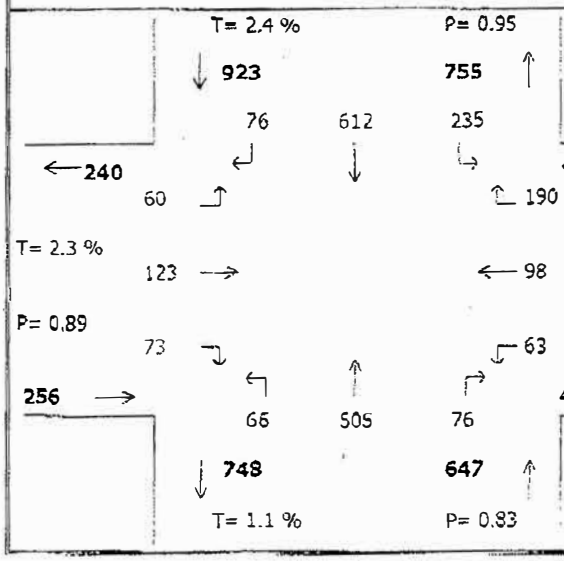
Surveyed By:
TRAFFIC SMITHY, INC
1225 NW Murray Blvd Suite 111
Portland, OR 97229
Phone: 503-641-6333 Fax: 503-643-8866

Report Reviewed by: JG

	EASTBOUND			SOUTHBOUND			NORTHBOUND			WESTBOUND			
TIME PERIOD	↓	→	↑	↲	↓	↳	↰	↑	↱	↲	←	↰	ALL
13:00-13:05	6	10	10	9	39	13	1	39	12	4	10	8	161
13:05-13:10	8	13	6	5	50	11	10	36	9	2	9	18	177
13:10-13:15	9	23	6	6	43	23	6	44	1	5	6	16	188
13:15-13:20	4	5	5	5	46	17	5	46	10	4	7	27	181
13:20-13:25	6	11	6	7	35	19	4	54	2	4	4	20	172
13:25-13:30	4	12	9	7	60	24	9	45	8	4	6	16	204
13:30-13:35	5	10	5	5	44	19	3	33	4	7	12	30	177
13:35-13:40	8	8	6	3	43	8	3	26	4	7	14	21	151
13:40-13:45	9	10	8	3	41	16	7	39	7	5	14	18	177
13:45-13:50	12	5	6	8	55	15	5	45	3	5	6	8	173
13:50-13:55	4	6	3	1	46	15	2	42	12	5	15	18	169
13:55-14:00	6	8	5	3	28	17	1	41	5	8	10	18	150
14:00-14:05	1	4	2	7	45	5	9	33	2	4	8	19	139
14:05-14:10	6	7	5	8	39	10	3	41	6	5	9	21	160
14:10-14:15	3	6	2	5	46	17	8	31	5	7	8	14	152
14:15-14:20	3	11	1	6	59	9	5	43	6	2	7	14	166
14:20-14:25	4	12	6	8	27	13	3	30	5	5	13	22	148
14:25-14:30	9	7	1	3	35	13	6	44	5	10	5	20	158
14:30-14:35	6	5	6	9	45	13	8	33	1	5	9	10	150
14:35-14:40	4	9	7	4	53	23	6	42	7	3	20	15	193
14:40-14:45	8	12	5	7	54	18	6	41	4	5	4	14	178
14:45-14:50	9	11	3	9	57	12	4	48	2	6	7	20	188
14:50-14:55	6	10	2	6	42	17	7	43	3	2	16	19	173
14:55-15:00	8	10	6	3	34	19	10	28	8	4	8	20	158
15:00-15:05	4	9	4	3	55	10	2	63	5	10	9	18	192
15:05-15:10	10	14	7	6	50	18	10	43	9	3	11	14	195
15:10-15:15	4	15	5	9	65	26	10	49	5	2	7	21	218
15:15-15:20	2	8	2	8	55	15	4	39	9	3	7	9	161
15:20-15:25	11	6	7	5	59	16	7	46	6	5	12	16	196
15:25-15:30	7	8	4	4	49	19	5	41	9	3	10	19	173
15:30-15:35	10	8	4	2	47	23	1	43	7	8	6	18	177
15:35-15:40	2	7	6	8	34	18	5	31	6	7	8	17	149
15:40-15:45	6	9	7	4	55	24	6	34	2	5	6	18	176
15:45-15:50	11	9	4	10	55	21	8	47	8	6	7	19	205
15:50-15:55	3	12	6	7	51	22	3	36	8	6	10	10	174
15:55-16:00	3	18	4	10	37	23	5	33	2	5	5	16	161
TOTALS	221	348	181	213	1678	601	197	1452	207	181	325	616	6220
PHF	0.74	0.79	0.82	0.72	0.87	0.92	0.75	0.85	0.77	0.79	0.89	0.84	0.91
% Trucks	0.5	4.3	2.2	1.4	2	2.2	1	1.7	1	0.6	6.8	2.1	2.1
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	
Pedestrians		16			7			3			4		

INTERSECTION TURN MOVEMENT PEAK HOUR REPORT

File: DEF1



LOCATION:

SW 257TH DR AT HISTORIC COLUMBIA RIVER HWY
TROUTDALE, OR

Date: **05/22/04** Day: **SAT**
Time: **13:00 - 16:00**

Report Prepared for:
DKS ASSOCIATES

Surveyed By:
TRAFFIC SMITHY, INC
1225 NW Murray Blvd Suite 111
Portland, OR 97229
Phone: 503-641-6333 Fax: 503-643-8866

Report Reviewed by: JG

TIME PERIOD	EASTBOUND ↴	→	↱	SOUTHBOUND ←	↓	→	NORTHBOUND ←	↑	→	WESTBOUND ↓	←	↑	ALL
ALL VEHICLES													
15:00-15:15	18	38	16	18	170	54	22	155	19	15	27	53	605
15:15-15:30	20	22	13	17	163	50	16	126	24	11	29	39	530
15:30-15:45	18	24	17	14	136	65	12	108	15	20	20	53	502
15:45-16:00	17	39	14	27	143	66	16	116	18	17	22	45	540
LIGHT TRUCKS (SINGLE UNIT 2 AXLES)													
15:00-15:15	0	1	0	0	2	2	0	1	1	0	1	1	9
15:15-15:30	0	2	0	0	2	1	1	0	0	0	1	0	7
15:30-15:45	0	1	0	0	0	2	0	2	0	0	2	3	10
15:45-16:00	0	2	0	0	1	3	0	1	0	0	2	1	10
MEDIUM TRUCKS (SINGLE UNIT >2 AXLES)													
15:00-15:15	0	0	0	0	3	0	0	0	0	0	0	0	3
15:15-15:30	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30-15:45	0	0	0	0	0	0	0	0	0	0	0	0	0
15:45-16:00	0	0	0	0	1	0	0	0	0	0	0	0	1
HEAVY TRUCKS (SEMI-TRACTOR TRAILER)													
15:00-15:15	0	0	0	0	1	0	0	0	0	0	0	0	1
15:15-15:30	0	0	0	0	1	0	0	1	0	0	0	0	2
15:30-15:45	0	0	0	0	0	0	0	0	0	0	1	0	1
15:45-16:00	0	0	0	1	2	0	0	0	0	0	0	0	3
BICYCLES													
15:00-15:15	0	0	0	0	0	0	0	0	0	0	0	0	0
15:15-15:30	0	0	0	0	0	0	0	0	0	0	0	1	1
15:30-15:45	0	0	0	0	0	0	0	0	0	0	0	0	0
15:45-16:00	0	0	0	0	0	0	0	0	0	0	0	0	0

PEDESTRIANS Crosswalk	SOUTH	WEST	EAST	NORTH	ALL
15:00-15:15	3	1	0	0	4
15:15-15:30	2	1	1	0	4
15:30-15:45	0	3	0	0	3
15:45-16:00	2	0	0	0	2

Peak Hour By Movement													
PHF	0.91	0.79	0.88	0.7	0.9	0.89	0.75	0.81	0.79	0.79	0.84	0.9	0.9
% Trucks(All)	0	4.9	0	1.3	2.1	3.4	1.5	1	1.3	0	7.1	2.6	2.2
% Trucks(M+H)	0	0	0	1.3	1.3	0	0	0.2	0	0	1	0	0.5
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Hourly Totals													
13:00-14:00	81	121	75	62	530	197	56	490	77	60	113	218	2080
13:15-14:15	68	92	62	62	528	182	59	476	68	65	113	230	2005
13:30-14:30	70	94	50	60	508	157	55	448	64	70	121	223	1920
13:45-14:45	66	92	49	69	532	168	62	466	61	64	114	193	1936
14:00-15:00	67	104	46	75	536	169	75	457	54	58	114	208	1963
14:15-15:15	75	125	53	73	576	191	77	507	60	57	116	207	2117
14:30-15:30	79	117	58	73	618	206	79	516	68	51	120	190	2175
14:45-15:45	79	115	57	67	602	217	71	508	71	58	107	204	2156
15:00-16:00	73	123	60	76	612	235	66	505	76	63	98	190	2177

D- LOS Descriptions

TRAFFIC LEVELS OF SERVICE

Analysis of traffic volumes is useful in understanding the general nature of traffic in an area, but by itself indicates neither the ability of the street network to carry additional traffic nor the quality of service afforded by the street facilities. For this, the concept of *level of service* (LOS) has been developed to subjectively describe traffic performance. Level of service can be measured at intersections and along key roadway segments.

Level of service categories are similar to report card ratings for traffic performance. Intersections are typically the controlling bottlenecks of traffic flow and the ability of a roadway system to carry traffic efficiently is generally diminished in their vicinities. Levels of Service A, B and C indicate conditions where traffic moves without significant delays over periods of peak travel demand. Level of service D and E are progressively worse peak hour operating conditions and F conditions represent where demand exceeds the capacity of an intersection. 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 level of service calculation methodology for both intersections and arterials[1]. The following sections provide interpretations of the analysis approaches.

[1] *Highway Capacity Manual 2000*, Transportation Research Board, Washington D.C., 2000, Chapters 16 and 17.

UNSIGNALIZED INTERSECTIONS (ALL-WAY STOP CONTROLLED)

Unsignalized intersections and all-way stop controlled intersections are each subject to a separate capacity analysis methodology. All-way stop controlled intersection operations are reported by leg of the intersection.

This method calculates a delay value for each approach to the intersection. The *2000 Highway Capacity Manual 2000* describes the detailed methodology. The following table describes the amount of delay associated with each level of service.

Level of Service	Delay (seconds)
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

UNSIGNALIZED INTERSECTIONS (TWO-WAY STOP CONTROLLED)

Unsignalized intersection level of service is reported for the major street and minor street (generally, left turn movements). The method assesses available and critical gaps in the traffic stream which make it possible for side street traffic to enter the main street flow. The *Highway Capacity Manual 2000* describes the detailed methodology. It is not unusual for an intersection to experience level of service E or F conditions for the minor street left turn movement. It should be understood that, often, a poor level of service is experienced by only a few vehicles and the intersection as a whole operates acceptably.

