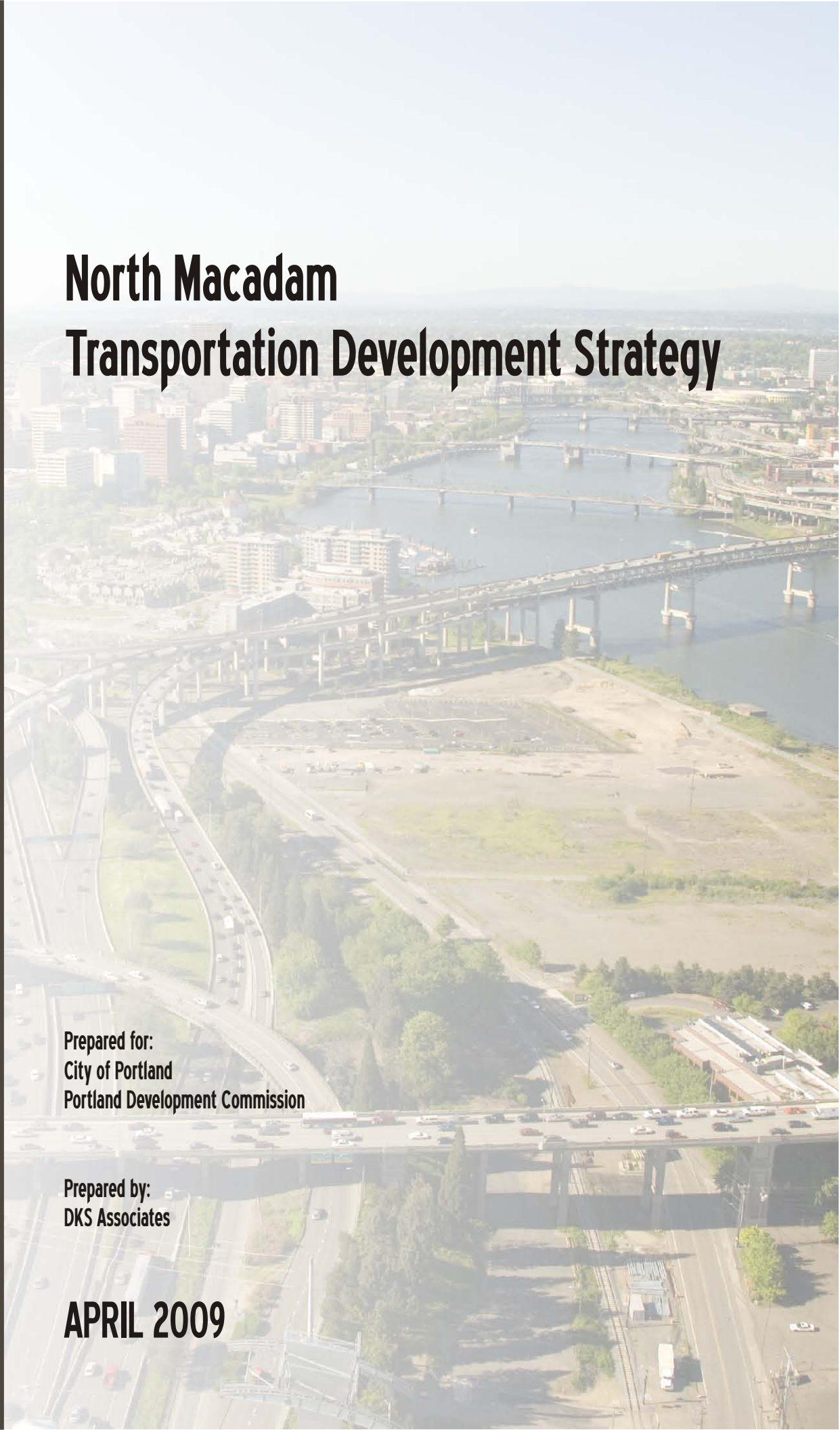
NORTH MACADAM TRANSPORTATION DEVELOPMENT STRATEGY

North Macadam Transportation Development Strategy



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City of Portland
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CHAPTER

1

EXECUTIVE SUMMARY

INTENT OF STRATEGY

The purpose of this study was to develop a plan for multimodal transportation projects to accommodate future development within the North Macadam Urban Renewal Area (URA). Previous transportation studies and plans have addressed different components of the North Macadam URA. This study was intended to confirm, modify, unify, and add to previous findings and analyze those areas not yet studied. This study identifies the need for both short term (the next 10 years) and long term (the next 20 years) transportation projects, as well as prioritized projects, and establishes approximate year of need and prioritization for projects. The outcome is a comprehensive multimodal transportation plan with project recommendations that support the planned development in the North Macadam URA over the next 20 years.

View of the northern portion of the North Macadam Urban Renewal Area (north of the Ross Island Bridge).

The North Macadam URA is expected to develop with residential, business and institutional uses over the next 20 years. Based on land use and trip generation assumptions in the North Macadam URA, trips are expected to increase by over 400% by the year 2030[1], making transportation improvements critical to access and circulation for the area.

[1] *Chapter 4: Assumptions and Methodology* details the growth in trips and explains how the 400% growth rate was obtained. The growth was based on land use assumptions used in the regional travel demand model.

The projects developed in this study address five key modes of transportation:

- Motor vehicle
- Freight
- Pedestrians
- Bicycles
- Transit (light rail, buses, and street car)

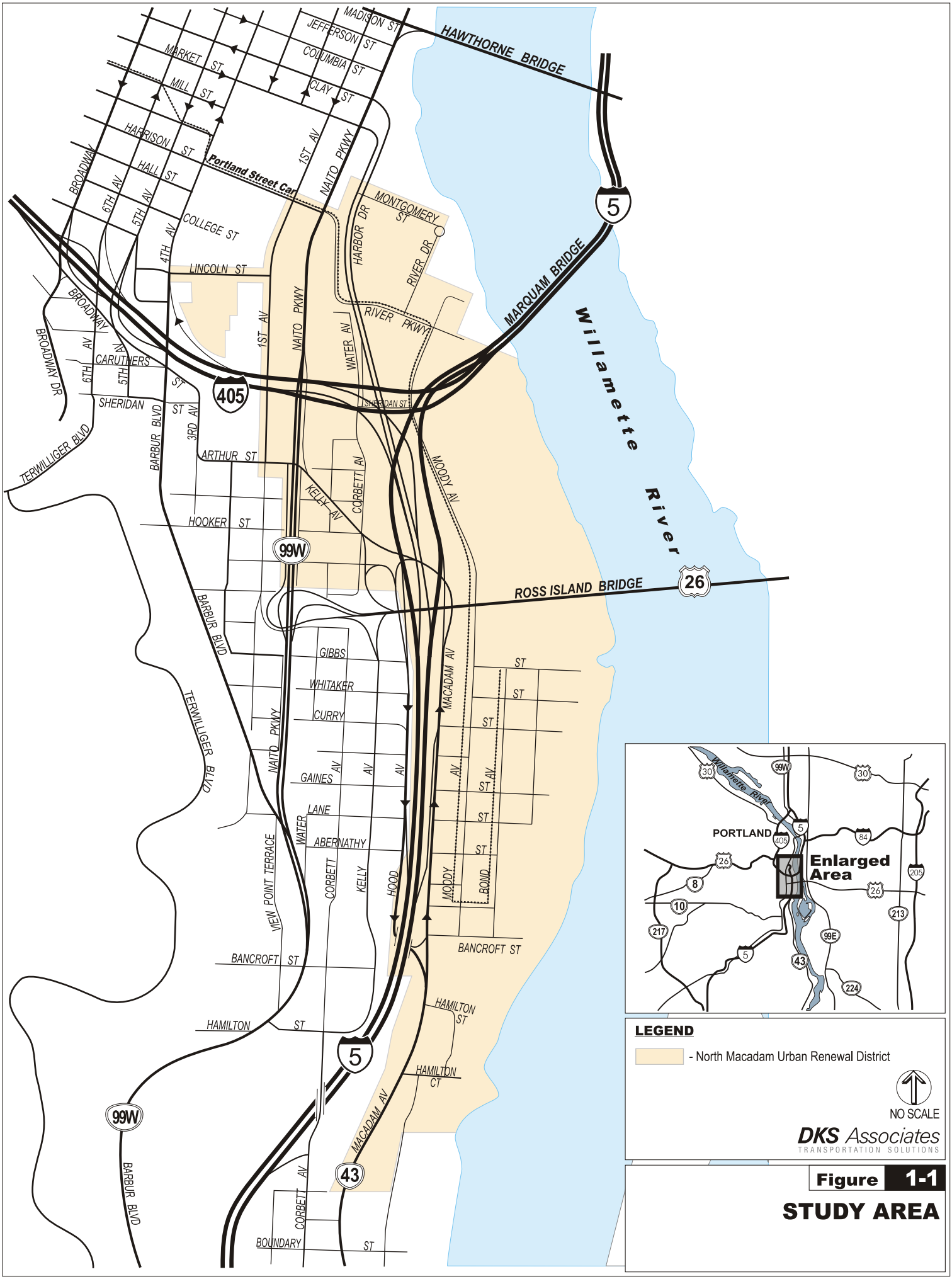
STUDY AREA

The study intersections fall within the North Macadam URA district, as well as select intersections adjacent to the district that were of significant interest. The North Macadam URA encompasses land bordered by the Willamette River to the east, Montgomery Street and Harrison Street to the north, SW 1st Avenue, SW Naito Parkway, SW Macadam Avenue, and SW Hood Avenue to the west, and the southern boundary is approximately 1,000 feet south of Hamilton Court. In Figure 1-1 the North Macadam URA is shown.

The study area encompasses roadways under the jurisdiction of both City of Portland (PDOT) and Oregon Department of Transportation (ODOT). Each agency has its own traffic operation standards (detailed further in Chapter 7) and agency goals can conflict. For example, ODOT prioritizes regional transportation while PDOT places a priority or local trips. With two separate agencies owning and operating roadways adjacent to each other, challenges were present in developing this transportation strategy.

PROCESS

The North Macadam Transportation Development Strategy was developed with coordination among a Project Management Team (PMT), a Technical Advisory Committee (TAC), a Stakeholder Advisory Committee (SAC) and members of the community. Regular meetings were held between the PMT and the advisory committees to gain input and guidance throughout the course of the project. The SAC meetings were public meetings where community members were welcome to provide input to the process. Two open houses were also held at critical points of the project to get feedback from a broader range of the community. Also, the City's Project Manager made visits to the South Portland Neighborhood Association, Bicycle Advisory Committee, Pedestrian Advisory Committee, and Freight Advisory Committee for input from the broader community.


HAWTHORNE BRIDGE
MARQUAM BRIDGE
ROSS ISLAND BRIDGE
Willamette River
MADISON ST
JEFFERSON ST
COLUMBIA ST
CLAY ST
MARKET ST
MILL ST
HARRISON ST
HALL ST
COLLEGE ST
LINCOLN ST
SHERIDAN ST
ARTHUR ST
HOOKER ST
GIBBS ST
WHITAKER ST
CURRY ST
GAINES ST
LANE ST
ABERNATHY ST
BANCROFT ST
HAMILTON ST
HAMILTON CT
BOUNDARY ST
BROADWAY
6TH AV
5TH AV
4TH AV
1ST AV
BROADWAY DR
CARUTHERS ST
3RD AV
BARBUR BLVD
TERWILLIGER BLVD
NAITO PKWY
HARBOR DR
MONTGOMERY ST
RIVER DR
RIVER PKWY
WATER AV
KELLY AV
CORBETT AV
MOODY AV
MACADAM AV
BOND ST
HOOD AV
VIEW POINT TERRACE
Portland Street Car
405
99W
5
26
43
PORTLAND
Enlarged Area
LEGEND
- North Macadam Urban Renewal District
NO SCALE
DKS Associates
TRANSPORTATION SOLUTIONS
Figure 1-1
STUDY AREA

After the initial scoping process and needs assessment, the existing conditions were analyzed in the study area. A comprehensive list of potential bicycle, pedestrian, transit and motor vehicle projects were developed with input from the TAC, SAC and the various advisory committees. The transportation system was analyzed with future year 2030 traffic volumes and several different transportation projects were developed. Once the transportation projects were developed, each project was analyzed and then with combined input from the involved agencies and stakeholders, projects were recommended and prioritized for each mode of transportation.

The following Figure 1-2 illustrates the process of this study.

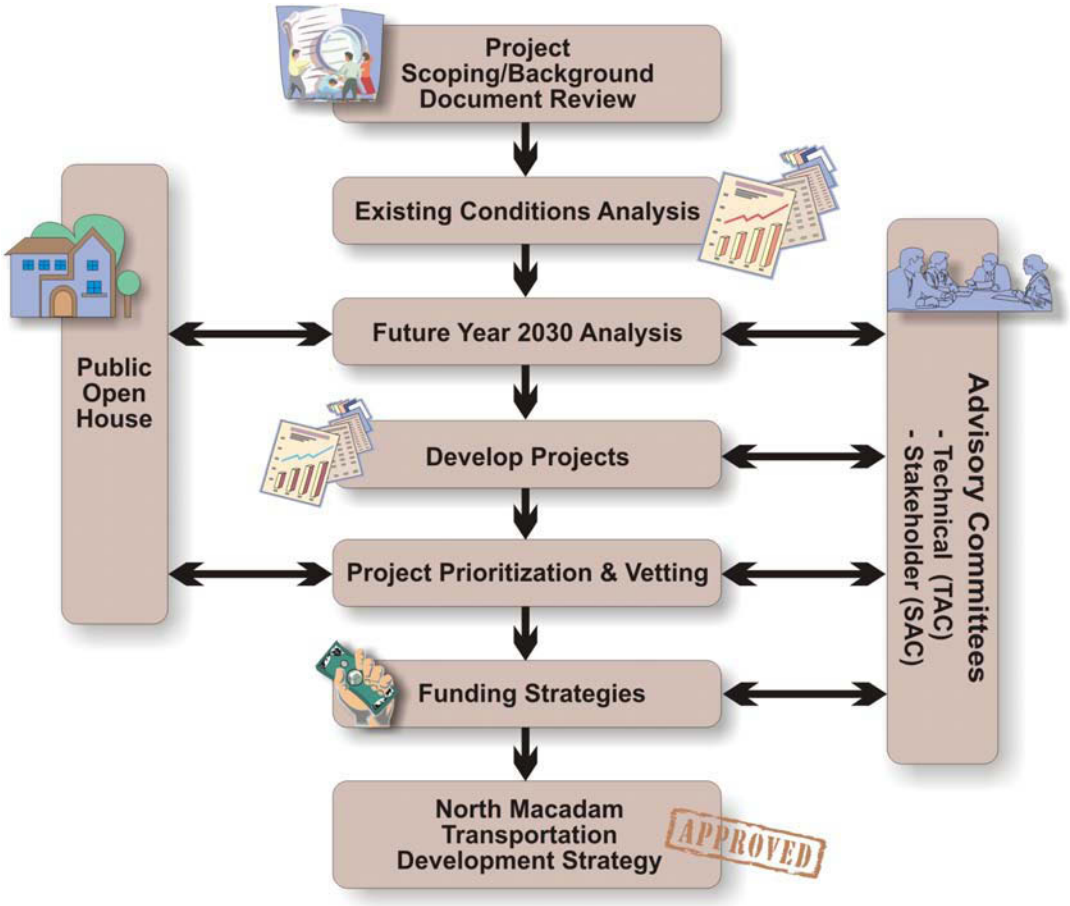


Figure 1-2: Project Process

Development of Projects
For each mode of transportation, projects were developed to address deficient areas. For bicycle, pedestrian and transit projects the deficiencies were often found through input from local community members. For motor vehicle projects, the deficient areas were determined using traffic software programs that model roadway conditions as well as from community input.

It is important to understand the process used to reach the final list of motor vehicle projects because certain lessons were learned along the way that changed the initial course of the project. At the start of the process, projects were developed that addressed three main areas:

- Regional connections to I-405, US-26 and I-5
- Ross Island Bridge connections on the west end of the bridge
- Local/arterial improvements to the North Macadam URA

The regional projects were the first area to be reevaluated for inclusion in this study. Although the regional connections are a critical component to the roadway network, there were several factors beyond the growth of the North Macadam URA contributing to the need for improvements on these facilities. The intent of this study was to evaluate and improve areas within and directly impacted by traffic to and from the North Macadam URA. Evaluation of the regional connections indicated that they were not a primary determinant of access to/from the district and they should be studied via a separate process.

Another project area involved evaluating the ramps at the west end of the Ross Island Bridge. The ramps to the Ross Island Bridge are immediately adjacent to the North Macadam URA, and originally, it made sense to address the redevelopment in this study. The reconfiguration of the bridge ramps has been a longstanding issue of residents of this area and was studied in detail in the South Portland Circulation Study accepted by Council in 2001. It was determined by city staff and community members that it was appropriate for this study to consider some alternative circulation ideas. The new alternatives developed in this strategy were intended to reflect the neighborhood interest to redevelop the area taken up by the ramps to and from the bridge, and establish a more pedestrian friendly and connected grid-like roadway network.

Some of the alternatives developed in this study process differ significantly from the recommended circulation option in the South Portland Circulation Study[2] from 2001. Although each of these new preliminary alternatives identified circulation benefits for multiples modes, there was enough difference from the previous study that additional detailed analysis and public involvement would be necessary to choose a new preferred alternative.

This amount of required process was beyond the scope and timeframe of this study.

This photograph shows the ramps at the west end of the Ross Island Bridge - looking southbound.

The final component of the motor vehicle projects consisted of local and arterial improvements. These projects focus on areas with a more direct impact to travelers to and from the North Macadam URA. These local and arterial improvement projects make up the list of motor vehicle projects analyzed and proposed in this study.

SUMMARY OF FINDINGS

The projects are organized by mode of transportation: pedestrian and bicycle, transit, and motor vehicle. In each mode projects are further categorized by priority level (high, medium or low). The prioritization was based on several factors in the analysis, as well as input from the advisory committees. Further detail about the prioritization process can be found in Chapters 5 through 7 for each transportation mode. The following pages give a brief overview of the recommended projects by transportation mode and priority. To begin with, the high priority and in-process projects are highlighted across all modes of transportation.

[2]South Portland Circulation Study, Report and Recommendations. City of Portland, June 2001.

High Priority/In Process Projects – All Modes

The in-process projects (listed in Table 1-1) are projects already moving forward and in the design phase that were assessed in previous studies. It is important to understand that this North Macadam Development Strategy does not alter anything for these in-process projects, but the projects are shown in this report to help complete the understanding of the future transportation network in the North Macadam URA.

Table 1-1: List of In-Process Projects for All Modes of Transportation

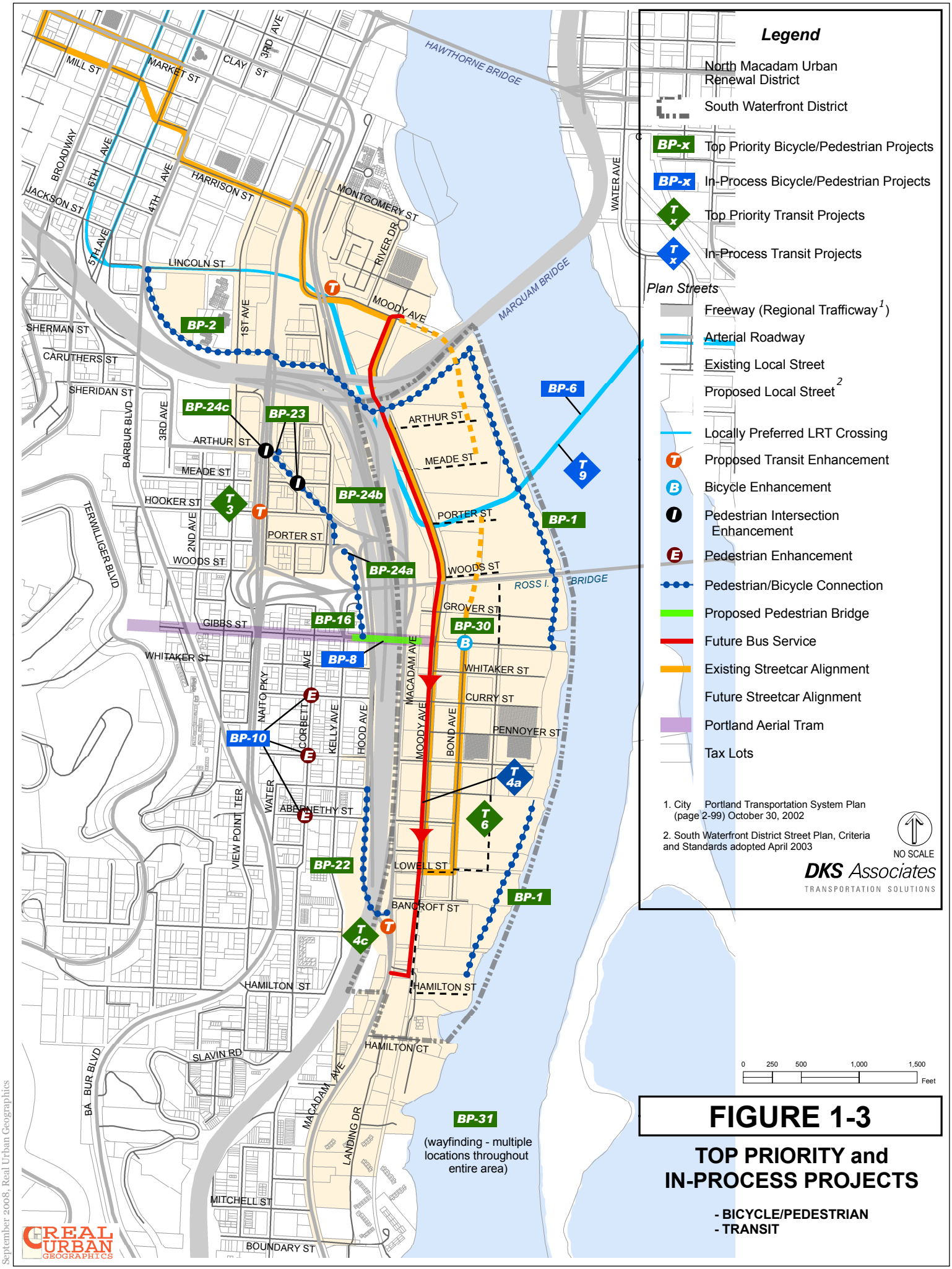
Project Map #	Project Name
Pedestrian - Bicycle Projects	
BP-6	Portland-Milwaukie Light Rail Bridge Project
BP-8	Gibbs Street Bridge and Crossing Enhancements
BP-10	Corbett Avenue Traffic Calming Project
Transit Projects	
T-3	Naito/Hooker Bus Stop Enhancement
T-4a	TriMet Line 35-Macadam Route Change and Stops
T-9	Light Rail Transit
Motor Vehicle Projects	
MV-1	Milwaukie Light Rail Traffic Signals and Improvement Project

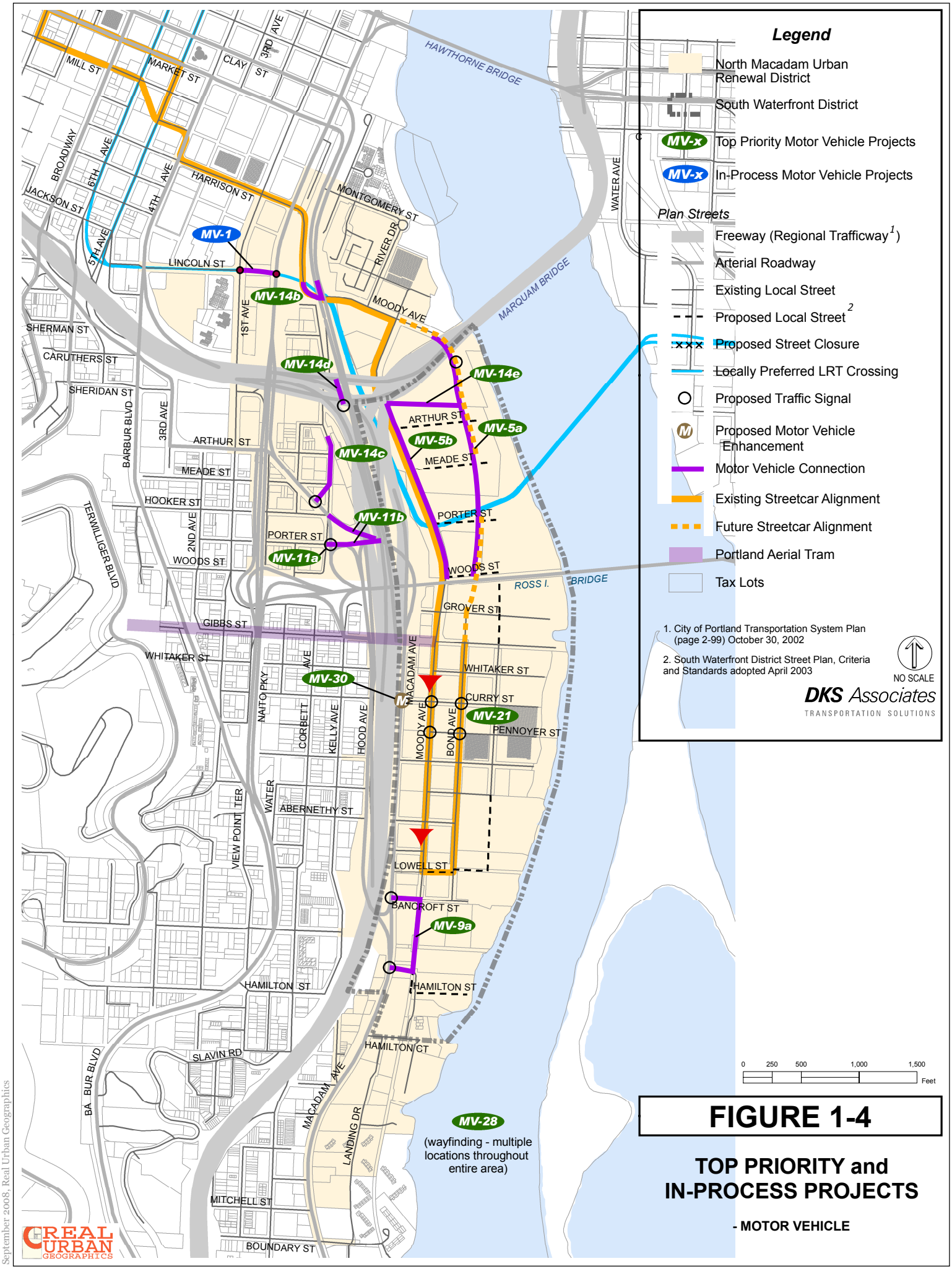
The high priority projects (listed in Table 1-2) are the main focus of this transportation development strategy.

Table 1-2: List of High Priority Projects for All Modes of Transportation

Project Map #	Project Name
Pedestrian - Bicycle Projects	
BP-1	South Waterfront Willamette Greenway Trail
BP-2	North of I-405 Connection
BP-16	Hood Avenue Sidewalk Enhancement – Porter St. to Gibbs St.
BP-22	Hood Avenue Crosswalk and Sidewalk Enhancement – Lane to Macadam
BP-23	Kelly Pedestrian Tunnel Closure and Crosswalk Replacement
BP-24a	BP-24a: West-end Ross Island Bridgehead Connection
BP-24b	BP-24b: Kelly Avenue bike lanes
BP-24c	BP-24c: Ramp Crossing of Kelly Ave to Naito Pkwy NB
BP-30	Tram Bike Parking
BP-31	Wayfinding
Transit Projects	
T-4c	Bancroft Transit Improvements
T-6	Streetcar Headways and Service Hours
Motor Vehicle Projects	
MV-5a	Moody/Bond Couplet - Bond Avenue Extension
MV-5b	Moody/Bond Couplet - Moody Avenue realignment
MV-9a	South Portal – phase 1
MV-11a	Porter/Kelly Signalization and Kelly slip ramp closure
MV-11b	Kelly Ramp realignment
MV-14b	North Portal: Harbor Drive/River Parkway Improvement
MV-14c	North Portal: Kelly Avenue/Corbett Avenue Improvement
MV-14d	North Portal: Southbound Harbor Drive/Sheridan Street Improvement
MV-14e	North Portal: Sheridan Extension (Moody to Bond)
MV-21	Signalize Intersections – South Waterfront District
MV-28	Motor Vehicle Wayfinding
MV-30	I-5 Northbound Off-Ramp/SW Curry Street – Northbound Right turn closure from I-5 Off-Ramp

To summarize the in process and high priority projects, two graphics show the projects by mode. Figure 1-3 shows the in process and high priority bicycle/pedestrian and transit projects, while Figure 1-4 shows the in process and high priority motor vehicle projects.


Legend
North Macadam Urban Renewal District
South Waterfront District
BP-x Top Priority Bicycle/Pedestrian Projects
BP-x In-Process Bicycle/Pedestrian Projects
T x Top Priority Transit Projects
T x In-Process Transit Projects
Plan Streets
Freeway (Regional Trafficway[1])
Arterial Roadway
Existing Local Street
Proposed Local Street[2]
Locally Preferred LRT Crossing
Proposed Transit Enhancement
Bicycle Enhancement
Pedestrian Intersection Enhancement
Pedestrian Enhancement
Pedestrian/Bicycle Connection
Proposed Pedestrian Bridge
Future Bus Service
Existing Streetcar Alignment
Future Streetcar Alignment
Portland Aerial Tram
Tax Lots
1. City Portland Transportation System Plan (page 2-99) October 30, 2002
2. South Waterfront District Street Plan, Criteria and Standards adopted April 2003
NO SCALE
DKS Associates
TRANSPORTATION SOLUTIONS
0 250 500 1,000 1,500 Feet
BP-2
BP-24c
BP-23
BP-24b
BP-24a
BP-16
BP-8
BP-10
BP-22
BP-6
BP-1
BP-30
BP-31
T 3
T 9
T 4a
T 6
T 4c
BP-31 (wayfinding - multiple locations throughout entire area)
HAWTHORNE BRIDGE
MARQUAM BRIDGE
ROSS I. BRIDGE
MILL ST
MARKET ST
CLAY ST
3RD AVE
BROADWAY
6TH AVE
4TH AVE
5TH AVE
JACKSON ST
HARRISON ST
MONTGOMERY ST
RIVER DR
WATER AVE
LINCOLN ST
MOODY AVE
1ST AVE
SHERMAN ST
CARUTHERS ST
SHERIDAN ST
BARBUR BLVD
3RD AVE
ARTHUR ST
MEADE ST
HOOKER ST
2ND AVE
PORTER ST
WOODS ST
TERWILLIGER BLVD
GIBBS ST
WHITAKER ST
NAITO PKY
CORBETT AVE
KELLY AVE
HOOD AVE
MACADAM AVE
BOND AVE
CURRY ST
PENNOYER ST
GROVER ST
WATER VIEW POINT TER
ABERNETHY ST
LOWELL ST
BANCROFT ST
HAMILTON ST
HAMILTON CT
SLAVIN RD
BA BUR BLVD
LANDING DR
MITCHELL ST
BOUNDARY ST
FIGURE 1-3
TOP PRIORITY and IN-PROCESS PROJECTS
- BICYCLE/PEDESTRIAN
- TRANSIT
September 2008, Real Urban Geographics
REAL URBAN GEOGRAPHICS


Legend
North Macadam Urban Renewal District
South Waterfront District
MV-x Top Priority Motor Vehicle Projects
MV-x In-Process Motor Vehicle Projects
Plan Streets
Freeway (Regional Trafficway[1])
Arterial Roadway
Existing Local Street
Proposed Local Street[2]
Proposed Street Closure
Locally Preferred LRT Crossing
Proposed Traffic Signal
Proposed Motor Vehicle Enhancement
Motor Vehicle Connection
Existing Streetcar Alignment
Future Streetcar Alignment
Portland Aerial Tram
Tax Lots
1. City of Portland Transportation System Plan (page 2-99) October 30, 2002
2. South Waterfront District Street Plan, Criteria and Standards adopted April 2003
NO SCALE
DKS Associates
TRANSPORTATION SOLUTIONS
0 250 500 1,000 1,500
Feet
MV-1
MV-14b
MV-14d
MV-14e
MV-5a
MV-5b
MV-14c
MV-11b
MV-11a
MV-30
MV-21
MV-9a
MV-28
(wayfinding - multiple locations throughout entire area)
HAWTHORNE BRIDGE
MARQUAM BRIDGE
ROSS I. BRIDGE
MILL ST
MARKET ST
CLAY ST
3RD AVE
BROADWAY
6TH AVE
4TH AVE
5TH AVE
JACKSON ST
HARRISON ST
MONTGOMERY ST
RIVER DR
WATER AVE
LINCOLN ST
1ST AVE
MOODY AVE
SHERMAN ST
CARUTHERS ST
SHERIDAN ST
BARBUR BLVD
3RD AVE
ARTHUR ST
MEADE ST
HOOKER ST
2ND AVE
TERWILLIGER BLVD
PORTER ST
WOODS ST
GROVER ST
GIBBS ST
WHITAKER ST
MACADAM AVE
NAITO PKY
CORBETT
KELLY AVE
HOOD AVE
MOODY AVE
BOND AVE
CURRY ST
PENNOYER ST
WATER
ABERNETHY ST
VIEW POINT TER
LOWELL ST
BANCROFT ST
HAMILTON ST
HAMILTON CT
SLAVIN RD
BA BUR BLVD
LANDING DR
MITCHELL ST
BOUNDARY ST
FIGURE 1-4
TOP PRIORITY and IN-PROCESS PROJECTS
- MOTOR VEHICLE
REAL URBAN GEOGRAPHICS
September 2008, Real Urban Geographics

Bicycle/Pedestrian Projects

Through the course of this project, several projects were developed to improve pedestrian and bicycle circulation. Table 1-3 lists all of the bike and pedestrian projects and Figure 1-5 shows all of the projects as well as the correlating priority level. *Chapter 5: Pedestrian and Bike Plan* provides greater detail about each of these projects.

Table 1-3: Proposed Pedestrian and Bicycle Projects

Project Map #	Project Name
BP-1	South Waterfront Willamette Greenway Trail
BP-2	North of I-405 Connection
BP-4	Arthur Street Tunnel
BP-5	Arthur Street Connection and Steps
BP-6	Portland-Milwaukie Light Rail Bridge Project
BP-7	Macadam/City Center Ramp Connection
BP-8	Gibbs Street Bridge and Crossing Enhancements
BP-9	Gaines Street Pedestrian Bridge
BP-10	Corbett Avenue Traffic Calming Project
BP-11	Hamilton Street to South Portal Pedestrian/Bicycle Connection
BP-12	Slavin Rd Connection to Red Electric Trail
BP-13	Naito Pkwy Curb-Cut to Hawthorne Bridge
BP-14 4	th Avenue/Lincoln Street Pedestrian Improvement
BP-16	Hood Avenue Sidewalk Enhancement – Porter St. to Gibbs St.
BP-18	South Moody Avenue Connection
BP-19 Rich	ardson Street Connection
BP-20	Gibbs Street Promenade
BP-21	Corbett Avenue Uphill Bike Lane – Boundary to Hamilton
BP-22	Hood Avenue Crosswalk and Sidewalk Enhancement – Lane to Macadam
BP-23	Kelly Pedestrian Tunnel Closure and Crosswalk Replacement
BP-24a	West-end Ross Island Bridgehead Connection
BP-24b	Kelly Avenue bike lanes
BP-24c	Ramp Crossing of Kelly Ave to Naito Pkwy NB
BP-25	Naito Pedestrian Crossing at Porter St
BP-26	Hooker Street Pedestrian Boulevard between Naito and Kelly
BP-28	Moody Ave/ River Parkway Sidewalk Cut-Back
BP-29	Bike Enhancement of Grover St Underpass at Naito Pkwy
BP-30	Tram Bike Parking
BP-31a	Wayfinding (bicycle)
BP-31b W	ayfinding (pedestrian)
BP-32	Gibbs Bridge To Light Rail Bike Connection
BP-33 SW	1st Avenue Bicycle Improvements
BP-34	Harrison Uphill Bike Treatment

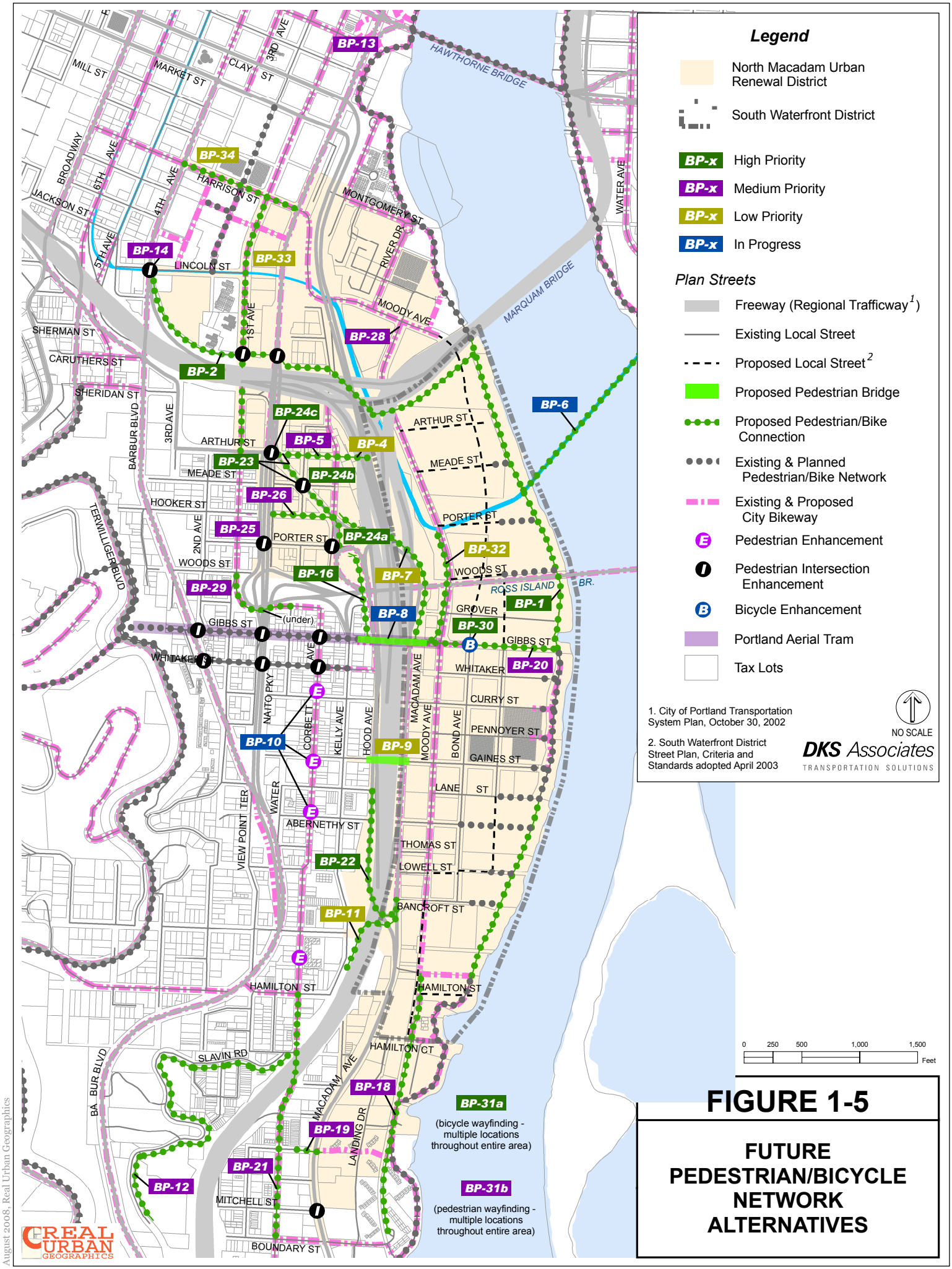


FIGURE 1-5

FUTURE PEDESTRIAN/BICYCLE NETWORK ALTERNATIVES

REAL URBAN GEOGRAPHICS

August 2008, Real Urban Geographics

Transit Projects

Through the course of this project, twelve transit projects were developed. These projects are listed in Table 1-4 and shown in Figure 1-6. For more detail about each of these transit projects, *Chapter 6: Transit Plan*, can be referenced.

