S. EXECUTIVE SUMMARY

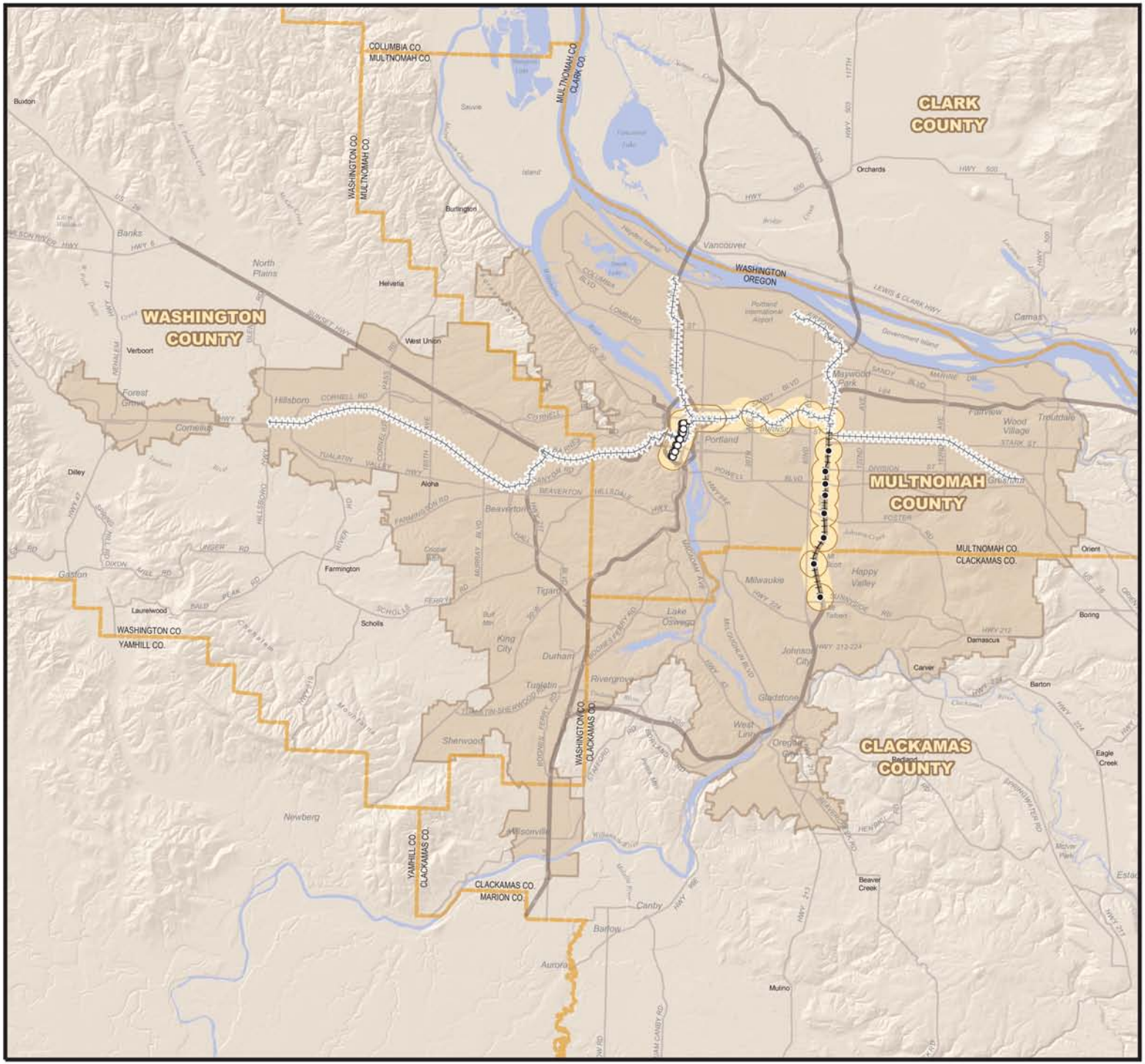
This document provides a summary of the *South Corridor I-205/Portland Mall Light Rail Project (Project) Final Environmental Impact Statement* (FEIS) including: the Project history and decision making; the alternatives considered; the anticipated environmental consequences of the Project; the anticipated transportation impacts of the project; the historic, archaeological and parkland analysis of the Project; the Project's financial analysis and plan; an evaluation of the Project; and an overview of issues to be resolved in subsequent phases of the Project. Because this Executive Summary presents the results of the FEIS in summary form, the FEIS and its background documentation should be referenced for more detailed information.

The South Corridor is a subset of the South/North Transit Corridor and the FEIS is derived in part from the *South/North Draft Environmental Impact Statement* (DEIS), the *South Corridor Supplemental Draft Environmental Impact Statement* (SDEIS) and the *Downtown Amendment to the SDEIS* (ASDEIS), which were published by the Federal Transit Administration (FTA) and Metro in February 1998, December 2002 and October 2003, respectively. The South Corridor I-205/Portland Mall Light Rail Project FEIS (and this Executive Summary) focuses on the I-205 and Portland Mall segments of the South Corridor Project. The FEIS provides updated and additional information on the purpose and need, alternatives considered, affected environment and anticipated transportation and environmental impacts, reflecting the changed conditions since the DEIS, SDEIS and ASDEIS were published and reflecting the selection and subsequent amendment of the Locally Preferred Alternative (LPA). The LPA was adopted by the Metro Council for the South/North Corridor in July 1998, then amended for the South Corridor in April 2003 and amended again for the downtown Portland Mall Segment in January 2004. Section S.1 of this Executive Summary provides a more detailed description of South Corridor Project's history and decision-making process.

The South Corridor I-205/Portland Mall Project FEIS has been prepared in compliance with the National Environmental Policy Act (NEPA). The Federal Transit Administration (FTA) and the Federal Highway Administration (FHWA) are the Federal co-lead agencies for the Project, and Metro and TriMet are the Project's local lead agencies. Preparation of the FEIS is one step in the Federal transportation project development process that is intended to be an integral part of a metropolitan area's long-range transportation planning process. The purpose of the FEIS is to provide final documentation of the project's environmental analysis used to select the preferred alternative and to demonstrate the Project's compliance with NEPA and other federal laws, regulations and guidance. In particular, the FEIS demonstrates the Project's efforts to avoid, minimize and mitigate impacts to the built and natural environment, while addressing the Project's goal and objectives. As such, the FEIS documents the benefits, costs and impacts associated with the I-205/Portland Mall Light Rail Project (Phase 1 of the South Corridor LPA) and the No-Build Alternative, and summarizes information on the alternatives and options that were previously developed and evaluated.

S.1 Definition of the South Corridor

The South Corridor is part of the larger South/North Transit Corridor within the Portland, Oregon and Vancouver, Washington metropolitan region. As shown in Figure S.1-1, this region includes four counties: Multnomah, Clackamas and Washington counties in Oregon, and Clark County in Washington. This region is the population and economic center of an extensive area, including most of Oregon, southern Washington and western Idaho.



South Corridor Project

Location of Project in Portland Metro Area

FIGURE S.1-1

- *Urban Growth Boundary*
- *Half-Mile Alignment Area*
- *Half-Mile Station Area*

ALIGNMENTS

- *Existing Light Rail*
- *Portland Mall Segment*
- *I-205 Segment*

STATION LOCATIONS

- *Portland Mall Segment*
- *I-205 Segment*
- *Existing Stations*
- *County Line*

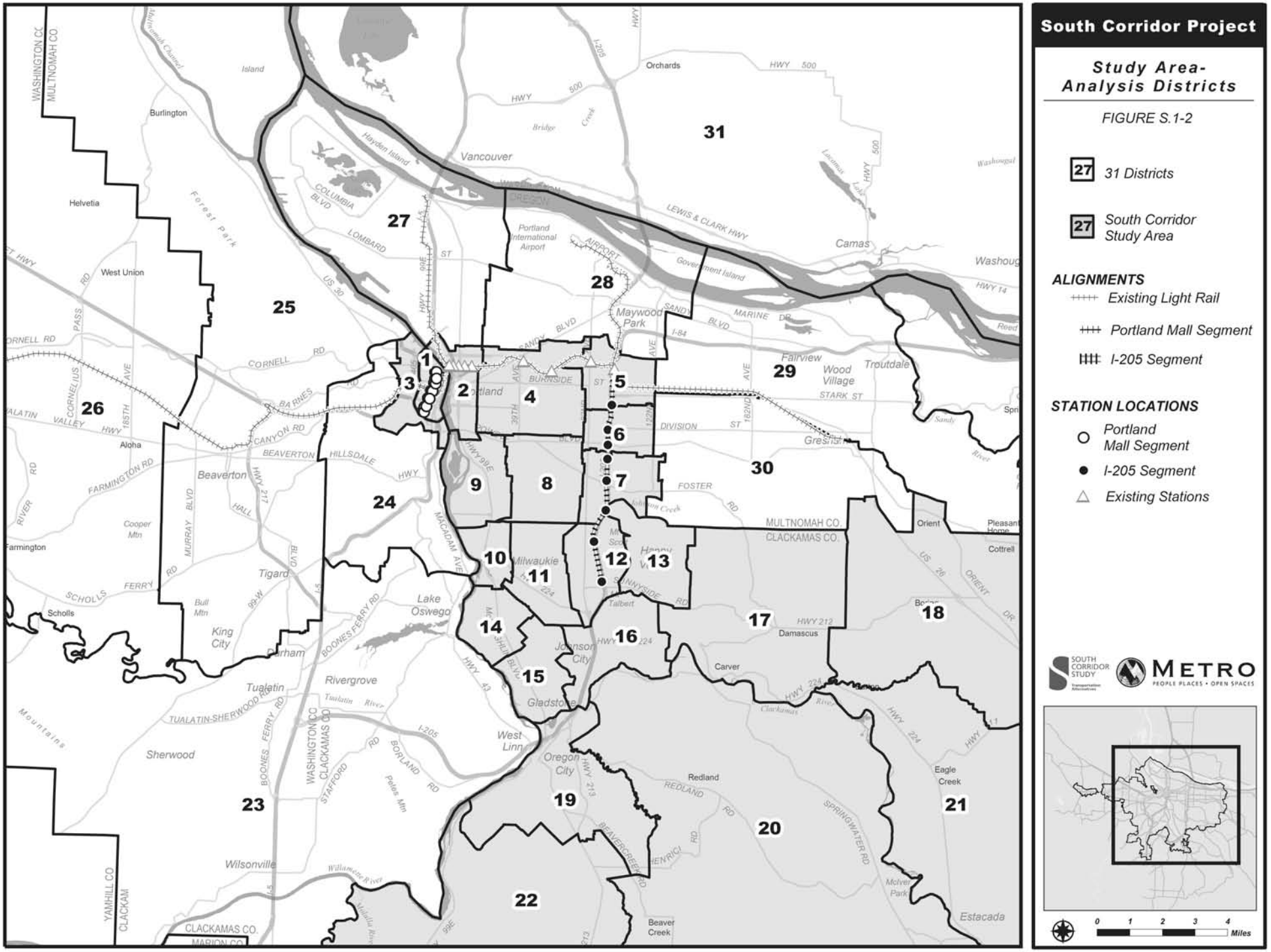
SOUTH CORRIDOR STUDY

METRO
PEOPLE PLACES • OPEN SPACES

NORTH

0 1 2 3 4 Miles

July 2004

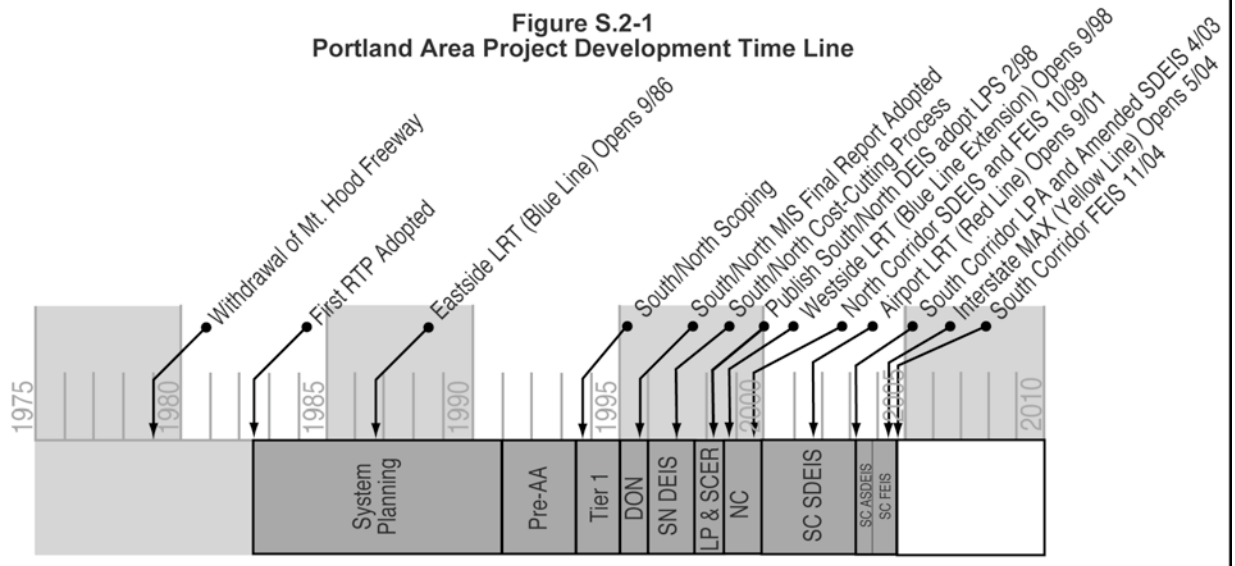

South Corridor Project
Study Area-
Analysis Districts
FIGURE S.1-2
27 31 Districts
27 South Corridor Study Area
ALIGNMENTS
Existing Light Rail
Portland Mall Segment
I-205 Segment
STATION LOCATIONS
Portland Mall Segment
I-205 Segment
Existing Stations
SOUTH CORRIDOR STUDY
METRO
PEOPLE PLACES • OPEN SPACES
0 1 2 3 4 Miles
September 2004

The South Corridor is defined as the travel shed between the urban and urbanizing portion of Clackamas County and the Portland Central City, as illustrated in Figure S.1-2. Travel within the corridor uses a variety of local, regional, state and interstate facilities. The Tri-County Metropolitan Transportation District of Oregon (TriMet) is the provider of public transportation services in the study area and currently operates fixed-route transit buses, on-demand van and small bus service for the elderly and disabled and light rail lines throughout the Oregon portion of the region.

S.2 Project History and Decision-Making Process

The need to examine high capacity transit (HCT) options in the South Corridor was established over two decades of system and sub-area planning studies. Following is a description of the study stages that have culminated in the development of the SDEIS. Refer to Figure S.2-1 for a time line illustrating these project phases. A more detailed description of the Project's history and decision-making process may be found in Section 2.1 of the FEIS.

Figure S.2-1
Portland Area Project Development Time Line



List of Acronyms

DEIS	- Draft Environmental Impact Statement	LRT	- Light Rail Transit
DON	- Design Option Narrowing	MIS	- Major Investment Study
FEIS	- Final Environmental Impact Statement	Pre-AA	- Preliminary Alternatives Analysis
LPA	- Locally Preferred Alternative	RTP	- Regional Transportation Plan
LPS	- Locally Preferred Strategy	SDEIS	- Supplemental Draft Environmental Impact Statement
S/N	- South/North Corridor	LP	- Listening Posts
NC	- North Corridor	SCER	- South Corridor Evaluation Report
SC	- South Corridor	ASDEIS	- Amendment to the South Corridor Supplemental Draft Environmental Impact Statement

A. 1980 – 1993: Early South/North Corridor Planning Studies

System Planning Studies. Since the mid-1980s, there have been a series of major transportation analyses and actions taken that implemented the region's basic policy shift away from constructing radial freeways and toward a greater emphasis on meeting travel demand through improvements in public transportation, including: the 1982 *Regional Transportation Plan* (RTP); and a system-level Phase I study of regional transitways between 1984 and 1986 that recommended more detailed Phase II studies of the South Corridor.

Preliminary Alternatives Analysis. Both Milwaukie and I-205 high capacity transit (HCT) alternatives were evaluated during the Preliminary Alternatives Analyses (Pre-AAs), which were used to select a priority corridor after the Westside Light Rail Project, and which separately evaluated the North and South corridors. In the Milwaukie Corridor, which is part of the South Corridor, the Pre-AAs evaluated a light rail alignment that would connect downtown Portland with Milwaukie, the Clackamas Regional Center and Oregon City. In the I-205 Corridor (which is also a part of the South Corridor), an alignment was evaluated that would connect the Oregon City, the Clackamas and Gateway regional centers, continuing into downtown Portland via the existing Blue Line alignment. In 1993, the Metro Council selected the Milwaukie Corridor as the priority corridor in the south.

B. 1993 – 1998: South/North Corridor Major Investment Study (MIS) and DEIS

The South/North MIS/DEIS phase of project development was initiated in 1993 and concluded with the publication of the South/North DEIS in 1998. The phase included three primary activities:

Scoping. In 1993, the South/North Project's Federal *Scoping Process* was undertaken to identify the range of mode and alignment alternatives to be studied further within the project's two-tiered narrowing process. The Scoping Process itself included a narrowing process that identified the range of alternatives to be studied further within Tier I.

Tier I Activities. Tier I, which culminated with the Metro Council and FTA's approval of the *South/North Major Investment Study* (Metro: November 1995) narrowed the range of alternatives and options to be studied further in the Tier II South/North DEIS.

Tier II South/North Draft Environmental Impact Statement. Work on the South/North DEIS was initiated in January 1996. Work on preparing the DEIS was delayed due to a cost-cutting process that was initiated in November 1996 that was intended to further refine the range of alternatives and options under study. Based on the revised set of alternatives and options, the South/North DEIS was published in February 1998. Based on the DEIS and public comments, the Metro Council selected the LPA and adopted the project's LPA Report in July 1998.

C. 1998: Project Capital Funding Vote and Reassessment

In November 1998 after the voters of the region did not re-approve the primary local match for the South/North Project LPA the region was required to reassess the project. Following the defeat of the (previously approved) local funding measure, a series of "listening posts" were held where elected officials in the region solicited comments and input from citizens regarding how the region should proceed with transit solutions in the South and North Corridors. In response to the community input at these "listening posts" the Joint Policy Committee on Transportation (JPACT) and the Metro Council initiated two processes: a redesigned Interstate Avenue light rail alignment was developed and proposed for the North Corridor; and the evaluation of additional non-light rail options for the South Corridor.

D. 1999: North Corridor Project Development

The following project development activities supplemented the South/North DEIS and resulted in a Full Funding Grant Agreement (FFGA) with FTA and construction of the Interstate MAX line :

North Corridor SDEIS. Shortly after the November 1998 ballot measure was defeated, local business and community leaders proposed a new modified, lower cost full Interstate Avenue light rail alignment. An SDEIS was subsequently prepared for the new alignment (now in operation and known as the Yellow Line or the Interstate MAX line). In June 1999, the Metro Council amended the South/North LPA to include the Full Interstate Alternative as the preferred alternative within the North Corridor and to define the first construction segment of the South/North Project as the segment between the Rose Quarter and the Expo Center.

North Corridor Interstate MAX Light Rail Project FEIS. Metro, TriMet and FTA published the North Corridor SDEIS in April 1999, and the North Corridor FEIS in October 1999. After the region selected the Interstate MAX Alignment as the LPA, FTA issued the Record Of Decision (ROD) for the project in January 2000. Construction of the Yellow Line was completed and began revenue operation in May 2004.

E. 1999 – Present: South Corridor Project Development

The following activities focused on the South Corridor, supplemented the South/North DEIS and resulted in the publication of the South Corridor FEIS:

South Corridor Transportation Alternatives Study. In April 1999, also in response to the defeat of the South/North Corridor regional funding ballot measure, Metro's Joint Policy Advisory Committee on Transportation (JPACT) directed Metro staff to develop a study work program for the South Corridor that would lead to the evaluation of and advancement of non-light rail options to address the transportation problems in the corridor. The first step of the South Corridor Transportation Alternatives Study included Scoping, which concluded in May 2000, and which identified the array of mode and general alignment alternatives to be studied further.

In October 2000, Metro and the study participants published the *South Corridor Transportation Alternatives Study Evaluation Report*, which documented the study's evaluation and assessment of seven non-light rail transportation modes or approaches that were identified to address the corridor's transportation problems. The following alternatives were evaluated in the report:

- No-Build Alternative;
- Commuter Rail Alternative;
- River Transit Alternative;
- High Occupancy Vehicle (HOV) Lanes Alternative;
- High Occupancy Toll (HOT) Lanes Alternative;
- Bus Rapid Transit; and
- Busway Alternative

In November 2000, after considering the study's findings and public comments, the study's Policy Group narrowed the range of alternatives to be studied further in the South Corridor SDEIS to: the No-Build Alternative; the Bus Rapid Transit (BRT) Alternative; and the Busway Alternative. Subsequently, the Policy Group heard substantial additional public comment requesting the addition of light rail alternatives and in response the Policy Group added the following alternatives to the SDEIS: the Milwaukie Light Rail Alternative; I-205 Light Rail Alternative; and Combined (Milwaukie and I-205) Light Rail Alternative.

South Corridor SDEIS. In February 2002, FTA and FHWA issued a scoping notice in the *Federal Register*, announcing their intent to work with Metro and TriMet to prepare an SDEIS based on this range of alternatives (No-Build, BRT, Busway, Milwaukie LRT, I-205 LRT and Combined LRT alternatives) and a range of options for each alternative. The South Corridor SDEIS was published in December 2002 and was used to inform the public and local decision makers in their selection of the LPA by providing a summary of the significant benefits, costs, impacts and trade-offs associated with the alternatives and options under study.

South Corridor LPA. In April 2003, after publication of the South Corridor SDEIS, receipt and consideration of public, agency and jurisdictional comments, and recommendations from the Project Steering Committee and local jurisdictions, the Metro Council adopted a 2-Phased LPA approach for the South Corridor as follows:

- Phase 1 – I-205 Light Rail would extend light rail along I-205 from the existing Gateway Transit Center located in the Gateway Regional Center to the Clackamas Town Center Transit Center located in the Clackamas Regional Center, and would include the preliminary selection of light rail on the Portland Mall in downtown Portland; and
- Phase 2 – Milwaukie Light Rail would extend light rail from the south end of downtown Portland near PSU to the Milwaukie Town Center, generally parallel to SE McLoughlin Boulevard.

There were two main reasons for adopting the 2-Phased approach in the South Corridor. First, even though the region wanted to pursue both phases, financial constraints and realities would only allow the region to proceed with one at a time. Also, The Milwaukie Project (Phase 2) still had several outstanding alignment and design issues to be resolved (i.e. Milwaukie transit center location, park-and-ride size and location, terminus location in downtown Milwaukie and Lincoln Street connector on the south end of downtown Portland). Resolution of these issues could occur while the Phase 1 LPA proceeded toward construction. Each Phase would have independent utility because each Phase would connect different activity centers to the Central City and is not dependent upon the other Phase for its success.

Downtown Amendment to the South Corridor SDEIS (ASDEIS). Published in October 2003, the ASDEIS was prepared to reevaluate the downtown Portland Mall light rail alignment, which was evaluated in the South/North SDEIS but which was not evaluated within the South Corridor SDEIS. The ASDEIS was prepared to update the information on the alternative since publication of the South/North DEIS.

Downtown Portland Mall LPA Amendment. In January 2004, after publication of the ASDEIS, after receipt and consideration of public comment and after receipt and consideration of recommendations from the Mayor's Committee for Portland Mall Revitalization and the South Corridor Steering Committee, the Metro Council reaffirmed the South Corridor LPA selection of the downtown Portland Mall light rail alignment as part of Phase One of the South Corridor Project.

S.3 Purpose and Need for the Proposed Action

This section summarizes the purpose and need for the South Corridor Project. First, a summary of the project's purpose, need and objectives are provided. Second, a more detailed description of the

growth and transportation problems and opportunities is provided. For more detailed information see Chapter One Purpose and Need of the South Corridor I-205/Portland Mall FEIS.

S.3.1 Purpose, Need, Goal and Objectives

The South Corridor Policy Committee defined the Purpose and Need for a major transit investment in the South Corridor as follows.

Purpose (and Goal) of the Project: to implement a major transit program in the South Corridor that maintains livability in the metropolitan region, supports land use goals, optimizes the transportation system, is environmentally sensitive, reflects community values, and is fiscally responsive.

Need for the Project: rapid historic and projected population and employment growth in the South Corridor, creating an unmet demand for increased travel opportunities and transit capacity; high levels of existing traffic congestion and travel delay in the South Corridor and deteriorating travel conditions in the future caused by projected population and employment growth; the need for high-quality transit service in the South Corridor to achieve regional and local land use objectives

Objectives for the Project:

- Provide high quality transit service in the corridor.
- Ensure effective transit system operations in the corridor.
- Maximize the ability of the transit system to accommodate future growth in travel demand in the corridor.
- Minimize traffic congestion and traffic infiltration through neighborhoods in the corridor.
- Promote desired land use patterns and development in the corridor.
- Provide for a fiscally stable and financially efficient transit system.
- Maximize the efficiency and environmental sensitivity of the engineering design of the proposed project.

S.3.2 Growth, Transportation and Land Use Problems and Opportunities

Following is a summary of the growth and transportation problems and the land use opportunities in the South Corridor.

Population and Employment Growth. Over the past twenty-five years, the population of the four-county region grew by approximately 56 percent, from approximately 1.10 million residents in 1975 to 1.79 million residents in 2000. Since 1980, the rate of employment growth in the region has been almost 50 percent greater than the national average, averaging approximately 3.1 percent per year (from 676,400 jobs in 1980 to 1,164,600 jobs in 2000), compared to the average national growth rate per year of 1.9 percent. Clackamas County is a fast-growing part of the region, with the number of households increasing on average by 2.3 percent per year and the number of jobs increasing on average by 3.8 percent per year (from 1980 to 1998). With over 121,400 current jobs in the South Corridor portion of Clackamas County, employment is forecast to reach 200,540 jobs by 2025, an average annual growth rate of 2.2 percent. In addition, in 2003 the Metro Council approved a major expansion of the Oregon portion or the region's urban growth boundary east of Happy Valley in Clackamas County. The South Corridor also includes the Portland Central City, the Central Eastside Industrial District, the Lloyd District, the Rose Quarter and the Gateway Regional Center, which are

all in Multnomah County. Office space in downtown Portland grew by approximately 174 percent from 1980 to 2000, while employment grew by approximately 36 percent. The Portland Central City contains the largest concentration of employment in the region and is expected to see employment grow by over 50 percent by 2025 with the addition of approximately 62,200 new jobs. In summary, population and employment growth in the corridor will create demand for additional transit service, result in deteriorating travel conditions, and create opportunities for high-density, mixed-use activity centers that can be well served by high-capacity transit alternatives.

Traffic Congestion and Vehicle Delay. High levels of population and employment growth in the corridor will continue to cause deteriorating conditions on the corridor's transportation system. Over the next twenty years, vehicle miles traveled (VMT) in the region is forecast to increase by 36.6 percent, leading to almost a tripling in the miles of major roadways in the corridor that are congested (i.e., miles of roads that would have volumes greater than 90 percent of the roadway's capacity – from 76 road miles to 211 miles), which indicates a rapidly-deteriorating level of service in the corridor. For example, I-205 would be just below or over capacity during peak periods for virtually its entire length within the South Corridor by the year 2025.

Transit System Conditions. As a result of increased congestion in the South Corridor, transit operating speeds within the corridor have deteriorated over that past two decades, which, for example, resulted in a five-minute increase in transit travel times between downtown Portland and Oregon City over the past several years. A deterioration in transit travel times means that TriMet must increase service hours and the size of its bus fleet, thereby incurring increased operating costs, simply to maintain a constant level of service. If transportation network improvements are not made in the South Corridor, these conditions will continue to worsen over time. For example, with the Project's No-Build Alternative, transit travel times from downtown Portland to the Milwaukie Town Center and the Clackamas Regional Center would increase by over 50 percent by 2025. In downtown Portland, the Portland Mall and Cross-Mall LRT alignment generally provide buses and light rail vehicles, respectively, with a reliable and exclusive operating environment. However, both the Portland Mall and the Cross Mall alignments have capacity limitations that, if exceeded, could degrade transit speed and reliability. TriMet estimated that with the I-205 Alternative using the Cross Mall alignment (before 2020) more than 30 trains per hour would operate on the Cross Mall alignment, resulting in delays and increased travel times for patrons and increased operating costs for the transit district.

Land Use Policies. Over the past 25 years, there has been a continuous progression of state, regional and local policy decisions and public infrastructure investments aimed at establishing growth in corridors and activity centers that are, or are planned to be supported by high capacity transit. As a result, land use designations, zoning patterns and water, sewer and other infrastructure plans and investments in all jurisdictions have been located and sized on the basis of development forecast in current and planned high capacity transit corridors. In particular, on a regional level, Metro's *Region 2040 Growth Concept* is predicated on implementation of a south/north transit spine to link key activity centers in the corridor. Without a high-capacity transit investment in the corridor, the region's entire growth management strategy could be at risk – and with it, the economic vision, livability and development goals and land use plans for the region may not be realized.

S.4 Alternatives Considered

The purpose of this section is to provide a description of the I-205/Portland Mall Project (Phase 1 of the South Corridor LPA referred to herein as the "Project") and the No-Build Alternative. A more comprehensive description of these two alternatives is in Chapter 2 – Alternatives Considered of the FEIS and in the *Final Definition of Alternatives Report* (Metro: October 2004). A more thorough and detailed description of the alternatives and options that have been previously developed and evaluated are in the South/North DEIS, the South Corridor SDEIS and the Downtown Amendment to the SDEIS (ASDEIS). A summary of the rationale for the selection of the South Corridor LPA is in Section 7.5 of the FEIS, and in more detail in the *South Corridor LPA Report* (April 2003) and the *Downtown Portland Mall Segment LPA Report* (January 2004).

S.4.1 I-205/Portland Mall Project Alternative (Project)

The Project is the first Phase of the larger South Corridor Project, which includes a two-phased plan for light rail and associated improvements for the southern portion of the South/North Corridor (see Section S.1 for more detail on the definition of the corridor). With the Project, light rail capital improvements (e.g., trackway, subsystems, stations, park-and-ride lots, the operation of light rail vehicles, etc.) would be made in the I-205 Segment and in the Portland Mall Segment. Table S.4-1 summarizes various characteristics of the Project and Figure S.4-1 illustrates the full South Corridor Locally Preferred Alternative (including Phase 1 and Phase 2). Phase 2 (Portland to Milwaukie LRT) of the LPA is not addressed in this South Corridor I-205/ Portland Mall FEIS.

I-205 Segment. In the I-205 Segment, the Project improvements would include an approximately 6.5-mile light rail extension and related improvements. The double-tracked light rail line would extend along I-205 from the existing Gateway TC (which is located on the existing MAX Blue and Red Lines) to the Clackamas Town Center TC. At the Gateway TC, the three light rail lines would share common passenger boarding platforms. Within the I-205 Segment there would be eight new light rail stations and five new light rail park-and-ride lots with a combined capacity of 2,066 parking spaces.

Portland Mall Segment. In the Portland Mall Segment, the Project would include an approximately 1.8-mile light rail extension from the west end of the Steel Bridge to a new terminus at SW Jackson Street near Portland State University (see Figure S.4-2). The Portland Mall light rail alignment would operate as a double-tracked line from the Steel Bridge to NW 5th Avenue at NW Irving Street, from that point the light rail line would operate southbound on NW and SW 5th Avenue to SW Jackson Street and northbound on SW and NW 6th Avenue to PSU.

In addition, the I-205/Portland Mall Project would result in the purchase of 30 additional light rail vehicles to meet 2025 demand and the expansion of the Ruby Junction light rail operations and maintenance facility to accommodate those additional vehicles. The Project would include the construction of a new light rail sub-station adjacent to the existing Banfield light rail alignment. Further, the Project would include the same roadway improvements as the No-Build Alternative.

S.4.2 No-Build Alternative

The bus service network, related transit facilities and roadway improvements included in the No-Build Alternative are consistent with the *2004 Regional Transportation Plan* (RTP) 2020 financially

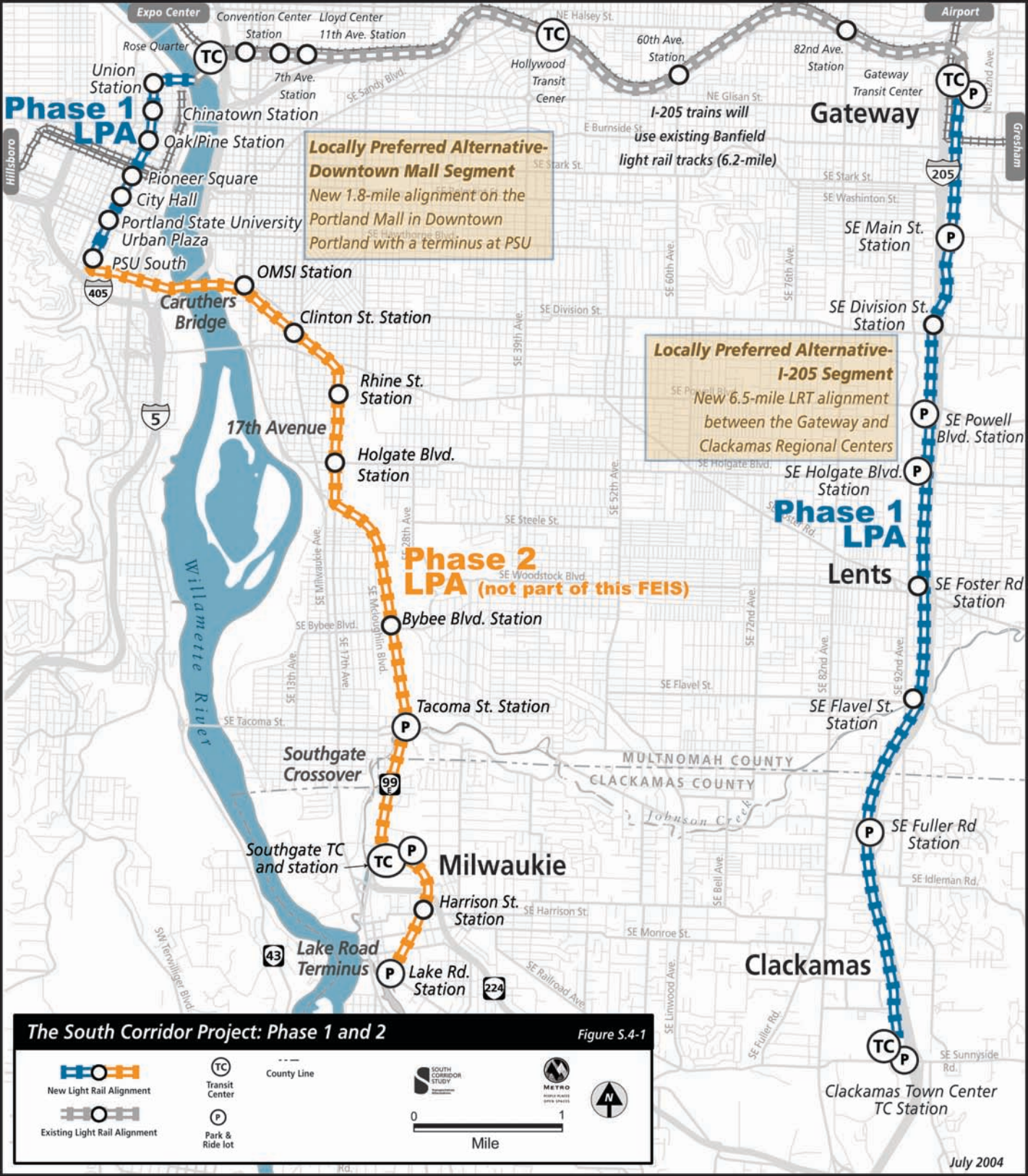

Expo Center
Convention Center Station
Lloyd Center 11th Ave. Station
Rose Quarter
Union Station
Phase 1 LPA
Chinatown Station
Oak/Pine Station
Pioneer Square
City Hall
Portland State University Urban Plaza
PSU South
OMSI Station
Caruthers Bridge
Clinton St. Station
Rhine St. Station
17th Avenue
Holgate Blvd. Station
Phase 2 LPA (not part of this FEIS)
Bybee Blvd. Station
Tacoma St. Station
Southgate Crossover
Southgate TC and station
Milwaukie
Harrison St. Station
Lake Road Terminus
Lake Rd. Station
7th Ave. Station
Hollywood Transit Cener
60th Ave. Station
82nd Ave. Station
Airport
Gateway Transit Center
Gateway
I-205 trains will use existing Banfield light rail tracks (6.2-mile)
Locally Preferred Alternative- Downtown Mall Segment
New 1.8-mile alignment on the Portland Mall in Downtown Portland with a terminus at PSU
Locally Preferred Alternative- I-205 Segment
New 6.5-mile LRT alignment between the Gateway and Clackamas Regional Centers
SE Main St. Station
SE Division St. Station
SE Powell Blvd. Station
SE Holgate Blvd. Station
Lents
SE Foster Rd Station
SE Flavel St. Station
SE Fuller Rd Station
Clackamas
Clackamas Town Center TC Station
Willamette River
Johnson Creek
MULTNOMAH COUNTY
CLACKAMAS COUNTY
Hillsboro
Gresham
The South Corridor Project: Phase 1 and 2
Figure S.4-1
New Light Rail Alignment
Existing Light Rail Alignment
Transit Center
Park & Ride lot
County Line
0
1
Mile
July 2004

Table S.4-1
Summary Characteristics of the I-205/Portland Mall Project and the No-Build Alternative

Characteristic	No-Build	I-205/Mall
New LRT Trackway Miles		
Portland Mall Segment	0	1.8 mile
Gateway to Clackamas Segment	0	6.5 miles
Total	**0**	**8.3 miles**
Number of New LRT Stations		
Portland Mall Segment [1]	0	7
I-205 Segment	0	8
Total	**0**	**15**
Number of P&R Lots / Spaces		
LRT	0 / 0	5 / 2,066
Non-LRT	1 / 300	1 / 300
Total	**1 / 300**	**6 / 2,366**
Transit Vehicles[2] (Corridor / Systemwide)		
Buses	307 / 1,028	300 / 1,027
Light Rail	0 / 117	30 / 147
Weekday Systemwide Transit VMT		
Bus	105,740	105,030
Light Rail	11,910	14,700
Systemwide Revenue Vehicle Hours		
Bus	6,600	6,500
Light Rail	600	750
Capital Costs (millions)[3]	**$0.0**	**$489.13**
Annual O&M Cost (millions)[3]	**$313.64**	**$320.83**

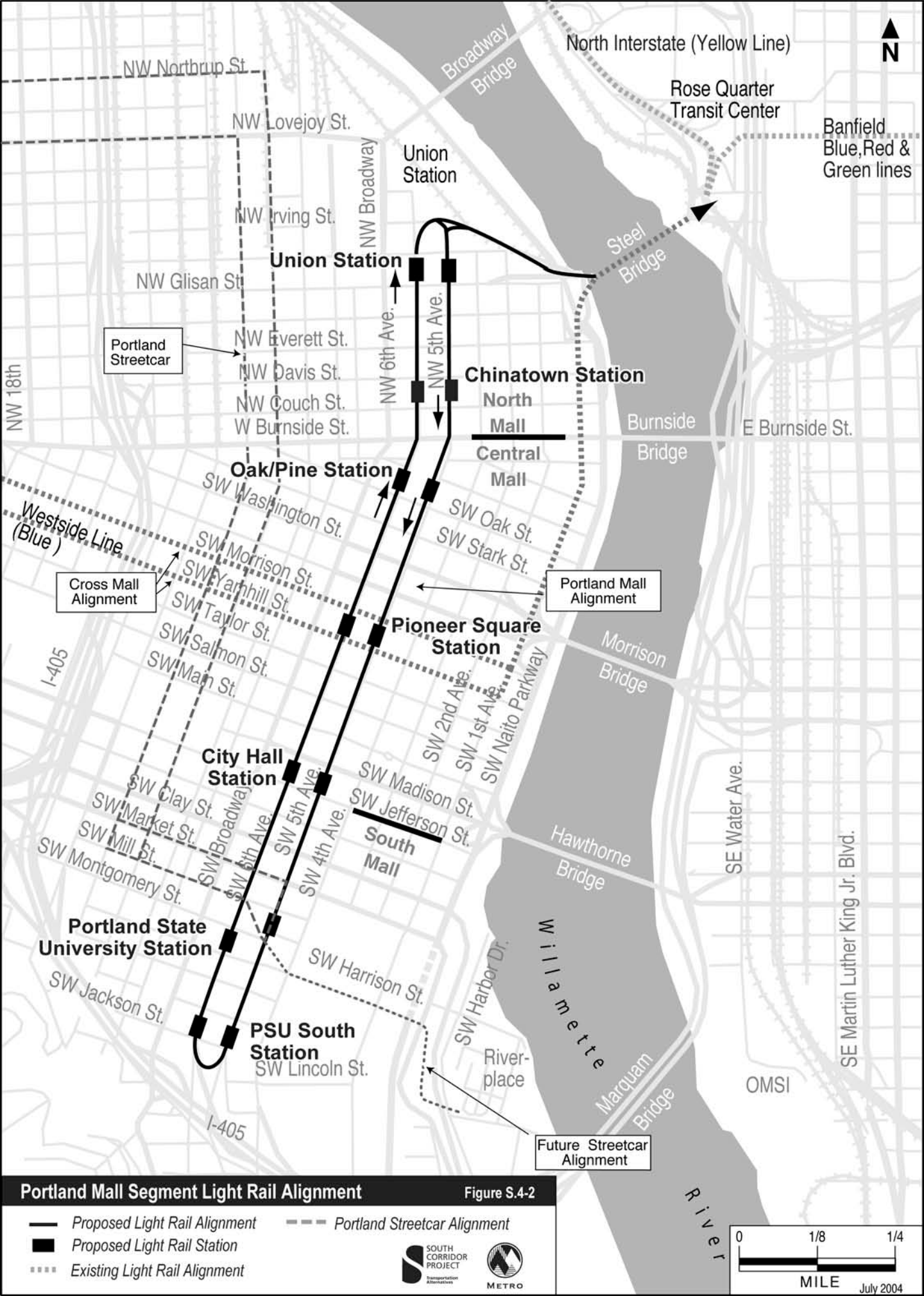
Source: Metro, September 2004.
Note: LRT = light rail transit; P&R = park-and-ride; VMT = vehicle miles traveled; O&M = operations and maintenance. All data is for average weekday 2025.

1 In the Portland Mall Segment, light rail stations are paired between NW and SW 5th and 6th avenues; a paired set of stations near the same cross street on NW and SW 5th and 6th avenues constitutes one station in this table.

2 Includes active and spare vehicles.

3 All costs are in millions expressed in 2004 dollars and are based on 2025 service levels. Capital costs are those in addition to the No-Build Alternative. Capital costs Include interim finance costs – they do not reflect a cost savings of approximately $414,000 due to a slightly-reduced bus fleet for the Project, compared to the No-Build Alternative. See sections 2.3 and 2.4 and Chapter 6 of the FEIS for more detail on how capital and operating costs were calculated.

constrained transit and road network (Metro: adopted December 2003). The No-Build Alternative would include one additional park-and-ride lot within the South Corridor, to be located at the New Hope Church with a total capacity of 300 parking spaces (which would also occur with the I-205/ Portland Mall Project). In addition to the existing interstate, state, regional and local roadway facilities, the No-Build Alternative would include a variety of roadway improvements that are listed in the financially constrained road network of the RTP. The No-Build Alternative would also include an approximately 1.5 percent average annual systemwide transit service increase, which would result in an increase in revenue hours of approximately 50 percent by 2025, compared to service levels in 2000. Under the No-Build Alternative, buses in the South Corridor would continue to operate in mixed traffic on increasingly congested streets and highways and those buses would generally experience increases in their travel time and a deterioration of their schedule reliability into the foreseeable future. TriMet would continue to operate light rail service on three interconnected lines and the cross-mall alignment in downtown Portland and would begin to experience crowded operating conditions, resulting in decreased reliability and decreased average speeds during the peak periods, beginning around 2020.


N
North Interstate (Yellow Line)
Rose Quarter Transit Center
Banfield Blue,Red & Green lines
Broadway Bridge
Steel Bridge
Burnside Bridge
Morrison Bridge
Hawthorne Bridge
Marquam Bridge
NW Northrup St.
NW Lovejoy St.
NW Irving St.
NW Glisan St.
NW Everett St.
NW Davis St.
NW Couch St.
W Burnside St.
NW 18th
NW Broadway
NW 6th Ave.
NW 5th Ave.
Union Station
Union Station
Portland Streetcar
Chinatown Station
North Mall
Central Mall
Oak/Pine Station
E Burnside St.
SW Washington St.
SW Oak St.
SW Stark St.
Westside Line (Blue)
SW Morrison St.
SW Yamhill St.
SW Taylor St.
SW Salmon St.
SW Main St.
Cross Mall Alignment
Portland Mall Alignment
Pioneer Square Station
I-405
SW 2nd Ave.
SW 1st Ave.
SW Naito Parkway
City Hall Station
SW Madison St.
SW Jefferson St.
South Mall
SW Clay St.
SW Market St.
SW Mill St.
SW Broadway
SW 6th Ave.
SW 5th Ave.
SW 4th Ave.
SW Montgomery St.
Portland State University Station
SW Harrison St.
SW Jackson St.
SW Harbor Dr.
Willamette River
PSU South Station
SW Lincoln St.
Riverplace
OMSI
SE Water Ave.
SE Martin Luther King Jr. Blvd.
I-405
Future Streetcar Alignment
Portland Mall Segment Light Rail Alignment
Figure S.4-2
Proposed Light Rail Alignment
Proposed Light Rail Station
Existing Light Rail Alignment
Portland Streetcar Alignment
SOUTH CORRIDOR PROJECT
Transportation Alternatives
METRO
0
1/8
1/4
MILE
July 2004

S.5 Transportation Impacts

This section summarizes the transit, highway and freight impacts of the I-205/Portland Mall Project and the No-Build Alternative. Please refer to Chapter 4 (Transportation) of the FEIS for more detail on the transportation affected environment and environmental impacts.

S.5.1 Transit Impacts

The alternatives would impact transit service and facilities in the corridor by changing: the amount of service; the residential and employee access to fixed-guideway stations; transit travel times; reliability; and ridership.

Amount of Transit Service. The No-Build Alternative would include a number of new bus routes and improved headways on existing routes that would result in a 48 percent increase in transit vehicle miles traveled in the South Corridor by 2025, compared to existing conditions. Transit vehicle hours traveled in the corridor would increase by 50 percent for the same time period. While systemwide 2025 average light rail vehicle miles traveled under the I-205/Portland Mall Project would increase by 7 percent, compared to the No-Build Alternative, systemwide place miles would increase by 35 percent, illustrating how much more efficient light rail operations are for the provision of patron-carrying capacity.

Transit Coverage. The percentage of households and jobs within the South Corridor with quarter-mile access to transit in 2025 would remain unchanged from the No-Build Alternative to the I-205/ Portland Mall Project, demonstrating that the primary reason for increases in transit ridership under the Project would be the result in improved transit travel times, rather than increased transit coverage.

Transit Travel Times. As illustrated in Table S.5-1, weekday transit travel times in the p.m. peak period peak direction in 2025 would improve with the I-205/Portland Mall Project, compared to the No-Build Alternative. In-vehicle transit travel times would be reduced by 4 percent to 41 percent, except for trips taken from PSU to Lents, which would remain unchanged. For example, in-vehicle transit travel times from downtown Portland to Clackamas Town Center would take 38 minutes with the Project, compared to 52 minutes with the No-Build Alternative, a 26.9 percent reduction.

Reliability. The l Project would include the construction of 8.3 miles of additional exclusive or reserved right-of-way for light rail, which would result in almost one fifth of all transit riders in the South Corridor using that reserved right-of-way for all or a portion of their trip. In contrast, the No-Build Alternative would not result in any increase in reserved right-of-way for transit.

Ridership. As a result of the travel time benefits and improved reliability provided by the reserved right-of-way for light rail service, the Project would result in an increase in average South Corridor weekday total transit ridership in 2025; increasing by approximately 5 percent compared to the No-Build Alternative (from 249,560 originating rides with the No-Build Alternative to 262,670 with the I-205/Portland Mall Project). In addition, systemwide light rail ridership (boarding rides) would increase by 27.6 percent on an average weekday in 2025 with the Project (195,310 rides), compared to the No-Build Alternative (153,025 rides).

Table S.5-1
Summary of Transit Impacts

Measures	No-Build	I-205/Mall
Amount of Service		
Corridor Place Miles[1]	2,027,520	2,730,450
Percent of Corridor Households with Transit Access	66%	66%
Percent of Corridor Jobs with Transit Access	79%	79%
Travel Times[2]: In-Vehicle Transit Travel Times from Pioneer Square to:		
Damascas	79	59
Lents	37	31
Clackamas Town Center	52	38
Reliability		
Miles of Reserved or Separated ROW	0	8.3
Percent of Total Corridor Passenger Miles in Separated ROW	0	18%
Transit Ridership: Linked Trips[3]		
South Corridor	249,560	262,670
Systemwide	551,540	568,420
Mode Split by Trip Purpose		
Home-Based Work	38%	41%
Non-Work	24%	25%
Total	**30%**	**32%**
Light Rail Boarding Rides[4]		
Blue Line	107,550	105,625
Yellow Line	15,415	15,200
Red Line	30,060	27,985
Green Line (I-205)	N/A	46,500
Total	**153,025**	**195,310**

Source: Metro August, 2004.
Note: LRT = light rail transit; ROW = right-of-way. All data is average weekday 2025.
[1] Place miles = transit vehicle capacity (seated and standing) for each vehicle type, multiplied by vehicle miles traveled for each vehicle type (see Table 2.2-2).
[2] Average weekday, 2025, in the p.m. peak period in the peak direction.
[3] A linked trip is defined as a one-way trip from an origin (e.g., one's home) to a destination (e.g., one's place of work), independent of whether the trip would require a transfer or not.
[4] A boarding ride (i.e., unlinked) is defined as when a passenger boards a transit vehicle, independent of whether or not the boarding would be the result of a transfer from another transit vehicle.

S.5.2 Traffic Impacts

This section describes the regional and local traffic impacts that would result from the I-205/Portland Mall Project and the No-Build Alternative.

Regional Traffic Impacts are assessed through several regional congestion measures, including: vehicle miles traveled; vehicle hours traveled and vehicle hours of delay; vehicle volumes at two congestion cutlines (which are imaginary geographical lines that capture traffic flows on a set of parallel roadways); and parking spaces that would be removed. Those measures are summarized in Table S.5-2.

- **Regional Congestion Measures.** In 2025, the I-205/Portland Mall Project would reduce average regional weekday vehicle miles of congestion by approximately 125,000 miles, compared to the No-Build Alternative, a 0.4 percent reduction. Similarly, regional weekday vehicle hours traveled would also be reduced by approximately 0.4 percent, a reduction of 5,000 hours per day. More significantly, regional vehicle hours of delay in 2025 would be reduced by approximately 1.1 percent (or 570 hours).

- **Cutline Vehicle Volumes.** Vehicles crossing imaginary cutlines in the South Corridor would be reduced by up to 1.3 percent as a result of automobile users under the No-Build Alternatives that would shift to transit use under the I-205/Portland Mall Project.

- **Parking Spaces Removed.** The I-205/Portland Mall Project would result in the removal of 149 on-street parking spaces and 346 off-street parking spaces, compared to the removal of no parking spaces under the No-Build Alternative.

Table S.5-2
Summary of Traffic Impacts

Measures	No-Build	I-205/Mall
Measures of Regional Travel		
Vehicle Miles of Travel	35,645,000	35,520,000
Vehicle Hours of Travel	1,411,000	1,406,000
Vehicle Hours of Delay	51,820	51,250
Vehicle Volumes at Select Cutlines		
Willamette River Bridges (Fremont through Ross Island)	55,290	54,720
I-84 plus east/west streets at NE/SE 82nd Avenue (I-84 through SE Foster Road)	30,250	29,860
East/west streets at SE 82nd Avenue (SE Flavel St. through SE Sunnybrook St.)	13,000	13,000
I-205 plus north/south streets at SE Holgate Blvd. (SE 82nd through SE 112th avenues	17,350	17,130
Parking Spaces Removed (on/off street)		
Portland Mall Segment	0 / 0	119 / 64
I-205 Segment	0 / 0	30 / 282
Total	**0 / 0**	**149 / 346**

Source: Metro; August, 2004.
Note: LRT = light rail transit; ROW = right-of-way. Unless otherwise noted, all data is average weekday 2025.

Local Traffic Impacts are measured in terms of level of service (LOS), volume-to-capacity changes or long queue lengths that would occur at intersections or on key roadway segments. These impacts could be the result of: changes in traffic volumes related to the provision of light rail service (particularly the access and egress of vehicles from park-and-ride lots); transit vehicle priority treatments at intersections; and/or modifications to existing roadways that could reduce roadway capacity or at-grade street crossings by light rail.

The majority of the area within the Corridor would have no negative traffic impacts from the Project. The local traffic impacts that would result from the Project would be mitigated through a range of identified mitigation measures.

S.6 Environmental Consequences

This section summarizes the environmental impacts that would occur with the No-Build and Project.

S.6.1 Land Use and Economic Impacts

Compared to the No-Build Alternative, the I-205/Portland Mall Project would have a greater likelihood of positively impacting regional and land use goals and objectives by providing a fifth spoke in the region's light rail system, which would provide higher-capacity and higher-quality transit connections between the adopted Region 2040 Growth Concept activity centers in the South

Corridor. Short-term economic benefits of the Project would include the creation of approximately 7,580 construction-related jobs and $260.7 million in construction-related personal income. Longer-term economic benefits would include increased transit oriented development around stations that would contribute to tax bases.

S.6.2 Community Impacts

Community impacts are defined as impacts to neighborhood character, cohesion and livability that could result from traffic, access, noise, vibration, displacements and visual impacts resulting from the alternatives. The Project would result in benefits to adjacent neighborhoods by improving transit access into and out of those neighborhoods. As summarized in Table S.6-1, the No-Build Alternative would result in no displacements and the I-205/Portland Mall Project would result in 33 residential displacements, three business displacements and one institutional displacement.

S.6.3 Visual Impacts

Impacts to the visual environment are defined as changes to the existing conditions that would be brought about by the propose improvements. Visual impacts are identified by assessing viewer sensitivity, level of change (from existing conditions) and level of impact. The No-Build Alternative would have no impact to the visual environment of the South Corridor. The I-205/Portland Mall Project would have low to medium visual impacts in the I-205 Segment. The most significant visual impact of the Project would be a "high" level of visual impact to the central portion of the Portland Mall, due to viewer sensitivity and the visual change (e.g., potential removal and replacement of several mature trees along the Portland Mall).

S.6.4 Air Quality Impacts

In 1997, the Environmental Protection Agency (EPA) approved the carbon monoxide (CO) and ozone Air Quality Maintenance Plan (AQMP) for the Portland/Vancouver region. In January 2001, the US Department of Transportation issued its determination of conformity for the Financially Constrained System of the 2003 Regional Transportation Plan (RTP), finding that the RTP supports the purpose of the region's State Implementation Plan (SIP). Consistency with the AQMP requires that CO and ozone levels be kept within Federal and state standards. The effects of the Project on CO, VOC and NO_x, compared to the No-Build Alternative, are summarized in Table S.6-1. Federal and state air quality standards would be met under both of the alternatives. Both of the alternatives would result in reductions in carbon monoxide, nitrogen oxides and volatile organic compounds in 2025, compared to today based on expected improvements in emissions cleaning technologies; however the I-205/Portland Mall Project would result in the greater reduction in each pollutant type.

S.6.5 Noise and Vibration Impacts

Table S.6-1 summarizes the number of significant noise and vibration impacts (significant impacts are those noise and vibration impacts that would exceed Federally-adopted standards – i.e., "severe" or "moderate") that would occur under each alternative with identified mitigation measures. Section 3.5 of this FEIS provides a detailed description of the methodology and Federal standards used to determine the number of impacts and a more detailed breakdown of what kind of impacts would occur, where they would occur and how they could be mitigated. There would be no noise or

vibration impacts associated with the No-Build Alternative. The Project would result in 33 "moderate" noise-related impacts after implementation of the identified mitigation measures.

Table S.6-1
Summary of Environmental Impacts, by Alternative

Measures	No-Build	I-205/Mall
Land Use and Economic[1]:		
Annual Operations-Related Employment	2,522	2,584
Construction-Related Employment	0	7,580
Construction-Related Personal Income	0	$260,656,440
Displacements (Residential / Business / Institutional or Public):		
Portland Mall Segment	0 / 0 / 0	3 / 2 / 1
I-205 Segment	0 / 0 / 0	30 / 1 / 0
Total	**0 / 0 / 0**	**33 / 3 / 1**
Regional Air Quality[2]:		
Carbon Monoxide	131,072	130,613
Nitrogen Oxides	4,061	4,064
Volatile Organic Compounds	4,289	4,274
Noise and Vibration[3]:		
Noise Impacts	0	33
Vibration Impacts	0	0
Ecosystems:		
Acres of Wetland Filled / Spanned	0.00 / 0.00	0.01 / 0.00
Acres of Waterway Filled / Spanned	0.00 / 0.00	0.09 / 0.17
Acres of Vegetation Displaced	0.00	27.50
Linear Feet of Stream Impacted / TES Bearing	0.00 / 0.00	87.50 / 55.20
TES Wildlife and Plants	No Impact	No Impact
Water Quality/Hydrology:		
Additional Impervious Acres	0.0	16.3
Impervious Surface to be Treated (new and existing)	0.0	21.2
Percent of New Impervious Area to be Treated	0	130%
Cubic Yards Fill In Flood Plain	0	411
Energy:		
Regional Daily Vehicle (billion BTU)	328.993	327.967
Construction (billion BTU)	0	2,944.80
Hazardous Materials Sites Displaced (CERCLIS / ECSI[4]):		
Portland Mall Segment	0 / 0	0 / 2
I-205 Segment	0 / 0	0 / 2
Operations and Maintenance Facility	0 / 0	0 / 4
Total	0 / 0	0 / 8

Source: Metro, July 2004.

Note: LRT = light rail transit; ROW = right-of-way; TES = threatened and endangered species; BTU = British thermal units.

1 Short-term economic impacts would be the result of construction-related activities within the Portland metropolitan area, expressed in person-year jobs. Long-term impacts would be the result of the on-going operation of the transit facility and additional transit vehicles (based on 2025 service levels) and would be expressed in full-time equivalent jobs.

2 All emission reductions are measured for the Portland metropolitan region in tons per average weekday in 2025.

3 The noise impacts identified within this table reflect forecast noise levels with identified mitigation measures. Identification of impacts is based on "significant" and "moderate" noise impacts as defined by the FHWA and FTA criteria. All of the 33 noise impacts remaining after the identified mitigation would be "moderate." See Section 3.5 of this FEIS for more information.

4 CERCLIS = Comprehensive Environmental Response, Compensation and Liability Information System, which tracks Federal superfund sites; ECSI = Environmental Clean-up Site Inventory, which is the state of Oregon's equivalent of the Federal CERCLIS list. The sites on these lists generally have multiple containments or contaminated media (e.g., soil, groundwater, etc.) and would generally present the greatest risk of construction delay and/or increased cost to the project.

S.6.6 Ecosystems Impacts

The No-Build Alternative would result in no impacts to the South Corridor's ecosystems. In general, most of the potential impacts of the Project to ecosystems would be avoided through the current conceptual design and the remaining impacts would be relatively small for potential projects of this scale. Table S.6-1 summarizes the remaining impacts on wetlands. Only approximately 0.01 acres of wetland would be filled under the Project. Approximately 87.5 linear feet of stream (55.20 feet of stream with threatened or endangered species) would be impacted by the Project and there would be no impact to any threatened or endangered species. A Biological Assessment was prepared and submitted to NOAA Fisheries. A subsequent Biological Opinion (BO) was issued in July 2004 and concluded "that the proposed Project is not likely to jeopardize the continued existence of ESA-listed (fish species)…" A copy of the BO is included in Appendix B of the FEIS.

S.6.7 Water Quality and Hydrology Impacts

The No-Build Alternative would result in no water quality or hydrology impacts. In general, the design of the Project would avoid most of the potential impacts to water quality and hydrology. In summary, the Project would result in an additional 16.3 acres of additional impervious surface in the South Corridor – 21.2 acres of new and existing impervious surface in the corridor would be treated during construction of the Project. In addition, the Project would require the addition of approximately 411 cubic yards of fill in flood plains located in the vicinity of the Project.

S.6.8 Energy Impacts

The impacts to energy are divided into construction-related and operations-related impacts. Construction of the Project would require the use of approximately 2,944.8 billion British thermal units (BTU), while annual operational energy savings with the Project would be approximately 394.5 billion BTU per year, compared to the No-Build Alternative.

S.6.9 Geology, Soils and Seismic Impacts

There would be no significant geologic, soils or seismic impacts with the No-Build Alternative and the Project would have only minor impact within the Portland Mall Segment. In the I-205 Segment the geologic, soils or seismic impacts of the Project would be more significant because it would involve more earthwork. Impacts related to construction would be limited to stability of partially constructed slopes, temporary changes to drainage and erosion and resulting sedimentation.

S.6.10 Hazardous Materials Impacts

Hazardous waste sites and facilities on or near the proposed Project would pose a low-level risk of adverse impacts to human health and the environment. However, such sites could result in construction delays and/or increased costs to the project and could be subject to complex regulatory and permitting requirements. There are six classifications of hazardous materials sites and facilities. Of these, the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) tracks Federal superfund sites. Environmental Clean-up Site Inventory (ECSI) is the state of Oregon's equivalent of the Federal CERCLIS list. The sites on these lists generally have multiple containments or contaminated media (e.g., soil, groundwater, etc.) and would generally present the greatest risk of construction delay and/or increased cost to the project. The number of

CERCLIS and ECSI sites that would be in close proximity of construction activity for the Project is summarized in Table S.6-1. There would be no CERCLIS or ESCI sites affected by the No-Build Alternative, compared to no CERCLIS and eight ESCI sites within close proximity to construction of the Project.

S.7 Historic and Parklands Impacts

There are 62 individual historic resources and two potential archaeological sites within the I-205/ Portland Mall Project's area of potential effect. There are also four public parkland resources located within approximately 150 feet of the proposed Project. The Project has been designed to avoid or minimize impacts to these and any other historic and parkland resources (see Chapter Five – Historic and Parkland Resources of the FEIS for more detail).

The No-Build Alternative would have no adverse impacts on historic resources, nor would it require the "use" of any parkland resources (see Table S.7-1). The I-205/Portland Mall Project would not have any adverse impacts on historic or archaeological resources, however, the Project would "use" a portion of one public recreation facility (the Springwater Trail) and four historic resources (the Orren Battin house, the Firehouse, the Signal Tower, and Union Station/the Steam Plant). The project has demonstrated and documented that: 1) all possible effort has been made to avoid and minimize adverse impacts to the resource; 2) where adverse impacts to the resource would occur with the I-205/Portland Mall Project, the project has demonstrated that there is no prudent nor feasible alternative that would avoid those impacts; and 3) all possible planning has occurred to mitigate the remaining adverse impacts to that parkland resource.

Table S.7-1
Section 4(f) Resources Where a "Use" is Required
No-Build Alternative and I-205/Portland Mall Project

Segment	Public Parklands and Recreation Areas[1]	Historic Resources[2]	Known Archaeological Sites[3]	Total
No-Build Alternative	0	0	0	**0**
I-205/Portland Mall Project				
Portland Mall Segment	0	4	0	**4**
I-205 Segment	1	1	0	**2**
Maintenance Facility Expansion	0	0	0	**0**
Total	**1**	**5**	**0**	**6**

Source: Metro, April 2004 and S*outh/North Corridor Project Parklands, Recreation Areas, Wildlife and Waterfowl Refuges (Section 4(f)) Results Report* (Metro, February 1998).

[1] Public parklands and recreation areas that are Section 4(f) resources.

[2] Historic resources where a portion of the site would be used by one or more of the alternatives.

[3] Potential Archaeological Sites include identified sites that have a high probability of finding significant archaeological resources.

S.8 Financial Evaluation

This section summarizes the I-205/Portland Mall Project's financial feasibility analysis and funding plan, providing information to assess the fiscal feasibility of building and operating the I-205/ Portland Mall Project.

S.8.1 Financial Feasibility Analysis

This section provides an assessment of the financial feasibility of the alternatives, given the costs of the alternatives and given the current, anticipated and potential sources of revenue. The Project's capital elements and costs have been divided into two distinct categories: 1) the opening year project

would be all project elements that would be purchased and constructed with an initial Federal FFGA that would allow for completion and operation of the project in September 2009; and 2) the 2010 to 2025 project elements, which would include the remaining purchases and construction (i.e., additional light rail vehicles and additional maintenance facility capacity, respectively) that would allow for operations to meet demand in 2025. The financial feasibility analysis for the I-205/Portland Mall Project has been divided into the two following elements, because each element would have a different financing plan.

A. The Project Capital Financial Feasibility Analysis focuses on whether there are adequate project capital resources currently available to construct the opening year I-205/Portland Mall Project and, if not, identification of the options for resolving the project capital need for additional resources. Project capital costs accounted for in the project capital financial feasibility analysis are only those capital costs that would be associated with the implementation of the opening year Project (2010 to 2025 Project costs are accounted for in the system fiscal feasibility analysis).

B. The System Fiscal Feasibility Analysis focuses on whether there are adequate resources to operate and maintain the entire transit system, including operations of the Project alternatives, between now and opening year (2009) and to the year 2025, and, if not, identifying the options for resolving the system financial need. System costs include all transit operation and maintenance (O&M) costs and all transit capital expenditures (including 2010 to 2025 Project costs) to the year 2025, except for the capital costs of the Project accounted for in the Project Capital Financial Feasibility Analysis.

S.8.1.1 Costs

This section summarizes the project capital costs and changes to the system costs that would occur with each of the alternatives.

A. Project Capital Costs

Table S.8-1 presents the project capital costs for the No-Build Alternative and the I-205/Portland Mall Project, in year-of-expenditure (YOE) dollars (the YOE dollar costs are based on the 2004 dollar capital costs summarized in Table S.4-1, but YOE dollar costs also account for inflation from 2004 to the time of construction). The project capital costs would include all facility improvements, vehicle purchases and interim finance costs required by the I-205/Portland Mall Project, in excess of

Table S.8-1
Summary of Project Capital and Operating Costs,
(in millions of dollars)

	No-Build	I-205/Mall
Annual Capital Costs – YOE$[2]		
Opening Year	0	$493.71
2010 to 2025	0	$38.53
Total	**0**	**$532.24**
Annual O& M Costs – 2025 Service Levels in 2004$	**$313.64**	**$320.83**
Cumulative System Costs (FY 2005-2025 – YOE$)		
System Operating Costs	$11,259.8	$11,692.2
System Capital Costs	$ 636.4	$636.4
Total	**$11,896.2**	**$12,328.6**

Source: TriMet; August, 2004.
Note: LRT = light rail transit; YOE = year-of-expenditure; O&M = operating and maintenance.

the capital costs that are currently committed and included within the No-Build Alternative. The table also differentiates between the opening year and the 2010 to 2025 project costs. The opening year capital costs for the I-205/Portland Mall Project would be $493.71 million, with an additional $38.53 million required for the 2010 to 2025 capital improvements, resulting in a total 2025 project cost of $532.24 million (YOE$).

B. System Costs

System costs include all capital and O&M expenditures by TriMet over the 20-year planning period, except the capital costs for the opening year Project. Total system cost is the aggregate of system operating costs and system capital costs. System operating costs include all annual transit operating and maintenance costs, including the cost of operating and maintaining: 1) the existing transit system; 2) customary increases in transit service hours throughout the system that are required to maintain headways and capacity; and 3) the I-205/Portland Mall Project. Table S.8-1 summarizes the cumulative system operating costs (shown in YOE dollars) covering the 20-year planning period for the No-Build Alternative ($11,896.2 million) and the I-205/Portland Mall Project ($12,328.6 million). The increased system costs of the Project compared to the No-Build Alternative would be due to the increased expenditures needed to operate the expanded light rail system, which could exceed the reduction in bus operating expenditures. Table S.8-1 also summarizes the system capital costs from 2005 to 2025 in YOE dollars. System capital costs included all transit capital costs, except for the opening year capital costs, and included the 2010 to 2025 Capitals Costs.

S.8.1.2 Currently Available Revenues

Two categories of available revenue resources are examined within this section: revenue resources reserved for the I-205/Portland Mall Project capital costs; and revenue resources reserved for transit system costs.

S.8.1.2.1 Currently-Available Transit Project Capital Revenues

Table S.8-2 summarizes the capital project revenue currently available for the I-205/Portland Mall Project, which would be applied to the proposed FFGA for the opening year project. Local committed funds currently total $173.48 million

Table S.8-2
Currently-Committed I-205/Portland Mall
Local Capital Revenues (YOE dollars)

Local – Committed (Non-New Starts)	Amount
Clackamas County	35,333,000
City of Portland	21,333,000
Portland Development Commission	20,000,000
TriMet	25,333,000
Metro MTIP-STP	48,481,000
Federal/ODOT-STP	23,000,000
Total	**173,480,000**

Source: TriMet; August 2004.
Note: YOE = year of expenditure; MTIP = Metropolitan Transportation Improvement Program; ODOT = Oregon Department of Transportation; STP = Surface Transportation Program.

S.8.1.2.2 Available Transit System Revenues

System revenues are derived from a series of sources. As shown in Table S.8-3, existing transit system revenue sources are projected to provide $12.456 billion (YOE dollars) for the No-Build Alternative and $12.715 billion for the I-205/Portland Mall Project between FY 2005 and FY 2025. The difference in revenue between the alternatives reflects differences in passenger revenues and interest earnings. Available transit system revenues exist to meet the system costs of the No-Build Alternative ($11,896.2 billion) and the I-205/Portland Mall Project ($12,328.6 billion) (see Table S.8-1 for a build up of system costs).

Table S.8-3
Summary of Currently-Available Transit System Revenues
FY05-FY25 Cumulative Total (in Billions of YOE Dollars)

	No Build	I-205/Mall
System O&M Revenues		
Passenger Revenues	$2.428	$2.632
Employer/Municipal	$7.606	$7.607
Payroll Tax		
Self-Employment Tax	$0.290	$.290
State In-Lieu	$0.061	$0.061
Grants/Capital	$1.185	$1.285
Reimbursement		
ATP	$0.093	$0.093
Interest	$0.209	$.164
Other	$0.484	$0.484
Subtotal[1]	**$12.358**	**$12.617**
System Capital Revenues		
Grants: State or Federal[2]	$0.098	$0.098
Total System Revenues	**$12.456**	**$12.715**

Source: TriMet, July 2004.
Note: FY = fiscal year; YOE = year-of-expenditure; LRT = light rail transit; O&M = Operations and Maintenance.
[1] System operations revenues not needed for operating costs would be available for system capital costs.
[2] General funds revenues that would be transferred to the capital fund are shown in the system operations subtotal.

S.8.1.3 Existing Revenue Needs

This section summarizes the project capital and system revenue needs for the I-205/Mall Project.

A. Existing Project Capital Revenue Need

Table S.8-4 summarizes the opening year Project revenue shortfall of $320.24 based on the estimated YOE project costs (Table S.8-1) and committed local funding (Table S.8-2). There is no revenue shortfall for the 2010 Project. Sections S.8.1.4 and S.8.1.5 summarize how the opening year capital revenue shortfall will be addressed.

Table S.8-4
Summary of Additional Needed Revenue for the Project Capital Costs
Opening Year and 2010 to 2025 Costs (in Millions of YOE Dollars)

	Opening Year LRT Capital Cost	2010 to 2025 LRT Capital Cost	Total LRT Capital Cost
Project Capital Cost	$493.7	$38.5	$532.24
Available Capital Revenues	$173.5	$38.5	$212.0
Additional Project Capital Needed[2]	**$320.2**	**$0**	**$320.24**

Source: TriMet, July 2004.
Note: YOE = year-of-expenditure; LRT = light rail transit.
[1] Based on system revenues available; however, TriMet will seek New Starts funds for these costs.
[2] Based on federal share from footnote 1 above.

B. Existing System Revenue Need

There is no projected system revenue shortfall, because projected system revenues (Table S.8-3) exceed projected system costs (Table S.8-1), for both the No-Build Alternative and the I-205/ Portland Mall Project.

S.8.1.4 Proposed Additional Revenues

This section identifies the potential capital revenue sources that could be used to meet the opening year Project's identified revenue needs.

A. Additional Project Capital Revenue Sources

There are two primary revenue sources that could be used to fund the $320.24 million opening year project capital shortfall (see Table S.8-4): Section 5309 New Starts funds; and local funds.

- **Section 5309 New Starts Funds.** FTA Section 5309 New Starts grants are discretionary Federal funds available for new fixed-guideway transit systems and extensions to existing fixed-guideway systems. Currently, up to 80 percent of New Starts project costs can qualify for New Starts funding, however Congress and FTA may consider reducing the maximum New Starts share to 50 percent or 60 percent. Based on the project's proposed 60 percent Federal funding share, TriMet will seek a FFGA based on a New Starts share of $296,220,000. An additional $23.18 million in Section 5309 New Starts funds would be sought at a later date for the 2010 to 2025 Project costs.

- **Other Local and Regional Funds**. The City of Portland anticipates contributing an additional $24.0 million (for a total of $45.333 million) from proceeds of a local improvement district to pay for a portion of the opening year project costs. This contribution, when combined with the proposed Federal New Starts share of $296.22 million and available system revenues from TriMet, would provide adequate funds for the opening year project costs and for the 2010 to 2025 Project costs.

B. Potential System Revenue Sources

No additional system revenue is required for the I-205/Portland Mall Project.

S.8.1.5 System Fiscal Feasibility Conclusions and Risk Assessment

This section summarizes the conclusion of the fiscal feasibility analysis for project capital and systemwide funding needs.

A. Project Capital Funding

A summary of the opening year, 2010 to 2025 and total light rail capital funding plans is shown in Table S.8-5. The only non-Section 5309 capital funds remaining to be committed are the additional $24.0 million of the City of Portland LID funds. For the proposed opening year Project FFGA, $296.20 million in Section 5309 New Starts Funds would be required and $23.20 million in New Starts funds would be needed at a later date for the 2010 to 2025 Project costs.

Table S.8-5
Project Capital Finance Plan: Summary
(in Millions of YOE Dollars)

Opening Year LRT Capital Cost		
Cost in $YOE		**$493.7**
Revenues		
P	Section 5309 New Starts Funds	$296.20
C	Metro MTIP Funds	$ 48.50
C	Clackamas County Urban Renewal Funds	$ 35.30
C	Portland Funds (non-LID)	$ 21.30
P	Portland LID Funds	$ 24.00
C	PDC Urban Renewal Funds	$ 20.00
C	TriMet Funds	$ 25.30
C	Federal/ODOT STP Funds	$ 23.00
	Total	**$493.70**
2010 to 2025 LRT Capital Costs		
Cost in $YOE		**$ 38.53**
Revenues		
P	Section 5309 New Starts Funds	$ 23.20
C	TriMet Funds[1]	$ 15.41
	Total	**$ 38.53**
Grand Total: Opening Year and 2010 to 2025 Costs		
Cost in $YOE		**$532.24**
Revenues		
P	Section 5309 New Starts Funds	$319.20
C	Metro MTIP Funds	$ 48.50
C	Clackamas County Urban Renewal Funds	$ 35.30
C	Portland Funds (non-LID)	$ 21.30
P	Portland LID Funds	$ 24.00
C	PDC Urban Renewal Funds	$ 20.00
C	TriMet Funds	$ 40.74
C	Federal/ODOT STP Funds	$ 23.00
	Total	**$532.24**

Source: TriMet, August 2004.
Notes: P = funds planned but not yet committed; C = funds currently committed; MTIP = Metropolitan Transportation Improvement Program; STP = Surface Transportation Program; LID = local improvement district. Numbers may not add due to rounding.
[1] Included in system revenues.

Even with a FFGA, a project must have funds appropriated to it on an annual basis to actually receive Section 5309 New Start funds. The appropriation would be subject to budget limits, the demand for appropriations from other projects and other congressional dynamics. The amount of New Starts funds appropriated to a project in a given year may be less than the project would require that year. Thus, the opening year Project capital plan includes an interim-borrowing program to cover these potential Federal funding delays. Further, TriMet has demonstrated through its detailed fiscal analysis that it has the financial mechanisms and capacity in place to manage and fund potential project cost overruns (see Chapter 6 of the FEIS for more detail).

B. System Fiscal Feasibility

Table S.8-4 shows the projected year-by-year beginning working capital results expressed in YOE dollars and months of operations. The fiscal condition of transit system operations is considered adequate if the beginning of year operating reserve (percent of operating expenditures) is maintained at 12 percent. As shown in Table S.8-6, there would be sufficient system revenues to operate the Project, as well as to implement substantial service increases in other portions of the system and still maintain beginning year operating reserves at desired levels.

C. Implementation of the Finance Plan

Implementation of the I-205/Portland Mall Project finance plan depends on successfully obtaining:

- Final approval of the City of Portland LID for $24.0 million;
- FTA and Congressional authority to proceed to construction; and
- A FFGA between TriMet and FTA that provides sufficient Section 5309 New Starts funds to finance opening year costs.

Table S.8-6
Amount of Working Capital in Excess of the 12 Percent Standard by Year During Opening Year Construction Period (Millions of YOE$)

Revenues	FY06	FY07	FY08	FY09	FY10
Amount of Working Capital in Excess of the 12 percent Standard	$6.2	$3.2	$7.2	$18.3	$35.4

Source: TriMet, August 2004.
Note: FY = fiscal year.

S.9 Evaluation of the Alternatives

This section evaluates the alternatives for the South Corridor Project from three different perspectives: evaluation of the alternatives based on a range of criteria and measures to assess the alternatives' ability to meet the project's objectives, which synthesizes key findings of the other chapters of the FEIS; equity considerations; a summary of the major tradeoffs between the alternatives; and a summary of the rationale for the selection of the I-205/Portland Mall Project.

S.9.1 Effectiveness Evaluation

The purpose of this section is to draw upon the wide array of analyses presented in the Executive Summary and the FEIS to assess the effectiveness of the I-205/Portland Mall Project in relationship to the No-Build Alternative. Effectiveness is measured on the basis of an alternative's ability to meet the South Corridor Project's objectives, using a variety of decision-making criteria, each with one or

more quantitative and/or qualitative measures. It is important to note that these criteria are not weighted or ranked in order of importance. Select measures for the evaluation criteria are summarized in Table S.9-1. This information is provided in summary form because most of the project's evaluation criteria are presented elsewhere in this Executive Summary. See Sections 7.1 and 7.2 of the South Corridor FEIS for a detailed evaluation of the alternatives utilizing the project's criteria and measures and for a summary of the significant tradeoffs between the I-205/Portland Mall Project and the No-Build Alternative.

Table S.9.1
Comparison of the No-Build Alternative and I-205/Portland Mall Project Using Evaluation Criteria and Measures

Evaluation Criteria	Selected Evaluation Measures	No-Build	I-205/Mall
Provide High Quality Transit Service	**Transit Travel Time Savings [1] from Pioneer Square to:**		
	Damascas	79	59
	Lents Town Center	37	31
	Clackamas Transit Center	52	38
	Bus/LRT Travel Times on Portland Mall [2]	10.2 / NA	9.2 /7.9
	Annual 2025 Ridership:		
	Systemwide Transit [2]	171,340,760	177,510,720
	Systemwide LRT[3]	50,192,200	64,051,840
Ensure Effective Transit System Operations	**Operating Considerations**	Crowded conditions for LRT operations on the Cross Mall	No difficult operating conditions
Maximize System's Ability to Accommodate Growth	**Corridor Network Expansion Capability**	Crowded conditions for LRT operations on the Cross Mall	Doubling of LRT capacity in downtown Portland
Minimize Neighborhood Traffic Congestion/ Infiltration	Traffic Volumes on/near I-205 across SE Holgate Boulevard [4]	17,350	17,130
	Transit Volumes on/near I-205 across SE Holgate Boulevard [4]	1,390	4,160
Promote Desired Land Use Patterns and Development	**Ability to Serve Corridor Activity Centers**	No new LRT service to activity centers	Provides new LRT service to centers
	Residents within 45 minutes of[5]:		
	Downtown Portland	678,210	692,140
	Lloyd District	641,170	685,050
Fiscally Stable and Financial Efficient Transit System	Capital Costs [6]	$0	$489.13
	Operating Costs [7]	$313.64	$320.83
	Annual Operating Cost Per Originating Ride	$1.83	$1.81
Maximize Engineering Design and Environmental Sensitivity	Displacements [9]	0	37
	Noise Impacts [10] (with mitigation)	0	33
	Vibration Impacts [10]	0	0
	Acres of Impacted Wetland	0.00	0.01
	Acres of Parkland Used	0.0	.011
	Historic Resources Impacted	0	0
	Archaeologically-Sensitive Areas Affected	0	0

Source: Metro; October 2004.
Note: all data is for 2025 NA = not applicable; LRT = light rail transit.
1 Compared to No-Build conditions in minutes of total transit travel time for an average weekday during the p.m. peak period in the peak direction (i.e., outbound).
2 Annual linked trips (a linked trip is an entire trip from an origin to a destination, l ke from home to work, independent of whether or not that trip would require a transfer).
3 Annual unlinked ride (an unlinked ride is counted each time a passenger would board a transit vehicle, independent of whether or not the passenger would transfer to that transit vehicle from another vehicle).
4 On roadways or transit lines generally parallel to and in the vicinity of I-205.
5 Based on peak-hour, peak-direction in-vehicle transit travel times.
6 In year of expenditure dollars.
7 In 2003 dollars based on 2025 operating conditions.
8 Systemwide based on unlinked transit trips (see note 3).
9 Includes residential, business, public and institutional displacements.
10 Impacts after committed mitigation.

S.9.2 Social Equity Considerations

The percentage of low-income, minority and/or Hispanic resident in nine out of the ten neighborhoods that are adjacent to the proposed Project is greater than the regional average of 8.7 percent, 17.1 percent and 8.0 percent for those populations, respectively (2000 US Census). Unlike projects that would negatively impact minority and/or low-income neighborhoods without serving them, the South Corridor Project is expressly aimed at serving many minority and/or low-income neighborhoods. Further, the Project would not result in negative consequences to low-income or minority neighborhoods that would not be served and benefited by the transit improvements that would occur, nor would the Project's impacts to those neighborhoods be disproportionate to the benefits that they would receive.

S.9.3 Rationale for the Selection of the Locally Preferred Alternative

The April 2003 and January 2004 South Corridor Locally Preferred Alternative (LPA) report outlines the Metro Council's rationale for the selection of the I-205/Portland Mall Project as the Phase 1 LPA. Following is a summary of that rationale for each major element of the Metro Council's decision.

A. I-205 Light Rail Alternative

As documented in the April 2003 LPA Report, the Metro Council selected the I-205 Light Rail Alternative because it would:

- Have the greatest transit ridership of the alternatives considered for the I-205 Segment and would carry the greatest number of transit trips of any individual alternative considered in the SDEIS;

- Save approximately 12 minutes in transit travel times between the Rose Quarter and the Clackamas Town Center Transit Center, compared to the No-Build Alternative (average weekday, 2025 during the peak period in the peak direction);

- Support the Region 2040 Growth Concept by offering high capacity transit connections between the Gateway Regional Center and the Clackamas Regional Center, while serving the Lents Town Center as well as connecting directly to the Portland Central City;

- Provide excellent opportunities for transit-oriented development in support of the Region 2040 Growth Concept in the Gateway regional Center, the Lents Town Center and the Clackamas Regional Center;

- Use existing available right-of-way that was set aside during construction of I-205 for a future transitway, which would allow for construction of I-205 light rail with minimal residential and business displacements, property acquisitions and related costs; and

- Provide improved regional transit connections from the South Corridor to the Portland International Airport, Gresham, downtown Portland, the Lloyd District, Beaverton, Hillsboro and other areas served by the regional light rail system.

B. Light Rail on the Portland Mall

As documented in the January 2004 Portland Mall Segment LPA Report, the Metro Council reaffirmed its selection of Light Rail on the Portland Mall Alternative because it would:

- Provide consistency with over three decades of downtown Portland planning decisions, including the City of Portland's 1972 Downtown Plan;
- Provide better light rail access to the spine of office and retail development that has occurred along either side of the Portland Mall;
- Be consistent with analysis and recommendations received from the City of Portland and TriMet;
- Avoid the high costs and impacts of a subway alternative and still meet the region's demand for light rail capacity within downtown Portland to the year 2040; and
- Provide for optimal transfers between light rail lines and buses that would traverse the Portland Mall, while also providing transfer opportunities for light rail lines that would use the Cross Mall alignment and bus lines that would cross the Portland Mall.

S.10 Public Involvement Program

An extensive and pro-active public involvement program has been conducted throughout the larger South/North Transit Corridor Study, the North Corridor Interstate MAX Project, the South Corridor SDEIS, the Downtown Amendment to the SDEIS and the preparation of the South Corridor FEIS. The public involvement program has been designed and implemented to meet the FTA's and FHWA's goals of providing complete information, timely public notice, full public access to key decisions and early and continuing involvement of the public.

Chapter 8, Comments and Responses provides a detailed listing of comments received during the two separate public comment periods: Appendix A, Community Participation provides an overview of the public outreach process; Appendix B, Agency Coordination provides an overview of the agency coordination efforts; and, Appendix C, Environmental Justice describes the approach and results of the project to Executive Order 12898.

S.11 Issues to be Resolved

The analysis and preparation of the FEIS represents one phase, albeit an important one, in the course of the South Corridor Project. Even with its conclusion, there are still numerous issues to be resolved, and this section addresses some of the more important and immediate landmarks.

S.11.1 Record of Decision

Following a mandated minimum 30-day review period for the South Corridor I-205/Portland Mall FEIS, FTA and FHWA may issue a joint Record of Decision, (ROD) for the Project, which summarizes the mitigation measures to be implemented with the Project. The ROD would establish the federally selected preferred alternative for FHWA.

S.11.2 Federal Participation in the Capital Finance Plan

Consistent with the project's capital finance plan new Federal funds would be secured through the Federal Section 5309 New Starts authorization and appropriations cycles and through the FTA grant process. Further, implementation of the financial plan includes the execution of a Full Funding Grant Agreement (FFGA) with FTA. Definition of all items that are considered eligible for Federal funding must be specified in the FFGA.

S.11.3 I-205 Right-of-way Project Coordination

Portions of the I-205 alignment would be constructed in right-of-way currently under the responsibility of ODOT and FHWA. The I-205 freeway will continue to require access for ongoing maintenance and operations and in addition, the freeway could be expanded in future. TriMet will work cooperatively with ODOT and FHWA during the final design phase to reduce and eliminate potential conflicts related to the use of right-of-way. During the final design phase, the Project will continue to work to ensure that the light rail project minimizes impact to the freeway, allows for future expansion and allows for future ODOT stormwater facilities.

P. PREFACE

This South Corridor I-205/Portland Mall Light Rail Project (Project) Final Environmental Impact Statement (FEIS) has been prepared in compliance with the National Environmental Policy Act (NEPA). The Federal Transit Administration (FTA) has provided partial funding for the preparation of this FEIS. FTA and the Federal Highway Administration (FHWA) are Federal co-lead agencies for this FEIS. TriMet has taken over the role as the local lead agency for the I-205/Portland Mall Light Rail Project and Metro had responsibility for preparation of this FEIS. The U.S. Army Corps of Engineers (Corps) is a cooperating federal agency. This FEIS has been prepared in accordance with FTA guidelines outlined in *Procedures and Technical Methods for Transit Project Planning* (FTA: September 1986, latest revision January 1995) and the FHWA/Urban Mass Transportation Administration's *Environmental Impact and Related Procedures* (29 CFR Parts 635, 640, 650, 712, 771 and 790; 40 CFR Part 1500; 49 CFR Part 622: August 1987, 23 CFR Part 771 revised April 1991).

P.1 Federal Transportation Major Investment Planning and Project Development Process

The federal transportation project development process is designed to be an integral part of a metropolitan area's long-range transportation planning process. It provides decision-makers and the public with better and more complete information before the final decisions are made. Early in the planning and project development process, regional transportation planning efforts identify corridors and/or sub-areas with significant transportation problems that may need a major transportation investment. The local jurisdiction, in cooperation with FTA and/or FHWA completes an Alternatives Analysis (AA) to determine the Locally Preferred Alternative (LPA) that best address identified transportation problems. The Regional Transportation Plan (RTP) and short-range Transportation Improvement Program (TIP) are amended to include the LPA. Following completion of the National Environmental Policy Act (NEPA) process, which results in issuance of a Record of Decision (ROD), the project may apply for federal design and construction funding through the FTA Section 5309 New Starts program. The New Starts process is designed to rank projects for congressional review and provide a level playing field for the numerous competing rail transit "new starts" across the country. The Federal New Starts process also includes reviews for readiness at several key points, most importantly entry into Preliminary Engineering (PE) and Final Design (FD). During Final Design, FTA and the local lead agency will negotiate a Full Funding Grant Agreement (FFGA). An FFGA establishes the terms and conditions for federal financial participation in a project including setting the maximum amount of Federal new starts funding and, within the limits of law, provides assurance and predictability of Federal financial support for a new stars project.

Following is a brief summary of the primary steps taken through the federal transportation planning development process. A more detailed discussion of the South Corridor Project's history follows in Section P.2.

- **Systems Planning**. During the systems planning phase, Metropolitan Planning Organizations (MPOs) such as Metro, in consultation with local jurisdictions, identify transportation problems and determine whether a major transportation investment should be evaluated and/or advanced into an Alternatives Analysis. The MPO establishes priorities for development and the lead local agency submits an application to the federal government for advancing a corridor into the federal project planning process.

- **Alternatives Analysis**. The intent of an alternatives analysis (AA) is to identify and compare the costs, benefits and impacts of a range of transportation alternatives as a means of providing local decsionmakers with the information necessary to implement the most appropriate transportation solutions in priority corridors. Alternatives Analysis is the process of reaching a broad consensus on exactly what type of improvement best meets locally defined goals and objectives for a specified corridor. Typically the AA is coordinated with the requirements of the National Environmental Policy Act of 1969 (NEPA) and a Draft Environmental Impact Statement (DEIS) is prepared that evaluates the alternatives. Occasionally the DEIS is prepared during a later phase of the project, such as during Preliminary Engineering.

- **Selection of the Locally Preferred Alternative (LPA).** The LPA is selected by the MPO based on a thorough technical analysis and evaluation of the alternatives, as well as input received through an extensive public involvement process. It is a broad collaborative process involving local transportation planning agencies, service providers, local governments, state and federal resource agencies, potential funding partners and the general public (through a formal citizen participation process).

- **Preliminary Engineering (PE).** Following the selection of the LPA, the local lead agency submits an application to the FTA requesting permission to enter into PE. The FTA may authorize a project to proceed into the PE phase of project development. PE is intended to refine the design of the LPA to the extent necessary to complete the NEPA process. PE results in estimates of project costs, benefits, and impacts for which there is a much higher degree of confidence. Also during PE, local funding commitments are secured and the FTA Section 5309 New Starts criteria are addressed. PE typically proceeds simultaneously with completion of the NEPA process, usually including preparation of an EIS. PE is considered complete when the FTA and/or FHWA declare in the Record of Decision (ROD) that the NEPA process has been completed.

- **Final Design (FD).** FD is the last phase of project development and includes right-of-way acquisition and the preparation of final construction plans, detailed specifications, construction cost estimates, and bid documents. Once FD has advanced to the 60% level, project sponsors may negotiate a Full Funding Grant Agreement (FFGA) with FTA that defines the amount of federal participation in the project.

Following completion of final design, the project sponsors initiate construction of the project and eventually proceed into operation of the Project.

P.2 South Corridor Project History

Following is a brief summary of the South Corridor Project history. A more detailed summary of the previous phases of the project can be found in Chapter 2 of this FEIS.

Between the early 1980s and 1993, the region undertook several Systems Planning and Pre-Alternative Analyses studies in the North Corridor, South Corridor and Portland Central Business District (CBD). Both the South and North Corridors were identified in the Regional Transportation Plan (RTP) as future High-Capacity Transit Corridors. In October 1993, following several local systems planning studies and priority corridor studies, the FTA issued notice in the *Federal Register* of the intent to publish an EIS for the combined South/North Corridor. The scoping notice described

a two-tiered process. First, an initial set of alternatives would be identified, analyzed, evaluated and narrowed for further study. Second, a small set of the most promising alternatives selected through the narrowing process would be studied further in the *South/North DEIS.*

The Scoping process identified and evaluated a wide range of mode, alignment and terminus alternatives. At the conclusion of Scoping in December 1993, the range of alternatives was narrowed based on initial technical analysis and public comment. The project completed three narrowing steps as follows: 1) Tier I Narrowing of Terminus and Alignment Alternatives; 2) Tier I Design Option Narrowing; and 3) Cost-Cutting, that led to the selection of the set of alternatives that were described and evaluated in the *South/North DEIS*

In November 1995, the Metro Council adopted the *South/North Major Investment Study (MIS) Final Report* (Metro: November 1995) which documented the project's compliance with the FTA's and FHWA's *Major Metropolitan Planning Rule*. The *MIS Final Report* included the selection of the design concept and scope for the LPA for the South/North Corridor. In April 1996, the FTA concurred that Metro had met the federal MIS requirements for the South/North Corridor, and approved Metro's request to advance the corridor into PE concurrent with the preparation of the *South/North DEIS*.

The *South/North DEIS* was published in February 1998. The purpose of the DEIS was to summarize the benefits, costs and impacts associated with the study alternatives, and to provide citizens, agencies, jurisdictions and decision makers with information needed to make an informed judgement when selecting the LPA to advance into the PE/FEIS stage of project development. Following the publication of the DEIS, there was an approximately 6-week public comment period and three public hearings were held. After the public comment period, local jurisdictions, project committees and the Metro Council selected the Full-Length Light Rail Alternative from Clackamas Regional Center to Vancouver as the LPA, with the South Corridor identified as the first construction segment. Unfortunately, in November 1998, the voters of the region did not approve the primary local match for the South/North Project LPA and the region was required to reassess the project.

Following the defeat of the (previously approved) local funding measure, a series of "listening posts" were held where elected officials from Metro, TriMet, cities and counties in the region solicited comments and input from citizens regarding how the region should proceed with transit solutions in the South and North Corridors. Following these "listening posts" a group of business leaders and citizens requested that a revised Full-Interstate Avenue Alternative in the North Corridor be evaluated as a smaller and lower cost project. A Supplemental DEIS, focusing on the North Corridor Interstate Avenue Alternative, was published in April 1999. Following a public comment period and public hearing, in June 1999 the Metro Council amended the LPA and defined the North Corridor Interstate MAX Light Rail Project as the first construction segment for the South/North Corridor and selected the new Full-Interstate Alignment Alternative. The *North Corridor Interstate MAX Light Rail Project FEIS* was published in October 1999. The North Corridor Project began construction in 2000 and operations in May 2004.

Following the "listening posts," the North Corridor SDEIS, and amendment to the LPA in the North Corridor, the region refocused on Transportation Alternatives in the South Corridor. The South Corridor Transportation Alternatives Study (SCTAS) was initiated to examine non-light rail alternatives. The purpose of the SCTAS was to develop, evaluate and prioritize non-light rail transportation options that were responsive to community needs and the travel demand in the South

Corridor that could be implemented expeditiously and moved forward into advanced design, environmental analysis and construction. The SCTAS examined the following eight alternatives: No-Build Alternative, Radial Commuter Rail Alternative (Oregon City to Portland), Circumferential Commuter Rail Alternative (Milwaukie to Beaverton), River Transit Alternative, High Occupancy Vehicle (HOV) Lanes Alternative, High Occupancy Toll (HOT) Lanes Alternative, Bus Rapid Transit Alternative (BRT), and Busway Alternative.

Based on the findings in the *Evaluation Report* (Metro: October 2000), the South Corridor Study Policy Group (a committee of elected and appointed officials) narrowed the list of alternatives to be studied further in the *South Corridor Project SDEIS*. The Policy Group determined that HOV lanes, HOT lanes, Commuter Rail and River Transit did not meet the study's Purpose and Need and should not be studied further. In addition, after hearing from citizen groups in Southeast Portland, Milwaukie and Clackamas County, the Policy Group decided that the SDEIS should examine both a revised Milwaukie Light Rail Alternative and an I-205 Light Rail Alternative.

In December 2002, FTA, FHWA and Metro published the *South Corridor Project Supplemental Draft Environmental Impact Statement* (SDEIS) that examined a No-Build Alternative, a Bus Rapid Transit (BRT) Alternative, a Busway Alternative, a Milwaukie Light Rail Alternative, an I-205 Light Rail Alternative and a Combined (Milwaukie and I-205) Light Rail Alternative. Following a public comment period and recommendations from local jurisdictions and agencies, the Metro Council amended the LPA on April 17, 2003. The LPA was amended for the South Corridor to include a two-phase major transit investment strategy. Phase 1 would include a Light Rail Project between the Clackamas Regional Center, the Gateway Regional Center and the Portland Central City, and would include the Portland Mall alignment in downtown Portland between the Steel Bridge and Portland State University (PSU). Phase 2 would include a separate Light Rail Project between the Milwaukie Town Center and the to Portland Central City. There were two main reasons for adopting the 2-Phased approach in the South Corridor. First, even though the region wanted to pursue both phases, financial constraints would only allow the region to proceed with one phase at a time. Also, The Milwaukie Project (Phase 2) still had several outstanding alignment and design issues to be resolved (i.e. Milwaukie transit center location, park-and-ride size and location, terminus location in downtown Milwaukie and Lincoln Street connector on the south end of downtown Portland). Resolution of these issues could occur while the Phase 1 LPA proceeded toward construction. Each Phase would have independent utility because each Phase would connect different activity centers to the Central City and is not dependent upon the other phase for its success.

The *Downtown Amendment to the South Corridor Project SDEIS* was published in October 2003 to update the NEPA analysis for the Downtown Portland Segment. The LPA was again amended in January 2004 to reaffirm the Portland Mall alignment in the downtown area as part of the Phase 1 project along with the I-205 Light Rail alignment. This FEIS addresses the South Corridor LPA Phase 1 Project, which is also referred to as the I-205/Portland Mall Light Rail Project or the Project. A subsequent EIS process is anticipated for Phase 2 of the LPA.

P.3 Role of Federal, State and Local Agencies

In addition to FTA and FHWA as co-federal lead agencies, eight local jurisdictions, state, and regional agencies are participants in the South Corridor Project, including: Metro, TriMet, the Oregon Department of Transportation (ODOT), the City of Portland, the City of Milwaukie, Oregon City Multnomah County and Clackamas County. TriMet is the local lead agency, and Metro is supporting

the project and has been responsible for preparation of this FEIS. The coordination effort has taken place within the process that the FTA and FHWA prescribe for evaluating the environmental impacts, benefits, costs, and financing associated with the proposed Project in order to qualify for Federal funding. Metro, with assistance from TriMet, consultants and the participating local jurisdictions, has led the technical analysis supporting this document. TriMet prepared the Preliminary Engineering and cost estimates. FTA and FHWA have furnished technical and procedural guidance and have independently evaluated this FEIS prior to its approval and publication. Many federal state and local agencies have commented on the SDEIS and the Downtown Amendment to the SDEIS. These comments are summarized and addressed in Chapter 8, Comments and Responses.

While the FHWA is not anticipated to be a funding partner for the I-205/Portland Mall Project, FHWA has an oversight role for the I-205 right-of-way that would be utilized by the Project and for congestion on the I-205 and I-405 freeways.

P.4 Organization of this FEIS

This FEIS has an executive summary, a preface, eight chapters and several appendices. The FEIS Chapters are briefly summarized below.

The **Executive Summary** provides a summary of the major findings of the FEIS. It is intended to provide the reader with a basic understanding of the transportation problems in the South Corridor, the alternatives evaluated to address those problems and the significant benefits, costs and impacts associated with the I-205/Portland Mall Project. In addition, summary information is provided on the finance plan for the Project. The Executive Summary has also been published separately.

Chapter One, Purpose and Need describes the South Corridor study area and the existing transportation facilities. A discussion of state and local land use and transportation planning goals and regulations is provided, and specific transportation problems within the roadway and transit systems in the corridor are described. The chapter concludes with the Study Corridor's goal and objectives, which provides context for the selection of the LPA including the I-205/Portland Mall Project.

Chapter Two, Alternatives Considered provides an overview of the alternatives studied in the corridor and the screening and selection process that resulted in the selection of the I-205/Portland Mall Project as the Phase 1 LPA. This chapter defines the transit improvements, roadway capital improvements, and transit operations improvements. It further defines capital costs and operating and maintenance costs of the No-Build Alternative and the South Corridor I-205/Portland Mall Light Rail Project that form the basis for the analysis and comparison in the rest of the document.

Chapter Three, Environmental Analysis and Consequences discusses the significant impacts of the I-205/Portland Mall Project on the built and natural environments. This section identifies the potential significant direct, indirect and cumulative environmental impacts of the proposed Project and identifies mitigation measures that address significant impacts of the Project.

Chapter Four, Transportation Affected Environment and Impacts describes the anticipated transit, traffic and other transportation impacts that would result from the I-205/Portland Mall Project. Mitigation measures that address significant transportation impacts are also identified.

Chapter Five, Historic Archaeological and Parklands Resources provides a summary of the laws and regulations governing historic cultural and parkland resources, lists the identified resources, and evaluates the effects of the project on these resources. It includes a description of the mitigation commitments included in the Memorandum of Agreement with the State Historic Preservation Officer (SHPO). Also in this chapter is a summary of the "Section 4(f)" Analysis and mitigation.

Chapter Six, Financial Analysis includes the financial analysis for the South Corridor Project and presents the finance plan for the I-205/Portland Mall Project.

Chapter Seven, Evaluation of the I-205/Portland Mall Project provides a comparison of the No-Build Alternative and the proposed Project in terms of impacts, cost and financial feasibility. The Project is evaluated in terms of how effectively and equitably it meets the project's goal and objectives and, finally significant trade-offs between the Project and No-Build are discussed.

Chapter Eight, Comments and Responses presents a summary of both written and oral comments received during the two separate public comment periods associated with the SDEIS and Downtown Amendment to the SDEIS. Brief responses are provided to the comments.

Appendices are includes at the end of the FEIS to provide more detailed information on a number of topics including: community participation, agency coordination, environmental justice, station activities, supporting documents, a list of preparers, a list of recipients, and a matrix showing the comments and responses.

P.5 Supporting Documents

A variety of in-depth reports that document the technical analysis used to prepare this FEIS and the previous NEPA documents have been prepared and published. The primary reports leading to the publication of this South Corridor I-205/Portland Mall FEIS are listed in Appendix E, Supporting Documents, and are available for review at Metro's Transportation Planning Office, 600 NE Grand Avenue, Portland, Oregon, 97232.

P.6 Community Participation

An extensive and proactive public involvement program has been conducted throughout the larger South/North Transit Corridor Study, the North Corridor Interstate MAX Project, the South Corridor SDEIS, the Downtown Amendment to the SDIES and the preparation this South Corridor FEIS. The public involvement program has been designed and implemented to meet the FTA's and FHWA's goals of providing complete information, timely public notice, full public access to key decisions, and early and continuing involvement of the public (23 CRG Part 450.316l; October 1993).

Chapter 8, Comments and Responses provides a detailed listing of comments received during the two separate public comment periods and responses to the comments; Appendix A, Community Participation provides a more detailed overview of the public outreach process; Appendix B, Agency Coordination provides an overview of the agency coordination efforts and agency comments; and, Appendix C, Environmental Justice describes the approach and analysis of the project related to Executive Order 12898.

P.7 Completion of the Environmental Impact Statement Process

This FEIS has been circulated to federal, state, regional and local agencies and officials and local libraries (see Appendix G List of Recipients). A digital compact disc copy of the FEIS has been provided to all persons, organizations and agencies that made substantive comments on the SDEIS or the Downtown Amendment to the SDEIS. Each commenter has also been notified that they could obtain a printed copy of the Executive Summary or the FEIS by contacting Metro. The Executive Summary and the full FEIS have also been made available to anyone who requested a copy.

No action can be taken on the project for at least 30 days following publication of the notice of availability of this FEIS in the *Federal Register* to allow federal agencies the opportunity to refer interagency disagreements, if there are any, to the Council on Environmental Quality. Federal funds cannot be committed to the project until the EIS process has been completed. The federal environmental process would be complete when the lead federal lead agencies issue a joint Record of Decision (ROD) for the project.

TABLE OF CONTENTS

LIST OF FIGURES

Chapter 4 Transportation Facilities Services and Impacts

Chapter 5 Historic and Parkland Resources

LIST OF TABLES

Executive Summary

Chapter 1 Purpose and Need

Chapter 2 Alternatives Considered

Chapter 3 Affected Environment and Environmental Consequences

Chapter 4 Transportation Facilities, Services and Impacts

Chapter 5 Historic and Parkland Resources

Chapter 6 Financial Analysis

Chapter 7 Evaluation of Alternatives

PROJECT NOMENCLATURE

This Final Environmental Impact Statement (FEIS) discloses the effects of Phase 1 of the Locally Preferred Alternative(LPA) for the South Corridor portion of the South/North Transit Corridor. The project includes the South Corridor I-205/Portland Mall LRT Project (Project) This FEIS compares the No-Build Alternative and the I-205/Portland Mall Project. Following are summary definitions and selected nomenclature. Complete descriptions of the alternatives are included in Chapter 2.

South/North Transit Corridor Study. The full collection of studies and processes associated with the South/North Light Rail Transit (LRT) Project. Those studies and processes include the Preliminary Alternatives Analyses (Pre-AA), Draft Environmental Impact Statement (DEIS), Supplemental Draft Environmental Impact Statement (SDEIS) for Interstate MAX, North Corridor Interstate MAX Final Environmental Impact Statement (FEIS), South Corridor Project Supplemental Draft Environmental Impact Statement (SDEIS), Downtown Amendment to the South Corridor Project Supplemental Draft Environmental Impact Statement (ASDEIS), this South Corridor I-205/ Portland Mall FEIS and the future South Corridor LPA Phase 2 (Milwaukie to Portland LRT Project).

Locally Preferred Alternative (LPA). The South Corridor Project LPA includes a 2-Phased Light Rail Project. Phase 1 of the LPA (Phase 1 LPA) is addressed in this FEIS and includes the I-205 Segment and the Portland Mall Segment light rail improvements. Phase 2 of the LPA (Phase 2 LPA), the Portland to Milwaukie Segment is not addressed in this FEIS. The Phase 2 LPA is planned to be addressed in a subsequent environmental document.

South Corridor I-205/Portland Mall Light Rail Transit Project (I-205/Portland Mall Project or Project). Phase 1 of the South Corridor Project LPA includes a light rail project in the I-205 and Portland Mall segments. In the I-205 Segment a 6.5-mile double-tracked light rail alignment, light rail stations, and park-and-ride lots would extend light rail from the Clackamas Town Center mall area along I-205 to the Gateway Transit Center. In the Portland Mall Segment the Project would include a new 1.8-mile light rail alignment on 5th and 6th avenues between the Steel Bridge and PSU.

I-205 Segment. The Project segment from the Clackamas Regional Center to the Gateway Regional Center along I-205.

Portland Mall Segment. The Project segment between the west end of the Steel Bridge and Portland State University, on NW and SW 5th and 6th avenues with a terminus and turnaround south of SW Jackson Street.

Banfield Segment. The existing light rail alignment between the Gateway Transit Center and the Steel Bridge that would be used to connect the I-205 Segment with the Portland Mall Segment. Trains would operate on 6.2 miles of existing tracks on the Banfield line shared with the Blue and Red lines.

Milwaukie Segment. The South Corridor Project segment between downtown Milwaukie and downtown Portland. This segment would be constructed as Phase 2 of the South Corridor Project and is not evaluated in this FEIS.

I-205/Portland Mall Project Stations and Park-and-Ride Lots.

The **I-205 Segment** would include eight new light rail stations and five new park-and-ride lots with approximately 2,066 new park-and-ride spaces as follows:

- Clackamas Town Center Transit Center Station with 500 space park-and-ride lot structure,
- Fuller Road Station with 624 space park-and-ride lot,
- Flavel Street Station,
- Foster Road Station,
- Holgate Blvd. Station with 125 space park-and-ride lot,
- Powell Blvd. Station with 391 space park-and-ride lot,
- Division Street Station, and
- Main Street Station with 426 space park-and-ride lot.

The **Portland Mall Segment** would include seven new light rail stations. Each station would have a new southbound platform on NW and SW 5th Avenue and a northbound platform on NW and SW 6th Avenue.

- **Union Station**
  NW Hoyt Street/6th Avenue Station
  NW Glisan Street/5th Avenue Station
- **Chinatown Station**
  NW Davis Street/6th Avenue Station
  NW Couch Street/5th Avenue Station
- **Oak/Pine Streets Station**
  SW Pine Street/6th Avenue Station
  SW Oak Street/5th Avenue Station
- **Pioneer Square Station**
  Pioneer Square East/6th Avenue Station
  Pioneer Courthouse/5th Avenue Station
- **City Hall Station**
  City Hall/SW 6th Avenue Station
  City Hall/SW 5th Avenue Station
- **Portland State University Station**
  PSU Urban Center/SW 6th Avenue Station
  PSU Urban Center/SW 5th Avenue Station
- **PSU South Station**
  PSU South/SW 6th Avenue Station
  PSU South/SW 5th Avenue Station

MAX lines. The existing MAX system includes the following lines:

- The **Blue Line** runs east and west across the region between Gresham, Gateway, downtown Portland, Beaverton and Hillsboro.
- The **Red Line** runs between the Portland International Airport, Gateway, downtown Portland and Beaverton. This line shares the alignment with the Blue line from Gateway to Beaverton.
- The **Yellow Line** runs between North Portland and downtown Portland.
- The **Green Line** is planned to be the new line that is proposed to run from Clackamas Regional Center to Gateway and along the Portland Mall. This line will share the existing alignment between Gateway and the Steel Bridge with the Blue line and the Red line.

LIST OF ACRONYMS

AA - Alternatives Analysis
ACDP - Air Contaminant Discharge Permit
ACHP - Advisory Council for Historic Preservation
ADA - Americans with Disabilities Act
ADT - Average Daily Traffic
APE - Area of Potential Effect
APTA - American Public Transit Association
ASDEIS - Downtown Portland Amendment to the South Corridor SDEIS
BA - Biological Assessment
BES - Bureau of Environmental Services
BMP - Best Management Practices
BO - Biological Opinion
Btu - British Thermal Unit
CAC - Citizens Advisory Committee
CBD - Central Business District
CERCLA - Comprehensive Environmental Response, Compensation and Liability Act
CERCLIS - Comprehensive Environmental Response, Compensation and Liability Information System
CEQ - Council on Environmental Quality
CFR - Code of Federal Regulations
CFS - Cubic Feet per Second
CHD - Chinatown/Japantown Historic District
CIH - Certified Industrial Hygienist
CPTED - Crime Prevention Through Environmental Design
CSP - Certified Safety Professional
CO - Carbon Monoxide
Corps - US Army Corps of Engineers
CRAG - Columbia Region Association of Governments (Metro's Predecessor)
CRC - Clackamas Regional Center
CRD - Columbia River Datum
CRL - Confirmed Release List
CRLI - Confirmed Release List Inventory
CSCS - Confirmed and Suspected Contamination Sites
CTC - Clackamas Town Center
C-TRAN - Clark County Public Transportation Benefit Area Authority
CWA - Clean Water Act
dB - Decibel
dBA - A-weighted decibel
DEIS - Draft Environmental Impact Statement
DO - Depressional Outflow
DOE - Determination of Eligibility
DRAC - Downtown Rail Advisory Committee
DRC - Data Resource Center at Metro
DSL - Oregon Department of State Lands
ECSI - Environmental Clean-up Site Information
EFH - Essential Fish Habitat
EIS - Environmental Impact Statement
EO - Executive Order
EPA - Environmental Protection Agency
ESA - Endangered Species Act
ESU - Evolutionary Significant Unit
FEIS - Final Environmental Impact Statement
FEMA - Federal Emergency Management Agency
FFGA - Full Funding Grant Agreement
FHWA - Federal Highway Administration
FINDS - Facility Index Notification System
FIRM - Flood Insurance Rate Maps
FPPA - Farmland Protection Policy Act
FTA - Federal Transit Administration
FY - Fiscal Year
GO - General Obligation
HC - Hydrocarbons
HCT - High Capacity Transit
HGM - Hydrogeomorphic
HOT - Heating Oil Tank
HOT - High Occupancy Toll lanes
HOV - High Occupancy Vehicle lanes
HVOC - Halogenated Volatile Organic Compounds
ISTEA - Intermodal Surface Transportation Efficiency Act
JPACT - Joint Policy Advisory Committee on Transportation
L_{dn} - 24-hour, Time Averaged, A-weighted Sound Level
L_{eq} - Equivalent Continuous Sound Levels
L_{max} - Maximum Noise Levels
L_{xx} - Statistical Noise Level Descriptor
LCDC - Land Conservation and Development Commission
LONP - Letter of No Prejudice
LOS - Level-of-Service
LPA - Locally Preferred Alternative
LPS - Locally Preferred Strategy

LQG – Large Quantity Generators
LRT - Light Rail Transit
LRV - Light Rail Vehicle
LUFO - Land Use Final Order
LUST - Leaking Underground Storage Tank
MAX - Metropolitan Area Express (TriMet's existing light rail system)
MIS - Major Investment Study
MOA - Memorandum of Agreement
MPO - Metropolitan Planning Organization
MSA - Magnuson-Stevens Act
NAAQS - National Ambient Air Quality Standards
NEPA - National Environmental Policy Act
NFA - No Further Action
NPDES - National Pollutant Discharge Elimination System
NRHP - National Register of Historic Places
NOAA Fisheries - formerly NMFS (National Marine Fisheries Service)
NO_X - Nitrogen Oxides
O&M - Operations and Maintenance
ODEQ - Oregon Department of Environmental Quality
ODFW - Oregon Department of Fish and Wildlife
ODOT - Oregon Department of Transportation
ONHP - Oregon Natural Heritage Program
ORS - Oregon Revised Statutes
PAC - Policy Advisory Committee
PAH - Polynuclear Aromatic Hydrocarbon
P&R - Park-and-Ride
PCB - Polychlorinated Biphenyls
PDC - Portland Development Commission
PE - Preliminary Engineering
Phase 1 LPA - I-205/Portland Mall LRT Project
Phase 2 LPA - Milwaukie to Portland LRT
PIP - Productivity Improvement Program at TriMet
PM_{10} - Particulate matter (10 microns or less in size)
PSU - Portland State University
ppm - Parts Per Million
Pre-AA - Preliminary Alternatives Analysis
RCRA - Resource Conservation and Recovery Act
RCRIS - Resource Conservation and Recovery Information System
RFP - Regional Framework Plan
RFT - Riverine Flow-through
RMS - Root Mean Square
ROD - Record of Decision
ROW - Right-of-Way
RTP - Regional Transportation Plan
RUGGO - Regional Urban Growth Goals and Objectives
SCS -Soil Conservation Service
SCTAS - South Corridor Transportation Alternatives Study
SDEIS - Supplemental Draft Environmental Impact Statement
SHPO - State Historic Preservation Officer
SIP - State Implementation Plan
SMART- South Metro Area Transit (Wilsonville)
SQG - Small Quantity Generators
STP - Surface Transportation Program
TAZ - Transportation Analysis Zone
TC - Transit Center
TEA-21 - Transportation Equity Act for the Twenty-First Century
TES - Threatened or Endangered (or candidate) Species
TIP - Transportation Improvement Program
TOD - Transit Oriented Development
TriMet - Tri-County Metropolitan Transportation District of Oregon
TPH - Total Petroleum Hydrocarbons
TPR - Transportation Planning Rule
TSP - Total Suspended Particulates
TSM - Transportation Systems Management
TSS - Total Suspended Solids
UGB - Urban Growth Boundary
UPRR - Union Pacific Railroad
URA - Urban Renewal Area
URS - Environmental Consultant for this FEIS
USDOT - United States Department of Transportation
USFWS - US Fish and Wildlife Service
UST - Underground Storage Tank
V/C - Volume to Capacity Ratio
VdB - Root Mean Square Vibration Velocity in Decibel Units
VHT - Vehicle Hours Traveled
VMT - Vehicle Miles Traveled
VOC - Volatile Organic Compounds
YOE$ - Year-of-Expenditure Dollars
2040 - Region 2040 Growth Concept

SOUTH CORRIDOR PROJECT
CLACKAMAS AND MULTNOMAH COUNTIES, OREGON

I-205/PORTLAND MALL LIGHT RAIL TRANSIT PROJECT
FINAL ENVIRONMENTAL IMPACT STATEMENT

Prepared Pursuant to the National Environmental Policy Act
(42 U.S.C. Section 4322)

by the

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL TRANSIT ADMINISTRATION
FEDERAL HIGHWAY ADMINISTRATION

and

METRO

in cooperation with

U.S. ARMY CORPS OF ENGINEERS, PORTLAND DISTRICT
TRI-COUNTY METROPOLITAN TRANSPORTATION DISTRICT OF OREGON

November 30, 2004
Date of Approval

R.F. Krochalis, Region X Administrator
For the Federal Transit Administration

November 24, 2004
Date of Approval

David Cox, Division Administrator
For the Federal Highway Administration

November 9, 2004
Date of Approval

David Bragdon, Council President
For Metro

November 9, 2004
Date of Approval

Fred Hansen, General Manager
For the Tri-County Metropolitan Transportation District of Oregon

1. PURPOSE AND NEED

This *South Corridor I-205/Portland Mall Light Rail Project Final Environmental Impact Statement (FEIS)* focuses on Phase 1 of the South Corridor Project Locally Preferred Alternative (LPA). Phase 1 includes the I-205 Segment (Clackamas Regional Center to Gateway Regional Center) and the downtown Portland Mall Segment (Steel Bridge to Portland State University) light rail project (Project). Phase 2 would implement the South Corridor Milwaukie Light Rail Project between downtown Portland and Milwaukie. The phases and segments of the South Corridor Project are shown in Figure 1.1-1. The region's decision to move the South Corridor Project forward in two phases is documented in the *South Corridor Project LPA Report* (Metro: April 2003) and subsequently in the *South Corridor Project Downtown Portland Mall Segment LPA Report* (Metro: January 2004). A future Supplemental Environmental Impact Statement and FEIS are planned for the Phase 2 Milwaukie Light Rail Project. The region made the LPA decisions following publication of the *South Corridor Project Supplemental Draft Environmental Impact Statement* (SDEIS) in December 2002 and publication of the *Downtown Amendment to the South Corridor Project Supplemental Draft Environmental Impact Statement* (ASDEIS) in October 2003.

This chapter defines the South Corridor and specific project segments and phases. Other topics include:

- Identification of the transportation challenges and policies in the Corridor that warrant consideration of a major transit investment
- A summary of the purpose of and need for a major investment in the South Corridor
- A geographic and demographic description of the South Corridor
- A description of the South Corridor's existing transportation system
- An overview of impacts to the South Corridor from high population and employment growth
- A description of the existing and projected traffic congestion in the South Corridor
- A summary of the existing and projected impacts of congestion on the operation of the transit system in the South Corridor
- An overview of the land use policies that affect the South Corridor transportation network and operating conditions
- An overview of how state, regional and local transportation policies affect the South Corridor
- A summary of the South Corridor Project's Goal and Objectives

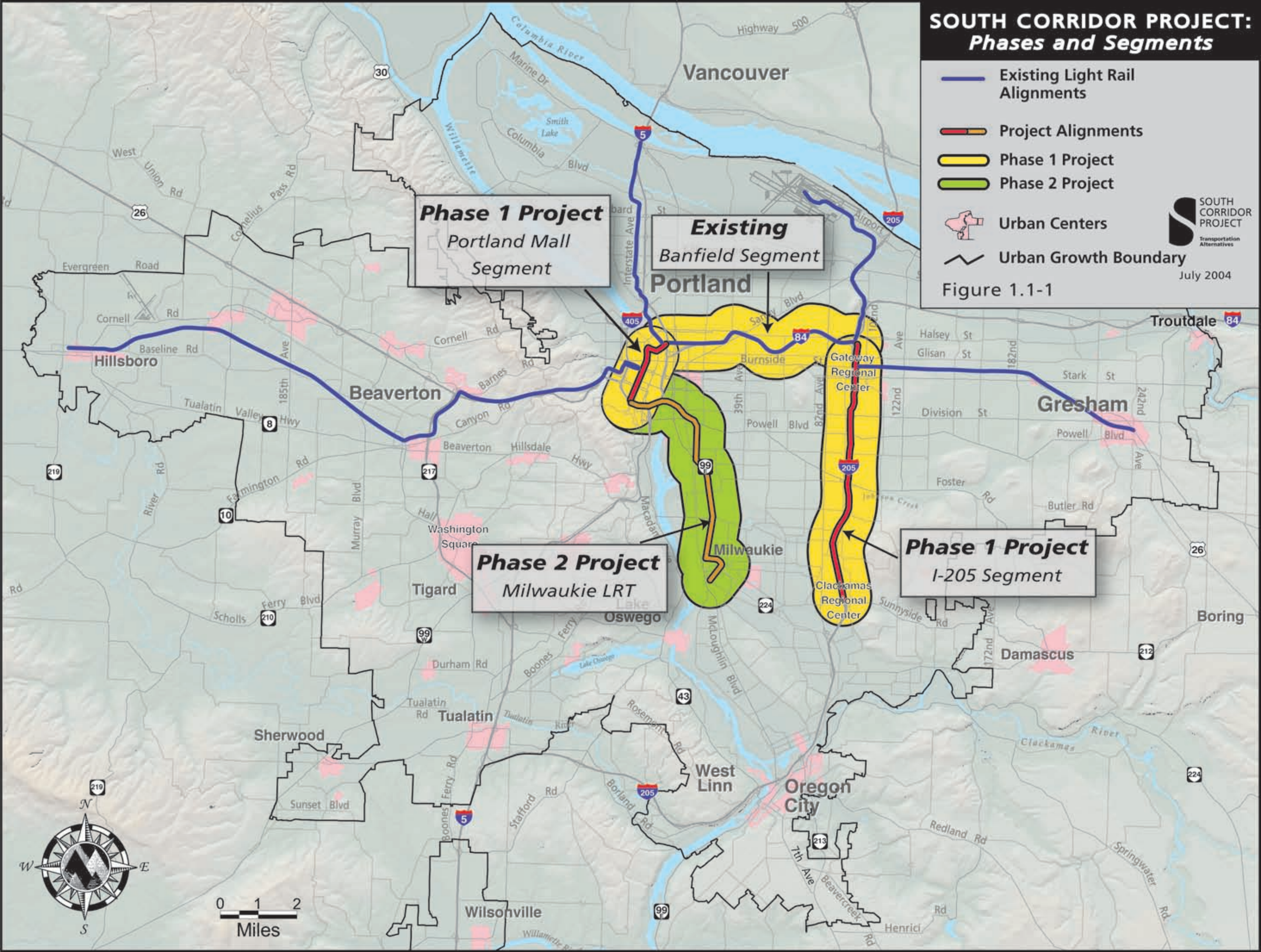
1.1 Statement of the South Corridor Project Purpose and Need

The **purpose** of a major transit investment in the South Corridor is:

> *To implement a major transit program in the South Corridor that maintains livability in the metropolitan region, supports land use goals, optimizes the transportation system, is environmentally sensitive, reflects community values, and is fiscally responsive*.

The **need** for a major transit investment in the South Corridor is identified as:

- Historic and projected rapid population and employment growth in the South Corridor, create an unmet demand for increased travel opportunities and transit capacity.



SOUTH CORRIDOR PROJECT:
Phases and Segments
Existing Light Rail Alignments
Project Alignments
Phase 1 Project
Phase 2 Project
Urban Centers
Urban Growth Boundary
SOUTH CORRIDOR PROJECT
July 2004
Figure 1.1-1
Phase 1 Project
Portland Mall Segment
Existing
Banfield Segment
Phase 2 Project
Milwaukie LRT
Phase 1 Project
I-205 Segment
Vancouver
Portland
Hillsboro
Beaverton
Gresham
Troutdale
Tigard
Lake Oswego
Milwaukie
Gateway Regional Center
Clackamas Regional Center
Washington Square
Tualatin
Sherwood
West Linn
Oregon City
Wilsonville
Damascus
Boring
Columbia River
0 1 2
Miles
N
S
E
W

- High levels of existing traffic congestion and travel delay in the South Corridor and deteriorating travel conditions in the future caused by population and employment growth.
- The need for high-quality transit service in the South Corridor to achieve regional and local land use objectives.

The following sections provide additional detail on these issues and conclude with the definition of the South Corridor Project's Goal and Objectives.

1.2 Description of the Study Area, Project Phases and Segments

1.2.1 Definition of the Study Area

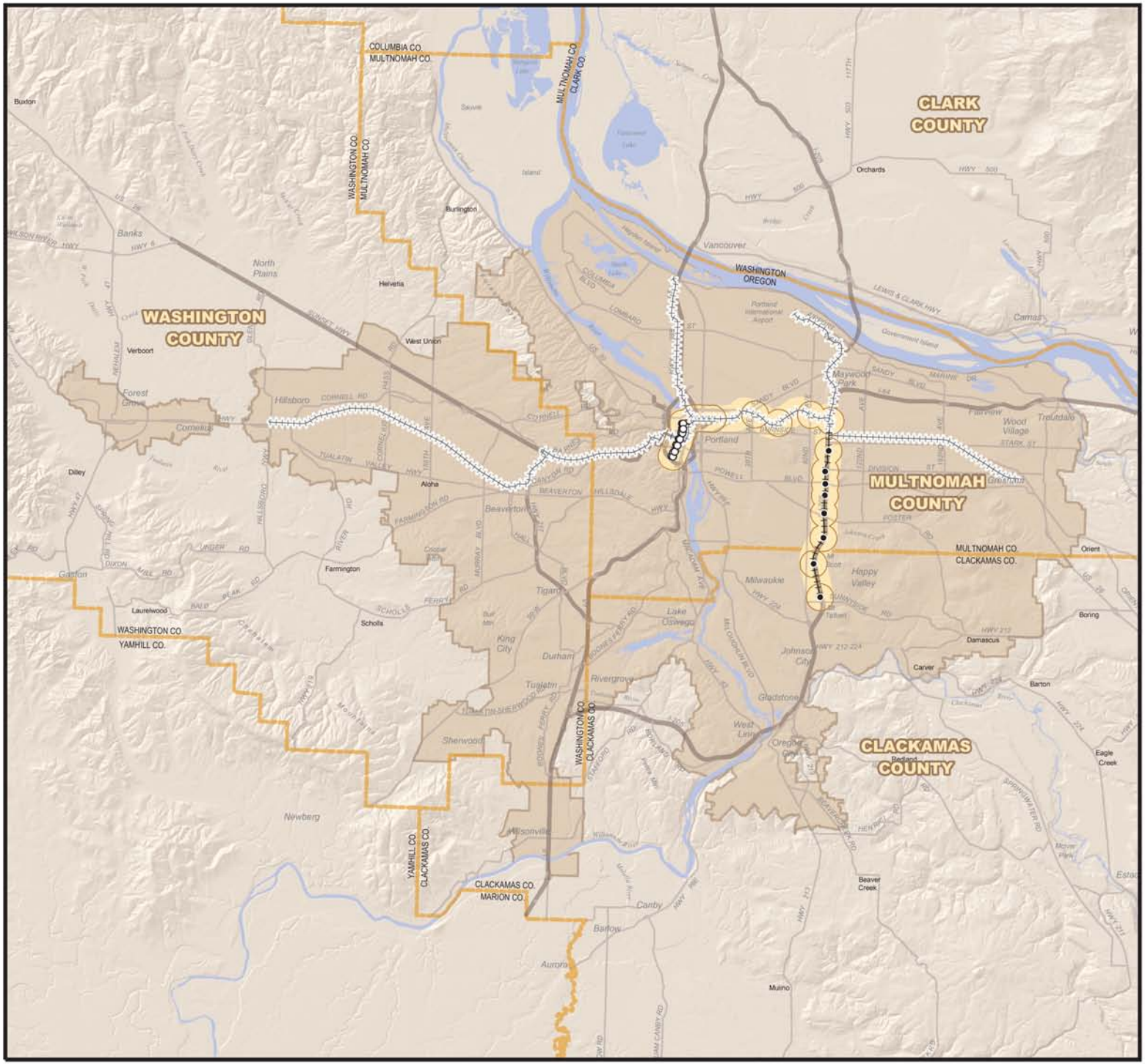
The South Corridor is in the rapidly growing Portland, Oregon/Vancouver, Washington metropolitan region. This metropolitan region is the population and economic center of an extensive area including most of Oregon, southern Washington and western Idaho. It incorporates the urban portion of three Oregon Counties (Multnomah, Clackamas and Washington counties), and one county in the State of Washington (Clark County). Portland, Oregon is the largest city in the region and is located at its geographic center. The South Corridor is the southern half of the South/North Corridor. The South Corridor study area is generally defined as the "travel-shed" between the urbanizing portion of Clackamas County and the Portland Central City. Figure 1.2-1 illustrates the location of the South Corridor Project within the larger metropolitan region.

The South Corridor includes of the cities of Oregon City, Gladstone, and Milwaukie; the Clackamas Regional Center area of unincorporated Clackamas County; southeast Portland; and the Portland Central City. Shown on Figure 1.2-2 are the sub-districts for the study area. Figure 1.2-3 shows the detailed transportation analysis zones (TAZs) for the Central City area.

1.2.2 Description of Project Phases and Segments

The entirety of the South Corridor Project is contained within the South Corridor study area as described above. Figure 1.1-1 shows the two phases of the project LPA as well as the individual segments that make up each phase. As stated above, the corridor is defined as a broad travel-shed. Within the corridor, three light rail project segments were selected in LPA processes (I-205, the Portland Mall and Milwaukie). The LPA further prioritized those segments into two phases. Phase 1, includes the I-205 Segment and the Portland Mall Segment, and is the focus of this FEIS. Phase 2 includes the Milwaukie Segment, and will be the subject of a subsequent EIS. References in this FEIS to the South Corridor refer to the entire corridor as illustrated in Figure 1.2-2, references to the "I-205/Mall Project" or "Project" refer to the proposed light rail and related improvements in both the I-205 and Portland Mall Segments. There were two reasons for adopting this 2-Phased approach. First, financial constraints would only allow the region to proceed with one at a time. Also, The Milwaukie Project (Phase 2) still has several outstanding alignment and design issues to be resolved. Resolution of these issues has proceeded while the Phase 1 LPA proceeded toward construction. Each Phase has independent utility because each Phase would connect different activity centers to the Central City and is not dependent upon the other Phase for successful operations.

The South Corridor SDEIS addressed a variety of segments in the South Corridor, while the Downtown Amendment to the SDEIS focused only on the Portland Mall Segment. Both the I-205



South Corridor Project

Location of Project in Portland Metro Area

FIGURE 1.2-1

- Urban Growth Boundary
- Half-Mile Alignment Area
- Half-Mile Station Area

ALIGNMENTS

- Existing Light Rail
- Portland Mall Segment
- I-205 Segment

STATION LOCATIONS

- Portland Mall Segment
- I-205 Segment
- Existing Stations

County Line

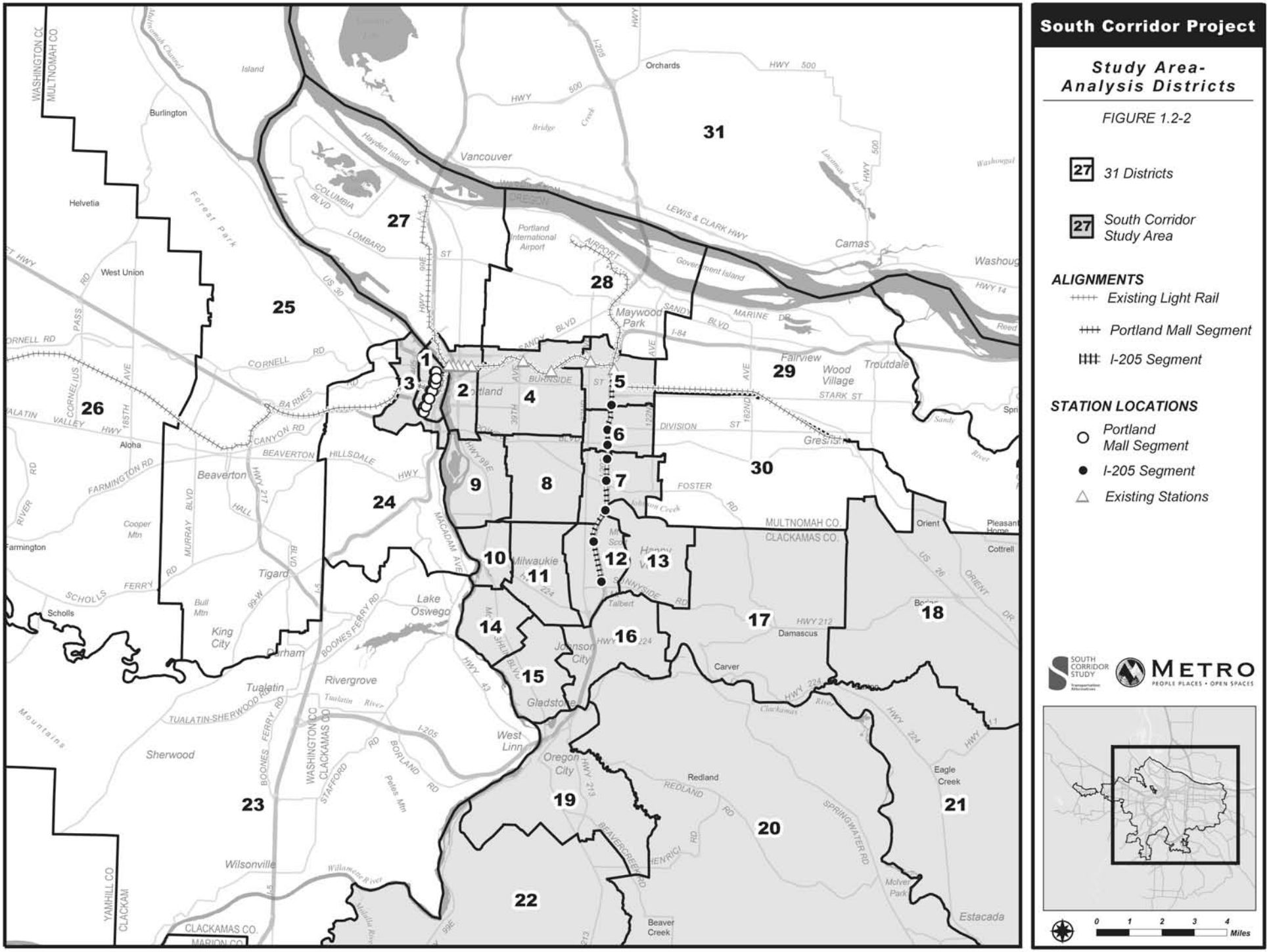
SOUTH CORRIDOR STUDY

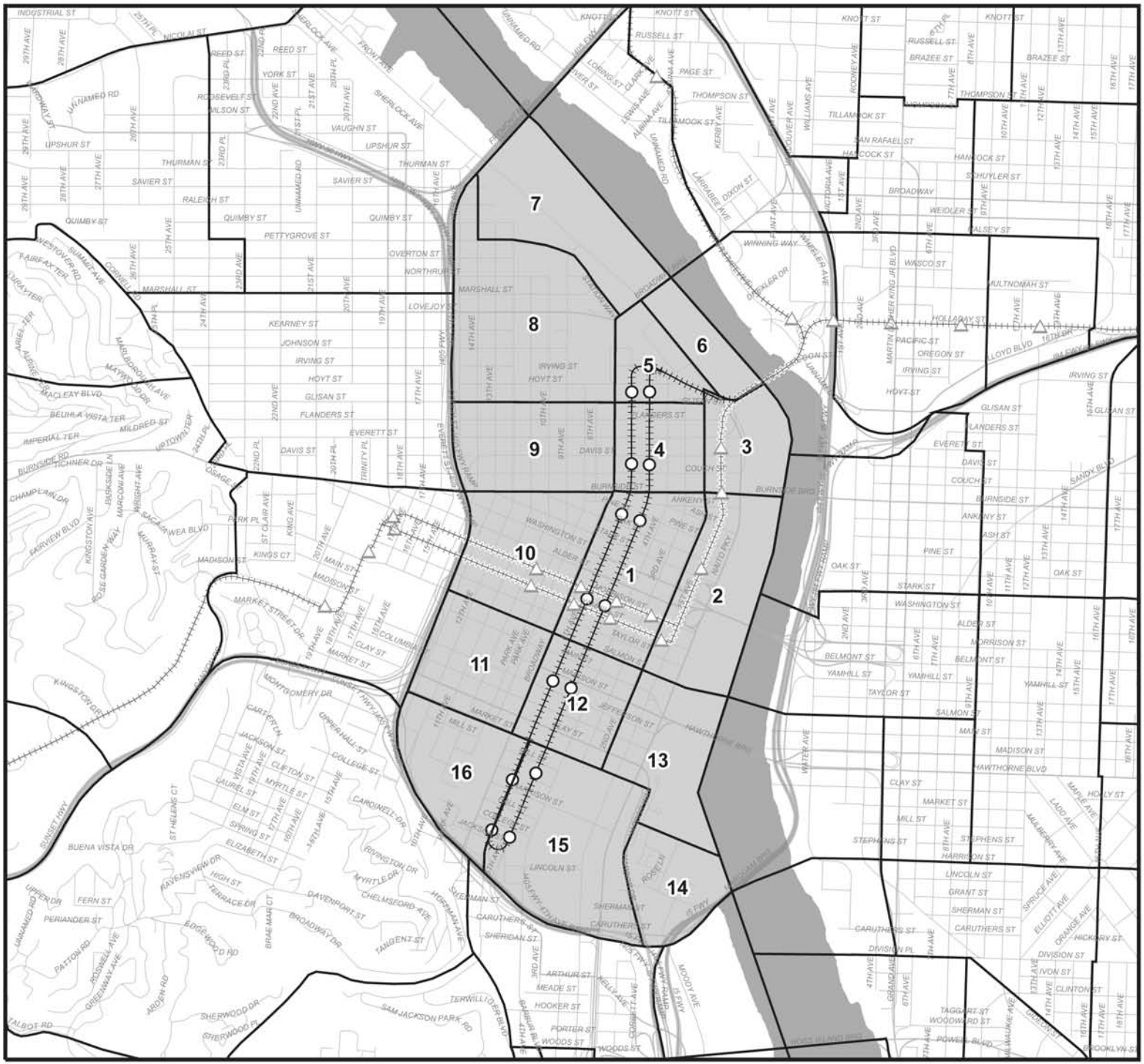
METRO
PEOPLE PLACES • OPEN SPACES

NORTH

0 1 2 3 4 Miles

September 2004


South Corridor Project
Study Area-
Analysis Districts
FIGURE 1.2-2
27 31 Districts
27 South Corridor Study Area
ALIGNMENTS
Existing Light Rail
Portland Mall Segment
I-205 Segment
STATION LOCATIONS
Portland Mall Segment
I-205 Segment
Existing Stations
SOUTH CORRIDOR STUDY
METRO
PEOPLE PLACES • OPEN SPACES
0 1 2 3 4 Miles
July 2004



South Corridor Project

Portland Mall Segment-Transportation Analysis Zones

FIGURE 1.2-3

11 *Transportation Analysis Zones*

ALIGNMENTS

Existing Light Rail

Portland Mall Segment

STATION LOCATIONS

Portland Mall Segment

Existing Stations

SOUTH CORRIDOR STUDY

METRO
PEOPLE PLACES • OPEN SPACES

0 0.1 0.2 0.3 0.4 Miles

July 2004

and Portland Mall segments are addressed in this FEIS. Analysis that pertains only to the Milwaukie to Portland Segment is not included in this FEIS, but will be fully addressed in subsequent environmental documents for the Phase 2 LPA.