Unsignalized intersection levels of service are described in the following table.

Level of Service	Delay (sec/veh)	Expected Delay
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 an intersection. Control delay (or signal delay) includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. In previous versions of this chapter of the *HCM* (1994 and earlier), delay included only stopped delay. As delay increases, the level of service decreases. Calculations for signalized and unsignalized intersections are different due to the variation in traffic control. The *Highway Capacity Manual 2000* provides the basis for these calculations.

Level of Service	Delay (sec/veh)	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

E- LOS Calculations – Existing Conditions

Troutdale TSP
PM Peak Hour
Existing Conditions

Scenario Report

Scenario:	Default Scenario
Command:	Default Command
Volume:	Default Volume
Geometry:	Default Geometry
Impact Fee:	Default Impact Fee
Trip Generation:	Default Trip Generation
Trip Distribution:	Default Trip Distribution
Paths:	Default Paths
Routes:	Default Routes
Configuration:	Default Configuration

Troutdale TSP
PM Peak Hour
Existing Conditions

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in
# 1 Buxton Road/Historic Columbia	C	19.5	0.000	C	19.5	0.000	+ 0.000 D/V
# 2 I-84 WB Ramps/Marine Road	B	11.0	0.445	B	11.0	0.445	+ 0.000 D/V
# 3 I-84 EB Ramps/Marine Road	B	15.4	0.692	B	15.4	0.692	+ 0.000 D/V
# 4 I-84 EB Ramps/Graham Road	B	18.3	0.883	B	18.3	0.883	+ 0.000 D/V
# 5 I-84 WB Ramps/Graham Road	B	12.6	0.451	B	12.6	0.451	+ 0.000 D/V
# 6 Marine Drive/Sundial Road	B	13.8	0.000	B	13.8	0.000	+ 0.000 D/V
# 7 257th Drive/Cherry Park Road (	D	39.1	0.913	D	39.1	0.913	+ 0.000 D/V
# 8 Troutdale Road/Stark Street	C	31.0	0.762	C	31.0	0.762	+ 0.000 D/V
# 9 Troutdale Road/17th Street	B	13.8	0.525	B	13.8	0.525	+ 0.000 D/V
# 10 Cherry Park Road/Buxton Street	B	16.0	0.471	B	16.0	0.471	+ 0.000 D/V
# 11 257th Drive/Historic Columbia	C	31.5	0.681	C	31.5	0.681	+ 0.000 D/V

Troutdale TSP
PM Peak Hour
Existing Conditions

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #1 Buxton Road/Historic Columbia River Highway

Average Delay (sec/veh): 4.2 Worst Case Level Of Service: C[19.5]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0	0	1! 0	0	0	0 0 0	0	0	0 1 0	0	1	0 0 0
Volume Module:												
Base Vol:	164	0	37	0	0	0	0	169	484	35	126	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	164	0	37	0	0	0	0	169	484	35	126	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	173	0	39	0	0	0	0	178	509	37	133	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	173	0	39	0	0	0	0	178	509	37	133	0
Critical Gap Module:												
Critical Gp:	6.4	xxxx	6.2	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	xxxx	3.3	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	639	xxxx	433	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	687	xxxx	xxxxx
Potent Cap.:	443	xxxx	627	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	916	xxxx	xxxxx
Move Cap.:	430	xxxx	627	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	916	xxxx	xxxxx
Volume/Cap:	0.40	xxxx	0.06	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	0.04	xxxx	xxxx
Level Of Service Module:												
Queue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	0.1	xxxx	xxxxx
Stopped Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	9.1	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	*	*	*	A	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	456	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	2.4	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	0.1	xxxx	xxxxx
Shrd StpDel:	xxxxx	19.5	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	9.1	xxxx	xxxxx
Shared LOS:	*	C	*	*	*	*	*	*	*	A	*	*
ApproachDel:		19.5		xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:		C		*			*			*		

Troutdale TSP
PM Peak Hour
Existing Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #2 I-84 WB Ramps/Marine Road

Cycle (sec): 60 Critical Vol./Cap. (X): 0.445
Loss Time (sec): 8 (Y+R = 4 sec) Average Delay (sec/veh): 11.0
Optimal Cycle: 28 Level Of Service: B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0	0	0 0 0	0	0	2 0 1	0	0	0 0 0	0	1	1 0 0
Volume Module: >> Count Date: 7 Nov 2001 <<												
Base Vol:	0	0	0	0	390	106	0	0	0	237	632	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	0	390	106	0	0	0	237	632	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
PHF Volume:	0	0	0	0	431	117	0	0	0	262	698	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	0	431	117	0	0	0	262	698	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	0	0	0	431	117	0	0	0	262	698	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	1.00	1.00	1.00	1.00	0.95	0.85	1.00	1.00	1.00	0.95	0.95	1.00
Lanes:	0.00	0.00	0.00	0.00	2.00	1.00	0.00	0.00	0.00	0.55	1.45	0.00
Final Sat.:	0	0	0	0	3610	1615	0	0	0	985	2625	0
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.00	0.12	0.07	0.00	0.00	0.00	0.27	0.27	0.00
Crit Moves:					****						****	
Green/Cycle:	0.00	0.00	0.00	0.00	0.27	0.27	0.00	0.00	0.00	0.60	0.60	0.00
Volume/Cap:	0.00	0.00	0.00	0.00	0.44	0.27	0.00	0.00	0.00	0.44	0.44	0.00
Delay/Veh:	0.0	0.0	0.0	0.0	18.6	17.6	0.0	0.0	0.0	6.7	6.7	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	0.0	18.6	17.6	0.0	0.0	0.0	6.7	6.7	0.0
HCM2kAvg:	0	0	0	0	4	2	0	0	0	5	5	0

Troutdale TSP
PM Peak Hour
Existing Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #3 I-84 EB Ramps/Marine Road

Cycle (sec):	60	Critical Vol./Cap. (X):	0.692
Loss Time (sec):	12 (Y+R = 4 sec)	Average Delay (sec/veh):	15.4
Optimal Cycle:	51	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0	0	0	0	1	1	1	0	0	0	1	0
Volume Module: >> Count Date: 7 Nov 2001 <<												
Base Vol:	0	0	3	613	4	0	0	1207	2	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	3	613	4	0	0	1207	2	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
PHF Volume:	0	0	3	669	4	0	0	1318	2	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	3	669	4	0	0	1318	2	0	0	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	0	3	669	4	0	0	1318	2	0	0	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	1.00	1.00	0.87	0.95	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00
Lanes:	0.00	0.00	1.00	1.99	0.01	0.00	0.00	1.99	0.01	0.00	0.00	0.00
Final Sat.:	0	0	1644	3598	23	0	0	3604	6	0	0	0
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.19	0.19	0.00	0.00	0.37	0.37	0.00	0.00	0.00
Crit Moves:			****	****				****				
Green/Cycle:	0.00	0.00	0.00	0.27	0.27	0.00	0.00	0.53	0.53	0.00	0.00	0.00
Volume/Cap:	0.00	0.00	0.69	0.69	0.69	0.00	0.00	0.69	0.69	0.00	0.00	0.00
Delay/Veh:	0.0	0.0	219.9	21.9	21.9	0.0	0.0	11.6	11.6	0.0	0.0	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	219.9	21.9	21.9	0.0	0.0	11.6	11.6	0.0	0.0	0.0
HCM2kAvg:	0	0	1	7	7	0	0	10	10	0	0	0

Troutdale TSP
PM Peak Hour
Existing Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #4 I-84 EB Ramps/Graham Road

Cycle (sec):	60	Critical Vol./Cap. (X):	0.883
Loss Time (sec):	8 (Y+R = 4 sec)	Average Delay (sec/veh):	18.3
Optimal Cycle:	73	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0	0	2	0	1	0	0	0	0	0	1	0
Volume Module: >> Count Date: 25 May 2004 <<												
Base Vol:	0	682	64	0	0	0	190	232	1497	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	682	64	0	0	0	190	232	1497	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
PHF Volume:	0	733	69	0	0	0	204	249	1610	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	733	69	0	0	0	204	249	1610	0	0	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	733	69	0	0	0	204	249	1610	0	0	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	1.00	0.95	0.85	1.00	1.00	1.00	0.87	0.87	0.87	1.00	1.00	1.00
Lanes:	0.00	2.00	1.00	0.00	0.00	0.00	1.00	0.27	1.73	0.00	0.00	0.00
Final Sat.:	0	3610	1615	0	0	0	1653	444	2862	0	0	0
Capacity Analysis Module:												
Vol/Sat:	0.00	0.20	0.04	0.00	0.00	0.00	0.12	0.56	0.56	0.00	0.00	0.00
Crit Moves:		****						****				
Green/Cycle:	0.00	0.23	0.23	0.00	0.00	0.00	0.64	0.64	0.64	0.00	0.00	0.00
Volume/Cap:	0.00	0.88	0.19	0.00	0.00	0.00	0.19	0.88	0.88	0.00	0.00	0.00
Delay/Veh:	0.0	33.3	18.8	0.0	0.0	0.0	4.6	13.9	13.9	0.0	0.0	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	33.3	18.8	0.0	0.0	0.0	4.6	13.9	13.9	0.0	0.0	0.0
HCM2kAvg:	0	10	1	0	0	0	2	18	18	0	0	0

Troutdale TSP
PM Peak Hour
Existing Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #5 I-84 WB Ramps/Graham Road

Cycle (sec): 60 Critical Vol./Cap. (X): 0.451
Loss Time (sec): 12 (Y+R = 4 sec) Average Delay (sec/veh): 12.6
Optimal Cycle: 36 Level Of Service: B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1	1	0	0	0	0	0	0	0	0	1	0
Volume Module: >> Count Date: 7 Nov 2001 <<												
Base Vol:	772	55	0	0	0	96	0	0	0	0	153	20
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	772	55	0	0	0	96	0	0	0	0	153	20
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
PHF Volume:	832	59	0	0	0	103	0	0	0	0	165	22
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	832	59	0	0	0	103	0	0	0	0	165	22
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	832	59	0	0	0	103	0	0	0	0	165	22
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.96	0.96	1.00	1.00	1.00	0.87	1.00	1.00	1.00	1.00	0.93	0.93
Lanes:	1.87	0.13	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.77	0.23
Final Sat.:	3388	241	0	0	0	1644	0	0	0	0	3138	410
Capacity Analysis Module:												
Vol/Sat:	0.25	0.25	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.05	0.05
Crit Moves:		****				****					****	
Green/Cycle:	0.54	0.54	0.00	0.00	0.00	0.14	0.00	0.00	0.00	0.00	0.12	0.12
Volume/Cap:	0.45	0.45	0.00	0.00	0.00	0.45	0.00	0.00	0.00	0.00	0.45	0.45
Delay/Veh:	8.4	8.4	0.0	0.0	0.0	25.1	0.0	0.0	0.0	0.0	25.5	25.5
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	8.4	8.4	0.0	0.0	0.0	25.1	0.0	0.0	0.0	0.0	25.5	25.5
HCM2kAvg:	6	6	0	0	0	2	0	0	0	0	2	2