Table 1-4: Proposed Transit Projects

Project Map #	Project Name
T-2	Multi-modal Transit Hub
T-3	Naito/Hooker Bus Stop Enhancement
T-4a	TriMet Line 35-Macadam Route Change and Stops
T-4b	North Portal Transit Improvements
T-4c	Bancroft Transit Improvements
T-5	Water Taxis
T-6	Streetcar Headways and Service Hours
T-8	Hamilton Street Funicular
T-9	Light Rail Transit
T-10	Bus Connection to National College of Natural Medicine
T-12	Streetcar to Lake Oswego
T-13	Streetcar through North District and Close the Loop

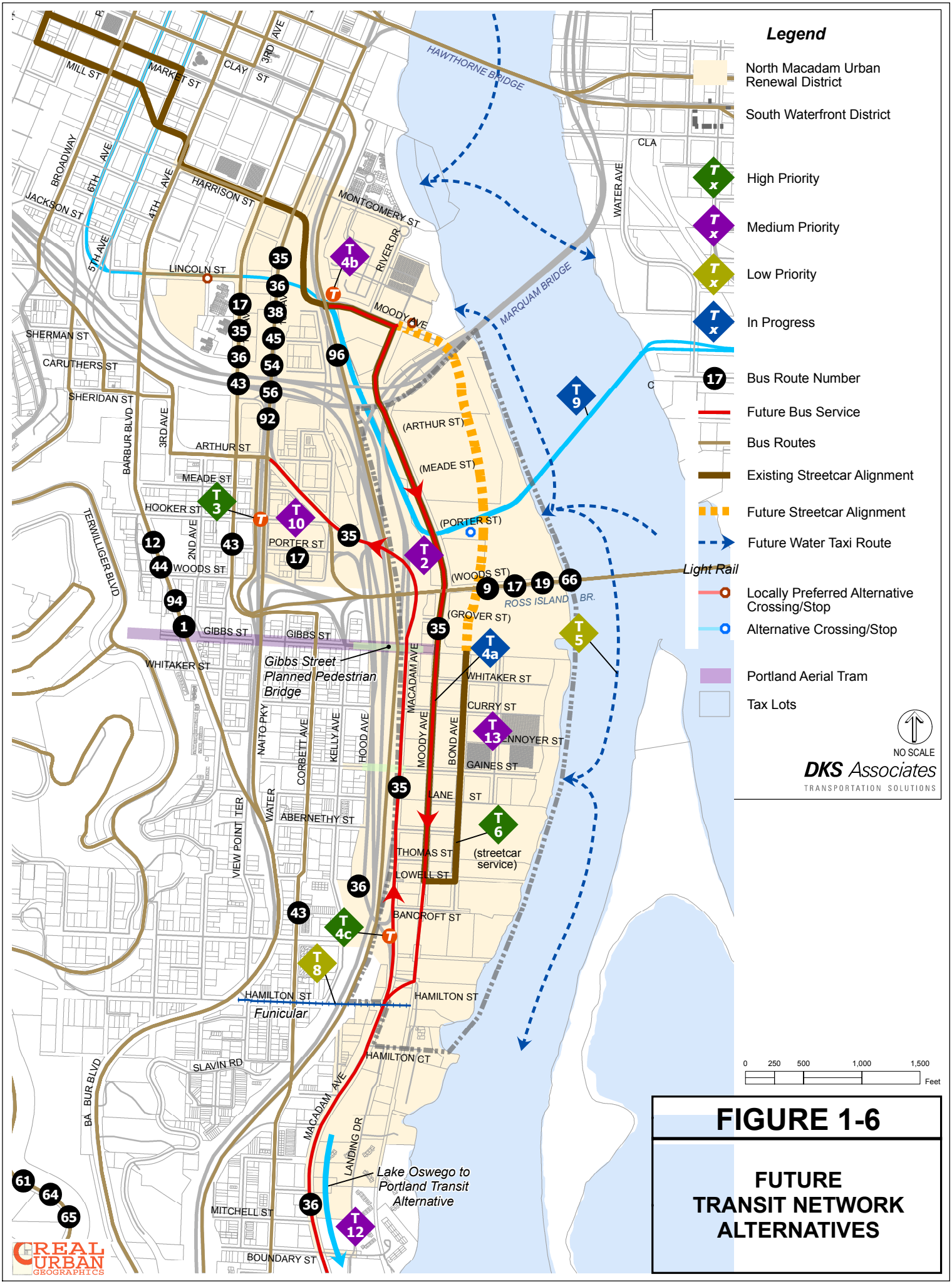


FIGURE 1-6

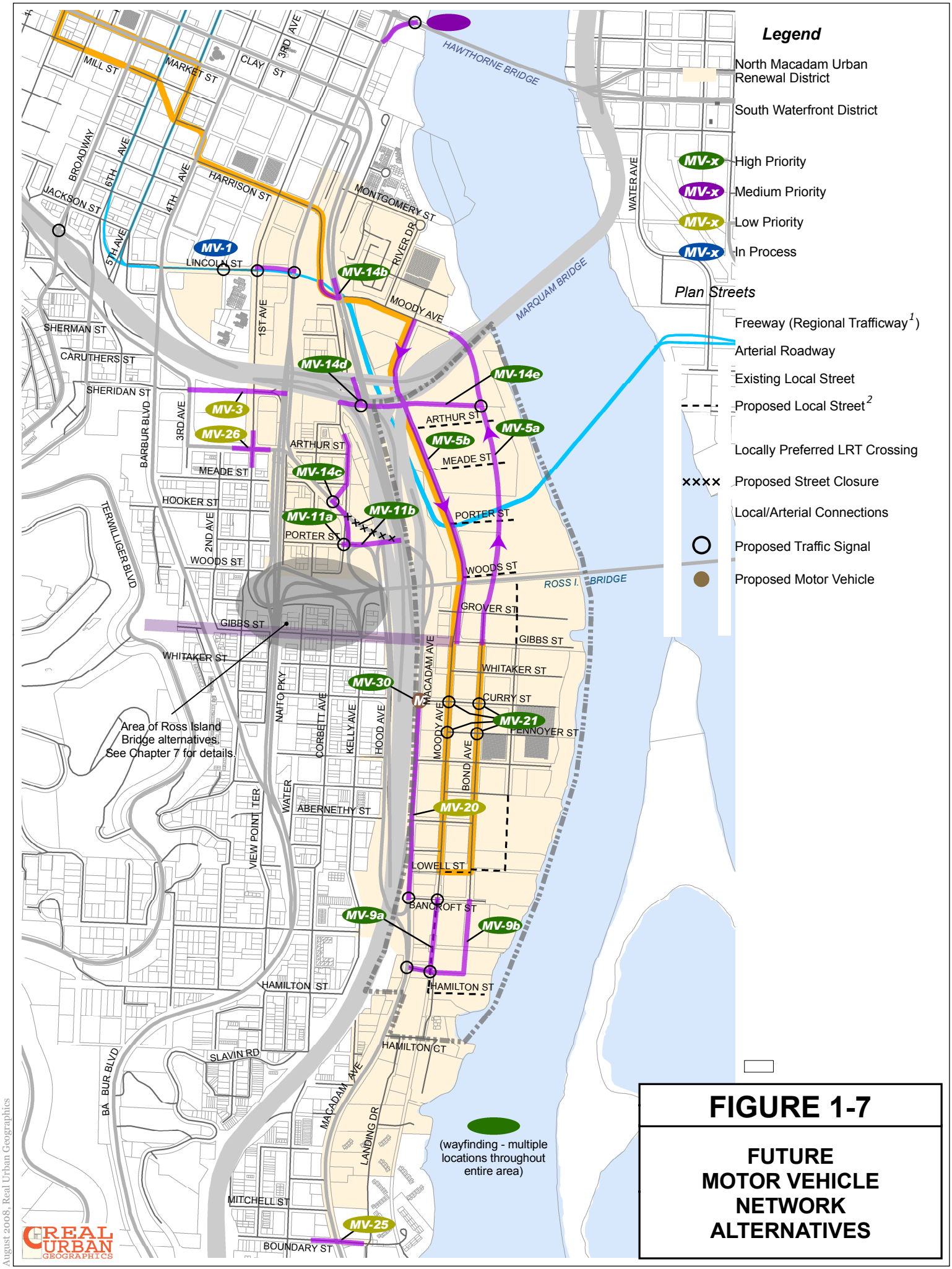
FUTURE TRANSIT NETWORK ALTERNATIVES

Motor Vehicle/Freight Projects

A total of 19 motor vehicle/freight projects were developed from this study. Several of the projects are related to one another but could be constructed independently or in phases. The motor vehicle projects are listed in Table 1-5 and show in Figure 1-7. For more detail about each of these motor vehicle projects, *Chapter 7: Motor Vehicle Plan*, can be referenced.

Table 1-5: Proposed Motor Vehicle Projects

Project Map #	Project Name
MV-1	Milwaukie Light Rail Traffic Signals and Improvement Project
MV-3	Sheridan Street Roadway Extension (SW 3rd Ave to SW Naito Parkway)
MV-5a	Moody/Bond Couplet - Bond Avenue Extension
MV-5b	Moody/Bond Couplet - Moody Avenue realignment
MV-9a	South Portal – phase 1
MV-9b	South Portal – phase 2
MV-11a	Porter/Kelly Improvement - Signalization and Kelly slip ramp closure
MV-11b	Porter/Kelly Improvement - Kelly Ramp realignment
MV-14b	North Portal: Harbor Drive/River Parkway Improvement
MV-14c	North Portal: Kelly Avenue/Corbett Avenue Improvement
MV-14d	North Portal: SB Harbor Drive/Sheridan Street Improvement
MV-14e	North Portal: Sheridan Street Extension (Moody Avenue to Bond Avenue)
MV-20	NB Macadam 3rd Lane
MV-21	Signalize Intersections – South Waterfront District
MV-24	Hawthorne Bridge/Naito Ramp Improvement
MV-25	SW Macadam Avenue /SW Boundary Street Improvement
MV-26	Arthur Street/1st Avenue Improvement
MV-28	Motor Vehicle Wayfinding
MV-30	I-5 Northbound Off-Ramp/SW Curry Street – Northbound Right turn closure from I-5 Off-Ramp


Legend
North Macadam Urban Renewal District
South Waterfront District
MV-x High Priority
MV-x Medium Priority
MV-x Low Priority
MV-x In Process
Plan Streets
Freeway (Regional Trafficway[1])
Arterial Roadway
Existing Local Street
Proposed Local Street[2]
Locally Preferred LRT Crossing
Proposed Street Closure
Local/Arterial Connections
Proposed Traffic Signal
Proposed Motor Vehicle
MV-1
MV-14b
MV-14d
MV-14e
MV-3
MV-26
MV-14c
MV-11a
MV-11b
MV-5a
MV-5b
MV-30
MV-21
MV-20
MV-9a
MV-9b
MV-25
HAWTHORNE BRIDGE
MARQUAM BRIDGE
ROSS I. BRIDGE
MILL ST
MARKET ST
CLAY ST
3RD AVE
BROADWAY
6TH AVE
5TH AVE
4TH AVE
JACKSON ST
HARRISON ST
MONTGOMERY ST
RIVER DR
WATER AVE
LINCOLN ST
1ST AVE
MOODY AVE
SHERMAN ST
CARUTHERS ST
SHERIDAN ST
BARBUR BLVD
3RD AVE
ARTHUR ST
MEADE ST
HOOKER ST
2ND AVE
WOODS ST
TERWILLIGER BLVD
PORTER ST
GROVER ST
GIBBS ST
WHITAKER ST
MACADAM AVE
CURRY ST
PENNOYER ST
MOODY AVE
BOND AVE
NAITO PKY
CORBETT AVE
KELLY AVE
HOOD AVE
WATER
ABERNETHY ST
VIEW POINT TER
LOWELL ST
BANCROFT ST
HAMILTON ST
HAMILTON CT
SLAVIN RD
BA BUR BLVD
LANDING DR
MITCHELL ST
BOUNDARY ST
Area of Ross Island Bridge alternatives. See Chapter 7 for details.
(wayfinding - multiple locations throughout entire area)
FIGURE 1-7
FUTURE MOTOR VEHICLE NETWORK ALTERNATIVES
REAL URBAN GEOGRAPHICS
August 2008, Real Urban Geographics

FUNDING STRATEGY

A comprehensive funding strategy to provide direction on the implementation of projects was also developed as part of this project. This approach was developed over several months and incorporated input from the TAC, SAC, and the North Macadam Urban Renewal Advisory Committee. The Funding Strategy includes a matrix identifying potential funding sources for each project. A variety of funding sources, both public and private, were considered, including, but not limited to, North Macadam Urban Renewal Area Tax Increment Financing, Transportation System Development Charges, Local, State and Federal grants, and private Local Improvement Districts.

FUNDING STRATEGY

The North Macadam Transportation Strategy funding strategy identifies both public and private funding sources that can be utilized to develop the transportation system in and around the North Macadam Urban Renewal Area. The funding strategy is intended to provide City agencies and district stakeholders with a clearer understanding of the likely distribution of costs for each project and the total contribution anticipated from each funding source.

This funding strategy will also provide a guide for city bureaus and district stakeholders in how best to pursue the needed funding. Completing the transportation strategy and the funding strategy creates the potential for a North Macadam District legislative agenda in which all district stakeholders can use their common interest in furthering key projects to advocate for priority from outside sources.

Total Cost

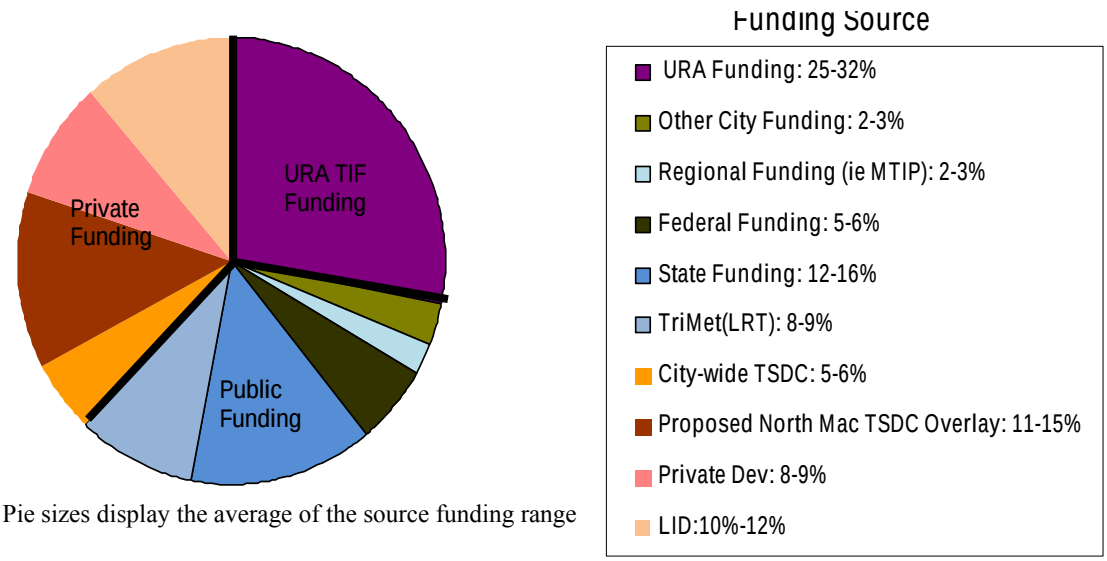
The Top Priority Projects proposed in the Transportation Strategy total between $125.1 Million and $157.6 Million. The breakdown of project costs by mode is detailed below in Table 1-6.

Table 1-6: Total Cost by Mode for Top Priority Projects

Top Priority Projects	Low Cost	Top Cost
Motor vehicle improvements	98.5M	124.8M
Pedestrian and bicycle projects	6.6M	7.7M
Transit projects (district contribution)	20M	25M
Total Cost	125.1M	157.6M

Funding

The range of contributions proposed to come from each funding source is shown below in Figure 1-8. The low and high funding amount range varies by source. For some sources, like the city-wide TSDC, the proposed TSDC overlay or the North Macadam URA TIF, a specific amount has been designated with a greater amount of certainty so there is no difference between the low and the high figure. For other sources, the ranges vary considerably from the low to high figures. This reflects the unknown degree to which district projects might be able to obtain funding from each particular source.



* Pie sizes display the average of the source funding range

Figure 1-8: Funding Source Distribution

District Funding Contribution

Based on the proposed ranges, district sources would contribute between 58 and 65 percent of the funding for transportation projects. Non-district sources would contribute between 35 and 42 percent of funding. Looking back at the character of the projects, approximately 48 – 51% of the total cost is for projects that primarily serve the district. The remaining projects serve both the district and the rest of the region and many are on streets with state jurisdiction such Hwy 43, US 26 or serve as ramps or frontage roads to I-5 and I-405.

Comparing the character of funding sources to the character of the projects (as shown in Table 1-7 and Figure 1-9) establishes that district sources will cover the funding needs for projects that serve primarily district users. District sources will also contribute to the improvement of adjacent facilities that serve both the district and the region.

Table 1-7: District Share of Funding

District Based Funding	Low Amount		High Amount		Percent Range
District funding sources	$80M		$93M		58%-65%
Non-district funding sources	$43M		$67M		35%-42%
District Serving Projects	**Low Amount**		**High Amount**		**Percent Range**
District serving projects	$60M		$80M		48%-51%
District and regional serving projects	$65M		$77M		49%-52%

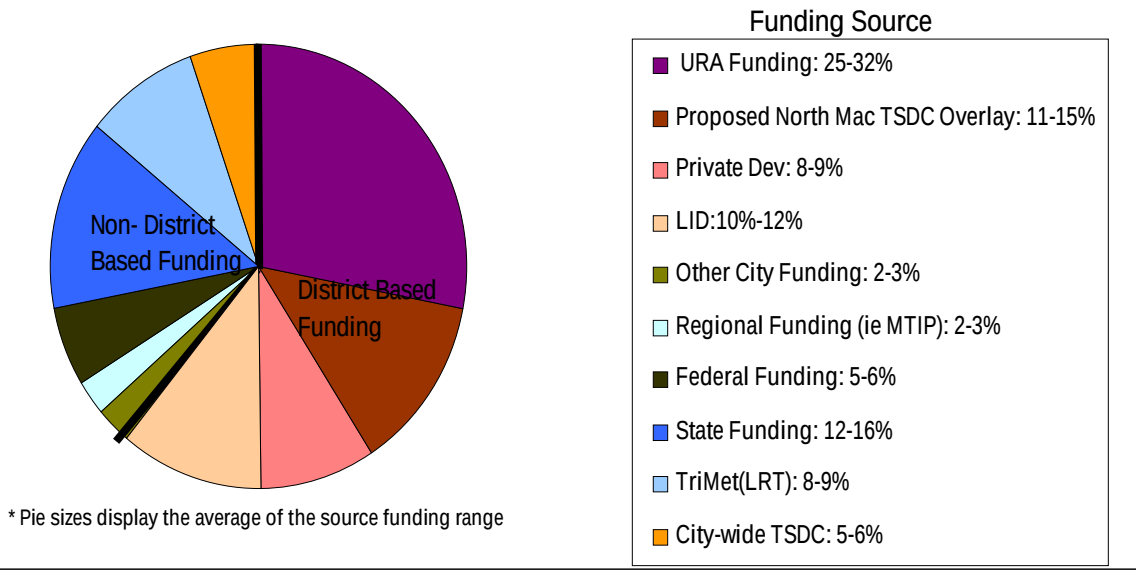


Figure 1-9: District and Non-District Based Funding Contributions

CHAPTER

2

GOALS AND PROJECT PROCESS

PROJECT BACKGROUND

The North Macadam Urban Renewal Area (URA) is rapidly developing with residential, commercial and school uses. By 2030 traffic volumes are expected to grow by over 400% from 2005 traffic volumes[1]. In order to accommodate this growth, the transportation infrastructure needs to be improved across all modes.

There have been several previous studies that addressed issues within and around the URA District, but never a study that holistically addresses all the transportation needs and aspirations of the North Macadam URA. This study was completed with the intent to unify previous findings and to analyze the North Macadam URA as a whole entity. Findings from previous studies were incorporated into this plan, as well as addressing areas not yet studied. A summary of the previous studies is included in Appendix - A of this report.

By 2030, the PM peak hour traffic volumes for the North Macadam Urban Renewal Area are expected to grow by over 400% from today's levels.

The intent of this *North Macadam Transportation Development Strategy* was to focus on access points to and from the district, and travel within the district. Regional transportation issues were not addressed in detail within this plan due to the regional nature and context of potential improvements.

[1] *Source:* Metro Models: 2005 - Metro RTP with North and Central TAZ's in the South Waterfront District reduced by 60% (see Land Use Memo in Appendix A); 2030 - Milwaukie LRT No Build Model.

In addition to evaluating access and determining projected transportation infrastructure needs, funding strategies were also explored to help identify how funding could be implemented to pay for high priority projects.

PROJECT GOALS AND OBJECTIVES

The purpose of this transportation study was to identify short term (within next ten years) and long term (within the next twenty years) transportation needs and projects within the North Macadam Urban Renewal District along with identifying project phasing, priorities, and a funding strategy. These transportation needs and projects will form the core of the *North Macadam Transportation Development Strategy*.

Several project goals were developed as part of the project scoping process that was conducted in 2007 to help guide the process and the outcome of the *North Macadam Transportation Development Strategy*. The following list outlines these project goals:

Providing a balanced transportation system allows for reduced vehicle miles traveled and less potential for failing intersections

- **Balanced Transportation System**: Develop a multi-modal transportation system that provides safe and efficient options for transit, bicycle, pedestrian, freight and motor vehicle users and that includes parking management, transportation demand management (TDM), and transportation system management (TSM) strategies to enhance inter-modal connectivity within the North Macadam Urban Renewal Area.

- **Compatibility**: Develop a transportation system that is consistent with the City's Comprehensive Plan and that coordinates with county, state and regional plans.

- **Coordination**: Coordinate with ongoing planning and development opportunities inside and outside of the North Macadam District, particularly within the study area.

- **Economic Development**: Provide a transportation system that fosters and maintains economic development, particularly in the North Macadam Urban Renewal Area.

- **Funding:** Develop a funding strategy that utilizes a mixture of funding sources that maximizes public and private partnerships.

- **Livability:** Design and construct transportation facilities in a manner that enhances the livability of the South Portland Neighborhood and South Downtown.

- **Mobility**: Develop and maintain a transportation system that accommodates future growth and provides practical, convenient access to, from, through and within the North Macadam District.

- **Priorities:** Plan improvements to coincide with expected need and project phasing.

- **Sustainability**: Provide an integrated, financially and environmentally sustainable transportation system that meets present needs while facilitating the needs of future generations.

Within the study area, some roadways are operated and maintained by the Oregon Department of Transportation (ODOT) while others are operated and maintained by the City of Portland. The issue of two different agencies operating and maintaining a network of roadways can sometimes lead to conflicting goals. Maintaining a balanced perspective between the two agencies was considered during development of the goals. The functional classification and roadway ownership is further detailed in *Chapter 3: Existing Conditions* of this report.

PROJECT PROCESS

Two key components to the success of this project were public involvement and the technical evaluation. The public involvement allowed for feedback and input from the community to be included in the project, and the technical evaluation created a method to analyze a range of projects and determine the best solution for identified transportation deficiencies.

Public involvement and stakeholder consensus is a critical element to the success of a project during the planning and implementing process

Public Involvement

During the course of this project there was a continued effort to inform the public and gain feedback to incorporate into the project. The public involvement occurred through Stakeholder Advisory Committee meetings, Technical Advisory Committee meetings, open houses, presentations to neighborhood associations, and individual briefings for stakeholder groups. A website containing information was also available.

Regular monthly Stakeholder Advisory Committee (SAC) meetings were held to review project elements and progress, as well as to get feedback on these elements. Members of the SAC included community members, key agency representatives, property owners and developers. The general public was also welcome to attend the SAC meetings and provide input.

The Technical Advisory Committee (TAC) met on a regular basis throughout the project and supplied technical expertise for review of technically oriented elements. Members of the TAC consisted of representatives from Portland Department of Transportation (PDOT), Oregon Department of Transportation (ODOT), Portland Development Commission (PDC), Bureau of Planning (BOP), TriMet and the consultant team.

Both a Technical Advisory Committee (TAC) and a Stakeholder Advisory Committee (SAC) were formed to review analysis and recommendations for the project.

Two open houses were held at key points in the process and were well attended by the community members. One open house was held after developing several different transportation alternatives for the North Macadam URA. The second open house was held after specific projects had been developed and prioritized using feedback from the SAC and TAC members. At both open houses community members were invited to provide feedback and input about the projects, which was then incorporated into the transportation development strategy.

Additional meetings and briefings were held for interested parties during this process to provide a better understanding of the projects and implications to the surrounding area.

Technical Evaluation

The technical evaluation was done in two processes. One process focused on the motor vehicle environment while the other process focused on the pedestrian/bicycle and transit environment. The motor vehicle process had more quantitative evaluation, whereas the other modes were more qualitative in nature. This section gives a brief overview of both technical evaluation processes.

Motor Vehicle

The traffic operation modeling was completed using Synchro software[2] and future year 2030 volumes were estimated using the regional travel demand model. Using the regional travel demand model and forecasting future volumes is a complex process and is

[2] Trafficware Synchro, Version 6

described in more detail in *Chapter 4: Methodology and Assumptions*.

The main scenarios evaluated for traffic operations included:

- 2007 AM and PM peak hour existing conditions
- 2030 PM peak hour No-Build: Existing roadway network
- 2030 PM peak hour Build: Future roadway network with proposed projects
- Short term analysis 2015, 2020 and 2025 PM peak hours

By completing the traffic operation analysis of the existing conditions, areas currently deficient were identified. Then using the same roadway network but with future year 2030 PM peak hour volumes, the roadway network was again analyzed to determine the full extent of traffic operation issues if no improvements were made to the system.

Certain roadway projects are already "planned" by the City of Portland, so the probability of no roadway improvements over the next 23 years is doubtful. These "planned" roadway projects are part of the Regional Transportation Plan's (RTP's) financially constrained project list[3]. This list contains projects already identified and likely to be constructed by the year 2030 given the current funding levels.

A number of "planned" projects within the study area have been identified with the Metro Regional Transportation Plan, and are assumed to be in place for future analysis.

After accounting for projects on the RTP's financially constrained list, and adding new potential projects to improve transportation deficiencies, traffic operations were again tested with the 2030 PM peak hour traffic volumes. This testing either confirmed the chosen projects or led to adjustments to ensure each project could accommodate the future year 2030 PM peak hour volumes.

Additional traffic operations were tested for intermediate years between 2007 and 2030 to help identify a timeframe when individual projects may be necessary. For these intermediate years, a linear growth factor and uniform growth throughout the North Macadam URA was assumed.

Bicycle/Pedestrian and Transit Projects

Bicycle, pedestrian and transit projects were primarily scoped by identifying deficiencies in the existing network and future

[3] Metro Regional Transportation System Plan, Adopted July 2004. website: http://www.oregonmetro.gov/files/planning/2004rtpprojectlist.xls

connection needs. Some projects were identified in previous studies, and those projects were carried forward with this study. Project staff took several walking and bike tours, and a transit tour of the area, in order to gain first hand insight to the bike, pedestrian and transit needs of the area. Additionally, community members who use the bike, pedestrian and transit modes on a daily basis supplied input for these projects.

PROJECT VETTING

After determining which projects met future deficiency needs and connectivity/circulation needs, the projects for each mode of transportation went through a vetting process. The vetting process was based on a set of evaluation criteria (slightly different for each of the three project mode categories) used to rank each of the projects. The evaluation criteria was created by the project management team, with input from the TAC and SAC members, and then each project was rated on a scale of 1 to 5 on how well the project met each criteria. A score of 1 represented criteria not met and a score of 5 represented a criteria well fulfilled by the project. The specific evaluation criteria are described in *Chapters 5-7* for each transportation mode plan.

Evaluation criteria were developed with input from the TAC and SAC to help determine how each individual project met project goals, and how those projects rated against each other

For the pedestrian/bike and transit projects, the scoring from this process led directly to the list of prioritized projects. The motor vehicle project list was a little more complicated to prioritize, so additional factors were used to help evaluate the projects.

For the motor vehicle projects, the final prioritized project list was from a combination of factors:

- The scores received from the project ranking criteria;
- Project year of need;
- Percent contribution of traffic to/from the North Macadam URA traveling through the select project area; and
- Project feasibility (based on land use complications, ties to other projects, private development timeline, and other staff knowledge)

Ultimately, this process led to a final list of recommended projects for each mode of transportation (pedestrian/bike, transit, and motor vehicle/freight). Those final project lists were also ranked and prioritized through this vetting process.

CHAPTER

3

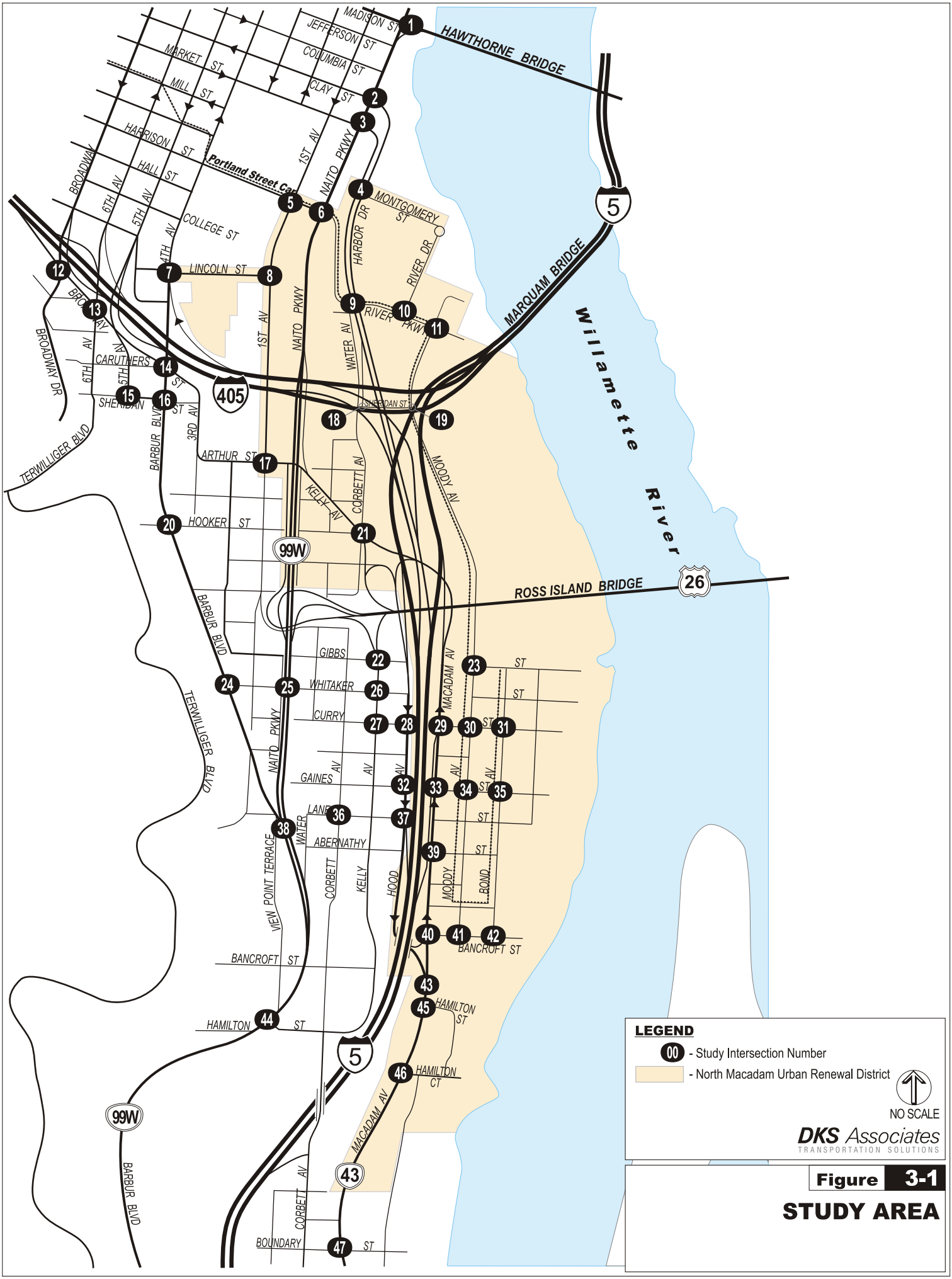
EXISTING CONDITIONS

The following sections provide an assessment of the existing transportation conditions within the North Macadam Transportation Development Strategy study area. The analysis focuses on current roadway characteristics, traffic volumes, heavy vehicle data, pedestrian/bicycle activity, transit service, parking and study intersection operations. The existing conditions section of this report will help evaluate and identify existing transportation deficiencies within the study area for all modes of travel.

STUDY AREA

The North Macadam Transportation Development Strategy study area is primarily focused on the area within the North Macadam Urban Renewal (URA) District boundary, which includes the South Waterfront District. Select intersections outside of the North Macadam URA boundary were also included based on their significance and/or proximity to the district. The study area intersections were selected based on input from the City of Portland and stakeholders within the study area[1] and include intersections within the district and adjacent to the district. Figure 3-1 identifies the study area and intersections selected for analysis.

[1] Stakeholders included members of the Portland Development Commission and the Urban Renewal Advisory Committee Commission (URAC) and other significant property owners in the area including: Portland State University, Oregon Health Science University and private developers.


HAWTHORNE BRIDGE
MARQUAM BRIDGE
ROSS ISLAND BRIDGE
Willamette River
MADISON ST
JEFFERSON ST
COLUMBIA ST
CLAY ST
MARKET ST
MILL ST
HARRISON ST
HALL ST
COLLEGE ST
LINCOLN ST
MONTGOMERY ST
HARBOR DR
RIVER DR
RIVER PKWY
SHERIDAN ST
ARTHUR ST
HOOKER ST
GIBBS ST
WHITAKER ST
CURRY ST
GAINES ST
LANE ST
ABERNATHY ST
BANCROFT ST
HAMILTON ST
HAMILTON CT
MACADAM AV
MOODY AV
CORBETT AV
KELLY AV
WATER AV
1ST AV
3RD AV
4TH AV
5TH AV
6TH AV
BROADWAY
BROADWAY DR
CARUTHERS ST
NAITO PKWY
BARBUR BLVD
TERWILLIGER BLVD
VIEW POINT TERRACE
HOOD
BOND
Portland Street Car
405
99W
5
26
LEGEND
00 - Study Intersection Number
- North Macadam Urban Renewal District
NO SCALE
DKS Associates
TRANSPORTATION SOLUTIONS
Figure 3-1
STUDY AREA

The North Macadam study area is surrounded by several regional roadways including I-5, I-405, Macadam Avenue (OR 43) and US 26. Access to the district is limited to three major portals:

- SW Macadam Avenue/SW Bancroft Street
- River Parkway and Sheridan Street to Moody Avenue
- Macadam Avenue at Gaines Street and Curry Street

TRANSPORTATION FACILITIES

The North Macadam Urban Renewal District study area has multiple jurisdictions, agencies, and stakeholders that own and maintain transportation facilities as well as operate on or near the facilities

Although this study's primary focus is the North Macadam Urban Renewal District, providing a summary of key roadways and transportation facilities that serve the district is important background information that develops the context for the study and helps evaluate the existing conditions of the study area. The transportation facilities, both in and out of the study area influence the North Macadam District.

Within the study area, I-5, I-405, Kelly Avenue, Hood Avenue, and Macadam Avenue (OR 43) are Oregon Department of Transportation (ODOT) facilities; the other roadways in the study area are maintained by the City of Portland. Both ODOT and the City of Portland classify roadways in their jurisdiction to help describe the use and purpose of each roadway. Interstate 5 and Interstate 405 are classified by ODOT as interstates; Macadam Avenue is classified as a district highway[2]. Kelly Avenue is also classified as a district highway by ODOT.

Functional Classification

The functional classification of roadways helps determine the nature of the facility for motor vehicle traffic (and other modes). Larger roadways that carry a higher volume of traffic typically have a higher functional classification as compared to smaller roadways with smaller traffic volumes. The motor vehicle functional classifications within the study area are shown in Figure 3-2 and are based on the City of Portland Transportation System Plan[3] and the South Waterfront District Street Plan[4]. The traffic classification describes the type of traffic and land uses the street

[2] Oregon Highway Plan, 1999. Table 4.
[3] City of Portland Transportation System Plan, 2006 Technical Update adopted on April 5, 2007 (page 2-99)
[4] South Waterfront District Street Plan, Criterias and Standards, Adopted April 2003, updated 2007.

should serve. Several arterial routes carry regional and other non-local traffic through the study area, including:

- **Barbur Boulevard**- this facility links the Capitol Highway-Beaverton Hillsdale Highway (OR 10) corridor to the regional highway system (I-405 and US 26) and downtown Portland through 5th-6th-Broadway/Arthur Street
- **Naito Parkway**-this facility connects Barbur Boulevard to the Ross Island Bridge, downtown, and to other Willamette River Bridges
- **Kelly Avenue/Arthur Street**-this facility connects the Ross Island Bridge and Macadam Avenue to the regional highway system and into downtown through 5th-6th Avenue/Broadway/Arthur Street
- **Macadam Avenue/Hood Avenue-**this couplet links Macadam Avenue (OR 43) to the regional highway system (I-5, I-405, and Ross Island Bridge) and downtown Portland

A wide variety of data was collected to help analyze the full existing transportation operations

- *Intersection geometry*
- *Signal timing*
- *Pedestrian movements*
- *Bicycle movements*
- *Transit stops/patronage*
- *Traffic control*
- *Motor vehicle turns*
- *Collision data*

Study intersection data was collected through field observations. This data included an inventory of lane geometry at intersections (number of turning lanes), intersection traffic control (signal, stop sign), on-street parking locations, transit stop locations and observations of traffic operations during the AM and PM peak hours. The current study intersection lane geometry and traffic control are shown in Figure 3-4.

Count Data

The majority of the traffic count data was collected at the study intersections in early November 2007 to establish a baseline for current operating conditions. The remaining traffic counts were conducted between March and November of 2007. Study intersection performance focused on the morning peak period (7 AM to 9 AM) and the evening peak period (4 PM to 6 PM). Twenty-four hour traffic count data was also collected throughout the study area at key locations. These counts are helpful in understanding the peak conditions of traffic during the entire day. The Average Daily Traffic Volumes for several locations are shown in Figure 3-3. The existing traffic volumes at study area intersections are summarized in Figure 3-4.