1.3 Description of the Transportation System Serving the South Corridor

The Willamette River separates east Portland from west Portland and dictates the configuration of the road network serving the South Corridor, including downtown Portland. Figure 1.3-1 illustrates the existing transit network in the South Corridor and Figure 1.3-2 provides a detailed illustration of the Portland Mall Segment transportation network. Downtown Portland connects to the regional highway system in the northern portion of the Corridor via a series of bridges over the Willamette River. Two interstate highway system bridges connect downtown Portland with I-5 via the I-405 downtown loop: the Marquam Bridge (south) and the Fremont Bridge (north). The Morrison Bridge provides a direct connection to I-5 northbound, and to the SE Grand Avenue and SE Martin Luther King Junior Boulevard couplet, which transition into SE McLoughlin Boulevard (SE Grand Avenue, SE Martin Luther King (MLK), Jr. Boulevard, and SE McLoughlin Boulevard together constitute Highway 99 East).

I-205 connects the Clackamas Regional Center area to the north with the Gateway Regional Center and to the south with the Oregon City Regional Center. I-205 extends across the Columbia River to Clark County to the north and across the Willamette River, connecting to I-5 in the south near Tualatin and Wilsonville. SE McLoughlin Boulevard, a major arterial serving the southern portion of the Corridor, provides the primary access between the City of Portland, the inner SE Portland neighborhoods, the City of Milwaukie, the Oak Grove neighborhood, the City of Gladstone, and the City of Oregon City. Highway 224 is the major arterial that connects Milwaukie and SE McLoughlin Boulevard with the Clackamas Regional Center area.

The street network in downtown Portland is primarily a grid pattern of predominantly one-way and some two-way local streets and arterials, with generally continuous sidewalks on both sides of most streets. Most of the intersections within the Downtown Portland Segment are controlled with timed signals that generally allow a progression of green signals along the one-way grid network. The signal system for West Burnside, which is a major two-way east-west arterial, is generally not integrated into one-way grid's signal timing network. Downtown Portland was platted on 200-foot blocks that afford a high level of pedestrian connectivity to both buses and light rail. This block system is largely responsible for downtown Portland's reputation as a pedestrian friendly area.

Three public transit operators serve the Portland/Vancouver metropolitan region and Downtown Portland. The Tri-County Metropolitan Transportation District of Oregon (TriMet) serves the Oregon portion of the region and the Clark County Public Transportation Benefit Area Authority (C-TRAN) serves Clark County. C-TRAN provides service from Clark County to the Portland area through an agreement with TriMet, including service into and out of Downtown Portland. Portland Streetcar Inc. provides intra-downtown circulation and connects Portland State University via the west end of Downtown Portland to northwest Portland. TriMet provides an extensive bus network throughout the Oregon portion of the region, and it operates and is actively expanding its light rail network. In addition to the above, the South Metro Area Rapid Transit district (SMART) operates service in the city of Wilsonville that connects to TriMet service. The cities of Sandy (to the east) and Canby (to the south) provide transit service in their jurisdictions.

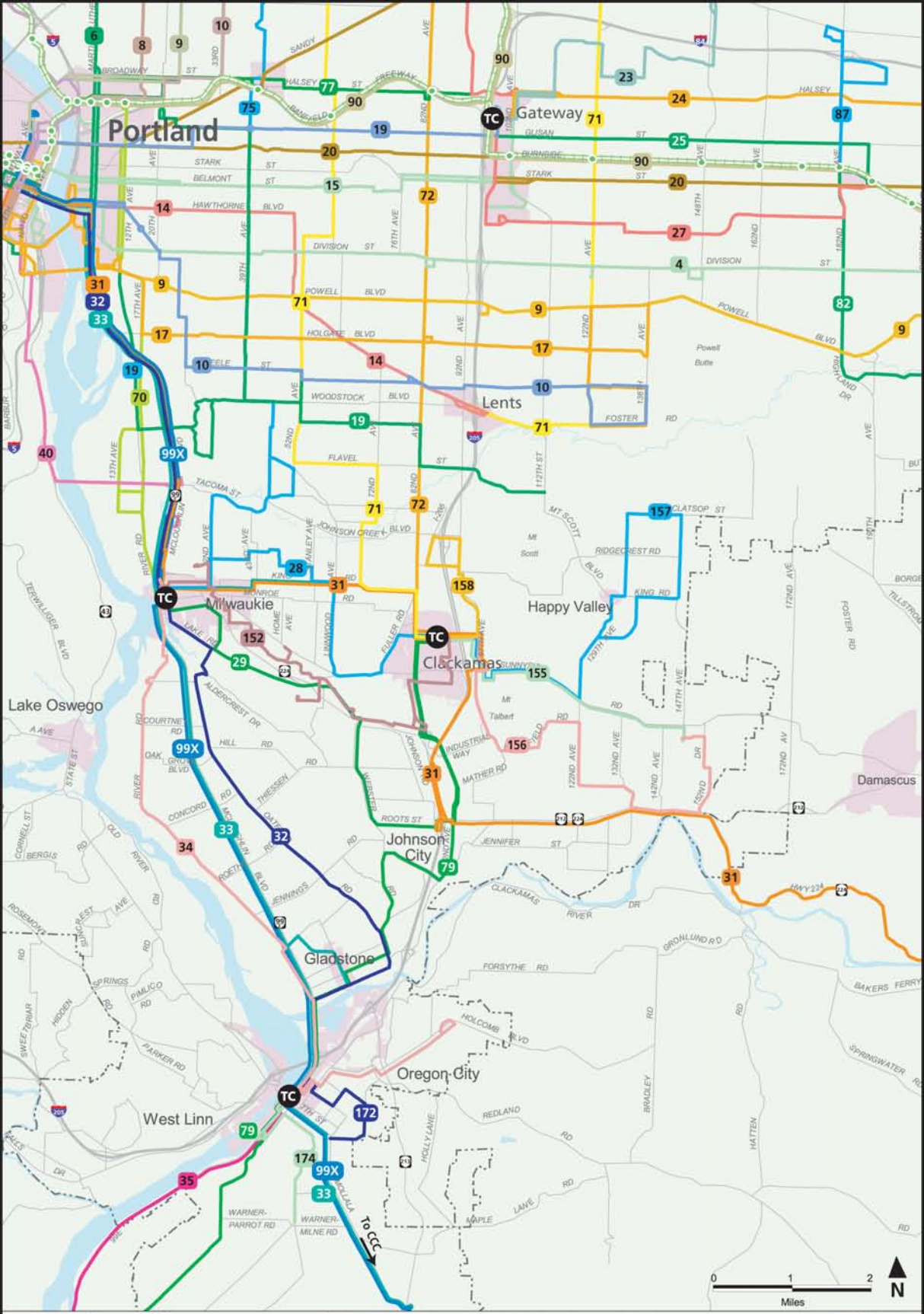


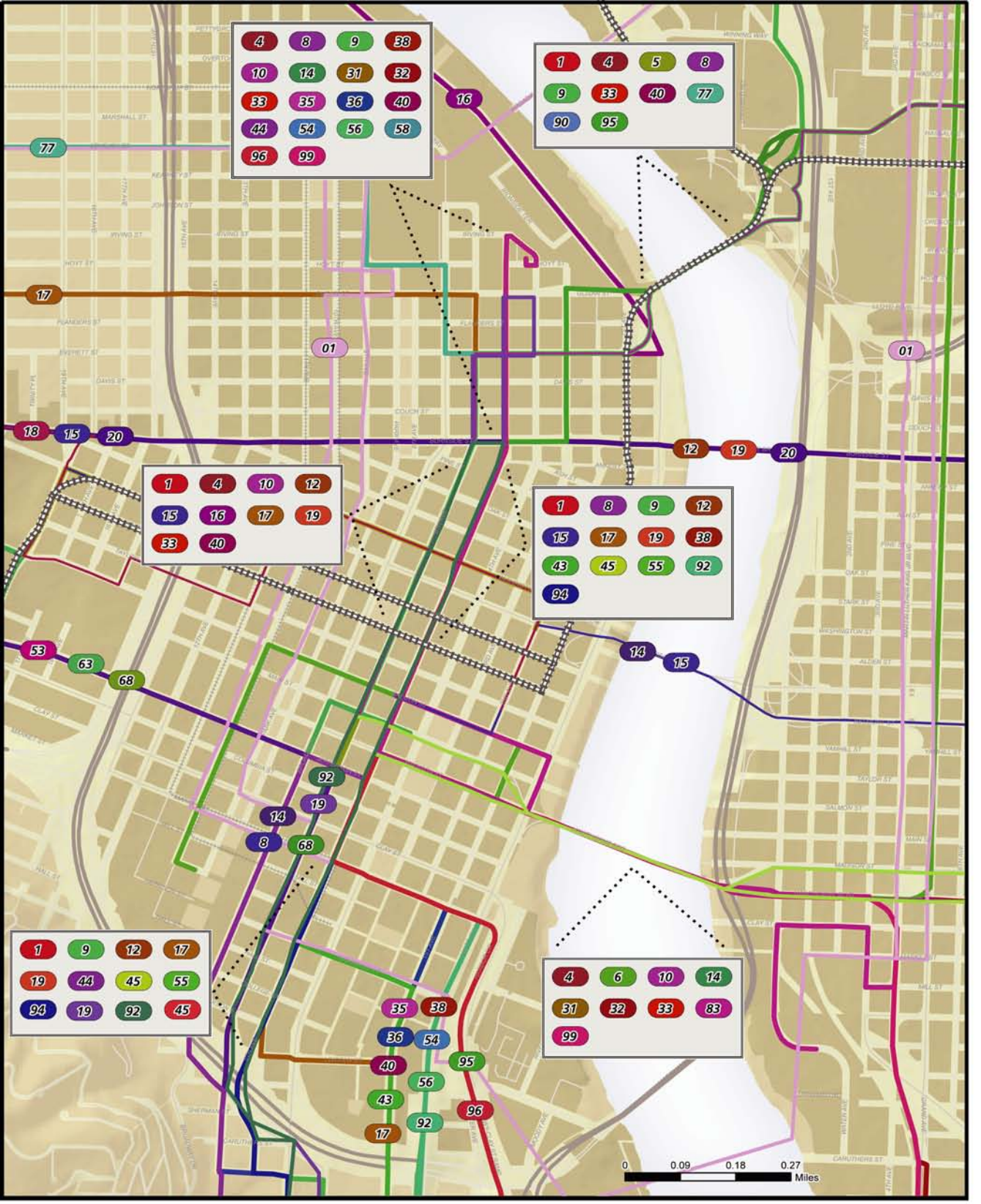
Figure 1.3-1
South Corridor - Existing Transportation Network

LEGEND
29 Bus Route
Light Rail and Station
TC Transit Center
UGB

METRO

SOUTH CORRIDOR STUDY
Transportation Alternatives

October 2003



SOUTH CORRIDOR PROJECT: Portland Mall Segment Existing Transit Network

Figure 1.3-2

METRO PLANNING DEPARTMENT: CORRIDOR DIVISION

EXISTING TRANSIT NETWORK

- 32 Bus Lines
- Light Rail

BOUNDARIES

- Central City

METRO PEOPLE PLACES + OPEN SPACES

0 0.4 0.8 1.2 1.6 Miles

0 0.5 1 1.5 2 Kilometers

TriMet provides bus service within the South Corridor. Line 72 Killingsworth-82nd Avenue that provides bus service along NE/SE 82nd Avenue, parallel to I-205. Line 72 operates with 10-minute or better service between 6:00 a.m. and 7:00 p.m. and is consistently one of the highest ridership lines on the TriMet system. TriMet operates trunk routes on SE McLoughlin Boulevard. These bus lines connect the Portland central business district (CBD) with Milwaukie, Clackamas, and Oregon City. Bus service on SE McLoughlin Boulevard was upgraded in September 1999 to provide a 15-minute frequency during the day and a 7.5-minute frequency during the peak travel hours. As part of that upgrade and subsequent to it, TriMet continues to add and upgrade shelters on SE McLoughlin Boulevard as part of a continuing improvement program.

TriMet also provides light rail service (the Metropolitan Area Express, or MAX) on the Blue Line between Gresham, downtown Portland, Beaverton and Hillsboro, and on the Red Line (Airport MAX) between the Portland International Airport, downtown Portland, and the Beaverton Transit Center. The Yellow Line (Interstate MAX), began operation in May 2004 between downtown Portland and the Expo Center, serving the northern part of the South/North Corridor. The Yellow Line connects with the Blue Line and the Red Line at the Rose Quarter Transit Center and shares the cross-mall alignment in downtown Portland. Both the Blue Line and the Red Line provide light rail service between downtown Portland and the Gateway Transit Center on the Banfield Segment of the corridor.

The transit network within the Downtown Portland Segment is generally composed of four distinct but interrelated elements: the existing bus transit mall, referred to in this FEIS as the Portland Mall light rail alignment; the existing "cross-mall" light rail alignment; the Portland Streetcar rail line, and other bus routes operating in mixed traffic on streets other than the bus transit mall. These are described in more detail below.

- The Portland Mall, which opened in 1978 to provide transit priority right-of-way to improve bus travel times and reliability, is located on SW 5th and 6th avenues, generally extending between SW Harrison Street (in the vicinity of Portland State University (PSU)) and NW Irving Street (in the vicinity of Union Station). Based on the original transit mall design, automobiles are allowed in a single through lane in most sections of the Portland Mall. Chapter Four provides more detail on transit operating characteristics for the Portland Mall.

- The Cross-Mall Light Rail Alignment, which opened in 1986 with the Banfield Light Rail Project (the eastern portion of the Blue Line), is generally located on SW 1st Avenue, between the Steel Bridge and SW Yamhill Street, and on SW Yamhill and Morrison streets between SW 1st Avenue, and SW 18th Avenue. Light rail vehicles operate in exclusive right-of-way, but light rail tracks cross intersecting streets at grade, generally using the downtown Portland signal system and an integrated rail signal system.

- The Portland Streetcar provides circulator service within downtown and in Northwest Portland. The 2.5 mile streetcar line connects northwest Portland with PSU via SW 10th and 11th avenues through downtown's west end district. The streetcar operates in mixed traffic within the constraints of the downtown traffic signal system. The streetcar began operation in July 2001, and a 0.6 mile expansion is underway to RiverPlace. A further extension to the South Waterfront area is planned.

- Buses operating in mixed traffic generally are on NW Glisan and Everett streets, West Burnside Street, SW Washington, Main, Madison, Salmon, Clay and Market streets.

1.4 High-Growth Impacts the Portland/Vancouver Region and the South Corridor

This section describes the high population and employment growth that has occurred within the Portland/Vancouver metropolitan region, Clackamas County, and the South Corridor that has led to transportation problems within the corridor.

A. Portland/Vancouver Metropolitan Region

The population of the four-county region has grown by approximately 56 percent, from 1,100,900 residents in 1975 to 1,789,500 residents in 2000. The population trends over this period consisted of three distinctly different cycles. The 1970s were a period of rapid growth with a population growth rate of 2.1 percent per year on average. The early and mid-1980s were marked by a recession, with population remaining virtually flat. Population has been growing rapidly since 1988, with a net increase of about 350,000 residents added to the region over this period.

Since 1980, the average annual rate of employment growth in the Portland/Vancouver metropolitan region has been almost 50 percent greater than the national average. From 1980 to 2000, employment growth in the Portland/ Vancouver region averaged 3.1 percent per year, increasing from 676,400 jobs in 1980 to 1,164,600 jobs in 2000, while the national average was 1.9 percent. During the late 1980s and into the 1990s, the region's job growth ranked as the fourth fastest in the country, with annual job growth peaking at about 52,000 net new jobs in 1994 and averaging about 32,000 per year. Employment growth slowed in the early 1990s, particularly in 1991, during a short national recession. In the late 1990s the region experienced strong job growth, with an average increase of close to 55,000 net new jobs from 1990 to 2003, reflecting nearly a 2.0 percent annual growth rate.

The recent economic slow-down has affected the nation, Oregon and the Portland/Vancouver metropolitan region. However, the economic slow-down is not expected to persist, and recent economic indicators show that improvement has already begun. The 2025 regional population and household projections account for this slow down and subsequent recovery and have been developed with knowledge that the economy will ebb and flow, with slower rates during some years and higher rates during others.

B. South Corridor

The South Corridor includes portions of Clackamas County, the Portland Central City and some southeast Portland neighborhoods as well as the cities of Milwaukie, Gladstone and Oregon City. The Project is wholly contained with the boundaries of the city of Portland and Clackamas County. Table 1.4-1 presents projected growth in the corridor 2000 to 2025.

Clackamas County. Clackamas County is a fast growing part of the region. Between 1980 and 1998, the number of households in the county increased by about 2.3 percent per year and the number of jobs increased by 3.8 percent per year. The portion of the South Corridor that is located within Clackamas County (Sub-districts 10-22, see Figure 1.2-2) currently contains about 91,150 households, with an expected growth rate of 2.6 percent per year between 2000 and 2025, reaching

an estimated total of 171,500 households by 2025. With respect to employment, the portion of the South Corridor in Clackamas County currently contains about 121,400 jobs. With an expected growth rate of 2.0 percent per year, employment in this portion of the South Corridor is projected to reach 200,540 jobs by 2025. The Clackamas Regional Center has been a major development node in recent years and is projected to continue to develop rapidly. In addition, last year the Metro Council approved a major expansion of the urban growth boundary (UGB) east of Happy Valley in the Damascus area, as well as in several other areas in other parts of the region. When this area is developed to urban densities, it will significantly increase the amount of urban development in the urbanizing portion of Clackamas County, resulting in further demands on the transportation infrastructure.

Table 1.4-1
Projected Households and Employment Growth in the South Corridor by Sub-Area[1]

	Households			Employment		
Sub-Area[1]	**2000**	**2025**	**Change**	**2000**	**2025**	**Change**
Downtown Portland (1)	7,120	17,410	144%	121,300	183,500	51%
Gateway (5)	9,910	14,725	48%	19,520	24,960	28%
Lents (7)	8,150	10,670	31%	6,110	7,700	26%
SE Portland (8)	19,320	22,290	15%	9,160	10,100	10%
Inner SE (9)	8,800	10,850	23%	18,530	22,650	22%
Milwaukie (10)	3,420	9,390	58%	7,770	13,760	76%
Clackamas Reg. Center (12)	7,100	10,190	43%	23,000	40,100	74%
Gladstone (15)	7,990	9,150	14%	8,120	9,330	15%
Oregon City (19)	10,050	18,670	86%	15,930	25,700	61%
South Corridor Total (1-22)	**199,350**	**316,890**	**58%**	**431,580**	**620,000**	**44%**
Regional Total (1-31)	**703,410**	**1,063,560**	**51%**	**1,160,890**	**1,725,000**	**47%**

Sources: US Census, 2000 and Metro Data Resource Center, 2004.
[1] Number designation in parenthesis is a corridor sub-area number. Sub areas are illustrated in Figure 1.2-2.

Portland Central City. The South Corridor encompasses Portland's Central City, which includes the CBD, the Central Eastside Industrial District (CEID), the Lloyd District, and the Rose Quarter. The square footage of office space within downtown Portland increased by approximately 174% between 1980 and 2000, while employment grew by approximately 36 percent. Within Downtown Portland (sub-district 1, see Figure 1.2-2), the number of households is projected to more than double over the next two decades with the addition of 10,280 households, more than twice the growth rate of the corridor and region. Employment in Downtown Portland is expected to increase by approximately 51 percent, similar to the corridor and regional growth rates by 2025. However the number of jobs to be added in downtown is the greatest absolute increase (62,200 jobs) of any regional or town center in the region. The historic and forecast growth rate within the region, the South Corridor and the Downtown Portland Segment will continue to:

- Create a demand for additional transit service, particularly to access downtown employment destinations;
- Result in deteriorating travel conditions; and
- Create opportunities for high-density development nodes that can be well served by high-capacity transit alternatives.

Several southeast Portland neighborhoods are also in the South Corridor. Southeast Portland is primarily an established urban residential area with older industrial uses along major transportation corridors such as SE McLoughlin Boulevard. The portion of Southeast Portland in the Corridor (sub-districts 4-9 in Figure 1.2-2) currently contains 88,500 households and is expected to grow at 0.6

percent per year to 102,530 by 2025.

1.5 The Effect of Traffic Congestion on the South Corridor

High levels of growth in population and employment are expected to continue to cause deteriorating conditions on the transportation system in the South Corridor. Topographic features, land use patterns, a deficient road network and economic conditions fostering growth in Clackamas County have combined to make congested traffic conditions typical of daily travel to, from and within the South Corridor. In the future, traffic problems in the corridor are forecast to worsen as a result of projected growth. Over the past two decades, traffic volumes on the South Corridor's regional roadways have increased significantly. Table 1.5-1 summarizes the historic growth in traffic volumes on I-205, the primary highways connecting activity centers in the South Corridor and downtown Portland.

Table 1.5-1
Historic Growth in South Corridor Average Daily Traffic Volumes on I-205

	1985 ADT [1]	1995 ADT [1]	2002 ADT[1]	% Change (1985-2002)
I-205 at SE Powell Boulevard	76,600	144,300	168,100	119%
I-205 at SE Foster Road	72,300	139,400	153,300	112%
I-205 at SE Sunnyside Road	66,300	111,400	122,300	84%

Source: Oregon Department of Transportation, 2002.
[1] ADT = average daily traffic (vehicle volumes in both directions).

Traffic volumes to, from and within the Downtown Portland Segment have also grown over the past two decades, as indicated by the growth in traffic volumes on the bridges crossing the Willamette River, which generally link the Downtown Portland Segment with the remainder of the South Corridor Study Area. As illustrated in Table 1.5-2, average weekday traffic volumes across the bridges have increased by 13.7% to 64.0% over the past two decades.

Table 1.5-2
Historic Growth in Average Daily Traffic Volumes[1] on Downtown Portland Bridges Crossing the Willamette River, 1980/86 to 2000

Bridge	1980/86 Volume	2000 Volume	% Change
Burnside (1986)	37,900	43,100	13.7%
Morrison (1986)	43,100	55,000	27.6%
Hawthorne (1986)	23,600	36,200	53.4%
Marquam (I-5 freeway 1980)	84,800	139,100	64.0%
Ross Island (1980)	50,100	57,400	14.6%

Source: City of Portland and ODOT, 2003.
[1] Average weekday vehicle volumes in both directions

Growth in traffic within the South Corridor is forecast to continue over the next two decades. Table 1.5-3 summarizes the impacts of population and employment growth on traffic in the South Corridor. As shown, a 39 percent increase in peak 2-hour vehicle miles of travel (VMT) is anticipated in the South Corridor by 2025. This VMT growth is projected to lead to a doubling of the miles of major roads in the South Corridor that are congested (i.e., have volumes that are in excess of 90% of the design capacity of the roadway). This highly disproportionate increase in congestion compared to VMT indicates that traffic conditions in the corridor will quickly and significantly deteriorate over the next 25 years.

Table 1.5-3
Current and Projected South Corridor
P.M. Peak 2-Hour VMT and Congestion - All Arterials and Highways

	Vehicle Miles Traveled		Road Miles with V/C > 0.90	
Sub-Area	**2000**	**2025**	**2000**	**2025**
Gateway (5)	115,760	129,231	5	9
Lents (7)	71,632	91,881	1	7
Inner SE (9)	75,193	88,003	7	9
Milwaukie (10)	35,392	45,376	4	5
Clackamas Reg. Ctr. (12)	121,607	158,492	1	7
Gladstone (15)	24,873	32,299	0	3
Oregon City (19)	125,679	201,866	5	29
South Corridor Total (1-22)	**1,660,344**	**2,311,645**	**76**	**211**
Regional Total (1-31)	**5,978,466**	**8,165,154**	**284**	**633**

Source: Metro, July 2004.
Note: VMT = vehicle miles traveled, V/C = volume-to-capacity ratio is the vehicle volume on a roadway facility at a given point, divided by the roadway's vehicle capacity at that same point. Number in parentheses refers to the analysis districts see Figure 1.2-2.

As shown in Table 1.5-4, by 2025 traffic on I-205 is projected to be at or over capacity for its entire length within the South Corridor. As a result of this projected deterioration of traffic operation service levels, drivers in the South Corridor would experience a significant increase in congested traffic conditions based on the No-Build Alternative (2004 RTP Financially Constrained 2025 Network).

Table 1.5-4
Projected P.M. Peak-Hour South Corridor Traffic Conditions
Southbound – Year 2025 [1]

Location (Southbound Direction)	Volume [2]	V/C Ratio [3]
I-205 south of SE Stark Street	6,366	.96
I-205 south of SE Powell Boulevard	6,823	1.03
I-205 south of SE Foster Road	6,620	1.00
I-205 south of Johnson Creek Boulevard	6,714	1.02

Source: Metro, July 2004.
[1]Based on the No-Build Alternative.
[2]Vehicles per hour.
[3]V/C = volume-to-capacity ratio.

Table 1.5-5 shows that, by 2025 as the major regional highway facilities exceed capacity, the neighborhood arterials that parallel these major facilities would absorb regional travel demand, creating congestion and delay resulting in a variety of impacts to the neighborhoods. Measured on a volume-to-capacity (V/C) basis, these parallel arterials will suffer similar levels of congestion as the major highways.

Table 1.5-5
P.M. Peak-Hour Conditions on Highways and Arterials– Year 2025[1]

Location (Southbound Direction)	Facility	Volume [2]	V/C [3] Ratio
South of SE Stark Street	SE 82nd Avenue	1,150	.82
	SE 102nd Avenue	756	1.08
South of SE Powell Boulevard	SE 82nd Avenue	1,652	.92
	SE 92nd Avenue	589	.84
South of SE Johnson Creek Boulevard	SE 82nd Avenue	1,470	.82

Source: Metro July 2004.
[1] Based on the No-Build Alternative.
[2] Vehicles per hour.
[3] V/C = ratio of vehicle volume to capacity.

1.6 The Effect of South Corridor Growth and Traffic on the Transit System

TriMet operates several major trunk routes in the South Corridor connecting to the Portland Central City. As previously mentioned, traffic congestion has worsened in the past 20 years, resulting, in part, in slower transit travel speeds. A deterioration in transit travel times means that TriMet must increase service hours, operating costs, and the size of the bus fleet in order to maintain a constant level of service, resulting in a loss of operating efficiency.

If transportation network improvements are not made in the South Corridor, conditions will continue to worsen over time. For example, as shown in Table 1.6-1, under the No-Build Alternative, transit travel times from downtown Portland to the Clackamas Regional Center are projected to increase by 58 percent by 2025.

Table 1.6-1
Current and Projected Bus Travel Times[1] in the South Corridor Between Downtown Portland and Select Locations

Location	2000	2025[2]	% Change
Clackamas Regional Center	33	52	58%
Milwaukie	22	31	41%
Oregon City	41	55	34%

Source: Metro, July 2004.
[1] In-vehicle time in minutes during the p.m. peak hour in the peak direction.
[2] Based on the No-Build Alternative.

As congestion causes travel times to increase, schedule reliability will worsen. Timed-transfer operations are particularly sensitive to trunk line reliability. As a result, operations of the Milwaukie, Clackamas Town Center, and the Oregon City Transit Centers are projected to become less reliable over time without exclusive transit right-of-way to protect reliability and improve speed. As reliability decreases and transit time increases, transit ridership can be expected to decrease as well.

In downtown Portland, the Portland Mall and the cross-mall alignment generally provide buses and light rail vehicles, respectively, with a relatively reliable operating environment by providing a high level of exclusive operating right-of-way for transit vehicles. As such, transit vehicles operating on the Portland Mall and the cross-mall alignment have not seen a deterioration in travel times or reliability. However, both the Portland Mall and the cross-mall alignment have theoretical and practical capacity limitations that, if exceeded, could result in a deterioration of speed and reliability for the transit vehicles and patrons using the facilities. Over the next two decades, TriMet does not plan to significantly increase the number of buses using the Portland Mall during peak periods. LRT on the Portland Mall would create additional transit capacity without increasing bus volumes.

TriMet plans to increase the number of light rail vehicles that would enter and exit downtown Portland over the next two decades. The anticipated growth in the number of light rail vehicles entering and exiting downtown Portland would be the result of:

- Growth in ridership and the addition of light rail vehicles on the existing Red (Airport MAX) and Blue (Eastside and Westside MAX) lines needed to meet the increase in demand;
- The recent introduction of light rail service between downtown Portland and north Portland on the Yellow Line (Interstate MAX) and the growth in ridership that will occur through 2025; and

- The introduction of light rail service between downtown Portland and the Clackamas Regional Center with the Green Line and any growth in demand that would occur from the opening of the Green Line to 2025.

Table 1.6-2 summarizes the historic and anticipated growth in the number of light rail trains that would exit downtown Portland via the Steel Bridge during the peak hour in 2025. As illustrated in the table, by 2025, there would be 30 peak hour light rail trains exiting downtown Portland via the Steel Bridge.

Table 1.6-2
Historic and Projected Growth in the Number of Light Rail Trains Exiting Downtown Portland via the Steel Bridge

Event	Year	Trains Per Hour
Initiation of Banfield MAX (western portion of the Blue Line)	1986	8
Initiation of Westside MAX	1998	8
Initiation of Airport MAX	2001	14
Initiation of Interstate MAX	2004	20
I-205 and Portland Mall Opening	2009	26
South Corridor Forecast Year with I-205 Light Rail	2025	30

Source: TriMet, April 2004.

In order to more fully understand the impact that the anticipated growth in the number of light rail vehicles entering and exiting the Downtown Portland Segment would have on the speed and reliability of light rail operations, TriMet performed a detailed analysis of light rail operations on the cross-mall alignment. This analysis was based on the projected light rail vehicle volumes for the year 2020, which included the Red, Blue, Yellow and Green lines. The results of this work, including an assessment of various changes to the cross-mall alignment and downtown Portland signal system, are documented in the *Downtown Light Rail Systems Analysis* (TriMet and Metro: December 2002), prepared in conjunction with the South Corridor SDEIS. The results of this analysis for a 2020 forecast year are presented here to document the need for the proposed project. Chapter 4 of this FEIS includes detailed analyses of 2025 light rail and bus operating conditions and impacts for both the No-Build and I-205/Portland Mall Light Rail alternatives.

These analyses showed that as train volumes grow, there would be a small and gradual increase in light rail running times and delay, which would adversely affect operating speed and schedule reliability. Above 24 trains per hour in one direction, impacts would begin to grow at a greater rate. Operations on the track section of the cross-mall alignment between SW 1st and 11th avenues on SW Yamhill and Morrison streets would create the most significant constraint on system capacity. As future volumes approach 30 trains per hour in one direction, delays and service quality reductions would likely occur. A delayed train could affect other subsequent trains, and, overall, the light rail system would have less ability to recover from schedule delays, especially during peak periods.

For this analysis, combined light rail train volumes on the Red, Blue, Yellow and Green lines of 33 trains per hour in the peak direction were analyzed. The computer model analysis projected that if all of those light rail trains were to be routed on the cross-mall alignment, there would be significant travel time delays and deterioration in reliability. To mitigate for this potential impact, five potential system modifications were examined. Although one of these mitigation measures (i.e., signal timing modifications) held promise to increase capacity to allow for the additional trains associated with the I-205 project, service quality on the cross-mall alignment would still be reduced as the number of trains per hour approaches the ceiling of capacity. For example, light rail travel times from SW 11th

Avenue to the Rose Quarter Station via the cross-mall alignment with 33 trains per hour would increase by approximately ten minutes with no mitigation measures. Depending on the mitigation measure used, the delay could be reduced to 1.2 minutes or could increase to over 14 minutes. Therefore, without an additional light rail alignment within the Downtown Portland Segment, light rail travel times and reliability would tend to degrade, resulting in increasing operating costs and inability to meet a growing demand for transit.

Financial efficiency has been one of TriMet's primary goals over its three-decade existence. During the 1990s, fiscal efficiency in government has increased as a priority as Oregonians have expressed their concerns about taxation and governmental efficiency by passing major tax limitation measures in 1990, 1996 and 1997. During this same period, adoption of the Americans with Disabilities Act (ADA) has required TriMet to expand its special needs transit service, and the large population and employment growth in Washington and Clackamas Counties has compelled TriMet to increase suburban bus service. By their nature, both of these services exhibit relatively high operating costs per rider and have tended to lower TriMet's systemwide average operating efficiency.

Looking forward, there are many factors that will challenge the region and TriMet's ability to keep the cost per ride on the transit system at an affordable level. Elements of the strategy undertaken by TriMet to improve its operating efficiencies include:

- TriMet's Productivity Improvement Process (PIP), which encourages all TriMet employees to develop innovative processes, procedures or technologies that result in greater efficiency and increased service quality. In the five fiscal years from 2000 to 2004, the PIP saved TriMet $16.8 million in ongoing operating and capital costs. PIP savings for fiscal year 2005 are expected to total an additional $2.7 million. Through June 30, 2004, PIP activities had resulted in accumulative cost savings of more than $49 million;
- Endorsing major new regulations requiring transit-supportive land use patterns;
- Adhering more strictly to TriMet's adopted policy to implement periodic fare increases designed to maintain farebox revenue; and
- Improving the operating efficiencies along major regional trunk lines through the implementation of high-capacity transit solutions such as light rail transit (LRT), busway, or bus rapid transit (BRT).

1.7 The Effect of State, Regional, and Local Land Use Plans and Transportation Policies in the South Corridor

1.7.1 Land Use Plans

Over the past quarter century there has been a continuous progression of state, regional, and local policy decisions and investments, in both the Oregon and Washington portions of the region, aimed at establishing growth corridors and activity centers that are supported by high-capacity transit. In 1973, the Oregon Legislature passed Senate Bill 100, which established the Land Conservation and Development Commission (LCDC) and established the requirement for local jurisdictions to prepare, adopt, and enforce comprehensive land use plans. The LCDC adopted goals and guidelines that provided specific direction to cities and counties for development of these comprehensive land use plans. In 1979, to comply with the statewide urbanization goal (Goal 14) the Columbia Region Association of Governments (CRAG, Metro's predecessor) adopted the region's first UGB. The

UGB defined the area in which urban development and investment could occur in the Oregon portion of the metropolitan region. Oregon State law requires that the UGB contain sufficient land to accommodate expected growth for 20 years. State law also requires that county governments prohibit or sharply restrict the type and density of development allowed outside the UGB.

To implement the UGB policies, local comprehensive plans are required to make adequate provision for the urban services needed to support the development envisioned inside the UGB, while complying with other statewide goals. Since 1976, all applicable local and regional land use plans and policies in the Oregon portion of the region have been formulated on the basis of providing high-capacity transit in regional corridors such as the South Corridor. As a result, for 30 years, land use designations, zoning patterns and water, sewer, and other infrastructure plans and investments in all local jurisdictions have been located and sized on the basis of development forecast in high-capacity transit corridors.

In 1991, the LCDC developed and adopted the Transportation Planning Rule (TPR) to implement Statewide Planning Goal 12, Transportation, to strengthen the connections between land use policies and transportation policies. The TPR requires cities and counties to:

- Consider changes to land use densities and designs as a way to meet transportation needs;
- Adopt changes to their subdivision and development ordinances to encourage more transit- and pedestrian-friendly development and street patterns; and
- Amend their comprehensive plans to allow transit-oriented developments along transit routes.

In 1992, Metro district voters approved a new home rule charter that expanded Metro's land use responsibility. The charter directs Metro to prepare and adopt a "Future Vision" for the region, looking ahead for a period of 50 years and addressing "preservation of regional land and natural resources" and "how and where to accommodate the population growth." The charter further directs Metro to adopt ordinances that would require local comprehensive plans and zoning regulations to comply with the *Regional Framework Plan* (RFP).

Metro responded to the charter requirements by developing the *Regional Urban Growth Goals and Objectives,* which contain the *Region 2040 Growth Concept.* These regional land use policies are further defined and implemented through the RFP and the *Regional Transportation Plan* (RTP). Collectively these plans establish the policy approach for managing the land within the UGB and identify development patterns that would help to achieve the regional goals and objectives. The plan is designed to absorb 720,000 additional residents into the Oregon portion of the metropolitan region by 2040 with limited expansion of the UGB.

The *Region 2040 Growth Concept* designates the Portland Central City as the highest density employment hub in the Portland metropolitan region. The role of the Central City as the region's financial, cultural, tourism, retail, and commercial center is reinforced by the plan. The plan designates several "Regional Centers" and defines them as mixed-use areas consisting of high-density employment and residential developments served by high-capacity transit. The *Region 2040 Growth Concept* also designates "Town Centers," and defines them as smaller and slightly less dense than the Regional Centers. Within the South Corridor, the area around the Clackamas Town Center, the Gateway area, and the central area of Oregon City are designated as Regional Centers. The central area of Milwaukie, central Happy Valley, central Gladstone, and the Lents commercial

area are designated as Town Centers. The *Region 2040 Growth Concept* is predicated on implementation of a south/north transit spine linking the key activity centers in the Corridor. If high-capacity transit improvements are not implemented, the region's entire growth management strategy could be at risk.

If the *Region 2040 Growth Concept* (including implementation of the RFP and RTP) is not achieved, the economic vision, livability, and development goals and land use plans for the region would not be realized and would have to be revised. As more and more public and private investment is made based on these regional land use and transportation plans, it is becoming increasingly difficult to turn back on the state, regional, and local transportation plans and policies. Given the links in the region among land use, transportation and transit, economic development and livability, as well as the growing public and private investment in support of these policies, it is essential to consider high-capacity transit options in the South Corridor.

1.7.2 Transportation Policies

In 1973, a Governor's Task Force was formed to clarify the transportation policy of the Oregon portion of the region. At its conclusion, the Task Force decided to assign most of the new commuter growth caused by development to transit. As a result, regional and local transportation planning has shifted from an emphasis on accommodating automobiles to a broader approach aimed at maximizing the efficient use of land through implementation of a multi-modal transportation system.

This shift in regional transportation planning priorities was reinforced in 1976, when the U.S. Department of Transportation (USDOT) formally approved the withdrawal of the proposed Mt. Hood Freeway from the Interstate system. In 1978 CRAG adopted the *Regional Transportation Corridor Improvement Strategy* which established the priority for transit ways in the region's major radial corridors. This action was followed in 1979 by the withdrawal of the proposed I-505 freeway in northwest Portland from the federal Interstate system. These actions initially made approximately $200 million, and ultimately approximately $500 million, available to the metropolitan area for substitute transportation projects. Shortly after the Mt. Hood Freeway withdrawal, the Governor of Oregon requested that CRAG assist in allocating the funds and that priority for the use of the funds be given to "regional transit corridor projects." This action symbolized the shift in policy that new major radial highway capacity would no longer be constructed in the region. Instead, future capacity and maintenance of level of service on major radial corridors depends primarily on high-capacity transit. Highway improvements would be employed primarily to alleviate bottlenecks, balance the system, and respond to safety and operational problems.

There were also secondary implications of these transportation policy decisions. The decision to prioritize major regional transit corridors meant that:

- The remainder of the transportation system would be sized and designed to be compatible with transit;
- The pattern and type of development in the Portland region would be dependent on high capacity transit; and
- The comprehensive plans of the counties and cities in the region would be based on these policies.

In retrospect, over the past two and a half decades, this policy has fundamentally affected almost every major planning and development decision in the region. Since the withdrawal of the Mt. Hood Freeway, there have been a series of major transportation analyses and policy decisions implementing this basic policy shift.

1.8 Project Goal and Objectives

The Goal and Objectives established for the South Corridor Project (the south part of the South/North Corridor) derive from the purpose and need analysis summarized above and as originally defined for the South/North Transit Corridor Study. The Goal of the Project is:

> *To implement a major transit program in the South Corridor that maintains livability in the metropolitan region, supports land use goals, optimizes the transportation system, is environmentally sensitive, reflects community values, and is fiscally responsive.*

The Objectives of the South Corridor Project are to:

1. Provide high quality transit service in the corridor.
2. Ensure effective transit system operations in the corridor.
3. Maximize the ability of the transit system to accommodate future growth in travel demand in the corridor.
4. Minimize traffic congestion and traffic infiltration through neighborhoods in the corridor.
5. Promote desired land use patterns and development in the corridor.
6. Provide for a fiscally stable and financially efficient transit system.
7. Maximize the efficiency and environmental sensitivity of the engineering design of the proposed project.

2. ALTERNATIVES CONSIDERED

The purpose of this chapter is to describe the improvements included in the No-Build Alternative, and Phase 1 of the South Corridor Project Locally Preferred Alternative also known as the I-205/ Portland Mall Project (the Project). These alternatives are described, evaluated, compared, and the results are documented in this South Corridor I-205/Portland Mall Light Rail Project Final Environmental Impact Statement (FEIS).

Section 2.1 of this chapter summarizes the screening and selection process for the South Corridor Project that resulted in the selection of the Phase 1 LPA. This section includes a description of the alternatives considered in the *South Corridor Supplemental Draft Environmental Impact Statement* (SDEIS) and the *Downtown Amendment to the Supplemental Draft Environmental Impact Statement* (ASDEIS), and a description of the screening and selection process, including the original South/North Project alternatives analysis and scoping. Section 2.2 describes the transit and roadway capital improvements and the transit operating characteristics for the No-Build Alternative and the I-205/ Portland Mall Project. Sections 2.3 and 2.4 summarize the capital and operating and maintenance costs of the alternatives, respectively, which provide the basis of the financial analysis described in Chapter 6.

For a more thorough description of the alternatives, refer to the *Final Definition of Alternatives Report* (Metro: November 2004). Detailed plan drawings of the alternatives under consideration may be found in the conceptual design plans and profiles prepared by TriMet in March 2004.

2.1 Screening and Selection Process

The need to examine high capacity transit (HCT) options in the South Corridor was established over two decades of system, sub-area and planning studies and Federal environmental impact and alternatives analysis studies. The previous study stages included: System Planning; Preliminary Alternatives Analysis (Pre-AA); Scoping; Tier I Narrowing of Terminus and Alignment Alternatives; preparation of the *South/North Draft Environmental Impact Statement* (DEIS); *North Corridor Supplemental Draft Environmental Impact Statement* and *North Corridor Interstate MAX Final Environmental Impact Statement*, the *South Corridor Transportation Alternatives Study* and the South Corridor SDEIS and ASDEIS.

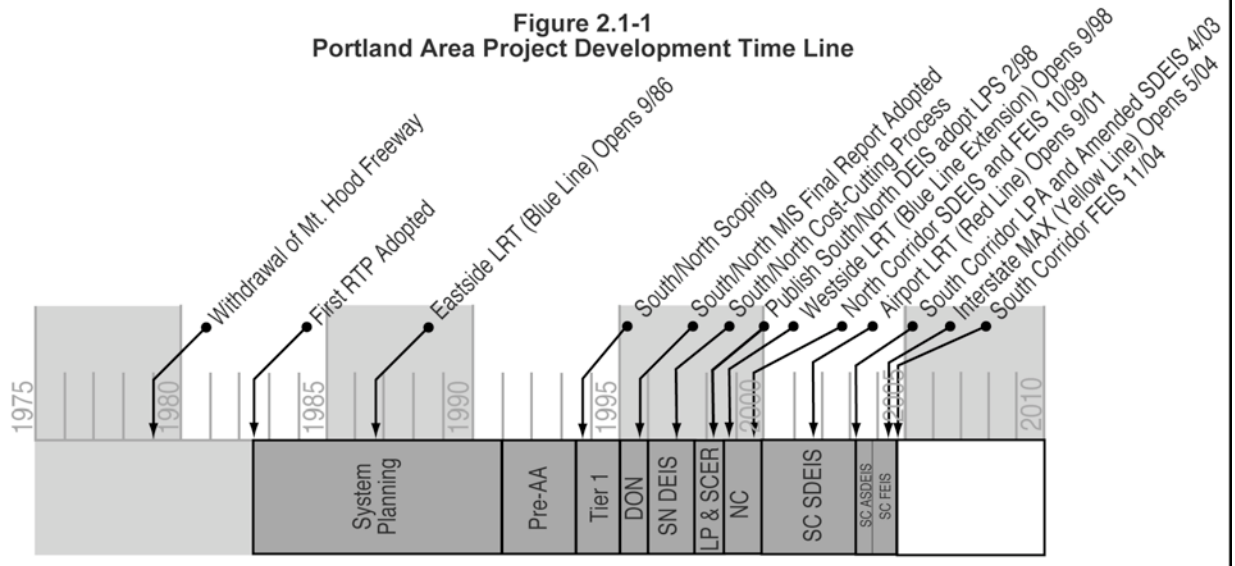
Figure 2.1-1 provides a timeline illustrating the sequencing of these phases. Following is a summary of the major milestones that occurred within each phase. For more detail on the planning background for the South Corridor, see the *South Corridor Transportation Alternatives Study: Background Document* (Metro: January 2000). Also, refer to Section 8.1 and Appendix A of this FEIS for a description of the public involvement process implemented for the study through the various phases of development.

2.1.1 System Planning Studies

During the 30 years following the withdrawal of the Mt. Hood Freeway from the Federal Interstate Highway System, there were a series of major transportation analyses and actions taken that implemented the basic policy shift away from constructing radial freeways and toward a greater emphasis on meeting demand through improvements in public transit. In 1978, the Columbia Region Association of Governments (CRAG – predecessor to Metro) adopted the *Regional Transportation*

Corridor Improvement Strategy, which identified the need to consider transitways in the major radial corridors in the region. In 1982, Metro adopted its first *Regional Transportation Plan* (RTP), determining that a phased approach to implementing the third-priority transitway serving Portland and Clackamas County (after the Banfield and Westside light rail projects, which are now combined as the Blue Line). Between 1984 and 1986, Metro, in cooperation with its regional partners, conducted a system-level Phase I study of transitways in the region, which included the South Corridor (i.e., the Milwaukie and I-205 Corridors). The Phase I study recommended more detailed Phase II studies of the South Corridor.

Figure 2.1-1
Portland Area Project Development Time Line



List of Acronyms

DEIS	- Draft Environmental Impact Statement	LRT	- Light Rail Transit
DON	- Design Option Narrowing	MIS	- Major Investment Study
FEIS	- Final Environmental Impact Statement	Pre-AA	- Preliminary Alternatives Analysis
LPA	- Locally Preferred Alternative	RTP	- Regional Transportation Plan
LPS	- Locally Preferred Strategy	SDEIS	- Supplemental Draft Environmental Impact Statement
S/N	- South/North Corridor	LP	- Listening Posts
NC	- North Corridor	SCER	- South Corridor Evaluation Report
SC	- South Corridor	ASDEIS	- Amendment to the South Corridor Supplemental Draft Environmental Impact Statement

2.1.2 Preliminary Alternatives Analyses

Both Milwaukie and I-205 high capacity transit (HCT) alternatives were evaluated during the Preliminary Alternatives Analyses (Pre-AA). This phase of the study was designed to select a priority corridor to advance as the region's next priority after the Westside Light Rail Project. North and South Corridors were evaluated separately. The South Corridor analysis compared HCT alternatives in the Milwaukie Corridor and the I-205 Corridor. The North Corridor analysis compared HCT alternatives in the I-5 and I-205 Corridors.

For the Milwaukie Corridor, the analysis evaluated a light rail alignment connecting downtown Portland, Milwaukie, Clackamas Regional Center and Oregon City in a "Y" configuration branching at Milwaukie. The I-205 Corridor analysis evaluated an I-205 light rail line that connected Oregon City with Clackamas Regional Center, and Gateway, continuing along the Banfield light rail line to downtown Portland. A light rail connection between Portland International Airport and Gateway, continuing to downtown Portland, was also evaluated. Ultimately, the Airport MAX segment of the I-205 light rail line was constructed and began operation in September 2001.

In April 1993, the Metro Council selected the Milwaukie Corridor to be the priority corridor for the South Corridor and selected the I-5 Corridor as the priority corridor for the North Corridor (Metro Resolution No. 93-1784). Further, the Council adopted an action plan to merge the corridors into a single South/North Corridor for purposes of completing an Alternatives Analysis and Draft Environmental Impact Statement.

The groundwork for the inclusion of the I-205 Segment in the evaluation of South Corridor alternatives began with the 1993 Pre-AA study. Although the Milwaukie and I-5 corridors were chosen as priority corridors for immediate HCT project development, the I-205 corridor remained an important transit corridor. In 1995, two years after the conclusion of the Pre-AA, the region adopted the Region 2040 Growth Concept that created an integrated transportation and land use strategy of focusing higher density development in "Regional Centers" and "Town Centers" connected by high capacity transit. The I-205 segment of the South Corridor would connect the Gateway Regional Center and the Clackamas Regional Center to the Portland Central City, thus helping the region achieve its adopted land use vision of development nodes connected by high capacity transit. The inclusion of the I-205 Segment in the South Corridor supports the pattern of land use and development that is defined in the Region 2040 Growth Concept. The goal of connecting "Regional Centers" with high capacity transit adheres to this vision and is more consistent with the regional vision than the land use plans that were in place during the 1993 Pre-AA Study.

2.1.3 Scoping

The South/North Project was initiated in October 1993, when the Federal Transit Administration (FTA) issued notice in the *Federal Register* of its intent to publish an environmental impact statement (EIS) for the South/North Corridor. The *Scoping Notice* described a two-tier process: first, an initial set of alternatives would be identified, analyzed and evaluated; second, only a small set of the most promising alternatives selected through that process would be studied further in the DEIS. The Scoping Process itself also included an evaluation, public comment and narrowing process that included a series of eight mode and alignment workshops. Within the 30-day public comment period, four public scoping meetings were held to receive comments on the project's proposed range of alternatives and impacts to be studied further. In December 1993 the Federal Scoping Process concluded with the adoption of the *Tier I Description of Alternatives Report* by the South/North Steering Committee (Metro: December 1993).

2.1.4 Tier I Activities

The purpose and outcome of the Tier I activities was to narrow the range of alternatives to be considered within the subsequent Tier II South/North Draft Environmental Impact Statement (DEIS) The primary milestones that occurred during the Tier I phase of the study, which was initiated in January 1994, were: the narrowing of terminus and alignment alternatives through the Metro Council's adoption of the *Tier I Final Report* (Metro: December 1994; Resolution No. 94-1989); the narrowing of design options through the adoption of the *Design Option Narrowing Final Report* by the South/North Steering Committee and endorsed by the Metro Council (Metro: January 1996); the narrowing of downtown Portland light rail alignments through Metro Council's adoption of the *Downtown Portland Tier I Final Report* (December 1995: Resolution No. 95-2243); Metro Council's adoption of the *MIS Final Report* (November 1995: Resolution No. 95-2243); and FTA's approval of the *MIS Final Report* and advancement of the South/North Corridor into Preliminary Engineering.

2.1.5 Tier II South/North Draft Environmental Impact Statement

The purpose of the Tier II phase of the study was to prepare and publish the South/North DEIS and to select a locally preferred alternative. Work on the South/North DEIS was initiated in January 1996. In December 1996, prior to completion of the DEIS, the South/North Steering Committee and the Metro Council evaluated the defeat of a November 1996 ballot measure that would have provided State of Oregon funding for a portion of the cost of the South/North Project. In response to the election results, project staff was directed to undertake a cost-cutting process, which included over 200 public meetings, and which resulted in the Metro Council's adoption of the *Cost-Cutting Measures Final Report* (Metro: May 1997). The cost-cutting process helped to further refine the set of alternatives and options studied within the South/North DEIS.

The South/North DEIS was published on February 27, 1998. The DEIS summarized the significant benefits, costs and impacts associated with the alternatives and options under study. The DEIS also documented the trade-offs between various alternatives and design options. Following the conclusion of the DEIS public comment period on April 24, 1998, Metro initiated the process that led to the adoption of the *South/North Locally Preferred Strategy Final Report* by Metro's Joint Policy Advisory Committee on Transportation (JPACT) and by the Metro Council in July 1998.

2.1.6 North Corridor Supplemental Draft and Final Environmental Impact Statement

In November 1998, voters defeated a local funding ballot measure that would have re-approved the local funding for the South/North Project that was originally approved by voters in 1994. In response to the loss of local funding, elected officials in the region held a series of *listening posts*, where they invited the public to comment on how to best meet the future transportation needs of the region. Generally, the majority of those commenting supported a multi-modal transportation emphasis as a tool to maintain livable communities. Of those commenting specifically on the South/North Project, many suggested moving forward with a shorter project and were particularly supportive of a line to the north only.

In March 1999, a group of local business and community leaders asked TriMet and Metro to investigate the development of a new light rail alignment in the North Corridor, proposing a new *Full Interstate Avenue Alignment* (i.e., the Yellow Line, or Interstate MAX). The TriMet Board of Directors and the Metro Council directed project staff to prepare a SDEIS to examine the benefits, costs and impacts associated with the proposed alignment alternative. In summary, the new alignment significantly reduced costs, displacements and other impacts compared to the adopted Locally Preferred Strategy (LPS) alignment in the North Corridor. The North Corridor SDEIS was published in the *Federal Register* in April 1999.

After considering the SDEIS, public comment and recommendations from participating local jurisdictions, the Metro Council amended the South/North LPS to include the *Full Interstate Avenue Alignment* as the preferred alternative and to define the segment between the Rose Quarter and the Expo Center as the first construction segment. The Federal environmental process for the first segment of the North Corridor was completed in 1999 when FTA, TriMet and Metro published the North Corridor FEIS (October 1999) and when the FTA issued its Record of Decision for the project in the *Federal Register* in January 2000. The Yellow Line was opened in May 2004.

2.1.7 South Corridor Transportation Alternatives Study

In April 1999, in response to the defeat of the November 1998 ballot measure and the subsequent *listening posts*, JPACT directed Metro staff to develop a study work program for the South Corridor that would evaluate and advance non-light rail transportation options that would address the transportation problems in the corridor. The South Corridor Transportation Alternatives Study began with a scoping process, which concluded in May 2000. Comments received during the scoping process were documented in the *South Corridor Transportation Alternatives Study Public Comments for Scoping* (Metro: May 2000). The Policy Group considered the comments when they issued the *South Corridor Study Wide Range of Alternatives* report (Metro: July 2000), which identified the array of alternatives (mode and general alignment) for further study and evaluation in the South Corridor Transportation Alternatives Study.

In October 2000, Metro and the study participants published the *South Corridor Transportation Alternatives Study Evaluation Report*, which documented the study's evaluation and assessment of seven non-light rail transportation modes or approaches that were identified to address the corridor's transportation problems. The following alternatives were evaluated in the report:

- No-Build Alternative;
- Commuter Rail Alternative;
- River Transit Alternative;
- High Occupancy Vehicle (HOV) Lanes Alternative;
- High Occupancy Toll (HOT) Lanes Alternative;
- Bus Rapid Transit; and
- Busway Alternative.

After the Evaluation Report was published, the project staff and decision makers held a series of open houses and accepted public comment on the study's analysis and findings. In November 2000, after considering the technical analysis (i.e., benefits, costs and environmental impacts in relationship to the corridor's transportation and land use problems and opportunities), public comment and recommendations from the study's technical advisory group, the project's Policy Group narrowed the range of mode alternatives to advance into further study.

After reviewing the Evaluation Report and hearing from the public (as documented in the *South Corridor Transportation Alternatives Study Public Comment Report*), the Policy Group determined that River Transit, Commuter Rail, HOV Lanes and HOT Lanes failed to meet the project's goals and objectives (i.e., support for land use goals, reflecting community values and providing high quality transit service in the corridor). The rationale for these decisions is documented in more detail in the *South Corridor Evaluation Summary Repor*t (October 2000) and summarized below.

The rationale for removing the River Transit Alternative from further study included:

- The location of the service and the re-located transit center along the Willamette River would not serve land uses in Oregon City, Lake Oswego, City of Milwaukie or downtown Portland very well. Service to many of these key locations in the South Corridor would require bus transfers or long walks to the town and regional centers.
- This option could not serve the Clackamas Regional Center, due to the distance from the river.

- The River Transit Alternative would cost $6 million more annually to operate than other alternatives.
- River Transit would attract the least amount of corridor ridership of any of the alternatives.
- Transit centers and park-and-ride garages adjacent to the Willamette River would not be consistent with local plans for the riverfront area.
- The transit centers and park and rides would be located in or near Willamette River riparian areas, and docks and piers would be located on the Willamette River creating concerns related to threatened and endangered fish species.
- The River Transit Alternative was not strongly supported by public comments.

The rationale for removing Commuter Rail Alternative from further study included:

- The proposed stations would not serve the regional and town centers of the South Corridor very well, with the exception of Oregon City. The Clackamas Regional Center would be located more than one mile from the nearest station, the Milwaukie Town Center would be located more than three quarters of a mile from the nearest station, and access into downtown Portland would require a transfer or long walk across the Hawthorne Bridge.
- The Commuter Rail Alternative would operate only during peak hours.
- The Commuter Rail Alternative would require substantial new track and right-of-way, but would still be limited in the hours of use due to bottlenecks in the existing Union Pacific main line railroad and as a result, would be the second most expensive alternative to operate and build.
- Potential conflicts associated with the sharing of portions of the Union Pacific mainline tracks, right-of-way and the portions of the Brooklyn Yard intermodal facility could be costly and create service delays and decrease reliability.

The rationale for removing the High Occupancy Toll Lanes Alternative and the **High Occupancy Vehicle Lanes Alternative** from further study included:

- Public acceptance of the HOT and HOV lanes were the lowest of all alternatives;
- Alternatives would not have directly served Clackamas Regional Center;
- Would have eliminated or significantly reduced some local access to Highway 224;
- The HOT and HOV alternatives would have resulted in physical and emotional impacts to neighborhoods in Milwaukie and Portland; and
- Lack of downstream capacity to handle additional vehicles attracted to the facility.

The Policy Group determined that the Bus Rapid Transit Alternative and the Busway Alternative best met the project's goals and objectives and should be studied further in the South Corridor SDEIS along with the No-Build Alternative.

The Policy Group also heard substantial public comments expressing support for the inclusion of light rail alternatives in the SDEIS. The central and southeast Portland neighborhoods, City of Milwaukie neighborhoods and Clackamas area citizens urged the Policy Group to add Milwaukie light rail and I-205 light rail as alternatives for further study in the SDEIS. The Policy Group directed staff to proceed with the development of a lower-cost Milwaukie light rail alignment and to develop a concept for an I-205 light rail alignment that would operate between the Clackamas Town Center TC and the Gateway TC. After reviewing the subsequent analyses, the Policy Group

determined that both Milwaukie light rail and I-205 light rail should be further examined in the SDEIS as elements of the following alternatives:

- Milwaukie Light Rail Alternative;
- I-205 Light Rail Alternative; and
- Combined (I-205 and Milwaukie) Light Rail Alternative.

The Policy Group directed staff to work with the FTA and the Federal Highway Administration (FHWA) and other Federal, state and local agencies to prepare a SDEIS for the South Corridor based on this range of six alternatives. In preparation for the SDEIS, the Policy Group also evaluated and selected a range of design options for each of the alternatives that would also be studied further in the SDEIS. In February 2002, the FTA and FHWA issued a supplemental scoping notice in the *Federal Register,* announcing its intent to prepare and publish a SDEIS based on this range of alternatives.

The South Corridor SDEIS provides a summary of the significant benefits, costs and environmental impacts associated with six alternatives. The SDEIS findings were presented to the public in a series of open houses and public meetings. The South Corridor Project Policy Committee made the initial recommendation for the LPA for the South Corridor. The local jurisdictions in the corridor each reviewed and endorsed the Policy Committee's recommendation. The *South Corridor Project Locally Preferred Alternative Report* (Metro: April 2003) documents the decision defining the I-205/ Portland Mall Light Rail Project as the Phase 1 Locally Preferred Alternative and the first construction segment, to be followed by phase 2, the South Corridor Milwaukie Light Rail Project. The rationale for selecting the LPA and removing some of the alternatives from further study are summarized below.

The rationale for removing the BRT Alternative from further study included:

- The BRT Alternative would have resulted in the fewest number of corridor transit trips and would have been the least reliable due to the lack of separated right-of-way and least number of protected intersections.
- The BRT Alternative would have resulted in less travel time-savings for most major origin and destination locations.
- The BRT Alternative would have reduced the vehicle miles traveled and vehicle hours of delay by second smallest amount compared to the other alternatives.
- The BRT alignment would have been located in the vicinity of the greatest number of hazardous materials sites of all the alternatives.
- The BRT Alternative did not have strong public acceptance.

The rationale for removing the Busway Alternative from further study included:

- Public acceptance of the Busway Alternative was low due to potential traffic impacts, displacements and noise impacts. The Busway Alternative was strongly opposed in the Milwaukie to Clackamas Regional Center Segment due to ecosystem and traffic impacts and other concerns of the residents.
- The Busway Alternative would have resulted in a slower transit travel time compared to the Locally Preferred Alternative.
- The Busway Alternative would have resulted in the most noise impacts.
- The Busway Alternative would have resulted in the most displaced businesses (51).

- The Busway Alternative would have resulted in the greatest amount of riparian impacts of all the alternatives considered.
- The Busway Alternative would have created more acres of new impervious surfaces compared to the other alternatives.
- The Busway Alternative raised concerns about the vehicle capacity of the Hawthorne Bridge and Portland Mall to accommodate additional articulated buses.

The rationale for selecting the Combined LRT Alternative (I-205 and Milwaukie) as the LPA, and not selecting the just the I-205 Alternative or just the Milwaukie Alternative as stand alone projects included:

- The LPA resulted in the greatest increase in corridor and systemwide transit trips and would result in the greatest reduction in vehicle miles traveled and vehicle hours of delay.
- The LPA would result in the greatest reduction in traffic infiltration into neighborhoods.
- The LPA would better support activity centers as measured by access to fast and reliable transit service to town and regional centers.
- The LPA would provide greater access to high quality transit service as measured by population located within ¼ mile of fixed guideway stations, the amount of park-and-ride spaces and lots, the ease of transfers and the reliability of the alternative.
- The LPA would result in the greatest reduction in air pollution.
- The LPA would result in the most significant economic benefit in the region in both jobs created during construction and additional personal income.
- The LPA received greater support than the other alternatives.

2.1.8 History of Downtown Portland Transit Mall Alignment Plans and Policies

In downtown Portland, numerous light rail alignments have been investigated over the last 30 years. Following is a short description of these studies and alignments.

- The **Downtown Plan,** completed in 1972, called for a high-capacity transit spine in downtown Portland to help focus and serve high-density development along SW 5th and 6th avenues. Southwest 4th Avenue and SW Broadway were designated auto and truck access streets, providing balanced access for all types of vehicle trips in the Downtown core area.

- The **Portland Mall,** on SW 5th and 6th avenues between SW Madison and W Burnside streets, opened in 1978. These streets were reconfigured from major general purpose traffic streets with on-street parking to streets where buses and pedestrian activity are the major focus.

- During the planning phase for the **Banfield Light Rail Project** in 1979, numerous downtown light rail alignments were investigated including SW/NW 4th, 5th, 6th avenues SW/NW Broadway, and SW Yamhill/Morrison streets (Cross Mall). The Cross Mall alignment was selected to avoid impacting the newly constructed Portland Mall and conflicts with automobiles and trucks on SW 4th Avenue and SW Broadway. The Portland City Council conditioned its approval of the Cross Mall alignment on the recommendation that the next light rail alignment should be placed on the existing downtown Portland bus transit mall. The Banfield Light Rail Project opened in 1986.

- The **Central City Plan** completed in 1988, reaffirmed the Portland Mall as the preferred location for light rail transit and strengthened zoning allowing for the highest land use densities along SW 5th and 6th avenues to be supported by transit. Private enterprises continue to utilize SW 4th Avenue and SW Broadway for auto and truck access.

- During the planning phase for the **Westside Light Rail Project,** the Portland Mall and Cross Mall alignments were reinvestigated. The Cross Mall was selected. This decision was the result of input from the *Downtown Rail Advisory Committee (DRAC)* in 1989, which noted that enough capacity existed on the Cross Mall to accommodate the Westside Line and advised that the next north-south line be located on the Portland Mall. The Westside LRT (i.e. the west portion of the Blue Line) opened in 1998.

- The ***DRAC*** was reconvened during the **North/South Light Rail Analysis** in 1993 to advise on light rail alignments. Numerous surface alignments were reexamined and a light rail alignment on SW 5th and 6th avenues was reconfirmed as the best surface alignments. The SW 4th Avenue and Broadway subway options were also investigated but were dropped from further consideration. Significantly higher cost of a subway led decision makers to recommend the Portland Mall alignment. A six-month study was undertaken by the Downtown Oversight Committee to refine the Portland Mall alignment.

- The **Downtown Oversight Committee** included elected officials and business leaders. This group investigated various bus, light rail and automobile configurations for the Portland Mall as well as entries to the Portland Mall on the north and south ends of downtown. Configurations included four, three and two lane combinations on SW 5th and 6th avenues. The recommendations from this committee were developed into plans that were examined in the South/North DEIS and were selected as the downtown alignment for the *South/North Locally Preferred Strategy* (Metro: July 1998).

- During the **South Corridor Project,** the Project's Policy Committee directed staff to develop lower-cost alignments for light rail, which resulted in a Willamette River crossing using the Hawthorne Bridge and SW 1st Avenue and the I-205 Light Rail Alignment proposal to operate on the Cross Mall. As noted previously, during the public comment period for the *South Corridor Project SDEIS* (Metro: December 2002), many concerns were raised about the feasibility of adding more trains to the Cross Mall and SW 1st Avenue, particularly the effects on reliability. Based on these public comments and technical concerns, the Metro Council directed in the *South Corridor Locally Preferred Alternative Report* (Metro: April 2003) that a Portland Mall alignment with the I-205 Light Rail Alternative be included in the Preliminary Locally Preferred Alternative.

- The ***Downtown Amendment to the South Corridor Project Supplemental Draft Environmental Impact Statement*** (October 2003) described the Portland Mall light rail alignment alternatives and evaluated their impacts. Following public review and comment, the Portland City Council and the TriMet Board held public hearings and recommended reaffirming the Locally Preferred Alternative (LPA) for Downtown Portland that included light rail on the Portland Mall. The Metro Council reaffirmed the LPA in January 2004. The Portland Mall LPA is described in the *Downtown Portland Mall Segment Locally Preferred Alternatives Report* (January 2004). The adopted Downtown Portland LPA includes direction that light rail should be implemented from the west end of the Steel Bridge where it would diverge from the existing MAX tracks, to NW

5th and 6th avenues via NW Irving Street. The alignment would turn south on NW 5th and 6th avenues, crossing West Burnside Street and extending south to PSU terminating at a turnaround on SW Jackson Street between SW 5th and 6th avenues. The I-205/Portland Mall Project is intended to serve the high-density spine along SW 5th and 6th avenues and the central and southern sections of the Portland Mall. A detailed description of the I-205/Portland Mall Project is included in Section 2.2.2.

2.2 Definition of Alternatives

The purpose of this section is to provide a description of the Phase 1 Locally Preferred Alternative (I-205/Portland Mall Project or Project) and the No-Build Alternative that are documented in this FEIS. A more comprehensive description of these alternatives, including detailed plan and profile drawings for the I-205/Portland Mall Project, can be found in the *Final Definition of Alternatives Report* (Metro: November 2004). This section summarizes the following: 1) the transit (bus and light rail) and roadway capital improvements for each alternative, and 2) the bus and light rail operating characteristics for each alternative. Table 2.2-1 summarizes the transit and roadway improvements that would be included with both alternatives. Table 2.2-2 summarizes the transit vehicles and service characteristics of both alternatives.

2.2.1 No-Build Alternative

This section describes the attributes of the No-Build Alternative (see Table 2.2-1). The No-Build Alternative serves as a reference point to gauge the benefits, costs and impacts of the I-205/Portland Mall Project.

The bus service network, related transit facilities and roadway improvements included in the No-Build Alternative are consistent with the *2004 Federal Update of the Regional Transportation Plan* (RTP) 2025 financially constrained transit and road network (Metro: December 2003). This section summarizes the capital improvements (i.e., transit and roadway) and transit operating characteristics of the No-Build Alternative. More detail on the capital improvements and operating characteristics of the No-Build Alternative can be found in the *Final Definition of Alternatives Report* (Metro: November 2004).

2.2.1.1 No-Build Capital Improvements

This section summarizes the transit and roadway improvements that are included in the No-Build Alternative. These proposed capital improvements are consistent with the financially constrained transit and road network of the RTP.

A. No-Build Transit Improvements

In addition to the existing transit capital facilities in the South Corridor, the No-Build Alternative would include a 300-space shared-use park-and-ride lot at the New Hope Church, east of the Clackamas Town Center on SE Monterey Avenue.

Outside of the South Corridor, the No-Build Alternative would include the Yellow Line (the Interstate MAX light rail line) between downtown Portland and the Expo Center in North Portland, which opened in May 2004. The No-Build Alternative also includes the existing Blue Line (the

Eastside MAX and the Westside MAX light rail lines), between Gresham and Hillsboro, and the existing Red Line (the Airport MAX light rail line), between the Portland International Airport and Beaverton Transit Center. The transit capital improvements in the No-Build Alternative are also included in the I-205/Portland Mall Project.

Table 2.2-1
Summary of Transit and Roadway Improvements for All Alternatives

Alternative	Transit Improvements	Roadway Improvements
No-Build Alternative	• Existing 2004 transit services and facilities; • Service improvements based on TriMet service standards (see Section 2.2.1.2.A for more detail); • Some increases in route frequency and/or run times to avoid peak overloads and/or maintain schedule reliability; • Incremental increases in service hours and associated vehicle procurement, consistent with available revenue sources and consistent with the RTP 2025 financially constrained transit network, annual increases in service hours forecast to be approximately 1.5% per year; • Three new bus routes in the South Corridor: 1) a route that would connect the Clackamas TC and the Milwaukie TC; 2) a route that would connect Oak Grove with the Clackamas TC; and 3) a route that would operate on I-205, connecting the Gateway and Clackamas TCs; • Yellow Line (Interstate MAX) from the Rose Quarter to the Expo Center; • Currently planned transit capital improvements, such as a 300-space surface P&R lot at the New Hope Church; • Minor changes in transit operations and routing in the South Corridor; and • An additional (fourth) bus operations and maintenance facility and expansion of the Powell Garage to accommodate at least 50 additional buses.	Road improvements are limited to those in the RTP financially constrained highway network – see the *South Corridor Project Final Definition of Alternatives Report* (Metro: November 2004) for a detailed listing of the planned roadway projects within the South Corridor.
I-205/ Portland Mall Project	• All transit improvements included within the No-Build Alternative; • The I-205/Portland Mall Project light rail alignment would operate on 14 miles of existing and new alignments (6.5m I-205, 6.2m Banfield, 1.8m Portland Mall). • The I-205 Segment would consist of approximately 6.5-miles of new double-tracked LRT alignment, that would connect the existing Gateway TC and the Clackamas TC, generally parallel to I-205 with 8 new LRT stations (Clackamas Town Center Station, Fuller Station, Flavel Station, Lents Station, Holgate Station, Powell Station, Division Street Station, Main Street Station). • Trains would operate on 6.2 miles of existing tracks on the Banfield line shared with the Blue and Red lines. The Banfield Segment would operate with all of the existing stations currently used by the Red and Blue Lines between Gateway TC and Rose Quarter TC; • The Portland Mall Segment would consist of 1.8-miles of one-way track, northbound on NW/SW 6th Avenue and southbound on NW/SW 5th Avenue with seven pairs of station platforms (Union Station, Chinatown Station, Oak/Pine Station, Pioneer Square Station, City Hall Station, PSU Station, PSU South Station); • The I-205 bus route included in the No-Build Alternative, between the Gateway and Clackamas TCs would be eliminated; • Five additional P&R lots providing 2,066 additional spaces (combined capacity, in addition to the No-Build Alternative). Park-and-ride lots would be located at Clackamas Town Center (500 spaces – structured), Fuller (624 spaces), Holgate (125 spaces), Powell (391 spaces), and Main Street (426 spaces); • Relocation of the Clackamas TC; and • Expansion of the Ruby Junction O&M facility to accommodate 30 additional LRVs.	Road improvements would generally be limited to those in the RTP financially constrained highway network; except for one minor modification to a ½ mile section of SE Fuller Rd to accommodate the LRT alignment.

Source: *Final Definition of Alternatives Report*. (Metro: November 2004).
Note: LRT = light rail transit; TC = transit center; P&R = park-and-ride; Clackamas TC = Clackamas Town Center Transit Center; RTP = *2004 Federal Update to the Regional Transportation Plan* (Metro: December 2003); NB = northbound; SB = southbound; O&M = Operations and Maintenance.

Table 2.2-2
Transit Vehicles and Service Characteristics (2025)

Attribute		No-Build	I-205/Mall Project
Number of buses			
South Corridor			
	In service	246	240
	Spares	61	60
	Total	307	300
Systemwide			
	In service	822	821
	Spares	206	206
	Total	1,028	1,027
Number of LRVs			
South Corridor			
	In service	0	26
	Spares	0	4
	Total	0	30
Systemwide			
	In service	102	128
	Spares	15	19
	Total	117	147
Transit VMT (Weekday)			
South Corridor			
	Bus	30,720	30,130
	LRV	0	2,790
Non-Corridor			
	Bus	75,020	74,900
	LRV	11,910	11,910
Systemwide			
	Bus	105,740	105,030
	LRV	11,910	14,700
Place Miles[1] (Weekday)			
South Corridor			
	Bus	2,027,520	1,988,580
	LRV	0	741,874
Non-Corridor			
	Bus	4,880,745	4,872,960
	LRV	3,168,060	3,168,060
Systemwide			
	Bus	6,908,265	6,861,540
	LRV	3,168,060	3,909,934
Revenue Hours (Weekday)			
South Corridor			
	Bus	1,970	1,920
	LRV	0	150
Non-Corridor			
	Bus	4,630	4,580
	LRV	600	600
Systemwide			
	Bus	6,600	6,500
	LRV	600	750

Source: *Final Definition of Alternatives Report* (Metro: November 2004).
Note: VMT=vehicle miles traveled; LRV=light rail vehicle
[1] Place miles= *transit vehicle* (seated and standing) multiplied by vehicle miles traveled.

Table 2.2-3
Primary Transit Facilities in the South Corridor

Transit Facility	No-Build	I-205/Mall
Separated Guideway		
Light Rail Track Miles (two-way)	0	8.3
Stations		
Light Rail Stations	0	15
P&R Lots		
Light Rail P&R Lots	0	5
P&R Spaces		
Light Rail P&R Spaces	0	2,066
O&M Facility		
Building Size[1]	211,000	236,700
Property Size[1]	0	313,000

Source: *Final Definition of Alternatives Report* (Metro: November 2004).
Note: LRT = light rail transit; LRV = light rail vehicle; P&R = park-and-ride; O&M = operating and maintenance.
[1] Expansion at Ruby Junction in square feet, compared to existing.

B. No-Build Roadway Improvements

In addition to the existing interstate, state, regional and local roadway facilities, the No-Build Alternative would include a variety of roadway improvements that are defined in the financially constrained road network of the RTP. Following is a list of the most significant roadway improvements that would occur in the South Corridor under the No-Build Alternative:

- Burnside/Couch Couplet – implement a one-way couplet with westbound traffic on NW Couch Street and eastbound traffic on W Burnside Street.
- Foster/Woodstock Improvements – Phase I & II of the Lents Town Center Plan including new traffic signals, pedestrian crossings, etc.
- Johnson Creek/I-205 Interchange – rebuild interchange and add loop ramp and northbound on-ramp; realign southbound off-ramp.
- Otty Road – widen and add turn lanes; extend Otty Road west across SE 82nd Avenue.
- Sunrise Highway – construction of a new four-lane highway from 1-205 to SE 122nd Avenue.
- Linwood/Harmony/Lake Road Improvements – grade separation of SE Harmony Road over the Union Pacific Railroad between its intersection with SE Lake Road, SE Linwood Avenue and SE Railroad Avenue.
- Harmony Road Improvements – widening SE Harmony Road, from generally two to three lanes to five lanes, between SE 82nd Avenue and Highway 224.
- West Monterey Extension – extension of SE Monterey Avenue between SE 82nd Avenue and SE Fuller Road, as a two-lane roadway.
- Monterey Improvements – widening of SE Monterey Avenue, from generally two to three lanes to five lanes, between SE 82nd Avenue and I-205.
- Causey Avenue Extension – extension of SE Causey Avenue across I-205 to SE Bob Schumacher Road as a three-lane roadway.
- Sunnybrook Road – construct a three-lane extension to provide alternative east-west route connecting SE Sunnyside Road and SE Harmony Road.

The roadway capital improvements in the No-Build Alternative are independent of the transit improvements and would be implemented for the Project as well.

2.2.1.2 No-Build Transit Operating Characteristics

This section summarizes the bus and light rail operating characteristics that would occur under the No-Build Alternative. A more detailed summary of transit operating characteristics can be found in the *Final Definition of Alternatives Report* (Metro: November 2004).

A. No-Build Bus Operations

Similar to TriMet's existing transit network (Figure 1.2-1), the No-Build Alternative would provide peak-hour bus service between downtown Portland and the South Corridor, generally via the major radial streets in southeast Portland (e.g. SE Division, SE Powell, SE Holgate) and northern Clackamas County (SE King Road). Trunkline bus service in the western portion of the South Corridor would be via SE McLoughlin Boulevard north of Milwaukie, with buses operating on an average combined headway of approximately two and one-half minutes on SE McLoughlin Boulevard and of approximately two minutes to and from the Milwaukie TC, in the a.m. and the p.m. peak periods, respectively.

Again, similar to the existing transit network in the South Corridor, other routes would provide cross-town and/or feeder service and would operate at somewhat longer headways, depending on demand. In general, all fixed routes (existing and future) would operate at minimum policy headways, as outlined in *TriMet Service Standards* (TriMet: May 1989). The Standards are as follows: Urban Grid Routes, Regional/Urban Trunk Routes – 10 minutes peak and 15 minutes base; City Radials and Crosstown Routes – 15 minutes peak and 15 minutes base; Suburban Timed Transfer and Regional Trunks – 15 minutes peak and 30 minutes base; Suburban Radials/Feeders – 30 minutes peak and 30 minutes base; and Peak-Only Radials/Feeders – 30 minute peak.

Transit service improvements within the No-Build Alternative would be limited to those that could be funded using existing revenue sources. In general, the average annual increase in service hours projected to be available under the financially constrained transit network through 2025 would be approximately 1.5 percent per year. Systemwide, TriMet, C-TRAN, and SMART would operate approximately 6,600 weekday revenue hours of bus service under the No-Build Alternative in the year 2025, approximately 32 percent more than it provided in 2000.

Following is a listing of the bus service improvements associated with the No-Build Alternative, highlighting the most significant changes that would occur relative to the existing bus network in the South Corridor (note that all route numbers and names used for new bus routes are for the purpose of this study only – they may not be the route numbers assigned when implemented by TriMet):

- All existing transit service, as of March 2004, that was not included in the South Corridor Project's September 2000 base year transit network;
- Modifications to Route 31-Estacada, that would alternately branch the route to Damascus and Estacada, and to Route 155 Sunnyside, that would extend the route into Damascus;
- The addition of Route 30-Johnson Creek, which would connect the Clackamas Town Center TC with the Milwaukie TC, generally via SE Johnson Creek Boulevard;
- The addition of Route 07-Thiessen, which would connect the Oak Grove residential area with commercial activity in the Clackamas Regional Center, generally via SE Theissen Road; and
- The addition of Route 03-Parkrose/Clackamas Town Center, which would connect the Parkrose TC, the Gateway TC and the Clackamas Town Center TC, generally via I-205.

Under the No-Build Alternative, buses in the South Corridor would continue to operate in mixed traffic on increasingly-congested streets and highways, and would generally experience increases in their travel time and a deterioration of their schedule reliability into the foreseeable future.

Under its draft *Facilities Master Plan*, an additional (fourth) bus operations and maintenance facility and a modest expansion at the Powell Garage would be completed by 2025. These improvements would be implemented under the No-Build Alternative and TriMet would have the operations and maintenance building capacity to accommodate increases in the bus fleet size due to the No-Build Alternative without any other facility increases.

B. Light Rail Operating Characteristics

With the No-Build Alternative, TriMet would operate light rail service on three interconnected lines, described in Section 2.2.1.1.A. With the opening of the Yellow Line (Interstate MAX) in May 2004, all three lines (Yellow Line, Blue Line and Red Line) are now in revenue service.

Under the No-Build Alternative in 2025, Blue Line light rail trains would generally operate every five minutes (12 trains per hour) between Gresham and Hillsboro during the peak period, and every twelve minutes (5 trains per hour) during off-peak times. Red Line light rail trains would operate as they currently do, between Beaverton Transit Center and the Portland International Airport, at fifteen-minute headways (4 trains per hour) during peak and off-peak periods. On the Yellow Line, trains would operate between downtown Portland and the Expo Center in North Portland at ten-minute headways (6 trains per hour) in peak periods and twelve-minute headways (5 trains per hour) during off-peak periods. There would be no light rail service operated in the South Corridor under the No-Build Alternative.

2.2.2 I-205/Portland Mall LRT Project

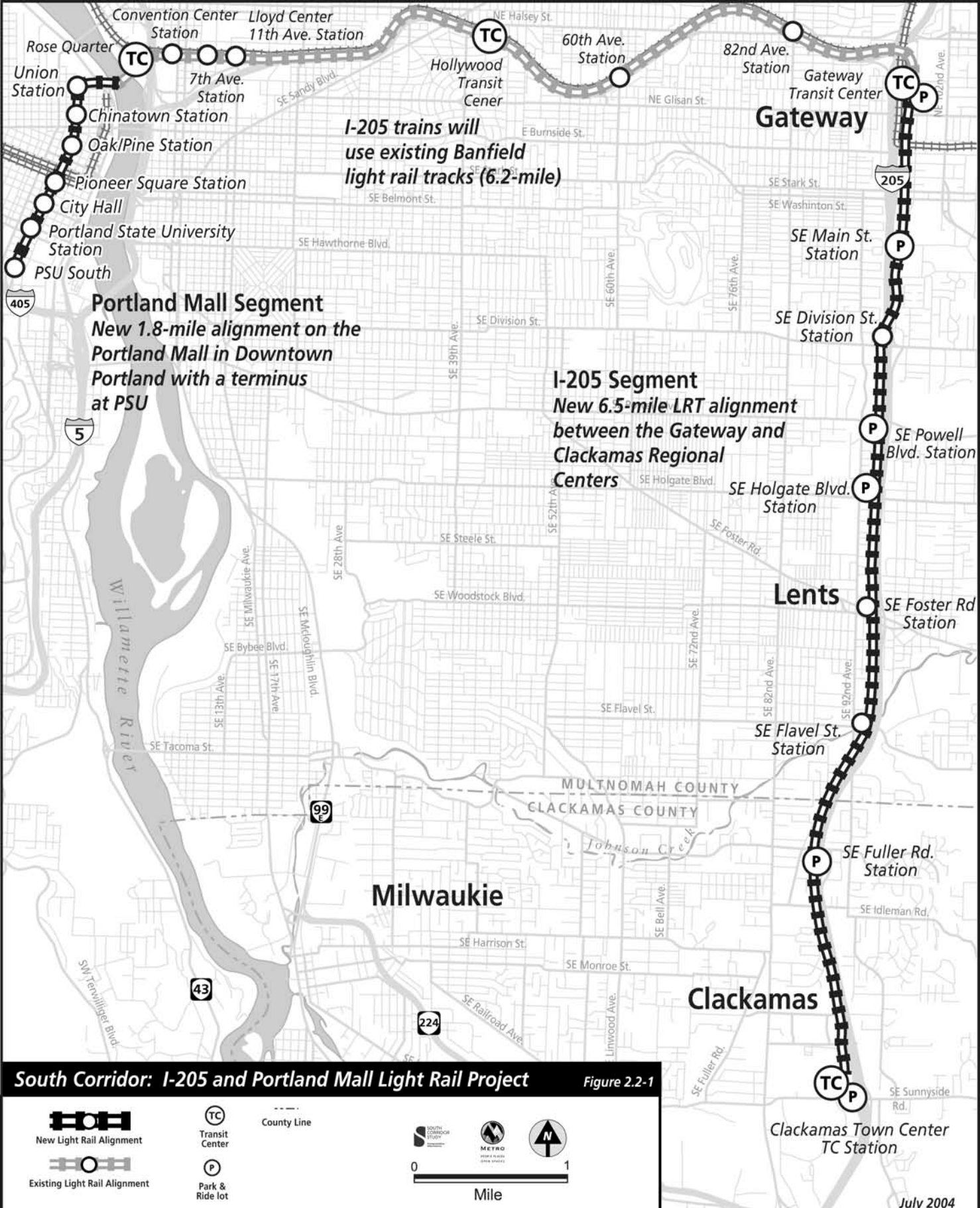
The purpose of this section is to describe the capital and operating improvements that would occur with the I-205/Portland Mall Project (see Tables 2.2-1, 2.2-2 and 2.2-3; and Figures 2.2-1 and 2.2-2). The Project would include all of the transit capital improvements in the No-Build Alternative. The Project would include both light rail and bus-oriented capital improvements.

2.2.2.1 Light Rail Capital Improvements

With the Project, light rail capital improvements would be made in the I-205 Segment and in the Portland Mall Segment. One new power sub-station would be added in the Banfield Segment.

A. I-205 Segment

In the I-205 Segment, the improvements would be focused around an approximately 6.5-mile light rail extension. The double-tracked light rail line would generally extend along I-205 from the existing Gateway TC, which is located on the existing Blue and Red Lines, to the Clackamas Town Center TC. At the Gateway TC, the three light rail lines would share common passenger boarding platforms. The project would share the existing light rail alignment with existing lines between Gateway and the Steel Bridge (Banfield Segment).



South Corridor: I-205 and Portland Mall Light Rail Project *Figure 2.2-1*

New Light Rail Alignment

Existing Light Rail Alignment

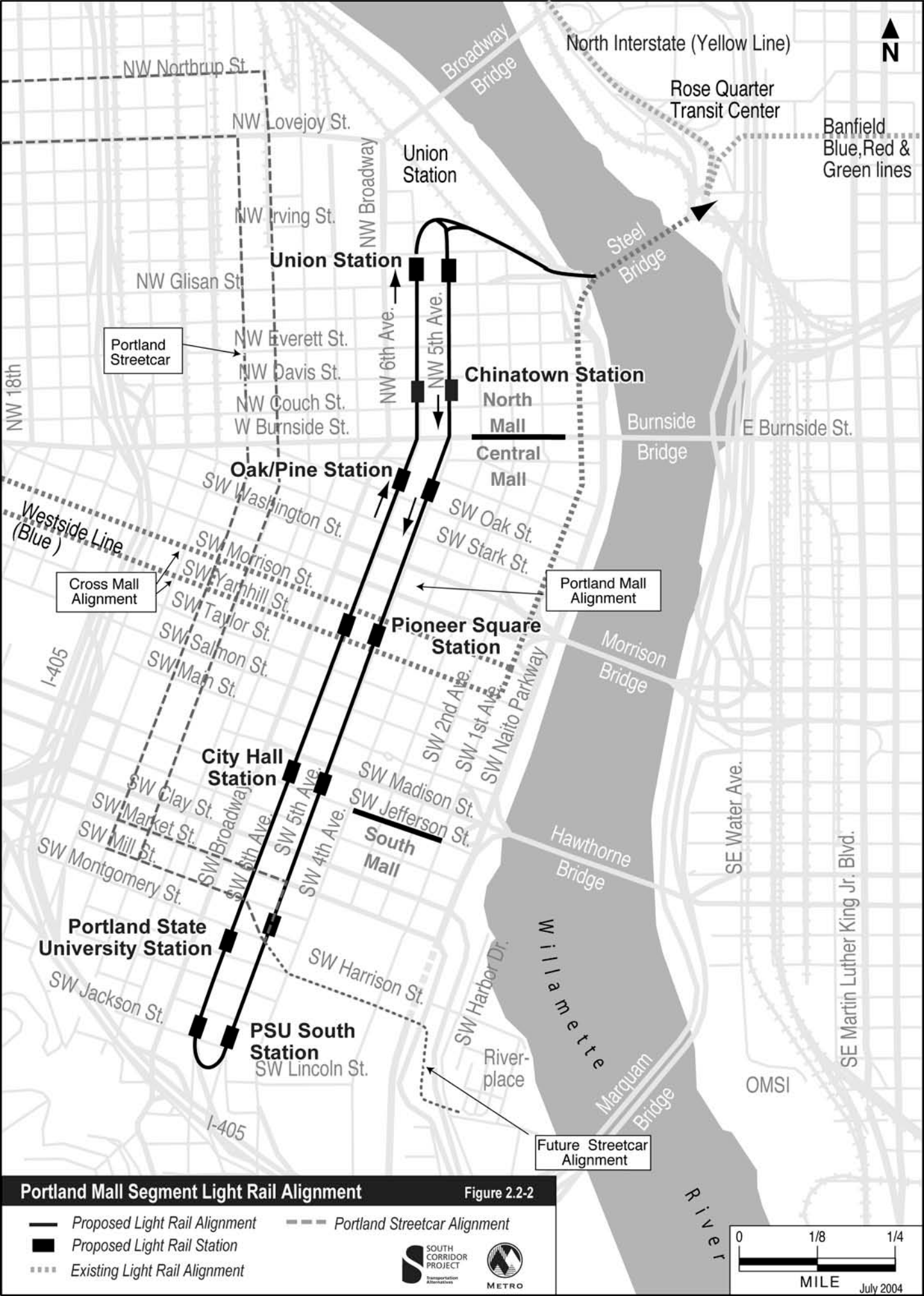
Transit Center

Park & Ride lot

County Line

0 1 Mile

July 2004


North Interstate (Yellow Line)
N
Broadway Bridge
Rose Quarter Transit Center
Banfield Blue,Red & Green lines
NW Northrup St.
NW Lovejoy St.
Union Station
NW Broadway
NW Irving St.
Steel Bridge
Union Station
NW Glisan St.
NW 6th Ave.
NW 5th Ave.
Portland Streetcar
NW Everett St.
NW Davis St.
NW Couch St.
W Burnside St.
NW 18th
Chinatown Station
North Mall
Central Mall
Burnside Bridge
E Burnside St.
Oak/Pine Station
SW Washington St.
SW Oak St.
SW Stark St.
Westside Line (Blue)
SW Morrison St.
SW Yamhill St.
Cross Mall Alignment
Portland Mall Alignment
SW Taylor St.
Pioneer Square Station
SW Salmon St.
SW Main St.
I-405
Morrison Bridge
SW 2nd Ave.
SW 1st Ave.
SW Naito Parkway
City Hall Station
SW Madison St.
SW Jefferson St.
SW Clay St.
SW Market St.
SW Broadway
SW 6th Ave.
SW 5th Ave.
SW 4th Ave.
South Mall
SW Mill St.
SW Montgomery St.
Hawthorne Bridge
SE Water Ave.
Portland State University Station
SW Harrison St.
SW Jackson St.
SW Harbor Dr.
Willamette River
PSU South Station
SW Lincoln St.
River-place
Marquam Bridge
OMSI
SE Martin Luther King Jr. Blvd.
I-405
Future Streetcar Alignment
Portland Mall Segment Light Rail Alignment
Figure 2.2-2
Proposed Light Rail Alignment
Proposed Light Rail Station
Existing Light Rail Alignment
Portland Streetcar Alignment
SOUTH CORRIDOR PROJECT
Transportation Alternatives
METRO
0
1/8
1/4
MILE
July 2004

South of the existing Gateway Transit Center and north of SE Foster Road, the light rail alignment would generally be located within the right-of-way reserved for a transitway when I-205 was initially constructed, including several existing underpass structures. The design of the light rail alignment would not preclude future expansion of I-205. Following is a summary of the capital improvements that would be associated with the light rail along the I-205 alignment.

The I-205 light rail alignment would extend south from the existing Blue Line at a branch just south of the existing and unaltered Gateway TC at approximately NE Glisan Street, just east of I-205. The generally at-grade light rail alignment would cross under several east-west arterials, before crossing under I-205 south of SE Market Street, using an existing box tunnel. The light rail alignment would continue south, generally directly west of and parallel to I-205.

The light rail line would include one new 426-space surface park-and-ride lot east of I-205 at SE 96th Avenue at SE Main Street and four new park-and-ride lots along the west side of I-205: a 391-space surface lot at SE Powell Boulevard; a 125-space surface lot north of SE Holgate Boulevard; a 624-space surface lot on SE Fuller Road; and a 500-space structured park-and-ride lot between the Clackamas Town Center mall and the western edge of I-205. The Clackamas Town Center TC would be relocated adjacent to the station and park-and-ride lot.

B. Portland Mall Segment

The Portland Mall Segment would include approximately 1.8 miles of new light rail improvements on the Portland Mall, extending from the west end of the Steel Bridge to the terminus at SW Jackson Street near Portland State University. The Portland Mall extension would operate as a double-tracked line from the Steel Bridge to NW 5th Avenue at NW Irving Street. From that point the light rail line would operate southbound on NW and SW 5th Avenue to SW Jackson Street and northbound on SW and NW 6th Avenue from SW Jackson Street to NW Irving Street. The Portland Mall Segment includes the North Mall, Central Mall and South Mall areas. Figure 2.2-2 shows the general alignment and station locations for the Portland Mall light rail alignment. Figures 2.2-3, 2.2-4 and 2.3-5 provide representative sketches and cross-sections for the station areas in the North Mall, Central Mall and South Mall areas.

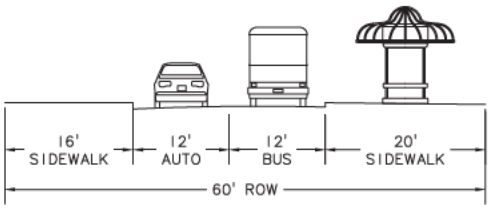
In the **North Mall** area, (Steel Bridge to W Burnside) the Portland Mall alignment would branch off from the existing light rail alignment at the west end of the Steel Bridge and transition from the existing Glisan Street Ramp to a new structure toward NW Irving Street. General-purpose traffic would cross over the Light Rail Alignment at a signalized intersection on the Glisan Street Ramp. The alignment would reach ground level at NW 3rd Avenue and would then turn onto the existing Portland Mall where TriMet buses currently operate. Southbound trains would operate on 5th Avenue and northbound trains would operate on 6th Avenue. Light rail trains would operate in the right lane with buses, while autos would be located in the left lane (Figure 2.2-3). Buses could operate on the light rail tracks when not occupied by trains. Right turns off of the North Mall would be prohibited for general-purpose traffic to avoid conflicts with trains, just as they are today to avoid conflicts with buses. Stations would be located at NW Glisan/Hoyt streets and NW Couch/Davis streets on NW 5th and 6th avenues. Bus stop locations would be consolidated to NW Davis/Everett and to cross-street locations compared to every two blocks with the No-Build Alternative.

In the **Central Mall** area (W Burnside to SW Jefferson Street) stations would be located at SW Oak/Pine streets, SW Morrison/Yamhill streets and at SW Madison/Jefferson streets on SW 5th and

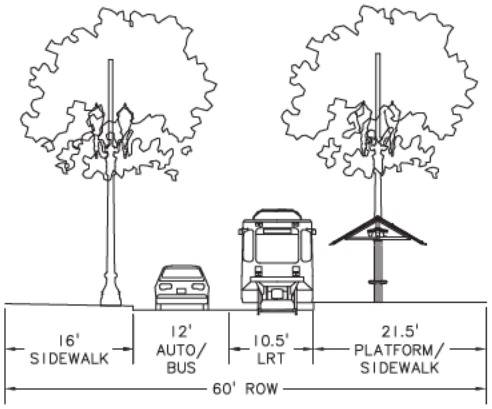
METRO

Figure 2.2-3
Portland Mall Representative Alignment and Cross Sections

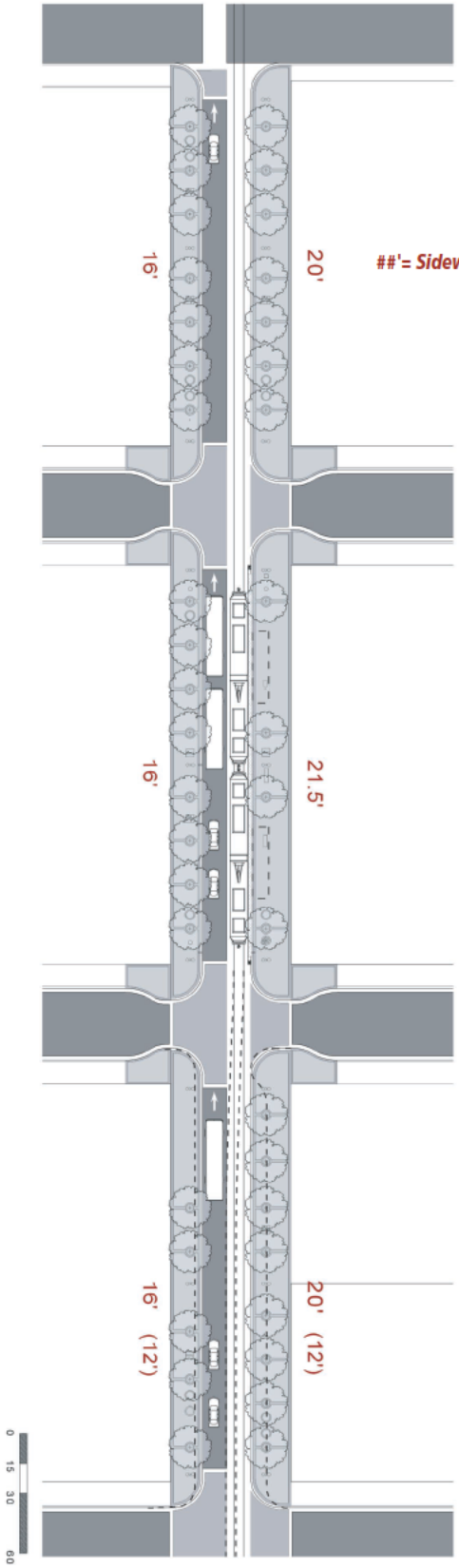
North Mall



EXISTING NORTH MALL SECTION 1
1" = 10'



RIGHT SIDE PLATFORM OPTION B 3
1" = 10'



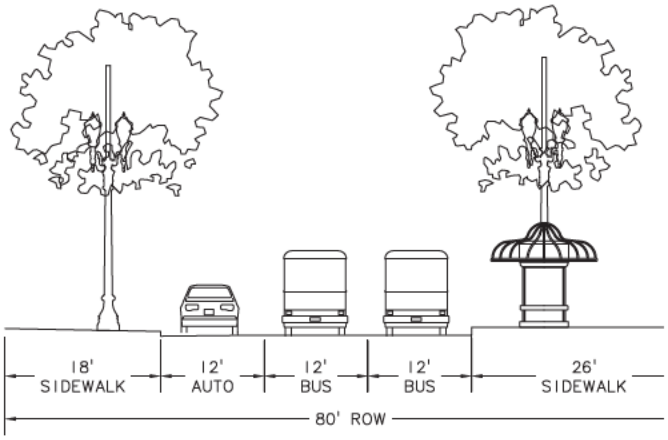
##'= Sidewalk widths

Note: Diagrams shows a typical station block section. Roadway and block configurations are subject to change.

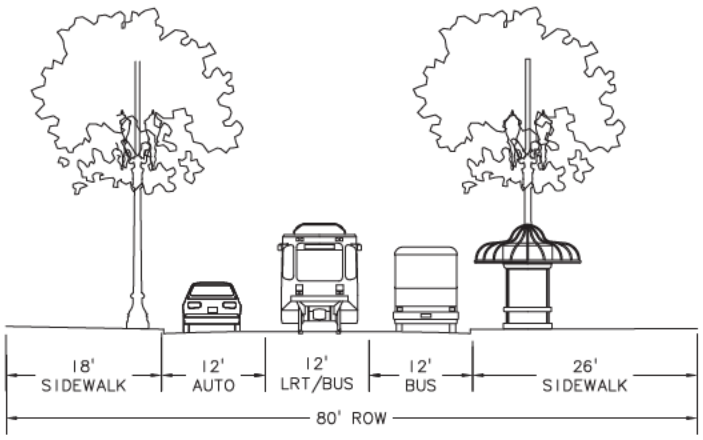
METRO

Figure 2.2-4
Portland Mall Representative Alignment and Cross Sections

Central Mall

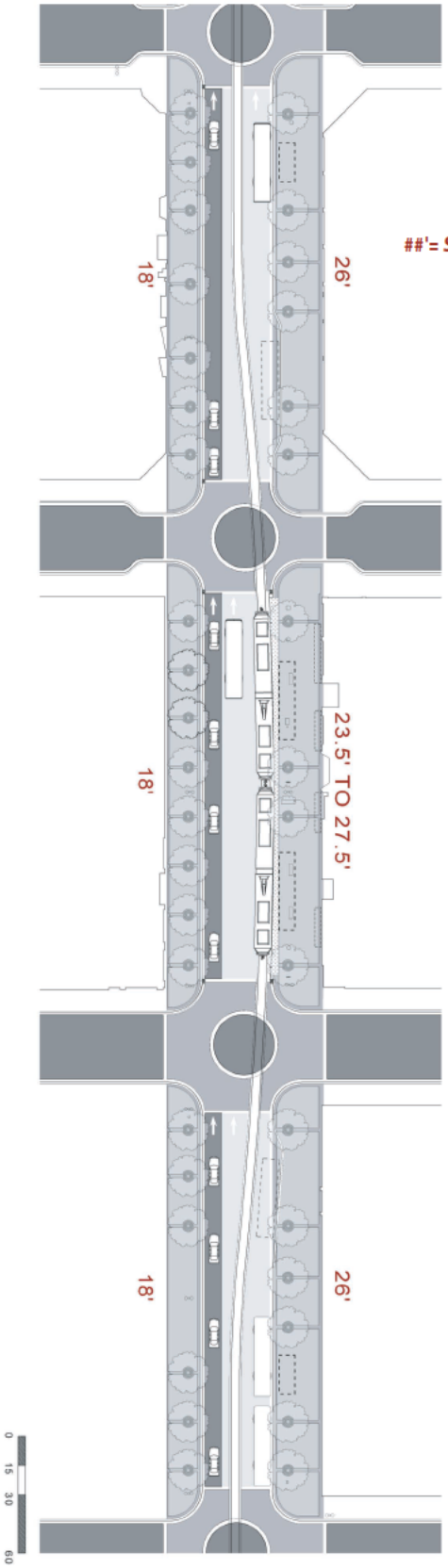


EXISTING CENTRAL MALL SECTION 1
1" = 10'



PROPOSED SECTION CENTRAL MALL – NON-STATION 1
1" = 10'

Note: Diagrams shows a typical station block section. Roadway and block configurations are subject to change.

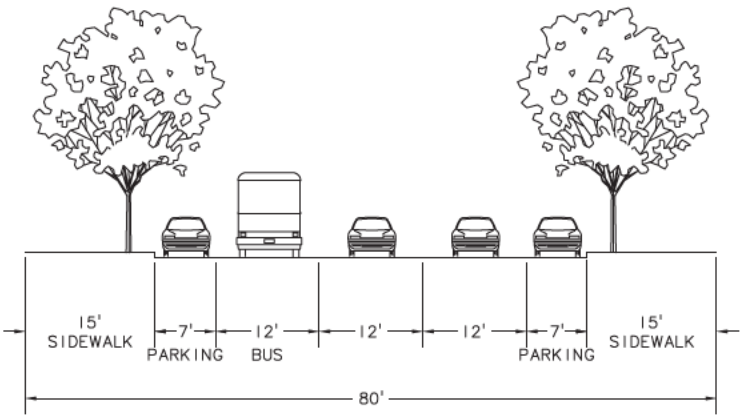


##'= Sidewalk widths

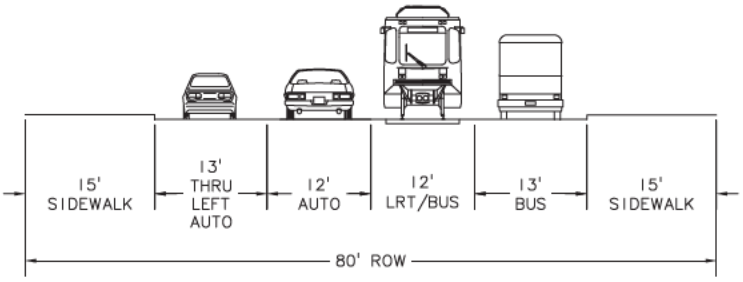
METRO

Figure 2.2-5
Portland Mall Representative Alignment and Cross Sections

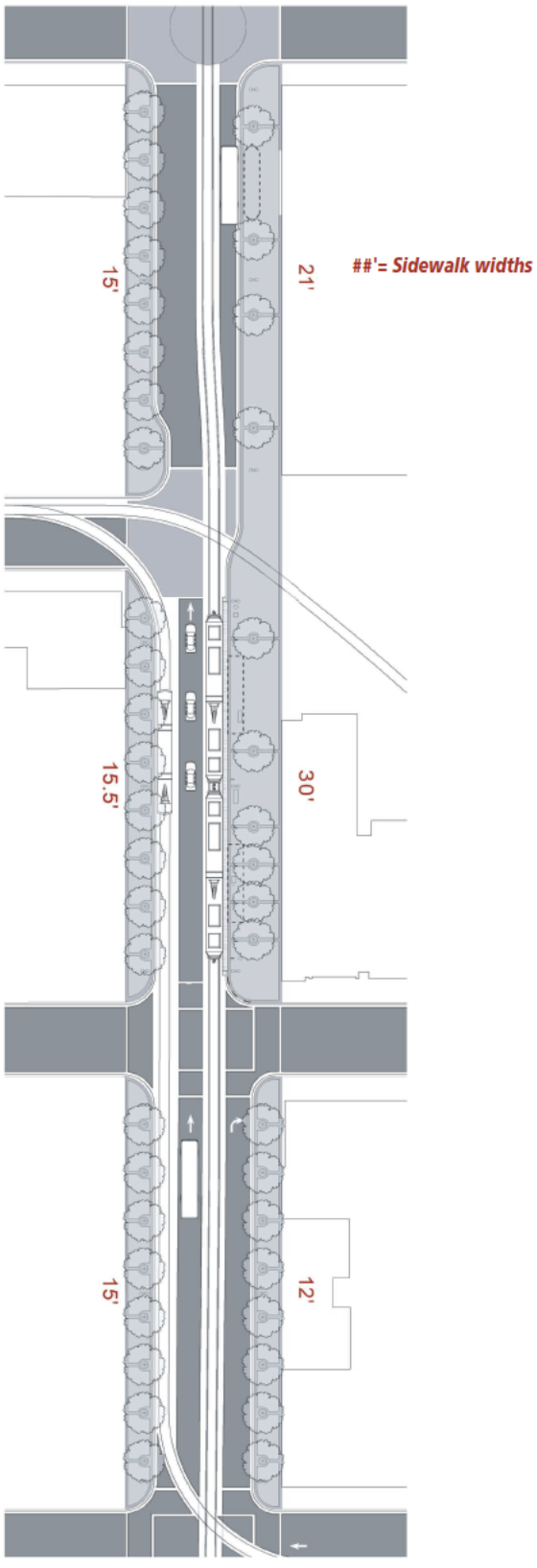
South Mall



EXISTING STREET SECTION SOUTH MALL – 5TH & 6TH AVE 3
1" = 10'



SOUTH MALL – 6TH AVE (TYP) 1
1" = 10'



##'= Sidewalk widths

Note: Diagrams shows a typical station block section. Roadway and block configurations are subject to change.

6th avenues. Currently in the Central Mall, auto access is provided for in the left lane, but auto access is blocked between W Burnside/Ankeny streets, SW Stark/Washington streets and SW Yamhill/ Taylor streets. The design would continue to allow autos in the left lane where they are currently allowed and LRT and buses would operate in the center lane with a bus only lane located in the right lane. General traffic would be prohibited from turning right off of the Portland Mall, as is the case today, to avoid conflicts with light rail trains and buses. At station blocks in the Central Mall, the stations would be located on the right side of the street. A center bus lane in each station block would allow buses to continue through past stopped light rail trains, and the left lane would be available for general purpose traffic (Figure 2.2-4).

In the **South Mall** area, (SW Jefferson to SW Jackson streets) LRT would generally be located in the center lane with bus stop locations in the right lane and general traffic in the left lane (Figure 2.2-5).

The majority of the on-street parking would be removed from both SW 5th and 6th avenues to allow enough space for traffic, transit and pedestrians. Light rail stations would be located at the PSU Urban Center (SW Mill/ Montgomery streets) and between SW College/Jackson streets. PSU would be served by both of these stations. Light rail layover tracks would be provided at the SW Jackson Street turnaround to allow for headway recovery for trains arriving from Vancouver or Clackamas.

With the I-205 light rail, TriMet's fleet of light rail vehicles would increase by 30, from a total fleet size of 117 to 147, compared to the No-Build Alternative (see Table 2.2-2). The operations and maintenance facility needs for the additional light rail cars would be met through an expansion of TriMet's existing Ruby Junction Operations and Maintenance Facility; the O&M facility building would increase by 25,700 square feet and the property size would increase by 313,000 square feet (Table 2.2-3).

2.2.2.2 Project Bus Capital Improvements

With the Project, there would be some bus capital improvements over and above the No-Build Alternative such as adding bus shelters and improvements at bus stops that provide transfers with the Project. In the Portland Mall Segment bus stops along the Portland Mall would be re-spaced to accommodate LRT. New bus shelters would be constructed along SW Columbia Street, SW Jefferson Street, SW 10th Avenue and SW 11th Avenue to accommodate bus route modifications.

2.2.2.3 I-205/Portland Mall Project Roadway Capital Improvements

This section summarizes the roadway improvements that would occur in the I-205 and Portland Mall segments as a result of the Project.

A. I-205 Segment

In the I-205 Segment, the Project would include all of the roadway capital improvements that would be included with the No-Build Alternative.

B. Portland Mall Segment

In the Portland Mall Segment the Project would include three blocks where an additional lane would be added for automobiles, which would create a through general purpose lane the full length of light

rail alignment on NW/SW 5th Avenue and NW/SW 6th Avenue between NW Irving Street and SW Jackson Street.

2.2.2.3 I-205/Portland Mall Project Transit Network Operating Characteristics

The purpose of this section is to provide a summary of the bus and light rail operating characteristics in the South Corridor with the I-205/Portland Mall Project. The transit network for the Project would be built upon the No-Build transit network described in Section 2.2.1.2.

A. Bus Operating Characteristics

In the I-205 Segment, the trunkline bus route that would generally operate on or parallel to portions of I-205 between the Gateway and Clackamas Town Center Transit Centers (TC) with the No-Build Alternative would be eliminated with the Project, because it would duplicate the service provided by the Project. The Clackamas Town Center TC would be relocated from the north side of the shopping mall parking lot to the east side of the shopping mall. With the I-205/Portland Mall Project, no other modifications to the No-Build Alternative bus network would be made in the I-205 Segment.

In the Portland Mall Segment, the addition of light rail on the Portland Mall would allow a limited amount of bus service to be re-deployed to underserved areas of downtown on non-mall downtown streets, primarily SW Columbia Street, SW Jefferson Street, SW 10th Avenue and SW 11th Avenue. The final bus service re-deployment plan will be determined through a public process.

With the Project, outside of the I-205 corridor and downtown Portland, no other changes would be made to the No-Build transit network.

B. Light Rail Operating Characteristics

Table 2.2-2 summarizes the projected light rail operating characteristics of the I-205/Portland Mall Project. The Blue Line and Red Line would operate with the same service pattern and headways with both the No-Build Alternative and the Project. The Yellow Line would also operate with the same service pattern and headways as the No-Build Alternative between the Expo Center and the west end of the Steel Bridge. From the west end of the Steel Bridge to SW Jackson Street, the Yellow Line would utilize the new Portland Mall light rail alignment and would no longer operate on the existing cross-mall light rail alignment in order to provide a balanced level of service between the existing cross-mall alignment and the new Portland Mall alignment.

With the Project in 2025, the Green Line would have one-way vehicle travel times between the Gateway TC and the Clackamas Town Center TC of approximately 15 minutes for both peak and off-peak periods. The one-way vehicle travel times along the Portland Mall alignment (with the Green Line and the Yellow Line) would be approximately 16 minutes between the Rose Quarter Transit Center and SW Jackson Street for both peak and off-peak periods.

Service on the Green Line would generally operate with seven and one-half minute headways during weekday peak periods, with twelve-minute headways during weekday off-peak periods and with 15-minute headways during weekday evenings. Service on the Green Line would generally span from 5:00 a.m. to 1:30 a.m. on weekdays, with later starting hours on Saturdays, Sundays and holidays. Light rail trains would not exceed two cars in length and only rarely would single-car trains be

operated. Random inspection for proof-of payment would be conducted similar to today's operation on the existing light rail system.

2.3 Capital Costs

This section presents the capital costs estimates for the I-205/Portland Mall Project. First there is a brief description of the methods used to estimate the project's capital costs. Then the capital cost estimates are presented by segment and by cost category.

2.3.1 Capital Costing Methodology

In general, capital cost estimates for the I-205/Portland Mall LRT Project have been developed within a four-step process:

A. Definition of Alternatives and Preparation of Plan Sheets. The cost estimates are based on the March 2004 FEIS Concept Design plan sheets prepared by TriMet. The plan and profile sheet is a unique segment of the proposed alignment, and common match lines between the plan sheets ensure that double counting of project elements has not occurred.

B. Unit Costs. Unit costs, appropriate to the current level of design, were identified and estimated. Examples of unit costs include a cost per foot of light rail track and a cost per foot of retaining wall. Unit costs were derived from a variety of sources, such as engineer's estimates, completed projects, standard estimating manual and the completion of standard estimating practices. Wherever possible, unit costs were based on actual TriMet light rail and bus capital improvement project experience, existing TriMet policies and programs and Federal regulations governing the construction of Federally financed transit projects.

C. Quantity Calculations. Smaller cost segments and elements (i.e., units) were identified and tallied for each plan sheet. Cost elements were identified for all known quantities, such as the length of light rail track required or the length of retaining wall to be constructed. In addition, vehicle quantities for each alternative were calculated for the project's forecast year (2025), based upon the regional travel demand forecasts and TriMet's established transit operating standards. The resulting change in fleet size by vehicle type was used to help determine if an expansion of the system's operating and maintenance facilities would be required, and if so, the extent of the required expansion.

D. Cost Calculations. For each plan sheet, the unit costs were multiplied by the quantities required for each cost element, and the total was then assigned to one of 10 cost categories. An additional plan-sheet-based cost category – right-of-way – was calculated using assessed values of identified properties. In addition to the plan sheet and unit-based cost categories, there are three systemwide costs categories: operating and maintenance facility, buses and light rail vehicles. Two final cost categories – contingency and engineering and administration – were calculated based on the other cost categories, using contingency rates reflecting past experience and industry standards. Each cost category has a separate contingency rate to account for unknown and future changes in project scope. Cost categories with less risk and uncertainty are assigned lower contingencies. Engineering and administration was generally calculated as a percentage of all other line items, except vehicle procurement. Engineering and administration costs include the costs for final design, construction management, inspection services, intergovernmental agreements and administrative activities. The sum of the cost categories is the total capital cost. All capital costs are presented in March 2004

dollars, without consideration of future inflation or project staging and scheduling. As a result, the estimates presented in this section do not forecast the future cost of construction. In contrast, year-of-expenditure costs, as summarized in Section 6.1 of this FEIS, are intended to reflect the cost to construct a certain alternative in a certain time frame with certain funding sources. Year-of-expenditure costs rely on a series of factors including: expected inflation rates, a preliminary construction schedule, expected funding commitments, level of service on opening day and expected appropriations.

2.3.2 Capital Cost Estimates

The I-205/Portland Mall Light Rail Project capital cost estimates (in year 2004 dollars) are presented in Table 2.3-1. The total capital cost estimate for the proposed project is $489.1 million (in 2004 dollars), with $334.7 million for the I-205 Segment and $154.4 million for the Portland Mall Segment.

Table 2.3-1
Estimated I-205/Portland Mall Project Capital Costs (Year 2004 Dollars)[1]

Cost Category	I-205 Segment	Portland Mall Segment	I-205/Mall Project Total
Guideway & Track Elements	$55,933	$16,790	$72,723
Light Rail Stations & Bus Stops	$13,117	$11,416	$24,533
Operating and Maintenance Facility	$21,446	0	$21,446
Site Work & Special Conditions	$29,375	$49,666	$79,041
Right-of-way and Land	$10,550	$5,295	$15,845
Electrical and Signal Systems	$39,425	$29,615	$69,039
Light Rail Vehicles (30)	$97,028	0	$97,028
Engineering/Administration	$36,325	$25,310	$61,635
Interim Finance	$5,220	$2,748	$7,968
Contingency	$26,304	$13,570	$39,874
Total	$334,723	$154,410	$489,133

Source: TriMet, July 2004.
Note: Capital costs are in thousands of dollars. The Project costs do not include a savings of $414,000 attributed fewer buses compared to the No-Build Alternative.
[1] Based on 2025 service levels that require 30 light rail vehicles. Six fewer light rail vehicles and a smaller expansion of the operating and maintenance facility would be required for opening day service (2009) and would cost approximately $35.4 m less.

2.4 Operating and Maintenance Costs

This section summarizes the projected annual corridor and systemwide transit operating and maintenance (O&M) costs that would be incurred to operate and maintain the proposed project. The I-205/Portland Mall Project is compared to the No-Build Alternative.

2.4.1 Operating and Maintenance Costing Methodology

TriMet estimated operations and maintenance costs using a model where labor and material costs were calculated as a function of service levels. In this model, vehicle miles, vehicle hours, the number of vehicles and other operating characteristics for the No-Build Alternative and the proposed Project were converted to the need for resources, such as employees, materials and services that would be required to operate those alternatives. Systemwide and non-corridor O&M costs include TriMet, C-TRAN, SMART, the Portland Streetcar, and the Wilsonville to Beaverton Commuter Rail Project costs, but only TriMet would incur O&M costs within the South Corridor.

Once derived, resources were converted to expenditures by applying unit cost factors, resulting in

cost estimates for direct labor, materials and services. Key elements of the O&M cost model include:

- The cost estimates include both operator and non-operator (e.g., administrative) staff;
- The current level of contracting for bus maintenance (approximately 5 percent) would continue;
- Fuel efficiency of the transit fleet would remain at current levels; and
- Staff productivity factors have been derived from current TriMet experience.

All O&M cost estimates are for service levels in the year 2025 (the project's forecast year), and for the No-Build and I-205/Portland Mall Project as described in Section 2.2, Description of the Alternatives of this FEIS. All O&M costs are expressed in 2004 dollars. O&M costs are used as input into the project's financial analysis summarized in Chapter 6 of this FEIS.

2.4.2 Operating and Maintenance Cost Estimates

Table 2.4-1 provides a summary of the projected annual O&M costs for the I-205/Portland Mall Project and the No-Build Alternative. The table breaks down O&M costs by South Corridor and non-corridor costs, and the South Corridor costs are broken down further between bus and light rail costs. The costs in the table are in 2004 dollars at 2025 service levels. The I-205/Portland Mall Project would increase annual O&M costs relative to the No-Build Alternative by approximately $7.1 million.

Table 2.4-1
Corridor, Non-Corridor and System
Annual Operating and Maintenance Costs[1]

	No-Build	I-205/ Mall Project
South Corridor		
Bus	$22,621,410	$ 21,151,447
Light Rail	0	$ 10,004,438
Sub-Total	$22,621,410	$ 31,155,885
Non-Corridor	$291,023,560	$ 289,676,091
System Total	$313,644,970	$ 320,831,976

Source: TriMet, August 2004.
[1] Costs are in 2004 dollars at year 2025 service levels. Operating and Maintenance Costs include TriMet, C-TRAN, SMART, Wilsonville to Beaverton Commuter Rail, Portland Streetcar and other community-based transit. Costs exclude Accessible Transportation Program, Oregon Medical Assistance Program transportation, and debt service

3. ENVIRONMENTAL ANALYSIS AND CONSEQUENCES

This chapter describes the existing social and natural environment in the study Corridor and identifies the probable direct, indirect and cumulative impacts of the proposed I-205/Portland Mall Project (Project) in comparison to the No-Build Alternative. It identifies significant sensitive resources that would be affected by the Project, defines the anticipated impacts, and identifies mitigation measures that would address the identified impacts of the proposed Project.

3.1 Land Use and Economic Activity

This land use and economic activity section summarizes existing and forecasted population, households, employment, and land use patterns and development trends in the South Corridor, focusing on downtown Portland and along I-205. It provides information on the existing land use and transportation policy framework, and the expected direct, indirect and cumulative effects of the Project at the regional level, at the corridor level and by segment. And finally, it describes mitigation measures that would address the potential impacts.

3.1.1 Affected Environment

The discussion in this section focuses on existing and projected households, population, employment, land use patterns, development trends, and land use plans affecting the South Corridor. The discussion is presented in three subsections: land use and economic conditions for the four-county Portland/Vancouver metropolitan region; land use and economic conditions in the South Corridor; and existing and planned land uses for the I-205 and Portland Mall segments.

The Portland/Vancouver metropolitan region is the economic center of an extensive area that includes most of Oregon, southwest Washington, and portions of Idaho. The metropolitan region, with downtown Portland as its urban and geographic center, is located near the confluence of the Columbia and Willamette Rivers. The metropolitan region includes Multnomah, Clackamas, and Washington Counties in Oregon, and Clark County in Washington.

3.1.1.1 Land Use Policy Framework

This section provides an overview of the Project's land use policy context, first at the state level, then at the regional level, and finally at the corridor and station area level.

3.1.1.1.1 State Land Use Planning and Policy Framework

With adoption of Senate Bill 100 in 1973, the State of Oregon implemented a statewide system of land use planning. Senate Bill 100 requires all cities and counties to adopt and implement comprehensive land use plans for their respective jurisdictions. Oregon's Land Conservation and Development Commission (LCDC) reviews the local plans for compliance with the *Statewide Planning Goals and Guidelines*. Once compliance is acknowledged by LCDC, the local plan becomes the controlling document for land use within the geographic area covered by the plan.

Urban growth boundaries (UGB) are a key tool of Oregon's planning program. Under Goal 14, Urbanization, every city in Oregon must establish a UGB to accommodate projected 20-year land needs. Land inside the UGB is recognized as the appropriate location for urban development and

supporting infrastructure, while land outside the UGB is reserved for resource uses (primarily agriculture and forestry) and limited rural development. Metro is responsible for adopting and managing the UGB in the metropolitan area for all 24 cities and the urban portions of the three counties.

In addition, the Transportation Planning Rule (TPR) was adopted by LCDC in 1991 as one of the tools to implement Goal 12, Transportation, and strengthen the land use/transportation planning connection. The TPR requires local jurisdictions to consider increased densities and a greater mix of land uses as a tool to reduce reliance on the automobile; adopt changes to subdivision and development ordinances to encourage more transit-, pedestrian-, and bicycle-friendly development and street patterns; review proposed amendments to comprehensive plans to ensure that the transportation system is adequate to support planned land uses; and amend comprehensive plans to allow transit-oriented developments (TOD's) along transit routes. The TPR also requires that Metro plan for a 10 percent reduction in vehicle miles traveled (VMT) per capita over 20 years and an additional 5 percent over 30 years.

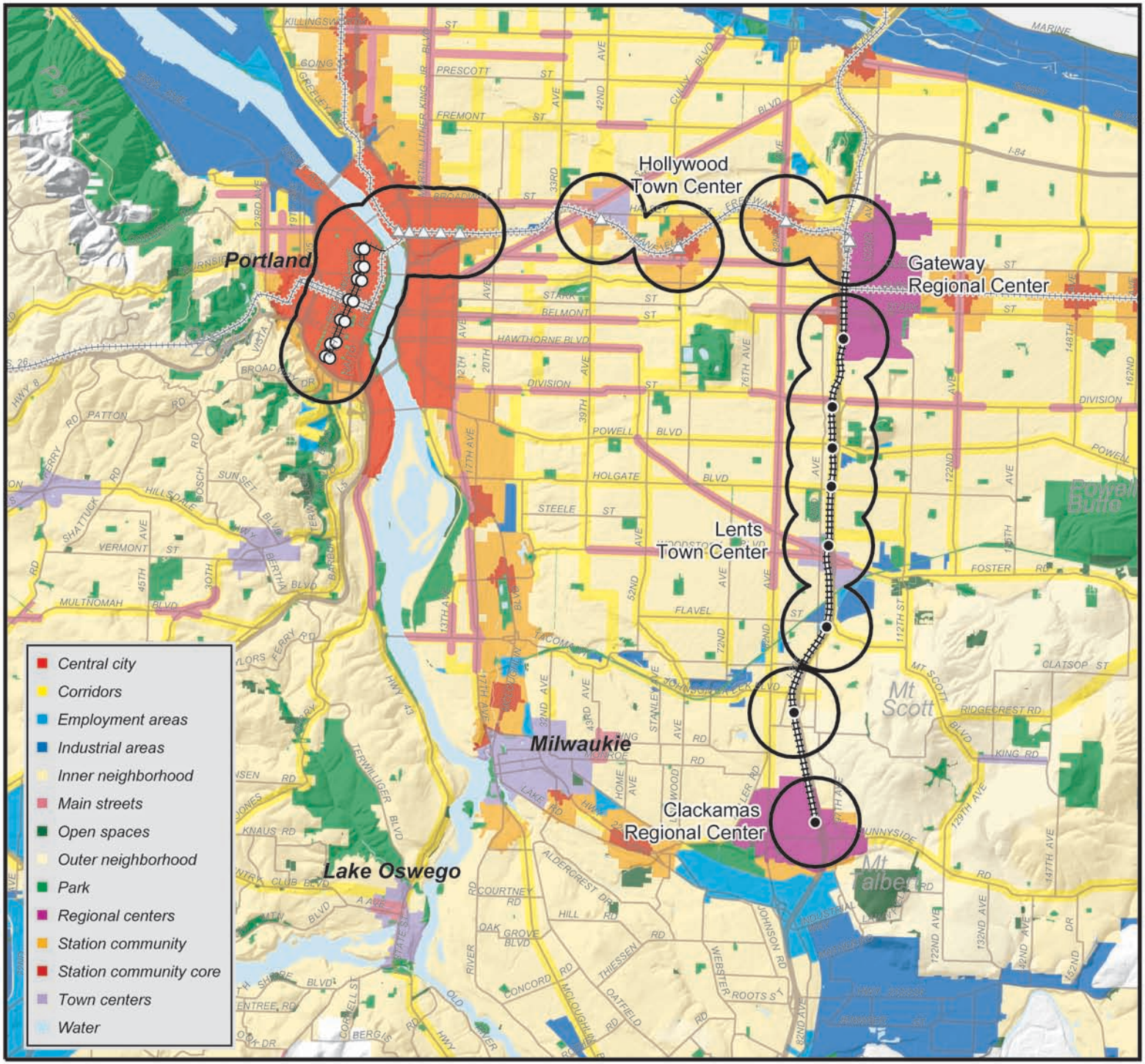
3.1.1.1.2 Regional Land Use Planning and Policy Framework

The Portland metropolitan area has a strong regional planning framework in place, with the nation's only elected regional government, Metro. The presence of a strong regional planning framework provides the Portland area a unique authority to coordinate and implement growth management policies across multiple local jurisdictions. Under state law, Metro is responsible for adopting and managing the regional land use planning, including the UGB for the urban portions of Multnomah, Washington, and Clackamas counties and the 24 cities in the Portland metropolitan area. Regional planning has had an impact on land use patterns in the Portland region, particularly when compared with other metropolitan areas. Infill and redevelopment have accommodated a growing share of development since the regional UGB was adopted, the average lot size for new residential development is smaller and overall densities have increased within the UGB. Lands outside of the UGB have largely been preserved for farm and forest use and limited rural development.

Metro adopted the *Region 2040 Growth Concept* (*Growth Concept*) as the strategy and tool for managing future regional land use patterns (see Figure 3.1-1). The *Growth Concept* is designed to:

- Encourage growth in mixed-use centers and corridors, with an increased emphasis on infill and redevelopment within the UGB;
- Protect access to designated natural areas inside the UGB and protect farm and forest land outside the UGB; and,
- Coordinate transportation and land use planning and expand transportation choices.

The *Growth Concept* incorporates policies to direct growth to a hierarchy of interrelated mixed-use urban centers, including the Central City (which includes downtown Portland), Regional Centers, Town Centers, Station Areas and Corridors. Transportation investments play a fundamental role in the region's ability to achieve the growth management goals defined in the *Growth Concept*. Also, the *Regional Transportation Plan* (RTP) targets 20-year transportation investments to leverage development envisioned in the Growth Concept. The Growth Concept envisions that all Regional Centers would be connected to the Central City by light rail. Currently four of seven designated Regional Centers are linked to the Central City by light rail (Gresham, Gateway, Beaverton, and Hillsboro). The proposed Project would add a light rail link to the Clackamas Regional Center.



South Corridor Project

REGIONAL GROWTH CONCEPT PLAN

FIGURE 3.1-1

ALIGNMENTS

- *Existing Light Rail*
- *Portland Mall Segment*
- *I-205 Segment*

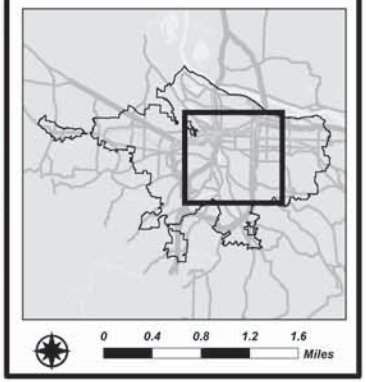
STATION LOCATIONS

- *Portland Mall Segment*
- *I-205 Segment*
- *Existing Stations*

Half-Mile Station Area

SOUTH CORRIDOR STUDY

METRO
PEOPLE PLACES • OPEN SPACES



July 2004

3.1.1.1.3. Local Land Use Planning and Policy Framework

This section briefly summarizes the existing land use and adopted comprehensive plan land use designations for the two Project segments. Figure 3.1-2 illustrates the boundaries of the local jurisdictions in the Project area. Figure 3.1-3 illustrates existing land use in the Project area and identifies the areas within ½ mile of the proposed light rail stations. Figure 3.1-4 illustrates generalized comprehensive plan designations for the same area.

A. I-205 Segment

The I-205 Segment links the Gateway Regional Center, the Lents Town Center, and the Clackamas Regional Center along I-205. The majority of this segment is in the City of Portland; the portion of the segment that is generally south of Clatsop Street is in Clackamas County.

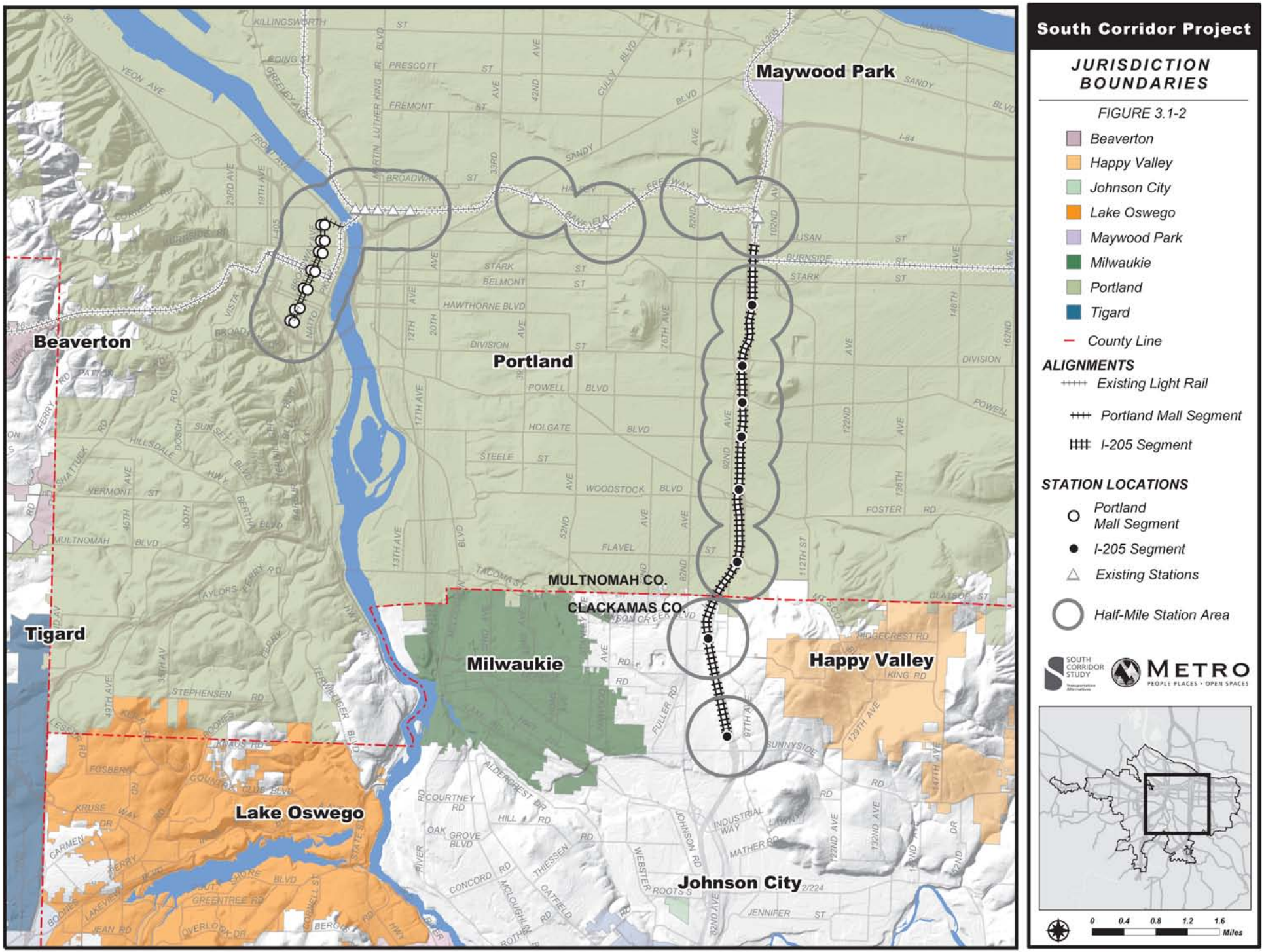
Existing Land Use and Development

Land use and development patterns in this segment have been significantly shaped by transportation facilities. Two freeways, I-84 and I-205, intersect at the north end of the segment. The Hillsboro to Gresham MAX line (Blue Line) and the Airport MAX line (Red Line) converge at the Gateway Transit Center and overlap between Gateway and downtown Portland. Major east/ west streets such as SE Stark Street, SE Washington Street, SE Division Street, SE Powell Boulevard, SE Holgate Boulevard, and SE Foster Road connect neighborhoods located east and west of I-205 and serve as important transit streets.

A big expansion development of the outer southeast area came after World War II. By the late 1970s the area contained most of its existing landmarks, including Gateway Shopping Center, Mall 205, Portland Adventist Hospital, and strips of businesses along SE 102nd Avenue and many other east-west arterials. In the 1980s, the area was annexed to Portland to access urban services. With the completion of I-205 in 1983 and the Banfield light rail line in 1986, Gateway became a transit hub second only to downtown Portland.

Major land uses in the Lents Town Center include commercial service and retail uses, traditional neighborhoods, Lents Park, and the Freeway Land Company industrial site east of I-205. Johnson Creek and the Springwater Corridor Trail traverse the Lents community and provide both constraints and amenities for development. Residential neighborhoods in the northern portion of this segment reflect traditional, mixed-era, and suburban development patterns. More recently developed neighborhoods typically have fewer street connections and often lack sidewalks. Connected streets are more common in the traditional neighborhoods. Natural features such as the topography of two buttes, Mount Scott and Johnson Creeks, also constrain street connectivity and development in some portions of this segment.

Land use and development patterns in the Clackamas County portion of this segment have been more strongly shaped by the I-205 freeway. Commercial development is concentrated in interchange areas at SE Johnson Creek Boulevard and SE Sunnyside Road. The major commercial use is the Clackamas Town Center regional mall. In addition to the commercial and employment uses, there is a significant amount of housing along the I-205 corridor, including several large apartment complexes that take advantage of good access to transportation and jobs.