Troutdale TSP
PM Peak Hour
Existing Conditions

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #6 Marine Drive/Sundial Road

Average Delay (sec/veh): 4.3 Worst Case Level Of Service: B[13.8]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0	0	0	0	0	1	0	0	1	0	0	0
Volume Module: >> Count Date: 17 Oct 2001 <<												
Base Vol:	0	0	0	101	0	103	47	308	0	0	162	17
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	101	0	103	47	308	0	0	162	17
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
PHF Volume:	0	0	0	121	0	123	56	369	0	0	194	20
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	0	0	121	0	123	56	369	0	0	194	20
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	6.4	xxxx	6.2	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	3.5	xxxx	3.3	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	686	xxxx	204	214	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	416	xxxx	842	1368	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	403	xxxx	842	1368	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.30	xxxx	0.15	0.04	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
Queue:	xxxxx	xxxx	xxxxx	1.2	xxxx	0.5	0.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Stopped Del:	xxxxx	xxxx	xxxxx	17.7	xxxx	10.0	7.7	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	C	*	B	A	*	*	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd StpDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			13.8			xxxxxx			xxxxxx		
ApproachLOS:	*			B			*			*		

Troutdale TSP
PM Peak Hour
Existing Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #7 257th Drive/Cherry Park Road (South)

Cycle (sec):	100	Critical Vol./Cap. (X):	0.913
Loss Time (sec):	16 (Y+R = 4 sec)	Average Delay (sec/veh):	39.1
Optimal Cycle:	122	Level Of Service:	D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Permitted			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1	0 1	1 0	1	0 1	1 0	1	0 0	1 0	1	0 0	1 0
Volume Module: >> Count Date: 26 May 2004 <<												
Base Vol:	269	609	8	7	999	171	206	3	354	22	10	8
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	269	609	8	7	999	171	206	3	354	22	10	8
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
PHF Volume:	289	655	9	8	1074	184	222	3	381	24	11	9
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	289	655	9	8	1074	184	222	3	381	24	11	9
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	289	655	9	8	1074	184	222	3	381	24	11	9
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	0.95	0.95	0.33	0.93	0.93	0.95	0.85	0.85	0.95	0.93	0.93
Lanes:	1.00	1.97	0.03	1.00	1.71	0.29	1.00	0.01	0.99	1.00	0.56	0.44
Final Sat.:	1805	3556	47	623	3015	516	1805	14	1603	1805	985	788
Capacity Analysis Module:												
Vol/Sat:	0.16	0.18	0.18	0.01	0.36	0.36	0.12	0.24	0.24	0.01	0.01	0.01
Crit Moves:	****				****			****		****		
Green/Cycle:	0.18	0.57	0.57	0.39	0.39	0.39	0.25	0.26	0.26	0.01	0.02	0.02
Volume/Cap:	0.91	0.33	0.33	0.03	0.91	0.91	0.49	0.91	0.91	0.91	0.49	0.49
Delay/Veh:	69.8	11.7	11.7	18.9	38.4	38.4	32.7	59.9	59.9	186.1	57.4	57.4
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	69.8	11.7	11.7	18.9	38.4	38.4	32.7	59.9	59.9	186.1	57.4	57.4
HCM2kAvg:	13	5	5	0	22	22	6	15	15	2	1	1

Troutdale TSP
PM Peak Hour
Existing Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #8 Troutdale Road/Stark Street

Cycle (sec):	100	Critical Vol./Cap. (X):	0.762
Loss Time (sec):	16 (Y+R = 4 sec)	Average Delay (sec/veh):	31.0
Optimal Cycle:	79	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Prot+Permit			Prot+Permit			Prot+Permit			Prot+Permit		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1	0 0	1 0	1	0 0	1 0	1	0 1	1 0	1	0 1	1 0
Volume Module: >> Count Date: 25 May 2004 <<												
Base Vol:	197	151	49	126	336	104	106	398	304	46	313	59
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	197	151	49	126	336	104	106	398	304	46	313	59
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	207	159	52	133	354	109	112	419	320	48	329	62
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	207	159	52	133	354	109	112	419	320	48	329	62
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	207	159	52	133	354	109	112	419	320	48	329	62
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	0.96	0.96	0.95	0.97	0.97	0.95	0.89	0.89	0.95	0.98	0.98
Lanes:	1.00	0.75	0.25	1.00	0.76	0.24	1.00	1.13	0.87	1.00	0.84	0.16
Final Sat.:	1805	1381	448	1805	1400	433	1805	1914	1462	1805	1560	294
Capacity Analysis Module:												
Vol/Sat:	0.11	0.12	0.12	0.07	0.25	0.25	0.06	0.22	0.22	0.03	0.21	0.21
Crit Moves:	****				****		****				****	
Green/Cycle:	0.44	0.29	0.29	0.52	0.33	0.33	0.40	0.32	0.32	0.32	0.28	0.28
Volume/Cap:	0.56	0.39	0.39	0.21	0.76	0.76	0.45	0.69	0.69	0.28	0.76	0.76
Delay/Veh:	21.8	28.6	28.6	13.0	35.6	35.6	23.2	31.6	31.6	25.9	39.8	39.8
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	21.8	28.6	28.6	13.0	35.6	35.6	23.2	31.6	31.6	25.9	39.8	39.8
HCM2kAvg:	6	5	5	2	14	14	3	11	11	1	13	13

Troutdale TSP
PM Peak Hour
Existing Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #9 Troutdale Road/17th Street

Cycle (sec): 100 Critical Vol./Cap. (X): 0.525
Loss Time (sec): 8 (Y+R = 4 sec) Average Delay (sec/veh): 13.8
Optimal Cycle: 33 Level Of Service: B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0	0	1! 0	0	0	1! 0	0	0	1! 0	0	0	1! 0
Volume Module: >> Count Date: 25 May 2004 <<												
Base Vol:	27	263	11	47	456	54	72	58	36	10	51	39
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	27	263	11	47	456	54	72	58	36	10	51	39
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
PHF Volume:	31	299	13	53	518	61	82	66	41	11	58	44
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	31	299	13	53	518	61	82	66	41	11	58	44
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	31	299	13	53	518	61	82	66	41	11	58	44
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.92	0.92	0.92	0.93	0.93	0.93	0.79	0.79	0.79	0.92	0.92	0.92
Lanes:	0.09	0.87	0.04	0.08	0.82	0.10	0.43	0.35	0.22	0.10	0.51	0.39
Final Sat.:	157	1528	64	150	1451	172	652	525	326	174	888	679
Capacity Analysis Module:												
Vol/Sat:	0.20	0.20	0.20	0.36	0.36	0.36	0.13	0.13	0.13	0.07	0.07	0.07
Crit Moves:					****			****				
Green/Cycle:	0.68	0.68	0.68	0.68	0.68	0.68	0.24	0.24	0.24	0.24	0.24	0.24
Volume/Cap:	0.29	0.29	0.29	0.52	0.52	0.52	0.52	0.52	0.52	0.27	0.27	0.27
Delay/Veh:	6.5	6.5	6.5	8.3	8.3	8.3	34.5	34.5	34.5	31.3	31.3	31.3
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	6.5	6.5	6.5	8.3	8.3	8.3	34.5	34.5	34.5	31.3	31.3	31.3
HCM2kAvg:	4	4	4	10	10	10	7	7	7	3	3	3

Troutdale TSP
PM Peak Hour
Existing Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #10 Cherry Park Road/Buxton Street

Cycle (sec): 100 Critical Vol./Cap. (X): 0.471
Loss Time (sec): 12 (Y+R = 4 sec) Average Delay (sec/veh): 16.0
Optimal Cycle: 39 Level Of Service: B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Split Phase			Split Phase		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1	0	1	0	0	0	0	0	1	0	0	0	0	1! 0	0	0	0	1	0
Volume Module: >> Count Date: 2 Jun 2004 <<												
Base Vol:	66	179	0	0	462	66	41	0	93	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	66	179	0	0	462	66	41	0	93	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
PHF Volume:	69	186	0	0	481	69	43	0	97	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	69	186	0	0	481	69	43	0	97	0	0	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	69	186	0	0	481	69	43	0	97	0	0	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	1.00	1.00	1.00	0.98	0.98	0.89	1.00	0.89	1.00	1.00	1.00
Lanes:	1.00	1.00	0.00	0.00	0.88	0.12	0.31	0.00	0.69	0.00	1.00	0.00
Final Sat.:	1805	1900	0	0	1634	233	519	0	1177	0	1900	0
Capacity Analysis Module:												
Vol/Sat:	0.04	0.10	0.00	0.00	0.29	0.29	0.08	0.00	0.08	0.00	0.00	0.00
Crit Moves:	****				****		****					
Green/Cycle:	0.08	0.71	0.00	0.00	0.62	0.62	0.17	0.00	0.17	0.00	0.00	0.00
Volume/Cap:	0.47	0.14	0.00	0.00	0.47	0.47	0.47	0.00	0.47	0.00	0.00	0.00
Delay/Veh:	46.3	4.9	0.0	0.0	10.3	10.3	38.3	0.0	38.3	0.0	0.0	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	46.3	4.9	0.0	0.0	10.3	10.3	38.3	0.0	38.3	0.0	0.0	0.0
HCM2kAvg:	3	2	0	0	9	9	4	0	4	0	0	0

Troutdale TSP
PM Peak Hour
Existing Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #11 257th Drive/Historic Columbia River Highway

Cycle (sec): 100 Critical Vol./Cap. (X): 0.681
Loss Time (sec): 16 (Y+R = 4 sec) Average Delay (sec/veh): 31.5
Optimal Cycle: 66 Level Of Service: C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1	0 1	1 0	1	0 1	1 0	1	0 1	0 1	1	0 1	0 1
Volume Module:												
Base Vol:	68	466	113	388	856	82	47	192	99	100	128	203
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	68	466	113	388	856	82	47	192	99	100	128	203
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
PHF Volume:	73	501	122	417	920	88	51	206	106	108	138	218
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	73	501	122	417	920	88	51	206	106	108	138	218
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	73	501	122	417	920	88	51	206	106	108	138	218
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	0.92	0.92	0.95	0.94	0.94	0.95	1.00	0.85	0.95	1.00	0.85
Lanes:	1.00	1.61	0.39	1.00	1.83	0.17	1.00	1.00	1.00	1.00	1.00	1.00
Final Sat.:	1805	2821	684	1805	3252	311	1805	1900	1615	1805	1900	1615
Capacity Analysis Module:												
Vol/Sat:	0.04	0.18	0.18	0.23	0.28	0.28	0.03	0.11	0.07	0.06	0.07	0.14
Crit Moves:		****		****			****					****
Green/Cycle:	0.08	0.26	0.26	0.34	0.53	0.53	0.04	0.15	0.15	0.08	0.20	0.20
Volume/Cap:	0.54	0.68	0.68	0.68	0.54	0.54	0.68	0.70	0.43	0.70	0.36	0.68
Delay/Veh:	48.9	35.3	35.3	31.5	16.0	16.0	70.0	47.5	39.4	58.2	35.2	43.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	48.9	35.3	35.3	31.5	16.0	16.0	70.0	47.5	39.4	58.2	35.2	43.0
HCM2kAvg:	3	10	10	12	10	10	3	7	3	5	4	7