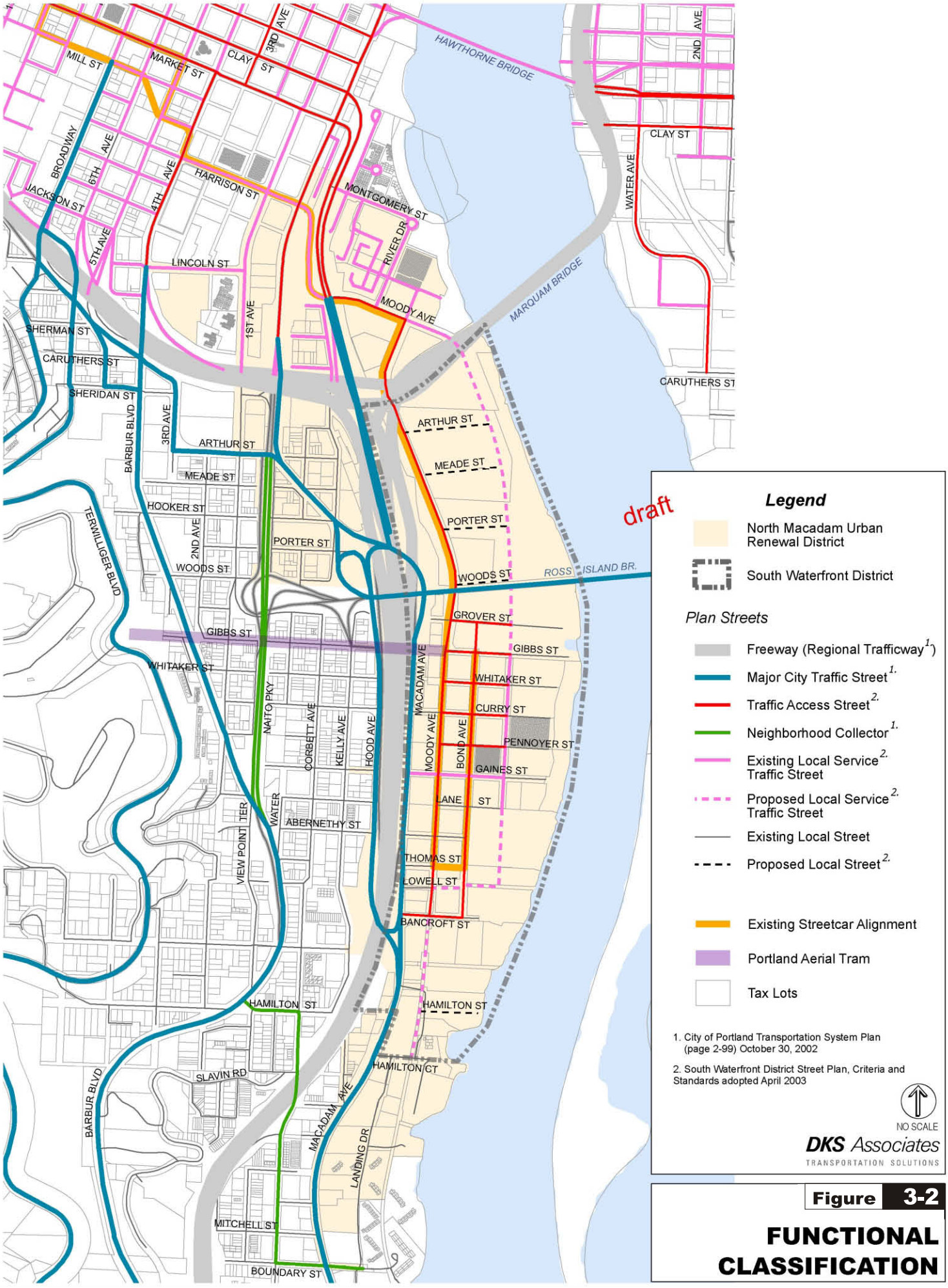


Figure 3-2

FUNCTIONAL CLASSIFICATION

January 2008, Real Urban Geographics

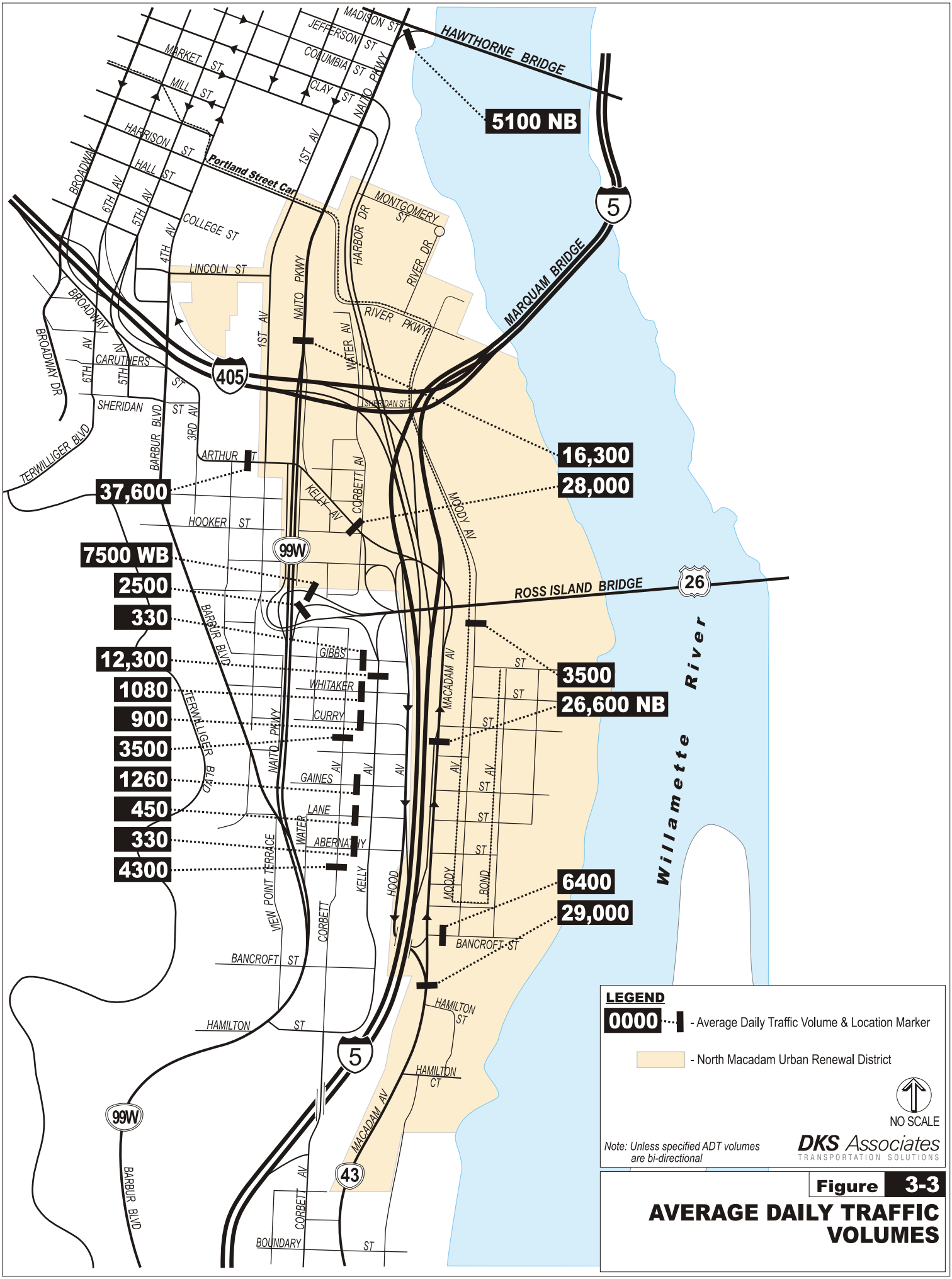
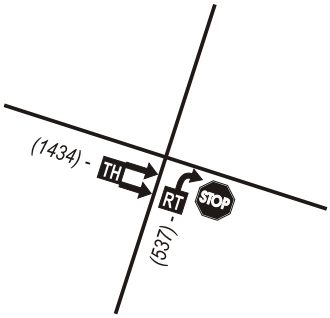


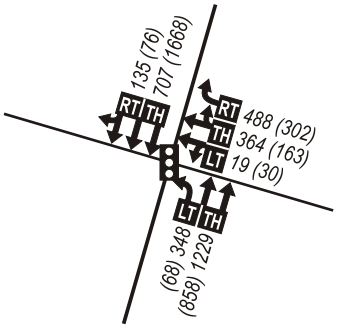
Figure 3-3

AVERAGE DAILY TRAFFIC VOLUMES

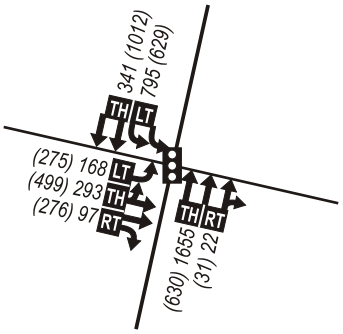
1 NAITO PKWY @ HAWTHORNE BRIDGE



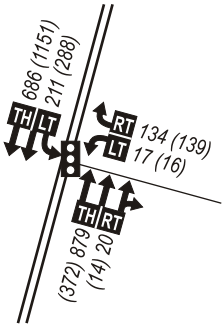
2 NAITO PKWY @ CLAY ST



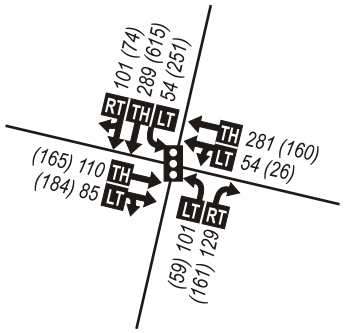
3 NAITO PKWY @ MARKET ST



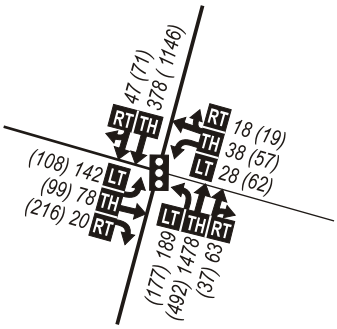
4 HARBOR DR @ MONTGOMERY ST



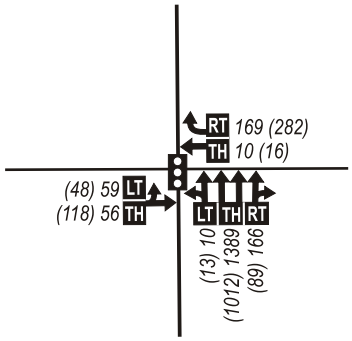
5 1ST AV @ HARRISON ST



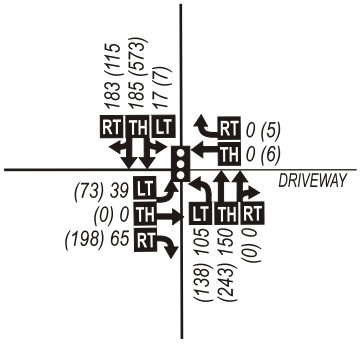
6 NAITO PKWY @ HARRISON



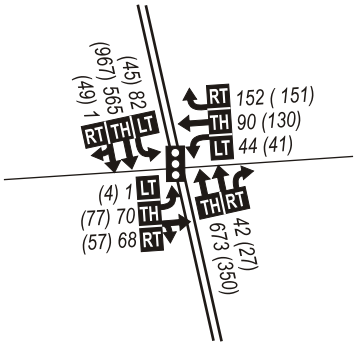
7 4TH AV @ LINCOLN ST



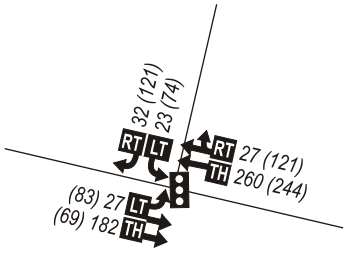
8 1ST AV @ LINCOLN ST



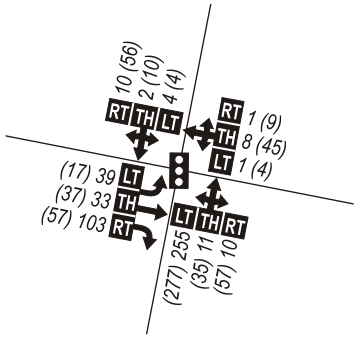
9 HARBOR DR @ RIVER PKWY



10 RIVER PKWY @ RIVER RD

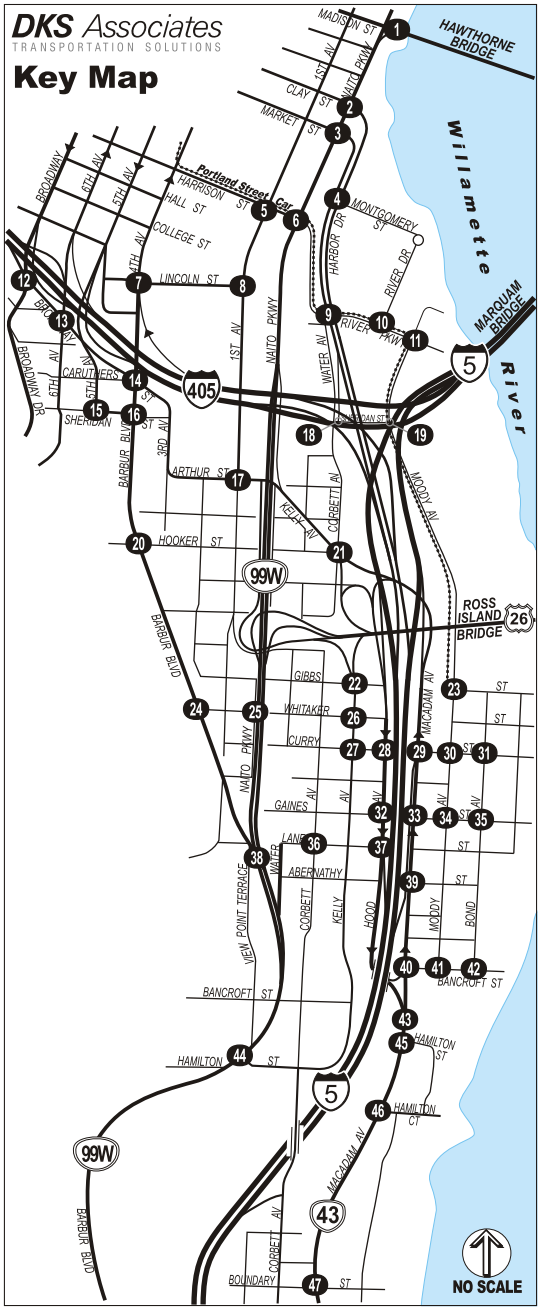


11 MOODY AV @ RIVER PKWY



DKS Associates
TRANSPORTATION SOLUTIONS

Key Map



LEGEND

- 00 - Study Intersection Number
- Traffic Signal
- STOP - Stop Sign
- Lane Configuration
- AM (PM) - Peak Hour Traffic Volume
- LT TH RT - Volume Turn Movement (Left•Thru•Right)
- (TWLTL) - Two-Way Left Turn Lane

Figure 3-4a

EXISTING 2007 GEOMETRY & AM/PM PEAK HOUR TRAFFIC VOLUMES

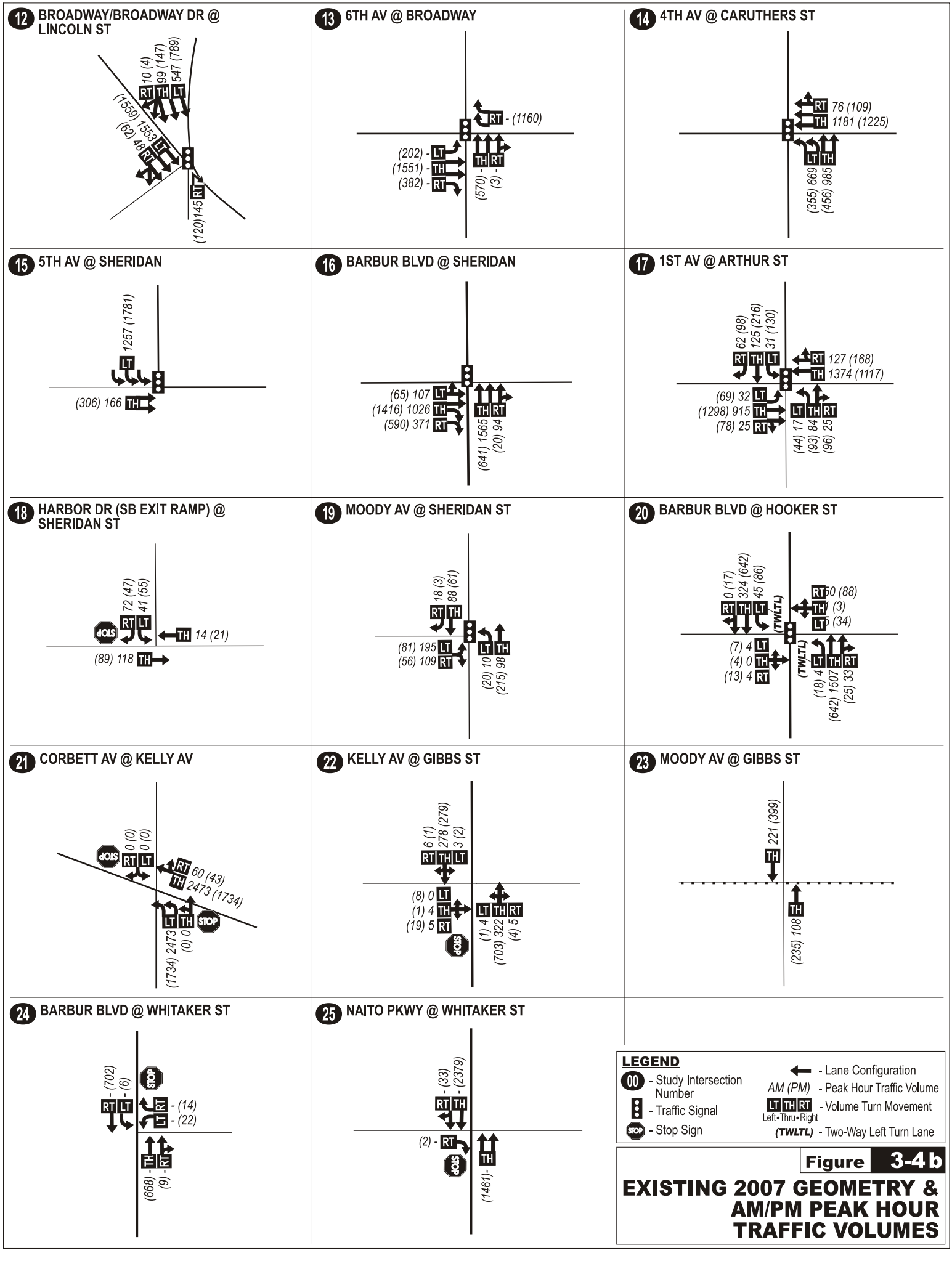
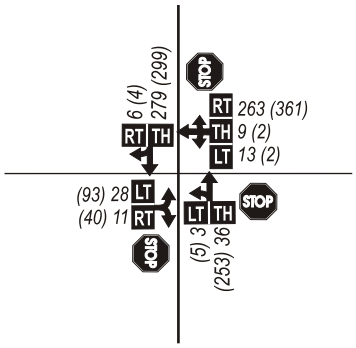


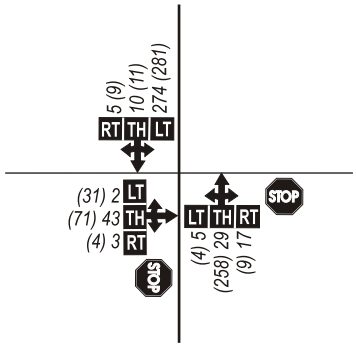
Figure 3-4b

EXISTING 2007 GEOMETRY & AM/PM PEAK HOUR TRAFFIC VOLUMES

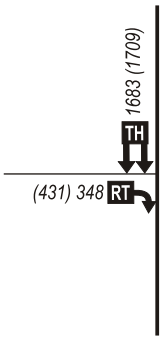
26 KELLY AV @ WHITAKER ST



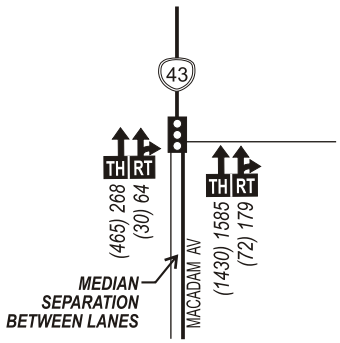
27 KELLY AV @ CURRY ST



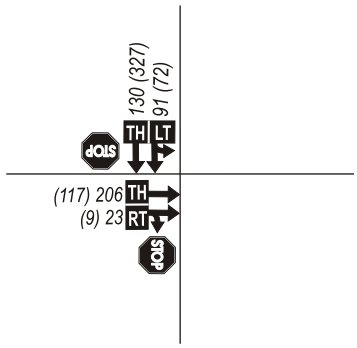
28 HOOD AV @ CURRY ST



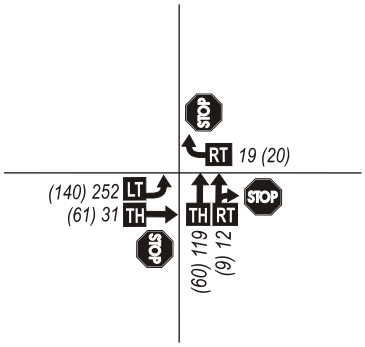
29 MACADAM AV @ CURRY ST



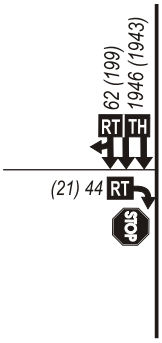
30 MOODY AV @ CURRY ST



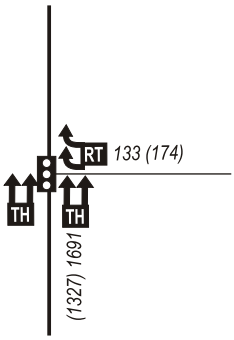
31 BOND AV @ CURRY ST



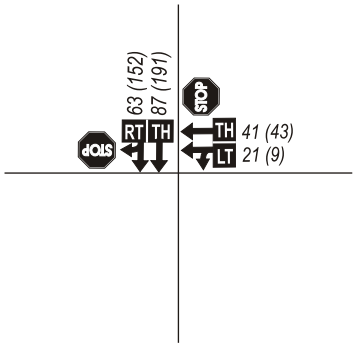
32 HOOD AV @ GAINES ST



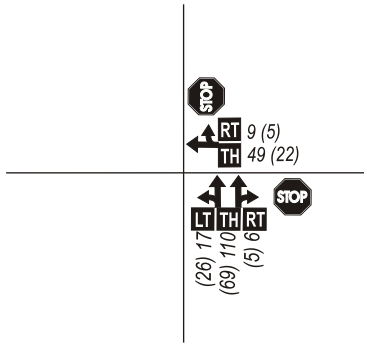
33 MACADAM AV @ GAINES ST



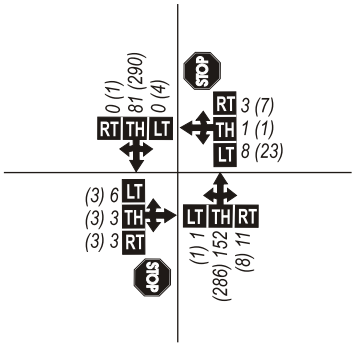
34 MOODY AV @ GAINES ST



35 BOND AV @ GAINES ST

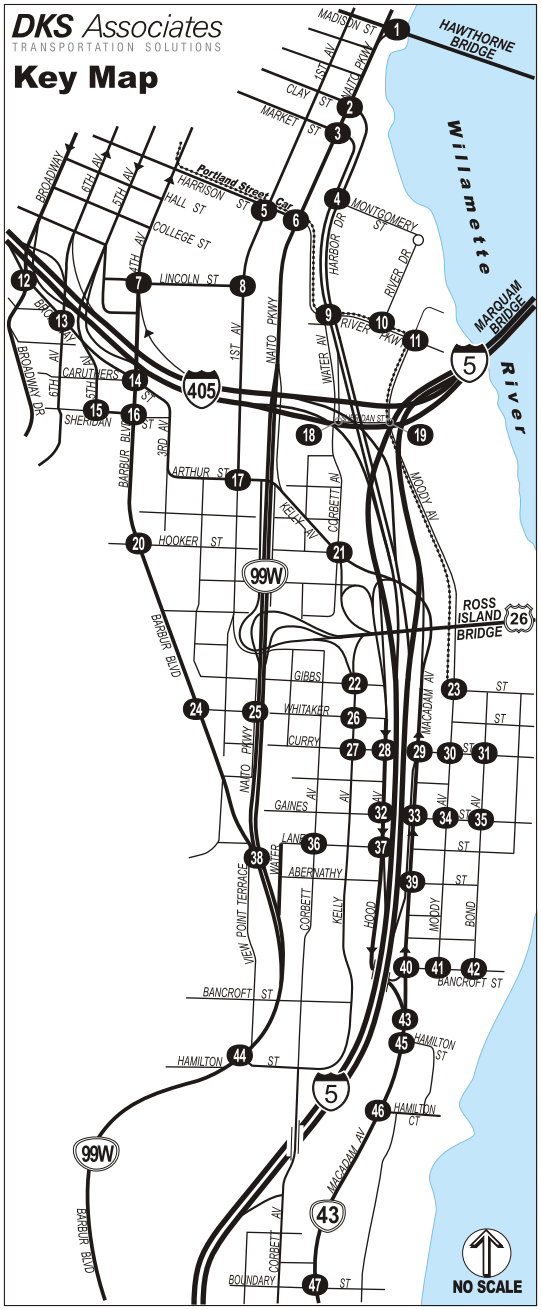


36 CORBETT AV @ LANE ST



DKS Associates
TRANSPORTATION SOLUTIONS

Key Map



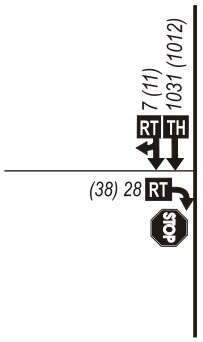
LEGEND

- 00 - Study Intersection Number
- - Traffic Signal
- STOP - Stop Sign
- - Lane Configuration
- *AM (PM)* - Peak Hour Traffic Volume
- LT TH RT - Volume Turn Movement (Left•Thru•Right)
- *(TWLTL)* - Two-Way Left Turn Lane

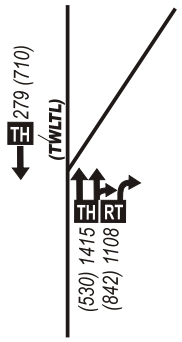
Figure 3-4c

EXISTING 2007 GEOMETRY & AM/PM PEAK HOUR TRAFFIC VOLUMES

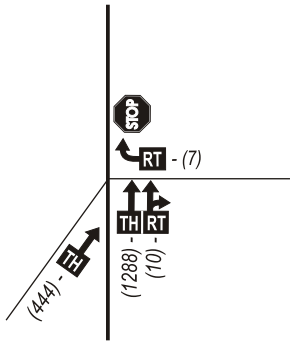
37 HOOD AV @ LANE ST



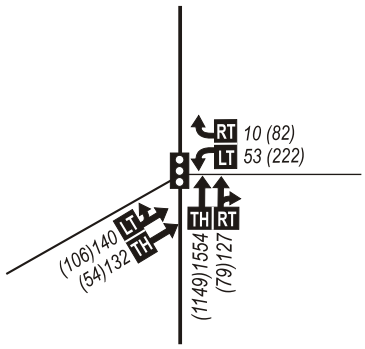
38 BARBUR BLVD @ NAITO PKWY



39 MACADAM AV @ ABERNATHY ST



40 MACADAM AV @ BANCROFT ST



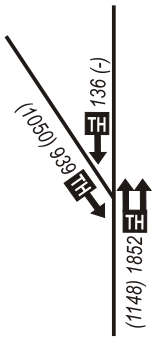
41 MOODY AV @ BANCROFT ST

Intersection Under Construction During Data Collection

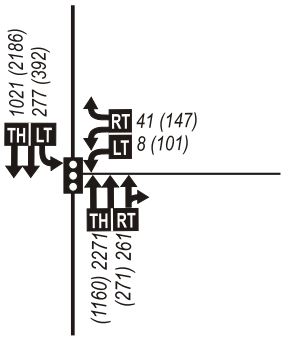
42 BOND AV @ BANCROFT ST

Intersection Under Construction During Data Collection

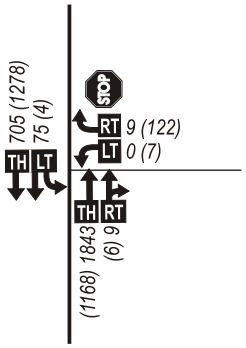
43 MACADAM AV @ HOOD AV (Sth)



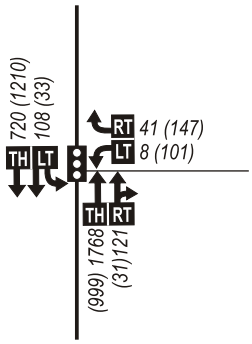
44 BARBUR BLVD @ HAMILTON ST



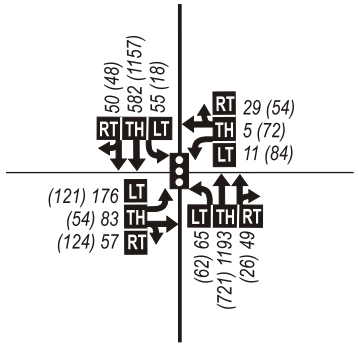
45 MACADAM AV @ HAMILTON ST



46 MACADAM AV @ HAMILTON CT



47 MACADAM AV @ BOUNDARY ST



LEGEND

- 00 - Study Intersection Number
- Traffic Signal
- STOP - Stop Sign
- Lane Configuration
- *AM (PM)* - Peak Hour Traffic Volume
- LT TH RT - Volume Turn Movement (Left • Thru • Right)
- *(TWLTL)* - Two-Way Left Turn Lane

Figure 3-4d

EXISTING 2007 GEOMETRY & AM/PM PEAK HOUR TRAFFIC VOLUMES

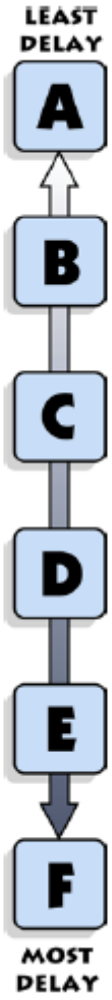
TRAFFIC OPERATIONS

To determine the current performance at study intersections, an operational analysis was conducted based on the weekday AM and PM peak hour traffic volumes, lane configurations and traffic controls shown in Figures 3-3 and 3-4. The capacity analysis was based on methodology from the *2000 Highway Capacity Manual*[5] to produce levels of service, average vehicle delays, and volume to capacity ratios for assessing any existing operational deficiencies.

Level of Service (LOS), delay, and volume to capacity (v/c) ratios are typically used as measures of effectiveness to evaluate intersection operations. 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 about without significant delays during periods of peak hour travel demand. Level of Service D and E are progressively worse peak hour operating conditions, with Level of Service F representing long delays and vehicle queues and is commonly considered to be a "failing" condition.

A volume to capacity (v/c) ratio is the peak hour traffic volume at an intersection divided by the maximum volume that intersection can accommodate. For example, a v/c ratio equivalent to 0.80 indicates that peak hour traffic is using 80 percent of the intersection's capacity. If traffic volumes exceed capacity, queues will form and will lengthen until demand subsides below the available capacity. As the v/c ratio approaches 1.0, intersection operation becomes unstable and small disruptions can cause traffic flow to break down.

The majority of the intersections are city facilities, for which mobility standards have been adopted as part of the *City of Portland Transportation System Plan.* The intersection operational standards are based on the type of intersection control. LOS D is the minimum acceptable design standard for a signalized intersection.[6] For unsignalized intersections, LOS E represents the minimum acceptable design standard. This standard applies to the overall performance at an all-way stop controlled intersection and the minor street approach of a two-way stop controlled intersection. Macadam Avenue (OR 43) is a state facility, for



Level-of-service (LOS) is based on average intersection delay, and is rated similar to a report card

[5] *2000 Highway Capacity Manual*, Transportation Research Board, 2000.
[6] City of Portland Transportation System Plan, 2006 Technical Update adopted on April 5, 2007.

which mobility standards have been adopted as part of the *1999 Oregon Highway Plan*.[7] ODOT's preferred performance standard for OR 43 is a maximum volume-to-capacity ratio of 0.99 and applies to all intersections on SW Macadam Avenue (OR 43).

Intersections are typically the controlling bottlenecks of traffic flow. The ability of a roadway system to carry traffic efficiently is nearly always diminished in their vicinity. Table 3-1 summarizes the intersection operating conditions for the AM and PM peak periods.

Table 3-1: Existing Study Area Intersection Operations

Intersection	AM Peak Hour				PM Peak Hour			
	Delay	LOS	Average Intersection V/C	Highest Approach V/C	Delay	LOS	Average Intersection V/C	Highest Approach V/C
Signalized Intersections								
Harrison Street/Naito Parkway	20.0	C	0.66	0.80(EB)	48.1	D	0.76	0.98(SB)
Arthur Street/1st Avenue	21.2	C	0.64	0.72(NB)	26.0	C	0.81	0.92(WB)
Hamilton Court/Macadam Ave	7.4	A	0.74	0.83(SB)	8.7	A	0.48	0.68(WB)
Boundary Street/Macadam Ave	21.7	C	0.78	0.91(EB)	19.0	B	0.64	0.69(EB)
4th Avenue/Lincoln Street	8	A	0.49	0.74(WB)	12.7	B	0.48	0.65(WB)
Montgomery Street/Harbor Drive	11.5	B	0.54	0.60(SB)	13.4	B	0.49	0.61(SB)
Harrison Street/Harbor Drive	14.1	B	0.49	0.81(WB)	24.0	C	0.52	0.52(SB)
Curry Street/Macadam Avenue	14.4	B	0.69	0.69(NB)	17.7	B	0.66	0.74(NB)
Moody Avenue/Gibbs Street	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Macadam Avenue/Gaines Street	5.0	A	0.54	0.60(NB)	8.2	A	0.48	0.49(NB)
Moody Avenue/River Parkway	33.6	C	0.44	0.85(EB)	34.2	C	0.32	0.90(EB)
Moody Avenue/River Drive	7.8	A	0.18	0.69(EB)	15.9	B	0.42	0.80(EB)
Moody Avenue/Sheridan Street	14.7	B	0.38	0.68(EB)	9.0	A	0.22	0.39(EB)
1st Avenue/Lincoln	14.7	B	0.17	0.27(SB)	24.7	C	0.44	0.80(NB)
1st Avenue/Harrison Street	20.3	C	0.43	0.80(WB)	21.7	C	0.43	0.80(WB)
Broadway Street/Lincoln Street	22.1	C	0.66	0.86(EB)	22.5	C	0.62	0.86(WB)
Caruthers Street/Barbur Blvd	28.5	C	0.70	0.77(NB)	10.9	B	0.65	0.76(NB)
Sheridan Street/Barbur Blvd	25.5	C	0.89	0.91(NB)	14.5	B	0.75	0.81(NB)
Hooker Street/Barbur Boulevard	3.5	A	0.55	0.57(NB)	5.3	A	0.30	0.33(NB)
Bancroft Street/Macadam Ave	16.0	B	0.58	0.72(NB)	18.0	B	0.60	0.90(NB)

[7] *1999 Oregon Highway Plan*, Oregon Department of Transportation, 1999.

Table 3-1 continued

Intersection	AM Peak Hour				PM Peak Hour			
	Delay	LOS	Average Intersection V/C	Highest Approach V/C	Delay	LOS	Average Intersection V/C	Highest Approach V/C
Hamilton Street/Barbur Blvd	15.7	B	0.89	0.91(NB)	13.9	B	0.83	0.90(NB)
Market Street/Naito Parkway								
Clay Street/Naito Parkway	28.8	C	0.91	0.99(WB)	27.2	C	0.77	0.96(SB)
Sheridan Street/5th Avenue	6.5	A	0.31	0.66(EB)	9.3	A	0.51	0.76(EB)
Broadway Avenue/6th Street	23.3	C	0.85	0.99(NB)	14.5	B	0.80	0.90(EB)
Broadway Avenue/5th Street	22.4	C	0.79	0.89(NB)	5.4	A	0.60	0.6(EB)
Bancroft Street/Moody Avenue	Under Construction-no data available							
Bancroft Street/Bond Avenue								
Unsignalized intersections								
Hawthorne Bridge/Naito Parkway	>80	A/F		>1.0	>80	A/F		>1.0
Curry Street/Bond Avenue	11.6	A/B		0.31	8.6	A/A		0.22
Harbor Drive (southbound off-ramp)/Sheridan Street	8.3	A/A		0.16	8.0	A/A		0.13
Kelly Avenue/Corbett Avenue	3.6	A/A		0.04	0.8	A/A		0.04
Gibbs Street/Kelly Avenue	12.4	A/B		0.02	15.0	A/C		0.08
Kelly Avenue/Whitaker Street	11.1	A/B		0.47	17.2	B/C		0.61
Curry Street/Kelly Avenue	9.4	A/A		0.34	11.7	A/B		0.45
Curry Street/Moody Avenue	9.7	A/A		0.31	9.4	A/A		0.36
Hood Avenue/Gaines Street	16.4	A/C		0.49	17.4	A/C		0.50
Gaines Street/Moody Avenue	7.6	A/A		0.16	7.7	A/A		0.29
Gaines Street/Bond Avenue	7.6	A/A		0.12	7.4	A/A		0.11
Corbett Avenue/Lane Street	10.8	A/B		0.02	15.7	B/C		0.10
Hood Avenue/Lane Street	13.9	A/B		0.48	13.7	A/B		0.45
Abernethy Street/Macadam Ave	-	-		-	30.5	A/D		0.30
Hamilton Street/Macadam Ave	33.9	A/B		0.75	25.4	B/D		0.50
Barbur Boulevard/Whitaker St	-	-		-	34.2	A/D		0.29

SOURCE: ***DKS** Associates*

LOS = Level of Service
A/A = major street LOS/minor street LOS
Signalized delay = Average intersection delay in seconds
Unsignalized delay = Highest minor street approach delay
V/C = Volume-to-capacity ratio

Motor Vehicle Performance

Based on the isolated intersection analysis, all of the intersections operate with a LOS D or better, with the exception of Naito Parkway/Madison Street (Hawthorne Bridge). Field observations indicate intersection and/or roadway operations outside of the district contribute to significant vehicle congestion, queuing and vehicle delays at several intersections and roadway links within the district. The vehicle congestion areas are summarized in Figure 3-5.

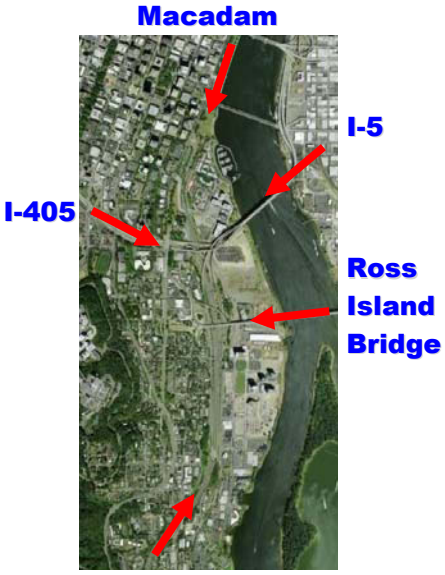
The Willamette River and Interstate-5 limit access and circulation opportunities to the majority of the district. Access to areas east of I-5 is limited to three primary portals including:

- SW Macadam Avenue/SW Bancroft Street
- River Parkway and Sheridan Street to Moody Avenue
- Macadam Avenue at Gaines Street and Curry Street

Eastbound PM peak hour vehicle congestion on the Ross Island Bridge creates congestion and queuing within the district on the approach roadways to the bridge. Field observations indicate queues during the PM peak hour extend from the approach ramps back towards Broadway and along the Naito Parkway and the Kelly Avenue/Hood Avenue approaches.