South Corridor Project

JURISDICTION BOUNDARIES

FIGURE 3.1-2

- Beaverton
- Happy Valley
- Johnson City
- Lake Oswego
- Maywood Park
- Milwaukie
- Portland
- Tigard
- County Line

ALIGNMENTS

- Existing Light Rail
- Portland Mall Segment
- I-205 Segment

STATION LOCATIONS

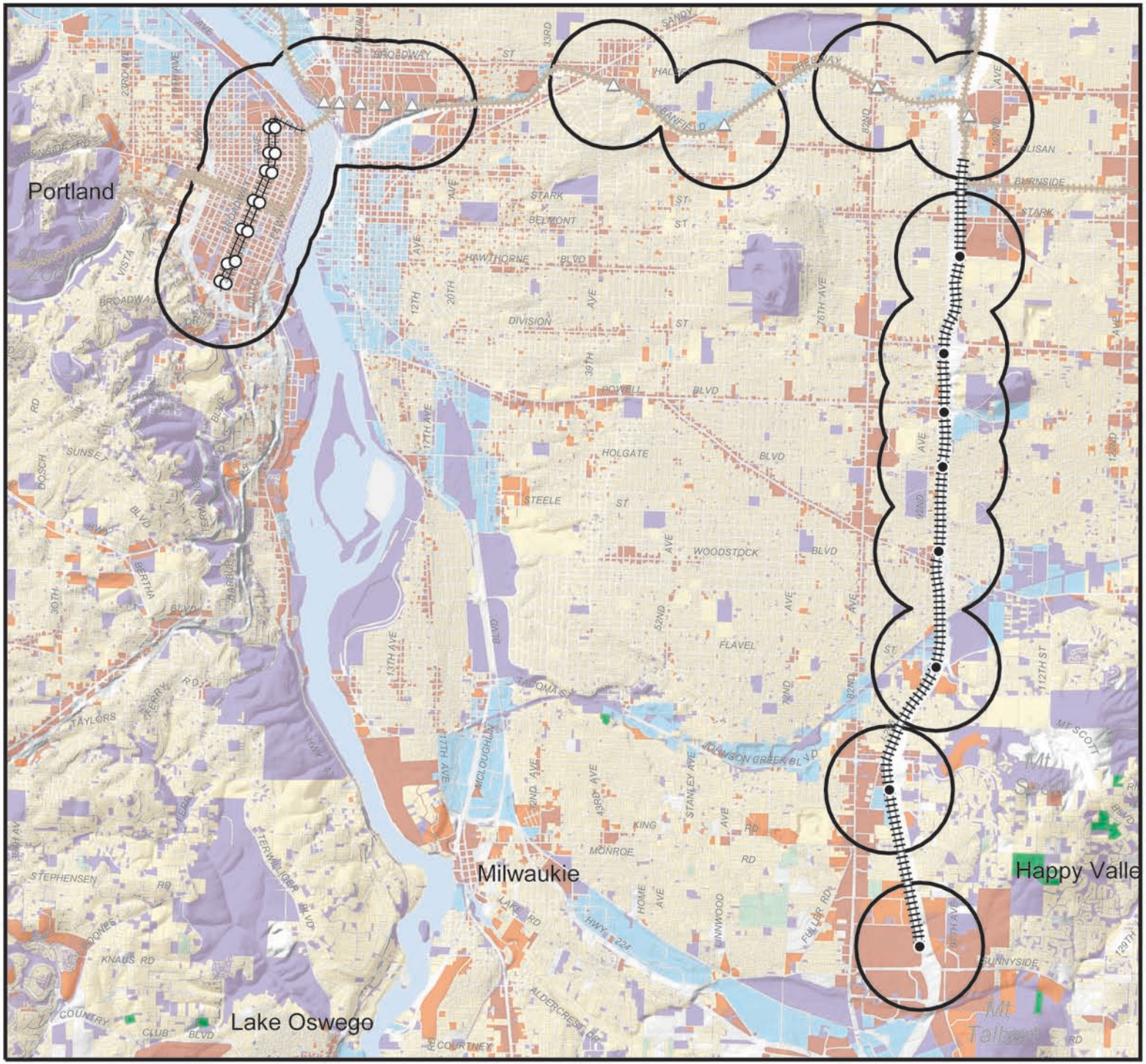
- Portland Mall Segment
- I-205 Segment
- Existing Stations
- Half-Mile Station Area

SOUTH CORRIDOR STUDY Transportation Alternatives

METRO PEOPLE PLACES • OPEN SPACES

0 0.4 0.8 1.2 1.6 Miles

September 2004



South Corridor Project

EXISTING LAND USE

FIGURE 3.1-3

- Agriculture
- Commercial
- Forest
- Industrial
- Multi Family
- Public
- Single Family
- Vacant

ALIGNMENTS

- Existing Stations
- Portland Mall Segment
- I-205 Segment

STATION LOCATIONS

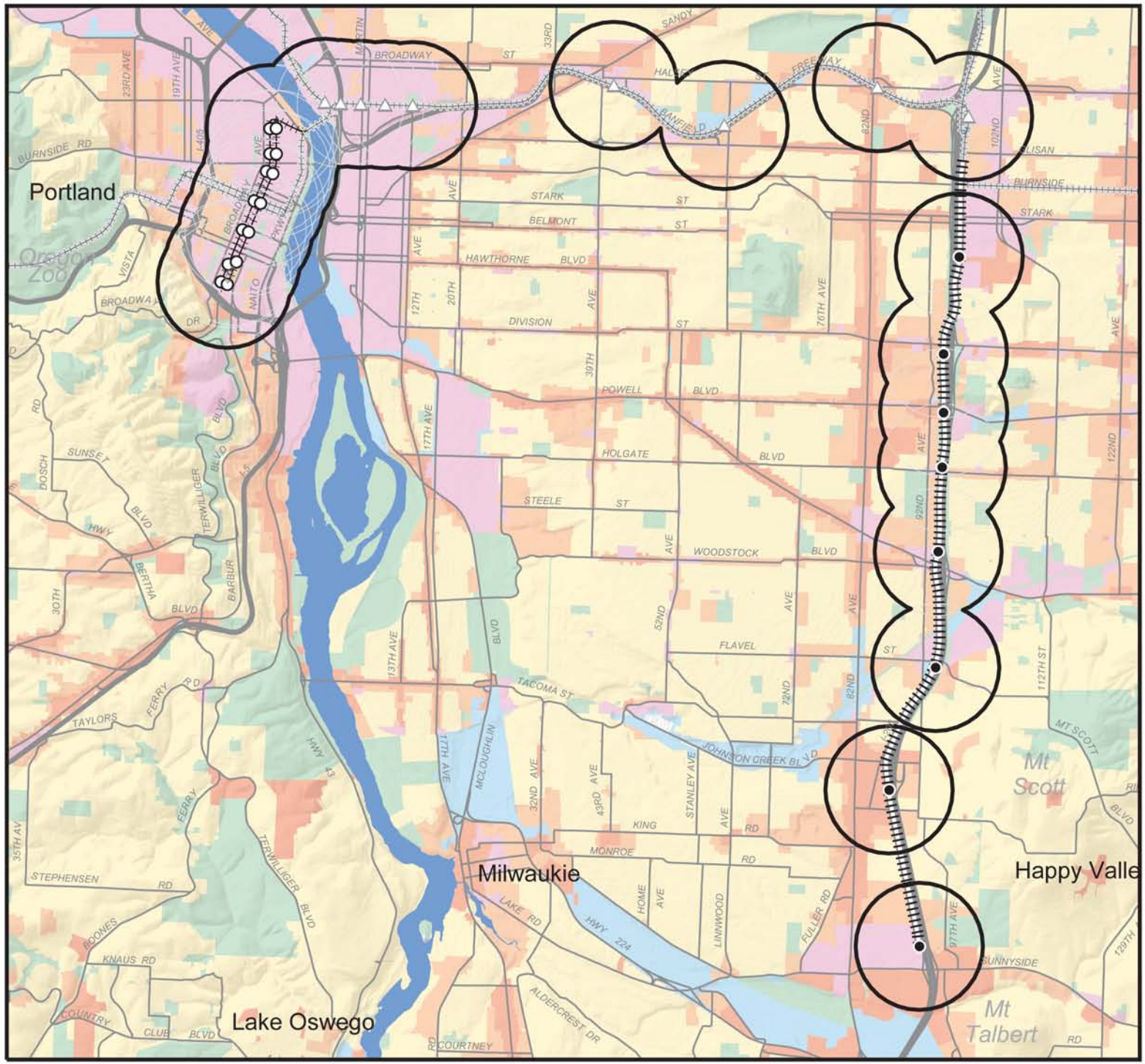
- Portland Mall Segment
- I-205 Segment
- Existing Stations
- Half-Mile Station Area

SOUTH CORRIDOR STUDY Transportation Alternatives

METRO PEOPLE PLACES • OPEN SPACES

0 0.25 0.5 0.75 1 Miles

July 2004



South Corridor Project

COMPREHENSIVE PLAN DESIGNATIONS

FIGURE 3.1-4

- Commercial
- Industrial
- Multi Family
- Mixed Use
- Parks & Open Spaces
- Single Family

ALIGNMENTS

- Existing Light Rail
- Portland Mall Segment
- I-205 Segment

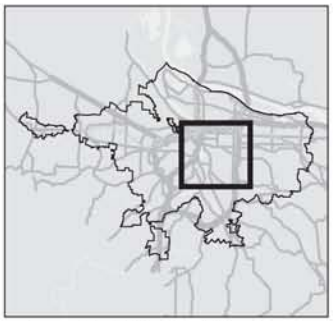
STATION LOCATIONS

- Portland Mall Segment
- I-205 Segment
- Existing Stations

Half-Mile Station Area

SOUTH CORRIDOR STUDY

METRO
PEOPLE PLACES • OPEN SPACES



0 0.25 0.5 0.75 1 Miles

July 2004

Planned Land Use and Development

Local plans that apply in the I-205 Segment include the *Portland Comprehensive Plan,* the *Outer Southeast Community Plan*, and the *Clackamas County Comprehensive Plan*. The most intense development is planned for the Gateway Regional Center area at the north end. Three portions of the Gateway Regional Center (Gateway, Mall 205, and SE 102nd Avenue) are designated for central commercial development, the City of Portland's most physically intense commercial designation. The Portland Adventist Medical Campus is designated for institutional and residential use. The area flanking NE 99th Avenue is designated for high-density residential and mixed employment uses. Lands fronting on major east/west streets and SE 82nd Avenue are generally designated for storefront commercial and general commercial uses. Large areas also have been designated for multi-dwelling residential uses, particularly along transit streets and near commercial services.

The *Outer Southeast Community Plan* identifies the Lents community as a second focal point for more intensive development. The area along SE Woodstock Boulevard is designated for mixed commercial development, and a mixed-use central employment area is identified near the intersection of SE 92nd Avenue and SE Foster Road. Multi-family residential uses are planned for areas near the Lents Town Center and along I-205. The area south of the Springwater Corridor trail is generally designated for industrial and central employment uses. Johnson Creek also crosses this segment just north of the proposed Flavel Station. The I-205 bike path and the Springwater Corridor are identified as open space/recreational trails in the adopted plans.

In Clackamas County, areas east of I-205 are generally designated for medium-to-high density residential use closer to the freeway, with lower-density residential areas further east. Plan designations are more varied to the west of I-205, where land is designated as low-, medium-, and high-density residential; retail and corridor commercial; and Regional Center commercial, office, and planned mixed use.

In comparing existing land use and planned land uses, the most significant change is envisioned for the area between SE Sunnyside Road and SE Monterey Avenue that extends from I-205 west to SE Fuller Road. Land uses in this area are planned to transition over time into a denser mix of commercial, office, and residential uses.

B. Portland Mall Segment

The Portland Mall Segment is located in downtown Portland and is within the Region 2040 Central City area.

Existing Land Use and Development

Downtown Portland is the civic, commercial and entertainment center of the region. The existing bus transit mall, which provides a generally separated right-of-way for buses between Union Station and PSU, runs north and south through the downtown core on NW and SW 5th and 6th avenues, forming a spine for the region's highest-density office and retail development and activity. There are many major civic buildings located in downtown including the Federal Courthouse, the Multnomah County Courthouse, the Wyatt Federal Building, Portland City Hall, the Portland Building, the many structures that make up Portland State University (PSU) and various State of Oregon office buildings.

Planned Land Use and Development

Downtown Portland is largely developed, with relatively little difference between existing land use and planned land uses. Local comprehensive plans that are applicable to this segment include the *Portland Comprehensive Plan*, and the *Portland Central City Plan.* The *Portland Central City Plan* defines the area along the existing transit mall as the highest-density central commercial mixed use area in the region. The plan also calls for extensive pedestrian and transit facilities to support the existing and planned development. The southern part of the CBD is designated as the University District, in recognition of PSU. Tom McCall Waterfront Park and the Eastbank Esplanade are identified as open space areas. The retail core is designated as the area surrounding SW 5th and SW 6th avenues and SW Yamhill and Morrison streets where the existing MAX Blue and Red lines currently operate.

The City of Portland's *Central City Transportation Management Plan* provides for very restrictive parking development ratios in downtown Portland and, to a lesser extent, in areas surrounding downtown Portland. City policy limits the number of parking spaces that can be built in conjunction with new development. New surface parking lots and parking garage developments are stringently controlled through the city's parking regulatory process. Without substantial transit expansion to reduce the need for additional parking supply, these regulations could constrain the amount of development that would occur in downtown Portland. The reduction in the demand for parking spaces that would result from the construction and operation of the Project is an indication of its relative ability to support downtown Portland development objectives. Additionally, the expense of constructing parking garages would take away from other development opportunities.

3.1.1.2 Population, Households and Employment Growth

This section summarizes the population, household and employment growth patterns for the region, the South Corridor and the two Project segments.

A. Region

The region's population and employment have grown significantly over the last couple of decades, and this growth is expected to continue over the next 25 years (see Table 3.1-1). Between 1990 and 2000 the four-county region grew by approximately 27 percent (adding 377,000 residents) to a year 2000 population of 1,789,000. The number of households increased by approximately 26 percent (144,000 households) to 697,000. Growth over the next 25 years (to 2025) is expected to be more moderate. Population is expected to increase 32 percent (575,000 residents) and households are projected to increase by 53 percent (366,000 households). In the 1990s the region also experienced strong job growth, leading to an increase of 309,000 new jobs, or 36 percent growth over ten years. Projected employment growth over the next 25 years is also expected to be more moderate, at 451,000 net new jobs (an increase of 39 percent).

As the national economy recovers from the recent slow down, Oregon and the Portland area are expected to follow. Technology is considered a key industry to watch and is expected to contribute significantly to the region's recovery. The Portland area was particularly hard hit during the recent recession, during which the region's unemployment rate exceeded that of the rest of the state for the first time in almost 20 years.

Table 3.1-1
Historic, Existing and Projected Population, Households and Employment
For the Four-County Region [1]

	1990	2000	2025 (Projected)	% Change 1990-2000	% Change 2000-2025
Population	1,412,000	1,789,000	2,364,000	27%	32%
Households	553,000	697,000	1,063,600	26%	53%
Employment	856,000	1,165,000	1,616,000	36%	39%

Sources: 1990 and 2000 population and households data is from the US Census Bureau. All employment numbers and 2025 projections of population and households are from the Metro Data Resource Center, July 2004.
[1] Includes Multnomah, Clackamas, and Washington Counties in Oregon and Clark County in Washington.

B. South Corridor

The South Corridor includes lands within the local jurisdiction responsibility of the city of Portland and urban unincorporated portions of Clackamas County. Figure 3.1-2 illustrates jurisdictional boundaries within the South Corridor study area. The Corridor contains a broad mix of urban land uses and is developed with a mix of urban densities. The Project would be located entirely inside the regional UGB. The Corridor's economy is integrated with the larger regional and state economies. Development and unemployment in the region directly affect development patterns and employer behavior in the Corridor.

The Central City is the focal point of the region and the Corridor, with the highest intensity of development in downtown Portland on the west side of the Willamette River. Areas close to downtown Portland are largely developed, with a pattern of inner residential neighborhoods and supporting commercial development along main streets and transportation corridors. Major arterial streets tend to be oriented in an east-west direction to link with the bridges over the Willamette River. Outside of the Central City, the most intensive development in the Corridor is projected for the Gateway and Clackamas regional centers.

C. Project Segments and Station Areas

Existing and projected population and employment within one half mile of the proposed stations are shown in Table 3.1-2 by segment. The population in the proposed new one-half mile station areas is expected to increase by 108 percent by 2025 (from 33,700 people to 70,900), and employment is expected to grow by 47 percent (from 150,300 jobs to 221,500).

Table 3.1-2
Existing and Projected Population and Employment
Within ½ Mile Station Areas by Segment [1]

	Population			Employment		
Segment [1]	**2000**	**2025**	**% Change**	**2000**	**2025**	**% Change**
I-205 Segment (8 new LRT stations)	22,107	29,361	32.8%	24,010	35,834	49.2%
Portland Mall Segment (7 new LRT stations)	11,614	41,550	257.8%	126,314	185,620	46.9%
Total (New Segments)	**33,721**	**70,911**	**108.2%**	**150,324**	**221,454**	**47.3%**
Banfield Segment (9 existing LRT stations)	22,729	35,525	60.7%	45,728	64,407	40.8%
Total (with existing Banfield Segment)	**56,450**	**106,437**	**88.6%**	**196,079**	**285,861**	**45.8%**

Sources: US Census, 2000; Metro Data Resource Center, 2004.
[1] Segments are shown on the South Corridor Map, Figure 1.1-1. Data cover the areas within ½ mile of the Project Stations. The Banfield Segment includes the existing LRT service between the Rose Quarter Transit Center and the Gateway Transit Center.

3.1.1.3 Regional and Corridor Economics

The Portland/Vancouver metropolitan region's economy has been generally growing and diversifying over the past several decades. While transit has not been shown to directly affect the amount of regional economic growth, the quality of the overall transportation system does influence economic activities and location decisions. In downtown Portland, the existing Transit Mall has significantly contributed to achieving the high-density and mixed-use development that has been built along the north-south spine of the existing Bus Transit Mall. Adding light rail to the existing transit mall would significantly expand transit service and transportation options on the mall, improve the effectiveness of the overall transportation system, and thereby help support and maintain the region's economy, and facilitate the continued redevelopment along the mall. In the I-205 Segment, the Project would expand transit service and transportation options in the South Corridor, improve the effectiveness of the overall transportation system, and thereby help maintain the region's economy.

A. Development Market Conditions.

Overall demand for housing in the Region is driven by population growth and demographic factors that affect household size and composition. Single- and multi-family housing sales are also affected by current low interest rates and the perception of real estate as a prime investment alternative. The housing market in the region has remained strong during the recent economic slowdown. As of June 2002, apartment vacancy rates averaged 6.5 percent for units constructed in and prior to 1979, 7.1 percent for units constructed between 1980 and 1995, and 7.8 percent for buildings constructed in 1996 and later. The metropolitan area has experienced a small decline in multi-family building that began in 1997. Although Washington County's multi-family building has exceeded previous years, Clackamas County has generally seen a decline and leveling off in the number of units permitted, from 776 in 1998 to 608 in 1999, 550 in 2000, and 580 in 2001. Two areas of the Central City are projected to provide significant housing growth over the next decade: the River District on the north end of downtown and the South Waterfront District on the south end.

Demand for office-commercial space is driven by employment in several sectors, including finance, insurance, and real estate services, and government. The metropolitan area's office market has been affected by the overall slow down in the high-tech industry and by the slower economy. However, the relatively lackluster pace of office development here compared to other west coast metropolitan markets (such as San Francisco and Seattle) has meant a relatively softer impact on the downside of the market cycle. In 2002, the Portland-Vancouver office market contained 34.7 million square feet of multi-tenant office space in buildings with 10,000 square feet or more of gross leasable area, 40 percent of which were within the CBD. Within the CBD, employment is projected to increase from 121,000 to 168,000 between 2000 and 2020, an increase of 39 percent. In 2002, the overall office vacancy rate was 16.6 percent, not surprising since the unemployment rate was 8.6 percent, and five new buildings adding 512,832 square feet of office space had recently been completed.

Demand for industrial space in the Region is driven primarily by manufacturing-sector employment. The Portland-Vancouver industrial market contains approximately 174.5 million square feet of owner-used, single-, and multi-tenant buildings with 10,000 square feet or more of gross leasable area. In 2001, the regional industrial vacancy rate was 7.7 percent. Completed projects in the first quarter of 2002 totaled 500,000 square feet, 320,000 square feet of which had been pre-committed.

Demand for retail commercial space in the region is driven by patterns in consumer spending. Increases in population and households are generally accompanied by increases in aggregate spending. Increases in employment also lead to increases in households' disposable income. After a decade of unparalleled growth, the Portland metropolitan area retail market now appears to be mixed. At the end of 2001, the Portland-Vancouver retail market contained 37.4 million square feet of malls, shopping centers, and street retail (consisting of buildings 10,000 square feet or more of gross leasable area). Nearly 1.7 million square feet of retail space came on-line in 2000, and then overall vacancy was 4.48 percent at the end of 2001. Construction activity slowed significantly in 2001, with only 692,000 square feet coming on-line. A number of larger projects have also been delayed and/or stalled, including the Wood Village Town Center, shops at Tanasbourne, and Cascade Station (along the Airport MAX line).

B. State and Regional Economic Development Plans and Programs

This section summarizes economic development programs relevant to the I-205/Portland Mall Project. Oregon Community Solutions teams, made up of staff from five state departments, work with local governments "to craft integrated solutions to complex community development problems, and help turn local visions and opportunities into real projects that promote livability." Community Solutions objectives include rebuilding rural and distressed economies, increasing the development of affordable housing, revitalizing down towns and main streets, and reducing sprawl and congestion. The Metro/Hood River Regional Team currently manages and funds several projects within the region, which are described below.

- **Gateway Station Development/Urban Renewal Area.** The team received a Community Incentive Fund application for a mixed-use affordable and market-rate housing development adjacent to the Gateway MAX station. The Project presents an opportunity to balance housing in the area with jobs at the airport and at the planned Cascade Station development near the airport and I-205.
- **Lents Town Center/Johnson Creek Restoration.** The team has been involved with the Lents Urban Renewal Area activities and with related work to restore Johnson Creek and address flooding issues, and has provided ideas to promote livability and environmental protection in the design of new buildings.

Local jurisdictions also have economic development plans and programs of their own. Gateway became the City of Portland's tenth Urban Renewal Area (URA) in June 2001, with a "standing principle" to "facilitate the full and productive use of the land for appropriate 'regional center' uses." The URA plan describes appropriate regional center development as mixed-use, compact, and supporting a range of travel options and opportunities for community interaction and economic advancement.

The City of Portland adopted the Lents Town Center URA as an Urban Renewal District in September 1998. The Lents URA goals and objectives include several economic development goals. These goals focus on neighborhood and commercial revitalization and the creation of family wage jobs for area residents. The Lent's Urban Renewal Plan's economic/commercial development projects include:

- Development Opportunity Strategies Program: technical and/or financial assistance in determining redevelopment feasibility;

- Storefront Improvement Program: matching grants to rehabilitate commercial storefronts or long-term vacant commercial space;
- Business Development Program: technical and/or financial assistance to improve operations, increase profitability and/or create jobs;
- Redevelopment Assistance Program: technical and/or financial assistance to commercial/industrial property developers; and
- Business Recruitment/Area Marketing Program: promotion of opportunities within the area to prospective employers and business customers.

3.1.2 Land Use and Economic Impacts

This section is a summary of direct, indirect and cumulative land use and economic development consequences that could result from the construction and operation of the proposed Project. It compares the No-Build Alternative and the I-205/Portland Mall Project, and evaluates impacts of operations of the Project and evaluates impacts associated with construction of the Project facilities. It also evaluates cumulative impacts of the Project and other reasonably foreseeable other projects.

The No-Build Alternative does not include specific new transit station locations; consequently, data are not available on existing and projected households, population, and employment served by the No-Build transit improvements. Because the No-Build Alternative includes fewer transit improvements relative to the I-205/Portland Mall Project, it follows that there would be fewer direct land use and economic consequences. For example the No-Build Alternative would:

- Have no construction employment or personal income benefits to the region;
- Have less construction employment, operations employment, personal income related to construction, and longer term tax base impacts relative to the Project; and,
- Provide less transit support for increased densities in designated mixed-use centers.

3.1.2.1 Land Use Policy

This section summarizes the No-Build Alternative's and the Project's impacts and compliance with land use policy within the state, the region and the corridor. Specifically this section evaluates impacts to land use policy, employment, tax bases and the economy. It concludes with a summary of land use and economic impacts that would be expected to result from construction activities.

A. No Build Alternative

It is unlikely that the No-Build Alternative would lead to the changes in land uses and new development that is anticipated by the state, regional and local plans. The No-Build Alternative would also likely increase pressure within the region to further expand the urban growth boundary, because light rail service would not be available to support the higher-density mixed use development in the Central City and light rail station areas.

The No-Build Alternative would not provide the high capacity transit improvement that the plans envision to support the high-density office and commercial development in the Portland Central City. The addition of LRT on the existing Transit Mall in the Portland Central City has been envisioned since the adoption of the Central City Plan in 1972. The addition of light rail service on the Portland Mall is a key element of implementing the plan and the Region 2040 Growth Concept.

The No-Build Alternative would include a minimal level of transit improvements in the South Corridor; consequently, it would be compatible with local comprehensive plans. However, the No-Build Alternative would not provide the level of transit service anticipated in local comprehensive plans; therefore, the No-Build Alternative would provide less support for transit-oriented development, particularly in the Clackamas Regional Center.

In comparison with the I-205/Portland Mall Project, the No-Build Alternative would not contribute to achievement of the region's level of service objectives for its transportation system. Further, the No-Build Alternative would not support intensified development in the designated Regional Centers and Town Centers as called for in the *Region 2040 Growth Concept* and local comprehensive plans. As a result, the No-Build Alternative would make it more difficult to achieve the population and employment densities envisioned in the *Region 2040 Growth Concept* and would add to pressure to expand the region's UGB.

The No-Build Alternative would include transit improvements in the South Corridor as outlined in Table 2.2-1. Though these improvements would be compatible with regional plans and policies, they would not provide the level of LRT service to and within the Central City, designated Regional Centers, and Town Centers envisioned in the *Region 2040 Growth Concept*. As a result, the No-Build Alternative would provide minimal transit support for a transition to higher-density uses in areas such as the Clackamas Regional Center.

B. I-205/Portland Mall Project

With the North Corridor Interstate MAX LRT line completed, the region has a light rail system in place with four major spokes to the east, west and north including the Airport line. The South Corridor would provide an important fifth spoke of the regional system and enable high-capacity transit connections to the Central City and several regional centers and town centers, as envisioned in the *Region 2040 Growth Concept* and the *RTP.* In addition, LRT stations have the potential to serve as nodes for transit-oriented development as demonstrated at some stations along the existing MAX system and as envisioned in the local, regional and statewide planning efforts.

Statewide Planning Goals

The I-205/Portland Mall Project would support the *Statewide Planning Goals*. It would provide improved transit service to lands within the regional UGB that are designated for urban development, consistent with the emphasis of the *Statewide Planning Goals*, particularly Goal 11, Public Facilities and Services; Goal 12, Transportation; and Goal 14, Urbanization. The proposed transit improvements would not serve rural lands or result in pressure to convert rural lands to urban uses, consistent with Goal 3, Agricultural Lands; Goal 4, Forest Lands; and Goals 11, 12 and 14.

Goal 12, Transportation, and the TPR promote the development of safe, convenient, and economic transportation systems designed to reduce reliance on the automobile so that air pollution, traffic, and other livability problems faced by urban areas in other parts of the country might be avoided. The TPR includes measures to improve the livability of urban areas, particularly larger metropolitan areas, by promoting changes in land use patterns and the transportation system that make it more convenient for people to walk, bicycle, and use transit, and to drive less to meet their daily needs. The Project would provide an opportunity for modal shift in the Corridor and would provide a tool for the region to achieve the TPR's VMT reduction targets. The TPR also requires local

governments to consider changes to land use densities and urban design as a way to meet transportation needs. Specifically, the TPR states that local governments must consider "increasing residential densities and establishing minimum residential densities within ¼ mile of transit lines, major regional employment areas, and major regional retail shopping areas." The Project would be designed to link and serve major regional employment and shopping areas such as the Central City, the Gateway and Clackamas Regional Centers, the Lents Town Center; and other activity centers such as the Portland Adventist Medical Center.

Regional Plans and Policies

The *Region 2040 Growth Concept* directs most new development to mixed-use urban centers and along major transportation corridors. Focusing new jobs, housing, and services in these centers and corridors provides many benefits and has important implications for the region's transportation system. Adopted regional and local plans support targeting transit investments to leverage higher-density development in the designated mixed-use centers. The regional plans envision that LRT would become the backbone of the transit system, connecting regional centers to one another and the Central City.

The Project would be most supportive of regional plan policies that encourage high-capacity transit links of designated regional centers and town centers. The Project would link a major transit hub at Gateway Regional Center with Lents Town Center and the Clackamas Regional Center. Riders could take light rail from Clackamas County to downtown and the Westside, or could transfer at Gateway to connect to the Gresham Regional Center or north to the Airport. The RTP calls for LRT service along I-205 connecting the Gateway and Clackamas regional centers.

The Project would be compatible with the following plans and policies:

- The design type designations in the *2040 Growth Concept.* The Project would provide a new LRT connection between the Gateway and Clackamas regional centers, and leverage existing LRT lines to provide additional connections to the Portland Central City and other regional centers to the east and west (Gresham, Beaverton and Hillsboro).
- The RTP identifies the I-205 corridor for LRT service, and it also notes that LRT is the best public transportation mode to serve the designated central city and regional center land use components of the *Growth Concept.*

In summary, the ultimate success of the *Growth Concept* is predicated on the implementation of a north/south transit spine on the Portland Mall in the CBD that links to the key activity centers in the Corridor and the Region. The *Central City Plan* designates the majority of downtown Portland and several surrounding neighborhoods for high-density office, commercial and residential uses. The plan depends on high-quality transit to provide regional access to the Central City and a high-quality pedestrian environment to support trips within the Central City. If high-capacity transit improvements were not implemented, the region's growth management strategy would be at risk.

Local Plans and Policies

- The City of Portland's *Outer Southeast Community Plan* illustrates a proposed high-capacity transit line in the I-205 corridor between the Gateway and Clackamas regional centers. The land use element of the plan has been implemented with higher density zoning along transit corridors.

- The *Clackamas County Comprehensive Plan* transit policy states the county will work with federal, state, and regional agencies to implement LRT in the I-205 Corridor.

The Project would include new stations to serve key activity centers such as Portland Adventist Hospital and Clackamas Town Center, and would provide expanded transit service and stations in three designated urban renewal areas (Gateway Regional Center, Lents Town Center and Clackamas Regional Center). All three URAs outline plans for public investments in infrastructure and amenities to attract and support private investment and more intensive development.

The service, permanence, and amenities of the stations in the I-205 Segment could attract higher-density, transit-oriented development at locations such as the Main Street Station (near Portland Adventist Hospital), the Foster Road Station (serving Lents Town Center), and the Clackamas Transit Center Station (serving the regional mall and nearby high-density office and residential development). Existing development patterns around many of the planned stations are relatively low density and auto oriented.

Operation of the I-205/Portland Mall Project would require expansion of the existing LRT operations and maintenance facilities at Ruby Junction in the City of Gresham and at Elmonica in Washington County. Expansion of the Elmonica Facility would be within the existing property owned by TriMet. The Ruby Junction facility is located south of SE Burnside Road and east of SE 199th Avenue. The site is zoned for Heavy Industrial use. The original Ruby Junction facility had capacity for about 48 light rail vehicles (LRVs). In 2001, the City of Gresham approved a land use application for expansion of the facility to accommodate 17 to 24 additional LRVs for the Interstate MAX Project. The Interstate MAX expansion connecting to North Portland has been completed.

Further expansion of the Ruby Junction facility would be required to accommodate additional LRVs associated with the I-205/Portland Mall Project. The expansion would include about 10 additional acres and would require the vacation of a dead end street, SE 199th Avenue. Current land uses in the expansion area include heavy industrial uses such as a car storage/wrecking yard site, a paving company, and an auto body site. Expansion of the Ruby Junction facility would be compatible with the heavy industrial zoning and surrounding industrial uses. City of Gresham land use approvals would be required for the expansion of the Ruby Junction Facility.

3.1.2.2 Employment and Economic Impacts

Economic and employment impacts resulting from construction and operation of the Project would occur throughout the region. Some economic impacts would result directly from spending by the Project for construction, while others would be indirect impacts such as increased consumer or business spending. Though the Project would not greatly change total regional employment figures, construction of the Project would cause a shift in job location, as development and employment would centralize around the Project.

A. Operational Employment

Existing and projected households, population, and employment within a one-half-mile radius of the stations are shown in Table 3.1-4. The stations in the I-205 segment would include some land within the freeway right-of-way; resulting in less land within one-half mile of the stations being available for residential or employment uses.

Longer-term direct impacts would include employment from the operation and maintenance of the I-205/Portland Mall Project. The degree to which these jobs would be an actual economic benefit would depends in part on the source of funding for the Project. Locally funded operations yield a smaller economic benefit than federally funded operations because the money would likely otherwise be spent on other projects in the region.

Table 3.1-3 summarizes operations employment and economic impacts related to operation of the Project, as compared to the No-Build Alternative. Under the No-Build Alternative, total transit system operating costs would be just over $313 million (2004 dollars) in 2025 (including operations and maintenance costs for TriMet, Washington County Commuter Rail, C-TRAN, and Portland Streetcar). Of this amount, $22.6 million would provide bus service within the South Corridor. With the I-205/Portland Mall Project, total transit system operating costs would be nearly $321 million in 2025 (2004 dollars). Of this amount, $31.1 million would provide service to the South Corridor. The operations and employment numbers shown in Table 3.1-3 represent total annual operations cost and employment.

Table 3.1-3
Estimated Operations and Maintenance Costs and Operations Employment – 2025

	Estimated Annual Operations and Maintenance Costs	Estimated Operations Employment
No-Build Alternative	$313,643,464	2,522
I-205/Portland Mall Project	$320,831,976	2,584

Source: TriMet, July 2004. Costs are in 2004 dollars at year 2025 service levels.

B. Construction Employment

Construction of the Project would result in short-term regional income and employment benefits. The short-term income impacts from construction of the Project would include:

- Direct added income associated with new construction jobs;
- Indirect added income from jobs created in industries supplying goods and services to the construction firms;
- Induced income resulting from additional purchases made by the households receiving the new direct and indirect income benefits; and,
- Potential adverse short-term business income impacts related to reduced roadway and pedestrian access and construction noise.

Table 3.1-4 shows the estimated economic effect of construction of the Project. The cost of construction of the Project would be an estimated $394 million dollars. One of the most significant economic impacts of construction is the creation of construction jobs in the area. The Project would result in an estimated 7,580 added person year jobs in the Metro region. This would include 2,760 direct jobs, 1,780 indirect jobs and 3,040 induced jobs.

Direct, indirect and induced income impacts from construction spending are projected to generate $260.6 million of added personal income from construction jobs, industries supplying construction materials and other purchases from new income.

Employment related to construction expenditures would include the direct employment impacts of immediate construction hiring, as well as indirect and induced impacts. Indirect employment impacts

would include employment by businesses providing goods and services to the construction firms. Induced impacts would include jobs created as a result of additional purchases made by households due to increased income linked to direct or indirect employment impacts. Direct, indirect, and induced job or employment impacts from construction spending would generate 7,580 added jobs in the metropolitan region. These impacts would be expected to dissipate relatively quickly once construction is completed. There would also likely be long term indirect jobs created in the vicinity of proposed stations.

Table 3.1-4
Project Construction-Related Economic and Employment Impacts ($2004)

	Construction Costs [2]	Construction Impacts [1]	
		Jobs [3]	Personal Income
No-Build Alternative	**$0**	**0**	**$0**
I-205/Mall Project Total	**$394,934,000**	**7,580**	**$260,656,440**
Direct Jobs Created	n/a	2,760	$152,049,590
Indirect Jobs Created	n/a	1,780	$108,606,850
Induced Jobs Created	n/a	3,040	

Source: Metro, July 2004.
[1] Jobs and personal income impacts include direct, indirect, and induced employment and income generated by construction expenditures.
[2] Construction costs include the total capital cost minus the cost of buying vehicles.
[3] Estimates of jobs created were prepared by Metro based on the following job estimate multipliers: 6.98 direct jobs per million dollars of capital cost; 4.51 indirect jobs per million of capital costs; and 7.70 induced jobs per million dollars of capital costs.

3.1.2.3 Tax Base Impacts

The Project would have very little effect on local property tax bases. The Project has been designed to minimize the need for use of privately owned land for Project right-of-way. Because the amount of land that would be taken out of private ownership and converted to public right-of-way for the Project is so small and the tax base of the study area is so large, the overall impact to the tax base would be insignificant. Conversely, the development that is expected to occur around the new light rail stations would likely significantly increase the tax bases in the vicinity of the stations.

3.1.2.4 Construction Impacts

The No-Build Alternative would result in no direct construction related impacts in the South Corridor. Direct and indirect impacts would result from construction of the Project because it would be a large public works project. Construction of large public works projects such as light rail can be disruptive and/or supportive of businesses in the vicinity of the construction activities. When construction activities occur in streets or near businesses, access for customers can be disrupted. Construction activity can also be good for local businesses, such as when construction workers patronize local businesses and when construction related activities utilize local contractors or businesses such as truckers or suppliers. Also, if businesses are displaced to locations outside of the corridor due to construction, jobs could be lost. Construction-related impacts end with construction.

A. I-205 Segment

Established business districts in the corridor that would be affected by Project construction include the Lents Town Center Business District, and the Clackamas Regional Center, which includes Clackamas Town Center. In addition, the businesses in the immediate vicinity of SE Holgate and SE Division Streets, SE Powell Boulevard, and SE Johnson Creek Boulevard would be impacted by construction of new LRT grade-separation structures where they would cross over these streets.

B. Portland Mall Segment

Project construction of the embedded track on 5th and 6th avenues in downtown Portland would impact the surrounding business district. Impacts could include temporary disruption of pedestrian access, construction noise and vibration. The construction process as planned would be limited to the right-of-way small three to four block segments at one time. Refer to section 3.12 for additional discussion on the approach to construction in the Portland Mall Segment.

3.1.2.5 Cumulative Land Use and Economic Impacts

Cumulative impacts of the Project and other foreseeable improvements in the Central City and in the vicinity of I-205, such as those envisioned in the RTP would support implementation of regional and local land use plans. Without these projected improvements, it would be difficult for local and regional government to realize the adopted city and regional plans. The region's experience has demonstrated that new, concentrated, mixed-use development is more likely to occur in response to fixed route transit lines and stations than in response to bus stop locations. Regional and local comprehensive plans have targeted new growth and development to a number of activity centers such as the Portland Central City, the Gateway and Clackamas regional centers, and the Lents Town Center. These centers are intended to be the focus of mixed-use commercial and residential areas with pedestrian-oriented development. In addition, regional and local plans call for targeting public investments, including public transportation investments, to support the designated mixed-use centers. While the Project would be only one of several tools used to implement these plans, it is unlikely that the plans could be fully implemented without public transit improvements.

In comparison, it is unlikely that the No-Build Alternative would lead to changes in land uses or development in the Corridor consistent with regional and local plans. The No-Build Alternative could indirectly increase pressure to expand the UGB because the designated regional centers and town centers would not have the transit capacity to accommodate anticipated higher-density development. State law requires Metro to provide land within the UGB to meet 20-year projected needs. If land within the UGB cannot accommodate as much growth as planned or if it occurs at a much lower density than planned, this could result in pressure to expand the UGB to provide additional land for development jeopardizing natural resource lands including farm and forest lands.

The Project could have both positive and negative indirect impacts on neighborhoods. The improved transit accessibility would result in increased land values in proximity to the stations. The higher land values could lead to "gentrification" of existing neighborhoods as lower value improvements are replaced by higher value improvements. New development could provide expanded opportunities for housing and employment in the station areas; however, it could also contribute to displacement of affordable housing.

The cumulative land use impacts would be most directly related to regional and local plans, targeting new development in the designated centers. In addition, the Gateway Regional Center, Lents Town Center, and Clackamas Regional Center are all urban renewal districts. Public investment and improvements are planned to support new private investment in the urban renewal districts, adding the opportunity to tie into the urban renewal plans and leverage the transit improvements.

In the I-205 corridor, other cumulative land use impacts would relate to recent changes to the size and location of the Regional UGB. The Pleasant Valley and Damascus areas east of I-205 are now

included in the UGB. Urban development of these new areas (potentially in the range of 10,000 acres) would have major implications for the regional transportation system, and the I-205 corridor in particular. The Project would not directly serve the Pleasant Valley and Damascus areas. However, the availability of high-capacity transit service (including park-and-ride access and feeder bus access) in the I-205 corridor would provide important options for travel and mobility in this portion of the region.

3.1.3 Mitigation

Mitigation of impacts to businesses during construction (short-term impacts) would be accomplished through a number of activities. For example, TriMet worked extensively with the businesses along Interstate Avenue during the Interstate MAX construction process, and many of the same mitigation techniques would be applied to the Project including:

- Manage the construction so that it does not disrupt any single area for an extended period of time.
- Provide signage indicating access directions during construction.
- Provide signage indicating that businesses are open during construction.
- Provide temporary parking for businesses that lose parking due to construction.
- Especially in downtown Portland, maintain pedestrian access to businesses.
- Provide business promotional information during the construction process.
- Utilize area businesses and contractors for construction activities.
- Purchase construction materials from local businesses to the extent practicable.
- Minimize construction noise and dust.
- Manage work hours to balance community disruption.

The process of planning for the Project has included, and will continue to include, steps to avoid or minimize impacts of all types. Displacements have been minimized through the continued refinement of the alternative and design options. To the extent feasible and practicable, the Project would use or follow existing public road rights-of-way to minimize displacement impacts. Locations for related facilities such as stations, park-and-ride lots and maintenance facilities have been selected to balance displacement and other adverse impacts with the positive benefits of high-capacity transit proximity and service. In some instances, there may be opportunities for minor design modifications during preliminary and final engineering to avoid or reduce displacement impacts. Where displacements are unavoidable, relocation assistance would be available to assist displaced residences and businesses.

3.2 Displacements, Social and Neighborhood Impacts

The purpose of this section is to address issues related to displacements, social and neighborhood issues. This section summarizes the affected neighborhood and social environment and defines impacts to this environment. It concludes with a summary of measures that could mitigate the identified impacts.

3.2.1 Affected Environment

Along the I-205/Portland Mall Project alignment, there are seven neighborhoods within the City of Portland and three neighborhoods within Clackamas County. The seven neighborhoods along the I-

205 alignment include both neighborhoods located immediately adjacent to the alignment and those that are separated from the alignment by the freeway. The three neighborhoods in the Portland Mall Segment include neighborhoods immediately adjacent to the alignment and one neighborhood that is located a few blocks from the alignment. This section provides a summary of the demographics, character and community facilities within each of these neighborhoods.

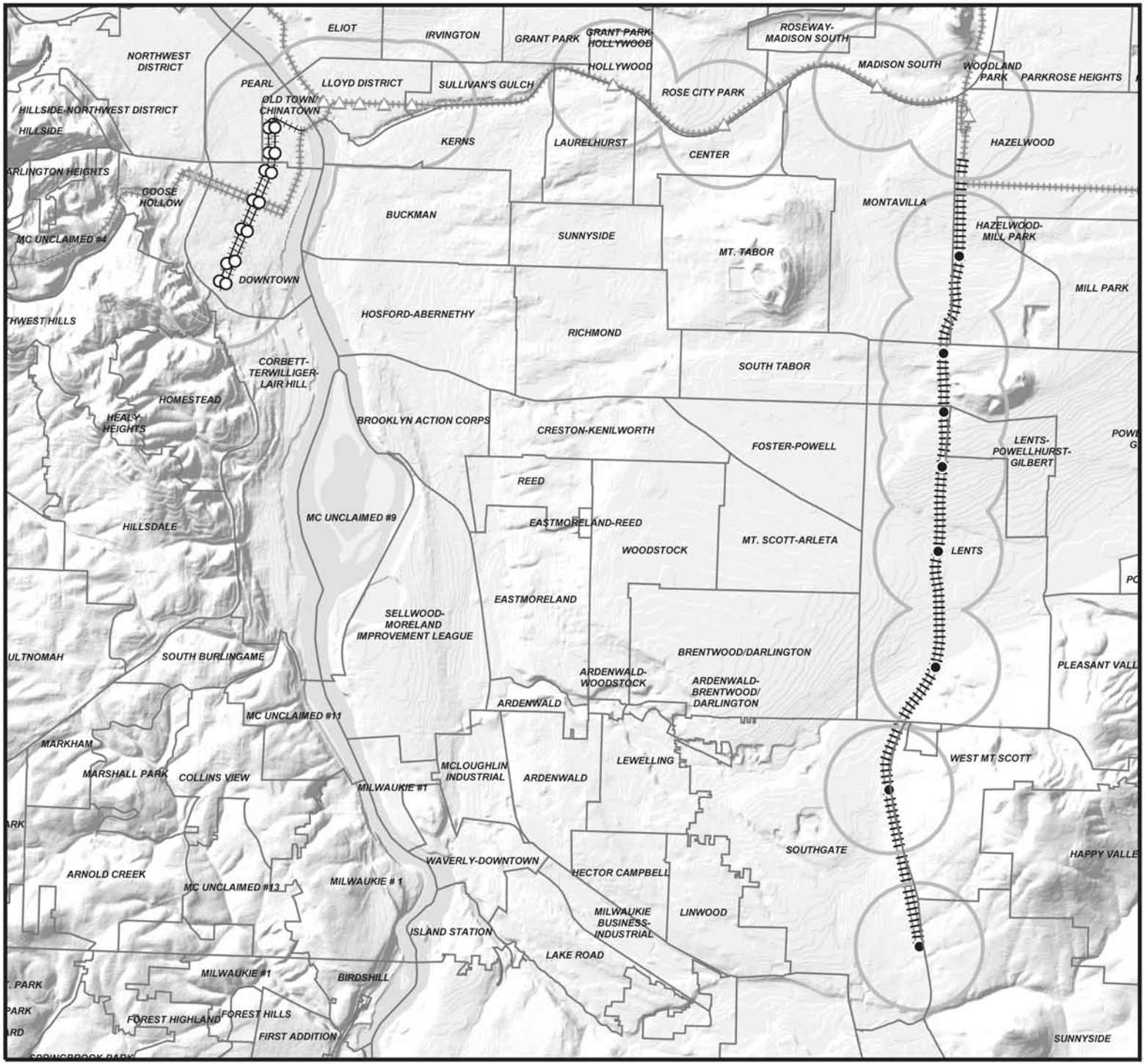
The location of each neighborhood is illustrated in Figure 3.2-1. Socioeconomic information for each neighborhood is provided in Table 3.2-1 and illustrated in Figures 3.2-2, 3.2-3 and 3.2-4. Socio-economic characteristics of each neighborhood have been compared to data for the entire Tri-County area[1] and significant differences from regional characteristics are noted in this summary. Housing tenure, race/ethnicity[2], elderly[3] and population (households and individuals) data for each neighborhood are based on block-level data from the 2000 US Census. Data for Hispanic origin and minority populations are listed separately. "The federal government considers race and Hispanic origin to be two separate and distinct concepts" and collects census data to reflect both race and ethnicity.[4] Under this definition, a person can be a member of any racial group while being of Hispanic origin. The poverty statistics listed for each neighborhood refer to the percentage of households with incomes below the federally defined poverty level ($17,463 in 2000 for a family of four). Poverty data is based on block group[5] level data from the 2000 US Census.

Table 3.2-1
Summary of the Socio-economic Profiles of the Neighborhoods Adjacent to the I-205/Portland Mall Project (2000)

Neighborhood	House-holds	Popula-tion	Employ-ment	% Minority[1]	% Hispanic[2]	% Poverty[3]	% Elderly[4]	% Renters[5]	Median Home Value[6]
Downtown	6,488	10,225	106,639	23.7%	4.5%	32.1%	15.3%	91.9%	N/A[7]
Hazelwood	7,691	20,021	2,441	22.7%	8.6%	12.5%	16.7%	45.2%	$137,920
Lents	6,676	18,358	4,900	23.5%	10.4%	15.0%	10.6%	42.7%	$109,400
Montavilla	6,109	16,193	5,825	25.0%	6.8%	10.4%	11.3%	39.8%	$120,100
Old Town/ Chinatown	1,216	2,657	5,329	22.6%	4.9%	49.2%	4.8%	99.6%	N/A[7]
Pearl	746	1,117	11,302	15.9%	5.5%	19.6%	4.2%	47.6%	$306,830
Powellhurst-Gilbert	6,294	17,973	3,956	22.0%	8.6%	13.7%	10.3%	42.3%	$126,640
Southgate	6,089	14,599	15,425	17.6%	11.8%	10.4%	11.6%	59.9%	$126,995
Sunnyside	3,500	7,203	3763	11.3%	3.7%	8.2%	11.7%	64.3%	$147,470
West Mt. Scott	1,048	2,761	321	20.5%	3.4%	2.5%	11.1%	33.0%	$207,430
Tri-County Area	569,461	1,444,219	1,014,401	17.1%	8.0%	8.7%	10.4%	27.1%	N/A
Clackamas Co.	128,201	338391	180635	8.7%	4.9%	6.1%	11.1%	28.9%	$160,889
Multnomah Co.	272,098	660,486	555,161	20.8%	7.5%	11.4%	11.1%	43.1%	$116,711

Source: 2000 US Census; Metro Data Resource Center, June 2004
Note: The information in this table is illustrated in Figure 3.2-1 Neighborhood boundaries, Figure 3.2-2 Income Levels of Households, Figure 3.2-3 Minority Residents, and Figure 3.2-4 Hispanic Residents.
[1] Minority- Percentage of residents whose race is not white alone.
[2] Hispanic- Percentage of residents of Hispanic or Latino origin.
[3] Poverty- Percentage of households with incomes below the Federally specified poverty level.
[4] Elderly- Percentage of residents who are age 65 or older.
[5] Renters- Percentage of occupied housing units occupied by renters.
[6] Median Home Value- Median assessed home value.
[7] Due to the small number of single-family homes in this neighborhood, median home value was not available.

[1] The Tri-County area refers to the entire three-county area (Multnomah, Washington and Clackamas Counties) and includes the South Corridor Project area.
[2] Race/ethnicity data refer to two measures: percent of residents that are members of minority groups and percent of residents that are of Hispanic or Latino origin regardless of race.
[3] The term elderly is used throughout this report, as defined by the US Census Bureau, to refer to people age 65 or older.
[4] US Census Bureau, "Overview of Race and Hispanic Origin 2000: Census 2000 Brief." www.census.gov, accessed on November 21, 2002.
[5] The US Census Bureau did not release poverty data at the block level. Because other demographic data were collected at the block level, there may be slight inconsistencies between the poverty data and the other socioeconomic data.



South Corridor Project

NEIGHBORHOOD BOUNDARIES

FIGURE 3.2-1

Neighborhood Boundaries

ALIGNMENTS

- Existing Light Rail
- Portland Mall Segment
- I-205 Segment

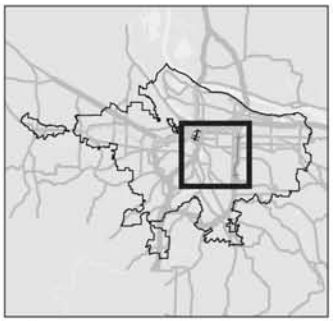
STATION LOCATIONS

- Portland Mall Segment
- I-205 Segment
- Existing Stations

Half-Mile Station Area

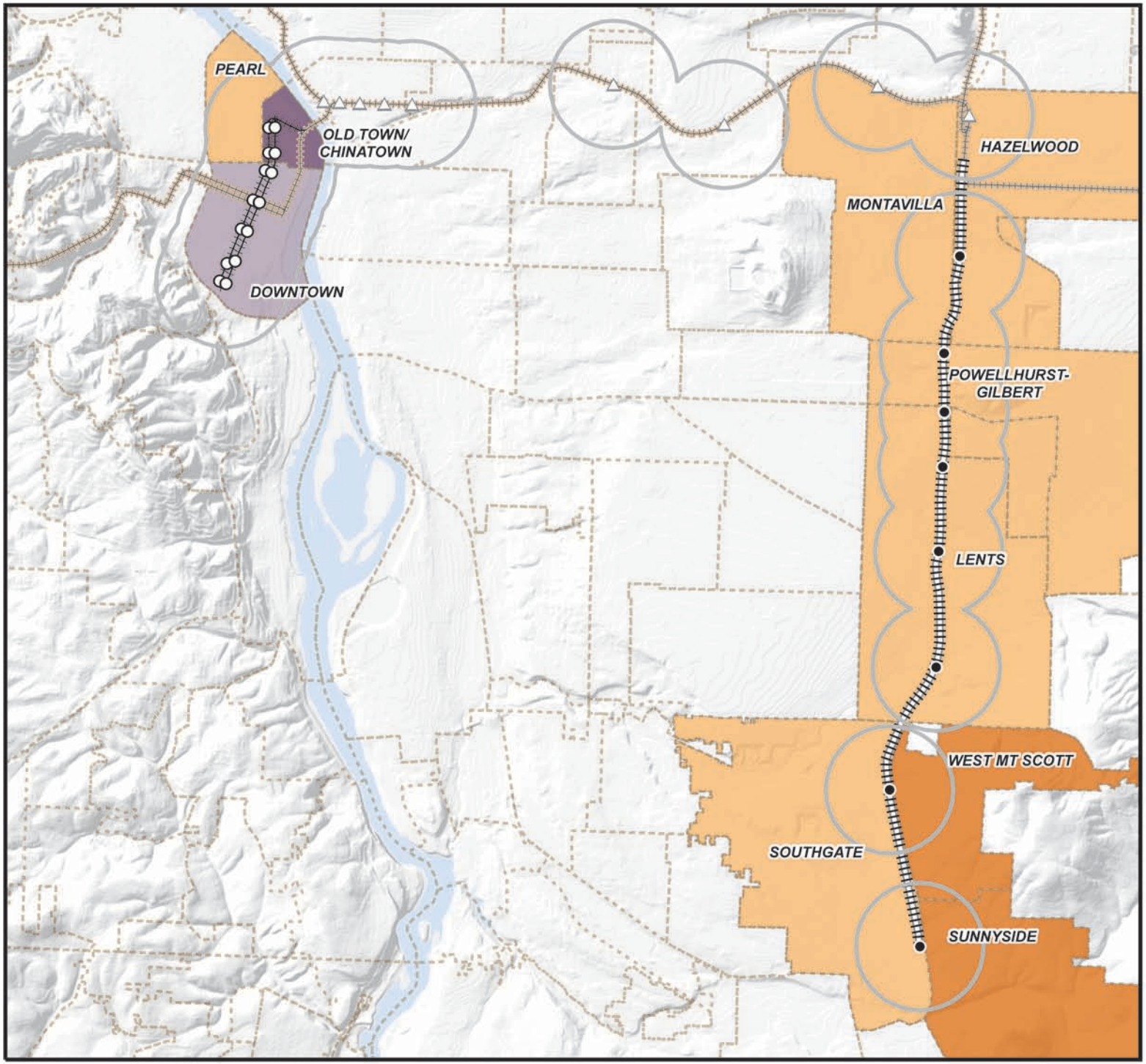
SOUTH CORRIDOR STUDY

METRO
PEOPLE PLACES • OPEN SPACES



0 0.3 0.6 0.9 1.2 Miles

July 2004



South Corridor Project

INCOME LEVEL OF HOUSEHOLDS

FIGURE 3.2-2

Percentage of households by neighbohood with incomes below the Federally specified poverty level

- *2.50 - 8.20%*
- *8.21 - 19.60*
- *19.61 - 32.10*
- *32.11 - 49.20*

Regional Average: 8.71

Neighborhood Boundaries

ALIGNMENTS

Existing Light Rail

Portland Mall Segment

I-205 Segment

STATION LOCATIONS

Portland Mall Segment

I-205 Segment

Existing Stations

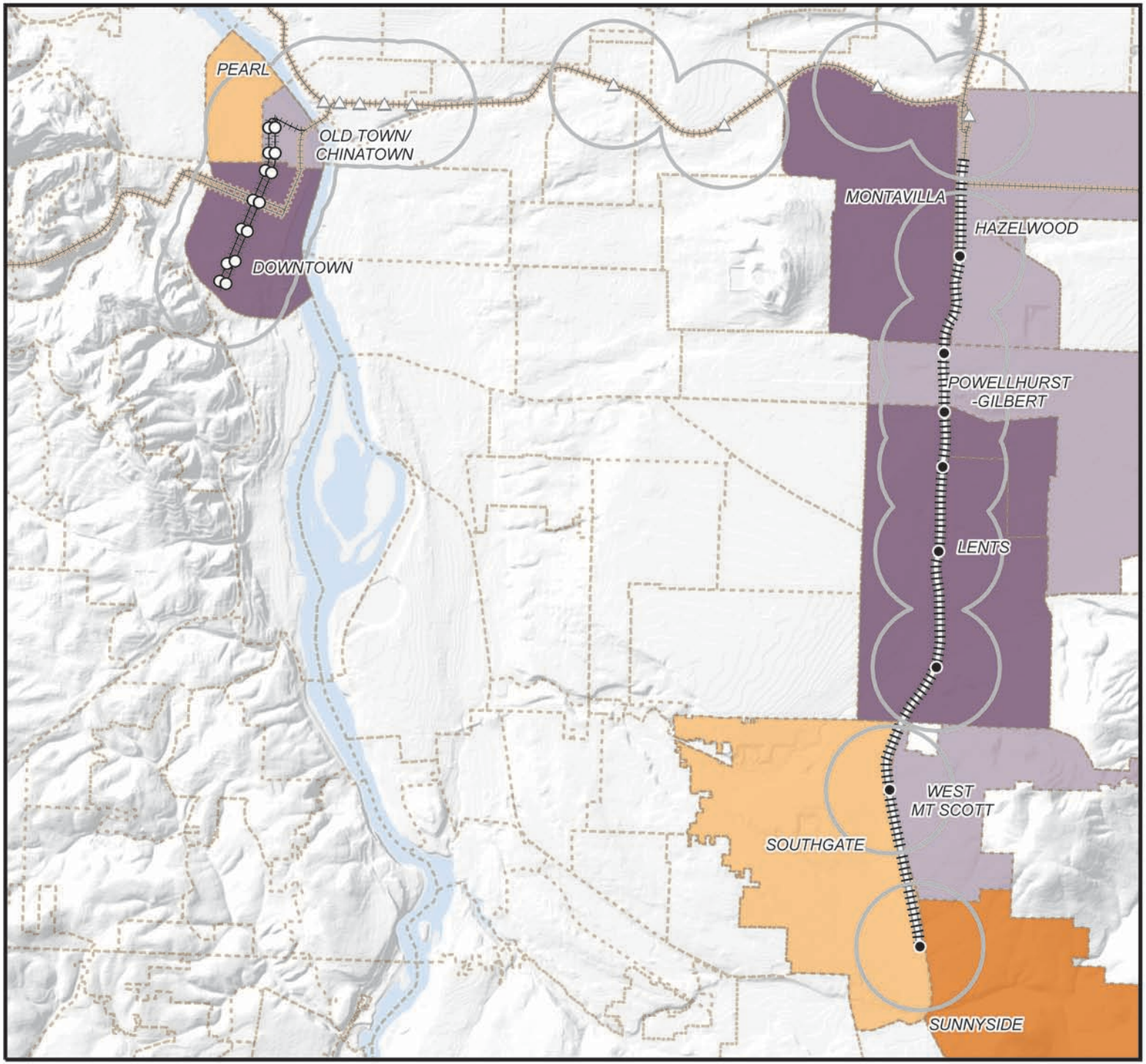
Half-Mile Station Area

SOUTH CORRIDOR STUDY
Transportation Alternatives

METRO
PEOPLE PLACES • OPEN SPACES

0 0.25 0.5 0.75 1 Miles

July 2004



South Corridor Project

MINORITY RESIDENTS

FIGURE 3.2-3

Percentage of residents by neighborhood whose race is not white alone

- 11.30%
- 11.31 - 17.60
- 17.61 - 22.70
- 22.71 - 25.00

Regional Average: 17.1%

Neighborhood Boundaries

ALIGNMENTS

- Existing Light Rail
- Portland Mall Segment
- I-205 Segment

STATION LOCATIONS

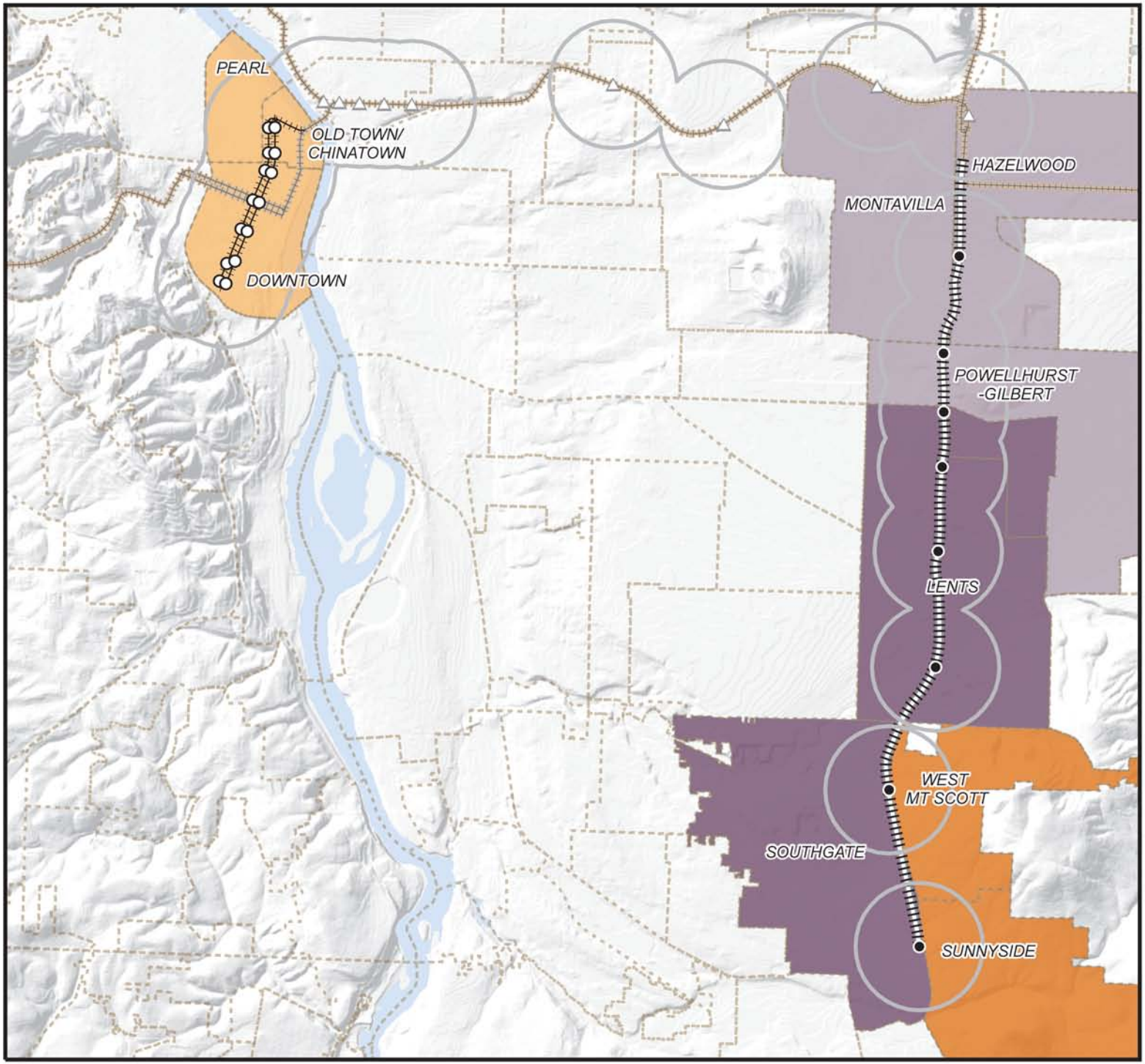
- Portland Mall Segment
- I-205 Segment
- Existing Stations
- Half-Mile Station Area

SOUTH CORRIDOR STUDY Transportation Alternatives

METRO PEOPLE PLACES • OPEN SPACES

0 0.25 0.5 0.75 1 Miles

July 2004



South Corridor Project

HISPANIC RESIDENTS

FIGURE 3.2-4

Percentage of residents by neighborhood of Hispanic or Latino origin

- 3.40 - 3.70%
- 3.71 - 5.50
- 5.51 - 8.60
- 8.61 - 11.80

Regional Average: 8.01%

Neighborhood Boundaries

ALIGNMENTS

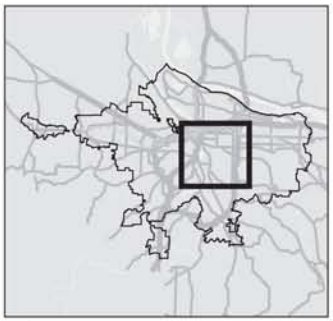
- Existing Light Rail
- Portland Mall Segment
- I-205 Segment

STATION LOCATIONS

- Portland Mall Segment
- I-205 Segment
- Existing Stations
- Half-Mile Station Area

SOUTH CORRIDOR STUDY

METRO PEOPLE PLACES • OPEN SPACES



0 0.25 0.5 0.75 1 Miles

July 2004

Employment data was collected by the State of Oregon Employment Department in 2000. The median home values were compiled through an analysis of data provided by county tax assessors. These neighborhood characteristics are referenced in the separate discussion of Environmental Justice (Appendix C, Environmental Justice Compliance). Employment and population data is also presented in Section 3.1, Land Use and Economic Activity.

About 8 percent of the Tri-County[6] area's 1.4 million residents live within the neighborhoods adjacent to the I-205/Portland Mall Project and about 16 percent of the Tri-County area's one million jobs are located in the neighborhoods adjacent to the Project. Nearly 70 percent of jobs in Project neighborhoods are located in downtown Portland.

There are significant minority, Hispanic, low-income and elderly populations within the corridor. The Hazelwood, Lents, Powellhurst-Gilbert and Southgate neighborhoods have larger proportions of residents of Hispanic or Latino origin[7] than the Tri-County average. Only the Pearl and Sunnyside neighborhoods do not have proportions of residents who are members of minority groups that exceed the Tri-County average. Only the Sunnyside and West Mt. Scott neighborhoods do not have higher proportions of households with incomes below the federally defined poverty level[8] than the Tri-County average. Only the Pearl, Old Town/Chinatown and Powellhurst-Gilbert neighborhoods do not have proportions of elderly residents that exceed the Tri-County average. All of the neighborhoods adjacent to the I-205/Portland Mall Project have proportions of renters that exceed the Tri-County average.

The breakdown of minority populations within neighborhoods adjacent to the I-205/Portland Mall Project is illustrated in Table 3.2-2. The largest minority group in the neighborhoods adjacent to the I-205/Portland Mall Project is Asian. Asian is the largest minority group in the Downtown, Montavilla, Sunnyside and West Mt. Scott neighborhoods. Hispanic origin of any race is the largest minority group in the Hazelwood, Lents, Pearl, Powellhurst-Gilbert and Southgate neighborhoods. African-American is the largest minority group in the Old Town/Chinatown Neighborhood.

Table 3.2-2
Minority[1] Populations Within Neighborhoods Adjacent to the I-205/Portland Mall Project

Neighborhood	African-American Alone	American Indian, Eskimo and Aleut Alone	Asian Alone	Native Hawaiian or Pacific Islander Alone	Hispanic Origin of Any Race	Other Race Alone	Multi-Racial
Downtown	6.6%	1.3%	9.4%	0.3%	4.5%	2.0%	4.2%
Hazelwood	3.2%	1.2%	7.9%	0.3%	8.6%	5.1%	4.5%
Lents	1.7%	1.3%	9.0%	0.4%	10.4%	6.3%	4.9%
Montavilla	3.2%	1.0%	12.0%	0.5%	6.8%	3.4%	4.4%
Old Town/ Chinatown	8.5%	4.0%	2.4%	0.3%	4.9%	3.3%	4.0%
Pearl	3.5%	1.6%	4.2%	0.2%	5.5%	2.2%	4.0%
Powellhurst-Gilbert	2.6%	1.1%	8.5%	0.2%	8.6%	4.7%	4.6%
Southgate	2.2%	1.0%	3.5%	0.4%	11.8%	6.8%	3.7%
Sunnyside	1.7%	1.1%	4.3%	0.1%	3.7%	1.4%	2.7%
West Mt. Scott	2.1%	0.2%	14.2%	0.3%	3.4%	0.8%	3.0%

Source: 2000 US Census; Metro Data Resource Center, May 2004.
[1]Residents whose race is not white alone.

[6] The Tri-County area refers to the entire three-county area (Multnomah, Washington and Clackamas Counties) and includes the South Corridor Project area.
[7] Residents of Hispanic or Latino origin are referred to as Hispanic throughout this report.
[8] As reported by the 2000 US Census.

3.2.1.1 I-205 Segment Neighborhoods

A. City of Portland Neighborhoods

The **Montavilla** and **Hazelwood neighborhoods** are located south of I-84 and are separated by the I-205 freeway. Both neighborhoods are comprised of a mix of land uses including auto-oriented commercial development, residential and traditional storefronts. The Gateway Regional Center and urban renewal district are located in the Hazelwood Neighborhood. The Portland Adventist Hospital is also located in the Hazelwood neighborhood. Both neighborhoods have a larger proportion of residents who are members of a minority group and Hazelwood has a higher proportion of residents who are Hispanic than in the Tri-County area. Montavilla has the largest proportion of minority residents of neighborhoods in the corridor. Both neighborhoods have a higher proportion of renter occupied housing units and higher poverty rates than the Tri-County average.

The **Lents** and **Powellhurst-Gilbert neighborhoods** are both divided by I-205 and were divided by the construction of I-205 in the late 1970s. Both neighborhoods include a mix of land uses including auto-oriented retail, and single and multi-family housing. Much of the Lents neighborhood is identified as an urban renewal district by the City of Portland. The Waddle's Boys and Girls Club in Lents is a significant community facility. The Lents and Powellhurst-Gilbert neighborhoods both have higher than average proportions of residents who are members of a minority group or are Hispanic than the Tri-County area. Both neighborhoods have a higher proportion of renter occupied housing and have higher poverty rates than the Tri-County area average.

B. Clackamas County Neighborhoods

The **Southgate Neighborhood** is bordered by I-205 to the east and Multnomah County to the north. It is a large neighborhood with diverse land uses including the Clackamas Town Center mall, single and multi-family housing and auto-oriented retail along SE 82nd Avenue. County offices and other employment areas are concentrated in the southern part of the neighborhood. Much of the neighborhood has been designated as the Clackamas Regional Center and is part of a Clackamas Town Center urban renewal area. Southgate is home to a relatively large proportion of residents who are Hispanic compared to the Tri-County average. Renters occupy nearly 60 percent of housing units in the neighborhood. A slightly higher percentage of residents are elderly in the Southgate neighborhood than the Tri-County area, partially due to the concentration of senior housing north of the Clackamas Town Center. The Southgate Neighborhood also has a higher poverty rate than the Tri-County area.

The **Sunnyside** and **West Mt. Scott Neighborhoods** are bordered on the west by I-205 and are located in northern Clackamas County. West Mt. Scott and the northern portion of the Sunnyside Neighborhood are primarily residential neighborhoods comprised of single-family homes with some apartments and town homes located near major arterials. Sunnyside Road is lined with auto-oriented commercial development. The Kaiser Sunnyside Medical Complex is also located in the Sunnyside neighborhood. A larger proportion of West Mt. Scott residents are members of minority groups than in the Tri-County area as a whole. Few West Mt. Scott or Sunnyside residents are Hispanic. Renters occupy 65 percent of housing units in the Sunnyside neighborhood, more than twice the Tri-County area average. West Mt. Scott has the highest assessed single-family home value in the I-205 segment. Both neighborhoods have lower poverty rates than the Tri-County average.

3.2.1.2 Portland Mall Segment Neighborhoods

The **Downtown Portland Neighborhood** contains the region's business and retail core, with a high-density mix of retail, office, apartment and condominium housing and mixed-use buildings, museums, places of worship, as well as Portland State University (PSU), numerous small and large parks and other public facilities. Federal, county, city and state offices are located in downtown Portland including City Hall and the county and federal courthouses. The street system is primarily a one-way grid with limited auto access on parts of the Portland Mall along 5th and 6th avenues. Housing is concentrated in the southeastern portion of the neighborhood, near PSU and the park blocks, and in the RiverPlace mixed use development.

The Downtown Portland Neighborhood's poverty rate is substantially higher than the Tri-County area's average. A significantly higher proportion of residents of the Downtown Neighborhood are members of a minority group or are elderly than in the Tri-County area. A smaller proportion of Downtown Neighborhood's residents are Hispanic than the Tri-County average. Renters occupy more than three times as large a percentage of housing units in Downtown Portland than in the Tri-County area and there are few single-family homes. Apartments, single room occupancy hotels and condominiums comprise most of the housing stock.

The **Old Town/Chinatown Neighborhood** includes a variety of industrial, commercial and residential uses. There are several bridges over the Willamette River with one end in the neighborhood including the Broadway, Burnside and Steel bridges. The roadway system is a mix of one and two-way streets, and includes the northern portions of the Portland Mall along NW 5th and 6th avenues. The entire neighborhood is a significant employment center, including wholesale distributors, supply stores and other retail business. The neighborhood also has a large homeless population, social service providers for the homeless community and single room occupancy hotels. Significant community facilities include the Portland Saturday Market, the Classical Chinese Garden and the northern end of Tom McCall Waterfront Park that connects to the Eastside Esplanade via the Steel Bridge pedestrian and bike bridge. Old Town/Chinatown has benefited from development in the neighboring Pearl District and has begun to experience reinvestment. Chinatown was recently designated as a historic district. The poverty rate in Old Town/Chinatown is nearly 50 percent, much higher than the Tri-County average. Renters occupy nearly all housing units. Twenty-three percent of residents are members of a minority group, more than the Tri-County average of 17 percent. There are fewer Hispanic and elderly residents in the Old Town/Chinatown Neighborhood than the Tri-County average.

The **Pearl Neighborhood** is comprised of retail, office, industrial, commercial and residential uses. Many warehouse and industrial buildings have been converted to mixed-use buildings with commercial or retail uses on the ground floor with housing above. The Pearl is home to an arts community with galleries and studios. The roadway system is a mix of one and two-way streets and includes streetcar service. A number of public buildings are located in the Pearl including the main post office, the federal customs and immigration building and the city's train and bus depot. The north park blocks extend six blocks between SW Ankeny and NW Glisan streets in the Pearl.

The Pearl Neighborhood's poverty rate is the lowest of the downtown Portland neighborhoods, but it is still twice the Tri-County average. There are fewer Hispanic, elderly and minority residents in the Pearl than the Tri-County average. Owners occupy more than half of housing units in the Pearl and the median home value is the highest of any neighborhood adjacent to the Project.

3.2.2 Displacement Impacts

Table 3.2-3 summarizes the total number, and nature of displacements that would result from the proposed Project. Table 3.2-4 lists the properties that would be displaced by address and current use.

Table 3.2-3
Displacements by Segment and Type

	No Build Alternative	I-205/Portland Mall Project		
		Portland Mall Segment	I-205 Segment	Total
Residential	0	3	31	34
Business	0	2	1	3
Public/institutional	0	1	0	1
Total	0	6	32	38

Source: Metro and TriMet, 2004

Table 3.2-4
I-205/Portland Mall Project Displacements by Address and Use

Address	Use	Segment
6235 SE 94th Avenue	Residential	I-205
6305 SE 94th Avenue	Residential	I-205
6317 SE 94th Avenue	Residential	I-205
9151 SE Crystal Springs Road	Residential	I-205
9151 SE Crystal Springs Road	Residential	I-205
9151 SE Crystal Springs Road	Residential	I-205
9151 SE Crystal Springs Road	Residential	I-205
9151 SE Crystal Springs Road	Residential	I-205
8402 SE 89th Avenue	Residential	I-205
8510 SE 89th Avenue	Residential	I-205
8646 SE Fuller Road	Residential	I-205
8760 SE Fuller Road	Residential	I-205
8760 SE Fuller Road	Residential	I-205
8770 (8760) SE Fuller Road	Residential	I-205
8862 SE Fuller Road	Residential	I-205
8920 SE Fuller Road	Residential	I-205
9608 SE Fuller Road	Residential	I-205
9700 SE Fuller Road	Residential	I-205
9730 SE Fuller Road	Residential	I-205
9750 SE Fuller Road	Residential	I-205
9750 SE Fuller Road	Residential	I-205
8510 SE Con Battin Road	Residential	I-205
8530 SE Con Battin Road	Residential	I-205
8600 SE Con Battin Road	Residential	I-205
8702 SE Con Battin Road	Residential	I-205
8636 SE Con Battin Road	Residential	I-205
8506 SE Con Battin Road	Residential	I-205
8700 SE Con Battin Road	Residential	I-205
9730 SE Fuller Road	Residential	I-205
9730 SE Fuller Road	Residential	I-205
9730 SE Fuller Road	Residential	I-205
9730 SE Fuller Road	Residential	I-205
1984 SW 6th Avenue	Business	Portland Mall
1986 SW 6th Avenue	Business	Portland Mall
520 SW Jackson	Residential	Portland Mall
522 SW Jackson	Residential	Portland Mall
2005 SW 5th Avenue	Institutional	Portland Mall
518 SW Jackson Street	Residential	Portland Mall

Source: Metro, TriMet August, 2004
Note: Addresses may be repeated for multifamily dwellings or addresses with more than one dwelling on a single tax lot.

I-205 Segment. North of Foster Road the right-of-way for the proposed Project was established when I-205 was constructed in the late 1970s. South of Foster Road, a total of 31 properties must be acquired to construct the Project. Five of these displacements would be single-family homes in the Lents neighborhood. Five units of an apartment building in the southern part of the Lents neighborhood would also be displaced. In the Southgate neighborhood, the Fuller Road Park-and-Ride would displace 16 residences. Also in the Southgate neighborhood, five homes and one business located on Fuller Road north of Johnson Creek Boulevard would be displaced.

Portland Mall Segment. In the Portland Mall Segment, two businesses, a duplex, a single-family home and a sorority house at the Portland Mall's southern end would be displaced.

3.2.3 Social and Neighborhood Impacts

3.2.3.1 Corridor-Wide Impacts

Access to regional facilities and services is measured by the number of residents within 45 minutes of key corridor destinations using transit. Table 3.2-5 summarizes the number of corridor residents within 45 minutes (total, unweighted) of Downtown Portland, the Lloyd District, the Gateway Regional Center, Lents and the Clackamas Regional Center by transit in 2025. The I-205/Portland Mall Project would increase the number of residents with access to these major activity centers by 15 percent with particularly large increases in Lents (38 percent) and the Clackamas Regional Center (35 percent).

Table 3.2-5
Access to Major Activity Centers: Number of Residents Within 45 Minutes[1] of Key Corridor Destinations Using Transit, by Alternative (2025)

Measure/Work Destination	No-Build	I-205/ Mall Project
45-Minute Transit Access to:		
Downtown Portland	678,210	692,140
Lloyd District	641,170	685,050
Gateway Regional Center	651,940	722,800
Lents	437,240	603,070
Clackamas Regional Center	392,600	531,730

Source: Metro; August, 2004.
[1]Total un-weighted transit travel time during the p.m. peak period on an average weekday in 2025.

Maintaining **safety and security** at light rail stations and park-and-ride lots has been a significant issue raised by neighborhoods adjacent to the I-205/Portland Mall Project. During the course of community meetings and citizen advisory committee review of station locations and designs, requests have been made to carefully evaluate lighting, fencing, the presence of security personnel, video cameras and landscaping to ensure that park-and-ride lots and stations are as safe as possible.

Compared to the No-Build Alternative, safety and security would not be significantly impacted by the construction of the Project. During the final design process and during construction, TriMet would implement these features to accomplish the goal of ensuring safety and security at transit facilities. Security cameras and patrols would be used as appropriate to ensure a secure environment for TriMet passengers. As designs are finalized, the TriMet police as well as police agencies in the City of Portland and Clackamas County will be invited to review lighting, landscaping and fencing plans. More detail on this topic can be found in Section 3.11, Safety and Security, of this FEIS.

3.2.3.2 Neighborhood-level Impacts

A. I-205 Segment Neighborhoods

Access to neighborhoods in the I-205 Segment would be improved through the addition of the Project to transportation system compared to the No-Build Alternative. The new light rail route would fill long-standing neighborhood needs for a transit link east of 82nd Avenue. In addition, the new light rail line would provide these neighborhoods with a new route for reaching downtown Portland, the Airport, Gresham, Beaverton and Hillsboro by transit, complementing existing east-west bus routes. The east-west bus routes would continue to operate providing additional service and choices. I-205 Segment neighborhoods would benefit from increased neighborhood cohesion compared to the No-Build Alternative. The new light rail route would provide new transit connections within and between neighborhoods.

Some community members have raised concerns that neighborhood quality would be adversely impacted by light rail due to increased crime, noise levels, park-and-ride traffic and on-street parking in neighborhoods. As discussed above in Section 3.2.3.1, Corridor Wide Impacts, TriMet does not anticipate increased crime levels as a result of light rail and would design and would operate transit facilities to be as safe as possible.

Freeway noise is a concern in the corridor, particularly in the Lents and Southgate neighborhoods where many homes have no existing noise protection. The Project would mitigate much of the passby noise created by light rail by constructing more than one mile of sound walls between light rail tracks and homes in the Lents and Southgate neighborhoods. This sound wall should mitigate 40 moderate noise impacts and one severe noise impact. Twenty-seven moderate noise impacts in the Lents and Southgate neighborhoods would not be fully mitigated. All three vibration impacts in the I-205 segment could be mitigated. In areas where existing noise mitigation is currently in place, TriMet will ensure that any increase in noise levels caused by LRT operations would be mitigated to provide the same level of noise protection that exists today.

Traffic and parking impacts have been identified as major community concerns. There are some areas where on-street parking may be utilized for informal park-and-riding if prevention strategies such as placing time limits on parking or neighborhood parking permit programs are not implemented.

SE 96th Avenue near the Main Street Park-and-Ride lot would experience increased traffic that could be mitigated by relocating the entrance to the Portland Adventist Academy parking lot to SE Market Street and providing turn lanes on SE 96th Avenue and SE Market Street. The intersection of SE 92nd Avenue and SE Powell Boulevard could be impacted by traffic associated with the Powell Park-and-Ride lot. This increased traffic could affect travel to and from the Lents neighborhood and would be mitigated by additional queuing capacity for right and left turns from northbound SE 92nd Avenue onto SE Powell Boulevard. In addition, the Project would make half-street improvements (on the east side of 92nd Avenue) including sidewalks and streetlights between SE Powell Boulevard and the park-and-ride entrance. Additional delay may occur for patrons leaving the Clackamas Town Center Park-and-Ride during the holiday shopping season. At the Fuller Park-and-Ride, Clackamas County and TriMet will coordinate to ensure that intersection improvements at SE Fuller Road and SE Otty Road that will be completed prior to light rail construction are sufficient to meet additional demand created by the park-and-ride lot.

B. Downtown Portland Neighborhoods (Pearl, Old Town/Chinatown, Downtown)

The Project would include a new light rail alignment between the Steel Bridge and Portland State University. Vibration impacts in Downtown Portland would be mitigated, but the rerouting of buses onto SW Jefferson, SW Columbia and SW Harrison streets, along with the existing high noise levels from traffic would result in six unmitigated moderate noise impacts. The Portland Mall bisects both the Old Town/Chinatown and Downtown neighborhoods. The Portland Mall alignment could promote neighborhood cohesion and livability by adding transit service between neighborhoods and within downtown Portland. It could support the revitalization of the Portland Mall and address concerns of business owners by improving design and increasing activity along the Portland Mall. Some bus routes will likely be moved from 5th and 6th avenues to other Downtown locations such as Columbia and Jefferson streets and 10th and 11th avenues. The visual environment along the Portland Mall would change to include catenaries, track and other rail facilities. The visual changes would be consistent with the urban environment currently dominated by bus facilities. The design of transit facilities would be designed to complement the character of downtown neighborhoods with special attention given to the Chinatown Historic District and other recognized areas.

3.2.3.3 Cumulative and Indirect Impacts

Neighborhoods in the Portland Mall Segment could experience cumulative impacts related to a new infrastructure project in addition to recent major infrastructure projects such as the Big Pipe sewer Project and construction of the Portland Streetcar which affected downtown traffic and parking.

Cumulative impacts in the I-205 Segment could include reconstruction of soundwalls recently constructed by the Oregon Department of Transportation (ODOT) in areas of the Southgate Neighborhood adjacent to a new auxiliary lane on I-205. In addition, cumulative construction impacts related to traffic and staging could occur in these areas. In the Southgate neighborhood, traffic patterns could be changed as a result of on-going redevelopment. At some point, before light rail construction, left turns from SE Johnson Creek Boulevard onto Fuller Road are expected to be prevented by installation of a median on SE Johnson Creek Boulevard. Project traffic analysis assumed that this left-turn would not be allowed and that cars accessing the park-and-ride from I-205 would use SE Otty Road.

Beneficial cumulative effects related to planned and market-driven development would occur in neighborhoods adjacent to the Project. This activity would help communities along the route realize their community plans and visions including urban renewal plans. Also, neighborhoods could experience positive and negative indirect impacts resulting from the I-205/Portland Mall Project. Improved transit accessibility would be a positive impact on the livability and accessibility of neighborhoods. Negative indirect impacts could include gentrification resulting from increased land values and increased traffic from additional new development.

3.2.4 Construction Impacts in Neighborhoods

Construction of large public works projects can affect neighborhoods, both residents and businesses, in the vicinity of the construction activities. When construction activities occur in streets or near businesses and homes, access can be disrupted. Noise, dust and traffic from construction can also disrupt daily life for those who live or work near the construction site. Construction activity can also be good for communities, such as when construction workers patronize local businesses and when

construction related activities utilize local contractors or businesses such as truckers or suppliers. TriMet will work with neighborhood associations and residents to ensure that impact related to construction are minimized. Traffic related construction impacts are detailed in Section 4.5. Noise and vibration related construction impacts are detailed in Section 3.5.2.

A. I-205 Segment

Access to neighborhoods in the immediate vicinity of SE Holgate and Division streets, SE Powell Boulevard, and SE Johnson Creek Boulevard would be impacted by construction of new structures. In addition, neighborhoods surrounding construction staging areas may be impacted by noise and traffic related to construction. The I-205 multi-use path may be impacted by construction activities resulting in temporary detours for multi-use path users.

B. Portland Mall Segment

Project construction of light rail along the Portland Mall would affect users of 5th and 6th avenues including bus riders and pedestrians as well as auto and truck traffic. In addition, businesses located along the Portland Mall may have temporarily restricted or less convenient access.

3.2.5 Mitigation

Efforts to avoid potential Project displacements have occurred throughout Preliminary Engineering and preparation of this FEIS and will continue through final design and construction. Where displacements are unavoidable, relocation assistance would be available to assist displaced residents and businesses in compliance with the *Uniform Relocation Assistance and Real Property Acquisition Regulations for Federal and Federally Assisted Programs* (Title 49 Code of Federal Regulations, part 24). The I-205/Portland Mall Project would provide compensation to property owners based on fair market value of the properties in accordance with the State and Federal laws on property acquisition and relocation. Specific mitigation for visual and aesthetic, noise and vibration and traffic impacts is identified in sections 3.3, 3.5 and 4.6, respectively.

3.3 Visual and Aesthetic Qualities

This section summarizes information on the existing visual environment, the impacts to visual resources from the proposed Project, and identifies the visual mitigation that would be included in the Project. For additional details on the visual analysis, see the *South Corridor Project SDEIS* (Metro, November 2002) and the *Downtown Amendment to the SDEIS* (Metro, October 2003).

3.3.1 Affected Visual and Aesthetic Environment

The Corridor travel shed lies in the northern Willamette River Valley. The visual characteristics of its landform, hydrology, native vegetation, urban and rural land uses reflect this larger regional landscape. A number of knobby buttes, or remnants of volcanic cones, rise above the valley floor in the southern and eastern portions of the Project area. The Cascade Mountains provide a distant backdrop in the east, while the Tualatin Mountains frame the western edge of the view shed.

The Portland region encompasses a variety of cities and suburbs that surround the largest city, Portland. Urban development of the region began in the mid-1800s, with the first major overland

immigration to Oregon City. Downtown Portland developed as a center of commerce and industry for the state. Development within downtown, and many of the surrounding neighborhoods, grew up along streetcar lines, which ran in street until the middle of the 20th century.

Suburban development moved to the east in the 1920s and escalated after World War II. Older neighborhoods in outer east Portland share the same streetcar-oriented history and housing stock as many inner neighborhoods, but overall development patterns are more auto-oriented, including malls and retail or industrial corridors. Today, the I-205/Portland Mall Project area is predominantly urbanized. Suburban development is rapidly filling in the less dense southeastern portion of the study area. Regional and local land use plans have identified centers for focused growth and development and a regional urban growth boundary to contain urbanization and preserve the natural and resource environment outside the urban area.

3.3.1.1 I-205 Segment

The I-205 Segment follows the I-205 freeway in outer east Portland from the Gateway Regional Center into the rapidly developing Clackamas Regional Center area of northern Clackamas County. Most of Interstate 205 was completed by 1983, and cut a wide swath out of the developing suburban neighborhoods. The highway environment is typical of the interstate system nationwide. The environment is simple but well maintained and generally screens adjacent residential areas from the highway. Most of the land in the right-of-way is landscaped with grass, shrubs or trees. Some of the residential areas are screened from the highway by sound walls or tall landscaped berms. A bicycle and pedestrian path runs the length of the freeway, connecting to the adjacent neighborhoods and the major cross-streets.

The regional landscape slopes gently to the south and includes several significant geographic landmarks. Rocky Butte is near the north end of the I-205 Segment. Other formations within proximity of the corridor are Mount Tabor, Kelly Butte, Mount Scott, and Mount Talbert. Mount St. Helens, the Tualatin Mountains, and Mount Hood and its foothills are visible in the distance from some points.

The **Gateway Subsegment** is an area of regional importance in outer east Portland. Its former agricultural history is barely visible today. Since the 1950s, the area has developed as a shopping and service destination and major employment center. It is served by I-205 and I-84. Two TriMet light rail lines and many bus routes serve the Gateway Transit Center. In 1994, Metro designated the Gateway area as a Regional Center, a focus for employment and housing growth and transit- and pedestrian-friendly environments. The area includes the basin surrounding the interstate highway, the associated bike path, and the neighborhoods to the east and west, which are typically moderate-density single-family neighborhoods. The multi-lane, grade-separated interstate freeway is wide and dominates the area. Major roads running perpendicular to the highway (including Burnside Road, SE Stark Street, and Washington Street) all cross over the freeway. There is a pedestrian bridge at SE Main Street. The highways and related structures dominate the character and foreground views. The highway runs in a trench approximately 20 feet below the grade of local streets. Landscaping softens the edges of the highway, and the visual environment in the corridor is simple. Landmarks include the Gateway Transit Center, Mall 205, and the Portland Adventist Academy and Hospital. Because the freeway has cut a broad swath from the urban area, it also opens up views of several significant geographic landmarks, such as Mount St. Helens, Kelly Butte, and Mount Scott.

The **Lents Subsegment** is part of the large Lents Neighborhood, which contains newer suburban development as well as pre-war developments built around streetcar service in the early 20th century. What was once the commercial center of Lents, at SE 92nd Avenue and SE Foster Road, is now the redeveloping center of the Metro-designated Lents Town Center and a City of Portland Urban Renewal Area. The predominantly single-family residential areas include housing of mixed sizes and ages. In general, the residential areas are visually and physically separated from the freeway by high berms. The bikeway runs along the west side of the highway, between the berm and the back yards of adjacent houses.

The freeway is elevated on a concrete structure or on fill in the Lents area and access ramps slope down to meet the local cross streets: SE Powell and Holgate boulevards, SE Foster Road, and SE Flavel Street. Large portions of the excess right-of-way around the freeway are landscaped with grass and sparse trees, and the neighborhoods are screened from the highway by sound walls or high berms. A regional bicycle and pedestrian trail, the Springwater Corridor, passes through Lents, as does Johnson Creek. The land rises to the southeast toward the base of Mount Scott, the dominant land feature.

The **Clackamas Subsegment** includes the portion of the corridor under the jurisdiction of Clackamas County. Mount Scott is the dominant topographical feature, rising immediately to the east of I-205, which separates the neighborhoods from one another. Development in this segment visibly conveys the area's history and growth. While there are pockets of pre-war and rural housing, there are also established subdivisions from the 1970s, and new subdivisions of large houses and condominiums. The Clackamas Regional Center, which includes the Clackamas Town Center mall, anchors the southern end of the corridor. The large New Hope Church sits on the east side of the highway overlooking the valley.

3.3.1.2 Portland Mall Segment

The Portland Mall Segment is located along the existing Portland Bus Mall and is divided into the North Mall, Central Mall and South Mall areas and includes the Downtown, Old Town/Chinatown, Pearl District and University District neighborhoods.

The **North Mall** includes areas of the Old Town/Chinatown and Pearl District neighborhoods. This area is characterized by its low flat skyline of two-to-four story structures, some of which have historic cast-iron or Chinese-inspired detailing. The area is also defined by large, bold structures on its edge, including the historic Union Station and the historic Steel Bridge. New five and six story buildings with storefront retail and residential units above have recently been constructed along NW 5th and 6th avenues.

The **Central Mall** is in the core area of downtown Portland and contains the Government Center and the retail and office core. This area is a pedestrian-oriented section of the Central Business District that connects several blocks of large-scale multi-story buildings, public plazas, and historic and civic structures. Notable buildings and places that create a sense of history and solidarity with Portland's past include the Portland City Hall, the University Club, Pioneer Courthouse, Pioneer Courthouse Square, and the Ambassador Apartments. The area is a visually rich environment, with street trees, plantings, street furniture, fountains and public art. Street trees lining the Portland Mall on SW 5th and 6th avenues create a continuous tree canopy and trunks add to the sense of place and historic qualities of this part of downtown.

The **South Mall** includes sections of the Downtown Neighborhood and the University District that houses Portland State University (PSU). The University District contains instructional and residential buildings. The PSU Urban Plaza incorporates rail tracks for the Portland Streetcar through the plaza with a streetcar station located between two buildings. The structures and activities that are on the PSU Campus are a major contributor to the character of this area, which is changing as PSU continues to construct new buildings. Several multi-story office and residential buildings border SW 5th and 6th avenues, and St. Mary's church and academy is another landmark in this area.

3.3.2 Visual and Aesthetic Impacts

Visual and aesthetic impacts are changes to the existing conditions that may be brought about by construction of the Project. These changes may detract from the visual environment or enhance it. Because these are subjective criteria, this assessment focuses on those changes to the existing visual environment that may be measured in terms of high, moderate, or low impact. Enhancement and detraction are factors that may be affected by subsequent design and mitigation considerations. The major dimensions of the impacts would be determined by the factors shown in Table 3.3-1.

Table 3.3-1
Factors Affecting Visual Impacts

High Impact	Moderate Impact	Low Impact*
Elevated structure	Minimum grade separation	At grade/below grade
Substantial property displacement	Low property displacement	Within existing ROW
Significant new parking	Minimum parking	No new parking
High visual disruption	Moderate disruption	Low visual disruption
Visual connection to neighborhood	Inconsistent screening of neighborhood	Screening of neighborhood
Blocks scenic feature	Disruption of visual feature	No change to visual feature
Removal of all vegetation	Removal of some vegetation	Maintains pattern of vegetation
Changes out of scale to street	Changes to scale of street	Maintains existing scale

*Some impacts associated with transportation projects, such as screening, landscaping, lighting, sound walls, and pedestrian and b ke improvements, can be a positive improvement in the existing conditions.

For each of the visual changes, the accompanying consideration is the nature and quality of the existing environment and the sensitivity of the viewer to the changes. "Viewer sensitivity" refers to the preferences, values, and opinions of different groups of viewers. It includes considerations of the length of time for which the Project would be seen, the distance of the viewer from the Project, and the type of viewer (e.g., neighborhood resident or highway traveler).

To provide a better understanding of how the Project would appear within the corridor, a number of visual simulations and video simulations have been prepared. The visual simulations that have been prepared are created from a photograph of a specific location within the corridor where Project improvements are proposed. The simulations provide an artist's illustrative alterations depicting how the improvements could look at that particular location. These simulations are developed based on a preliminary level of design (approximately 15-30%) and would likely change as the design of the Project is refined, as various elements of mitigation are developed and as other details of the Project are decided.

3.3.2.1 No-Build Alternative

The No-Build Alternative would include transportation improvements as defined in the Regional Transportation Plan (RTP) Financially Constrained network. The increased frequency of buses on the Portland Mall would not be a significant change and would not adversely impact sensitive

viewers. Other projects and additional development within the study area could affect existing visual resources, however, since many of these projects have not been designed, it is difficult to evaluate their visual impacts. The No-Build Alternative (or existing visual landscape) is used as the baseline for comparison of the proposed I-205/Portland Mall Project.

3.3.2.2 I-205/Portland Mall Project

Visual impacts would include the impacts of constructing and operating the Project and would affect the visual environment within the corridor. Short-term construction-related changes to the existing visual environment would occur with the I-205/Portland Mall Project. The construction-related impacts would be temporary and would be eliminated when the Project construction is complete. These impacts could include the presence of machinery, staging areas, other required structures or equipment, and activities that would limit or obstruct views or in some way change neighborhood features identified as contributing to the neighborhood visual character. Construction-related impacts to visual resources could also include the temporary construction materials and debris located near these views, or in areas seen by large numbers of viewers.

A. I-205 Segment

Potential visual impacts in the I-205 Segment are summarized in Table 3.3-2 and described in more detail below. Overall, visual impacts related to the addition of LRT between the Gateway and Clackamas Regional Centers would be low to moderate because the proposed transportation improvements would be mostly within an existing transportation corridor.

Table 3.3-2
Summary of Potential Visual Impacts in the I-205 Segment

Location	Changing Features	Viewer Sensitivity	Level of Change	Level of Impact
SE Main Street	Station, 426-space parking lot	Medium	Low	Low
SE Division Street	Station	Low	Medium	Low
SE Division Street	Bus pullouts, pedestrian improvements	Medium	Low	Low
SE Powell Boulevard	New over-crossing, revised bike path, station, 391 space park-and-ride lot	Medium	Medium	Medium
SE Holgate Boulevard	Station, 125-space park-and-ride lot, remove landscaping	Low	Medium	Low
SE Foster Road	Station, new overpass, new walls	Medium	Medium	Medium
SE Woodstock Boulevard	Trackway, structure, retaining walls, building displacement	Medium	High	Medium
SE Harold Street	New overpass	High	Medium	Medium
Springwater Corridor	New overpass	High	Low	Medium
SE Flavel Street	Station, crossing gates	High	Medium	Medium
E 92nd to 89th avenues	Remove buildings and trees, new bridge, fill	High	Medium	Medium
Johnson Creek Boulevard/ Fuller Road	Station, new over crossing, change in development and circulation, remove buildings and vegetation, 624 space park-and-ride lot	Medium	High	Medium
Otty Road	Path, retaining walls	Medium	Low	Low
Clackamas Town Center	Relocate Transit Center, station, 500 space park-and-ride lot structure	Low	Low	Low

Source: *Visual and Aesthetic Impacts Results Report* (Metro and URS, November 2002), SDEIS (Metro, 2002), ASDEIS (Metro, 2003), and Final Definition of Alternatives Report (Metro, 2004)
Note: High, Medium and Low Impacts are described in Table 3.3-1.

Significant visual changes would result from the addition of large grade-separated over-crossing structures at SE Powell Boulevard, SE Harold Street, SE Foster Road, the Springwater Corridor, SE 92nd Avenue, and SE Johnson Creek Boulevard. Figure 3.3-1 is a visual simulation of the proposed Foster Road Station, and Figure 3.3-2 is a visual simulation of the proposed Johnson Creek

Figure 3.3-1 Visual simulation of SE Foster Road Station.
View to the west.

Figure 3.3-2 Visual simulation of Johnson Creek Boulevard Bridge.
View to the south.

Boulevard Bridge. At these locations, the new bridge structures would include both retaining walls for the bridge approach as well as the actual spans. Other changes throughout the corridor would include changes in traffic circulation; changes in development patterns, new stations and park-and-ride lots, and the removal of selected structures.

The Johnson Creek Boulevard LRT bridge would introduce a large structure into the visual environment. This would be visible from neighborhoods to the north and south, as well as from Mount Scott. The structure would be within the existing freeway transportation corridor, and the quality of the environment is low. The structure could block some medium quality views of Mount Scott and the surrounding landscape for travelers and residents.

B. Portland Mall Segment

Potential visual impacts in the Portland Mall Segment are summarized in Table 3.3-3 and described in more detail following. Generally, the LRT systems elements (i.e., trackway, catenary poles, overhead wires, and platforms) would alter the existing visual environment of the Portland Mall. However, the new visual landscape would generally be similar to the existing LRT environment on SW Yamhill and Morrison streets and SW First Avenue. The proposed LRT route on 5th and 6th avenues is adjacent to many historic buildings. Many of these were originally oriented toward the streetcar line that historically ran down 5th Avenue.

Table 3.3-3
Summary of Potential Visual Impacts in the Portland Mall Segment

Location	Changing features	Viewer Sensitivity	Level of Change	Level of Impact
North Mall	Add trackway, catenary system remove existing landscaping and some street furniture	Medium	High	Medium
NW Glisan Street	Add new ramp off of Steel Bridge to Union Station	Medium	High	Medium
NW 5th Avenue, Couch/Davis streets	New station platforms in front of historic buildings	Medium	Medium	Medium
Central Mall	Remove landscaping, add station platforms, trackway, catenary system	Medium	High	Medium
Central Mall	Potential removal and replacement of mature trees along the transit mall [1]	High	High	High
Pioneer Courthouse, Yamhill/Morrison streets	New station platforms in front of historic building	High	Medium	Medium
South Mall	Station platforms trackway, catenary system, street furniture, terminus/turnaround tracks	Medium	High	Medium

Source: Metro, July 2003
Note: High, Medium and Low Impacts are described in Table 3.3-1.
[1] Tree removal will be subject to guidance from the City of Portland's Urban Forester and may not all be required due to physical displacement as part of the Project, but necessary due to the health f trees and other construction activities.

In the **North Mall** area a moderate degree of visual impact would result from the addition of the rail alignment, station platforms and associated facilities. Overhead wires and poles would add clutter to the view of Union Station, but overall would have little effect on the visual scale of the North Mall area. The trackway would be located within the current right-of way of 5th and 6th avenues. There would be few changes to the existing brick sidewalks, with the exception of the addition of new shelters and relocation of some of the existing bus shelters. The addition of a new LRT ramp to the Steel Bridge would create a visual change by introducing a significant new structure into the visual environment adjacent to the historic firehouse and signal tower on NW 3rd Street. This structure would be located next to an existing ramp structure and adjacent to the Union Pacific Railroad, in an area of low to moderate visual quality. Viewer sensitivity would be moderate.

A moderate level of visual impact would occur in the **Central Mall** area. The existing trees along the Central Mall are being examined and could be trimmed or potentially replaced. The replacement of these large trees would introduce a visual impact. The determination of any modifications will be made after finalizing consultations with the City Forester, arborists and the public during the next phase of Final Design. Existing street furniture and art would be removed or relocated and overhead electrical wires for the LRT would be added. Light rail station platforms could obscure street-level views of Pioneer Courthouse (see Figures 3.3-3 and 3.3-4). Sidewalk widths would be reduced in some blocks where an additional lane will be added.

In the **South Mall** area, a moderate level of visual impact would occur. The visual changes would include removal of on street parking, addition of the LRT trackway, overhead wires and catenary poles, potential modification of sidewalks and the addition of station platforms. The terminus/ turnaround at SW Jackson Street would include two sets of tracks in an area currently used as a parking lot adjacent to I-405. The current Portland Mall type of street and sidewalk treatments, including brick sidewalks, crosswalks and intersection circles, do not currently exist south of SW Jefferson Street. The potential addition of some of these urban design features in this area would help to visually link this area with the rest of the Portland Mall to the north.

C. Maintenance Facility

The expansion of the LRT operations and maintenance facility at Ruby Junction would require removal of several houses, small businesses and some trees and vegetation. It would change the existing development pattern and scale in the area and would result in a different visual environment. However, all of the potentially sensitive viewers would be displaced. These homes are currently surrounded by industrial uses including a gravel pit and the new development of the maintenance facility would not be visible to other residential neighborhoods. The visual impact would be low.

3.3.3 Cumulative Impacts

Cumulative impacts could result from planned and market-driven development in the adjacent neighborhoods. For example, transportation projects included in the financially constrained RTP would widen some corridors, introduce new structures, and support some changes in the development scale. Associated developments could affect existing development and vegetation patterns. Cumulative impacts that would result would depend on the extent to which land cleared during the construction of the Project is redeveloped, and the amount of new development and redevelopment that would occur around the Project facilities.

In the **I-205 Segment** the cumulative visual impacts of the Project would relate to the introduction of LRT service in the I-205 corridor. In some locations the availability of LRT may encourage private developers to introduce larger scale structures into the visual environment. Cumulative impacts could be created by new development and redevelopment around the proposed stations.

In the **Portland Mall Segment**, the cumulative effect of the Project would be to reinforce the Transit Mall as the main office and retail spine in downtown Portland. It would extend the Mall's way finding and aesthetic treatments to create a visually strong corridor from the north end of downtown to the south. Such improvements could enhance the identity and legibility of the downtown core. It may also encourage private developers in institutions to introduce larger scale developments. Additional development would be expected to be in scale with current downtown development.

Figure 3.3-3 Visual simulation of SW Oak/Pine Station at SW 5th Avenue View to the south.

Figure 3.3-4 Visual simulation of SW Yamhil/Morrison Station at SW 5th Avenue. View to the north.

3.3.4 Mitigation

The purpose of visual impact mitigation is to reduce or to eliminate any adverse changes in the existing visual quality caused by improvements associated with construction and operation of the Project. With one possible exception, the removal of the mature trees in the Central Mall, the Project would not have significant negative impacts on identified visual resources in the vicinity of the proposed Project. Therefore, no mitigation measures would be required of the Project.

I-205 Segment

Several types of moderate visual impacts would occur in the I-205 Segment with construction of the Project. These include construction of new overpass structures; trackway, catenary and signalization systems; stations and park-and-ride lots; and sound and retaining walls. During Final Design, Project staff will continue to work with ODOT, local jurisdictions and neighborhoods to reduce visual impacts, to enhance the visual quality of new Project elements, minimize obstructions of visual resources, and buffer neighborhoods from negative visual elements.

Portland Mall Segment

Several types of moderate visual impacts could occur in the Portland Mall Segment if the Project were to be constructed. These would include the introduction of a new ramp off the Steel Bridge, the introduction of a trackway and overhead catenary system along the Transit Mall, changes to the existing pedestrian environment, and new station platforms that could obstruct visual resources and views. To address these potential impacts:

- Refine the design of the new LRT ramp from the Steel Bridge and associated retaining walls with consideration of the scale and character of the existing surrounding environment.
- Modify the street and sidewalks in a manner and with a quality of design that is consistent with the current urban design treatments on the Portland Mall. Work to preserve the high quality pedestrian environment that exists on the Portland Mall within the context of the historic environment and the desire to use low maintenance materials.
- Architectural treatment of the station platforms would be provided where adjacent structures have recognized historic value (at Pioneer Courthouse and at the Old Town/NW Couch Street stations). Station features such as the shelter canopy, lighting fixtures, street trees, positioning of poles and the control system will be situated to minimize potential negative visual impacts and to not conflict with the character of identified historic structures.

Also, if a significant number of the trees in the Central Mall portion of the Portland Mall Segment were removed, it could constitute a significant visual impact. If this proves to be the case, TriMet would work with the City Forester, residents, businesses, and urban design professionals to carefully plan for the replacement of the trees in a manner that, over time, would re-establish the visual effect of the existing trees and their canopy.

3.4 Air Quality Impacts

The purpose of this section is to identify the Air Quality effects of the Project, compared to the No-Build Alternative.

3.4.1 Affected Environment

The affected environment section identifies the air quality regulations and existing air quality in the region and corridor.

3.4.1.1 Air Quality Regulations and Standards

This section summarizes air quality regulations and information about the existing air quality in the Portland metropolitan area. The federal government has established National Ambient Air Quality Standards (NAAQS) to protect the public from unhealthy levels of air pollution. In addition, the Oregon Department of Environmental Quality (DEQ) has established State Ambient Air Quality Standards (SAAQS) that are at least as stringent as the NAAQS. The US Environmental Protection Agency (EPA) has delegated air quality program implementation to DEQ. The following regulations and regulatory guidance have been referenced as part of this air quality analysis (these regulations are also summarized in Table 3.4-1):

- Oregon Administrative Rules (OAR) Chapter 340, Division 252 (OAR 340-252, Transportation Conformity) which establishes criteria and procedures for determining conformity with state or federal implementation plans of transportation plans, programs, and projects funded or approved under Title 23 of the Federal Transit Act.
- OAR 340-202, which establishes ambient air quality standards.
- OAR 340-254, which regulates indirect sources.
- EPA's Guideline for Modeling Carbon Monoxide from Roadway Intersections (Nov. 1992).

Table 3.4-1
State and Federal Ambient Air Quality Standards

Pollutant	Averaging Time	Federal	Oregon
Carbon Monoxide	8-hour	9 ppm	9 ppm
	1-hour	35 ppm	35 ppm
Lead	Calendar Quarter	1.5 $\mu g/m^3$	1.5 $\mu g/m^3$
Ozone	1-hour	0.12 ppm	0.12 ppm
	8-hour	0.08 ppm	-
Nitrogen Dioxide	Annual Arithmetic Mean	0.053 ppm	0.053 ppm
Sulfur Dioxide	Annual Arithmetic Mean	0.03 ppm	0.02 ppm
	24-hour	0.14 ppm	0.10 ppm
	3-hour	n/a	0.50 ppm
PM_{10}	3-year Average Arithmetic Mean	50 $\mu g/m^3$	50 $\mu g/m^3$
	24-hour Average	150 $\mu g/m^3$	150 $\mu g/m^3$
$PM_{2..5}$	3-year Average Annual Arithmetic Mean	15 $\mu g/m^3$	-
	3-year Average, 98th Percentile of 24-hour Average	65 $\mu g/m^3$	-

Source: Oregon DEQ, 2003.
Note: ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter; PM_{10} = particulates with an aerodynamic diameter of less than or equal to 10 micrometers; $PM_{2.5}$ = particulate with an aerodynamic diameter of less than or equal to 2.5 micrometers.

Geographic areas where concentrations of a pollutant exceed the ambient air quality standards are classified as nonattainment (do not attain standards) areas. Areas previously designated as nonattainment that are now in compliance with air quality standards are classified as maintenance areas. Federal regulations require states to prepare State Implementation Plans (SIPs) that identify emission reduction strategies for nonattainment and maintenance areas. The Portland area is a CO maintenance area. The Metro area is in attainment with the 8-hour ozone[9] standard and is an ozone

[9] Ozone is commonly known as smog and is formed when several chemicals are subjected to sunlight and mix in the atmosphere. The key chemicals include volatile organic compounds (VOC) and oxides of nitrogen (NOx).

maintenance area for the 1-hour standard. Effective June 15, 2005, the 1-hour standard will be revoked and no longer apply. The Metro area is in attainment with all other air pollutant standards.

As a result of the Clean Air Act Amendments of 1990, both Oregon and Washington developed regulations designed to ensure that transportation plans and regionally significant transportation projects would be consistent (in conformance) with the SIP. There are two parts to demonstrating conformity for transportation projects. The first requirement of the SIP is that estimated pollutant emissions for transportation sources in the metropolitan area remain below the oxides of nitrogen (NO_X), volatile organic compounds (VOC), and CO emissions budget for on-road mobile sources. The estimate must be based on future projects included in the financially constrained Regional Transportation Plan (RTP) and the Metropolitan Transportation Improvement Program (MTIP). The second requirement of the SIP for CO is that no individual project may cause a violation of the NAAQS, or an increase in the frequency or severity of an existing violation. To address this requirement, an analysis of conditions immediately around the Project must be completed. This investigation is known as a hot spot analysis. Carbon monoxide concentrations tend to be high near congested intersections during cold, calm (temperature weather inversion) conditions.

3.4.1.2 Existing Conditions

Air quality has improved in the Portland/ Vancouver area since the early 1980s. In the 1990s, improvements were made, and in 1997 EPA redesignated the region as a maintenance area for ozone and CO. Maintenance plans are now in effect for these pollutants to ensure continued compliance with existing standards. Ozone problems tend to be regional in nature because the chemical reactions that produce ozone occur over a period of time. In 2001, DEQ data show that vehicle emissions were the largest single source of ozone precursors, contributing over one-third of all precursor emissions in the region. Other sources include lawn mowers, other gas-powered tools, and household products and paints, the use of which increases with population growth. High ozone levels typically occur downwind of Portland in Canby, Oregon (which tends to have the highest concentration of ozone in the region as a result of predominant summer weather patterns). Data collected in Canby from 1990 through 2003 are summarized in Table 3.4-2.

Table 3.4-2
Ambient Ozone Monitoring Data for Canby Oregon

Year	Summer Average (ppm)	Highest 1-Hour (ppm)	3-Year Mean of the Annual 4th Highest Daily Maximum 8-Hour Value (ppm)	No. of Days Standard Exceeded	Result
1990	0.029	0.165	-	4	violation
1991	0.030	0.129	0.084	1	comply
1992	0.030	0.126	0.092	1	comply
1993	0.023	0.092	0.078	0	comply
1994	0.029	0.117	0.079	0	comply
1995	0.027	0.099	0.072	0	comply
1996	0.029	0.149	0.084	1	comply
1997	0.025	0.085	0.079	0	comply
1998	0.026	0.137	0.081	3	violation
1999	0.028	0.102	0.073	0	comply
2000	0.025	0.086	0.073	0	comply
2001	0.025	0.099	0.069	0	comply
2002	0.025	0.101	0.066	0	comply
2003	0.029	0.097	0.070	0	comply

Source: DEQ, May 2004. Standard exceeded means any day with 12 parts per million or greater ozone.
Note: ppm = parts per million.

CO is a pollutant of local concern with highest concentrations usually measured near heavily congested intersections. DEQ maintains monitoring stations for CO in areas of Portland that typically experience maximum concentrations of CO. Table 3.4-3 lists recent, greatest ambient CO concentrations recorded in Portland.

Table 3.4-3
Portland [1] Ambient Carbon Monoxide Concentrations (ppm)

Year	Highest 8-hour (ppm)	Second Highest 8-hour (ppm)	Number of Times Standard Exceeded [2]	Result
1990	9.0	7.4	0	comply
1991	10.6	9.2	1	comply
1992	8.0	7.8	0	comply
1993	8.7	8.4	0	comply
1994	7.5	6.4	0	comply
1995	7.5	6.6	0	comply
1996	6.6	6.5	0	comply
1997	5.9	4.8	0	comply
1998	4.8	4.6	0	comply
1999	7.5	6.2	0	comply
2000	5.4	4.4	0	comply
2001	4.2	3.9	0	comply
2002	4.5	4.5	0	comply
2003	4.0	4.4	0	comply

Source: DEQ, May 2004.
Note: ppm = parts per million.
[1] Data report the highest concentration measured at several monitoring stations in Portland, Oregon.
[2] Non-overlapping 8-hour averages that exceed 9 ppm when rounded to the nearest whole ppm.

3.4.2 Air Quality Impacts

This section summarizes the region-wide and local air quality impacts that would result from the implementation of the South Corridor LRT Project. Additional details can be found in the *South Corridor Project Air Quality Results Report* (Metro and TW Environmental, November 2002), the *Air Quality Conformity Determination* (Metro, February 27, 2004), *Interagency Consultation Summary* (Metro, July 2004), and *Methodology for Analysis of Local Impacts on Air Quality (Hot Spots) Memorandum* (TW Environmental, September 2004).

3.4.2.1 Conformity Determination

As a basic check on the potential air quality effects of a project, Federal regulations mandate that a project must be included in the Financially Constrained System Model of the area's Regional Transportation Plan, and air quality conformity must be demonstrated for the plan. This means that adequate financing of a project along with all other projects included in the plan must be demonstrated, and the air quality impact of adding all of the planned projects to a region are calculated and it is demonstrated that they would all comply with air quality standards. In February 2004, Metro estimated total region-wide transportation source emissions, including the I-205/ Portland Mall LRT Project, for the Portland Air Quality Maintenance Area (AQMA) for ozone precursors and for the Metro boundary for CO (these boundaries are approved by the Oregon Environmental Quality Commission and the EPA).

The analysis shows that the total air emissions within the region, including the effects of additional light rail in downtown Portland and I-205, do not exceed the emission budgets for any year into the future to the year 2025 (see Table 3.4-4). Details of the analysis, methodology, and results are included in the Air Quality Conformity Determination (Metro, February 27, 2004). The USDOT

affirmed their concurrence of the Air Quality Conformity Determination of the RTP and MTIP on March 5, 2004 (see letter in Appendix B, Agency Coordination, jointly signed by FHWA and FTA).

Table 3.4-4
Conformity Summary for Budget Years:
Total Emission Estimates Including I-205/Portland Mall Project

		2006	2007	2010	2015	2020	2025
Winter CO (Metro Boundary, 000s pounds/day)							
	Model	n/a	769.0	752.6	774.5	822.2	854.4
	Budget	n/a	775	772	801	856	856
O	**Summer VOC** (AQMA, tons/day)						
Z	Model	39.4	n/a	36.4	34.7	37.3	37.2
O	Budget	41	n/a	40	40	40	40
N	**Summer NOx** (AQMA, tons/day)						
E	Model	46.1	n/a	42.2	38.0	37.1	41.3
	Budget	51	n/a	52	55	59	59

Source: *Air Quality Conformity Determination* (Metro, February 27, 2004) n/a = no emission budget established for year. MOBILE5a-h air quality software model as approved by USDOT. Emissions less than the budget mean that the region is projected to meet clean air standards, and conform with the regulations.
Note: N/A means not required. AQMA means air quality maintenance area. CO means carbon monoxide. VOC means volatile organic compounds. NOx means oxides of nitrogen. VOC and NOx are precursors to ground level ozone, also commonly known as smog.

3.4.2.2 Comparison of No-Build Alternative and the I-205/Portland Mall Project

This section summarizes the analysis of air quality effects that would result from the No-Build Alternative and the I-205/Portland Mall Project Alternative including a comparison of regional pollutant emissions and local impacts at intersections.

A. Direct Impacts

This section summarizes changes in the regional pollutant emissions and local impacts at intersections that would result from the South Corridor alternatives.

Region-wide Impacts. The primary pollutants of concern in the metropolitan area affected by transportation sources are ozone and CO. The *Portland Ozone Maintenance Plan*, approved by EPA in 1997 includes the "South/North LRT Project" as a Transportation Control Measure (TCM) to be built by the year 2007 as one means of maintaining the region's air quality. The I-205/Portland Mall Project is the southern part of the South/North LRT Project. The proposed *Second Portland Area Carbon Monoxide Air Quality Maintenance Plan* includes the I-205/ Portland Mall LRT Project as a contingent TCM.

Estimated annual region-wide air emissions of VOC, NOx, and CO are shown in Table 3.4-5 with estimated vehicle miles traveled (VMT). The table also shows that, despite the increase in vehicle miles over a 20-year period, vehicle emissions are expected to decrease substantially. The I-205/ Portland Mall Project shows lower regional emissions than the No-Build Alternative.

Localized Hot Spots. CO has the potential to build to unacceptable levels at locations where there are high levels of vehicular traffic and congestion. Local concentrations of CO near intersections will be affected by improvements or degradation in traffic congestion as a result of the Project. Localized effects can be expected where an alternative would cause traffic delays, or where park-

and-ride facilities cause local increases in traffic volumes. Improvements in CO concentrations would be expected where grade separation or modifications to roadway configurations would improve local traffic conditions. Three intersections with the highest estimated 2025 traffic volumes or with the highest future estimated level of service ratios (traffic volume divided by intersection capacity) were analyzed. The selected intersections are those whose conditions will be conducive to high CO concentration impacts for the I-205/Portland Mall Project. The results compare the No-Build Alternative and existing conditions at the same intersections. 1-hour and 8-hour CO concentrations were forecast and compared with 1-hour and 8-hour standards.

Table 3.4-5
Estimated Annual Regional Pollutant Emissions[10] for Existing Conditions, No-Build, and I-205/Mall Project (tons/year)

Alternative	VMT	VOC	CO	NO_X
Existing Conditions	10,421,480,348	34,404	229,485	34,076
No-Build [1]	13,043,456,140	4,289	131,072	4,061
I-205/Mall Project [1]	12,997,665,080	4,274	130,613	4,046

Source: TW Environmental, Inc., August 2004. MOBILE6.2 air quality software was used as required by USDOT.
Note: VMT = vehicle miles traveled. CO = carbon monoxide, VOC = volatile organic compounds NOx = oxides of nitrogen. VOC and NOx are precursors to ground level ozone, also commonly known as smog.
[1] Year 2025

The results of the hot spots analysis show CO concentrations are not expected to exceed standards. Further, the estimated concentrations in Table 3.4-6 for the No-Build alternative and the I-205/ Portland Mall Project are well below the state and federal regulations for the 1-hour (35 ppm) and the 8-hour (9 ppm) standards. Although there is little to no difference between these two alternatives, both show lower CO concentrations when compared to existing conditions at these three intersections. It should be noted that as part of the environmental review process for new facilities that will generate additional traffic, the State of Oregon requires an Indirect Source Construction Permit (ISCP) under OAR 340-254-0040 to analyze carbon monoxide levels and take mitigating actions if necessary. A permit must be obtained if an increase in the number of parking spaces at any one proposed parking facility exceeds 1,000 parking spaces (or 850 spaces if located in downtown Portland) None of the proposed park-and-ride facilities are this large enough to require an ISCP.

Table 3.4-6
Highest Projected 8-Hour[1] and 1-Hour Carbon Monoxide Concentrations Near Intersections (ppm)

Intersection	Existing Conditions		No-Build[2]		I-205/Mall Project [2]	
	8-Hour	1-Hour	8-Hour	1-Hour	8-Hour	1-Hour
SE 82nd Avenue/Sunnyside Road	6	8	4	5	4	6
SE 82nd Avenue/Johnson Creek Blvd	7	9	4	6	4	6
SE 92nd Avenue/Foster Road	5	6	4	5	4	5

Source: TW Environmental, Inc., August 2004.
Note: Concentrations are expressed in parts per million (ppm).
[1] 8-hour average concentration.
[2] 2025 estimated concentrations.

[10] The air quality analysis was completed using the same I-205/ Portland Mall Project as proposed. However, the air quality software used differed. That is, the conformity determination was done using MOBILE5a-h, consistent with USDOT and EPA requirements and the Ozone Maintenance Plan budgets established using MOBILE5 and approved by EPA and as reported in Table 3.4-4. The comparison of the Existing Conditions, No-Build and I-205/Mall Project was performed using the same Project configuration and design, but with MOBILE6.2 as reported in Table 3.4-5. Accordingly, the outputs reported in Tables 3.4-4 and 3.4-5 are not directly comparable, but are consistent with USDOT requirements and air quality standards.

Maintenance Facility. The proposed LRT maintenance facility expansion will be regulated under DEQ programs for stationary sources and will be required to obtain permits if emissions exceed certain thresholds. Air Contaminant Discharge Permits (ACDPs) are required either for maintenance facilities where more than 25 automobiles are painted each year or for facilities where emissions exceed certain thresholds. Emissions sources at maintenance facilities typically include painting, solvent cleaning, and fuel storage. Expected activities at each maintenance facility should be analyzed prior to construction or expansion. If the facilities are subject to permitting, permits must be obtained prior to construction.

B. Construction Impacts

Construction impacts will vary according to location and weather conditions (rain suppresses dust). Air quality impacts from construction would logically be lowest with the No-Build Alternative and higher for the I-205/Portland Mall Project because of the necessity of construction activities.

The primary impacts of construction will be the generation of dust from site clearing, excavation and grading, localized diesel emissions from construction equipment, and impacts to traffic flow in the Project area. Traffic congestion increases idling times and reduces travel speeds resulting in increased vehicle emission levels. Construction of concrete facilities may have associated dust-emitting sources, such as concrete mixing operations. Stationary sources such as concrete mix plants are generally required to obtain air contaminant discharge permits from the DEQ and to comply with regulations to control dust and other pollutant emissions. Also, diesel emissions are an air toxic concern. Diesel emissions will likely increase temporarily in the areas where construction equipment is concentrated. This is expected to be primarily a concern in downtown Portland.

3.4.2.3 Cumulative Impacts

The forecast traffic volumes used to analyze the air quality impacts of the I-205/Portland Mall Project are cumulative traffic volume estimates that include existing traffic and projected background growth in volumes from development over time. Background concentrations representing the cumulative emissions of other sources in the area are added into the predicted local concentrations for CO at intersections. Because of these inclusive analysis methods, the results reported throughout this report section already represent cumulative air quality effects.

3.4.3 Mitigation

This subsection provides a summary of mitigation methods for addressing impacts.

A. Operations Impact Mitigation

One of the benefits of mass transportation improvements like light rail is reduced automobile vehicle miles traveled and associated congestion. The *Ozone Maintenance Plan* for the Portland air quality maintenance area includes the South/North LRT Project as a transportation control measure to maintain the region's air quality. The Project would reduce regional VMT and pollutant emissions when compared with the No-Build Alternative. The result of the local hot spots analysis shows no exceedance of the CO NAAQS. This analysis included intersections that would potentially be affected by park-and-ride lot access. No localized CO impacts are predicted as a result of the Project; therefore, no mitigation is needed.

Maintenance facilities would have to comply with stationary source permitting programs designed to prevent adverse environmental impacts from stationary sources. No adverse impacts are expected as a result of Project related maintenance facility operations.

In 2004, TriMet instituted a Continuously Regenerating Trap (CRT) technology for buses, and plans to retrofit part of its fleet with this device. TriMet is also working with the Oregon Department of Environmental Quality to secure sufficient and reliable sources of ultra-low sulfur diesel fuel. These two innovations in the bus system, together with ongoing purchases of new diesel vehicles that have substantially reduced emissions compared with older models, will provide long-term reductions in diesel emissions. As most buses serve the downtown Portland area, the benefits of these improvements will occur within the area of concern.

B. Construction Impact Mitigation

Construction contractors are required to comply with OAR 340-208-0210 which requires that reasonable precautions be taken to avoid dust emissions. Typical mitigation measures include applying water or suppressants during dry weather and taking other measures, such as truck and equipment washing, to prevent the transport of dirt and dust from construction areas onto nearby roads. To reduce the effect of construction delays on traffic flow and resultant emissions, when possible, road or lane closures should be restricted to non-peak traffic periods. Also, Tri Met is evaluating the feasibility of having contractors use low-sulfur or biodiesel for light construction vehicles in the downtown portion of the Project. Current technology in heavy construction vehicles does not appear to make the use of low-sulfur or biodiesel fuels a practical choice.

3.5 Noise and Vibration Impacts

This section summarizes the noise and vibration impacts that would result from changes to the operation of buses and light rail vehicles due to the proposed Project and from Project construction. The existing noise environment and the proposed mitigation measures are also described. For more detail, please see the *South Corridor Noise and Vibration Mitigation Plan* (Metro: November 2004).

3.5.1 Affected Environment

In the I-205 Segment noise-sensitive land uses located within 300 feet of the proposed improvements include apartments, single-family residences, motels, two school/daycare uses, playing fields at the Lent Little League, the Springwater Trail and a church. Vibration-sensitive uses include the residential structures and magnetic resonance imaging (MRI) instrumentation located in a commercial building near the Clackamas Town Center. Vehicle traffic on I-205 dominates the current ambient noise and vibration environment in this area.

Within the Portland Mall Segment noise and vibration sensitive land uses located along 5th and 6th avenues include high-density office buildings, retail, apartments, houses, hotels, St. Mary's High School, PSU, Pioneer Square, and Pioneer Courthouse. Truck, bus, existing light rail and streetcar traffic dominates the current ambient noise and vibration environment in this area.

3.5.1.1 Noise Assessment Criteria

Prediction methods used to estimate noise levels from the LRT, crossing signals, and park-and-ride lots followed the detailed analysis methods described in the FTA *Transit Noise and Vibration Impact Assessment Guidance Manual* (FTA: April 1995), except that the FHWA Traffic Noise Prediction Model (TNM) was used to estimate shielding for receptors along the I-205 Segment and to assess sound wall effectiveness. The impact criteria in the FTA Guidance Manual are founded on well-documented research on community reaction to noise and are based on the change in noise exposure using a sliding scale that takes into account existing noise levels. Based on the FTA Guidance, the amount that the transit project is allowed to change the overall noise environment is reduced with increasing levels of existing noise. The FTA Noise Impact Criteria groups noise-sensitive land uses into the three following categories:

- **Category 1:** Buildings or parks where quiet is an essential element of their purpose.
- **Category 2:** Residences and buildings where people normally sleep. This includes residences, hospitals, and hotels where nighttime sensitivity is assumed to be of utmost importance.
- **Category 3:** Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, churches, and office buildings that depend on quiet as an important part of operations. Parks and recreational facilities are also included.

Day/night noise level ($L_{dn)}$ is used to characterize noise exposure for residential areas (Category 2). The L_{dn} is a 24-hour average sound level with a 10-dBA penalty added to nighttime levels to account for increased sensitivity to nighttime noise. The maximum 1-hour energy average noise level (L_{eq}) during the period that the facility is in use is used to characterize noise exposure for other noise sensitive land uses such as school and applicable office buildings (Categories 1 and 3) where nighttime noise levels are less important. The FTA noise impact criteria are summarized in Table 3.5-1. The FTA criteria differentiate between impacts and severe impacts as follows:

- **Impacts:** This level is sometimes referred to as moderate impacts. In this range, other project-specific factors must be considered to determine the magnitude of the impact and the need for mitigation. These other factors can include the predicted increase over existing noise levels, the types and number of noise-sensitive land uses affected, existing outdoor-indoor sound insulation, and the cost-effectiveness of mitigating noise to more acceptable levels.
- **Severe Impacts:** Severe noise impacts are considered "significant" as this term is used in the National Environmental Policy Act (NEPA) and implementing regulations. Noise mitigation will normally be specified for severe impact areas unless there is no practical method of mitigating the noise.

The first column of Table 3.5-1 shows existing noise exposure. The remaining columns show the noise level caused by the transit Project alone that is necessary for the two levels of impact. Future noise exposure would be the combination of the existing noise exposure and the additional noise caused by the transit Project. As existing noise exposure increases, the amount of the allowable increase in the cumulative noise caused by the addition of the Project decreases.

In addition to the FTA guidance, a design standard included in the American Public Transit Association document *Guidelines for Design of Rapid Transit Facilities* (APTA: January 1979) was used. The guideline recommends using an L_{max} (maximum passby noise level) of 75 dBA for single and multi-family residential units with average densities.

Table 3.5-1
FTA Noise Impact Criteria

Existing Noise Exposure L_{eq} or L_{dn}[1]	Project Noise Exposure Impact Thresholds, L_{dn} or L_{eq}[1] (all noise levels in dBA)			
	Category 1 or 2 Sites		Category 3 Sites	
	Impact	Severe Impact	Impact	Severe Impact
<43	Ambient+10	Ambient+15	Ambient+15	Ambient+20
43-44	52	58	57	63
45	52	58	57	63
46-47	53	59	58	64
48	53	59	58	64
49-50	54	59	59	64
51	54	60	59	65
52-53	55	60	60	65
54	55	61	60	66
55	56	61	61	66
56	56	62	61	67
57-58	57	62	62	67
59-60	58	63	63	68
61-62	59	64	64	69
63	60	65	65	70
64	61	65	66	70
65	61	66	66	71
66	62	67	67	72
67	63	67	68	72
68	63	68	68	73
69	64	69	69	74
70	65	69	70	74
71	66	70	71	75
72-73	66	71	71	76
74	66	72	71	77
75	66	73	71	78
76-77	66	74	71	79
>77	66	75	71	80

Note: Specific values within 1/10 decibel are used to determine impacts; however, thresholds in this table are rounded to the nearest whole decibel.

[1] L_{dn} is used for land uses where nighttime sensitivity is a factor; Daytime L_{eq} is used for land use involving only daytime activities.

Category Definitions:

Category 1: Buildings or parks where quiet is an essential element of their purpose.

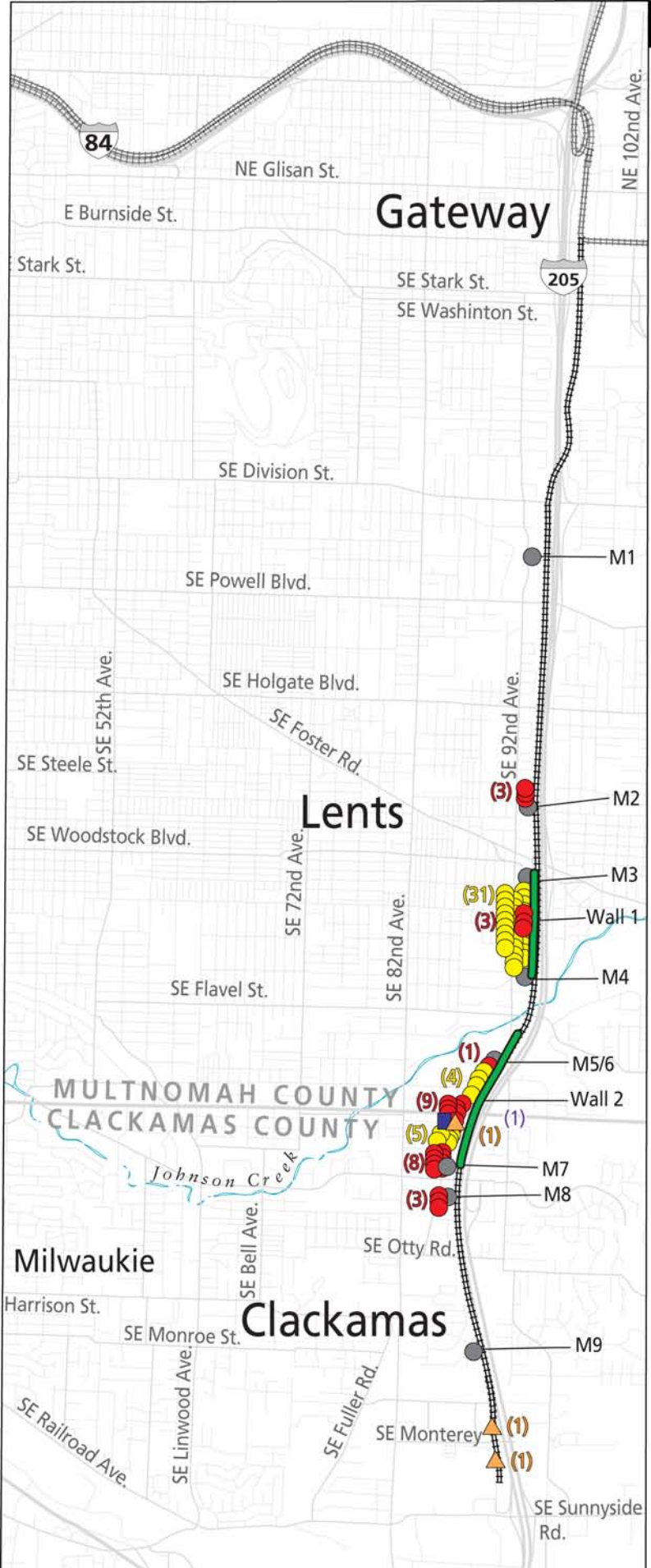
Category 2: Residences and buildings where people normally sleep. This includes residences, hospitals, and hotels where nighttime sensitivity is assumed to be of utmost importance.

Category 3: Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, and churches and recreational facilities.

3.5.1.2 Existing Noise Environment

Existing noise levels for the potentially affected area were established by long-term (24-hour) and short-term (30-minute periods during daytime, evening, and nighttime hours) noise measurements. Noise monitoring was performed at ten new monitoring locations (nine located in the I-205 Segment and one located in the Portland Mall Segment) for this study. The criteria for monitoring selection included land use, existing ambient noise levels, number of sensitive receivers in the area, and level of expected impact. Data from previous noise measurements performed for the South/North Corridor DEIS were used and supplemental measurements were taken to provide a more complete data set of existing noise levels in the areas likely to be affected by the Project, and to confirm that the previous data were still valid.