Troutdale TSP
Weekend PM Peak Hour
Existing Conditions

Scenario Report

Scenario:	Default Scenario
Command:	Default Command
Volume:	Default Volume
Geometry:	Default Geometry
Impact Fee:	Default Impact Fee
Trip Generation:	Default Trip Generation
Trip Distribution:	Default Trip Distribution
Paths:	Default Paths
Routes:	Default Routes
Configuration:	Default Configuration

Troutdale TSP
Weekend PM Peak Hour
Existing Conditions

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in
# 4 I-84 EB Ramps/Graham Road	B	14.6	0.729	B	14.6	0.729	+ 0.000 D/V
# 5 I-84 EB Ramps/Graham Road	B	12.4	0.482	B	12.4	0.482	+ 0.000 D/V
# 11 257th Drive/Historic Columbia	C	29.5	0.579	C	29.5	0.579	+ 0.000 D/V

Troutdale TSP
Weekend PM Peak Hour
Existing Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #4 I-84 EB Ramps/Graham Road

Cycle (sec): 60 Critical Vol./Cap. (X): 0.729
Loss Time (sec): 8 (Y+R = 4 sec) Average Delay (sec/veh): 14.6
Optimal Cycle: 47 Level Of Service: B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0	1	1 0 1	0	0	0 0 0	1	0	0 1 1	0	0	0 0 0
Volume Module:												
Base Vol:	1	715	76	0	0	0	241	210	929	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	1	715	76	0	0	0	241	210	929	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
PHF Volume:	1	786	84	0	0	0	265	231	1021	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	1	786	84	0	0	0	265	231	1021	0	0	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	1	786	84	0	0	0	265	231	1021	0	0	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.81	0.81	0.85	1.00	1.00	1.00	0.88	0.88	0.88	1.00	1.00	1.00
Lanes:	0.01	1.99	1.00	0.00	0.00	0.00	1.00	0.37	1.63	0.00	0.00	0.00
Final Sat.:	4	3064	1615	0	0	0	1668	615	2721	0	0	0
Capacity Analysis Module:												
Vol/Sat:	0.26	0.26	0.05	0.00	0.00	0.00	0.16	0.38	0.38	0.00	0.00	0.00
Crit Moves:		****						****				
Green/Cycle:	0.35	0.35	0.35	0.00	0.00	0.00	0.51	0.51	0.51	0.00	0.00	0.00
Volume/Cap:	0.73	0.73	0.15	0.00	0.00	0.00	0.31	0.73	0.73	0.00	0.00	0.00
Delay/Veh:	19.5	19.5	13.4	0.0	0.0	0.0	8.6	12.9	12.9	0.0	0.0	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	19.5	19.5	13.4	0.0	0.0	0.0	8.6	12.9	12.9	0.0	0.0	0.0
HCM2kAvg:	4	9	1	0	0	0	3	11	11	0	0	0

Troutdale TSP
Weekend PM Peak Hour
Existing Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #5 I-84 EB Ramps/Graham Road

Cycle (sec): 60 Critical Vol./Cap. (X): 0.482
Loss Time (sec): 12 (Y+R = 4 sec) Average Delay (sec/veh): 12.4
Optimal Cycle: 37 Level Of Service: B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1	1	0 0 0	0	0	0 0 0 1	0	0	0 0 0 0	0	0	1 1 0
Volume Module:												
Base Vol:	886	52	0	0	0	72	0	0	0	0	213	29
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	886	52	0	0	0	72	0	0	0	0	213	29
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
PHF Volume:	923	54	0	0	0	75	0	0	0	0	222	30
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	923	54	0	0	0	75	0	0	0	0	222	30
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	923	54	0	0	0	75	0	0	0	0	222	30
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.96	0.96	1.00	1.00	1.00	0.87	1.00	1.00	1.00	1.00	0.93	0.93
Lanes:	1.89	0.11	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.76	0.24
Final Sat.:	3428	201	0	0	0	1644	0	0	0	0	3120	425
Capacity Analysis Module:												
Vol/Sat:	0.27	0.27	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.07	0.07
Crit Moves:	****					****					****	
Green/Cycle:	0.56	0.56	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.15	0.15
Volume/Cap:	0.48	0.48	0.00	0.00	0.00	0.48	0.00	0.00	0.00	0.00	0.48	0.48
Delay/Veh:	8.2	8.2	0.0	0.0	0.0	28.1	0.0	0.0	0.0	0.0	24.2	24.2
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	8.2	8.2	0.0	0.0	0.0	28.1	0.0	0.0	0.0	0.0	24.2	24.2
HCM2kAvg:	6	6	0	0	0	2	0	0	0	0	3	3

Troutdale TSP
Weekend PM Peak Hour
Existing Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #11 257th Drive/Historic Columbia River Highway

Cycle (sec):	100	Critical Vol./Cap. (X):	0.579
Loss Time (sec):	16 (Y+R = 4 sec)	Average Delay (sec/veh):	29.5
Optimal Cycle:	55	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0	1	1 0	1 0	1	1 0	1 0	1	0 1	1 0	1	0 1
Volume Module:												
Base Vol:	72	526	74	216	620	66	56	120	83	54	117	198
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	72	526	74	216	620	66	56	120	83	54	117	198
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
PHF Volume:	79	578	81	237	681	73	62	132	91	59	129	218
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	79	578	81	237	681	73	62	132	91	59	129	218
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	79	578	81	237	681	73	62	132	91	59	129	218
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	0.93	0.93	0.95	0.94	0.94	0.95	1.00	0.85	0.95	1.00	0.85
Lanes:	1.00	1.75	0.25	1.00	1.81	0.19	1.00	1.00	1.00	1.00	1.00	1.00
Final Sat.:	1805	3108	437	1805	3217	342	1805	1900	1615	1805	1900	1615
Capacity Analysis Module:												
Vol/Sat:	0.04	0.19	0.19	0.13	0.21	0.21	0.03	0.07	0.06	0.03	0.07	0.13
Crit Moves:		****		****			****					****
Green/Cycle:	0.09	0.32	0.32	0.23	0.45	0.45	0.06	0.20	0.20	0.09	0.23	0.23
Volume/Cap:	0.47	0.58	0.58	0.58	0.47	0.47	0.58	0.35	0.29	0.35	0.29	0.58
Delay/Veh:	44.9	29.0	29.0	36.5	19.1	19.1	53.6	35.1	34.6	43.7	31.9	36.3
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	44.9	29.0	29.0	36.5	19.1	19.1	53.6	35.1	34.6	43.7	31.9	36.3
HCM2kAvg:	3	9	9	7	8	8	3	4	3	2	3	7

F- LOS Calculations – Master Plan

Troutdale TSP
Master Plan Mitigated
2025 PM Peak Conditions

Scenario Report

Scenario:	Default Scenario
Command:	Default Command
Volume:	Default Volume
Geometry:	Default Geometry
Impact Fee:	Default Impact Fee
Trip Generation:	Default Trip Generation
Trip Distribution:	Default Trip Distribution
Paths:	Default Paths
Routes:	Default Routes
Configuration:	Default Configuration

Troutdale TSP
Master Plan Mitigated
2025 PM Peak Conditions

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in V/C
# 1 Buxton Road/Historic Columbia	B	10.4	0.630	B	10.4	0.630	+ 0.000 D/V
# 2 I-84 WB Ramps/Marine Road	B	17.0	0.527	B	17.0	0.527	+ 0.000 D/V
# 3 I-84 EB Ramps/Marine Road	C	33.0	0.905	C	33.0	0.905	+ 0.000 D/V
# 4 I-84 EB Ramps/Graham Road	B	12.6	0.774	B	12.6	0.774	+ 0.000 D/V
# 5 I-84 WB Ramps/Graham Road	C	20.8	0.503	C	20.8	0.503	+ 0.000 D/V
# 6 Marine Drive/Sundial Road	C	34.9	0.786	C	34.9	0.786	+ 0.000 D/V
# 7 257th Drive/Cherry Park Road (	C	33.9	0.862	C	33.9	0.862	+ 0.000 D/V
# 8 Troutdale Road/Stark Street	D	44.1	0.959	D	44.1	0.959	+ 0.000 D/V
# 9 Troutdale Road/17th Street	B	18.7	0.797	B	18.7	0.797	+ 0.000 D/V
# 10 Cherry Park Road/Buxton Street	B	12.6	0.512	B	12.6	0.512	+ 0.000 D/V
# 11 257th Drive/Historic Columbia	D	38.8	0.820	D	38.8	0.820	+ 0.000 D/V

Troutdale TSP
Master Plan Mitigated
2025 PM Peak Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #1 Buxton Road/Historic Columbia River Highway

Cycle (sec): 100 Critical Vol./Cap. (X): 0.630
Loss Time (sec): 8 (Y+R = 4 sec) Average Delay (sec/veh): 10.4
Optimal Cycle: 41 Level Of Service: B

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	-	T	- R	L	-	T	- R	L	-	T	- R	L	-	T	- R
Control:	Split Phase				Split Phase				Permitted				Permitted			
Rights:	Include				Include				Include				Include			
Min. Green:	0	0	0		0	0	0		0	0	0		0	0	0	
Lanes:	1	0	0	0 1	0	0	0	0 0	0	0	0	1 0	0	1	0	0 0
Volume Module:																
Base Vol:	145	0	40		0	0	0		0	256	603		59	207	0	
Growth Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Initial Bse:	145	0	40		0	0	0		0	256	603		59	207	0	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Volume:	145	0	40		0	0	0		0	256	603		59	207	0	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
Reduced Vol:	145	0	40		0	0	0		0	256	603		59	207	0	
PCE Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
MLF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Final Vol.:	145	0	40		0	0	0		0	256	603		59	207	0	
Saturation Flow Module:																
Sat/Lane:	1900	1900	1900		1900	1900	1900		1900	1900	1900		1900	1900	1900	
Adjustment:	0.95	1.00	0.85		1.00	1.00	1.00		1.00	0.91	0.91		0.75	0.75	1.00	
Lanes:	1.00	0.00	1.00		0.00	0.00	0.00		0.00	0.30	0.70		0.22	0.78	0.00	
Final Sat.:	1805	0	1615		0	0	0		0	512	1207		316	1110	0	
Capacity Analysis Module:																
Vol/Sat:	0.08	0.00	0.02		0.00	0.00	0.00		0.00	0.50	0.50		0.19	0.19	0.00	
Crit Moves:	****									****						
Green/Cycle:	0.13	0.00	0.13		0.00	0.00	0.00		0.00	0.79	0.79		0.79	0.79	0.00	
Volume/Cap:	0.63	0.00	0.19		0.00	0.00	0.00		0.00	0.63	0.63		0.24	0.24	0.00	
Delay/Veh:	46.9	0.0	39.5		0.0	0.0	0.0		0.0	5.3	5.3		2.8	2.8	0.0	
User DelAdj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
AdjDel/Veh:	46.9	0.0	39.5		0.0	0.0	0.0		0.0	5.3	5.3		2.8	2.8	0.0	
HCM2kAvg:	6	0	1		0	0	0		0	12	12		3	3	0	