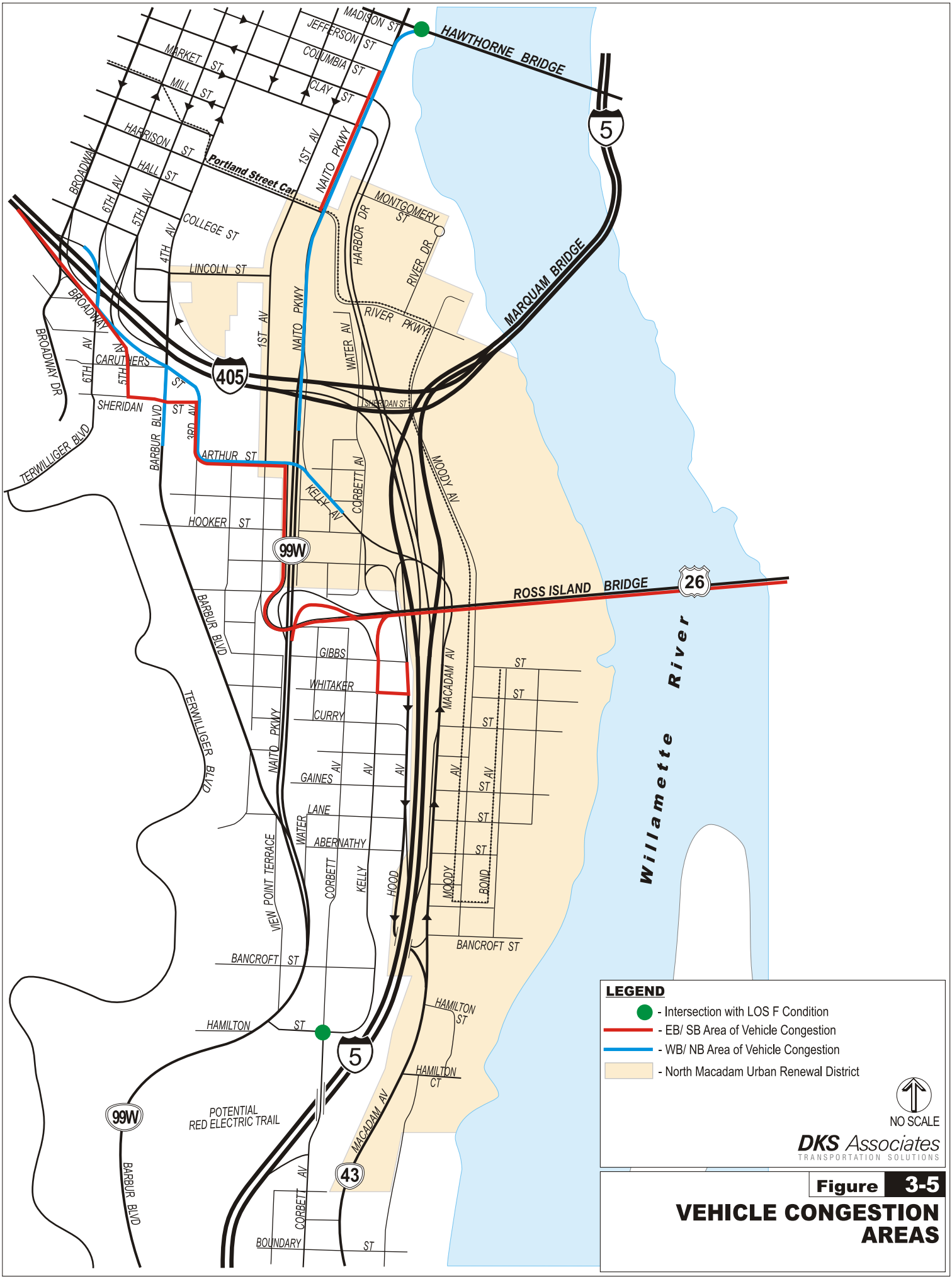
Vehicle congestion occurs during peak hours in the area around Broadway/4th Avenue/5th Avenue/6th Avenue due to access and circulation constraints to the city center and Interstate 405. Vehicles traveling northbound to access Interstate-405 utilize the left most lane on Broadway since the on-ramp is only one lane; this lane imbalance contributes to queuing that extends onto Arthur Street and Barbur Boulevard.

Vehicle congestion also occurs during peak hours in both directions on Naito Parkway between Harrison Street and Madison Street (Hawthorne Bridge). For vehicles traveling northbound, the unsignalized approach to the Hawthorne Bridge contributes to queuing that extends through the adjacent signalized intersections at Clay Street, Market Street and Harrison Street.



I-5 and Macadam

A number of the current regional routes that service the district have congestion during the AM and PM peak hours


HAWTHORNE BRIDGE
MARQUAM BRIDGE
ROSS ISLAND BRIDGE
Willamette River
MADISON ST
JEFFERSON ST
COLUMBIA ST
CLAY ST
MARKET ST
MILL ST
HARRISON ST
HALL ST
COLLEGE ST
LINCOLN ST
BROADWAY
6TH AV
5TH AV
4TH AV
Portland Street Car
1ST AV
NAITO PKWY
MONTGOMERY ST
HARBOR DR
RIVER DR
RIVER PKWY
WATER AV
BROADWAY DR
CARUTHERS ST
SHERIDAN ST
3RD AV
BARBUR BLVD
TERWILLIGER BLVD
ARTHUR ST
KELLY AV
CORBETT AV
MOODY AV
HOOKER ST
GIBBS ST
WHITAKER ST
CURRY ST
GAINES ST
LANE ST
ABERNATHY ST
VIEW POINT TERRACE
BANCROFT ST
HAMILTON ST
HAMILTON CT
MACADAM AV
BOND ST
BOUNDARY ST
POTENTIAL RED ELECTRIC TRAIL
405
99W
5
26
43
LEGEND
- Intersection with LOS F Condition
- EB/ SB Area of Vehicle Congestion
- WB/ NB Area of Vehicle Congestion
- North Macadam Urban Renewal District
NO SCALE
DKS Associates
TRANSPORTATION SOLUTIONS
Figure 3-5
VEHICLE CONGESTION AREAS

Field observations during the PM peak hour showed significant queuing for northbound traffic on Corbett Avenue caused by a four way stop controlled intersection at Corbett Avenue and Hamilton Street. This four-way stop is located approximately 1000 feet north of the I-5 Northbound Off-Ramp to Corbett Avenue and field observations showed the northbound queue on Corbett Avenue extended beyond the I-5 Off-Ramp during the PM peak hour.

TRAVEL TIME SURVEYS

Travel time runs were performed on two corridors through the study area to evaluate system performance and to help determine the approximate time it takes a vehicle to travel through the study area. Traffic volumes are higher during the PM peak hour and the travel times that were conducted between 4 PM and 6 PM represent the worst-case conditions. Two routes were selected to generally represent travel through the study area and evaluate most of the study area intersections. Five travel time runs were conducted and averaged for each of the routes. The travel time routes (conducted in both the northbound and southbound directions) include:

- **Route 1:** Macadam Avenue- Boundary Street intersection to Broadway/Jackson Street intersection via Macadam Avenue and Kelly Avenue/Corbett Avenue
- **Route 2:** Natio Parkway (South of I-405 to SW Columbia Street)

Collecting travel times along key roadways in the corridor help to determine arterial operations and calibrate the existing traffic modeling

Travel time runs help evaluate a corridor's traffic operations by estimating the average speed over segments and associating an LOS with those segments. These travel time runs help to determine areas that have excessive delay along a corridor. Table 3-2 and Table 3-3 summarize the results of the travel time runs for the selected routes. Figure 3-6 illustrates the travel time routes and the corresponding arterial level of service.

Table 3-2: Travel Time Results for Route 1 (SW Boundary Street to SW Jackson Street)

Roadway	Segment	Direction	Distance (miles)	Average Time (sec)	Average Speed (mph)	LOS
Macadam Avenue	SW Boundary Street to SW Hamilton Court	Northbound 0.	36	47	28	A
Macadam Avenue	SW Hamilton Court to SW Bancroft Street	Northbound 0.	21	29	28	A
Macadam Avenue	SW Bancroft Street to SW Abernethy Street	Northbound 0.	16	17	34	A
Macadam Avenue	SW Abernethy Street to SW Gaines Street	Northbound 0.	09	10	33	A
Macadam Avenue	SW Gaines Street to SW Curry Street	Northbound 0.	10	20	20	B
Macadam Avenue	SW Curry Street to SW Corbett Street	Northbound 0.	38	70	25	B
Kelly Avenue	SW Corbett Street to SW 1st Avenue	Northbound 0.	19	122	6	F
Arthur Street	SW 1st Avenue to 4th Avenue	Northbound 0.	26	68	15	C
Arthur Street	SW 4th Avenue to SW 6th Avenue	Northbound 0.	11	57	7	E
6th Avenue	SW 6th Avenue to SW Jackson	Northbound 0.	16	30	19	B
Average Northbound Total Results			**2.0**	**470**	**16**	**C**
Broadway Street	SW Jackson to SW Lincoln Street	Southbound	0.09	35	9	E
Broadway Street	SW Lincoln Street to SW 6th Avenue	Southbound	0.08	39	8	E
5th Avenue	SW 6th Avenue to SW Sheridan Street	Southbound	0.15	99	6	F
Sheridan Street	SW Sheridan Street to SW 4th Avenue	Southbound	0.05	33	5	F
Arthur Street	SW 4th Avenue to SW 1st Avenue	Southbound	0.24	204	4	F
Kelly Avenue	SW 1st Avenue to SW Gibbs Street	Southbound	0.50	215	8	E
Hood Avenue	SW Gibbs Street to SW Gaines Street	Southbound	0.23	41	20	B
Hood Avenue	SW Gaines Street to SW Lane Street	Southbound	0.05	6	32	A
Hood Avenue/Macadam Avenue	SW Lane Street to SW Hamilton Court	Southbound	0.41	47	32	A
Macadam Avenue	SW Hamilton Court to SW Boundary Street	Southbound	0.36	44	29	A
Average Southbound Total Results			**2.16**	**763**	**10**	**D**

SOURCE: ***DKS** Associates*

As shown in Table 3-2, for the two mile segment, the average LOS based on the amount of delay is LOS D for southbound travel and LOS C for northbound travel. Although these results indicate adequate operations, during the PM peak period there are several critical segments where the conditions degrade to LOS F and indicate significant congestion. Vehicles traveling northbound experience excessive delay west of Arthur Street towards downtown and I-405. The arterial LOS along this segment degrades from LOS C to LOS F, which represents low travel speeds and congested conditions. The trend is similar in the southbound direction; vehicles traveling out of downtown destined to the Ross Island Bridge or South Portland experience significant delay beginning north of I-405 on SW Broadway and extending south of the Ross Island Bridge Ramps.

Table 3-3: Travel Time Results for Route 2 (I-405 to SW Columbia Street)

Roadway	Segment	Direction	Distance (miles)	Average Time (sec)	Average Speed (mph)	LOS
Naito Parkway	I-405 Bridge to SW Harrison Street	Northbound 0.	31	324	6	F
Naito Parkway	SW Harrison Street to SW Market Street	Northbound 0.	14	327	1	F
Naito Parkway	SW Market Street to SW Clay Street	Northbound 0.	05	27	13	D
Naito Parkway	SW Clay Street to SW Columbia Street	Northbound 0.	05	6	21	B
Average Northbound Total Results			**0.55**	**685**	**3**	**F**
Naito Parkway	SW Columbia Street to SW Clay Street	Southbound	0.04	21	8	F
Naito Parkway	SW Clay Street to SW Market Street	Southbound	0.53	11	17	C
Naito Parkway	SW Market Street to SW Harrison Street	Southbound	0.14	97	6	F
Naito Parkway	SW Harrison Street to I-405 Bridge	Southbound	0.28	37	26	A
Average Southbound Total Results			**0.51**	**166**	**11**	**D**

SOURCE: ***DKS** Associates*

As shown in Table 3-3, the average delay in the southbound direction operates with a LOS D; however segments within the corridor operate at LOS F. Vehicles traveling in the northbound direction experience excessive delay (nearly 3 times the delay experienced in the southbound direction) for the majority of the corridor. The SW Clay Street/SW Market Street couplet provides access to and from I-5.

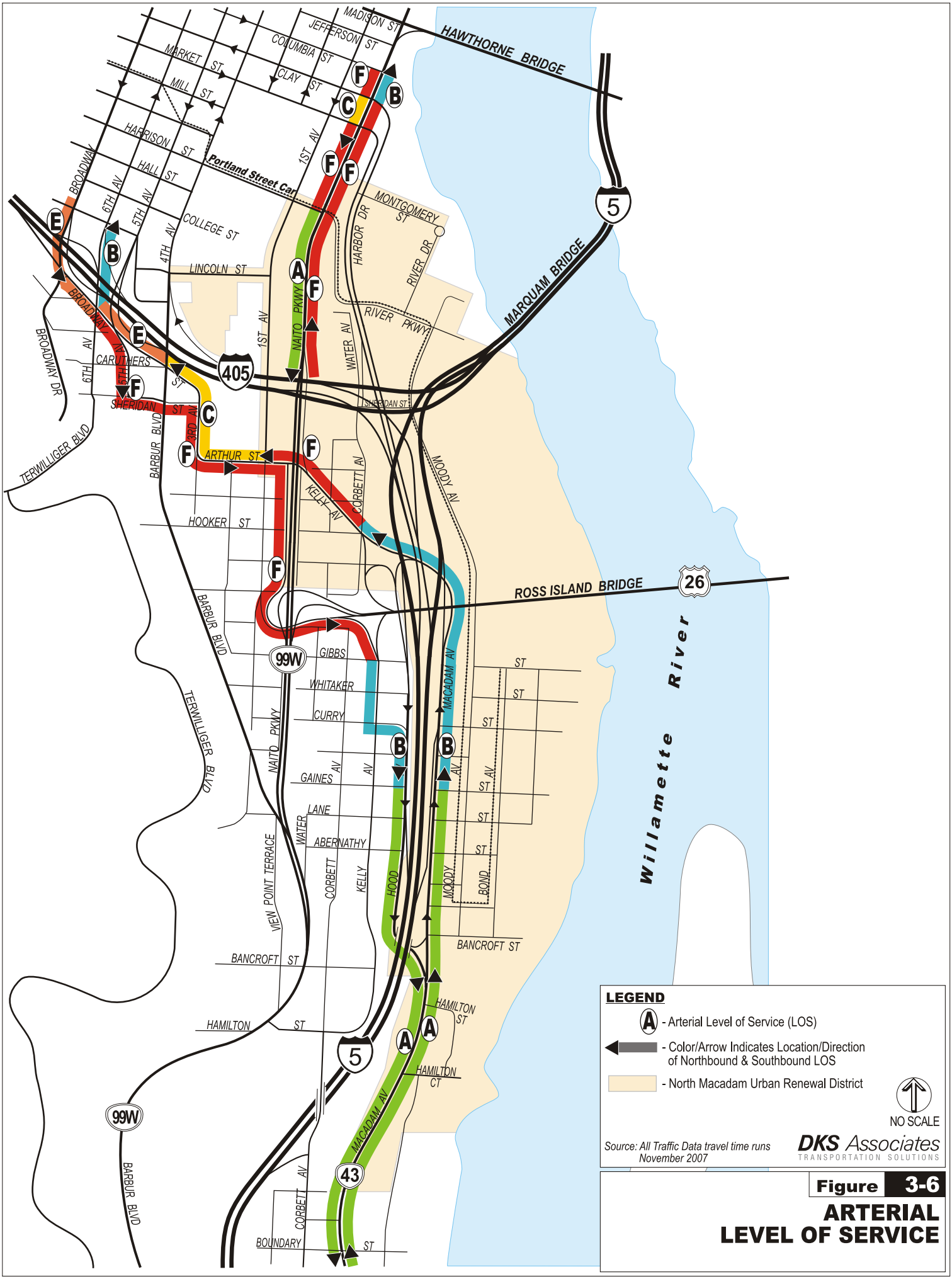


Figure 3-6

ARTERIAL LEVEL OF SERVICE

SPEED SURVEY DATA

Speed survey data was gathered within the study area at select locations west of the South Waterfront area. This area is primarily residential neighborhoods, with low posted speeds (generally 25 mph). These speed surveys track the volume and speed of vehicles as they pass a point on the roadway over a 24-hour time period. Table 3-4 summarizes the results of the speed survey data collected on several streets west of the study area, intended to determine the volumes and speeds of vehicles passing through the residential neighborhood.

Table 3-4: Speed Survey Data Results

Location	Direction	Posted Speed	Average Speed	85th Percentile Speed
Corbett Avenue south of Curry Street	Northbound	30 mph	28 mph	34 mph
Corbett Avenue south of Curry Street	Southbound	30 mph	27 mph	34 mph
Kelly Avenue south of Gibbs Street	Northbound	25 mph	16 mph	24 mph
Kelly Avenue south of Gibbs Street	Southbound	25 mph	20 mph	27 mph
Gaines Street east of Corbett Avenue	Eastbound	25 mph	16 mph	22 mph
Gaines Street east of Corbett Avenue	Westbound	25 mph	16 mph	24 mph
Corbett Avenue south of Abernethy Street	Northbound	30 mph	27 mph	34 mph
Corbett Avenue north of Abernethy Street	Southbound	30 mph	27 mph	34 mph

SOURCE: ***DKS** Associates*

The 85th percentile speed is used as a measure of the upper limit of reasonable speed for the prevailing conditions on a roadway. The 85th percentile speed represents a condition when 15% of the vehicles surveyed were traveling faster than the 85th percentile speed and 85% of the vehicles were traveling lower than the 85th percentile speed. As shown in Table 3-4, 85th percentile speeds indicate that vehicles traveling at the selected locations are within reasonable limits (within 5 mph of the posted speed limit).

VEHICLE COLLISION HISTORY

Collision data for the study area intersections was obtained from the Oregon Department of Transportation collects collision data along its corridors. The last three years of available crash data (2004-2006) were obtained for the study area intersections. The crash data indicated that there were no fatal crashes within the study area over the 3-year analysis time period. One collision involving a pedestrian/bicyclist was reported at SW Broadway/SW

6th Avenue and another was reported at SW 1st Avenue/SW Harrison Street.

Another means of comparing safety data is to calculate the collision rate at an intersection per million entering vehicles. A collision rate greater than 1.0 collisions per million entering vehicles can indicate locations where further study might be warranted. Within the study area, all of the crash rates were below 0.75, with the exception of SW Kelly Avenue/SW Whitaker Street which had a collision rate of 0.78 and was the highest rate within the study area. A complete table that summarizes the number of collisions over the past three years at the study area intersections and their calculated collision rates per million entering vehicles is included in the appendix.

Collision data revealed that all of the study area intersections had collision rates less than 0.80 for the past three years, and none of the intersections are within the top 100 High Accident Locations list maintained by the City of Portland.

The City of Portland also maintains a High Accident Location (HAL) list that ranks City facilities based on crash values, crash value rates per million entering vehicles, and total number of crashes. There are 395 intersections identified on the list. Based on the most recent HAL ranking (2001-2004)[8], none of the study area intersections are within the top 100, but three intersections are included on the list:

- SW Harrison Street/Naito Parkway
- SW Boundary Street/SW Macadam Avenue
- SW Barbur Boulevard/SW Hamilton Street

FREIGHT

Truck activity refers to medium and/or heavy vehicles traveling on the roadway that have more than four wheels, including multi-axle units as well as delivery trucks and buses. The study area classifies key roadways differently based on their character for serving freight movements; the freight classifications designated by the City of Portland TSP are shown in Figure 3-7.

The heavy vehicle percentages and volumes for the AM and PM peak hours at the study area intersections are shown in Figure 3-7. Heavy vehicle volumes range from 1% to 14% of total traffic during the AM and PM peak hours. Generally, heavy vehicle volumes are higher during the AM peak hour and throughout the day, as compared to the PM peak hour. The truck percentages are generally the highest on Moody Avenue and Bond Avenue

[8] High Accident Locations (2001-2004) obtained from the City of Portland.

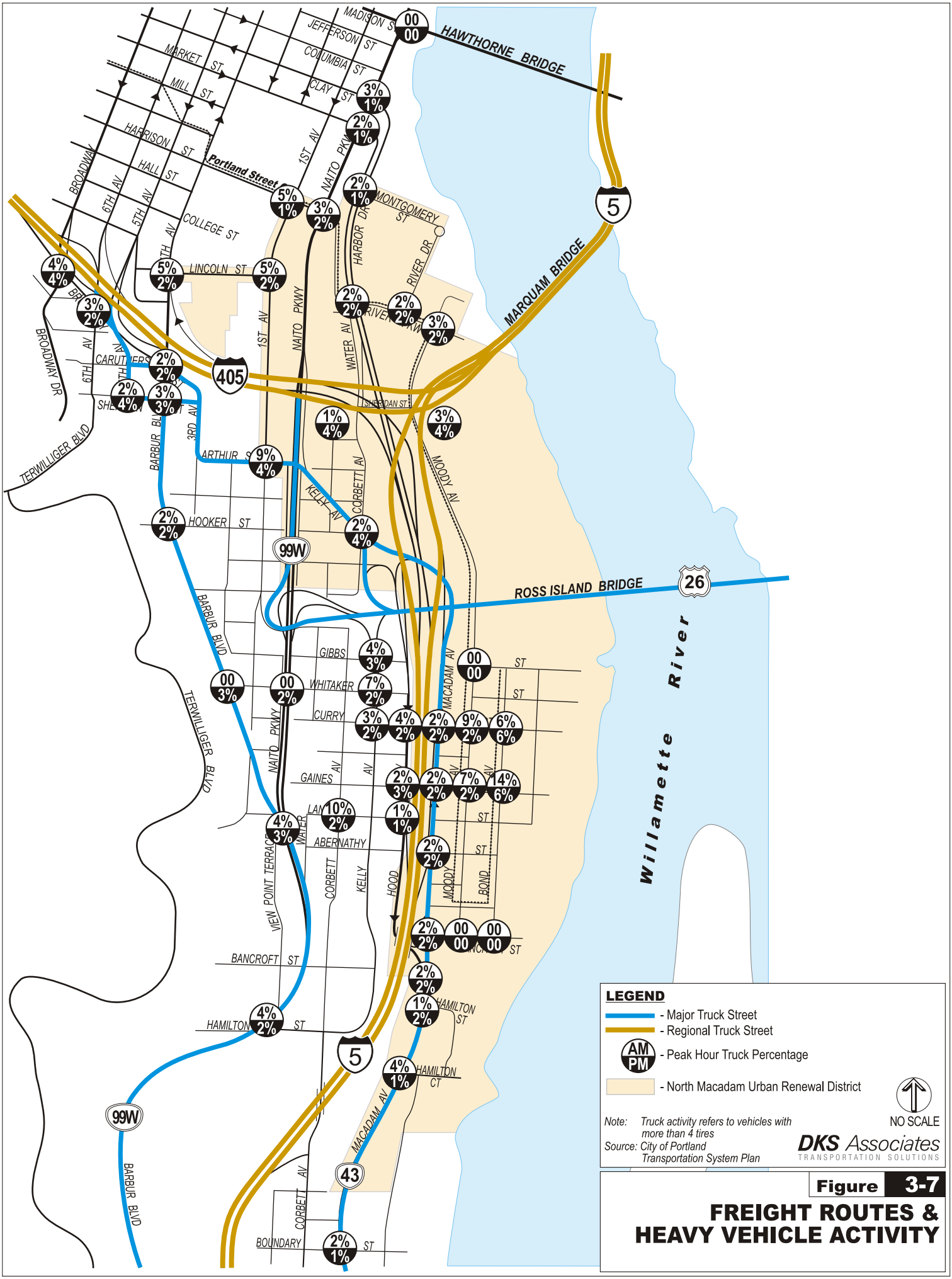


Figure 3-7

FREIGHT ROUTES & HEAVY VEHICLE ACTIVITY

between Curry Street and Gaines Street and can most likely be attributed to construction activity in the South Waterfront area. The roadways with the largest amount of heavy vehicles include: Broadway Street and Arthur Street.

Two 24-hour classification counts were conducted on Macadam Avenue and the I-5 off-ramp at Macadam Avenue. For these counts, heavy vehicles included six wheeled double-axle trucks and trucks with multi-unit axles; this classification does not include delivery trucks or buses. At both locations heavy vehicle traffic was relatively steady between the hours of 6 AM and 4 PM, with higher heavy vehicle volumes on Macadam Avenue. Over the 24 hour period Macadam Avenue had a total of 1,090 heavy vehicles and the I-5 Northbound Off-Ramp had a total of 349 heavy vehicles.

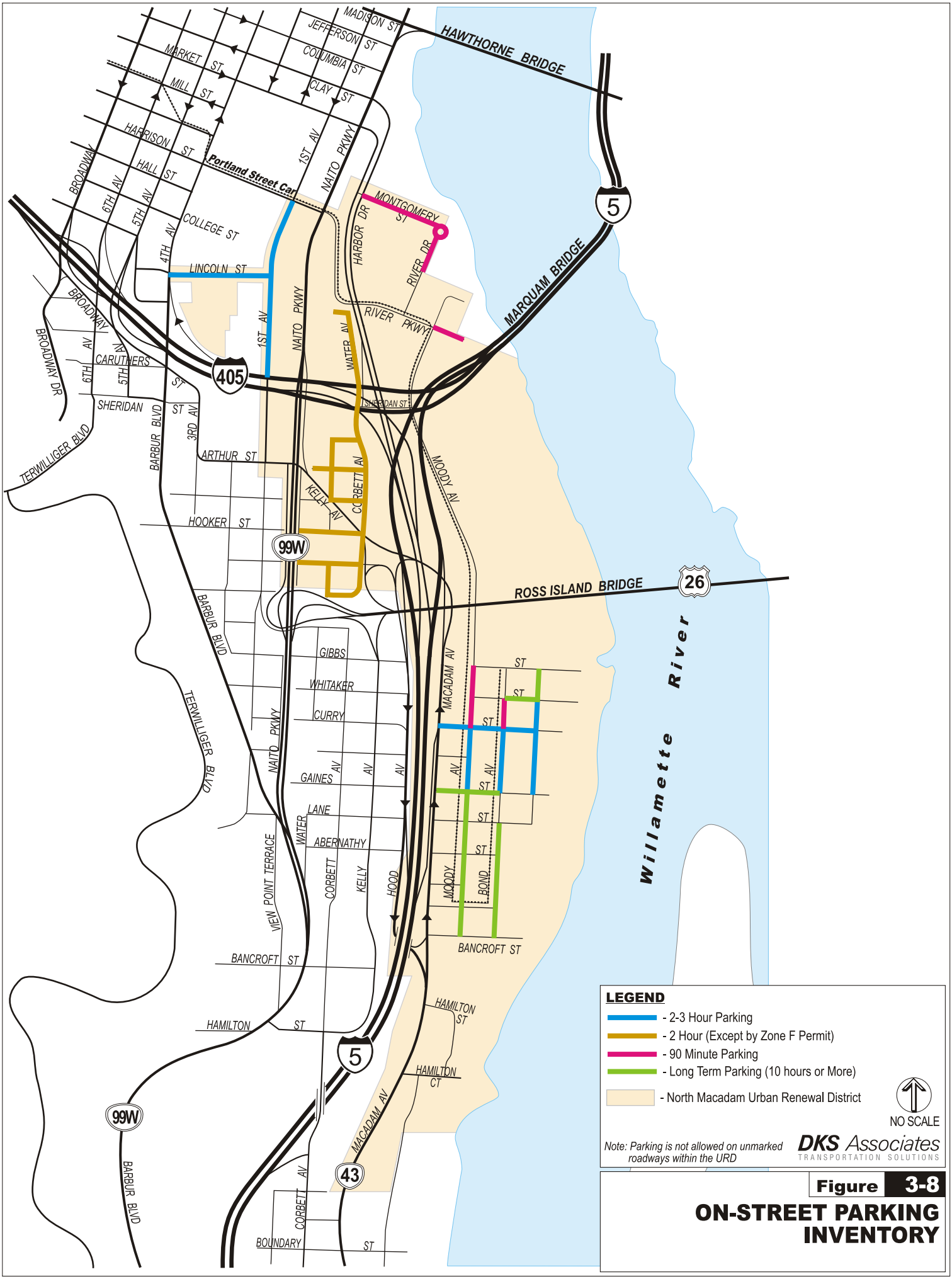
PARKING

An on-street parking inventory was conducted within the North Macadam Urban Renewal District to determine the number of on-street parking spaces and corresponding time limit restrictions. The on-street parking is summarized in Table 3-5. Parking is restricted on SW Naito Parkway, SW Moody Avenue or SW Macadam Avenue (OR 43). Figure 3-8 illustrates the on-street parking restrictions within the North Macadam URA district. Several of the parking spots located West of SW Water Avenue are designated as Zone F parking, which requires a City issued permit to park for longer than two hours. South of SW Gaines Street, several available sparking spaces do not have posted time restrictions at this time but as development continues in the area, restrictions would be posted.

Table 3-5: On-street Parking Inventory within the North Macadam URA District

Location		Short-term Parking				Long-term Parking	
From	To	15 minutes	90 minutes	120 minutes	180 minutes	11-hour	No Restriction
Mitchell Street	Bancroft St	0	0	0	0	0	0
Bancroft Street	Gibbs St	0	12	56	23	10	126
Gibbs Street	Sheridan St	0	0	226*	0	0	0
Sheridan Street (west of Harbor Dr)	Harrison St	2	0	76	45	0	0
Sheridan St (east of Harbor Dr)	Montgomery St	0	33	0	0	0	0
Total		**2**	**45**	**344**	**68**	**10**	**126**

Note: *Parking is 2-hour except by Zone F permit
Data is from January 2008.



LEGEND

- 2-3 Hour Parking
- 2 Hour (Except by Zone F Permit)
- 90 Minute Parking
- Long Term Parking (10 hours or More)
- North Macadam Urban Renewal District

NO SCALE

Note: Parking is not allowed on unmarked roadways within the URD

DKS Associates
TRANSPORTATION SOLUTIONS

Figure 3-8

ON-STREET PARKING INVENTORY

PEDESTRIAN

The pedestrian network consists of sidewalks, pedestrian bridges, and off-street paths. Sidewalks are present on most streets within the study area. There are several significant pedestrian generators within the study area including: the Oregon Health and Sciences University, the College of Naturopathic Medicine, Willamette Greenway Trail, the aerial tram, transit connections into the downtown core as well as local businesses.

Off-street trails also serve pedestrian activity within and in the vicinity of the study area. The Willamette Greenway Trail is a north-south trail that extends throughout the study area along the Willamette River. The off-street trail along Terwilliger Boulevard is another north-south route that connects OHSU and several other recreational and commuter trails. The *Southwest Urban Trails plan*[9] also identifies the existing trail connection between Terwilliger Boulevard and the North Macadam District and the Willamette Greenway Trail via an off-street trail and Whitaker Street. The existing connection is constrained by I-5; however, a pedestrian bridge crossing is currently in the preliminary design stage at Gibbs Street that will complete the east-west connection to the district. From the south, there is also the potential Red Electric Trail which is an off-street/shared roadway connection along Slavin Road that connects to Corbett Avenue.

Pedestrian access to/from the district is severely limited due to geographic constraints, man-made obstacles, and limited sidewalk connectivity.

Similar to motor-vehicle access into the district, pedestrian facilities also have significant barriers (e.g. Interstate-5, Ross Island Bridge Ramps/Kelly Street vicinity) that limit access into and within the district. Access into the district primarily occurs from the north (SW Moody Avenue) and the south (Willamette Greenway Trail). The Naito Parkway and Ross Island Bridge ramps also form physical barriers that inhibit safe, convenient pedestrian circulation in the vicinity. These barriers and pedestrian deficiencies require significant out-of-direction travel or crossings at unmarked locations for pedestrians trying to access the North Macadam District from the west.

Access to the district from the west is also limited by several high volume roadways with wide cross-sections and/or no pedestrian crossing facilities that pose challenges to the pedestrian environment. Pedestrian gaps in the network include: connections to existing multi-use trails, limited pedestrian crossing opportunity

[9] *Southwest Urban Trails Plan*, City of Portland July 2000.

along Barber Boulevard, Naito Parkway and Interstate-5, and gaps in the sidewalk system and way finding signage.

Pedestrian crossing counts were performed within the study area to determine the pedestrian activity levels at study area intersections. Figure 3-9 summarizes the pedestrian volumes at study intersections during the AM and PM peak period. The highest pedestrian activity during the AM peak period occurs at SW 4th Avenue/SW Lincoln Street (107 pedestrian crossings) near Portland State University and at SW Arthur Street/SW 1st Street (135 pedestrian crossings). During the PM peak period, pedestrian crossing volumes are highest at SW Naito Parkway/SW Harrison Street (112 pedestrian crossings) and on SW Moody Avenue at SW Gaines Street (103 pedestrian crossings) and at SW Curry Street (87 pedestrian crossings).

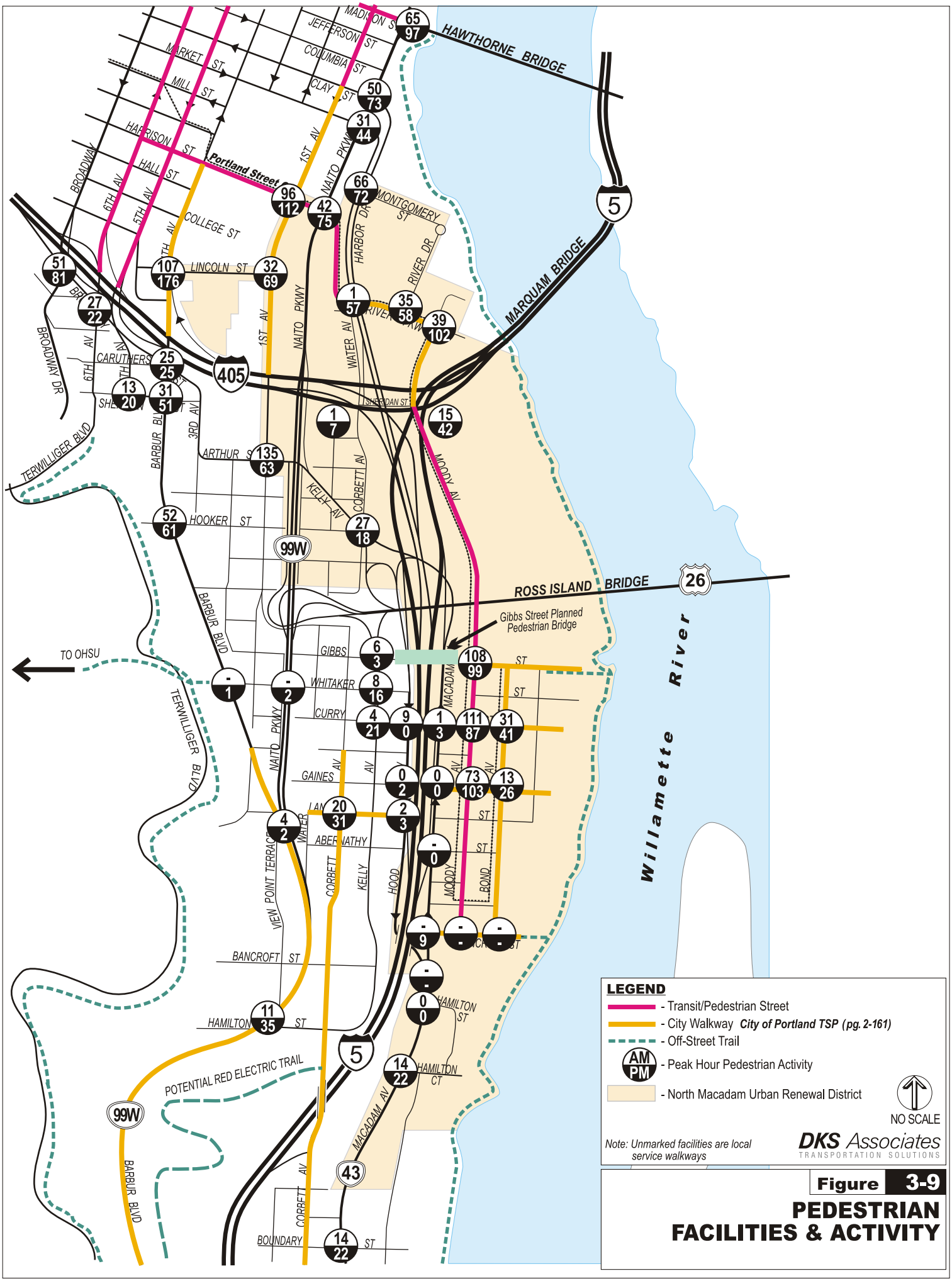
Similar to motor-vehicle classifications, the City of Portland designates pedestrian facilities. The majority of the study area is classified as a pedestrian district, with several roadways also identified as City Walkways. The pedestrian classifications (per the City of Portland TSP) are also shown on Figure 3-9.

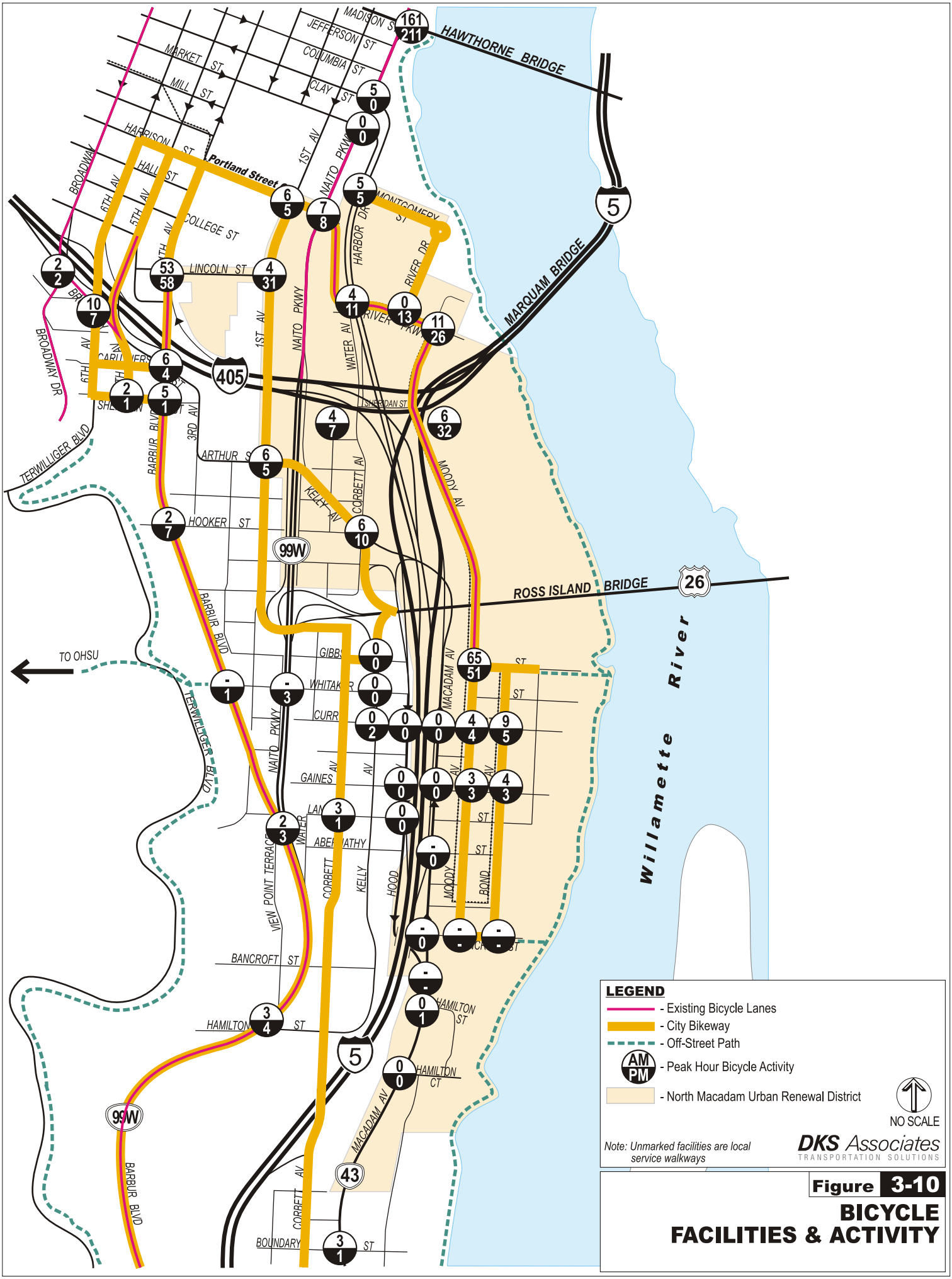
Safe, convenient and adequate facilities are essential to encourage bicycle riding

BICYCLE

Bicycle facilities within the study area include designated bicycle lanes, bicycle routes and off-street bicycle paths and trails. Most streets within the study area do not have bicycle facilities and operate as a shared facility with motor vehicles. Streets with low vehicle volumes and slow speeds do not need delineated bike lanes, as right-of-way under these conditions can be shared between motor vehicles and bicycles. The bicycle classifications (per the City of Portland TSP), existing bicycle facilities and AM and PM peak hour bicycle activity at the study area intersections are also shown on Figure 3-10.