Tables 3.5-2 and 3.5-3 and Figures 3.5-1 and 3.5-2 show monitoring locations and ambient (existing) noise levels in the I-205 and Portland Mall segments, respectively. Properties 249 and 900 are currently protected from I-205 noise by berms and noise barriers. Existing noise levels along I-205



SOUTH CORRIDOR FEIS

Noise and Vibration Impacts - I-205 Segment

FIGURE 3.5-1

Noise Impacts

- Moderate impact to be mitigated
- Moderate impact - no mitigation*
- Severe Impact to be mitigated

Vibration impacts

- Vibration impact to be mitigated

Other

- M# = Noise Monitoring location number (see Table 3.5-2 for addresses)
- Proposed sound wall location
- I-205 LRT Alignment
- (#) = Number of impacts in cluster

* Sound walls do not completely mitigate noise due to nearby structures and high amount of existing noise from the freeway

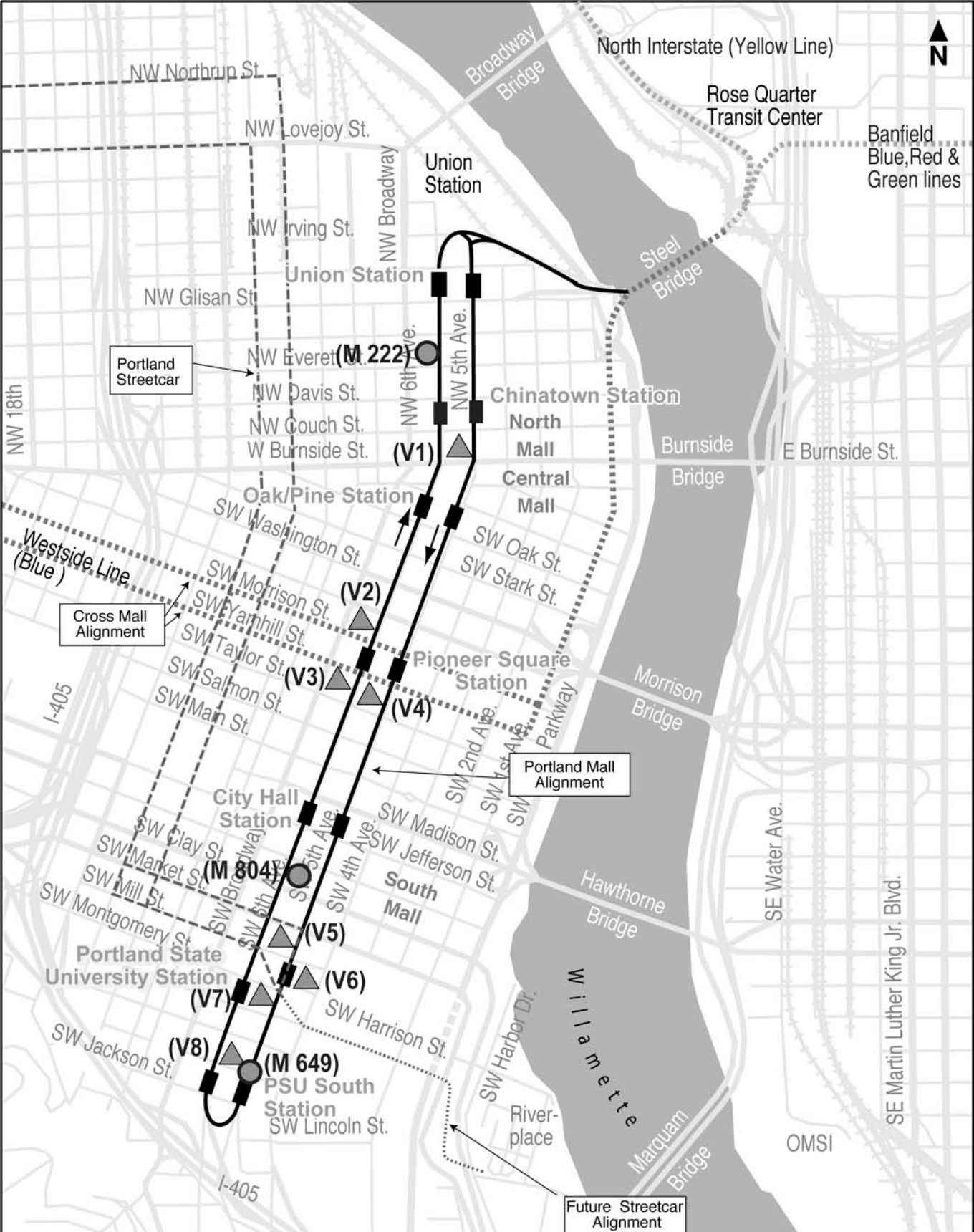
0 1 2 Miles

N

SOUTH CORRIDOR PROJECT

METRO

August, 2004


North Interstate (Yellow Line)
N
Broadway Bridge
Rose Quarter Transit Center
Banfield Blue,Red & Green lines
NW Northrup St.
NW Lovejoy St.
Union Station
NW Broadway
NW Irving St.
Union Station
Steel Bridge
NW Glisan St.
NW 6th Ave.
NW 5th Ave.
(M 222)
Portland Streetcar
NW Everett St.
NW Davis St.
NW Couch St.
W Burnside St.
NW 18th
Chinatown Station
North Mall
Central Mall
(V1)
Burnside Bridge
E Burnside St.
Oak/Pine Station
SW Washington St.
SW Oak St.
SW Stark St.
Westside Line (Blue)
SW Morrison St.
SW Yamhill St.
Cross Mall Alignment
SW Taylor St.
(V2)
(V3)
(V4)
Pioneer Square Station
SW Salmon St.
SW Main St.
I-405
Morrison Bridge
SW 2nd Ave.
SW 1st Ave.
Portland Mall Alignment
City Hall Station
SW Madison St.
SW Jefferson St.
SW Clay St.
SW Market St.
SW Mill St.
SW Montgomery St.
SW 5th Ave.
SW 4th Ave.
South Mall
(M 804)
Hawthorne Bridge
SE Water Ave.
(V5)
(V6)
(V7)
Portland State University Station
SW Harrison St.
SW Jackson St.
(V8)
(M 649)
PSU South Station
SW Lincoln St.
SW Harbor Dr.
Willamette River
River-place
Marquam Bridge
OMSI
SE Martin Luther King Jr. Blvd.
I-405
Future Streetcar Alignment
Noise and Vibration Impacts-Portland Mall Segment
Figure 3.5-2
Proposed Light Rail Alignment
Proposed Light Rail Station
Existing Light Rail Alignment
Potential Vibration Impact
(V1) Vibration Number (see Table 3.5-11)
(M1) Monitoring Location
SOUTH CORRIDOR PROJECT
Transportation Alternatives
0
1/8
1/4
MILE
July 2004

for properties without significant noise shielding from I-205 noise range between 68 and 72 dBA L_{dn}. These noise levels are in the outdoor noise range generally considered unacceptable for residential use. Existing noise levels along the Portland Mall Segment range between 68 and 73 dBA L_{dn} resulting from bus, truck and automobile operations. These noise levels are also fairly high and are in the outdoor noise range generally considered unacceptable for residential use.

3.5.1.3 Affected Vibration Environment

The vibration methodology used for this study followed the FTA vibration methodology described in the *Transit Noise and Vibration Assessment Guidance Manual* (FTA: April 1995). It was used to assess potential vibration impacts related to the Project. The FTA guidelines provide criteria to determine when adverse vibration effect might occur and where abatement should be considered. Transfer mobility tests were conducted at four locations along the I-205 Segment and one location along the Portland Mall Segment. These data were used to perform detailed vibration analyses for potentially affected properties along both segments in accordance with the FTA procedures. The transfer mobility test sites were selected to provide representative data for the entire Project. Data from noise and vibration analyses described in the *South/North Transit Study Noise and Vibration Results Report* (Metro: February 1998) were also used in the analysis.

Ambient vibration at a distance of approximately 200 feet from I-205 ranges from 48 to 50 VdB. At these levels, existing vibration is generally not noticeable. In the Portland Mall Segment, ambient vibration levels near the intersection of SW 5th Avenue and SW Jackson Street range from 56 to 67 VdB and ambient levels near SW 11th Avenue and SW Morrison Street range from 58 to 64 VdB without LRT or streetcar traffic. At these levels, existing vibration is generally not noticeable or is barely noticeable.

Table 3.5-2
Noise Monitoring Locations

Monitoring Location	Property No.	Category [1]	Location and Description
I-205 Segment			
M1	249	2	3202 SE 92nd Avenue, MFR
M2	466	2	9337 SE Harold Street, SFR
M3	537	2	6132 SE 93rd Avenue, SFR
M4	652	2	6724 SE 94th Avenue, SFR
M5	701	2	9139 SE Crystal Springs Blvd, MFR 1st floor
M6	701	2	9139 SE Crystal Springs Blvd, MFR 2nd Floor
M7	741	2	8424 SE 89th Avenue, SFR
M8	843	2	8606 SE Battin Street, SFR
M9	900	2	8975 SE Spencer Drive, SFR
Portland Mall Segment			
M10	222	2	625 NW Everett Street, MFR
M11	804	2	1414 SW 6th Avenue, Hotel
M12	649	2	2005 SW Fifth Avenue, MFR

Source: TW Environmental, Inc August 2004.
Note: MFR = Multi-family residential SFR = Single-family residential. See Figures 3.5-1 and 3.5-2 for approximate locations of properties.
[1] **Category Definitions:**
1-Buildings or parks where quiet is an essential element of their purpose.
2-Residences and buildings where people normally sleep. This includes residences, hospitals, and hotels where nighttime sensitivity is assumed to be of utmost importance.
3-Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, churches, and recreational facilities.

Table 3.5-3
Ambient Noise Levels

Property Number[1]	L_{dn}, dBA	Measurement Type	L_{eq}, dBA	
			Day[2]	Night[3]
I-205 Segment				
249	52	24-hour	48	45
466	69	24-hour	66	62
537	71	24-hour	67	64
652	72	24-hour	68	65
701	71	24-hour	69	63
701	72	24-hour	70	64
741	68	24-hour	64	60
843	72	24-hour	66	65
900	59	24-hour	55	52
Portland Mall Segment				
222	73	Short [4]	71	65
804	69	Short [4]	68	61
649	68	24-hour	65	60

Source: TW Environmental, Inc., August 2004
[1] Data for Properties 222 and 804 were taken from the *South/North Noise and Vibration Impact Analysis Results Report* (February 1998). Data for all other properties were measured in June 2004.
[2] Daytime: 7 a.m. to 10 p.m.
[3] Night time: 10 p.m. to 7 a.m.
[4] Short: 30-minute measurement

3.5.2 Noise and Vibration Impacts

A. No-Build Alternative

Under the No-Build Alternative, the noise and vibration environment would be affected by changes in traffic levels over time, commercial and industrial land use and development, the Union Pacific railroad yard in the Portland Mall Segment, and other planned projects. Noise levels in most areas would increase over time as the population and level of traffic on local roadways increases. Existing noise levels are fairly high in the Project area and existing noise impacts are common along the Portland Mall and I-205 Segments. These existing noise levels can be expected to increase somewhat with time. Vibration impacts do not appear to be common under the existing conditions, and would not occur with the No-Build Alternative.

B. I-205/Portland Mall Project

Table 3.5-4 includes a summary of the noise and vibration impacts identified in both the I-205 and Portland Mall Segments that would result from the Project. Specific impacts are discussed below, and mitigation approaches for these impacts are discussed in Section 3.5.3.

Table 3.5-4
Summary of Noise and Vibration Impacts Associated with the Project Without Identified Mitigation Measures [1]

	Severe Noise	Moderate Noise	Vibration	Total
Impacts Prior to Mitigation	1	73	11	85

Source: TW Environmental, Inc. August 2004.
[1] See Table 3.5-9 for Noise and Vibration impacts after the application of mitigation.

3.5.2.1 Noise Impacts

The determination of noise impacts are based on the existing noise environment and allowable noise increase as defined in the *Transit Noise and Vibration Assessment Guidance Manual*. The FTA noise impact criteria (Table 3.5-1) use a relative increase over existing noise levels to determine impacts. In areas with existing high L_{dn} noise levels, only a relatively small increase is allowed before the addition of noise from a transit project is considered an impact. The noise impact calculations address noise increases near special track work, bells at gated crossings, and noise from electrical substations.

I-205 Segment. The addition of the LRT noise along the I-205 Segment would increase cumulative noise levels by 0 to 3 dBA at most receivers predicted to experience a noise impact. This level of increase is normally not noticeable or is just noticeable. However, because of the existing high noise levels, these relatively small increases in overall noise levels cause noise impacts along portions of the I-205 Segment that are not shielded from the LRT alignment by topography or existing noise barriers. Noise levels at one property (750) would increase by 6 dBA due to special track work. Although the overall increase in 24-hour noise levels would be barely noticeable, individual train passby events would be audible and noticeable at many residences.

No noise impacts would occur along the I-205 Segment from the Gateway Transit Center to just north of Harold Street. In this northern portion of the Segment, existing topography, larger distances between the rail alignment and sensitive receivers, and existing berms and sound walls constructed during development of I-205 reduce impacts. A portion of the berm south of SE Main Street would be removed to construct an access road to the Main Street Park-and-Ride Lot. Preliminary analysis shows this berm removal would not be expected to increase sound levels at the adjacent properties. If the location of the berm removal changes during final design, a re-analysis of potential impacts would be required. There are three isolated noise impacts near SE Harold Street resulting from the elevated LRT street crossing. The portions of the I-205 Segment between approximately SE Woodstock Boulevard and the SE Johnson Creek Boulevard would have noise impacts to residential uses in areas adjacent to the alignment. In the areas between SE William Otty Road and SE Monterey Avenue, no impacts would occur due to protection from the existing sound walls. Portions of existing sound walls will be relocated by the Project and will require a relocation study to be coordinated with ODOT during the Final Design Phase. Table 3.5-5 lists properties that would experience noise impacts from the Project in the I-205 Segment with information on noise exposure and degree of noise impact.

The Holgate Boulevard and Fuller Road stations, park-and-ride facilities would be located near residential areas. The Holgate Boulevard Park-and-Ride Lot would be shielded from the adjacent residential areas by berms and noise impacts would not occur. The Fuller Station park-and-ride is projected to cause an increase in traffic along the residential area fronting Fuller Road, between Johnson Creek Boulevard and Con Battin Road. At the peak noise hour, this projected traffic increase would increase sound levels at these residences by less than 1 dBA and are not considered impacted under FHWA or FTA noise criteria. The Fuller Station park-and-ride complies with DEQ's Noise Control Regulations prohibiting a new source located on a previously unused site from increasing the L_{10} or L_{50} statistical noise level by more than 10 dBA (OAR 340-035-0035 (1)(b)(B) (i)).

Table 3.5-5
Potential I-205 Segment Light Rail Noise Impacts

Receiver ID [1] (listed north to south)	Property Address	Land Use	L_{dn} Noise Exposure in dBA				
			Impact Threshold (moderate/severe)	Existing Levels	LRT-Only Levels	Cumulative Levels	Increase Over Existing [2]
460	9334 SE Insley St	SFR	moderate	64	61	65	1
463	9345 SE Harold St	SFR	moderate	64	61	65	1
466	9337 SE Harold St	SFR	moderate	67	66	69	2
537	6132 SE 93rd Ave	SFR	moderate	68	65	70	2
541	6208 SE 93rd Ave	SFR	moderate	68	65	70	2
543	6210 SE 93rd Ave	SFR	moderate	68	64	69	1
545	6220 SE 93rd Ave	SFR	moderate	68	64	69	1
548	6230 SE 93rd Ave	SFR	moderate	68	64	70	2
552	6235 SE 94th Ave	SFR	moderate	68	64	70	2
556	6305 SE 94th Ave	SFR	moderate	68	64	70	2
557	6318 SE 93rd Ave	SFR	moderate	68	64	70	2
566	9315 SE Henry St	SFR	moderate	68	64	70	2
567	6327 SE 94th Ave	SFR	moderate	70	69	72	2
573	6404 SE 93rd Ave	SFR	moderate	70	69	72	2
577	6411 SE 94th Ave	SFR	moderate	70	69	72	2
581	6415 SE 94th Ave	SFR	moderate	69	66	70	1
584	6423 SE 94th Ave	SFR	moderate	69	66	70	1
587	6427 SE 94th Ave	SFR	moderate	69	66	70	1
593	9330 SE Duke St	SFR	moderate	68	65	70	2
595	6515 SE 94th Ave	SFR	moderate	68	65	70	2
599	6521 SE 94th Ave	SFR	moderate	68	65	70	2
603	6529 SE 94th Ave	SFR	moderate	67	64	69	2
607	6539 SE 94th Ave	SFR	moderate	67	64	69	2
610	6545 SE 94th Ave	SFR	moderate	67	64	69	2
616	6557 SE 94th Ave	SFR	moderate	67	64	69	2
622	6567 SE 94th Ave	SFR	moderate	67	63	69	2
623	6601 SE 94th Ave	SFR	moderate	67	63	69	2
627	6611 SE 94th Ave	SFR	moderate	67	63	69	2
633	6627 SE 94th Ave	SFR	moderate	67	63	69	2
636	9421 SE Glenwood St	SFR	moderate	69	69	72	3
639	6631 SE 94th Ave	SFR	moderate	67	63	69	2
647	9406 SE Glenwood St	SFR	moderate	69	69	72	3
652	6724 SE 94th Ave	SFR	moderate	69	69	72	3
659	9343 SE Cooper St	SFR	moderate	69	69	72	3
664	9344 SE Cooper St	SFR	moderate	69	69	72	3
665	9404 SE Cooper St	SFR	moderate	69	69	72	3
670	Recreation Trail	Rec. trail	moderate	66 [3]	67 [3]	70 [3]	4
701	9151 SE Crystal Springs Blvd	MFR	moderate	70	66	71	1
711	9034 SE Crystal Springs Blvd	SFR	moderate	68	63	69	1
719	9010 SE Tenino St	SFR	moderate	68	63	69	1
725	9002 SE Tenino St	SFR	moderate	68	63	69	1

Table 3.5-5
Potential I-205 Segment Light Rail Noise Impacts

Receiver ID [1] (listed north to south)	Property Address	Land Use	L_{dn} Noise Exposure in dBA				
			Impact Threshold (moderate/severe)	Existing Levels	LRT-Only Levels	Cumulative Levels	Increase Over Existing [2]
729	8340 SE 89th Ave	SFR	moderate	69	68	71	2
732	8412 SE 89th Ave	SFR	moderate	68	64	69	1
738	8424 SE 89th Ave	SFR	moderate	68	64	69	1
741	8436 SE 89th Ave	SFR	moderate	69	67	71	2
743	8448 SE 89th Ave	SFR	moderate	69	67	71	2
750	8507 SE 89th Ave	SFR	severe	70	74	76	6
754	8525 SE 89th Ave	SFR	moderate	68	64	69	1
762	8801 SE Clatsop St	SFR	moderate	68	64	69	1
771	8720 SE Clatsop St	SFR	moderate	68	64	69	1
780	8720 SE Clatsop St	SFR	moderate	69	66	71	2
781	8595 SE Fuller Rd	SFR	moderate	69	66	71	2
786	8613 SE Fuller Rd	SFR	moderate	68	66	70	2
792	8715 SE Fuller Rd	SFR	moderate	68	64	69	1
798	8805 SE Fuller Rd	SFR	moderate	67	63	68	1
799	8855 SE Fuller Rd	SFR	moderate	67	63	68	1
809	8635 SE Garden Ln	SFR	moderate	67	63	68	1
810	8626 SE Garden Ln	SFR	moderate	63	62	66	3
816	8636 SE Garden Ln	SFR	moderate	63	62	66	3
817	8920 SE Fuller Rd	SFR	moderate	63	62	66	3
819	No Address – just south of Johnson Cr Blvd.	SFR	moderate	63	62	66	3
828	9017 SE Fuller Rd	SFR	moderate	63	62	66	3
829	8522 SE Hinkley Ave	SFR	moderate	63	62	66	3
832	9107 SE Fuller Rd	SFR	moderate	63	62	66	3
833	9226 SE Fuller Rd	SFR	moderate	63	62	66	3
837	9230 SE Fuller Rd	SFR	moderate	62	60	64	2
839	8606 SE Battin St	SFR	moderate	62	60	64	2
843	9334 SE Insley St	SFR	moderate	68	67	71	3

Source: TW Environmental, Inc.
Note: SFR = Single Family Residence
1. See Figures 3.5-1 and 3.5-2 for general property locations
2. "Increase Over Existing" equals "Cumulative Levels" minus "Existing Levels".
3. L_{eq} levels shown (for Category 3 uses)

An existing berm south of SE Monterey Avenue would be removed as part of the light rail and Clackamas park-and-ride garage construction. This berm removal would likely increase sound levels at the Clackamas Corner commercial property by 10 to 12 dBA. An increase of 10 dBA over existing noise levels would be a substantial noise increase under ODOT noise guidelines. The FTA noise guidance does not consider commercial buildings to be sensitive noise receptors and therefore the removal of the berm and exposure to higher noise levels would not be considered an impact. As per agreement between FTA and FHWA, this FEIS was prepared using FTA's noise criteria. During Final Design, TriMet will meet with these commercial buildings representatives to understand local noise concerns and consider options for providing mitigation of noise impacts in this area.

Portland Mall Segment. Along the Portland Mall Segment, LRT speeds are slow enough that noise impacts would not occur. The distance to the noise impact contour along the Portland Mall Segment generally falls within the roadway or sidewalks. In the few areas where greater impact distances result from special track work, there are no nearby noise sensitive receivers, or the noise impact zone would not reach the sensitive receivers.

The Project includes rerouting buses from 5th and 6th avenues to accommodate the LRT on the Portland Mall and to provide better transit service to all areas of downtown Portland. The noise levels associated with the shifted bus volumes were determined using a screening level analysis, based on a two-dimensional modeling approach. The greatest noise increases associated with the bus rerouting are projected to occur along SW Jefferson, SW Columbia, and SW Harrison streets and range from 1 to 2 dBA in all areas except for SW Harrison Street between SW Naito Parkway and SW 6th Avenue where a 3 dBA increase is projected. Generally, 3 dBA is the minimum change in outdoor sound levels that can be perceived by a person with normal hearing. However, as previously discussed, the FTA noise impact criteria (Table 3.5-1) use a relative increase over existing noise levels to determine impacts. Because of this, these relatively small increases in overall noise levels could cause noise impacts as defined by FTA. The locations that would see a moderate noise impact due to the 1 to 3 dBA increase in noise from rerouted buses would include the portions of the following properties that front on Columbia, Jefferson, or Harrison Streets: the Marriott hotel located on the corner of SW Naito Parkway and SW Columbia Street, the Days Inn Motel located at 1414 SW 6th Avenue, the Regency Apartments located at 1410 SW Broadway, residential apartments located at 1405 SW Park, Portland Center Apartment Homes located at 200 SW Harrison Street, and the Oakwood at the Essex House apartments located at 1330 SW 3rd Avenue.

Construction Noise Impacts. Construction activities would occur throughout the Project area and, in some cases, very near existing structures. L_{max} noise levels for typical construction equipment are shown in Table 3.5-6. Construction activities are expected to include pile driving and operation of equipment such as bulldozers, scrapers, pavers, and jack hammers. A more detailed description of the expected construction methods and activities is included in Section 3.12 of this document. Construction noise would be subject to local noise regulations that limit activities during certain hours. Permits and variances may be required depending on the hours of construction and expected noise levels.

Indirect and Cumulative Noise Impacts. Indirect noise impacts would not occur as a result of the I-205/Portland Mall Project. The data in Table 3.5-5 show the Project's cumulative impacts of the Project and existing noise conditions. Increases in future cumulative levels over existing cumulative levels would result from estimated increases in traffic volumes on I-205.

Table 3.5-6
Construction Noise Levels for Typical Construction Equipment

Construction Phase	Loudest Equipment	Noise Level at 100 feet (dBA-L_{max})
Clearing and grubbing	Bulldozer, backhoe	86
Earthwork	Scraper, bulldozer	88
Foundation	Backhoe, loader	85
Superstructure	Crane, loader	86
Base preparation	Trucks, bulldozer	88
Paving	Paving trucks	89

Source: U.S. Department of Transportation. *Highway Construction Noise: Measurement, Prediction, and Mitigation*. 1977.

3.5.2.2 Vibration Impacts

The predicted vibration levels reported in this section are based on a maximum probable analysis method. The receivers may experience actual vibrations that are less than the predicted values, and it is unlikely that the actual vibration at each identified receiver will be greater than the predicted values.

I-205 Segment. Three potentially impacted receivers were identified along the I-205 Segment. The impacted receivers are distributed throughout the segment. Some of the impacts (Properties 750 and 960) would be produced by the proximity of special track work (frogs) to receivers. Property 940 would be impacted by vibration based on proximity to the light rail trackway. The magnitudes of the potential ground-borne vibration impacts are listed in Table 3.5-7.

Table 3.5-7
I-205 Segment Light Rail Vibration Impacts

Property Number	Land Use	Land Use Category	Distance from source (feet)	Vibration exposure (VdB re:1 μ-inch/sec)		
				FTA Impact Criteria	Predicted LRT Vibration	Increase Over Criteria
750[1]	SFR	2	81	72.0	75.8	3.8
940	MFR	2	32	72.0	75.0	3.0
960[1,2]	COM	1	98	65.0	73.0	8.0

Source: Earth Dynamics, August 2004.
Note: SFT = Single Family Residential; MFR = Multi-Family Residential; COM = Commercial.
[1] V bration impact calculated from frog.
[2] Sensitive equipment (MRI) at this receiver.

Portland Mall Segment. Details of the potential ground-borne vibration impacts at eight properties in the Portland Mall Segment potentially impacted by vibration are shown in Table 3.5-8. Vibration levels at other locations would not exceed FTA standards for vibration impacts.

Table 3.5-8
Portland Mall Segment Light Rail Vibration Impacts

Property No. (listed from north to south)	Land Use	Land Use Category	Distance From Source (ft)	Vibration exposure (VdB re:1 μ-inch/sec)		
				Impact Criteria	Predicted LRT Vibration[1]	Increase Over Criteria
453	Mixed Use	2	24	72.0	75.4	3.4
663[2]	Office	3	56	75.0	77.6	2.6
686[2]	Office	3	63	75.0	77.1	2.1
689[2]	Office	3	44	75.0	79.0	4.0
935[2]	School	3	49	75.0	78.7	3.7
971[2]	Motel	2	56	72.0	81.6	9.6
587[2]	Office	3	40	75.0	79.6	4.6
600[3]	Multiple	1	25	65.0	75.0	10.0

Source: Earth Dynamics, August 2004
[1] Vibration predicted at ground level.
[2] Vibration impact calculated from track crossing.
[3] Possible v bration-sensitive equipment on first two floors of building. Residential uses above.

Construction Vibration Impacts. Vibration related to construction would primarily result from the operation of heavy equipment such as, excavators, compactors, and pile drivers. Typically, vibratory roller compactors produce vibrations of approximately 100 VdB at a distance of 50 feet. Pile driving typically produces vibrations ranging from 100 to 117 VdB at a distance of 50 feet. Although construction has the potential for causing intrusive vibration, the intrusion should be short-term. Construction activities are expected to include pile driving, and operation of equipment such as bulldozers, scrapers, pavers, and jack hammers. A more detailed description of the expected construction methods and activities is included in Section 3.12 of this document.

Indirect and Cumulative Vibration Impacts. Adverse indirect effects would not occur as a result of the Project. Similarly, the Project, when combined with other past, present, and reasonably foreseeable future actions would not cause adverse cumulative vibration impacts. The Project is consistent with Federal, state, and local land use plans. The Project would not create unavoidable adverse environmental vibration effects.

3.5.3 Mitigation

Table 3.5-9 provides a summary of the noise and vibration impacts identified in the previous section for both the I-205 and Portland Mall Segments, with and without mitigation. Specific impacts and possible mitigation approaches are discussed in detail in the *South Corridor Noise and Vibration Mitigation Plan* (Metro: October, 2004).

Table 3.5-9
Summary of Noise and Vibration Impacts With and Without Mitigation

	Severe Noise	Moderate Noise	Vibration	Total
Total Impacts	1	73	11	85
Mitigated Impacts	1	40	11	52
Impacts Remaining After Mitigation	0	33	0	33

Source: TW Environmental, Inc., August 2004

3.5.3.1 Noise Mitigation

Noise mitigation for LRT operational impacts can take two basic forms:

- Reduction of source noise levels through vehicle specifications, alignment modifications, or speed reductions.
- Blocking of source noise with barriers, or improved sound insulation of buildings.

The alignment of the Project is constrained by the existing road system. In most areas with noise impacts it does not appear feasible to modify the alignment significantly. LRT speeds are designed to meet service and ridership goals. A significant reduction in LRT speeds would reduce the overall effectiveness of the system and is not considered a reasonable mitigation measure. Sound insulation of individual buildings is generally not cost effective to implement with reliable results. Therefore, the analysis of potential mitigation for the impacts of the Project is focused on blocking noise sources with barriers.

I-205 Segment. The effectiveness of noise barriers to mitigate impacts along the I-205 Segment was analyzed. In most areas along I-205, the LRT noise levels are close to, or slightly lower than, existing noise levels. I-205 Freeway contributes significantly to the cumulative noise levels. Because of this, sound walls would need to reduce a portion of the freeway noise contribution in order to

achieve an effective reduction of 5 dBA in the overall noise environment. In general, noise barriers can mitigate the cumulative noise levels for receivers nearest the LRT alignment where a portion of the freeway noise can be blocked. Because of the relative heights of the LRT, freeway, and receivers, noise barriers cannot achieve effective noise reductions in most areas. In areas where the LRT operates on a structure, sound walls were generally found to be ineffective for reducing L_{dn} noise levels because they do not reduce the freeway noise contribution. The analysis examined wall heights up to 14 feet in areas where impacted resources were identified. At 14 feet, barriers could achieve effective reductions of five dBA at only seven properties. At eight feet, barriers could achieve a five dBA reduction at three properties. By increasing the wall height to 10 feet in two sections of the alignment, six properties receive a five dBA benefit and the severe noise impact is mitigated. The wall height analysis was based on preliminary data for ground elevations and LRT design. If the LRT and ground level information change during final design, additional analysis of the proposed mitigation would be required.

In areas where the L_{dn} levels could not be reduced effectively by sound walls, an analysis of the L_{max} was performed to determine if sound walls would reduce annoyance from maximum levels during LRT pass by events. It was determined that 8-foot high sound walls would reduce L_{max} levels below the APTA guideline of 75 dBA in most sections of the I-205 Segment.

Based on the results of the barrier analysis, two sound walls are recommended to mitigate noise impacts along I-205: Wall 1 from Woodstock to the Springwater Corridor (approximately 2500 feet in length) and; Wall 2 from just north of SE Crystal Springs Boulevard to just north of SE Johnson Creek Boulevard (approximately 2,875 feet in length). The recommended wall height would be eight feet with short sections of ten-foot wall near property 750 and properties 636, 647, and 652. The section of ten-foot wall near property 750 would be to mitigate for the impacts of the frog in this location. If the frog is moved following the vibration mitigation recommendations, this increased height section may not be needed.

Two additional walls were analyzed, one on the north side of Harold Street (for properties 460, 463, and 466) and one starting south of SE Johnson Creek Boulevard extending south to Fuller Road Station (for properties 837, 839, and 843). Even at 16-foot heights, these walls would not effectively reduce noise levels due to the already high levels of freeway noise and the elevation of the light rail. Maximum noise reductions achieved by the walls would be less than 3 dBA, and overall reductions would be less than 1 dBA in most locations. In addition, the walls would reduce the L_{max} to 75 dBA at only one property in an area zoned for commercial development. For these reasons, these walls are not recommended.

Portions of the existing sound walls between SE William Otty Road and SE Monterey Avenue may need to be relocated with the Project. If they are moved, the length of the sound walls and top-of-wall elevations would be maintained at existing levels to provide mitigation equivalent to existing levels after they are moved. This relocation of the existing sound wall will be coordinated with FHWA and ODOT during Final Design.

During Final Design, TriMet will meet with representatives of the commercial businesses located south of SE Monterey Avenue related to potential concerns regarding the removal of an existing berm. Based on these conversations, TriMet in coordination with ODOT will consider the application of noise mitigation in this area. The mitigation could potentially include design modifications that leave portions of the berm and/or that adds a sound wall.

Portland Mall Segment. In the Portland Mall Segment, the LRT would not result in any noise impacts. The Project would include rerouting buses from SW 5th and 6th avenues to accommodate the LRT and to provide better transit service to all areas of downtown Portland. The noise levels associated with the rerouting of buses would be lower than existing noise levels, but result in a maximum of 1 to 2 dBA increase in overall noise levels. These small increases could result in several impacted properties along SW Jefferson, SW Harrison and SW Columbia streets. However, mitigating these potential impacts is not practical; therefore, no noise mitigation is recommended for the Portland Mall Segment. However, during the Final Design phase, TriMet will finalize the rerouting of buses, which could result in the reduction of potential noise at these locations. Furthermore, TriMet is examining methods to reduce noise emissions from standard buses by further insulating engine compartments and by potentially increasing the number of hybrid technology buses in the TriMet fleet in order to reduce noise and air quality emissions.

Construction Noise Mitigation. Construction activities would occur throughout the project area as close as 50 feet from existing structures. The potential construction noise impacts of the Project are likely to be of concern to local residents. Buildings along the I-205/Portland Mall Project alignment could expect maximum construction noise levels in the 80- to 90-dBA range when equipment is operating in the immediate area. The typically short duration of construction would offset the relatively high noise levels.

To mitigate these potential impacts, the Project would:

- Comply with all local noise ordinances that describe the maximum allowable noise by the Project, by time of day and by type of land use;
- Secure noise variances to local noise ordinances for those Project activities that do no comply with these noise ordinances;
- Monitor construction noise levels to ensure that these activities comply with the noise ordinances and variances;
- Carefully schedule loud operations to limit the duration of these activities;
- Apply noise abatement equipment to construction equipment to lower noise emissions;
- Locate loud portable equipment away from noise sensitive uses;
- Turn off idling equipment when not in use;
- Communicate in advance with neighbors if extremely loud work is expected to occur; and
- Ensure that all engine-powered equipment have mufflers installed according to the manufacturer's specification and all equipment can comply with pertinent EPA equipment noise standards.

Unmitigated Noise Impacts. The properties shown in Table 3.5-10 would continue to be impacted by noise even after implementation of the recommended mitigation measures. Sound walls would not be completely effective at reducing overall noise levels at these properties due to the configuration of the freeway and LRT. Although the proposed sound walls would reduce noise from the Project, the cumulative noise from the freeway and light rail Project would not be completely mitigated. The sound walls could not block the necessary portion of the freeway noise to achieve overall noise reductions. L_{dn} noise levels at these properties would increase by 1 to 3 dBA over existing noise levels. Increases of 1 to 2 dBA are generally not noticeable although they are still considered an impact under FTA guidelines. Increases of 3 dBA are generally just noticeable. Moderate noise impacts are not considered significant adverse impacts under FTA guidance for purposes of the National Environmental Policy Act (NEPA). With the recommended mitigation, no significant adverse noise impacts would occur as a result of the proposed Project.

ODOT does not construct Type II sound walls (sound walls that are not a part of an ODOT roadway expansion). The freeway noise will be analyzed by ODOT on future modernization projects in the I-205 Corridor. Table 3.5-10 shows L_{dn} noise levels that cannot be effectively mitigated in some locations. However, the 8-foot sound walls would reduce L_{max} levels from train passbys substantially.

Table 3.5-10
Unmitigated and Partially Mitigated I-205 Light Rail Noise Impacts

Property Number [1] (listed from north to south)	Land Use	L_{dn} Noise Exposure in dBA				
		Impact Threshold (moderate/severe)	Existing Levels	Unmitigated Cumulative Levels	Mitigated Cumulative Levels	Increase Over Existing [2]
460[3]	SFR	moderate	64	65	65	1
463[3]	SFR	moderate	64	65	65	1
466[3]	SFR	moderate	67	69	69	2
593	SFR	moderate	68	70	69	1
595	SFR	moderate	68	70	69	1
599	SFR	moderate	68	70	69	1
701	MFR	moderate	70	71	71	1
732	SFR	moderate	68	69	69	1
738	SFR	moderate	68	69	69	1
741	SFR	moderate	69	71	71	2
743	SFR	moderate	69	71	71	2
754	SFR	moderate	68	69	69	1
762	SFR	moderate	68	69	69	1
771	SFR	moderate	68	69	69	1
780	SFR	moderate	69	71	70	1
781	SFR	moderate	69	71	70	1
810	SFR	moderate	63	66	66	3
816	SFR	moderate	63	66	66	3
817	SFR	moderate	63	66	66	3
819	SFR	moderate	63	66	66	3
828	SFR	moderate	63	66	66	3
829	SFR	moderate	63	66	66	3
832	SFR	moderate	63	66	66	3
833	SFR	moderate	63	66	66	3
837[3]	SFR	moderate	62	64	64	2
839[3]	SFR	moderate	62	64	64	2
843[3]	SFR	moderate	68	71	71	3

Source: TW Environmental, Inc., August 2004
Note: Increase of 1 to 2 dBA are generally not noticeable, are still considered an impact under FTA criteria based on the existing noise levels.
[1] See Figure 3.5-1 for locations.
[2] "Increase over Existing" equals "Cumulative Levels" minus "Existing Levels."
[3] LRT on structure and mitigation is neither effective nor provided. A sound wall will be located adjacent to other properties.

3.5.3.2 Vibration Mitigation

A total of 11 structures would be potentially impacted by vibration in the Project area - three structures in the I-205 Segment and eight structures in the Portland Mall Segment. Specific impacts and suggested mitigation are listed in Table 3.5-11. Eight of these structures would be impacted because of their proximity to special track work such as switches (frogs) and crossovers. Movable-point frogs are often suggested to mitigate vibrations from frogs; however, limited testing at a retractable frog and a normal frog at the Westside Light Rail near the Washington County Fairplex indicated no statistically significant decrease in ground vibration with the use of retractable frogs. Consequently, retractable frogs are not suggested as a mitigation measure for the South Corridor Project. Specific mitigation for each impacted receiver is described in the South Corridor *Noise and Vibration Mitigation Plan* (Metro: September, 2004).

Vibration mitigation for Portland Mall impacts would be finalized during the final design phase and could include one of the following three strategies:

- Use of high-resilience fasteners under the rail and within six feet of the rail crossing. The fastener spring-rate will be designed to address the vibration frequency that would cause the impact.
- During construction, modify and repair the existing flange bearing rail crossings at SW Morrison and Yamhill streets and SW 10th and 11th avenues to determine if vibration can be mitigated by performing more frequent maintenance and weld repair to the flange-bearing crossings. Implement at proposed track crossings if test results warrant.
- Install a floating slab to isolate vibration at rail crossings. The floating slab could consist of a concrete slab (approximately 15 feet by 15 feet) then rubber support pads and then a top concrete panel with the rail crossing.

The determination of the best option for reducing potential vibration impacts will be made based on further soil investigations, location of the track crossings, and consultation with experts in rail vibration mitigation during the final design phase. After implementing the mitigation identified in Table 3.5-11, all potential vibration impacts would be mitigated.

Table 3.5-11
Recommended Rail Vibration Impacts Mitigation

Property No.	Land Use & Location	Mitigation Measures	Vibration Reduction
I-205 Segment			
750	Single-Family Residential, 8448 SE 89th Ave.	Move frog a minimum of 103 feet from structure	3.8 VdB
940	Multi-Family/Apt. Complex, 11408 SE 90th Ave.	Install floating slab or shredded tire track isolation	5 VdB
960	Commercial/Retail, 11750 SE 82nd Ave.	Relocate MRI facility, install vibration isolation to MRI or building foundation	Unknown
Portland Mall Segment			
453	3- story Mixed Use, 5 NW 5th Ave.	Resilient fasteners / floating slab or flange bearing track crossing [1]	5 VdB
663	Office, 621-633 SW Morrison St.	Resilient fasteners / floating slab or flange bearing track crossing [1]	5 VdB
686	Office, 811-819 SW 6th Ave.	Resilient fasteners / floating slab or flange bearing track crossing [1]	5 VdB
689	Office, 520 SW Yamhill St.	Resilient fasteners / floating slab or flange bearing track crossing [1]	5 VdB
935	School, St. Mary's--1615 SW 5th Ave	Resilient fasteners / floating slab or flange bearing track crossing [1]	5 VdB
971	Motel, 415 SW Montgomery	Resilient fasteners / floating slab or flange bearing track crossing [1]	5 VdB
587	Office, PSU--1800 SW 6th Ave	Resilient fasteners / floating slab or flange bearing track crossing [1]	5 VdB
600	Multiple, PSU--1912 SW 6th Ave	Install vibration isolation tables, or relocated optical microscopes [1]	10 VdB

Source: Earth Dynamics, August 2004

Note: Vibration impacts would not be expected to harm or damage structures. VdB =(VdB re:1 μ-inch/sec) (measure of vibration in decibels)

[1] Specific mitigation to be determined during the final design phase in consultation with rail v bration mitigation expert.

3.6 Ecosystems

This section describes the affected environment and evaluates the environmental consequences to wetlands, vegetation, wildlife, fisheries, and threatened, endangered, and sensitive (TES) species affected by the South Corridor I-205/Portland Mall Project. Further detail can be found in the *South Corridor Ecosystems Results Report* (Metro and URS, November 2002), the *South Corridor Biological Assessment* (Metro and URS, May 2004). This environmental analysis tiers to those documents and corresponds to the context and intensity of the impacts anticipated.The Project design has been developed to avoid, reduce and minimize potential environmental impacts. Mitigation measures are identified within this Chapter where ecosystem impacts could not be avoided. Necessary permits and clearances for TES species are discussed in Section 3.6.1.6.

3.6.1 Affected Environment

The scope of the analysis for the affected environment consists of the I-205 Segment, comprising 3.1 miles of light rail that would be constructed on right-of-way (ROW) reserved for high capacity transit, 3.4 miles that would be located within or directly adjacent to Oregon Department of Transportation (ODOT) ROW along I-205, and 1.8-miles within the Portland Mall Segment with construction within existing roadway right-of-way. To construct the tracks in the downtown section, existing impervious area would be removed and replaced with impervious trackway.

3.6.1.1 Wetlands and Waterways

Wetland delineations were conducted to identify approximate boundaries of "waters of the united states" and "waters of the state" categorized as either "wetlands" or "non-wetland waterways" within the study corridor for the project. The study corridor extends 100 feet from the centerline of each linear alternative and to within approximately 50 feet of non-linear components (e.g., park-and-ride and maintenance facilities). Wetlands are those areas that satisfy the wetland criteria defined in the *1987 U.S. Army Corps of Engineers* (Corps) *Manual for Identifying and Delineating Wetlands* (Environmental Laboratory, 1987). Non-wetland waterways are water bodies or aquatic sites that are within the regulatory authority of the Corps under Section 404 of the Clean Water Act or the Oregon Department of State Lands (DSL) Oregon Removal-Fill law. Non-wetland waterways are water bodies or aquatic sites that are within the regulatory authority of the Corps under Section 404 of the Clean Water Act or the DSL Oregon Removal-Fill Law. In March 2001, the 9th U.S. Circuit Court of Appeals decision on Headwaters, Inc. v. Talent Irrigation District, 243 F.3d 526 (9th Circuit 2001) held that irrigation canals that receive water from natural streams and lakes, and divert water to streams and creeks, are connected as "tributaries" to those other waters. The Ninth Circuit further held that a stream which contributes its flow to a larger stream or other body of water is a tributary. As a result of this ruling, when there is a hydrological connection between a navigable water of the U.S. and another waterbody, non-wetland waterways are considered jurisdictional.

A full wetland determination and delineation study for all of the wetlands and waterways was conducted within the Project study area. Further detail can be found in the *South Corridor Wetland Delineation and Determination Report*, (Metro and URS, April 2004). An onsite visit with representatives from Metro, ODOT, U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NOAA Fisheries), City of Portland, and the Oregon DSL was made on April 7, 2004, with a verbal concurrence of the determination of non-jurisdictional waters. However, another onsite visit with representatives from Metro, ODOT, Corps, and TriMet was made on October 22, 2004 to reevaluate determination of non-jurisdictional waters based on the findings of the 9th Circuit Court in the Talent case. As a result, the Corps determined that concrete lined ditches north and south of Johnson Creek, are jurisdictional non-wetland waters (Appendix B Agency Coordination).

Waterways within the study corridor include the Willamette River, Johnson Creek, and Phillips Creek. The Willamette River would be crossed on the existing Steel Bridge. Johnson Creek would be crossed via a new pre-cast bridge and Phillips Creek is piped in the vicinity of the proposed rail crossing. No in-water work is anticipated. Both Johnson Creek and the Willamette River are considered to be "non-wetland waters" along the alignment. Two concrete lined ditches that convey stormwater from the I-205 Freeway to Johnson Creek were artificially created and but are considered to be "non-wetland waters".

Two wetland areas are located within the study corridor (Figure 3.6-1). Wetland A is located just north of Johnson Creek and is a classified as a depressional wetland based on the Judgmental Method of the Hydrogeomorphic (HGM)-based Assessment Method developed by DSL (Adamus and Field, 2001). This wetland conveys drainage from a paved parking lot to a swale and then to Johnson Creek via a culvert.

Wetland B is located north of SE Harold Street in I-205 ROW and was artificially created from uplands and has no direct connections to Johnson Creek. This wetland is classified as depressional outflow based on the HGM method and is a non-jurisdictional wetland These depressional wetlands were located in topographic depressions and are fed primarily by overland flow (runoff) and interflow from surrounding uplands. Characteristics of the depressional wetlands and waterways within the Project area are listed in Table 3.6-1.

Table 3.6-1
Summary of Wetlands and Waterways Within the South Corridor

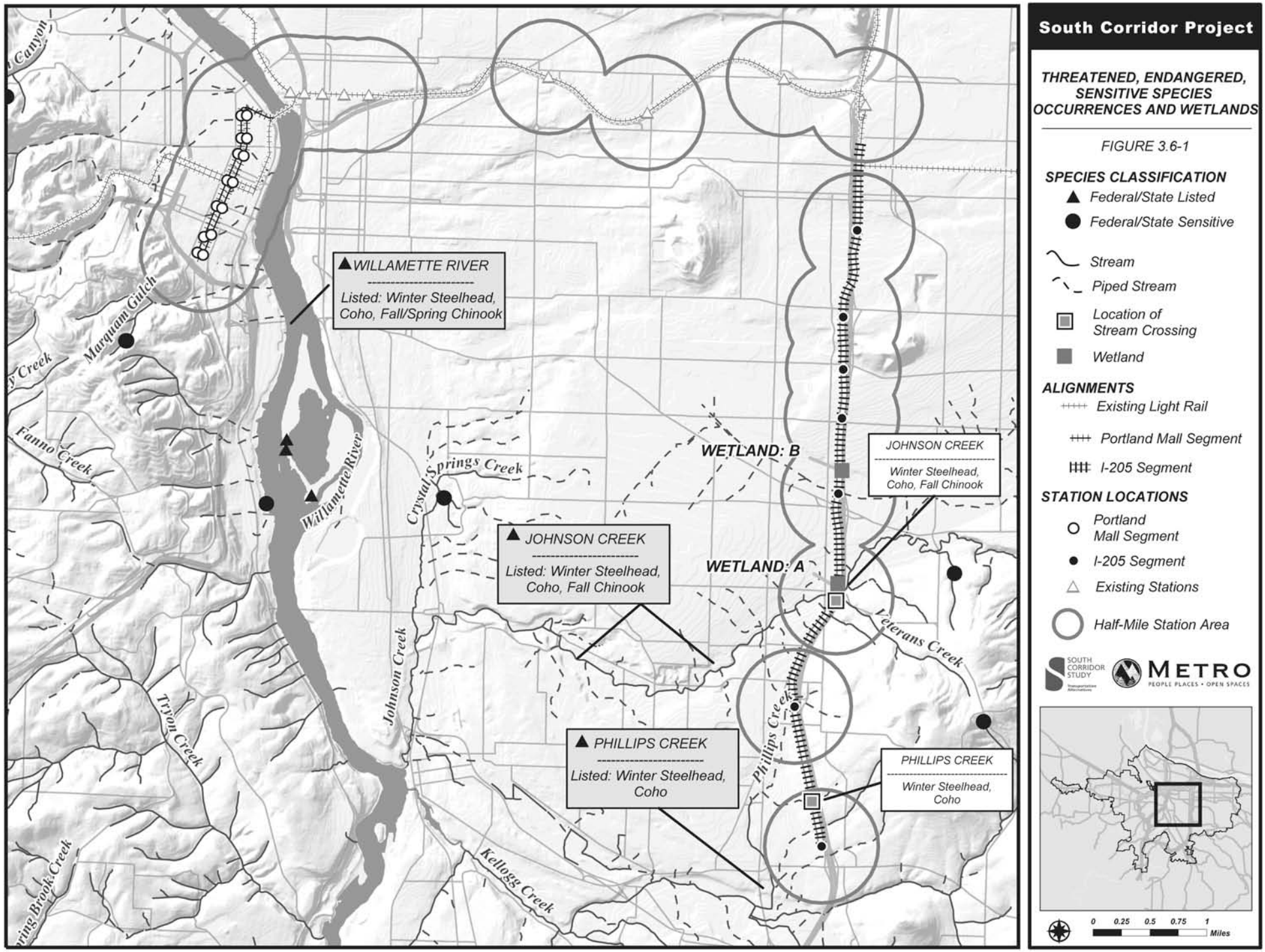
Site/Wetland	Waterway	Wetland Class	Wetland Determination	Comments
Concrete lined drainage ditch	Unnamed drainage ditches	RFT	Non-wetland waters (jurisdictional non-wetland waters)	Concrete lined drainage ditches.
Concrete lined channelized perennial stream	Johnson Creek	RFT	Non-wetland U.S. waterway (jurisdictional U.S. waterway)	Concrete lined channelized perennial creek in this portion; floodplain above Ordinary High Water Mark (OHWM) is non-wetland riparian.
Wetland A north of Johnson Creek	Small depressional wetland	DO	Wetland (jurisdictional)	Leads through culvert to Johnson Creek; fish could enter wetland at flood stage.
Wetland B north of SE Harold	Very small depressional wetland	DO	Wetland (non-jurisdictional)	Isolated, created from upland, drains to catch-basin and underground pipes (not an open and free connection to Johnson Creek; no fish habitat).

Source: URS, April 2004.
Notes: RFT = riverine flow-through; DO = depressional outflow

The HGM method was used to evaluate the following wetland functions for the existing wetlands:

- water storage and delay;
- sediment stabilization and phosphorus retention;
- nitrogen removal;
- primary production;
- thermoregulation;
- resident fish habitat support;
- anadromous fish habitat support;
- invertebrate habitat support;
- amphibian and turtle habitat;
- breeding waterbird support, and
- Winter and migratory waterbird support

This method is based on a series of questions that have been developed for each function to guide the analyst through the process of assigning importance to each function. Ratings are based on a scale of 0 to 1.0, with 0 representing minimal capacity and 1.0 representing the highest capacity. A summary of the HGM functional scores for each wetland area is provided in Table 3.6-2. The result is a numerical rating based on the importance of each function to the system.



South Corridor Project

THREATENED, ENDANGERED, SENSITIVE SPECIES OCCURRENCES AND WETLANDS

FIGURE 3.6-1

SPECIES CLASSIFICATION

- *Federal/State Listed*
- *Federal/State Sensitive*
- *Stream*
- *Piped Stream*
- *Location of Stream Crossing*
- *Wetland*

ALIGNMENTS

- *Existing Light Rail*
- *Portland Mall Segment*
- *I-205 Segment*

STATION LOCATIONS

- *Portland Mall Segment*
- *I-205 Segment*
- *Existing Stations*
- *Half-Mile Station Area*

SOUTH CORRIDOR STUDY

METRO PEOPLE PLACES • OPEN SPACES

0 0.25 0.5 0.75 1 Miles

September 2004

3.6.1.2 Vegetation

Most of the Project's I-205 Light Rail alignment would be in an area established for a future transitway when the freeway was originally constructed. This area is currently maintained by ODOT. Field evaluations for vegetation were conducted in the vicinity of the Project. A preliminary vegetation map of the potentially affected area was prepared using aerial photograph interpretation, National Wetland Inventory maps, maps from previously prepared vegetation studies and field surveys. Upland vegetation cover types were classified based on descriptions of vegetation associations in Franklin and Dyrness (1988), where appropriate. Field maps included approximate vegetation cover type boundaries, documented sensitive plant associations, potentially important wildlife habitat, and other key ecological features necessary to evaluate the alternatives. Field surveys for species of concern were conducted during appropriate timeframes in 2002 and 2004 to best determine presence or absence.

Table 3.6-2
Functional Assessment Of Wetlands In The South Corridor

Function	Wetland	
	A	B
HGM Class	DO[1]	DO[1]
Cowardin Classification	PEMC[2]	PEME[3]
Wetland Functions Score		
Water Storage and Delay	0.4	0.5
Sediment stabilization & phosphorus retention	0.5	0.2
Nitrogen removal	0.2	0.1
Primary production	0.3	0.1
Thermoregulation	N/A	N/A
Resident fish habitat support	N/A	N/A
Anadromous fish habitat support	N/A	N/A
Invertebrate habitat support	0.2	0.2
Amphibian & turtle habitat	0.1	0.1
Breeding waterbird support	0.1	N/A
Wintering & migratory waterbird support	0.3	N/A
Songbird habitat support	0.1	N/A
Support of Characteristic Vegetation	0.1	0.1

Source: URS, April 2002 and 2004.
Note: Refer to the Wetland Determination Report for details of the functional assessment. The functional scores are based on a scale of 0 to 1.0 with "0" being minimal capacity and "1.0" being highest capacity.
[1] DO-Depressional outflow
[2] PEMC-Palustrine emergent seasonally flooded
[3] PEME-Palustrine emergent seasonally flooded/saturated

Vegetation boundaries and classifications were verified in the field and refined as necessary during reconnaissance-level field surveys. Areas identified as requiring more detailed surveys (wetland determinations and TES species surveys) were re-surveyed on the ground to determine plant species composition, habitat quality and structure of vegetation communities. Habitat quality was assessed using such factors as native species composition, past disturbance and degree of fragmentation and isolation. All plant species encountered were recorded and identified to a level sufficient to determine their state or federal status, if any.

Within the I-205 Segment, 94 percent of the impact area is grassland of which a large portion is non-native. The Project impact area affects approximately 25.8 acres of grassland. Riparian scrub-shrub is located along the banks of Johnson Creek. Some scrub-shrub areas are located along the edges of the I-205 right-of-way, which are either remnants from the residential character of this area prior to the construction of the freeway, or the result of landscaping implemented with the construction of

the freeway. The Portland Mall Segment is urban with ornamental vegetation and trees. None of the vegetation cover types exist in this segment.

3.6.1.3 Wildlife

Wildlife surveys were conducted concurrently with vegetation classification in 2002 and 2004. The purpose of these surveys was to identify all prominent wildlife species in the vicinity of the Project, their relative abundance, location, and use of vegetation types. The function of existing plant communities in providing a habitat for wildlife was assessed based on field evaluations, literature review, professional opinion, and agency consultation. Wildlife habitat within the I-205 Segment is severely limited due to a concrete barrier and high-speed traffic of the freeway, noise, and mowing of existing grass, and overall lack of habitat. The Portland Mall Segment provides little or no habitat. Observed and expected wildlife species in the I-205 Segment are listed in Table 3.6-3.

Table 3.6-3
Wildlife Species Observed or Known to Occur in the South Corridor

Common Name	Scientific Name	Habitat(s) Used
Birds		
Great blue heron	*Ardea herodias*	Open water
Canada goose	*Brantus canadensis*	Open water
Mallard	*Anas platyrhynchos*	Open water
Rufous hummingbird	*Selasphorous rufus*	Developed
Northern flicker	*Colaptes auratus*	Developed
American crow	*Corvus brachrhynchos*	Developed
Scrub jay	*Aphelocoma coerulescens*	Developed
House wren	*Trogolodytes aedon*	Upland scrub-shrub
American robin	*Turdus migratorius*	Developed and grasslands
Black-capped chickadee	*Parus atricapilus*	Upland forest
Spotted towhee	*Pipilo erythrophthalmus*	Riparian forest and upland scrub-shrub
Song sparrow	*Melodius melospiza*	Upland scrub-shrub
Mammals		
Douglas' squirrel	*Tamiasciurus douglasii*	Developed
Raccoon	Procyon lotor	Developed and riparian forest

Source: Csuti, B. et al. 1997. Atlas of Oregon Wildlife. Oregon State University Press, Corvallis, Oregon.

Wildlife species that occur within 200-feet of the I-205 Segment include many species commonly found in urban habitats that are generally adapted to life in urbanized areas and often occur in edge habitats that exist along the boundaries of disturbed areas. Some of these common species are non-native such as bullfrogs, European starlings, and English sparrows.

The I-205 Segment was delineated into five vegetated and two non-vegetated cover types. Of these cover types, forested habitats generally provide the highest wildlife habitat values due to a greater supply of food, cover, and nesting structure. However, very little forested habitat exists within the I-205 Segment. The forested habitat that does exist occurs as scattered patches and planted vegetation, limiting its suitability to species with limited home ranges and high tolerances, and highly mobile species such as songbirds. Other habitat types that may provide many of the requisites for wildlife include scrub-shrub and open water habitats.

The Project would be located in the Pacific Flyway, one of four major North American flyways. The Migratory Bird Treaty Act (MBTA) prohibits the take, possession, import, export, transport, selling, purchase, barter, or offering for sale, purchase or barter, any migratory bird, their eggs, parts, and nests, except as authorized under a valid permit. No migratory nests were observed in the corridor during field visits or wildlife surveys.

3.6.1.4 Fisheries

Existing conditions and fish distribution were assessed for all watercourses crossed and within the immediate vicinity of the Project. Existing information provided documentation of known fish distribution and stream conditions. Field reconnaissance surveys were used to supplement existing information and provide site-specific stream condition assessment. Despite the degraded and altered condition of most of these waterways, many support populations of resident and TES fish species. Native and non-native fish, including TES species, known or believed to be present in Johnson Creek and Phillips Creek are listed in Table 3.6-4. Non-native fish have been released in State angling enhancement programs and in illegal introductions.

A new light rail bridge would cross Johnson Creek. Phillips Creek is piped in the area of the light rail crossing. Johnson Creek and Phillips Creek, which is a tributary to Mt. Scott Creek, are described below. Associated stream crossings are also shown in Figure 3.6-1. Although the Willamette River would also be crossed, no new construction is anticipated at this location.

Table 3.6-4
Fish Species Known to Occur in the Waterways Crossed by the Project

Common Name	Scientific Name	Johnson Creek	Mt. Scott Creek	Phillips Creek
Coho salmon	*Oncorhynchus kisutch*	X	X	X
Fall Chinook	*O. tshawytscha*	X		
Winter steelhead	*O. mykiss*	X	X	X
Summer steelhead	*O. mykiss*		X	X
Other Fish Species				
Banded killifish	*Fundulus diaphanus*			X
Brown bullhead	*Ictalurus nebulosus*			X
Chiselmouth	*Acrocheilus alutaceus*	X		
Cutthroat trout	*O. clarki clarki*	X	X	X
Goldfish	*Carassius auratus*			X
Green sunfish	*Lepomis cyanellus*	X		
Largemouth bass	*Micropterus salmoides*	X	X	X
Largescale sucker	*Catostomus macrocheilus*	X		
Mosquitofish	*Gambusia affinis*			X
Northern pikeminnow	*Ptychocheilus oregonensis*			
Pacific lamprey	*Lampetra tridentatus*	X	X	X
Peamouth chub	*Mylocheilus caurinus*	X		
Prickly sculpin	*Cottus asper*		X	
Rainbow trout	*O. mykiss*	X	X	X*
Redside shiner	*Richardsonius balteatus*	X	X	X
Reticulate sculpin	*Cottus perplexus*	X	X	X
Speckled dace	*Rhinichthys osculus*	X	X	X
Western brook lamprey	*Lampetra richardsoni*	X		X
Yellow bullhead	*Ictalurus natalis*	X		

Source: URS, 2004

Johnson Creek is 25 miles long, originating near the town of Cottrell, Oregon. The western portion of the creek flows primarily through urbanized habitat. The eastern portion of the creek flows through undeveloped open space and agricultural land. In the 1930s, the Federal Works Progress Administration cleared and lined about 90% of Johnson Creek between Cottrell and SE 158th Avenue. The channel was excavated to a depth of 6 to 10 feet with a bottom width of 25 to 50 feet. The banks were graded to have 1:1 side slopes and were lined with hand-placed stone. The channel has not been maintained; in many reaches shrubs and trees have grown in deposited sediment. Johnson Creek has been further channelized and rerouted in some areas to accommodate urban development. In and near the Project, Johnson Creek is characterized by banks of concrete and/or riprap, substrate of concrete, riprap and silt, and little riparian vegetation. No barriers to fish passage are present. A number of resident fish including threatened and Endangered Species (TES) have

been documented throughout Johnson Creek. Additional information can be found in *South Corridor Biological Assessment* (Metro: May 2004).

Phillips Creek is a mile-long, intermittent (grading into perennial) creek originating south of Harmony Point and terminating at its confluence with Mt. Scott Creek. Phillips Creek is an urbanized, rerouted, channelized creek with a low-gradient riffle-type habitat. The stream has moderately graded banks that are heavily reinforced at road crossings, primarily non-native riparian vegetation, gravel/sand substrate, and limited instream fish cover. No crossing structures or effects to terrestrial or aquatic species are expected in Mt. Scott Creek and Phillips Creek. Effects from storm water discharged are discussed in the Section 3.7 Water Quality.

Mt. Scott Creek originates in Happy Valley and flows south and west for about six miles to its confluence with Kellogg Creek at the North Clackamas Regional Stormwater Facility. Moderately graded banks with mixed-forested vegetation, boulder/gravel substrate, and moderate instream cover characterize the stream. No barriers to fish passage are present in Mt. Scott Creek. A number of resident species, including TES species, are known to occur in Mt. Scott Creek. Mt. Scott Creek is not crossed by the alignment.

The **Willamette River** is crossed on an existing structure. Modifications would occur to the approach structures to accommodate the proposed Project elements of the Project. No in-water work is expected to occur.

3.6.1.5 Threatened, Endangered, and Sensitive (TES) Species

TES species include those species state or federally listed as threatened or endangered, proposed for listing or identified as candidates, federal species of concern, or state sensitive species. For this investigation, species with local significance are also considered TES species. Figure 3.6-1 shows TES plant, wildlife, and fish species documented to occur within 5 miles of the Project features. These figures identify species as federal or state listed (threatened or endangered) and species of concern (sensitive). TES plants and wildlife are mapped according to their highest protection status (e.g., a species classified as a federal species of concern and state threatened is mapped as "federal or state listed").

USFWS identified nine threatened and two endangered fish and wildlife species with potential to occur within the Project vicinity. Two bird species, one amphibian and one fish species were also identified as candidates for Federal listing. In addition, USFWS identified 23 species of concern with potential to occur in the study area. The Oregon Natural Heritage Program (ONHP) database provided 87 records of 25 state and federal threatened and endangered species within a five-mile search area of the Project (ONHP, 2004). The NOAA Fisheries website was also consulted to identify listed anadromous fish species in the Project area as shown in Figure 3.6-1.

Federal consultation, as required by Section 7 of the ESA, was conducted during the FEIS phase of the Project development process to assess potential impacts on listed fish and their habitats. This consultation included a Biological Assessment (BA) of the Project with an ESA effects determination. The BA includes an assessment of potential effects to Essential Fish Habitat (EFH). EFH is habitat designated by the Magnuson-Stevens Act (MSA) as essential for the health and viability of commercially significant fish species. In the Project area, Coho and Chinook salmon are managed by the MSA.

Threatened, Endangered, and Sensitive Fish

TES fish species are prominent in the South Corridor area and constitute a major consideration of the Project impact analysis (refer to Table 3.6-4 for distribution of TES fish by waterway). Most waterways within the Project area have been documented to support populations of TES fish including Johnson Creek, Phillips Creek, and Mt. Scott Creek. Three TES fish species known to be present within the I-205/Portland Mall Project area are members of the Lower Columbia River Evolutionarily Significant Unit (ESU) or Upper Willamette River ESU. The species include Coho salmon (proposed threatened and also State endangered), fall Chinook salmon (NOAA Fisheries threatened), spring Chinook salmon (NOAA Fisheries threatened), summer steelhead trout (NOAA Fisheries threatened), and winter steelhead trout (NOAA Fisheries threatened). These species migrate, spawn, and rear in streams throughout the corridor.

Threatened, Endangered, and Sensitive Wildlife and Plants

This investigation evaluated the proximity of TES plants and wildlife to the Project. Surveys for TES plant and wildlife species were conducted in conjunction with vegetation mapping and wetland surveys. Potentially suitable habitats that could support TES plants were surveyed during the time of year when they could be most readily identified, usually during the flowering period. Wildlife surveys focused on habitat evaluation to predict the likelihood that TES species would occur in the potentially affected area. Results of these surveys supplemented information obtained from the resource agencies and existing reports. No TES plants or wildlife species were identified within the 200-foot-wide study corridor along the alignment and little or no potentially suitable habitat for any TES plant or wildlife species was observed.

3.6.1.6 Consultation, Coordination, and Permitting

The I-205/Portland Mall Project is subject to federal, state, and local regulations concerning potential impacts to biological resources. Consequently, the ecosystems study provides documentation that will be incorporated into permit decisions for the Project. All studies and analyses will be completed in sufficient detail to ensure compliance with the appropriate permit requirements. Consultation with NOAA Fisheries was conducted and NOAA Fisheries issued a Biological Opinion (BO) on July 21, 2004 (Appendix B) concluding consultation on TES fish species. The principal regulations, ordinances, and permit actions that could apply to the selected alternative are summarized in Table 3.6-5.

3.6.2 Environmental Impacts

CEQ Regulations (40 CFR 1500-1508) define the process necessary to satisfy the requirements of the National Environmental Policy Act (NEPA) process. This process includes the analysis of direct, indirect, and cumulative impacts. Direct effects are caused by the action, occur at the same time and place, and can be long-term, such as the placement of facilities and operation of the Project. Direct effects can include irreversible removal, disturbance, or destruction of biological resources. Short-term direct effects are temporary impacts, generally associated with construction activities that are usually reversible. Short-term impacts may include the removal of vegetation in construction staging, storage, and access areas, impacts to water quality from soil erosion and spills of toxic materials (e.g., equipment fuel), and increased noise, lighting, and human activity during Project construction.

Table 3.6-5
Summary of Potential Natural Resource Permit Requirements

Regulation/ Permit	Responsible Agency	Resource Studies	Regulated Resources
Federal			
Clean Water Act (CWA) Section 404 Individual Permit; Section 10 (Rivers and Harbors Act)	U.S. Army Corps of Engineers (Corps)	Alternatives analysis; wetland delineation study; wetland functional assessment and impact analysis; mitigation plan	Waters of the U.S., including wetlands
Endangered Species Act (ESA)	National Oceanic Atmospheric Administration Fisheries (NOAA Fisheries); U.S. Fish and Wildlife Service (USFWS)	Biological assessment addressing Project impacts to listed species, species proposed for listing, and candidate species	Vegetation, wildlife, fisheries
Fish and Wildlife Coordination Act	USFWS; NOAA Fisheries; Oregon Department of Fish and Wildlife (ODFW)	Agency consultation; identify impacts to fish and wildlife resources; recommend mitigation if necessary	Vegetation, wildlife, fisheries
Magnuson-Stevens Act	NOAA Fisheries	Identify potential impacts to Essential Fish Habitat	Commercially significant fisheries
Federal Migratory Bird Treaty Act	USFWS	Identify impacts to migratory birds	Wildlife
Executive Order 11990	FTA, FHWA, and Corps	Ensure protection of wetlands	Wetlands
State			
Oregon Removal and Fill Permit	OR Department of State Lands (DSL)	Alternatives analysis; wetland delineation study; wetland functional assessment and impact analysis; mitigation plan	Waters of the state, including wetlands
Oregon State ESA	ODFW; OR Department of Agriculture	Identify Project impact to state listed and candidate species	Vegetation, wildlife, fisheries
CWA Section 401 Water Quality Certification	OR Department of Environmental Quality (ODEQ); U.S. Environmental Protection Agency (EPA)	Assess Project compliance with state water quality standards; implement mitigation measures	Rivers, streams, other bodies of water
Local			
Portland Greenway Permit	City of Portland	Evaluation of impacts to native vegetation; mitigation or preservation of native vegetation	Vegetation, wildlife, fisheries
Environment Zone Overlay	City of Portland	Identification of adverse impacts; mitigation plan	Vegetation, wildlife, fisheries
Metro Functional Plan – Title 3	Metro	Evaluation of impacts on water quality, flood management, and fish and wildlife	Wildlife and fisheries
Setback Requirements	Clackamas County	Protection of river and stream corridors	Rivers and streams

Source: URS, 2004.

Indirect impacts are caused by the proposed action and occur later in time or distance, but are still reasonably foreseeable, such as degraded water quality caused by an increase in runoff from impervious areas built adjacent to wetlands or waterways. These impacts may be temporary or permanent, but are usually of long duration. Cumulative impacts are additive impacts from the incremental effects of a proposed action when placed in context with other past, present, and reasonably foreseeable future actions (CEQ Regulation, 40 CFR 1508.7). A list of past, present, and reasonably foreseeable projects that may affect biological resources in the Project area is included in Chapter 4 of the *South Corridor Ecosystems Results Report* (Metro and URS, November 2002).

The long-term impacts to biological resources (wetlands, vegetation, wildlife, fisheries, and TES) are summarized by alternative in Table 3.6-6. There would be virtually very small amount of fill of wetlands (0.01 acres) or waterways (0.09 acres) with the Project and approximately 0.17 acres of waterways that would be spanned. The Project would remove almost 28 acres of vegetation comprised of mostly grasslands within ODOT right-of-way.

Table 3.6-6
Summary of Project Impacts to Biological Resources

Alternative	Wetlands[1] (Fill / Span)	Waterways[2] (Fill / Span)	Vegetation[3]	Riparian and Fish Habitat[4]	TES Species	
					Fish[4]	Wildlife and Plants[5]
No-Build	NI	NI	NI	NI	NI	NI
I-205/Mall Project	0.01 / 0.0	0.09 / 0.17	27.50	87.5	55.2	None

Source: Metro and URS, June 2004.
Note: TES = Threatened and endangered species, NI = No Impact.
[1] Values are acres of wetlands filled and spanned by the Project.
[2] Values are acres of waterways filled and spanned by the Project.
[3] Values are acres of vegetation removed by the Project.
[4] Values are lineal feet of riparian/TES bearing stream that would be impacted by construction activity or shading by the Project.
[5] No TES wildlife or plant species have been identified within the study corridor.

3.6.2.1 Wetlands and Waterways

Impacts to wetlands and waterways could include direct losses from wetland fill and spanning (construction of a bridge, trestle, or other similar structure above a wetland or waterway). Spanning may impact wetlands by increasing shade and inhibiting vegetation growth. Impacts of such linear features were assessed within a 30-foot-wide corridor where the footprint of the Project would be located and where impacts are expected to occur. Impacts of non-linear features (park-and-ride and maintenance facilities) were determined from the feature footprint for that particular facility.

A. No-Build Alternative

Impacts to wetlands along the corridor are not expected from the No-Build Alternative. Untreated areas of sheetflow would continue in the Johnson Creek drainage. Traffic may increase at a higher rate than if light rail were available increasing the amount of petroleum based non-point pollution, which may runoff into wetlands and waterways.

Cumulative impacts of planned projects listed in the *Ecosystems Results Reports* (Metro/URS, December 2002) would collectively cause additional filling and/or spanning of wetlands and waterways throughout the Metro area. These activities are planned and expected within the Urban Growth Boundary and are limited and more strongly regulated outside of that boundary where wetlands and associated habitats are more abundant.

B. I-205/Portland Mall Project

Portland Mall Segment. No direct, indirect, or cumulative effects to wetland resources are expected in the Portland Mall Segment because no wetlands exist and no changes to water management are expected to occur as a result of the Project in this segment.

I-205 Segment

Direct Impacts. The Project would result in the filling of 0.01 acres of Wetland B (Figure 3.6-1) and the spanning of 0.17 acres of Johnson Creek. The two concrete-lined ditches located north and south of Johnson Creek would be removed with the north side ditch (0.06 acres) being replaced with a water quality swale and a pipe and the southern ditch (0.03 acres) being replaced with a pipe. Johnson Creek would not be directly impacted although some shading (0.17 acres) of the stream under the bridge spans would occur. Construction in the vicinity of Wetland A will be avoided and measures will be taken to protect this wetland. Any minor impacts to Wetland A would be

temporary. A series of BMPs are identified in the South Corridor Biological Assessment to avoid and minimize impacts these habitats.

Indirect Impacts. Impacts from changes in storm water discharge and vegetation removal are not expected for Wetland A as it is a low functioning wetland and its wetland functions (see Table 3.6-3) are expected to remain the same after restoration. Indirect impacts were not considered for Wetland A (non-jurisdictional) or the concrete-lined ditches since they would be filled or removed and replaced and or mitigated to better accommodate the stormwater discharge. Indirect impacts to Johnson Creek from fill of the concrete ditches are not expected based on mitigation of the newly constructed swale to meet NOAA Fisheries 6 month, 24 hour water quality storm event criteria.

Cumulative Impacts. Impacts to wetlands and waterways include direct and indirect impacts associated with other projects viewed collectively with wetland impacts in the Project area. The Project would contribute to the filling and/or spanning of wetlands. Increases in sediment and pollutant load levels in wetlands and/or waterways and/or hydrology sources is expected to be reduced from current conditions due to required stormwater management incorporated into the Project design. Increased runoff from impervious areas built adjacent to wetlands and/or waterways are also incorporated into the Project to maintain or improve current water management practices resulting in full mitigation of potential impacts.

Wetland Mitigation

The Project's design will continue to be refined with a goal to avoid or minimize impacts to the natural environment. Local BMPs for water quality and erosion control would be implemented to further minimize impacts during construction and operations. No federal, state, or local jurisdictions would likely require compensation for impacts to wetland or waterway resources in the form of mitigation under the CWA since those to be impacted are non-jurisdictional resources.

An existing concrete lined ditch that convey stormwater from I-205 would be removed and replaced with a new swale that would be sized to treat stormwater, resulting in an additional 0.4 acres of new pervious area over the existing conditions near Johnson Creek. The concrete lined ditch to the south of Johnson Creek would be replaced with a pipe. In addition, the South Corridor Project will replace non-native plants with plants selected from Portland's list of native plants in the riparian area of Johnson Creek between I-205 and SE 92nd Avenue.

3.6.2.2 Vegetation

Impacts to vegetation include direct losses or removal to accommodate Project facilities. This section describes vegetation impacts from the No-Build Alternative and the I-205/Portland Mall Project.

A. No-Build Alternative

No direct or indirect effects to vegetation or loss of vegetation would occur with the No-Build Alternative. The No-Build Alternative has contributed to the cumulative loss of native vegetation from clearing, grubbing, and grading that has already occurred along the right-of-way to accommodate light rail and the construction of I-205.

B. I-205/Portland Mall Project

I-205 Segment

Direct Impacts to vegetation would include permanent removal of vegetation to accommodate Project facilities. Only a few minor impacts would occur due to the Project because most of the vegetation is non-native and has previously been disturbed. No native or critical habitats exist along the alignment. A summary of the vegetation impacts by alternative is provided in Table 3.6-7.

The Project would permanently remove 27.5 acres of vegetation, most of which is grassland planted by ODOT within the existing freeway right-of-way. ODOT staff routinely maintains grass and tree areas within ODOT right-of-way. As noted, much of the Project alignment along I-205 was graded for a transitway when the freeway was constructed that further limits the amount of native vegetation along the alignment. Short-term construction-related effects are expected to occur to the existing vegetation but would be restored where feasible.

Table 3.6-7
Summary of Long-Term Impacts to Vegetation

	Grassland	Scrub-shrub	Upland Forest	Riparian Forest	Riparian Shrub	Total [1]
No-Build	N/A	N/A	N/A	N/A	N/A	N/A
I-205/Mall	25.80	1.68	0	0	0.05	27.5

Source: Metro/URS 2004

Indirect Impacts to vegetation include maintenance of the vegetation structure as ornamental or grass resulting in no structural diversity and the potential spread of noxious weeds.

Cumulative Impacts to vegetation include direct and indirect impacts from this and other projects in the watershed when viewed collectively. The Project would have a minor contribution to the loss of vegetation in the urban areas where conversion of vegetation is planned and expected.

Portland Mall Segment

The design for the light rail alignment along the Portland Mall would result in the removal of approximately 174 trees. These trees are located throughout the downtown area on 5th and 6th Avenues. The Project would plant approximately 184 new trees along the Portland Mall but these trees would be smaller in caliper size that the trees being removed. The Project would create an approximately 770-caliper inch deficit after the plantings are completed. The Project will work with the City of Portland Forester to mitigate for this impact.

Vegetation Mitigation

Hundreds of trees and thousands of shrubs will be planted along the alignment and as part of the landscaping at park-and-ride lots. The Project design staff will consider planting native plants, before considering non-native plantings. As noted above, non-native plants will be removed along the Johnson Creek riparian area and replaced by native plants between I-205 and SE 92nd Avenue.

3.6.2.3 Wildlife

Impacts to wildlife result from permanent alteration of habitat components such as vegetation, forage, and cover to accommodate Project facilities. No direct, indirect, or cumulative impacts to wildlife are anticipated for the Portland Mall Segment for either alternative due to lack of suitable habitat in the city center.

A. No-Build Alternative

Impacts to wildlife and wildlife habitat would be minimal with the No-Build Alternative due to the urbanized nature of the area.

B. I-205/Portland Mall Project

Direct impacts to wildlife would include disturbance and removal of vegetation during construction. Short-term direct wildlife impacts would occur along 60 feet of the riparian bank next to the Project footprint. The proposed Project footprint would have a long-term affect of 64 lineal feet of riparian habitat lost. Lost vegetation in the short-term impact areas would be replaced and wildlife currently using these areas is expected to adapt to the potential changes. Effects are considered short-term.

Indirect impacts of vegetation loss may result in modification of soils, hydrology, or other existing growing conditions affecting quality of forage and cover for wildlife. This effect will be minimal compared to current conditions as a result of the limited scope of ground disturbing activities consistent with the urbanization that exists and is planned for the area.

Cumulative impacts to wildlife habitat include direct and indirect impacts related to other projects when viewed collectively with the I-205/Portland Mall Project area. Other area projects would contribute to the loss of habitat for wildlife to accommodate facilities, residences, or other structures. Based on the current and planned urbanization of the area and expected alteration of these habitats, the contribution is within the expectations established by the urban growth boundary.

Wildlife Mitigation

Any adverse impacts to birds protected by the Migratory Bird Treaty Act (MBTA) nesting in areas cleared or graded during construction would be avoided by scheduling the clearing activity during the non-nesting season. However, no nesting pairs were observed during field surveys.

In order to minimize impacts to wildlife, removal of native vegetation should be avoided. If native vegetation removal is unavoidable, cut trees and large shrubs should be left onsite to provide cover for small mammals, ground-nesting birds and herpeto fauna.

3.6.2.4 Fisheries

The impact assessment for fisheries resources includes the analysis of both short and long-term impacts to the stream and adjacent riparian zone. Determination of impacts includes disturbance or loss of riparian vegetation, increased sedimentation, reduction of spawning and rearing habitat and increased impervious surface runoff into the stream. No impacts from the implementation of the Portland Mall Segment would be anticipated because no fish bearing streams would be affected.

A. No-Build Alternative

The No-Build Alternative would not affect the existing condition of fisheries within the Project area. The potential for greater increases in traffic without light rail available may cause greater amounts of petroleum based non-point pollution, which may runoff into waterways effecting water quality and fish species.

B. I-205/Portland Mall Project

Direct impacts would include a loss of 64 lineal feet of riparian habitat from the Project footprint and 60 lineal feet of temporary impacts related to construction activities. Increase in sedimentation during construction should be minor based on implementation of BMPs, so no reduction of spawning and rearing habitat is expected. Mitigation for increased stormwater runoff would minimize the impact of increased impervious surface (see Section 3.7.2). Table 3.6-8 is a summary by alternative of the permanent and temporary impacts in lineal feet to riparian. Fish use in the Corridor is shown in Table 3.6-4.

Table 3.6-8
Summary of Potential Impacts to Riparian and Fish Habitat[1]

	Lineal Feet of Permanent Impact[2]	Lineal Feet of Temporary Impact[3]	Total	Lineal Feet of Permanent Impact to TES Streams[4]
No-Build Alternative	N/A	N/A	N/A	N/A
I-205/Portland Mall	64.0	60.0	124.0	64.0

Source: Metro and TriMet, August 2002.
Note: TES = Threatened and endangered species.
[1] Impacts are based on the Project, as described in Table 2.2-3.
[2] Permanent impacts would be created by the project.
[3] Temporary impacts are potentially the result of construction related activities, including a 30-foot temporary corridor on either side of the proposed alignment.
[4] TES species (winter steelhead, summer steelhead, Coho salmon, fall Chinook) present at, or immediately downstream of the stream reach in question.

Indirect impacts of hydrologic alteration from increased impervious surface would not occur with implementation of the mitigation measures outlined in the *South Corridor Biological Assessment* (Metro and URS, May 2004). No other indirect effects would occur.

Cumulative impacts of urban development and other projects within the urban expansion boundary may contribute to the cumulative loss of riparian areas and add to the cumulative total of impervious surfaces. The Project's contribution to the cumulative total is considered minor when viewed in the context of the urban growth areas and the minor amount of loss for projects of this intensity.

Fisheries Mitigation

Mitigation measures for the I-205/Portland Mall Project are designed to first avoid and then minimize and compensate for all unavoidable impacts. Impacts to fisheries would be avoided or minimized through the use of conservation measures designed into the Project construction plan, use of TriMet BMPs, adherence to ODFW-recommended in-water work windows, and other appropriate design and siting of facilities (see TES Mitigation below).

3.6.2.5 Threatened, Endangered, and Sensitive Species

Federal consultation, as required by Section 7 of the ESA, was conducted during the FEIS phase of the Project to assess potential impacts on listed fish and their habitats from the Project related improvements. The species addressed included Lower Columbia (ESU) Chinook salmon, and Lower Columbia ESU steelhead trout, both listed as threatened under the ESA, and Lower Columbia/ Southwest Washington ESU Coho salmon, a candidate for listing under ESA.

Threatened, Endangered, and Sensitive Fish

A biological assessment for TES fish species was prepared for the South Corridor Project. In that document, the Federal Transit Administration (FTA) determined that the South Corridor Project is **not likely to adversely affect** Lower Columbia ESU Chinook salmon and Lower Columbia ESU steelhead trout. However, further design refinements may involve changes that have the potential to adversely impact listed species. Based on a worst-case scenario, the FTA concludes that NOAA Fisheries may find that the Project **may affect and would be likely to adversely affect** listed species. On July 21, 2004, NOAA Fisheries issued a Biological Opinion (BO) and found that the I-205/Portland Mall Project **is likely to adversely affect** listed species because the South Corridor Project will be constructed and operated over and beside the Willamette River in Portland Mall Segment and Johnson Creek and its tributaries and Phillips Creek in the I-205 Segment. NOAA Fisheries provided a BO that included terms and conditions to be implemented as conservation measures in the agreement. The BO also included a consultation on effects to EFH and suggested conservation recommendations as required by the Act. The BO is included in Appendix B.

Threatened, Endangered, and Sensitive Wildlife and Plants

A total of ten TES wildlife and plant species were identified within five miles of the proposed Project, but outside of the study corridor (see Figure 3.6-1). These species are bald eagle, peregrine falcon, great blue heron, purple martin, red-legged frog, northwestern pond turtle, painted turtle, white rock larkspur, tall bugbane, and Oregon sullivantia. Because these species occur within an existing urbanized environment and outside the study corridor, no **long- or short-term impacts** to these species or their habitats are expected as a result of the Project. Therefore, no **cumulative impacts** would occur to TES wildlife species or their associated habitats.

3.6.2.6 Threatened, Endangered, and Sensitive Species Mitigation

The BO issued by NOAA Fisheries identifies a series of terms and conditions for the construction and operations of the Project. The I-205/Portland Mall Project will comply with these terms and conditions. A copy of the BO is included in Appendix B, Agency Coordination.

A combination of watershed features and engineering solutions has been incorporated into the Project design as outlined in Section 4, Project Description *South Corridor Biological Assessment* (Metro: May 2004). As described in the Habitat Conservation Division (HCD) n-Line Stormwater guidance, for projects located in subwatersheds with higher levels of development and degraded biological conditions (where forests, wetlands, and riparian zones have already been removed), further degradation can be avoided and some improvement can be provided by using engineered BMPs, and by restoring natural riparian zones, upland forests and wetlands. The I-205/Portland Mall

Project has incorporated both of these approaches by maximizing infiltration, applying engineered BMPs, and improving riparian conditions in the Johnson Creek area.

Conservation measures have been incorporated into the Project design to avoid and minimize impacts to listed fish species and their habitat. These measures address stormwater mitigation, avoidance of in-water work through design, temporary erosion control during construction, containment of construction materials, handling of hazardous materials, avoiding disturbance of riparian vegetation and/or restoration of vegetated areas where impacts are unavoidable. In addition, the new bridge(s) will be constructed to provide two feet of freeboard above the Federal Emergency Management Agency (FEMA) 100-year floodplain elevation, and will have abutment placement, which allows the bridge to span the creek from the top of its banks.

In addition to the conservation measures and minimization and avoidance measures identified above, proposed mitigation for the Project is intended to meet the appropriate regulatory requirements. These include DSL and Corps requirements for potential impacts to wetlands and waters of the State/U.S., the City of Portland BES requirements, and NOAA Fisheries direction under ESA and MSA consultation. The Project design and mitigation are also intended to replace or restore any natural functions (water quality, hydrology, habitat, or otherwise) that would be lost or impaired as a result of the proposed Project. As with the impacts analysis, the proposed mitigation is somewhat conceptual and actual plans could change as a result of the design and permitting process, however the intent to replace lost functions will continue to shape the proposed mitigation elements.

As a part of early planning, the Project has been designed to avoid wetlands and natural areas. Early planning has led to the current design that treats water quality and quantity by employing BMPs. These BMPs include the use of vegetated swales, infiltration, and tree planting to provide cooling shade and increase evapotranspiration at the largest areas of new impervious surface construction (park-and-ride lots) and along the alignment.

Proposed riparian improvements between I-205 and SE 92nd Avenue include planting numerous trees and native plants and removal of invasive species along the riparian habitat in the Johnson Creek vicinity. Plantings would improve habitat functions by increasing shade, habitat complexity, large woody debris recruitment material, and prey availability in the form of invertebrates. The temporary and permanent impacts of the Project to riparian vegetation would be mitigated by following a minimum of a 1:1 native woody plant replacement ratio. This mitigation will help to restore some of the currently impaired functions in the watershed including shading, tree cover, habitat complexity, and large woody material recruitment sources. Emphasis would be placed on planting native conifers on the south side of Johnson Creek to provide eventual shading of the stream.

Mitigation plans also include treating approximately 5.6 acres of currently untreated existing impervious surface. This includes treatment of 1.5 acres of I-205 roadway runoff and 2.0 acres of impervious area at the Clackamas Town Center. Treatment for improved water quality is intended to minimize impacts to already impaired water quality and habitat functions in the affected watersheds. At NOAA Fisheries suggestion, TriMet has committed to work with the City of Portland BES to implement the stormwater manual through negotiations that could include various solutions such as off-site improvements and/or participation in BES “wet weather” programs.

3.7 Water Quality

This section describes the affected environment and evaluates the environmental consequences for water quality, hydrology, and floodplains that would be affected by the I-205/Portland Mall Project and No-Build Alternative.

Mitigation measures are identified that would avoid or minimize any adverse environmental impacts identified in the analysis. Necessary water quality permits and clearances are discussed in the affected environment and listed in Section 3.7.1. Additional water quality and hydrological detail can be found in the *South Corridor Project Water Quality and Hydrology Results Report* (Metro and URS, November 2002) and the *South Corridor Biological Assessment* (Metro and URS, May 2004).

3.7.1 Affected Environment

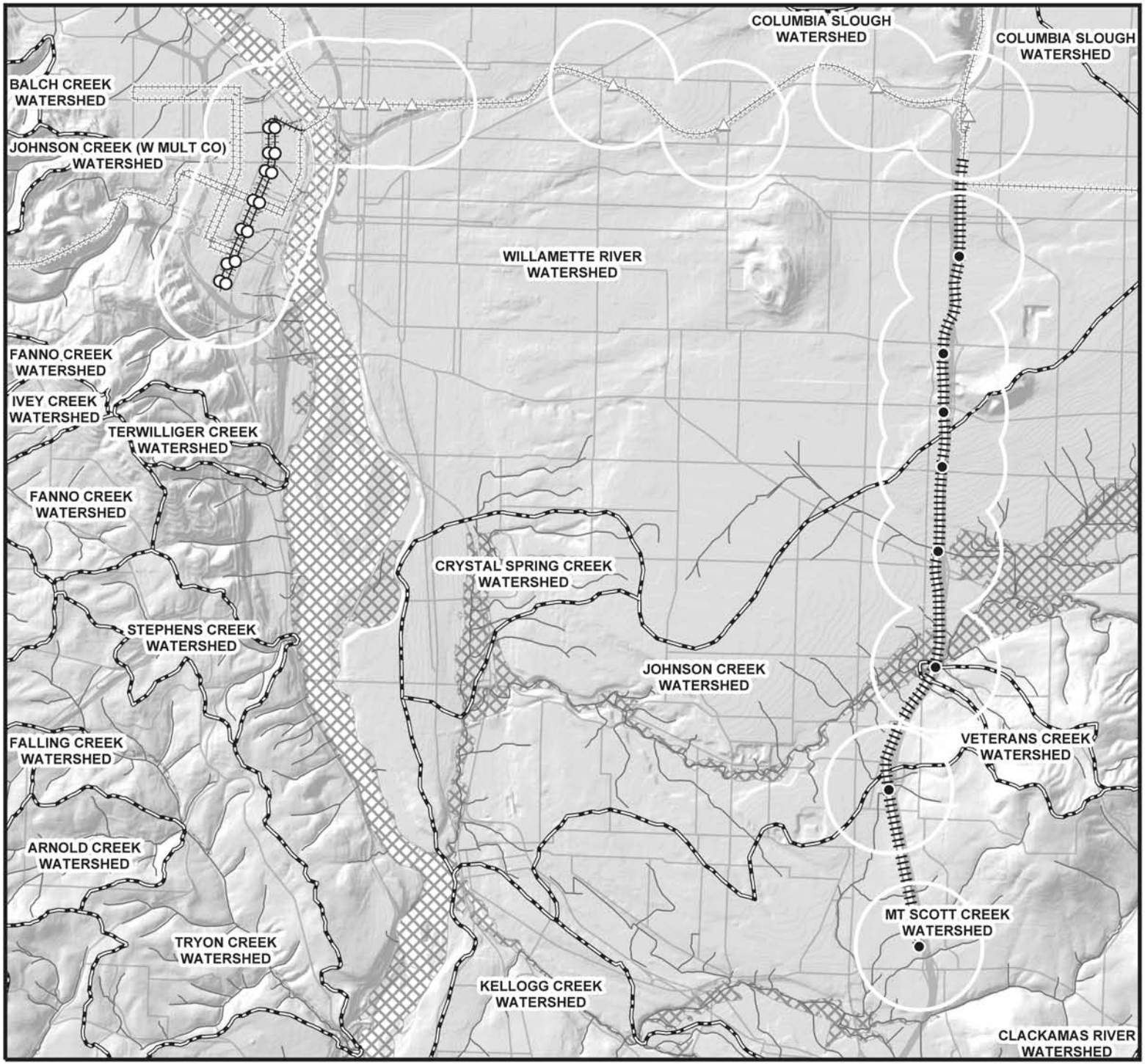
The I-205/Portland Mall Project would cross or intersect major and minor watercourses and floodplains within the lower Columbia and Willamette River watersheds. Rivers and streams that would be affected by the Project include the Willamette River, Johnson Creek, Mt. Scott Creek and Phillips Creek. Tributaries to Kellogg Creek could also be indirectly affected by the Project.

Based on estimates calculated from Metro geographic information system (GIS), more than one-third of the Project area, or 123,176 acres, is currently covered with impervious surfaces such as streets and roofs. In hydrologic analyses for urban areas, it is typically estimated that more than 95 percent of the annual precipitation runs off these impervious surfaces. Much of the remaining pervious land surface has been graded and, while vegetated, produces runoff in excess of rates characteristic of the undisturbed lowland coniferous forests and grasslands that characterized the Project area before Anglo-Europeans arrived. Such alterations of the land have produced alterations in channel hydrology, habitat value, and water quality.

Changes in channel hydrology have resulted in stream channel degradation and reduced instream habitat quality. Clearing of streamside vegetation has led to increases in summer water temperatures beyond those tolerated by native fish. Increases in bacteria in streams are typically attributed to combined sewer overflows, failing septic systems, and the waste from urban wildlife and pets. Construction in floodplains within the Corridor has reduced both the flood storage and conveyance capacity of natural watercourses, resulting in economic losses from flooding, and has provided the justification for local channel and near-stream modifications designed to increase conveyance. Modifications designed to increase conveyance often result in increased flow velocity that can erode and scour stream channels and degrade in-stream habitat.

There are no sole source aquifers located in the Portland area as designated by the Environmental Protection Agency (EPA). Flooding and water quality conditions of the waterways potentially affected by the I-205/Portland Mall Project are described below. Rivers, floodplains and watersheds boundaries in the Project area are shown in Figure 3.7-1 and described below.

The **Willamette River**, which is tidally influenced downstream of Willamette Falls in Oregon City, generally flows north through Portland to its confluence with the Columbia River. The Willamette River has been listed under Section 303(d) of the Clean Water Act (CWA) and is classified as a major source of pollutants to the Lower Columbia River due to its suspended sediment, total phosphorus and bacterial concentrations. Water temperature in the lower Willamette River is higher



South Corridor Project

WATERSHEDS AND FLOODPLAINS

FIGURE 3.7-1

Watersheds

100 Year Floodplain

ALIGNMENTS

Existing Light Rail

Portland Mall Segment

I-205 Segment

STATION LOCATIONS

Portland Mall Segment

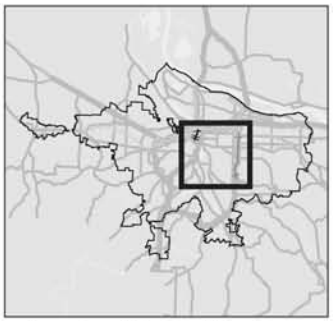
I-205 Segment

Existing Stations

Half-Mile Station Area

SOUTH CORRIDOR STUDY

METRO PEOPLE PLACES • OPEN SPACES



0 0.25 0.5 0.75 1 Miles

July 2004

than regional interim water quality criteria recently proposed by the EPA to protect endangered salmonids. Fish listed under the Endangered Species Act (ESA) have been found in the Willamette River. The National Oceanic Atmospheric Administration Fisheries (NOAA Fisheries) and US Fish and Wildlife Service (USFWS) have determined that the Willamette River and its tributaries, including all of the rivers and streams described below, are critical habitat for fish listed as threatened or endangered.

Pollutant sources in the Willamette River include municipal and industrial wastewater and stormwater discharges. The river is also listed as not meeting water quality standards due to skeletal deformities in fish, elevated mercury concentrations in fish tissue, and arsenic and pentachlorophenol concentrations in the sediment. However, the sources of these pollutants appear to be upstream of the Portland metropolitan area.

Suspended sediment, total phosphorus, and bacteria sources are located both upstream from and within the Portland metropolitan area. Average daily stream flow of the Willamette River at downtown Portland is approximately 32,000 cubic feet per second (cfs), whereas the 100-year flood flow is estimated to be 400,000 cfs. The 100-year flood is expected to be contained within the channel banks in downtown Portland in the Project corridor, with minor overbank flooding possible in industrial areas downstream of downtown Portland. The Willamette River is regulated by reservoirs on tributaries and the upper reaches of the river. These reservoirs are operated by the U.S. Army Corps of Engineers (Corps) to prevent flooding; however, flooding within the corridor can occur as a result of backwater effects on the Columbia River or localized flooding along tributaries.

Johnson Creek flows west from central Multnomah and Clackamas counties before discharging to the Willamette River in Milwaukie. It is listed under Section 303(d) of the CWA for not attaining water quality standards for bacteria and temperature, and for elevated dieldrin and DDT concentrations. The main sources of these pollutants are stormwater runoff and historic horticultural operations upstream of the Project area. Fish listed under the ESA have been found in this water body.

Metro GIS data indicates that impervious surface covers approximately 39 percent of the basin in the Project area. Existing bridge crossings restrict creek flow and localized flooding is common, particularly in the low-gradient reach upstream of SE 82nd Avenue. Portions of Johnson Creek were channelized in the 1930s, reducing the hydraulic connection between the stream and the floodplain. In many areas, the channelized sections have not been maintained and sediment and vegetation have reduced the capacity of the stream to convey floodwaters.

Phillips Creek is a small stream that flows in culverts for much of its length. Runoff from adjacent commercial and industrial areas degrades water quality and recent water quality monitoring by Clackamas County has shown elevated bacteria concentrations. Flood flows are generally confined within the existing channel, although flooding problems have been recorded as a result of undersized culverts. Cutthroat trout have been found in the stream. Phillips Creek is piped in the vicinity of the I-205/Portland Mall Project.

Mt. Scott Creek flows west from the Happy Valley area and joins Kellogg Creek. Mt. Scott Creek has had historical flooding problems. The impervious surface area in this basin is estimated to be 46 percent of the overall basin area. Water quality in Mt. Scott Creek is generally good with only a few recent summertime exceedances of bacteria standards. ESA-listed fish have been found in this water

body. The I-205/Portland Mall Project would not cross Mt. Scott Creek. Mt. Scott Creek is a tributary to Kellogg Creek.

Kellogg Creek flows west from central Clackamas County into Kellogg Lake after merging with Mt. Scott Creek. Kellogg Lake discharges into the Willamette River south of downtown Milwaukie. The impervious surface area in the Kellogg Creek basin is estimated to be slightly less than 40 percent of the overall basin area; therefore, flow and pollutant loading in the stream are typical of stormwater-dominated systems. Elevated concentrations of total dissolved solids have been reported. Future local flooding is predicted along Kellogg Creek, although no existing substantial flooding problems have been recorded. ESA-listed fish have been found in this water body. The I-205/ Portland Mall Project would not cross Kellogg Creek.

3.7.1.1 Consultation, Coordination, and Permitting

The I-205/Portland Mall Project affect on water resources must be judged in light of applicable Federal, state, and local regulations. This section describes the Federal, state, and local regulations and roles.

Water quality is regulated by the CWA. The Department of Environmental Quality (DEQ) implements the CWA in Oregon, reviews the water quality status of streams in the Project area and issues discharge permits that apply to wastewater and stormwater discharges from municipal and industrial sources. As part of their municipal stormwater permits, the cities of Portland and Gresham, and Clackamas County have adopted ordinances that set performance standards or provide specific guidance regarding the use of Best Management Practices (BMPs) to control the quality and quantity of stormwater discharges to surface water bodies. In most cases, both new and redeveloped impervious surface areas must be accounted for when determining whether stormwater BMPs are required. The City of Portland requires that stormwater management for redeveloped impervious surfaces reduce peak stormwater discharge rates from sites to a portion of the predevelopment peak discharge rates for large storms (e.g., prior to alteration by Anglo-American settlers) to mitigate for the effects of past development built without stormwater management. DEQ issues stormwater discharge permits to control the water quality effects of construction. All of the local jurisdictions have some form of drainage ordinance to protect streams from runoff. The cities of Portland and Gresham and Clackamas County also have erosion control ordinances designed to protect instream water quality.

Metro has a regional regulation, Title 3, aimed at preserving the beneficial uses of stream corridors (including both habitat-related and hydrology-related uses) by prohibiting additional development in either the FEMA-designated 100-year floodplain or in areas inundated by the February 1996 flood, except in cases where development is mitigated through balanced cut and fill. The municipal ordinances and the Federal Flood Insurance Program are aimed at preserving the water conveyance and storage functions of floodplains while reducing economic loss to those already situated in floodplains. Executive Order 11988 also provides protection of floodplains by directing that Federal agencies reduce the risk of flooding and flood impact and to preserve the natural beneficial values served by floodplains.

Local ordinances are consistent with Metro's Title 3, Water Quality, Flood Management, and Fish and Wildlife Conservation, provisions to protect the habitat values of watercourses. The City of Portland and Clackamas County's Water Environment Services have adopted sensitive-area setbacks

and buffers to protect riparian areas that provide water quality protection as well as in-stream and near-stream habitat functions. Protecting water quality and habitat is critical to the survival of native salmonids that have been listed as threatened or endangered under the ESA. The Project area is within designated critical habitat for ESUs of a number of listed fish species. Threatened and endangered species issues are addressed in the Section 3.11 and in the *South Corridor Project Ecosystems Results Report* (Metro and URS, November 2002) and *South Corridor Biological Assessment* (Metro and URS, May 2004).

3.7.2 Project Impacts to Water Quality, Hydrologic, and Floodplains

Water quality impacts of the Project were assessed qualitatively, based on the amount of impervious surface, type of vehicle used on the surface, and proximity of proposed facilities to receiving water bodies. Primary areas of concern related to the impacts of vehicle operation and impervious surfaces are temperature, oil and grease, total suspended solids (TSS), metals (including zinc, copper, and lead), and litter. The net increase in impervious surfaces was calculated by totaling newly created impervious areas on existing open space minus newly created pervious area. Floodplain impacts were determined by calculating the amount of fill expected in the 100-year floodplain based on the proposed I-205/Portland Mall Project footprint.

The I-205/Portland Mall Project would increase impervious surface by 16.3 acres and require 411 cubic yards of floodplain fill. The majority of increased impervious surface would be due to new park-and-ride lots. The floodplain fill would be the result of filling a concrete ditch near Johnson Creek. A locally substantial impact to water quality and hydrology detectable at the basin level is would result from additional stormwater discharge into Johnson Creek without consideration of mitigation. Following is a more detailed discussion of No-Build Alternative and Project direct and indirect impacts to water quality, hydrology and floodplains.

3.7.2.1 Portland Mall Segment Impacts

A. No-Build Alternative

The No-Build Alternative would have approximately 3.8 million more vehicle miles traveled in 2025 than forecast with the I-205/Portland Mall Project. This increased vehicle miles would lead to more non-point pollution that would runoff into streams and rivers located in the South Corridor, compared to the Project.

B. I-205/Portland Mall Project

Direct Impacts. The Project would convert approximately three acres of the existing impervious pavement on 5th and 6th avenues in downtown Portland to impervious trackway area. No new impervious surface would result in the Portland Mall Segment. Decreases in water quality or alteration of hydrologic conditions would not be detectable based on the potential for limiting of stormwater runoff and pollutant transport. Direct impacts would be construction related and short-term (see Section 3.7.4 Construction Impacts).

Indirect Impacts. Changes in transportation use patterns with fewer autos and more trains in the Mall area could have a beneficial impact on water quality in the Portland Mall Segment by reducing the amount of pollutant transport to surface water bodies.

Cumulative Impacts. The Portland Mall Segment of the Project would have little or no contribution to the regional impacts of conversion to impervious surface and no noticeable decrease in water quality or alteration of hydrologic conditions based on direct and indirect impact assessment. Changes of vehicle use on the surface could be considered beneficial by limiting rate of stormwater runoff and pollutant transport to water bodies.

Mitigation Portland Mall Segment

The Project would be subject to the City of Portland Bureau of Environmental Services (BES) Stormwater Manual. The manual requires the treatment of stormwater quality and quantity in the downtown Portland area. As recommended by NOAA Fisheries during pre-consultation meetings, the South Corridor Project has committed to work with BES to implement their stormwater manual through negotiations that could include various solutions such as off-site improvements and/or participation in BES "wet weather" programs.

3.7.2.2 I-205 Segment

A. No-Build Alternative

Under the No-Build Alternative, a number of roadways would be expanded or constructed and are included in the Regional Transportation Plan. The No-Build Alternative would result in additional vehicle miles traveled (3.8 million more annually in 2025 than the I-205/Portland Mall Project) that would result in greater levels of non-point pollution.

B. I-205/Portland Mall Project

Direct Impacts. The Project would include LRT tracks, stations, park-and-ride lots, and bridges over both roads and Johnson Creek. Surface park-and-ride lots are proposed at SE Main, SE Powell Boulevard, SE Holgate Boulevard and SE Fuller Road, and a structured park-and-ride lot is proposed at the Clackamas Town Center. The Project would also include a redeveloped transit center at Clackamas Town Center and a bridge over Johnson Creek. There would be 16.3 acres of net impervious area created as a result of the Project improvements (see Table 3.7-1). Project improvements at Johnson Creek (e.g. trackway, station and bridge) would create a locally substantial impact to water quality and hydrology as a result of potential increased runoff rates and the resulting discharge into Johnson Creek without mitigation. Approximately 411 cubic yards of fill would be placed along Johnson Creek for bridge construction to elevate the bridge approaches above the FEMA 100-year floodplain. The Project would displace approximately 0.4 acres of a newly created water quality swale constructed by ODOT. The functions of the displaced water quality swale would be replaced on opposite side of I-205 freeway.

Indirect Impacts. The potential for a reduction in vehicle use on the surface of I-205 could limit the rate of stormwater runoff and pollutant transport to surface water bodies in all areas.

Cumulative Impacts. This segment of the Project would contribute to the regional impacts of conversion to impervious surface, increasing the exiting acreage by 15.8 acres and creating a locally substantial impact to Johnson Creek water quality and hydrology without mitigation. Reduction of vehicle use on the roadways could be considered beneficial by limiting the amount of pollutant transport to water bodies.

Cumulative impacts to water quality, hydrology, and floodplains build over time. In the basins that would be affected by the Project, destabilization of stream channels began with past actions such as logging and has continued with the development of agricultural and urban areas. Because much of the development has already taken place in the urban areas of the basins affected by the I-205/Portland Mall Project, most of the development-related hydrologic changes and pollutant loading, and thus damage to streams, have already occurred.

Table 3.7-1
New Impervious Area by I-205/Portland Mall Project Location

Location	New Impervious area (acres)	New Impervious Area Proposed for Quality Treatment/Quantity as Detention (acres)	New Treatment for Existing Untreated Impervious Area (acres)	Total Area to be Treated
Main Street				
Station	0.2	0.2		100%
Park-and-ride (424-spaces)	2.9	2.9		100%
Division Street Station	0.1	0.1		100%
Powell				
Bridge	0.1	.01	0.2	300%
Station	0.3	0.3		100%
Park-and-ride (400-spaces)	2.8	2.8		100%
Holgate				
Station	0.1	0.1		100%
Park-and-ride (125-spaces)	1.1	1.1		100%
Harold Bridge	0.05	0.05	0.05	200%
Lents Station	0.6	0.6		100%
Foster/Woodstock Bridge	0.2	0.2	0.4	300%
Springwater Bridge	0.05	0.05	0.02	140%
Johnson Creek				
Swale	-0.4		1.5	
Bridge	0.07	0.07		100%
Station	0.1	0.1		100%
92nd Avenue Bridge	0.2	0.2	0.2	200%
Johnson Creek Bridge	0.8	0.8	0.2	125%
Fuller				
Station	0.1	0.1		100%
Park-and-ride (628-spaces)	4.4	4.4		100%
Clackamas Regional Center				
Station	0.7	0.7		100%
Park-and-ride (500-spaces)	0		2	
Paths/driveways/out buildings	0.4	0.4		100%
Ruby Junction O & M facility	1.4	1.4		100%
Total	**16.3**	**16.6**	**4.6**	**130%**

Source: Metro/TriMet 2004.
Note: O & M = Operating and Maintenance

Mitigation I-205 Segment

The I-205/Portland Mall Project has been designed to incorporate pre-consultation stormwater treatment advice from both NOAA Fisheries and BES. The stormwater treatment strategies are included in trackway treatment, park-and-ride design, structures, and approach to the crossing of Johnson Creek area. The overall approach to stormwater is to treat and infiltrate wherever possible (See Table 3.7-2).

The **trackway design** for the I-205 segment is proposed as tie-and-ballast that will allow stormwater to infiltrate into the ground. Where tie-and-ballast is not appropriate, for example on bridges, stormwater will be collected, treated and infiltrated. If soils or other local conditions do not allow infiltration, the stormwater will be detained in accordance to NOAA Fisheries guidance.

Table 3.7-2
Stormwater Mitigation Approach

Location	Summary Of Conceptual Stormwater Management
Trackway	Concrete tie-and-rock ballast trackway allows infiltration and assumed to be pervious per determination for Interstate MAX. No treatment or detention required.
Paths/driveways/ outbuildings	Roof runoff would be shed and infiltrated in soakage trenches. Pervious paving will be considered for access drives.
Main Street Station and Park-and Ride (P&R) (426-spaces)	Stormwater from the station and from the 426-space surface lot would be treated in a swale and would be infiltrated in a drywell system. (For the purpose of this summary, drywell systems include, paving design to maximize sheetflow and minimize hardscape, collection in catch basins and piped conveyance only as necessary, cleanouts and manholes as required, an isolation valve at the infiltration point to prevent spills entering drywells, and implementation of maintenance BMPs). New trees and shrubs will be planted in vegetated swales and throughout facility to provide cooling shade.
Division Street Station	Stormwater will sheetflow from shelter onto sand-set pavers platform and adjacent pervious area. No connection to storm system needed as infiltration is expected.
Powell Bridge	Stormwater would be collected, treated in a swale, and infiltrated in a drywell or soakage trench system.
Powell Station and P&R (391-spaces	Stormwater from the 391-space surface lot, including the new access drive, would be treated in swales, and/or proprietary devices, then infiltrated in a drywell system or systems.
Holgate Station and P&R (125-spaces)	Stormwater for this access roadway, LRT station, and 125-space surface lot would be directed to a swale and infiltrated in a drywell system.
Harold Bridge	Stormwater would be collected, treated in a swale, and infiltrated in a drywell or soakage trench system.
Lents Station	Stormwater for this LRT station would be directed to a swale and infiltrated in a drywell system.
Foster/Woodstock Bridge	Stormwater would be collected, treated in a swale, and infiltrated in a drywell or soakage trench system.
Springwater Bridge	Stormwater would be collected, treated in a swale, and infiltrated in a drywell or soakage trench system.
Johnson Creek	
Concrete swale north of Johnson Creek	Stormwater currently conveyed in a concrete-lined ditch to an existing outfall on Johnson Creek would be placed into new pipe and conveyed to a replacement outfall. The existing outfall would be decommissioned. A portion (approximately 1.5 acres) of ODOT's I-205 freeway stormwater would be treated and conveyed to a long new swale created between the trackway and bike path, and conveyed to an existing outfall on Johnson Creek. Swale will include trees to provide cooling shade.
Concrete swale south of Johnson Creek	Stormwater currently conveyed in the concrete-lined ditch to an existing outfall on Johnson Creek would be placed into new pipe and conveyed to the existing or a replacement outfall. The existing outfall would be decommissioned if not used.
Johnson Creek Bridge	Stormwater would be collected, treated, and conveyed into the existing outfall. Approaches using bioswale systems for treatment and maximizing infiltration of treated water prior to the outfall are being considered.
Flavel Street Station	Stormwater would sheetflow from new pervious surfaces and infiltrate in a soakage trench, or be treated with a proprietary device and disposed to city storm system.
92nd Ave Bridge	Stormwater would be collected, treated in a swale or mechanical device, and infiltrated (depending on space) or conveyed downstream to Johnson Creek via existing pipe (see Flavel Street Station).
Fuller Station and P&R (624-spaces)	Stormwater from the station and from the 624-space surface lot would be treated in a swale and oil/water separator series and then infiltrated in a drywell system.
Clackamas Station and P&R (500-spaces)	Stormwater from the station will be conveyed to a drywell system and infiltrated. Stormwater from the 500-space parking structure would be treated with stormwater planters and then infiltrated in a drywell system (depending on acceptable soils, otherwise to an existing pipe).

Source: Metro/TriMet/URS 2004

Stormwater from **park-and-ride lots** will be directed to vegetated water quality swales or in a treatment circuit with proprietary devices as a treatment facility at most locations. If the site constraints limit the use of swales, water quality manholes will be used. At the Clackamas Town Center park-and-ride lot, stormwater will be collected from the roof, treated in stormwater planters

and/or in combination with proprietary devices and infiltrated in a drywell system. The Project will treat stormwater that results from the hydrological event as defined by NOAA Fisheries (6-month – 24 hour storm event). In addition, numerous trees and shrubs will be planted within and around each park-and-ride lot to provide cooling shade and increase evapotranspiration.

Stormwater from **bridges** will be collected, treated, and infiltrated. Stormwater treatment would be accomplished in a water quality swale or a mechanical device such as a water quality manhole. The design of the Johnson Creek Bridge will avoid impacts by using a pre-cast bridge without piers in Johnson Creek that will not require or limit in-water construction work.

Stormwater from **stations and associated small building** will sheet flow to the ground and be infiltrated. Stormwater from system buildings will directed to stormwater planters and to adjacent grassy areas for infiltration. No connections to the stormwater system are anticipated at stations.

North and south of Johnson Creek, **concrete lined ditches** that convey stormwater from I-205 to Johnson Creek will be relocated. The northern ditch will be relocated and converted to a water quality swale and will result in the treatment of 1.5 acres of the I-205 freeway over the No-Build Alternative. The relocation of this ditch would result in 411 cubic yards of floodplain fill, which will be mitigated by the creation of the relocated water quality swale. On the south side, the concrete ditch will be converted to a piped system.

As a part of recent expansion of I-205 freeway, ODOT constructed a stormwater quality treatment facility along the west side of the freeway ("ODOT Swale"). The Project would displace this facility (0.4 acre) and proposes to replace its function. A location on the east side of the northbound I-205 freeway lanes just south of SE Otty Road has preliminarily been identified for a potential in-kind replacement of this facility. Stormwater would sheet flow from the freeway lanes, be treated through a new vegetated swale, detained and then conveyed to Phillips Creek through an existing stormwater conveyance pipe.

With mitigation, no long-term water quality, hydrologic, or floodplain substantial impacts occur. Few mitigated impacts would be detectable at the local scale and no mitigated impacts would be detectable at the basin scale.

3.7.2.3 Operations and Maintenance Facility

A. No-Build Alternative

No new facilities would be built. No direct, indirect, or cumulative affects from the Operating and Maintenance Facility with implementation of the No-Build Alternative are expected.

B. I-205/Portland Mall Project

In addition to the trackway, bridges, light rail stations, and park-and-ride lots, TriMet would require a number of small system buildings to provide electric traction power to the light rail system and to provide signal and communications for the system. Stormwater would run off the roofs of these buildings and be infiltrated in soakage trenches. Driveways to access these building would be constructed using pervious paving materials.

TriMet will also need to expand operating and maintenance facilities located at Ruby Junction near 200th Avenue on the Eastside Light Rail line and Elmonica near SW 170th Avenue on the Westside Light Rail Line. These improvements would include the addition of tie-and-ballast trackway and some minor additions to existing buildings. A total of 1.4 acres of new impervious area would be created. Stormwater from the parking lot and roofs of this facility would be collected and infiltrated.

3.7.3 Construction Impacts

A. I-205/Portland Mall Project

Direct Impacts. Short-term impacts would be associated with construction of the Project improvements. Short-term impacts on water quality and hydrology related to the construction of the proposed alternatives include erosion, sedimentation in receiving waters, increased turbidity or increased TSS in streams, and increased stormwater discharge to streams. Erosion impacts from any site are generally proportional to the actual area of unprotected soil at any given time. The erosion potential can be estimated by knowing the slope, length of slope, and erodability or type of soils on the slope. Construction on or near stream banks is the most problematic because of the bank steepness and proximity to the receiving waters.
Short-term impacts are more likely to occur near stream crossings where construction would be in proximity to the receiving water, and in areas of more extensive construction such as at park-and-ride lots, stations and transit centers. Construction vehicles near streams could also be a potential source of fuel/chemical spills.

Without mitigation, short-term impacts would be expected at Johnson Creek because of construction activities, including a new bridge over Johnson Creek.

Indirect Impacts. No indirect short-term impacts are expected.

Cumulative Impacts. Required mitigation measures to reduce the impacts of all future new development as required by local, state, and federal regulations would also be applied, further reducing the cumulative impacts associated with the I-205/Portland Mall Project.

Mitigation of Construction Impacts

Local regulations control construction BMPs in a manner that reduces and tries to eliminate runoff. Some of these required control measures include the use of straw, plastic, or other coverings of exposed ground, protecting large trees and other components of vegetation buffers, restricting vegetation clearing activities and site grading to dry weather periods, and installing geomembranes to prevent soil from eroding. Other practices include sediment detention basins, barrier berms and silt fencing. Regulations also prevent in-stream work while migrating fish are present.

BMP were provided by NOAA Fisheries staff and identified as conditions for general construction (NOAA Fisheries, February 11, 2004). They are based on the programmatic consultation biological opinion for the Corps Standard Local Operating Procedures for Endangered Species II (SLOPES II). These BMP will be a condition for construction around Johnson Creek, thereby lowering the risk for construction related impacts. In addition, the Project will be subject to the City of Portland BES Erosion Control Manual.

3.8 Geology, Soils, and Seismic Impacts

The following section describes the geologic character, soils, geologic hazards, and soil and rock resources in the potentially affected area of the South Corridor. This section also summarizes effects of the South Corridor I-205/Portland Mall Light Rail Project on the geology, soils and seismic environment within the study area. For additional information refer to the *South Corridor Project Geology, Soils and Seismic Impacts Results Report* (Metro: December 2002).

3.8.1 Affected Environment

Physiography. The South Corridor lies within the Portland Basin, the northernmost portion of the Willamette Valley. The Portland Basin is bounded on the west by the Portland Hills and on the east by the western Cascades. The topography of the basin is characterized by terraces and channels created by Pleistocene flooding and modified by Holocene river and stream activity. Small streams and lakes commonly occupy the Pleistocene flood channels. Small volcanic buttes are common throughout the Portland Basin. The Willamette River flows northward through the basin to its confluence with the Columbia River. The Project area includes some smaller tributaries including Johnson Creek and Kellogg Creek.

Geology. The South Corridor Project area is underlain by rocks from Eocene to Pleistocene age and unconsolidated quaternary age sediments. The rock units include basalt of the Eocene Basalt of Waverly Heights, several members of the Miocene Columbia River Basalt Group, conglomerate and associated deposits of the Plio-Pleistocene age Troutdale Formation, and basalt and associated pyroclastic deposits of the Plio-Pleistocene Boring Lava. Unconsolidated units include gravels, sands, and finer sediments related to Pleistocene catastrophic flooding and recent alluvium deposited along the rivers and streams.

Soils. The soils within the South Corridor Project area have developed on flood and alluvial deposits and weathered basalt, with smaller areas derived from volcanic rocks. In many areas these soils are classified as urban land, where original soils have been extensively modified by cuts, fills, and grading associated with development. Where undisturbed, soils in the Project area consist of sandy to clayey loam and are well to poorly drained. Shallow groundwater may be encountered within several sections of the corridor. Because of the soil types and gentle topography, the soil erosion hazards are generally slight with some areas of moderate hazard.

Soil types are influenced by the underlying geology. Soils that develop on the fine-grained flood deposits and Quaternary channel deposits are typically silt loams. Coarse-grained flood deposits are overlain by sandy loams. Soil types that have developed over alluvial deposits are fill areas are variable and include silt to clay loams thought sandy and gravelly loams.

The *Farmland Protection Policy Act* (FPPA) is intended to minimize the impact Federal programs have on the unnecessary and irreversible conversion of farmland to nonagricultural uses. It assures that—to the extent possible—Federal programs are administered to be compatible with state, local units of government, and private programs and policies to protect farmland. Because all of the South Corridor Project area is within the Portland Metropolitan area Urban Growth Boundary (UGB), and the lands inside the UGB are designated for urban development, the Project would be consistent with, and supportive of, the FPPA.

Earthquake Hazards. The Pacific Northwest has four types of seismic sources related to the presence of the Cascadia subduction zone. These sources include (1) the subduction zone megathrust, which represents the boundary (interface) between the downgoing Juan de Fuca plate and the overriding North American plate; (2) faults located within the Juan de Fuca plate (referred to as the intraplate or intraslab region); (3) crustal faults principally in the North American plate; and (4) volcanic sources beneath the Cascade Range. Figure 3.8-1 illustrates the relative earthquake hazards in the South Corridor Project area. There are some crustal Quaternary faults in the vicinity of the South Corridor Project area that may be active. The Portland Hills Fault and East Bank Fault are two Quaternary faults in the area. The presence of the Cascadia subduction zone and potentially active Quaternary faults within the Project area result in potential seismic hazards.

Landslides. The potential for major landslides within the South Corridor is limited. The topography within the Project area is relatively gentle and the geologic conditions are generally favorable.

Volcanic Activity. Volcanic hazards are limited in the South Corridor Project area. The primary volcanic hazards include ashfall or flooding associated with eruptions from nearby Cascade volcanoes such as Mt. Hood and Mt. Saint Helens.

Soil and Rock Resources. Economic minerals were not identified within the South Corridor Project area. Ross Island Sand and Gravel (located on Ross Island) and Willamette Sand and Gravel (on the Clackamas River) are the nearest quarry sites.

3.8.2 Geology, Soils, and Seismic Impacts

This section addresses the direct, indirect and cumulative effects of the proposed Project on the identified resources. Direct effects are impacts that would be caused by the Project improvements at the time of Project implementation; indirect effects are impacts from the Project but are later in time or farther removed in distance; and, cumulative impacts are caused by the incremental impact of the Project along with other past, present and future actions.

The I-205/Portland Mall Project would generally cross over land that is already urbanized. Almost all the land in the Project area has been previously altered or developed to some extent. Impacts to the geologic environment would consist of relatively minor changes in topography and drainage patterns, minor settlement of near surface materials, potential increased erosion, and potential changes in slope stability. These types of impacts would occur as a result of excavation, placement of structures and fills, and clearing and grading. More site-specific geotechnical investigations would be performed during preliminary engineering and final design for the specific Project elements such as structures and park-and-ride lots. The current investigations have identified problem areas, and future engineering and designs can be developed to mitigate adverse effects.

A. No-Build Alternative

The majority of transit and other transportation improvements associated with the No-Build Alternative would have no impact on the geologic and soils environment because they would involve modifications to the existing transportation system in an already urbanized area.

South Corridor Project

Relative Earthquake Hazard

FIGURE 3.8-1

- A — Highest tendency to experience damage
- B
- C
- D — Lowest Tendency
- LPA: I-205 Light Rail Stations
- LPA: I-205 Light Rail Alignment
- LPA: Downtown Light Rail Stations
- LPA: Downtown Light Rail Alignment
- Existing Light Rail

0 0.4 0.8 1.2 Miles

B. I-205/Portland Mall Project

In the Portland Mall Segment the impacts from the LRT construction on 5th and 6th avenues would be very minimal. The Portland Mall segment is in the highly urbanized Portland Central City. Other than pavement removal and utility relocation, little earthwork would be required. The main exception would be the new ramp from the Steel Bridge to the vicinity of Union Station. The structure and approach fills may be located on existing fill. The composition of this material is variable, from well-constructed fill to randomly placed material, possibly containing concrete and brick rubble, sawdust, mill ends and other waste. It could also contain fine-grained flood deposits and recent alluvium. The surface of these areas has been extensively modified by past construction. The subsurface material in the area adjacent to the west end of the Steel Bridge is the Troutdale Formation.

In the I-205 Segment the impacts from the LRT construction would be more significant because it would involve more earthwork. Impacts related to construction would be limited to stability of partially constructed slopes, temporary changes to drainage, and erosion and resultant sedimentation.

The proposed light rail transit improvements within the I-205 Segment would have moderate impacts on the geology and soils. The improvements primarily involve the development of railways, stations and park-and-ride lots along the existing I-205 freeway. There would be several overpasses associated with construction of the improvements, including over SE Powell Boulevard, SE Harold Street, SE Foster Road, SE Woodstock Boulevard, SE Crystal Springs Boulevard, and SE Johnson Creek Boulevard. Although soils in this segment are not particularly susceptible to settlement, site-specific geotechnical investigations would be completed prior to further design of these overpasses. Most of the I-205 LRT improvements would not be within mapped high seismic hazard areas. The two exceptions are an area of moderate to high ground motion amplification hazard south of the SE Main Street Station and an area north of the Flavel Street Station. The south end of the alignment is mapped as being within a high liquefaction and ground motion amplification hazard area. The surface trace of the East Bank Fault has been inferred to cross the alignment just north of the Flavel Street Station. Although the potential for surface rupture along this fault is not well understood, the potential for surface rupture and strong ground shaking motions has been examined during preliminary engineering of this station and the associated overpass. During Final Design, the Project design would be further developed to address this issue.

Shallow groundwater underlies the proposed improvements south of the Johnson Creek Station. Shallow bedrock capped with clayey soils is present beneath the majority of the I-205 Segment. Much of the alignment south of the Johnson Creek Station would traverse moderately steep slopes (up to 15% grade). Proper drainage systems have been evaluated during preliminary engineering to prevent buildup of pore-water pressures, which could destabilize the slopes. Parking structures would require a site-specific seismic hazard analysis during Final Design. Shallow ground water may be encountered in portions of the alignment along SE Monterey Avenue. This condition should be given appropriate consideration during further advanced design.

The Ruby Junction LRT Maintenance Facility expansion at SE 199th Avenue would have minimal impact on geology and soils because the extent of earthwork would be limited and existing topography is fairly flat. The expansion would result in minimal impact to the geology and soils on the site, and to the surrounding land.

3.8.2.3 Cumulative Impacts

Cumulative impacts of the Project and other actions in the vicinity of the Project would be minimal and generally limited to slope stability and soil erosion. Proximal construction projects would be considered while mitigating soil erosion hazards during construction of the Project. Proper design and construction of slopes would minimize the potential for slope instability. Adjacent structures and known proposed development would be accounted for during final design and construction.

3.8.3 Mitigation

A thorough geotechnical investigation of the Project area during Final Design would provide the necessary information to anticipate and remediate less than ideal foundation conditions. Cuts and fills would be designed for necessary stability.

Erosion can be controlled by designing slopes to minimize the effect of surface runoff. Collection and routing of surface water away from cut and fill slopes would limit erosion damage. Exposed soil could be seeded to control erosion and prevent sediment laden runoff from reaching streams. Stream banks at bridges could be reinforced to prevent erosion.

Existing unstable slopes could be avoided. In areas where unstable slopes may exist or have been identified during the preliminary engineering geotechnical investigation, the slopes could be re-graded or mechanically stabilized and properly drained to minimize slope failure potential. The southern portion of the I-205 Segment is one area that requires further investigation. Areas where new slopes or cuts are planned would also be investigated for stability and would be properly graded or mechanically stabilized. Where shallow groundwater is encountered, drains would be installed to increase slope stability as necessary. Soft foundation conditions, delineated by the exploration program, could be mitigated with proper design.

Portions of the Project area are underlain by fine-grained soils that would be susceptible to settlement. Mitigation would depend on several issues, including extent of the compressible soils, the presence of groundwater and the depth to a load-bearing soil or bedrock. Where the unstable soils are limited in extent, they can be over excavated and replaced with engineered fill, matt foundations, deep foundations, piles, or other forms of mechanical foundation support. In areas where excavation would not be practical, surcharging could accelerate settlement and installing wick drains or the structures could be mechanically supported.

Seismic hazards within the Project area include liquefaction, amplification of ground motions and earth rupture. All three could lead to structural damage due to settlement, shaking or earth displacement. Generalization of mitigation alternatives is difficult until site-specific information is gathered regarding subsurface conditions. Liquefaction can be mitigated by stabilizing the soils or supporting the structures on non-liquefiable soil or bedrock. Ground motion amplification can be reduced through foundation design and proper structural design. Damage to at-grade track would probably be limited. Damage to bridges and other structures could be more significant. A thorough geotechnical investigation would delineate those areas where seismically unstable materials are present and designs would be developed to limit earthquake damage as much as possible.

3.9 Energy

This section summarizes the energy consumption impacts from the construction and operation of the South Corridor LPA. Both indirect and direct energy consumption is measured in British thermal units (Btu). One Btu is the quantity of energy necessary to raise one pound of water one degree Fahrenheit at one atmosphere of pressure. For more detailed information, see the *South Corridor Project Energy Impacts Results Report* (Metro and DEA, December 2002).

3.9.1 Affected Energy Environment

3.9.1.1 Existing Energy Consumption Overview

This section generally addresses types, sources, and utilization rates for various energy sources in the Pacific Northwest, including the State of Oregon. The discussion of energy use focuses primarily on fossil fuel and electrical use, and the demand for these resources. Existing (Year 2000) energy consumption by various transportation types (automobiles, trucks, buses, and motorcycles) for the Portland metropolitan area is also characterized. The transportation facility types also include the MAX light rail system and related facilities such as park-and-ride lots and maintenance facilities.

Recent energy price increases and general apprehensions about energy shortages have occurred at the national level, including in the Pacific Northwest. Energy purchases make up a large proportion of the Oregon economy, and energy prices have generally mirrored those of the rest of the nation; however in the case of electricity, prices have far exceeded national average increases. Energy use by source in Oregon in 1999 (Oregon Office of Energy, 2003) follows:

- Petroleum – 49 percent
- Electricity – 20 percent
- Natural Gas – 19 percent
- Other (wood, wind, solar, biomass) – 12 percent

Approximately half of the energy demand in Oregon is for transportation, with petroleum accounting for nearly 90 percent of that demand.

3.9.1.2 Existing Transportation Energy Consumption in the Portland Metropolitan Area

Base year (2000) transportation energy consumption in the Portland metropolitan area is summarized in this section, and includes energy used for motor vehicles (including automobiles, light, medium and heavy trucks, buses and motorcycles), the TriMet light rail system, transit vehicle maintenance, the operation of bus and LRT maintenance facilities, and park-and-ride lots. Table 3.9-1 summarizes the daily energy consumption for these activities. Year 2000 total daily transportation energy consumption in the Portland metropolitan area is estimated at 264.298×10^9 Btu.

3.9.2 Energy Impacts

The following sections focus on:

- Energy that would be consumed during operation of the I-205/Portland Mall Project (direct impacts),

- Energy that would be consumed during construction of the Project (indirect impacts),
- Projected long-term energy savings for the transportation system with the operation of the I-205/Portland Mall Project.

Table 3.9-1
Transportation Operations Energy Consumption in 2000 – Portland Metropolitan Area

Vehicle Type	Percent of VMT [1]	Daily VMT [1]	Average Fuel Consumption (MPG) [2]	Daily Fuel Consumption (Gallons)	Daily Energy Consumption (Billions of Btu's*)
LD Gas Automobiles	42.03	12,005,450	22.4	535,958	66.995
LD Gas Trucks	32.77	9,360,425	18.8	497,895	62.237
MD Gas Trucks	12.43	3,550,500	13.5	263,000	32.875
HD Gas Trucks	3.86	1,102,570	5.7	193,433	24.179
LD Diesel Automobiles	0.14	39,990	26.7	1,498	0.208
LD Diesel Trucks	0.21	59,985	23.4	2,563	0.356
HD Diesel Vehicles	8.14	2,325,110	5.8	400,881	55.602
Motorcycles	0.42	119,970	50.0	2,399	0.300
Subtotal	100	28,564,000		1,897,628	242.752
MAX LRT System [3]		15,650			0.438
Vehicle Maintenance [4]					
LDV 505 Btu's/Mile					10.840
MDV 1,186 Btu's/Mile					4.211
HDV 1,714 Btu's/Mile					5.875
LRT Maint. Facility Operation [5]					0.028
Bus Maint. Facility Operation [5]					0.147
Park-and-Ride Operation [5]					0.007
Total					264.298

Notes: * Btu = British Thermal Unit, Btu/gallon of gasoline = 125,000 (gross), Btu/gallon of diesel = 138,700 (gross)
HD =Heavy Duty, HDV =Heavy Duty Vehicle, LD = Light Duty, LDV = Light Duty Vehicle, MD = Medium Duty,
[1] Metro, 2004
[2] CalTrans, 1997
[3] Calculated as (8.2 kwh/car mile) x (15,650 car miles) x (3,412Btu/kWh)
[4] CalTrans, 1983
[5] TriMet, 2004

3.9.2.1 Direct Energy Impacts

Direct energy impacts would consist of energy consumed for operation of the vehicle transportation system including light rail, buses and vehicles traveling the roadways. In addition to the vehicle operations the energy consumed by light rail and buses also includes maintenance, repair and operation of the light rail system, and the operations and maintenance facilities and park-and-ride lots used for light rail and buses. Table 3.9-2 is a summary of the predicted daily operational energy use for the No-Build Alternative and Project in the year 2025.

Table 3.9-2
Summary of Daily Transportation Operations Energy Consumption in 2025 (Billion Btu[1])

Energy Use	No-Build	I-205/Mall
Motor Vehicles	301.071	300.016
LRT System	0.488	0.606
Vehicle Maintenance	27.194	27.098
LRT Maintenance Facilities	0.034	0.038
Bus Maintenance Facilities	0.199	0.199
Park-and-Rides	0.008	0.010
Total	**328.993**	**327.967**

Sources: Metro 2004, Tri-Met 2004
[1] Btu = British Thermal Unit. One gallon of gasoline = 125,000 Btu.

The No-Build Alternative would consume more energy, with use peaking at 328.993 x 10^9 Btu/day. The I-205/Portland Mall Project would consume less energy, at 327.967 x 10^9 Btu/day. The difference in energy consumption between these alternatives is 1.026 x10^9 Btu, the equivalent of 8,208 gallons of gasoline per day.

3.9.2.2 Indirect Energy Impacts

Indirect impacts to energy consumption that would occur from construction of the Project are shown in Table 3.9-3. The Project would consume approximately 2,944.80 x 10^9 Btu for construction.

Table 3.9-3
Summary of Construction Energy Consumption
(Billion Btu[1])

Construction Component	No-Build	I-205/Mall
Total Construction Energy Demand	0	2,944.80

Source: Metro 2004; Tri-Met 2004
1 Btu = British Thermal Unit. One gallon of gasoline = 125,000 Btu.

3.9.2.3 Summary of Energy Impacts

Table 3.9-4 summarizes the combined annual energy use for operation and construction (indirect and direct impacts) of the study alternatives.

Table 3.9-4
Summary of Annual[1] Energy Consumption (Billion Btu[2])

Alternative	Motor Vehicle[3] Annual Energy Use	Bus Annual Energy Use	LRT Annual Energy Use	Total Annual Operations Energy	Annual Operational Energy Savings[4]	Total Construction Energy
No-Build	110,756.81	920.73	177.41	111,854.96	0	0
I-205/Mall Project	110,371.62	915.00	218.87	111,505.49	349.47	2,944.80

Sources: Metro, 2004; TriMet, 2004
[1]Assumes an annualization factor of 340 days per year.
[2]Btu = British Thermal Unit. One gallon of gasoline = 125,000 Btu.
[3] Not including buses
[4] As compared to No-Build Alternative

3.9.2.4 Cumulative Impacts

The Project is not expected to have a significant cumulative effect on energy supply or consumption at a regional level. Construction and operation of the Project is not expected to affect local or regional fuel availability, or require the development of new energy sources. Compared to the No-Build Alternative, operation of the Project would cumulatively add to the availability of energy by reducing overall VMT and associated energy consumption in the Portland metropolitan area.

3.9.3 Energy Mitigation

One of the goals for the South Corridor Project is to reduce demand for energy. Operation of the Project would reduce energy consumption for the total transportation system as compared to the No-Build Alternative. Therefore, no mitigation measures are necessary.

3.10 Hazardous Materials

This section identifies the Hazardous Materials sites located in the vicinity of the proposed Project improvements and evaluates the effect of the identified sites on the proposed Project.

Many common industrial and commercial activities use hazardous materials and generate hazardous wastes. They can be products containing hazardous materials that are damaged during shipment, discontinued supplies, products with an expired shelf life, discarded paints, spent solvents, waste degreasers, cleaning compounds, or by-products of chemical processes. For example, a typical commercial automobile maintenance business generates waste oil, heavy metals, battery acids, solvents, and petroleum fuels (e.g., gasoline and diesel fuel). Residential activities may also generate hazardous waste, such as paints containing lead, asbestos insulation, and heating oil tanks. The improper use, storage, or disposal of hazardous wastes can adversely impact the environment.

Hazardous materials can present potential environmental health impacts, particularly from construction activity within or near hazardous materials sites, that may affect both the natural environment and human environment arising from contaminant exposure during construction activity. Examples of potential impacts may include increased cancer risks from exposure to toxic materials, destruction of material or habitat from explosion or ignition of hazardous materials, or illness from contact with toxic or corrosive materials.

3.10.1 Federal and State Environmental Databases

The definition of hazardous waste can be found in *40 Code of Federal Regulation (CFR) 261.3*. By definition, wastes are hazardous if: 1) they are listed (specifically named); or 2) they exhibit any of four hazardous waste characteristics (ignitability, corrosivity, reactivity, and toxicity). Federal and state environmental databases were researched for site specific environmental assessment to identify potential effects on the South Corridor Project. These databases are discussed below.

3.10.1.1 Environmental Protection Agency (EPA) Databases

The EPA compiles several lists and databases regarding hazardous materials. These include: 1) properties or facilities that EPA has investigated, or is currently investigating, for a release or threatened release of hazardous substance; 2) identification and tracking of hazardous waste from point of generation to point of disposal; and 3) facility identification, addresses, and parent company. The EPA lists include the following:

- **Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS).** CERCLIS is the official repository for site-specific and non-site specific data to support the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). It contains information on hazardous waste site assessment/remediation from 1983 to the present. CERCLIS information is compiled by EPA and used to report official Superfund sites. It helps EPA Regional managers evaluate cleanup actions and track Superfund site plan activities and budgets.

- **Resource Conservation and Recovery Information System (RCRIS).** Small and large quantity generators, transporters, treaters, storers, and disposers of hazardous waste are required to provide information concerning their activities to state environmental agencies. These agencies in turn provide the information to regional and national EPA offices in accordance with the Resource Conservation and Recovery Act (RCRA). The system is primarily used to track

handler permit or closure status, compliance with federal/state regulations, and waste handler inventories. It also tracks corrective action, regulation enforcement, and facility management and environmental program progress assessment. Small Quantity Generators (SQG) are facilities that generate less than 2,200 pounds of hazardous waste per month. Large Quantity Generators (LQG) are facilities that generate more than 2,200 pounds of hazardous waste per month.

3.10.1.2 Oregon Department of Environmental Quality (DEQ) Database

DEQ publishes the following environmental listings with information on site names, addresses, environmental site cleanups, and cleanups that have received DEQ approval for no further action.

- **Environmental Cleanup Site Information (ECSI).** The ECSI list contains sites that are, or may be, contaminated and may require cleanup. DEQ adds these sites to the Confirmed Release List (CRL) and the Confirmed Release List Inventory (CRLI) when it determines they meet the respective criteria for listing.

- **Leaking Underground Storage Tank (LUST).** The LUST list is a compilation of site names and addresses for sites that contain reported leaking underground storage tanks.

- **Underground Storage Tank (UST).** The UST list is a compilation of site names, addresses, and tank information on USTs registered with DEQ. This database does not indicate whether a spill or release has occurred.

3.10.2 Affected Hazardous Materials Environment

This section identifies hazardous material sites within 500 feet of the proposed Project based on a review of the federal and state databases. The sites were identified as having a potential to impact the Project. Table 3.10-1 shows the number and type of known hazardous material sites and facilities within 500 feet of the proposed improvements by segment. The general locations of the identified hazardous materials sites in the corridor are shown on Figure 3.10-1.

Table 3.10-1
Number of Hazardous Material Sites in the South Corridor Affected Area [6]

Segment	CERCLIS[1]	ECSI[2]	RCRIS[3]	LUST[4]	UST[5]
I-205 Segment	0	2	19	40	19
Portland Mall Segment	0	2	59	40	34
Operations and Maintenance Facility	0	0	3	2	2
I-205/Portland Mall Project Total	0	4	81	82	55

Source: Environmental Data Resources, May 2004 and the *South Corridor Project Hazardous Materials Impacts Technical Memo* (Metro and URS, May 2004).
Note: Some sites can be listed on more than one of these data bases.
[1] CERCLIS = Comprehensive Environmental Response, Compensation and Liability Information System
[2] ESCI = Environmental Cleanup Site Inventory
[3] RCRIS = Resource Conservation and Recovery Information System
[4] LUST = Leaking Underground Storage Tanks
[5] UST = Underground Storage Tank
[6] Affected area is defined as hazardous material sites located within 500 feet of the proposed Project improvements.