Troutdale TSP
Master Plan Mitigated
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Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #2 I-84 WB Ramps/Marine Road

Cycle (sec): 90 Critical Vol./Cap. (X): 0.527
Loss Time (sec): 8 (Y+R = 4 sec) Average Delay (sec/veh): 17.0
Optimal Cycle: 33 Level Of Service: B

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	-	T	- R	L	-	T	- R	L	-	T	- R	L	-	T	- R
Control:	Permitted				Permitted				Split Phase				Split Phase			
Rights:	Include				Include				Include				Include			
Min. Green:	0	0	0		0	0	0		0	0	0		0	0	0	
Lanes:	0	1	1	0 0	0	0	2	0 1	0	0	0	0 0	0	1	1	0 0
Volume Module:																
Base Vol:	21	14	0		0	628	38		0	0	0		428	587	0	
Growth Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Initial Bse:	21	14	0		0	628	38		0	0	0		428	587	0	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Volume:	21	14	0		0	628	38		0	0	0		428	587	0	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
Reduced Vol:	21	14	0		0	628	38		0	0	0		428	587	0	
PCE Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
MLF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Final Vol.:	21	14	0		0	628	38		0	0	0		428	587	0	
Saturation Flow Module:																
Sat/Lane:	1900	1900	1900		1900	1900	1900		1900	1900	1900		1900	1900	1900	
Adjustment:	0.69	0.69	0.95		0.95	0.90	0.81		0.95	0.95	0.95		0.90	0.90	0.95	
Lanes:	1.00	1.00	0.00		0.00	2.00	1.00		0.00	0.00	0.00		0.84	1.16	0.00	
Final Sat.:	1303	1303	0		0	3420	1530		0	0	0		1442	1978	0	
Capacity Analysis Module:																
Vol/Sat:	0.02	0.01	0.00		0.00	0.18	0.02		0.00	0.00	0.00		0.30	0.30	0.00	
Crit Moves:						****								****		
Green/Cycle:	0.35	0.35	0.00		0.00	0.35	0.35		0.00	0.00	0.00		0.56	0.56	0.00	
Volume/Cap:	0.05	0.03	0.00		0.00	0.53	0.07		0.00	0.00	0.00		0.53	0.53	0.00	
Delay/Veh:	19.5	19.3	0.0		0.0	23.9	19.7		0.0	0.0	0.0		12.5	12.5	0.0	
User DelAdj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
AdjDel/Veh:	19.5	19.3	0.0		0.0	23.9	19.7		0.0	0.0	0.0		12.5	12.5	0.0	
HCM2kAvg:	1	0	0		0	7	1		0	0	0		9	9	0	

Troutdale TSP
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Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #3 I-84 EB Ramps/Marine Road

Cycle (sec):	90	Critical Vol./Cap. (X):	0.905
Loss Time (sec):	12 (Y+R = 4 sec)	Average Delay (sec/veh):	33.0
Optimal Cycle:	106	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Split Phase			Split Phase		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0	0	0 1	0	1 1	0 0	1	0 2	0 1	0	0 0	0 0
Volume Module:												
Base Vol:	0	21	6	774	272	0	13	1024	170	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	21	6	774	272	0	13	1024	170	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	21	6	774	272	0	13	1024	170	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	21	6	774	272	0	13	1024	170	0	0	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	21	6	774	272	0	13	1024	170	0	0	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	0.92	0.92	0.87	0.87	0.95	0.81	0.90	0.81	0.95	0.95	0.95
Lanes:	0.00	0.78	0.22	1.00	1.00	0.00	1.00	2.00	1.00	0.00	0.00	0.00
Final Sat.:	0	1358	388	1648	1648	0	1530	3420	1530	0	0	0
Capacity Analysis Module:												
Vol/Sat:	0.00	0.02	0.02	0.47	0.16	0.00	0.01	0.30	0.11	0.00	0.00	0.00
Crit Moves:			****	****				****				
Green/Cycle:	0.00	0.02	0.02	0.52	0.52	0.00	0.33	0.33	0.33	0.00	0.00	0.00
Volume/Cap:	0.00	0.91	0.91	0.91	0.32	0.00	0.03	0.91	0.34	0.00	0.00	0.00
Delay/Veh:	0.0	169	168.7	29.8	12.5	0.0	20.3	39.1	23.1	0.0	0.0	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	169	168.7	29.8	12.5	0.0	20.3	39.1	23.1	0.0	0.0	0.0
HCM2kAvg:	0	2	2	24	5	0	0	18	4	0	0	0

Troutdale TSP
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Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #4 I-84 EB Ramps/Graham Road

Cycle (sec):	90	Critical Vol./Cap. (X):	0.774
Loss Time (sec):	8 (Y+R = 4 sec)	Average Delay (sec/veh):	12.6
Optimal Cycle:	58	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Split Phase			Split Phase		
Rights:	Include			Include			Ovl			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0	0 2	0 1	0	0 0	0 0	1	0 0	1 1	0	0 0	0 0
Volume Module:												
Base Vol:	0	674	109	0	0	0	258	256	1344	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	674	109	0	0	0	258	256	1344	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	674	109	0	0	0	258	256	1344	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	674	109	0	0	0	258	256	1344	0	0	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	674	109	0	0	0	258	256	1344	0	0	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	0.90	0.81	0.95	0.95	0.95	0.83	0.83	0.83	0.95	0.95	0.95
Lanes:	0.00	2.00	1.00	0.00	0.00	0.00	1.00	0.32	1.68	0.00	0.00	0.00
Final Sat.:	0	3420	1530	0	0	0	1573	503	2643	0	0	0
Capacity Analysis Module:												
Vol/Sat:	0.00	0.20	0.07	0.00	0.00	0.00	0.16	0.51	0.51	0.00	0.00	0.00
Crit Moves:		****						****				
Green/Cycle:	0.00	0.25	0.25	0.00	0.00	0.00	0.66	0.66	0.91	0.00	0.00	0.00
Volume/Cap:	0.00	0.77	0.28	0.00	0.00	0.00	0.25	0.77	0.56	0.00	0.00	0.00
Delay/Veh:	0.0	35.5	27.3	0.0	0.0	0.0	6.5	12.7	1.0	0.0	0.0	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	35.5	27.3	0.0	0.0	0.0	6.5	12.7	1.0	0.0	0.0	0.0
HCM2kAvg:	0	11	3	0	0	0	3	17	5	0	0	0

Troutdale TSP
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Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

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Intersection #5 I-84 WB Ramps/Graham Road

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Cycle (sec): 90 Critical Vol./Cap. (X): 0.503
Loss Time (sec): 12 (Y+R = 4 sec) Average Delay (sec/veh): 20.8
Optimal Cycle: 40 Level Of Service: C

****

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1	1 0	0 0	0	0 0	0 1	0	0 0	0 0	0	0 1	1 0
Volume Module:												
Base Vol:	756	130	0	0	0	187	0	0	0	0	176	22
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	756	130	0	0	0	187	0	0	0	0	176	22
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	756	130	0	0	0	187	0	0	0	0	176	22
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	756	130	0	0	0	187	0	0	0	0	176	22
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	756	130	0	0	0	187	0	0	0	0	176	22
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.91	0.91	0.95	0.95	0.95	0.82	0.95	0.95	0.95	0.95	0.88	0.88
Lanes:	1.71	0.29	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.78	0.22
Final Sat.:	2946	507	0	0	0	1557	0	0	0	0	2988	374
Capacity Analysis Module:												
Vol/Sat:	0.26	0.26	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.06	0.06
Crit Moves:		****				****					****	
Green/Cycle:	0.51	0.51	0.00	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.12	0.12
Volume/Cap:	0.50	0.50	0.00	0.00	0.00	0.50	0.00	0.00	0.00	0.00	0.50	0.50
Delay/Veh:	14.7	14.7	0.0	0.0	0.0	30.7	0.0	0.0	0.0	0.0	38.3	38.3
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	14.7	14.7	0.0	0.0	0.0	30.7	0.0	0.0	0.0	0.0	38.3	38.3
HCM2kAvg:	9	9	0	0	0	5	0	0	0	0	3	3

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Troutdale TSP
Master Plan Mitigated
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Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

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Intersection #6 Marine Drive/Sundial Road

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Cycle (sec): 100 Critical Vol./Cap. (X): 0.786
Loss Time (sec): 12 (Y+R = 4 sec) Average Delay (sec/veh): 34.9
Optimal Cycle: 74 Level Of Service: C

****

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1	0 0	1 0	1	0 0	1 0	1	0 0	1 0	1	0 1	0
Volume Module:												
Base Vol:	65	205	31	73	418	108	99	469	163	43	152	20
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	65	205	31	73	418	108	99	469	163	43	152	20
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	65	205	31	73	418	108	99	469	163	43	152	20
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	65	205	31	73	418	108	99	469	163	43	152	20
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	65	205	31	73	418	108	99	469	163	43	152	20
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	0.98	0.98	0.95	0.97	0.97	0.95	0.96	0.96	0.95	0.98	0.98
Lanes:	1.00	0.87	0.13	1.00	0.79	0.21	1.00	0.74	0.26	1.00	0.88	0.12
Final Sat.:	1805	1617	245	1805	1463	378	1805	1355	471	1805	1651	217
Capacity Analysis Module:												
Vol/Sat:	0.04	0.13	0.13	0.04	0.29	0.29	0.05	0.35	0.35	0.02	0.09	0.09
Crit Moves:	****				****			****			****	
Green/Cycle:	0.05	0.31	0.31	0.10	0.36	0.36	0.18	0.44	0.44	0.03	0.29	0.29
Volume/Cap:	0.79	0.41	0.41	0.41	0.79	0.79	0.31	0.79	0.79	0.79	0.31	0.31
Delay/Veh:	85.1	27.7	27.7	43.8	34.5	34.5	36.5	29.1	29.1	100.0	27.7	27.7
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	85.1	27.7	27.7	43.8	34.5	34.5	36.5	29.1	29.1	100.0	27.7	27.7
HCM2kAvg:	4	6	6	3	16	16	3	18	18	3	4	4

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Troutdale TSP
Master Plan Mitigated
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Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #7 257th Drive/Cherry Park Road (South)