From the north, bicycle lanes on SW Moody Avenue serve the North Macadam district. Marked bicycle lanes extend from SW River Parkway to SW Bancroft Street. From the south, bicycle access is provided via the Willamette Greenway Trail or on Macadam Avenue (which does not have bicycle lanes). Elsewhere within the North Macadam Urban Renewal District, marked bicycle lanes are limited.


HAWTHORNE BRIDGE
MARQUAM BRIDGE
ROSS ISLAND BRIDGE
Willamette River
Portland Street
Gibbs Street Planned Pedestrian Bridge
TO OHSU
POTENTIAL RED ELECTRIC TRAIL
LEGEND
- Transit/Pedestrian Street
- City Walkway City of Portland TSP (pg. 2-161)
- Off-Street Trail
AM PM - Peak Hour Pedestrian Activity
- North Macadam Urban Renewal District
NO SCALE
Note: Unmarked facilities are local service walkways
DKS Associates
TRANSPORTATION SOLUTIONS
Figure 3-9
PEDESTRIAN FACILITIES & ACTIVITY


HAWTHORNE BRIDGE
MARQUAM BRIDGE
ROSS ISLAND BRIDGE
Willamette River
MADISON ST
JEFFERSON ST
COLUMBIA ST
CLAY ST
MARKET ST
MILL ST
HARRISON ST
HALL ST
COLLEGE ST
LINCOLN ST
SHERIDAN ST
ARTHUR ST
HOOKER ST
GIBBS ST
WHITAKER
CURRY
GAINES
LANE
ABERNETHY
BANCROFT ST
HAMILTON ST
HAMILTON CT
BOUNDARY ST
BROADWAY
BROADWAY DR
6TH AV
5TH AV
4TH AV
1ST AV
3RD AV
NAITO PKWY
HARBOR DR
RIVER DR
WATER AV
CORBETT AV
KELLY AV
MOODY AV
MACADAM AV
BOND ST
HOOD
VIEW POINT TERRACE
TERWILLIGER BLVD
BARBUR BLVD
TO OHSU
Portland Streetcar
405
99W
5
26
43
LEGEND
- Existing Bicycle Lanes
- City Bikeway
- Off-Street Path
AM PM - Peak Hour Bicycle Activity
- North Macadam Urban Renewal District
NO SCALE
Note: Unmarked facilities are local service walkways
DKS Associates
TRANSPORTATION SOLUTIONS
Figure 3-10
BICYCLE FACILITIES & ACTIVITY

Generally, bicycle activity within the North Macadam Urban Renewal District is between zero and ten bicycle trips traveling through the study intersections during the peak periods. The highest bicycle activity during both the AM and PM peak periods occurs on the Hawthorne Bridge (at Naito Parkway), with approximately 210 eastbound bicycle trips through the intersection. The intersection at SW 4th Avenue/SW Lincoln Street, near Portland State University also has significant bicycle volumes traveling through the intersection (greater than 50 bicycles entering the intersection) during the AM and PM peak periods.

Several of the bicycle counts conducted within the district were done in November and may underestimate some of the bicycle travel that may occur throughout the year, specifically during the summer months. The City of Portland [10] conducted bicycle counts between July and September of 2007. The daily bicycle counts at Moody Avenue/Gibbs Street were approximately 1,250 over a 24-hour period. As compared to the 2006 daily counts conducted by the City of Portland, bicycle volumes at Moody Avenue/Gibbs Street increased by approximately 135%.

The South Waterfront Area is not only serviced by buses, but also has streetcar service and the aerial tram

TRANSIT

The study area is served by TriMet. Bus routes and the Portland Streetcar operate through the study area and provide access to and from the North Macadam URA District. Bus service is provided on Macadam Avenue via Line 35-Macadam and Line 36-South Shore, but currently does not enter the district east of Macadam Avenue. The City of Portland[11] has classified key routes in the study area for transit corridors. Table 3-6 summarizes these transit functional classifications for key roadways in the study area. Figure 3-11 summarizes the transit service and daily ridership data for bus routes within the study area. As shown, several bus routes operate in the vicinity of the district including 4 routes on the Ross Island Bridge. There is no transit access from the bus routes traveling on the Ross Island Bridge into the district south of the Ross Island Bridge.

The highest concentration of ridership within the North Macadam URA District occurs at SW Macadam Avenue/SW Hamilton

[10] Access online: http://www.portlandonline.com/shared/cfm/image.cfm?id=169951

[11] City of Portland Transportation System Plan, 2006 Technical Update adopted on April 5, 2007.

Court, Natio Parkway/SW Harrison Street, and along SW 1st Avenue at SW Lincoln Street and SW Arthur Street. Generally peak headways are twenty minutes apart, which correlates to a transit headway level of service of "C".[12]

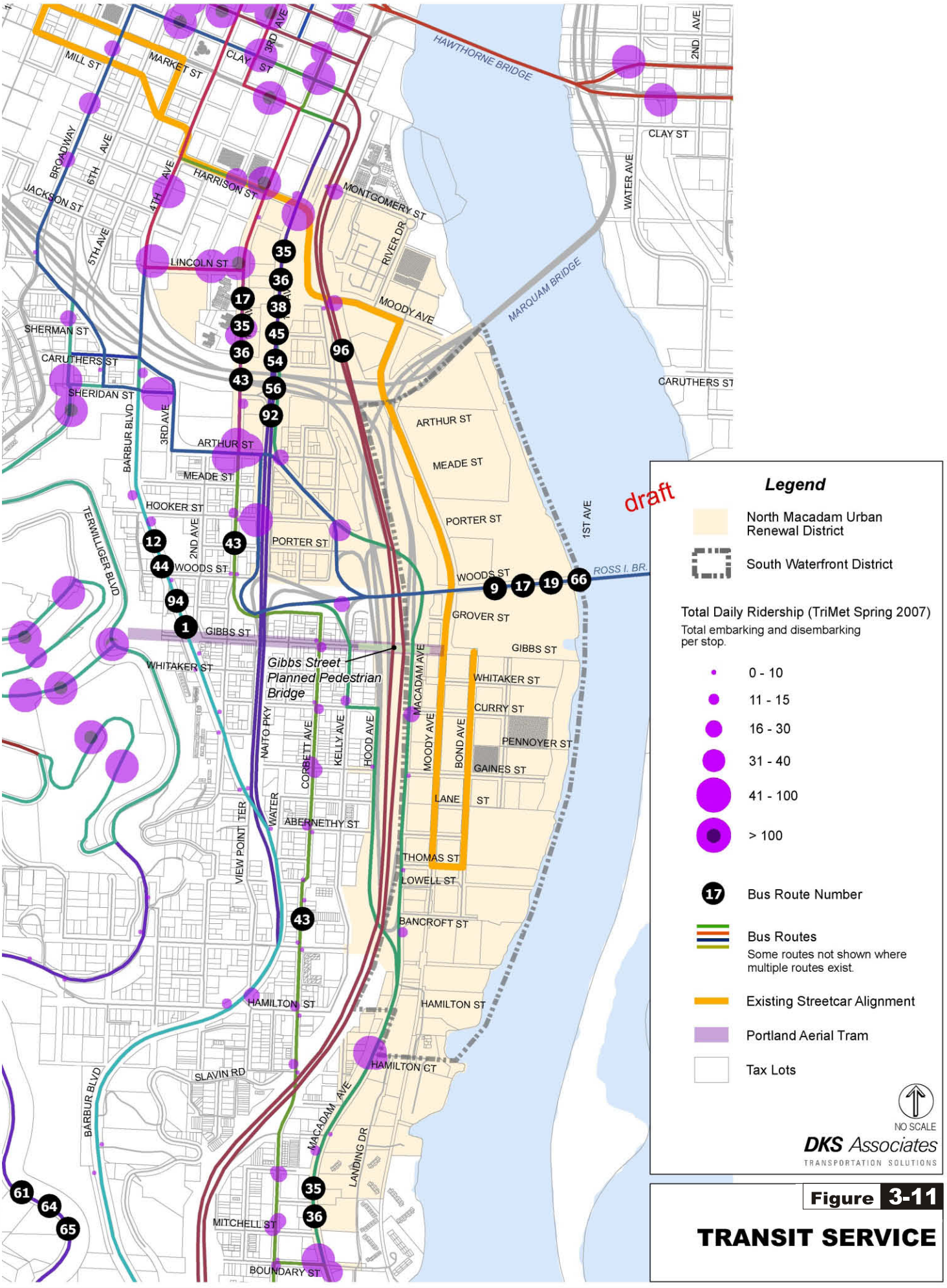
The Portland Streetcar operates between 5:30 AM and 11:45 PM with 13 minute headways during peak times and 15-20 minute headways during off-peak times. The existing streetcar services the South Waterfront area between SW Lowell Street and SW 1st Avenue with continuing service to NW 23rd Avenue. There are 9 stops within the district on Harrison Street, River Parkway, Moody Avenue, Lowell Street, and Bond Avenue.

The Portland Aerial Tram operates Monday-Friday between 5:30 AM and 9:30 PM and Saturday between 9 AM and 5 PM with service between the South Waterfront and Marquam Hill. Headways are approximately 5 minutes. The tram operates Sundays from Memorial Day to Labor Day between 9:00 AM and 5:00 PM.

Table 3-6: Transit Functional Classification

Roadway	City of Portland Classification
SW Harrison Street	Regional Transitway and Major Transit Priority Street
SW 4th Avenue	Regional Transitway and Major Transit Priority Street
SW Moody Avenue	Regional Transitway and Major Transit Priority Street
SW Arthur Street	Major Transit Priority Street
SW Kelly Avenue	Major Transit Priority Street
SW 1st Avenue	Transit Access Street
SW Naito Parkway	Transit Access Street
SW Corbett Avenue	Transit Access Street
SW Macadam Avenue	Major Transit Priority Street
SW Hood Avenue	Major Transit Priority Street
SW Barbur Boulevard	Regional Transitway and Major Transit Priority Street

[12] *2000 Highway Capacity Manual*


draft
Legend
North Macadam Urban Renewal District
South Waterfront District
Total Daily Ridership (TriMet Spring 2007)
Total embarking and disembarking per stop.
0 - 10
11 - 15
16 - 30
31 - 40
41 - 100
> 100
17 Bus Route Number
Bus Routes
Some routes not shown where multiple routes exist.
Existing Streetcar Alignment
Portland Aerial Tram
Tax Lots
NO SCALE
DKS Associates
TRANSPORTATION SOLUTIONS
Gibbs Street Planned Pedestrian Bridge
HAWTHORNE BRIDGE
MARQUAM BRIDGE
ROSS I. BR.
MILL ST
MARKET ST
CLAY ST
HARRISON ST
JACKSON ST
LINCOLN ST
SHERMAN ST
CARUTHERS ST
SHERIDAN ST
ARTHUR ST
MEADE ST
HOOKER ST
PORTER ST
WOODS ST
GIBBS ST
WHITAKER ST
GROVER ST
CURRY ST
PENNOYER ST
GAINES ST
LANE ST
ABERNETHY ST
THOMAS ST
LOWELL ST
BANCROFT ST
HAMILTON ST
HAMILTON CT
SLAVIN RD
MITCHELL ST
BOUNDARY ST
MONTGOMERY ST
MOODY AVE
RIVER DR
WATER AVE
1ST AVE
2ND AVE
3RD AVE
4TH AVE
5TH AVE
6TH AVE
BROADWAY
BARBUR BLVD
TERWILLIGER BLVD
NAITO PKY
CORBETT AVE
KELLY AVE
HOOD AVE
MACADAM AVE
BOND AVE
LANDING DR
VIEW POINT TER
WATER
Figure 3-11
TRANSIT SERVICE

SUMMARY OF KEY FINDINGS AND ISSUES

The following section summarizes key findings from the existing transportation conditions within the study area.

Pedestrian

- Interstate-5 and the Willamette River create significant barriers for pedestrians traveling to and from the district.
- Pedestrian circulation and access near the western terminus of the Ross Island Bridge and the Kelly District (north of SW Kelly Avenue between I-5 and SW Naito Parkway) is constrained.
- The intersections with the highest pedestrian crossing counts during the peak periods were:
  - 4th Avenue/Lincoln Street
  - Curry Street/Moody Avenue
  - Gaines Street/Moody Avenue
  - 1st Street/Harrison Street

Bicycle

- Interstate-5 and the Willamette River create significant barriers for bicycles traveling to and from the district.
- The intersections with the highest bicycle counts in the AM peak period were:
  - 4th Avenue/Lincoln Street
  - 6th Avenue/Broadway Street
  - Naito Parkway/Madison St (Hawthorne Bridge)
  - River Parkway/Moody Avenue

Transit

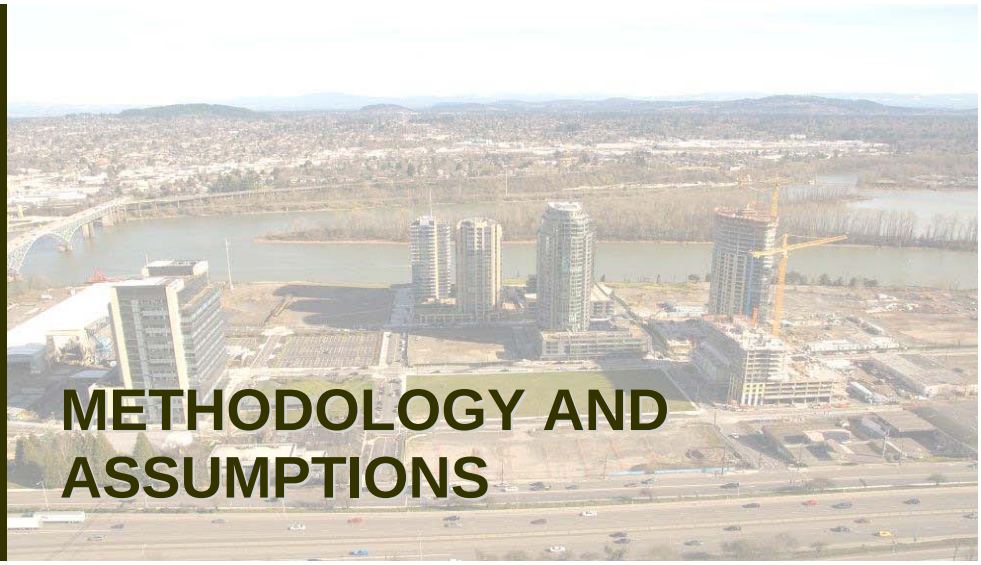
- There is limited transit service to the North Macadam District south of the Ross Island Bridge. Existing bus service is provided along Macadam Avenue (Routes 35 and 36), with stops at Boundary Street and Curry Street, but does not enter the core of the district.
- There is no transit access from the Ross Island Bridge into the district (south of the Ross Island Bridge).
- The Portland Streetcar operates within the district from Harrison Street to Lowell Street and has 9 stops at Harrison Street, River Parkway, Moody Avenue, Lowell Street, and Bond Avenue.
- The aerial tram provides transit service between the district and OHSU.

Motor Vehicle/Freight

- The Willamette River and Interstate-5 limit access and circulation opportunities to the majority of the district.
- PM peak hour vehicle congestion eastbound on the Ross Island Bridge creates vehicle congestion and queuing with the district on the approach roadways to the bridge.
- Vehicle congestion occurs during peak hours around Broadway/4th Avenue/5th Avenue/6th Avenue due to access and circulation constraints to the City Center and Interstate 405.
- Vehicle congestion during peak hours in both directions on Naito Parkway occurs between Harrison Street and Madison Street (Hawthorne Bridge).
- Excessive vehicle queues exist during the PM peak hour at the Hamilton Street/Corbett Street intersection.

CHAPTER

4



METHODOLOGY AND ASSUMPTIONS

The following chapter outlines the methodology and assumptions used to model the future transportation conditions in the study area.

MODELING ASSUMPTIONS

Future conditions for the planning horizon (2030) were analyzed to determine future deficiencies within the study area. The future transportation system was modeled using the EMME/2 regional travel demand model which is comprised of two key elements: land use and the planned roadway network. For consistency with other ongoing studies within the study area[1], the 2030 Portland to Milwaukie Light Rail travel demand model was used for future analysis.

The motor vehicle modeling and assumptions related to land use, future vehicle forecasting, and mode choice are discussed below. A traffic operations overview is also included at the end of the chapter.

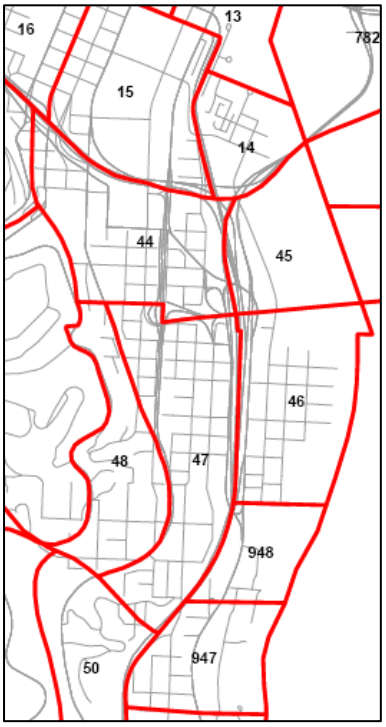
Land Use

Land use is a key factor in how the transportation system operates and how many vehicle trips are projected to use the roadway network. 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

[1] 2030 Portland to Milwaukie Light Rail Draft Environmental Impact Study, Metro. 2007.

system. Understanding the amount and type of land use is critical to taking actions to maintain and/or enhance transportation system operation.

The land uses are represented in Transportation Analysis Zones (TAZs). The Portland metro region is composed of 1360 TAZs. Each TAZ represents certain land uses that determine the number of trips generated to and from the TAZ. To predict future volumes land uses are adjusted to account for planned developments in each TAZ. In some cases a TAZ must be broken into smaller components to better represent how and where trips access the network.



The land use within the Metro region is divided up into small areas called Transportation Analysis Zones (TAZs) that hold household and employment data for that specific area

Projected land uses were assessed within the study area for the year 2005 (base year) and 2030 (future year) that reflect comprehensive plans and Metro's land use assumptions. These are consistent with the adopted Regional Transportation Plan[2]. The land use data was extracted from the regional model for the study area for the following conditions:

- Existing base 2005 conditions (2005 Metro Regional Transportation Plan Model)
- Year 2030 forecast conditions (2030 Metro Portland - Milwaukie Light Rail Model)

The primary growth area is focused in the South Waterfront Area which is bound by I-5, the Willamette River, the Marquam Bridge and Hamilton Court. *Table 4-1* summarizes the existing (2005) and future year (2030) land use for the TAZs which most closely replicate the North Macadam study area.[3]

Table 4-1: Existing and Future South Waterfront Land Use Summary

Land Use	2005	2030	Growth	Percent Growth
Households 26	6	6,446	6,180	2,300%
Employees 6,	359	15,720	9,361	147%

SOURCE: 2005 Regional Transportation Plan (RTP) Model (EMME/2) and 2030 Portland to Milwaukie LRT Model (EMME/2)

[2] Metro Regional Transportation System Plan, Adopted July 2004.
[3] The TAZs that closely replicate the South Waterfront area for the base year are 172-174, 175-179,180, 1168, and 1169. This does not include the entire North Macadam URA with adds TAZs 81, 84-88 and 1159.

As part of the this study, the 2030 Metro Portland to Milwaukie Light Rail travel demand model was used to help forecast future volumes for study area intersections. In order to obtain more accurate results, the TAZs that represent the North Macadam area in the Metro model were disaggregated (broken into smaller sub-area TAZs) and the control total land use was assigned within the smaller TAZs.

Planned Roadway Network

The planned transportation system included projects included in Metro's Regional Transportation Plan Financially Constrained funding scenario. This scenario only included transportation system improvements that are expected to be constructed and implemented within the current funding levels. Key assumptions include Portland to Milwaukie Light Rail, South Portal improvements on SW Macadam Avenue, and I-5 northbound off-ramp improvements to the district. The base roadway network also includes the extension of the Moody Avenue/Bond Avenue extension.

Additional roadway system improvements are needed to address the existing and future needs and deficiencies, as well as serve the projected future growth in the North Macadam Urban Renewal District.

There are a number of planned projects that have been accounted for in the analysis of future conditions. One of these projects is a new light rail transit project connecting Downtown Portland to Milwaukie

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 transportation analysis zone) 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 analysis[4]. The model process is tailored to variations in travel characteristics and activities in the region.

Table 4-2 illustrates the estimated growth in vehicle trips generated within the North Macadam/South Waterfront study area during the PM peak period between 2005 and 2030. It indicates that vehicle trips within the study area would grow by approximately 217

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

percent between 2005 and 2030 if the land develops according to the 2030 land use assumptions. Assuming a 25-year horizon to the 2030 scenario, this represents annualized growth rate of about 9% percent per year.

Table 4-2: North Macadam Raw Model Trip Generation

	2005 Trips	2030 Trips	2030-2005 (Growth)	2030-2005 (% Growth)
North Macadam Study Area (area bordered by Hamilton Court, I-5, Marquam Bridge and Willamette River)	2,574 8,	171 5,	597	217%

SOURCE: 2005 and 2030 Metro Regional Travel Demand Models

Another part of the land use process is calibrating the 2005 Base Model to verify that it accurately reflects the existing vehicle trips. To calibrate the Base Model, existing traffic volumes are compared to those in the Base Model. During this process it is helpful to disaggregate the TAZs to ensure that trips access the network as they would on the actual roadway system.

The calibration process for this study compared the trip generation for the base year (2005) model and the existing (2007) counts within the study area. The base year (2005) model trip generation was high relative to the existing (2007) counts in the Central and North portions of the study area. In order to more accurately represent the growth that is likely to occur in the district, the trip generation in the following TAZ's (172-179, 1168 and 1169) were reduced by 60% for the base year (2005) model[5]. While it may not be consistent with Metro's adopted land use, it is more consistent with traffic patterns observed today and would represent a more likely (or worst case) scenario. More details on this process are included in a technical memorandum that is attached to Appendix A of this report.

Table 4-3: North Macadam Trip Generation with Reduced 2005 Trips to Better Correlation to 2007 Traffic Volumes

	2005 Trips	2030 Trips	2030-2005 (Growth)	2030-2005 (% Growth)
North Macadam Study Area (area bordered by Hamilton Court, I-5, Marquam Bridge and Willamette River)	1,376 8,	171 6,	795	493%

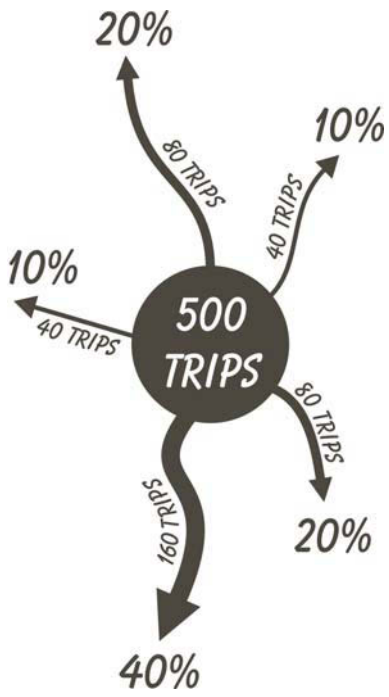
SOURCE: Adjusted 2005 Metro Regional Travel Demand Model, and 2030 unadjusted Metro Regional Travel Demand Models.

[5] See "Land Use Summary Memorandum" by DKS Associates, dated January 10, 2008. Attached in Appendix A.

Using the adjusted 2005 Model, the vehicle trips are expected to grow by almost 500% between 2005 and 2030. This correlates to a 20% annualized growth rate per year and gives a more conservative (or worst case) growth estimate than with no adjustment to the 2005 Model trips.

Trip Distribution

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 within the North Macadam Urban Renewal district are essentially a function of future land use in the city, the distribution of trips is influenced by regional growth. External trips (trips that have either an origin and not a destination in the North Macadam district or have a destination but not an origin in North Macadam) and through trips (trips that pass through the North Macadam District and have neither an origin nor a destination in North Macadam) 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.



Trip distribution indicates the percentage of trips to/from and area, while trip assignment indicates the path those trips take.

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. Travel speeds and times are estimated using "volume-delay functions" 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.

Mode Choice

Within the model, assumptions have been made that reflect the number of trips by various modes (single-occupant vehicle, transit, carpool, pedestrian, bicycle, etc.). The 2030 Portland to Milwaukie Light Rail model assumes the completion of the light rail segment between Portland and Milwaukie and the effects of improved transit are given as assumptions in the travel forecast of vehicle

trips. *Table 4-4* summarizes the mode split assumptions for the 2005 (base) and 2030 (future) models.

Table 4-4: Existing and Projected Mode Splits (PM Peak Hour)

Mode	2005	2030
Drive alone	56%	48%
Drive with Passenger	18%	10%
Passenger Trips	19%	27%
Transit 3%		9%
Bike/Walk 4%		6%
Total 10	**0%**	**100%**

SOURCE: 2005 and 2030 Trip Summary Comparison from Metro's Travel Demand Model, includes TAZs 81,84-88, 172-180, 646, 647, and 1159

FUTURE VOLUME FORECASTS (POST PROCESSING)

Intersection turn movements were extracted from the model at study area intersections for both the base year 2005 and forecast year 2030 scenarios. These intersection turn movements were not used directly, but the increment of the year 2030 turn movements over the 2005 turn movements was applied (added) to existing (actual 2007) turn movement counts within the study area.

A post processing technique was utilized to refine model travel forecasts to the volume forecasts utilized for 2030 intersection analysis. The turn movement volumes used for future year intersection analysis can be found in the technical appendix.

To help visualize the process, the equation below shows how the future forecast volumes were obtained. The adjustment factor (23/25) was due to a two year difference between the existing counts in 2007 and the 2005 base year.

$$\left[\underbrace{(2030\ MODEL - 2005\ MODEL)}_{Growth\ Increment\ In\ Model} \times \underbrace{\frac{23}{25}}_{Adjustment\ Factor}\right] + EXISTING\ COUNTS = FUTURE\ FORECAST$$

TRAFFIC MEASURES OF EFFECTIVENESS

An understanding of the traffic analysis terminology as well as summarizing the measures of effectiveness used is helpful to evaluate traffic operations for this study.

Level-of-Sevice (LOS)

Intersections LOS is similar to a "report card" rating, based on the average vehicle delay for all movements at the intersection. Level-of-service A, B or C indicate conditions where vehicles can move freely. Level-of-service D and E are progressively worse and generally indicated intersections where queuing of vehicles occur. Level-of-service F is the worst performance an intersection can attain.

Volume-to-Capacity (V/C) Ratio

Another measure of effectiveness is the volume-to-capacity (v/c) ratio for signalized intersection. This is a measure of the amount of capacity (number of vehicles an intersection can accommodate) compared to the actual number of vehicles that utilize the intersection during the peak hour. As an intersection becomes more heavily utilized, the v/c ratio increases. For existing conditions the maximum value is 1.0 (the capacity of an intersection must be equal to or greater than volume of cars measured traveling through an intersection). Intersection start to reach a "capacity" constrained condition when the v/c ratio is at approximately 0.90 to 0.95 or higher (meaning that 90% to 95% of the intersection is used with only 5% to 10% available for new demand). Under future conditions, the demand can be higher than the capacity and values greater than 1.0 can occur.

A volume-to-capacity (V/C) ratio measures the amount of capacity that has been used up by motor vehicles at an intersection. Think of capacity at an intersection like a glass of water … when the glass is ½ full the capacity used up would be 0.5

CHAPTER

5

BICYCLE AND PEDESTRIAN IMPROVEMENTS

BICYCLE AND PEDESTRIAN FACILITIES

A central focus of the North Macadam Transportation Strategy is to create a balanced transportation system where a significant portion of district residents and employees can access the district and attend to their daily needs without relying on the motor vehicle. Balancing the district's transportation demand will prolong the useful life of the district's motor vehicle facilities and provide useful alternative access as nearby regional facilities experience increased congestion as result of continued growth throughout the region.

The North Macadam District is ideally positioned and planned to emphasize both bicycle and pedestrian transportation. Its proximity to downtown and access to the emerging regional trail system creates the potential for the district users to connect to numerous destinations quickly and comfortably. In addition, the connection to the institutions on Marquam Hill offered by the Portland Aerial Tram is already proving to be an attractive option for a large number of cyclists and pedestrians and will only grow with the construction of the Gibbs St Pedestrian Bridge.

Existing pedestrian facilities in the South Waterfront District

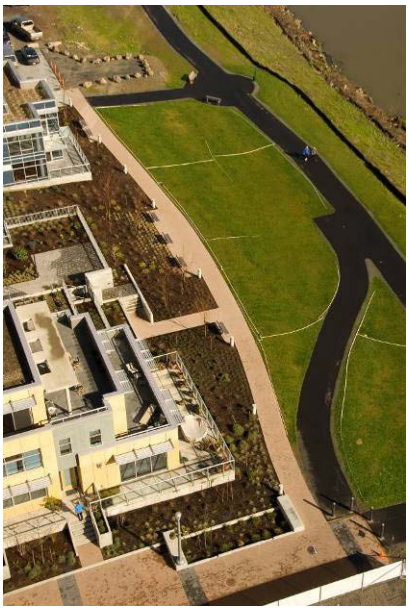
As stated earlier in this report, the South Waterfront Plan established an overall mode split goal of at least 30 percent and a work mode split of at least 40 percent, for public transit, pedestrian and bicycle trips to the district. Achieving this goal is only possible if the North Macadam URA is seamlessly connected to adjacent neighborhoods and downtown by safe and convenient pedestrian and bicycle connections. The City and district stakeholders will

need to work together to continue to implement improvements to realize the desired urban character of the district as it grows.

Current Pedestrian and Bicycle Infrastructure

Despite initial infrastructure improvements in the district, bicycle and pedestrian access to the North Macadam URA remains difficult for many Portland residents, especially those in neighborhoods to the South and West of the district. The large number of regional roadways in the study area including I-5, I-405 and Naito Parkway combined with grade changes create significant physical barriers for pedestrians or cyclists traveling to or from the North Macadam district, especially in the East-West directions.

Due to the barriers created by the I-5 freeway and the Willamette River, access is primarily from the north and south of the District. Today, access to the South Waterfront is limited to SW Moody Avenue from the north and the Greenway trail from the south. Within the district, bike lanes and city standard sidewalks have been added as the street network has been improved.



Off street multiuse paths are a safe and efficient means of connectivity for both pedestrians and bicycles

Access to and from the Ross Island Bridge area is particularly difficult, isolating a large portion of the Urban Renewal Area. There are no developed surface bikeway connections, and the surface connections that do exist are not bicycle-friendly or welcoming to pedestrians. While sidewalks do exist, they are often of a minimal width (4'-6'). Additionally, inadequate roadway crossings and high speed, high traffic volumes make navigating this area amongst the most challenging in the region.

Another important element for pedestrians and cyclists is the connectivity of the system and the ability to navigate the system effectively. The city's existing pedestrian and bicycle wayfinding systems provide signs with maps and directions to specific destinations throughout the city but these systems have not yet been extended into the North Macadam District.

Projects Considered

To develop a comprehensive list of possible projects to serve the future needs of the district, project ideas developed in previous planning studies were first compiled and reviewed. New project ideas we also developed from identified issues and suggestions provided at individual meetings with stakeholder and neighborhood groups and at the first public open house. In addition, project staff toured the study area by bicycle and by foot

on multiple occasions to experience the access challenges first hand and identify possible solutions.

As I-5 is a major barrier for district access, a key priority for the pedestrian and bicycle component of this strategy is to create improved accesses at locations where existing roadways go over or under the I-5 freeway. Using all existing access locations presents the only affordable option to create frequent connections for the district. Given the large number of regional facilities in the area, many of these proposed pedestrian and bicycle projects are on or near Oregon Department of Transportation (ODOT) facilities. The implementation of these projects will require close coordination and partnership with ODOT.

Proposed Pedestrian and Bicycle Improvement Projects

Twenty-eight projects were developed to support the pedestrian and bicycle needs of the district and surrounding areas. Some projects were separated into smaller projects to allow for greater implementation as funding becomes available. Some projects are also related to specific redevelopment plans identified in previous studies and as such will not be realized until those developments are implemented. Table 5-1 lists the pedestrian and bicycle projects compiled by the project team.

Table 5-1: Pedestrian and Bicycle Projects

Project Map #	Project Name	Project Description
BP-1	South Waterfront Willamette Greenway Trail	Connection to existing alignment of multi-use waterfront trail.
BP-2	North of I-405 Connection	New pedestrian/bike connection between 3rd Ave and Water Ave, passing along south side of The International School and under I-405. The connection will tie into South Auditorium trails.
BP-4	Arthur Street Tunnel	Arthur Street tunnel under I-5 to connect NCNM and surrounding area more directly to OHSU Schnitzer campus.
BP-5	Arthur Street Connection and Steps	Pedestrian/bike only boulevard along Arthur St. from Kelly Ave to Corbett Ave with steps and ramps from Water Ave to Corbett Ave.
BP-6	Porter-Sherman Light Rail Bridge Crossing	Pedestrian/bicycle/transit bridge crossing over the Willamette River.
BP-7	Macadam/City Center Ramp Connection	Widen sidewalk and add railing along the Macadam/City Center ramp to improve connections between SWF and City Center.
BP-8	Gibbs Street Bridge and Crossing Enhancements	Pedestrian bridge over I-5 and crossing enhancements along Gibbs or Whitaker at Kelly Ave, Corbett Ave, Naito Pkwy and Barbur Blvd.
BP-9	Gaines Street Pedestrian Bridge	Pedestrian bridge over I-5.

Table 5-1: Pedestrian and Bicycle Projects continued

Project Map #	Project Name	Project Description
BP-10	Corbett Avenue Traffic Calming Project	Enhanced pedestrian crossings (refuge islands, curb extensions, cross walks and speed bumps) at several intersections along Corbett Ave (Hamilton to Gibbs).
BP-11	Hamilton Street to South Portal Pedestrian/Bicycle Connection	New pedestrian/bike trail along hillside west of I-5 from Hamilton Street to existing I-5 underpass at Hood/Bancroft.
BP-12	Slavin Rd Connection to Red Electric Trail	Combined off-street and on-street pedestrian/bicycle connection between Barbur Boulevard and Corbett Avenue.
BP-13	Naito Pkwy Curb-Cut to Hawthorne Bridge	Curb cut from Naito Pkwy SB to Hawthorne Bridge ramp and at top of ramp onto the bridge to allow better bike access.
BP-14 4	th Avenue/Lincoln Street Pedestrian Improvement	Provide signalized pedestrian crossings on south and east legs of the intersection.
BP-16	Hood Avenue Sidewalk Enhancement – Porter St. to Gibbs St.	New pedestrian/bike connection along Kelly between Porter Street and Gibbs Street. This connection from NCNM / Ross Island Bridge to the Gibbs Bridge for access into the SWF District
BP-18	South Moody Avenue Connection	New pedestrian/bike connection between Hamilton Street and Boundary Street along the existing trolley right-of-way.
BP-19	Richardson Street Connection	New pedestrian/bike connection along Richardson Street from Corbett Avenue to the eastside of Macadam Avenue. Include break in Macadam Ave median.
BP-20	Gibbs Street Promenade	Pedestrian/bike promenade along Gibbs Street from Moody (at the base of the lower tram terminal) to the Greenway Trail.
BP-21	Corbett Avenue Uphill Bike Lane – Boundary to Hamilton	Add bike lane to Corbett Avenue NB from Boundary Street to Hamilton Street.
BP-22	Hood Avenue Crosswalk and Sidewalk Enhancement – Lane to Macadam	Place jersey barriers with a handrail between Hood Avenue sidewalk (eastside of street) and traffic. Add pedestrian crossing of Hood Ave at Lane St.
BP-23	Kelly Pedestrian Tunnel Closure and Crosswalk Replacement	Close pedestrian tunnel beneath Kelly at Naito and Arthur. Replace tunnel with at-grade crosswalk and pedestrian island on Kelly at Meade St.
BP-24	Ross Is. Bridge to SW 1st Ave Connection	Improvements to provide continuous connection from the west end Ross Island Bridge sidewalk to SW 1st Ave. Comprised of BP-24a, BP-24b, BP-24c.
BP-24a	West-end Ross Island Bridgehead Connection	Add pedestrian crossing and island across Kelly at Porter (connect bus stop to NCNM campus) and across Ross Island Bridge WB ramp at Hood/Porter (connect bus stop to north sidewalk of bridge). Add pedestrian crossing across the N. Macadam/City Center ramp at Kelly (connect bus stop to sidewalk on north side of Kelly).
BP-24b	Kelly Avenue bike lanes	Add bike lane on north side of Kelly Ave between SW 1st Ave and the west-end Ross Island Bridgehead.
BP-24c	Ramp Crossing of Kelly Ave to Naito Pkwy NB	Stripe crosswalk across two lane ramp from Kelly Ave to Naito Pkwy NB.
BP-25	Naito Pedestrian Crossing at Porter St	Add at-grade pedestrian crossing facility across Naito at Porter.
BP-26	Hooker Street Pedestrian Boulevard between Naito and Kelly	Convert Hooker Street into a pedestrian boulevard between Naito and Kelly.

Table 5-1: Pedestrian and Bicycle Projects continued

Project Map #	Project Name	Project Description
BP-28	Moody Ave/ River Parkway Sidewalk Cut-Back	Cut sidewalk back at SW corner of Moody Ave and River Parkway to provide sufficient space to continue bike lane through the right-hand turn.
BP-29	Bike Enhancement of Grover St Underpass at Naito Pkwy	Add speed bumps and sharrows (or bike lanes if sufficient space) to Grover St car lanes under Naito Pkwy overpass to improve bike usage and safety.
BP-30	Tram Bike Parking	Add secure bike parking facility adjacent to the lower tram terminal to meet existing and future bike parking demand.
BP-31a	Wayfinding (Bicycle)	Add wayfinding signs to assist bicyclists in accessing the South Waterfront District and finding specific locations with the North Macadam Urban Renewal Area.
BP-31b	Wayfinding (Pedestrian)	Add wayfinding signs to assist pedestrians in accessing the South Waterfront District and finding specific locations with the North Macadam Urban Renewal Area.
BP-32	Gibbs Bridge To Light Rail Bike Connection	Add bicycle trail from east end of Gibbs Street Pedestrian Bridge to LRT station at SW Porter St.
BP-33	SW 1st Avenue Bicycle Improvements	Add a bike lane on SW 1st Avenue between SW Arthur Street and SW Harrison Street in the northbound direction.
BP-34	Harrison Uphill Bike Treatment	Replace the right vehicle lane on SW Harrison with an uphill bike lane from SW Naito Parkway to SW 4th Avenue.

Project Evaluation

Twenty-eight proposed projects were carried forward into the formal project evaluation process. An evaluation matrix was developed to provide a consistent quantitative method of prioritizing potential projects. In creating evaluation criteria, project staff utilized guidelines listed in the CROW Design Manual for Bicycle Traffic (June 2007) and added additional measures to capture the attributes of the proposed projects proposed in this study. In addition, staff also used a feasibility criteria to measure if the project could likely be implemented by 2015. The evaluation criteria is shown in Table 5-2 and the evaluation matrix is shown in Table 5-3. Figure 5-1 maps the pedestrian and bicycle projects and also shows the priority assigned to each project as a result of the evaluation process.