3.10.2.1 I-205 Segment

Hazardous material sites in the I-205 Segment between Gateway and Clackamas relate primarily to heating oil tanks and USTs. There are also some light industrial uses in the vicinity of I-205. When I-205 was constructed, hazardous material sites were not regulated and a number of residences and

other structures were displaced. As a result, there may be unrecorded sites within the I-205 right-of-way. No identified CERCLIS sites are in close proximity to the proposed Project improvements. Apollo Metal Finishing Inc. and E.W. Shields are the only identified ECSI sites. There are nineteen identified RCRIS sites. None of the RCRIS sites are listed as Large Quantity Generators (LQG). The RCRIS sites include a gasoline service station, retail properties, and multiple industrial facilities. Of the 40 identified LUST sites in proximity to the Project improvements 24 are listed as heating oil tank (HOT) release sites. The remaining LUST sites are retail properties, gasoline and diesel service stations, and maintenance facilities. There are 19 identified UST sites, including industrial facilities, gasoline and diesel service stations, and maintenance facilities. Thirteen of the UST sites are also listed as LUST sites. The locations of the hazardous material sites in close proximity to the Project improvements are shown on Figure 3.10-1.

3.10.2.2 Portland Mall Segment

The Portland Mall Segment has several hazardous material sites related primarily to retail gasoline underground storage tanks, heating oil tanks, and some past industrial practices in the Union Station and Postal Service area. No identified CERCLIS sites are in close proximity to the proposed Project. The Postal Service Processing and Distribution Center and Union Station Parcel B South are the two ECSI sites located within 500 feet of the Project improvements. There are 59 RCRIS sites identified, and of the 59 sites two are listed as LQG sites. Forty LUST sites were identified within 500 feet of the Project improvements. Of the 40 LUST sites, seven were related to HOT releases. There are 34 UST sites, and 19 of these sites also listed as LUST sites. The locations of the hazardous material sites in close proximity to the Project improvements are shown on Figure 3.10-1.

3.10.2.3 Light Rail Operations and Maintenance Facility Expansion Area

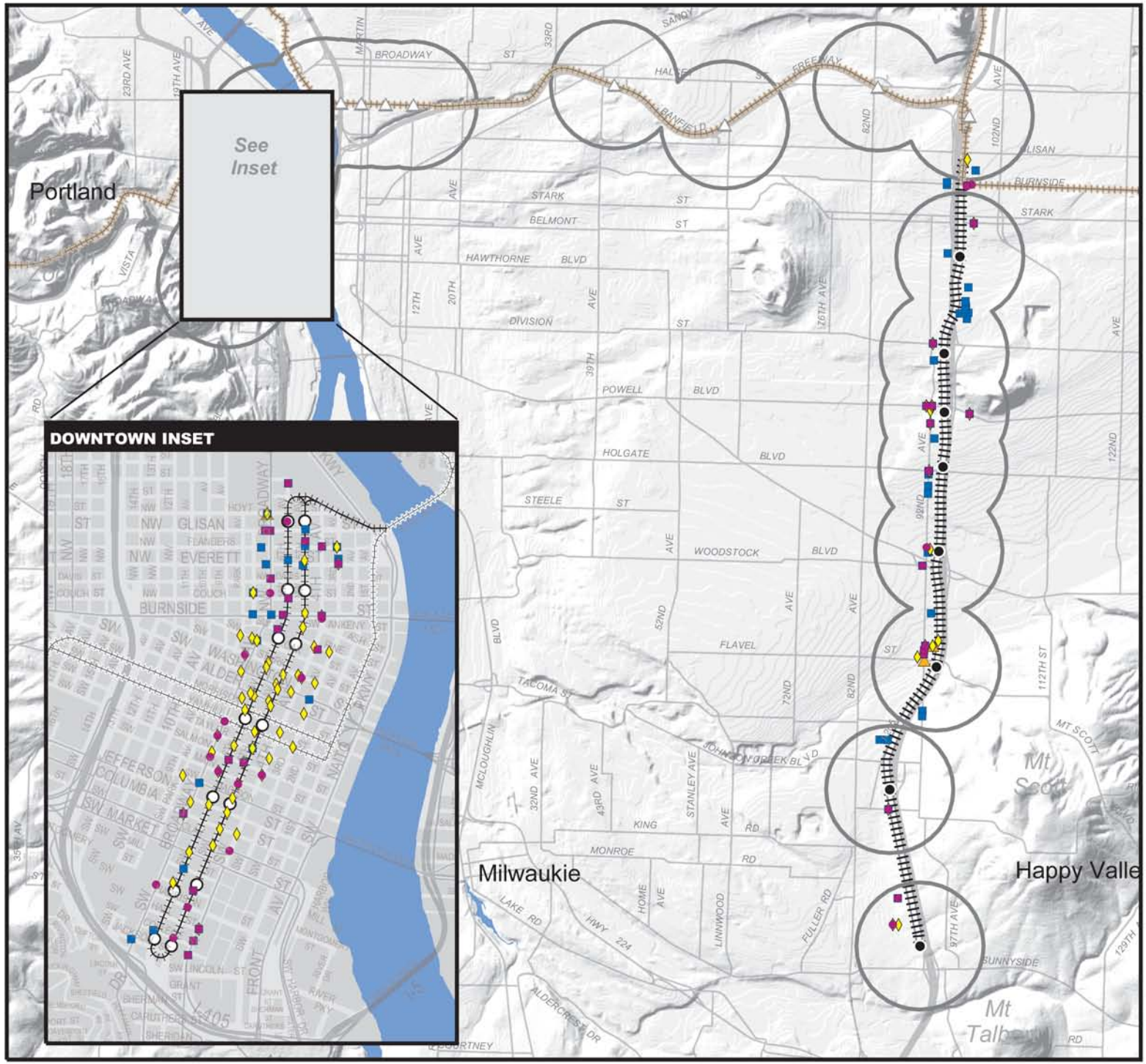
Construction of the LRT Project would require an expanded light rail operations and storage facility at TriMet's Ruby Junction facility. Up to ten properties along NW Eleven Mile Avenue could be displaced by construction of the expanded maintenance facility. The existing land use on these properties is primarily industrial and storage. No identified CERCLIS and ECSI sites are located within 500 feet of the Ruby Junction expansion area. Three RCRIS SQG sites are located near the facility. Two LUST sites that have received letters of No Further Action (NFA) from DEQ are located near the facility. Also, there are two identified UST sites, one of which is listed as a LUST site.

3.10.3 Hazardous Materials Environmental Consequences

This section presents the analysis of potential effects associated with identified hazardous material sites in close proximity to the proposed Project improvements. Construction and operation of the Project could increase the risk of adverse environmental impacts and liability associated with any hazardous materials. The potential for impacts has been assessed based on the types of hazardous materials present, or potentially present, and their location with respect to the proposed improvements. The direct, indirect and cumulative impacts are discussed in the following sections.

3.10.3.1 No-Build Alternative

The No-Build Alternative would not increase the risk associated with known hazardous materials sites as a result of improvements for the Project. Displacements of buildings and removal of soil



South Corridor Project

HAZARDOUS MATERIALS SITES

FIGURE 3.10-1

HAZARDOUS MATERIALS

- ECSI
- UST
- LUST
- RCRIS

ALIGNMENTS

- Existing Light Rail
- Portland Mall Segment
- I-205 Segment

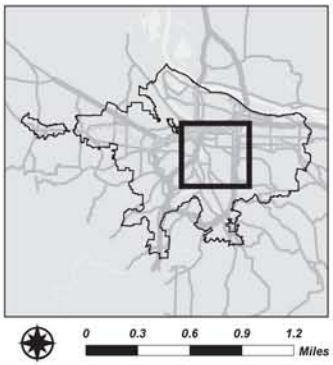
STATION LOCATIONS

- Portland Mall Segment
- I-205 Segment
- Existing Stations

Half-Mile Station Area

SOUTH CORRIDOR STUDY

METRO
PEOPLE PLACES • OPEN SPACES



September 2004

associated with new construction would not occur; therefore, there would be no Project-related impacts to hazardous materials sites. However, any existing impacts associated with hazardous waste, such as leaking underground storage tanks and other contaminated sites, would continue.

3.10.3.2 I-205/Portland Mall Project

This analysis identifies sites that could be displaced by or are located near the proposed Project improvements. "Displaced" refers to sites that would be completely or partially removed by (or acquired for) the Project, and "near" refers to sites within 500 feet of the Project. Table 3.10-2 shows the number of hazardous material sites that could be affected by the Project improvements by type of hazardous material site and by segment.

Table 3.10-2
Hazardous Material Sites by Segment

	CERCLIS[1]		ECSI[2]		RCRIS[3]		LUST[4]		UST[5]	
Segment	Displaced	Near	Displaced	Near	Displaced	Near	Displaced	Near	Displaced	Near
I-205 Segment	0	0	0	2	2	17	1	39	1	18
Portland Mall Segment	0	0	0	2	0	59	0	40	0	34
Operations and Maintenance Facility	0	0	0	0	0	3	1	1	0	2
Total I-205/Portland Mall Project	0	0	0	4	2	79	2	80	1	54

Source: Environmental Data Resources, May 2004 and the *South Corridor Project Hazardous Materials Impacts Technical Memo* (Metro and URS, May 2004)
Notes: Displaced = sites that would be acquired, at least in part, for the proposed Project, Near = site within 500 feet of, but not displaced by, the Project. Some sites could be listed on more than one data base.
[1] CERCLIS = Comprehensive Environmental Response, Compensation and Liability Information System.
[2] ESCI = Environmental Clean-up Site Inventory.
[3] RCRIS = Resource Conservation and Recovery Information System.
[4] LUST = Leaking Underground Storage Tanks.
[5] UST = Underground Storage Tanks.

In general, the Project could have beneficial impacts on identified hazardous materials sites and brownfield sites in close proximity to the proposed Project improvements through related community development opportunities. Examples of potential beneficial impact include completion of environmental site assessments that indicate what, if any measures need to be implemented to protect human health and the environment, completion of remediation projects that prevent future exposure risks, and construction of transportation or transportation related projects and businesses that support the community impacted by the Project.

There could be opportunities for the Project to partner with TriMet's Brownfields Assessment Pilot Project, the Portland Brownfields Showcase Program and the Clackamas County Brownfields Assessment Pilot Program. Where Brownfield sites exist in proposed LRT station areas, these types of partnerships could help to make sites available for development or redevelopment that would in turn support ridership of the LRT system.

A. I-205 Segment

In the I-205 Segment impacts to the proposed Project improvements could occur from two ECSI sites, Apollo Metal Finishing Inc. and E.W. Sheilds. Apollo Metal Finishing Inc. is located approximately 90 feet to the west of the Project improvements, and was issued a NFA letter. The site would not be displaced by the Project improvements and, therefore, it is not likely to have a long-term impact on the Project. The exact location of the E.W. Sheilds site contamination will require a more through a file review at DEQ. In July 1989, DEQ received a complaint form indicating that solvents and thinners had been disposed of on the E.W. Sheilds property. A DEQ site screening was

recommended in February 1994. Further assessment of this site would be required to determine the impacts from this site.

Nineteen RCRIS listed SQGs are located along this segment of the Project, and two of the generators would potentially be displaced by the proposed Project improvements. Compliance violations have not been issued to either of these generators; therefore, the sites have a low potential to have long-term impacts on the Project. Two of the remaining 17 sites have received compliance violation notices; however, compliance was achieved. Due to the location of these sites, they have a low potential to have long-term impacts on the Project.

Forty LUST sites are located along this segment of the Project, and the Oregon Department of Transportation's (ODOT) Barlow School site is the only LUST site that could be partially displaced. Although the site has received two No Further Action (NFA) letters for both LUST listings at the site, without further assessment it's not possible to conclude if the likely displacement would present long-term impacts to the Project. Eight of the forty LUST sites have not received NFA letters. Northwest Natural Gas-Mt. Scott Service Center, which is located 35 feet to the west of the proposed alignment, is the closest of the open LUST sites. The remaining seven open LUST sites are located greater than 250 feet from the proposed improvements. However, without further file reviews, it is impossible to conclude if the open LUST sites would present long-term impacts on the Project in this segment.

Two USTs were previously decommissioned at the ODOT Barlow School site. As discussed above, the Project could displace this site. Unless additional unidentified tanks are present, no long-term impacts would be expected due to the presence of USTs.

B. Portland Mall Segment

Many of the hazardous materials sites within the Portland Mall Segment have already completed remediation activities and therefore have a reduced probability of impacting light rail construction or operations in the downtown area.

Two ECSI sites, the Postal Service Processing and Distribution Center and Union Station Parcel B South, could impact the Project in the Portland Mall Segment. The Postal Service Processing and Distribution Center is located approximately 320 feet to the west of the north end of the Project improvements. NW Hoyt Street, bounds the center on the south, and the center is bound on the east by NW Broadway Avenue, on the west by NW 9th Avenue, and on the north by the NW Lovejoy Street ramp. The site is also listed twice as a closed LUST. The current facility was constructed in 1962 on the site of historic rail yards and railroad freight terminals. A manufactured gas plant operating between the 1880's and the 1930's and was also located in the northwest corner of the property. It is likely that operations at the plant generated by-products and wastes that contaminated soil and groundwater, and that this contamination remains beneath the asphalt and concrete that cover most of the area. Contaminants of greatest concern include benzene, lead, benzo(a)pyrene, and dibenzo(a,h)anthracene. Tanner Creek, enclosed in a concrete and brick conduit during the early 1900s-1910s, historically passed beneath the site where the heaviest contamination has been encountered. The conduit was of notoriously poor construction; several sections of the conduit subsequently collapsed. The conduit was later abandoned by backfilling with sand. Primary concerns are potential dermal contact or incidental soil ingestion exposures for utility trench workers, and potential migration to the nearby Willamette River.

Union Station and its associated rail yards were built when the former Couch Lake was filled-in during the 1890s. In the mid-1990s, the Portland Development Commission (PDC) acquired the rail yards, both north and south of the Broadway Bridge (Parcel A North and Parcel B South, respectively). The Union Station site is also listed twice on the LUST database, and one of the listings remains open. Investigations completed in 1996 and 1997 indicated shallow soils to be contaminated with petroleum hydrocarbons, polynuclear aromatic hydrocarbons (PAHs), lead and arsenic. Deeper soils were found to contain elevated levels of PAHs. A separate area of crude oil contamination was found in soils in the southern portion of the site. DEQ determined that the groundwater was not significantly impacted and deemed that no further action was necessary for the groundwater contamination. Excavation and treatment of contaminated soil in the area of crude oil contamination was completed in May 1997. Capping of the northernmost portion of the site (Lot 3) was started shortly thereafter. The cap was completed in the spring of 1998, concurrent with the development of multi-family residential housing on Lot 3 (The Yards at Union Station). Capping and redevelopment of Lot 4 (Phase II of The Yards) started in September 1998 and was largely completed in December 1999. Capping of two undeveloped portions of Lot 4 is on-going. Capping and redevelopment of Lot 5 has not been scheduled. Specific lot locations were not available for production of this FEIS.

Fifty-seven RCRIS SQGs and two RCRIS LQGs are located along this segment, and none of the generators will be displaced by Project improvements. Compliance violations have not been issued to the generators except Portland State University (PSU), one of the LQGs. PSU is listed as having 36 violations; however, compliance was reportedly achieved for each violation. Due to the location of these sites, they should have no long-term impacts on the Project in this segment.

Forty LUST sites are located along this segment, and none of the sites would be displaced by the Project improvements. Ten of the forty LUST sites have not received NFA letters. Union Station – Portland Development Commission, Pendleton Woolen Mills, Trutz Kronke (HOT), and the Westwind Hotel (HOT), which are located within 25 feet of Project improvements, are the closest of the open LUST sites. The remaining open LUST sites are located greater than 40 feet from the segment. However, without further file reviews, it is not possible to conclude if the open LUST sites would present long-term impacts on the Project in this segment.

There are 34 UST sites in segment; however, no long-term impacts would be expected due to the presence of USTs as none of the UST sites would be displaced by the Project improvements.

C. Light Rail Operations and Maintenance Facility Expansion

Ten properties along NW Eleven Mile Avenue could be displaced by construction of the expanded facility. Three RCRIS sites and two UST sites are located near the facility, but none of these would be displaced by the expansion. Due to the location of these sites, they should have no long-term impacts on this facility expansion. Coachman Body and Frame located at 1843 NW Eleven Mile Lane is one of the ten properties and is listed as a HOT release site on the LUST list. According to DEQ, after cleanup of the impacted soil was completed, the site received a NFA letter in 1992. Due to the status of the listing, the potential impact of the release on the expansion is low. In the regular course of business, TriMet should perform Phase I and II Environmental Site Assessments on the displaced properties prior to acquisition.

3.10.4 Impacts to Hazardous Materials Sites

The potential direct and indirect effects of the hazardous material sites on construction and operations activities could include:

- Delays to allow for negotiations with responsible parties and regulatory agencies.
- Possible action by regulatory agencies.
- Remediation activities.
- Possible exposure of construction workers or the public to hazardous materials.
- Increased costs for disposal and replacement of contaminated soil and regulatory interaction.
- Possible releases of hazardous materials into previously unaffected areas.
- Design and implementation of measures to prevent the exacerbation of impacts to soil and/or groundwater.

Further investigation of known or potential hazardous materials sites and facilities, as well as early interaction with regulatory agencies during the Final Design phase, could avoid or reduce these risks. Also, potential impacts of construction activities could vary with the different listed sites depending on which database the site is listed on:

- **CERCLIS and ECSI** sites that would be displaced or are located near the proposed Project may present the greatest impacts during construction activities. Further file reviews at DEQ may be required for the listed sites. Subsurface investigations may be required to determine the extent and magnitude of contamination. Remedial activities may be required at listed sites that could be displaced.
- **RCRIS** sites are unlikely to impact construction activities. If a RCRIS site was to be displaced by the proposed Project, then hazardous waste stored on the property would need to be properly removed and disposed of at an approved hazardous waste disposal facility.
- **LUST** sites are listed as having an open or closed cleanup status. In order to evaluate impacts to construction activities, displaced LUST sites would require further assessment to determine the extent of soil and groundwater contamination. Adjoining LUST sites may also require further assessment as contaminated groundwater may migrate past the property boundaries. Additional assessment may include file reviews at DEQ and/or subsurface investigations. Heating oil tank releases may also present concerns to construction activities if the property is to be displaced or is located adjacent to the chosen alternative. Due to the physical nature of heating oil, it is unlikely that releases on distant properties could impact construction activities.
- **UST** sites are unlikely to impact construction activities unless the sites were to be displaced by the Project alternatives. USTs may require decommissioning prior to construction activities.

Construction could discover or reveal released contaminants to the environment and, therefore, could be a benefit because the released material would need to be characterized and/or remediated.

3.10.5 Cumulative Impacts

The cumulative impacts of the Project on hazardous materials sites could include: 1) site cleanup related to development of the Project could increase the cumulative demand for contaminated soil disposal facilities; 2) during construction, workers could be exposed to hazardous materials; and,

3) increased development pressure in the area of the Project could cause cleanup of sites that might not be otherwise cleaned up. However, the level of exposure to construction workers could be minimized with proper training and the use of appropriate protective equipment. Over time, however, development of the Project could decrease the likelihood of exposure to the general public to hazardous materials, since any contamination is likely to be remediated.

3.10.6 Hazardous Materials Mitigation

This section identifies measures to mitigate impacts of the Project improvements on identified hazardous materials sites**.**

3.10.6.1 Mitigation of Direct Impacts

Mitigation of potential hazardous materials impacts would occur in three phases; pre-construction, construction and operations. TriMet would further evaluate hazardous materials issues and consult with the US EPA and DEQ during the Final Design phase of the Project to gain more information about the identified sites. Sites that would be acquired, or are in close proximity to the proposed improvements, would have a Phase I Environmental Assessment completed. This would include file reviews, reviewing permits, conducting geophysical surveys, and/or conducting surface and/or subsurface assessments. Prior to acquisition, TriMet would contact appropriate regulatory agencies to determine whether more recent information is available, and whether further assessment of the parcels is scheduled or warranted. The information obtained would be provided to TriMet so appropriate steps can be taken to evaluate sites for acquisition and to decrease the agency's risk of liability.

A. Pre-Construction

The acquisition of land containing hazardous waste could incur risk of financial liability if contamination requiring characterization, removal or disposal were to be discovered. To reduce liability risks, the data compiled in this report should be further reviewed and evaluated to identify parcels where hazardous materials are known to exist or may be present. Sites that would be acquired, or are in proximity to the proposed Project improvements, should be evaluated in more depth during Final Design. This could include file reviews, reviewing permits, conducting geophysical surveys, and/or conducting subsurface assessments. Prior to acquisition, TriMet should contact appropriate regulatory agencies to determine whether more recent information is available, and whether further assessment of the parcels is scheduled. The information obtained would be used by TriMet to take appropriate steps to evaluate sites for acquisition and to decrease the agency's risk of liability.

Entering into an agreement with a regulatory agency, such as a Prospective Purchase Agreement, may lessen future liabilities resulting from purchasing contaminated properties. A limited sampling and analysis program, coordinated in conjunction with geotechnical investigations, could be developed and implemented on sites with known contamination. Conducting geophysical surveys at sites with suspected USTs, or where UST locations are unknown, could reduce the risk of encountering buried USTs, product pipelines, or other anomalies such as utility lines that could adversely impact construction activities.

B. Construction

Hazardous materials can present potential environmental health impacts from construction activity within or near hazardous materials sites, that may affect both the natural environment and human environment arising from contaminant exposure during construction activity. Examples of potential impacts may include increased cancer risks from exposure to toxic materials, destruction of material or habitat from explosion or ignition of hazardous materials , or illness from contact with toxic or corrosive materials. Mitigation for each site would vary based on the different site conditions, and/or levels and types of contamination or suspected contamination within the soil and/or groundwater. With some of the sites, no mitigation may be necessary; other sites may require extensive onsite mitigation.

Adverse impacts to construction workers from contamination can be minimized or avoided. A work plan would be designed for each site that would include actions to be implemented if construction activities encounter impacted soil and/or groundwater. Sites that have the potential for contaminated groundwater to be encountered may include recommended actions for de-watering the groundwater table, and treatment and disposal plans for the groundwater generated. Or in cases where construction could encounter impacted soils, actions may include excavation and the proper disposal of impacted soils by properly trained and equipped subcontractors before construction begins. Other actions could include modifications to the Project design. For sites that have impacted soils or groundwater, grading alternatives could be considered to avoid encountering groundwater during construction activities.

Depending on the location and the potential severity of hazardous materials exposure associated with it, a Health and Safety Plan would be developed for all construction activities consistent with applicable laws. A qualified health and safety specialist, such as a Certified Industrial Hygienist (CIH) or Certified Safety Professional (CSP), should assist in preparing the plan based on the evaluation of the proposed construction activities. The plan would prescribe safe work practices, personal protective equipment (i.e., tyvek suits, respiratory protection, emergency response, safety training), and requirement for all construction workers. The need for construction site monitoring for detection of toxic or explosive conditions would also be addressed. Additionally, an occupational medical monitoring program could be required to be in place for those workers exposed to or working with hazardous materials.

3.10.6.2 Mitigation of Indirect Impacts

Indirect impacts would primarily occur after construction has been completed. Emergency response procedures, consistent with existing laws and regulations, would be developed for use by light rail personnel in the unlikely event of a major hazardous materials release close to the alignment. Typical activities covered in such procedures include accidents, reporting of suspicious dumping or releases along the alignment, and monitoring of RCRA permit applications, hazardous materials spill reports, and DEQ sampling results for the vicinity of the Project. Federal, state, and local government agencies have developed contingency plans in the event of an accidental release or spill of hazardous materials and should be included in all newly established emergency response procedures.

Controls and measures should be planned, designed and implemented to avoid further exacerbation of impacted sites during or after construction. Plans and procedures should be prepared to prevent future releases or spills along the alignment.

3.11 Safety and Security

3.11.1 Crime Prevention and Passenger Safety

Community members have expressed concerns about the safety and security of the transit system and the potential effect of increased light rail on neighborhoods. Neighborhood concerns have focused on personal safety at transit stations, theft from vehicles at park-and-ride lots and increased property crimes in neighborhoods adjacent to light rail stations. TriMet has developed strategies for addressing crime at light rail stations and park-and-rides over the course of 18 years of operating light rail in the region and the lessons learned would be applied to design and operation of new facilities. Crime occurs at varying levels throughout the region and is likely to occur at higher rates in areas where people congregate such as light rail stations, shopping malls and parks. TriMet continually works to increase passenger and community safety throughout their service area.

To create a safe transit environment, TriMet's Transit Security Division, including sworn law enforcement officers from jurisdictions throughout the service area, patrols trains, buses and park-and-ride lots. TriMet would coordinate with local jurisdictions to effectively patrol any new facilities constructed as part of the I-205/Portland Mall Project. TriMet also contracts with a private security firm to provide additional patrols, and within Multnomah County for a full-time Deputy District Attorney to prosecute transit-related crimes.

TriMet has developed and adopted a system-wide *Transit Security Plan* that calls for the application of community policing goals and techniques to improve transit security. Appropriate elements of the plan would be incorporated into the design and operation of the proposed Project. These would likely include:

- In-house training of transit district employees to increase awareness of and prevent criminal activities;
- Coordination with local law enforcement agencies and personnel;
- Improved facility design and operations standards that would improve visibility at transit stations and increase security enforcement levels; and
- Investment in new tracking and surveillance technology.

In 1995, TriMet established the South/North Safety and Security Advisory Committee to incorporate law enforcement expertise into the planning and design of the South/North Project. TriMet's Security Director chaired the South/North committee, which included law enforcement personnel from local jurisdictions along the proposed South/North alignment. In May 1998, the committee completed a report of recommended safety and security guidelines for preliminary engineering of the South/North Light Rail Project. The safety and security guidelines integrate security design concepts with the experiences of constructing and operating the Blue Line (east-west) and now are enriched by the experience of operating the Red Line (Airport) and the Yellow Line (Interstate). These guidelines would be applied to the design of the I-205/Portland Mall Project.

TriMet's design criteria call for development of stations and facilities with Crime Prevention through Environmental Design (CPTED) standards. CPTED is widely accepted as an effective crime prevention strategy. TriMet's design criteria also define standards for visibility, lighting, access and art placement to encourage secure facilities.

Additional transit service can also help to create a safe environment in neighborhoods. TriMet provides extra eyes-on-the-street every day through its drivers and other employees. TriMet operators are able to request medical or police assistance for passengers and the general public. TriMet has also trained employees to recognize and evaluate suspicious activity, people or objects in light of more recent awareness of national security needs. In addition, the continuous auto and bike lanes on the Portland Mall would provide more "eyes on the street" all hours of the day.

3.11.2 Emergency Response

TriMet's emergency response procedures are constantly evaluated and improved system-wide. TriMet has developed plans in accordance with the FTA's *Recommended Emergency Preparedness Guidelines for Rail Transit Systems* (Federal Transit Administration: March 1985) and *Recommended Emergency Preparedness Guidelines for Urban, Rural, and Specialized Transit System* (Federal Transit Administration: January 1991). These emergency response plans would be revised specifically to include the I-205/Portland Mall Project to ensure a secure transit system.

TriMet and FTA completed a security assessment of TriMet facilities that identified potential security improvements for the transit system. Improvements identified during the assessment included minor design and lighting changes on MAX lines and at bus stops, changes to light rail station platforms and security improvements near vital structures. Many of the recommendations identified in the security evaluation relate to security measures TriMet was already implementing such as installing additional security cameras in all transit vehicles and expanding the number of monitored security cameras on light rail trains, at stations and at park-and-ride lots.

TriMet constantly evaluates and improves standard responses to emergency situations. TriMet's security response procedures include strategies for assisting in evacuations or other emergency responses and reacting to an emergency involving the transit system. Since effective response must include key responders from agencies throughout the transit system service area, TriMet has held training sessions with bomb squads, hostage teams, fire fighters and police officers to ensure that emergency personnel are familiar with the transit system, vehicles and emergency procedures.

TriMet and FTA are taking appropriate steps to ensure that the entire transit system is designed and operated in a way that will not encourage terrorist activities. TriMet has developed procedures to ensure a quick and effective response to any emergency or catastrophic event.

3.11.3 Operational Safety Considerations

The design for the proposed Portland Mall/I-205 Light Rail Project has been developed to maximize operational safety. The I-205 Segment is generally grade-separated from roadway crossings. The alignment will only cross vehicle traffic at-grade in two locations: Flavel Street and the access to the Main Street Park-and-Ride. The Main Street Park-and-Ride driveway has been designed to maximize sight distances and minimize the risk of cars being trapped between gates. The Flavel crossing will be gated and the platform would be elongated to reduce the risk of train/auto conflicts.

Pedestrians, autos, buses and trains will all use the Portland Mall when the I-205/Portland Mall Project is implemented. All intersections will be signalized to coordinate the flow of traffic, pedestrians and transit on 5th and 6th avenues and on cross streets consistent with downtown Portland's grid system. Generally autos would be located in the left lane and buses and trains would use the center and right lanes. Generally, trains would operate in the transit-only center lanes on 5th and 6th avenues and move to the right lane at stations. These movements would be coordinated and with buses controlled by lane geometry, a series of operating rules and a series of "train approaching" signals that would communicate to bus operators that they should pull into the right curb lane.

The auto lane will be separated from the center lane by a series of raised bumps used to remind auto drivers to stay in the left lane. A series of pavement markers and street signs will also signal to auto drivers where the appropriate lane is and which turning movements are allowed. Pedestrian movements will be controlled by pedestrian signals and traffic signals at each intersection that identify when it is safe for pedestrians to cross streets.

3.11.4 Mitigation

Given the region's 18 years experience operating light rail and bus transit, it is unlikely that construction or operation of the I-205/Portland Mall Project would significantly effect safety and security in the corridor. Strategies such as CPTED, use of police and private security patrols and security cameras could be employed to make the Portland Mall/I-205 light rail facilities as safe and secure as possible. The existing policies and procedures for operations during a potential catastrophic event and to prevent terrorist activities developed by TriMet and FTA would be expanded to include the I-205/Portland Mall Project. Finally, design criteria such as platform location and length, pedestrian crossings and alignment design would be used to ensure that the Project operates safely.

3.12 Construction Impacts

This section addresses construction of the I-205/Portland Mall Project and the expected effects of construction with respect to the environmental and social topic areas that have been discussed previously in Chapter 3. Additional discussion of construction impacts can also be found in each of the individual topic areas previously discussed in this chapter. Also, traffic and transit construction impacts and mitigation are discussed in Section 4.5.

Construction related impacts can be direct or indirect, are typically short term in duration and generally end with the completion of construction. Construction impacts can also be more disruptive than the longer-term impacts of Project operations.

The No-Build Alternative would not cause construction related land use, economic, social, environmental or other impacts related to the Project. The list of projects that are included in the RTP financially constrained network that make up the No-Build Alternative would individually have construction impacts but it is not possible to measure or document them at this time because most of the projects have not yet been designed or evaluated for specific impacts.

3.12.1 Approach to Constructing the Project

The I-205/Portland Mall Project includes two distinctly different construction segments. First, the I-205 Segment would be constructed largely within the existing right-of-way of the I-205 freeway with associated stations and park-and-ride lots. Approximately 3.1-miles of the right-of-way between NE Glisan Street and SE Foster Road was cleared and graded for future high-capacity transitway when the I-205 Freeway was constructed in the early 1980's. The Project alignment would generally be located within ODOT right-of-way for the remaining 3.4-miles between SE Foster Road and Clackamas Town Center.

The Portland Mall Segment would be constructed primarily within the existing street right-of-way of the existing downtown bus transit mall on 5th and 6th avenues. In downtown Portland, new right-of-way is required at the north end where the alignment would leave the Steel Bridge on a new ramp and head toward Union Station and at the south, in the vicinity of the new turnaround at SW Jackson Street.

A. I-205 Segment

Construction of the I-205 Segment is planned to be accomplished through a design-build contract. The contractor has been selected by TriMet and has provided consultation services to TriMet during Preliminary Engineering. A design-build type of construction process was successfully used for TriMet's Airport MAX line that opened for revenue service in September 2001 and on a section of the Interstate MAX line that opened for service in May 2004. Prior to beginning construction TriMet would complete Final Design, land use and environmental permitting and right-of-way acquisition.

Construction of the I-205 Segment is planned to begin in Summer 2006 and extend through summer of 2009. Because the northern portion of the alignment would be in the reserved transit way along I-205, it would be a relatively simple construction process. The area south of Foster Road would be more complicated because there is not a reserved transit way.

General activities that would take place during construction will change over the three-year construction period. Early construction work would include establishing and setting up staging areas, moving utilities including water, sewer and stormwater pipes, electrical poles, cell towers, fiber optic cables, and relocating and constructing new sound walls.

The majority of the construction period would generally be dedicated to the Light Rail and ancillary facilities. Retained fill areas would be created by constructing new retaining walls and filling behind them. The trackway would be prepared by developing drainage, preparing sub-grade, adding ballast and then laying tracks. The overhead catenary would be constructed by adding foundations and poles along the alignment, span wires and electrical catenary. Signals and communication equipment required for the train operations would be added along the alignment and at small buildings located along the alignment. The park-and-ride lots and stations would be then added along with the transit center and structured park-and-ride at Clackamas Town Center. The final stages of construction include addition of station finishes, art and signage and landscaping. Following completion of the construction, TriMet would extensively test the line prior to opening it for passenger service.

B. Portland Mall Segment

Construction of the Portland Mall Segment would follow an approach that is more appropriate for the more complex active urban environment of the existing transit mall. Construction is expected to be done with a Construction Management General Contractor (CMGC) that would work closely with TriMet including public involvement staff. The contractor would be selected early in the Final Design phase of the Project. Construction on the Mall is expected to begin in 2006 and extend until Fall 2009.

The earliest steps in the downtown construction process would include work on the multiple utilities (water, sewer, stormwater, electrical and communications) that currently exist in both 5th and 6th avenues, and setting up staging sites. A combination of private and public utilities and TriMet contractors would perform this utility relocation work. During the first year of construction, a general purpose automobile lane could be developed on 5th and 6th avenues at blocks bordered by SW Stark/Washington and SW Yamhill/Taylor streets. The only major structure that would be constructed in the downtown Portland area is the new ramp from the Steel Bridge to Union Station, and work on it would begin very early in the construction process.

Construction is planned to be completed on small three to four block sections of the mall at one time. TriMet anticipates utilizing approximately 25 different work zones. The total duration of construction in each of these work zones is anticipated to be approximately six weeks if utilities have already been relocated. If utilities have not been relocated, the construction phase for any one zone would be longer. Within the six-week timeframe, it is anticipated that complete sidewalk reconstruction would take approximately three to four weeks. Complete sidewalk reconstruction is only anticipated in light rail station platform blocks in the North and Central Mall areas. In the South Mall more sidewalk reconstruction would be required. Intersections within these 25 work zones would take approximately three to four weeks to rebuild, depending on the specific intersection improvements needed. Intersections may experience partial or full closure during reconstruction depending on cross street traffic requirements. Intersections constructed in halves may require six to eight weeks for completion. During construction, buses are proposed to be rerouted off of the Portland Mall onto 3rd/4th avenues, 10th/11th avenues and SW Jefferson/Columbia streets.

TriMet would work with its contractor to ensure that pedestrian access is maintained to all businesses through the entire construction process. Automobile access and loading access to some businesses on the south end of the transit mall would be displaced. TriMet would work with these businesses early in the process to relocate automobile access in some cases and ensure loading access as necessary.

3.12.2 Impacts Related to Construction

Each of the previous sections of this chapter has described construction impacts as they would relate to the individual topic areas. The purpose of this section is to consolidate that information into a more comprehensive discussion of the likely impacts of Project construction. Following is a list of typical construction impacts prior to avoidance or mitigation efforts. A more detailed discussion focused on the two Project segments follows.

- Land use and economics – construction related land use and economic impacts would typically consist of short-term increases in construction and related employment and temporary disruptions to surrounding land uses, including businesses.
- Social and neighborhoods – construction related impacts to neighborhoods could result from increased traffic congestion, truck traffic, noise, vibration and dust. Temporary street closures, traffic and bus reroutes and traffic detours could temporarily increase or decrease traffic within neighborhoods.
- Noise and vibration – the operation of machinery used in construction (e.g., bulldozers, scrapers and pavers, pile drivers and jack hammers) would typically generate noise and vibration during construction. Pile driving would likely occur where new structures would be constructed.
- Ecosystems, water quality and soils – construction impacts typically include water quality related impacts, fish and wildlife habitat removal or temporary disruption, and soil erosion from ground cover removal.
- Hazardous Materials – hazardous materials contamination in the groundwater or soils can be dangerous to construction workers along with hazardous materials that are used or stored on sites.
- Public utilities and services – temporary interruption of some utilities and services could occur during construction.
- Air Quality – construction related impacts could occur from truck and equipment emissions , dust from excavation and demolition and emissions from increased congestion.

I-205 Segment

Because the I-205 Segment portion of the Project would be constructed within the relatively wide right-of-way along I-205, there would be fewer construction impacts to adjacent land uses, including businesses. Potential construction-related impacts are described below from the north to the south of the I-205 Segment.

The alignment would cross under SE Stark and Washington Streets in a new underpass. This underpass would likely require some temporary disruptions to traffic in the immediate area and would result in the removal of fill material and the addition of concrete retaining walls, which could result in a number of truck trips to and from the site. The construction of the trackway and systems along the alignment would require heavy equipment to dig and move earth, to develop the sub-grade and to add ballast.

The Main Street park-and-ride lot would require earthwork to clear and grade the site and the alignment, and for construction of trackway and the asphalt park-and-ride lot. Construction materials would need to be delivered to the site.

Construction of the LRT structure over SE Powell Boulevard would require driving or auguring of piles to support the bridge piers. Pile driving could create temporary noise and vibration impacts to the adjacent properties. Construction of the bridge could require some short-term changes in traffic patterns and the addition of truck traffic in the vicinity for materials delivery to the site. Stormwater runoff from the site would not likely to cause soil erosion because the design/build contractor would be required to use the City of Portland's Erosion Control Manual.

Construction activities for the Powell and Holgate park-and-ride lots would be similar to the Main Street park-and-ride lot. Similar impacts created from construction would be expected to occur at

these locations including increased noise, dust, and construction related traffic. Access to local business should not be affected, except for perhaps from the construction of half street improvements at the intersection of SE 92nd Avenue and SE Powell Boulevard.

Construction impacts along the light rail alignment between the Main Street park-and-ride and SE Woodstock Boulevard are expected to be minor since this area has already been cleared and graded for a transitway. As noted above, impacts would be associated with the activity of finalizing the trackway and overhead electrical systems.

The bridges over SE Harold Street and SE Foster Rd/Woodstock Boulevard would require driving or auguring of piles to support the bridge piers and then the construction of bridge bents, stringers and deck. This activity would take place adjacent to and above roadways and could require some temporary traffic disruptions from detours and the delivery of materials to and from the sites. On each side of the new Foster/Woodstock Bridge, earth would be retained by walls constructed of concrete. Earth moving equipment would operate in this area to construct these walls and to grade the earth. Direct access to local businesses is not expected to be affected.

The construction of soundwalls is anticipated between SE Woodstock Boulevard and the Springwater Corridor and between SE Crystal Springs and approximately SE Fuller Road. Construction of the soundwalls could require pile driving for the post and earthmoving equipment for site preparation. The Project could schedule the installation of soundwalls early within the construction phase of the Project to mitigate construction related noise impacts to adjacent properties and buildings.

The bridge over the Springwater corridor trail would not affect automobile traffic but would likely require temporary closures of the trail to bicyclists and pedestrians during short periods of construction. Access to the I-205 and Springwater Corridors could be temporarily blocked during construction while portions of the I-205 trail are relocated or modified and while a bridge is being constructed over the Springwater Corridor. Detour routes for bicyclists would likely be provided on local streets, with clear signage to direct pedestrians and bicyclists back to the trail.

The construction of the stormwater swales, the bridge over Johnson Creek and planting along the riparian area could result in short-term increases in erosion from these areas as grading and other earthwork is completed.

The alignment between SE Flavel Street and SE Crystal Springs Boulevard would include the construction of retained fill walls and a new light rail bridge over the intersection of SE 92nd Avenue and SE Crystal Springs Boulevard. Similar to other structures described previously, this structure would require driven or augured piles and other construction activities that could require heavy equipment that could be noisy and create dust. Materials would need to be delivered to and from the site that could locally affect traffic.

Between SE Crystal Springs Boulevard and SE Johnson Creek Boulevard construction activities would take place close to a number of residences. These houses could experience increased noise and dust as a result of construction activities. The bridge over SE Johnson Creek Boulevard would require construction of piles, piers, bridge decking and associated elements that would necessitate the operation of heavy earthmoving equipment and the delivery of materials to and from the site.

This activity could increase noise, dust and traffic locally. The I-205 multiuse path could be detoured during construction to avoid conflict with construction activities.

The construction of the Fuller Road park-and-ride lot would require the removal of a dozen houses and out buildings, site preparation requiring the operation of earthmoving equipment and delivery of materials to and from the site. These activities, if not mitigated, could increase noise, dust, traffic and runoff in the local area.

Construction of the trackway between SE Otty Road and SE Monterey Avenue, would require relocation of existing sound walls, portions of the I-205 multiuse path, and a water quality swale. These activities, in addition to construction of the trackway and catenary systems would require heavy earthmoving equipment that could result in temporarily higher noise and dust levels in the immediate area.

The Clackamas Transit Center and structured park-and-ride lot would require the removal of existing asphalt materials, construction of footings, piers and parking decks. These activities, in addition to the retained fill walls supporting the trackway and the I-205 bike/pedestrian path, would require the operation of heavy earthmoving equipment and the movement of materials to and from the site. These activities could create noise and vibration impacts and dust and erosion impacts in the immediate vicinity. Localized traffic impacts due to construction could affect retail activities in the immediate vicinity at Clackamas Corner and the Town Center.

Construction activities associated with the expansion of Ruby Junction Operations and Maintenance facility would result in removal of buildings and some minor grading and trackway construction. Impacts would include the addition of construction related traffic on NW Eleven Mile Road.

Portland Mall Segment

Construction of the Project's light rail alignment and associated facilities along the Portland Mall would require the relocation of public and private utilities in 5th and 6th avenues that could be in conflict with the light rail trackway or to maintain access to utilities for operations and maintenance. The utility relocation would require the operation of heavy equipment to excavate utilities, digging equipment, grinding equipment and concrete equipment, which could create localized noise and vibration impacts, air quality impacts and erosion. The activity in front of businesses, where complete sidewalk reconstruction would occur (SW Yamhill/Taylor, SW Stark/Washington and from SW Madison to SW Jackson streets), would see constraints to pedestrian access during this estimated three to four week time duration. Businesses would experience decreases in vehicle access and pedestrian visibility that could result in temporary economic impacts to these businesses. Automobile, automobile drop-off and truck delivery access would be affected on 5th and 6th avenues during the six to eight week construction duration.

The reconstruction of approximately 58 intersections along 5th and 6th avenues would limit some through travel in downtown Portland and would necessitate detours that could temporarily increase traffic congestion and trip lengths. As buses are routed to 3rd/4th, 10th/11th avenues, and SW Jefferson/Columbia streets, some transit riders would be required to walk further and may have a slower trip due to buses temporarily having to share these roads with general-purpose traffic. Some on-street parking would be removed during construction to allow for temporary bus stops.

Modification to the Steel Bridge ramp would require the operation of heavy equipment used to drive or auger piles, lift equipment, cut steel, move earth, and lay concrete. These operations could create localized noise, dust and erosion activity. Additionally, westbound auto access over the Steel Bridge would be closed as necessary for the ramp modification. The addition of a switch between the existing light rail line and the new line would require that operations on the existing line cease for a short period and would require existing passengers to transfer to buses to continue their trip. Similarly, the crossing of the streetcar tracks in the South Mall area would require streetcar service disruption during construction.

3.12.3 Utilities

The construction of light rail tracks would result in physical conflicts with existing and planned utilities, including street lighting, electrical, sewer, water and gas services along with communication cables. Light rail electrification can lead to additional stray electrical current that can accelerate corrosion of metal pipes and, as a result, some water and gas pipes directly under the trackway may also need to be relocated. The relocation of utilities would be carefully managed and scheduled during Final Design to avoid construction delays and additional costs. During Preliminary Engineering, TriMet has coordinated with utility providers and have identified conflicts and strategies for managing cost and construction scheduling.

TriMet has coordinated with local utilities to assure adequacy of services necessary to operate the light rail, stations and park-and-ride lots.

3.12.4 Construction Impact Mitigation

Mitigation of construction impacts would include a number of measures that are based both in Federal, State and local regulations and in the practices that TriMet has used in past on light rail projects including the Interstate MAX Project, Airport Light Rail Project and the Westside/Hillsboro Project. Construction mitigation strategies are discussed in greater detail in the previous sections of Chapter 3 and in Chapter 4.

In general, mitigation for **economic impacts** during construction would include working with local businesses to ensure that access to the business can be maintained during construction and would include TriMet providing signs in the construction zones, publications and notificaitons to let customers know that these businesses are open during construction. TriMet would work with the local community and construction workers to encourage the patronage of these businesses during construction. When possible, TriMet would also work with the community and the contractors to hire local disadvantaged business and to purchase materials from local vendors. An example of this practice occurred during the construction of the Interstate MAX line, when local haulers formed a consortium that worked with the contractors to haul materials to and from the sites, thereby ensuring that more of the construction dollars went back into the local community. Further mitigation of economic impacts would be to ensure that the duration of construction in front of a property is minimized to the extent practicable.

Mitigation for **air quality** would ensure that dust from construction related activity and emissions from construction equipment is kept to a minimum. Contractors would be required to adhere to OAR 340-208-0210 that requires reasonable precautions be taken to avoid dust emissions. An example

could include applying water or suppressants to bare dirt areas at construction sites during dry weather to prevent the transport of dust to nearby roads and buildings.

Mitigation for **noise and vibration** impacts would include adherence to local noise ordinances and restrictions that regulate noise emissions and times of operations when close to noise sensitive uses such as residential areas The contractor would need to apply for a variance to the noise regulations if these standards were to be exceeded.

Mitigation for **ecosystem and water quality** impacts would include adherence to the "best management practices" (BMPs) as outlined in Appendix C of the *South Corridor Biological Assessment*. The BMPs include measures developed to ensure that impacts are avoided or minimized. In addition, the contractors would be required to adhere to the City of Portland's Erosion Control Manual that sets strict limits and sound practices for ensuring a minimum amount of erosion from construction. Greater detail of construction mitigation for ecosystem and water quality can be found in Sections 3.6.3 and 3.7.3 respectively.

Mitigation for **hazardous materials** includes preparation of plans for each segment that describes actions to be implemented during construction if hazardous materials are found. In addition, a Health and Safety Plan would be developed for all construction activities consistent with applicable laws. Mitigation would also include construction worker training for those instances when hazardous materials are present at the construction site. Specific mitigation strategies are discussed in more detail in Section 3.10.

Mitigation for **traffic and transit** related impacts are discussed in greater detail in Section 4.6. of this FEIS. Traffic impacts could include avoiding closures of arterial roadways during the morning or afternoon peak traffic hours and clearly marking detours. Mitigation for impacts to transit riders would include clearly marking transit route changes and temporary bus stops in downtown Portland.

4. TRANSPORTATION FACILITIES, SERVICES AND IMPACTS

This chapter presents the benefits and impacts that the I-205/Portland Mall Light Rail Project would have on the transportation system, including the transit system, traffic movements, and freight movement in the project area. It provides an overview of the affected transportation environment, followed by a summary of the transportation benefits and the transit and highway and street impacts that would result from the implementation of the Project.

Transit impacts are assessed by using various measures of service level, travel time, reliability, and ridership. Highway and street impacts are assessed by using various measures of congestion on streets, freeways, and intersections and by assessing impacts to parking supply and utilization. In addition impacts to pedestrian and bicycle travel are assessed through qualitative discussions. For detailed information on the traffic analysis refer to the *Traffic Impacts Technical Documentation* (Metro and DKS, November 2004).

4.1 Affected Environment

This section summarizes characteristics of the existing transportation system and travel behavior within the region and corridor, highlighting travel behavior, public transportation, highway, and pedestrian and bicycle infrastructures and networks; regional and local parking policies and supplies; regional and local transportation plans; and freight movements.

4.1.1 Travel Behavior

The basic unit of measure used to describe travel behavior is the "person trip," which is a trip made by one person from a point of origin to a destination via any travel mode. Several trip variables, including origin, destination, mode, and purpose of the trip, further describes travel behavior. Data on existing and forecast transit ridership are reported in two ways: "linked" trips (also known as originating rides) and "unlinked" trips (also known as boarding rides). Linked transit trips are also person trips and represent the full origin-to-destination transit trip, regardless of how many separate transit vehicle boardings (or transfers) are required to complete the trip. Unlinked trips (or boarding rides) count each time a person boards a transit vehicle. A linked transit trip that requires a transfer will include at least two transit vehicle boardings.

In 2000, the base year for this Final Environmental Impact Statement (FEIS), the transportation facilities in the South Corridor accommodated a total of 2,186,200 person trips (both automobile and transit) on an average weekday. Of these, approximately 96,600 were on the transit system. The South Corridor accounted for approximately 33 percent of all daily person trips and 37 percent of all daily transit trips in the Portland metropolitan region. Daily work trips in the Corridor totaled 486,200 in 2000, of which 50 percent (242,000) remained within the South Corridor. Of the Corridor's average weekday transit trips in 2000, 37 percent (35,600) occurred between locations within the South Corridor and the Portland Central City, which includes downtown Portland, the Lloyd District, and the Central Eastside Industrial District (CEID).

Transit is a significant mode for work trips to downtown Portland. In 2000, there were 149,000 total daily work trips to downtown Portland. Of those, 61,000 trips were made via the transit system (41 percent). In the South Corridor, there were 38,060 daily work trips to downtown Portland; of those, 15,300 (40 percent) were on transit.

4.1.2 Public Transportation

The existing South Corridor transit system (see Figures 1.3-1 and 1.3-2) includes a portion of the grid-oriented transit system that serves much of southeast Portland. The grid network of radial and cross-town bus lines provides for multi-destinational travel, often through transfers between bus lines providing frequent service. The Corridor's transit network also includes a suburban, timed-transfer system serving transit centers in Clackamas County. The suburban, timed-transfer system is designed to serve both intra-suburban trips and suburb-to-downtown Portland (or other major regional destination) trips. The intra-suburban trips are served by feeder bus lines that connect suburban residential neighborhoods with transit centers in Milwaukie, Oregon City, and Clackamas Town Center in Clackamas County and Gateway in Multnomah County. These transit centers are linked to downtown Portland with high-capacity, high-frequency trunk line bus and light rail service. The Clackamas County trunk lines generally operate on SE McLoughlin Boulevard and Highway 224. Schedules for the trunk lines and feeder lines are defined so that buses arrive and depart from the major transit centers at the same time. This "pulse" allows for short, convenient, and predictable transfer times. The grid and timed-transfer service plans have led to strong growth in both urban and suburban transit travel, with most suburban ridership concentrated on trunk lines.

Transit service in the South Corridor is primarily provided by fixed-route, fixed-schedule buses operating in mixed traffic on freeways, highways, arterials, and local streets. As noted in Section 1.5 of this FEIS, transit service in the South Corridor is hampered by slowing speeds and reliability problems. Decreasing bus speeds and deteriorating reliability have been caused, in large part, by increased traffic congestion within and surrounding the Corridor.

An analysis of the proximity of employment sites to existing transit service determined that the transit coverage of employment sites (defined as a transit stop within ¼ mile of a job site) is 78 percent in the South Corridor. Transit coverage of residential areas within the corridor is 61 percent. These coverage rates compare with 80 percent employment center coverage and 61 percent residential area coverage for the region as a whole.

4.1.2.1 Public Transportation Providers

The Tri-County Metropolitan Transportation District of Oregon (TriMet) is the largest mass transit operating agency serving the Oregon portion of the Portland/Vancouver metropolitan area, and the fifth largest on the West Coast. Under Oregon law (ORS 267), TriMet is a non-profit, municipal corporation operating in the urbanized portion of three Oregon counties; Multnomah, Clackamas and Washington. Its operating area covers approximately 590 square miles and it serves a population of approximately 1.3 million (2001). The Clark County Public Transportation Benefit Area Authority (C-TRAN) provides transit services throughout Clark County, Washington, and into downtown Portland. The South Metro Area Rapid Transit (SMART) operates in Wilsonville and surrounding areas and includes connections to the TriMet system. SMART has been operated by the City of Wilsonville since 1998.

4.1.2.2 Transit Lines and Operations

TriMet currently operates 701 buses and 95 light rail vehicles (LRVs), including spares. TriMet's weekday operations run from approximately 3:30 a.m. to 2:00 a.m. Weekday service is generally divided between a.m. and p.m. peak period service (approximately 7:00 a.m. to 9:00 a.m. and 4:30

p.m. to 6:30 p.m., respectively). Midday service is generally from approximately 9:00 a.m. to 4:30 p.m. and evening service is from approximately 6:30 p.m. to 9:30 p.m. The remaining early morning and late night service operates at lower frequencies. During the p.m. peak period, 565 buses and 65 LRVs are in service. Cumulatively, buses in the TriMet system travel a total of approximately 27 million miles annually, with LRVs, traveling an additional 2.6 million miles annually. Total annual revenue hours (total number of hours transit vehicles are in revenue service) are 1.5 million for buses and 123,000 for light rail vehicles. Systemwide average speed is about 16 mph for buses and about 21 mph for LRVs, (average speeds include dwell times at bus stops and light rail stations).

Urban grid bus lines operate approximately every 15 minutes during the midday period, with more frequent service during the a.m. and p.m. peak periods, as demand warrants. Suburban trunk lines operate about every 30 minutes during the midday period and about every 15 minutes during the a.m. and p.m. peak periods. Buses on feeder lines typically run every 30 minutes during the midday period and about every 20 to 30 minutes during the a.m. and p.m. peak periods.

Currently, during the p.m. peak hour, 18 TriMet trunk line buses depart downtown Portland for the South Corridor. During the midday period, line 33 provides four trunk line trips per hour in each direction between downtown Portland and the South Corridor. Within the City of Portland, radial and cross-town bus lines provide transit service paralleling and intersecting these trunk lines.

TriMet's light rail system, or Metropolitan Area Express (MAX), currently consists of an east-west line from Gresham, through downtown Portland to Hillsboro (the Blue Line), a line connecting Beaverton Transit Center with the Portland International Airport (the Red Line), and the recently completed 5.8-mile Interstate Avenue extension north from Rose Quarter Transit Center to the Portland Metropolitan Exposition (Expo) Center (the Yellow Line). The current system includes 64 light rail passenger stations, 7,310 park-and-ride spaces adjacent to light rail stations, and two light rail operating and maintenance facilities – Ruby Junction on the east side of the Blue Line and Elmonica on the west side of the Blue Line. As of June 2004, system-wide average weekday light rail ridership was 97,100 boarding rides, average Saturday ridership was 79,900, and average Sunday ridership was 53,200.

The Blue Line is a 33-mile east-west light rail line with service between Gresham to the east and Hillsboro to the west via downtown Portland. Currently, the Blue Line operates approximately every 10 minutes during the midday period, with shorter headways during the a.m. and p.m. peak periods adjusted to meet demand and to comply with adopted loading standards.

The Red Line, which opened September 2001, includes a 5.5-mile extension on the eastside connecting Gateway Regional Center to Portland International Airport. Red Line trains operate between Beaverton Transit Center (TC) and Portland International Airport (PDX) on both an older portion of the Blue line (between Beaverton TC and Gateway TC) and on the newer portion of tracks, between the Gateway TC and the airport. North of the Gateway TC, the Red Line includes four stations and one park-and-ride lot, with capacity for 180 parking spaces. Current operations include daily service every 15 minutes with through-routed service between Beaverton and PDX. As of June 2004, patronage on the Red Line from Beaverton to Portland International Airport averaged approximately 18,600 boarding rides per weekday.

The Yellow Line, which opened May 2004, includes a 5.8-mile light rail extension north from the Rose Quarter Transit Center to the Portland Metropolitan Exposition (Expo) Center. The Yellow

Line operates between the Expo Center and downtown Portland and includes 10 new light rail stations and two new park-and-ride facilities, with a total of 600 parking spaces. Currently, the Yellow Line operates approximately every 10 minutes during the a.m. and p.m. peak periods and every 15 minutes during the midday period. As of June 2004, patronage on the Yellow Line averaged approximately 12,000 boarding rides per weekday.

In addition to the transit service provided by TriMet, the 2.5-mile **Portland Streetcar** operates between the intersection of NW 23rd Avenue and NW Lovejoy Street and Portland State University (PSU) in downtown Portland. The City of Portland constructed and currently manages the streetcar operation and contracts with TriMet to provide operators for the system. Streetcars run every 15 minutes during most of the day and less frequently in the evening and weekends, based on demand. Streetcar fares are fully integrated with TriMet fares and passes; tickets and transfers are accepted. There is no charge to riders who travel entirely within Fareless Square (i.e., a free-ride zone in downtown Portland and Lloyd District). In 2002, the Streetcar carried an average of 4,500 riders each weekday. An extension of the Portland Streetcar from PSU to the South Waterfront is under construction.

4.1.2.3 Passenger Facilities

TriMet currently maintains approximately 8,100 bus stops, 64 light rail stations, 1,000 bus shelters (41 of which are on the downtown Portland transit mall), 62 dedicated and shared use park-and-ride lots, and 16 transit centers. TriMet also provides special services for the elderly and the handicapped through the LIFT Program. TriMet operates a Customer Assistance Center in downtown Portland and provides sales and assistance outlets and ticket vending machines at light rail stations and along the transit mall in Fareless Square. TriMet also offers the option of bringing bicycles on-board all LRVs or placing them on external racks on all buses.

4.1.2.4 Current Ridership, Operating Revenue, and Operating Expenses

From 1981 to 1986, during a statewide and regional economic recession, average daily ridership on TriMet's fixed-route transit network (bus and light rail service) declined from 130,600 boardings to 115,600. However, by fiscal year (FY) 1994, the state and regional economies were experiencing strong growth, and average daily ridership had recovered to a new high of 198,400, primarily as a result of increases in employment, population, parking costs, and transit service. Average daily ridership has exceeded 250,000 boardings since early 1999, with the introduction of Westside light rail service and new feeder bus service as key factors in ridership growth. By June 2004, with full implementation of the Blue Line, Red Line and Yellow Line and continued increases in bus service, weekday boarding rides (bus and light rail) averaged approximately 304,000, Saturday ridership averaged 194,600, and Sunday ridership averaged 132,800.

TriMet's fares are established on the basis of zones. As of September 2004, TriMet fares for adults are $1.35 for two-zone trips and $1.65 for trips longer than two zones. Monthly passes are available for $49.00 for two-zone trips and $60.00 for longer trips. Discounted ticket prices are available to senior citizens, the disabled, and school-aged children. Trips taken wholly within downtown Portland and the Lloyd District fareless square areas are free. TriMet also provides a variety of group fare purchase options throughout the region.

Between fiscal year 1987 and fiscal year 2001, TriMet's annual systemwide farebox revenues increased from $19.5 million to $51.2 million. Costs for operations and maintenance during this period increased from $58.4 million to $156.7 million annually. Fare revenue as a percentage of the cost of operation and maintenance declined from 33.4 percent to 32.6 percent and operations cost per boarding ride increased from $1.22 to $1.84, reflecting inflation, decreasing bus operating speeds due to congestion and service expansion to lower ridership areas and time periods.

As of 2000, there were approximately 96,600 average weekday transit rides in the South Corridor. Full-time employed riders in the corridor tend to use transit for household trips and work-related transportation. Approximately three-quarters of TriMet's customers are classifies as "choice" customers, meaning they either have a car available but choose to use transit, or they do not choose to own a car, but rather to rely on transit. The other one-quarter of TriMet's customers are transit-dependent.

4.1.2.5 Accessible Service

Each of TriMet's light rail and bus lines is fully wheelchair accessible. TriMet operates North America's first low-floor LRVs on the Blue Line, Red Line and Yellow Line. All TriMet bus lines are wheelchair accessible using Lifts or low-floor buses with ramps. TriMet's Lift Program provides additional accessible service in the corridor. Lift is an accessible transportation program providing more than 919,000 (fiscal year 2003) door-to-door trips annually to individuals who cannot use regular TriMet buses because of a physical or mental disability. Lift also provides a reliable, accessible transportation resource for agencies wishing to purchase pre-scheduled door-to-door service for their clients.

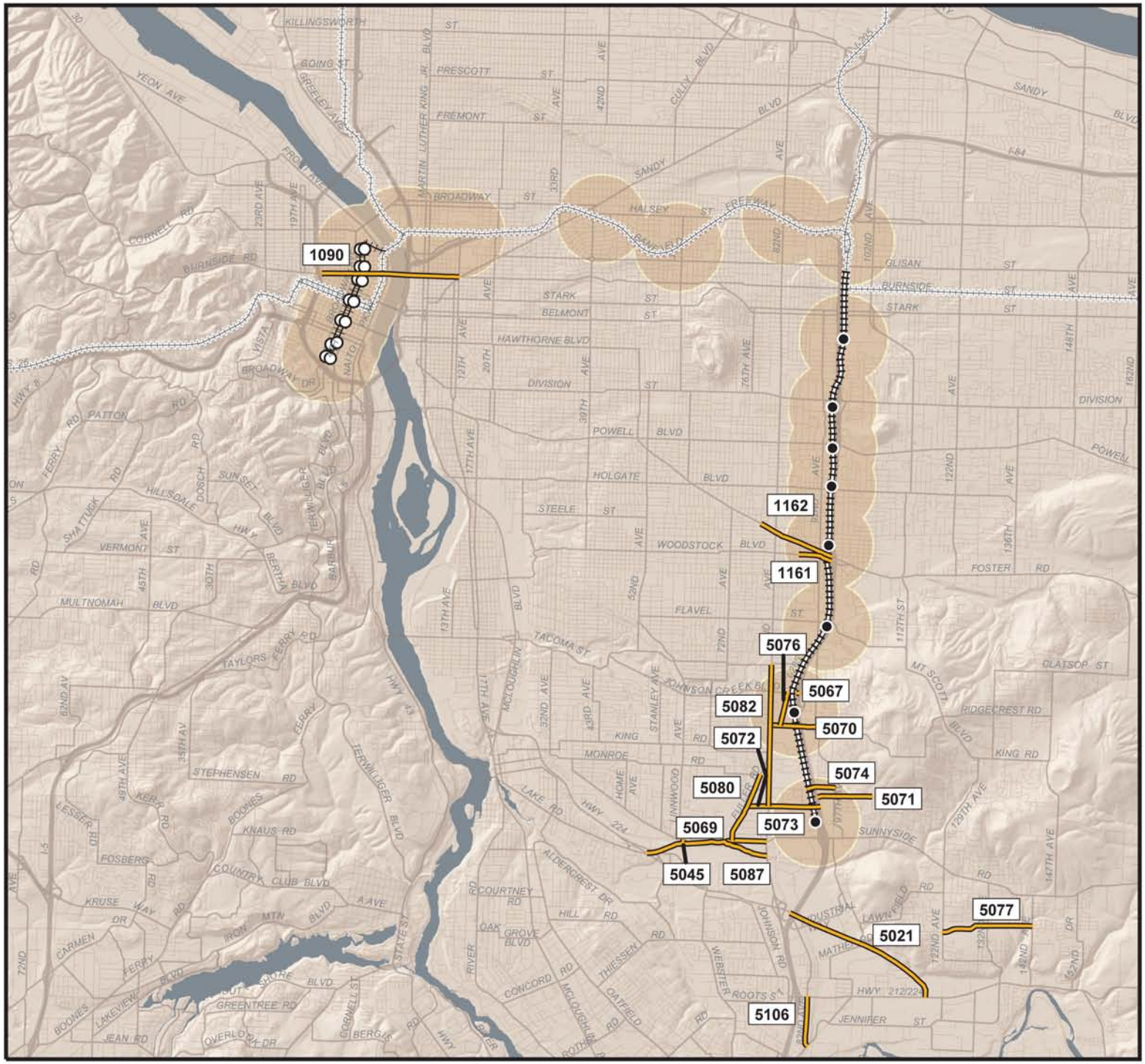
TriMet works with local jurisdictions to provide access to the transit system. The transit agency coordinates with cities and counties to plan service and capital improvements such as improved frequency, bus stops, park-and-ride lots, and transit stations with a goal of full accessibility of fixed-route services. All alternatives proposed for the South Corridor Project would provide fully accessible service.

4.1.3 Roadways

The South Corridor is served by a network of roads under the jurisdiction of the Oregon Department of Transportation (ODOT), Clackamas and Multnomah Counties, and the City of Portland. Significant congestion currently occurs on the Corridor's regional highways, local streets, and arterials.

4.1.3.1 Regional Highway Network

Many of the region's freeways and highways serve at least a portion of the South Corridor. The regional facilities include I-205, Highway 224, and SE McLoughlin Boulevard (Highway 99E). These roadways form the core of the road network in the South Corridor Project area and are shown in Figure 4.1-1. Regional and local transportation plans identify a number of highway and street improvements (as well as non-motorized improvements) that could affect the South Corridor Project area. These improvements are listed and briefly described in Table 4.1-1 and shown on Figure 4.1-1. Notable projects include the proposed widening of SE Harmony Road to a five-lane cross section, and the proposed realignment of the I-205 southbound off-ramp at SE Johnson Creek Boulevard to SE Fuller Road.



South Corridor Project

RTP- Roadway Capacity Projects

FIGURE 4.1-1

Roadway Capacity Projects in the Project Area

1090 *RTP Project Number*
(See Table 4.1-1 for project description)

ALIGNMENTS

Existing Light Rail

Portland Mall Segment

I-205 Segment

STATION LOCATIONS

Portland Mall Segment

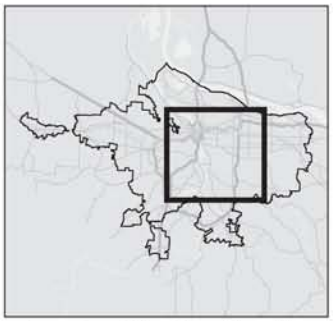
Stations: I-205 Segment

Existing Stations

Half-Mile Station Area

SOUTH CORRIDOR STUDY

METRO PEOPLE PLACES • OPEN SPACES



0 0.4 0.8 1.2 1.6 Miles

August 2004

Local Street Network

A wide range of conditions exists on the local street network within the South Corridor, depending on travel demand and the capacity of existing roadways. Local streets potentially affected by the Project were identified and the existing levels of service (LOS) on those streets were calculated.

Table 4.1-1
Regional Transportation Plan Financially Constrained
Roadway Capacity Projects in the Vicinity of the Project

RTP Project #	Affected Street	RTP Project Description
1090	W Burnside Street and NW Couch Street	Implement a one-way couplet with westbound traffic on NW Couch Street and eastbound traffic on W Burnside Street between the Burnside Bridge and NW 15th Avenue
1161 & 1162	SE Foster Road and SE Woodstock Boulevard	Implement Phase I & II of the Lents Town Center Business District Plan including new traffic signals, pedestrian crossings etc.
5021	Highway 224	Construct a new 4-lane highway and reconstruct the Highway 212/122nd interchange
5045	SE Linwood, Harmony & Lake Roads	Add NB right turn lane, add EB right turn lane, add WB left turn lane and grade separate
5067	SE Johnson Creek Boulevard Interchange	Rebuild the interchange and add loop ramp and NB on-ramp; realign SB off-ramp
5069	SE Harmony Road	Widen the street to five lanes from SE 82nd Avenue to Highway 224 with sidewalks and bike lanes.
5070	SE Otty Road	Widen and add turn lanes
5071	SE Otty Road	Extend SE Otty Road as two-lane collector to improve east-west connectivity
5072	SE Monterey Avenue	Construct a two-lane extension to improve east-west connectivity
5073	SE Monterey Avenue	Widen street to five lanes, from SE 82nd Avenue to the recently constructed overcrossing of I-205. This project will include sidewalks and bike lanes.
5074	SE Causey Avenue	Construct a three-lane extension of the street over I-205 to SE Bob Schumacher Road to improve east-west circulation. This project includes sidewalks and bike facilities.
5076	SE Fuller Road	Widen street and add turn lanes between SE Johnson Creek Boulevard and SE Otty Road
5077	SE Summers Lane	Extend SE Summers lane between SE 122nd Avenue and SE 142nd Avenue
5080	SE Fuller Road	Widen the street to three lanes between SE Harmony Road and SE Monroe Street, to improve north-south circulation in the regional center area. This project includes removing auto access to SE King Road.
5082	SE 82nd Avenue	Widen to add sidewalks, lighting, crossings, bike lanes and traffic signals
5087	SE Sunnybrook Road	Construct a three-lane extension to provide alternative east-west route connecting SE Sunnyside Road with SE Harmony Road
5106	SE 82nd Drive	Widen to five lanes between Highway 212 and SE Lawnfield Road

Source: 2004 Regional Transportation Plan (Metro, December 2003).

Traffic conditions on local streets generally are characterized by LOS at intersections, and intersections are categorized as either signalized (i.e., controlled by a traffic signal) or unsignalized (i.e., controlled by stop and/or yield signs or un-signed). LOS for local streets is based on an assessment of delay for existing or forecast traffic volumes, consistent with the *Highway Capacity Manual*. Delay is used to define the LOS at intersections, which is a measure of operational conditions and how those conditions are perceived by motorists. Delay at a signalized intersection depends on two factors: the capacity of the intersection (as defined by the number of lanes and lane widths) and signal timing. For unsignalized intersections, delay is also determined using two factors: street capacity and the type of stop or yield sign used to control the intersection. Level-of-service for an intersection is classified into ratings that range from "A" to "F," where "A" represents the least congested operation and "F" the most congested operation.

Existing p.m. peak-hour traffic counts were conducted in the spring of 2002 and updated at selected locations in the spring of 2004 at study area intersections in the South Corridor. Following is a summary of the traffic operating conditions for intersections in the corridor by segment.

A. I-205 Segment

The major roadway facilities in the I-205 Segment (Gateway to Clackamas) include I-205, SE Powell Boulevard, SE Foster Road, SE Woodstock Boulevard, and SE Johnson Creek Boulevard. A summary of existing p.m. peak-period traffic operations in the Gateway to Clackamas Segment follows:

- The intersection of SE Johnson Creek Boulevard at the I-205 southbound ramps operates at LOS F.
- The intersection of SE Johnson Creek Boulevard at SE 82nd Avenue operates at LOS E.
- All other signalized intersections in this segment operate at LOS D or better.
- The unsignalized intersections studied in this segment operate at LOS D or better.

B. Portland Mall Segment

Downtown Portland is served by a freeway loop system (I-5 and I-405) that provides the boundary for what is traditionally considered to comprise "downtown" Portland. The freeway loop provides access to the downtown Portland street network at numerous interchanges.

The downtown Portland street network is generally comprised of a dense network of relatively narrow (two-to-three lane) one-way streets. Peak-period traffic patterns within downtown are generally balanced between east-west and north-south. The traffic signals within the core of downtown are operated as a coordinated grid, with the signals operating at a one-quarter cycle off-set. This operating plan allows both east-west traffic and north-south traffic to travel at approximately 12 miles per hour through the downtown grid. Significant queuing at traffic signals is usually limited to a few locations associated with freeway or bridge access. Buses and light rail trains operate within this grid system.

4.1.4 Bicycle Activities

As part of the transportation data collection effort for the study area intersections, bicycle trips taken through those intersections were counted and compiled for the p.m. peak hour, which coincides with the motor vehicle p.m. peak hour. Similar to pedestrian count data, bicycle counts were the highest in downtown Portland and across the Hawthorne Bridge. Intersections further away from downtown Portland tended to have fewer bicycle trips than those closer to downtown Portland. For a more detailed analysis of bicycle facilities and activity please refer to the *Traffic Impact Technical Documentation* (Metro and DKS, November 2004). A summary of the bicycle activity within the South Corridor follows.

- **Portland Central City.** P.M. peak hour bicycle activity within downtown Portland generally ranges from 20 to 100 trips per hour through project area intersections, with more than 250 users crossing the Hawthorne Bridge (approximately 225 eastbound and 35 westbound) during the p.m. peak hour. Bicyclists on the Hawthorne Bridge typically travel along SE Hawthorne Boulevard and SE Madison Street east of the Willamette River or access the Eastside Esplanade bicycle/pedestrian path for north/south travel along the river with connections to the Springwater Corridor.

- **Clackamas Regional Center.** Bicycle counts in the vicinity of the Clackamas Regional Center indicate that fewer than five bicycle trips per hour are taken through the observed intersections during the p.m. peak period.

- **I-205.** Bicycle counts at intersections along the I-205 segment showed fewer than five bicycle trips per hour were taken through the observed intersections during the p.m. peak period. Many bicycle trips in the vicinity of I-205 travel on the I-205 multiple-use path, which runs parallel to I-205 and connects to the Springwater Corridor multiple-use path, which extends west and east to Milwaukie and Gresham, respectively. The Springwater Corridor connects to the I-205 multiple-use path in the vicinity of SE Flavel Street.

4.1.5 Pedestrian Activities

As part of the transportation data collection effort for the project area intersections, pedestrian trips taken through those intersections were counted and compiled for the motor vehicle p.m. peak hour. Similar to bicycle count data, pedestrian counts were the highest in downtown Portland and across the Hawthorne Bridge and within other activity centers in the Corridor. Intersections further away from downtown areas tended to have fewer pedestrian trips than those closer to downtown areas. A summary of pedestrian activity within of the South Corridor follows.

- **Downtown Portland.** Downtown Portland has the highest level of pedestrian activity occurring at the surveyed intersections during the p.m. peak hour, with approximately 100 to 500 pedestrians per hour traveling through each intersection.

- **Clackamas Regional Center.** The intersections adjacent to the Clackamas Town Center shopping center have limited pedestrian activity during the p.m. peak hour, with fewer than ten pedestrian trips per hour taken through a majority of the observed intersections. Locations where pedestrian activity tends to occur are localized along the I-205 multiple-use path, on SE Monterey Avenue, and along SE Sunnyside Road, all in the vicinity of the Clackamas Town Center TC. Approximately 10 to 20 pedestrian trips occur at intersections in this area during the p.m. peak hour. Project area intersections adjacent to I-205 have limited pedestrian activity during the p.m. peak hour, with fewer than 20 pedestrian trips being taken through a majority of the observed intersections.

4.1.6 Parking

This section provides an inventory of on-street and off-street parking spaces within the general vicinity of the capital improvements included in the South Corridor alternatives.

Numerous on-street parking spaces are located on the roadways that would parallel and intersect the proposed alignments for the various alternatives being considered. In downtown Portland, on-street parking is almost exclusively metered and priced at approximately $1 per hour. Many of the proposed light rail station locations have adjacent on-street parking, some of which have time restrictions and some of which allows unrestricted use. Table 4.1-2 lists the number of existing on-street parking spaces that would be within approximately 500 feet of a proposed transit station.

Table 4.1-2
I-205 Segment Existing On-Street Parking Spaces and Use

Station	Spaces Within 500 Feet[1]	Utilization (%) Within 500 Feet[2]	Spaces Within 1,000 Feet[1]	Utilization (%) Within 1,000 Feet[2]
SE Main Street	19	0%	40	0%
Division Street	48	5%	94	12%
Powell Boulevard	42	12%	90	14%
Holgate Boulevard	81	5%	245	12%
Foster Road	24	38%	105	29%
Flavel Street	34	0%	119	4%
Fuller Road	10	0%	24	0%
Clackamas Town Center	0	N/A	30	10%

Source: DKS Associates: July 2004
[1] Approximate number of on-street spaces near proposed station location.
[2] Weekday, midday estimate of utilization, August 2002.

Off-street parking in the South Corridor is generally privately owned and typically serves adjacent commercial activity. In general, off-street parking spaces in downtown Portland are priced or are provided for the exclusive use of one or more adjacent businesses. Almost all of the existing off-street parking lots in the project corridor outside of downtown Portland are not priced.

The area of potential parking impact near major transit stations was evaluated for existing light rail stations along the east portion of the Blue Line. Three stations were surveyed during August 2001: the Hollywood Transit Center (which has no park-and-ride spaces), the Gateway Transit Center (which has more than 800 park-and-ride spaces), and the Burnside/122nd Park-and-Ride Lot (which has more than 400 spaces). Survey information indicates that, within a radius of about 500 feet from the station locations (about two blocks), on-street parking is highly utilized (75 percent or higher). Within a radius of approximately 500 to 1,000 feet from a station, on-street parking use diminishes. Outside the 1,000-foot radius, on-street demand falls quickly.

These surveys of parking space use around existing light rail stations were conducted to help determine an approximate parking-impact area for proposed station areas in the South Corridor, based on trips destined to a station that would start as a motor vehicle trip (i.e., park-and-ride trips). The average walking distance for park-and-ride trips (between an automobile and the transit station) is different than it is for walk-access trips (i.e., trips between a point of origin or destination and the transit station). The typical walk distance for a walk-access trip is up to ½ mile. In contrast, the average walk distance for a park-and-ride trip (from a parked automobile to the transit station) would be much less because of the travel time sensitivity of park-and-ride lot users.

4.1.7 Freight Facilities

Movement of freight and goods throughout the project area is vital for the economic vitality of the region. Freight movement within the project area is accomplished using two modes: railroad and truck. There are no existing railroad facilities within the I-205 segment of the South Corridor Project. The portion of the Project using the existing light rail alignment along I-84 would operate adjacent to the Union Pacific Railroad tracks between Gateway and Lloyd Center (same as the existing Blue Line and Red Line). At the west end of the Steel Bridge the Project would operate adjacent to and offset from railroad tracks at the south end of Union Station used primarily for passenger service.

While peak-periods of truck activity typically occur during the midday, when total traffic levels are lower, the p.m. peak-hour was selected for this analysis because it tends to be the most congested period of the day. A summary of truck movements in the South Corridor includes:

- **Portland Central City.** Truck trips through intersections within downtown Portland make up approximately 2 to 5 percent of all vehicular trips during the p.m. peak period.
- **Clackamas Regional Center.** Within the Clackamas Regional Center area, truck trips make up approximately 1 to 3 percent of all trips taken through intersections during the p.m. peak hour.
- **I-205.** The intersections in the vicinity of I-205 have truck activity similar to other study area locations during the p.m. peak hour, ranging from 1 to 5 percent.

4.1.8 Navigable Waterways

The Project would cross the Willamette River on the existing tracks on the Steel Bridge. There would be no change to navigable waterways on the Willamette River resulting from the Project.

4.2 Transit Impacts

The following discussion of transit impacts is limited to service and ridership considerations. Cost and other financial considerations are discussed in the following sections of this FEIS: Section 2.3: Capital Costs; Section 2.4: Operations and Maintenance Costs; and Section 6.1: Financial Analysis.

4.2.1 Service Characteristics

Transit service considerations in this section include the amount of transit service and transit service coverage, transit travel times, reliability, and downtown Portland transit operations. The No-Build Alternative was developed to be consistent with the transit service characteristics of the 2025 Financially Constrained Network of the *2004 Federal Update of the Regional Transportation Plan* (RTP) (Metro, December 2003). The Project is similar to the No-Build Alternative except for the Portland Mall light rail alignment in downtown Portland and transit service between Gateway and Clackamas provided by light rail rather than bus (there would also be some minor bus route modifications to serve light rail stations). See the *Final Definition of Alternatives Report (*Metro, November 2004) or Section 2.2 of this FEIS for a more detailed description of the alternatives.

4.2.1.1 Amount and Coverage of Service

The amount of transit service provided is measured by daily transit vehicle hours traveled (VHT), daily transit vehicle miles traveled (VMT), and daily place-miles of service. Daily vehicle hours are the cumulative time that transit vehicles are in operation, and daily vehicle miles are the distance they travel, independent of vehicle size. "Daily" is defined as an average weekday in 2025. In addition to providing an overview of transit service level, these statistics are inputs into the operations and maintenance cost model. Place-miles refers to the total carrying capacity (seated and standing) of each bus or train type; it is calculated by multiplying vehicle capacity of each bus or LRV by the number of service miles traveled each day by each vehicle type. Place-miles highlights differences in overall transit passenger-carrying capacity that would result from the different mix of vehicles and levels of service called for under each alternative. Table 4.2-1 summarizes the major transit characteristics for the No-Build Alternative and the Project.

Amount of Service

Service growth under the No-Build Alternative would be constrained by currently available revenue sources, consistent with the financially constrained transit network in Metro's 2004 RTP. Normal

annual growth in service would occur over the next 20 years at an estimated rate of 1.5 percent per year. The No-Build Alternative in 2025 would result in a 48 percent increase in average weekday corridor transit vehicle miles and a 50 percent increase in transit VHT compared to existing service. The greater percentage increase in VHT compared to VMT indicates that transit speeds in the corridor would slow relative to existing conditions, due to increasingly congested and slowing traffic on local streets, arterials and highways.

The Project would include a 6.5-mile light rail extension that would generally parallel I-205 and connect the existing Gateway TC with the Clackamas Town Center TC. Green Line light rail trains would be through-routed between the Clackamas Town Center TC and downtown Portland via 6.2 miles of existing track along I-84 and through the Lloyd District shared with the Blue and Red lines, and 1.8 miles of new double-track along the Portland Mall (5th and 6th Avenues). In the peak hour in 2025, two-car trains would operate every 7.5 minutes on average between Clackamas and downtown Portland (see Section 2.2 of this FEIS for more detail).

Table 4.2-1
Average Weekday Corridor Transit Service Characteristics, by Existing Conditions, No-Build Alternative, and the I-205/ Portland Mall Project

Attribute	Existing	No-Build	I-205/Mall
Transit VMT[1] (Weekday)			
Bus	20,700	30,720	30,130
LRV	0	0	2,790
Total	20,700	30,720	32,920
% Change[2]	N/A	48%	+7%
Transit Revenue VHT (Weekday)			
Bus	1,310	1,970	1,920
LRV	0	0	150
Total	1,310	1,970	2,070
% Change[2]	N/A	50%	+5%
Place Miles[3] (Weekday)			
Bus	1,366,200	2,027,520	1,988,580
LRV	0	0	741,870
Total	1,366,200	2,027,520	2,730,450
% Change[2]	N/A	48%	+35%

Source: *Final Definition of Alternatives Report* (Metro: November 2004).
Note: LRV = light rail vehicle; VMT = vehicle miles traveled; VHT = vehicle hours traveled; N/A = not applicable.
[1] For LRVs, *transit* VMT is measured in train miles, rather than car miles.
[2] For the No-Build Alternative, the % change is from existing; for the Project, the % change is from the No-Build Alternative.
[3] Place-miles = transit vehicle capacity (seated and standing) for each vehicle type multiplied by VMT for each vehicle type.

Compared to the No-Build Alternative (see Table 4.2-1), the Project would result in a greater number of place miles, total transit VHT, and total transit VMT. Total corridor place miles (bus and light rail) for the Project would increase by 35 percent, transit VHT would increase by 5 percent, and transit VMT would increase by 7 percent.

The growth in transit service for the Project reveals two consistent characteristics. First, compared to the No-Build Alternative, the Project would have a greater percentage increase in transit VMT than the percentage increase in transit VHT, indicating that average transit speeds in the Corridor would increase with the Project. Second, with the Project compared to the No-Build Alternative, the percentage increase in transit place-miles (defined as transit vehicle capacity multiplied by vehicle miles) would be greater than the percentage increase in vehicle hours. This increased transit capacity without a proportional increase in vehicle hours would result from increases in the passenger-carrying capacity of light rail. For example, a standard 40-foot bus has a capacity (seated and

standing) of 65 people and a two-car light rail train can carry 266 people (133 per car). Consequently, one hour of light rail service can provide more than four times the passenger-carrying capacity of a standard bus.

Transit Coverage

Transit coverage is a measure that can be used to indicate how well households and employment would be served by alternative transit networks. Table 4.2-2 shows the percentage of people in the South Corridor that would work and live within a ¼-mile radius of a station or bus stop. Existing (2000) transit coverage in the South Corridor is 61 percent for households and 78 percent for employment. A portion of the South Corridor is located in areas that lie outside of the TriMet service area boundary. Both the No-Build Alternative and the Project would improve transit coverage within the South Corridor. With both the No-Build Alternative and the Project, transit coverage in the South Corridor would increase to 66 percent for households and 79 percent for employment. The same transit coverage for both alternatives indicates that the networks are based on the same background transit system.

The increased coverage over existing levels is due to the expansion of transit service called for in the 2004 RTP Financially Constrained network, which forms the basis for the No-Build Alternative and the Project. The increased coverage would also result, in part, from growth in population and employment inside the region's urban growth boundary (UGB). Forecasts of population and employment growth used for this FEIS are consistent with the Region 2040 Concept Plan, which is based on local and regional comprehensive plans that emphasize concentrating growth in regional centers and town centers served by transit.

Table 4.2-2
Transit Coverage[1]: Percentage of Corridor[2] Population and Employment Within ¼-Mile of a Transit Stop, by Existing Conditions, No-Build, and I-205/Mall Project

	Existing	No-Build	I-205/Mall
Households	61%	66%	66%
Employment	78%	79%	79%

Source: Metro, 2004.
[1] The percentage of the corridor's population or employment that would be located within a ¼-mile of either a bus stop or a light rail station (see Figure 1.2-1 for an illustration of the South Corridor).
[2] The South Corridor study area includes population and employment that lie outside of TriMet's service area.

4.2.1.2 Transit Travel Time

Transit and auto travel time are assessed using in-vehicle time and total travel time, as shown in Tables 4.2-3 and 4.2-4, respectively. These tables summarize the p.m. peak-hour in-vehicle and total travel time for transit and automobiles for the No-Build and the Project. The travel time data are shown between selected locations in the Portland Central City (i.e., Pioneer Square, PSU, and the Rose Quarter) and selected locations in the corridor (i.e., Clackamas Town Center TC, Oregon City and Lents).

In-vehicle transit travel time includes only the amount of time it takes for a vehicle to travel between an origin and destination. For buses operating in mixed traffic, this measure reflects roadway speed limits, congestion, and dwell time at bus stops. In-vehicle travel time for light rail operating in exclusive right-of-way includes acceleration to and deceleration from the maximum operating speed which also accounts for the local operating environment, alignment design, wheel-rail traction (if

applicable), and braking performance in both uphill and downhill operations. Total transit travel time includes time spent walking to transit, initial wait time, transfer wait time (if any), in-vehicle time, and time walking from transit to the destination. Total auto travel time includes time getting to and from the auto at both the trip origin and trip destination.

Table 4.2-3
Transit and Auto P.M. Peak Hour, In-Vehicle Travel Times[1] to Selected Corridor Locations From Selected Portland CBD Locations, – Year 2025

Origin/Destination	No-Build		I-205/Mall	
	Auto	**Transit**	**Auto**	**Transit**
To Clackamas TC from:				
Pioneer Square	37	52	37	38
PSU	37	50	37	42
Rose Quarter	35	40	35	30
To Damascus from:				
Pioneer Square	54	79	54	59
PSU	54	79	54	63
Rose Quarter	51	58	51	49
To Lents from:				
Pioneer Square	30	37	30	31
PSU	30	35	30	35
Rose Quarter	28	39	28	23

Source: Metro, 2004.
Note: TC = transit center; PSU = Portland State University.
[1] In minutes for travel in the PM peak period. In-vehicle time is only the time that a passenger would spend within a public transit vehicle or automobile.

Table 4.2-4
Transit and Auto P.M. Peak Hour, Total Travel Time[1] to Selected Corridor Locations From Selected Portland CBD Locations – Year 2025

Origin/Destination	No-Build		I-205/Mall	
	Auto	**Transit**	**Auto**	**Transit**
To Clackamas TC from:				
Pioneer Square	42	60	42	48
PSU	42	61	42	52
Rose Quarter	40	55	40	39
To Damascus from:				
Pioneer Square	59	95	59	78
PSU	59	95	59	82
Rose Quarter	56	73	56	68
To Lents from:				
Pioneer Square	35	46	35	41
PSU	35	48	35	46
Rose Quarter	33	54	33	32

Source: Metro, 2004.
Note: TC = transit center; PSU = Portland State University.
[1] In minutes for travel in the PM peak period. Total time is the sum of in-vehicle time and all other time related to completing the trip, including walking and waiting time.

Clackamas Town Center Transit Center. Peak-hour, in-vehicle transit travel time from Pioneer Square to the Clackamas Town Center TC would be 52 minutes with the No-Build Alternative and 38 minutes with the Project, a 27 percent reduction. The Project would also provide a faster in-vehicle travel time between the Rose Quarter and Clackamas Town Center TC (30 minutes with the Project, compared to 40 minutes with the No-Build Alternative).

Lents. With the No-Build Alternative, transit patrons would use line 14-Hawthorne, for travel between downtown Portland and Lents. The Project would save 6 minutes of transit in-vehicle time and 5 minutes of total transit time between Pioneer Square and Lents. The transit travel time savings

between Rose Quarter and Lents would be even greater, with a savings of 16 minutes of transit in-vehicle time and 22 minutes of total transit travel time. With the Project, the transit in-vehicle time between Rose Quarter and Lents would be 5 minutes less than a similar trip using an automobile.

Damascus. Peak-hour, in-vehicle transit travel time from PSU to Damascus would be 79 minutes with the No-Build Alternative and 63 minutes with the Project, a 20 percent reduction. The Project would also provide a faster in-vehicle travel time between the Rose Quarter and Damascus (49 minutes with the Project, compared to 58 minutes with the No-Build Alternative).

4.2.1.3 Reliability

Table 4.2-5 summarizes transit reliability measures for the No-Build Alternative and the Project within the South Corridor. Reliability measures include the number of miles of reserved or separated right-of-way, and the percentage of passenger-miles in reserved or separated right-of-way. The Project would operate almost entirely within reserved right-of-way and would provide a greater amount of separation from the adjacent automobile traffic. This separation generally provides for a greater level of reliability than an alternative operating in mixed traffic, which would require more interaction with autos in mixed traffic.

Table 4.2-5
South Corridor Transit Reliability Measures
Average Weekday – Year 2025

Reliability Measures	No-Build	I-205/Mall
Miles of Fixed Guideway in Reserved or Separated ROW	N/A	8.3[1]
Passenger-miles in ROW	N/A	130,285
% of Total Corridor Passenger-miles in ROW	N/A	18%

Source: Metro, 2004.
Note: LRT = light rail transit; ROW = right-of-way.
[1] Includes the portion of the Green Line (I-205 LRT) between Gateway and Clackamas and the Portland Mall between the Steel Bridge and PSU.

Trunk route service reliability is critical to efficient transit system operations. With the Project, the primary trunk route service (Green Line) serving the Clackamas Town Center Transit Center would operate in exclusive right-of-way and would be highly reliable. With the No-Build Alternative the trunk route bus service (Line 31) would operate on surface streets and on shopping center access roads. During the peak-shopping season in late November and December, trunk route bus access to and egress from the transit center could be delayed by conflicts with shopping center traffic. With the Project and the No-Build Alternative, feeder bus access would also be subject to seasonal conflicts with shopping center traffic. With the Project and the new transit center location on the east side of the shopping mall, feeder bus access could be subject to some additional seasonal delay compared with the No-Build Alternative.

The Project includes light rail on the Portland Mall in which buses would share one of two transit-only lanes with light rail vehicles – the second transit-only lane would be used exclusively by buses. The new mode mix and operating rules for the transit lanes would reduce the capacity for buses on the Mall and would introduce modest rail-priority related delay for bus operations in order to accommodate train movements. Countering this increased bus delay, however, would be the reduction in bus travel times along the Mall created by the reduction in the number of bus stops (as well as the reduction in the potential for bus stop delays).

The net result would be a 6 to 7 percent increase in bus travel speeds through the Portland Mall with the Project, compared to the No-Build Alternative. Light rail train volumes would be well below the capacity ceiling on both downtown alignments, with 16 in each direction on the cross mall and 14 in each direction on the Portland Mall in 2025, which would result in sustainable LRT schedule reliability, while improving bus operations along the Portland Mall.

4.2.1.4 Portland Mall Segment Light Rail Operations

The Portland Mall opened in March 1978 to provide transit priority right-of-way, to clarify service patterns and to improve bus travel times and reliability through downtown Portland. The Portland Mall originally extended from SW Madison Street to W Burnside Street on SW 5th and 6th Avenues. In June 1994, the Mall was extended north to NW Irving Street.

Construction of a light rail alignment along the Portland Mall would provide opportunities for expanding light rail coverage, improving light rail and bus operations, improving transit access for trips completely within downtown Portland and enhancing connectivity between the bus and light rail system. Both light rail and buses would operate on NW and SW 5th and 6th Avenues. The transit operations plan for light rail and buses is described below.

A. Transit Stop Spacing

The South Corridor Project would place light rail on the Portland Mall, generally in the center lane with stations approximately every four to five blocks. Light rail and buses would share a through lane, though buses would not operate in the light rail lane at stations when trains are present and bus stops would not be on the light rail tracks (see figures 2.2-3, 2.2-4 and 2.2-5). The Green Line and the Yellow Line would operate along the Portland Mall light rail alignment. The Yellow Line opened in May 2004 and is currently using the existing light rail alignment along NW/SW 1st Avenue and SW Morrison and Yamhill streets.

Routing both the Yellow and Green lines on the Portland Mall would improve light rail service coverage within downtown and balance train volumes between the two downtown Portland alignments. Long-range plans envision through-routing Yellow Line trains to Milwaukie (the Phase 2 Project of the South Corridor). The Red and Blue lines would continue to operate on the cross-mall alignment. Many bus routes would continue to operate on the Mall as they do today, especially the "Frequent Service" routes that have the most frequent service throughout the day and continue frequent service into evenings and weekends. Some bus routes would be moved to other streets to provide additional service coverage within downtown, to improve efficiency, and to reduce capacity constraints on future bus service on the Mall. Operational modeling indicates that with the planned level of 2025 light rail service on the Mall there would be adequate capacity to accommodate the number of buses forecast on the Portland Mall for 2025.

Light rail operations in the Central Mall would require changes to bus stop locations. Bus stops would be removed from the block faces that would contain light rail stations and buses would be limited to a single through transit lane when light rail trains dwell at stations. This changed operating plan would be similar to current operations, where the right lane is reserved for buses serving bus stops and the single center lane is used for through bus operations. In addition, the half-blocks immediately before and after each light rail station would generally not be used for regular fixed-

route bus service to avoid the potential for conflicts between light rail vehicles and buses. These spaces could be used for LIFT services or other needs without creating conflicts.

TriMet bus operators and trainers field-tested the bus maneuvers necessary for various configurations of bus and light rail operations on the Portland Mall. Based on these field tests, the bus stop immediately before these nearside stops could be moved forward to allow more space in those stops without compromising operations or safety. This change in bus stop spacing could also provide more capacity at those stops. The planned bus stop placement for the Portland Mall alternatives would result in bus stop spacing changing from approximately every two blocks to an average of every three blocks in the Central Mall, with stops generally either two blocks or four blocks apart depending on the interaction of the stop locations with light rail station placement.

The bus stops in the North Mall would also change from their current configuration. Bus stops would be eliminated from light rail station blocks. Bus stops would be limited on the North Mall, with light rail replacing some routes, and many bus stops moved to cross-streets. Bus stops would remain at Union Station and on NW 5th and 6th avenues in the vicinity of NW Everett Street and NW Davis Street as well as cross streets in the near vicinity of NW 5th and 6th avenues.

Currently, many bus routes operate the full length of the Portland Mall to Union Station to reach the bus layover facility. The addition of light rail to Union Station would provide a new mode and additional transit capacity for passengers to this area, reducing the number of buses required to travel the full length of the North Mall. As a result, TriMet would change some bus routing and layover locations for certain bus routes. With a reduction in the number of bus stops along the Portland Mall, bus loading and dwell times would increase. The average walk time and distance to reach a bus stop would increase for approximately one-quarter to a half of bus riders by an average of approximately one block (200 feet), compared to existing conditions. This is a relatively small change that would be offset by the availability of light rail service on the Mall and by faster bus travel times on the Mall once riders board the bus. However, mobility-challenged riders would more impacted by the bus stop spacing change due to the extra distance required to reach the bus stop for some trips.

B. LRT and Bus Operations

With the Project, revised standard operating procedures would be implemented for both bus and light rail operators on the Portland Mall. In the Central Mall and in a large portion of the South Mall, bus and light rail operations would be focused on two free-flowing transit-only lanes. In the North Mall and in portions of the far end of the South Mall, where bus volumes are low today and would be lower still in the future, buses would share lanes with automobiles and they would be allowed to use the light rail lane for passing.

In situations where light rail and buses would share the same operating environment, light rail trains would have the right-of-way. Signals and operations similar to the existing SW Morrison and Yamhill Street alignments would govern light rail operations. Bus operations have more flexibility and therefore would rely on standard operating rules with the addition of train warning signals to ensure that bus operators are aware of approaching trains. The current operating rules for bus operations on the Portland Mall, where buses move in and out of bus stop locations using bus turn signals and rules about right-of-way, would need to be amended to accommodate light rail trains. Light rail trains, when present (approximately once every 3-4 minutes in the peak hour), would have the right-of-way, with buses allowed to follow behind. Buses would be allowed to pass light rail

trains at the station, using the through lane, just as they do to pass stopped buses at bus stops, but would not be allowed to pull directly in front of light rail trains, because the combined length of a standard size bus and a two-car train is longer than most downtown Portland blocks.

A combination of today's bus operating rules and additional operating rules would result in safe and efficient operations. A bus signal control system would be installed to give priority to trains and clear the shared bus/light rail lane of buses immediately ahead of moving trains to allow trains to move forward. These "train clearance signals" would clear the track of buses for trains that would be traveling from one station to the next. Train-to-wayside communications, similar to those on the cross-mall alignment, would allow train operators to signal their intention to move forward at the next green signal. This would trigger a signal system directed at buses indicating the impending movement of the train, signaling buses to begin clearing the lane and not to enter the lane if they are currently at a bus stop. During train movements, the bus-directed signal would keep the lane clear until the train had passed that point, at which time buses could follow behind the train. Buses could also platoon forward while staying in the right lane until the train passed.

In the North Mall, autos currently travel in the left lane, while the right lane is reserved for buses. With light rail added to the North Mall, this configuration would change. Light rail would operate in the right lane, with two stations in each direction on the right side. Buses could operate in either lane, autos would be restricted to the left lane and light rail vehicles would operate in the right lane. Buses could only stop at bus stops specifically built to allow buses to stay clear of the tracks, such as at Union Station, or on cross-streets. Because light rail and autos should not be mixed in regular traffic for safety and operational reasons, autos would be restricted to the left lane just as they are today, but with the addition of some buses traveling through in this lane as well. With the Project, auto left turns would continue to be allowed along NW 5th and 6th avenues in the North Mall.

The addition of light rail on the Portland Mall would allow a limited amount of bus service to be re-deployed to underserved areas of downtown on non-mall downtown streets, primarily SW Columbia Street, SW Jefferson Street, SW Harrison Street, SW 10th Avenue and SW 11th Avenue. The final bus service re-deployment plan will be determined through a public process during final design.

4.2.2 Transit Ridership

This section provides an analysis of transit ridership in the corridor and usage of stations. Within this section, several types of transit ridership are evaluated: total corridor transit ridership; transit trip productions; work and non-work transit trips and mode share; light rail ridership; and station activity.

4.2.2.1 Systemwide and South Corridor Transit Ridership

Table 4.2-6 summarizes total 2000 and 2025 average weekday transit ridership for all bus and light rail trips produced in or attracted to the South Corridor for Existing (2000), No-Build Alternative, and Project. The Project would generate 13,110 more total weekday corridor transit trips than the No-Build Alternative, a 5 percent increase.

Table 4.2-6
Total Systemwide and South Corridor Transit Trips[1], by Existing (2000), No-Build and I-205/Mall, Average Weekday – Year 2025

	Existing (2000)	No-Build	I-205/Mall
Total Corridor Transit Trips (originating rides)	96,600	249,560	262,670
% Change from Existing	N/A	+158%	+172%
% Change from No-Build	N/A	N/A	+5%
Total Systemwide Transit Trips	259,300	551,540	568,420

Source: Metro, 2004.
[1] Transit trips are one-way linked trips from an origin (e.g., home) to a destination (e.g., place of work or school), independent of whether the trip requires a transfer or not. A person traveling from home to work and back counts as two trips. Total corridor transit trips include all light rail and bus trips produced in or attracted to the South Corridor.

4.2.2.2 Transit Trip Productions

Figure 4.2-1 illustrates the change in transit trip productions (i.e., where trips originate) for the Project, compared with the No-Build Alternative. The map highlights the areas within the South Corridor that would experience an increase in transit trip productions with the Project and, conversely, the areas that would experience a loss in transit trip productions as a result of the Project.

4.2.2.3 Work and Non-Work Transit Trips and Mode Share

Table 4.2-7 summarizes corridor transit trips and transit mode share for trips produced in the South Corridor destined to the Portland Central City for work and non-work purposes (the Portland Central City includes the Lloyd District, the CEID, downtown Portland, North Macadam, Goose Hollow, and Northwest Portland). The table demonstrates that the Project would result in improved transit mode share compared to the No-Build Alternative. The transit mode share for work trips to the Portland Central City would increase from 38 percent with the No-Build Alternative to 41 percent with the Project.

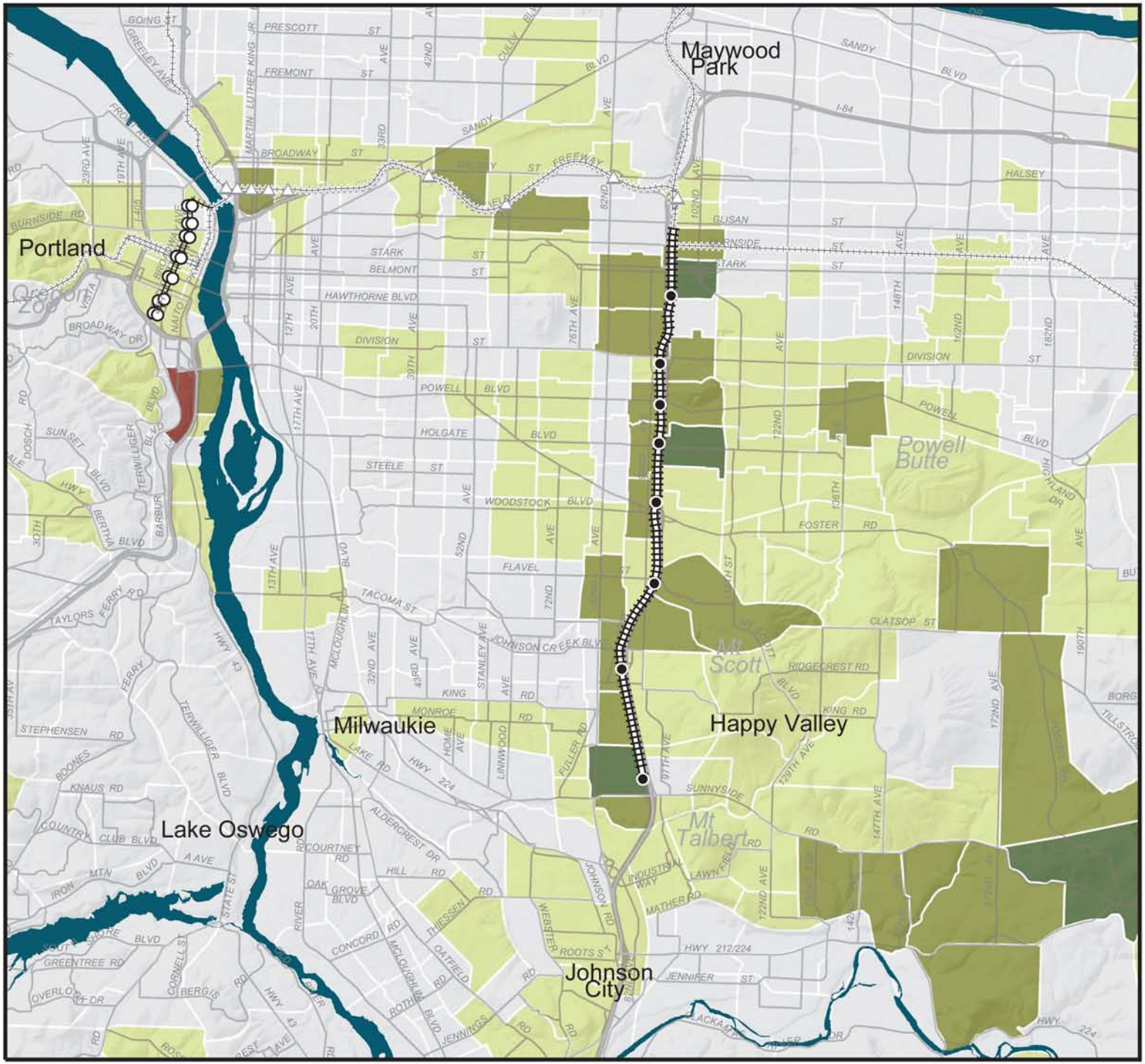
Table 4.2-7
Work and Non-Work Corridor Transit Trips and Transit Mode Share to Central City[1], by Existing, No-Build, and I-205/Mall[1], Average Weekday – Year 2025

	Existing (2000)	No-Build (2025)	I-205/Mall (2025)
Home-Based Work[2]			
Transit	16,990	39,450	42,780
Total Person	63,150	104,100	104,100
Mode Split	27%	38%	41%
Non-Work[3]			
Transit	15,890	31,795	32,450
Total Person	108,550	131,975	131,975
Mode Split	15%	24%	25%
Total			
Transit	32,880	71,245	75,230
Total Person	171,700	236,075	236,075
Mode Split	19%	30%	32%

Source: Metro, 2004.
[1] Central City includes Lloyd District, Central Eastside Industrial District, downtown Portland, North Macadam, Goose Hollow and Northwest Portland. Excludes intra-Portland CBD trips.
[2] Home-based work trips are defined as trips taken directly between one's home to one's place of work.
[3] Non-work trips are defined as all trips that are not home-based work trips.

4.2.2.4 Light Rail Ridership

Table 4.2-8 summarizes projected average weekday 2025 systemwide light rail ridership and the peak load point ridership for each light rail line.



South Corridor Project

Change in Transit Trip Productions

FIGURE 4.2-1

Change in Transit Trips by TAZ Compared to No-Build Alternative

- *Loss of more than 100*
- *Loss of 21 to 100**
- *Loss of 20 to Gain of 20*
- *Gain of 21 to 100*
- *Gain of 101 to 250*
- *Gain of more that 250*

*Does not occur on this map

ALIGNMENTS

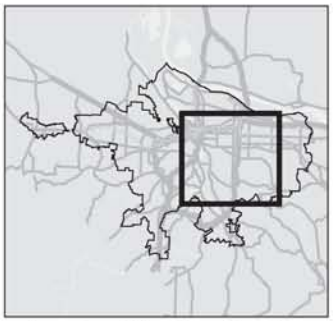
- *Existing Light Rail*
- *Portland Mall Segment*
- *I-205 Segment*

STATION LOCATIONS

- *Portland Mall Segment*
- *I-205 Segment*
- *Existing Stations*

SOUTH CORRIDOR STUDY Transportation Alternatives

METRO PEOPLE PLACES • OPEN SPACES



0 0.4 0.8 1.2 1.6 Miles

September 2004

Because the light rail lines would operate as an integrated element of TriMet's overall transit system, ridership on each light rail line would be susceptible to changes in the configuration of transit service and facilities in the South Corridor. This interrelationship of ridership between the light rail lines is demonstrated throughout Table 4.2-8. For example, ridership would be different on the Blue and Red Lines with the No-Build Alternative and the Project. With the Project, the Blue and Red Lines would have slightly lower ridership as some Blue and Red line trips would be accommodated on the Green Line in the section that the three lines share (between Gateway TC and Rose Quarter TC).

Table 4.2-8
LRT Ridership, by No-Build and I-205/Mall, Year 2025

	No-Build	I-205/Mall
Average Weekday Riderhip[1]		
South Corridor LRT Line		
I-205 LRT South of Gateway (Green Line)[2]	N/A	38,000
I-205 LRT West of Gateway (Green Line)[3]	N/A	8,500
Total Green Line	**N/A**	**46,500**
Other LRT Lines		
Blue Line (East-West MAX)	107,550	105,625
Yellow Line (Interstate MAX)	15,415	15,200
Red Line (Airport MAX)	30,060	27,985
Total System LRT Boarding Rides	**153,025**	**195,310**
P.M. Peak-Hour, Peak Direction, Peak-Load Point		
South Corridor – Green Line[4]		
Green Line (I-205 LRT)	N/A	2,080
Other LRT Lines[4]		
Blue Line – East	3,190	2,990
Blue Line – West	2,780	2,920
Yellow Line – North	803	840
Red Line	520	430

Source: Metro, 2004.
Note: LRT = light rail transit; N/A = not applicable; TC = transit center.
[1] LRT ridership is boarding rides per line. Linked trips are counted twice if they transfer from one LRT line to another LRT line.
[2] I-205 LRT South of Gateway ridership consists of trips that would board or deboard the Green Line at a station south of the Gateway TC.
[3] I-205 LRT West of Gateway ridership includes trips on the Green line that would not travel south of the Gateway TC.
[4] The peak-load points for each line would be in the following locations: Blue Line East – east of Lloyd Center; Blue Line West – west of Goose Hollow; Yellow Line – north of Rose Quarter; Red Line - east of Lloyd Center; Green Line – south of Gateway.

4.2.2.5 Station Activities

This section focuses on the mode that transit patrons would use to access the light rail stations included in the Project (average weekday, 2025). Mode of access is defined as the mode of transportation that a transit patron would use to travel from their home to the identified station, where the patron would board the transit vehicle – patrons that travel through the station on the same transit vehicle are not reported as a station activity. Table 4.2-9 summarizes average weekday 2025 mode of access to the Project light rail stations.

Table 4.2-9
I-205/Mall Mode of Access Average Weekday – Year 2025

Mode of Access to Transit	I-205/Mall
Walk	45%
Bus Transfers	40%
Auto (Park-and-Ride)	15%

Source: Metro, 2004.
Note: LRT = light rail transit.

4.3 Highway and Street Impacts

The purpose of this section is to evaluate the impacts to the highway and street network based on the No-Build Alternative and the Project. Impacts to the highway and street system have been separated into systemwide and local impacts. Transit improvements in the South Corridor could affect traffic operations and congestion in two basic ways. First, these improvements could divert trips from automobiles to transit, resulting in reduced systemwide vehicular travel, as discussed in Section 4.3.1. Second, transit facilities could also affect localized traffic operations on highways and streets in the project area. These localized effects are discussed by alternative in Section 4.3.2.

4.3.1 Cumulative Impacts

The cumulative impacts associated with the Project are addressed in two ways. The first is a description of the impact of the Project on the operations of the regional roadway system and the second is a discussion of the impact to the Project of major regional roadway projects included in the 2025 Financially Constrained RTP network.

The traffic analysis and transit ridership forecast described in this chapter are based on regional travel forecasting models. The regional model networks are designed for the year 2025 and include roadway and transit improvements throughout the Portland metropolitan area, including Clackamas, Multnomah, and Washington Counties in Oregon and Clark County in Washington (consistent with the RTP Financially Constrained network).

4.3.1.1 Systemwide Impacts

The Project would result in an increase in transit mode share in the corridor (see Figure 4.2-7). This increased level of transit ridership results in corresponding decreases in automobile vehicle trips. The reduced vehicle trips provide for some changes in systemwide measures. Three systemwide traffic measures, regional roadway VMT, regional roadway VHT, and regional vehicle hours of delay are summarized, by alternative, in Table 4.3-1. Changes in traffic across selected screenlines in the corridor are presented in Table 4.3-2.

Table 4.3-1
2025 Average Weekday Regional Roadway Data

Measure	No-Build	I-205/Mall
Average Weekday VMT	35,645,000	35,520,000
Average VHT	1,411,000	1,406,000
Vehicle Hours of Delay	51,820	51,250

Source: Metro: July 2004.
Note: VMT = vehicle miles traveled; VHT = vehicle hours traveled.

Table 4.3-2
2025 Average Weekday PM-Peak Direction, 2-Hour Vehicle Volumes at Select Corridor Screenlines

Screenline Location	No-Build	I-205/Mall
Willamette River Bridges (Fremont through Ross Island)	55,290	54,720
I-84 plus E/W Streets at NE/SE 82nd Avenue (I-84 through SE Foster)	30,250	29,860
E/W Streets at SE 82nd Avenue (SE Flavel through SE Sunnybrook)	13,000	13,000
I-205 plus N/S Streets at SE Holgate (SE 82nd through SE 112th)	17,350	17,130

Source: Metro: July 2004.

The Project would help to reduce congestion and related problems, when compared to the No-Build Alternative. For all measures, the Project would reduce VMT, VHT, and vehicle hours of delay in 2025: VMT would be reduced by more than 125,000 miles, VHT would be reduced by more than 5,000 hours, and vehicle delay would be reduced by approximately 570 hours per average weekday as compared to the No-Build Alternative. This reduction in congestion would result in less fuel and time wasted which annually would equal $3.1 million in time and fuel savings.

Table 4.3-2 shows the total 2025 traffic volumes forecast across screenlines at four locations. The screenline provides a peak direction count of the projected auto volumes on a range of parallel streets at a particular point. The screenline locations included in the table include eastbound trips crossing the Willamette River, eastbound trips crossing NE/SE 82nd Avenue and southbound trips crossing SE Holgate Boulevard.

With the Project compared with the No-Build Alternative, in the p.m. peak 2-hours there would be a decrease of 570 cars leaving downtown Portland on the Willamette River bridges. There would also be a decrease in eastbound traffic on east/west streets (between I-84 and SE Foster Road) in the vicinity of NE/SE 82nd Avenue. Peak 2-hour traffic volumes on east/west streets between SE Flavel Street and SE Sunnybrook Road would be similar with the Project and the No-Build Alternative. This would be due to increased auto egress from park-and-ride lots at Fuller Road and Clackamas Town Center with the Project that would offset traffic decreases resulting from increased transit ridership. With the Project there would be a small decrease in peak 2-hour auto southbound volumes on north/south streets parallel to I-205 in the vicinity of SE Holgate Boulevard, compared with the No-Build Alternative.

4.3.1.2 Impacts from Planned Regional Facilities

The transportation analysis in this FEIS is based on the RTP Financially Constrained network, which includes additional capacity or operational changes on a number of roadways in the corridor (see Table 4.1-1 and Figure 4.1-1). This section describes the potential impact to the Project of two of the more significant projects included in the future year networks.

The Sunrise Project is included in the Financially Constrained network as a new expressway connection between I-205 and SE 122nd Avenue at Highway 212/224. This future facility would provide improved access between the new UGB expansion area near Damascus and the Clackamas Regional Center area. If the Sunrise Project were not constructed, there would be longer travel times between the new growth area and the Clackamas Town Center Park-and-Ride that could result in a slightly lower utilization rate for this park-and-ride facility.

The Financially Constrained network also includes the development of a new one-way couplet on W Burnside Street and NW Couch Street. The implementation of this couplet would change the traffic signal timing in the north portion of downtown Portland. If the Burnside/Couch Couplet project is not constructed, the Project could see delays for some southbound light rail trains due to the long traffic signal cycle lengths at W Burnside Street. With the couplet project, the traffic signal cycles would likely be reduced and lessen the potential for delay to light rail trains.

4.3.2 Local Traffic Impacts

This section evaluates impacts of the Project on the local highway and street network. This section also summarizes impacts to bicycle and pedestrian activities and facilities.

Impacts to the highway and street network are measured in terms of congestion, as well as changes in accessibility on the corridor roadway system, specific impacts on adjacent roadway facilities associated with the transit stations and park-and-ride lots and as changes in parking supplies and demand.

This section describes the impacts that the Project would have on local traffic operations. Local traffic impacts are measured by impacts to intersection level-of-service, delay, queuing, and safety. Local traffic impacts that would require mitigation are determined by the following:

- Metro and ODOT have adopted level-of-service criteria for the Portland metropolitan area that allow for a reduced LOS during the peak one hour compared with the secondary peak hour. For purposes of this FEIS, if the Project would degrade an intersection's performance from an acceptable LOS in the No-Build to an unacceptable LOS (based on adopted state, regional and local standards) the Project will work with the operating jurisdiction to develop a cost-effective solution to mitigate the intersection performance to a minimum of the peak hour standard or to a maximum of the secondary hour standard.

- If an intersection would operate at an unacceptable LOS (typically LOS E or LOS F) with both the No-Build and Project, mitigation would be required if the Project would cause an increase in intersection delay of 10 seconds or more or an increase of 0.05 or more to the demand-to-capacity ratio, compared with the No-Build Alternative.

- If queuing with the Project would block adjacent signalized intersections, the Project would implement mitigation measures to achieve non-blocking conditions, similar to those under the No-Build Alternative. If queuing blockage occurs with both the No-Build Alternative and the Project, then the Project would be mitigated to no-build conditions.

- If the No-Build Alternative does not meet warrants or safety criteria (e.g., traffic signal warrants, access spacing criteria), but the Project does, the Project would include mitigation measures to address the warrants or safety impacts.

This section evaluates the local traffic impacts by segment and by type of impact: level-of-service at intersections, traffic impacts related to proposed park-and-ride lots, parking supply and facilities, bicycle operations and facilities, and pedestrian activities and facilities. Section 4.6 details the transportation mitigation commitments.

4.3.2.1 I-205 Segment

This section summarizes the local traffic impacts that would result with the Project, including level-of-service at intersections, localized traffic impacts related to proposed park-and-ride lots, parking supply and facilities, bicycle operations and facilities, and pedestrian activities and facilities.

A. Motor Vehicle Impacts - Level-of-service at Intersections

This section describes the level-of-service for p.m. peak hour in 2025 at intersections adjacent to the light rail alignment that would result with implementation of the Project. Because numerous intersections were evaluated for this segment, the segment has been broken down into smaller sub-areas. The intersections were analyzed for a no-build condition based on optimized traffic signal timing. The Project traffic mitigation, where required, is in addition to the optimized traffic signal operation. The traffic mitigation is described in Section 4.6 Transportation Mitigation.

Gateway to SE Flavel Street Area

The Gateway to SE Flavel Street area is defined as the intersections surrounding proposed light rail station locations from the Gateway Transit Center to SE Flavel Street along I-205. All intersections within this area were evaluated to determine potential project-related impacts. Table 4.3-3 summarizes the level-of-service operations for this area and identifies those intersections where project-related impacts would occur. Table 4.3-3 shows that with the Project the intersections of SE Division Street/SE 96th Avenue/I-205 northbound off ramp, SE Powell Boulevard/SE 92nd Avenue and SE Holgate Boulevard/SE 92nd Avenue would meet project mitigation criteria for increase in delay and/or change in the demand-to-capacity ratio. These impacts would result primarily from the introduction of the Main Street, Powell Boulevard and Holgate Boulevard Park-and-Ride Lots.

Table 4.3-3
2025 P.M. Peak-Hour Intersection Level-of-Service
I-205 Segment – Gateway to SE Flavel Street Area

Intersection		No-Build			I-205/Mall		
		Delay[1]	LOS[2]	V/C[3]	Delay[1]	LOS[2]	V/C[3]
I-205 south ramp	SE Stark Street	15.2	B	0.77	15.4	B	0.77
I-205 north ramp	SE Stark Street	14.2	B	0.79	16.3	B	0.82
I-205 south ramp	SE Washington Street	31.9	C	0.83	36.8	D	0.84
I-205 north ramp	SE Washington Street	17.0	B	0.92	17.0	B	0.93
SE 96th Avenue	SE Main Street		A/F			A/F	
SE 96th Avenue	Main Street Park-and-Ride		N/A			A/F	
SE 96th Avenue	SE Market Street		F			F	
SE 92nd Avenue	SE Market Street		A/F			A/F	
SE Division Street	SE 96th Avenue/I-205 NB	47.0	D	0.98	90.1	F	1.09
SE Division Street	I-205 southbound	56.5	E	0.95	64.3	E	0.95
SE Division Street	SE 92nd Avenue	46.1	D	0.78	54.0	D	0.81
SE 92nd Avenue	SE Powell Blvd	71.8	E	1.04	148.6	F	1.45
I-205 south ramp	SE Powell Blvd	10.9	B	0.71	10.2	B	0.68
I-205 north ramp	SE Powell Blvd	99.4	F	1.19	106.0	F	1.19
SE 92nd Avenue	SE 91st Place		A/F			A/F	
SE 92nd Avenue	SE Holgate Blvd	67.1	E	0.99	100.2	F	1.09
SE Holgate Blvd	Holgate Park-and-Ride		N/A			A/D	
SE 92nd Avenue	SE Foster Road	124.8	F	1.09	132.5	F	1.10
I-205 south ramp	SE Foster Road	7.8	A	0.55	7.9	A	0.56
I-205 north ramp	SE Foster Road	13.0	B	0.65	13.0	B	0.65
SE 92nd Avenue	SE Woodstock Blvd	26.5	C	0.93	26.5	C	0.93
I-205 south ramp	SE Woodstock Blvd	11.2	B	0.62	11.3	B	0.63
I-205 north ramp	SE Woodstock Blvd	24.8	C	0.87	24.6	C	0.87
SE 92nd Avenue	SE Flavel Street	89.0	F	1.03	87.9	F	1.07

Source: DKS: August 2004.
Note: N/A = not available.
[1] Delay is the average stopped delay per vehicle at an intersection, in seconds.
[2] LOS is the intersection level-of-service based on Highway Capacity Manual procedures.
[3] V/C is the volume-to-capacity ratio using the forecast travel volumes on all intersection approaches divided by the intersection capacity.

Johnson Creek Boulevard to William Otty Road Area

The Johnson Creek Boulevard to William Otty Road area is defined as the intersections surrounding the proposed Fuller Road light rail station from SE Johnson Creek Boulevard to SE William Otty Road along I-205. All project area intersections within this sub-area were evaluated to determine potential project-related impacts. The 2025 traffic analysis in this vicinity was based on planned improvements to the SE Johnson Creek Boulevard interchange, such as a new northbound on ramp to I-205 from westbound SE Johnson Creek Boulevard, and a new southbound entrance loop ramp from SE Johnson Creek Boulevard westbound to I-205. The analysis was also based on a planned median on Johnson Creek Boulevard from just west of the I-205 southbound off-ramp to just west of SE Fuller Road. With the median in place, left turns from westbound SE Johnson Creek Boulevard to southbound SE Fuller Road and northbound SE Fuller Road to westbound SE Johnson Creek Boulevard would not be permitted. Table 4.3-4 summarizes the level-of-service for intersection operations in this segment and identifies those intersections where project-related impacts would occur.

As shown in Table 4.3-4, the intersections of SE William Otty Road with SE 82nd Avenue and SE 92nd Avenue would meet project criteria for mitigation. The project-related impacts at these intersections would result from the additional trips attracted to and exiting from the Fuller Road Park-and-Ride Lot. With the median in place on SE Johnson Creek Boulevard, access at the intersection of SE Fuller Road and SE Johnson Creek Boulevard would be limited to right-in/right out. Given these turn limitations, morning access to the park-and-ride site from I-205 northbound would likely be via SE 92nd Avenue to SE Otty Road to SE Fuller Road.

Table 4.3-4
2025 P.M. Peak-Hour Intersection Level-of-Service
I-205 Segment – Johnson Creek Boulevard to William Otty Road Area

Intersection		No-Build			I-205/Mall		
		Delay[1]	LOS[2]	V/C[3]	Delay[1]	LOS[2]	V/C[3]
SE 82nd Avenue	SE Johnson Cr Blvd	115.9	F	1.21	124.5	F	1.24
SE Fuller Road	SE Johnson Cr Blvd		A/F			A/F	
I-205 SB On-Ramp	SE Johnson Cr Blvd	21.7	C	0.84	24.8	C	0.87
I-205 NB Ramp	SE Johnson Cr Blvd	19.7	B	0.40	19.5	B	0.42
SE 92nd Avenue	SE Johnson Cr Blvd	47.4	D	0.89	52.6	D	0.95
SE 82nd Avenue	SE William Otty Rd	33.8	C	0.96	51.3	D	1.03
SE Fuller Road	Fuller Park-and-Ride		N/A			A/C	
SE Fuller Road	SE William Otty Rd	26.9	C	0.52	40.1	D	0.98
SE 92nd Avenue	SE William Otty Rd	52.3	D	0.86	62.7	E	0.95

Source: DKS: August 2004
Note: N/A = not available.
[1] Delay is the average stopped delay per vehicle at an intersection, in seconds.
[2] LOS is the intersection level-of-service based on Highway Capacity Manual procedures.
[3] V/C is the volume-to-capacity ratio using the forecast travel volumes on all intersection approaches divided by the intersection capacity.

Clackamas Town Center Area

The Clackamas Town Center area encompasses SE Harmony Road, SE Sunnyside Road, SE Sunnybrook Road, SE 82nd Avenue, SE Bob Schumaker Road and SE Monterey Avenue. All project area intersections within this sub-area were evaluated to determine potential project-related impacts.

As Table 4.3-5 indicates, with the Project, all intersections in the Clackamas Town Center operate within the limits of acceptable delay and demand to capacity ratio and would not meet project mitigation criteria.

B. Motor Vehicle Impacts - Park-and-Ride Lots

The I-205 Segment includes five new light rail park-and-ride lots with the Project: Main Street, Powell Boulevard, Holgate Boulevard, Fuller Road, and Clackamas Town Center Park-and-Ride Lots.

Main Street Park-and-Ride Lot would include a 426 space surface park-and-ride lot located in ODOT right-of-way east of I-205 and west of SE 96th Avenue at SE Main Street. In 2025 this lot would generate approximately 300 vehicle trips during the p.m. peak hour. The one motor vehicle access to the park-and-ride lot is proposed on the west side of SE 96th Avenue approximately 250 feet north of SE Market Street as an unsignalized intersection with the access road operation forecast to be LOS F during the p.m. peak hour. The signals at intersections both north (SE Main Street) and south (SE Market Street) of the access road intersection, would likely provide gaps in traffic during the evening peak hour that would allow vehicles to safely egress from the park-and-ride lot. An analysis indicated that the 95th percentile queue would be approximately 150 feet from SE 96th Avenue. The project design would provide approximately 200 feet of storage between the street and the crossing of the tracks. Bus service to the Main Street Park-and-Ride Lot would be via SE 96th Avenue and would utilize curbside bus stops (in both directions).

Table 4.3-5
2025 P.M. Peak-Hour Intersection Level-of-Service
I-205 Segment – Clackamas Town Center Area

		No-Build			I-205/Mall		
Intersection		Delay[1]	LOS[2]	V/C[3]	Delay[1]	LOS[2]	V/C[3]
CTC Entrance (P&R access)	SE Monterey Ave		A/C			A/C	
SE 82nd Ave	SE Monterey Ave	49.8	D	0.94	57.2	E	0.94
SE 82nd Ave	SE Sunnyside Rd	88.8	F	1.15	97.8	F	1.19
Promenade Access Rd	SE Sunnyside Rd	35.0	D	0.68	34.3	C	0.71
CTC Access Road	SE Sunnyside Rd	52.3	D	0.66	52.9	D	0.71
SE 93rd Ave	SE Sunnyside Rd	11.2	B	0.47	11.2	B	0.48
I-205 SB Ramp	SE Sunnyside Rd	39.5	D	0.99	44.2	D	1.00
I-205 NB Ramp	SE Sunnyside Rd	46.9	D	1.09	52	D	1.08

Source: DKS: August 2004
[1] Delay is the average stopped delay per vehicle at an intersection, in seconds.
[2] LOS is the intersection level-of-service based on Highway Capacity Manual procedures.
[3] V/C is the volume-to-capacity ratio using the forecast travel volumes on all intersection approaches divided by the intersection capacity.

Powell Boulevard Park-and-Ride Lot would include 391 parking spaces and would generate about 280 vehicle trips in the p.m. peak hour. One access road to the park-and-ride lot would be provided and would be shared with the adjacent State of Oregon offices. The intersection of the access road with SE 92nd Avenue would be signalized and would operate at LOS A in the 2025 p.m. peak hour. The proposed signalized intersection would connect the access road with SE 91st Place, which provides access to Marshall High School. Bus service to this park-and-ride lot would be via SE Powell Boulevard using curbside bus stops (in both directions), which would be accessed from the park-and-ride lot and light rail station via a relocated pedestrian and bicycle path.

Holgate Boulevard Park-and-Ride Lot would include 125 parking surface spaces. The park-and-ride lot would be located north of SE Holgate Boulevard and west of I-205 and would generate approximately 90 vehicle trips in the p.m. peak hour. Automobile access would be provided via an intersection off SE Holgate Boulevard, approximately 400 feet west of SE 95th Avenue and 350 feet east of SE 92nd Avenue; the intersection would be unsignalized and would operate at LOS D in the 2025 p.m. peak hour. Bus service to the station would be via curbside bus stops on SE Holgate Boulevard.

Fuller Road Park-and-Ride Lot would provide 624 surface parking spaces and would generate approximately 440 vehicle trips in the p.m. peak hour. Access to this park-and-ride lot would be provided at two locations. One of these access points would be located on the east side of SE Fuller Road, approximately 700 feet north of SE William Otty Road. The other access point would be via a connector roadway utilizing the existing SE Con Battin Road alignment (located approximately 230 feet north of the access on SE Fuller Road). This access roadway would lead to the second park-and-ride access point on the south side of the SE Con Battin Road approximately 290 feet to the east of SE Fuller Road. These unsignalized access points to/from the park-and-ride would operate at LOS A to LOS C in the 2025 p.m. peak hour.

Under the No-Build Alternative, the interchange area along SE Johnson Creek Boulevard near the Fuller Road Park-and-Ride Lot would be improved compared to existing conditions. These improvements under the No-Build Alternative would include a median on SE Johnson Creek Boulevard, which would eliminate westbound to southbound left turns and northbound left turns and through movements. In addition, a westbound to southbound loop ramp and a westbound to northbound on-ramp would be included with the No-Build Alternative, which would create a partial cloverleaf interchange of I-205 and SE Johnson Creek Boulevard.

With turn restrictions for westbound traffic on SE Johnson Creek Boulevard at SE Fuller Road, some out of direction travel would occur for vehicles accessing the park-and-ride from westbound SE Johnson Creek Boulevard or from the I-205 southbound off-ramp. Vehicles or buses traveling from these directions would travel southbound on SE 92nd Avenue to SE William Otty Road (westbound) to SE Fuller Road (northbound) to access the transit station.

Clackamas Town Center Park-and-Ride Lot would have a 500 space park-and-ride structure located on the east side of the shopping center. The Clackamas Town Center TC would be relocated to the east side of the Clackamas Town Center parking lot, resulting in an increase in the number of available shopper parking spaces in the Clackamas Town Center's northern parking lot where the existing transit center and park-and-ride parking would be removed.

The Clackamas Town Center Park-and-Ride Lot would use existing shopping center access points onto surrounding streets. The 500-space park-and-ride structure would generate approximately 350 vehicle trips in the weekday p.m. peak hour in 2025. During most times, the majority of these trips would be oriented to the south and east of the station area. However, during the peak-shopping season in late November and December, greater use of the northerly access would likely occur in response to traffic congestion in the vicinity of the SE Sunnyside Road parking lot access roads (December traffic is typically 40 percent above average during the p.m. peak period). TriMet and Clackamas County are working with the Clackamas Town Center management to develop a detailed circulation management plan for this area that accommodates bus access, park-and-ride access and shopping mall parking access.

C. Motor Vehicle Impacts - Parking

Table 4.3-6 summarizes the parking impacts for the Project in the I-205 Segment. The Project would remove 282 spaces at the Clackamas Town Center shopping mall. At the shopping mall, a portion of an existing lightly used parking lot would be removed for a park-and-ride lot structure, and spaces currently used for park-and-ride near the existing transit center (southeast area of the Town Center) would be returned for use by mall patrons. In addition, the existing transit center located in the

central north area of the Town Center parking area would be returned for use by mall patrons, resulting in a net increase of 318 parking spaces for shopping mall patrons.

Table 4.3-6
Parking Removal: I-205 Segment with the I-205/Mall

Street/Site	Type[1]	Location	Spaces Removed	Current Use[2]
SE Flavel Street	On	At Light Rail crossing	10	0%
SE Fuller Road	On	South of SE Johnson Creek Boulevard	20	0%
East of CTC TC[3]	Off	North of SE Sunnyside Road, west of I-205	282[3]	15%
Total			**312**	

Source: DKS Associates: June 2004.
Note: CTC = Clackamas Town Center; TC = transit center; N/A = not available.
[1] On = On-street parking; Off = Off-street parking.
[2] Current usage is the daytime occupancy of the parking for that location based upon surveys conducted August 2002.
[3] Removal of the existing transit center and park-and-ride spaces in the north CTC parking lot would add approximately 600 (250 in transit center and 350 in park-and-ride) parking spaces at this location resulting in a net increase of approximately 318 parking spaces for the CTC shopping mall.

D. Bicycle Impacts

With the Project, bicycle access to station locations would be provided via the I-205 multi-use path, by the east-west Springwater Corridor pedestrian and bicycle path, and by the surrounding on-street bicycle network. Station areas include bicycle facilities, which could include secure storage areas. TriMet will coordinate with the governing jurisdiction to determine the appropriate number of bicycle storage facilities per station.

The off-street multi-use path adjacent to I-205 offers station area access for bicycles in the north/south directions. In the east/west direction, some gaps exist in the planned bicycle network around stations. Local jurisdictions should consider access to light rail stations as bicycle system plans are updated.

E. Pedestrian Impacts

Table 4.3-7 summarizes the pedestrian facilities that would be in the vicinity of the proposed stations within the I-205 Segment. The table describes whether adequate pedestrian facilities exist within the immediate vicinity of the transit stations (primary) and in the area beyond the immediate vicinity of the station but within ¼ mile (secondary). The secondary access would be the responsibility of the local jurisdictions and would not be considered a project responsibility. In general, the project designs for each station area include pedestrian facilities within the immediate station area.

Table 4.3-7
Existing Pedestrian Facilities
in the Vicinity of Proposed LRT Stations

Segment/Station Location	I-205/Mall	
Gateway to Clackamas Segment	**Primary**	**Secondary**
Main Street	Adequate	Adequate
Division Street	Adequate	Adequate
Powell Boulevard	Adequate	Adequate
Holgate Boulevard	Adequate	Adequate
Foster Road	Adequate	Adequate
Flavel Street	Adequate	Adequate
Fuller Road	Adequate	Adequate
Clackamas Town Center	Adequate	Adequate

Source: DKS Associates: July 2004

4.3.2.2 Portland Mall Segment

This section summarizes the local traffic impacts that would result from the Project, including level-of-service at intersections, traffic diversion, parking supply and facilities, bicycle operations and facilities, and pedestrian activities and facilities in the Portland Mall Segment.

A. Motor Vehicle Impacts – Level-of-Service

This section describes the intersection LOS impacts that would result with the Project in the Portland Mall Segment. Motor vehicle operations for the 2025 p.m. peak hour for the No-Build Alternative and the Project were analyzed for all of the study area intersections to determine potential project-related impacts. To determine the future forecast for vehicular traffic within the Portland Mall Segment, a combination of forecasting tools were used. Among these tools were historic growth rates, the City of Portland's and Metro's EMME/2 travel demand forecast models. All of these forecasting tools were reviewed to help estimate future travel forecasts. The downtown Portland area within the Metro EMME/2 travel demand forecast models (both 2000 and 2025) were disaggregated based on an inventory of parking allocation within the downtown. In addition to the disaggregation, post processing was conducted using existing traffic counts, 2000 base year travel demand forecast volumes and 2025 travel demand forecast volumes. This process was used to estimate future traffic demand at study area intersections. Table 4.3-8 summarizes the level-of-service operations that would occur in the Portland Mall Segment with the Project and identifies those intersections where project related impacts would occur.

With the Project there would be minor changes in vehicle delay at intersections in the South Transit Mall resulting from turn restrictions and lane reductions compared with the No-Build Alternative. This increased delay and the introduction of new traffic signals with the Project, does not create unacceptable traffic operations in the South Transit Mall area.

The ability to provide adequate motor vehicle access to and egress from downtown Portland was evaluated at the I-405 ramp connections in the South Mall and at the Steel Bridge. There is adequate roadway capacity available to serve the forecast 2025 vehicle demand at these two key motor vehicle portals to downtown Portland.

B. Motor Vehicle Impacts - Access

An inventory of motor vehicle access points (driveways, garage entrances, etc.) was prepared for the existing Portland Mall within the study area. The Project would impact sixteen access points due to restricted access or closure. The location of the accesses, the owners, and the impacts are summarized in Table 4.3-9.

In addition to the vehicular access points along SW/NW 5th and 6th avenues there would be some on-street access impacts. There are two on-street access points where the Project would impact pick-up/drop-off areas.

SW 5th Avenue between SW Salmon Street and SW Main Street (east curb) – This area is currently used by Multnomah County as a prison transfer location during certain times of the day. The Project design would retain the ability for this function to occur, however through-motor vehicle movement would be restricted during these occurrences.

Table 4.3-8
Portland Mall Segment - 2025 P.M. Peak Hour Intersection Level-of-Service Comparison

Intersection	No-Build			I-205/Mall		
	Delay[1]	LOS[2]	V/C[3]	Delay[1]	LOS[2]	V/C[3]
North Transit Mall						
NW/SW 4th Avenue/Burnside Street	138.5	F	1.39	138.7	F	1.39
NW 4th Avenue/Couch Street	22.7	C	0.90	30.0	C	0.95
NW/SW 5th Avenue/Burnside Street	43.7	D	1.09	55.2	E	1.12
NW 5th Avenue/Everett Street	4.9	A	0.60	4.5	A	0.63
NW 5th Avenue/Glisan Street	14.1	B	0.58	13.4	B	0.58
NW 6th Avenue/Burnside Street	88.4	F	1.18	90.7	F	1.21
NW 6th Avenue/Everett Street	13.6	B	0.69	14.1	B	0.72
NW 6th Avenue/Glisan Street	25.5	C	0.53	28.8	C	0.56
NW Broadway/Burnside Street	181.4	F	1.48	171.8	F	1.28
NW Broadway/Couch Street	73.8	E	1.18	57.3	E	1.12
NW 5th Avenue/Flanders Street		A/A		8.6	A	0.27
NW 5th Avenue/Davis Street		A/B		13.9	B	0.41
NW 5th Avenue/Couch Street	14.9	B	0.91	15.9	B	0.93
NW 6th Avenue/Flanders Street		A/B		7.1	A	0.51
NW 6th Avenue/Davis Street		A/A		10.4	B	0.49
NW 6th Avenue/Couch Street	12.1	B	0.93	14.3	B	0.93
NW 5th Avenue/Hoyt Street		A/A		9.4	A	0.18
NW 6th Avenue/Hoyt Street		A/A		11.0	B	0.23
NW 5th Avenue/Irving Street		A/A		52.3	D	0.80
NW 6th Avenue/Irving Street		A/A		9.7	A	0.31
South Transit Mall						
SW 4th Avenue/Clay Street	13.0	B	0.73	13.2	B	0.73
SW 4th Avenue/Market Street	14.4	B	0.77	14.1	B	0.77
SW 5th Avenue/Madison Street	12.4	B	0.50	7.7	A	0.48
SW 5th Avenue/Jefferson Street	14.3	B	0.74	15.2	B	0.59
SW 5th Avenue/Columbia Street	11.2	B	0.57	10.7	B	0.49
SW 5th Avenue/Clay Street	15.0	B	0.77	15.6	B	0.60
SW 5th Avenue/Market Street	14.0	B	0.58	13.0	B	0.54
SW 5th Avenue/Mill Street		A/C		13.4	B	0.50
SW 5th Avenue/Montgomery Street	0.2	A	0.25	8.9	A	0.47
SW 5th Avenue/Hall Street		A/C		29.7	C	0.78
SW 5th Avenue/Harrison Street	13.2	B	0.56	31.8	C	0.84
SW 5th Avenue/College Street		A/F		14.3	B	0.69
SW 5th Avenue/Jackson Street		A/B			A/B	
SW 6th Avenue/Madison Street	11.9	B	0.43	11.8	B	0.58
SW 6th Avenue/Jefferson Street	9.3	A	0.70	14.4	B	0.86
SW 6th Avenue/Columbia Street	11.1	B	0.49	11.3	B	0.47
SW 6th Avenue/Clay Street	8.8	A	0.75	9.5	A	0.74
SW 6th Avenue/Market Street	14.5	B	0.62	15.5	B	0.65
SW 6th Avenue/Jackson Street		A/E			A/E	

Source: DKS Associates, August 2004

Note: The intersection LOS software does not calculate delay and V/C for unsignalized intersections. Existing unsignalized intersections would remain unsignalized with the No-Build Alternative. With the Project, some unsignalized intersections would be converted to signalized intersections.