Cycle (sec): 120 Critical Vol./Cap. (X): 0.862
Loss Time (sec): 16 (Y+R = 4 sec) Average Delay (sec/veh): 33.9
Optimal Cycle: 112 Level Of Service: C

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	T	R		L	T	R		L	T	R		L	T	R	
Control:	Protected				Protected				Protected				Protected			
Rights:	Include				Include				Ovl				Include			
Min. Green:	0	0	0		0	0	0		0	0	0		0	0	0	
Lanes:	1	0	1	1	0	1	0	1	1	0	1	0	2	1	0	0	1	0
Volume Module:																
Base Vol:	359	741	16		6	1362	221		202	11	818		24	15	5	
Growth Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Initial Bse:	359	741	16		6	1362	221		202	11	818		24	15	5	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Volume:	359	741	16		6	1362	221		202	11	818		24	15	5	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
Reduced Vol:	359	741	16		6	1362	221		202	11	818		24	15	5	
PCE Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
MLF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Final Vol.:	359	741	16		6	1362	221		202	11	818		24	15	5	
Saturation Flow Module:																
Sat/Lane:	1900	1900	1900		1900	1900	1900		1900	1900	1900		1900	1900	1900	
Adjustment:	0.95	1.00	1.00		0.95	0.98	0.98		0.95	1.00	0.85		0.95	0.96	0.96	
Lanes:	1.00	1.96	0.04		1.00	1.72	0.28		1.00	1.00	2.00		1.00	0.75	0.25	
Final Sat.:	1805	3709	80		1805	3201	519		1805	1900	3230		1805	1372	457	
Capacity Analysis Module:																
Vol/Sat:	0.20	0.20	0.20		0.00	0.43	0.43		0.11	0.01	0.25		0.01	0.01	0.01	
Crit Moves:	****					****			****					****		
Green/Cycle:	0.23	0.71	0.71		0.01	0.49	0.49		0.13	0.11	0.35		0.03	0.01	0.01	
Volume/Cap:	0.86	0.28	0.28		0.28	0.86	0.86		0.86	0.05	0.73		0.47	0.86	0.86	
Delay/Veh:	61.0	6.3	6.3		65.8	31.3	31.3		77.5	47.4	37.0		64.3	184	184.4	
User DelAdj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
AdjDel/Veh:	61.0	6.3	6.3		65.8	31.3	31.3		77.5	47.4	37.0		64.3	184	184.4	
HCM2kAvg:	16	5	5		1	28	28		10	0	14		2	2	2	

Troutdale TSP
Master Plan Mitigated
2025 PM Peak Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #8 Troutdale Road/Stark Street

Cycle (sec): 100 Critical Vol./Cap. (X): 0.959
Loss Time (sec): 16 (Y+R = 4 sec) Average Delay (sec/veh): 44.1
Optimal Cycle: 146 Level Of Service: D

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	T	R		L	T	R		L	T	R		L	T	R	
Control:	Prot+Permit				Prot+Permit				Prot+Permit				Prot+Permit			
Rights:	Include				Include				Include				Include			
Min. Green:	0	0	0		0	0	0		0	0	0		0	0	0	
Lanes:	1	0	0	1	0	1	0	1	0	1	0	1	1	0	1	0	0	1	0
Volume Module:																
Base Vol:	268	165	53		164	456	102		179	674	539		75	536	59	
Growth Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Initial Bse:	268	165	53		164	456	102		179	674	539		75	536	59	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Volume:	268	165	53		164	456	102		179	674	539		75	536	59	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
Reduced Vol:	268	165	53		164	456	102		179	674	539		75	536	59	
PCE Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
MLF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Final Vol.:	268	165	53		164	456	102		179	674	539		75	536	59	
Saturation Flow Module:																
Sat/Lane:	1900	1900	1900		1900	1900	1900		1900	1900	1900		1900	1900	1900	
Adjustment:	0.95	0.96	0.96		0.95	1.00	0.85		0.95	0.89	0.89		0.95	0.99	0.99	
Lanes:	1.00	0.76	0.24		1.00	1.00	1.00		1.00	1.11	0.89		1.00	0.90	0.10	
Final Sat.:	1805	1386	445		1805	1900	1615		1805	1871	1497		1805	1686	186	
Capacity Analysis Module:																
Vol/Sat:	0.15	0.12	0.12		0.09	0.24	0.06		0.10	0.36	0.36		0.04	0.32	0.32	
Crit Moves:	****					****			****					****		
Green/Cycle:	0.38	0.23	0.23		0.45	0.25	0.25		0.47	0.39	0.39		0.38	0.33	0.33	
Volume/Cap:	0.75	0.52	0.52		0.32	0.96	0.25		0.68	0.92	0.92		0.48	0.96	0.96	
Delay/Veh:	33.2	34.8	34.8		18.0	67.9	30.3		29.0	40.1	40.1		25.1	59.0	59.0	
User DelAdj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
AdjDel/Veh:	33.2	34.8	34.8		18.0	67.9	30.3		29.0	40.1	40.1		25.1	59.0	59.0	
HCM2kAvg:	9	6	6		4	19	3		6	22	22		3	23	23	

Troutdale TSP
Master Plan Mitigated
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Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #9 Troutdale Road/17th Street

Cycle (sec): 100 Critical Vol./Cap. (X): 0.797
Loss Time (sec): 8 (Y+R = 4 sec) Average Delay (sec/veh): 18.7
Optimal Cycle: 64 Level Of Service: B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0	0	1! 0	0	0	1! 0	0	0	1! 0	0	0	1! 0
Volume Module:												
Base Vol:	27	319	64	76	829	87	72	152	37	13	86	43
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	27	319	64	76	829	87	72	152	37	13	86	43
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	27	319	64	76	829	87	72	152	37	13	86	43
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	27	319	64	76	829	87	72	152	37	13	86	43
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	27	319	64	76	829	87	72	152	37	13	86	43
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.90	0.90	0.90	0.92	0.92	0.92	0.81	0.81	0.81	0.92	0.92	0.92
Lanes:	0.06	0.78	0.16	0.08	0.83	0.09	0.28	0.58	0.14	0.09	0.61	0.30
Final Sat.:	112	1324	266	135	1468	154	427	901	219	161	1063	531
Capacity Analysis Module:												
Vol/Sat:	0.24	0.24	0.24	0.56	0.56	0.56	0.17	0.17	0.17	0.08	0.08	0.08
Crit Moves:					****			****				
Green/Cycle:	0.71	0.71	0.71	0.71	0.71	0.71	0.21	0.21	0.21	0.21	0.21	0.21
Volume/Cap:	0.34	0.34	0.34	0.80	0.80	0.80	0.80	0.80	0.80	0.38	0.38	0.38
Delay/Veh:	5.8	5.8	5.8	13.5	13.5	13.5	50.2	50.2	50.2	34.5	34.5	34.5
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	5.8	5.8	5.8	13.5	13.5	13.5	50.2	50.2	50.2	34.5	34.5	34.5
HCM2kAvg:	5	5	5	23	23	23	11	11	11	4	4	4

Troutdale TSP
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Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #10 Cherry Park Road/Buxton Street

Cycle (sec): 100 Critical Vol./Cap. (X): 0.512
Loss Time (sec): 12 (Y+R = 4 sec) Average Delay (sec/veh): 12.6
Optimal Cycle: 41 Level Of Service: B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Permitted			Split Phase			Split Phase		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1	0	1 0	0	0	0 1	0	0	1! 0	0	0	0 1 0
Volume Module:												
Base Vol:	45	156	0	0	607	68	41	0	70	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	45	156	0	0	607	68	41	0	70	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	45	156	0	0	607	68	41	0	70	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	45	156	0	0	607	68	41	0	70	0	0	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	45	156	0	0	607	68	41	0	70	0	0	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	1.00	1.00	1.00	0.99	0.99	0.90	1.00	0.90	1.00	1.00	1.00
Lanes:	1.00	1.00	0.00	0.00	0.90	0.10	0.37	0.00	0.63	0.00	1.00	0.00
Final Sat.:	1805	1900	0	0	1685	189	631	0	1077	0	1900	0
Capacity Analysis Module:												
Vol/Sat:	0.02	0.08	0.00	0.00	0.36	0.36	0.07	0.00	0.07	0.00	0.00	0.00
Crit Moves:	****				****		****					
Green/Cycle:	0.05	0.75	0.00	0.00	0.70	0.70	0.13	0.00	0.13	0.00	0.00	0.00
Volume/Cap:	0.51	0.11	0.00	0.00	0.51	0.51	0.51	0.00	0.51	0.00	0.00	0.00
Delay/Veh:	51.4	3.4	0.0	0.0	7.2	7.2	42.8	0.0	42.8	0.0	0.0	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	51.4	3.4	0.0	0.0	7.2	7.2	42.8	0.0	42.8	0.0	0.0	0.0
HCM2kAvg:	2	1	0	0	10	10	4	0	4	0	0	0

Troutdale TSP
Master Plan Mitigated
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Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

****

Intersection #11 257th Drive/Historic Columbia River Highway

****

Cycle (sec): 100 Critical Vol./Cap. (X): 0.820
Loss Time (sec): 16 (Y+R = 4 sec) Average Delay (sec/veh): 38.8
Optimal Cycle: 91 Level Of Service: D

****

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1	0 1	1 0	1	0 1	1 0	1	0 1	0 1	1	0 1	0 1
Volume Module:												
Base Vol:	114	548	139	436	1120	147	118	323	199	147	180	167
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	114	548	139	436	1120	147	118	323	199	147	180	167
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	114	548	139	436	1120	147	118	323	199	147	180	167
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	114	548	139	436	1120	147	118	323	199	147	180	167
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	114	548	139	436	1120	147	118	323	199	147	180	167
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	0.92	0.92	0.95	0.93	0.93	0.95	1.00	0.85	0.95	1.00	0.85
Lanes:	1.00	1.60	0.40	1.00	1.77	0.23	1.00	1.00	1.00	1.00	1.00	1.00
Final Sat.:	1805	2793	708	1805	3137	412	1805	1900	1615	1805	1900	1615
Capacity Analysis Module:												
Vol/Sat:	0.06	0.20	0.20	0.24	0.36	0.36	0.07	0.17	0.12	0.08	0.09	0.10
Crit Moves:		****		****				****		****		
Green/Cycle:	0.08	0.24	0.24	0.29	0.45	0.45	0.12	0.21	0.21	0.10	0.19	0.19
Volume/Cap:	0.79	0.82	0.82	0.82	0.79	0.79	0.55	0.82	0.59	0.82	0.50	0.55
Delay/Veh:	69.5	42.5	42.5	42.7	25.9	25.9	44.6	50.7	38.7	69.2	37.6	39.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	69.5	42.5	42.5	42.7	25.9	25.9	44.6	50.7	38.7	69.2	37.6	39.0
HCM2kAvg:	6	12	12	15	18	18	4	12	6	7	5	5

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G- LOS Calculations – Action Plan