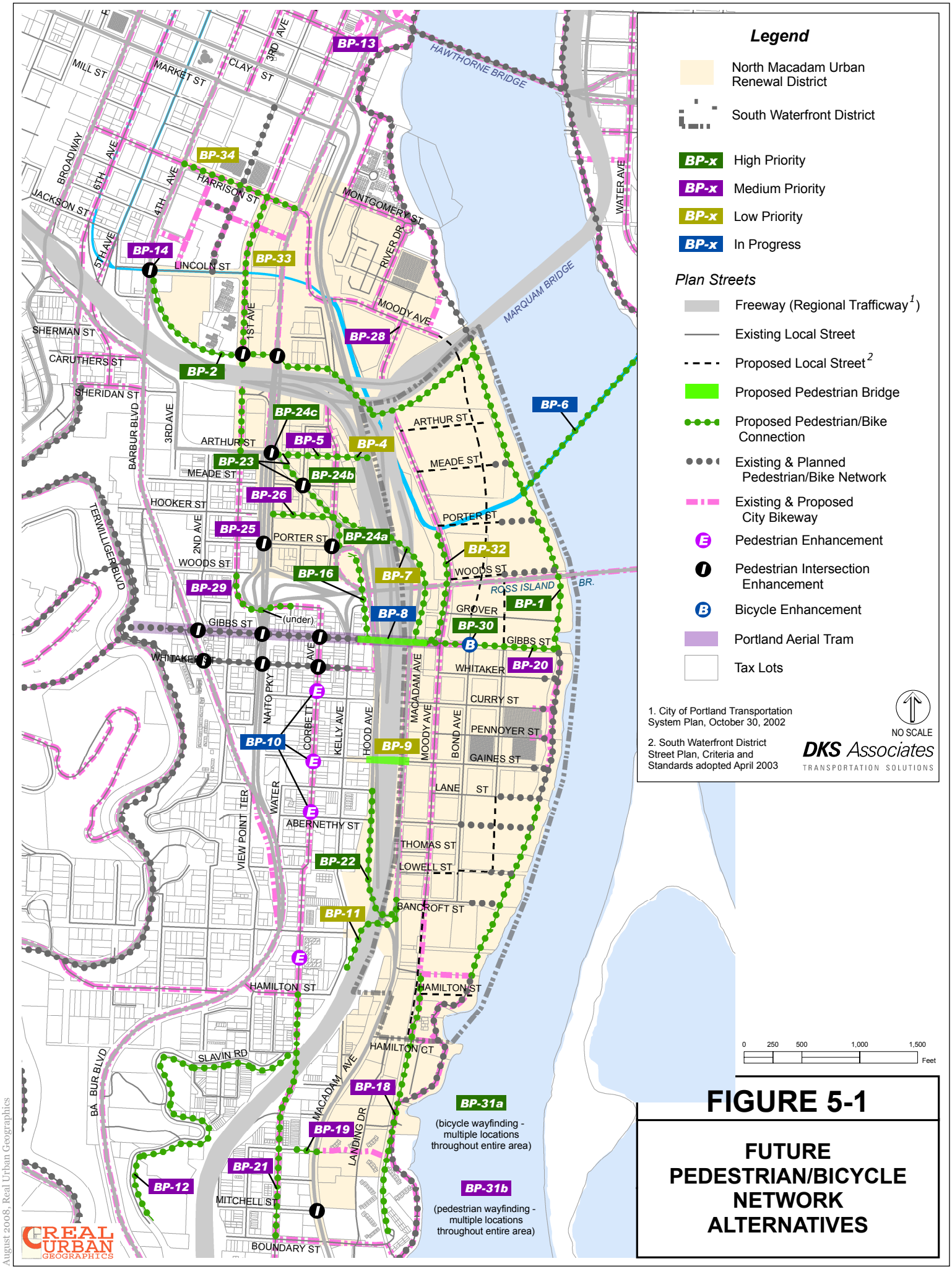


FIGURE 5-1

FUTURE PEDESTRIAN/BICYCLE NETWORK ALTERNATIVES

Table 5-2: Pedestrian and Bicycle Project Evaluation Criteria

Evaluation Criteria	Ranking Scale				
	1	2	3	4	5
Cohesion - builds a network of logical and cohesive routes that makes connections across barriers and/or fills gaps where no connection currently exists; builds out the regional network	little cohesion; no regional connection	⟷	moderate cohesion and /or regional connection	⟷	significant cohesion AND regional connection
Comfort - creates a positive user experience; good surface, generous space and little hindrance from other traffic participants; an attractive and socially safe environment without smell or noise inconvenience	poor user experience	⟷	moderate user experience	⟷	very good user experience
Safety - provides a safer alternative to that which exists today; avoids conflicts, separates uses, reduces speeds at conflict points, ensures unambiguous traffic situations	not safer; high traffic conflict	⟷	moderately safe; limited traffic conflict	⟷	much safer; no traffic conflict
Directness – provides short route with few detours and shorter travel times relative to other transportation modes from origin to destination	indirect route; slower than alt. modes	⟷	few detours; competitive w/ alt. modes	⟷	very direct; faster than alt. modes
Utilization - serves as a major destination (e.g. Willamette Greenway Trail) or links major destinations, high density areas, or connection points	links low-density / low-use areas	⟷	links moderate-use areas	⟷	links high-density / high-use areas
URA Benefit - project directly benefits URA residents/employees by serving destinations within the URA	no benefit to URA	⟷	moderate benefit to URA	⟷	significant benefit to URA
Cost : Benefit - cost to benefit relationship (cost of project compared to overall benefit reaped from project)	little bang for the buck	⟷	cost=benefit	⟷	big bang for the buck
Feasibility - What is the feasibility of the project occurring by 2015?	(project already **I**n **P**rocess / **H**igh feasibility / **L**ow feasibility				

In Process and High Priority Projects

The pedestrian and bicycle projects given high priority ranking represent the initial package of projects needed to provide safe and comfortable district access from surrounding neighborhoods and downtown Portland. A few projects that are in process are also included to reference their importance in the City's ongoing effort to improve district access. These projects are included in Table 5-4.

Table 5-3: Pedestrian and Bicycle Project Evaluation Matrix

Projects		Ranking Criteria								Rank	
Proj #	Project Name	Cohesion	Comfort	Safety	Directness	Utilization	URA Benefit	Cost: Benefit	Feasibility	Mean	
BP-6	Portland-Milwaukie Light Rail Bridge Crossing	5	5	5	4	5	5	4	IP	4.7	In Process Projects
BP-8	Gibbs Street Bridge and Crossing Enhancements	4	5	5	5	5	4	4	IP	4.6	
BP-10	Corbett Avenue Traffic Calming Project	N/A	4	3	N/A	2	1	4	IP	2.8	
BP-1	South Waterfront Willamette Greenway Trail	4	5	4	4	5	5	4	H	4.4	Top Tier Projects
BP-2	North of I-405 Connection	4	4	4	5	5	5	3	H	4.3	
BP-30	Tram Bicycle Parking	N/A	4	3	4	5	4	4	H	4.0	
BP-31	Wayfinding To and Around the North Macadam URA	5	4	3	3	4	4	5	H	4.0	
	BP-31a: Bicycle Wayfinding	-	-	-	-	-	-	-	-	-	
	BP-31b: Pedestrian Wayfinding	-	-	-	-	-	-	-	-	-	
BP-24	Ross Is. Bridge to SW 1st Ave Connection	3	3	3	4	4	4	5	H	3.8	
	BP-24a: West-end Ross Island Bridgehead Connection (BP-24)	3	3	4	4	5	5	5	H	4.1	
	BP-24b: Kelly Avenue Bike Lane (BP-30)	5	2	3	4	4	5	5	H	4.0	
	BP-24c: Ramp Crossing of Kelly Ave to Naito Pkwy NB (BP-29)	2	3	3	N/A	3	3	5	H	3.2	
BP-23	Kelly Pedestrian Tunnel Closure & Crosswalk Replacement	N/A	4	4	4	2	3	5	H	3.7	
BP-16	Hood Avenue Sidewalk Enhancement – Porter St. to Gibbs St.	3	4	3	3	4	4	4	H	3.6	
BP-22	Hood Avenue Crosswalk & Sidewalk Ehancement - Lane to Macadam	3	2	3	4	3	4	5	H	3.4	
BP-26	Hooker St Ped Blvd between Naito and Kelly	1	5	3	N/A	2	4	5	H	3.3	Second Tier Projects
BP-18	South Moody Avenue Connection	2	4	3	3	4	4	3	H	3.3	
BP-13	Naito Pkwy Curb-Cut to Hawthorne Bridge	N/A	4	3	3	4	1	5	H	3.3	
BP-14	4th Avenue/Lincoln Street Pedestrian Improvement	N/A	3	3	N/A	2	3	5	H	3.2	
BP-28	Moody Ave / River Parkway Sidewalk Cut-Back	2	4	3	N/A	4	4	2	H	3.2	
BP-5	Arthur Street Connection and Steps	2	4	2	3	3	4	4	H	3.1	
BP-21	Corbett Avenue Uphill Bike Lane - Boundary to Hamilton	3	3	4	3	2	1	4	H	2.9	
BP-29	Bike Enhancement of Grover St Underpass at Naito Pkwy	2	3	3	3	3	1	4	H	2.7	
BP-19	Richardson Street Connection	2	3	2	3	2	3	3	H	2.6	
BP-20	Gibbs Street Promenade	2	5	2	N/A	4	5	4	M	3.7	
BP-25	Naito Pkwy Pedestrian Crossing at Porter	3	3	2	4	3	4	4	M	3.3	
BP-12	Slavin Rd Connection to Red Electric Trail	3	5	4	2	3	1	3	M	3.0	
BP-32	Gibbs Bridge Bike Connection to Porter	3	3	4	3	2	4	2	M	3.0	
BP-33	SW 1st Avenue Bicycle Improvements	3	3	4	3	3	2	3	M	3.0	
BP-34	SW Harrison Uphill Bike Treatment	3	3	3	3	4	3	3	M	3.1	
BP-9	Gaines Street Pedestrian Bridge	3	5	3	5	5	3	2	L	3.7	Low Tier
BP-11	Hamilton St to South Portal Ped/Bike Trail	4	4	4	4	3	3	2	L	3.4	
BP-7	Macadam/City Center Ramp Connection	4	2	3	3	4	4	2	L	3.1	
BP-4	Arthur Street Tunnel	3	3	3	5	3	4	1	L	3.1	
BP-3	South of I-405 Connection	Recommended to be deleted - project impractical									
BP-15	Corbett Ave/Water Ave Enhancement	Recommended to be deleted - infrastructure improvements already required by redevelopment requirements									
BP-17	Abernethy St Connection to Greenway Trail	Recommended to be deleted - connection recommended for inclusion in parcel development									
BP-27	I-405 Bike Crossing Improvements	Recommended to be deleted - these improvements more appropriately considered by the Central City Plan									

Table 5-4: In Process and High Priority Bike and Pedestrian Projects

Project No.	In Process Bicycle and Pedestrian Projects
BP-6	Portland-Milwaukie Light Rail Bridge Crossing
BP-8	Gibbs Street Bridge and Crossing Enhancements
BP-10	Corbett Avenue Traffic Calming Project
	High Priority Bicycle and Pedestrian Projects
BP-1	South Waterfront Willamette Greenway Trail
BP-2	North of I-405 Connection
BP-30	Tram Bicycle Parking
BP-31	Wayfinding To and Around the North Macadam URA BP-31a: Bicycle Wayfinding BP-31b: Pedestrian Wayfinding
BP-24	Ross Is. Bridge to SW 1st Ave Connection BP-24a: West-end Ross Island Bridgehead Connection (BP-24) BP-24b: Kelly Avenue Bike Lane (BP-30) BP-24c: Ramp Crossing of Kelly Ave to Naito Pkwy NB (BP-29)
BP-23	Kelly Pedestrian Tunnel Closure & Crosswalk Replacement
BP-16	Hood Avenue Sidewalk Enhancement – Porter St. to Gibbs St.
BP-22	Hood Avenue Crosswalk & Sidewalk Enhancement - Lane to Macadam

These photographs are along Kelly Avenue just north of the Ross Island Bridge. This is one area that the bike and pedestrian projects targeted for improvement.

Expanding the City Bicycle and Pedestrian Network into the North Macadam URA

Two new routes are proposed as additions to the City's bicycle and pedestrian network designated in the Transportation System Plan. These routes will better integrate the North Macadam District with adjacent neighborhoods. The routes are discussed below.

SW Hooker and Corbett/Water Avenue Bikeway/Walkway
East-west bicycle connections to the North Macadam URA are particularly challenging from the existing Bicycle and Pedestrian network in the Lair Hill Neighborhood. By changing SW Hooker Street to be classified as a city walkway and city bikeway, SW Hooker Street, SW Corbett Avenue/SW Water Avenue provide a promising connection through this area. SW Hooker Street has an existing pedestrian signal at its intersection with SW Barbur Boulevard, and an existing pedestrian and bicycle bridge over SW Naito Parkway. In addition, BP-26 envisions an enhanced pedestrian streetscape with limited vehicle access on SW Hooker Street between SW Naito Parkway and SW Kelly Avenue as a focus of the planned NCNM campus expansion. A new signal and pedestrian crossing is proposed at SW Kelly Avenue, and a realigned SW Corbett Avenue would provide a connection to the district via SW Sheridan Avenue/SW Moody Avenue.

SW Gibbs or SW Whitaker City Bikeway and Walkway
The introduction of the Gibbs St. Pedestrian Bridge over I-5 will attract increased numbers of District bound pedestrians and cyclists from SW Portland. Several pedestrian crossings are proposed for improvement concurrent with bridge construction: SW Kelly Avenue/SW Gibbs Street, SW Naito Parkway/SW Gibbs Street, and SW Naito Parkway/SW Whitaker Street. SW Barbur Boulevard will connect with SW Trails Trail #1 and create a new East-West corridor though the Lair Hill Area.

PROJECT SUMMARY SHEETS

For each project a summary sheet was created to give further detail about the project. The pedestrian and bicycle project sheets are listed numerically.

PEDESTRIAN / BIKE PROJECTS

BP-1. SOUTH WATERFRONT WILLAMETTE GREENWAY TRAIL

Need/Purpose

The South Waterfront Greenway Trail will stretch from the Marquam Bridge south to the River Forum Building, providing a critical link in the river trail system. Once completed, this section will provide a complete trail connection along the west side of the Willamette River from the Steel Bridge south to the Sellwood Bridge. The South Waterfront Greenway will balance the needs of people, wildlife, and a healthy river.

Background Data

The *South Waterfront Greenway Development Plan*, accepted by City Council in 2004, provides a vision and concept plan for the entire South Waterfront Greenway. The Central District section of the South Waterfront Greenway (from SW Gibbs St south to SW Lane St) is the first section of the South Waterfront Greenway to be designed and constructed in the South Waterfront District.

Transportation System Plan #20057

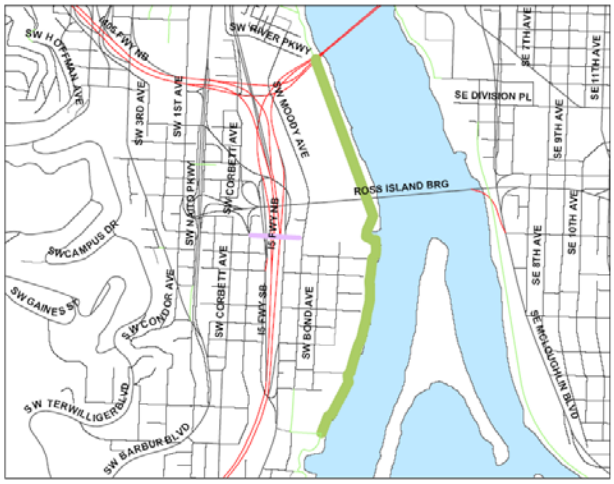
Regional Transportation Plan #10162

Description of Improvement

The South Waterfront Greenway Trail will be designed and constructed in phases as land is redeveloped. The section currently under review is the Central District Greenway, which stretches from SW Gibbs St to SW Lane St. This project will create a linear riverfront park and trail, with separated paths for pedestrians and cyclists. In addition, it will improve natural habitat by grading, stabilizing, and replanting the riverbank.

The South Waterfront Greenway Trail is a project directed by the Portland Bureau of Parks and Recreation and the Portland Development Commission. The North Macadam Transportation Development Strategy strongly supports the project moving forward but is not taking a lead on the project.

Project Area



Cross-section Detail or Photo

Central District portion of the
South Waterfront Greenway Trail

Preliminary Cost Estimate

$56 Million*

Priority

High

* Figure provided by the *South Waterfront Greenway Implementation Strategy* (June 2008) per development plans outlined by the South Waterfront Greenway Master Plan.

PEDESTRIAN / BIKE PROJECTS

Alternatives/Additional Notes

Additional Images / Graphics

PEDESTRIAN / BIKE PROJECTS

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BP-2. NORTH OF I-405 CONNECTION

Need/Purpose

There are few pedestrian and bicycle access routes between downtown and the South Waterfront District. This project would provide a direct, non-motorized connection between downtown and the District. Particularly, it would connect Portland State University (PSU) and the OHSU Schnitzer Campus, two institutions that are partnering to share teaching facilities. This project could provide a means by which the Milwaukie Light Rail project could meet the State requirement for bike provisions to be included with the transit project.

Background Data

The proposed project would be built in the north of I-405 right-of-way, from SW 4th Ave to SW Naito Parkway.

ODOT owns the facility and must approve the project.

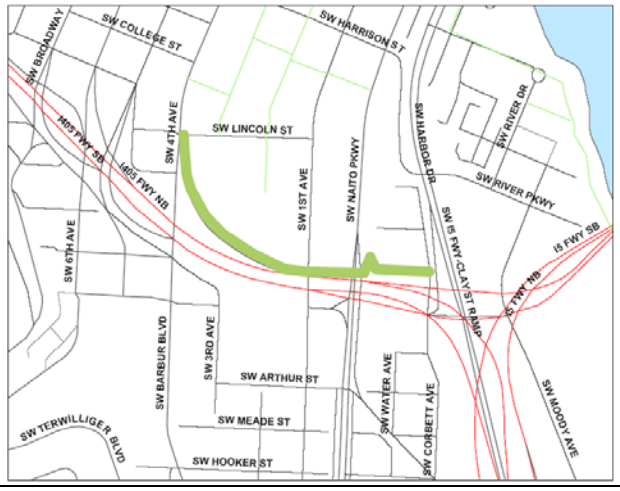
The existing space varies between 48 and 75 feet in width, the majority of which is relatively flat. However, one section, about 150 ft in length, is sloped at 6-24%.

The project includes two road crossings – SW 1st Ave under PDOT, and SW Naito Pkwy under ODOT domain.

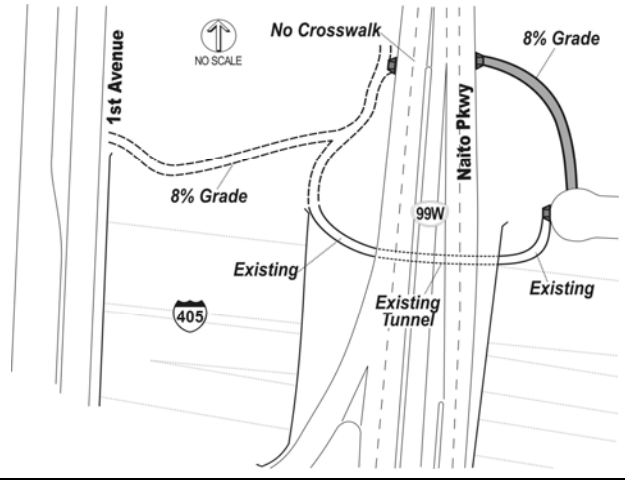
Description of Improvement

This project would be an off-road, non-motorized, 12' wide, multi-use path from SW 4th Ave & SW Lincoln St to SW Naito Pkwy, one at-grade street crossings at SW 1st Ave, one improved pedestrian underpass at SW Naito Pkwy, and sidewalk improvements on SW Caruthers from SW Naito Pkwy to SW Water Ave. The total length of the off-road path is about 1350 feet (excluding the street crossings and sidewalk improvements). Path construction requires negotiating trees in the right-of-way, building a 12' asphalt/concrete path, and constructing a retaining wall about 150 ft long. The at-grade pedestrian and bicycle crossing of SW 1st Ave requires two new ped/bike ramps, a break in the median, striping the crosswalk, and posting crosswalk signs. The SW Naito Pkwy underpass requires improved, vandal-proof lighting and a wider connection between the underpass and SW Caruthers St. The sidewalk on the north side of SW Caruthers St should be widened to 12 feet, with street lighting and street trees added.

Project Area



Cross-section Detail or Photo



Preliminary Cost Estimate

$2.4 to $2.8 Million

Priority

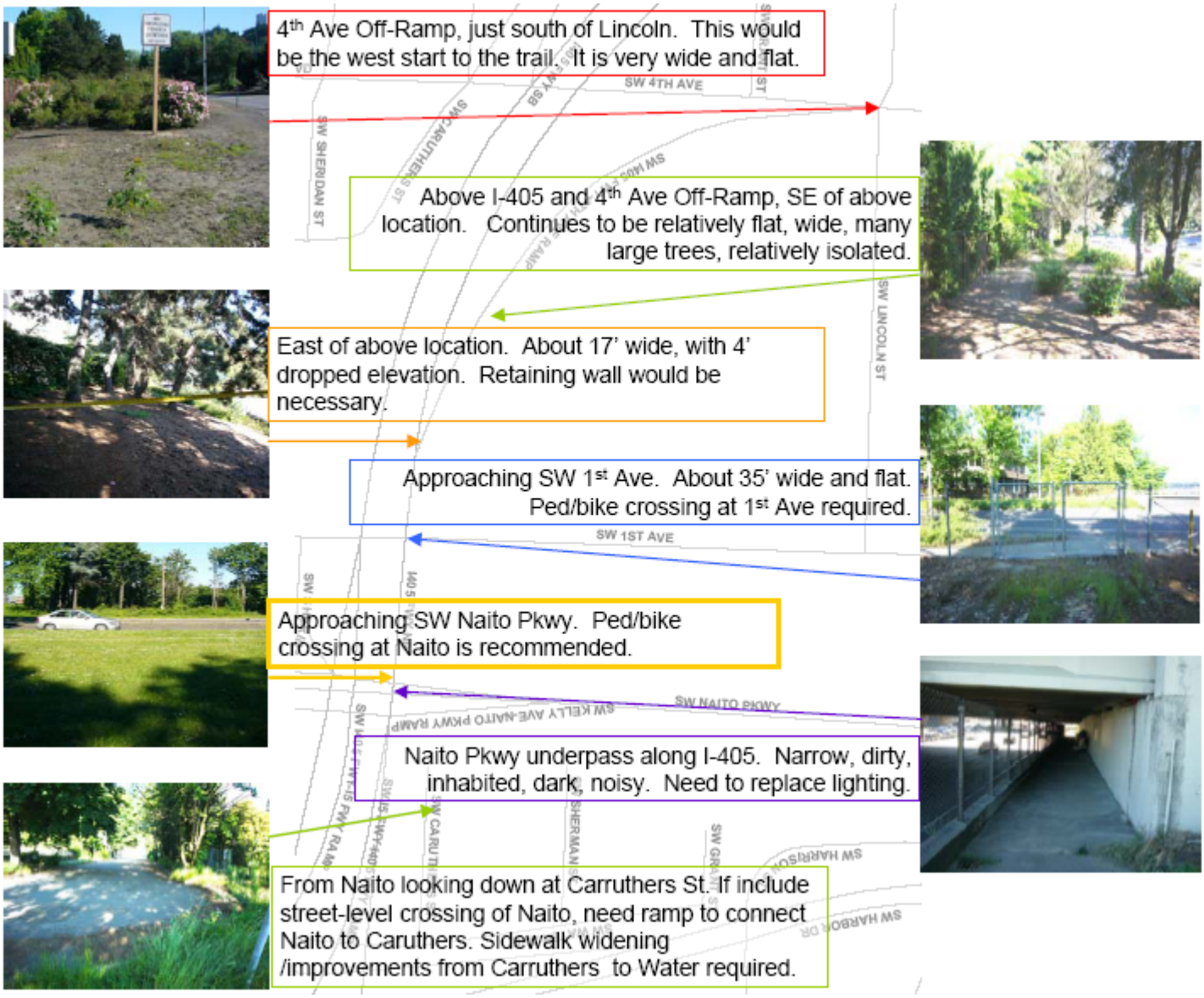
High

PEDESTRIAN / BIKE PROJECTS

Alternatives/Additional Notes

An at-grade crossing of SW Naito Pkwy is more desirable than using the existing pedestrian underpass. The underpass provides homeless shelter and is unsanitary and uncomfortable for many users. The challenges associated with the at-grade crossing of Naito are as follows: 1) it does not meet the criteria for a marked crosswalk without other amenities, the islands are not adequate, and it may need a signal but not meet warrants required for a signal; 2) the roadway is too narrow to maintain all travel lanes and add an island; 3) it is an active section of roadway – northbound drivers have an add lane and a merge lane and southbound drivers have a departure lane – the marked speed is 40 mph; 4) the ADA ramp from SW Naito Pkwy to SW Caruthers St requires a switchback, it is about a 10% grade. An alternative to a marked crosswalk at SW Naito Pkwy would be to cut ped/bike ramps in the sidewalk and a break in the median with no crosswalk or signage. Any crossings would require ODOT approval.

Additional Images / Graphics



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BP-5. ARTHUR STREET CONNECTION AND STEPS

Need/Purpose

As the South Waterfront District continues to develop, demand for safer, more comfortable pedestrian and bike connections to the District will continue to increase. As shown in the North of Kelly District Plan, SW Arthur St, from SW Naito Pkwy to SW Corbett Ave, was identified as a pedestrian and bike corridor. This connection would provide a pleasant, non-motorized route from the north Lair Hill neighborhood, including the National College of Natural Medicine, to the South Waterfront District. It also would contribute to attracting redevelopment to the North of Kelly District.

Background Data

Project originally proposed in *the North of Kelly District Plan* (October 2007) by the Oregon Transportation and Growth Management Program, Portland Development Commission, and Crandall Arambula PC.

This section of SW Arthur St (from SW Naito Pkwy to SW Corbett Ave) is a quiet, low-volume street.

It has standard six-foot sidewalks.

The grade from SW Water Ave to SW Corbett Ave is about 13%.

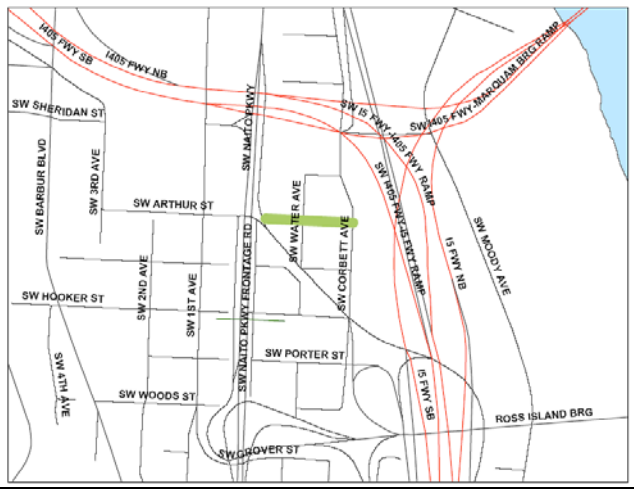
Description of Improvement

This project would establish SW Arthur St, from SW Kelly Ave to SW Corbett Ave, as a pedestrian/bicycle corridor.

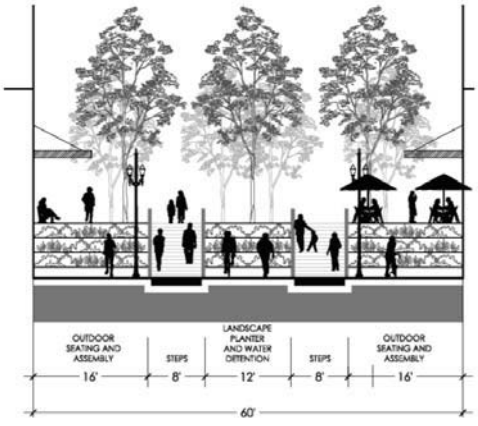
SW Arthur St, between SW Kelly Ave and SW Water Ave, would be a shared roadway for motorized and non-motorized users. The north sidewalk should be expanded to 15 feet and should include street furniture, street trees and street lighting.

SW Arthur St, between SW Water Ave and SW Corbett Ave, would be a pedestrian/bicycle-only street, consisting of pedestrian steps down to SW Corbett Ave with a bicycle and ADA-compatible ramp built into the steps. The cross-section would consist of a 16' outdoor seating and assembly space, 8' steps, 12' landscape planter and water detention, 8' steps, 16' outdoor seating and assembling space (see cross-section below).

Project Area



Cross-section Detail or Photo



Section -Arthur Steps

Courtesy of Crandall Arambula PC, North of Kelly District Plan, October 2007

Preliminary Cost Estimate

$ 15 Million*

Priority

Medium

* The Arthur Street Steps *and Tunnel* cost estimate in the *North of Kelly District Plan* (October 2007) was $15M. The tunnel would make up the vast majority of the cost. Separated costs of the two segments is TBD.

PEDESTRIAN / BIKE PROJECTS

Alternatives/Additional Notes

Additional Images / Graphics

SW Arthur Street looking east from SW Kelly Avenue toward SW Water Avenue – recommended sidewalk expansion to 15 feet

SW Arthur Street looking west from SW Corbett Avenue toward SW Water Avenue – recommended non-motorized boulevard with the Arthur Steps

PEDESTRIAN / BIKE PROJECTS

BP-6. PORTLAND-MILWAUKIE LIGHT RAIL BRIDGE CONNECTION

Need/Purpose

The Portland-Milwaukie Light Rail Project will connect the Portland City Center to the City of Milwaukie and north Clackamas County. Included in the project is the Willamette River Crossing, a bridge over the Willamette River that will connect the South Waterfront District at the OHSU Schnitzer Campus and Portland's eastside, south of the Oregon Museum of Science and Industry. The bridge will serve transit, bicycles and pedestrians, providing a critical local and regional link for non-motorized travel.

Background Data

Currently, cyclists and pedestrians coming from Portland's southeast neighborhoods and beyond have few comfortable choices for accessing the South Waterfront District and the Portland Aerial Tram. The Sellwood Bridge to the south has poor pedestrian and bicycle facilities. The Ross Island Bridge to the north also has poor pedestrian and bike facilities and no safe connection to the South Waterfront District or downtown from the west bridgehead. The Willamette River Crossing will provide this much needed link.

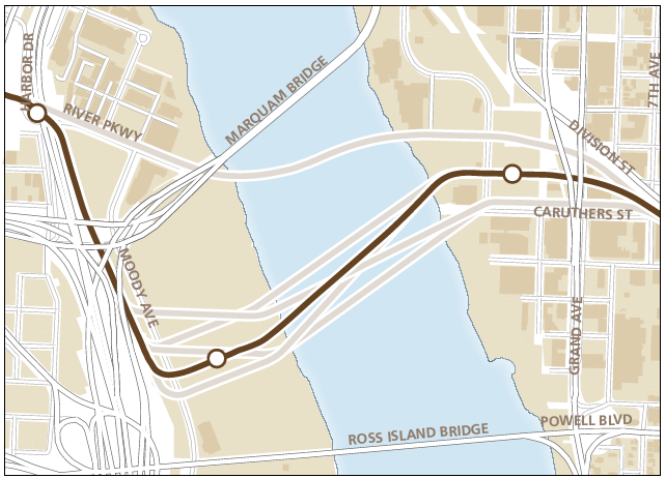
Regional Transportation Plan #10901

Description of Improvement

The Willamette River Crossing designs include deck widths that range from 58-66 feet depending on the location of the bridge and the bridge type. This would include a 13-foot lane in each direction that would be shared by light rail, streetcar and buses. In addition, there would be two 12-foot bicycle/pedestrian lanes on either side of the transit lanes.

The Willamette River Crossing is part of the Portland-Milwaukie Light Rail Project that is a partnership project between the Cities of Milwaukie, Oregon City and Portland, Clackamas and Multnomah counties, Oregon Department of Transportation, TriMet, and Metro. The North Macadam Transportation Development Strategy strongly supports the project moving forward but is not taking a lead on the project.

Project Area



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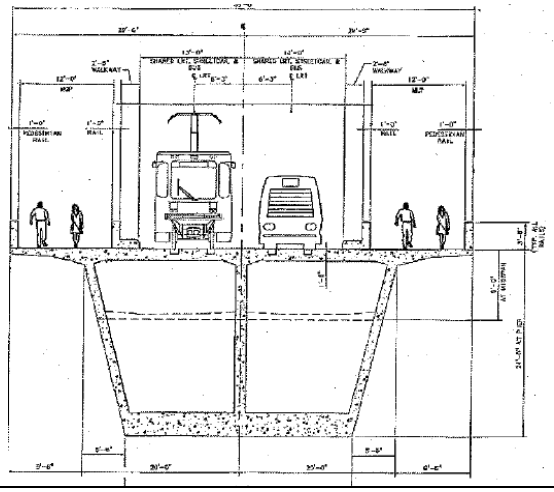


Preliminary Cost Estimate

$1.2 - $1.3 Billion for entire bridge*

$48 - $68 Million for pedestrian/bike portion

Priority

In Process

*Cost estimate provided by the *Portland-Milwaukie Light Rail Project Supplemental Draft Environmental Impact Statement,* page 5-3, Table 5.1-2. Prepared May 2008.

PEDESTRIAN / BIKE PROJECTS

Alternatives/Additional Notes

Additional Images / Graphics

PEDESTRIAN / BIKE PROJECTS

BP-7. MACADAM / CITY CENTER RAMP CONNECTION

Need/Purpose

The Macadam/City Center Ramp currently serves as one of few connections between the North Macadam Urban Renewal Area neighborhoods east of I-5 and the South Waterfront District. The sidewalk on the northeast side of the ramp is narrow and adjacent to fast-moving traffic, however the direct connection it provides makes it attractive to pedestrians and bicyclists. Widening the sidewalk and providing a barrier between it and the travel lanes would make this a more comfortable, safer connection.

Background Data

This is a new improvement, not previously proposed in another report.

ODOT has jurisdiction over this facility.

The existing sidewalk varies between 4 and 5.5 feet.

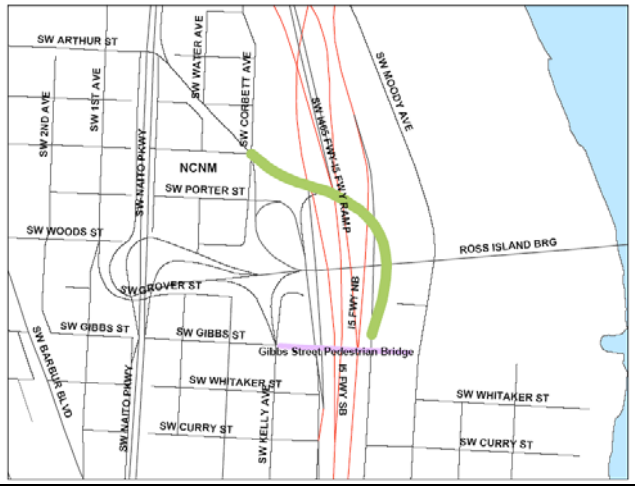
The existing roadway is two 15-foot northeast bound travel lanes.

The total length of the structure is 1500 feet.

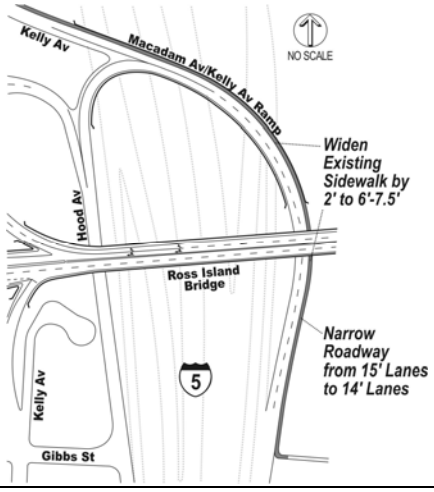
Description of Improvement

This project proposes widening the existing sidewalk by two feet (to 6–7.5 feet) and adding a guardrail between the sidewalk and the roadway for the 150-foot length of the ramp structure. Widening the sidewalk would require narrowing the travel lanes from 15 feet to 14 feet, which would necessitate grinding the existing center stripe and restriping.

Project Area



Cross-section Detail or Photo



Preliminary Cost Estimate

$ TBD

Priority

Low

PEDESTRIAN / BIKE PROJECTS

Alternatives/Additional Notes

This project received a medium feasibility rank because of cost and nearby alternatives. It is uncertain that the structure can support a wider sidewalk. Determining the structure's ability to support a wider sidewalk and actually building the wider sidewalk would be costly. Further, this project would perform essentially the same function as its preferred alternative: BP-16. In addition, the Gibbs Street Pedestrian Bridge is scheduled to be constructed by the fall of 2010. The bridge is to be constructed three blocks to the south of the existing ramp. It will provide a direct and comfortable connection over SW Hood Ave, I-5, and SW Macadam Ave. Finally, this project would require ODOT approval.

Additional Images / Graphics

Sidewalk (5.5 feet) on north side of Macadam/City Center Ramp looking east with South Waterfront District development in the background.

Sidewalk (4.5 feet) on northeast side of Macadam/City Center Ramp looking south underneath the Ross Island Bridge with the aerial tram tower in the background.

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BP-8. GIBBS STREET BRIDGE AND CROSSING ENHANCEMENTS

Need/Purpose

Interstate 5 is a major barrier between the Corbett, Terwilliger and Lair Hill neighborhoods and the Willamette River and South Waterfront District (SWD). Currently, there is over one-half mile with no connection across I-5. The Gibbs Street Pedestrian (and bicycle) Bridge will provide non-motorized users with safe and convenient access between these neighborhoods and the Willamette River/SWD. It will also provide direct pedestrian and bicycle connection from OHSU facilities in the SWD with the OHSU Marquam Hill Campus.

Background Data

The first concepts for the bridge were identified by participants in the international competition to design the Portland Aerial Tram. The designs have been refined by a public process involving public input, direction from the citizen and technical advisory committees, and project consultants. Final bridge design is to be completed by July 2009 and construction is to be completed by Fall 2010. The project also includes ped and bike crossing enhancements of SW Kelly Ave, SW Corbett Ave, SW Naito Pkwy, and SW Barbur Blvd.

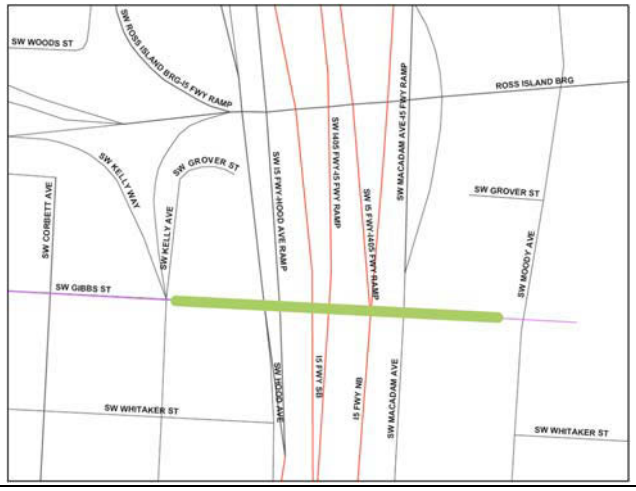
Transportation System Plan #20061

Regional Transportation Plan #10163

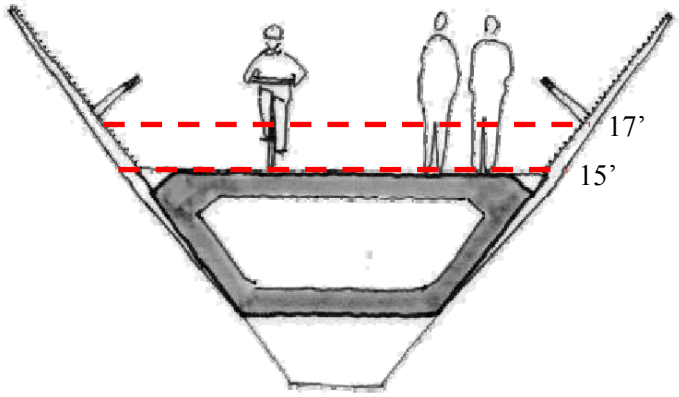
Description of Improvement

The Gibbs Street Pedestrian Bridge will span SW Hood Ave, I-5, and SW Macadam Ave. Because it crosses I-5, it must be approved by ODOT. The useable portion of the bridge must be at least 15 feet wide and the structure must provide 17'6" clearance above all three roadways. The bridge span is about 700 feet long. It must meet ADA requirements, meaning that no part of the bridge may exceed a 5% incline or 8.33% incline with resting platforms. The project will include two large elevators and a stairway to connect the east end bridgehead to Moody Avenue (about 65 feet). The project will also include pedestrian and bicycle crossing improvements at Kelly and Gibbs, Corbett and Gibbs, Naito and Whitaker, and Barbur between Gibbs and Whitaker. The crossing improvements will include striping, some curb extensions and a pedestrian signal.