[1] Delay is the average stopped delay per vehicle at an intersection, in seconds.

[2] LOS is the intersection level-of-service based on Highway Capacity Manual procedures.

[3] V/C is the volume-to-capacity ratio using the forecast travel volumes on all intersection approaches divided by the intersection capacity.

SW 6th Avenue between SW Market Street and SW Clay Street – this area is currently used by the US Post Office to house seven drive-up drop-off mailboxes. During Final Design, TriMet and the City of Portland will discuss options with the Post Office including the possibility of relocating the mailboxes around the corner to the south curb of SW Clay Street between SW 6th Avenue and SW Broadway.

Table 4.3-9
Changes to Vehicular Access on the Portland Mall with the Project

Access Location	Owner/Business	Potential Impacts
SW 5th Ave. between Jackson St. and College St. (west curb)	National Bartending Academy	• Building does not appear to allow for a reconfiguration of access to the adjacent street. During Final Design, strategies to maintain access for this building will be explored. • Access to five off-street perpendicular parking stalls would be eliminated.
SW 5th Ave. between Jackson St. and College St. (west curb)	Columbia Cascade Company	• Station platform would remove access to off-street private garage.
SW 5th Ave. between Jackson St. and College St. (west curb)	Kentojuko Dojo	• Station platform would remove access to off-street private garage.
SW 5th Ave. between College St. and Hall St. (west curb)	Portland Fire Bureau	• A fire signal would need to be constructed and special operation provided for fire pre-emption with LRT. • Access to five off-street perpendicular parking stalls would be eliminated.
SW 5th Ave. between College St. and Hall St. (west curb)	PSU Ondine Hall	• Building does not appear to allow for a reconfiguration of access to adjacent streets due to ramp. During Final Design, strategies to maintain access for this building will be explored.
SW 5th Ave. between Hall St. and Harrison St. (west curb)	PSU Garage	• Access to parking structure could be closed on SW 5th Avenue to utilize existing SW Harrison Street access for all vehicles. Revised circulation would be required.
SW 5th Ave. between Harrison St. and Montgomery St. (west curb)	PSU Center for Advanced Technology	• Access limited to PSU faculty/motor pool parking lot. Special operation would be needed with LRT temporarily. Redevelopment of the site includes one driveway on Harrison. No impact to new site development.
SW 5th Ave. between Pine St. and Oak St. (west curb)	US Bank	• Right turns for motor vehicles crossing over LRT tracks to access the US Bank building parking garage would be allowed with three phase signal at SW Oak St.
NW 5th Ave. between Everett St. and Davis St. (east curb)	Kalberer Food Service Equipment	• Freight access/loading area may need partial use of LRT lane for maneuvering and may require special operations (active signs). Connection to freight area from Davis Street may be possible with building modification.
NW 5th Ave. between Irving St. and Hoyt St. (west curb)	Greyhound	• Access to Greyhound terminal ingress would occur with signal across LRT. Exit driveway to 5th Avenue across LRT may require additional signage and train warning sign.
NW 5th Ave. between Hoyt St. and Glisan St. (east curb)	Classic Chauffer	• Limousine turns into Classic Chauffer may require partial use of the LRT tracks for access in to driveway. Exit would occur on Hoyt St.
NW 5th Ave. between Hoyt St. and Glisan St. (west curb)	Greyhound	• LRT platform would block access to Greyhound exit driveway. Access would be relocated to NW Glisan Street.
SW 6th Ave. between Jackson St. and College St. (east curb)	PSU South	• Building has primary access from SW College Street. Access would be closed, relocated access or special operation would be required.
SW 6th Ave. between Clay St. and Columbia St. (east curb)	Javaman Coffee and Law Offices	• Access would be closed. Secondary access is provided on Clay Street. Several parking stalls may be inaccessible with access closure (or require tandem parking).
SW 6th Ave. between Clay St. and Columbia St. (east curb)	Days Inn	• Access is adjacent to bus only lane. Final Design will consider closing access (secondary access provided on SW Clay Street) or provide exit vehicle lane between Days Inn access and SW Columbia Street.

Source: DKS Associates, May 2004.

C. Motor Vehicle Impacts - Queuing

The analysis of traffic queuing used a traffic operational simulation analysis to determine traffic progression impacts. Based on this analysis, vehicle queues at most of the study intersections would clear within one traffic signal cycle during the 2025 average weekday evening peak hour with the Project. However, traffic would progress as a platoon of vehicles with limited ability to maneuver between lanes with both the No-Build Alternative and with the Project. The conversion of unsignalized intersections to signalized intersections would increase the potential for queuing on NW/SW 5th and 6th avenues with the Project, compared with the No-Build Alternative. There are two locations where queuing conditions could be worse with the Project compared with the No-Build Alternative: NW 6th Avenue at W Burnside Street and SW 5th Avenue at SW Hall Street.

D. Traffic Circulation and Diversion

The proposed light rail alignment would not significantly alter the traffic patterns in the Central Mall. In the North Mall with the Project, autos would be permitted to cross W Burnside on NW/SW 5th and 6th avenues and to operate on a through-auto lane the full length of the Portland Mall. This general-purpose

vehicle lane would attract some additional auto trips that would divert primarily from NW/SW Broadway and NW/SW 4th Avenue.

In the South Mall (south of SW Madison Street) the introduction of light rail would require the removal of general-purpose lanes and modification to bus lanes along SW 5th and 6th Avenues as well as turn prohibitions at certain signalized and unsignalized intersections. In the vicinity of PSU, as many as two auto travel lanes would be removed. With full general-purpose vehicle connectivity along NW/SW 5th and 6th avenues, turn prohibitions and a reduction of lane capacity in the South Mall, vehicle counts would be reduced by approximately 200 to 300 vehicles in each direction on NW/SW 5th and 6th avenues in the p.m. peak hour. Table 4.3-10 summarizes lane reductions and turn restriction impacts.

Table 4.3-10
Lane Removal and Turn Prohibitions on the Portland Mall with the Project

Street	Location	Impact
SW 5th Avenue		
Auto-Access Lane Restriction/Addition		
	SW Oak Street to SW Stark Street	Left turn lane to allow through auto access
	SW Stark Street to SW Washington Street	Through auto lane/access added
	SW Morrison Street to SW Yamhill Street	Left turn only to allow through auto access
	SW Yamhill Street to SW Taylor Street	Through auto lane/access added
	SW Taylor Street to SW Salmon Street	Left turn only to allow through auto access
	SW Salmon Street to SW Main Street	Through auto lane/access added[1]
	SW Madison Street to Jefferson Street	Reduce to one through auto lane
	SW Jefferson Street to Columbia Street	Reduce to one through auto lane
	SW Columbia Street to Clay Street	Reduce to one through auto lane
	SW Clay Street to Market Street	Reduce to one through auto lane
	SW Market Street to Mill Street	Loss of right only and one through auto travel lane.
	SW Mill Street to Montgomery Street	Loss of one through auto travel lane.
	SW Montgomery Street to Harrison Street	Conversion of through auto travel lane to right turn only lane.
	SW Harrison Street to Hall Street	Loss of one through auto travel lane and conversion of through auto travel lane to right turn only lane.
	SW Hall Street to College Street	Reduce to one through auto lane
	SW College Street to Jackson Street	Conversion of right turn only lane to through auto travel lane.
Turn Prohibition		
	SW 5th Avenue at College Street	Right turn prohibited
	SW 5th Avenue at Mill Street	Right turn prohibited
	SW 5th Avenue at Clay Street	Right turn prohibited
	SW 5th Avenue at Jefferson Street	Right turn prohibited
SW 6th Avenue		
Auto-Access Lane Restriction/Addition		
	SW College Street to SW Hall Street	Conversion of through auto travel lane to right turn only lane.
	SW Hall Street to SW Harrison Street	Conversion of through auto travel lane to right turn only lane.
	SW Mill Street to SW Market Street	Loss of one through auto travel lane.
	SW Market Street to SW Clay Street	Loss of one through auto travel lane.
	SW Clay Street to SW Columbia Street	Loss of right turn only lane.
	SW Columbia Street to SW Jefferson Street	Loss of one through auto travel lane.
	SW Jefferson Street to SW Madison Street	Loss of right turn only lane.
	SW Salmon Street to SW Taylor Street	Left turn only to allow through auto access
	SW Taylor Street to SW Yamhill Street	Through auto lane/access added
	SW Alder Street to SW Washington Street	Left turn only to allow through auto access
	SW Washington Street to SW Stark Street	Through auto lane/access added
Turn Prohibition		
	SW 6th Avenue at Jackson Street	Right turn prohibited
	SW 6th Avenue at College Street	Right turn prohibited
	SW 6th Avenue at Mill Street	Right turn prohibited
	SW 6th Avenue at Market Street	Right turn prohibited
	SW 6th Avenue at Columbia Street	Right turn prohibited
	SW 6th Avenue at Madison Street	Right turn prohibited

Source: DKS Associates, June 2004.
[1]This block face is on the west side of the Multnomah County Courthouse and the through auto lane would be blocked for up to ½ hour two or more times per day, due to prisoner transfers.

Based on an assessment of queuing and traffic operations on SW 6th Avenue between I-405 and SW College Street, the Project design has been modified to accommodate two northbound through lanes on SW 6th Avenue from I-405 through to SW Jackson Street and will accommodate three general purpose traffic lanes from SW Jackson Street through to SW Harrison Street. TriMet will work with the City of Portland to evaluate whether the closure of SW Jackson Street at SW 6th Avenue is warranted due to operations and safety concerns. If the closure is determined to be necessary, TriMet and the City will work through the City's street closure process. In 2004 in the P.M. peak hour, there were 33 vehicle trips traveling westbound on SW Jackson Street to northbound on SW 6th Avenue (the only permitted move at the intersection). If the closure were implemented the diverted traffic would not cause impacts elsewhere in the system.

For the South Mall, an analysis of traffic diversion in the 2025 average weekday a.m. peak hour was conducted in order to assess the impact of the proposed reduction in vehicular capacity on SW 6th Avenue. Approximately 250 auto trips would be diverted to other northbound streets (ranging from SW Naito Parkway to SW 10th Avenue). With the traffic diverted from SW 6th Avenue, the increased volume on SW 4th Avenue would result in a level-of-service and queuing impact at SW 4th Avenue and SW Market Street.

E. Bicycle Impacts

Bicycles traveling on SW 5th Avenue between SW Market and SW Montgomery streets would share the general-purpose vehicle lane with autos. The bicycle lane on SW 5th Avenue south of SW Jackson Street would be affected by the LRT turnaround/staging area. With the No-Build Alternative, bicyclists would utilize the west curb lane and enter the dedicated bike lane south of SW Jackson Street. The proposed LRT alignment would require bicyclists to ride with vehicular traffic along the east curb vehicle lane. As the vehicle lane approaches SW Jackson Street, bikes would merge across a bus-only lane to reach the existing bike lane along the west curb lane.

At the north end of the Portland Mall, the proposed LRT alignment would modify NW Irving Street, which is designated a City Bikeway, between NW 6th Avenue and NW 3rd Avenue, although bicycles could still share the general-purpose traffic lanes, as they currently do.

F. Pedestrian Impacts

There are two locations where the LRT alignment would conflict with pedestrian crossings where they are not currently controlled by traffic signals. The first location would be the LRT turn-around/staging area on the south end of the project would require southbound pedestrians on SW 5th Avenue (along the west curb) to cross two LRT tracks approximately 100' south of Jackson Street. The second location would be at the southeast corner of the NW 5th Avenue and NW Irving Street intersection. The existing pedestrian crossing on the east leg of NW Irving Street at SW 5th Avenue is currently offset creating potential for conflicts for pedestrians and motor vehicles. The project design would mitigate this existing problem. Sidewalks on NW Irving Street from NW 6th Avenue to NW 3rd Avenue would be impacted by the proposed LRT alignment, resulting in the loss of sidewalk space on one side of the street (an area with very low pedestrian activity due to the adjacent railroad tracks).

G. Parking Impacts

The Project would remove some heavily used on-street parking along several block faces on SW 5th and 6th avenues south of SW Madison Street to accommodate the light rail alignment and tracks. Table 4.3-11 shows the location and the number of spaces be removed. City of Portland parking meter revenues would be reduced with the Project due to the elimination of approximately 119 on-street public metered parking spaces.

Approximately 64 off-street parking spaces would be removed within the Portland Mall segment of the Project. Table 4.3-12 identifies three areas south of SW Hall Street where some off-street parking would be eliminated.

Table 4.3-11
Portland Mall On-Street Parking Removal

Street	Location	Parking Spaces Removed	Current Usage[1]
SW 5th Avenue			
	SW Jackson Street to SW College Street	9	100%
	SW College to SW Hall Street	0	100%
	SW Hall Street to SW Harrison Street	7	100%
	SW Harrison Street to SW Montgomery Street	9	100%
	SW Montgomery Street to SW Mill Street	2	100%
	SW Mill Street to SW Market Street	10	100%
	SW Market Street to SW Clay Street	2	100%
	SW Clay Street to SW Columbia Street	6	66%
	SW Columbia Street to SW Jefferson Street	6	100%
	SW Jefferson Street to SW Madison Street	5	100%
SW 6th Avenue			
	I-405 to SW College Street	10	100%
	SW College to SW Hall Street	15	100%
	SW Hall Street to SW Harrison Street	11	100%
	SW Harrison Street to SW Montgomery Street	8	100%
	SW Montgomery Street to SW Mill Street	8	100%
	SW Mill Street to SW Market Street	8	100%
	SW Market Street to SW Clay Street	4	100%
	SW Clay Street to SW Columbia Street	0	100%
	SW Columbia Street to SW Jefferson Street	0	100%
	SW Jefferson Street to SW Madison Street	3	100%
Total		**119**	

Source: DKS Associates, May 2004
[1] Based on DKS Associates parking survey for an average weekday, mid-day condition in May 2004.

Table 4.3-12
Portland Mall Off-Street Parking Impacts

Location	Parking Spaces Removed	Current Usage[1]
On SW 5th Avenue		
South of Jackson Street[2]	54	72%
SW Jackson Street to SW College Street[3]	5	60%
SW College Street to SW Hall Street[4]	5	100%
Total	**64**	

Source: DKS Associates (May 2004)
[1] Based on DKS Associates parking survey for an average weekday, mid-day condition in May 2004.
[2] U-Park lot.
[3] National Bartending Academy.
[4] Portland Fire Bureau. There would be no parking impacts to emergency vehicles.

Table 4.3-13 shows that in addition to on-street and off-street parking impacts, the Project would also remove two bus staging areas and two taxi staging areas in the North Mall area.

Table 4.3-13
Portland Mall - Taxi/Bus Staging Zone Impacts

Street	Location	Staging Zones Removed (Type)
NW 3rd Avenue	NW Glisan Street to NW Hoyt Street	1 (bus)
NW Hoyt Street	NW 3rd Avenue to NW 4th Avenue	2 (bus)
NW Irving Street	NW 6th Avenue to NW 5th Avenue	7 (taxi)
SW 6th Avenue	SW Clay Street to SW Columbia Street	1 (taxi)
SW 6th Avenue	SW Market Street to SW Clay Street	1 (bus)
Total		**4 bus & 8 taxi**

Source: DKS Associates, May 2004

4.4 Freight Impacts

The following section summarizes the potential for impacts to the freight system associated with the Project. Freight activity within the two study areas is comprised of two primary modes: freight railroads and trucking.

4.4.1 Freight Railroads

The Project would not result in any conflict between light rail vehicles and freight rail activity. All freight rail activity is and would continue to be conducted along separate right-of-way and track alignment and there are no areas where light rail would cross a freight rail line or encroaches on railroad right-of-way. For this reason impacts to freight rail activity are negligible.

4.4.2 Trucking

Freight activity within the Portland Mall Segment is minimal with intersection truck counts at two percent or less, and only slightly higher in the I-205 Segment. The Project would have minimal affect on the ability to move goods and services effectively and efficiently within and through the Portland Metropolitan area.

4.5 Construction Impacts

Section 3.12 of this FEIS provides a detailed description of the approach to constructing the Project in the I-205 Segment and in the Portland Mall Segment. In summary, the construction of the Project would result in temporary short-term impacts to local and regional transportation operations. These impacts could potentially include temporary lane closures, temporary signals, detours, and disruption of traffic during peak and/or non-peak times. These impacts could result in temporary traffic intrusion into local neighborhoods as a result of congestion and/or detours, disruption of access by motorized and non-motorized modes to local businesses, and the temporary loss of on-street parking. Following is a more detailed discussion of construction impacts by project segment.

4.5.1 I-205 Segment Construction Impacts

Construction of the Project in the I-205 Segment is planned to begin in Summer 2006 and extend through Summer of 2009. Because the northern portion of the alignment would be in the reserved transit way along I-205, it would be a relatively straightforward construction process. The area south of Foster Road would be more complicated because there is not a reserved transit way in this area, although most of the improvements would be located within ODOT right-of-way. Early construction work would include setting up staging areas, moving utilities including water, sewer and stormwater

pipes, electrical poles, cell towers, fiber optic cables, and relocating and constructing new sound walls. The staging areas for this construction would be determined during final design.

A. Construction Impacts to Bus Operations

The bus routes in the vicinity of the Project are typically located on the east-west arterials running perpendicular to the I-205 light rail alignment. During construction of project structures, stations and park-and-rides, some bus stops may be temporarily closed or moved.

B. Construction Impacts to Bicycle Operations

Project construction impacts to bicycle operations in the I-205 segment would be related to modifications to the I-205 multi-use path, construction of the bridge over the Springwater Corridor and relocation or construction of sound walls. These impacts are described in detail in Section 3.12.

C. Construction Impacts to Pedestrian Operations

During construction, some sidewalks would be closed to allow for trenching or other work that would disturb the pedestrian areas. TriMet would work to minimize obstructions and impacts to pedestrian access to business during construction. Pedestrian impacts associated with the I-205 multi-use path are described in detail in Section 3.12.

D. Construction Impacts to Motor Vehicle Operations

Construction impacts to motor vehicle operations between the Gateway TC and SE Foster Road are expected to be minor since this area has been cleared and graded for a transitway. Construction of bridges over SE Powell Boulevard, SE Foster Road and SE Woodstock Boulevard and SE Johnson Creek Boulevard would likely require temporary lane closures.

Portland Mall Segment Construction Impacts

Construction of the Portland Mall Segment would follow an approach that is appropriate for the more complex active urban environment of the existing transit mall. Construction is expected to be accomplished using a Construction Management General Contractor (CMGC) that would work closely with TriMet. The contractor would be selected early in the Final Design phase of the Project. Construction on the Mall is expected to begin in 2006 and extend until Fall 2009.

A. Construction Impacts to Bus Operations

In the Portland Mall Segment, buses would be removed from SW 5th and 6th avenues between NW Irving Street and Portland State University for the duration of the Portland Mall construction period. Buses would be re-routed on several downtown Portland streets, possibly including NW/SW 3rd Avenue, NW/SW 4th Avenue, NW/SW 10th Avenue, NW/SW 11th Avenue, NW/SW Broadway, SW Columbia Street and SW Jefferson Street.

One of the goals of utilizing up to seven alternate streets for temporary bus service is to minimize the impacts of bus operations on these streets. Temporary impacts that could be expected along these alternate bus routes include, loss of on-street parking, traffic impacts due to dwelling buses and more

restricted pedestrian-ways on sidewalks adjacent to temporary bus stops. Impacts to bus patrons during the construction period would generally include, longer travel times, less convenient transfers and longer walk distances.

B. Construction Impacts to Bicycle Operations

During construction, portions of 5th and 6th avenues would be periodically closed to bicycles when auto access is also prohibited. Bicycle access could also be blocked temporarily at cross street intersections during some stages of construction for safety reasons.

C. Construction Impacts to Pedestrian Operations

During construction of the Portland Mall Segment, some sidewalks would be closed to allow for trenching or other work that would disturb the pedestrian areas. TriMet would work to minimize obstructions and impacts to pedestrian access to business during construction. Pedestrians may be required to detour to the opposite side of the street or potentially around a block.

D. Construction Impacts to Motor Vehicle Operations

During construction some portions of SW 5th and 6th avenues would periodically be closed to auto traffic. During these periods SW 4th Avenue and SW Broadway would see increased auto volumes. Motor vehicle access could also be blocked temporarily at cross street intersections during some stages of construction for safety reasons.

E. Construction Impacts to Parking

During construction, more pressure will be placed on on-street and off-street parking in the immediate area near the Portland Mall as some spaces are removed to allow for equipment and because of increased parking demand due to construction workers. Temporary construction impacts to parking would affect up to approximately 120 on-street parking spaces.

4.5.3 Construction Impact Mitigation

Mitigation for construction impacts would include:

- Provide traffic control personnel and signage as needed to minimize impact to traffic flow on major traffic streets in the vicinity of project construction.
- Avoid street and intersection closures during morning and evening peak commute times.
- Work with businesses in the construction zones to maintain auto, bicycle and pedestrian access.
- During construction, impacted transit stops would be temporarily relocated to the nearest possible location on the same transit route without interfering with the construction process.
- During construction, temporary sidewalks and/or pathways would be provided to replace any sidewalks and/or trails adjacent to the project that are impacted by construction.
- To minimize the amount of truck excavation trips to/from the site, efforts will be made to recycle as much of the excavated earth from the project sites as possible.
- A comprehensive public outreach program will be developed to inform local residents and businesses of potential delays and impacts to the local street network due to temporary construction.

4.6 Transportation Mitigation

This section describes the transportation mitigation measures that will be implemented with the Project. The need for mitigation is determined based on the mitigation criteria described in Section 4.3.2. The impact analysis is presented in Section 4.3.2.1 for the I-205 Segment and Section 4.3.2.2 for the Portland Mall Segment.

4.6.1 I-205 Segment Mitigation

Mitigation for Motor Vehicle impacts

- **SE Main Street/SE 96th Avenue.** The No-Build Alternative would meet traffic signal warrants (peak hour, fourth hour and eighth hour) at SE Main Street and SE 96th Avenue in the forecast year. The City of Portland will determine whether a signal should be implemented at this location. If the intersection is unsignalized or signalized the Project creates the need for a southbound left turn pocket. The south leg of the intersection would shadow the southbound left turn pocket with a median to enhance pedestrian crossings of SE 96th Avenue. To help reduce potential pick-up/drop-off trips accessing the park-and-ride from SE 96th Avenue, up to four short-term on-street parking stalls could be accommodated on SE Main Street along the existing curb space.

- **SE 96th Avenue/Park-and-Ride Entrance.** The No-Build Alternative would result in unacceptable operating conditions from the Portland Adventist High School side street access on the east side of SE 96th Avenue. The Project would offset the entrance to the Main Street Park-and-Ride access from the high school access on the east side of the roadway. The park-and-ride entrance intersection with SE 96th Avenue would operate at LOS F conditions. Mitigation for this intersection consists of relocating the high school access (to limit turn conflicts) to SE Market Street and creating a northbound left turn pocket on SE 96th Avenue for access to the park-and-ride.

- **SE Market Street/SE 96th Avenue.** Similar to the intersection of SE Main Street/SE 96th Avenue, the No-Build Alternative would meet signal warrants (peak hour, fourth hour and eighth hour) in 2025. The City of Portland will determine whether to implement a signal at this location. Mitigation at this intersection under the Project will consist of re-striping the southbound, eastbound and northbound approaches of the intersection to contain left turn pockets, allowing for additional capacity at the intersection and a reduction in delay.

- **SE Division Street/SE 96th Avenue/I-205 Northbound Ramp.** The existing operations of this intersection allow for split phasing in the northbound and southbound directions. In addition, northbound left turns are currently prohibited, but would be allowed in the future. The No-Build Alternative would operate with acceptable conditions under this configuration, but is on the edge of unacceptable conditions. Due to the Main Street Park-and-Ride Lot, the Project would add enough additional trips to create unacceptable intersection operations. Mitigation at this intersection consists of modifying the northbound/southbound operations to remove the split phasing and allow for protected left turns and an overlapped southbound right turn, allowing for acceptable operating conditions.

- **SE 92nd Avenue/SE Powell Boulevard.** The future operation of this intersection with the No-Build Alternative would not meet acceptable operating conditions. By 2025, with the Project, the added traffic associated with the Powell Boulevard Park-and-Ride Lot would exacerbate the intersection operation problems. Mitigation at this intersection consists of lengthening the northbound left turn pocket to accommodate projected 2025 queuing and modifying (restriping) the northbound geometry to accommodate separate left, through and right movements. The northbound right turn would accommodate the projected 2025 queue lengths. In addition, all separate right turns at the intersection would have overlap phasing.

- **SE 92nd Avenue/SE 91st Place/Park-and-Ride Entrance.** Currently this is an unsignalized intersection providing access to Marshall High School to the west and ODOT facilities to the east. The No-Build Alternative is forecast to operate at LOS F in 2025 but would not meet traffic signal warrants. With the addition of the traffic associated with the Powell Boulevard Park-and-Ride, the intersection would meet traffic signal warrants in 2025. Mitigation would consist of signalizing the intersection and adding northbound and southbound left turn pockets with separate westbound left and right turn geometry.

- **SE 92nd Avenue/SE Holgate Boulevard.** Under the No-Build Alternative, the intersection of SE 92nd Avenue and SE Holgate Boulevard would not meet acceptable operating conditions. With the Project, the additional traffic associated with the Holgate and Powell park-and-ride lots would create unacceptable operating conditions. Mitigation at this intersection would consist of modifying the traffic signal operations by allowing for a longer signal cycle length, as well as, adding a northbound right turn pocket. Restriping of the southbound and westbound approaches would also need to occur to allow for adequate queue storage for left turns.

- **SE Holgate Boulevard/Park-and-Ride Entrance.** The vehicle entrance to the Holgate park-and-ride does not exist under the No-Build Alternative. The Project would create an access to the park-and-ride lot on the north side of SE Holgate Boulevard. Implementation of an eastbound left turn pocket will allow for acceptable operating conditions at this unsignalized intersection. The eastbound left turn pocket will shadow on the east leg of the intersection with a pedestrian crossing median to allow for an enhanced pedestrian/bicycle crossing SE Holgate Boulevard.

- **SE Johnson Creek Boulevard/SE 92nd Avenue.** The No-Build Alternative would have acceptable operating conditions and the Project would create unacceptable conditions. Traffic signal timing optimization will allow for adequate operations with the Project.

- **SE Johnson Creek Boulevard/I-205 Southbound ramps.** The No-Build Alternative is based on a partial cloverleaf design of the interchange area. During construction of the Project, the columns of the overpass on the north and south side of SE Johnson Creek Boulevard will be placed so as to not restrict the future interchange improvements. TriMet will coordinate with Clackamas County and ODOT to ensure the proper placement of the LRT support columns.

- **SE Fuller Road/Park-and-Ride Entrance.** The vehicle entrance from SE Fuller Road to the Fuller Road Park-and-Ride Lot would not exist under the No-Build Alternative. The Project would create an access to the park-and-ride on the east side of SE Fuller Road north of SE William Otty Road. Implementation of a southbound left turn pocket will allow for acceptable operating conditions at this unsignalized intersection.

- **SE William Otty Road/SE 82nd Avenue and SE William Otty Road/SE Fuller Road.** There is a large retail complex planned for the area south of SE Otty Road near SE Fuller Road. As part of the development conditions, the retail developer is required to participate in funding improvements at SE Otty Road and SE Fuller Road and at SE Otty Road and SE 82nd Avenue (Highway 213). The Project would add approximately 180 additional p.m. peak hour vehicles on the southbound approach at SE Fuller Road and SE Otty Road and approximately 60 additional p.m. peak hour vehicles on the westbound approach at SE Otty Road at SE 82nd Avenue. Clackamas County and TriMet will prepare an agreement including the retail developer and ODOT to define the appropriate treatment at these two intersections, develop a schedule for the improvements and determine the cost responsibility for each party.

- **SE William Otty Road/SE 92nd Avenue.** Under the No-Build Alternative, the intersection of SE William Otty Road and SE 92nd Avenue would operate at acceptable levels, however the Project would result in unacceptable conditions at the intersection. Mitigation at the intersection would include traffic signal timing optimization and overlapping the eastbound right turn phase (currently a separate eastbound right turn pocket exists), which would allow for adequate operations.

Mitigation for bicycle and pedestrian impacts

With the Project, the design of the SE Flavel Street, SE Fuller Road, and CTC stations would impact the existing I-205 multi-use path. The existing path would be realigned to provide access to the proposed station areas and would use grade separations in several locations. Bicycle and pedestrian access to stations along I-205 would be highly dependent on the I-205 multi-use path. During Final Design, TriMet will work with the City of Portland, Clackamas County, ODOT and the bicycle community to ensure that the multi-use path can provide adequate capacity and safety for through trips using the pathway and for pedestrian and bicycle trips accessing the light rail stations. At the under crossing of SE Otty Road the multi-use path would be narrowed from 12 feet to 10 feet. Appropriate signage will be provided on the approaches to this narrow section to warn pathway users.

Mitigation for Parking Impacts

There would be some minor reduction in the amount of on-street curb space available for parking at the Flavel Street Station and the Fuller Road Station. Surveys found that this curb space was not currently used for parking on a typical weekday. There would also be some minor parking displacement associated with some of the traffic mitigation measures (i.e. adding or extending turn lanes, re-channelization, etc.). Mitigation of on-street parking loss in this segment is not proposed at this time.

4.6.2 Portland Mall Segment Mitigation

Portland Mall Motor Vehicle Mitigation

With the Project there would be no impacts to vehicular traffic in the North Mall or Central Mall that would require mitigation.

In the South Mall, traffic would be diverted from SW 6th Avenue to SW 4th Avenue in the a.m. peak hour. The added traffic on SW 4th Avenue at SW Market Street would result in degraded intersection level-of-service and extended northbound queues. Providing a northbound right-turn lane would allow the intersection to operate at an acceptable level-of-service.

With the Project, the Steel Bridge would operate with a single eastbound auto travel lane in order to avoid delays associated with the increased number of light rail trains and the operation of the light rail switch at the west end of the bridge. In order for the eastbound traffic to merge into a single travel lane across the bridge, new traffic control will be required for traffic merging from northbound NW Naito Parkway to provide coordination with traffic from NW Everett Street and southbound NW Naito Parkway.

Portland Mall Bicycle Mitigation

The Project would provide a shared travel lane on SW 5th and 6th avenues between SW Market Street and SW Jackson Street that would be open to bicycle travel. TriMet will coordinate with the City of Portland and the bicycle community during final design to ensure that the Project maintains adequate bicycle access opportunities within downtown Portland.

Portland Mall Pedestrian Mitigation

The Project will provide special crossing warning and refuge areas at the sidewalk crossings of LRT tracks south of the intersection of SW 5th Avenue at SW Jackson Street.

Further the Project will provide adequate pedestrian through-walking areas adjacent to the planned station locations. Through-walking areas are clear pathways free of street furniture or other impediments, these areas should be approximately eight feet in busy pedestrian locations such as the Central Mall and six feet in areas with lower levels of pedestrian traffic.

Portland Mall Parking Mitigation

The loss of on-street parking will be mitigated through management strategies to maximize the use of remaining spaces and the reduced parking demand provided by the Project.

5. HISTORIC AND PARKLANDS RESOURCES

This chapter presents an inventory of the historic, archaeological and public parkland resources in the South Corridor and an assessment of impacts to those resources by the South Corridor I-205/ Portland Mall Project (Project). The discussion of these resources is combined in this chapter in order to address the specific requirements of Section 106 of the National Historic Preservation Act, the requirements known as Section 4(f) of the 1966 Department of Transportation Act, as amended and Section 6(f)(3) of the *Land & Water Conservation Fund Act of 1965* (Public Law 88-578).

Through earlier phases of the South Corridor Study, alternatives and options were developed and evaluated, narrowed and refined. An important objective in the narrowing and refinement of alternatives has been to avoid or minimize potential impacts to historic, archaeological and parkland resources. Documentation of the previous efforts to avoid and minimize impacts to known resources is documented in the DEIS, the SDEIS and the ASDEIS and related technical reports. The current design of the Project reflects the previous efforts to meet this objective. Through this process, the number and level of impacts to historic resources that would be affected by the Project have been significantly reduced.

5.1 Summary of Applicable Federal Laws

5.1.1 Section 106 Regulations

Section 106 of the National Historic Preservation Act, as amended, and *Executive Order 11593 Protection and Enhancement of the Cultural Environment*, require that federally assisted projects be examined for impacts to all historic districts, sites, buildings, structure or objects and archaeological sites listed on, or eligible for inclusion in the National Register of Historic Places. Federal agencies must consult with the State Historic Preservation Officer (SHPO) before undertaking projects that would affect such properties. The Advisory Council for Historic Preservation (ACHP) has established procedures for protection of historic and cultural properties on or eligible to be listed on the National Register of Historic Places. These regulations are defined in *36 CFR Part 800 – Protection of Historic Properties*.

This Final Environmental Impact Statement (FEIS) includes an assessment of the I-205/Portland Mall Project on historic resources. Through the preparation of this FEIS and Preliminary Engineering (PE) efforts were made to avoid or minimize and mitigate adverse impacts to identified resources. The resulting impact analyses and commitments to mitigation were completed in coordination with the Oregon SHPO. A Memorandum Of Agreement (MOA) has been executed between TriMet, the Oregon SHPO, and the Federal Transit Administration (FTA) that defines how the project will ensure that there are no adverse effects to historic resources.

5.1.2 Section 4(f) Regulations

The Federal regulations known as Section 4(f) are from the *U.S. Department of Transportation (USDOT) Act of 1966* (49 USC 303). The regulations state:

> *"It is the policy of the United States Government that special effort be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites."*

These regulations require that USDOT agencies, including FTA and FHWA:

> *"…not approve the use of land from a significant publicly owned park, recreation area, or wildlife and waterfowl refuge, or any significant historic site unless a determination is made that:*
>
> *1) there is no feasible and prudent alternative to the use of the land, and*
>
> *2) the action includes all possible planning to minimize harm to the property resulting from such use."*

The term Section 4(f) resources refers to those resources that are subject to these requirements. In the context of Section 4(f) the term "use" means taking or acquiring a resource (or a portion of the resource) for construction and/or permanent use (or use during construction) by a transportation facility, or substantially impairing the intended use of the resource through the construction of a transportation facility (i.e. from a significant noise or visual impact) which is known as "constructive use."

Concurrent with development of this FEIS, the *Draft Section 4(f) Report* was prepared and circulated to the Department of Interior and to other Federal, state and local agencies with jurisdiction over affected resources, for consultation and comment. Comments from these agencies has been incorporated into the *Final Section 4(f) Report* and documented in Section 5.3 of this FEIS. Mitigation commitments would also be included in the project Record of Decision (ROD) by FTA and FHWA.

5.1.3 Section 6(f) Regulations

Section 6(f)(3) resources are those parklands that have acquired funding through the *Land & Water Conservation Fund Act of 1965* (Public Law 88-578). Because 6(f) funds have been used to purchase or enhance these resources, they are afforded extra protection by federal law, and sometimes require the approval of the Secretary of the Interior before changes can be made to property purchased or improved with these funds. If Section 6(f) properties are required for a transportation project, the project must provide functional replacement of the park land. Similar to Section 4(f) resources, Section 6(f)(3) resources require special approval before their use as parklands can be altered. The project's effects on Section 6(f) resources are documented in Section 5.4 of this FEIS.

5.2 Historic, Archaeological and Cultural Resources and Impacts

This section summarizes the process that the South Corridor Project undertook: to identify the Area of Potential Effect (APE); to identify the existing and potential Section 106 resources within the APE; to determine the effects of the proposed project on the identified resources; and to define the mitigation for project "effects" and "adverse effects."

5.2.1 Determination of the Area of Potential Effect

The APE that has been used for the South/North DEIS, the South Corridor Project SDEIS, the Downtown Amendment to the SDEIS and this FEIS was determined in consultation with the Oregon SHPO. The APE for the downtown area was defined as 1/2 block (approximately 100 feet) on each side of the project alignment. The APE for the I-205 Segment was defined as 150 feet from the proposed project improvements.

5.2.2 Identification of Historic, Archaeological and Cultural Resources

Several sources were used to identify potential historic and cultural resources within the APE, including previous South/North Corridor DEIS reports, South Corridor Project reports, state agency and local jurisdiction historic resource inventories, SHPO files, Oregon Historical Society resources and files, and field research. Potentially interested Native American Tribal groups were also contacted and invited to provide cultural resource data.

Significant historic, archaeological and cultural research was done in conjunction with preparation of the South/North DEIS. When the South Corridor Project SDEIS was prepared, additional new records review and field work was done to identify resources in the I-205 Segment of the Corridor. The downtown Portland inventory from the South/North DEIS was updated in the fall of 2003 for the Downtown Amendment to the SDEIS. A number of changes since the previous work were identified and documented.

In the APE of the I-205/Portland Mall Project, 62 historic resources were identified; 35 are currently listed on the National Register of Historic Places (NRHP), 21 have been previously determined eligible for listing, and 6 new resources have been identified as eligible for listing in the NRHP. Table 5.2-1 summarizes the numbers of identified historic resources within the two Project segments. There are no previously identified archaeological sites in the APE, but there is one identified high probability archaeological site in downtown Portland and one along I-205. Table 5.2-2 lists the identified historic resources by name and address, and shows the National Register of Historic Places status of each resource. The general locations of the identified historic resources are shown on Figure 5.2-1.

Table 5.2-1
Summary of Identified Historic Resources

	NRHP[1]	Previous DOE[2]	Eligible [3]	Total Historic	Potential Archaeological Sites [4]
Portland Mall Segment	35	21	5	61	1
I-205 Segment	0	0	1	1	1
I-205/Mall Project Total	35	21	6	62	2

Sources: Metro, July 2004, Archaeological Investigations Northwest, June 2003, and South/North Project Historic, Archaeological and Cultural Impacts Results Report, (February 1998).

[1] NRHP = Historic resource currently listed on the National Register of Historic Places.

[2] DOE = Historic resource previously determined eligible for the National Register of Historic Places .

[3] Eligible = Historic resource that has been identified as eligible for the National Register of Historic Places

[4] Potential Archaeological Sites = Identified sites that have a high probability of finding significant archaeological resources.

5.2.3 Determination of Effects to Historic, Archaeological and Cultural Resources

This section summarizes the evaluation of effects on the historic resources that have been identified within the APE of the I-205/Portland Mall Project. The evaluation of effect has been done based on the criteria of adverse effect in 36 CFR Part 800.5 in consultation with the SHPO and FTA. The criteria of adverse effect states:

> *"**Criteria of adverse effect**. An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been*

identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative.

Examples of adverse effects. *Adverse effects on historic properties include, but are not limited to:*
(i) Physical destruction of or damage to all or part of the property;
(ii) Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation, and provision of handicapped access, that is not consistent with the Secretary's standards for the treatment of historic properties (36 CFR part 68) and applicable guidelines;
(iii) Removal of the property from its historic location;
(iv) Change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance;
(v) Introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant historic features;
(vi) Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization; and
(vii) Transfer, lease, or sale of property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance."

A. No-Build Alternative

The No-Build Alternative is not expected to result in any direct or indirect adverse effects to identified historic or cultural resources.

B. I-205/Portland Mall Project Impacts

For resources within the South Corridor Study APE where the project effects do not meet any of the criteria of adverse effect, they were determined to have either no effect, or no adverse effect as a result of the Project. A preliminary determination of effect was included in the SDEIS and ASDEIS documents for the various study alternatives. After selection of the LPA the determinations were reevaluated in light of the LPA decision in consultation with the SHPO, local jurisdictions, and other interested parties. The final determinations of effect that would result from the I-205/Portland Mall Project, and mitigation commitments were defined and have been documented in the Memorandum of Agreement (MOA) between the Oregon SHPO, the FTA and TriMet. The final MOA is included in Appendix B Agency Coordination.

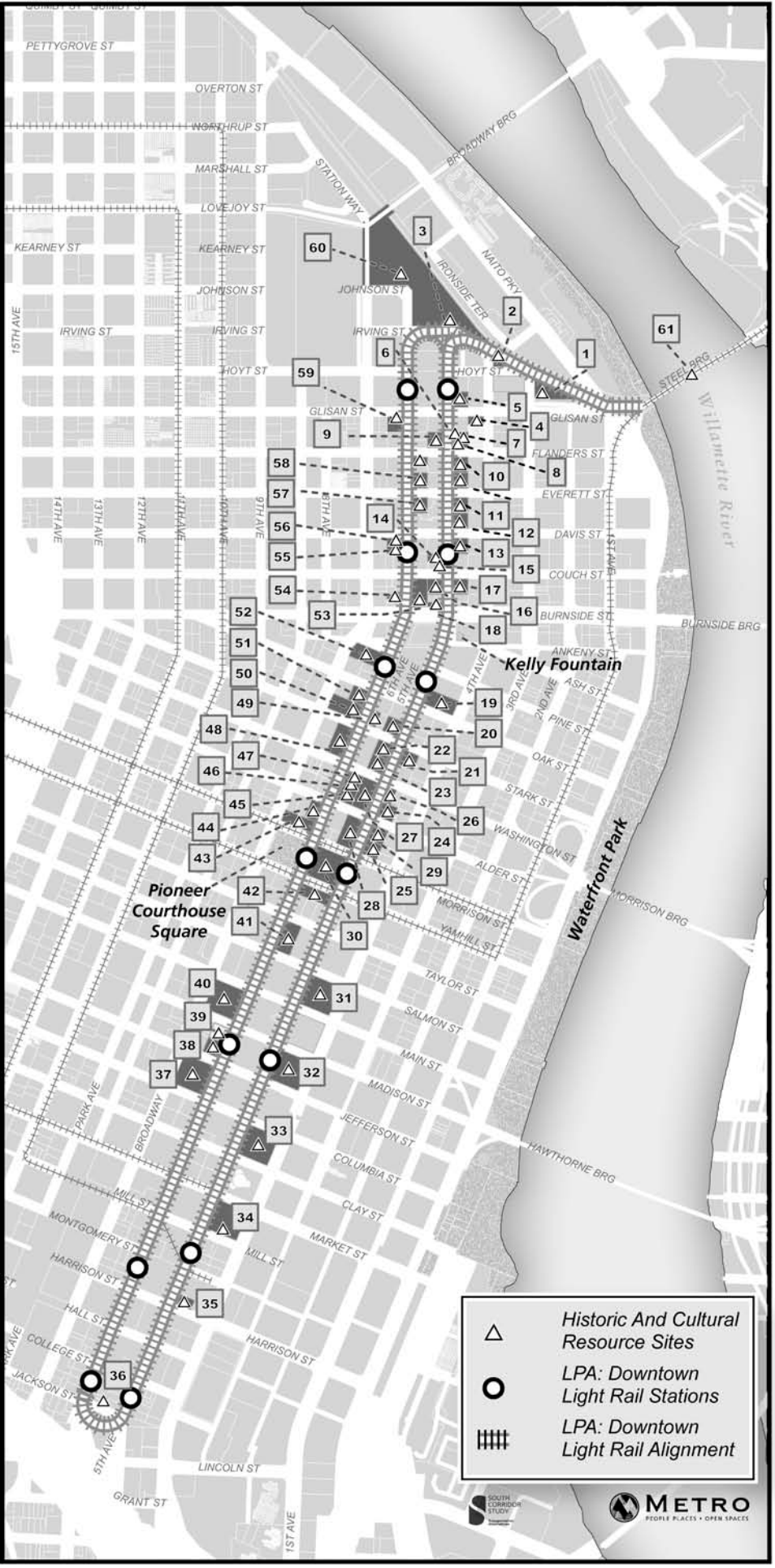
Table 5.2-2 includes a list of the identified historic resources, the resource addresses, the National Register Status of the identified resources, and a summary of the determinations of affect associated with the proposed I-205/Portland Mall Project. Figure 5.2-1 shows the location of the identified historic resources in the Portland Mall Segment.

Table 5.2-2
Historic and Cultural Resources and Determinations of Effect

#	Resource Name, Address	National Register Status [1]	Determination of Effect
1	Firehouse, 510 NW 3rd Avenue	DOE, Portland	Partial Take – No Adverse Effect
2	Signal Tower, 600-610 NW 3rd Avenue	Eligible (S/N DEIS)	Partial Take – No Adverse Effect
3	Steam Plant, 503 NW Irving	National Register	Partial Take – No Adverse Effect
4	Columbia River Ship Supply, 406 NW Glisan Street	National Register	No Adverse Effect
5	Hotel Medford, 506-510 NW 5th Avenue	Eligible (S/N DEIS)	No Adverse Effect
6	Harper Brassworks, 416 NW 5th Avenue	National Register (CHD)	No Adverse Effect
7	Commercial/Industrial, 412 NW 5th Avenue	National Register (CHD)	No Adverse Effect
8	Povey Building, 408 NW 5th Avenue	National Register (CHD), Portland	No Adverse Effect
9	Oregon Casket, 403 NW 5th Avenue	DOE	No Adverse Effect
10	Minnesota Hotel, 322 NW 5th Avenue	National Register (CHD)	No Adverse Effect
11	Warehouse, 222-234 NW 5th Avenue	National Register (CHD)	No Adverse Effect
12	Auto Building, 208 NW 5th Avenue	National Register (CHD)	No Adverse Effect
13	Factory/Comm., 125-135 NW 5th Avenue	DOE	Platform – No Adverse Effect
14	Commercial Building, 115-117 NW 5th Avenue	DOE	Platform – No Adverse Effect
15	Warehouse, 107 NW 5th Avenue	DOE	Platform – No Adverse Effect
16	Warehouse, 19 NW 5th Avenue	DOE	No Adverse Effect
17	Fithian-Barker Shoe Store, 20 NW 5th Avenue	National Register (CHD non-Contributing)	No Adverse Effect
18	York Apartments, 5 NW 5th Avenue	DOE	No Adverse Effect
19	Lincoln Building, 421 SW Oak Street	Eligible (S/N DEIS)	No Adverse Effect
20	Lumberman's Building/Oregon Trail Building, 333 SW 5th Ave.	National Register, Portland	No Adverse Effect
21	J. K Gill Building, 408 SW 5th Avenue	Eligible (S/N DEIS)	No Adverse Effect
22	First National Bank, 401 SW 5th Avenue	National Register, Portland	No Adverse Effect
23	Mead Building, 421 SW 5th Avenue	Eligible (FEIS)	No Adverse Effect
24	Swetland Building, 500 SW 5th Avenue	Eligible (S/N DEIS)	No Adverse Effect
25	Lipman Wolfe & Co., 521 SW 5th Avenue	National Register, Portland	No Adverse Effect
26	Yeon Building, 533 SW 5th Avenue	National Register, Portland	No Adverse Effect
27	Failing Building, 620 SW 5th Avenue	Eligible (S/N DEIS)	No Adverse Effect
28	Meier & Frank Building, 621 SW 5th Avenue	National Register, Portland	No Adverse Effect
29	Kress, S. H., Building, 638 SW 5th Avenue	National Register, Portland	No Adverse Effect
30	Pioneer Courthouse, 520 SW Morrison Street	National Register, Portland	Platform – No Adverse Effect
31	Multnomah County Courthouse, 1021 SW 4th Avenue	National Register, Portland	No Adverse Effect
32	Portland City Hall, 1220 SW 5th Avenue	National Register, Portland	No Adverse Effect
33	Oregon State Building/Fifth Avenue Building, 1400 SW 5th Ave.	Eligible (FEIS)	No Adverse Effect
34	St Mary's Rock Wall, bounded by SW Mill/Market and 4th/5th	Eligible (FEIS)	No Adverse Effect
35	Harrison Court Apartments 1834 SW 5th Avenue	Eligible (FEIS)	No Adverse Effect
36	Residence, 525 SW Jackson Street	Eligible (FEIS)	No Adverse Effect
37	Oregonian Building, 1320 SW Broadway	Eligible (S/N DEIS)	No Adverse Effect
38	University Club, 1225 SW 6th Avenue	National Register, Portland	No Adverse Effect
39	Ambassador Apts., 1209 SW 6th Avenue	National Register	No Adverse Effect
40	U.S. Courthouse, 620 SW Main Street	National Register	No Adverse Effect
41	Public Services Building, 920 SW 6th Avenue	National Register, Portland	No Adverse Effect
42	Pacific Building, 520 SW Yamhill Street	National Register, Portland	No Adverse Effect
43	American Bank Building, 617-621 SW Morrison Street	National Register, Portland	No Adverse Effect
44	Selling Building, 610 SW Alder Street	National Register, Portland	No Adverse Effect
45	Bedell Building, 520 SW 6th Avenue	National Register, Portland	No Adverse Effect
46	Olds and King/Exchange Building, 514 SW 6th Avenue	Eligible, Portland	No Adverse Effect
47	Wilcox Building, 506 SW 6th Avenue	National Register, Portland	No Adverse Effect
48	Equitable Building, Commonwealth Building, 421 SW 6th Ave.	National Register, Portland	No Adverse Effect
49	Bank of California, 330 SW 6th Avenue	National Register, Portland	No Adverse Effect
50	U.S. National Bank, 321 SW 6th Avenue	National Register, Portland	No Adverse Effect
51	Wells Fargo Building, 309 SW 6th Avenue	National Register, Portland	No Adverse Effect
52	Corbett Brothers Garage, 630 SW Pine Street	National Register, Portland	No Adverse Effect
53	Apostolic Faith, 16-34 NW 6th Avenue	DOE	No Adverse Effect
54	Nickel Star Theater, 9-13 NW 6th Avenue	Eligible (S/N DEIS)	No Adverse Effect
55	Hotel West, 121-127 NW 6th Avenue	DOE, 1991	No Adverse Effect
56	Butte Hotel, 129-137 NW 6th Avenue	DOE, 1991	No Adverse Effect
57	Athens Hotel, 226-238 NW 6th Avenue	DOE, 1991, Portland	No Adverse Effect
58	Biltmore Hotel, 302-314 NW 6th Avenue	DOE, 1991	No Adverse Effect
59	Oregon Cracker Co., 423 NW 6th Avenue	National Register, Portland	No Adverse Effect
60	Union Station, 800 NW 6th Avenue	National Register, Portland	Partial take – No Adverse Effect
61	Steel Bridge, Center Span	Eligible (S/N DEIS)	No Adverse Effect
62	Orrin Battin House, 8606 SE Battin Road	Eligible (FEIS)	Partial take – No Adverse Effect

Source: Metro and the Oregon State Historic Preservation Officer (SHPO), June 2004, Archaeological Investigations Northwest: June 2003, and *Historic, Archaeological and Cultural Resources (Section 106) Impacts Results Report* (Metro: February 1998).

[1]NRHP = National Register of Historic Places; Portland = Portland Landmarks Register; DOE = Determination of Eligibility Previously Made; CHD = Chinatown/Japantown Historic District; Eligible = Determined eligible as part of the S/N Transit Corridor Study or based on new analysis for the South Corridor Project; and Eligible (FEIS) = DOE made as part of South Corridor FEIS.



South Corridor Project

Historic and Cultural Resources

FIGURE 5.2-1

	Historical and Cultural Sites	Address
1	Firehouse	510 NW 3rd Avenue
2	Signal Tower	600-610 NW 3rd Avenue
3	Steam Plant	503 NW Irving
4	Columbia River Ship Supply	406 NW Glisan Street
5	Hotel Medford	506-510 NW 5th Avenue
6	Harper Brassworks	416 NW 5th Avenue
7	Commercial/Industrial	412 NW 5th Avenue
8	Povey Building	408 NW 5th Avenue
9	Oregon Casket	403 NW 5th Avenue
10	Minnesota Hotel	322 NW 5th Avenue
11	Warehouse	222-234 NW 5th Avenue
12	Auto Building	208 NW 5th Avenue
13	Factory/Comm.	125-135 NW 5th Avenue
14	Commercial Building	115-117 NW 5th Avenue
15	Warehouse (Commercial/Office)	107 NW 5th Avenue
16	Warehouse	19 NW 5th Avenue
17	Fithian-Barker Shoe Store	20 NW 5th Avenue
18	York Apartments	5 NW 5th Avenue
19	Lincoln Building	421 SW Oak Street
20	Lumberman's Building/Oregon Trail Building	333 SW 5th Avenue
21	J. K Gill Building	408 SW 5th Avenue
22	First National Bank	401 SW 5th Avenue
23	Mead Building	421 SW 5th Avenue
24	Swetland Building	500 SW 5th Avenue
25	Lipman Wolfe & Co.	521 SW 5th Avenue
26	Yeon Building	533 SW 5th Avenue
27	Failing Building	620 SW 5th Avenue
28	Meier & Frank Building	621 SW 5th Avenue
29	Kress, S. H., Building	638 SW 5th Avenue
30	Pioneer Courthouse	520 SW Morrison Street
31	Multnomah County Courthouse	1021 SW 4th Avenue
32	Portland City Hall	1220 SW 5th Avenue
33	Oregon State Building/Fifth Avenue Building	1400 SW 5th Avenue
34	St Mary's Rock Wall	SW Market/Mill, 4th/5th
35	Harrison Court Apartments	1834 SW 5th Avenue
36	Residence	525 SW Jackson Street
37	Oregonian Building	1320 SW Broadway
38	University Club	1225 SW 6th Avenue
39	Ambassador Apts.	1209 SW 6th Avenue
40	U.S. Courthouse	620 SW Main Street
41	Public Services Building	920 SW 6th Avenue
42	Pacific Building	520 SW Yamhill Street
43	American Bank Building	621 SW Morrison Street
44	Selling Building	610 SW Alder Street
45	Bedell Building	520 SW 6th Avenue
46	Olds and King Store	514 SW 6th Avenue
47	Wilcox Building	506 SW 6th Avenue
48	Equitable Building, Commonwealth Building	421 SW 6th Avenue
49	Bank of California	330 SW 6th Avenue
50	U.S. National Bank	321 SW 6th Avenue
51	Wells Fargo Building	309 SW 6th Avenue
52	Corbett Brothers Garage	630 SW Pine Street
53	Apostolic Faith	16-34 NW 6th Avenue
54	Nickel Star Theater	9-13 NW 6th Avenue
55	Hotel West	121-127 NW 6th Avenue
56	Butte Hotel	129-137 NW 6th Avenue
57	Athens Hotel	226-238 NW 6th Avenue
58	Biltmore Hotel	302-314 NW 6th Avenue
59	Oregon Cracker Company	427-435 NW 6th Avenue
60	Union Station	800 NW 6th Avenue
61	Steel Bridge, Center Span	

0 0.1 0.2 0.3 Miles

JULY 2004

Impacts to Historic Resources During Construction

Noise, dust, and temporary limitations to access during construction of the I-205/Portland Mall Project could cause temporary construction-related impacts to historic resources. However, because most of the Project construction would occur within public right-of-way, these impacts would be limited and could generally be mitigated through careful construction management and coordination with the potentially affected properties. No construction-related impacts are expected to constitute an "adverse effect" to any identified historic resources.

Indirect and Cumulative Impacts to Historic Resources

In downtown Portland there could be some small indirect impacts to other historic resources. For example, as the Central City activity levels increase and some buses are rerouted off the mall, there would be increased traffic and bus use of off-mall streets. Increased automobile and bus traffic could increase noise levels by an estimated one or two decibels on some streets where buses are rerouted off the Mall. Generally a noise increase of three decibels is required for the noise increase to be noticeable.

Cumulative impacts of the Project in conjunction with other potentially foreseeable projects, to historic resources could include increased urbanization in Portland's Central City that could add pressure to demolish some historic resources to accommodate redevelopment. Cumulatively, it could result in adverse impacts if development or redevelopment activities were to result in the loss of, or encroachment of development on historic resources. Conversely, rehabilitation and reuse of historical resources and preservation of historic resources could create a beneficial impact for the resources, including preservation and/or rehabilitation of structures that might otherwise deteriorate or be demolished.

5.2.4 Mitigation of Impacts to Historic Resources

Construction of the I-205/Portland Mall Project is not expected to cause any "adverse affects" to identified historic or cultural resources. Project staff has consulted with the SHPO (and will continue to consult with the SHPO through final design and construction) to ensure that the Project is developed in a manner that is sensitive to the historic character of the many adjacent resources in the vicinity of the Project. The commitment to continue consultation on design issues in the vicinity of historic resources is documented in the South Corridor I-205/Portland Mall Project Memorandum of Agreement (MOA). The MOA is contained in Appendix B Agency Coordination. If during construction there is a discovery of any potential archaeological resource, a professional archaeologist would be brought in to help determine if the resource is significant. Response to any possible archaeological discoveries is also addressed in the MOA.

5.2.5 State Historic Preservation Officer and Tribal Coordination

SHPO. Over the past nearly decade long South Corridor Project development process, project staff have regularly consulted with the Oregon SHPO. The SHPO has been consulted with on determining the Area of Potential Effect (APE), on identifying resources that are on or eligible for the National Register of Historic Places, on evaluating the potential effects of the project alternatives on the identified resources and on identifying the appropriate mitigation measures. The project staff has worked extensively to avoid impacts to identified resources where ever possible and then to

minimize the effects where they cannot be avoided. As the project development process continues into final design and construction, the project staff will continue to consult with the SHPO on design of the Project elements that are in close proximity to identified historic resources. As stated in the MOA, the staff will also coordinate with the SHPO in the event that any new historic resources or archaeological resources are discovered during the construction process.

Native American Tribes. Project coordination with Tribal groups has also been done through the project development process. Project staff has contacted cultural resource representatives from the following Native American Tribes and Commissions:

- Confederated Tribes of the Grand Ronde,
- Confederated Tribes of the Warm Springs,
- Confederated Tribes of Siletz, and
- Columbia Inter Tribal Fish Commission.

Copies of the DEIS, SDEIS, and ASDEIS were sent to all of these groups. No comments or follow-up contacts were received by the project staff from any of these tribal groups.

5.3 Public Parklands and Recreation Areas - Section 4(f) Resources

This section presents an inventory of Section 4(f) resources in the vicinity of the I-205/Portland Mall Project and an assessment of the impacts of the Project on identified resources. The Section 4(f) regulations are summarized in section 5.1.2. The assessment of impacts focuses on the potential "use" or "constructive use" of identified Section 4(f) Resources. In the context of Section 4(f) the term "use" means taking or acquiring a resource (or a portion of the resource) for construction and/or permanent use (or use during construction) by a transportation facility, or substantially impairing the intended use of the resource through the construction of a transportation facility (i.e. from a significant noise or visual impact) which is known as "constructive use." Section 4(f) resources include publicly owned parks, recreation areas, wildlife and waterfowl refuges and historic sites. Historic properties are also protected under Section 106 of the National Historic Preservation Act and are addressed in Section 5.2 of this document. Section 4(f) resources require special review in relation to the various potential project-related effects. The approval for "use" of these resources in transportation projects can only be made if there are no prudent and feasible alternatives, and if all possible planning efforts have been made to minimize the harm to these resources.

5.3.1 Identification of "Section 4(f)" Resources

The identification of publicly owned parks, recreation areas, and wildlife and waterfowl refuges was completed based on a review of existing published information, field inspection, and discussions with various public agency representatives. Several municipal and county agencies were contacted for information about potential Section 4(f) resources within the study area. The Metro Parks and Greenspaces Department, the City of Portland Parks and Recreation Bureau, Portland Development Commission, and Clackamas Parks District were contacted for information about potential Section 4(f) resources. Individuals knowledgeable about parks, bicycle trails, and planned recreational trails were contacted, and provided useful information about specific locations of resources. Potential Section 4(f) resources include both developed parks and undeveloped areas (informal parks) that are owned by a public entity. Also, field inspections of the project area were conducted to identify potential Section 4(f) resources.

The study area for identification of parklands, recreation areas, and wildlife and waterfowl refuges included an area approximately 150 feet on each side of the proposed project improvements. Table 5.3-1 lists the Section 4(f) Park Resources that have been identified in the I-205 and Portland Mall Segments of the Corridor.

Table 5.3-1
Identified Parkland, Recreation Areas, Wildlife and Waterfowl Refuges
Within 150 feet of the I-205/Portland Mall Project

Resource Name, General Location	Resource Type	Resource Features and Activities
Governor Tom McCall Waterfront Park, along the West Bank of the Willamette River in downtown Portland	City Park	Open space, trail, benches monuments, landscaping
Pioneer Square, one city block between SW Broadway/ 6th Avenue and SW Yamhill/Morrison streets	Plaza	Entire downtown block used for numerous civic and special events and open space
Kelly Fountain, at W Burnside Street and SW 5th Avenue	City Park and Fountain	Open space with fountain and park benches
Springwater Corridor, from McLoughlin Boulevard east passing under I-205, continuing through Gresham and then east toward Sandy	Pedestrian and bicycle trail	Rail-to-trail conversion of former freight rail line with pedestrian, bicycle and equestrian uses

Source: Metro, June 2004; and *South/North Corridor Project Parklands, Recreation Areas, Wildlife and Waterfowl Refuges (Section 4(f)) Results Report* (Metro and AINW, November 2002).

Identification of Historic Properties that also Qualify for Section 4(f) Evaluation

All historic properties qualify for further evaluation and possible special protection under the Section 4(f) regulations if a "use" or "constructive use' of an historic resource is proposed. Historic and cultural resources and related potential Project impacts are described in Section 5.2. In total, 62 historic resources have been identified within the area of potential effect of the proposed Project improvements. The analysis of "adverse effects" on Historic Resources in Section 5.2 has concluded that no historic resources would be "adversely effected" by the proposed Project improvements. However, the Section 4(f) regulations evaluate the "use" and "constructive use" of parklands and historic resources. There are several historic resources where the project improvements would require a "use" of a portion of the property associated with the resource. These resources include the Firehouse (510 NW 3rd Avenue), three Union Station Property historic structures (including the Signal Tower, the Steam Plant and Union Station), and the Orrin Battin House. Because the project would need to "use" a portion of the property associated with each of these identified historic resources they have been included in the Section 4(f) analysis below.

5.3.2 Proposed "Use" of Section 4(f) Resources

The potential effects of the proposed Project on the identified Section 4(f) parklands and historic properties were evaluated to determine if there would be a "use" of identified Section 4(f) resources. This evaluation took into account the qualities of the Section 4(f) resources and assessed the potential for impairment to the protected activities, features, or attributes of the resources. Table 5.3-2 lists the Section 4(f) Resources where the project would require a "use" of a portion of the property. As noted in the Section 106 portion of this chapter, the SHPO has concurred that the proposed "uses" would have "no adverse affect" on the subject historic resources. The Project is not expected to require the "use" of any known or potential archaeological sites.

In the **Portland Mall Segment** there would not be any "use" of the three identified publicly owned parklands that are in close proximity to the proposed Project improvements. However, the Project will need to "use" part of the land associated with several historic resources. The historic resources that the project would need to "use" a portion of the associated land include: #1 the Firehouse, #2 the

Signal Tower, #3 the Steam Plant and #60 Union Station. The Signal Tower, the Steam Plant and Union Station are all on the same parcel of land. Each of these resources are on parcels of land that are significantly larger than the historic structures, and the land that would be required for the Project improvements would not require the alteration or destruction of the historic structures.

Table 5.3-2
Section 4(f) Resources Where a "Use" is Required for the Project

Segment	Public Parklands and Recreation Areas [1]	Historic Resources [2]	Known Archaeological Sites [3]	Total
No-Build Alternative	0	0	0	**0**
Portland Mall Segment	0	4	0	**4**
I-205 Segment	1	1	0	**2**
I-205/Mall Project Total	1	5	0	**6**

Sources: Metro, July 2004 and S*outh/North Corridor Project Parklands, Recreation Areas, Wildlife and Waterfowl Refuges (Section 4(f)) Results Report* (Metro, February 1998)
[1] Public parklands and recreation areas that are Section 4(f) resources.
[2] Historic resources where a portion of the site would be used by the Project.
[3] Potential Archaeological Sites include identified sites that have a high probability of finding a significant archaeological resource.

In the **I-205 Segment**, there would be a "use" of a small portion of the land associated with historic resource #62, the Orrin Battin House and the Springwater Corridor near where the trail currently crosses under the I-205 freeway.

Temporary impacts could occur to Section 4(f) resources during construction, such as construction easements on park land, access impacts, dust, noise, and visual changes. None of the identified Project related construction impacts is expected to constitute a "use" or a "constructive use" as defined in Section 4(f) regulations. For further detail on the Section 4(f) analysis, refer to Section 5.4 below. Additional details on the "Section 4(f)" analysis is included in the *South Corridor Project Draft Section 4(f) Report* (Metro: July 2004) and the *Final Section 4(f) Report* (Metro: November 2004).

Cumulative Impacts

Cumulative impacts to parklands could include improved public access (such as to Tom McCall Waterfront Park and Pioneer Square) for public events and activities, due to the increased access from the Project's proposed transit improvements and other projects identified in the RTP. No cumulative impacts are expected to occur that would constitute a "use" or "constructive use" as defined in the Section 4(f) regulations.

5.4 Section 4(f) Evaluation, Findings and Conclusions

This section provides a summary of the Section 4(f) resource evaluation for the identified resources located in the South Corridor Study area that would be "used" by the I-205/Portland Mall Project. More detailed information regarding the analysis and impacts can be found in the *South Corridor Project Draft 4(f) Report* and *Final 4(f) Report*. The 4(f) evaluation has considered:

- the proposed South Corridor Project LRT alignment plan and design in downtown Portland and I-205,
- the National Register of Historic Places eligible resources, including the Firehouse, Signal Tower, Steam Plant, Union Station, Orrin Battin House,
- the Springwater Corridor recreational resource,

- possible harm to these resources,
- the search for prudent and feasible alternative LRT alignments and designs to avoid use of resources, or reduce the potential use, and
- possible planning to minimize the harm to the resources.

5.4.1 Section 4(f) Evaluation for the Firehouse and Union Station Property, Including the Signal Tower, Steam Plant and Union Station

A. Proposed Action

The proposed Project design would extend the existing LRT tracks from the Steel Bridge toward Union Station on a new ramp, descending from about 15 feet above the surrounding street level at the northeastern corner of the Firehouse property to at-grade level at the northwestern corner. The new ramp would require "use" of approximately 35 feet along the north side of the Firehouse parcel (about 12,000 square feet). The project would also require the "use" of a triangular portion of the Union Station property parcel adjacent to the Signal Tower, and a minor reconstruction of the driveway near the Steam Plant.

The design of the project would significantly reduce the amount of useable land on the Firehouse and Signal Tower properties. The property owner, the Portland Development Commission (PDC), has concluded that the remnant land at the Firehouse and Signal Tower would not have an independent economic value, and has consequently requested that TriMet purchase the entire Firehouse property, and the remaining property around the Signal Tower. TriMet has discussed this issue with PDC, however TriMet cannot proceed with property acquisition negotiations with PDC until it receives project approval. Upon FTA's issuance of a Record of Decision (ROD) for the South Corridor Project (including authorization to purchase property), TriMet would proceed with property acquisition negotiations with PDC and would attempt to purchase the entire Firehouse parcel, and to purchase the Signal Tower and the land immediately adjacent to it (not including the Steam Plant or Union Station itself). Further, should TriMet acquire these properties, measures to ensure that the historic features of the Firehouse and Signal Tower would be protected in the future have been addressed in the Memorandum of Agreement (MOA) between TriMet, FTA and the SHPO. The MOA is included in Appendix B Agency Coordination. The 4(f) evaluation has considered the proposed use, alternatives to avoid the resources and planning to minimize harm, from both the proposed Project design as well as the potential change of ownership.

B. Description of the 4(f) Resource

There are four Section 4(f) resources located in the vicinity of NW 3rd Avenue and NW Glisan Street, including the Firehouse and three Union Station property structures. The Firehouse is a two story brick building located at 510 NW 3rd Avenue between NW Glisan and NW Hoyt streets built to house fire protection services for the nearby area. The Firehouse structure has been vacant for the past couple of years. Most recently it was used as commercial office space. The three Union Station historic structures are all located on a single parcel of land that is adjacent to the Firehouse property. Following are descriptions of these individual historic structures:

- The **Signal Tower** is located at 600 NW 3rd Avenue. It is a two-story brick building with a red clay tile roof that was originally designed to house signal and communication facilities for the adjacent heavy rail facilities in the vicinity of Union Station. This structure is no longer used for

railroad purposes. All communications and switching operations have been transferred to a small pre-fabricated structure immediately to the east of the historic Signal Tower structure.

- The **Steam Plant** was constructed in 1896 as an annex to Union Station, to provide power and to serve as a storeroom and office. It is located at 503 NW Irving Street and is built in the same style and materials as Union Station.
- **Union Station**, located at 800 NW 6th Avenue, is a railroad passenger terminal constructed during the period 1893-1896 by the Northern Pacific Terminal Company. This brick, stucco and sandstone with red clay tile roof includes a 150 foot tower with a neon "Go by Train" sign. From 1923 through the peak passenger use year 1945, the building was served by several major railroads. The building is currently used as the local Amtrak station.

C. Potential Harm to the 4(f) Resource by the Proposed Action

The Firehouse, Signal Tower, Steam Plant and Union Station share common considerations for this Section 4(f) analysis. That is, the proposed LRT alignment in the vicinity of the Firehouse and Union Station reflects extensive work by the project design team to "thread the needle" or in this case locate the light rail tracks carefully between the historic structures, avoiding several resources on both the north (Signal Tower, Steam Plant) and south (Firehouse) sides of the proposed alignment. Consequently, efforts to minimize the harm to one resource could result in harm to the other resources.

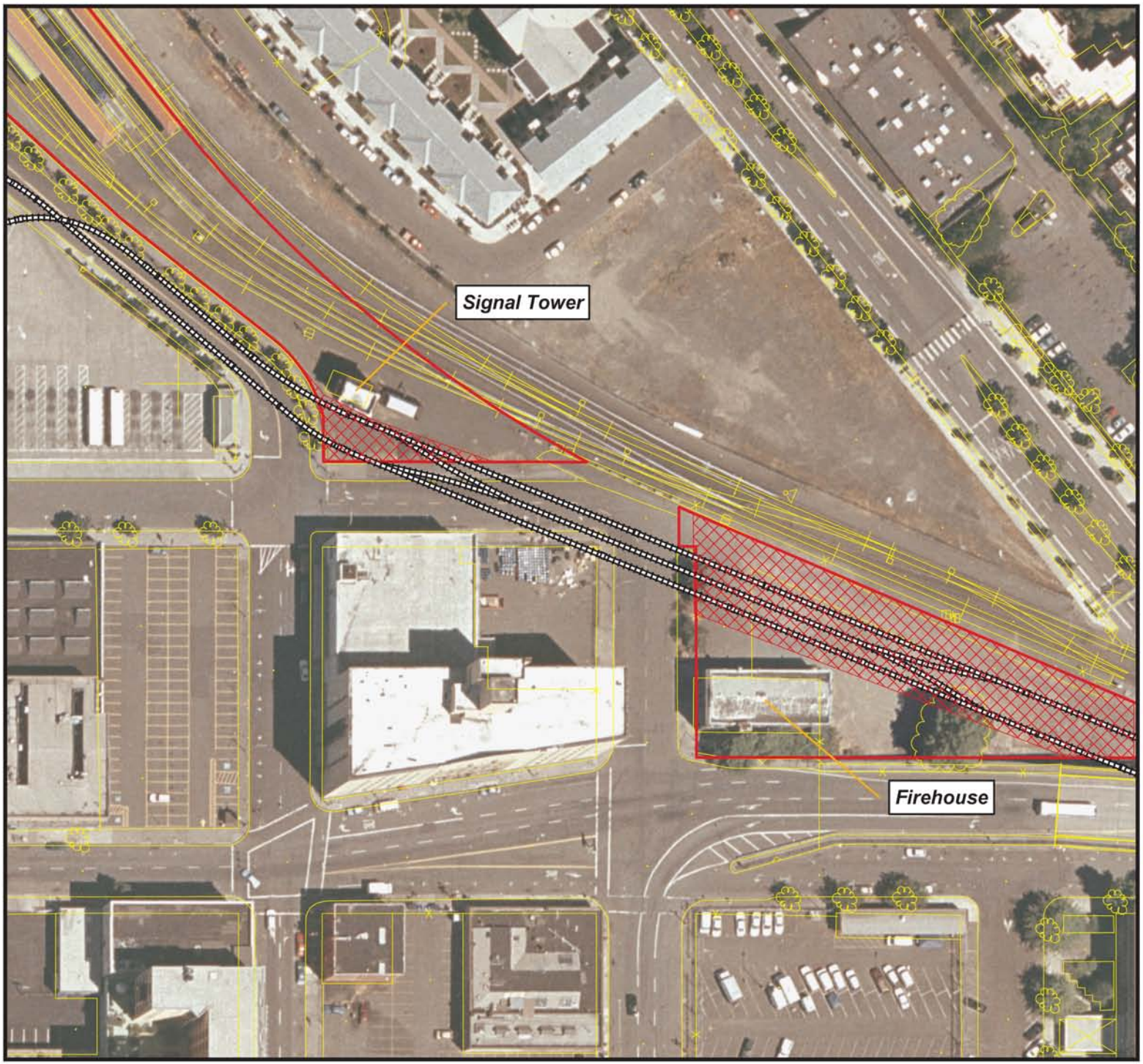
LRT-related construction and operation in the vicinity of the Firehouse and Union Station property resources would include “use” of the land on the north side of the Firehouse and on the south side of the Signal Tower, a reduction in the visibility of the Firehouse when viewed from some locations to the east and north of the building, reconstruction of a driveway near the Steam Plan and an increase in noise and vibration when the LRT vehicles pass. While the Union Station structure is located on the same parcel as the Steam Plant and the Signal Tower, there would not be alterations or changes from the project to the Union Station structure. Figure 5.4-1 illustrates the “Section 4(f) use” of the Firehouse and Union Station Properties. Potential harm to the resource during construction could include construction related noise, dust and temporary limitations to access.

Potential harm to the Firehouse and Union Station structures could result primarily from increased urbanization in the Portland Central City. Cumulatively, urbanization could result in development or redevelopment pressure which could result in the loss of, or further encroachment of development on these historic resources. Conversely, rehabilitation and reuse of historical resources and preservation of historic resources is likely to benefit the resources, including preservation and/or rehabilitation of structures that might otherwise deteriorate or be demolished.

D. Search for Prudent and Feasible Alternatives and Assessment

In the search for alternatives to avoid the use of this resource, TriMet light rail engineers considered the following design options:

- **Option 1** - The proposed Project alignment. This design proposes to align the LRT facilities to balance the impacts and minimize the effects on the Signal Tower and Firehouse so that neither historic resource is more adversely impacted.
- **Option 2** - Pocket track 25 feet from railroad right-of-way. This design would include a pocket track 25 feet from the existing Freight rail line and allows for a stored light rail vehicle to return to operations in either direction.



South Corridor Project

Section 4(f)- "Use" of Firehouse and Signal Tower Properties

FIGURE 5.4-1

Area of Project "Use"

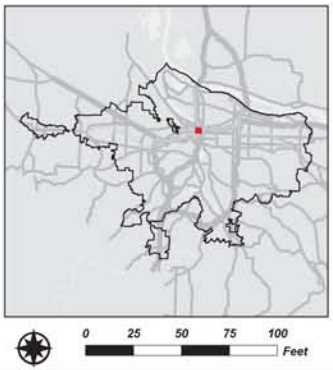
Impacted Taxlot

ALIGNMENTS

Portland Mall Segment

SOUTH CORRIDOR STUDY

METRO
PEOPLE PLACES • OPEN SPACES



July 2004

South Corridor Project

Section 4(f)- "Use" of Steam Plant and Union Station

FIGURE 5.4-2

Area of Project "Use"

Impacted Taxlot

ALIGNMENTS

Portland Mall Segment

SOUTH CORRIDOR STUDY

METRO
PEOPLE PLACES • OPEN SPACES

0 25 50 75 100 Feet

July 2004

- **Option 3** - No pocket track and possible LRT vehicle storage at Union Station. This option would locate the LRT tracks the furthest to the north (adjacent to the heavy rail tracks) and would include relocation of the Signal Tower and equipment shed adjoining the signal tower.
- **Option 4** - Tail track adjacent to Portland Traction right-of-way, double track LRT. This option would locate the LRT tracks further to the north and would require relocation of the Signal Tower equipment shed.
- **Option 5** - Union Station Storage. This option would use the heavy rail tracks at Union Station for LRT vehicle storage.

In evaluating the options, Option 3 would have the most adverse effect on the historic resources, because it would require moving or demolishing the Signal Tower. Moving the Signal Tower could be done in a way that could retain some visual connection to the railroads area and its current historic location. However, this approach is less desirable, from a historic perspective, than keeping the structure in place where it provides a clear connection to the railroad tracks, passenger rail trains and Union Station. The Signal Tower is a concrete structure, including its walls, with brick veneer, so moving it could probably be achieved without damage to the structure, but there would be risks nonetheless inherent in moving a 100 plus year old concrete and brick structure with a clay tile roof. In addition, Option 3 is infeasible because the time needed to switch LRT vehicles would be so substantial that it would make efficient operation of the LRT system unworkable. The consequence of avoiding the impacts of Option 1 by implementing Option 3 would be an infeasible LRT operation, compromise of the historic context of the Signal Tower structure and risk of possible structural damage to the Signal Tower from moving it.

Option 4 would share the same operation problem as Option 3, making LRT operation unworkable and therefore this option infeasible. In addition, Option 4 would still require acquisition of some land from both the Firehouse and Signal Tower, though it has less impact to the Signal Tower than some of the other options. Accordingly, the consequences of avoiding the impacts of Option 1 by implementing Option 4 would be an infeasible LRT operation while still needing to take land from both the Firehouse and Signal Tower properties.

Option 5 would address the operational needs to store and switch LRT vehicles by using a portion of the land and tracks at Union Station. However, representatives of Amtrak and the PDC (the property owner) are not willing to allow use of the existing heavy rail tracks and land for LRT storage. Issues include interference with Amtrak train operations and safety. Consequently, Option 5 is also infeasible. The consequences of avoiding the impacts of Option 1 by implementing Option 5 would be an unworkable LRT operation because of conflicts with heavy rail operations.

Option 2 would leave the Signal Tower intact, but it would include placing new LRT tracks on both sides of the Signal Tower. This design would isolate the Signal Tower and be less safe for motor vehicles and pedestrians because the visibility of the LRT vehicles on the northernmost LRT tracks would be partially obscured by the Signal Tower. In addition, approval to move the Amtrack switching and telecommunications equipment shed would have to be secured from the railroad. The consequences of avoiding the impacts of Option 1 by implementing Option 2 would be to surround the Signal Tower with LRT tracks making it less accessible for use and decreasing pedestrian safety because the presence of a moving LRT vehicle could be obscured at some locations.

Option 1, the Proposed Approach, while requiring acquisition of land from both the Firehouse and Signal Tower properties, minimizes the effects on both resources. Consequently, the historic values

of the structures would be maintained. LRT could also substantially increase the visibility of the structures to the public and could spur reuse and potential restoration of the structures, thereby helping ensure their long-term preservation. The proposed approach also has none of the operational problems concerning storage and switching that make other options infeasible.

E. Measures to Minimize Harm

The I-205/Portland Mall Project as embodied in the proposed approach (Option 1) is not expected to have an "adverse affect" on the identified historic resources. Project staff has consulted with the SHPO, and through the consultation, there is agreement that the project would be developed in a manner that is sensitive to the many adjacent historic resources. The MOA provides for SHPO review of the design during the Final Design process to ensure compatibility of the project with the adjacent historic resources. In order to ensure that the project design is sensitive to and compatible with the historic resources, the design efforts will be coordinated with the SHPO to ensure that the project can be constructed adjacent to these historic resources without causing adverse effects.

Measures to minimize harm during construction would address noise and vibration, dust, visual and access impacts. To address potential short-term construction harm, temporary access limitations could be minimized by limiting construction activities during important seasonal events that may occur at the historic or cultural resources and providing alternative, temporary access where necessary. Dust and noise may be mitigated through standard specifications in contract documents. Measures to address long-term potential harm such as visual effects would include use of complementary materials or design treatments to minimize those effects.

5.4.2 Section 4(f) Evaluation for the Orrin Batten House

A. Proposed Action

Construction of the Project would include addition of LRT to the west side of the I-205 freeway and relocation of the present bikeway such that the easternmost part of the Orrin Battin property would be "used" to accommodate some of these facilities. The proposed LRT alignment would need to "use" approximately 320 square feet of land from the Orrin Battin land parcel. The area that would be "used" would include an elongated triangular shaped area on the east side of the Orrin Battin property adjacent to the freeway.

B. Description of the 4(f) Resource

The Orrin Battin House was built between 1900 and 1920. It is a wood sided house with a covered porch that retains significant architectural integrity from its original construction. It was built by the Battin family on a portion of a larger parcel of land purchased by Thomas and Caroline Battin in 1887. This National Register eligible structure is located at 8606 SE Battin Road and is presently used as a parsonage for the Rock Solid Baptist Church, located immediately to the west.

C. Potential Harm to the 4(f) Resource by the Proposed Action

The project would require the "use" of a triangular piece of property totaling 320 square feet of land (8 feet by 80 feet) from the Orrin Battin House parcel of land on the easternmost side of the property. The LRT would be located adjacent to the Freeway, and will require relocation of the I-205

pedestrian/ bicycle path to the west, which requires the use of a portion of the property associated with this house. Potential harm during construction could include construction noise, vibration and dust. Figure 5.4-3 illustrates use of the Orrin Battin House.

D. Search for Prudent and Feasible Alternatives and Assessment

In addition to the proposed design (Option 4) that requires acquisition of 320 square feet of property, the following options have been identified and analyzed: Option 1 - reduction of the width of the bike path; Option 2 - an extension of the bridge structure that would move the relocated bike path wholly onto existing ODOT property; and Option 3 - relocate the bike path onto Maloney Road.

Option 1 appeared initially to be a simple and cost effective solution - to narrow the bike path along the segment at the Orrin Battin house. However, Federal and State standards for bike paths have minimum width requirements. Section 1202 (Bicycle Transportation and Pedestrian Walkways) of the Transportation Equity Act for the 21st Century (TEA-21), states "In implementing section 217(g), United States Code, the Secretary, in cooperation with the American Association of State Highway and Transportation Officials, the Institute of Transportation Engineers, and other interested organizations, shall develop guidance on the various approaches to accommodating bicycles and pedestrian travel."

The USDOT Policy Statement developed in response to this requirement states that:

"1. Bicycle and pedestrian ways shall be established in new construction and reconstruction projects in all urbanized areas unless one or more of three conditions are met:

- *bicyclists and pedestrians are prohibited by law from using the roadway. In this instance, a greater effort may be necessary to accommodate bicyclists and pedestrians elsewhere within the right of way or within the same transportation corridor.*
- *the cost of establishing bikeways or walkways would be excessively disproportionate to the need or probable use. Excessively disproportionate is defined as exceeding twenty percent of the cost of the larger transportation project*
- *where sparsity of population or other factors indicate an absence of need. For example, the Portland Pedestrian Guide requires "all construction of new public streets" to include sidewalk improvements on both sides, unless the street is a cul-de-sac with four or fewer dwellings or the street has severe topographic or natural resource constraints....."*

The facts pertaining to the Orrin Battin property include: 1) bicyclists and pedestrians are prohibited from the I-205 freeway roadway but an existing multi-use path exists between the freeway and the Orrin Battin property within the I-205 right-of-way; and, 2) the site is located within the Metro urban growth boundary that currently accommodates over 1.3 million people. Accordingly, it was conclude that a path for bicyclists and pedestrians is required.

South Corridor Project

Section 4(f)- "Use" of Orrin Battin Property

FIGURE 5.4-3

Area of Project "Use"

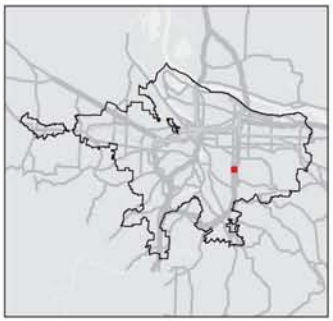
Impacted Taxlot

ALIGNMENTS

I-205 Segment

SOUTH CORRIDOR STUDY Transportation Alternatives

METRO PEOPLE PLACES • OPEN SPACES



0 25 50 75 100 Feet

August 2004

USDOT Policy further states that:

> *"4. The design and development of the transportation infrastructure shall improve conditions for bicycling and walking through the following additional steps:….designing facilities to the best currently available standards and guidelines. The design of facilities for bicyclists and pedestrians should follow design guidelines and standards that are commonly used, such as the AASHTO Guide for the Development of Bicycle Facilities…"*

The *Guide for the Development of Bicycle Facilities,* (AASHTO, 1999) states on pages 35 and 36, concerning shared use paths that:

> *"Under most conditions, a recommended paved width for a two-directional shared use path is 3.0 m (10 feet). In rare instances, a reduced width of 2.4 m (8 feet) can be adequate. In addition, the Guide states "A minimum of 0.6 m (2-foot) wide graded area with a maximum 1:6 slope should be maintained adjacent to both sides of the path; however, 0.9 m (3 feet) or more is desirable to provide clearance from trees, poles, walls, fences, guardrails or other lateral obstructions."*

Preliminary engineering plans for the South Corridor Project in the vicinity of the Orrin Battin property show a total path width of 12 feet. Assuming a reduced paved surface width of 8 feet and the minimum clearance area of 2 feet on both sides, this totals 12 feet. (ODOT has asked for a 12 foot width and would pave the whole section.) Accordingly, it was concluded that a minimum width of 12 feet, as shown on the Project plan, is the minimum Federally acceptable width for a bike and pedestrian path.

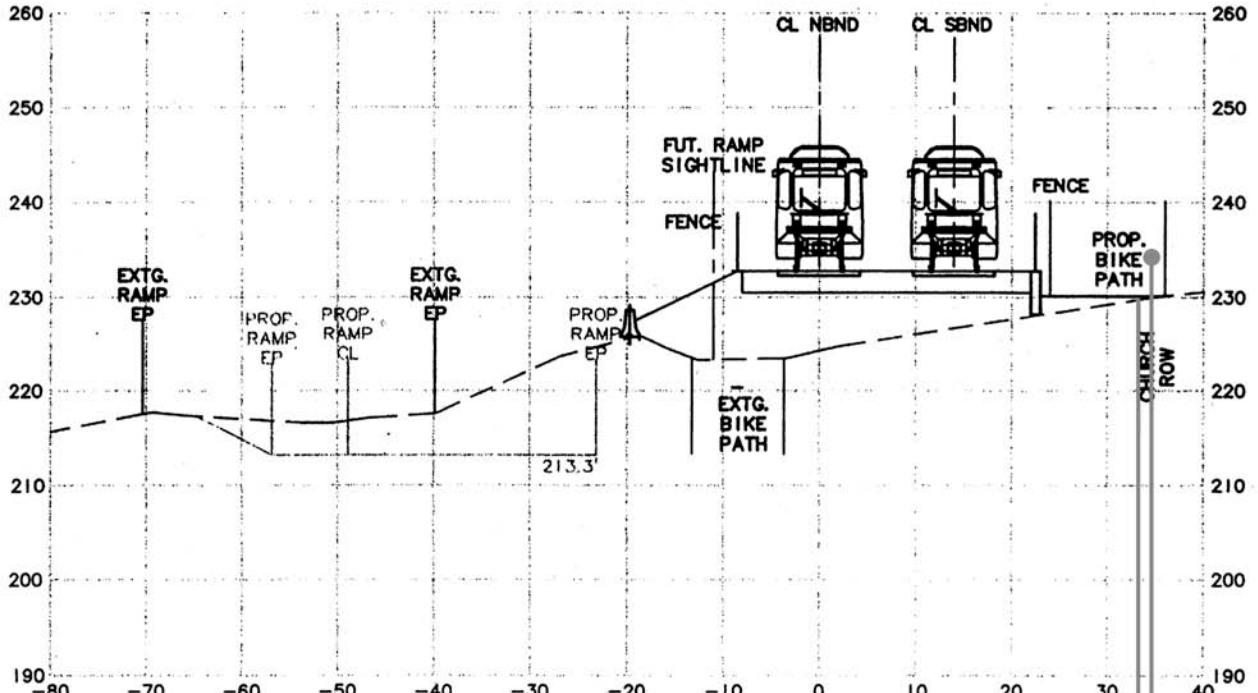
The cross section (see Figure 5.4.4) of the Project improvements as they would be located adjacent to the Orrin Battin property illustrates the proposed design. Given the geometry and orientation of the Orrin Battin property lines and the centerline alignment of the South Corridor LRT, it is not possible to eliminate acquiring some portion of the Orrin Battin property without jeopardizing design flexibility for an additional future lane (and sight line) for the I-205 freeway or reduce the width of the bike path below Federal standards.

TriMet engineers determined that the proposed LRT bridge spanning Johnson Creek Boulevard (Option 2) would need to be extended a minimum of 500 feet in order to provide enough room to move the bike path off of the Orrin Battin property. The profile of the structure would also have to change (get higher) to provide enough vertical clearance for the path. This was deemed not prudent because of the extraordinary additional cost that would be required to extend the bridge, especially when it could not be guaranteed that the resource would remain in tact over the long term. That is, the Orrin Battin house is located in close proximity to the Johnson Creek interchange with I-205, and can be accessed from the fully signalized Fuller Road. On the west side of Fuller Road is a new Home Depot store. While there are no known plans for redevelopment of the Orrin Battin House property or adjacent properties, the recent Home Depot store location suggests that in the future substantial land use changes would be likely to occur to the properties on the east side of Fuller Road as redevelopment occurs in this area and the local economy evolves and matures.

Figure 5.4-4
Orrin Battin Property and I-205 Alignment Cross Section

NOTES:

NOT ALL POINTS EXACTLY ON STATION. CROSS SECTION PERP. TO ALIGNMENT CENTERLINE. DETAILS OF TRACK STRUCTURE NOT SHOWN.



Option 3 would relocate the bike path onto Maloney Road. This Option, in addition to significantly reducing the existing continuity of the bike path and creating out-of-direction travel for bike path users, would require significant additional new right-of-way acquisition because Maloney Place is not a through street and new right-of-way would have to be purchased to connect the bike path alignment along I-205 further to the south. It was also noted that having bike traffic crossing in the front and along the side of this house would cause further isolation of the historic resource and would prove to be more disruptive and cause a greater negative effect than the small property take. The Orrin Battin house, as parsonage to the Church, has parking on Maloney Road, as does the property to the west. Therefore, there is no good location for the path that does not interfere with an existing parking setup.

Accordingly, Option 4 was devised to provide sufficient space for the Project improvements. This Option would result in taking approximately 320 square feet of land from the easternmost portion of the Orrin Battin house property. The original Orrin Battin parcel of land was earlier impacted by the acquisition and construction of the I-205 freeway. The original parcel of land was rectangular in shape and substantially larger until the ODOT acquisition for the I-205 freeway was completed in the 1970s. The freeway right-of-way acquisition included land thought to be sufficient to add high capacity transit in the future. For the majority of the I-205 Segment no additional right-of-way is needed. The proposed acquisition of 320 feet of land from the Orrin Battin house property is one of the few exceptions.

The effect of avoiding the impact of Option 1 would be to violate Federal standards for minimum bike path width. The consequences of avoiding an impact with Option 2 would be to incur extraordinary costs associated with extending the proposed Johnson Creek Boulevard LRT bridge an extra 500 feet. The consequences of routing the bike path along Maloney Place would be further isolation of this resource, out-of direction travel for path users, possible conflicts with motor vehicle parking along Maloney Place and the need to find an additional right-of-way to connect a Maloney Place bike path alignment with the I-205 bike path further to the east and south.

E. Measures to Minimize Harm

Possible measures to minimize harm to the resource could include design treatments and minimization of noise, dust, vibration, visual degradation and temporary access limitations generated during construction. Temporary access limitations could be minimized by limiting construction activities during important events that may occur at the historic or cultural resources and providing alternative, temporary access where necessary. Dust and noise may be mitigated through standard specifications in contract documents. Measures to address long-term potential harm such as visual effects could include use of complementary materials or design treatments to minimize those effects.

In addition, TriMet is investigating the possibility of replacing the “used” land on the northeastern side of the property such that no net loss of property could be achieved.

If during construction there were a discovery of any archaeological resources, a professional archaeologist would be brought in to help identify the significance of any potential resources. Response to any archaeological discoveries has been defined in advance through the MOA.

5.4.3 Section 4(f) Evaluation for the Springwater Corridor

A. Proposed Action

The proposed Project improvements would result in a small encroachment on lands included in the Springwater Corridor right-of-way where it is adjacent to the I-205 freeway.

B. Description of the 4(f) Resource

The Springwater Corridor is a former heavy rail right-of-way that has been converted through the Rails-to-Trails process to a recreational trail. The rail line abandonment of the former freight rail line was initiated by ODOT in conjunction with the Highway 99 widening of McLoughlin Boulevard. The trail improvement was subsequently done by the City of Portland Parks Bureau. This trail is the major southeast segment of the Region's 40 Mile Loop Trail, originally conceived in 1903 as a nature trail encircling the city of Portland. Today the loop is over 170 miles long. The trail serves commuters and recreational trail users from many parts of the region.

C. Potential Harm to the 4(f) Resource by the Proposed Action

Potential harm to the Springwater Corridor by the LRT crossing over the trail could include an increase in noise when the LRT vehicles would pass over the trail and a reduced view along the trail where it currently passes under the I-205 freeway. During construction increased levels of noise, vibration, and dust could occur as well as temporary limitations to access.

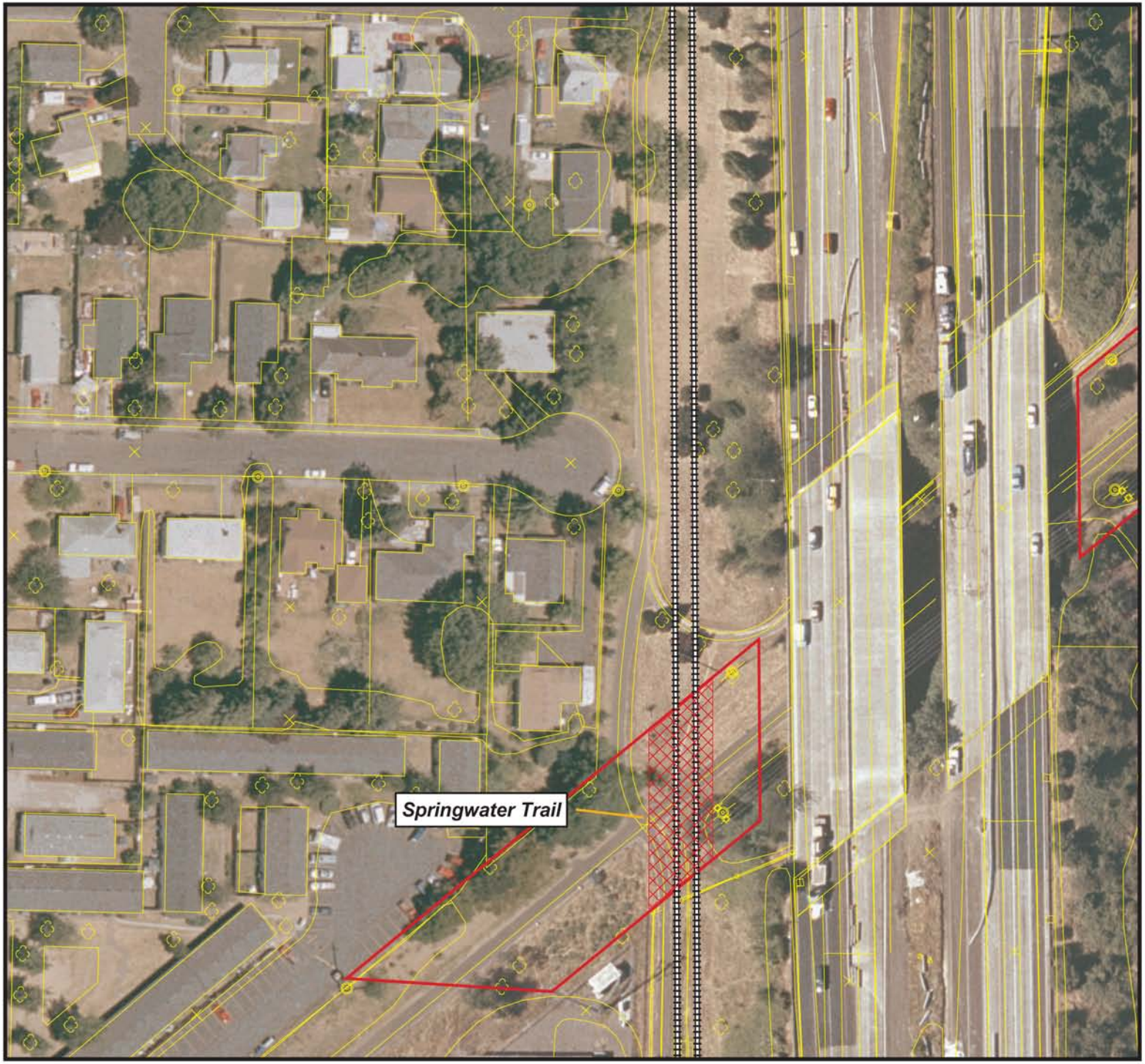
D. Search for Prudent and Feasible Alternatives and Assessment

Options to the originally proposed at-grade crossing design include: Option 1 - at-grade crossing; Option 2 - a box tunnel design; and Option 3 - an LRT bridge over the Springwater Corridor.

Option 1, an at-grade LRT crossing of the Springwater Corridor is the lowest cost option and would use the existing topography for the LRT track elevation. This design would include crossing gates and pedestrian warning lights. The LRT vehicles would activate the crossing gates and not stop at the Springwater Corridor crossing between the Flavel Street station and Foster Road station. Potential conflicts between LRT vehicles and pedestrians or bike riders would be addressed by activation of crossing gates and warning lights prior to the LRT vehicles crossing the trail. The safety of pedestrians and bike riders would be an issue because of LRT vehicle speeds, trail users unfamiliarity with LRT vehicles and the substantial stopping distance requirements for the LRT vehicles. The noise of the bells associated with the closing of the crossing gates would be disruptive. Also the sound wall and the I-205 structure could obscure the views of oncoming trains.

Option 2, a grade separated crossing using a box tunnel, would be a much higher cost design as the elevation of the LRT tracks would be achieved through a combination of retaining walls, fill and a box tunnel. This design would greatly reduce the chance for conflicts between trail users and LRT vehicles. However, this design would substantially reduce the visual opening under the I-205 freeway along the trail.

Option 3, a LRT bridge, would be the highest cost option. Option 3, like Option 2, would also address safety concerns about LRT vehicle and pedestrian or bike conflicts.



South Corridor Project

Section 4(f)- "Use" of Springwater Trail

FIGURE 5.4-5

Area of Project "Use"

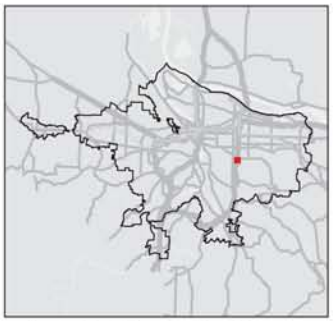
Impacted Taxlot

ALIGNMENTS

I-205 Segment

SOUTH CORRIDOR STUDY

METRO
PEOPLE PLACES • OPEN SPACES



0 20 40 60 80
Feet

July 2004

In addition, it would expand Springwater Corridor visibility underneath the I-205 freeway, compared with Option 2, both because of the inverted trapezoid design as well as light wells that would illuminate the Springwater Corridor passage under the LRT bridge, making a more open feeling along this segment.

None of these options would totally avoid "use" of the Springwater Corridor. Short of not building the LRT project, each option requires some "use" of this multi-use path called the Springwater Corridor. The most significant consequences of implementing Option 1 for the Springwater Corridor is safety concerns for pedestrians and bicyclists using the Springwater Corridor as they traverse an at-grade LRT crossing. The LRT track would also be placed within the Springwater Corridor right-of-way. The consequences of implementing Option 2 (box culvert design) for the Springwater Corridor is encroachment of the Springwater Corridor right-of-way by fill and the foundations of a box culvert on the Springwater Corridor as well as restricting the visibility of trail users. The consequences of implementing Option 3 (LRT bridge) for the Springwater Corridor would be the encroachment of the Springwater Corridor right-of-way by fill and the foundations of a LRT bridge as well as some restriction of the visibility of the Springwater Corridor, though not as much as with Option 2.

E. Measures to Minimize Harm

Possible measures to minimize the harm to the Section 4(f) Resource include design treatments and minimization of potential harm during construction (such as noise, vibration, dust and temporary access limitations). Temporary access limitations during construction could be minimized by limiting construction activity in the vicinity of the recreation resource and providing alternative, temporary access where necessary. Dust and noise may be minimized through appropriate specifications in contracting documents. Measures to improve existing conditions along the trail, including lighting, crime prevention design and visibility, have also been identified. Measures could include use of sky lights in the overcrossing structure and the use of a bridge to provide a greater feeling of openness and security and the use of complementary materials or design treatments.

5.4.4 I-205/Portland Mall Project Section 4(f) Findings

The South Corridor I-205/Portland Mall Project has conducted an extensive Section 4(f) process that has been summarized and documented in the previous sections of Chapter 5 of this FEIS. It is documented in more detail in the *South Corridor I-205/Portland Mall Project Draft Section 4(f) Report*, and the *South Corridor I-205/Portland Mall Project Draft Final Section 4(f) Report.* The analysis has:

1. Identified all Section 4(f) Resources in close proximity to the Project.
2. Evaluated the possible "use" of the resources by the Project.
3. Where a "use" of a resource was identified, ensured that all possible planning was done to avoid and/or minimize the "use" of the identified resource.
4. Where the "use" of a Section 4(f) Resource could not be avoided, determined that no prudent or feasible alternative exists to the proposed "use" of the resource.

The I-205/Portland Mall Project would require the "use" of several historic and one recreational property, including:

1. the Firehouse (historic)
2. the Signal Tower (historic)
3. the Union Station/Steam Plant (historic)
4. the Orrin Battin House (historic), and
5. the Springwater Corridor (recreational trail).

After extensive analysis of the Project in the vicinity of these identified Section 4(f) resources, and after consultation with the Oregon State Historic Preservation Officer and the US Department of the Interior, FTA and FHWA hereby find that there is no prudent or feasible alternative to the use of a portion of the land from the Firehouse, Signal Tower, Union Station/Steam Plant, Orrin Battin House and the Springwater Corridor, by the South Corridor I-205/Portland Mall Project, and that the proposed action includes all possible planning to minimize harm to these properties resulting from such use by the project.

Accordingly, the FHWA and FTA, in consultation with the US Department of the Interior and the Oregon State Historic Preservation Officer, find that the *I-205/Portland Mall Project Final Section 4(f) Report* (Metro, November 2004) demonstrates compliance with all Federal requirements with regard to Section 4(f) regulations, and hereby adopt the analysis and findings of fact for the Firehouse, Signal Tower, Union Station/Steam Plant, Orrin Battin House and Springwater Corridor as they relate to the South Corridor I-205/Portland Mall LRT Project.

5.5 Section 6(f) Resources

As described in Section 5.1.3 earlier, Section 6(f)(3) resources are parklands that have used funding from the Land & Water Conservation Fund Act of 1965 (Public Law 88-578) for acquisition of the park land or improvements to existing park land. Section 6(f)(3) resources are also protected by federal law and require special approval before they can be used or their use can be altered. If 6(f) funds have been used to purchase or enhance a parks resource, it is afforded extra protection by federal law, and sometimes requires the approval of the Secretary of the Interior before changes can be made to the property. If a Section 6(f) property was required for a transportation project, the project must provide functional replacement of the park land of equal or greater fair market value. Information about resources that qualify as Section 6(f) resources was researched through the Oregon Parks and Recreation Department (OPRD). OPRD manages the program for the State of Oregon and maintains records of those parklands that have obtained funding through this program throughout the state.

There are two park resources in close proximity to the study alternatives that have received Land and Water Conservation Funds (LCWF) and therefore qualify as Section 6(f) resources. The resources are Tom McCall Waterfront Park and Pioneer Square, both in the downtown Portland area.

Tom McCall Waterfront Park. Tom McCall Waterfront Park is a large park in downtown Portland that runs for over 25 city blocks along the west bank of the Willamette River. Waterfront Park is frequently the location of many annual community and regional festivals within the Portland area (such as the Portland Rose Festival, the Blues Festival and the Cinco de Mayo festival to name only a few), often drawing tens of thousands of people. Public access to the park is a very important issue. There is limited parking in downtown Portland, and therefore both the existing and proposed Light Rail Transit would provide key transportation access for hundreds of people who attend the activities at Tom McCall Waterfront Park.

Land and Water Conservation Funds were used in the southern part of the park near RiverPlace and the Marquam (I-5) Bridge. The area of Tom McCall Waterfront Park where LWCF funds were used is a significant distance south of the area where the proposed I-205/Portland Mall Project would be in close proximity to the park, at the north end. The project would not use any land from Waterfront Park.

Pioneer Square. Pioneer Square is an important public gathering place for the residents of the Portland metropolitan area. Pioneer Square is considered the heart of downtown Portland and is often referred to as "Portland's living room". It is used extensively for civic festivals and community activities. Pioneer Square currently has light rail transit stations on the north and south sides of the square, and the existing Bus Transit Mall is on the east side of the square. The existing transit access provided by light rail and buses is an important element of the community's ability to access the square for these large civic activities. The Project would add a new light rail alignment in downtown Portland and would result in the addition of a new light rail station on the east side of Pioneer Square. The new light rail station would be added across SW 6th Avenue from the Square where currently the bus transit mall bus stops exist. The proposed improvements would not require the "use" of any of the land area from Pioneer Square.

Section 6(f) Finding. There would be no "use" of Section 6(f) resources for the Light Rail Improvements proposed for the I-205/Portland Mall Project.

6. FINANCIAL ANALYSIS

6.1 Introduction

This chapter presents the financial analysis for the South Corridor Locally Preferred Alternative (LPA) Phase 1 Project, referred to as the I-205/Portland Mall LRT Project (or Project), and the No-Build Alternative. This financial analysis provides information to assess the fiscal feasibility of building and operating the Project. Specifically, this chapter presents a summary of: the Project's financial analysis; the projected capital, operating and maintenance (O&M) costs; currently available resources; Project fiscal conclusions; system fiscal feasibility conclusions; and implementation of the finance plan.

6.2 Financial Analysis

This section addresses the components and feasibility of the capital and operating financial plans for the Project. The financial analysis has been conducted in two parts: (a) the Project Capital Funding Analysis and (b) the System Funding Analysis. This method of analysis clearly differentiates between one-time Project capital cost requirements and ongoing system costs. Both the Project Capital Financial Feasibility Analysis and the System Fiscal Feasibility Analysis have been prepared on a cash-flow basis. Table 6.2-1 lists the components of the transit system that are included in these analyses. The Project capital financial feasibility analysis includes only the opening year Project costs and that all other costs, including the 2010 to 2025 Project costs are included in the system fiscal feasibility analysis. Sections 6.2.1 and 6.2.2 elaborate on the analysis methods.

Table 6.2-1
Components of the Financial Analysis

Financial Analysis Element	Components of Transit System Costs Addressed in the Analysis
Project Capital Funding Analysis System Funding Analysis	• I-205/Portland Mall LRT Project Opening Year Capital Costs • I-205/Portland Mall LRT Project '2010-2025 LRT Capital Costs • I-205/Mall LRT operations cost • Agency-wide operations costs (LRT and bus) • Agency-wide capital costs (other than I-205/Mall LRT Opening Year Capital Cost)[1]

Source: TriMet, October 2004.
[1] Includes all on-going capital expansion and replacement costs.

6.2.1 Project Capital Financial Feasibility Analysis

The Project Capital Funding Analysis focused on whether there are adequate capital resources to construct the I-205/Portland Mall LRT Project and, if not, presents the options for resolving the capital shortfalls. The I-205/Portland Mall LRT Project capital costs are only those costs associated with constructing the LRT Project. Over the Project's 20-year planning horizon, the Tri-County Metropolitan Transportation District of Oregon (TriMet) will have other capital costs that are not associated with constructing the I-205/Portland Mall LRT Project. These other capital costs which included 2010 to 2025 Project capital costs and all other transit capital costs are considered system capital costs and, as such, are accounted for in the System Funding Analysis. The Project Capital Funding Analysis is based on the following:

- **Construction Schedule.** Estimates of capital costs in year-of-expenditure (YOE) dollars are based on a schedule under which civil construction and vehicle acquisition would occur between June 2006 and July 2009, with the initiation of revenue service in September 2009.

- **Construction Cost Inflation.** All construction costs are projected to inflate 2.5 percent per year during the construction period.

6.2.2 System Fiscal Feasibility Analysis

The System Funding Analysis focuses on whether there would be adequate resources to operate and maintain the entire transit system, including operations of the Project, over the 20-year planning period. System costs include all transit operating and maintenance costs and all transit capital expenditures to 2025, including 2010 to 2025 Project costs and excluding for I-205/Portland Mall LRT Project capital costs. The system funding analysis is based on the following key assumptions:

A. Annual Transit Service Increase. Bus service (as measured by revenue hours) is projected to increase .55 percent in Fiscal Year (FY) 2005, then .5 percent each year between FY09 and FY13 and 1 percent per year thereafter. Service increase projections also include Wilsonville to Beaverton Commuter Rail service beginning September 2007. Furthermore, existing rail operations would be expanded as projected in response to increasing demand.

B. Operating Cost Inflation. Major assumptions for forecasting future system operations and maintenance costs included the following:

- Union wages increase of 3.15 percent per year, (3 percent inflation and 0.15 percent longevity premiums) consistent with labor contract.
- Management salaries increase 3.0 percent per year (before above union wage increases).
- Health benefits costs increase of 14 percent in FY06 through FY11, 12 percent in FY12 and 10 percent thereafter. These estimates are consistent with current and historical trends.
- Workers compensation expenses increase at 3.1 percent per year throughout the forecast.
- FICA, payroll tax, disability, life insurance and sick leave benefits increase 3.15 percent per year.
- Pension costs in FY05 reflect an 8 percent return in FY05, 6.5 percent returns in FY06 and FY07 and 8 percent thereafter.
- Retiree/disabled medical rates increase 12 percent per year through FY11, 10 percent in FY12 and 8 percent thereafter. The rate of increase is estimated to decline 5 percent in FY07 when the new Medicare Prescription Drug benefit begins. In addition, the plan assumes a net increase each year in the number of people receiving these benefits, based on a census of current employee ages and estimated retirements, death and turnover rates.
- Natural gas and electricity costs increase at 4 percent per year throughout the forecast.
- Diesel fuel costs increase at 4 percent annually.
- Other materials and services costs increase at 2 percent per year, FY06-FY11 and 3 percent per year in subsequent years.
- The result of all of the above forecast assumptions is a weighted average personal services and materials and services inflation rate each year. This rate averages 5 percent per year throughout the forecast.

C. System Capital Cost Inflation. System capital costs consist mostly of bus and rail vehicle procurement required for fleet replacement and expansion. The costs of all transit capital expenditures other than for the I-205/Portland Mall LRT Project are projected to inflate at 3 percent per year.

D. Tax Revenues. Payroll tax revenues, self-employment tax revenues, and state in lieu of tax revenues are forecast based on the assumptions described in Section 6.4.2.

E. Fares. The 20 year systemwide forecast is based on fare increases that are to be implemented in September 2004 (scheduled), September 2005, September 2006, September 2007 and every other year thereafter, consistent with adopted TriMet fare policy. Each fare increase is planned to be $0.05 cash per trip and $2.00-3.00 per adult monthly pass, except in September 2005 when fares are estimated to increase $.10 cash per trip and $4-5 per pass. The additional revenues are needed to offset what appear to be permanently higher diesel fuel prices. The two out-of-cycle fare increases in September 2004 and September 2006 will help fund the cost of new services in the forecast.

6.3 Costs

This section examines both capital costs and systems costs for the I-205/Portland Mall LRT Project and the No-Build Alternative. The following section summarizes the expected I-205/Portland Mall LRT Project capital, and operations and maintenance (O&M) costs.

6.3.1 I-205/Portland Mall LRT Project Capital Costs

The capital cost of the I-205/Portland Mall LRT Project has been estimated based on TriMet's experience with the Interstate MAX LRT Project that began operation on May 1, 2004. More information on the capital cost estimates is included in Section 2.3.2 Capital Cost Estimates. Table 6.3-1 summarizes the capital cost estimates for the I-205/Portland Mall LRT Project in 2004 dollars and year-of-expenditure (YOE) dollars. The capital cost estimates include all costs for facility improvements, right-of-way, interim borrowing, and vehicle purchases that would be required to construct and equip the Project. Capital cost estimates include Final Design, but do not include Preliminary Engineering. The capital costs are divided into two categories:

- **2009 Opening Year LRT Capital Costs** include the initial construction costs of the I-205/ Portland Mall LRT Project to be included in the Project's Full Funding Grant Agreement (FFGA).
- **2010 to 2025 LRT Capital Costs** include the cost of the vehicles and maintenance facilities that must be added over time, after the 'opening year' Project is completed, to meet forecast 2025 transit demand and service levels.

The **Total LRT Cost**, as shown in Table 6.3-1 is the cumulative total of opening year LRT capital costs and 2010 to 2025 LRT capital costs and represents the entire Project capital cost of the 2025 network.

Opening Year LRT capital costs are estimated to be $453.72 million in 2004 dollars (2004$), which accounting for inflation through the end of construction, equates to $493.71 million in year-of-expenditure dollars (YOE$). Between 2010 and 2025, as ridership on the light rail line grows, six additional light rail vehicles and an expanded maintenance yard are projected to be needed at an estimated cost of $35.41 million in 2004 dollars (2010 to 2025 LRT capital costs). Total LRT costs, which are the sum of Opening Year LRT capital costs and 2010 to 2025 LRT capital costs, are estimated to be $489.13 million in 2004$ and $532.24 in YOE$. Again, the 2010 to 2025 Project capital costs are accounted for in the system fiscal feasibility analysis and not the Project capital feasibility analysis.

Table 6.3-1
I-205/Portland Mall LRT Project Capital Costs

Cost Category	Cost (Millions)
LRT Capital Costs in 2004 Dollars	
Opening Year LRT Capital Cost	$453.72
2010 to 2025 LRT Capital Cost	$35.41
Total LRT Costs in 2004 Dollars	**$489.13**
LRT Capital Costs in YOE Dollars	
Opening Year LRT Capital Cost	$493.71
2010 to 2025 LRT Capital Cost	$38.53
Total LRT Costs in YOE Dollars	**$532.24**

Source: TriMet, October 2004.
Note: LRT = light rail transit; YOE = year-of-expenditure

6.3.2 I-205/Portland Mall LRT Project Operations and Maintenance (O&M) Costs

Table 6.3-2 shows 2025 corridor annual O&M costs for the Project expressed in 2004 dollars. Corridor operating costs include the cost of operating and maintaining all transit lines within the geographic area defined as the South Corridor in Chapter 1. The estimates shown in Table 6.3-2 incorporate all bus O&M costs within the South Corridor, including the O&M costs of the I-205/Portland Mall LRT Project. The projected annual O&M cost of the Project is $7.2 million (2004 dollars) more than the No-Build Alternative. Again, the Project operating and maintenance costs are accounted for in the system fiscal feasibility analysis.

Table 6.3-2
I-205/Portland Mall LRT Project Annual Operating Costs
(Year 2025 Service Levels in Year 2004 Dollars)

Operating Cost Element	Operating Cost (Millions)
I-205 /Mall Project O&M Costs	10.004
Corridor Bus O&M Costs	21.151
Total Corridor O&M Costs	31.155

Source: TriMet, August 2004

6.3.3 System Costs

System costs include all projected capital and O&M expenditures by TriMet over the 20-year planning period, except the capital costs for the I-205/Portland Mall LRT Project. Total system cost is the aggregate of system operating costs and system capital costs.

System operating costs include all annual transit operating and maintenance costs, including the projected cost of operating and maintaining the existing transit system increases in bus and rail service hours throughout the system and the cost of I-205/Portland Mall LRT Project operations.

Table 6.3-3 shows the projected cumulative system operating costs (in YOE dollars) covering the 20-year planning period for both the Project and No-Build alternatives. These costs incorporate the 2025 O&M costs for the I-205/ Portland Mall LRT Project. O&M costs were calculated for each year of the forecast in a cash flow analysis using current and planned services levels inflated by the inflation rates described above. The resulting year-by-year costs were then summed to determine the cumulative totals.

Table 6.3-3 also shows the cumulative system capital costs of the alternatives over the 20-year planning period in YOE dollars (i.e., FY05 through FY25). System capital costs include all currently-committed capital projects, except: the I-205/Portland Mall LRT Project. These system

capital costs include a regular schedule of vehicle replacement purchases; the purchase of additional vehicles that would be required by customary service increases; and the purchase of additional vehicles and maintenance facility expansion required to support the transit expansion in the South Corridor from 2010 to 2025. The only capital costs not accounted for in the system capital costs are those capital costs attributed to the I-205/ Portland Mall LRT Project.

Table 6.3-3
Cumulative System Costs: FY05-FY25 (YOE$)

Cost (millions)	No Build	I-205/ Portland Mall LRT
System Operating Costs	$11,259.8	$11,692.2
System Capital Costs	$ 636.4	$636.4
Total System Costs	**$11,896.2**	**$12,328.6**

Source: TriMet, August 2004

The total system costs are the sum of system capital costs and system operating costs. Table 6.3-3 shows that the total system cost for the No-Build Alternative in YOE dollars (covering the period FY 2005 through FY 2025) is projected to be $432.4 million less than the total system cost for the I-205/ Portland Mall LRT Project.

6.4 Currently Available Resources

Two categories of available revenue resources are examined in this section: revenues reserved for the I-205/Portland Mall LRT Project capital costs and revenues reserved for transit system costs.

6.4.1 Currently Available Project Capital Revenues

As of October 2004, $173.5 million of non-Section 5309 New Start funds are committed to pay for opening year LRT capital costs. Non-federal funds to pay the 2010 to 2025 LRT capital costs have been incorporated in the System operations plan. The sources and amounts of committed funds to pay for opening year LRT Capital Costs are summarized in Table 6.4-1 and described below.

Table 6.4-1
Currently-Committed I-205/Portland Mall
Local Capital Revenues (YOE dollars)

Local – Committed (Non-New Starts)	Amount
Clackamas County	35,333,000
City of Portland	21,333,000
Portland Development Commission	20,000,000
TriMet	25,333,000
Metro MTIP-STP	48,481,000
Federal/ODOT-STP	23,000,000
Total	**173,480,000**

Source: TriMet; October 2004.
Note: YOE = year of expenditure; MTIP = Metropolitan Transportation Improvement Program; ODOT = Oregon Department of Transportation; STP = Surface Transportation Program.

A. $48.5 Million in Metro Metropolitan Transportation Improvement Program (MTIP) Funds for Opening year LRT Capital Costs. The Transportation Efficiency Act for the 21st Century (TEA-21), the current federal transportation act, (and the proposed SAFETEA bills) allocate (by formula) a percentage of the state's apportionment of Surface Transportation Program (STP) funds to the Portland region, to be programmed to projects through the MTIP. In addition, by agreement, the Oregon Department of Transportation (ODOT) allocates a portion of the state's apportionment of

Congestion Management Air Quality (CMAQ) funds to the Portland region to be programmed through the MTIP. MTIP funds are allocated to specific projects based on the recommendation of the Joint Policy Advisory Committee on Transportation (JPACT) and the approval of the Metro Council, which is the region's Metropolitan Planning Organization (MPO).

- In January 1997, JPACT recommended and Metro approved Resolution No. 96-2442, which committed $55 million of MTIP funds to the South/North Corridor Project.
- In June 1999, JPACT recommended and Metro approved Resolution No. 99-2806A, which amended Resolution No. 96-2442 by adding another $12.5 million of MTIP funds toward the "North Light Rail and South Corridor Transit Financing Strategy."
- In April 2003, JPACT recommended and the Metro Council approved Resolution No. 03-3303, which made additional STP funds available to the I-205 LRT Project, Washington County Commuter Rail Project, and North Macadam Project.
- In July 2004, JPACT recommend and Metro approved Resolution No. 04-3468, which in total added another $10.4 million of MTIP funds to the multi-year commitment of funds for the I-205/Portland Mall LRT Project.

Table 6.4-2, below, shows the overall multi-year commitment of MTIP funds resulting from the JPACT/Metro actions. The second column in Table 6.4-2 shows the cumulative year-by-year commitment of funds resulting from these four JPACT/Metro actions. These funds are granted to TriMet, which in its discretion may use the funds directly, through a borrowing program, or through a combination of both for the Interstate MAX, I-205/Portland Mall LRT Project, Washington County Commuter Rail Project, and North Macadam Projects. The funds used for the Interstate MAX Project are shown in the third column of Table 6.4-2, leaving the amounts shown in the fourth column for the remaining three projects. A mix of funding scenarios corresponding to the needs of TriMet's financing program of STP and CMAQ funds will be used to fulfill the multi-year commitment of MTIP funds.

Table 6.4-2
Multi-Year Commitments of Metro MTIP Funds

Fiscal Year	Multi-Year Commitment of Metro MTIP Funds	Metro MTIP Funds used for Interstate MAX Project	Remaining MTIP Funds for I-205/Mall LRT, Commuter Rail, N Macadam Projects
FY '99	$1,500,000	$1,500,000	$ -
FY '00	$6,000,000	$6,000,000	$ -
FY '01	$6,000,000	$6,000,000	$ -
FY '02	$6,000,000	$6,000,000	$ -
FY '03	$6,000,000	$6,000,000	$ -
FY '04	$6,000,000	$6,000,000	$ -
FY '05	$6,000,000	$6,000,000	$ -
FY '06	$8,000,000	$4,000,000	$4,000,000
FY '07	$8,000,000	$ -	$8,000,000
FY '08	$9,300,000	$ -	$9,300,000
FY '09	$9,300,000	$ -	$9,300,000
FY '10	$9,300,000	$ -	$9,300,000
FY '11	$9,300,000	$ -	$9,300,000
FY '12	$9,300,000	$ -	$9,300,000
FY '13	$9,300,000	$ -	$9,300,000
FY '14	$9,300,000	$ -	$9,300,000
FY '15	$9,300,000	$ -	$9,300,000
Total	**$127,900,000**	**$41,500,000**	**$86,400,000** [1]

Source: Metro, October 2004.
Note: MTIP = Metropolitan Transportation Improvement Program; LRT = light rail transit.
[1] Of this total, $10 million is available to North Macadam Projects and $10 million is available to the Wilsonville to Beaverton Commuter Rail Project.

Pursuant to Resolution No. 04-3468, from the stream of revenue shown in the fourth column, TriMet is to provide $10 million, net of interest payments, each to the Commuter Rail Project and North Macadam Project. All remaining funds are to be made available to the I-205/Portland Mall LRT Project.

Because the timing of the funds does not correspond to the construction schedule for the recipient projects, TriMet will undertake a borrowing program. It is currently anticipated that TriMet will issue revenue bonds to be repaid with the remaining multi-year commitment of MTIP funds (i.e. GARVEE Bonds) and backed with a pledge of TriMet's federal operating funds (i.e. Section 5307 and Rail Modernization funds). It is estimated that the cash and net proceeds of bonds made available from the MTIP funds for the I-205/Portland Mall LRT Project would be $48.5 million.

B. $35.333 Million in Clackamas County Development Agency Urban Renewal Funds. The Clackamas County Board of Commissioners, acting as the urban renewal agency for the county, established the Clackamas Town Center Urban Renewal District (CTC URD), adopted the *Urban Renewal Plan* for the CTC URD and budget for the planned improvements. In enacting the Urban Renewal Plan, the Clackamas County Board of Commissioners initially programmed $12 million for the construction of a transitway project. On July 22, 2004, the County Board of Commissioners took two additional actions in support of the I-205/Portland Mall LRT Project. First, it amended the Urban Renewal Plan to read as follows:

> *9. Transitways: A key to development of the entire Town Center area is the provision of high-quality regional transit service. Provision of such service will improve traffic circulation in the immediate area and make transit access to the area a viable alternative to the automobile. Such transitway shall be in the form of light rail transit along the I-205 Corridor as shown on Exhibit 5 and shall include all facilities reasonably related to the design and construction of such transitway facility. The Agency may provide financial assistance and may participate in the design and construction of such transitway in an amount equal to the amount that the Agency finds and determines to be the proportional benefit and service of the transitway to the Urban Renewal Area. This project may also consist of improvements to the following streets as shown on Exhibit 5 to allow for safe and efficient transit service: Fuller Road, SE Otty, SE 80th Avenue, Monterrey Avenue, Sunnybrook Road and Harmony Road, or other street improvements which will assist the project.*

Second, the County Board approved and executed an Intergovernmental Grant Agreement (IGA), consistent with the revised urban renewal plan, committing $36.333 million of urban renewal funds to the I-205/Portland Mall LRT Project; $1.0 million of which is to pay the costs of Preliminary Engineering (these PE funds are not further addressed in this FEIS) and $35.333 million to pay the cost of Final Design and Construction of the Project.

C. $25.333 Million in TriMet General Funds for Opening Year LRT Capital Costs. In its Intergovernmental Grant Agreements with the city of Portland, Clackamas County Development Agency and PDC, TriMet has committed to provide $25.333 million to pay opening year LRT Capital Costs for the I-205 LRT Project. These funds are in addition to the $48.5 million in bond proceeds TriMet will provide from the MTIP borrowing discussed above.

TriMet has reserved the financial capacity to provide the $25.333 million through its annual budgeting and financial planning processes. These funds will come from a revenue bond to be repaid

by TriMet's General Fund, which was recently supplemented by payroll/self-employment tax rate hike of 0.1 percent to be phased-in over the next ten years. The General Fund revenues used to repay the $25.333 million capital contribution bond is accounted for in the agency-wide operations cash flow plan.

D. $21.333 Million in City of Portland Funds for Opening Year LRT Capital Costs. In total, the City of Portland will contribute $45.333 million to the Project. Currently $21.333 million is contractually committed through an Intergovernmental Grant Agreement approved by the City Council on August 11, 2004. The City anticipates providing an additional $24.0 million from a Local Improvement District, which is in the process of being formed, as discussed in Section 6.4.4 B. While the City retains the right to provide funds from other sources, the Intergovernmental Grant Agreement contemplates the following as part of its non-LID contribution:

- $15 million in net proceeds from City revenue bonds secured by revenues received by the Portland Office of Transportation. On August 11, 2004, the City Council enacted an increase to downtown Portland on-street parking rates, which enhances the revenue stream for these bonds.
- $1.1 million in funds from the Bureau of Environmental Services to pay Project costs associated with designing and relocating sewer lines along the light rail alignment.
- $3.9 million in funds from the Bureau of Water Works to pay Project costs associated with designing and relocating water lines along the light rail alignment.
- $1.333 million from Transportation System Development charges.

E. $23 Million in Federal Surface Transportation Program (STP) Funds. ODOT is responsible for the local programming of STP funds. At its July 14, 2004 meeting, the Oregon Transportation Commission (OTC) approved an amendment to the 2004-2007 Statewide Transportation Improvement Program (STIP) that programmed $23.0 million of the state's apportionment of Surface Transportation Program (STP) funds to pay the capital cost of the I-205/Portland Mall LRT Project. It is currently anticipated that these funds will be used directly as grants to the Project (as opposed to repayment of borrowing). The programming of STIP funds consists of three units summarized in Table 6.4-3.

Table 6.4-3
ODOT Programming of STP Funds

Project Name	Federal Amount (Millions)	Fiscal Year
I-205/Mall LRT Unit 1	$ 7.5	2006
I-205/Mall LRT Unit 2	$10.5	2007
I-205/Mall LRT Unit 3	$ 5.0	2008
Total	**$23.0**	

Source: TriMet, August 2004.
Note: ODOT = Oregon Department of Transportation; STP = Surface Transportation Program; LRT = light rail transit.

TriMet and ODOT have agreed that ODOT may reprogram the $10.5 million from FY 2006 (Unit 2) to FY07 and the $5.0 million from FY 2007 (Unit 3) to FY 2008 as part of the 2006-2009 STIP Update. The Project capital cash flow plan shown in Table 5.1-11 assumes that these funds are reprogrammed.

F. $20 Million in Urban Renewal Funds from Portland Development Commission. At its August 11, 2004 meeting, the Board of Commissioners of the Portland Development Commission (PDC) approved an Intergovernmental Grant Agreement (IGA) providing $20.0 million in urban

renewal funds for Final Design and construction of the Project. The I-205/Portland Mall LRT Project traverses five of PDC's urban renewal districts (i.e., the South Park Blocks, Downtown Waterfront, River District, Lents Town Center and Gateway Regional Center Urban Renewal Areas). PDC has reserved the right to provide the $20.0 million from a combination of these districts; provided that it cannot allocate more funds from a district than the amount of eligible costs in that district.

6.4.2 Available Transit System Revenues

System revenues are derived from a series of sources. As shown in Table 6.4-4, existing transit system revenue sources are projected to provide between $12.456 and $12.617 billion (YOE dollars) between FY05 and FY25, depending on the alternative. The difference between the No-Build Alternative and the Project reflects differences in passenger revenues and interest earnings. The major sources of available system revenues and key assumptions follow.

A. Payroll Tax Revenues. TriMet levies a 0.6218 percent tax on the gross payrolls of private businesses and municipalities within its district. The tax is dedicated to TriMet. The payroll tax is TriMet's largest source of operating revenue, accounting for nearly 51 percent ($146 million) of its operating revenues in FY04.

Table 6.4-4
Summary of Currently Available Transit System Revenues
FY05-FY25 Cumulative Total (in Billions of YOE Dollars)

	No Build	I-205/Portland Mall LRT
System O&M Revenues		
Passenger Revenues	$2.428	$2.632
Employer/Municipal	$7.606	$7.607
Payroll Tax		
Self-Employment Tax	$0.290	$.290
State In-Lieu	$0.061	$0.061
Grants/Capital	$1.185	$1.285
Reimbursement		
ATP	$0.093	$0.093
Interest	$0.209	$.164
Other	$0.484	$0.484
Subtotal [1]	**$12.358**	**$12.617**
System Capital Revenues		
Grants: State or Federal [2]	$0.098	$0.098
Total System Revenues	**$12.456**	**$12.715**

Source: TriMet, July 2004.
Note: FY = fiscal year; YOE = year-of-expenditure; LRT = light rail transit. Subtotals and totals reflect addition of exact amounts and are arithmetically correct. This table shows rounded amounts and totals calculated from these rounded numbers may not exactly match the subtotals or totals cited above.
[1] System operations revenues not needed for operating costs would be available for system capital costs.
[2] General funds revenues that would be transferred to the capital fund are shown in the system operations subtotal.

The Oregon Legislature, in its 2003 session gave the TriMet Board the authority to increase the payroll tax for employers and self-employed individuals from .6218 percent to .7218 percent over a 10-year phase-in period. The TriMet Board approved the increase at their August 11, 2004 meeting. The payroll tax rate will increase one-hundredth of a percent each year for 10 years, beginning January 1, 2005.

The payroll tax has been a stable and growing revenue source since its inception. Controlling for changes in tax rates, growth in payroll tax revenues are directly tied to growth in employer payrolls

within the district, which in turn is caused by employment growth, wage inflation, and changes in job composition. Between 1983 and 2003, the tri-county payroll increased at an annual compound growth rate of 6.8 percent. During that time, there were two recessions during which year-over-year payroll tax receipts declined (FY83 and FY02-FY03).

Based on short-term forecasts commissioned by TriMet, employer/municipal payroll tax revenues are projected to increase 3.1 percent in FY05, 7.5 percent in FY06, and 7.9 percent in FY07. After FY07, the employer/municipal payroll tax is projected to grow at an average annual rate of 6.7 percent, for an average annual growth rate of 6.8 percent FY05 to FY25.

B. Self-Employment Tax Revenues. In addition to the payroll tax, TriMet also levies a 0.6218 percent tax on the net income earned within its district by self-employed individuals. Self-employment tax revenues have increased 5.3 percent per year since FY88**.** The Oregon Legislature gave the TriMet Board the authority to increase the payroll tax for self-employed individuals from .6218 percent to .7218 percent over a 10-year phase-in period.

Based on short-term forecasts commissioned by TriMet, self-employment tax revenues are projected to increase 5.3 percent in FY05, 7.4 percent in FY06, and 2.0 percent in FY07. After FY07, the employer/municipal payroll tax is projected to grow at an average annual rate of 5.3 percent, the FY88-FY04 average.

C. State In-Lieu Revenues. State of Oregon government offices located within TriMet's district boundaries are not subject to the municipal payroll tax. Instead, they make in lieu of tax payments to TriMet based on 0.6218 percent of their gross payrolls. Between FY83 (when the program was instituted) and FY95 the growth rate of state in lieu receipts was 8.24 percent per year. In the next two fiscal years; however, there were substantial decreases in these receipts due to the conversion of Oregon Health & Science University (OHSU) from a State agency paying in-lieu of tax to a local government employer paying payroll tax. Adjusting for the conversion of OHSU from state to local government employer, the long-term growth rate for state in lieu receipts has been 4.1 percent.

Based on short-term projections commissioned by TriMet, state in-lieu of tax revenue is projected to increase by 2.7 percent in FY05, 1.0 percent in FY 2006 and 8.0 percent in FY07. After FY07, state-in-lieu proceeds are projected to increase at 4.1 percent per year, the average annual rate of growth since 1984 (adjusting for the conversion of OHSU from state to private employer).

D. Grants and Capital Reimbursement. After FY04, when TEA-21 is expected to be replaced by a new federal transportation authorization act, the finance plan assumes that TriMet will continue to receive Section 5307 formula funds consistent with the House proposal for reauthorization, then growing 3 percent annually beyond the reauthorization period. Section 5307 are Federal formula grant funds for urban areas to assist in transit planning, transit capital and operations.

FTA provided TriMet's Rail Modernization estimate for the next reauthorization based on the House proposal (HR 3550). Beyond the next reauthorization, this source is estimated to grow 4 percent per year. In addition, TriMet estimates an additional $1 million in FY12 when Interstate MAX would become age-eligible for Rail Modernization funds and $1.5 million in FY18 when I-205/Portland Mall LRT Project would become age-eligible for Rail Modernization funds.

E. Passenger Revenues. In 1990, TriMet implemented a policy of biennial fare increases and the forecast is based on a continuation of this policy. TriMet also increases fares to fund special service increases. The fiscal forecast is based on fare policy, which would lead to fare increases that will be implemented September 2004 (in effect), September 2005, September 2006, September 2007 and every other year thereafter. Each fare increase is planned to be $0.05 cash per trip and $2.00-3.00 per adult monthly pass, except in September 2005 when fares are estimated to increase $.10 cash per trip and $4-5 per pass. The additional revenues are needed to offset what appear to be permanently higher diesel fuel prices. The two fare increases in September 2004 (in effect) and September 2006 will help fund the cost of new services in the forecast.

Passenger revenues from LRT services are based on Metro ridership forecasts and forecast average fares. Passenger revenues from bus services are based on bus ridership growth of 2 percent per year and an additional 23 boarding rides per hour on new bus services.

6.4.3 Existing Project Capital Revenue Shortfalls

This section discusses the amount of additional Project and system revenues that would be needed to make the Project (both the opening year Project and the 2010 to 2025 Project) fiscally feasible. In this analysis, the Project would be fiscally feasible: if Project capital revenues would be sufficient to meet the capital cost of the Project (both the opening year Project and the 2010 to 2025 Project); and if ongoing revenues would be sufficient to meet the estimated total system costs plus maintain a beginning-year working capital reserve sufficient to fund 12 percent of operating costs.

Table 6.4-5 summarizes the projected capital funding shortfalls (i.e. Project capital cost minus committed revenues) for the I-205/Portland Mall LRT Project in YOE dollars. The estimated shortfall for the Opening Year Project is $320.21 million and there is no projected shortfall for the 2010 to 2025 Project capital costs. Section 6.5 demonstrates how the shortfall for the opening year Project would be eliminated.

Table 6.4-5
Summary of Revenue Shortfalls for I-205/Portland Mall LRT Project
Capital Costs (in Millions of YOE Dollars)
Opening Year and 2010 to 2025 Costs

	Opening Year Project	2010 to 2025 Project	Total Project
Project Capital Cost	$493.71	$38.5	$532.24
Committed Capital Revenues	$173.50	$38.5[1]	$212.00
Project Capital Shortfall [2]	**$320.21**	**$0.0**	**$320.24**

Source: TriMet, July 2004.
Note: YOE = year-of-expenditure.
[1] Assumes system revenues available; however, TriMet will seek New Starts funds for these costs.
[2] Includes assumed federal share from footnote (1) above.

6.4.4 Proposed Additional Project Capital Revenues

Potential sources for addressing the capital cost funding shortfalls are identified below:

A. Section 5309 New Starts Funds. FTA Section 5309 New Starts grants are discretionary Federal funds available for new light rail transit extensions to existing light rail systems. Thus, both the Opening Year and 2010 to 2025 LRT Capital Costs would be eligible for Section 5309 New Starts funds.