Troutdale TSP
Action Plan
2025 PM Peak Conditions

Scenario Report

Scenario:	Default Scenario
Command:	Default Command
Volume:	Default Volume
Geometry:	Default Geometry
Impact Fee:	Default Impact Fee
Trip Generation:	Default Trip Generation
Trip Distribution:	Default Trip Distribution
Paths:	Default Paths
Routes:	Default Routes
Configuration:	Default Configuration

Troutdale TSP
Action Plan
2025 PM Peak Conditions

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in
# 1 Buxton Road/Historic Columbia	B	14.8	0.704	B	14.8	0.704	+ 0.000 D/V
# 2 I-84 WB Ramps/Marine Road	B	15.5	0.744	B	15.5	0.744	+ 0.000 D/V
# 3 I-84 EB Ramps/Marine Road	C	29.5	0.942	C	29.5	0.942	+ 0.000 D/V
# 4 I-84 EB Ramps/Graham Road	B	13.9	0.339	B	13.9	0.339	+ 0.000 D/V
# 5 I-84 WB Ramps/Graham Road	C	20.8	0.792	C	20.8	0.792	+ 0.000 D/V
# 6 Marine Drive/Sundial Road	F	182.3	0.000	F	182.3	0.000	+ 0.000 D/V
# 7 257th Drive/Cherry Park Road (	F	122.8	1.285	F	122.8	1.285	+ 0.000 D/V
# 8 Troutdale Road/Stark Street	E	61.7	1.044	E	61.7	1.044	+ 0.000 D/V
# 9 Troutdale Road/17th Street	B	17.7	0.750	B	17.7	0.750	+ 0.000 D/V
# 10 Cherry Park Road/Buxton Street	B	13.4	0.536	B	13.4	0.536	+ 0.000 D/V
# 11 257th Drive/Historic Columbia	E	60.1	0.987	E	60.1	0.987	+ 0.000 D/V

Troutdale TSP
Action Plan
2025 PM Peak Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #1 Buxton Road/Historic Columbia River Highway

Cycle (sec):	100	Critical Vol./Cap. (X):	0.704
Loss Time (sec):	8 (Y+R = 4 sec)	Average Delay (sec/veh):	14.8
Optimal Cycle:	49	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0	0	1! 0	0	0	0 0	0	0	1 0	0	1	0 0
Volume Module:												
Base Vol:	198	0	51	0	0	0	0	257	616	59	218	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	198	0	51	0	0	0	0	257	616	59	218	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	198	0	51	0	0	0	0	257	616	59	218	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	198	0	51	0	0	0	0	257	616	59	218	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	198	0	51	0	0	0	0	257	616	59	218	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.94	1.00	0.94	1.00	1.00	1.00	1.00	0.91	0.91	0.75	0.75	1.00
Lanes:	0.80	0.00	0.20	0.00	0.00	0.00	0.00	0.29	0.71	0.21	0.79	0.00
Final Sat.:	1413	0	364	0	0	0	0	506	1213	305	1126	0
Capacity Analysis Module:												
Vol/Sat:	0.14	0.00	0.14	0.00	0.00	0.00	0.00	0.51	0.51	0.19	0.19	0.00
Crit Moves:			****					****				
Green/Cycle:	0.20	0.00	0.20	0.00	0.00	0.00	0.00	0.72	0.72	0.72	0.72	0.00
Volume/Cap:	0.70	0.00	0.70	0.00	0.00	0.00	0.00	0.70	0.70	0.27	0.27	0.00
Delay/Veh:	43.6	0.0	43.6	0.0	0.0	0.0	0.0	9.8	9.8	5.0	5.0	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	43.6	0.0	43.6	0.0	0.0	0.0	0.0	9.8	9.8	5.0	5.0	0.0
HCM2kAvg:	9	0	9	0	0	0	0	16	16	4	4	0

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2000 HCM Operations Method (Base Volume Alternative)

Intersection #2 I-84 WB Ramps/Marine Road

Cycle (sec):	50	Critical Vol./Cap. (X):	0.744
Loss Time (sec):	8 (Y+R = 4 sec)	Average Delay (sec/veh):	15.5
Optimal Cycle:	48	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0	0	0 0 0	0	0	2 0 1	0	0	0 0 0	0	1	1 0 0
Volume Module:												
Base Vol:	0	0	0	0	810	214	0	0	0	475	920	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	0	810	214	0	0	0	475	920	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	0	810	214	0	0	0	475	920	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	0	810	214	0	0	0	475	920	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	0	0	0	810	214	0	0	0	475	920	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	0.95	0.95	0.95	0.90	0.81	0.95	0.95	0.95	0.90	0.90	0.95
Lanes:	0.00	0.00	0.00	0.00	2.00	1.00	0.00	0.00	0.00	0.68	1.32	0.00
Final Sat.:	0	0	0	0	3420	1530	0	0	0	1165	2256	0
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.00	0.24	0.14	0.00	0.00	0.00	0.41	0.41	0.00
Crit Moves:					****						****	
Green/Cycle:	0.00	0.00	0.00	0.00	0.32	0.32	0.00	0.00	0.00	0.55	0.55	0.00
Volume/Cap:	0.00	0.00	0.00	0.00	0.74	0.44	0.00	0.00	0.00	0.74	0.74	0.00
Delay/Veh:	0.0	0.0	0.0	0.0	21.1	16.8	0.0	0.0	0.0	12.0	12.0	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	0.0	21.1	16.8	0.0	0.0	0.0	12.0	12.0	0.0
HCM2kAvg:	0	0	0	0	9	4	0	0	0	12	12	0

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2000 HCM Operations Method (Base Volume Alternative)

Intersection #3 I-84 EB Ramps/Marine Road

Cycle (sec):	60	Critical Vol./Cap. (X):	0.942
Loss Time (sec):	12 (Y+R = 4 sec)	Average Delay (sec/veh):	29.5
Optimal Cycle:	93	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0	0	0	0	1	0	1	1	0	0	0	1	1	1	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	5	419	856	0	0	732	1009	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	5	419	856	0	0	732	1009	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	5	419	856	0	0	732	1009	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	5	419	856	0	0	732	1009	0	0	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	0	5	419	856	0	0	732	1009	0	0	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	0.95	0.82	0.89	0.89	0.95	0.95	0.82	0.82	0.95	0.95	0.95
Lanes:	0.00	0.00	1.00	0.66	1.34	0.00	0.00	1.26	1.74	0.00	0.00	0.00
Final Sat.:	0	0	1557	1106	2259	0	0	1969	2715	0	0	0
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.38	0.38	0.00	0.00	0.37	0.37	0.00	0.00	0.00
Crit Moves:			****	****				****				
Green/Cycle:	0.00	0.00	0.00	0.40	0.40	0.00	0.00	0.39	0.39	0.00	0.00	0.00
Volume/Cap:	0.00	0.00	0.94	0.94	0.94	0.00	0.00	0.94	0.94	0.00	0.00	0.00
Delay/Veh:	0.0	0.0	378.4	30.4	30.4	0.0	0.0	27.8	27.8	0.0	0.0	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	378.4	30.4	30.4	0.0	0.0	27.8	27.8	0.0	0.0	0.0
HCM2kAvg:	0	0	1	17	17	0	0	16	16	0	0	0

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2000 HCM Operations Method (Base Volume Alternative)

Intersection #4 I-84 EB Ramps/Graham Road

Cycle (sec):	90	Critical Vol./Cap. (X):	0.339
Loss Time (sec):	8 (Y+R = 4 sec)	Average Delay (sec/veh):	13.9
Optimal Cycle:	25	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Split Phase			Split Phase		
Rights:	Include			Include			Ovl			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0	0	2	0	1	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0
Volume Module:												
Base Vol:	0	1192	142	0	0	0	222	229	754	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	1192	142	0	0	0	222	229	754	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	1192	142	0	0	0	222	229	754	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	1192	142	0	0	0	222	229	754	0	0	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	1192	142	0	0	0	222	229	754	0	0	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	0.90	0.81	0.95	0.95	0.95	0.84	0.84	0.84	0.95	0.95	0.95
Lanes:	0.00	2.00	1.00	0.00	0.00	0.00	1.00	0.47	1.53	0.00	0.00	0.00
Final Sat.:	0	3420	1530	0	0	0	1593	742	2444	0	0	0
Capacity Analysis Module:												
Vol/Sat:	0.00	0.35	0.09	0.00	0.00	0.00	0.14	0.31	0.31	0.00	0.00	0.00
Crit Moves:		****							****			
Green/Cycle:	0.00	0.48	0.48	0.00	0.00	0.00	0.43	0.43	0.91	0.00	0.00	0.00
Volume/Cap:	0.00	0.72	0.19	0.00	0.00	0.00	0.33	0.72	0.34	0.00	0.00	0.00
Delay/Veh:	0.0	20.0	13.4	0.0	0.0	0.0	17.4	23.2	0.6	0.0	0.0	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	20.0	13.4	0.0	0.0	0.0	17.4	23.2	0.6	0.0	0.0	0.0
HCM2kAvg:	0	14	2	0	0	0	5	13	2	0	0	0

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2000 HCM Operations Method (Base Volume Alternative)

Intersection #5 I-84 WB Ramps/Graham Road

Cycle (sec): 60 Critical Vol./Cap. (X): 0.792
Loss Time (sec): 12 (Y+R = 4 sec) Average Delay (sec/veh): 20.8
Optimal Cycle: 62 Level Of Service: C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1	1	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	1140	229	0	0	0	279	0	0	0	0	175	22
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	1140	229	0	0	0	279	0	0	0	0	175	22
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	1140	229	0	0	0	279	0	0	0	0	175	22
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	1140	229	0	0	0	279	0	0	0	0	175	22
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	1140	229	0	0	0	279	0	0	0	0	175	22
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.91	0.91	0.95	0.95	0.95	0.82	0.95	0.95	0.95	0.95	0.88	0.88
Lanes:	1.67	0.33	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.78	0.22
Final Sat.:	2878	578	0	0	0	1557	0	0	0	0	2987	375
Capacity Analysis Module:												
Vol/Sat:	0.40	0.40	0.00	0.00	0.00	0.18	0.00	0.00	0.00	0.00	0.06	0.06
Crit Moves:	****					****					****	
Green/Cycle:	0.50	0.50	0.00	0.00	0.00	0.23	0.00	0.00	0.00	0.00	0.07	0.07
Volume/Cap:	0.79	0.79	0.00	0.00	0.00	0.79	0.00	0.00	0.00	0.00	0.79	0.79
Delay/Veh:	15.0	15.0	0.0	0.0	0.0	33.5	0.0	0.0	0.0	0.0	43.1	43.1
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	15.0	15.0	0.0	0.0	0.0	33.5	0.0	0.0	0.0	0.0	43.1	43.1
HCM2kAvg:	13	13	0	0	0	7	0	0	0	0	4	4

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Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #6 Marine Drive/Sundial Road