Project Area



Cross-section Detail or Photo



Preliminary Cost Estimate

$ 11.0 Million*

Priority

In Process

* Cost Estimate provided by the Gibbs Street Pedestrian Bridge website: www.gibbsbridge.org.

PEDESTRIAN / BIKE PROJECTS

Alternatives/Additional Notes

Additional Images / Graphics

PEDESTRIAN / BIKE PROJECTS

BP-10. CORBETT AVENUE TRAFFIC CALMING PROJECT

Need/Purpose

SW Corbett Avenue is designated as a local service street but often functions as a neighborhood collector, carrying traffic volumes of up to 4500 vehicles per day. Traffic speed counts also reveal speeding vehicles along this section of Corbett. High traffic volumes and speeds can be attributed to increased growth and congestion along the Barbur/Macadam/I-5 corridor, which causes many vehicles to divert onto Corbett for quick access to the Ross Island Bridge/Hwy 26 or the Central City. This project aims to preserve livability and safety for local residents and to return the performance of SW Corbett Avenue to its current street classification.

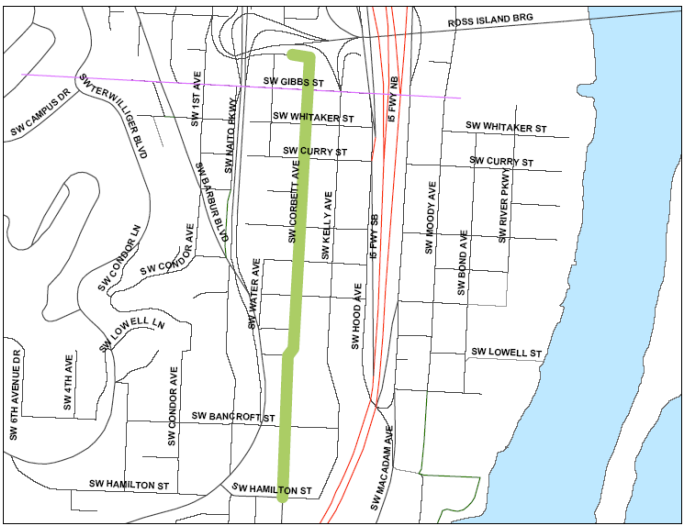
Background Data

Both the Portland Aerial Tram Final Recommendation and Report and the South Portland Circulation Study have identified the need for traffic calming along Corbett Avenue. This project is the third phase of traffic calming in the area. Phase one and phase two occurred on SW Virginia and SW Corbett (Boundary to Hamilton), respectively. In 2004, the Portland Office of Transportation secured funding for this third phase of traffic calming. In 2007, PDOT conducted a public outreach process and worked with the community to identify a preferred design. The plan was adopted by Portland City Council fall 2007.

Description of Improvement

This project will construct traffic calming improvements on SW Corbett Ave from SW Hamilton St to SW Grover St. The approved design includes three curb extensions (with striped crossing), three median islands, three speed tables, one raised crosswalk, wayfinding signage, and reduction in posted speed limit from 30 to 25mph.

Project Area



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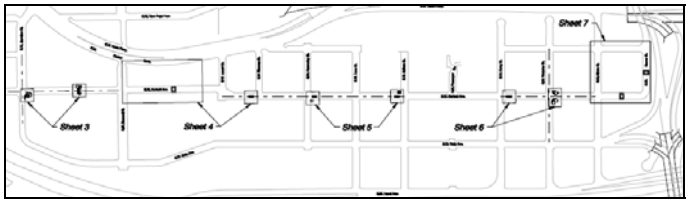

See reverse side for enlarged image

Preliminary Cost Estimate

$160,000 – $180,000*

Priority

In process

* Cost estimate derived from 60% design

PEDESTRIAN / BIKE PROJECTS

Alternatives/Additional Notes

Additional Images / Graphics

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BP-12. SLAVIN ROAD ROUTE FOR THE RED ELECTRIC TRAIL

Need/Purpose

There are limited bicycle and pedestrian routes that connect southwest Portland to the North Macadam Urban Renewal Area. The proposed Slavin Road Route for the Red Electric Trail would provide a quiet, meandering route to Barbur Blvd to connect Hillsdale and the SW community beyond Hillsdale with the North Macadam Urban Renewal Area and the Willamette Greenway Trail.

Background Data

The Red Electric Trail is a proposed, 16-mile bike and pedestrian trail that would connect the Tualatin and Willamette rivers. A challenging section of the trail is the steep descent of the east face of the west hills.

The Red Electric Trail Planning Study recommends a pedestrian trail on the north side of the ravine in George Himes Park and an elevated structure for a two-way bicycle passage on a different alignment.

The Study offers the Slavin Road Route for the Red Electric Trail as an alternative. This route is supported by nearby neighborhood associations.

Description of Improvement

This route is over one-mile long and is a combined on-road / off-road pedestrian and bicycle connection between SW Barbur Blvd and SW Corbett Ave. The route follows the wooded area from the end of SW Parkhill Dr to a future path under the rebuilt Barbur Blvd Bridge. It follows the contours to connect with old Slavin Rd and continues along Slavin Rd to SW Seymour St near SW Corbett Ave. This project proposes a 12' asphalt path with 2' aggregate shoulders through the wooded areas and a 7' combination curb and sidewalk along the existing SW Slavin Rd. Construction of the trail requires: porous AC pavement on aggregate base; adjusting water facilities; adding street lighting on new wood poles along the bike path and upgrading luminaires along Slavin; building retaining walls along the entire length of the path (10' high) except for sidewalk sections along existing roadway and path using existing pavement.

Project Area

Cross-section Detail or Photo

Preliminary Cost Estimate

$7.1 Million

Priority

Medium

* Preliminary cost estimate derived from the Portland Parks and Recreation *Red Electric Trail Planning Study* (May 2007). The cost estimate does not include property acquisition or bridge improvements.

PEDESTRIAN / BIKE PROJECTS

Alternatives/Additional Notes

Issues and Estimating Assumptions as identified in *Project Estimate Report: Development Phase for Red Electric Trail, Part 6b* (PDOT, August 2007):

- Right-of-Way– Assumes using ODOT right-of-way, as well as some private property donations
- Assume that ODOT will reconstruct the Barbur Blvd Bridge with bike path under roadway for this option to function
- BES – No storm, sanitary, water-quality facilities needed, using porous pavement
- Assume new luminaires and arms on new wood poles every 200' along bike path; upgrade luminaires along new sidewalk along Slavin Rd.
- Slavin Rd is a City maintained street; therefore it is not improved in this estimate.

Additional Images / Graphics

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BP-13. NAITO PARKWAY CURB-CUT TO HAWTHORNE BRIDGE

Need/Purpose

There is currently no safe, bicycle-friendly access to the South Waterfront District for cyclists traveling on SW Naito Pkwy southbound. This curb cut would allow cyclists to use the vacant Hawthorne Bridge on-ramp to get over SW Naito Pkwy and use the Hawthorne ped/bike access ramp to return to grade on the east side of SW Naito Pkwy, connecting to the Greenway Trail.

Background Data

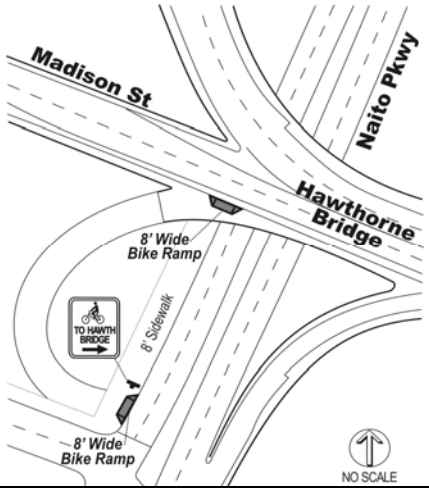
The existing Hawthorne Bridge on-ramp is no longer in use, it is closed to vehicles. SW Naito Pkwy has bicycle lanes in the southbound lanes as far south as SW Jefferson St, where the bridge ramp connects. Beyond SW Jefferson St the bicycle lanes disappear.

Description of Improvement

The improvement is a curb cut from the bicycle lane on Naito Pkwy southbound to the Hawthorne Bridge on-ramp and a curb cut from the Hawthorne Bridge sidewalk to the eastbound bicycle lane. This would provide eastbound bicycle access onto the Hawthorne Bridge. The ramp is located on the south side of the Hawthorne Bridge, just west of Naito Pkwy.

Project Area

Cross-section Detail or Photo



Preliminary Cost Estimate

$19,000 - $21,000

Priority

Medium

PEDESTRIAN / BIKE PROJECTS

Alternatives/Additional Notes

Additional Images / Graphics

PEDESTRIAN / BIKE PROJECTS

BP-14. SW 4TH AVE& SW LINCOLN ST PEDESTRIAN IMPROVEMENT

Need/Purpose

As the southern portion of the Portland City Center near the intersection of SW 4th Ave & SW Lincoln St continues to develop, pedestrian crossings should be added to the south and the east sides of this intersection. The Portland-Milwaukie Light Rail Project will pass through this intersection, Portland State University plans to develop the intersection's southeast parcels, the proposed west terminus of the North of I-405 Connection proposed in this report (BP-2) is at SW 4th Ave & SW Lincoln St. The new development will attract more pedestrians to this intersection.

Background Data

In June 2007 a City signal inspector investigated the possibility of adding crosswalks to the south and east legs of the intersection. Because the location is substandard, the project would require replacing about half of the signal installation.

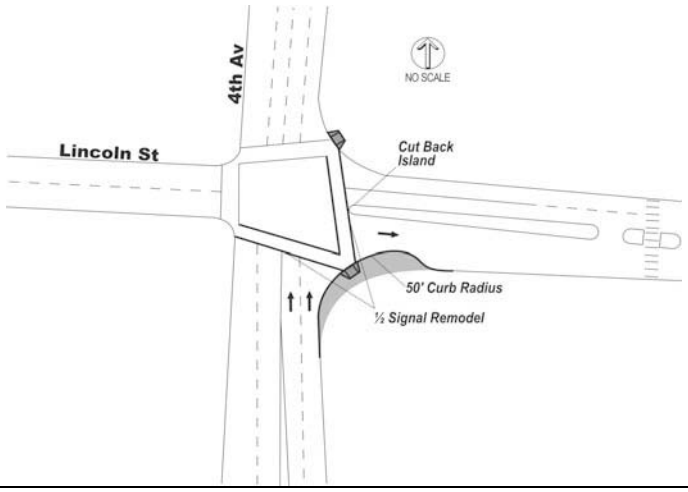
Some of the vehicles regulated by the signal on the south leg of the intersection are exiting I-405 via the SW 4th Ave off-ramp. ODOT may have concerns about ramp back-ups with the addition of a pedestrian signal on the south leg.

Description of Improvement

This project recommends replacing about half of the signal installation, which includes replacing the signal pole and installing/updating the ped crossings, signal indications, conduits (which lack capacity of additional wires) and pole mounted controller (which also lacks capacity of additional wires). It also requires striping the south and east legs of the intersection, cutting back the SW 4th Ave pedestrian island, and constructing a large curb extension on the southeast corner.

Project Area

Cross-section Detail or Photo



Preliminary Cost Estimate

$320,000 – $380,000

Priority

Medium

PEDESTRIAN / BIKE PROJECTS

Alternatives/Additional Notes

Additional Images / Graphics

SW 4th Ave & SW Lincoln St – looking southeast toward SW 4th Ave northbound. Three lanes on right-side of photo are a continuation of SW 4th Ave, two lanes on left-side of photo are exiting I-405.

PEDESTRIAN / BIKE PROJECTS

BP-16. HOOD AVENUE SIDEWALK ENHANCEMENT – PORTER STREET TO GIBBS STREET

Need/Purpose

The Gibbs Street Pedestrian Bridge will provide safe, comfortable bicycle and pedestrian access across I-5 to the South Waterfront District. The Hood Avenue Sidewalk Enhancement is intended to provide better bicycle and pedestrian access to the west end of the Gibbs bridgehead. It links the Ross Island Bridge sidewalk to the Bridge via a wide, well-lit bicycle and pedestrian sidewalk along the west side of Hood Avenue. BP-24a should be implemented in conjunction with this project to provide safe access to the proposed route.

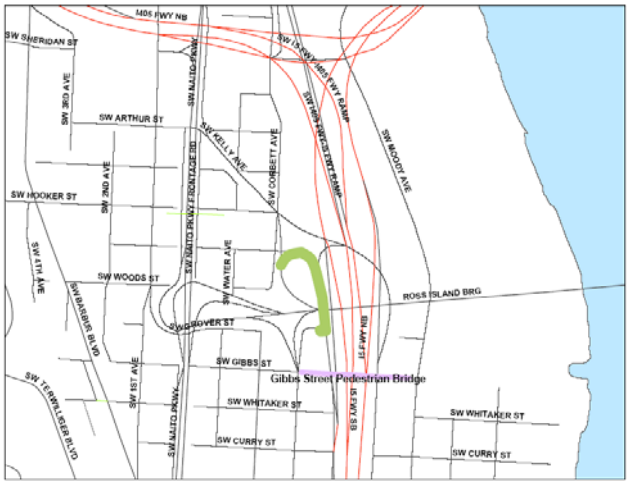
Background Data

The sidewalk that exists today is 6' wide. There is no median between the sidewalk and Hood Avenue. Hood Avenue is three lanes of high-volume, high-speed traffic (posted speeds are 40 mph). To the west of the sidewalk is an open, grassy right of way. ODOT owns and operates the Hood Ave right of way. The agency has expressed willingness to support this project, while reserving the right to expand Kelly and take the improved connection.

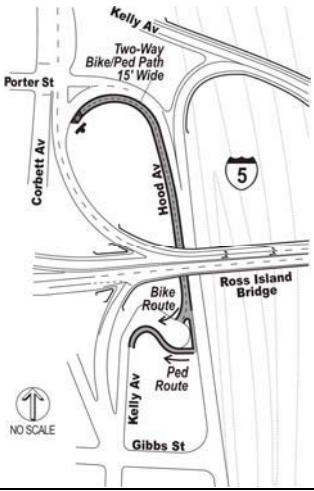
Description of Improvement

The Hood Avenue Sidewalk Enhancement recommends the expansion of the sidewalk along the west side of Hood Ave from 6' to 12' and the addition of a median to provide some separation from fast moving traffic. Passing underneath the Ross Island Bridge, the bridge piers will restrict the width of the path. Pedestrian street lighting should be added along the sidewalk to improve safety. The length of the sidewalk enhancement is 750 feet. The preferred pedestrian connection to the Gibbs Street Pedestrian Bridge is along SW Grover St. Such a connection requires cutting through existing shrubs to connect the SW Hood Ave sidewalk to the SW Grover St sidewalk. The alternative pedestrian path would be to continue pedestrians another block south along SW Hood Ave to SW Gibbs St and direct pedestrians up Gibbs, on the north side of the bridge, to the bridgehead.

Project Area



Cross-section Detail or Photo



Preliminary Cost Estimate

$1.2 - $1.4 Million

Priority

High

PEDESTRIAN / BIKE PROJECTS

Alternatives/Additional Notes

Additional Images / Graphics

Sidewalk along east side of Hood Avenue recommended for expansion to 12 foot mixed-use path with pedestrian lighting

PEDESTRIAN / BIKE PROJECTS

BP-18. SOUTH MOODY AVENUE CONNECTION

Need/Purpose

New sections of the South Waterfront Willamette Greenway Trail propose separating bicycle and pedestrian traffic. This project would provide for extension of a separate, more direct bike path further south beyond where it is currently planned. The path would be built in the existing Willamette Shore Trolley right-of-way. It is recommended to be implemented with the Lake Oswego streetcar extension.

Background Data

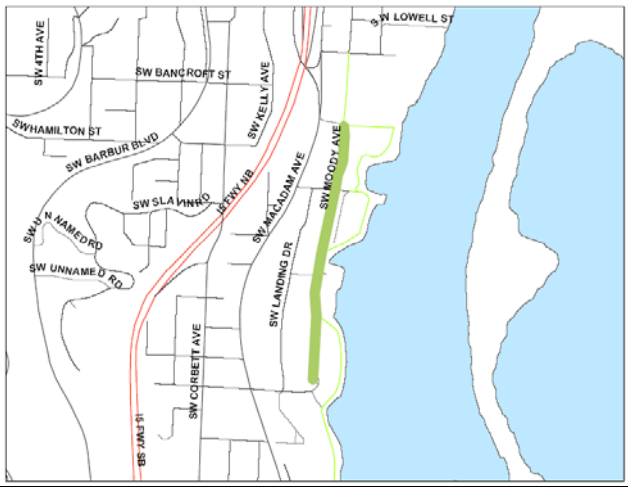
This project is contingent on the construction of the Lake Oswego streetcar extension.

Description of Improvement

This project recommends a 12-14 foot-wide bike path with two-foot shoulders to be built in conjunction with the Lake Oswego streetcar extension in the existing Willamette Shore Trolley right-of-way. The extension is recommended from SW Hamilton St in the north to SW Boundary St in the south.

For more project details, please refer to the *Lake Oswego to Portland Transit and Trail Study Evaluation Summary Public Review Draft (July12, 2007).*

Project Area



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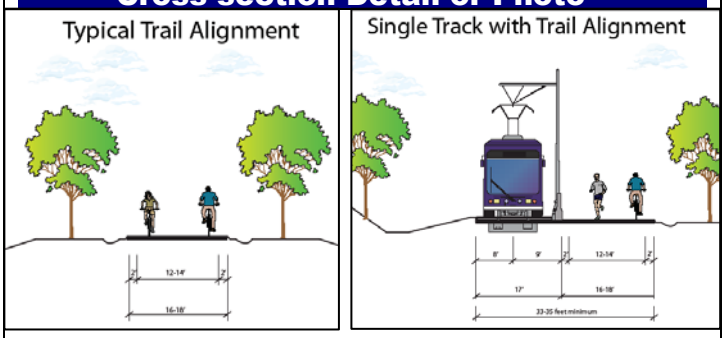

Preliminary Cost Estimate

$7.4 Million*

Priority

Medium

PEDESTRIAN / BIKE PROJECTS

Alternatives/Additional Notes

*This preliminary cost estimate is for construction of the entire trail from the South Waterfront District to Lake Oswego as provided in the *Lake Oswego to Portland Transit and Trail Study Evaluation Summary Public Review Draft (July12, 2007)*. A cost estimate for this short section of the trail has not been developed.

Additional Images / Graphics

PEDESTRIAN / BIKE PROJECTS

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BP-19. RICHARDSON STREET CONNECTION

Need/Purpose

SW Richardson St east of SW Macadam Ave is a multi-use path that connects to the Willamette Greenway Trail. Access to this path however, is limited because it originates at low-density commercial uses along SW Macadam Ave and is not connected to high-density residential users. The proposed project would extend a trail one block west of SW Macadam Ave and connect to many multi-family residential complexes, increasing access to the Willamette Riverfront and Greenway Trail.

Background Data

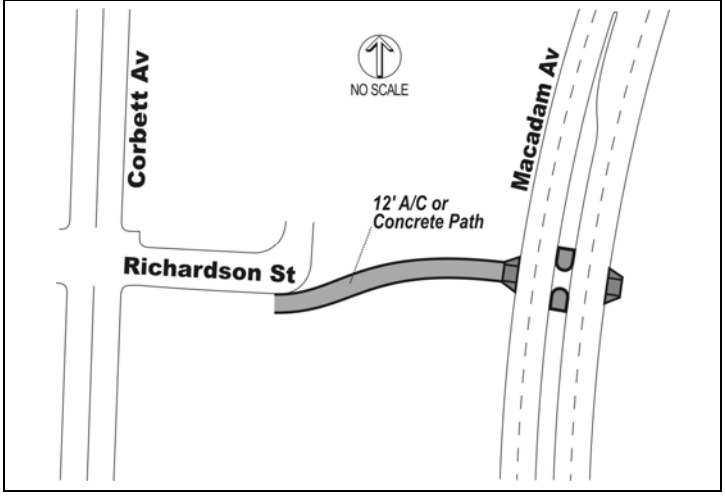
The right of way where the trail is proposed is heavily vegetated, the slope is about 12%, and it is about 170 feet in length.

Description of Improvement

This project recommends the construction of a 170 ft trail between SW Macadam Ave and the south sidewalk along SW Richardson St. It should be a 12 foot-wide, asphalt/concrete trail. In addition, two pedestrian ramps should be constructed to cross SW Macadam Ave with a break cut into the median. Pedestrian volumes do not justify a marked crosswalk. The SW Macadam Ave ramps and median break will require ODOT approval.

Project Area

Cross-section Detail or Photo



Preliminary Cost Estimate

$1.2 - $1.4 Million

Priority

Medium

PEDESTRIAN / BIKE PROJECTS

Alternatives/Additional Notes

Additional Images / Graphics

PEDESTRIAN / BIKE PROJECTS

BP-20. GIBBS STREET PROMENADE

Need/Purpose

The *Portland Aerial Tram Final Recommendations and Report* (June 10, 2004) calls for Gibbs Street, in the South Waterfront District, to be a "universal space" – a flexible urban space that can house a variety of activities and function (similar to Pioneer Courthouse Square). The space is to accommodate a number of uses, including tram facilities, pedestrian bridge traffic, bus and streetcar stops, access to adjacent development and the Willamette Greenway, programmed events, and vehicular access in an understated way.

Background Data

The construction of this project will be dependent on the redevelopment of the Zidell property.

This project was envisioned during the Portland Aerial Tram project as part of the connection from Marquam Hill to the Waterfront. AGPS Architecture developed the project through the conceptual design phase.

The *South Waterfront Greenway Development Plan Schematic Design* (August 2004) has also developed a design for this space.

Transportation System Plan #20040

Description of Improvement

The *South Waterfront District Street Plan, Criteria and Standards* (October 2007) calls for a 110' Gibbs Street right-of-way. This promenade will extend from SW Bond Ave to the Willamette Greenway Trail. The ground plane will be composed of unit pavers, decomposed granite or some other sort of permeable material that will provide a base upon which other elements are placed. The Portland Aerial Tram Report calls for a line of trees along the northern boarder of the space, a series of low walls running east-west to provide seating, and grass panels to provide space to play and relax. It also calls for connecting the existing storm water planter at the tram station with a proposed storm water planter at the foot of Gibbs, adjacent to the Greenway.

Project Area

Cross-section Detail or Photo

Image courtesy of *Portland Aerial Tram – Final Recommendations and Report* (June 10, 2004).

Preliminary Cost Estimate

$ *

Priority

Medium

*Undetermined

PEDESTRIAN / BIKE PROJECTS

Alternatives/Additional Notes

Additional Images / Graphics

SW Gibbs St looking east

SW Gibbs Street looking east with programmed activities

SW Gibbs Street looking west

Images courtesy of *Portland Aerial Tram – Final Recommendations and Report* (June 10, 2004).

PEDESTRIAN / BIKE PROJECTS

BP-21. CORBETT AVENUE UPHILL BIKE LANE – BOUNDARY STREET TO HAMILTON STREET

Need/Purpose

SW Corbett Ave is a designated City Bikeway. It provides one of two bicycle access routes from southwest Portland, west of I-5, to downtown Portland. SW Corbett Ave is a roadway heavily used by both vehicles and bicycles; currently there are no bicycle lanes. A particularly steep section of SW Corbett Ave is from SW Boundary St to SW Hamilton St. This project proposes to make SW Corbett Ave a more comfortable and more attractive bicycle route by adding an uphill bike lane on the west side of Corbett Ave along this stretch.

Background Data

SW Corbett Ave from SW Boundary St to SW Hamilton St is 36 feet wide.

Currently there are two travel lanes (one in each direction), with parking on each side of the street.

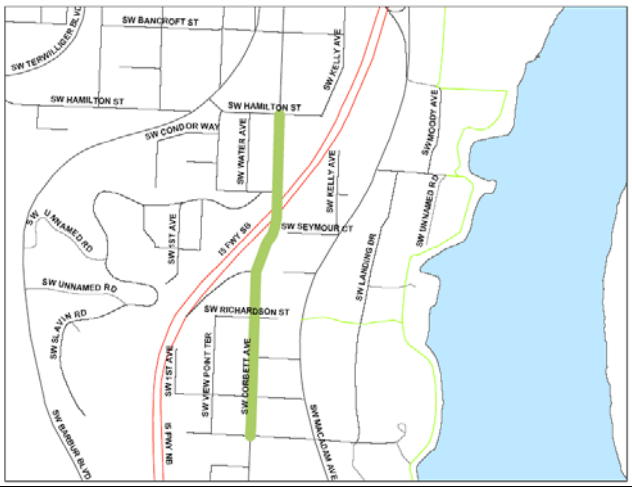
There is not sufficient space to add a 5-foot bike lane to the existing street configuration.

A stretch of this section of Corbett Ave is on structure and passes over I-5. Parking is not permitted on this structure.

Description of Improvement

This project proposes adding an uphill bike lane to SW Corbett Ave from SW Boundary St to SW Hamilton St. Adding a bike lane requires removing one lane of parking. As the on-street parking spaces on the east side of the street are in the highest demand, this parking should remain and parking on the west side of the street should be removed. The center line will have to be removed and restriped 5 feet to the west. A 5-foot bike lane should be striped between the southbound travel lane and the parking. The proposed stretch of striping is about 0.4 miles.

Project Area



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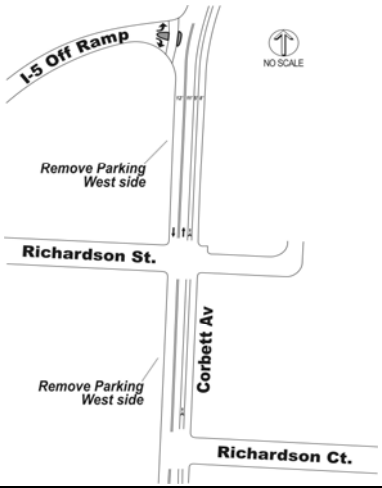

Preliminary Cost Estimate

$19,000 *

Priority

Medium

*Construction costs as estimated by PDOT Traffic Engineer, Wendy Cawley (July 3, 2008). Cost estimate does not include project management costs (including public process to remove parking).

PEDESTRIAN / BIKE PROJECTS

Alternatives/Additional Notes

- One consideration, instead of adding a separate bike lane, would be to provide shared bike route markings along the uphill stretch to improve bicycle safety.

Additional Images / Graphics

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BP-22. HOOD AVENUE CROSSWALK & SIDEWALK ENHANCEMENT – LANE ST TO MACADAM AVE

Need/Purpose

Access between the Corbett, Terwilliger, Lair Hill neighborhoods and the South Waterfront District and Willamette River is limited by I-5. The Hood Avenue underpass below I-5 near Bancroft Street provides the only connection across I-5 from the Macadam Avenue/City Center off-ramp to SW Corbett Ave, a distance of about 1 mile. The underpass may only be accessed by walking along the SW Hood Ave sidewalk for about 5 blocks before reaching the underpass.

Background Data

In order to access the SW Hood Ave sidewalk, pedestrians and cyclists must cross two lanes of very fast moving SW Hood Ave traffic at SW Lane St.

The sidewalk is 5½ feet and over-grown. The curb is the only barrier between vehicles and pedestrians/cyclists using the sidewalk.

There are two travel lanes with a posted speed of 40 mph, which transitions to 35mph near the I-5 underpass curve.

SW Hood Ave is under ODOT jurisdiction.

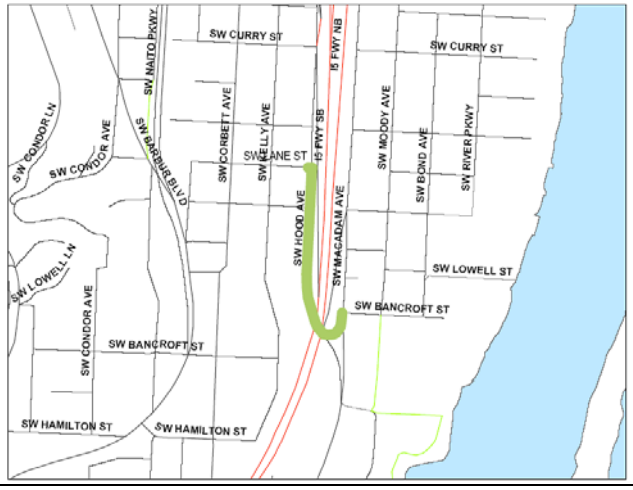
Description of Improvement

In order to provide better pedestrian and bicycle access to the SW Hood Ave I-5 underpass, the proposed project includes a crosswalk and the placement of jersey barriers between SW Hood Ave and the existing sidewalk.

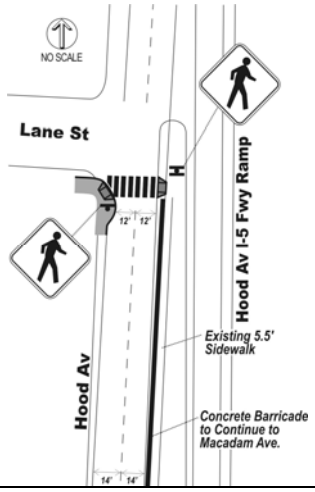
To provide access to the existing SW Hood Ave sidewalk on the east side of the street, it is necessary to add a crosswalk across SW Hood Ave at the south side of SW Lane St. This improvement should include a curb extension on the west side, pedestrian ramp on the east side, a marked crosswalk, and crosswalk signs. A minimum sight distance of 690 feet is required for such a crossing; the sight distance at this location is more than 800 feet.

To increase safety and comfort to sidewalk users, 1150 linear feet of concrete barriers with handrails should be placed between the eastern-most travel lane and the sidewalk. This will require grinding and restriping 1150 linear feet of striping.

Project Area



Cross-section Detail or Photo



Preliminary Cost Estimate

$1.0 - $1.2 Million

Priority

High

PEDESTRIAN / BIKE PROJECTS

Alternatives/Additional Notes

One alternative to crossing Hood Avenue at Lane would be to move the crossing one block south to Abernethy. Freeway traffic exiting I-5 has more separation from SW Hood at Abernethy, which may make this option more comfortable for pedestrians.

Further scoping is needed to ascertain feasibility of this option.

Additional Images / Graphics

SW Hood Avenue at SW Lane Street – recommended crossing to be placed here

Sidewalk along west side of SW Hood Avenue, leading to I-5 underpass – jersey barriers recommended to be placed between roadway and sidewalk

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BP-23. KELLY AVENUE PEDESTRIAN TUNNEL CLOSURE & CROSSWALK REPLACEMENT

Need/Purpose

SW Kelly Ave is a high capacity, high speed roadway. It acts as a barrier between neighborhoods to the northeast and southwest, as there is only one designated pedestrian crossing of SW Kelly Ave between the Ross Island Bridge and SW 1st Avenue (a distance of more than a quarter-mile). Over this distance, two bus stops are located on the northeast side of Kelly, carrying many riders heading to destinations southeast of Kelly. The one existing crossing is a pedestrian tunnel that passes under SW Kelly Ave just east of SW Naito Pkwy. The tunnel is unsanitary, feels unsafe, and provides shelter to homeless. Of 28 respondents to a PDOT survey, 24 requested that the tunnel be closed and replaced with a street-level crossing due to tunnel-related safety concerns.

Background Data

SW Kelly Ave is 2 lanes WB and 2 lanes EB with parking on south side of street.

Posed speeds on SW Kelly Ave are 35 mph.

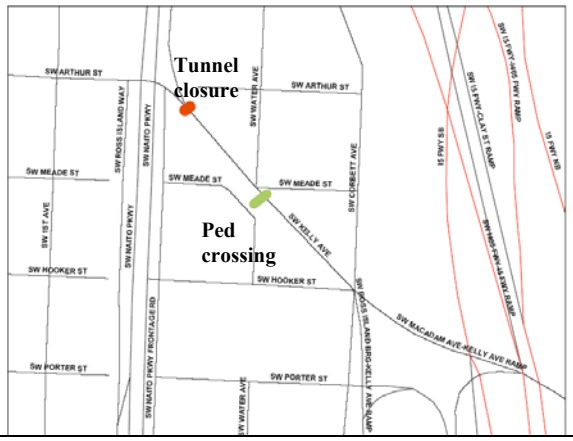
ODOT has jurisdiction over both SW Kelly Ave and the Kelly pedestrian tunnel.

ODOT agrees that the Kelly tunnel should be closed.

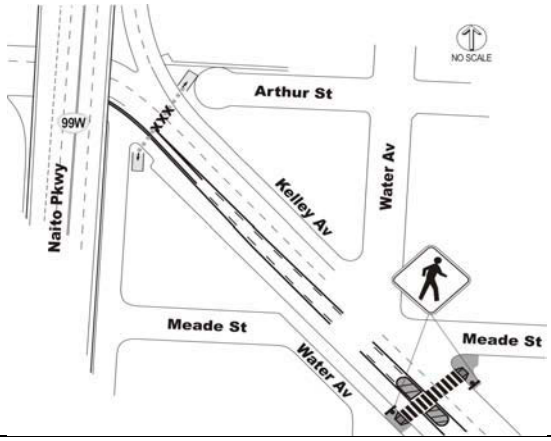
Description of Improvement

This project recommends closing the SW Kelly Ave tunnel by cementing over the top of each opening. This should only occur concurrently with the installation of an at-grade pedestrian crossing on SW Kelly Ave. Due to limited sight-distance near the tunnel, the crossing should be placed south of the SW Meade St intersection where there is 450 feet sight distance in each direction. The crosswalk should specifically include: reducing Kelly southbound to one lane, turning the existing center southbound lane into a center two-way left turn lane, constructing a pedestrian island in the left turn lane at the crossing location, constructing two pedestrian ramps, striping the crosswalk and adding crosswalk signs to alert vehicles. In addition, the bus stop on the north side of Kelly near the pedestrian tunnel should be relocated close to the pedestrian crossing. If BP-24B Kelly Avenue Bike Lane is implemented, this crossing must be signalized.*

Project Area



Cross-section Detail or Photo



Preliminary Cost Estimate

$260,000 - $310,000

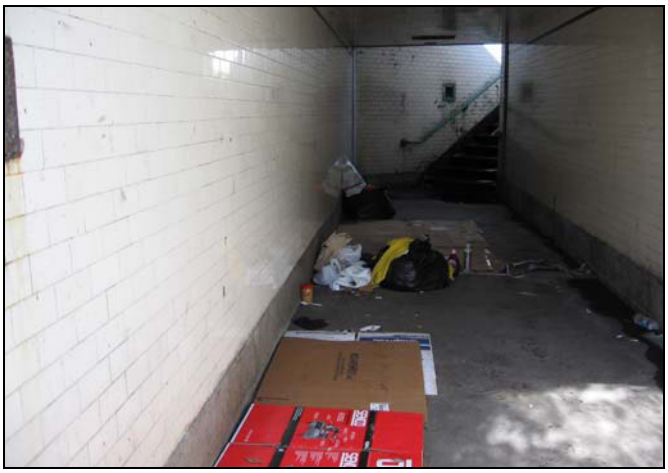
$410,000-$560,000 if crossing is signalized (see above)*

Priority

High

PEDESTRIAN / BIKE PROJECTS

Additional Images / Graphics



SW Kelly Avenue pedestrian underpass just east of SW Naito Parkway – the tunnel conditions are unsanitary and feel unsafe

SW Kelly Avenue tunnel entrance looking Northeast.

Northeast Tunnel entrance looking across Kelley to SW entrance

Looking west down Kelly Avenue from NE tunnel entrance.

PEDESTRIAN / BIKE PROJECTS

BP-24A. WEST END ROSS ISLAND BRIDGEHEAD CONNECTION

Need/Purpose

The sidewalk at the west end of the Ross Island Bridge delivers bicyclists and pedestrians to a maze of fast vehicular movements, with no designated crossings. In addition, the #9, 17, 19 bus stop just north of the bridgehead is located on an island surrounded by three high-capacity roadways and no pedestrian crossings to help bus users safely get to and from the bus stop. Many students, staff and faculty at the Natural College of Natural Medicine (NCNM) use this bus stop getting to and from campus. This project provides safer and more comfortable pedestrian and bike access to and from the Ross Island Bridge and the bus stop.

Background Data

SW Kelly Ave provides a direct connection from south of the Portland City Center to the Ross Island Bridge.

The section of SW Kelly Ave from SW 1st Ave to the Ross Island Bridge is 1300 feet.

In the southbound direction, SW Kelly Ave includes two travel lanes and on street parking, the northbound direction includes two and three travel lanes.

Average daily trips on SW Kelly Ave northbound are 10,220.

The roadway is ODOT fee simple, ODOT will have to approve the proposed project.

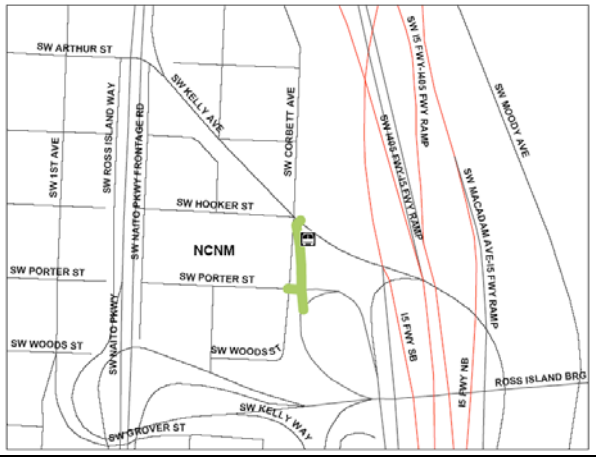
Description of Improvement

Crossing #1: From the bridge sidewalk to the bus stop island, construct a pedestrian refuge island (with pedestrian ramps) between the two merging eastbound travel lanes – the right turn bridge off-ramp and SW Porter St. At the northeast corner of SW Corbett Ave and SW Porter St build a curb extension.

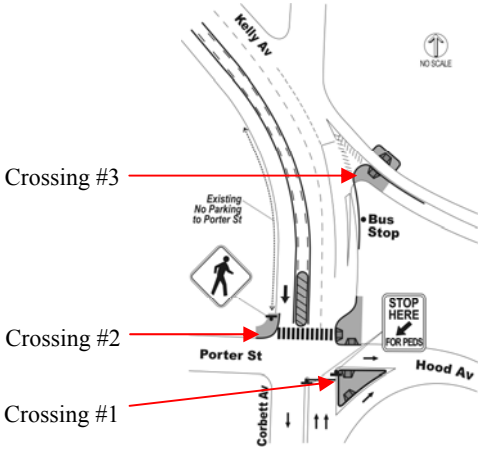
Crossing #2: Reduce southbound travel lanes on SW Kelly Ave/SW Corbett St (from SW Naito Pkwy to SW Porter St) to one lane and convert center southbound lane to a two-way left turn lane. At the intersection of SW Corbett Ave and SW Porter St, construct a raised median island in the left turn lane. At the northwest corner of SW Corbett Ave and SW Porter St add a pedestrian ramp. Stripe and sign a crosswalk between the northeast and northwest corners of SW Corbett Ave and SW Porter St. Add a "Stop Here for Peds" bar and signs for traffic exiting the bridge and heading north on SW Corbett Ave. Include a multi-use bus/bicycle lane between Crossing #2 and Crossing #3.