As shown in Table 6.4-6, about $296.2 million of Section 5309 New Starts funds would be sought to pay Opening Year Capital Costs. Between 2010 and 2025, another approximately $23.118 million of Section 5309 New Start funds would be sought to pay for additional vehicles and maintenance facilities that are projected to be needed to meet ridership growth (i.e., the 2010 to 2025 Project).

Table 6.4-6
Proposed Section 5309 New Starts Funds
(in Millions of YOE Dollars)

	Millions of Dollars
Capital Cost	
Opening Year Capital Costs	$493.70
2010-2025 Capital Costs	$38.53
Total LRT Capital Costs	**$532.24**
60 percent Section 5309 New Starts Fund Share	
Opening Year Capital Costs	$296.20
2010 to 2025 Capital Costs	$23.18
Total New Start Funds	**$319.38**

Source: TriMet, July 2004.
Note: YOE = year of expenditure; LRT = light rail transit. Totals reflect addition of exact amounts and are arithmetically correct. This table shows rounded amounts and totals calculated from these rounded numbers may not exactly match the subtotals or totals cited above.

Congress establishes the maximum amount of New Starts funds that can be made available nationally on a year-by-year basis in the federal transportation authorization act. A light rail project customarily obtains New Starts funds through an FFGA with FTA. The FFGA establishes the maximum amount of New Starts funds available to the Project and the terms and conditions of receiving New Starts funds. While federal statutes allow up to 80 percent of Project costs to be paid by Section 5309 New Starts funds, FTA will not recommend a project for funding that seeks a New Starts funds contribution in excess of 60 percent of project costs. The financing plan for the I-205/ Portland Mall LRT Project shown in Table 6.4-6 assumes a 60 percent contribution of New Starts funds.

B. City of Portland Local Improvement District (LID) Funds. In addition to the $21.333 million described in Section 6.4.1 D previously, the City of Portland anticipates contributing $24.0 million (for a total of $45.333 million) from the proceeds of a Local Improvement District (LID) to pay a portion of Opening Year LRT Capital Costs. The LID assessment as proposed would be paid for by Downtown property owners, with rates varying based on adjacency to the mall, and including $7 million from Portland State University. The establishment of a LID must follow certain procedures established by state law and the City Charter. There are essentially three steps in this process:

- **Enactment of a Resolution of Intent** to establish the LID occurred on August 11, 2004. The Resolution of Intent describes the preliminary proposal for the Project definition, district boundaries, maximum amount of funds to be paid by the LID, and the assessment formula for individual property owners. The Resolution of Intent also triggers official notification to the potentially affected property owners and the start of the remonstrance period.
- **The Remonstrance Period** is a 21-day period during which property owners can formally object to the establishment of the LID. It begins with notice being provided to all property owners within the proposed district that describes the Project and the assessment that would be paid by the property owner. It also includes a remonstrance form. If property owners cumulatively representing 40 percent of the LID in terms of land area send the remonstrance form to the City, the City Council would be prohibited from establishing the LID (but can re-initiate the process six months later).

- **The Time and Manner Ordinance** is the final City action creating the LID. It occurs at the end of the remonstrance period, and establishes the final Project description, district boundaries, assessment formula, and maximum contribution to the Project. The Time and Manner Ordinance is scheduled for Council consideration in Fall, 2004. Upon passage of the Ordinance, the LID funds will be fully committed to the Project.

6.5 Conclusions

A 20-year cash-flow analysis was prepared, in which transit revenues by source and expenditures by line item were projected on a year-by-year basis using the assumptions described above and fully inclusive of the I-205/Portland Mall LRT Project and Commuter Rail Project. The resulting cash flow is shown in Table 6.5-1.

6.5.1 Project Capital Funding Conclusions

A summary of the Opening Year, 2010 to 2025 and Total LRT Capital funding plans is shown in Table 6.5-2. The only non-Section 5309 capital funds remaining to be committed are the $24.0 million City of Portland LID funds. Table 6.5-3 shows the cash flow of capital funds currently estimated to pay Opening Year LRT Capital Costs.

Even with a FFGA, a project must have funds appropriated to it on an annual basis to actually receive Section 5309 New Start funds. The appropriation is subject to budget limits, the demand for appropriations from other projects, and other congressional dynamics. The amount of New Starts funds appropriated to a project in a given year may be less than the project requires that year. Thus, the I-205/Portland Mall LRT Project capital plan includes an interim borrowing program to cover these potential federal funding lags.

Interim borrowing could affect the opening year Project finance plan in two ways:

1. It could add project costs associated with the fees charged for maintaining an interim borrowing program; and,
2. It would require the implementation of a borrowing program.

With regard to the added Project costs, the capital costs and the annual Project expenditures shown include $8.7 million in finance costs associated with interim borrowing. With regard to implementing an interim-borrowing program, the capital finance plan adopts a two-step strategy:

1. If local or state funds are available, such funds may be advanced (i.e. spent beyond on the 40 percent share local share for early expenditures) to fill funding gaps caused by lagging federal appropriations.
2. TriMet would implement an interim-borrowing program to cover the lag in federal funding occurring after the local and state funds have been fully expended. The interim-borrowing program for the I-205/Portland Mall LRT Project could be arranged in a manner similar to that used for the Interstate MAX Light Rail Project, although a larger borrowing program is anticipated. For the Interstate MAX LRT Project TriMet borrowed $100,000,000 for interim financing needs. For the I-205/Portland Mall LRT Project, TriMet plans to issue up to $200,000,000 in variable rate bonds, or similar short-term securities such as commercial paper.

Table 6.5-1
20-Year Cash-Flow Analysis

Millions	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25
I. System Costs/Revenues																					
System Costs																					
System Operating Expense	296.2	300.7	321.4	339.2	360.6	395.7	421.2	444.1	467.1	494.0	523.9	544.9	579.1	614.4	660.5	699.3	739.3	794.6	845.7	895.9	954.6
System Capital Expense	17.2	30.8	56.8	32.5	27.1	29.5	31.9	29.4	30.9	35.8	37.5	43.7	42.6	62.8	98.7	59.1	44.0	192.4	50.1	53.8	58.4
System Revenues																					
Payroll Taxes	160.5	172.4	185.5	197.9	211.0	224.9	239.8	255.7	272.6	290.6	309.8	330.3	352.2	375.5	400.4	426.9	455.2	485.3	517.5	551.8	588.3
Passenger Fares	63.0	69.4	75.0	79.9	81.7	93.0	95.2	103.3	105.8	115.0	118.0	128.2	131.5	143.0	146.6	159.4	163.4	177.7	182.2	198.0	203.1
Federal Operating/Capital Support	42.9	45.5	50.0	51.8	54.4	55.4	58.1	64.5	61.2	62.9	64.6	57.1	58.9	62.3	64.3	66.4	68.5	70.7	73.0	75.3	77.8
Federal/State Capital and Bond Revenues	9.3	19.2	45.0	20.3	20.9	3.8	20.6	4.0	4.1	4.2	4.3	4.4	4.5	26.1	60.8	4.9	5.1	150.8	5.3	5.5	5.6
Other	25.8	24.4	28.9	35.5	41.0	47.0	52.8	58.5	65.8	74.2	82.5	87.6	93.0	98.7	105.1	111.3	117.5	124.8	132.2	139.7	147.9
General Fund Result	(11.9)	(0.6)	6.2	13.7	21.3	(0.9)	13.4	12.5	11.4	17.2	17.9	19.1	18.5	28.2	18.0	10.5	26.3	22.4	14.4	20.6	9.7
Working Capital Reserve																					
Beginning Working Capital	54.2	42.3	41.7	47.9	61.6	82.9	82.0	95.4	107.9	119.4	136.5	154.4	173.5	192.0	220.3	238.2	248.7	275.0	297.4	311.8	332.4
Beginning Working Capital/Operating Cost	18.3%	14.1%	13.0%	14.1%	17.1%	21.0%	19.5%	21.5%	23.1%	24.2%	26.1%	28.3%	30.0%	31.3%	33.3%	34.1%	33.6%	34.6%	35.2%	34.8%	34.8%
II. Project Costs/Revenues - I-205																					
Project Costs	7.5	30.5	152.2	189.2	100.0	13.4	0.9	493.7													
Project Revenues																					
Federal New Start Funds	-	-	20.0	70.0	70.0	70.0	66.2	296.2													
TriMet: MTIP Allocation *	7.5	23.0	18.0					48.5													
TriMet: General Fund Bonds *		-	25.3	-	-			25.3													
Clackamas County Development Agency *			35.3					35.3													
ODOT *		7.5	10.5	5.0				23.0													
City/PSU *		-	41.3	-	24.0			65.3													
Interim Finance			1.7	114.2	6.0	(56.6)	(65.3)														
Total Project Revenues	7.5	30.5	152.2	189.2	100.0	13.4	0.9	493.7													
Project Annual Surplus (Deficit)	-	-	-	-	-	-	0.0														
Accumulated Surplus (Deficit)		-	-	-	-																
III. Project Costs/Revenues - Commuter Rail																					
Project Costs	13.0	70.5	19.6	0.5				103.5													
Project Revenues																					
Federal New Starts Funds ***	5.7	40.0	6.1					51.8													
State of Oregon*		35.3						35.3													
TriMet: MTIP Allocation *	10.3							10.3													
Washington County *		6.2						6.2													
Total Project Revenues	15.9	81.5	6.1					103.5													

* Available or Committed

*** $5.7 million of New Starts Funds Appropriated to Commuter Rail

Table 6.5-2
Project Capital Finance Plan Summary
(in Millions of YOE Dollars)

Opening Year LRT Capital Cost		
Cost in YOE Dollars		**$493.7**
Revenues		
P	Section 5309 New Starts Funds	$296.20
C	Metro MTIP Funds	$ 48.50
C	Clackamas County Urban Renewal Funds	$ 35.30
C	Portland Funds (non-LID)	$ 21.30
P	Portland LID Funds	$ 24.00
C	PDC Urban Renewal Funds	$ 20.00
C	TriMet Funds	$ 25.30
C	Federal/ODOT STP Funds	$ 23.00
	Total	**$493.70**
2010 to 2025 LRT Capital Costs		
Cost in $YOE		$ 38.53
Revenues		
P	Section 5309 New Starts Funds	$ 23.20
C	TriMet Funds [1]	$ 15.41
	Total	**$ 38.53**
Grand Total: Opening Year and 2010 to 2025 Costs		
Cost in $YOE		**$532.24**
Revenues		
P	Section 5309 New Starts Funds	$319.20
C	Metro MTIP Funds	$ 48.50
C	Clackamas County Urban Renewal Funds	$ 35.30
C	Portland Funds (non-LID)	$ 21.30
P	Portland LID Funds	$ 24.00
C	PDC Urban Renewal Funds	$ 20.00
C	TriMet Funds	$ 40.74
C	Federal/ODOT STP Funds	$ 23.00
	Total	**$532.24**

Source: TriMet, July 2004.
Notes:. P = funds 'planned' but not yet 'committed'; C = funds currently 'committed'; MTIP = Metropolitan Transportation Improvement Program; STP = Surface Transportation Program; Numbers may not add due to rounding.
[1] Included in System revenues.

Table 6.5-3
I-205/Portland Mall LRT Project Opening Year Costs Capital Finance Plan: Cash Flow
(Millions of YOE Dollars)

	FY05	FY06	FY07	FY08	FY09	FY10	FY11	Total
Total Project Costs	$7.5	$30.5	$152.2	$189.2	$100.0	$13.4	$0.9	$493.7
Revenues								
Federal Sec. 5309 Funds			$20.0	$70.0	$70.0	$70.0	$66.2	$296.2
Metro MTIP Funds	$7.5	$23.0	$18.0					$48.5
TriMet Funds			$25.3					$25.3
Clackamas County Development Agency			$35.3					$35.3
Federal/ODOT STP		$7.5	$10.5	$5.00				$23.0
City of Portland			$21.3		$24.00			$45.3
PDC			$20.0					$20.0
Interim Borrowing			$1.7	$114.2	$6.0	($56.6)	($65.3)	$0.0
Total Project Revenues	**$7.5**	**$30.5**	**$152.2**	**$189.2**	**$100.0**	**$13.4**	**$0.9**	**$493.7**

Source: TriMet July 2004.
Note: Numbers may not add due to rounding; LRT = light rail transit; YOE = year of expenditure; MTIP = Metropolitan Transportation Improvement Program; ODOT = Oregon Department of Transportation; PDC = Portland Development Commission.

The bonds would be secured by the last $200,000,000 of federal New Starts appropriations and additional security will be provided by a subordinated pledge of TriMet's major revenue source, the employer payroll tax. As of 2003, TriMet has the ability to enter into interest rate swaps that will allow TriMet to lock-in favorable interest rates or cap exposure to rising interest rates at any time market conditions appear favorable. Several bond underwriters have indicated that such a security arrangement will be well received by rating agencies, letter of credit banks, and municipal bond insurers.

Another capital funding issue that must be addressed is how cost overruns can be addressed, if they occur.The agreements between TriMet and the County, City and PDC do not obligate any of the parties to contribute additional funds to pay for cost overruns. In the event of an overrun, TriMet is required to notify the participating governments of the overrun and, if appropriate, request additional funds to cover the overrun. If no additional funds are granted, TriMet is authorized to undertake any reductions in the Project scope it deems necessary or appropriate to eliminate the overrun.

In addition, TriMet has revenues available for the Project that have not been included in the Project revenues that could be used to pay for cost overruns. Under the terms of the IGAs, interest earnings on all funds deposited in the Project Account are retained by TriMet for cost overruns or supplemental improvements to the Project. The $77 million that is deposited by the County, City, and PDC within sixty days of execution of a FFGA for the Project is a grant, and as such is not subject to the yield restriction and spend-down requirements of tax-exempt borrowings. The amount of interest earnings from these funds depends on several factors that are difficult to predict; but earnings in the $2-$4 million range would be anticipated and could be substantially higher.

In the event of larger overruns, TriMet can use working capital above FTA's standards to cover the overrun. In this context, working capital that exceeds the amount required to achieve FTA's '12 percent of expenditures' standard for a 'medium' rating on O&M Funding Capacity could become available for any overrun. As shown in Table 6.5-4, in the early years of construction, the working capital above the 'medium' standard could only cover a $3.2-$7.2 million overrun. But those are not the years when a cost overrun would need to be covered. The more pertinent years would be FY09-10 when $18.3-$35.4 million would be available. With a maximum of one year of interim financing on a portion of an overrun, $35.4 million could be made available through this technique to cover any potential overruns.

Table 6.5-4
Amount of Working Capital in Excess of the 12 Percent Standard by Year During Construction Period (Millions of YOE Dollars)

Revenues	FY06	FY07	FY08	FY09	FY10
Amount of Working Capital in Excess of the 12 percent Standard	$6.2	$3.2	$7.2	$18.3	$35.4

Source: TriMet, August 2004

Lastly, in the event the working capital above the FTA medium standard would be sufficient to cover a shortfall, TriMet could provide additional funds to cover overruns by issuing 20-year General Fund-backed revenue bonds in an amount equal to $49 million. The amount of general funds required to repay such bonds, assuming twenty year bonds at 5 percent interest, is equal to about 0.015 percent of the payroll/self-employment tax. These funds could be made available to the Project from the recently approved tax rate increase. In the agency-wide operations cash flow, these funds are programmed for discretionary service increases, which are neither required nor specified at this point. Reprogramming of these funds would neither remove transit service from the street, nor would it cause any deduction or less-than-adequate increase in any essential planned service expansion.

Thus, between unaccounted for revenues, use of working capital above FTA's medium standard, and issuance of additional revenue bonds, TriMet would be capable of covering shortfalls equal to at least 10 percent of total Project costs.

6.6 System Fiscal Feasibility Conclusions

Table 6.5-4 shows the projected year-by-year beginning working capital results expressed in YOE dollars and months of operations. The fiscal condition of transit system operations is considered adequate if the beginning of year operating reserve (percent of operating expenditures) is maintained at 12 percent. As shown in Table 6.5-4, there would be sufficient system revenues to operate the Project, as well as implement substantial service increases in other portions of the system and still maintain beginning year operating reserves at desired levels.

6.7 Implementation of the Finance Plan

Implementation of the Project finance plan depends on successfully obtaining:

- Final Approval of the City of Portland Local Improvement District for $24.0 million.
- FTA and Congressional authority to proceed to construction.
- A Full Funding Grant Agreement (FFGA) between TriMet and FTA that provides sufficient Section 5309 New Starts funds to finance Opening Year Costs.

7. EVALUATION OF ALTERNATIVES

This chapter presents an evaluation of the effectiveness, equity and major trade-offs of the South Corridor I-205/ Portland Mall Light Rail Project (I-205/Portland Mall Project or Project) compared to the No-Build Alternative. This Chapter uses data and analyses from previous chapters of the FEIS.

7.1 Evaluation Methodology

The information in Section 7.2 summarizes the evaluation of the effectiveness of the No-Build Alternative and the I-205/Portland Mall Project in meeting the transportation, land use and environmental objectives for the Project. The South Corridor Goal and Objectives are listed in Section 1.8 of this FEIS. A summary of the measures of effectiveness for each objective is provided in Table 7.2-1. Section 7.3 summarizes the evaluation of social equity with respect to the project alternatives. It focuses on the relationship of the costs and the benefits of the project to minority and low-income populations and disadvantaged business enterprises in the region. The major fiscal cost-effectiveness and other trade-offs between the No-Build Alternative and the I-205/Portland Mall Project are summarized in Section 7.4.

7.2 Effectiveness in Meeting Corridor Objectives

The South Corridor Policy Group, consisting of elected and appointed officials from each of the jurisdictions and agencies participating in the study, established the following overall goal for the South Corridor Project: *To implement a major transit program in the South Corridor that maintains livability in the metropolitan region, supports land use goals, optimizes the transportation system, is environmentally sensitive, reflects community values and is fiscally responsive*. Based on this goal, and on the transportation needs and land use policies outlined in Chapter 1, seven objectives were established for the South Corridor Project. Table 7.2-1 outlines the seven objectives along with the criteria and measures that are associated with each objective and that are used to assess and compare the effectiveness of the No Build and the I-205/Portland Mall Project.

Effectiveness is a measure of an alternative's ability to meet the adopted project objectives. The methodology used to evaluate effectiveness in this chapter identifies two or more criteria for each objective and one or more measures for each criterion. The alternatives are evaluated based upon the measures that are particularly relevant and which highlight differences between the alternatives.

Most of the measures summarized in this section are based upon the analyses documented in the following chapters of this FEIS: Chapter 2 Alternatives Considered; Chapter 3 Affected Environment and Environmental Impacts; Chapter 4 Transportation Services, Facilities and Impacts; and Chapter 5 Historic, Archaeological and Parklands Resources. In general, those chapters provide a more detailed description of the data and the methodologies used to develop the data referenced within this section. The text of this chapter references tables that summarize the relevant measures or tables that are located in either this chapter or in chapters 2, 3, 4 or 5.

7.2.1 Ability to Provide High Quality Transit Service

The effectiveness of the alternatives to provide high-quality transit service is evaluated on the basis of the following five criteria: access to and from the transit network; transferability; travel times; reliability; and transit ridership.

Table 7.2-1
Measures of Effectiveness

Objective/Criteria	Measure
Provide High Quality Transit Service	
Access to/from Transit Network	• Change in the number of residential units and population within half-mile station areas
	• Change in the number of jobs within half-mile station areas
	• Number of new park-and-ride spaces
Transferability	• Ease of transfers
Travel Times	• Total transit travel times between major origins and destinations in the corridor
	• In-vehicle transit travel times between major origins and destinations in the corridor
	• Bus and LRT travel times on the Portland Mall
Reliability	• Additional miles of exclusive transit right-of-way
	• Passenger miles and percent of corridor passenger miles on LRT right-of-way
Ridership	• Annual systemwide transit ridership
	• Average weekday systemwide light rail ridership
	• Transit mode share from major centers in the corridor
Ensure Effective Transit System Operations	
Operating Effectiveness	• Safety considerations
	• Operating considerations
Maximize the Ability of the Transit Network to Accommodate Future Growth in Travel Demand	
Future Expansion Capability	• Corridor network expansion capability
Minimize Traffic Congestion and Traffic Infiltration through Neighborhoods	
Highway System Use	• PM peak vehicle volumes on parallel roadways at SE Powell Blvd. cut line
Traffic and Neighborhood Infiltration Relief	• PM peak transit ridership on parallel roadways/transitway at SE Powell Blvd. cut line
Promote Desired Land Use Patterns and Development	
Support of Activity Centers	• Ability to serve corridor activity centers as defined in the Region 2040 Growth Concept
Support of Land Use Policies	• Support of local land use plans
Access to Labor Force and Long-Term Employment	• Number of residents within 45 minutes of key corridor work destinations
	• Change in employment
Provide for a Fiscally Stable and Financially Efficient Transit System	
Cost-Effectiveness Measures	• Annual operating subsidy per transit trip
	• Annual operating cost per transit trip
	• Average weekday transit originating rides per revenue hour
Financial Feas bility	• Capital costs
	• Transit operating costs
Maximize the Efficiency and Environmental Sensitivity of the Engineering Design of the Proposed Project	
Displacements	• Number of residential units displaced
	• Number of businesses displaced
	• Number of public facilities displaced
Noise and Vibration	• Number of receptors exposed to noise levels caused by project alternatives in excess of adopted noise standards with identified mitigation
	• Number of structures exposed to v bration levels caused by project alternatives in excess of adopted vibration standards with identified mitigation
Wetlands and Parks	• Acres of impacted wetlands
	• Cubic feet of fill in the 100-year floodplain
	• Number of acres of parks used
Historic and Cultural Resources	• Number of historic resources adversely impacted
	• Number of archaeologically sensitive areas potentially affected
Significant Design Considerations	• Major engineering considerations

Source: Metro: July 2004.

A. Access To and From the Transit Network

Access to and from the transit network is assessed using two measures: the change in the number of residents and jobs in the year 2025 that would be located within one-half mile of a LRT transit station; and an assessment of the alternatives' ability to provide park-and-ride access.

Change in Residential Units, Residents and Employment with Access to LRT Stations

Table 7.1-2 summarizes the change in the number of residents and jobs in the I-205 Segment in the year 2025 that would be within one-quarter mile of a proposed light rail transit (LRT) stations for each alternative (similar data for the year 2000 is also provided in the table for reference). The measure is the difference between what coverage would be with a specific alternative, and the coverage provided by the region's existing LRT system. Coverage within one-quarter mile of a LRT station measures the ability of the transit system to provide direct access to transit service within protected right-of-way for residential and employment sites, and to accommodate future growth within the region's adopted urban growth boundary (UGB) as envisioned by state, regional and local land use plans. Under Metro's *Region 2040 Growth Concept*, many LRT stations would receive \//more intense and more broadly mixed uses. See Section 3.1 for additional information on land use and economic development within the South Corridor.

Table 7.2-2
Coverage: Increase[1] in Year 2000 and 2025 Population and Employment
Within 1/2-Mile of I-205 Segment[2] LRT Stations, by Alternative

Measure	No-Build	I-205/Portland Mall Project
Population		
2000	0	22,110
2025	**0**	**29,360**
Employment		
2000	0	24,100
2025	**0**	**35,830**

Source: Metro, August, 2004.
[1] Increases are compared to the number of residents and employment that would be within a quarter-mile of a LRT station that would be provided with the region's existing transit system and the addition of the Yellow Line, excluding the Gateway Transit Center.
[2] There would also be an unmeasured increase in population and employment within a ½ mile of a LRT station in the Portland Mall Segment; however the proportional change would be relatively minor because of the existing light rail and streetcar stations within the segment.

As shown in Table 7.2-2, the Project would result in an additional 29,360 residents and 35,830 employees being located within one half-mile of LRT stations in 2025, compared to the No-Build Alternative, which has no new LRT facility. These residents and employees would have improved transit access and access to the region's highest-quality transit service by being located within walking distance of a light rail station, which would not be present under the No-Build Alternative.

Ability to Provide Park-and-Ride Access

The ability to site park-and-ride lots for an alternative is demonstrated through: the number of park-and-ride lots spaces that would be provided under each alternative; and a qualitative assessment of the ability of the No-Build and the Project to provide adequate park-and-ride lot spaces.

The supply of park-and-ride lot spaces is an important consideration in the South Corridor: first, because there would be a strong demand for park-and-ride lot access to transit in the corridor in 2025; and second, because there are, and would continue to be, limited cost-effective and efficient opportunities for new park-and-ride lots along major transit trunklines in the corridor; third, it is generally best to intercept park-and-ride trips close to their point of origin, thereby reducing vehicle miles traveled, which means that park-and-ride lots are usually sited at least five miles away from the Portland Central City, which further limits the opportunity to site park-and-ride lots.

The data for park-and-ride lots are differentiated between LRT and non-LRT lots, because LRT lots would provide users with more direct access to the transit lines that would utilize the LRT, compared to non-LRT lots which would require users to take the first portion of their trips in mixed traffic and access from a non-LRT park-and-ride lot to the LRT transit service would require a transfer.

Table 7.2-3 summarizes the number of LRT and non-LRT park-and-ride lot spaces that would occur under each alternative. The No-Build Alternative and the Project would both provide 300 non-LRT park-and-ride spaces. The Project would result in 2,066 additional LRT spaces, compared to no additional LRT spaces under the No-Build Alternative.

Table 7.2-3
Transit Access: Number of South Corridor LRT and Non-LRT Park-and-Ride Spaces[1], by Alternative (Year 2025)

Measure	No-Build	I-205/Mall Project
LRT Spaces	0	2,066
Non-LRT Spaces	300	300
Total Spaces	**300**	**2,366**

Source: TriMet, August 2004.
[1] LRT spaces = spaces within any park-and-ride lots that would be directly adjacent to a light rail line or other LRT. Non-LRT spaces = spaces within any park-and-ride lot that would not be located adjacent to a LRT.

B. Transferability

The transferability criterion is assessed using one measure: a qualitative assessment of the ease of transfers facilitated by the alternatives. Transfers are an important consideration in evaluating alternate transit networks for two reasons: well-timed and reliable transfer opportunities at well-designed transfer facilities can generally improve overall transit access in a transit system like TriMet's with many destinations and can, oftentimes, reduce overall transit travel times. A trip that includes a transfer generally takes longer than a trip that does not include a transfer (a trip without a transfer is often referred to as a *single-seat ride*), due to the additional time that a patron would spend waiting for the second transit vehicle.

Ease of Transfers

Both of the alternatives would offer a transit service configuration that would be dependent on and facilitate transfers between transit routes. Transit service in the South Corridor would be configured to provide both grid (cross-town, non-CBD oriented routes) and radial service (CBD- oriented routes) on generally 15-minute or shorter headways during peak and midday periods. In suburban portions of the corridor, transit service would be configured around hubs connected to each other and downtown Portland by transit trunklines operating at 15-minute or shorter headways during the peak period and 30-minute or shorter headways at other times. Both the grid and the hub system would depend on reliable transit operations and well-positioned transfer facilities in order for transfers to be successful.

Primarily, three aspects of the transit system would differentiate the ease of transfers with the I-205/ Portland Mall Project compared to the No-Build Alternative. First, the presence of light rail service and stations along I-205 at major activity centers would provide comparatively more reliable trunkline transit service in the corridor for passengers transferring from other grid and feeder bus service. Second, the Project would include light rail service and stations along the full length of the Portland Mall, providing transfer opportunities for Green Line passengers to other bus and light rail

lines operating on and across the Portland Mall. Third, the Project would result in the relocation of one or more bus lines from the Portland Mall to other downtown Portland transit-designated streets, which would result both in more transfer opportunities in downtown Portland but also increased walk distances between bus lines for some transit patrons, compared to the No-Build Alternative.

C. Travel Times

Table 7.2-4 summarizes the average weekday p.m. peak-hour peak direction in-vehicle and total transit travel times between three locations in the Portland Central City Portland Statue University (PSU), Pioneer Square and the Rose Quarter) and three destinations in the South Corridor (Damascus, Lents and Clackamas Town Center TC) for the year 2025. In-vehicle time is the time spent traveling in a light rail vehicle or bus. Total transit travel time is the in-vehicle time plus time spent walking to and from the transit vehicle and time spent waiting for the transit vehicle (based on a common, representative point of origin or designation within the activity center). See Section 4.2.1.2 for a more detailed discussion of travel times in the corridor.

Transit Travel Times

For all of the origin and destination pairs illustrated in Table 7.2-4 and described above, all 2025 transit travel times between those pairs would improve with the Project, compared to the No-Build Alternative, except for in-vehicle transit travel times from PSU to Lents, which would remain unchanged. Among those pairs with a difference, the Project would reduce in-vehicle and total transit travel times by a range of approximately 12 percent to 41 percent and by 4 percent to 41 percent, respectively, compared to the No-Build Alternative. For example, in-vehicle transit travel times in 2025 from downtown Portland to Clackamas Town Center would take 38 minutes with the Project, compared to 52 minutes with the No-Build Alternative, a 26.9 percent reduction. The reduced travel time for transit patrons under the I-205/Portland Mall Project would primarily be due to their ability to utilize the Green Line for all or a portion of their transit trip, taking advantage of the new grade-separated light rail alignment. By generally separating light rail vehicles from the adjacent automobile traffic, light rail vehicles and their patrons would be relatively unaffected by traffic congestion and slower travel speeds on adjacent general purpose roadways, improving travel times and reliability compared to the No-Build Alternative.

Transit Travel Times on the Portland Transit Mall

A majority of TriMet's and some of C-TRAN's transit service currently use, or in 2025 would use the Portland Mall for a portion of the transit trip. The Portland Mall was constructed in 1978 with the goals of consolidating bus service to facilitate transfers and to provide a generally-separated and controlled operating environment for transit vehicles in order to increase reliability and reduce transit travel times. This measure of transit speed, focused on the Portland Mall, assesses transit in-vehicle travel times from NW Glisan Street to SW Madison Street in the p.m. peak hour for both buses and light rail vehicles. As summarized in Table 7.2-5, buses under the No-Build Alternative would take approximately 10.2 minutes to traverse the Portland Mall in 2025 on an average weekday in the p.m. peak hour. In contrast under the Project, bus and light rail vehicle travel times on the Portland Mall would be 9.2 minutes and 7.9 minutes, a reduction in travel time of approximately 10 percent and 23 percent, respectively. Because a relatively large number of the region's peak hour transit passengers would travel on all or a portion of the Portland Mall under either alternative, the

Portland Mall travel time savings that would occur with the Project would result in a significant annual total passenger travel time savings.

Table 7.2-4
Travel Times: Average Weekday 2025 In-Vehicle and Total Transit Travel Times[1] Between Major Origin and Destination Pairs, by Alternative

Measure/*Origin-Destination Pair*	No-Build	I-205/Portland Mall Project	
		Minutes	Change in Travel Time (%) [2]
In-Vehicle Transit Travel Time			
To Damascus, From:			
PSU	79	63	-20.3%
Pioneer Square	79	59	-25.3%
Rose Quarter	58	49	-15.5%
To Lents Town Center, From:			
PSU	35	35	0%
Pioneer Square	37	31	-16.2%
Rose Quarter	39	23	-41.0%
To Clackamas Transit Center, From:			
PSU	50	44	-12.0%
Pioneer Square	52	38	-26.9%
Rose Quarter	40	30	-25.0%
Gateway Transit Center			
Total Transit Travel Time			
To Damascus, From:			
PSU	95	82	-13.7%
Pioneer Square	95	78	-17.9%
Rose Quarter	73	68	-6.8%
To Lents Town Center, From:			
PSU	48	46	-4.2%
Pioneer Square	46	41	-10.9%
Rose Quarter	54	32	-40.7%
To Clackamas Transit Center, From:			
PSU	61	52	-14.8%
Pioneer Square	60	48	-20.0%
Rose Quarter	55	39	-29.1%

Source: Metro, July 2004.
Note: PSU = Portland State University.
[1] In minutes for travel in the PM peak period. In-vehicle time is only the time that a passenger would spend within a public transit vehicle. Total time is the sum of in-vehicle time and all other time related to completing the trip, including walking and waiting time.
[2] Percent change from the No-Build Alternative – a positive number means that travel time for the alternative would be increased for that origin and destination pair relative to the No-Build Alternative, while a negative number means that travel time would decrease.

Table 7.2-5
Travel Times: 2025 Peak-Hour Average Weekday Bus and Light Rail Travel Time[1] on the Portland Mall, by Alternative

Measure	No-Build	I-205/Mall Project
Bus	10.2	9.2
Light Rail	N/A	7.9

Source: Metro: June 2004.
Note: N/A = not applicable.
[1] Between NW Glisan Street and SW Madison Street in the p.m. peak hour.

D. Reliability

TriMet has found that the existing light rail lines, which use reserved or separated right-of-way, have exhibited greater percentages of on-time arrivals than trunkline and local buses operating in mixed

traffic. Transit service that would utilize no or small amounts of reserved right-of-way would operate in mixed traffic and would be subject to traffic congestion and delay. Within this section, transit reliability is measured in three ways: one, the number of miles of exclusive LRT or separated right-of-way provided for transit vehicles within the corridor; two, the number and percentage of average weekday passenger miles in the corridor in 2025 that would occur within a LRT right-of-way; and three, the average amount of transit priority provided at intersections in the corridor.

Table 7.2-6 summarizes three measures of transit reliability: miles of LRT right-of-way; the number of passenger miles that would occur on that LRT right-of-way; and the percentage of total corridor trips that would occur on the LRT right-of-way. The No-Build Alternative would provide no LRT facility in the corridor, so there would be no LRT passenger miles in the corridor. The Project would result in a total of 8.3 additional miles of light rail LRT in both segments, which would result in over 130,000 additional passenger miles on LRT, compared to the No-Build Alternative. Of the average weekday passenger miles within the South Corridor in 2025, approximately 18 percent would be on light rail with the Project. Almost one fifth of the corridor's transit riders under the Project would utilize and benefit from the improved travel times and reliability provided by light rail transit service operating within a separated right-of-way.

Table 7.2-6
Reliability: Miles of LRT[1] Right-of-Way and 2025 Average Weekday Passenger Miles on LRT[1] Right-of-Way in the South Corridor, by Alternative

Measure	No-Build	I-205/Mall Project
Miles of LRT ROW	0 miles	8.3 miles
Passenger Miles on LRT ROW	0	130,285
Percent of Total Corridor Passenger Miles on LRT ROW	0%	18%

Source: Metro, July 2004.
Note: ROW = right-of-way.
[1] A LRT provides an exclusive grade- and/or barrier-separated transit right-of-way (i.e., a busway or light rail alignment) – see Section 2.2 for more detail.

E. Ridership

This section uses three measures to assess transit ridership in the South Corridor: systemwide 2025 average weekday transit ridership; systemwide 2025 average weekday light rail ridership; and 2025 average weekday transit mode share to and from major centers in the South Corridor.

Total Transit Ridership

Table 7.2-7 summarizes total 2025 average weekday systemwide transit ridership (i.e., bus and light rail linked trips) by alternative. A linked trip is defined as a one-way trip from an origin (e.g., one's home) to a destination (e.g., one's place of work), independent of whether the trip would require a transfer or not.

Annually, the Project would result in approximately 177.5 million systemwide originating trips in 2025, compared to approximately 171.3 million trips with the No-Build Alternative, a 3.6 percent increase. The increase in systemwide originating trips would primarily be due to the improved travel times and access to transit service that the Project would provide, compared to the No-Build Alternative.

Table 7.2-7
Ridership: Systemwide Annual 2025 Transit Linked Trips [1], by Alternative and 2025 Average Weekday LRT Boarding Rides, by LRT Line and Alternative

Measure	No-Build	I-205/ Mall Project
Systemwide Transit		
Linked Trips[1]	171,340,760	177,510,720
Systemwide LRT Boarding Rides[2]		
Yellow Line	5,056,120	4,985,600
Blue Line	35,276,400	34,645,000
Red Line	9,859,680	9,179,080
Green Line	N/A	15,242,160
Total LRT	**50,192,200**	**64,051,840**

Source: Metro: August, 2004.
Note: N/A = not applicable.
[1] Annual, 2025. A linked trip is defined as a one-way trip from an origin (e.g., one's home) to a destination (e.g., one's place of work), independent of whether the trip would require a transfer or not.
[2] Annual, 2025. A boarding ride (i.e., unlinked trip) is defined as when a passenger boards a transit vehicle, independent of whether or not the boarding would be the result of a transfer from another transit vehicle.

Light Rail Ridership

Table 7.2-7 summarizes systemwide light rail boardings by light rail line for the year 2025 by alternative. A boarding ride (i.e., unlinked trip) is defined as each time a passenger boards a transit vehicle, independent of whether the boardings would be the result of a transfer from another transit vehicle or not. Annual systemwide light rail line boarding in 2025 would increase under the Project to over 64.1 million compared to approximately 50.2 million boarding rides with the No-Build Alternative, a 28.5 percent increase. As illustrated in Table 7.2-7, there would be a relatively small decrease in 2025 boarding rides on the existing light rail lines (i.e., Yellow, Blue and Red lines) with the addition of the I-205/Portland Mall Project, compared to the No-Build Alternative due to some light rail riders shifting to the Green Line. The number of riders shifting to or from other light rail lines would be exceeded by the number of riders on the Green Line that would shift from bus lines or other modes of travel (e.g., automobile), compared to the No-Build Alternative, resulting in an overall increase in light rail ridership with the Project, compared to the No-Build Alternative.

Transit Mode Share to Major Corridor Activity Centers

Table 7.2-8 summarizes the peak two-hour transit mode share from the South Corridor to four major activity centers within the corridor: downtown Portland; Clackamas Regional Center; Gateway Regional Center; and Milwaukie Town Center. Transit mode share is defined as the percentage of all trips (all trips taken using any mode) originating in the South Corridor and destined to one of the six activity centers that would arrive via a transit vehicle – bus or light rail.

Table 7.2-8
Ridership: 2025 PM Peak Two-Hour Transit Mode Share[1] From Major South Corridor Activity Centers to the South Corridor, by Alternative

Activity Center	No-Build	I-205/Mall Project
Downtown Portland	30%	32%
Clackamas Regional Center	5%	6%
Gateway Regional Center	9%	11%
Lents Town Center	7%	9%

[1] Transit mode share is the percentage of all trips traveling from the activity center to the South Corridor during the PM peak two hours that would be taken on transit.

The Project would result in increases in transit mode share in 2025 for trips taken from each of the four activity centers identified in Table 7.2-8 to any location within the South Corridor. The increases would range from one to two percentage points. For example, in downtown Portland, the transit mode share for trips taken to the South Corridor in the p.m. peak period would increase from approximately 30 percent with the No-Build Alternative to approximately 32 percent with the Project. These increases in mode split for the Project would primarily be due to the increased transit ridership resulting from improved transit travel times and access to the region's light rail system provided to those activity centers.

7.2.2 Ability to Ensure Effective Transit System Operations

The relative effectiveness of the I-205/Portland Mall Project and the No-Build Alternative in providing effective transit system operations is assessed using the following two qualitative measures: operational safety considerations and operating considerations.

A. Safety Considerations

There will be few differences in safety considerations between the No-Build and I-205/Portland Mall alternatives because the design of either alternative would conform to adopted local and industry-wide design standards. For the I-205/Portland Mall Project, safety considerations primarily focus on the number of at-grade crossings because, while they will meet stringent design and safety standards, they will slightly increase the risk of light rail conflicts with other vehicles.

- **No-Build Alternative.** With the No-Build Alternative, the Blue, Red and Yellow lines would only operate on the existing Cross Mall alignment on SW Morrison and Yamhill streets and 1st Avenue. Although growth in transit service over time would increase the number of light rail vehicles crossing through at-grade intersections within the Portland Mall Segment and would increase the number of other potential conflicts during any given hour, the existing alignment is already equipped with appropriate signalization, signage and safety procedures. Therefore, any increase in the chance of incidents would be relatively small, determined by the growth in overall service.

- **I-205/Portland Mall Project Alternative.** By introducing a second light rail alignment in downtown Portland, the Project would have two primary effects on safety. First, the additional light rail alignment would allow light rail service in the Portland Mall Segment to be distributed between two separate alignments. This division of service would reduce somewhat the overall frequency of light rail trains on the existing alignment, slightly reducing the chance for incidents as described above under the No-Build Alternative. Second, the new light rail alignment in the Portland Mall Segment would be located on the Portland Mall, thereby introducing new at-grade intersection crossings and mixed light rail and bus operations on the Portland Mall. As noted above, the existing light rail alignment (the cross-mall) has a number of at-grade intersection crossings. The cross-mall alignment uses a synchronized rail and general traffic signal system, signals and safety operations. Similar signalization, signage and safety operations would be utilized for the new Portland Mall alignment, and therefore the new light rail alignment would not represent a significant departure from current safety considerations. Currently, light rail and buses only travel together within the same alignment on the Steel Bridge. The Project would allow buses and light rail vehicles to share one transit only lane in each direction (northbound on 6th and southbound on 5th) for the length of the Portland Mall. Signalization and adjustments in

operating procedures would be necessary to minimize safety considerations. Specifically, a train-approaching signal would clearly indicate to bus operators that a train is nearing that location and that buses should not operate in the shared transit only lane until the train has passed. Additionally, the lane geometry for the Portland Mall would be designed to minimize conflict between light rail and bus. Unlike the Steel Bridge, automobiles would not be allowed to operate in the shared light rail and bus lane, eliminating the mixture of motor vehicles operated by non-professional drivers and transit vehicles operated by professional operators.

B. Operating Considerations

Both the No-Build Alternative and the I-205/Portland Mall Project would be generally free of operating issues that could adversely affect operations. The design for either alternative would avoid steep grades, excessively sharp turns and interference from cross traffic that could hamper reliability where possible. Minor differences in operating conditions for the two alternatives are as follows:

- **No-Build Alternative.** The No-Build Alternative would result in crowded operating conditions for light rail vehicles that would use the existing light rail alignment on NW and SW 1st Avenue and on SW Yamhill and Morrison streets (the cross mall alignment). These conditions would result in operating complexities, as well as increased average light rail travel times and decreased schedule reliability, compared to existing conditions and conditions under the I-205/Portland Mall Project. Transit operations would be more complex for the existing light rail alignment because TriMet would need to implement operating policies and procedures aimed at reducing the adverse effects of the crowded operating conditions. Operating conditions for buses using the Portland Mall would generally remain unchanged from existing conditions and would be relatively less complex, compared to operating conditions on the Portland Mall the Project, which would introduce joint light rail and bus operations on the Portland Mall, as well as introducing auto traffic in several blocks which today are closed to general traffic.

- **I-205/Portland Mall.** With the I-205/Portland Mall Project, operating capacity and conditions would improve for each of the light rail alignments that would operate within the Portland Mall Segment (i.e. the existing cross-mal alignment and the proposed Portland Mall alignment). By providing a second light rail alignment within the Portland Mall Segment, the Project would increase the number of light rail trains that could serve downtown Portland within a given hour, avoiding the crowded light rail operating conditions on the existing Cross Mall alignment under the No-Build Alternative and thereby allowing for future growth in existing light rail lines and expansion of additional light rail lines to other portions of the region. Additional light rail tracks would be located at the PSU terminus to offer additional layover and schedule recovery space that would provide more flexibility to maintain on-time performance (i.e., reliability) for operations. Because a light rail train can carry considerably more passengers than a bus, the total passenger capacity on the Portland Mall would be increased, although the Portland Mall's carrying capacity for buses would be somewhat reduced, compared to the No-Build Alternative. The Project would require light rail vehicles to operate in the same transit only lane as buses (buses would have an additional adjacent bus-only lane to operate within). Mixed bus and light rail operations on the Portland Mall would require additional signalization and adjustment to current standard operating procedures to ensure safe and efficient operations.

7.2.3 Ability to Maximize the Ability of the Transit Network to Accommodate Future Growth in Travel Demand

Federal guidelines require that the analysis shown in this FEIS be based on a design year approximately 20 years in the future. In response to that requirement, the designs and operating plans for the No-build Alternative and the Project are based on 2025 operating conditions and levels of demand. Based on the region's commitment to integrated transportation, land use and growth management plans, an important consideration in evaluating the alternatives is to assess how well the alternatives would accommodate the expansion of the corridor transit network to meet future increases in demand.

Following is a qualitative evaluation of how the two alternatives would accommodate future growth in travel demand. This qualitative evaluation is based on the results of TriMet's current light rail and bus operations and a recent capacity study of the Portland Mall Segment.

- **No-Build Alternative.** The No-Build Alternative would result in crowded operating conditions for light rail vehicles on the existing cross-mall light rail alignment on NW and SW 1st Avenue and on SW Yamhill and Morrison streets. In 2025, there would be 22 light rail trains per hour operating in each direction on the existing light rail alignment on SW Morrison and Yamhill streets under the No-Build Alternative. TriMet's operations analysis has demonstrated that even minor increases in the number of light rail vehicles using the Cross Mall in excess of 20 trains per hour (either due to growth in demand or due to the opening of new light rail lines that would utilize the cross mall alignment) would result in some impacts to peak-period light rail operations, speed and reliability. Future additional train per hour would result in proportionally greater impacts to light rail operations, especially beyond 24-27 trains per hour. Finally, at some point the absolute operating capacity of the light rail line would be reached (i.e., 30 trains per hour in either direction), eliminating the opportunity for any further service expansion without an additional light rail alignment within the Portland Mall Segment.

- **I-205/Portland Mall Project Alternative.** By providing a second light rail alignment within the Portland Mall Segment, the Project would increase the number of light rail trains that can serve downtown Portland, avoiding the crowded operating conditions of the No-Build Alternative and allowing additional capacity for future growth in existing light rail lines and expansion of additional lines to other portions of the region.

7.2.4 Ability to Minimize Traffic Congestion and Traffic Infiltration Through Neighborhoods

The objective to minimize traffic congestion and traffic infiltration through neighborhoods is assessed by evaluating two criteria: highway system use and reducing traffic infiltration into neighborhoods.

A. Highway System Use

Highway system use in this FEIS is assessed using p.m. peak two-hour weekday vehicle volumes in 2025 on I-205 and parallel roadways at SE Powell Boulevard. The cutline used within this analysis is illustrated in Figure 4.1-1 of this FEIS.

Table 7.2-9 summarizes average weekday peak two-hour vehicle volumes at the cut line for each of the alternatives. With the Project, average weekday roadway volumes on I-205 and adjacent parallel

streets at SE Holgate Boulevard would be reduced by 220 vehicles in the peak direction in 2025, compared to the No-Build Alternative, a 1.3 percent reduction.

Table 7.2-9
Highway System Use: 2025 Average Weekday PM Peak Direction
Two-Hour Vehicle Volumes[1] and Transit Ridership[1]
at SE Powell Boulevard Cutline[2], by Alternative

Cutline Number and Location	No-Build	I-205/Portland Mall Project
PM-Peak Vehicle Volumes	17,350	17,130
Transit Ridership	1,390	4,160

Source: Metro; August, 2004.
[1] The number of vehicles or transit riders that would cross the cutline on the designated set of parallel streets in the peak direction within the two-hour p.m. peak period.
[2] I-205 plus north/south cross streets at SE Holgate Boulevard (i.e., SE 82nd through 112th avenues).

B. Minimize Traffic Infiltration into Neighborhoods

The ability to minimize traffic infiltration into neighborhoods is assessed by measuring the 2025 average weekday p.m. peak two-hour transit ridership across cut line on I-205 and parallel roadways and transitway (i.e., light rail alignment) at SE Powell Boulevard (see the previous section on highway use for a definition and description of the cutlines).

Table 7.2-9 summarizes 2025 average weekday peak two-hour transit ridership through a cutline across I-205 and parallel streets at SE Division Street. With the I-205/Portland Mall Project, approximately 4,160 transit riders would cross that cutline in the peak direction, compared to 1,390 with the No-Build Alternative, almost tripling transit ridership across the cutline. This increase in transit ridership across that cutline with the Project would be the result of: 1) existing transit riders under the No-Build Alternative taking an alternate route for their trip (e.g., via buses generally operating on Highway 224 and SE McLoughlin Boulevard with the No-Build, compared to via the Green Line adjacent to I-205 with the Project); and 2) new transit riders attracted to the system due to a reduction in transit travel times and improved access to transit service.

7.2.5 Ability to Promote Desired Land Use Patterns and Development

The evaluation of the ability of the alternatives to promote desired land use patterns and development focuses on three criteria: the ability of the alternatives to support activity centers; the ability of the alternatives to support land use policies; and the ability of the alternatives to provide access to jobs for the corridor's labor force. Consistent with FTA guidance, the analysis reported in this FEIS holds the amount of regional and corridor growth constant among project alternatives. That is, the analysis does not incorporate any quantitative differences between the alternatives in the amount of development that is projected to occur within the region or the corridor.

A. Support of Activity Centers

Following is an assessment of the relative ability of the I-205/Portland Mall Project to serve the major activity centers as defined in the *Region 2040 Growth Concept*, when compared to the No-Build Alternative. The *Region 2040 Growth Concept* identified the following Centers in the South Corridor: the Portland Central City, the Gateway Regional Center, the Clackamas Regional Center, the Oregon City Regional Center, the Lents Town Center, and the Milwaukie Town Center.

With the No-Build Alternative, general bus transit service in the corridor would increase from existing conditions over time; however there would no new light rail improvements or connections between any of the Region 2040 plan's activity centers. The quality of transit service with the No-Build Alternative would not be as high as with the Project. With the Project, there would be a new light rail connection between the Clackamas Regional Center, the Lents Town Center and the Gateway Regional Center. The Project would provide high-quality (relatively high speed and reliability) transit connections from Clackamas and Lents to the Gresham Regional Center, the Airport, the Hollywood Town Center, the Portland Central City, the Beaverton Regional Center and the Hillsboro Regional Center via the existing MAX system.

Within the Portland Central City, the I-205/Portland Mall Project would significantly expand light rail service within the region's most significant activity center. The Portland Mall alignment would serve the high-density north-south office and retail spine with new LRT service, and provide direct LRT service to Portland State University at the south end.

B. Support of Land Use Policies

This section assesses the relative ability of the I-205/Portland Mall Project to support adopted land use and transportation plans, compared to the No-Build Alternative. This evaluation generally focuses on the alternatives' ability to assist in implementing state planning goals and in implementing local and regional land use and transportation plans.

The Project would continue the region's long-term commitment toward implementation of state, regional and local land use and transportation plans, when compared to the No-Build Alternative. Although both the No-Build Alternative and the Project could be viewed as consistent with the adopted plans, the difference between the two alternatives in achieving implementation of these plans is significant. The I-205/Portland Mall Project would go much further toward implementing adopted state, regional and local plans and polices. The difference relates to how effective the Project would be in implementation of the vision embodied in 30 years of planning, compared to the No-Build Alternative.

Implementation of Statewide Planning Goals. Oregon law mandates that statewide planning goals be implemented through state, regional and local comprehensive plans. Both the No-Build Alternative and the I-205/Portland Mall Project would be consistent with the Statewide Planning Goals. However, the Project would provide high-quality transit service to areas within the Urban Growth Boundary (UGB) that are targeted to receive high-density mixed-use urban development, consistent with the emphasis of the Statewide Planning Goals, particularly Goal 11 Public Facilities and Services, Goal 12 Transportation, and Goal 14 Urbanization. The proposed Project would not serve rural lands or result in pressure to convert rural lands to urban uses, consistent with the emphasis of Goal 3 Agricultural lands, Goal 4 Forest Lands and Goals 11, 12 and 14. The Project has been designed to link and serve major regional employment, commercial and residential areas such as downtown Portland, Gateway, Lents, and Clackamas. Relative to the No-Build Alternative, the Project would be supportive of the Statewide Planning Goals through the provision of safe and efficient transportation systems that are designed to reduce reliance on the automobile, including designs that would make it more convenient for people to walk, bicycle and use transit and to drive less and that would help achieve the state and regional goals of reducing per capita VMT. In conclusion, the Project would best implement the Statewide Planning Goals by providing the highest quality transit serve to support reduction in per capital VMT, thereby reducing reliance on individual

automobiles and achieving the population and employment densities envisioned for the activity centers.

Implementation of Regional Plans. Similar to the *Statewide Planning Goals*, regional plans and policies (including the *Regional 2040 Growth Concept,* the RTP, and the *Regional Framework Plan*) emphasize maintaining compact urban form by focusing new growth in specific mixed-use activity centers. The RTP supports targeting public investments, including transit improvements, to reinforce and support the goal of compact urban form. The *Region 2040 Growth Concept* directs most new development to mixed-use urban centers and along major transportation corridors. Adopted regional and local plans also support targeting transit investments to leverage higher-density development in the designated mixed-use centers. The regional plans envision that light rail and bus rapid transit will become the backbone of the transit system, connecting regional centers to each other and to the central city.

Both the No-Build Alternative and the I-205/Portland Mall Project were defined to be supportive of the regionally adopted land use and transportation goals, policies, and plans. However, the differences between the alternatives in terms of their abilities to achieve the larger vision of *the Region 2040 Growth Concept* and RTP are significant. These differences primarily relate to which alternative would provide for the most effective implementation of these plans and policies. Relative to the No-Build Alternative, the Project would support regional plan policies that call for high-capacity transit links between designated regional centers and town centers. The Project would link the Clackamas Regional Center and the Lents Town Center with the major transit hub at the Gateway Regional Center. Bringing light rail transit to the Clackamas Regional Center would be an important transportation improvement that is essential to achieving the higher-density employment and residential development envisioned for this regional center.

C. Ability to Provide Residential Areas with Good Access to Jobs and Increase Long-Term Employment

This section summarizes two measures related to employment: transit access to the labor force; and change in long-term regional employment.

Transit Access to the Labor Force

Access to the labor force is measured as the number of residents in 2025 within 45 minutes (in-vehicle, non-weighted time) of downtown Portland, the Lloyd District, the Gateway Regional Center and the Clackamas Regional Center, as summarized in Table 7.2-10. Because this measure uses total transit travel time, it accounts for the time that would be spent both traveling on a transit vehicle and walking to and from a bus stop or transit station and the time that would be spent waiting for the transit vehicle.

Table 7.2-10 summarizes the number of residents that would be located within 45 minutes of key South Corridor employment centers, based on total un-weighted transit travel times in the p.m. peak two-hour period for an average 2025 weekday. In summary, in 2025 the Project would result in increases in the number of residents that would be located within 45 minutes of the six identified employment centers via peak hour transit service, compared to the No-Build Alternative. The percentage increases would range from approximately 2.1 percent to 37.9 percent. For example, the number of residents within 45 minutes of the Clackamas Regional Center by transit would change

from approximately 392,600 under the No-Build Alternative to approximately 531,730 with the Project, a 35.4 percent increase. In general, the increases would be due primarily to the transit travel time improvements provided by the addition grade-separated right-of-way that would be utilized by the Green Line.

Table 7.2-10
Access to Labor Force: Number of Residents Within 45 Minutes[1] of Key Corridor Work Destinations Using Transit, by Alternative (2025)

Measure/Work Destination	No-Build	I-205/Mall Project (increase with Project)
45-Minute Transit Access to:		
Downtown Portland	678,210	692,140 (+13,930)
Lloyd District	641,170	685,050 (+43,880)
Gateway Regional Center	651,940	722,800 (+70,860)
Lents	437,240	603,070 (+165,830)
Clackamas Regional Center	392,600	531,730 (+139,130)
Damascus	252,620	280,270 (+27,650)

Source: Metro; August, 2004.
[1] Total un-weighted transit travel time during the p.m. peak period on an average weekday in 2025.

Changes in Short and Long-Term Employment

Changes in short-term employment compared to the No-Build Alternative would result from local construction-related expenditures associated with the Project, expressed in the number of additional new person-year jobs and increases in personal income. Changes in long-term employment from the No-Build Alternative would result from increases in on going operating and maintenance expenses, based on levels of service in 2025. Table 7.2-11 summarizes the changes in short and long-term employment levels that would result from the various build alternatives, based on 2025 service levels and facilities. The Project would result in an additional 7,580 construction-related jobs and 62 operating-related jobs, compared to the No-Build Alternative. See Section 3.1 of this SDEIS for more information on both long-term and short-term employment impacts.

Table 7.2-11
Access to Labor Force: Change in Employment and Personal Income Due to Construction and Operations, by Alternative

Measure	No-Build	I-205/Mall Project
Change in Construction-Related Employment[1]	0	7,580
Change in Operating-Related Employment[1]	2,522	2,584

Source: Metro; August 2004.
[1]See Section 3.1.2.2 Employment for a detailed explanation of how construction-related and operating-related employment has been calculated (tables 3.1-3 and 3.1-4).

7.2.6 Ability to Provide for a Fiscally Stable and Financially Efficient Transit System

The ability of the alternatives to provide for a fiscally stable and financially efficient transit system is measured through two sets of measures: a range of cost-effectiveness measures; and capital and operating and maintenance costs.

A. Cost-Effectiveness Measures

Cost-effectiveness analysis compares benefits of each alternative with its costs. Three measures are used in this study to assess the cost-effectiveness of the alternatives: annual systemwide operating cost per originating ride and annual systemwide operating subsidy per transit ride.

Methods

The **operating cost per originating ride** measure is the ratio of total annual transit rides in the system divided by the annual cost of operating the transit system. The **net future operating subsidy per originating ride** measure is calculated by dividing the net operating subsidy for the system by the number of future transit system originating rides, offering a slightly different perspective than operating cost per ride, in that light rail service tends to result in a greater average farebox recovery ratio than bus rides, reflecting a greater operating efficiency with light rail than with buses. Therefore, the net operating subsidy per ride depends on the mix of light rail and bus rides served by an alternative. Note that an *originating ride* is defined as a one-way person trip taken from a place of origin (e.g., one's home) to a destination (e.g., one's workplace), independent of whether that trip would require a transfer or not (see Table 4.2-6 for systemwide originating rides by alternative). **Originating rides per revenue hour** is the annual average number of transit trips taken for each hour of service that is provided under that alternative (see Table 2.2-2 for revenue hours by alternative).

It is important to consider these measures in a context of the wide spectrum of evaluation measures, as laid out in Table 7.2-1. Cost effectiveness measures do not address financial feasibility or the value of any benefit other than ridership. While cost effectiveness is an important factor, these results should be considered in light of the relative benefits of the alternative, which are not monetized nor incorporated in the calculation of these measures. Further, the financial feasibility of the alternatives, summarized in the following section and in greater detail in Section 6.1 of this FEIS, is a key factor in evaluating the alternatives.

Results

Table 7.2-12 summarizes the cost-effective measures for each of the alternatives (see the previous section for a description of the methods used to calculate the measures). It is important to note that all of the cost-effectiveness measures described in this section are based on systemwide measures and that it takes a relatively large change in corridor costs and benefits to produce a measurable

Table 7.2-12
Cost-Effectiveness and Financial Feasibility Measures[1], by Alternative

Measure	No-Build	I-205/Mall Project
Cost Effectiveness		
Annual Operating Cost Per Originating Ride[2]	$1.83	$1.81
Annual Operating Subsidy Per Originating Ride[3]	$1.02	$1.00
Average Weekday Originating Rides[2] per Revenue Hour	76	78
Financial Feasibility		
Capital Cost – 2004 Dollars (millions)	$0	$489.13[4]
Capital Cost – Year of Expenditure Dollars (millions)	$0	$532.24[4]
Operating Cost – 2004 Dollars (transit systemwide in millions)	$313.64	$320.83[4]

Source: Metro and TriMet: August 2004.
Note: All costs are in 2004 dollars and all measures are systemwide, based on 2025 service levels and 2025 facility improvements (see sections 2.2, 2.3 and 2.4 for more detail).

1 It should be noted that all of these indicators do not include any dollar values for many benefits resulting from the alternatives, such as reduced infrastructure costs, travel time savings, environmental benefits, etc.

2 An originating ride (i.e., linked) is defined as a one-way trip from an origin (e.g., one's home) to a destination (e.g., one's place of work), independent of whether the trip would require a transfer or not.

3 Operating subsidy is the total annual systemwide operating costs minus the total annual systemwide operating revenue (e.g., fares, etc.), divided by the annual number of originating rides.

4 Capital costs Include interim finance costs – they do not reflect a cost savings of approximately $414,000 due to a slightly-reduced bus fleet for the Project, compared to the No-Build Alternative. See sections 2.3 and 2.4 and Chapter 6 for more detail on how capital and operating costs were calculated.

change in systemwide measures. Therefore, even significant changes at the project and corridor level may result in relatively minor changes in systemwide measures. Annual operating costs per originating rides in 2025 would be approximately 1.1 percent less with the Project ($1.81) than with the No-Build Alternative ($1.83). Similarly, the Project would reduce the operating subsidy per originating ride to $1.00, compared to $1.02 with the No-Build Alternative, a two percent reduction. A reduction in these two measures illustrates the increased operating efficiencies in generating transit ridership with the Project, compared to the No-Build Alternative. A further indication of those efficiencies is evidenced through the increase in originating rides per revenue hour with the Project, compared to the No-Build Alternative (78 rides per revenue hour, compared to 76, respectively – a 2.6 percent increase).

B. Fiscal Measures

This FEIS uses two fiscal measures to compare the alternatives: capital costs; and annual operating costs.

Capital Costs. Capital costs for the Project are expressed in both current dollars (2004 dollars) and in year-of-expenditure costs. A description of the methodology used to prepare the current year cost estimates and a more detailed breakdown of the base year capital cost estimates may be found in Section 2.3 of this FEIS. Year-of-expenditure costs are based on the base year cost estimates, a draft construction schedule, projected inflation rates for right-of-way and construction costs and estimated finance costs. A description of the methodology used to prepare the year-of-expenditure cost estimates and a more detailed breakdown of those cost estimates may be found in Section 6.1 of this FEIS. This section uses the year 2004 dollar capital costs to compare the alternatives and options.

Table 7.2-12 summarizes the current year (i.e., 2004) capital cost for each alternative. There would be no capital costs associated with the No-Build Alternative, compared to a capital cost of $489.13 million (2004$) for the Project.

Operating and Maintenance Costs. Operating and maintenance (O&M) costs for the South Corridor Project are based on ridership forecasts for 2025 and on the resulting transit operating plan that would accommodate that ridership demand, expressed in current year dollars (year 2004). O&M costs for an alternative include all of the forecast costs that would be associated with operating the Portland/Vancouver area transit systems (i.e., TriMet, C-TRAN, Portland Streetcar, SMART and the Wilsonville to Beaverton Commuter Rail line) under that alternative. A more detailed description of the methodology used to prepare the O&M cost estimates and a more detailed breakdown of those cost estimates may be found in Section 2.4 of this FEIS.

Table 7.2-12 summarizes the South Corridor annual O&M costs for each alternative, expressed in 2004 dollars and based on 2025 service levels. Compared to the No-Build Alternative, 2025 annual operating costs for the Project would increase by approximately $7.19 million, a 2.3 percent increase.

7.2.7 Ability to Maximize the Efficiency and Environmental Sensitivity of the Engineering Design of the Proposed Project

This FEIS assesses a broad array of environmental impacts that would be associated with each of the alternatives under study, as required by the National Environmental Policy Act (NEPA). A detailed

presentation of those environmental impacts may be found in Chapters Three and Four of this FEIS. This section and Table 7.2-13 highlight several of those impacts as indicators of the efficiency and environmental sensitivity of the alternatives and options under study: displacements; noise and vibration impacts; impacts to wetlands and parklands; and impacts to historical and cultural resources. In addition, this section concludes with a qualitative discussion of significant design considerations associated with alternatives and options.

A. Displacements

Table 7.2-13 summarizes the potential displacements that would occur with each alternative under study. The No-Build Alternative would result in no displacements and the Project would result in 37 total displacements (of which 33 would be residential units, three would be business units and one would be a public facility).

Table 7.2-13
Environmental Sensitivity: Summary of
Environmental Evaluation Criteria, by Alternative

Criteria\Measure	No-Build	I-205/Mall Project
Displacements		
Residential Units	0	33
Businesses	0	3
Public Facilities	0	1
Total	**0**	**37**
Noise and Vibration[1]		
Noise	0	33
Vibration	0	0
Wetland, Flood plains and Parks		
Acres of Impacted Wetland	0.00	0.01
Cubic Yards of Fill in the 100-Year Floodplain	0.00	411
Acres of Parkland Used	0	.011
Historical and Cultural Resources		
Historic Resources Adversely Affected	0	0
Archaeologically-Sensitive Areas Potentially Affected	0	0

Source: Metro: July 2004.

[1] The noise impacts identified within this table reflect forecast noise levels with identified mitigation measures. Identification of impacts is based on "adverse" and "moderate" noise impacts as defined by the FHWA and FTA criteria. All of the 33 noise impacts remaining after the identified mitigation would be moderate. See Section 3.5 of this FEIS for more information.

B. Noise and Vibration

Table 7.2-13 summarizes the number of noise and vibration impacts (i.e., noise and vibration levels that would exceed Federally-adopted standards) that would occur under each alternative without and with identified mitigation measures. Section 3.5 of this FEIS provides a detailed description of the methodology and Federal standards used to determine the number of impacts and a more detailed breakdown of what kind of impacts would occur, where they would occur and how they could be mitigated. There would be no noise or vibration impacts associated with the No-Build Alternative. The Project would result in 33 "moderate" noise impacts with committed mitigation measures in place. All of the potential vibration impacts would be mitigated.

C. Impacts to Wetlands, Floodplains and Parklands

All of the conceptual designs of the alternatives have been developed with the objective to first avoid and then to minimize impacts to wetlands, floodplains and parklands. Table 7.2-13 summarizes the

remaining impacts to wetlands, floodplains and parklands that would occur with each alternative under study. Sections 3.6 and 3.7 and Chapter 5 provides a more detailed description of these impacts and the Federal regulations concerning wetlands, floodplains and parklands. The No-Build Alternative would result in no impacts to wetlands, floodplains or parklands. The Project would result in approximately 0.01 acres of impacted wetlands, 411 cubic yards of fill within the 100-year floodplain prior to mitigation and the use of .011 acres of parkland.

D. Impacts to Historical and Cultural Resources

As noted in Table 7.2-13, there would be no historical or cultural resources adversely affected by the Project. See Chapter 5 of this FEIS for a more detailed summary of the analysis of impacts to historic and cultural resources.

E. Significant Design Considerations

This section summarizes the significant differences in design considerations between the No-Build Alternative and the Project. No-Build Alternative would present no significant design considerations. The Project has been designed to maximize the efficiency of the design and to avoid, minimize and mitigate environmental impacts of the project. Complex structures have generally been avoided to reduce costs and maximize the efficiency of the Project. A number of design techniques have been used to increase the environmental sensitivity of the Project; for example, the crossing of Johnson Creek would be achieved with a clear-span bridge, which would require minor in-water construction work or temporary or permanent structures. The Project also includes creative designs for the treatment of stormwater at park-and-ride lots and stations. NOAA Fisheries issued a Biological Opinion in response to the Biological Assessment prepared by the Project to describe the potential Project impacts and subsequent mitigation on threatened and endangered fish species. As the Project progresses into final design, TriMet would also continue looking for other opportunities to increase the project's environmental sensitivity, such as those utilized on Interstate MAX: for example, the use of recycled plastic for some non-structural elements and the reuse of ground pavement for sub-base.

7.3 Social Equity Considerations

Social equity is measured in this FEIS by comparing the costs and benefits of the project alternatives to ensure that they are not unfairly distributed across population sub-groups. In particular, this assessment focuses on the relationship between the distribution of project benefits, in the form of improved transit access, and project impacts, in the form of displacements and local traffic and noise and vibration impacts. This analysis focuses on South Corridor neighborhoods that have a higher-than-average minority and/or low-income population (i.e., based on the Portland metropolitan area average). Definitions for minority (i.e., non-white and/or of Hispanic or Latino origin – collectively referred to in this FEIS as Hispanic) and low-income (i.e., below the Federal poverty level) neighborhoods are based on US Census definitions and 2000 US Census data. Finally, this section assesses how the project alternatives may benefit disadvantaged business enterprises.

Several sections of this FEIS provide more detailed information on the measures used to identify these social equity considerations: Chapter 2 – Alternatives Considered; Section 3.5 – Noise and Vibration; Section 3.2 - Displacements and Social and Neighborhood Impacts; Appendix C Environmental Justice.

7.3.1 Benefits and Impacts to Minority and Low-Income Neighborhoods

As summarized in Table 3.2-1, there are ten neighborhoods that would be located adjacent to the light rail alignment for the Project in the Portland Mall and I-205 segments. The proportion of minority, Hispanic and/or low-income residents within all but one of those neighborhoods (i.e. Sunnyside), is greater than the tri-county average (minority: 17.1 percent; Hispanic: 8.0 percent; and low income: 8.7 percent). In particular, neighborhoods with a greater proportion than average of minority residents include: Downtown (23.7 percent); Hazelwood (22.7 percent); Lents (23.5 percent); Montavilla (25.0 percent); Old Town/China Town (22.6 percent); Powellhurst-Gilbert (22.0 percent); Southgate (17.6 percent) and West Mount Scott (20.5 percent). Neighborhoods with a greater proportion than average of Hispanic residents include: Hazelwood (8.6 percent); Lents (10.4 percent); Powellhurst-Gilbert (8.6 percent); and Southgate (11.8 percent). Neighborhoods with a greater proportion than average of low-income residents include: Downtown (32.1 percent); Hazelwood (12.5 percent); Lents (15.0 percent); Montavilla (10.4 percent); Old Town/China Town (49.2 percent); Pearl (19.6 percent); Powellhurst-Gilbert (13.7 percent); and Southgate (10.4 percent).

Unlike projects that would negatively impact minority and/or low-income neighborhoods without serving them (such as a freeway that would divide and adversely impact a neighborhood without providing an interchange to serve those residents and businesses), the Project is expressly aimed at providing these minority and low-income neighborhoods with new and improved transit service. Following is a summary of additional light rail stations that would be provided by the Project within or near minority and/or low-income neighborhoods, contrasted with the anticipated impacts to those neighborhoods (i.e. noise and vibration and local traffic impacts and displacements).

A. Portland Mall Segment

Within the Portland Mall Segment, there would be five additional light rail station pairs located within the Downtown Neighborhood and two additional station pairs within the Old Town/ Chinatown Neighborhood, and directly adjacent to the Pearl Neighborhood. There would be eight vibration impacts and six displacements (i.e., one institution, two businesses and three residences) within the Downtown Neighborhood and no displacement or noise and vibration impacts within the Pearl or Old Town/Chinatown neighborhoods.

B. I-205 Segment

Within the I-205 Segment with the Project, there would be: one additional light rail station within the Hazelwood Neighborhood; one additional light rail station directly adjacent to and one within walking distance of the Montavilla Neighborhood; one additional light rail station within and one directly adjacent to the Powellhurst-Gilbert Neighborhood; four additional light rail stations within the Lents Neighborhood; two additional light rail stations within the Southgate Neighborhood; and one additional light rail station within about a half-mile of the West Mount Scott Neighborhood. In addition, five new park-and-ride lots, with a combined capacity of approximately 2,066 spaces, would provide additional access for neighborhood residents.

With the Project, there would be impacts to local traffic in: the Hazelwood Neighborhood due the SE Main Street Park-and-Ride Lot; the Lents neighborhood associated with the SE Holgate Boulevard and SE Powell Boulevard park-and-ride lots; and the Southgate Neighborhood due to the Clackamas Town Center Transit Center and the SE Fuller Road Park-and-Ride Lot. Displacements with the

Project would occur within: the Lents Neighborhood (i.e., ten residential); and the Southgate Neighborhood (one business and 21 residential). There would be 14 moderate noise impacts within the Lents Neighborhood and 13 noise impacts in the Southgate Neighborhood, due to the Project.

7.3.2 Disadvantaged Business Enterprises

TriMet has developed an extensive program of working with Disadvantaged Business Enterprises (DBEs) to facilitate DBE involvement in the design and construction of the Westside/Hillsboro, Airport MAX and Interstate MAX light rail projects. The Oregon Opportunity Advisory Committee was established by TriMet to assist project staff with the development and implementation of actions that afford contracting opportunities to socially and economically disadvantaged individuals and businesses. Each year, based in part on the work of the Advisory Committee, TriMet analyzes the availability and capabilities of DBEs with respect to upcoming contract opportunities, followed up with the establishment of DBE goals for the following year.

TriMet administers a Federal DBE program consistent with the policies and requirements set forth in 49 CFR Part 23. In accordance with the requirements regarding the use of Federal grants, all bidders are required to make good faith efforts to achieve DBE goals set by TriMet and, if they are not met, to show evidence of these efforts. Prior to a contract award, each DBE contractor identified in the bid must sign a letter of intent. In addition, TriMet has established outreach programs with other local governments to assist in the identification of qualified DBEs and DBE contracting opportunities. Furthermore, TriMet encourages contractors to utilize DBE sub-contractors and to satisfy DBE goals on all major contracts. These programs and procedures would be employed for any of the South Corridor alternatives under consideration.

7.4 Significant Tradeoffs Between the Alternatives

The purpose of this section is to provide a summary of the significant tradeoffs between the I-205/ Portland Mall Project and the No-Build Alternative. Fundamentally, this section compares the benefits (e.g., increased performance of the corridor's transportation system, fewer or avoided adverse environmental impacts or lower costs) and costs/impacts of the Project, compared to the No-Build Alternative. All data within this section is based on data found within the tables of Section 7.2, it is based on 2025 conditions and costs are expressed in 2004 dollars.

The Project would result in the following benefits: an additional 29,360 residents and 35,830 jobs located within a half-mile of a light rail station; an additional 2,066 LRT park-and-ride lot spaces; in-vehicle transit travel time improvements of approximately 12 to 41 percent; peak hour bus travel time reductions on the Portland Mall of approximately 10 percent; an additional 8.3 miles of LRT right-of-way; an additional 6.2 million annual transit riders and an additional 13.9 million annual light rail boardings; a 2.1 percent to 37.9 percent increase in the number of residents within 45-minutes of corridor employment centers via transit; and 7,580 additional construction-related jobs – compared to the No-Build Alternative. Those benefits of the Project would come at the following costs and result in the following impacts: $489.13 million in capital costs; $7.19 million additional operating and maintenance costs; 37 displacements; 33 noise impacts (after identified mitigation measures); and the displacement of approximately 0.01 acres of wetland, compared to no additional benefits, costs or impacts with the No-Build Alternative.

7.5 Rationale for Selection of the I-205/Portland Mall Project as the Phase 1 LPA

On April 17, 2003, the Metro Council adopted the South Corridor LPA Report, which presents the implementing strategy for transit improvements in the South Corridor. The Metro Council adopted a two-phased approach for the LPA, which would lead to: 1) the implementation of the I-205 Light Rail alternative; to be followed by: 2) the Milwaukie Light Rail Alternative. The two-phased approach was adopted to address fiscal constraints. The April 2003 report also outlined a "Preliminary LPA" for the Portland Mall Segment of the South Corridor: the Portland Mall Light Rail Alignment.

On January 15, 2004, The Metro Council adopted the Downtown Portland Mall Segment LPA Report, which affirmed the April 2003 Preliminary LPA for the Portland Mall Segment of the South Corridor: the Portland Mall Light Rail Alignment. The January 2004 decision also selected Portland State University (SW Jackson Street) for the segment's southern terminus.

These decisions were based on the analysis documented in the project's December 2002 SDEIS and the October 2003 ASDEIS, as well as public comment received during the two public comment periods and recommendations from local participating jurisdictions and agencies. Section 5.2 of the SDEIS and the ASDEIS summarizes the project's goal, objectives, criteria and measures that were used to compare and contrast the benefits, impacts and costs of the alternatives under consideration. Chapter 2 of the SDEIS and ASDEIS describe the other alternatives and options that were developed, analyzed and evaluated.

The April 2003 and January 2004 LPA reports outline the Metro Council's rationale for the selection of each alternative and design option as the LPA. Following is a summary of that rationale for each major element of the Metro Council's decision.

A. I-205 Light Rail Alternative

As documented in the April 2003 LPA Report, the Metro Council selected the I-205 Light Rail Alternative because it would:

- Have the greatest transit ridership of the alternatives considered for the I-205 Segment and would carry the greatest number of transit trips than any individual alternative considered in the SDEIS;
- Save approximately 10 minutes in transit travel times between the Rose Quarter and the Clackamas Town Center Transit Center, compared to the No-Build Alternative (average weekday during the peak period in the peak direction in 2025);
- Support the Region 2040 Growth Concept by offering high capacity transit connections between the Gateway Regional Center and the Clackamas Regional Center, while serving the Lents Town Center as well as connecting directly to the Portland Central City;
- Provide excellent opportunities for transit-oriented development in support of the Region 2040 Growth Concept in the Gateway regional Center, the Lents Town Center and the Clackamas Regional Center.
- Use existing available right-of-way that was set aside during construction of I-205 for a future transitway, which would allow for construction of I-205 light rail with minimal residential and business displacements, property acquisitions and related costs; and

- Provide improved regional transit connections from the South Corridor to the Portland International Airport, Gresham, downtown Portland, the Lloyd District, Beaverton, Hillsboro and other areas served by the regional light rail system.

B. East of the Clackamas Town Center Design Option

As documented in the April 2003 LPA Report, the Metro Council selected the East of the Clackamas Town Center Design Option because it would:

- Provide better park-and-ride lot access;
- Provide better transit access to jobs;
- Create a more direct future alignment if light rail were to be extended east or south from the Clackamas Town Center;
- Better accommodate future expansion plans for the Clackamas Town Center; and
- Affect fewer prime commercial parking spaces at the Clackamas Town Center, while increasing overall accessibility to the shopping mall and adjacent retail and commercial businesses.

C. Light Rail on the Portland Mall

As documented in the January 2004 Downtown Portland Segment LPA Report, the Metro Council selected the Light Rail on the Portland Mall Alternative because it would:

- Provide consistency with over three decades of downtown Portland planning decisions, including the City of Portland's 1972 Downtown Plan;
- Provide better light rail access to the spine of office and retail development that has occurred along either side of the Portland Mall;
- Be consistent with analysis and recommendations received from the City of Portland and TriMet;
- Avoid the high costs and impacts of a subway alternative and still meet the region's demand for light rail capacity within downtown Portland to the year 2040; and
- Provide for optimal transfers between light rail lines and buses that would traverse the Portland Mall, while also providing transfer opportunities for light rail lines that would use the Cross Mall alignment and bus lines that would cross the Portland Mall.

D. Portland State University (SW Jackson Street) Terminus Option

As documented in the January 2004 Downtown Portland Segment LPA Report, the Metro Council selected the Portland State University (SW Jackson Street) Terminus Option because it would:

- Extend light rail service to the PSU, with its base of 25,000 students, faculty and staff;
- Extend light rail service to the Portland Streetcar in the vicinity of the PSU Urban Center;
- Result in greater light rail and total transit ridership; and
- Avoid traffic and circulation impacts in central downtown Portland that would be associated with a terminus at SW Main Street.

8. COMMENTS AND RESPONSES

8.1 Introduction

This chapter summarizes and provides responses to the comments received during the public comment periods for the *South Corridor Project Supplemental Draft Environmental Impact Statement* (SDEIS) and the *Downtown Amendment to the South Corridor Project Supplemental Draft Environmental Impact Statement* (ASDEIS) as well as comments received outside of formal public comment periods. Comments on the SDEIS and ASDEIS were accepted in writing, by fax, by telephone or by e-mail as well as public testimony given at public hearings. Comments are grouped by topic area. All public comments are presented in the *South Corridor Public Comment Compendium*, a companion volume to this *South Corridor Project I-205/Portland Mall Light Rail Final Environmental Impact Statement* (FEIS).

All those who commented on the SDEIS or the ASDEIS have been sent copies of the FEIS Executive Summary or of this FEIS.

8.1.1 SDEIS Public Involvement and Comment Opportunities

Notice of availability of the South Corridor SDEIS was published in the *Federal Register* on December 20, 2002 beginning the 50-day formal public comment period that concluded on February 7, 2003. Comments submitted between December 9, 2002, when the SDEIS was available locally, and December 20, 2002 are included in the public comment report, summarized and responded to in this chapter of the FEIS. The following outreach activities supported the public comment period for the SDEIS.

- **SDEIS availability notification.** Notice of availability of the SDEIS was advertised in *The Oregonian*, *The Asian Reporter* and *El Hispanic News*, mailed to all property owners within 200 feet of all alternatives and included in the *Federal Register* on December 20, 2003.
- **SDEIS distribution.** The SDEIS was distributed to all neighborhood and business associations in the corridor, local libraries, local governments and agencies, interest groups and by request.
- **Open houses.** Three open houses were held on December 9, 10 and 11, 2002. Open houses were advertised along with notice of availability of the SDEIS and offered the public an opportunity to review technical findings, discuss questions with staff and provide written comments on the SDEIS.
- **Public hearings.** Two public hearings were held on the South Corridor Project SDEIS, on January 29, 2003 and February 4, 2003. Hearings were advertised in *The Oregonian*, *The Asian Reporter* and *El Hispanic News*. Notification of the public comment period and hearings were sent to all property owners within 200 feet of any alignment.
- **Local advisory groups.** Staff met with each local advisory group during the public comment period to discuss findings and answer questions. Each local advisory group submitted comments on the SDEIS that are addressed in this FEIS.
- **Community meetings.** Public involvement and technical staff attended neighborhood, business and civic group meetings during November 2002, December 2002 and January 2003 to discuss findings and answer questions.
- **Documentation of public comment.** The *SDEIS Public Comment Report* was compiled at the end of the public comment period, and includes and documents 313 comments. Comments were submitted by mail, e-mail, voice mail, fax and through testimony at public hearings.

- **Local jurisdiction hearings on the LPA.** The Milwaukie City Council, Portland City Council, Oregon City Commission, Multnomah County Board of Commissioners, Clackamas County Board of Commissioners and TriMet Board of Directors held public hearings to hear public comment and made recommendations on the adoption of the LPA in March and April 2003.
- **Metro Council hearing on the LPA.** The Metro Council held a hearing and accepted public comment before adopting the LPA on April 17, 2003.

8.1.2 ASDEIS Public Involvement and Comment Opportunities

Notice of availability of the ASDEIS for the Downtown area of the South Corridor Project was published in the *Federal Register* on October 3, 2003 beginning the 45-day formal public comment period that concluded on November 17, 2003. The following outreach activities supported the public comment period for the ASDEIS.

- **ASDEIS availability notification.** Notice of availability of the ASDEIS was advertised in *The Oregonian*, mailed to all property owners within 200 feet of the Portland Mall alignment and included in the *Federal Register* on October 3, 2003.
- **ASDEIS distribution.** The ASDEIS was distributed to all neighborhood and business associations in the corridor, local libraries, local governments and agencies, interest groups and to anyone who requested a copy.
- **Open houses.** Three open houses were held in October 2003. Open houses were advertised along with notice of availability of the ASDEIS and offered the public an opportunity to review technical findings, discuss questions with staff and provide written comments on the ASDEIS.
- **Downtown Community Advisory Committee.** Downtown CAC meetings were held on a monthly basis and were open to the public. The Downtown CAC recommended adoption of the amended LPA.
- **Community meetings.** Public involvement and technical staff attended neighborhood, business and civic group meetings during the fall and winter of 2003 to discuss findings and answer questions.
- **Public hearing.** The South Corridor Project held one public hearing on the ASDEIS on October 21, 2003. The hearing was advertised in *The Oregonian*. A notice of the public comment period and hearing was sent to all property owners within 200 feet of the Portland Mall alignment and members of the project mailing list.
- **Documentation of public comment.** The *ASDEIS Public Comment Report* was prepared at the end of the public comment period and included 143 comments. Comments were accepted by mail, e-mail, voice mail, fax and through testimony at public hearings.
- **City of Portland hearing on LPA amendment.** The Portland City Council heard public comment and made recommendations on the adoption of the amended LPA on December 4, 2003.
- **Metro Council hearing on LPA amendment.** The Metro Council heard public comment and made recommendations on the adoption of the amended LPA on January 15, 2004.

8.1.3 Organization of Responses

Comments have been grouped by topic area and summarized when more than one person made similar comments. In the case that an identical letter is included more than once in the public comment document, it may only be referenced once. A table that summarizes each comment and provides a cross-reference between the person or group that made the comment, the location of the

comment in the public comment reports and the location of the response is included as Appendix H of this FEIS. Comments on the SDEIS can be found in Section 8.2, comments on the ASDEIS can be found in Section 8.3 and comments received outside of official comment periods can be found in Section 8.4.

8.2 Responses to Comments on the SDEIS

This section summarizes the comments and responses relating to alternatives considered in the South Corridor SDEIS. Comments that are not relevant to the selection of a LPA or the design, operation or funding of the I-205/Portland Mall Light Rail Project (the Project) are not responded to in this FEIS. Comments relevant to the second phase of the South Corridor LPA, the Milwaukie Light Rail Project, will be addressed when an FEIS is prepared for that project.

8.2.1 Alternatives Considered

8.2.1.1 Support for the Locally Preferred Alternative

Comment 1.1A: I-205 and Milwaukie light rail should be constructed. I-205 light rail should be constructed in the first project phase (1-3 DeMarco; 1-4 Stone; 1-4, 3-16 Baltz, 1-5 Kennemer; 1-6 Hunt, B; 1-6 Hunt, J; 1-7 Chung; 1-7 Berliner; 2-3 Miles; 2-3 Stickely; 2-3 Marks; 2-3 Waldermar; 2-4 Tzantarmus; 2-5 Smith; 2-5 Mullins; 2-5 Doherty; 2-6 Cooley; 2-6 Schmidt; 2-6 Woodruff; 2-8 Clackamas County Neighborhood and Business Leaders; 2-10 Clackamas County Business Alliance; 2-12 Sunnyside United Neighbors CPO; 2-14 Clackamas County Economic Development Commission; 2-25 Johnson; 2-26 Gethoefer; 2-28 Zoltansky; 3-5, 6-69 Lewellen; 3-6 Toler; 3-7 Kerbaugh; 3-14 Kirk; 3-7 Simpson; 3-15 Cotton; 3-20 McGall; 3-20 Abeling; 3-21 Turner; 3-21 Kinser; 3-22 August; 3-24 LeClerc; 3-26 Southerland; 3-36 Jones; 4-8 Howe; 4-17 Osterman; 4-23 Ghormley; 4-26 Highfield; 4-28 Johnson; 4-29 Rubin; 4-30 Scher; 4-31 Swanson; 4-33 Wood; 4-34 Seaman; 4-34 Tolentino; 4-40 Thorton; 4-52 Roland; 4-52 Camp; 4-53 Sharp; 4-55 Pennington; 4-61 Bresky; 4-65 Quakenbush; 4-65 Poole; 4-67 Jensen; 5-3 Skelton; 6-5 Clackamas County Traffic Safety Commission; 6-20 Grant; 6-22 Hammerstad; 6-23 Lehan; 6-24 Jordan; 6-29 Opportunity Gateway PAC; 6-35 Parks; 6-37 Butler; 6-38 Hoggard; 6-39 Smith; 6-41 Bold; 6-43 Ling; 6-45 Gilbert; 6-49 Seagraves; 6-50 Stolt; 6-58 Baugher; 6-70 Rathbun; 6-71 Walker; 6-72 Gibson; 6-72 Harris; 6-73 Warnila; 6-73 Kniefel; 6-74 Acheson; 6-74 Esmond; 6-75 Archer; 4-61 Bresky).

Response: *On April 17, 2003, the Metro Council adopted a two-phased recommendation for the implementation of light rail in the South Corridor. The I-205/Portland Mall Light Rail Project was chosen as the first construction phase to be followed by construction of Milwaukie light rail. The Council's decision was based on information contained in the South Corridor SDEIS, public comment and recommendations by local agencies and jurisdictions.*

Comment 1.1B: I-205 light rail and Milwaukie light rail should be constructed with I-205 light rail being constructed first. Light rail should be extended to Oregon City (1-9 Bailey; 4-54 Kloster; 4-58 Fowler; 4-66 Saltenberger; 5-3 Schaafsma, 1-40 Norris, 3-7 Simpson, J).

Response: *The LPA calls for construction of both light rail alignments, with I-205 light rail being constructed first, consistent with these comments. Neither the I-205 light rail design nor the Milwaukie light rail design precludes future expansion to Oregon City.*

Comment 1.1C: I-205 light rail and Milwaukie light rail should be constructed with I-205 light rail being constructed first. Transit mall improvements should be incorporated into the next light rail project (1-4 Salsgiver).

Response: *The LPA calls for construction of both light rail alignments with I-205 light rail being constructed first, consistent with these comments. An amendment to the South Corridor SDEIS that focused on the Portland Mall alignment (ASDEIS) was prepared. As a result, the LPA was amended in January 2004 to include construction of light rail on the Portland Mall as part of the South Corridor I-205/Portland Mall Light Rail Project.*

Comment 1.1D: I-205 and Milwaukie light rail projects should be constructed, but Milwaukie light rail should not impact the Portland Mall (1-3 Parker).

Response: *The LPA calls for construction of both light rail alignments in two phases consistent with these comments. However, the Phase I LPA also includes a new light rail route on the transit mall to provide service to regional destinations, maintain consistency with 25 years of planning for light rail service on the mall and meet future capacity needs in downtown Portland. This will ensure that the Portland Mall segment is already built by the time the future Milwaukie project is started so that it would not impact the Portland Mall.*

Comment 1.1E: I-205 light rail should be constructed but it should be extended to Tualatin (3-6 Simpson).

Response: *The Regional Transportation Plan for Transit in 2020 shows Frequent or Rapid Bus service between the Clackamas Regional Center and Tualatin Town Center. In addition, construction of the Washington County Commuter Rail Project, which will extend peak hour commuter rail service south from Beaverton Transit Center through Tigard and Tualatin to Wilsonville, could begin in 2007.*

8.2.1.2 Other Light Rail Corridors

Comment 1.2A: Milwaukie light rail should be constructed as the first phase of the South Corridor Project (1-4 Zumwalt; 1-6 Tillstrom; 1-6 Christ; 1-7, 6-64 Phillipi; 1-7 Williams; 1-10 Nusbaum; 1-51 Parecki; 1-51 Posner; 6-62 Orton; 2-6 Zoltansky; 2-6, 3-35 Orton, K; 2-29 Zoltansky, P; 2-32, 6-64 Stephens; 3-4 Degon; 3-12 Cherry; 3-13 Gibbs; 3-14 Downing; 3-23 Beadle; 3-23 Kamp; 3-24 Lyon; 3-27 Merrick; 3-27 Norberg; 3-28 Kelly; 3-29 McKinnon; 3-30 Febel-Azcarate; 3-31 Merrick; 3-31 Civis; 3-32, 4-61 Lindahl; 3-32 Anderson; 3-40 McFarling; 3-38, 4-32 Weislogel; 4-5 Tong; 4-16 Bitz; 4-21 Fuglister; 4-22 Macken-Hambright; 4-43 Frishberg; 4-49 Baucom; 4-53 Cornilsen; 4-56 Hamm; 4-58 Berry; 4-59 Liljeholm; 4-59 Grelle; 4-60 Dahlen; 4-62 Thorton; 4-66 Moore; 4-75 Davis; 4-60 Pardes; 5-3 White; 5-4 Larkin; 6-25 Kinglsey; 6-28 Mathiesen; 6-54 Christenson; 6-59 Eastbank Park PAC; 6-60 Dudman; 6-61 Lake; 6-61 Lake, J; 6-66 Allwardt; 6-67 Wade; 6-68 Banyas; 6-68 Kobernick; 6-92 Seagler).

Response: *The LPA calls for I-205 light rail to be constructed as the first project phase (Phase 1 LPA) because I-205 light rail would have the highest transit ridership, save transit travel time compared to the no-build, support the 2040 growth concept, provide opportunities for transit-oriented development, utilize transit right-of-way established with the construction of the I-205 freeway and provide additional regional transit connections (LPA Report, Metro: April 2003).*

Comment 1.2B: Milwaukie light rail should be constructed as the first phase of the South Corridor Project. The more expensive project should be constructed first to minimize inflation (1-4, 2-27 Jannuzzi).

Response: *The LPA calls for I-205 light rail to be constructed prior to Milwaukie light rail based on consideration of public comments, technical information included in the SDEIS, and potential funding strategies.*

Comment 1.2C: Milwaukie light rail should be constructed as the first phase of the South Corridor Project. Opening day ridership on the Milwaukie alignment will be higher than on I-205. Buses should begin operating on I-205 to develop ridership for an eventual light rail line (1-3, 2-7, 4-11 Aschenbrenner; 1-4 Satterlee; 1-6 Christ; 1-6 Wyse; 1-6 Jawarsky; 1-8, 3-4 Polani; 1-8, 2-5, 2-16, 3-3 Howell; 2-5, 2-20 Williams; 2-29 Zoltansky, P; 3-25 Orton, L; 3-25 Corr; 3-33 Klotz; 4-4 McManamon; 4-6 Banks, R; 4-7 Banks, M; 4-38 Buss; 4-50 Gallant; 4-67 Stone; 4-73 Schmidt; 4-76 Padres, M; 6-34 Stueber; 6-52 Mathiesen).

Response: *The I-205/Portland Mall Light Rail Project would cost less to construct and would have higher ridership and fewer environmental impacts than the Milwaukie Light Rail Project. It would also better achieve land use goals by connecting downtown Portland and Portland State University directly with the Gateway and Clackamas regional centers, as well as the Lents Town Center. The Milwaukie line would connect downtown Portland with the Milwaukie Town Center.*

Comment 1.2D: Light rail should be constructed from Gateway to the Clackamas Town Center in the median of I-205 which would be considerably cheaper than building light rail from Portland to Milwaukie (4-50 Kodlin).

Response: *The proposed I-205 light rail alignment would utilize the available transitway between Gateway and SE Foster Road that was constructed along with the I-205 freeway. The alignment would be east of I-205 north of SE Market Street and west of the freeway south of SE Market Street. The capital cost of the I-205 alignment would be less than the Milwaukie alignment.*

Comment 1.2E: Light rail should be built east of I-205 where it would be less intrusive and would not disturb any of the existing neighborhoods (1-10 White).

Response: *The proposed I-205 light rail alignment would utilize the transitway between Gateway and SE Foster Road that was constructed along with the I-205 freeway. Because the transitway right-of-way was reserved and located within the freeway right-of-way, it has minimal neighborhood impact. The transitway right-of-way ends at Foster Road. The alignment remains on the west side of the freeway to the Clackamas Town Center terminus. Most of the route can adequately accommodate the light rail alignment as well as a potential future traffic lane though some displacements would be required on the west side of the freeway to accommodate light rail.*

Comment 1.2F: If light rail is going to be constructed between Clackamas and Gateway, it should be constructed along 82nd Avenue to replace Portland's most heavily trafficked bus (6-47 Carter).

Response: *The Line 72-82nd Avenue is consistently a high performing line for TriMet in terms of both ridership and productivity. SE 82nd Avenue is classified as a major traffic street and carries a*

substantial volume of traffic. Introducing light rail onto 82nd Avenue would likely be more costly and result in significantly greater traffic impacts and displacements than the proposed alignment adjacent to the I-205 freeway. The Line 72-82nd Avenue would continue to serve 82nd Avenue, while the I-205 light rail line would offer higher reliability and faster speeds for longer trips.

8.2.1.3 Other Modes

Comment 1.3A: Prefer bus rapid transit alternative because it is more cost effective (4-19 Birkett; 4-36 Pierson; 4-51 Barber).

Prefer bus rapid transit alternative between Milwaukie, Clackamas and Oregon City and I-205 light rail (4-26 Highfield).

Response: *Many neighborhood associations and community members in Milwaukie and southeast Portland opposed the Bus Rapid Transit Alternative. The Combined Light Rail Alternative had higher ridership and greater travel time savings than the Bus Rapid Transit Alternative. The Bus Rapid Transit Alternative would also cost more to operate than the light rail alternatives.*

Comment 1.3B: Prefer busway alternative (4-57 Denburg; 2-26 Dorman).

Response: *Many neighborhood associations and community members in Milwaukie and southeast Portland opposed the Busway Alternative. It also had lower projected ridership than the Combined Light Rail Alternative.*

Comment 1.3C: Support BRT from Milwaukie to Oregon City (3-9 Averill; 4-10 Johnson; 4-42 Gronke).

Response: *The LPA directs TriMet to implement BRT-type improvements incrementally through TriMet's Transit Investment Plan. Therefore, the BRT portion of the LPA is not reflected in this FEIS.*

Comment 1.3D: Prefer subway option in downtown Portland with any light rail route (1-4 Smith; 1-6, 1-18 Wyse; 1-6 Jawarsky; 1-8, 3-4 Polani; 1-10 Nussbaum; 3-19 Goff).

Response: *Numerous studies have been conducted over the past twenty years that have evaluated various subway options and each time the studies concluded that, while subway could be a viable long-range future option, light rail on surface alignments through downtown is preferred. A subway is superior to on-street light rail for speed, capacity and reliability at very high service levels. However, the cost of building a subway in downtown Portland and the Lloyd District was estimated by TriMet to be $1.2-1.5 billion in current dollars, which would be prohibitively expensive. Given the cost and lack of need for such a facility at 2025 ridership levels, a subway was not reconsidered for the downtown segment of the Project.*

Comment 1.3E: Do not put light rail on the transit mall (4-57 Kazen).

Response: *The Phase I LPA calls for light rail on the Portland Mall to ensure improved service quality in downtown Portland, reinforce 25 years of transportation and land use policy, serve important destinations (Portland State University and Union Station), and avoid eventual service*

limitations of operating the cross mall alone. In addition, the Portland Mall alignment received considerable public support and would be concurrent with needed improvements to the Portland Mall (Metro: April 2003).

Comment 1.3F: Consider building a light rail alignment on the Portland Mall (6-10 Wentworth; 1-4 Salsgiver).

Response: *The Phase I LPA calls for light rail on the transit mall.*

Comment 1.3G: A complete range of alternatives was not included in the SDEIS. Build HOT lanes instead of light rail. They could reduce regional congestion by far more than 1.5 percent (1-5 Stearns).

Response: *HOT lanes were considered during the South Corridor Transportation Alternatives study. HOT lanes were not carried forward for consideration in the Draft Environmental Impact Statement because of concerns detailed in the South Corridor Evaluation Report (Metro: October 2000) including downstream traffic impacts to Central Eastside neighborhoods, additional displacements and difficulty locating transit stops along the barrier-separated lane.*

Comment 1.3H: Prefers other options to light rail because light rail will not solve congestion and environmental problems (1-8 Holenstein; 1-7 Flynn).

Response: *Light rail cannot, nor is it intended to, solve all congestion and environmental problems. The South Corridor Transportation Alternatives Study evaluated many potential transit options in addition to a no-build alternative, including two different commuter rail lines, a busway, bus rapid transit, high occupancy toll lanes, high-occupancy vehicle lanes and river transit. None of these other modes was found to be acceptable to address the transportation problems in the South Corridor.*

Comment 1.3I: Consider personal rapid transit (1-50 Nelson).

Response: *Personal Rapid Transit (PRT) is best suited to other applications such as a circulator in dense urban downtown environments (i.e. Detroit and Miami), not suburb to central city commutes. Because it did not address the purpose and need for the project, PRT was not considered.*

Comment 1.3J: Build another lane on McLoughlin Boulevard and add a bus lane during peak hours (3-17 Falkenstein).

Response: *Several options for McLoughlin Boulevard were considered during the South Corridor Transportation Alternatives Study that included a busway, bus rapid transit, high occupancy vehicle (HOV) lanes and high occupancy toll (HOT) lanes. The HOV and HOT options would have added an additional lane to McLoughlin north of Milwaukie. Buses will continue to provide trunk line service to Milwaukie.*

Comment 1.3K: River transit would be more convenient, less expensive and serve more people (4-14 Bingham).

Response: *River transit was considered during the South Corridor Transportation Alternatives Study. River transit was not carried forward for consideration in the Draft Environmental Impact Statement because of concerns detailed in the South Corridor Evaluation Report (Metro: October 2000).*

Comment 1.3L: Range of alternatives was not sufficient because commuter rail was not included (4-39 Laubaugh).

Response: *Two types of commuter rail, radial and circumferential, were considered during the South Corridor Transportation Alternatives Study. Commuter rail was not carried forward for consideration in the SDEIS because of concerns detailed in the South Corridor Evaluation Report (Metro: October 2000).*

8.2.1.4 Other Bus Options

Comment 1.4A: Reroute buses to I-205 between Gateway and the Clackamas Town Center rather than building I-205 light rail (5-4 Joynt).

Response: *Bus service on I-205 would not result in the same benefits as light rail adjacent to I-205 because buses would be subject to the same congestion that exists on the freeway and would have to leave and enter the freeway at interchanges to pick up and drop off passengers, adding substantial travel time.*

Comment 1.4B: Buses are less expensive and more flexible than light rail. Therefore, light rail should not be constructed (3-16 Shannon, P; 3-17 Shannon, B; 4-15 Bittler; 4-20 Dahl; 4-49 Helm).

Response: *Buses are more flexible and do have lower capital costs than light rail. However, light rail has a lower operating cost per ride, offers more reliable service and can spur development due to its fixed route. For these reasons and others, the LPA calls for construction of new light rail routes.*

Comment 1.4C: Instead of building light rail along I-205, begin bus service on the route to build ridership (1-6 Wyse, 1-6 Jawarsky, 2-20 Williams, 2-16 Howell).

Response: *I-205 would be difficult to serve with buses, given the need to either leave the freeway to access bus stops or build access to buses within the freeway or transitway right-of-way. Ridership projections are strong for the I-205 line based on existing and future land uses. If the intent of this proposal is to establish demand for the service before the implementation of light rail, that test has been met by the ridership of the parallel 82nd Avenue bus.*

Comment 1.4D: Consider building a no-frills bus rapid transit alternative between Portland and Milwaukie and along I-205 (1-14 Stearns).

Response: *A bus rapid transit (BRT) alternative was considered between Portland and Milwaukie as part of the South Corridor Supplemental Draft Environmental Impact Statement (SDEIS). The BRT alternative was not selected as the preferred alternative for the Milwaukie project because light rail had higher ridership, better travel time and enjoyed a higher level of public support than BRT.*

8.2.2 Transportation Impacts

8.2.2.1 Transit Impacts

Comment 2.1A: Fewer light rail stations should be located in the Lents neighborhood (2-24, 6-27 Peek).

Response: *The four light rail stations in the large Lents neighborhood would be located at least one-half mile apart, consistent with TriMet spacing standards. Stations in Lents would be located at Powell Boulevard, Holgate Boulevard, Foster Road and Flavel Street to provide for convenient walk access as well as access by bike, park-and-ride or bus transfer.*

Comment 2.1B: The existing Cross Mall light rail alignment will not be able to handle the increased number of trains from the I-205 alignment (3-5 Nussbaum).

Response: *The Cross Mall alignment would eventually limit service expansion ability and would eventually decrease service quality with the addition of trains needed for system growth. For these reasons, the Phase I LPA calls for construction of the Portland Mall alignment. Capacity and operating issues on the Cross Mall alignment are discussed in the Downtown Light Rail Capacity Analysis (Metro, TriMet: 2003).*

Comment 2.1C: Include a major "make-over" of the Gateway Transit Center as part of the I-205 light rail project including structured parking with retail and streetscape improvements (3-36 Jones).

Are there plans to expand Gateway to accommodate I-205 light rail (2-32 Dorman)?

Response: *The northern limit of the I-205 Light Rail segment is the point at which it ties into the existing Blue Line tracks just south of NE Glisan Street. The only change to the existing route will be a track tie-in. Potential Gateway Transit Center station area redevelopment is being addressed by other public and private ventures. The Gateway Transit Center will not need to be modified to accommodate I-205 light rail.*

Comment 2.1D: Guarantee LIFT service between the Clackamas Town Center Transit Center and the Kaiser Sunnyside medical facility (1-5 Schwab).

Response: *LIFT service (the demand-responsive complementary paratransit service offered by TriMet for people who cannot use fixed route service due to disabilities) is already provided throughout the TriMet service area, and such a trip between Clackamas Town Center Transit Center and the Kaiser Sunnyside medical facility would be an available trip for qualified riders. Accessible fixed route bus service with lifts and/or low-floor buses is also expected to continue between these locations.*

Comment 2.1E: Concerned that I-205 light rail will reduce bus service in the corridor including the frequency and route of the Line 14 and eventual service on SE 92nd Avenue (2-24, 6-27 Peek).

Response: *No changes to bus routing for the routes and streets mentioned are proposed in conjunction with the Project. The Line 14 is a frequent bus line that serves arterials and*

neighborhoods not directly served by the proposed light rail. Bus service is not planned for SE 92nd Avenue.

Comment 2.1F: The proposed I-205 line assumes truncating the Airport MAX line at Gateway (3-3 Howell).

Response: *The I-205 light rail route would not require truncation of the Airport MAX line at Gateway. The Red Line would continue to operate directly to the Beaverton Transit Center.*

Comment 2.1G: Improve neighborhood bus service to connect neighborhoods to light rail service (2-12 Waldermar; 2-8 Clackamas County Business and Neighborhood Leaders; 1-7 Chung, 2-5 Orton).

Response: *During Preliminary Engineering and Final Design, TriMet will evaluate neighborhood bus service and potentially revise routes or schedules to better connect with I-205 light rail.*

Comment 2.1H: Additional trains entering downtown Portland from the Steel Bridge will severely impact peak hour operations if either the cross-mall or the on-mall alignment is chosen (2-16 Howell).

Response: *Results of modeling of the Rose Quarter/Steel Bridge complex of track crossings and merges shows that trains continue to move through the Rose Quarter with only small travel time increases beyond the opening of the proposed Green Line with the current traffic signal system. Over time, an improvement for Rose Quarter traffic operations would be required to maintain efficient light rail system operation. The improvement may involve as little as a traffic signal system upgrade.*

Comment 2.1I: Do not preclude locating a station at Stark/Washington should such a station become viable. This station could be incorporated into a building, mitigating the grade-separation between the station and the street (6-29 Cooley).

Response: *Although this station is not precluded, a station would be expensive to construct and would be very close to the Main Street Station. The Main Street Station offers more comfortable access for pedestrians across the freeway and into the commercial center at this end of the Gateway District and provides easy transfers with the frequent bus service.*

Comment 2.1H: Will more trains run between Gateway and downtown Portland to accommodate additional riders from the I-205 line (2-32 Dorman).

Response: *The Phase I LPA calls for I-205 LRT to be through-routed to downtown Portland which will result in more frequent service along the existing Banfield line.*

8.2.2.2 Traffic Impacts

Comment 2.2A: Grade-separate crossings of highways on the I-205 light rail alignment (4-57 Kazen).

Response: *The I-205 light rail design calls for grade-separation of all roadway crossings except Flavel Street and the entrance to the Main St Park and Ride. All crossings of streets that could be considered highways are grade-separated.*

Comment 2.2B: The Lents community would like to see the light rail line result in improved traffic conditions in the neighborhood (2-24, 6-27 Peek).

Response: *Chapter 4 of the FEIS documents the mitigated traffic impacts for the Lents area and all parts of the corridor.*

Comment 2.2C: Four story park-and-rides along 92nd Avenue and high density housing will cause increased traffic on 92nd Avenue. The increased traffic on 92nd Avenue will block access to the fire station in Lents (1-41 Aho).
Response: *Based in part, on neighborhood concerns the number of park-and-ride spaces at Powell Boulevard, Holgate Boulevard and Foster Road (all near 92nd Avenue) has been reduced from 960 spaces in the Supplemental Draft Environmental Impact Statement to 516 spaces in this FEIS. Reducing the planned number of spaces at the Holgate and Powell stations and eliminating the park-and-ride at the Lents Station accomplished this change. Section 4.3 of this FEIS discusses traffic impacts and mitigation strategies.*

Comment 2.2D: Increased traffic on 92nd Avenue could prevent Fire Station 11 from optimally serving the neighborhood (2-24, 6-27 Peek).

Response: *The traffic analysis prepared for the South Corridor SDEIS found that with the No-Build Alternative, the intersection at SE 92nd Avenue and SE Foster Road would operate at Level of Service (LOS) F with a maximum queue length of 625 feet. The analysis further found that with I-205 light rail, the intersection would operate in a manner nearly identical to the No-Build Alternative.*

The traffic analysis has shown no appreciable difference in traffic operations on SE 92nd Avenue in this area between the future year No-Build condition and the future year with the I-205 Light Rail Project making it unlikely that increased Project related traffic on SE 92nd Avenue (and queuing back from SE Foster Road) would impact the optimal operation of Fire Station 11.

8.2.2.3 Parking Impacts

Comment 2.3A: Downtown Lents and other areas in Lents near stations could experience on-street parking impacts from informal park-and-riding. Light rail patrons using on-street parking could hamper business in downtown Lents and create parking problems for residents (2-24, 6-27 Peek).

Response: *Section 4.1.4 of this FEIS discusses on-street parking impacts and potential mitigation strategies. The City of Portland has several tools in place to address on-street parking problems if they occur such as placing time limits on parking in front of businesses or instituting a residential parking permit program. Many on-street parking spaces in downtown Lents already have time restrictions (such as 2 hour parking) that would not allow informal park-and-ride use.*

Comment 2.3B: Too many park-and-ride spaces are located at Powell and Holgate. Park-and-ride spaces and the associated impacts should be more evenly distributed along the alignment (2-28 Zoltansky, J; 2-29 Zoltansky, P).

Response: *The number of park-and-ride spaces at the Powell and Holgate stations has been reduced from 800 to 516. The new total of 516 park-and-ride spaces is about one-quarter of the total park-and-ride spaces on the alignment at these two stations (out of eight). Some of the park-and-ride spaces eliminated from the Powell and Holgate park-and-rides were redistributed to the Main Street Park-and-Ride.*

Comment 2.3C: Construct a long-term, paid parking structure at the Clackamas Town Center (3-21 Kinser).

Response: *The proposed plan includes a 500-space park-and-ride garage at Clackamas Town Center for daily transit riders. TriMet does not provide long-term parking in order to make the highest possible number of spaces available during the morning commute when demand is highest.*

Comment 2.3D: Ensure safety and security at park-and-ride lots and light rail stations including security cameras and increased patrols by TriMet police (4-45 Kimura; 3-6 Simpson; 6-32 Bradley; 2-24, 6-27 Peek; 6-30 Cooley; 6-92 Taylor, 2-12 Waldemar).

Response: *TriMet will continue to evaluate safety and security measures at park-and-rides and stations along I-205 light rail. Security cameras and patrols will be used as appropriate to ensure a secure environment for TriMet passengers.*

Comment 2.3E: Build park-and-ride structures to be as unobtrusive as possible (2-12 Waldemar).

Response: *The only park-and-ride structure planned for the I-205 Light Rail Project is at the Clackamas Town Center. The park and ride structure is in keeping with the Clackamas Regional Center Plan and will be subject to design review by Clackamas County.*

Comment 2.3F: Prevent parking in neighborhoods by implementing fines that are high enough to discourage people for using neighborhood streets as a park-and-ride (2-12 Waldermar).

Response: *Parking on streets without meters, signed limits or a neighborhood permit program is not illegal, so fines cannot be levied in those areas.*

Comment 2.3G: TriMet should own and operate secure parking decks and bicycle storage facilities at stations near Powell, Foster, Sunnyside, 212 and Highway 213 (6-49 Seagraves).

Response: *The I-205/Portland Mall Light Rail Project will include bicycle storage at every station. Park-and-rides are planned for stations at Main Street, Powell Boulevard, Holgate Boulevard, Fuller Road and the Clackamas Town Center. A park-and-ride is not planned for Foster Road due to the lack of a suitable location. The alignment terminates just north of Sunnyside Road, so no facilities are planned south of the Clackamas Town Center.*

Comment 2.3H: Build enough park-and-ride capacity to meet demand (6-73 Warnila).

Response: *The South Corridor Project as described in Chapter 2 of this FEIS includes 2,052 park-and-ride spaces. The 2025 ridership analysis prepared for this FEIS, forecast demand for approximately 2,000 park-and-ride spaces in the corridor adjacent to I-205. The Federal Transit*

Administration will not fund project elements that provide for more capacity than is required within the forecast year of the analysis (in this case 2025). Surface park-and-ride lots could be converted to parking structures if needed for future park-and-ride capacity.

8.2.3 Environmental Consequences

8.2.3.1 Visual Impacts

Comment 3.1A: Light rail should be constructed in a way that will protect the privacy of people whose homes will be visible from trains. Use landscaping to protect the privacy of residents (2-12 Waldermar; 2-27 Welch; 2-24, 6-27 Peek).

Response: *In some areas, sound walls, which will also provide screening, will be constructed between homes and light rail. In areas without sound walls, appropriate fencing or plantings to provide effective visual screening where needed would be determined during Final Design.*

8.2.3.2 Noise and Vibration Impacts

Comment 3.2A: Noise and vibration impacts should be mitigated (2-12 Waldermar; 2-27 Welch; 6-27 Opportunity Gateway; 2-24, 6-27 Peek, 2-4 Martinez, 2-4 Taylor, 2-4 Turner, 2-6 Hites).

Response: *The Project is expected to have 74 noise and 11 vibration impacts. Forty-one of the noise impacts and all of the vibration impacts are expected to be fully mitigated. The only severe noise impact will be mitigated. Sound walls will be constructed adjacent to many of the locations of unmitigated noise impacts but, due to the high levels of existing freeway noise, the impacts cannot be completely mitigated by the construction of noise walls adjacent to light rail. Noise and vibration impacts and mitigation are detailed in Section 3.5.*

8.2.3.3 Displacements and Neighborhood Impacts

Comment 3.3A: Displaced residents should be treated fairly and "made whole" (2-6, 2-24, 6-27 Peek; 2-4 Turner; 2-4 Taylor; 2-4 Martinez; 2-6 Hites; 2-12 Waldermar; 2-27 Welch; 6-10 Wentworth).

Response: *All property acquisitions and relocations will be conducted in accordance with state and federal laws (Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (42 USC 4601) and associated regulations contained in 40 CFR part 24).*

Comment 3.3B: Where possible, houses should be displaced rather than businesses (4-57 Kazen).

Response: *Every effort has been made to avoid displacements to both homes and businesses. The I-205/Portland Mall Light Rail Project will result in the displacement of three businesses, one institution and 34 homes.*

Comment 3.3C: Locate a parking structure in downtown Lents that can be designed to serve light rail as well as the community's objectives for revitalization (meaning more jobs and investment) of downtown Lents (2-24 Peek).

Response: *After extensive discussion with community members, the I-205 Steering Committee determined that a park-and-ride should not be constructed in downtown Lents. An appropriate site was not identified for a surface parking lot.*

Comment 3.3D: If light rail is to be built on the west side of I-205 near the intersection of SE 92nd Avenue and SE Crystal Springs Road, it should be elevated south of SE Crystal Springs Boulevard to lessen disruption to the neighborhood (1-10 White).

Response: *The I-205/Portland Mall Project includes a grade-separation of SE 92nd Avenue and SE Crystal Springs Boulevard and then returns to grade south of Crystal Springs Boulevard.*

Comment 3.3E: The issues raised by the Lents community deserve the full attention of the Project and the region. The Project should work to address these issues as it moves forward (6-10 Wentworth).

Response: *The Project has engaged in sustained discussions with the Lents community about the design of light rail facilities to support community goals as well as avoidance and mitigation of impacts. The Project will continue to work with the Lents community to address concerns. Prior to the publication of the SDEIS, Metro Councilor Brian Newman, City of Portland Commissioner Jim Francesconi and TriMet General Manager Fred Hansen responded to a letter from the Outer Southeast Portland Light Rail Coalition addressing many of concerns and assuring the community of a continued commitment by the Project to work collaboratively with communities along I-205 on issues raised.*

Comment 3.3F: Platforms on the I-205 light rail alignment should be located strategically with a community and pedestrian orientation and not focus only on car and bus transfers. It is important that the best sites for infill development are not dedicated for park-and-ride lots and garages. For stations outside the centers, station community planning needs to occur during the next phase of development (6-11 Dotterrer).

Response: *Elements of the Project such as placement of platforms have been planned to provide a good balance of access for different modes and allow for future development to take advantage of the new access provided by the Project. For example, the Lents station is located on a pedestrian-friendly street in the heart of the Town Center, without a park-and-ride.*

8.2.3.4 Safety Impacts

Comment 3.4A: Light rail promotes crime at light rail stations and park-and-rides, on trains and in surrounding neighborhoods (1-10 Aho).

Response: *It has been suggested that transit, especially light rail, can increase crime in neighborhoods or that it provides a way for criminals to travel from one area to another. Portland, Gresham, Hillsboro and Beaverton, having many years of experience with the operation of MAX, have not found this to be true. Transit does not cause crime, but crimes do occur in public spaces where people gather for many purposes. Light rail stations are located to serve the most riders so they are located near activity centers, employment centers or neighborhoods with convenient pedestrian access. Stations will be designed to discourage criminal activity by providing an environment that is open and highly visible for surveillance, is well lighted, reduces opportunities*

for vandalism and, where possible, has more than one access point. These design principles make stations less opportune places for criminal activities to occur

Comment 3.4B: Concern about safety including concerns about crime and security at MAX stations and about protecting pedestrians and bicyclists near the line (2-24, 6-27 Peek).

Response: *TriMet is constantly working to find new tools to better address safety and security concerns. The I-205 segment will include grade-separated crossings of all roadways, except Flavel Street and the entrance to the Main St Park-and-Ride. The crossing of the Springwater Corridor Trail will also be grade-separated. In many cases, pedestrian and bike safety in the I-205 segment will be improved by installation of new traffic signals or grade-separated crossings for the I-205 multi-use path. The Portland Mall segment will provide a new auto lane along 5th and 6th avenues that will be shared with bicyclists, providing a new route in downtown Portland. The new lane will be separated from buses and light rail with a "rumble strip."*

TriMet will consider installing security cameras at new MAX stations and park-and-rides and would ensure that transit police or a private security contractor regularly patrols all facilities.

Comment 3.4C: Concerns from the Lents neighborhood about safety should be addressed (2-27 Welch).

Response: *The Project has engaged in an on-going process to address safety concerns raised by communities affected by the Project. Specific safety and security concerns raised by the Lents neighborhood are addressed in Section 3.11 of this FEIS.*

Comment 3.4D: Build a fence between freeway shoulder and adjacent bike paths and neighborhoods (2-12 Waldermar).

Response: *Fences will be constructed between the bike path and light rail tracks except at stations. Fence sections between neighborhoods and the bike path or between light rail and the freeway will be replaced if they are disrupted during construction. In addition, generally a barrier (fence or concrete) will be constructed between the freeway and the light rail alignment.*

Comment 3.4E: Construct a neighborhood-friendly fence between the bike path and homes (2-12 Waldermar).

Response: *Expenses not directly related to construction of light rail and related facilities or mitigation of project impacts would not be eligible for Project funding. ODOT, the agency that owns and operates the I-205 multi-use path, would be responsible for any fencing between homes and the path.*

Comment 3.4F: Install a lighting system along bike paths that run parallel to light rail (2-12 Waldermar).

Response: *TriMet will make improvements to the multi-use path in areas where the light rail alignment or facilities affect the path. These improvements to be determined through conversations with ODOT during final design could include additional lighting. In areas where the path is not affected by light rail, the Project will not change the multiuse path.*

Comment 3.4G: Install "more than adequate" lighting at stations and park-and-ride lots (2-12 Waldermar).

Response: *Lighting at stations and park-and-rides is designed to create a safe environment without disturbing nearby residents. During Final Design, TriMet will work with neighbors to design appropriate lighting.*

Comment 3.4H: Agencies involved in the designs need to pay particular attention to safety matters such as at-grade crossings for light rail, safe pedestrian and bicycle access and properly designed park-and-ride lots (6-5 Clackamas County Traffic Safety Commission).

Response: *The Project will take steps to ensure safe at-grade crossings for light rail and pedestrian and bike access as well as develop well-designed park-and-ride lots. The I-205 route has only two at-grade crossings, reducing the risk of conflicts. At the Flavel Station the platform has been extended to prevent conflicts that could be caused by train over-runs. Crime prevention specialists and representatives of police agencies will be engaged in designing park-and-rides.*

8.2.3.5 Park Impacts

Comment 3.5A: The crossing of the Springwater Corridor Trail by I-205 light rail should be grade-separated (2-6 Everhart; 6-10 Wentworth; 4-47 Walker).

Response: *A grade-separated crossing of the Springwater Corridor Trail is planned.*

8.2.3.6 Wetlands and Ecosystems Impacts

Comment 3.6A: The City of Portland's Bureau of Environmental Services would prefer that the Flavel Station is relocated to a site outside of the floodplain (6-18 Marriot; 6-10 Wentworth).

Response: *The Flavel Station would be located outside of the floodplain, south of SE Flavel Street, in response to this request from the City of Portland.*

Comment 3.6B: The City of Portland's Bureau of Environmental Services requests that the crossing of Johnson Creek and associated riparian areas be designed to minimize encroachment and disturbance to natural areas (6-18 Marriot).

Response: *The crossing of Johnson Creek has been designed to minimize impacts to creek and riparian areas. This design assumes a pre-cast bridge with no piers located in the creek to avoid and minimize impacts. Resources agencies and TriMet have agreed upon conditions for construction activities. Additional information can be found in the South Corridor Biological Assessment (Metro: May 2004).*

Comment 3.6C: The City of Portland's Bureau of Environmental Services believes the estimated amount of flood plain fill listed in the SDEIS on pages S-20 and 3-148 is too low (6-18 Marriot).

Response: *The amount of fill within the 100-year floodplain has been re-calculated based on revised designs and better survey data and has been adjusted from 200 cubic yards to 411 cubic*

yards. The fill will be mitigated by water quality swales that will remove more than 411 yards from the floodplain.

Comment 3.6D: The City of Portland's Bureau of Environmental Services believes that the explanation of impacts to soils and vegetation beginning on page 3-135 does not adequately reflect construction impacts (6-18 Marriot).

Response: *Soils and vegetation will be impacted in the area of Johnson Creek during construction and TriMet intends to use a series of "best management practices" to minimize and address impacts during construction. Potential impacts are described in greater detail in the South Corridor Biological Assessment.*

8.2.3.7 Energy and Air Quality Impacts

Comment 3.7A: Light rail options offer the greatest air quality and environmental benefits (4-46 Nordberg).

Response: *Comment noted.*

Comment 3.7B: Light rail will not improve air quality (1-7 Flynn).

Response: *As noted in section 3.4 of this FEIS, air quality as measured by VOC (volatile organic compounds), CO (carbon monoxide) and NO_x (nitrogen oxides) would be reduced with the I-205/ Portland Mall Project when compared to the No-Build Alternative.*

Comment 3.7C: Traffic delay savings attributed to I-205 light rail is not realistic. In any case, there are a lot of ways to reduce congestion and air pollution by more than 2 percent (in the case of congestion) and more than .03 percent (in the case of air pollution) that don't cost $500 million (1-14 Stearns).

Response: *The traffic analysis of the I-205 corridor is presented in Chapter 4 of this FEIS. The methods used to project ridership and traffic impacts have been approved by the Federal Transit Administration and the Federal Highway Administration and are considered to be professionally sound and realistic. The I-205/Portland Mall Light Rail Project has many other goals and objectives than improving air quality and congestion compared to the No-Build Alternative. Chapter 1 of this FEIS presents the Purpose and Need for the Project and lists the many goals light rail is designed to address. Attributing the entire cost of the Project to the pursuit of two narrow goals is not an accurate portrayal of the Project's benefits.*

8.2.3.8 Other

Comment 3.8A: Consider adding restrooms at stations (6-29 Opportunity Gateway PAC).

Response: *TriMet does not provide public restrooms anywhere within the district including at transit stations because of security and maintenance cost issues.*

Comment 3.8B: Provide lifetime light rail passes for residents who are severely impacted by light rail (2-12 Waldermar).

***Response**: The federal process requires mitigation of project impacts. These strategies that directly address impacts, such as noise, vibration and property impacts, are considered better mitigation than free transit passes.*

Comment 3.8C: Complete a thorough analysis of TOD potential at all stations (3-19 Goff).

***Response:** An analysis of development potential of each station included as part of the I-205/ Portland Mall Project will be conducted during TriMet's preliminary engineering effort.*

8.2.4 Financial Analysis and Evaluation

8.2.4.1 Cost

Comment 4.1A: Capital costs will be as high, or higher than the Milwaukie Corridor. Costs of additional trains and downtown construction to meet 2020 ridership projections were not included in initial cost estimates (2-16 Howell).

***Response:** As reported in SDEIS, the capital cost of the Milwaukie and I-205 light rail projects were documented as $517.97 million and $514.89 million for the fixed guideway and bus rapid transit elements in a year of expenditure cost. These capital costs included the trains necessary to operate in the year 2020.*

Comment 4.1B: Projected operating costs are 60% higher than costs projected for the Milwaukie Corridor (2-16 Howell).

***Response:** The 2020 annual operating cost documented in the SDEIS for the Milwaukie and I-205 light rail alternatives are $69.90 and $73.34 million, respectively. The annual operating cost for the Milwaukie Light Rail Alternative is approximately 6 percent lower than the I-205 Light Rail Alternative as shown in Table 5.1-2 of the South Corridor SDEIS.*

Comment 4.1C: The cost per ride for I-205 light rail is high and a Bus Rapid Transit alternative could have a lower cost per ride. The percentage reduction in vehicle miles traveled, traffic delay, and air pollution are so tiny they are less than the margin of error. (1-14 Stearns)

***Response:** In the SDEIS, Table 5.2-17 Cost-Effectiveness Measures by Alternative, shows an incremental cost per new originating ride of $9.50 for the I-205 light rail compared with $10.21 for the BRT Alternative. The SDEIS did not include a BRT alternative along I-205 based on the difficulty of designing an I-205 BRT concept that could operate effectively. Some of the limitations with I-205 BRT service include:*

- *Operations on the freeway would be subject to traffic congestion and station access and egress would be difficult;*
- *Design concepts that would separate BRT buses from general purpose traffic would require an additional traffic lane or significant transit-specific construction;*
- *A BRT operation on I-205 would require either a transfer to the existing Blue Line light rail at Gateway or would require that the I-205 BRT buses travel west on I-84 into central Portland.*

Due to these cost and operational limitations the South Corridor SDEIS did not include an I-205 BRT alternative.

It is correct to point out that the percentage reduction in vehicle miles traveled, traffic delay, and air pollution are quite small compared with the regional transportation system as a whole. The same would be true with any corridor-specific project, whether highway or transit. The purpose of the analysis in the SDEIS is to compare among the alternatives. That comparison shows that the alternatives that attract the highest transit ridership (I-205 light rail and Combined light rail) result in corresponding reductions in auto trip-making. At a system level, with a similar amount of overall trip-making, a small reduction in auto trip-making would result in slight reductions of air pollution emissions, vehicle miles traveled and total system traffic delay.

8.2.4.2 Revenues

Comment 4.2A: A bond election should be held to fund Milwaukie light rail, I-205 light rail and a downtown subway (1-6 Wyse, 1-6 Jawarsky).

Response: *The local share of the funding for I-205/Portland Mal Light Rail Project will come from existing regional, TriMet, ODOT, City of Portland and Clackamas County resources. Voter approved financing, such as general obligation bonds, may be necessary to construct Milwaukie light rail. A subway is not planned at this time.*

Comment 4.2B: A realistic funding plan for the South Corridor Light Rail Project has not been presented (1-8 Charles).

Response: *A funding plan for the I-205/Portland Mall Light Rail Project is provided in section 6.1 of this FEIS and includes sources of local matching funds as well as federal New Starts funding requirements.*

Comment 4.2C: Concerned that Lents urban renewal funds will be used for light rail construction (2-24, 6-27 Peek; 2-6 Hites).

Response: *The funding plan provided in section 6.1 of this FEIS assumes a contribution from the City of Portland and the Portland Development Commission. Potential funding sources identified by the Portland Development Commission include the South Park Blocks, Downtown Waterfront, River District, Lents Town Center and Gateway Regional Center Urban Renewal Areas.*

Comment 4.2D: Gateway urban renewal funds cannot be counted on to support the light rail project at this time. Any TIF contributions to the light rail project should be exchanged with PDC for an equal amount of funds, property or other items of value that promote Gateway's urban renewal goals (6-30 Cooley).

A concrete local funding mechanism needs to be part of this proposal. Addressing this issue later is not acceptable. Immediate urban renewal dollars need to be spent on visible projects in Gateway to benefit members of the community. The diverting of urban renewal dollars anytime soon to fund an I-205 alignment is unacceptable (4-45 Kimura).

Response: *The funding plan provided in section 6.1 of this FEIS assumes a contribution from the City of Portland and the Portland Development Commission. Potential funding sources identified by the Portland Development Commission include the South Park Blocks, Downtown Waterfront, River District, Lents Town Center and Gateway Regional Center Urban Renewal Areas.*

Comment 4.2E: Riders should pay more of the cost of I-205 light rail. Light rail should be financed with user fees (3-6 Toler, 1-3 Parker).

Response: *No publicly built and operated transit system in the country depends solely on farebox revenue to cover operating costs. When compared to other transit systems in the country, TriMet MAX has a lower than average cost per ride and maintains cost-effective operations.*

Comment 4.2F: Why can't money used for transit be spent on schools (3-22 Vargas)?

Response: *Money allocated by Congress through the Federal Transit Administration for transit must, by law, be spent for specific transit-related purposes. Similarly, education funding is dedicated to a specific purpose and cannot be used for transit.*

Comment 4.2G: Who will pay for light rail improvements and will the funding require voter approval (3-34 Buscho)?

Response: *The funding plan for the I-205/Portland Mall Light Rail Project is provided in section 6.1 of this FEIS. The funding plan calls for the use of existing revenue sources from Metro, TriMet, ODOT, the City of Portland and Clackamas County to fund the local share of light rail construction.*

Comment 4.2H: The plan lacks the public support needed to help finance the Project. The initial assumption was that the proposed alignment could be built without going to the voters for funds. This assumption is no longer valid (2-16 Howell).

Response: *The funding plan for the I-205/Portland Mall Light Rail Project is provided in section 6.1 of this FEIS. The funding plan calls for the use of existing revenues to fund the local share of light rail construction. However, it is anticipated that a funding vote would be required for the Milwaukie Light Rail Project.*

8.2.4.3 Ridership

Comment 4.3A: There is not enough density in Clackamas County to support transit despite ridership calculations (1-8 Charles).

Response: *The highest ridership bus line in the TriMet system is the Line 72, which serves 82nd Avenue, partially in Clackamas County and roughly parallel to the I-205 alignment. The Region 2040 Plan calls for the region to grow around a series of high-density mixed-use centers that are connected with high capacity transit such as light rail. The I-205 line would connect Downtown with the Gateway Regional Center and end at the Clackamas Regional Center, passing through the Lents Town Center. The 2025 ridership forecasts take into account growth in the regional and town centers and also reflect transit supportive policies in place in the centers. Another important factor for Clackamas County ridership is the future urbanization of the Damascus area and the effect of new jobs and housing on the transportation system.*

Comment 4.3B: I-205 ridership numbers are estimated to be too high given some of the assumptions used in the modeling (1-8, 2-16 Howell).

Response: *The travel demand forecasting model is based on future year (2025) land use allocations in keeping with the Region 2040 Plan and with the transportation networks identified in the Regional Transportation Plan. Given these assumptions and the unique way that the I-205 line acts a both a crosstown and radial transit line facilitating many different types of transit trips, the ridership estimates are reasonable. After a rigorous review, the FTA has approved Metro's travel demand forecasting methods.*

Comment 4.3C: Ridership estimates are not viable unless bus service in the corridor is disrupted (1-7 Flynn).

Response: *Because the I-205 light rail line is new service (it is not replacing an existing bus route), it layers on top of existing routes and provides higher quality service and more transit options than are available today. The ridership estimates are based on how the entire transportation network of roads, highways and transit buses and trains function. Future year assumptions regarding the transit network do not significantly change bus service.*

Comment 4.3D: The I-205 light rail proposal encourages auto dependence (ridership will rely primarily on vehicle access rather than by bus, bike and walking) (2-16 Howell).

Response: *As described in Table 4.2-9, only 15 percent of trips on light rail are expected to access light rail via park-and-ride. The remaining 85 percent of trips are projected to access light rail via walking(45 percent) or bus transfers (40 percent).*

8.2.5 Other

8.2.5.1 General Support for Light Rail

Comment 5.1A Support development of light rail in the region (2-4 Gethoefer; 3-6 Simpson; 3-14 Kirk; 4-41 Jette; 4-54 Berkowitz; 4-55 Pennington).

Response: *Consistent with this comment, the LPA calls for construction of two new light rail routes to serve the southeastern portion of the region.*

8.2.5.2 General Opposition to Light Rail

Comment 5.2A: Generally opposed to light rail development in the region. It is expensive, inflexible and not well utilized (1-8 Charles; 1-8 Holenstein; 1-8 Schoop; 3-18 Wax; 4-9 Rodeman; 6-65 Fagereng).

Response: *The Portland region has chosen to use light rail as the preferred high capacity transit mode to connect the central city with regional centers and town centers. In the Portland region, 44 miles of light rail has been constructed in the Banfield Corridor (East), Westside Corridor, Airport Corridor, and Interstate (North) Corridor. The two-phased South Corridor Light Rail Project would add an additional 14 miles to the system. As to the cost of light rail, the Federal Transit*

Administration and the Federal Highway Administration have approved the Project's methods for estimating capital and operating costs. The cost of light rail is reasonable when compared with the environmental costs of either doing nothing (the No-Build Alternative), or the costs of building new roads and highways to provide capacity.

Comment 5.2B: Opposed to construction of I-205 light rail (1-10 White, 1-10 Aho).

Response: *The LPA calls for I-205 light rail to be constructed as the first project phase because I-205 light rail would have the highest transit ridership, save transit travel time compared to the no-build, support the 2040 growth concept, provide opportunities for transit-oriented development, utilize transit right-of-way established with the construction of the I-205 freeway and provide additional regional transit connections (LPA Report, Metro: April 2003).*

Comment 5.2C: Light rail should not be constructed because it can be disrupted by terrorism or a natural disaster. Buses are more flexible and could be re-routed in these cases (6-70 Lund).

Response: *Any transportation facility could be disrupted by natural disasters or terrorist attacks. In the 1989 San Francisco earthquake, BART rail tunnels were undamaged and provided relief for commuters displaced by collapsed bridges and inoperative roadways. TriMet designs all rail facilities to meet current seismic standards as well as federal homeland security protocols and has response plans for natural disasters or terrorist actions.*

8.2.5.3 Community Participation

Comment 5.3A: TriMet and Metro staff need to make sure that those who will most affected by the possible light rail line are contacted and truly understand what the effects of light rail will be (2-24 Peek).

Response: *As described in Appendix A of this FEIS, Project public involvement staff provided a range of opportunities for involvement. During the preparation of the SDEIS, ASDEIS and FEIS, broad canvassing of homes and businesses most affected by light rail lines was employed to ensure that the residents and business owners nearest the route are aware of plans and have opportunities to participate.*

Comment 5.3B: The Project should have meetings with the business community to show them how the proposed light system can provide opportunities (3-34 Stewart).

Response: *As described in Appendix A of this FEIS, Project staff met with business and civic groups regularly to discuss the benefits, as well as the impacts, of light rail.*

Comment 5.3C: Requests that the comment period be extended by at least 30 days to allow more time to reach neighbors (1-10 White).

Response: *The comment period for the SDEIS was 55 days, 10 days longer than required, and was not extended based on this request.*

8.3 Responses to Comments on the ASDEIS

8.3.1 Relationship to South Corridor Supplemental Draft Environmental Impact Statement (SDEIS)

The Downtown Portland Amendment to the South Corridor Supplemental Draft Environmental Impact Statement (ASDEIS) was published in October 2003. A 45-day public comment period followed publication. The LPA for the South Corridor Project was affirmed by the Metro Council in January 2004. The ASDEIS was prepared after adoption of a preliminary LPA for downtown Portland. The preliminary LPA called for light rail to be constructed on the transit mall. Though the South Corridor SDEIS had not considered light rail on the transit mall, it had been studied in the South/North Draft Environmental Impact Statement.

The ASDEIS considered a no-build option, which would result in continued use of the cross-mall alignment in downtown Portland for I-205 light rail, an alignment on the Portland Mall with a terminus at Portland State University and an alignment on the Portland Mall with a terminus at Main Street. The ASDEIS assumed station spacing of about four blocks and evaluated three options for platform locations.

Note regarding comments on Portland Mall design issues: These comments address specific design details that are documented in the *Portland Mall Final Conceptual Design Report* (CDR) and which are not directly included in either the *SDEIS* or *Downtown Amendment to the SDEIS*. The *ASDEIS* addressed issues related to mode, alignment, terminus and station locations for the Downtown Segment. The *CDR* formed the basis for recommendations made by the Mayor's Steering Committee on Portland Mall Revitalization and the Portland Mall Citizen's Advisory Committee as to platform configuration, auto access, urban design concept, mall maintenance plan and revitalization strategies. These recommendations were adopted by the Portland City Council, TriMet Board, Joint Policy Advisory Committee on Transportation and Metro Council and form the basis for the Preliminary Engineering design of the Downtown Segment on the Portland Mall.

8.3.2 Alternatives Considered

This section summarizes the comments and responses relating to alternatives considered in the South Corridor SDEIS.

8.3.2.1 Support for the LPA

Comment 2.1A: Support light rail on the Portland Mall (2-3 Lewis, 2-4 Bartles, 2-4 Lewellan, 2-4 Ingvaldsen, 3-13 Albright, 4-63 Petrusich, 5-4 Hamm, 5-7 Brown, 5-7 Perry, 5-8 Levine, 5-13 Tarvin, 5-13 Baker, 3-30 Leclerc).

Response: *This comment is reflected in the Phase I LPA.*

Comment 2.1B: Support light rail on the Portland Mall with a terminus at Portland State University (2-4 Richardson, 2-5 Jubinville, 2-5 Powell, 2-5 White, 2-5 Groscup, 2-6 Risher, 3-11 Cone, 3-26 Campos, 3-32 Kalin, 3-42 Farrelly, 3-44 Lindahl, 3-46 Riesmeyer, 3-52 Clark, 3-54 Carey, 3-56 Manson, 3-60 Williams, 4-27 Peden, 4-28 Bartlett, 4-58 Stadry, 5-4 Battan, 5-25 Jimenez)

Response: *Comment noted. This comment is reflected in the Phase I LPA.*

8.3.2.2 Other Light Rail Corridors

Comment 2.2A: Prefer a subway.

The range of alternatives is inadequate because a subway in downtown Portland was not considered (2-4, 5-12 Parker, 2-5 Howell, 2-6 Buel, 2-8 Porter, 2-34 AORTA, 3-40 McFarling, 4-21 Saul, 4-60 Emlaw, 5-7 Winslow, 5-14 Poling, 5-28 Achenbach, 3-7 Smith).
Prefers subway in downtown Portland because a light rail on the mall will compromise urban design. Streetcar should operate on the surface (2-4 Smith, 5-17 Kahn).