Average Delay (sec/veh): 61.1 Worst Case Level Of Service: F[182.3]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0	0	0	0	0	1	1	0	1	0	0	0
Volume Module:												
Base Vol:	0	0	0	275	0	236	202	598	0	0	214	26
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	275	0	236	202	598	0	0	214	26
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	275	0	236	202	598	0	0	214	26
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	0	0	275	0	236	202	598	0	0	214	26
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	6.4	xxxx	6.2	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	3.5	xxxx	3.3	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	1229	xxxx	227	240	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	198	xxxx	817	1339	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	175	xxxx	817	1339	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	1.57	xxxx	0.29	0.15	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
Queue:	xxxxx	xxxx	xxxxx	18.1	xxxx	1.2	0.5	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Stopped Del:	xxxxx	xxxx	xxxxx	329.1	xxxx	11.2	8.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	F	*	B	A	*	*	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd StpDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			182.3			xxxxxx			xxxxxx		
ApproachLOS:	*			F			*			*		

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Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #7 257th Drive/Cherry Park Road (South)

Cycle (sec): 100 Critical Vol./Cap. (X): 1.285
Loss Time (sec): 16 (Y+R = 4 sec) Average Delay (sec/veh): 122.8
Optimal Cycle: 180 Level Of Service: F

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1	0	1	1	0	1	0	1	1	0	1	0	0	1	0	1	0	0	1	0
Volume Module:												
Base Vol:	309	1041	18	16	1886	212	233	6	489	23	13	9
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	309	1041	18	16	1886	212	233	6	489	23	13	9
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	309	1041	18	16	1886	212	233	6	489	23	13	9
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	309	1041	18	16	1886	212	233	6	489	23	13	9
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	309	1041	18	16	1886	212	233	6	489	23	13	9
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	0.95	0.95	0.95	0.94	0.94	0.95	0.85	0.85	0.95	0.94	0.94
Lanes:	1.00	1.97	0.03	1.00	1.80	0.20	1.00	0.01	0.99	1.00	0.59	0.41
Final Sat.:	1805	3538	61	1805	3197	359	1805	20	1599	1805	1054	730
Capacity Analysis Module:												
Vol/Sat:	0.17	0.29	0.29	0.01	0.59	0.59	0.13	0.31	0.31	0.01	0.01	0.01
Crit Moves:	****				****			****		****		
Green/Cycle:	0.13	0.57	0.57	0.02	0.46	0.46	0.23	0.24	0.24	0.01	0.02	0.02
Volume/Cap:	1.29	0.51	0.51	0.51	1.29	1.29	0.57	1.29	1.29	1.29	0.57	0.57
Delay/Veh:	199.5	13.0	13.0	62.3	160	160.3	36.3	185	184.9	363.3	67.3	67.3
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	199.5	13.0	13.0	62.3	160	160.3	36.3	185	184.9	363.3	67.3	67.3
HCM2kAvg:	21	10	10	1	62	62	7	31	31	3	2	2

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Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #8 Troutdale Road/Stark Street

Cycle (sec): 100 Critical Vol./Cap. (X): 1.044
Loss Time (sec): 16 (Y+R = 4 sec) Average Delay (sec/veh): 61.7
Optimal Cycle: 180 Level Of Service: E

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Prot+Permit			Prot+Permit			Prot+Permit			Prot+Permit		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1	0	0	1	0	1	0	0	1	0	1	0	1	1	0	1	0	0	1	0
Volume Module:												
Base Vol:	292	194	37	217	419	117	184	524	676	58	548	81
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	292	194	37	217	419	117	184	524	676	58	548	81
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	292	194	37	217	419	117	184	524	676	58	548	81
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	292	194	37	217	419	117	184	524	676	58	548	81
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	292	194	37	217	419	117	184	524	676	58	548	81
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.76	0.98	0.98	0.95	0.97	0.97	0.66	0.87	0.87	0.67	0.98	0.98
Lanes:	1.00	0.84	0.16	1.00	0.78	0.22	1.00	1.00	1.00	1.00	0.87	0.13
Final Sat.:	1448	1557	297	1805	1436	401	1250	1653	1653	1280	1624	240
Capacity Analysis Module:												
Vol/Sat:	0.20	0.12	0.12	0.12	0.29	0.29	0.15	0.32	0.41	0.05	0.34	0.34
Crit Moves:	****				****		****				****	
Green/Cycle:	0.37	0.22	0.22	0.47	0.27	0.27	0.45	0.38	0.38	0.35	0.32	0.32
Volume/Cap:	0.83	0.57	0.57	0.40	1.06	1.06	0.74	0.83	1.07	0.44	1.06	1.06
Delay/Veh:	41.5	37.0	37.0	17.5	94.1	94.1	27.7	31.9	77.4	26.6	89.0	89.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	41.5	37.0	37.0	17.5	94.1	94.1	27.7	31.9	77.4	26.6	89.0	89.0
HCM2kAvg:	11	7	7	5	25	25	7	17	31	2	29	29

Troutdale TSP
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Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #9 Troutdale Road/17th Street

Cycle (sec): 100 Critical Vol./Cap. (X): 0.750
Loss Time (sec): 8 (Y+R = 4 sec) Average Delay (sec/veh): 17.7
Optimal Cycle: 56 Level Of Service: B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0	0	1! 0	0	0	1! 0	0	0	1! 0	0	0	1! 0
Volume Module:												
Base Vol:	27	358	69	43	805	85	73	162	38	24	89	45
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	27	358	69	43	805	85	73	162	38	24	89	45
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	27	358	69	43	805	85	73	162	38	24	89	45
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	27	358	69	43	805	85	73	162	38	24	89	45
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	27	358	69	43	805	85	73	162	38	24	89	45
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.91	0.91	0.91	0.95	0.95	0.95	0.82	0.82	0.82	0.88	0.88	0.88
Lanes:	0.06	0.79	0.15	0.05	0.86	0.09	0.27	0.59	0.14	0.15	0.57	0.28
Final Sat.:	103	1360	262	83	1561	165	418	928	218	255	944	477
Capacity Analysis Module:												
Vol/Sat:	0.26	0.26	0.26	0.52	0.52	0.52	0.17	0.17	0.17	0.09	0.09	0.09
Crit Moves:					****			****				
Green/Cycle:	0.69	0.69	0.69	0.69	0.69	0.69	0.23	0.23	0.23	0.23	0.23	0.23
Volume/Cap:	0.38	0.38	0.38	0.75	0.75	0.75	0.75	0.75	0.75	0.41	0.41	0.41
Delay/Veh:	6.8	6.8	6.8	12.7	12.7	12.7	44.1	44.1	44.1	33.2	33.2	33.2
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	6.8	6.8	6.8	12.7	12.7	12.7	44.1	44.1	44.1	33.2	33.2	33.2
HCM2kAvg:	6	6	6	20	20	20	11	11	11	5	5	5

Troutdale TSP
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Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #10 Cherry Park Road/Buxton Street

Cycle (sec): 100 Critical Vol./Cap. (X): 0.536
Loss Time (sec): 12 (Y+R = 4 sec) Average Delay (sec/veh): 13.4
Optimal Cycle: 43 Level Of Service: B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Permitted			Split Phase			Split Phase		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1	0	1 0	0	0	0 1	0	0	1! 0	0	0	0 1 0
Volume Module:												
Base Vol:	47	223	0	0	620	68	42	0	91	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	47	223	0	0	620	68	42	0	91	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	47	223	0	0	620	68	42	0	91	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	47	223	0	0	620	68	42	0	91	0	0	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	47	223	0	0	620	68	42	0	91	0	0	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	1.00	1.00	1.00	0.99	0.99	0.89	1.00	0.89	1.00	1.00	1.00
Lanes:	1.00	1.00	0.00	0.00	0.90	0.10	0.32	0.00	0.68	0.00	1.00	0.00
Final Sat.:	1805	1900	0	0	1690	185	536	0	1162	0	1900	0
Capacity Analysis Module:												
Vol/Sat:	0.03	0.12	0.00	0.00	0.37	0.37	0.08	0.00	0.08	0.00	0.00	0.00
Crit Moves:	****				****				****			
Green/Cycle:	0.05	0.73	0.00	0.00	0.69	0.69	0.15	0.00	0.15	0.00	0.00	0.00
Volume/Cap:	0.54	0.16	0.00	0.00	0.54	0.54	0.54	0.00	0.54	0.00	0.00	0.00
Delay/Veh:	52.8	4.1	0.0	0.0	8.3	8.3	41.8	0.0	41.8	0.0	0.0	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	52.8	4.1	0.0	0.0	8.3	8.3	41.8	0.0	41.8	0.0	0.0	0.0
HCM2kAvg:	2	2	0	0	11	11	5	0	5	0	0	0

Troutdale TSP
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Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

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Intersection #11 257th Drive/Historic Columbia River Highway

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Cycle (sec): 120 Critical Vol./Cap. (X): 0.987
Loss Time (sec): 16 (Y+R = 4 sec) Average Delay (sec/veh): 60.1
Optimal Cycle: 180 Level Of Service: E

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Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:		Include			Include			Include			Include	
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0	1	1 0	1 0	1	1 0	1 0	1	0 1	1 0	1	0 1
Volume Module:												
Base Vol:	155	842	131	534	1653	231	144	247	236	125	176	256
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	155	842	131	534	1653	231	144	247	236	125	176	256
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	155	842	131	534	1653	231	144	247	236	125	176	256
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	155	842	131	534	1653	231	144	247	236	125	176	256
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	155	842	131	534	1653	231	144	247	236	125	176	256
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	0.93	0.93	0.95	0.93	0.93	0.95	1.00	0.85	0.95	1.00	0.85
Lanes:	1.00	1.73	0.27	1.00	1.75	0.25	1.00	1.00	1.00	1.00	1.00	1.00
Final Sat.:	1805	3061	476	1805	3110	435	1805	1900	1615	1805	1900	1615
Capacity Analysis Module:												
Vol/Sat:	0.09	0.28	0.28	0.30	0.53	0.53	0.08	0.13	0.15	0.07	0.09	0.16
Crit Moves:	****				****		****					****
Green/Cycle:	0.09	0.30	0.30	0.32	0.54	0.54	0.08	0.16	0.16	0.08	0.16	0.16
Volume/Cap:	0.99	0.91	0.91	0.91	0.99	0.99	0.99	0.79	0.89	0.89	0.58	0.99
Delay/Veh:	122.5	52.1	52.1	57.7	44.9	44.9	125.6	61.3	78.3	100.3	49.3	102.4
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	122.5	52.1	52.1	57.7	44.9	44.9	125.6	61.3	78.3	100.3	49.3	102.4
HCM2kAvg:	10	21	21	24	41	41	9	11	12	8	7	14

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This project is partially funded by a grant from the Transportation and Growth Management (TGM) Program, a joint program of the Oregon Department of Transportation (ODOT) and the Oregon Department of Land Conservation and Development (DLCD). This TGM grant is financed, in part, by federal Transportation Equity Act for the 21st Century (TEA-21), local government, and State of Oregon funds. The contents of this document do not necessarily reflect views or policies of the State of Oregon.

Acknowledgements

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