Crossing #3: Extend the curb at the southeast corner of the SW Corbett Ave and City Center/ Macadam ramp intersection. Add pedestrian ramps to sidewalks on both sides of the City Center/ Macadam ramp crossing.

Project Area



Cross-section Detail or Photo



Preliminary Cost Estimate

$610,000 - $670,000

Priority

High

PEDESTRIAN / BIKE PROJECTS

Alternatives/Additional Notes

NCHRP report 562 indicates that crosswalks can be marked on SW Corbett at Kelly and on the Kelly/Ross Island Bridge ramp with active or enhanced treatment (e.g. additional signage, beacons, or other).

Additional Images / Graphics

Crossing #1 – looking south from northeast corner of SW Corbett Ave & SW Porter St intersection toward the Ross Island Bridge sidewalk and off-ramp

Crossing #2 – looking west from northeast corner of SW Corbett Ave & SW Porter St intersection toward the National College of Natural Medicine campus

Crossing #3 – looking south from intersection of Corbett and Kelly

PEDESTRIAN / BIKE PROJECTS

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BP-24B. KELLY AVENUE BIKE LANE

Need/Purpose

The sidewalk at the west end of the Ross Island Bridge delivers cyclists to a maze of fast vehicular movements, with no designated or safe way to cross intersections or continue to the Portland City Center. Cyclists must dodge unpredictable traffic to cross the intersections, then join the fast moving traffic lanes on SW Corbett Ave/SW Kelly Ave or ride on the sidewalks. By reducing SW Kelly Ave/SW Corbett Ave to one lane southbound, a bicycle lane can be added to SW Corbett Ave/SW Kelly Ave northbound of from the Ross Island Bridge to SW Naito Pkwy, creating a safer, more direct connection between the Bridge and the City Center. Due to low volumes on SW Kelly Ave southbound, a bike lane is not recommended in this travel direction.

Background Data

SW Kelly Ave provides a direct connection from south of the Portland City Center to the Ross Island Bridge.

The section of SW Kelly Ave from SW 1st Ave to the Ross Island Bridge is 1300 feet.

In the southbound direction, SW Kelly Ave includes two travel lanes and on street parking, the northbound direction includes two and three travel lanes.

Average daily trips on SW Kelly Ave northbound are 10,220.

The roadway is ODOT fee simple, ODOT will have to approve the proposed project.

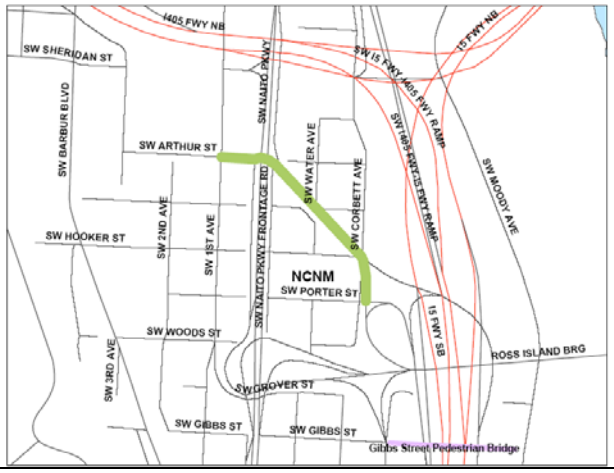
Description of Improvement

This project recommends adding a northbound bike lane on SW Corbett Ave/SW Kelly Ave. The bike lane would begin where the bridge sidewalk ends and continue along SW Corbett Ave/SW Kelly Ave/SW Arthur St to SW 1st Ave.

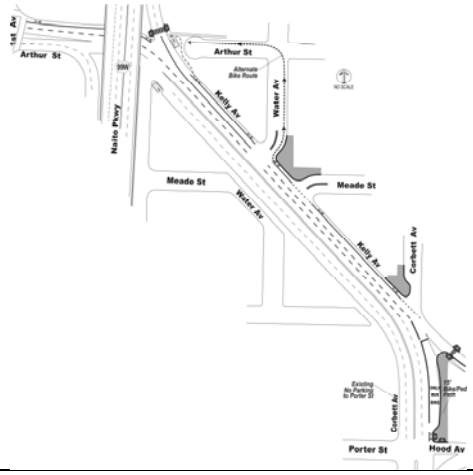
SW Corbett Ave Bike Lane: In the grassy median on the east side of SW Corbett Ave, from SW Porter St to the City Center/Macadam ramp intersection with SW Kelly Ave, construct a 15 foot-wide bike and pedestrian path or provide cyclists with an on-street alternative by converting the bus lane to a shared bus/bicycle facility.

SW Kelly Ave Bike Lane: On the north side of SW Kelly Ave, from the intersection of the City Center/Macadam ramp & SW Corbett Ave to SW 1st Ave, stripe a 5 foot bike lane. This requires converting the center southbound lane into a two-way left turn only lane, and grinding and restriping the existing northbound lanes. The northbound SW Kelly Ave lanes would change from 12'-14'-12' to 11'-11'-11'-5'. On SW Arthur Ave, restripe northbound travel lanes to 10.5' and 10.5' to allow for striping a 5' bike lane. To cross the two right turn travel lanes onto SW Naito Pkwy northbound, cyclists will be directed to the pedestrian crossing proposed in project BP-24c.

Project Area



Cross-section Detail or Photo



Preliminary Cost Estimate

$660,000 - $740,000

Priority

High

PEDESTRIAN / BIKE PROJECTS

Alternatives/Additional Notes

Implementation of BP-24b will require addition of signal at Kelly Avenue Crosswalk Replacement (BP-23).

Additional Images / Graphics

PEDESTRIAN / BIKE PROJECTS

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BP-24C. RAMP CROSSINGS OF KELLY AVENUE TO NAITO PARKWAY

Need/Purpose

In order to provide a safe pedestrian and bicycle connection between the Ross Island Bridge and SW 1st Ave, non-motorized users need a safe way to cross the SW Kelly Ave to Naito Pkwy ramps, both northbound and southbound. This project proposes enhanced crossings across both on-ramps to be used by pedestrians and bicyclists. (It will be a similar configuration to that constructed where SW Naito Pkwy branches from SW Barbur Blvd in the northbound direction.)

Background Data

Both the northbound and southbound SW Kelly Ave ramps onto Naito Pkwy accommodate two travel lanes.

While the right lane is required to turn right onto the ramp, the center lane can chose to take the ramp or continue straight.

Unable to predict vehicular movements in the center lane, with posted speeds of 35 MPH, and with no cross-walk, these are difficult crossings for both pedestrians and cyclists.

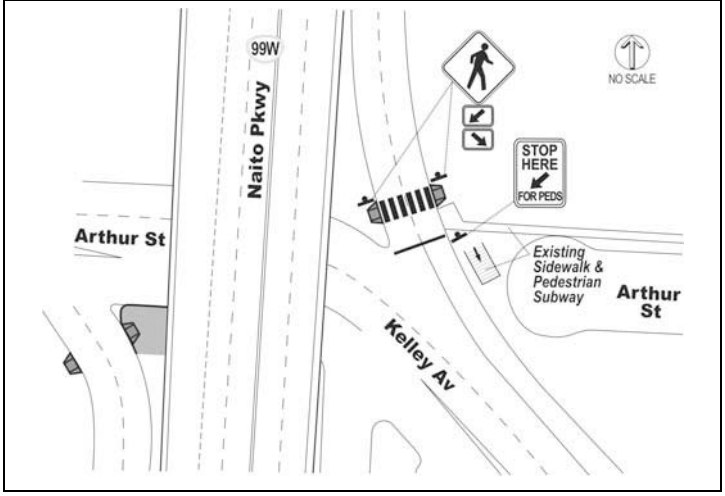
The roadways and ramps are under ODOT jurisdiction.

Description of Improvement

This project recommends striping a pedestrian crosswalk across the two-lane ramp from northeast-bound SW Kelly Ave to northbound SW Naito Pkwy. Prior to approving a marked crosswalk, pedestrian volumes will need to be counted and must meet the minimum requirement. In addition to striping, stop lines should be painted across the two lanes (prior to the crosswalk) with "Stop Here for Peds" signs. The existing curb cuts for the crosswalk across the northbound travel lanes may need to be rebuilt to meet ADA compliance. For the crosswalk across the southbound travel lanes, a large curb extension should be built out from the sidewalk under SW Naito Pkwy, north toward the SW Arthur St sidewalk. Curb cuts should be built on the north side of this intersection at SW Arthur St, but an enhanced crossing is not recommended at this time.

Project Area

Cross-section Detail or Photo



Preliminary Cost Estimate

$360,000 - $390,000

Priority

High

PEDESTRIAN / BIKE PROJECTS

Alternatives/Additional Notes

The two-lane ramp from southeast-bound SW Kelly Ave to southbound SW Naito Pkwy does not meet NCHRP Report 562 requirements for a marked crosswalk. Auto volumes are too high.

A PDOT traffic engineer examined the opportunity to limit the right turn onto the ramp to the northbound SW Kelly Ave-SW Naito Pkwy Ramp right-hand lane only. Doing this would provide increased predictability to pedestrians and bicyclists trying to cross the ramp. However, due to the weave on SW Kelly Ave that occurs prior to the ramp, a two lane ramp onto SW Naito Pkwy northbound is required.

Additional Images / Graphics

Looking westbound on SW Kelly Ave, toward the SW Naito Pkwy elevated structure. There are pedestrian crossing signs on either side of the ramp, but no traffic slowing or stopping measures.

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BP-25. SW NAITO PARKWAY PEDESTRIAN CROSSING AT SW PORTER STREET

Need/Purpose

In the vicinity of the National College of Natural Medicine, SW Naito Pkwy acts as a barrier between the college campus and the Lair Hill neighborhood to the west. Despite multiple lanes of fast moving traffic, pedestrians often cross SW Naito Pkwy at-grade at SW Porter Ave. This project recommends a formalized pedestrian crossing of SW Naito Pkwy at Porter. At this point, Naito is in an urban neighborhood and it is appropriate that the limited-access nature of the roadway changes to be slower and more permeable.

Background Data

This section of SW Naito Pkwy is 8 lanes wide.

- Two-lane, low-volume, frontage road
- Northbound – one bus lane and one travel lane
- Two southbound travel lanes on SW Naito Pkwy
- Two southbound travel lanes feeding onto the Ross Island Bridge.
- Three narrow, concrete medians separating lanes.

The travel speed on this section of SW Naito Pkwy is 40 mph.

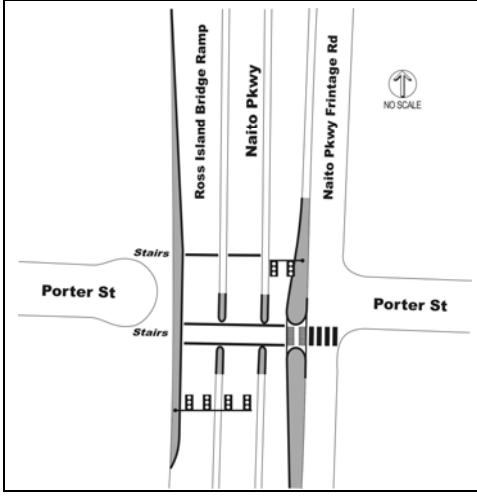
Description of Improvement

This project recommends placing a signalized crosswalk* across SW Naito Pkwy at SW Porter St. In addition to the signal and striping, the project requires rebuilding sections of the medians, complete with pedestrian cuts, and widening the sidewalk on each side of SW Naito Pkwy. An ADA-compatible ramp will need to be built from SW Porter St west of SW Naito Pkwy down to SW Naito Pkwy. Currently, the two streets are connected by two sets of about 4 stairs each.

*See Additional Notes on back side.

Project Area

Cross-section Detail or Photo



Preliminary Cost Estimate

$940,000 - $1.1 Million

Priority

Medium

PEDESTRIAN / BIKE PROJECTS

Alternatives/Additional Notes

The crossing requires a signal because it does not meet marked crosswalk criteria. Pedestrian counts need to be done at this location to determine whether the crossing meets warrants for a signal. To meet signal warrants, there must be less than one adequate gap per minute and 193 pedestrians crossing at this location during peak period. If it does not meet warrants, then this project will need to be put on hold until the character of SW Naito Pkwy in this vicinity starts to change or warrant requirements are met.

A signalized crosswalk on SW Naito Pkwy at SW Hooker St was considered, but the street configuration at this point is not appropriate for a pedestrian crossing. SW Porter St was selected as a better crossing location.

Additional Images / Graphics

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BP-26. HOOKER STREET PEDESTRIAN BOULEVARD BETWEEN NAITO PKWY AND KELLY AVE

Need/Purpose

SW Hooker St between Naito Pkwy and Kelly Ave cuts between the academic buildings of the National College of Natural Medicine, Ross Island Bridge campus. While the traffic volumes on this stretch of SW Hooker St are low, reclassification and reconfiguration of the street to a pedestrian boulevard would change the street function from dividing the campus to connecting it. This project connects to the new Kelly Street crossing (BP-23), and links the neighborhood to the OHSU Schnitzer Campus.

Background Data

This section of SW Hooker Street is 36 feet wide and about 500 feet long.

East end of the street dead ends before SW Kelly Ave.

West end of the street is a forced right turn onto SW Naito Pkwy frontage road.

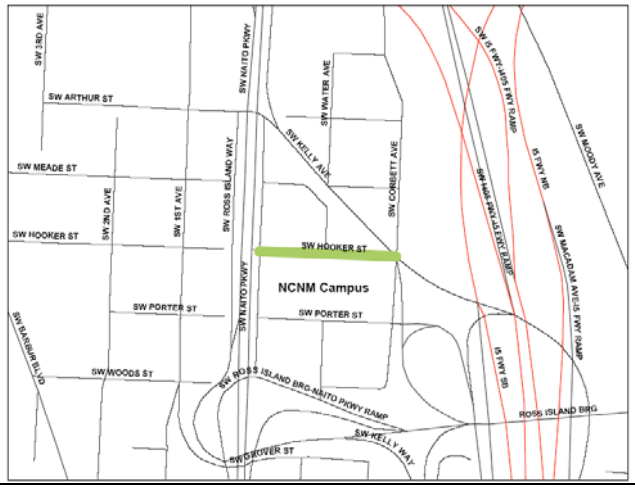
One other low-volume street, SW Water Ave, dead ends into SW Hooker Street at its mid-point.

The Hooker Street Pedestrian and Bicycle Bridge over SW Naito Pkwy connects at the middle of this stretch of SW Hooker St.

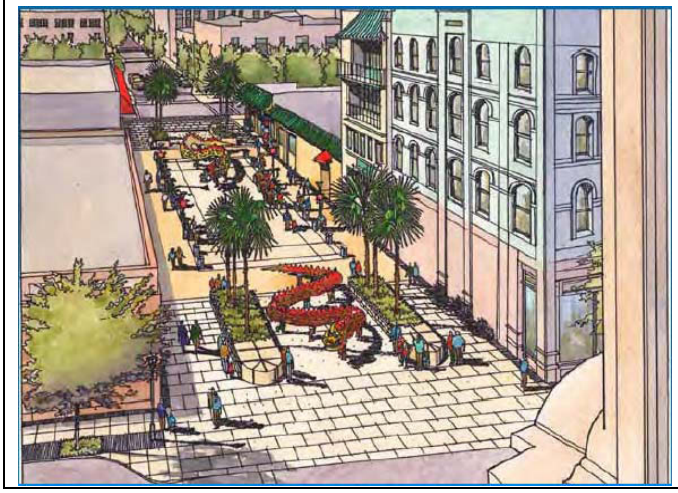
Description of Improvement

This project recommends that this 500 foot-long section of SW Hooker St, from SW Naito Pkwy to SW Kelly Ave, be turned from a neighborhood street into a predominately pedestrian boulevard. The construction of this section of SW Hooker St could be modeled off of the Chinatown festival streets in northwest Portland or off of SW Pennoyer St, from SW Bond Ave to the Willamette River in the South Waterfront District. The street could be constructed out of pavers or bricks. The street and sidewalk should be at the same level and blend together. The street should include street furniture, historical lighting, street trees, bike parking, and other pedestrian-friendly features.

Project Area



Cross-section Detail or Photo



Preliminary Cost Estimate

$3.8 - $4.4 Million

Priority

Medium

PEDESTRIAN / BIKE PROJECTS

Alternatives/Additional Notes

Additional Images / Graphics

SW Pennoyer St. in South Waterfront district

PEDESTRIAN / BIKE PROJECTS

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BP-28. MOODY AVE / RIVER PARKWAY SIDEWALK CUTBACK

Need/Purpose

From the Portland City Center to the South Waterfront District is a direct bike route along SW Harrison St, SW River Pkwy, and SW Moody Ave. A bike lane is consistent along this route, with the exception of a short section where it disappears – the right hand turn from SW River Pkwy eastbound to SW Moody Ave southbound. In order to eliminate confusion for cyclists and motorists and increase the safety of this route, a continuous bike lane should be carried through this curve.

Background Data

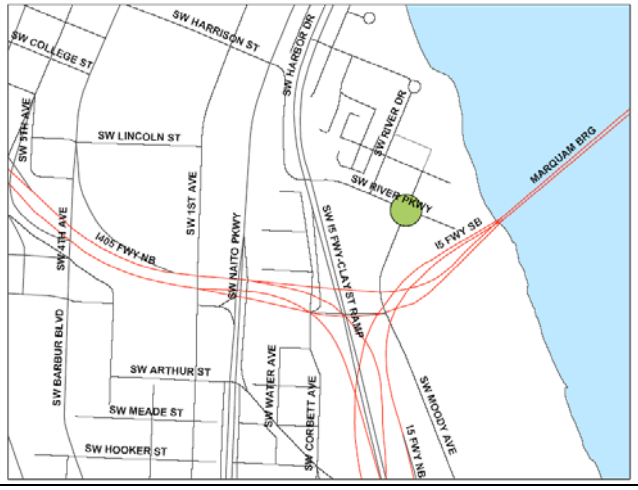
The bike lane drops for 130 feet around the curve.

The current street width at the curve from the center of the southbound streetcar lane to the curb is 19'.

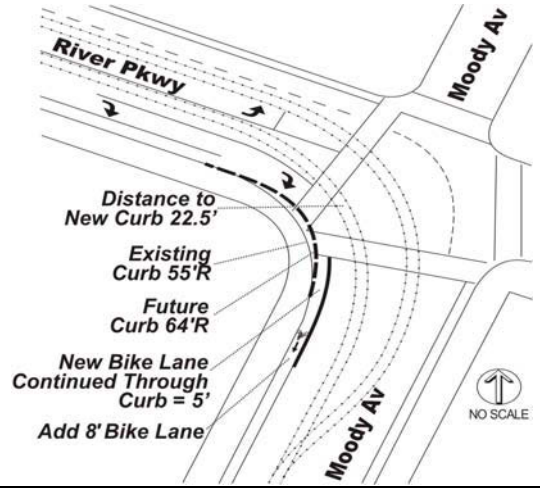
Description of Improvement

This project recommends that the curb at the southwest corner of SW Moody Ave and SW River Pkwy be required to be reconstructed when the parcel is redeveloped. The reconstruction should build the curb 22.5' from the center of the southbound streetcar lane. This would allow for striping a 5' bike lane through the corner.

Project Area



Cross-section Detail or Photo



Preliminary Cost Estimate

$240,000 - $260,000

Priority

Medium

PEDESTRIAN / BIKE PROJECTS

Alternatives/Additional Notes

Additional Images / Graphics

PEDESTRIAN / BIKE PROJECTS

BP-29. BIKEWAY ENHANCEMENT OF SW GROVER ST & SW 1ST AVE

Need/Purpose

SW Corbett Ave to SW 1st Ave is a designated City Bikeway, providing bicycle connection from southwest Portland neighborhoods to the Portland City Center. Just south of the Ross Island Bridge, SW Corbett Ave bends 90 degrees to the west and turns into SW Grover St. SW Grover St continues for a short distance, passing underneath SW Naito Pkwy and reemerging at SW 1st Ave. Bicycle lanes are not striped along any section of this route. Traffic calming along SW Corbett Ave (BP-10) will improve the biking experience along Corbett. The Grover and 1st Ave to Arthur section should have similar traffic calming and signing to improve bicycling safety and comfort.

Background Data

The slope on the west side of the Grover Street Underpass is almost 8% and the slope on the east side of the underpass is about 5%.

The roadway at the underpass curves from an east-west orientation to a north-south orientation, restricting sight distance.

The marked speed is 30 mph.

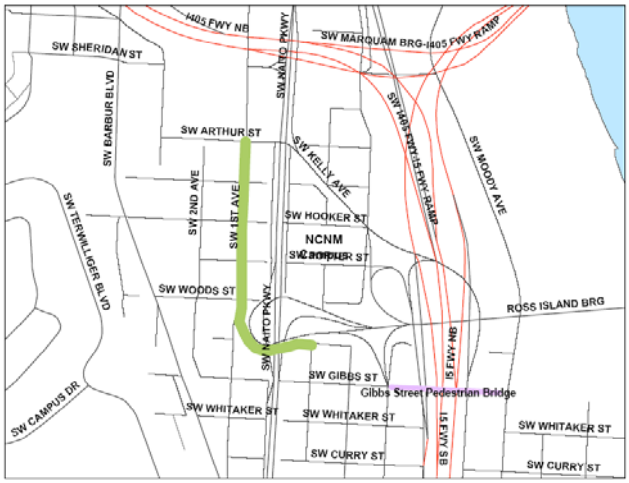
The travel lanes are each 15 feet wide.

Description of Improvement

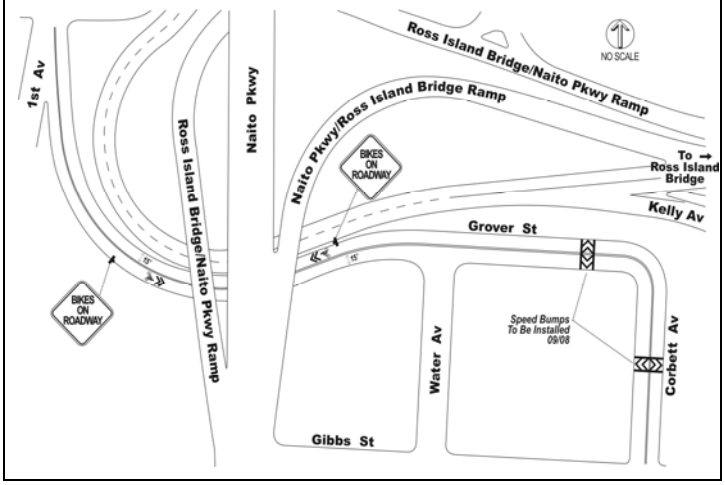
This project recommends that bicycle enhancements are made on SW Grover St, from SW Water Ave to SW 1st Ave, and on SW 1st Ave from SW Grover St to SW Arthur St. Recommended enhancements include traffic calming in the form of about three speed bumps, painted bike sharrows in the travel lanes, and "Bikes on Roadway" and "Speed Bumps Ahead" signs. The aim of these enhancements is to help develop the designated bikeway and improve the safety and comfort for cyclists traveling along SW Grover St and SW 1st Ave.

The specific locations of the speed bumps are to be determined.

Project Area



Cross-section Detail or Photo



Preliminary Cost Estimate

$23,000 – $25,000

Priority

Medium

PEDESTRIAN / BIKE PROJECTS

Alternatives/Additional Notes

We have recommended sharrows in favor of bicycle lanes for this improvement owing to two conditions in the project area:

1) The underpass curves are not wide enough to safely accommodate a bicycle lane.
2) Installing a bicycle lane in the segment between SW Grover and SW Arthur would impinge upon on-street parking and thus likely meet resistance from neighbors.

Additional Images / Graphics

Typical bike sharrow

PEDESTRIAN / BIKE PROJECTS

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BP-30. PORTLAND AERIAL TRAM BICYCLE PARKING

Need/Purpose

There is greater demand than supply for bicycle parking at the base of the Portland Aerial Tram (the tram). With no available bicycle racks, cyclists are locking bikes to nearby benches and trees, and overflowing into the OHSU underground parking structure one-block away.

As the South Waterfront District continues to grow, demand for bicycle parking will increase. This particular location will increasingly become a nexus for bicycle travelers in southwest Portland with the tram, streetcar, light rail, Greenway Trail, and Gibbs Promenade.

Additional bike parking is important to help the District achieve its targeted mode splits.

Background Data

Currently there are about 120 bike parking spaces at the base of the aerial tram. Many tram users opt to take their bicycles on the tram rather than lock them at the base. This is leading to overcrowding on the tram (up to 10 bicycles per tram car have been reported).

Interviews will be conducted in Spring/Summer 2009 to better understand bicycle travel patterns and needs. It is anticipated that a safer, more comfortable, more expansive bicycle parking facility at the base of the tram will encourage more bicycle commuting and fewer bicycles being carried in the tram cars.

Description of Improvement

This project recommends a one-level, covered bicycle parking structure with high visibility and good lighting. The structure should provide a minimum of 24 parking spaces. It is recommended that the structure offer two parking options: one that is free to all users with standard City approved bike racks; the other that is secured bike parking available to monthly paying customers.

This project may be merged with T-2: Multi-Modal Transit Hub

Project Area

Cross-section Detail or Photo

Preliminary Cost Estimate

$ 25,000 – $3+ Million*

Priority

High

* Preliminary cost estimate taken from Bikestation.org does not include annual operating cost.

PEDESTRIAN / BIKE PROJECTS

Alternatives/Additional Notes

OHSU has indicated that it would be open to alternative locations and/or configurations of the bicycle parking facility. Acceptable options would include:

- Location of the bicycle facility near the anticipated Porter Street MAX station
- Splitting the bicycle station into several smaller facilities located at several dispersed sites throughout the district

Additional Images / Graphics

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BP-31A. BICYCLE WAYFINDING TO AND AROUND THE NORTH MACADAM URA

Need/Purpose

The City of Portland's bikeway destination signs provide direction and distance to specified destinations, including commercial centers, parks of regional significance, transit facilities, and certain institutions.

With few access points to the South Waterfront District and several fast moving, limited access roads passing through the area, a bicycle wayfinding system should be established to help guide bicyclists into and out of the District.

Background Data

The South Waterfront District is developing into a high density residential and business district.

Currently there are no signs directing bicyclists to the District from other locations or to destinations within the District.

The City bikeway destination signs are placed at intersections along all developed bikeways, at key decision points, and as guidance through difficult turns.

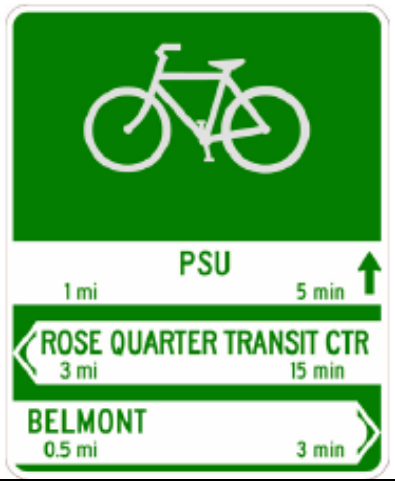
Description of Improvement

This project recommends adding directional placards to existing signs to help direct bicyclists along safe routes to the South Waterfront District. It also recommends adding new signs in and around the South Waterfront District to direct residents and visitors to specific destinations in and near the District.

The new signs should provide directions to the commercial center, the Central Greenway Trail and other parks of regional significance, institutions, and transit facilities, including the tram, streetcar, future light rail, and future bus stops.

Project Area

Cross-section Detail or Photo



Courtesy of Portland office of Transportation

Preliminary Cost Estimate

$ TBD

Priority

High

PEDESTRIAN / BIKE PROJECTS

Additional Images / Graphics

PEDESTRIAN / BIKE PROJECTS

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BP-31B. PEDESTRIAN WAYFINDING TO AND AROUND THE SOUTH WATERFRONT

Need/Purpose

The City of Portland's Pedestrian Wayfinding Signage System is a pedestrian-oriented informational and directional signage program. It currently exists in Portland's City Center, including the I-405 loop and the Lloyd District.

A pedestrian wayfinding system should be established in the South Waterfront District to direct residents and visitors to institutions, transit connections, parks, and nearby districts.

Background Data

The South Waterfront District is developing into a high density residential and business district.

Currently there are no signs directing pedestrians to the District from other locations or to destinations within the District.

Description of Improvement

This project recommends adding directional placards to existing signs to help direct pedestrians into the South Waterfront District. It also recommends adding new signs in and around the South Waterfront District to direct residents and visitors to specific destinations.

About 15 directional placards should be added to existing signs located in Downtown and the University District to direct pedestrian to the South Waterfront District.

About 20 new signs should be installed in the University District and the Corbett/Lair Hill/Terwilliger neighborhoods to direct pedestrians to the South Waterfront District and the OHSU Marquam Hill Campus.

About 15 new signs should be installed throughout the South Waterfront District. The new signs should provide directions to: OHSU Marquam Hill Campus, OHSU Schnitzer Campus, the Center for Health and Healing, the National College of Natural Medicine, John's Landing, Riverplace, Portland City Center, the tram, the streetcar, the Greenway Trail, South Waterfront Park, the future Gibbs Pedestrian Bridge and the future light rail, among others.

Project Area

Cross-section Detail or Photo

Courtesy of Portland office of Transportation

Preliminary Cost Estimate

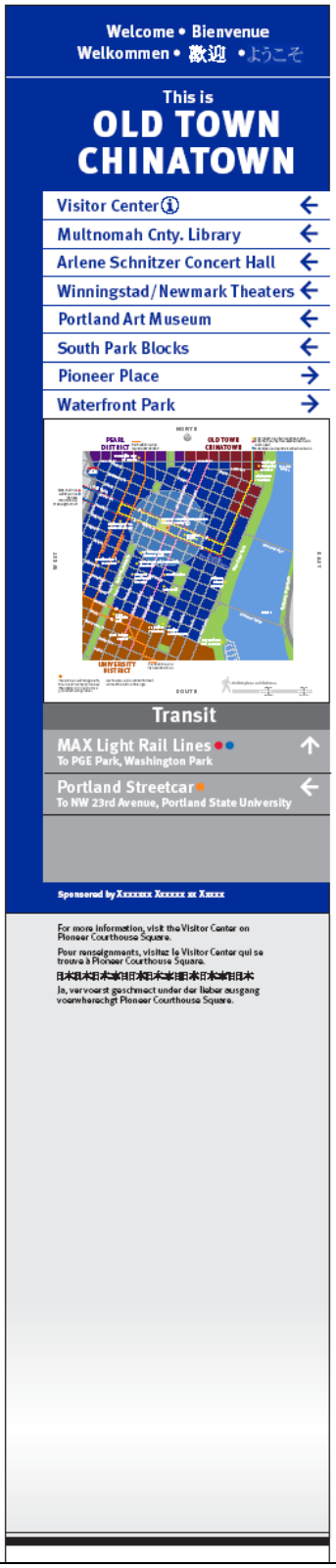
$ TBD

Priority

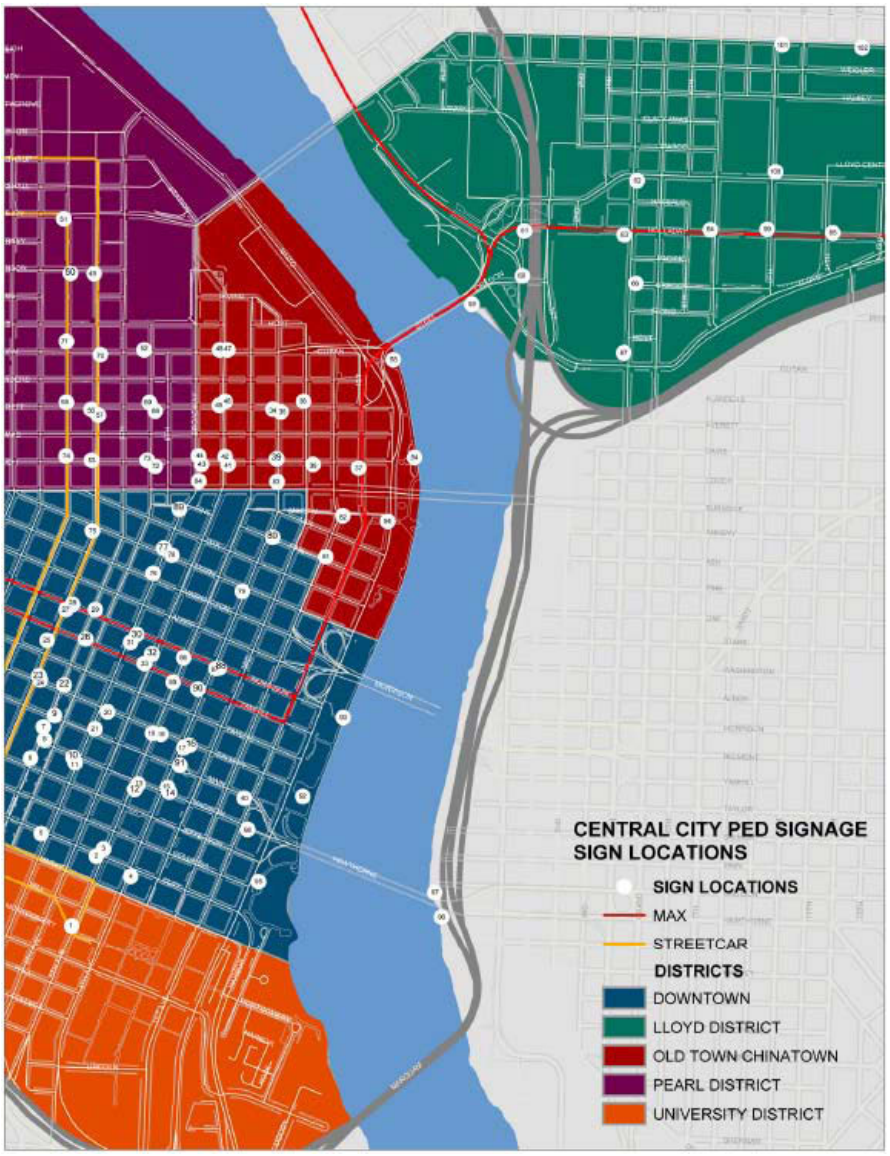
Medium

PEDESTRIAN / BIKE PROJECTS

Additional Images / Graphics



Courtesy of Joel Katz Deign Associates



Courtesy of Portland office of Transportation

Location of existing pedestrian signs in the five districts.

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BP-32. GIBBS PEDESTRIAN BRIDGE TO LIGHT RAIL BIKE CONNECTION

Need/Purpose

The eastern end of the Gibbs Street Pedestrian Bridge has no direct bicycle connection to the future Porter Street LRT station. This improvement will provide safe and comfortable movement between the bridge and LRT station by avoiding conflict with automobile activity on SW Moody and pedestrian activity in the elevator.

Background Data

Description of Improvement

This improvement is a 5% grade bike path from the top of the Gibbs Pedestrian Bridge to Porter Street. The path is shown in ODOT ROW and would be on structure for part of the distance.

Project Area

Cross-section Detail or Photo

Preliminary Cost Estimate

$ 2.5 Million

Priority

Low

PEDESTRIAN / BIKE PROJECTS

Additional Images / Graphics

PEDESTRIAN / BIKE PROJECTS

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BP-33. SW 1ST AVENUE BICYCLE IMPROVEMENTS

Need/Purpose

SW 1st Avenue is a designated City Bikeway. It provides one of two bicycle access routes from South Waterfront to downtown Portland and the only direct route from the NCNM campus across I-405. SW 1st Avenue north of SW Arthur Street is a roadway shared by vehicles and bicycles without the benefit of a northbound bicycle lane. This project proposes to make SW 1st Ave. a more comfortable and more attractive bicycle route by adding a northbound bike lane on SW 1st Avenue between SW Arthur Street and SW Harrison Street. SW Harrison Street is another designated City Bikeway, which links the S. Waterfront and PSU.

Background Data

Currently there are four travel lanes (two in each direction), separated by a median. There is also a southbound bike lane on SW 1st Ave. from SW Jefferson Street to SW Arthur Street.

Northbound vehicle traffic on SW 1st Avenue is moderate to light.

There is not sufficient space to add a 5-foot bike lane to the existing street configuration.

Description of Improvement

This improvement will add a bike lane on SW 1st Avenue between SW Arthur Street and SW Harrison Street. Adding a bike lane will require removing one northbound vehicle lane.

Project Area

Cross-section Detail or Photo

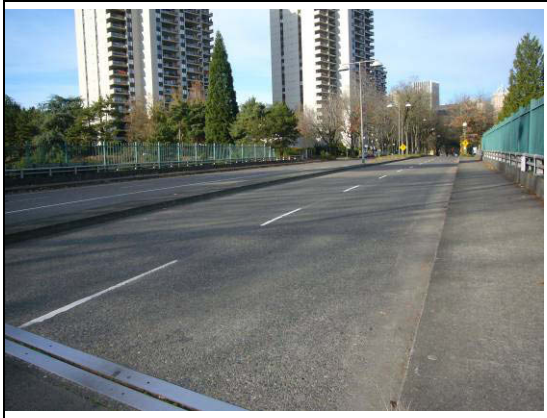
Preliminary Cost Estimate

$ TBD

Priority

Medium

Additional Images / Graphics



SW 1st Avenue is on structure across I-405. Enough median space is appropriated by a left turn lane on 1st Ave SB to prevent NB traffic lanes form being able to shift over enough to accommodate both the two traffic lanes and a new bike lane. There is a 6' wide sidewalk on structure.

SW 1st Ave looking NB. Note the light traffic and wide, tree-filled median.

SW 1st Avenue's NB lanes terminate at SW Harrison, forcing either a right or left turn.

PEDESTRIAN / BIKE PROJECTS

BP-34. HARRISON UPHILL BIKE TREATMENT

Need/Purpose

SW Harrison Street is a designated City Bikeway. It provides one of two bicycle access routes from South Waterfront to downtown Portland and the only direct route to Portland State University. SW Harrison St. is a roadway used by vehicles, streetcars and bicycles; currently there are no bicycle lanes on an uphill section of Harrison Street. between SW Naito Parkway to SW 4th Avenue. This project proposes to make SW Harrison Street. a more comfortable and more attractive bicycle route by adding an uphill bike treatment on the north side of SW Harrison Street along this stretch.

Background Data

Currently there are four travel lanes (two in each direction), separated by a median. The two inside lanes contain streetcar tracks. The median is home to two streetcar stops (each stop serves both directions) and pedestrian crosswalk refuges.

There is not sufficient space to add a 5-foot bike lane to the existing street configuration without removing a traffic lane.

There are bike lanes in both directions on SW Harrison Street between SW Naito Parkway and SW Moody Avenue.

Vehicle traffic on this segment of SW Harrison Street is moderate to light.

Description of Improvement

This improvement would replace the right vehicle lane on SW Harrison with an uphill bike lane from SW Naito Parkway to SW 4th Avenue, but will need traffic operations evaluation to determine:

- How the bike lane will affect vehicle stacking between Naito and 1st
- If and how cars will be able to drive around stopped streetcars

Project Area

Cross-section Detail or Photo

Preliminary Cost Estimate

$ TBD

Priority

Medium

PEDESTRIAN / BIKE PROJECTS

Additional Project Notes

Crossing 4th Ave on Harrison will still present challenges.

SW Harrison showing median utilized for street tree planting and Streetcar stops for both EB and WB line.

SW Harrison uphill showing special limitations for widening of street into curb or expansion of lanes.