Prefers a subway option that begins east of the Willamette River (2-6 Polani, 2-6 McEchron, 4-7 Peters).

Light rail on the mall should be grade-separated (2-4 McHuff, 3-65 Zawacki, 5-17 Gorman, 5-30 West).

Response: *Numerous studies have been conducted over the past twenty years that have evaluated various subway options and each time the studies concluded that, while subway could be a viable long-range option, light rail on surface alignments through downtown is preferred. A subway is superior to on-street light rail for speed, capacity and reliability at very high service levels. However, the cost of building a subway in downtown was estimated by TriMet to be roughly $1.3-1.6 billion in current dollars, which would be prohibitively expensive. Given the cost and lack of need for such a facility at 2025 ridership levels, a subway was not reconsidered for the downtown segment of the Project.*

Comment 2.2B: There is currently not enough capacity on the bus mall and adding light rail will make it worse. Light rail should be located in a separate right-of-way (3-36 VanWarmes).

If light rail is constructed on the mall, consider eliminating the bus mall altogether and building three transit centers in downtown Portland (PSU, Union Station and Stadium). Buses could circulate through downtown and serve the new transit centers (3-28 Bunnell).

Response: *An analysis of light rail capacity on the existing Cross-Mall alignment (Downtown Light Rail Capacity Analysis, TriMet and Metro 2002) found that the Cross-Mall alignment would begin to see degradation in reliability, speed and capacity as the line began to reach capacity some time after 2020. This was the main impetus for adding a new light rail alignment in Downtown – to relieve congestion on the rail system, and serve key destinations directly, like Portland State University and Union Station. Grade-separation either above or below grade has been evaluated many times and each time found to be too costly, not necessary from a capacity standpoint, and in conflict with downtown urban design goals. The bus mall is currently operating with approximately 140 buses in the peak direction during the peak hour, down from about 195 buses per hour in the early 1990's. The adopted design provides adequate capacity for long-term light rail operations and for buses on the Mall.*

Eliminating buses on the Portland Mall was considered and dropped from study because of the higher capital and operating costs associated with providing enough light rail capacity to accommodate the number of passengers that would be forced to transfer from a bus to light rail.

Comment 2.2C: Consider separating light rail from bus traffic on the mall by providing for bi-directional light rail traffic on 5th Avenue and bi-directional bus traffic on 6th Avenue (4-21 Saul, 4-58 Stadry, 5-25 Jimenez).

Response: *The Downtown traffic signal progression is dependant upon a one-way street grid. Two-way operations would cause significant delay and enormous traffic impacts. Congestion, delay and air quality impacts would be unacceptable.*

Comment 2.2D: The range of alternatives is inadequate because it only examines options for placing bus, light rail and automobile traffic on 5th and 6th avenues. Other options such as placing light rail on different streets or removing buses from the mall and relocating them to other streets should be considered (5-10 Blischke).

Other revitalization options for the Portland Mall were not seriously considered. Light rail on the mall has been the only option considered since 1993 (2-34 AORTA).

Response: *In the City of Portland's Central City Transportation Plan, 5th and 6th avenues are designated transit streets while Broadway and 4th avenues are designated as major auto traffic streets. These streets parallel the downtown retail and office core that has the highest density development in the region. This policy was first established in the 1972 Downtown Plan and has been reinforced by three decades of public and private investment and numerous studies. A small number of buses will be moved to other transit-designated streets in the downtown that now use the Portland Mall in order to optimize operations on the Portland Mall and to improve transit coverage in downtown Portland.*

Comment 2.2E: Consider an alternative where buses are removed from mall from NW Irving to SW Jackson streets on both 5th and 6th avenues. The North Terminal and an area south/adjacent to PSU could be reconfigured to create transit centers. Light rail could operate between these transit centers (5-22 Moore).

Response: *With the addition of light rail to the Portland Mall, a small number of buses would be removed from the Portland Mall and redeployed on other downtown transit streets to improve coverage within the downtown street grid. Requiring bus riders to transfer to light rail at the downtown end of their trip for a short ride to their destination would add an undue amount of delay and would adversely affect travel time and ridership.*

Comment 2.2F: A light rail route that circumvents downtown Portland should be constructed (2-6 Welch, 3-28 Bunnell).

Response: *As part of the South/North Transit Corridor Study, an "eastside connector" alignment was analyzed that would have stayed on the east side of the Willamette River and bypass downtown. Roughly 10 percent of the travel demand was estimated to be for through-trips to north Portland or Vancouver, with the remaining 90 percent having a destination in downtown or on the west side of the river. Requiring 90 percent of passengers to transfer at the peak load point to access downtown would add a transfer that would reduce ridership. Peak period service is the most expensive to*

provide, making the short distance trips into downtown particularly costly. Similarly, additional MAX trains would need to be added at the Rose Quarter to accommodate demand for downtown trips.

Comment 2.2G: Light rail should be constructed on Broadway and SW 4th Avenue (3-6 Hansen, 4-65 Taylor).

Response: *The alignment for light rail in downtown Portland has been the subject of discussion since the planning of the Banfield Light Rail route in 1979. North-south alignments were considered on most downtown avenues. In 1993, the Downtown Rail Advisory Committee examined numerous surface and subway alignments within downtown Portland and determined that 5th and 6th avenues should remain transit streets and Broadway and 4th avenues should remain major traffic streets. A surface route on SW 5th and 6th avenues was reconfirmed as the preferred alignment. It is consistent with plans adopted by the City of Portland, Metro and TriMet including the Downtown Plan (1972) and the Central City Plan (1988).*

Comment 2.2H: Reconsider design of alignment coming off the Glisan Street ramp from the Steel Bridge. The current design reduces the size of otherwise more developable parcels and creating more of a barrier between the blocks to the south of the railroad tracks and the redevelopment of the Yards at Union Station (5-23 Grund).

Response: *Many options were considered, including an alignment on Glisan itself, which would have impacted historic buildings and created more of a barrier between the two sides of Glisan. The current design minimizes impacts to existing land and stays as close to the existing heavy rail tracks as possible. No pedestrian or other access is currently allowed across the heavy rail tracks except over the pedestrian bridge to the south of Union Station, so the light rail tracks do not create any additional barrier.*

8.3.2.3 Stations

Comment 2.3A: A station with a left side platform should not be located in front of the Ambassador Condominiums, SW 6th Avenue and SW Madison Street because it would restrict truck traffic and auto drop-offs as well as damage existing trees. A right side or island platform would be acceptable (2-3 Courtney, J; 2-3 Courtney, P, 4-29 Bartlett, 2-6 Bartlett, Molly, 4-50 Bartlett, Mary, 4-60 Emlaw).

Relocate the station in front of the University Club between SW Jefferson and Madison streets one block south to a location between SW Columbia and Jefferson streets. If the stop cannot be relocated, an island or right-side station configuration would be preferred (4-54 Russell).

The University Club's truck delivery area must be accommodated or replaced. The only location for service deliveries to the Club is the on-street parking on Sixth Avenue (4-54 Russell).

Response: *A right side platform will be located across SW 6th Avenue from the Ambassador Condominiums and the University Club. On-street parking will be located on the west side of SW 6th Avenue between SW Madison and Jefferson streets to provide access to the Ambassador Condominiums and the University Club. The Heritage Elm will not be impacted.*

Comment 2.3B: Locate a station pair at Flanders and Glisan instead of Hoyt and Glisan (3-34 Lorenz).

Response: *Station locations were designed to minimize distance to Union Station and optimize the distance to the next stations to the south. Moving stations one block south would have increased the distance Union Station while reducing the distance to the next station to only three blocks, which is less than optimal.*

Comment 2.3C: Too many stations located south of Pioneer Square; three stops would be sufficient (3-62 Qureshi).

Response: *The design of the I-205/Portland Mall Project includes three stations south of the Pioneer Square station: City Hall, PSU Urban Center Plaza and Jackson Street (PSU South).*

Comment 2.3D: Add another station pair between Portland State University and City Hall (4-5 Freund).

Response: *The I-205/Portland Mall Project strikes a balance between the speed of through-trips on light rail and access to the light rail system at stations. Adding additional stations would result in slower speeds and overlapping station areas.*

Comment 2.3E: Stations are too close together (4-17 Skoglund, 3-52 Clark).

Response: *The Portland Mall Revitalization Conceptual Design Report explains that station spacing of 800 to 1,000 feet (four to five blocks) balances the need for good transit accessibility and reduced travel times (TriMet, March 2004).*

Comment 2.3F: The proposed station at SE Taylor Street on both 5th and 6th avenues should be moved to be positioned between Morrison and Yamhill streets to make transferring between the mall trains and the cross-mall trains easier (5-15 Winslow, 3-56 Manson).

Response: *This station location has been changed to SW 5th and 6th avenues and SW Yamhill and Morrison streets based on public comment and analysis in the Final Conceptual Design Report. The new location is reflected in the Project's Final Definition of Alternatives Report and Chapter 2 of the FEIS – Alternatives Considered.*

Comment 2.3G: Locate a station closer to Union Station. Consider building a covered walkway from Union Station to MAX (3-56 Manson).

Response: *Stations could not be moved closer to Union Station because stations cannot be placed on tightly curved track due to the large gap that would be created between the door and the platform resulting in safety concerns and impact to accessibility. This precluded moving the stations to the next block north.*

Comment 2.3H: Prefers left side platform (2-5 Carlson, 2-6 Risher, 2-6 Bertelson, 2-6 Klotz, 2-6 Fitzgerald, 2-6 Perry, 3-6 Hansen, 3-13 Albright, 3-24 Bryant, 3-32 Kalin, 3-42 Farrelly, 3-46 Riesmeyer, 3-48 Lopresti, 3-50 Bonner, 3-52 Clark, 3-54 Carey, 3-56 Manson, 3-60 Williams, 3-62

Qureshi, 4-5 Freund, 4-7 Peters, 4-18 Roy, 4-58 Stadry, 5-7 Perry, 5-8 Levine, 5-11 McOmber, 5-17 Galazka, 5-19 Kleffner, 5-25 Jimenez, 5-29 Holtz, 2-3 Lewis)

Response: *After reviewing numerous platform configuration options and hearing extensive public comment, the Mayor's Steering Committee on Portland Mall Revitalization, the Portland City Council, the TriMet Board and the Metro Council selected a right-side station platform configuration to be advanced through Preliminary Engineering. The FEIS analysis of impacts is based on the right-side platform. The right-side platform will keep all passenger operations on the right side of the street, simplifying the system for riders and keeping vehicle operations clear, with all through movements in the middle lane and all stops in the right lane.*

Comment 2.3I: Prefer the right side or island platforms because they provide convenient, legal access of these streets for cyclists (2-10 Liden).

Response: *The Portland Mall design calls for right-side platforms with a through-lane that will be available to both autos and bikes.*

Comment 2.3J: Prefer the right side platforms (5-13 Lande).

Response: *The selected route reflects this preference.*

Comment 2.3K: Prefer island platforms and a continuous auto lane (2-4 Ingvaldsen, 2-5 Powell, 3-28 Bunnell, 3-34 Lorenz, 3-36 VanWormes, 5-11 Hulden).

Response: *The Right-Side Platform Option would allow for a continuous auto lane along the Portland Mall with light rail stops on the right side.*

Comment 2.3L: Opposes island platform option (2-6, 2-27 Risher, 2-6 Cabral, 2-15 Richardson, 4-40 AIA-Urban Design, 5-19 Williams).

Response: *The island platform option was not selected.*

Comment 2.3M: Prefers island platforms for blocks where there is currently auto access (3-30 Leclerc).

Response: *Island platforms were not selected but a through auto lane will be created with the Right-Side Option by placing light rail stations on the right side of 5th and 6th avenues.*

8.3.2.4 Other Modes

Comment 2.4A: Prefers frequent low-floor trolley bus shuttles on the mall (2-6, 3-38 Polani, 2-16 Howell, 3-9 Christ, 4-18 Roy, 4-21 Saul, 4-44 Citizens for Better Transit, 5-17 Kahn)

Prefer mall buses (perhaps battery-powered) (4-9 Green).

Response: *Light rail on the Portland Mall will provide greater capacity per vehicle, lower cost per ride and connect with regional destinations as well as provide local service on the Portland Mall itself. Light rail on the Portland Mall is part of the larger project that includes light rail along I-205.*

Comment 2.4B: Adding streetcar lines east and west from Goose Hollow to connect with 10th and 11th avenues would be better than building light rail on the transit mall (3-58 Penney).

Response: *While such a configuration for the streetcar could be considered in another project, it would not provide any new service to the Portland Mall or the heart of downtown Portland. It would also not provide a routing in downtown for the I-205 alignment and the Yellow Line (Interstate MAX) or satisfy the Project's purpose and need.*

8.3.2.5 General Support for Light Rail

Comment 2.5A: Support rail transit (3-62 Qureshi).

Response: *Comment noted.*

8.3.2.6 Opposed to Light Rail on the Portland Mall

Comment 2.6A: Oppose light rail on the Portland Mall, SW 5th and 6th avenues (4-18 Roy, 5-21 Cook, 5-29 Heydt, 5-31 Soderberg, 4-17 Skoglund).

Response: *In the City of Portland's Central City Transportation Plan, 5th and 6th avenues are designated transit streets while Broadway and Fourth avenues are designated as major auto traffic streets. These streets parallel the downtown retail and office core that has the highest density development and floor area ratios in the region. This policy was first illustrated in the 1972 Downtown Plan and has been reinforced by three decades of public and private investment. Numerous studies have reaffirmed the Portland Mall as the best location for light rail. A small number of buses will be moved to other transit-designated streets in the downtown that now use the Portland Mall in order to optimize operations on the Portland Mall and to improve transit coverage in downtown.*

Comment 2.6B: The current plan to put light rail on SW 5th and 6th avenues is not the best way to the meeting the goals of proving a better north-south link through downtown, providing better bus and light rail transfer ability, providing transit service to Union Station or providing MAX service to PSU (5-4 Laubaugh).

Why is light rail needed on the mall? Excellent bus service already exists on the mall (3-58 Penney, 4-4, 5-5 Freund, 4-17 Skoglund).

Response: *As mentioned in the response to Comment 2.5A above, the Portland Mall on 5th and 6th avenues has been designated as the downtown's most densely developed corridor since 1972. Policy decisions have reinforced that choice. The reasons for putting light rail on the Portland Mall include: 1) continuing a policy of public and private investment that began with the 1972 Downtown Plan; 2) the need to add a second downtown light rail alignment to relieve pressure on the cross-mall alignment and 3) the need to revitalize the Portland Mall after 26 years of continuous use. The addition of light rail to the Portland Mall would allow higher volumes of transit riders to access the heart of downtown than in buses alone with fewer environmental impacts (noise, diesel fumes, etc). The Downtown Light Rail Capacity Analysis (TriMet, Metro: 2003) showed that travel times and*

reliability would continue to degrade if the existing cross-mall alignment was not supplemented with additional capacity.

Comment 2.6C: The current cross-mall alignment could accommodate all projected rail traffic, including trains from the Interstate and I-205 lines, until late in the 20-year planning window. The downtown component of the South Corridor Project does not need to be included in Phase One, but should be addressed and included and in Phase II (4-21 Saul).

Response: *In order to maintain consistent and reliable operations within downtown, the second alignment would be required on opening day for an I-205 line. Although an I-205 line could potentially operate on the existing cross-mall, this would not be sustainable over time without significant impacts to on-time performance and reliability and could require reduced frequencies during the peak while leaving little room for any increases in frequency for any of the lines operating in downtown.*

8.3.3 Transportation Impacts

8.3.3.1 Transit Impacts

Steel Bridge

Comment 3.1A: Improvements should be made to the Steel Bridge to allow trains to cross it faster (2-4 Richardson, 2-4 McHuff).

Response: *There are lift joints on both tracks across the Steel Bridge to span the gap between the lift span in the center of the bridge and the east and west approach ramps. Currently, trains must slow to 5 mph from the 15 mph operating speed elsewhere across the bridge to cross each joint (two per direction). TriMet is investigating ways to achieve a constant 15 mph speed across the bridge.*

Comment 3.1B: The Steel Bridge and numerous track crossings needed to run light rail on the mall will actually limit downtown train capacity. In fact, because of likely delays caused by inbound and outbound trains having to cross paths as they proceed through downtown, fewer Westside trains will be able to operate on Morrison and Yamhill streets during the peak hours (2-34 AORTA).

The Steel Bridge will become a bottleneck creating scheduling problems and service issues when there is a breakdown or closure for maintenance (4-7 Peters, 5-17 Gorman).

Response: *The Downtown Light Rail Capacity Analysis (TriMet and Metro: 2003) identified the Steel Bridge and the downtown signal system as capacity constraints for light rail. The report found that the level of service required to meet demand in 2020 and beyond could be provided with a reasonable level of reliability given these constraints.*

Light Rail Service

Comment 3.1C: The number of stations on the cross-mall alignment should be reduced (2-4 Richardson).

Response: *Changes to the cross-mall alignment are not included in scope of this project.*

Comment 3.1D: Light rail on the Portland Mall will move at walking speed and be jammed on opening day (2-4 Porter).

Response: *Light rail on the Portland Mall will operate with less travel time than the existing alignment on Morrison-Yamhill through downtown due to the station spacing, which allows consistent progression through downtown. The number of trains has been planned to match projected demands for the service, meaning there will be enough space for passengers.*

Comment 3.1E: Both light rail and buses will not fit on the mall (2-4 McHuff).

Response: *Based on months of detailed design and operational analysis, the Portland City Council, TriMet Board and Metro Council found that the Portland Mall could accommodate buses and light rail vehicles as well as autos, bicycles and pedestrians.*

Comment 3.1F: The current downtown light rail alignment would accommodate all of the trains from Gresham, Hillsboro, PIA, Interstate and Clackamas Town Center for at least a decade (2-34 AORTA).

Response: *Without the Portland Mall alignment, train speed and reliability would not meet transit demand through 2025, the last year of the required forecast year.*

Comment 3.1G: Build light rail on the mall and remove buses from the mall. Buses should be the feeder system for light rail (5-13 Baker, 5-28 Kailikea, 5-31 Roberts).

Response: *The combination of light rail and buses provides the highest number of riders access to Downtown, without compromising the service quality of either mode that would occur with transfers required so close to the Downtown core. Some bus routes, especially those that serve close-in Portland neighborhoods are not easily configurable as feeder buses.*

Bus Service

Comment 3.1H: Light rail on the mall will degrade transit service because bus stops will have to eliminated. The distance between bus stops will be doubled (2-34 AORTA, 4-65 Taylor, 5-28 Achenbach).

Concerned about increasing the bus stop spacing to every four blocks (3-10, 4-18 Roy, 5-19 Williams).

Bus operations in downtown would be slowed with light rail given preference in the middle lane (4-18 Roy).

Response: *The recommended Right-Side Option for the Portland Mall will extend the repeating of bus stop groupings from the existing two blocks to an average of three blocks. However, even with longer bus stop dwell times (with fewer stops) and interaction with light rail trains (i.e., buses and trains sharing the middle lane and all buses and trains using the right lane for stops and stations), simulations show higher average bus speeds and reduced bus travel times along both 5th and 6th avenues for the Project compared to the Portland Mall today.*

Comment 3.1I: Concerned about the ability of buses to maneuver around trains on the mall. The visual simulation shows that buses somehow have "rear-wheel steering" making it a poor representation of the real interaction between buses and trains on the mall (4-65 Taylor).

Response: *The Right-Side Platform Option allows vehicles to operate around each other in much the same way that buses maneuver today. More detailed analysis, including field testing with the existing bus fleet, have shown the ability to maneuver at normal bus mall operating speeds without special steering or other equipment. The visual simulation referenced is intended to be illustrative and was not capable of capturing bus maneuvers at the level of detail discussed.*

Comment 3.1J: Concerned about only having a single bus lane on the mall because a stopped bus can be an obstruction to traffic (5-3 Moore).

Response: *With light rail operating on the transit mall, one lane on the south and central parts of the mall would be shared between buses and light rail and one lane would be reserved for buses alone. Buses would be able to route around obstructions much like today, and general-purpose traffic will have its own non-transit lane much like today.*

In the North Mall, buses will share the right lane with light rail trains and with general traffic on the left. Along the Central and South Mall segments, all buses and trains will use the right lane to access stops and stations. Buses and trains will share the middle through lane, which will allow buses and trains stopped for passengers to be passed by transit vehicles moving between stops and stations. A train clearance signal system will maintain separation between buses and trains for overall safe and efficient transit operations along the Portland Mall.

Comment 3.1K: Will current bus routes be moved off the mall with riders being required to transfer to a train (5-9 Bell)?

Response: *TriMet anticipates accommodating most current bus routes on the mall. Those routes that are moved off of the mall will be moved to both north-south and east-west streets. Transferring to a train or to another bus will be an option for those riders with destinations along the Portland Mall who do not wish to walk.*

Streetcar Service

Comment 3.1L: Streetcars have trouble getting through the intersection of 5th and Market due to cross traffic. Won't light rail create more risk of an accident at this intersection (3-58 Penney)?

Response: *The downtown one-way grid signal system meters the progression of all vehicles through intersections including streetcars. As long as the signal functions properly, there should be no safety problems created by operating light rail and streetcar in the same intersection. Today, streetcar and light rail tracks cross at SW 10th and 11th avenues and SW Morrison and Yamhill streets safely.*

8.3.3.2 Traffic Impacts

Comment 3.2A: Mall project should be integrated with changes to Couch and Burnside streets (2-5 Powell).

Response: *The design of the Portland Mall has been coordinated with plans for the Burnside-Couch couplet and potential development opportunities.*

Auto Lane on the Transit Mall

Comment 3.2B: The first priority on the mall should be a good pedestrian/transit experience, not a through-auto lane (2-4 Smith).

Has concerns about or opposes a through auto lane (2-4, 3-3 Lewellen, 2-5 Hanson, 2-6 Bertelson, 2-6 Klotz, 2-6 Fitzgerald, 2-27 Risher, 2-34 AORTA, 3-6 Hansen, 3-11 Cone, 3-13 Albright, 3-32 Kalin, 3-50 Bonner, 3-60 Williams, 4-18 Roy, 4-57 Stadig, 5-5 Freund, 5-7 Brown, 5-7 Perry, 5-8 Levine, 5-11 McOmber, 5-18 Carey).

Bike routes on the mall should be included in revitalization plans (2-10 Liden, 3-11 Cone, 3-13 Albright).

Response: *Citizen representatives of pedestrian and bicycle advocacy groups were generally supportive of the adopted Right-Side Platform Option with a multi-modal travel lane (autos, skateboards and bicycles). The Right-Side Platform Option design concentrates all transit uses on the right side of the street, leaving the through-lane open for other users, including bicyclists who do not currently have legal access to the length of the mall because bicycles are not allowed in the bus lanes. The Right-Side Platform Option will provide a high level of pedestrian convenience and maintains the width of sidewalks close to or equal to the current width, depending on location.*

Comment 3.2C: Supports through auto lane (2-4 Ingvaldsen, 2-5 Jubinville, 2-5 White, 2-5 Whisler, 2-5 Groscup, 4-27 Peden, 5-11 Hulden).

Response: *A multi-modal through-lane for autos, bicycles and skateboards in included in the adopted Preliminary Engineering design that forms the basis of the FEIS.*

Comment 3.2D: The city should continue to limit motor vehicles on the transit mall though diversions, but a continuous bike route should be provided with bike lanes in the blocks where travel lanes for autos are absent (2-10 Liden).

Limit car traffic on transit mall. No cars between Jefferson and Burnside during rush hour (3-24 Bryant).

Create shared auto and pedestrian streets along the transit mall to facilitate car travel, pedestrian access and transit use (2-6 Williams).

Response: *A multi-modal through-lane for autos, bicycles and skateboards is included in the adopted Preliminary Engineering design that forms the basis of the FEIS. The simplicity of the through-lane and the improved circulation for all modes of travel make auto diversions or lane closures unnecessary.*

Comment 3.2E: Provide an auto lane north of Burnside (2-43 White).

Response: *The current design calls for a through multi-modal lane for the entire length of the Portland Mall.*

8.3.3.3 Parking Impacts

Comment 3.3A: The city should continue to restrict parking along the transit mall (2-10 Liden).

Response: *The current design allows some parking in the south Mall, where it is currently available today, but generally maintains current restrictions on parking in the central and north Mall. The siting of pullouts for deliveries along the Mall will be finalized during the Final Design phase. The policy adopted by the Mayor's Committee and the CAC regarding pullouts will guide siting decisions.*

Comment 3.3B: Nike would like to have temporary parking for deliveries and customer drop-offs (2-5 Groscup).

Support auto and truck pullouts along the Mall (2-43 White, 4-27 Peden).

Response: *The siting of pullouts for deliveries along the Portland Mall will be addressed during Final Design and will be guided by the policy adopted by the CAC and Mayor's Steering Committee.*

Comment 3.3C: Oppose adding auto pullouts along the Mall (2-27 Risher).

Response: *The policy adopted by the Mayor's Committee and the CAC regarding pullouts will guide siting decisions.*

8.3.4 Environmental Consequences

8.3.4.1 Noise and Vibration Impacts

Comment 4.1A: Will turns at the end of the transit mall create continuous screeching (3-60 Williams).

Response: *Without appropriate noise mitigation, trains would create wheel squeal at these turns. Wayside track lubricators have been included in the Project design which will eliminate this potential impact.*

Comment 4.1B: Bus noise on the transit mall should be evaluated and minimized (5-21 Ellingson).

Response: *Bus and light rail noise impacts were evaluated and are described in Section 3.5. The I-205/Portland Mall Project would result in fewer buses on the Portland Mall compared to the No-Build Alternative. TriMet is also examining utilizing hybrid bus technology that could reduce the amount of noise created by buses. Furthermore, TriMet will examine opportunities to increase the amount of insulation around the engine compartment of buses in order to decrease noise levels.*

8.3.4.2 Displacements, Social and Neighborhood Impacts

Comment 4.2A: Preserve public art on the mall (2-4 Richardson, 2-4 McHuff, 2-5 Carlson; 2-6 Fitzgerald).

Response: *Some art will be relocated or removed as a result of the Project. Decisions related to new and existing public art would be finalized during Final Design.*

Comment 4.2B: Preserve existing trees on the Portland Mall where possible or replace them (2-4 Richardson, 2-5 Carlson, 3-60 Williams, 4-58 Stadry, 5-8 Levine, 5-21 Cook, 4-53 BES, 5-19 Williams).

Response: *Some trees will need to be removed and replaced a result of the Project. Decisions related to landscaping including the preservation and replacement of trees along the mall would be finalized during Final Design.*

Comment 4.2C: Evaluate street trees on the mall. The extensive canopy blocks natural light during the day and streetlamps at night creating an unsafe environment (2-43 White, 3-44 Lindahl, 4-27 Peden, 4-63 Petrusich).

Response: *Decisions related to landscaping including the removal or replacement of trees along the mall would be made during Final Design.*

Comment 4.2D: Develop a cohesive and proactive mall management plan (4-27 Peden, 4-63 Petrusich).

Response: *The Conceptual Design Report Final Supplement (TriMet: May 2004) calls for development of a mall management strategy.*

Comment 4.2E: Mall revitalization plan should address panhandlers (2-5 Jubinville).

Response: *In order to build stewardship of the Portland Mall with adjacent property and business owners, the Portland Mall Revitalization Project has proposed a Mall Management Strategy, modeled after the non-profit organization that runs Pioneer Courthouse Square. This strategy would provide integrated, cohesive management of maintenance, security and programming resources on the Portland Mall. One of the main programming objectives of this organization would be to develop coordinated activities, campaigns and strategies for encouraging appropriate public behaviors and greater use of the mall by more people at more hours of the day.*

This active programming, coordinated with greater safety and security efforts on the mall, is seen as the most effective way to displace inappropriate forms of behavior, such as panhandling, sleeping and drug-dealing.

Comment 4.2F: Improve lighting on the mall (4-27 Peden, 4-63 Petrusich).

Response: *Detailed lighting plans for the mall would be developed during Final Design.*

Comment 4.2G: Downtown retailers are concerned about creating a more inviting atmosphere on the mall by improving the design and condition of the mall and increasing automobile and pedestrian activity as well as increasing truck delivery access (4-27 Peden).

Response: *The Downtown Conceptual Design Report focuses on the revitalization strategy for the Portland Mall that includes light rail, a multi-modal through lane and a high quality pedestrian environment. More detailed urban design will be developed during Final Design.*

8.3.4.3 Safety Impacts

Comment 4.3A: Concerned about safety impacts of having buses, light rail, autos and pedestrians interacting on 6th Avenue (2-5 Hanson).

Response: *The Portland Mall design minimizes interactions between autos, pedestrians, and transit by maintaining two transit-only lanes, a separate auto lane and clear and recognizable signalized pedestrian crossings at all intersections. Treatments to further enhance safety such as train warning signals will be continued into final design.*

Comment 4.3B: Bricks on mall are slippery (3-26 Campos).

Response: *Decisions related to paving materials will be made during final design.*

Comment 4.3C: To ensure pedestrian safety, all stops should be on the same side of street (3-6 Hansen).

Response: *The Right-Side Platform Option included in the Project provides bus and light rail access on the same side of the street.*

8.3.4.4 Bike and Pedestrian Concerns

Comment 4.4A: Add a traffic light at SW 4th and College to help passengers cross 4th Avenue safely (4-5 Freund).

Response: *A signal at this location is not included as part of the Project because it is not on the alignment. Lincoln St and Hall St (the two streets on each side of College at 4th) both have signalized intersections with pedestrian signals at 4th Avenue.*

Comment 4.4B: Creating a viable pedestrian environment on the mall needs to be a primary consideration (4-63 Petrusich).

Mall should be reserved for pedestrians and mass transit vehicles (5-6 Freund, D).

Response: *Citizen representatives of pedestrian and bicycle advocacy groups were generally supportive of the adopted Right-Side Platform Option with a multi-modal travel lane (autos, skateboards and bicycles). The Right-Side Platform Option concentrates all transit uses on the right side of the street, leaving the through-lane open for other users, while maintaining most sidewalks at their current width. The Right-Side Platform Option provides a high level of pedestrian convenience.*

Comment 4.4C: Address serious safety hazard posed to cyclists by MAX rail flanges in the roadway (particularly on SW 5th Avenue near PSU and on SW 6th Avenue approaching the Broadway Bridge) (2-10 Liden).

Response: *The Project would maintain one through-travel lane for bicycles and other traffic for the entire length of the Portland Mall. Unlike some previous design options, the Project would maintain a rail-free lane on SW 5th Avenue near PSU, meaning there would be no conflict between bicyclists and parallel rail tracks. Streetcar tracks would continue to cross SW 5th Avenue at SW Market Street much as they do today from Market Street onto 5th Avenue. Similarly, on NW 6th Avenue heading toward the Broadway Bridge, bicycles and other general-purpose traffic would be in the left lane which is free of rail tracks. To reach the Broadway Bridge, bicyclists could turn left onto any one of several streets including NW Hoyt or NW Glisan streets without crossing tracks avoiding a safety hazard for bicyclists in this area.*

Comment 4.4D: Bike parking on the mall should be considered throughout the design process (2-10 Liden).

Response: *Current City of Portland zoning requirements require eight long-term bicycle parking spaces at light rail stations. Decisions about lockers or other bicycle parking would be made in the context of the broader needs for downtown and potential security issues during final design.*

Comment 4.4E: The mall should be reserved for pedestrians and transit only. Bikes, skateboards and automobiles should not be allowed (5-5 Freund).

Response: *A multi-modal through-lane for autos, bicycles and skateboards is included in the Project design that forms the basis of this FEIS.*

Comment 4.4F: Opposed to cars and pedestrians using the same space (5-7 Perry, 3-46 Riesmeyer).

Response: *Sidewalks and a through-lane are planned for the mall giving autos and pedestrians separate spaces.*

Comment 4.4G: Options where light rail weaves are dangerous to bicyclists (3-30 Leclerc).

Response: *With the adopted Right-Side Platform Option, light rail and bus always occupy the two right hand lanes leaving the third lane to the left free for multi-modal access.*

8.3.4.5 Park and Historic Impacts

Comment 4.5A: The Portland Development Commission feels that the ASDEIS inadequately addresses the impacts to two PDC-owned properties: the “Fire Station Site” and the “Switch Tower.” PDC requests that mitigation measures for these two properties be clearly and specifically addressed in the Final EIS (4-35 Farkas).

Response: *Project staff has coordinated with the PDC staff and the State Historic Preservation Officer regarding the impacts to these properties. The Project expects to enter negotiations to acquire these properties when it is allowed to do so under federal regulations.*

Comment 4.5B: Page 3-43 states that "there are no Section 6(f) resources in close proximity to the study alternatives..." However, in Table 3.10-1, of the three parks listed within 150 feet of the South Corridor Project Alternatives, two of these parks have received LWCF grants and are therefore

protect by 6(f): Governor Tom McCall Waterfront Park and Pioneer Park. The document should be corrected to reflect this (5-27 Finlayson).

Response: *Chapter 5, Historic and Parklands, has been revised to respond this comment and to reflect that Pioneer Square and a small portion of Tom McCall Waterfront Park have received Land and Water Conservation Funds and are subject to Section 6(f) regulations. The Project will not use any portion of these two resources.*

Comment 4.5C: Page 3-45 states that "cumulative impacts to parklands could include improved public access (such as to Tom McCall Waterfront Park and Pioneer Park) due to the increased access from the proposed transit improvements and other projects identified in the Regional Transportation Plan. However, no cumulative impacts are expected to occur that would constitute a "use" or "constructive use" as defined in Section 4(f)." (5-27 Finlayson).

Response: *These two parks are primary locations for many large community events and activities in the Portland Metro Region. Construction of the Project will enhance the public's access to these parks. The cumulative effect of this increased access is seen more as an enhancement that will support their use as public gathering locations, and would not constitute a "constructive use".*

8.3.4.6 Wetlands and Ecosystems Impacts

Comment 4.6A: Collaborate with the Bureau of Environmental Services to manage stormwater issues and sustainable landscape design (4-53 BES).

Response: *Project staff have coordinated with BES staff on stormwater and design issues related to the Project and will continue to work together throughout final design.*

8.3.4.7 Energy and Air Quality Impacts

Comment 4.7A: Concerned that the analysis for short term impacts neglects to consider the impacts for diesel particulates emitted from the construction vehicles used in rebuilding the transit mall (4-15 Ginsburg).

Response: *Diesel emissions are a concern in the downtown Portland area as well as other locations within Multnomah County. Short-term impacts from diesel powered construction equipment has been added to the description of air quality and construction impacts in the FEIS. TriMet is evaluating the feasibility of having contractors use low-sulfur or biodiesel for light construction vehicles in the downtown portion of the Project. However, the current technology used in heavy construction vehicles does not appear to make feasible a commitment to use low-sulfur or biodiesel fuels for these vehicles.*

TriMet expects to begin retrofitting buses with a Continuously Regenerating Trap (CRT) which substantially reduces particulate emissions as funding is available. TriMet is also working with the Oregon Department of Environmental Quality to secure sufficient and reliable sources of ultra-low sulfur diesel fuel. These two innovations in the bus system will provide long-term reductions in diesel emissions. As most buses serve the downtown Portland area, the benefits of these improvements will occur within the area of concern.

8.3.4.8 Construction Impacts and Practices

Comment 4.8A: It will be difficult for pedestrians and buses to maneuver on the mall during construction thus destroying some business and transit ridership (5-28 Achenbach).

Response: *TriMet and the City of Portland would work with businesses along 5th and 6th avenues and on adjacent streets to ensure that pedestrian and delivery access could be maintained throughout the construction period. TriMet plans to focus construction on several blocks at a time in order to minimize the period of disruption at any one location. TriMet has extensive experience in working with businesses during light rail construction, most recently along N. Interstate Avenue, and will incorporate best practices in working within downtown Portland.*

TriMet and the City of Portland have developed a construction bus operations plan that would be implemented during the full Portland Mall construction period. Bus operations during the construction period would by virtue of added distance and travel time for some trips less than optimal. In developing the construction bus operations plan, TriMet included "minimize negative impacts to riders" as a guiding principle. A description of the construction bus plan is included in Section 4.5 of this FEIS.

Comment 4.8B: The City of Portland Bureau of Environmental Services (BES) would like to see the use of sustainable building materials and maintenance broadly applied throughout the Project. TriMet should apply principles from their Environmental Management System to the Project (4-53 BES).

TriMet should use efficient and "green" methods when considering landscaping and building materials (3-34 Lorenz).

Response: *TriMet has shown its commitment to environmental sustainability in construction during the Interstate MAX project and will continue to look for opportunities to apply sustainable principles during construction of the Project.*

8.3.5 Financial Analysis and Evaluation

8.3.5.1 Revenues

Comment 5.1A: The only reason light rail is being considered on the mall is to extract 60 percent of the cost from the Federal Transit Administration (2-34 AORTA).

Response: *The location of the Project does not affect the federal funding level. In the City of Portland's Central City Transportation Plan, 5th and 6th avenues are designated transit streets while Broadway and Fourth avenues are designated as major auto traffic streets. These streets parallel the downtown retail and office core that has the highest density development in the region. This policy was first established in the 1972 Downtown Plan and has been reinforced by three decades of public and private investment. Numerous studies have reaffirmed the Portland Mall as the best location for light rail. The LPA recommends construction of light rail on the Portland Mall as part of the first phase of the South Corridor Project to maintain reliable light rail service in downtown Portland as the system expands.*

Comment 5.1B: The downtown business community has been advised that it will likely be asked to fund some portion of the mall improvements. It is important that a clear rationale and financial formula/allocation to be proposed that does not have this particular business community directly funding a cost that deals with years of neglected maintenance or known current deficiencies with the Mall. Assuming that this can be accomplished, it is essential that not just the adjoining property owners share in this financial burden, but all those properties within the real service radius of the mall (2-43 White, 4-63 Petrusich).

Response: *The financing plan found in Section 6.1 of this FEIS states that the City of Portland would provide funding for the South Corridor Project. The City of Portland has identified several possible sources of these funds including urban renewal funds, parking meter revenues and a local improvement district. The proposed local improvement district includes commercial properties in most of downtown Portland.*

Comment 5.1C: Support the strategy to pursue federal funds for extending light rail service in downtown and for mall revitalization (4-40 AIA).

Response: *The Project is seeking 60 percent Federal funding.*

Comment 5.1D: Opposes any new taxes in Multnomah County to pay for light rail projects (5-3 Townsend).

Response: *The Project is expected to be funded with existing local revenues and federal grants.*

8.3.6 Other

8.3.6.1 General

Comment 6.1A: Project should focus on revitalizing the mall (2-5 Whisler).

Response: *The Final Conceptual Design Report (CDR) includes recommendations for revitalization along with design recommendations. Revitalization is furthered by the combination of measures outlined in the CDR that deal with urban design concept, station location and design, management of the Portland Mall and economic revitalization.*

Comment 6.1B: Provide restrooms on the mall (3-65 Zawacki).

Response: *The future transit mall management entity, envisioned as the day-to-day manager of the Portland Mall and described briefly in the Final Conceptual Design Report, has not been formed but could potentially consider some form of restrooms on the Portland Mall. However, there are several public bathrooms available along the full stretch of the mall, including Union Station, Greyhound, Pioneer Square, and PSU. TriMet does not provide public restrooms because of security and maintenance cost issues.*

8.3.6.2 Community Participation

Comment 6.2A: Convene a broader Citizen Advisory Committee that includes disabled people before a decision about light rail in downtown Portland is made (2-3 Lewis).

Response: *The CAC for the Portland Mall Project was reorganized for the Preliminary Engineering phase to include two members who represent groups concerned with Americans with Disabilities Act accommodations in public places, the TriMet Committee on Accessible Transportation and Independent Living Resources.*

Comment 6.2B: Disappointed that public meetings and open house are not scheduled on weekends because his work schedule (TriMet driver) does not allow him to attend meetings during the week (5-3 Moore).

Response: *Portland Mall public meetings were scheduled at times and at central locations in downtown Portland to permit the largest possible number of users to attend. Generally, meetings were held Monday through Thursday, either at the lunch hour or immediately after work so that commuters and downtown employees as well as local residents could attend. In addition, all materials for the Project were available from the TriMet website and community affairs representatives were available to discuss the Project at any time. In addition, presentations were given for TriMet operators on all three shifts.*

Comment 6.2C: Why weren't fliers advertising transit mall-related meetings put on buses (5-18 Carter)?

Response: *For broad project information meetings, rather than information about specific bus routing, methods such as mailings, newspaper advertisements, e-mail notices are more timely, effective and targeted than fliers on the buses. Fliers with information about public comment opportunities were posted at bus shelters along the Portland Mall.*

Comment 6.2D: Propose that a discussion group, including major property holders and other stakeholders in the areas, be assembled to review this issue before any final commitment is made to a particular configuration for connection to the Steel Bridge (5-24 Grund).

Response: *During the Preliminary Engineering phase (May-October 2004), a work scope was developed and stakeholder and jurisdictional partners were convened to discuss the future of the Steel Bridge in relation to the regional rail system.*

8.4 Other Comments

This section includes comments received from agencies and community members after the formal public comment processes. The comments included in this section were not published as part of the South Corridor SDEIS Public Comment Report or the Downtown Amendment to the SDEIS Public Comment Report. The full text of these comments can be found in the *South Corridor Project Public Comment Compendium*.

8.4.1 Comments from Agencies

8.4.1.1 Environmental Impacts

Comment 1.1A: Light rail would produce the largest environmental benefits because it best serves the region's land use goals. Light rail is the most promising way to foster compact mixed-use development and lessen dependence on the automobile (1 Norberg).

Response: *The LPA calls for construction of light rail consistent with these comments.*

Comment 1.1B: Include detailed information about contaminated sites identified in the SDEIS hazardous materials chapter in the FEIS. The FEIS should address each contaminated site by documenting the nature and extent of contamination, planned mitigation measures, steps that will be followed to protect workers and the public, the preparation of site safety plans, sampling and testing strategies and plans for final site cleanup certification (2 Joe).

Response: *Section 3.10 of this FEIS contains detailed information about contaminated sites.*

Comment 1.1C: Prefer Combined Light Rail Alternative because it provides for the most multi-modal choices and focused redevelopment potential to serve Portland and its southeastern communities (7 US EPA Region 10/Lee).

Response: *The LPA calls for construction of both the I-205 and Milwaukie light rail alignments consistent with this comment.*

Comment 1.1D: The FEIS should improve disclosure of current wetlands conditions, current wetland buffer conditions, projected impacts to wetlands and their buffers, and proposed mitigation efforts (7 US EPA Region 10/Lee).

Response: *Section 3.6.2.1 describes the existing wetland along the I-205 Segment. These wetland areas are also described in much greater detail in the* South Corridor Wetland Determination and Delineation Report *(Metro: June 2004). Two wetlands were found along the alignment. One wetland, which has been determined to be non-jurisdictional, would be impacted and the second would be avoided.*

Comment 1.1E: Rather than characterizing the long-term impacts to wetlands based on, for example, area of potential fill, recommend that the FEIS utilize an appropriate methodology to assess post-construction conditions of wetlands relative to their potential change in function. Concerned about applying HGM to assess wetlands function for all wetland types in project area (7 US EPA Region 10/Lee).

Response: *Text has been added to describe the potential effects on the two wetlands that are located near the I-205/Portland Mall Project (Section 3.6.2.1 Wetland and Waterways). One wetland would be filled and the second would be avoided by construction. The HGM method for assessing wetland functions was used based on discussion with US Army Corps of Engineers and Oregon Department of State Lands.*

Comment 1.1F: FEIS should discuss opportunities to improve and restore habitat conditions along waterways and streams in association with construction of Project in support of ESA. FEIS should provide clearer language regarding potential impacts to streams and habitat for ESA species (7 US EPA Region 10/Lee).

Response: *A number of improvements are planned along Johnson Creek including the removal of non-native species and the planting of native trees along the riparian area between I-205 and SE 92nd Avenue (Section 3.6.2.1). In addition, the I-205/Portland Mall Project would result in treating of 1.5 acres of stormwater that drains from the I-205 freeway untreated into Johnson Creek. Overall the Project would treat 5.6 acres of stormwater that currently falls onto impervious areas and runs off untreated (Table 3.7-1)*

Comment 1.1G: The FEIS should disclose any accessibility impacts caused by physical barriers due to transportation corridors and what mitigation might be applied to maintain community cohesion (7 US EPA Region 10/Lee).

Response: *The I-205 light rail route should not impact accessibility within neighborhoods because it will be constructed adjacent to the I-205 freeway and will not, with one exception, cross streets at-grade. The light rail route on the Portland Mall will not create a barrier within communities because it will not widen the current street right-of-way nor will it restrict pedestrian crossings at the end of each 200 foot block. Neighborhood accessibility impacts are discussed in Section 3.2, Social, Neighborhood and Displacement Impacts, of this FEIS.*

Comment 1.1H: The FEIS should illustrate potential beneficial impacts from the South Corridor Project on hazardous materials sites and brownfield sites and community redevelopment opportunities. The FEIS should identify partnership opportunities to coordinate with TriMet Brownfields Assessment Pilot, the Portland Brownfields Showcase Program and the Clackamas County Brownfields Assessment Pilot. The FEIS should incorporate information from TriMet's *Application for Demonstration Pilot for the South/North Transit Corridor Brownfields Economic Development Initiative*, submitted to FTA on March 23, 1998 (7 US EPA Region 10/Lee).

Response: *Because the I-205 and Portland Mall light rail alignments are nearly entirely within existing ODOT or City of Portland right-of-way, there is little risk of hazardous materials impact, as documented in Section 3.10.2. However, the Portland Brownfield Showcase Program and Clackamas County Brownfields Assessment Pilot are in place to pay the cost of environmental site assessments for private owners of brownfields (or suspected brownfields), who want to redevelop their property. The TriMet Brownfields Demonstration Pilot Program, associated with Interstate MAX Project station areas, ends December 31, 2004.*

Comment 1.1I: Complete surveys for threatened and endangered plants in compliance with guidance from the US Department of the Interior and Fish and Wildlife Service to ensure compliance with ESA (12 Taylor).

Response: *Surveys for threatened and endangered species were completed in 2002, 2003 and 2004. None have been found, due the in part to the I-205 segment of the Project being located in freeway right-of-way that was cleared, grubbed and landscaped in the 1980s.*

Comment 1.1J: Recommend that the FEIS consider fish and wildlife corridor enhancement along drainages such as Johnson Creek (12 Taylor).

Response: *The I-205/Portland Mall Project includes proposed mitigation along Johnson Creek to replace non-native plants and with native plants along the riparian corridor to provide diversity and*

shading. In addition, a concrete lined ditch will be replaced with a tree lined water quality swale just north of Johnson Creek (Section 3.6.2.6)

Comment 1.1K: Provide more thorough description of compensatory mitigation alternatives for the LPA in the FEIS. Allow Fish and Wildlife Service (FWS) an opportunity to review a general description of the mitigation sites conservation easement (12 Taylor).

Response: *Numerous local, state and federal natural resource staffs were involved in a tour of the Project on April 7, 200. This was an opportunity for agencies to discuss and comment on the assessment, impacts and potential mitigation strategies. Based on this tour and the advice received from the agencies, staff finalized the proposed mitigation strategies described in Section 3.6.2.*

Comment 1.1L: Favor an approach that avoids Section 4(f) resources, or, if there are no prudent and feasible alternatives to avoid them, an approach that minimizes harm (12 Taylor).

Response: *The Project has consistently identified all potential Section 4(f) resources and worked to avoid these resources. Where the resources have been identified and the Project would be unable to avoid the use of these resources, all possible planning has been done to reduce the project's impacts. The Section 4(f) analysis for the Project is documented in Chapter 5 of this FEIS and in the Draft and Final Section 4(f) Reports.*

Comment 1.1M: Add the following bullets to the Purpose and Need Statement:

- Avoid, minimize, and restore habitat for fish and wildlife in order to promote no-net-loss of habitat function in the affected transportation corridor.
- Where feasible and practicable, improve fish and wildlife habitat beyond what is required for compensatory mitigation (12 Taylor).

Response: *The Purpose and Need Statement for the proposed project was developed and adopted in the early phases of the project by elected officials serving on the Project Steering Committee. While the project strives to meet these two objectives in compliance with Federal and state laws and regulations, it would be inappropriate to change the purpose and need statement for the Project after the Phase I LPA has been adopted for the FEIS.*

Comment 1.1N: On page 3-225, in the second paragraph, 3rd sentence, recommend adding the phrase "of equal or greater fair market value" at the end of the sentence to more clearly spell out the true cost under Section 6(f)(3) of taking parklands acquired or developed with Land and Water Conservation Fund money (12 Taylor).

Response: *The suggested language has been added to Section 5.5 of this FEIS, which discusses Section 6(f) Resources in the Corridor. The Project does not anticipate using any Land and Water Conservation Fund properties.*

Comment 1.1O: Include discussion that outlines the potential short and long-term impacts to birds protected under the Migratory Bird Treaty Act (MBTA) and procedures for assuring compliance under the MBTA during project construction or operation (12 Taylor).

Response: *Text in Section 3.6.1.3 has been added to describe the migratory bird act.*

Comment 1.1P: Use numeric thresholds to designate high, medium and low functions for wetlands affected by the LPA in Table 3.11-3. For comparison purposes, include wetland fill impacts in Table 3.11-3 under the row currently displaying hydrogeomorphic classes (12 Taylor).

Response: *Table 3.6.2 includes a numeric scale and a footnote describing the scale.*

Comment 1.1Q: Follow Fish and Wildlife Service (FWS) stormwater guidance and recommendations for the LPA in the FEIS (12 Taylor).

Response: *These guidelines have been followed and the I-205/Portland Mall Project includes project elements to treat stormwater quality and quantity. These are described in detail in the South Corridor Biological Assessment and in Section 3.7.2.2.*

Comment 1.1R: Balanced cuts should generally not be combined with excavation associated with compensatory mitigation for impacts to fish and wildlife habitat (12 Taylor).

Response: *Mitigation for the 411 cubic yards of fill in the 100-year floodplain would be accomplished by developing a swale that will balance the fill with a compensatory cut that would also treat stormwater from the I-205 freeway (Section 3.7.2.2).*

Comment 1.1S: Recommend using pervious materials for parking areas and access roads associated with construction, operation and maintenance of the proposed transportation project (12 Taylor).

Response: *Pervious pavement was considered for the park-and-ride lots. Based on conversation with resource agencies, it was rejected in favor of collecting stormwater in water quality swales and allowing infiltration. Pervious pavement is being considered for some paths where autos and trucks would not operate.*

8.4.1.2 Traffic Impacts

Comment 1.2A: Provide a definition and clearer discussion of "cutline vehicle volume" (7 US EPA Region 10/Lee).

Response: *Cutline vehicle volume refers to the number of vehicles crossing a particular point in the evening peak one-hour in the peak direction. A cutline (also referred to as a screenline) typically includes all of the major roadway facilities serving a travel corridor either in a north-south direction or an east-west direction. This technique is used to measure whether changes to one roadway (e.g. added capacity) would have a corresponding impact on other parallel roadways.*

8.4.1.3 Construction Impacts

Comment 1.3A: The FEIS should provide further discussion of potential environmental health impacts from construction activity within or near hazardous material sites that may affect both the natural and human health environment (7 US EPA Region 10/Lee).

Response: *Section 3.10.6 of this FEIS addresses the Hazardous Materials identified in close proximity to the proposed project improvements and further discusses mitigation commitments related to Hazardous Materials during pre-construction, construction and operations of the project.*

The document states that TriMet would ensure compliance with all Federal and state regulations ensuring the protection of construction workers, operators and future transit riders.

8.4.2 Comments Received from the Public

8.4.2.1 LPA

Comment 2.1A: Support both I-205 and Milwaukie light rail but believe Milwaukie light rail should be constructed first (3 Merchant; 6 Jawarsky, 6 Rarick).

Response: *The LPA calls for I-205 light rail to be constructed as the first project phase because I-205 light rail would have the highest transit ridership, would save transit travel time compared to the no-build, would support the 2040 growth concept, would provide opportunities for transit-oriented development, would utilize transit right-of-way established with the construction of the I-205 freeway and would provide additional regional transit connections (LPA Report, Metro: April 2003).*

8.4.2.2 Transit Impacts

Comment 2.2A: Implement a shuttle bus between the Clackamas Town Center and Kaiser Sunnyside Hospital. Use lift buses and operators to provide the service (4 Schwab).

Response: *LIFT service is available for elderly and disabled riders through TriMet and such a trip between Clackamas TC and the Kaiser Sunnyside medical facility would be an available trip for qualified riders. There is also accessible fixed route bus service with lifts and/or low-floor buses today and expected in the future between these points.*

APPENDIX A. COMMUNITY PARTICIPATION

This section summarizes the community participation process for the South Corridor I-205/Portland Mall Light Rail Project (Project), describing past activities and elements as well as those used to support the preparation of this Final Environmental Impact Statement (FEIS) and Preliminary Engineering (PE). Additional Information on community participation activities can be found in the Preface (Section P.6, Public Participation), Chapter 2, Alternatives Considered (Section 2.1, Screening and Selection Process), and Appendix C, Environmental Justice Compliance. Responses to public comments received are contained in Chapter 8, Comments and Responses.

A.1 Community Participation

This section includes a summary of public involvement goals for the Project, as well as a description of elements of the community participation program.

A.1.1 Goals and Elements of the Community Participation Program

The goal of the public involvement process has been to support detailed design and engineering and avoidance or mitigation of community and environmental impacts through participation of well-informed and involved communities and local governments. This process was designed to ensure that community concerns and issues were identified and addressed in the planning, engineering, environmental, economic, and financial analysis of the Project as well as to ensure that previously identified concerns were addressed as designs were refined and mitigation plans developed. Public involvement and participation have been critical in the development of the Project and its predecessor, the South/North Transit Corridor Study. Active public participation and involvement have been integral elements in all phases of the study, including:

- Proactive public involvement and education programs to provide comprehensive and understandable information,
- Timely public notice,
- Full public access and involvement in key actions and decisions,
- Outreach to segments of the community that typically do not become involved in transportation planning, and
- Support for early and continuing involvement of the public.

A.1.1.2 Environmental Justice Outreach and Compliance

Staff evaluated 2000 Census data early in the process to ensure that public involvement activities met the needs of identified low-income and minority populations in the corridor. The 2000 Census data related to low income, minority, and Hispanic populations is provided in Section 3.2 Displacements, Social and Neighborhood Impacts and in Appendix B, Environmental Justice Compliance.

A.1.2 Public Participation Efforts by Project Phase

The key public involvement activities undertaken within each of the South Corridor's major project phases are summarized below. Section 2.1, Screening and Selection Process, of this FEIS, provides a project timeline and a more detailed description of these project phases.

A.1.2.1 South/North Corridor Project

The South Corridor Project was derived from the larger South/North Corridor Project. Community participation during the South/North Project began in 1991 with preliminary alternatives analysis that is detailed in the *South/North Draft Environmental Impact Statement* (Metro 1998). The DEIS evaluated various LRT alternatives in the larger South/North Corridor. The South/North Project LPA was selected and then revised when voters failed to re-approve local funding in November 1998. The North Corridor Interstate MAX Project emerged with alternative sources of local funding in the North portion of the Corridor and service began in May 2004. The South Corridor Project evolved from a reexamination of a variety of high-capacity transit alternatives in the South Corridor.

A.1.2.2 South Corridor Transportation Alternatives Study

Public involvement for the South Corridor Transportation Alternatives Study included the following activities:

- **Listening Posts.** South Corridor Project outreach began with a series of "listening posts" that followed the failure of local funding for the South/North Project in 1998. Elected officials met with community members in different areas of the region to gather input about how transportation issues might be addressed. Staff also met with neighborhood leaders who had been active in transportation planning to gain insight into improved public involvement techniques. Three hundred and seventy-five people gave testimony at the listening posts.

- **Community Meetings.** Staff met with community, neighborhood and business groups to share information, gather input and raise awareness about the South Corridor Study. Notices were sent to households and businesses included on the South Corridor mailing list at key points throughout the study.

- **Scoping.** The scoping phase of the South Corridor Study concluded in May of 2000. The purpose of scoping was to re-engage the public, agencies and local jurisdictions and to ensure that all viable alternatives were considered in the study. Public involvement during the scoping phase included a range of activities including meetings with agencies, the community and neighborhood groups, open houses and distribution of a newsletter. Advertising space was purchased in community and regional newspapers to notify the public about key decision points. In addition, citizen working groups were established for each segment of the corridor to recommend which alternatives ought to be included in the initial study phase.

- **Survey.** A scientific survey of 900 residents in the Corridor was completed. Three hundred residents from each corridor segment (Portland to Milwaukie, Milwaukie to Oregon City and Milwaukie to Clackamas) were asked to participate in a phone survey to gather information about the preferences and priorities of corridor residents.

- **Stop, Swap, and Shop.** Clackamas County sponsored the "Stop, Swap (ideas) and Shop" series. Public involvement team members talked with community members at grocery stores and transit centers to increase awareness about the Project in Clackamas County.

- **Public Comments.** A formal public comment period that included meetings with community groups, open houses and formal scoping meetings was held in spring 2000. Information about the

public comment period was featured in advertisements in several newspapers and mailed to 5,300 households and businesses in the South Corridor.

- **Narrowing of Study Alternatives.** The goals of public involvement during the narrowing phase of the South Corridor Study were to share technical information about each alternative with stakeholders and community members, to develop criteria for evaluating alternatives and to gather public input about each alternative. Ultimately, the public involvement process informed the narrowing decisions made by the Policy Committee. During the narrowing phase, staff made many presentations to neighborhood associations and groups, business organizations, community groups and civic organizations. Fliers announcing open house and comment period dates were distributed at these meetings. Approximately 35 displays were placed at businesses and other public locations throughout the corridor, and about 15 information tables were staffed throughout the corridor. Staff also provided information tables at community events to raise awareness about the study. Citizen working groups continued to meet during the narrowing phase. They reviewed technical information and public comments and, eventually, created working papers to guide the Policy Committee as they selected alternatives to study further in the corridor.

- **Additional Public Comments.** A formal public comment period was held between October 16 and November 17, 2000. Letters were sent to more than 40 neighborhood association chairs, CPO chairs and chairs of other community organizations announcing the opportunity for public comment and the open houses. A letter reminding recipients that the public comment period would close followed. The public comment period was advertised in *The Oregonian, The Clackamas Review, The Lake Oswego Review* and *The Oregon City News.*

- **Open Houses.** Open houses were held in Milwaukie, Oregon City, and Portland to provide information about the evaluation of alternatives and hear public comment. Open houses were also held in Gateway, Lents, Hosford-Abernethy and Brooklyn to review design options.

A.1.2.3 Preparation of the SDEIS

Project staff prepared the SDEIS and conducted extensive public involvement between September 2001 and November 2002. Public involvement activities included:

- **Local Advisory Groups.** Local advisory groups met regularly in Milwaukie, inner Southeast Portland, Downtown Portland, Gateway, and outer Southeast Portland. Local advisory groups worked closely with staff to learn about the alternatives and identify areas of community concern and built community consensus about the alternatives under consideration.

- **Corridor-wide Assemblies.** Staff organized corridor-wide assemblies as opportunities for representatives from local advisory groups, neighborhoods and communities throughout the corridor to learn and engage in discussions about the alternatives. Staff also organized segment assemblies, or meetings of local advisory groups within each segment, to discuss relevant issues.

- **Newsletters.** A newsletter detailing the alternatives and explaining the environmental process was prepared early in the SDEIS process. Another newsletter, published when the SDEIS was complete, provided results from the SDEIS and began to engage people in the LPA selection process. A final newsletter was prepared to announce the LPA decision and next steps.

- **Meetings and Briefings.** Staff members met with numerous neighborhood, community and civic groups to discuss the project, share preliminary results and engage community members to participate in the selection of a locally preferred alternative.

- **Media Outreach.** Many articles or stories about the South Corridor Project were included in various publications including *The Oregonian, The Bee, The Good Neighbor News, The East County News, The Milwaukie Pilot,* and other community newsletters and newspapers.

- **Web Site and Hotline.** During the SDEIS preparation, staff regularly updated the South Corridor web site and hotline to include project updates, findings and meeting information. Interested people could add their name to the mailing list, request additional information, or record a comment on either the web site or the hotline.

- **Door-to-Door Canvassing.** In potentially impacted areas, staff canvassed to inform residents about the study and hosted targeted open houses and meetings. Staff also met individually with potentially impacted property and business owners.

A.1.2.4 SDEIS Public Comment Period and Adoption of the LPA

A 50-day public comment period followed publication of the SDEIS. The following public involvement activities supported the public comment period and adoption of the LPA:

- **SDEIS.** The SDEIS and the Executive Summary were distributed to a wide range of public resources (including libraries, local governments and agencies), interested people and groups including neighborhood organizations, community groups and local advisory group members. The complete SDEIS and other supporting documents were available to the public upon request and were provided to interested persons and agencies.

- **Fact Sheets and Other Summary Materials.** A variety of summary materials and fact sheets were available. Summary materials helped community members to understand the results of the SDEIS.

- **Notification.** Advertisements were placed in local newspapers including *The Oregonian, The Asian Reporter* and *El Hispanic News* to announce the availability of the SDEIS, the public comment period, opportunities to learn more about the results of the SDEIS and who to contact for additional information. Notification of public hearings was sent to the project's mailing list and to property owners within 200 feet to the study alternatives. More detailed information about the public comment period and related meetings was listed on the project web page and on the transportation hotline.

- **Media Briefings.** Members of the media had an opportunity to preview the SDEIS findings prior to open houses through group and individual briefings.

- **Neighborhood Meetings.** Staff attended neighborhood meetings throughout the corridor to discuss the results of the SDEIS. These briefings provided neighborhood associations and community planning organizations with an opportunity to understand the results prior to making formal comments on the SDEIS.

- **Open Houses.** The project hosted three open houses to share the SDEIS findings and gather input. Open houses provided community members with an opportunity to learn about the findings, ask questions of staff and talk with other community members about the project.

- **Public Hearings.** The Policy Committee hosted two public hearings at locations in the corridor. Testimony from the public hearings was transcribed and summarized along with all public comments in the Public Comment Report.

- **Documentation of Public Comments.** Project staff compiled all comments made during the SDEIS comment period into the Public Comment Report. It was distributed to the public, staff, elected officials and participating jurisdictions. Responses to the comments are included in Chapter 8 of this FEIS.

- **Local Advisory Groups.** Project staff worked closely with local advisory groups to ensure that members understood the SDEIS findings and how to provide comments.

- **Local jurisdiction adoption of the LPA.** Each jurisdiction involved with the project, the cities of Portland, Milwaukie and Oregon City, Clackamas and Multnomah counties and TriMet, held public hearings prior to adopting the Locally Preferred Alternative.

- **Metro Council Adoption of the LPA.** The Metro Council held a hearing before the adoption of the LPA on April 17, 2003.

A.1.2.5 Preparation of the ASDEIS

- **Steering Committee.** Portland Mayor Vera Katz established the Mayor's Committee for the Portland Mall Revitalization, a committee of business, transit and government leaders to provide policy guidance and to oversee the development of the downtown Portland Mall Light Rail Transit study. This Steering Committee acted as the official hearings body for public testimony on the ASDEIS.

- **Portland Mall Citizen Advisory Committee.** The Portland Mall Citizen Advisory Committee (CAC) was comprised of stakeholders who have served as a sounding board for interests of the downtown community. The committee, organized in spring 2003, met bi-weekly with project managers to assist in developing and refining the light rail alternatives in downtown Portland.

- **Meetings and Briefings.** Staff met with key property owners and stakeholders during the preparation of the ASDEIS to ensure a complete understanding of options, impacts and process. Staff also met with neighborhood associations, business groups and civic organizations at key points during the study to share information and hear feedback.

- **Project Open Houses.** The project held open houses and meetings in the mall's north, central and south areas in July 2003. Open houses gave community members an opportunity to review project information, ask questions of staff and discuss the project options with each other.

A.1.2.6 Public Comment Period and Adoption of the Downtown Portland LPA

- **Amendment/ASDEIS.** The ASDEIS was distributed to a wide range of public agencies, interested people and groups including neighborhood organizations, community groups and community advisory committee members and was also available for review at public libraries.

- **Draft Conceptual Design Report.** The Draft Conceptual Design Report, a supporting document, offered an easy to read and understand summary of issues related to the Portland Mall Alternatives and urban design options. It was widely distributed to members of the public and decision-makers along with the ASDEIS.

- **Open Houses.** The project hosted three open houses during the public comment period. Open houses provided community members with an opportunity to learn about the findings, ask questions of staff and talk with other community members about the project. Staff provided opportunities for comment at each open house.

- **Public Hearing.** A public hearing was held on October 21, 2003 during the public comment period to offer community members the opportunity to share their opinions about the alternatives directly with the Mayor's Committee and the South Corridor Policy Committee.

- **Documentation of Public Comments.** All comments received during the public comment period were compiled in a public comment document that was made available to elected officials, members of the Mayor's Committee, members of the South Corridor Policy Committee, members of the CAC and other interested people. Responses to comments can be found in Chapter 8 of this FEIS.

- **Media Briefings.** Individual meetings with reporters and briefings for editorial boards were held during the process.

- **Neighborhood Meetings.** Staff attended neighborhood meetings in downtown Portland to discuss the results of the ASDEIS and to prepare the neighborhood associations to make formal comments.

- **Notification**. Advertisements were placed in local newspapers to announce the availability of the Amendment, the public comment period and opportunities to learn more about the project. Notification of the public hearing was sent to the individuals on the project's mailing list and to owners of property adjacent to the Portland Mall. Detailed information about the public comment period and related meetings was listed on the project hotline and web site.

- **Citizen Advisory Committee (CAC).** The CAC received periodic briefings on the project and reviewed both the findings of the Amendment and public comments. The Community Advisory Committee forwarded a recommendation on the amended LPA to the Mayor's Committee and the South Corridor Policy Committee.

- **Metro Council Adoption of the LPA.** The Metro Council held a hearing before the adoption of the LPA on January 15, 2004.

A.1.2.7 Preparation of the FEIS and Preliminary Engineering for the I-205/Portland Mall Light Rail Project

The Downtown Community Advisory Committee and an I-205 Community Advisory Committee continued to meet during the preparation of the FEIS and Preliminary Engineering for the Downtown and I-205 Light Rail Projects. The advisory committees provided the project with a link to community organizations and social networks that aided in the broad dissemination of project information as well as advised the project on issues related to public outreach. The committees also advised decision-makers about design refinements and mitigation plans.

Staff continued to update community, civic and business groups on a regular basis on project progress. Staff also met with residents and businesses likely to be affected by the Project. Staff worked with these individuals and organizations to refine designs to reduce impacts and develop mitigation plans where impacts could not be avoided. Staff also began meeting with potentially displaced households, business owners and property owners to ensure that they were familiar with the property acquisition and relocation process as well as the final decision-making processes.

As designs were refined, staff met with communities and individuals affected by potential changes. In some cases, staff held open houses or community meetings or canvassed homes and businesses to gather input on these neighborhood-level changes.

Throughout the process newsletters and fact sheets were prepared. Newsletters were prepared at key decision points and were widely distributed to the project mailing lists and related mailing lists. They were also available at meetings, community events and public facilities. In addition, fact sheets were prepared to address specific concerns and issues. Fact sheets were distributed during canvassing efforts, at CAC meetings, at meetings with community groups or by mail.

The project web site, hosted by TriMet during the FEIS and Preliminary Engineering phase, continued to be the primary source of project information for many community members. The web site was kept up-to-date with information about project meetings and decisions. Video simulations for both the I-205 an Portland Mall segments were available for viewing on the web site.

Advertisements, fliers and e-mail updates were used to notify community members about key decision points, meetings and other opportunities for involvement. Advertisements were placed in *The Oregonian* as well as in neighborhood newspapers, *El Hispanic News* and the Asian Reporter. Fliers advertising key meetings were prepared and either mailed to targeted areas along the alignment or distributed door-to-door. E-mail updates were sent regularly to those community members who requested to receive news by e-mail.

Staff continued to work with social service providers, affordable housing providers and other groups that interface with minority or low-income communities. Staff briefed the Russian Community Forum and used their extensive e-mail list to engage members of the Russian-speaking community in the project.

APPENDIX B. AGENCY COORDINATION, REQUIRED PERMITS AND AGENCY CORRESPONDENCE

This appendix summarizes the agency coordination that the South Corridor I-205/Portland Mall Project has undertaken through the preparation of this *South Corridor I-205/Portland Mall Final Environmental Impact Statement* (FEIS). This appendix also summarizes the permits that would be required for construction of the Project, and includes copies of key correspondence with federal and state agencies.

B.1 Agency Coordination

Agency coordination has played an important role throughout the South/North Transit Corridor Study process including the preparation of this FEIS. Many agencies were contacted during data collection, resource identification, determination of regulatory compliance requirements, development of analysis methods, inventorying of resources and identification of mitigation measures.

Table B.1-1
Federal, State and Local Agency Coordination

Agencies	Topics
Federal Agencies	
U.S. Army Corps of Engineers	Wetlands, Hydrology/Water Quality, and Geology/Soils
Federal Highway Administration	Hydrology/Water Quality, Wetlands, Traffic, Air Quality, Right-of-way, Displacements/ Relocations, Highway Improvement Plans, Noise and Vibration, and Capital Cost Estimates
Federal Emergency Management Agency	Hydrology/Water Quality
U.S. Department of Energy	Energy
U.S. Department of the Interior Geological Survey	Hydrology/Water Quality, Geology/Soils, and Visual Impact Assessment
U.S. Department of the Interior Park Service	Parklands Resources
Advisory Council on Historic Preservation	Historic/Cultural Resources
U.S. Environmental Protection Agency	Wetlands, Air Quality, Hazardous Materials, and Noise
U.S. Fish and Wildlife Service	Threatened and Endangered Species
U.S. Soil Conservation Service	Wetlands, and Geology/Soils
Bonneville Power Administration	Energy
NOAA Fisheries	Threatened and Endangered Species
Northwest Power Planning Council	Energy
State of Oregon Agencies	
Department of State Lands	Hydrology/Water Quality and Wetlands
Department of Fish and Wildlife	Wetlands, Threatened and Endangered Species, and Wildlife
Department of Energy	Energy
Department of Environmental Quality	Hydrology/Water Quality, Wetlands, Air Quality, Energy, Hazardous Materials, and Noise and Vibration
Department of Transportation	Hydrology/Water Quality, Wetlands, Traffic, Hazardous Materials, Air Quality, Energy, Geology/Soils, Displacements/Relocations, Highway Improvement Plans, Historic Resources, Noise and Vibration, and Capital Cost Estimates
State Historic Preservation Office	Historic and Archaeological Resources
Department of Geology and Mineral Industries	Geology/Soils
Local/Regional Agencies	
City of Portland and Clackamas County	Wetlands, Hydrology/Water Quality, Fish and Wildlife, Land Use and Economic Development, Historic Resources, Displacements/ Relocations, Transportation Plans and Traffic, Noise and Vibration, Visual Resources, Historic and Archaeological Resources, Neighborhoods, and Hazardous Materials
TriMet	Capital Costs, Operations and Maintenance Costs, Transit Operating Plans, Transit Facility Design, and Facility and Operation Guidelines

Source: Metro, June 2004

Consultation regarding compliance with specific regulatory issues with the U.S. Army Corps of Engineers, NOAA Fisheries, and the Oregon State Historic Preservation Office (SHPO) is reflected in letters from these agencies, included at the end of this appendix in Section B.3, List of Attached Agency Coordination Correspondence.

B.2 Permits and Approvals

Following is a list of the major Federal, state and local permits and approvals that the South Corridor Project is likely to need. As noted below, the South Corridor Project will seek intergovernmental agreements to consolidate, simplify and contain costs of the local permitting process to the extent possible.

B.2.1 Federal Permits and Approvals

- Section 404 Permit – Corps of Engineers
- Federal Endangered Species Act Review – NOAA Fisheries and US Fish and Wildlife Service (USFWS)
- Section 4(f) – US Department of the Interior

B.2.2 State of Oregon Permits and Approvals

- Section 106 Memorandum of Agreement – Oregon State Historic Preservation Officer
- State Wetland Removal and Fill Permit – Oregon Department of State Lands (ODSL)
- Indirect Source Permit – Oregon Department of Environmental Quality
- Underground Injection Control Permit – Oregon Department of Environmental Quality
- Oregon Endangered Species Act – Oregon Department of Fish and Wildlife (ODFW)
- NPDES Permit – Oregon Department of Environmental Quality
- PUC Permits – Oregon Public Utilities Commission
- Plan Review and Permits – Oregon Department of Transportation
- Rail Grade Crossing Permit – Oregon Department of Transportation

B.2.3 Local Jurisdiction Permits and Approvals

I-205 Segment

- Environmental Review – Johnson Creek – City of Portland
- Park-and-ride lots – Conditional Review Permit
- Development Review – Clackamas County
- Erosion Control Permit – City of Portland

Portland Mall Segment

- Construction Permit within ROW– Portland Office of Transportation
- Building Permits – City of Portland
- Erosion Control Permit – City of Portland

B.3 List of Attached Agency Coordination Correspondence

Below is a list of state and federal agency letters relating to the I-205/Portland Mall Project. The following pages contain copies of this correspondence.

1. U.S. Environmental Protection Agency – June 24, 2004, Letter stating Lack of Objection on the Downtown Amendment to the SDEIS.
2. Oregon Parks and Recreation Department – July 20, 2004, SHPO concurrence on determinations of "No Adverse Effect" for historic properties.
3. US Department of Interior – November 2004, Letter regarding Section 4(f) review.
4. Memorandum of Agreement (MOA) between SHPO, FTA and TriMet regarding historic properties.
5. US Department of Transportation – March 5, 2004, Air Quality Conformity Determination for the RTP and the MTIP.
6. U.S. Army Corps of Engineers – June 21, 2004, Letter accepting Formal consultation.
7. FTA – June 1, 2004, Letter transmitting Wetland Determination and Delineation Report to the US Corps of Engineers.
8. FTA – May 27,2004, letter to NOAA Fisheries regarding South Corridor Consultation.
9. NOAA Fisheries – July 21,1004, Letter issuing a Biological Opinion, including the Biological Opinion.
10. U.S. Army Corps of Engineers – November 19, 2004, Letter claiming jurisdiction of waters in the project area.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, WA 98101

RECEIVED
JUL 2 2004
By

June 24, 2004

Reply To
Attn Of: ECO-088

Ref: FTA-L40205-00
98-028-DOT

Mr. Richard Krochalis
Federal Transit Administration
Jackson Federal Building, Suite 3142
915 Second Avenue
Seattle, Washington 98174

Mr. Elton Chang
Federal Highway Administration
Equitable Center, Suite 100
530 Center St. N.E.
Salem, Oregon 97301

Dear Mr. Krochalis and Mr. Chang:

The U.S. Environmental Protection Agency has reviewed the **Downtown Amendment to the South Corridor Project** Supplemental Draft Environmental Impact Statement (the Amendment). This review was conducted pursuant to our responsibilities under the National Environmental Policy Act and Section 309 of the Clean Air Act.

We commend the project proponents for their efforts to expand and improve the light rail public transportation system in the Portland Metropolitan area. This project augments the multi-modal network to provide efficient transport that serves existing and future transportation needs, supports urban centers and transportation oriented land use and development, and prevents or lessens dispersed land uses and automobile dependency. Many environmental and community benefits result from this.

We have rated the Amendment as LO – Lack of Objections. An explanation of this rating is enclosed. Thank you for the opportunity to review and comment upon this proposal. If you have any questions concerning this review, please contact Elaine Somers of my staff at (206) 553-2966 or somers.elaine@epa.gov.

Sincerely,

Judith Leckrone Lee, Manager
Geographic Unit

Enclosure

cc: Sharon Kelly, METRO

Printed on Recycled Paper

U.S. Environmental Protection Agency Rating System for Draft Environmental Impact Statements Definitions and Follow-Up Action*

Environmental Impact of the Action

LO - - Lack of Objections

The Environmental Protection Agency (EPA) review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC - - Environmental Concerns

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce these impacts.

EO - - Environmental Objections

The EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no-action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU - - Environmentally Unsatisfactory

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

Adequacy of the Impact Statement

Category 1 - - Adequate

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis of data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2 - - Insufficient Information

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonaby available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses or discussion should be included in the final EIS.

Category 3 - - Inadequate

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the National Environmental Policy Act and or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

* From EPA Manual 1640 Policy and Procedures for the Review of Federal Actions Impacting the Environment. February, 1987.

Oregon
Theodore R. Kulongoski, Governor

Parks and Recreation Department
Heritage Conservation Division
725 Summer St. NE, Suite C
Salem, OR 97301-1271
(503) 986-0707
FAX (503) 986-0793
www.hcd.state.or.us

RECEIVED
JUL 2004
By

July 20, 2004

Ms. Sharon Kelly
Portland Metro
600 NE Grand
Portland, OR 97232-2736

RE: SHPO Case No. 04-1540
South Corridor Light Rail Project
Multiple sites, Portland/Milwaukie, Multnomah/Clackamas

Dear Ms. Kelly:

We have reviewed the materials submitted on the project referenced above, and we concur with a determination of No Historic Properties Adversely Affected for the following properties:

510 NW 3rd Ave., 600-610 NW 3rd Ave., 503 NW Irving, 406 NW Glisan St., 506-510 NW 5th Ave., 416 NW 5th Ave., 412 NW 5th Ave., 408 NW 5th Ave., 403 NW 5th Ave., 322 NW 5th Ave., 222-234 NW 5th Ave., 208 NW 5th Ave., 125-135 NW 5th Ave., 115-117 NW 5th Ave., 107 NW 5th Ave., 19 NW 5th Ave., 20 NW 5th Ave., 5 NW 5th Ave., 421 SW Oak St., 333 SW 5th Ave., 408 SW 5th Ave., 401 SW 5th Ave., 421 SW 5th Ave., 500 SW 5th Ave., 521 SW 5th Ave., 533 SW 5th Ave., 620 SW 5th Ave., 621 SW 5th Ave., 638 SW 5th Ave., 520 SW Morrison St., 1021 SW 4th Ave., 1220 SW 5th Ave., 1400 SW 5th Ave., St. Mary's Rock Wall, 1834 SW 5th Ave., 525 SW Jackson St., 1320 SW Broadway, 1225 SW 6th Ave., 1209 SW 6th Ave., 620 SW Main St., 920 SW 6th Ave., 520 SW Yamhill St., 621 SW Morrison St., 610 SW Alder St., 520 SW 6th Ave., 514 SW 6th Ave., 506 SW 6th Ave. 421 SW 6th Ave., 330 SW 6th Ave., 321 SW 6th Ave., 309 SW 6th Ave., 630 SW Pine St., 16-34 NW 6th Ave., 9-13 NW 6th Ave., 121-127 NW 6th Ave., 129-137 NW 6th Ave., 226-238 NW 6th Ave., 302-314 NW 6th Ave., 427-435 NW 6th Ave., 800 NW 6th Ave., 8606 SE Battin Road.

Our response here is to assist you with your responsibilities under Section 106 of the National Historic Preservation Act (per 36 CFR Part 800). Please feel free to contact me if you have further questions, comments or need additional assistance.

Sincerely,

Sarah Jalving
Historic Compliance Specialist
(503) 986-0679 or Sarah.Jalving@state.or.us

United States Department of the Interior

OFFICE OF THE SECRETARY
Washington, DC 20240

TAKE PRIDE IN AMERICA

ER-04/647

NOV 2 - 2004

Mr. R. F. Krochalis
Regional Administrator
Federal Transit Administration
915 Second Avenue
Federal Building, Suite 3142
Seattle, Washington 98174

RECEIVED
FTA/TRO-10
2004 NOV -4 P 2:45

Dear Mr. Krochalis:

This is in response to your request for the Department of the Interior's comments on the Section 4(f) Evaluation for the South Corridor Project, Portland, Oregon.

Section 4(f) Comments

The proposed action would use portions of five Section 4(f) properties for development. After a review of the project however, it appears that there is no feasible and prudent alternative to the uses of the Section 4(f) properties. All possible planning to minimize harm has been employed.

The National Park Service recommends continued coordination with the State Historic Preservation Officer in carrying out the requirements of the National Historic Preservation Act to further mitigate impacts associated with this undertaking.

We appreciate the opportunity to provide these comments.

Sincerely,

for Willie R. Taylor
Director, Office of Environmental
Policy and Compliance

MEMORANDUM OF AGREEMENT
PURSUANT TO 36 CFR PART 800
FOR THE SOUTH CORRIDOR I-205/PORTLAND MALL LIGHT RAIL PROJECT

WHEREAS, the Federal Transit Administration ("FTA") has determined that the South Corridor I-205/Portland Mall Light Rail Project ("Project") will have an effect upon properties included on, or eligible for inclusion on the National Register of Historic Places, and has consulted with the Oregon State Historic Preservation Officer (SHPO) pursuant to 36 CFR Part 800 regulations implementing Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. 470(f)); and,

WHEREAS, FTA in consultation with the Oregon SHPO has determined that the Project will have "No Adverse Effect" on the following Historic Resources that are included in, or considered eligible for inclusion in the National Register of Historic Places:

1. Firehouse, 510 NW 3rd Avenue, Portland, Oregon
2. Signal Tower, 600-610 NW 3rd Avenue, Portland, Oregon
3. Steam Plant, 503 NW Irving, Portland, Oregon
4. Columbia River Ship Supply, 406 NW Glisan Street, Portland, Oregon
5. Hotel Medford, 506-510 NW 5th Avenue, Portland, Oregon
6. Harper Brassworks, 416 NW 5th Avenue, Portland, Oregon
7. Commercial/Industrial, 412 NW 5th Avenue, Portland, Oregon
8. Povey Building, 408 NW 5th Avenue, Portland, Oregon
9. Oregon Casket, 403 NW 5th Avenue, Portland, Oregon
10. Minnesota Hotel, 322 NW 5th Avenue, Portland, Oregon
11. Warehouse, 222-234 NW 5th Avenue, Portland, Oregon
12. Auto Building, 208 NW 5th Avenue, Portland, Oregon
13. Factory/Commercial, 125-135 NW 5th Avenue, Portland, Oregon
14. Commercial Building, 115-117 NW 5th Avenue, Portland, Oregon
15. Warehouse (Commercial/Office), 107 NW 5th Avenue, Portland, Oregon
16. Warehouse, 19 NW 5th Avenue, Portland, Oregon
17. Fithian-Barker Shoe Store, 20 NW 5th Avenue, Portland, Oregon
18. York Apartments, 5 NW 5th Avenue, Portland, Oregon
19. Lincoln Building, 421 SW Oak Street, Portland, Oregon
20. Lumberman's Building/Oregon Trail Building, 333 SW 5th Avenue, Portland, OR
21. J. K Gill Building, 408 SW 5th Avenue, Portland, Oregon
22. First National Bank, 401 SW 5th Avenue, Portland, Oregon
23. Mead Building, 421 SW 5th Avenue, Portland, Oregon
24. Swetland Building, 500 SW 5th Avenue, Portland, Oregon
25. Lipman Wolfe & Co., 521 SW 5th Avenue, Portland, Oregon
26. Yeon Building, 533 SW 5th Avenue, Portland, Oregon
27. Failing Building, 620 SW 5th Avenue, Portland, Oregon
28. Meier & Frank Building, 621 SW 5th Avenue, Portland, Oregon
29. Kress, S. H., Building, 638 SW 5th Avenue, Portland, Oregon
30. Pioneer Courthouse, 520 SW Morrison Street, Portland, Oregon
31. Multnomah County Courthouse, 1021 SW 4th Avenue, Portland, Oregon
32. Portland City Hall, 1220 SW 5th Avenue, Portland, Oregon
33. Oregon State Building/Fifth Avenue Building, 1400 SW 5th Avenue, Portland, Oregon

34. St Mary's Rock Wall, bounded by SW Mill/Market streets and SW 4th/5th avenues, Portland, Oregon
35. Harrison Court Apartments, 1834 SW 5th Avenue, Portland, Oregon
36. Residence, 525 SW Jackson Street , Portland, Oregon
37. Oregonian Building, 1320 SW Broadway, Portland, Oregon
38. University Club, 1225 SW 6th Avenue, Portland, Oregon
39. Ambassador Apts., 1209 SW 6th Avenue, Portland, Oregon
40. U.S. Courthouse, 620 SW Main Street, Portland, Oregon
41. Public Services Building, 920 SW 6th Avenue, Portland, Oregon
42. Pacific Building, 520 SW Yamhill Street, Portland, Oregon
43. American Bank Building, 621 SW Morrison Street, Portland, Oregon
44. Selling Building, 610 SW Alder Street, Portland, Oregon
45. Bedell Building, 520 SW 6th Avenue, Portland, Oregon
46. Olds and King Store, 514 SW 6th Avenue, Portland, Oregon
47. Wilcox Building, 506 SW 6th Avenue, Portland, Oregon
48. Equitable Building, 421 SW 6th Avenue, Portland, Oregon
49. Bank of California 330 SW 6th Avenue, Portland, Oregon
50. U.S. National Bank, 321 SW 6th Avenue, Portland, Oregon
51. Wells Fargo Building, 309 SW 6th Avenue, Portland, Oregon
52. Corbett Brothers Garage, 630 SW Pine Street, Portland, Oregon
53. Apostolic Faith, 16-34 NW 6th Avenue, Portland, Oregon
54. Nickel Star Theater , 9-13 NW 6th Avenue, Portland, Oregon
55. Hotel West, 121-127 NW 6th Avenue, Portland, Oregon
56. Butte Hotel, 129-137 NW 6th Avenue, Portland, Oregon
57. Athens Hotel, 226-238 NW 6th Avenue, Portland, Oregon
58. Biltmore Hotel, 302-314 NW 6th Avenue, Portland, Oregon
59. Oregon Cracker Company, 427-435 NW 6th Avenue, Portland, Oregon
60. Union Station, 800 NW 6th Avenue, Portland, Oregon
61. Steel Bridge, Center Span, spanning the Willamette River at NW Glisan Street, Portland, Oregon
62. Orrin Battin House, 8606 SE Battin Road, Milwaukie, Oregon; and,

WHEREAS, the Tri-County Metropolitan Transportation District of Oregon ("TriMet"), the local lead agency responsible for construction and operation of the Project, has been invited into consultation and to concur in this Memorandum of Agreement;

NOW, THEREFORE, FTA and the Oregon SHPO agree that the undertaking shall be implemented in accordance with the following stipulations in order to take into account the effect of the Project on Historic and Cultural Properties.

STIPULATIONS

FTA will ensure that the following measures are carried out:

1. In the vicinity of resources that have been determined to have "no adverse effect," TriMet will ensure that the Project design for new construction is compatible with the historic qualities of the properties. FTA will ensure that the design is responsive to the recommended approaches to new construction set forth in the *Secretary of the Interior's Standards for the Treatment of Historic*

Properties (36 CFR 68; NPS 1992), and that the design and specifications for the Project, in the vicinity of these resources, are developed in consultation with the SHPO. Additional consideration will be given to shelter location and design adjacent to these properties. During the Final Design Phase, TriMet shall provide the SHPO with the Project Development Plans. Within thirty (30) days of its receipt of such plans, the SHPO shall be afforded the opportunity to review and comment thereon in the area adjacent to these resources. Plans shall be modified to accommodate the SHPO's comments where TriMet agrees that the suggested actions are practicable. If agreement cannot be reached, TriMet and the SHPO shall conduct further consultation with FTA to resolve the issue(s) in accordance with Stipulation 5 of this Agreement.

2. Firehouse (#1) at 510 NW 3rd Avenue, Portland, Oregon

TriMet shall ensure that the Firehouse is protected against damage during the construction of the Project. If TriMet should acquire the entire Firehouse parcel, including the Firehouse itself, TriMet shall also ensure that any work performed on the Firehouse is in accordance with the recommended approaches in the *Secretary of the Interior's Standards for Rehabilitation* and *Illustrated Guidelines for Rehabilitating Historic Buildings* (U.S. Department of the Interior, National Park Service, 1992) ("Standards and Guidelines"). Should work be proposed for the Firehouse, a rehabilitation or stabilization plan shall be developed in consultation with the SHPO and provided to the SHPO by TriMet. The SHPO shall be afforded the opportunity to review and comment on the plan within thirty (30) days of receipt thereof. Plans shall be modified to accommodate the SHPO's comments where TriMet agrees that the suggested actions are practicable. If agreement cannot be reached, TriMet and the SHPO shall conduct further consultation with FTA to resolve the issue(s) in accordance with Stipulation 5 of this Agreement.

3. Signal Tower (#2) at 600-610 NW 3rd Avenue, Portland, Oregon

TriMet shall ensure that the Signal Tower is protected against damage during the construction of the Project. If TriMet should acquire the Signal Tower, TriMet shall also ensure that any work performed on the Signal Tower is in accordance with the recommended approaches in the Standards and Guidelines. Should work be proposed for the Signal Tower, a rehabilitation or stabilization plan shall be developed in consultation with the SHPO and provided to the SHPO by TriMet. The SHPO shall be afforded the opportunity to review and comment on the plan within thirty (30) days of receipt thereof. Plans shall be modified to accommodate the SHPO's comments where TriMet agrees that the suggested actions are practicable. If agreement cannot be reached, TriMet and the SHPO shall conduct further consultation with FTA to resolve the issue(s) in accordance with Stipulation 5 of this Agreement.

4. Discoveries

TriMet shall notify the SHPO as soon as practicable if it appears that the Project or any element thereof will affect a previously unidentified property that may be eligible for inclusion in the National Register, or affect a known historic property in an unanticipated manner. TriMet will take all reasonable measures to avoid or minimize harm to the property and, if feasible, will stop work in the vicinity of the discovery, until it concludes consultation with the SHPO. If the newly discovered property has not been previously included in or determined eligible for the National Register, TriMet may assume that the property is eligible for purposes of this MOA. TriMet will consult with the SHPO as well as other parties to this MOA or interested parties recommended

by the SHPO to develop actions that will take the effects of the undertaking into account. If the newly discovered property contains Native American cultural items or human remains, TriMet and the SHPO shall consult to determine how the discovery should be treated. TriMet and the SHPO will develop data recovery measures that take into account the requests of the Most Likely Descendants and any interested Indian tribe in consultation with the Commission of Indian Services, the requirements of the Project, considerations of safety and environmental protection, and other applicable permits and considerations. TriMet will notify the SHPO of any time constraints, and TriMet and the SHPO will mutually agree upon time frames for this consultation. TriMet will prepare a written plan in response to the consultation with the SHPO and other interested parties. This plan will be provided by TriMet to the SHPO and all interested parties that participated in the consultation, who notify TriMet within the mutually agreed-upon time frames if the plan does not conform to the measures developed in consultation. TriMet will be responsible for implementation of the plan.

5. SHPO Review and Dispute Resolution

TriMet will provide information to the SHPO as defined previously. The SHPO will review the information and respond to TriMet within thirty (30) days of its receipt of such information. If TriMet disagrees on any issues raised by the SHPO, TriMet shall consult further with the SHPO to resolve the dispute. If TriMet and the SHPO cannot resolve the disagreement, TriMet and the SHPO will forward documentation relevant to the dispute to the FTA. Within 30 days after receipt of all pertinent documentation, FTA will provide recommendations, which TriMet will take into account in reaching a final decision regarding the dispute. If agreement is still not reached, any party may choose to invite the Advisory Council for Historic Preservation to join in the Consultation or to comment pursuant to 36 CFR 800.6(b). Any recommendation or comment provided by the Council will be understood to pertain only to the subject of the dispute, and TriMet and FTA's responsibility to ensure the completion of all actions required under this Agreement that are not the subject of the dispute will remain unchanged.

6. At any time during the implementation of the measures stipulated in this Agreement, should an objection to any such measure or its manner of implementation be raised by a signator to this Agreement, FTA shall take the objection into account and consult as needed with the objecting party, TriMet, or the SHPO to resolve the objection.

7. Failure to carry out the terms of this Agreement requires that FTA again request the SHPO's comments in accordance with 36 CFR part 800. If FTA cannot carry out the terms of the Agreement, it will not take or sanction any action or make an irreversible commitment that would result in an adverse effect with respect to National Register or eligible properties covered by the Agreement or would foreclose the SHPO's consideration of modifications or alternatives that could avoid or mitigate the adverse effect on the properties until the commenting process has been completed.

8. If any signatory to this Agreement determines that the terms of the Agreement cannot be met or believes a change is necessary, that signatory will immediately request the consulting parties to consider an amendment or addendum, pursuant to 36 CFR Section 800.6(c)(7), which will be executed in the same manner as the original Agreement.

9. Any signatory to this Agreement may suspend it by written notice to the other consulting parties. If this occurs, the parties will consult further to determine whether the issues can be resolved and the Agreement re-implemented in an amended form.

10. The SHPO may monitor activities carried out pursuant to this Agreement, and will review such activities if so requested by any person. FTA and TriMet will cooperate with the SHPO in carrying out the SHPO's monitoring and review responsibilities.

11. Within ninety (90) days after carrying out the terms of this Agreement, TriMet shall provide a written report to all signatories to the Agreement on the actions taken to fulfill the terms of the Agreement.

12. This Agreement is intended as the complete integration of all understandings among the parties, their successors and assigns with respect to the subject matter set out herein. No prior or contemporaneous addition, deletion, or other amendment hereto shall have any force or effect whatsoever, unless embodied herein in writing. No subsequent innovation, renewal, addition, deletion, or other amendment hereto shall have any force or effect unless embodied in a written amendatory or other Agreement executed by the parties and signed by the signatories of the original Agreement. This Agreement and any amendments shall be binding upon the parties, their successors and assigns.

Execution of this Memorandum of Agreement by FTA and the Oregon SHPO, and subsequent implementation of its terms, evidence that FTA has afforded the SHPO an opportunity to comment on the South Corridor I-205/Portland Mall Light Rail Project, the Project's effects on historic properties, and that FTA has taken into account the effects of the undertaking on historic properties.

FEDERAL TRANSIT ADMINISTRATION

By: _____ Date 11/23/04

OREGON STATE HISTORIC PRESERVATION OFFICER

By: _____ Date 5 Nov 2004

Concur:

TRI-COUNTY METROPOLITAN TRANSPORTATION DISTRICT OF OREGON

By: _____ Date 10/26/04

U.S. DEPARTMENT OF TRANSPORTATION

Federal Highway Administration
Oregon Division
530 Center Street, Suite 100
Salem, Oregon 97301
503-399-5749

Federal Transit Administration
Region X
915 Second Avenue, Room 3142
Seattle, Washington 98174-1002
206-220-7954

March 5, 2004
IN REPLY REFER TO
HPL.3-OR
90.220

Mr. David Bragdon
President
Metro Council
600 N.E. Grand Avenue
Portland, Oregon 97232-2736

RE: Conformity Determination for the Fiscal Year 2004 Regional Transportation Plan (RTP) and Fiscal Year 2004-2007 Metropolitan Transportation Improvement Program (MTIP)

Dear Mr. Bragdon:

The Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) have completed our review of the Portland Metro local conformity determination for the Fiscal Year (FY) 2004 RTP and FY 2004-2007 MTIP. A joint FHWA/FTA air quality conformity determination for the RTP and the TIP is required by *Section 93.104* of the Environmental Protection Agency's (EPA) August 15, 1997, *Transportation Conformity Rule Amendments: Flexibility and Streamlining: Final Rule, 40 CFR Parts 51 and 93 (Transportation Conformity Rule)* and the FHWA/FTA Metropolitan Planning *Rule, 23 CFR 450.* Our USDOT conformity determination is based upon Metro's conformity determination analysis and documentation submitted to our offices, by your March 4, 2004, letter and attachments, as well as supplemental documentation.

The Metro Council and Joint Policy Advisory Committee on Transportation adopted the local conformity determination on the FY 2004 RTP and FY 2004-2007 MTIP on March 4, 2004. The local conformity analysis and supplemental documentation provided by Metro indicates that all air quality conformity requirements have been met. Based on our review, we find that the FY 2004 RTP and the FY 2004-2007 MTIP conform to the applicable state implementation plan in accordance with: *40 CFR Parts 51 and 93*; the January 2, 2002, *Revised Guidance for Implementing the March 1999 Circuit Court Decision Affecting Transportation Conformity*; and, the EPA's May 14, 1999, *Conformity Guidance on Implementation of the March 2, 1999, Conformity Court Decision.* This USDOT conformity determination has been developed in accordance with *Oregon Administrative Rule (OAR) Chapter 340 Division 252, Transportation Conformity*, which defines the procedures and frequency for demonstrating conformity within the State of Oregon. This federal conformity determination was made after consultation with EPA Region X, pursuant to the *Transportation Conformity Rule.*

This letter constitutes the joint FHWA/FTA air quality conformity determination for Metro's FY 2004 RTP and FY 2004-2007 MTIP. If you have any questions regarding this federal conformity finding, please contact Michelle Eraut, FHWA, at (503) 587-4716 or Jennifer Bowman, FTA, at (206) 220-7953.

Sincerely,

David O. Cox
Division Administrator
Federal Highway Administration

R. F. Krochalis
Regional Administrator
Federal Transit Administration

cc:

FTA	(Rebecca Reyes-Alicea, Jennifer Bowman)
EPA	(Wayne Elson)
ODOT	(Jill Vosper, STIP Manager)
	(Vince Carrow, Environment)
	(Matthew Garrett, Region 1)
DEQ	(Dave Nordberg)
METRO	(Andy Cotugno)

ME/ma

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, PORTLAND DISTRICT
P.O. BOX 2946
PORTLAND, OREGON 97208-2946

June 21, 2004

REPLY TO
ATTENTION OF:
Operations Division
Regulatory Branch

Mr. R.F. Krochalis
Regional Administrator, Region 10
915 Second Avenue
Federal Building, Suite 3142
Seattle, Washington 98174-1002

Dear Mr. Krochalis:

In response to your letter dated February 25, 2004, the U.S. Army Corps of Engineers agrees to continue participating as a cooperating agency for the South Corridor Project, which is in the Final Environmental Impact Statement (FEIS) phase. In addition to reviewing appropriate portions of the FEIS, we are also in the process of reviewing the Wetland Delineation and Determination Report (dated April 16, 2004).

Mr. John Barco of my Regulatory Branch staff will be the point of contact for this project. Mr. Barco can be reached at the above address or telephone (503) 808-4382.

Sincerely,

Lawrence C. Evans
Chief, Regulatory Branch

Copy Furnished:

Metro (Dave Unsworth)
FHWA (Elton Chang)
Tri-Met (Alonzo Wertz)

U.S. Department
of Transportation
**Federal Transit
Administration**

REGION X
Alaska, Idaho, Oregon,
Washington

915 Second Avenue
Federal Bldg. Suite 3142
Seattle, WA 98174-1002
206-220-7954
206-220-7959 (fax)

RECEIVED
JUN 7 2004
By

June 1, 2004

Judy Linton
US Army Corps of Engineers
CENWP–OP-G
P.O. Box 2946
Portland, Oregon 97208-2946

RE: South Corridor Light Rail Project Wetland Delineation and Determination

Dear Ms. Linton:

Per our conversation, the purpose of this letter is to transmit the *South Corridor Light Rail Project Wetland Determination and Delineation Report* (Metro: May 2004).

The Federal Transit Administration (FTA) and the Federal Highway Administration (FHWA), along with local sponsors TriMet and Metro, are proposing to develop the South Corridor Light Rail Project that includes improvements in Portland, Oregon and are currently preparing a final environmental impact statement (FEIS). The US Army Corps has served as a cooperating agency for the project and we appreciate your willingness to comment on the enclosure.

If you have any questions, please feel free to contact me at (206) 220-4464.

Sincerely,

Rebecca Reyes-Alicea
Community Planner

Enclosure

Cc: Elton Chang, FHWA
Dave Unsworth, Metro

U.S. Department
of Transportation
Federal Transit Administration

REGION X
Alaska, Idaho, Oregon,
Washington

915 Second Avenue
Federal Bldg. Suite 3142
Seattle, WA 98174-1002
206-220-7954
206-220-7959 (fax)

RECEIVED
JUN 1 2004
By

MAY 27 2004

Bob Lohn, Regional Administrator
NOAA Fisheries
7600 Sand Point Way NE
Seattle, WA 98115-0070

RE: South Corridor Light Rail Project Consultation

Dear Mr. Lohn:

The purpose of this letter is to transmit the *South Corridor Project Biological Assessment for ESA Species under NOAA Fisheries Jurisdiction* (FTA/Metro: May 2004) and other related materials pursuant to Section 7 of the Threatened and Endangered Species Act and the Magnuson-Stevens Act.

The FTA along with local project partners, TriMet and Metro, are sponsoring the South Corridor Light Rail Project that includes improvements in Portland Oregon. The project elements include 6.5 miles of new light rail tracks adjacent to I-205 Freeway and 1.8 miles of new light rail tracks in downtown Portland. These project elements are connected via the existing Banfield light rail alignment. Associated improvements include 8 new stations, 6 park-and-ride lots and approximately 15.8 acres of new impervious area. The I-205 light rail alignment would also require a new bridge over Johnson Creek.

The Federal Transit Administration (FTA) believes that the project, as currently proposed, **may affect, but is not likely to adversely affect** Lower Columbia ESU Chinook salmon and Lower Columbia ESU steelhead trout. FTA, however, does recognize that this project consultation is taking place in the early design phases (3% to 5% engineering design) under a design/build construction method and that further design refinements made as the project progresses may involve changes that have the potential to adversely impact listed species. It is on the basis of these potential project design changes and associated negative impacts that NOAA Fisheries may conclude that this project **may affect, and would likely adversely affect** listed species and, therefore, initiate **formal consultation and the issuance of a NOAA Fisheries Biological Opinion**.

The materials provided under this cover constitute a complete package of information regarding all phases of construction and operation of the new facility, and fulfills requirements under 50 CFR 402.14(c) to initiate formal consultation procedures. The following materials are included in this consultation package:

- A description of the action being considered;
- A description of the specific area that may be affected by the action;
- A description of any listed species or critical habitat that may be affected by the action;
- A description of the manner in which the action may affect any listed species or critical habitat, and an analysis of any cumulative effects;
- Relevant reports, including any environmental impact statements (submitted previously under separate cover), environmental assessments, biological assessment or other analyses prepared on the proposal; and
- Any other relevant studies or other information available on the action, the affected listed species, or critical habitat.

FTA understands that, as stipulated in ESA Section 7(b)(1)(A) and 50 CFR 402.14(e), formal consultation will be initiated by your receipt of a formal consultation request and will conclude within 90 days. If your agency determines that a "may affect, likely to adversely affect" finding and formal consultation are appropriate, then please consider this letter a request for formal consultation. We anticipate NOAA Fisheries will develop a Biological Opinion within 45 days of completing the formal consultation period, or sooner if possible. FTA requests advance copies of the draft terms and conditions, and reasonable and prudent measures for review prior to finalizing the Biological Opinion.

If you have any questions, please contact Rebecca Reyes-Alicea (206-220-4464) or Jennifer Bowman (206-220-7953) from FTA or Dave Unsworth (503-797-1751) from Metro.

Thank you for your consideration.

Sincerely,

R. F. Krochalis
Regional Administrator

Attachment: *South Corridor Project Biological Assessment for ESA Species under NOAA Fisheries Jurisdiction*

cc w/ attachment:
Nancy Munn, NOAA Fisheries
Elton Chang, FHWA OR

cc w/o attachment:
Dave Unsworth, METRO
Neil McFarlane, TriMet

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

Refer to:
2004/00632

July 21, 2004

RECEIVED
JUL 22 2004
By

Mr. R.F. Krochalis
Regional Administrator
U.S. Department of Transportation
Federal Transit Administration, Region X
915 Second Avenue
Federal Building, Suite 3142
Seattle, Washington 98174-1002

Re: Endangered Species Act Section 7 Formal Consultation and Conference, and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for the South Corridor Light Rail Project in the City of Portland, and Clackamas County, Oregon

Dear Mr. Krochalis:

Enclosed is a biological opinion and conference opinion (Opinion) prepared by NOAA's National Marine Fisheries Service (NOAA Fisheries) pursuant to section 7 of the Endangered Species Act (ESA) that addresses the proposed funding of a project to construct two new segments of light rail tracks in the City of Portland and unincorporated Clackamas County, Oregon. The Federal Transit Administration (FTA) is sponsoring the project along with the local project partners, TriMet and Metro. Project elements include 6.5 miles of new light rail tracks beside the I-205 freeway and 1.8 miles of new light rail tracks in downtown Portland, eight new stations, five park-and-ride lots, and approximately 15.8 acres of new impervious area.

NOAA Fisheries concludes in this Opinion that the proposed action is not likely to jeopardize the continued existence of ESA-listed Lower Columbia River (LCR) Chinook salmon (*Oncorhynchus tshawytscha*) and LCR steelhead (*O. mykiss*). As required by section 7 of the ESA, this Opinion includes reasonable and prudent measures with terms and conditions that are necessary to minimize the potential for incidental take associated with this action. NOAA Fisheries also concludes that the proposed action is not likely to jeopardize the continued existence of LCR coho salmon (*O. kisutch*), a species proposed for listing as threatened under the ESA. However, the incidental take statement does not become effective for LCR coho salmon until NOAA Fisheries adopts this conference opinion as a biological opinion, after the listing is final. The prohibitions of the ESA do not apply to LCR coho salmon until this species is listed.

This document also serves as consultation on essential fish habitat (EFH) pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act and implementing

Printed on Recycled Paper

regulations at 50 CFR Part 600. The action area has been designated as EFH for Chinook salmon and coho salmon.

If you have any questions regarding this consultation, please contact Dr. Nancy Munn of my staff in the Oregon State Habitat Office at 503-231-6269.

Sincerely,

D. Robert Lohn
Regional Administrator

cc: Rebecca Reyes-Alicea, FTA
Elton Chang, FHWA
Dave Unsworth, Metro
Neil McFarlane, TriMet

Endangered Species Act - Section 7 Consultation
Biological Opinion & Conference Opinion

&

Magnuson-Stevens Fishery Conservation and Management Act
Essential Fish Habitat Consultation

South Corridor Light Rail Project in the City of Portland
and Clackamas County, Oregon

Agency:	U.S. Department of Transportation, Federal Transit Administration
Consultation Conducted By:	NOAA's National Marine Fisheries Service, Northwest Region
Date Issued:	July 21, 2004
Issued by:	for D. Robert Lohn Regional Administrator
Refer to:	**2004/00632**

TABLE OF CONTENTS

1. INTRODUCTION

1.1 Consultation History

On June 1, 2004, National Ocean and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NOAA Fisheries) received a letter dated May 27, 2004, and a biological assessment (BA) from the U.S. Department of Transportation, Federal Transit Administration (FTA), requesting formal consultation under the Endangered Species Act (ESA) on the funding of a light rail construction project in the City of Portland, Oregon and in unincorporated Clackamas County, Oregon. TriMet and Metro are local sponsors of the project, and FTA is the Federal funding partner.

FTA, in partnership with Metro and TriMet, proposes to construct the South Corridor Light Rail Project and operate new light rail alignments in two segments in Multnomah and Clackamas Counties, Oregon. These two segments are in downtown Portland, Oregon, and along the Interstate-205 Freeway (I-205), and are connected via the existing Banfield light rail alignment. In the downtown Portland segment, the light rail line would be on 5th and 6th Avenues. In the I-205 segment, 6.5 miles of light rail would be constructed beside I-205 between Gateway and Clackamas Regional Centers. The I-205 segment would include the construction of five new park-and-ride lots, six bridges across existing roadway arterials, and one bridge across Johnson Creek. This connection is intended to serve these quickly growing areas with alternative transportation choices that are a key component of Metro's 2040 land use plan that calls for maintaining the Urban Growth Boundary by increasing densities within town and regional centers.

In the BA, the FTA determined that Lower Columbia River (LCR) Chinook salmon (*Oncorhynchus tshawytscha*) and LCR steelhead (*O. mykiss*) are likely to occur within the project area and that the proposed project is "likely to adversely affect" (LAA) the listed species. There is potential for adverse effects, because the project will be constructed and operated over and beside the Willamette River in the downtown Portland segment, Johnson Creek and its tributaries, and Phillips Creek (a tributary to Mt. Scott Creek) in the I-205 segment. In addition to steelhead and Chinook salmon, LCR coho salmon (*O. kisutch*) may occur within the project area. LCR coho salmon were recently proposed for listing as a threatened species (June 14, 2004, 69 FR 33102).

References for listing status and dates, and ESA section 4(d) take prohibitions, are provided in Table 1. This biological opinion and conference opinion (Opinion) is based on the information presented in the BA and information provided during discussions with FTA, Metro and TriMet. The objective of this Opinion is to determine whether funding the construction of the light rail project is likely to jeopardize the continued existence of the ESA-listed species described in Table 1. This consultation is conducted pursuant to section 7(a)(2) of the ESA and its implementing regulations, 50 CFR 402.

The objective of the essential fish habitat (EFH) consultation is to determine whether the proposed action may adversely affect designated EFH for coho salmon and Chinook salmon, and to recommend conservation measures to avoid, minimize, or otherwise offset potential adverse effects to EFH resulting from the proposed action.

Table 1. Additional Background on Listing Status, Biological Information, Protective Regulations for the ESA-Listed Species Considered in this Consultation.

Species Evolutionarily Significant Unit (ESU)	Status	Protective Regulations	Biological Information, Historical Population Trends
Chinook salmon (*O. tshawytscha*)			
Lower Columbia River	Threatened 3/24/99; 64 FR 14308	7/10/00; 65 FR 42422	Myers *et al.* 1998; Healey 1991
Steelhead (*O. mykiss*)			
Lower Columbia River	Threatened 3/19/98; 63 FR 13347	7/10/00; 65 FR 42422	Busby *et al.* 1995; 1996
Coho salmon (*O. kisutch*)			
Lower Columbia River	Proposed Threatened 6/14/04; 69 FR 33102	None	NOAA Fisheries 2003

1.2 Proposed Action

1.2.1 Project Location

The project is within the Portland, Oregon urban area, within Multnomah and Clackamas Counties. The entire project is in the Willamette River basin, with the I-205 segment specifically in the Johnson Creek and Mt. Scott Creek watersheds. The project area includes two segments, one in downtown Portland that joins existing tracks at the west side of the Willamette River and one beside I-205. Within downtown Portland, new light rail tracks would be constructed between Portland State University and Union Station along 5th and 6th Avenues. From Union Station, the alignment would connect to the Willamette River Steel Bridge via a new ramp.

The I-205 segment is beside the I-205 Freeway and is generally included within the I-205 right-of-way (ROW) between I-84/I-205 (Gateway Regional Center) and SE Sunnyside Road (Clackamas Regional Center). The I-205 segment would include the construction of five new park-and-ride lots, six bridges across existing roadway arterials, and one bridge across Johnson Creek.

1.2.2 Background

A Final Environmental Impact Statement (FEIS) is being completed with FTA and the Federal Highway Administration (FHWA) as the National Environmental Policy Act (NEPA) co-Federal leads and the U.S. Army Corps of Engineers as a cooperating agency. TriMet is the lead local agency under NEPA for the design and construction of the project, and Metro is lead local agency in the preparation of the FEIS.

The proposed action is in the preliminary engineering phase of design, meaning that engineering design is 3 - 5% complete. Consequently, certain details are not yet available that are typically required to quantify and analyze the potential impacts to listed species from both the effects of construction related activities, and the effects of post-construction and operational activities. The BA evaluated the potential for effects, identified appropriate performance criteria for those project elements that are still under development, with the intent to avoid and minimize effects to the maximum extent practicable during the design process.

The South Corridor Light Rail would carry more than 33,300 rides per average weekday, would remove more than 11,000 auto trips per day, and would reduce the vehicle-miles traveled by 66,000 per day or over 3.8 million miles in a year. This reduction will result in less non-point pollution being created.

This project will connect downtown Portland with the Gateway Regional Center, the Lents Town Center, and the Clackamas Regional Center. The connection is intended to serve these quickly growing areas with alternative transportation choices that are a key component of Metro's 2040 land use plan that calls for maintaining the Urban Growth Boundary by increasing densities within town and regional centers.

1.2.3 Proposed Action

Downtown Portland Segment

The proposed construction in downtown Portland includes the construction of light rail tracks on 5th and 6th Avenues, and six pairs of stations. The distance between Portland State University and the Steel Bridge approach ramp is approximately 1.8 miles. A track turnaround would be constructed at SW Jackson Street. A new ramp will be constructed between the west approach to the Steel Bridge and NW Third Avenue. To construct the track, existing impervious area would be removed and replaced with an impervious trackway. No new impervious area is anticipated as a result of the South Corridor Light Rail Project within the downtown Portland segment as the area within the limits of construction work is currently impervious (concrete or asphalt). The new light rail would cross the Willamette River over an existing bridge structure.

TriMet would operate electric trains approximately every 3 minutes during the peak hours and every 5 minutes during off-peak hours. Buses, which stop every two blocks in downtown, would stop every four blocks resulting in fewer stops and less dwell- time.

The South Corridor Project will be subject to the City of Portland Bureau of Environmental Services (BES) Stormwater Manual. The manual requires the treatment of stormwater quality and quantity in the downtown Portland area. Detention of stormwater in this part of the project area would be expensive. TriMet has committed to work with BES to implement their stormwater manual through negotiations that could include various solutions such as off-site improvements and/or participation in the BES "wet weather" program.

I-205 Segment

Light rail improvements within the I-205 segment would include the construction of 6.5 miles of concrete tie-and-ballast trackway (no creosote-treated wood will be used), eight stations and five park-and-ride lots. For the first 3.1 miles (heading from north to south), the light rail alignment would be constructed on ROW set aside for high capacity transit when the Oregon Department of Transportation (ODOT) developed the I-205 Freeway (Gateway to SE Foster Rd). This reserved ROW has been cleared, grubbed, and graded to be ready for light rail improvements. The remaining 3.4 miles would be within or directly beside the ODOT ROW, generally as close to I-205 as ODOT will allow. The amount of new impervious area estimated to result from the proposed action is approximately 15.8 acres, although this could change as the project design is developed.

The majority of the new impervious surface is generated by the addition of park-and-ride lots and stations. The light rail trackway would be constructed in a manner that would allow infiltration of stormwater. Specifically, the light rail trackway would be constructed of sub-ballast with larger ballast material supporting concrete ties supporting the rails. Consistent with the precedent set on the Westside, Interstate Max, and Airport projects, this trackway is considered pervious and non-polluting.

All the proposed park-and-ride lots along I-205 would include facilities designed to provide water quality treatment of the 6-month, 24-hour storm event, consistent with the NOAA Fisheries' HCD On-line Stormwater Guidance for stormwater generated by new impervious surfaces. Vegetated water quality swales will be used either alone or in a treatment circuit with proprietary devices as the treatment facility at most locations. If site constraints limit the use of swales, the required treatment will be provided by proprietary devices.

One hundred percent of the stormwater from the design storm will be detained by infiltration of treated stormwater in underground injection wells (drywells) designed in accordance with the Oregon Department of Environmental Quality (DEQ) standards. Should site conditions limit the use of drywells in some locations, TriMet will provide detention in accordance with guidelines and dispose of stormwater to municipal systems in accordance with their requirements. In addition, numerous trees and shrubs will be planted within and around each park-and-ride lot, to provide cooling shade and increase evapotranspiration, with the exception of the structured lot at Clackamas Town Center.

In addition to trackways, bridges, light rail stations and park-and-ride lots, TriMet would require a number of small system buildings to provide electric propulsion power to the light rail system and to provide signal and communications for the system. Stormwater would flow off of the roofs of these buildings and be infiltrated in soakage trenches. Driveways to access these buildings would be constructed using pervious paving materials. TriMet will also need to expand operating and maintenance facilities at Ruby Junction near SE 200th Avenue on the Eastside Light Rail line and Elmonica near SW 170th Avenue on the Westside Light Rail Line. These improvements would include the addition of concrete tie-and-ballast trackway and some minor additions to existing buildings.

SE Main Street Station and Park-and-Ride Lot

At SE Main Street and SE 96th Avenue, a 424-space surface park-and-ride lot and a light rail station consisting of a center platform and shelters would be constructed. This area is maintained as grass. This park-and-ride lot would include water quality swales designed to treat the 6-month, 24-hour storm event stormwater. Drywells would be designed to provide adequate infiltration of stormwater. The station and park-and-ride lot would result in 0.2 acres and 2.9 acres of new impervious surface, respectively. More than 70 trees and hundreds of shrubs would be planted within and around the Main Street park-and-ride lot.

Division Street Station

The next station moving south along the alignment would be at SE Division Street and would create less than 0.1 acres of new impervious surface. Stormwater would run off the shelters onto the light rail platforms. The light rail platforms would be constructed with sand set pavers allowing for stormwater infiltration. Excess water would sheetflow onto the adjacent grassy area or the trackway. No connection to stormwater systems is anticipated. This approach will be used at all of the I-205 segment stations that would not have associated parking lots.

Powell Boulevard Station and Park-and-Ride Lot

Further south, the alignment would cross over SE Powell Boulevard on a new bridge. Stormwater from the bridge would be collected, treated and infiltrated in a drywell or soakage trench. Stormwater falls onto SE Powell Boulevard and is untreated before entering the municipal stormwater system. The Powell Bridge includes less than 0.1 acres of new impervious area.

The second park-and-ride lot, near Powell Boulevard, would include spaces for 400 automobiles. Stormwater would be collected and treated in water quality swales and/or proprietary devices before being infiltrated in a drywell system. This area is planted as grass and is maintained by ODOT. The park-and-ride lot would result in approximately 2.8 acres of new impervious area and the associated station would result in 0.3 acres.

Holgate Boulevard Station and Park-and-Ride Lot

The Holgate Station would include a 125-space surface park-and-ride lot and would result in 0.1 and 1.1 acres of new impervious pavement, for the station and lot respectively. Stormwater

would be collected, treated and infiltrated in a drywell system. This existing grass area is maintained by ODOT. Trees would be planted around, and within, the park-and-ride lot.

South of the Holgate Station, the light rail alignment would cross over SE Harold Street on a new bridge structure. Stormwater falls onto SE Harold Street and enters the stormwater system without treatment. The light rail bridge would result in 0.05 acre of new impervious area. Stormwater would be collected, treated and infiltrated in a drywell or a soakage trench system.

Foster Road Station and Park-and-Ride Lot

The Foster Road Station would include a 150-space park-and-ride lot near Lents Town Center. The area being considered for a park-and-ride site is being used for existing parking lots and buildings. The proposed park-and-ride would increase impervious area by approximately 0.9 acres and the station would add 0.6 acres. Stormwater would be collected and treated in swales and infiltrated in a drywell system. Shrubs and trees would be planted in and around the park-and-ride lot. Stormwater falling on the existing impervious area is untreated.

Flavel Street Station

The light rail alignment would cross over SE Woodstock and SE Flavel Streets on new bridge structures that would also include an ODOT bike path. Most of the area below the bridge is already impervious roadway and parking lots with stormwater flowing untreated to the existing stormwater system. As part of the proposed action, stormwater would be collected from the new structure, treated and infiltrated in a soakage trench or drywell system or combination. This bridge would increase impervious area by 0.2 acres.

The rail line would cross the existing Springwater Trail on a new bridge. The area below the bridge includes an asphalt path with adjacent grassy area. The new structure would result in 0.05 acres of new impervious area. Stormwater would be treated in swale or infiltrated in drywell or soakage trench.

At the proposed new station near SE Flavel Street (Flavel Street Station) stormwater would be treated in a similar manner to other stations and would result in 0.1 acre of new impervious area. South of the Flavel Street Station, the light rail alignment location would require that an ODOT-owned and maintained concrete-lined stormwater conveyance ditch be modified. Stormwater from the I-205 Freeway would be placed in a new pipe and would be conveyed to an existing pipe or relocated outfall on the south bank of Johnson Creek. This modification is described in more detail below. Additional water quality treatment and quantity attenuation for runoff from I-205 beyond what currently exists is not proposed as part of this project at this location due to physical space and funding constraints. The proposed action does not preclude ODOT from retrofitting this site for additional stormwater treatment in the future.

Stormwater from the proposed new light rail bridge across SE 92nd Avenue (just south of the Flavel Street Station) would be collected and pre-treated in a mechanical device or vegetated swale, and either infiltrated (as space allows), or connected to an existing municipal storm

conveyance system under SE 92nd Avenue that would outfall to Johnson Creek. Stormwater from the section of SE 92nd Avenue that would be covered by the new bridge is untreated before it is collected and conveyed to Johnson Creek. The proposed bridge structure would result in approximately 0.2 acre of new impervious area. However it would be built in part over existing impervious surface at SE 92nd Avenue.

Further south, the alignment would cross over Johnson Creek Boulevard on a new bridge that would result in 0.8 acre of new impervious area. Stormwater would be collected and pre-treated in a vegetated swale and infiltrated in a drywell or soakage trench system.

Johnson Creek Bridge

The proposed light rail alignment would cross over Johnson Creek on a new bridge(s) to be perpendicular to the stream. This crossing could be accommodated by either a single bridge, approximately 32 feet wide, or with two 18-foot wide bridges. In either case, the bridge will be designed to have 2 feet of freeboard above the Federal Emergency Management Agency (FEMA) 100-year floodway elevation and would be approximately 120 feet in length. A potential benefit of two bridges as opposed to one would be the ability to daylight the riparian and near-shore areas under the bridges, allowing for more native vegetation to grow than would under the low-light conditions of a single span bridge.

Although it is understood that the ordinary high water mark (OHWM) of Johnson Creek in this location has little functional meaning because of existing conditions, including highly altered hydrology from urbanization and the 70+ year-old concrete lining, efforts to avoid and minimize impacts from bridge design and construction have been incorporated into the proposed action. These minimization measures include a bridge design that would not place piers, bents, footings or bridge supports below the OHWM of Johnson Creek, and avoiding and minimizing impacts to the FEMA 100-year floodplain that could occur during construction. Additional bridge design detail will be determined in the Preliminary Engineering phase and performance criteria will be based in part on providing the best environmental solution.

A pre-cast bridge design will be used to avoid in-water construction. It is not anticipated that in-water work would be required to complete the new bridge, however, because of the early-design stage of the proposed action and the nature of the design-build process, in-water work isolation and fish salvage may be needed. The Oregon Department of Fish and Wildlife (ODFW) defined in-water work period for Johnson Creek as June 1 to August 31 (ODFW 2000). In the event that in-water work is unavoidable, in-water construction would be limited to the approved ODFW in-water work window. Construction work would occur over and beside Johnson Creek outside the in-water work period. Pilings may or may not be required.

The existing banks of Johnson Creek were hardened with concrete in the 1930s and very little native vegetation exists in this location. Stormwater treatment in this part of the proposed action is mixed; a portion of the area includes stormwater conveyance occurring in vegetated swales that would allow for some infiltration and unquantifiable water quality treatment, and some untreated areas that would sheetflow or would be conveyed directly into Johnson Creek.

As the proposed light rail alignment approaches Johnson Creek, the location of the light rail alignment would require removing an existing concrete-lined ditch. This ditch conveys stormwater from I-205 to Johnson Creek. As part of the proposed action, approximately 1.5 acres of stormwater coming from the ODOT ROW (I-205) would be treated in a new swale constructed between the light rail line and the relocated bike path. This swale would be sized to treat the 6-month, 24-hour water quality storm event, and would result in a limited amount of infiltration. The construction of the new swale and removing the concrete-lined ditch would create a net gain of 0.4 acres of new pervious area over the existing conditions near Johnson Creek. The remainder of the stormwater from ODOT's I-205 Freeway would be collected in new piping and conveyed untreated to existing or potentially relocated outfalls on Johnson Creek. Additional attenuation of water quantity from ODOT's I-205 Freeway in this location would be difficult and costly because of limited physical space due to existing development, the very clayey soils and high water table. This area is also mapped as being in or very near the FEMA 100-year floodplain.

Fuller Road Station and Park-and-Ride Lot

The park-and-ride lot at Fuller Road is a 628-space surface facility that would be west of SE Fuller Road between SE Otty Road and SE Johnson Creek Boulevard. Stormwater design for this park-and-ride would be similar to the other park-and-ride lots. Stormwater would be collected, treated (likely requiring swales in combination with proprietary devices) and infiltrated in drywells. This area includes approximately 12 single-family residences with associated driveways and structures. The new impervious surface area created by this new facility would be 4.4 acres.

As a part of recent expansion of the I-205 Freeway, ODOT constructed a stormwater quality treatment facility along the west side of the freeway ("ODOT Swale"). As a consequence of the proposed construction, this facility would be displaced. The lost function would be replaced through mitigation. A location on the east side of the northbound I-205 Freeway lanes just south of SE Otty Road has preliminarily been identified for a potential in-kind replacement of this facility. Stormwater would sheetflow from the freeway lanes, be treated through a new vegetated swale, detained and then conveyed to Phillips Creek through an existing stormwater conveyance pipe. If site conditions limit in-kind replacement, FTA and its partners will investigate replacement of this function within the Phillips Creek watershed, or replacement of this function in the Mt. Scott watershed in coordination with NOAA Fisheries staff.

Clackamas Regional Center Transit Center

The southern-most park-and-ride lot would be at the Clackamas Town Center, a 90-acre shopping center and parking facility with no stormwater treatment. Runoff from the existing facility is conveyed into Phillips Creek. The new park-and-ride facility would include a 500-space structured garage with a transit center on the first floor. Stormwater from the roof of this structure would be collected, treated with stormwater planters and/or in combination with proprietary devices and infiltrated in a drywell system. If soil conditions do not allow infiltration, then the required detention would be provided on site, and flows directed to an

existing stormwater conveyance system that connects to Phillips Creek. The new facility would result in approximately 0.7 acre of new impervious area as a result of the station and park-and-ride lot, but would provide treatment of 2.0 acres for a net gain in water quality and quantity treatment. As a result of the proposed action, there would be a net gain of 1.3 acres of treated impervious surface at this site.

1.2.4 Proposed Conservation Measures

FTA proposes to use a combination of best management practices (BMPs) to avoid and minimize impacts to sensitive natural resources during construction. These BMPs are included in Appendix B of the BA, and are based on the programmatic consultation biological opinion for the U.S. Army Corps of Engineers (COE) Standard Local Operating Procedures for Endangered Species II (SLOPES II). In addition, activities will comply with the City of Portland BES Erosion Control Manual. FTA will provide photo documentation of the construction and operation of the proposed water quality and detention facilities. TriMet will also monitor these improvements, including the plantings, for a period of 5 years.

2. ENDANGERED SPECIES ACT

2.1 Biological Opinion

2.1.1 Biological Information

The Willamette River serves as a migration corridor for the listed Chinook salmon and steelhead evolutionarily significant units (ESU) and the proposed coho salmon ESU under consideration in this Opinion. Project activities are unlikely to directly affect fish in the Willamette River, although indirect effects may occur through changes to water quality and hydrology as a result of new impervious surface. The project area includes Johnson Creek, a tributary to the Willamette River, and Phillips Creek, a tributary of Mt. Scott Creek which also flows into the Willamette River via Kellogg Creek. Johnson Creek in the project vicinity provides migratory habitat for steelhead and coho salmon, and may also serve as a feeding and rearing area for sub-yearling Chinook and coho salmon, and steelhead. Essential features of the area for the species are: (1) Substrate; (2) water quality; (3) water quantity; (4) water temperature; (5) water velocity; (6) cover/shelter; (7) food (juvenile only); (8) riparian vegetation; (9) space; and (10) safe passage conditions (see 65 FR 7764). The proposed action within the action area serves as a rearing and migration area for listed species considered in this Opinion. The essential habitat features that the proposed project may affect are substrate, water quality, water quantity, cover/shelter and food (juvenile), riparian vegetation, and safe passage conditions.

References for further background on listing status and biological information and critical habitat can be found in Table 1. According to a recent draft of "Preliminary conclusions regarding the updated status of listed ESUs of West Coast salmon and steelhead," drafted by the

West Coast Salmon Biological Review Team (BRT), a number of ESUs were determined by the majority of the BRT as "likely to become endangered in the foreseeable future" including LCR Chinook salmon, LCR steelhead, and LCR coho salmon (NOAA Fisheries 2003). Biological information for each listed ESU considered in this Opinion are discussed below.

Lower Columbia River Chinook

LCR Chinook salmon includes both fall-fun and spring-run stocks. Adults migrating to the Clackamas River may be present in the lower Willamette River starting in August and continuing through November, with peak migration occurring in September and October. Juveniles in this ESU would be expected in the lower Willamette River starting in March, continuing through July, with the peak occurring in April, May and June.

Threats to Chinook spawning and rearing habitat in the LCR ESU continue to be habitat degradation and loss due to extensive hydropower development projects, urbanization, logging, and agriculture.

Chinook salmon probably enter Johnson Creek to spawn during mid-September through October. Fry emerge from gravels in January or February. Unlike steelhead or coho salmon, Chinook salmon only spend a few weeks near spawning grounds before migrating to the ocean, and they are usually out of Johnson Creek by June. It is likely that most Chinook salmon found in the Johnson Creek system are either strays or fish seeking refuge from high flows in the Willamette River.

Phillips Creeks supports fall Chinook salmon in the lower reaches.

Lower Columbia River Steelhead

Based on the updated information provided in the BRT report (NOAA Fisheries 2003), the information contained in previous LCR status reviews and preliminary analyses, the number of historical and currently viable populations have been tentatively identified. Like the previous BRT, the current BRT could not conclusively identify a single population that is naturally self-sustaining. Over the period of the available time series, most of the populations are in decline and are at relatively low abundance. No population has a recent mean greater than 750 spawners. In addition, many of the populations continue to have a substantial fraction of hatchery origin spawners.

LCR steelhead move through the action area throughout the year. Peak movement is expected from late April through May. In Johnson Creek, winter-run adult steelhead return to spawn from mid-November through May. Two separate runs appear to peak in January/February, and again in April/May. Eggs or salmon fry can be present in the gravel from December to July. Juveniles can remain in Johnson Creek for one to two years before migrating as smolts to salt water. Steelhead are likely to use the mainstem Johnson Creek and tributaries.

Both winter and summer steelhead have been documented in Phillips Creek.

Lower Columbia River Coho Salmon

The BRT recently reviewed the status of the LCR coho salmon (NOAA Fisheries 2003). In the previous review concluded in 2001, the BRT was very concerned that over 90% of the historical populations in this ESU appeared to be extirpated or nearly so. The two populations with any significant production (Sandy and Clackamas) were at appreciable risk because of low abundance, declining trends, and failure to respond after a dramatic reduction in harvest. The most recent review was completed in 2003. Information collected for the review indicated that the ESU is dominated by hatchery-origin spawners, but there are some potential pockets of natural production. Johnson Creek is not specifically discussed in the review, but is included as part of the Clackamas population. The BRT agreed with earlier conclusions that only two populations have demonstrated appreciable levels of natural production, and added that both have experience recruitment failure over the last decade. From the 2001 review, there is only very limited information on the remainder of the 21 populations, but most were considered extirpated, or nearly so, during the low marine survival period of the 1990s. However, recently-initiated spawner surveys by ODFW and juvenile outmigrant trapping by Washington Department of Fish and Wildlife indicate there is some natural production in the Lower Columbia River. Unfortunately, the majority of populations remain dominated by hatchery-origin spawners, and there is little data to indicate they would naturally persist in the long term (NOAA Fisheries 2003).

Historically, coho salmon were observed in the lower reaches of Johnson Creek and Crystal Springs Creek from late September through early November. Eggs or fry could be in the gravels between October and March. Fry attempt to establish territories and remain in streams as juveniles for one to two years before smolts migrate to the sea. Both juvenile and adult coho salmon have been observed in Johnson Creek.

2.1.2 Evaluating Proposed Actions

The standards for determining jeopardy and destruction or adverse modification of critical habitat are set forth in section 7(a)(2) of the ESA as defined by 50 CFR Part 402 (the consultation regulations). In conducting analyses of habitat-altering actions under section 7 of the ESA, NOAA Fisheries uses the following steps of the consultation regulations combined with the Habitat Approach (NMFS 1999): (1) Consider the status and biological requirements of the species; (2) evaluate the relevance of the environmental baseline in the action area to the species' current status; (3) determine the effects of the proposed or continuing action on the species and whether the action is consistent with the available recovery strategy; (4) consider cumulative effects; and (5) determine whether the proposed action, in light of the above factors is likely to appreciably reduce the likelihood of species survival in the wild or destroy or adversely modify critical habitat. In completing this step of the analysis, NOAA Fisheries determines whether the action under consultation, together with cumulative effects when added to the environmental baseline, is likely to jeopardize the ESA-listed species. If NOAA Fisheries finds that the action is likely to jeopardize the listed species, NOAA Fisheries must identify reasonable and prudent alternatives for the action.

2.1.3 Biological Requirements

The first step in the methods NOAA Fisheries uses for applying the ESA section 7(a)(2) to listed salmonids is to define the species' biological requirements that are most relevant to each consultation. NOAA Fisheries also considers the current status of the listed species taking into account population size, trends, distribution and genetic diversity. To assess to the current status of the listed species, NOAA Fisheries starts with the determinations made in its decision to list the species for ESA protection and also considers new data available that are relevant to the determination.

The relevant biological requirements are those necessary for the listed species to survive and recover to a naturally-reproducing population level, at which time protection under the ESA would become unnecessary. Adequate population levels must safeguard the genetic diversity of the listed stock, enhance its capacity to adapt to various environmental conditions, and allow it to become self-sustaining in the natural environment.

For this consultation, the biological requirements are improved habitat characteristics that function to support successful adult and juvenile migration and rearing. Listed Pacific salmonid survival in the wild depends on the proper functioning of certain ecosystem processes, including habitat formation and maintenance. Restoring functional habitats depends largely on allowing natural processes to increase their ecological function, while removing adverse impacts of current practices. The current status of the listed species covered by this Opinion, based on their risk of extinction, has not significantly improved since they were considered for listing.

2.1.4 Environmental Baseline

In step 2 of NOAA Fisheries' analysis, we evaluate the relevance of the environmental baseline in the action area to the species' current status. The environmental baseline is an analysis of the effects of past and ongoing human-caused and natural factors leading to the current status of the species or its habitat and ecosystem within the action area. The action area is defined by NOAA Fisheries regulations (50 CFR 402.02) as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." The action area for this project, therefore, includes the water column, streambed, and banks of Johnson Creek from the upstream extent of construction activities, downstream to the extent of visible turbidity resulting from construction activities (approximately 100 feet downstream from the disturbance area). The action area also includes Veterans Creek, Phillips Creek from I-205 until its confluence with Mt. Scott Creek, and the Willamette River from downtown Portland to the Steel Bridge. While in-water work is not required for the downtown Portland activities and no new impervious surface will be required, water quality in downtown Portland is very poor and drains directly to the Willamette River. Water quality of the stormwater runoff does not meet the biological requirements of listed salmonids in the Willamette River, and the proposed action in downtown Portland has the potential to continue the existing trend. Consequently, the action

area is within the Willamette River basin, and the Johnson Creek watershed and the Mt. Scott Creek watershed. The environmental baseline conditions in these areas are described below.

Willamette River Basin

The Willamette River basin covers approximately 11,500 square miles in northwest Oregon between the Coast and Cascade mountain ranges. The river travels 187 miles from its headwaters to its mouth at the Columbia River. Most of the rainfall occurs in the fall, winter, and spring, with little rainfall during June, July, and August. The lowest river flow occurs during late summer. The 13 COE dams on tributary systems largely regulate flows in the mainstem Willamette River.

Significant changes have occurred in the watershed since the arrival of Europeans in the 1800s. The watershed was mostly forested land before the arrival of white settlers. Now, about half the basin is still forested. One-third of the basin is used for agriculture, and about 5% is urbanized or is in residential use. The river receives direct inputs from treated municipal wastes and industrial effluents. Nonpoint source input from agricultural, silvicultural, residential, urban and industrial land uses are also significant, especially during rainfall runoff.

The Willamette River, from its mouth to Willamette Falls, is on the 1998 DEQ 303(d) list as water quality limited for the following parameters: Temperature (summer), bacteria, biological criteria (fish skeletal deformities), and toxics (mercury in fish tissue). Results from DEQ ambient monitoring data indicate that 68% of the values at RM 7, and 61% of the values at rivermile 13.2 collected during the summer exceed the temperature standard of 68°C. Sediment conditions in the Willamette River watershed range from excellent in some of the upper tributaries to poor in much of the mainstem of the river (Altman *et al.* 1997). In the lower Willamette River, average turbidity levels tend to be higher in fall and winter. Monthly average turbidity ranges from 4 to 149 nephelometric turbidity units (NTUs).

In 1997, DEQ and the U.S. Environmental Protection Agency (EPA) took sediment samples within the Portland Harbor. The results of the study indicated that sediments in the harbor, contain concentrations of metals, polychlorinated biphenols (PCBs), pesticides, herbicides, dioxins/furans, tributyltin (TBT), and polynuclear aromatic hydrocarbons (PAHs) above EPA contaminant guidelines. Cleanup of the contaminated sediments is presently being addressed under the Federal Superfund process. In addition, the skeletal deformities in fish upstream of Willamette Falls suggests that there may also be chemical contamination upstream of the Portland Harbor area that make these fish more susceptible to parasites.

As part of the Remedial Investigation (RI) for the Portland Harbor Superfund, a group of potentially liable parties (the Lower Willamette Group) along with DEQ and EPA, have been investigating the physical, chemical and biological characteristics of the Portland Harbor. At least two more years of data collection will be conducted before completion of the RI for the Portland Harbor. Past and current stormwater discharges to the Willamette River are being investigated for their role in the poor conditions in the harbor.

Habitat conditions within the lower Willamette River are highly degraded. The streambanks have been channelized, off-channel areas removed, tributaries put into pipes, and the river has been disconnected from its floodplain as the lower valley was urbanized. Silt loading to the lower Willamette River has increased over historic levels due to logging, agriculture, road building, and urban and suburban development within the watershed. The river in the project area has a soft bottom, with little or no aquatic vegetation. Limited opportunity exists for large wood recruitment to the lower Willamette River due to the paucity of mature trees along the shoreline, and the lack of relief along the shoreline to catch and hold the material. The banks of the river in the action area are heavily industrialized, with much of the bank hardened with riprap, vertical concrete walls, and docking facilities. Much of the historic off-channel habitat has been lost due to diking and filling of connected channels and wetlands. Columbia Slough, downstream from the project site, is the closest remaining off-channel habitat. Connections between the slough and the river have been cut off, and dikes have been constructed along much of the slough.

In addition to the previously discussed salmonids, sockeye salmon, American shad, and white sturgeon occur in the lower Willamette River. Cutthroat trout are also present, but their abundance is low. Both juveniles and adults use the lower Willamette River as a migratory corridor and as rearing habitat for juveniles. Historically, Willamette Falls was impassable to fall Chinook salmon, coho salmon, chum salmon, and cutthroat trout. Only steelhead and some spring Chinook salmon were known to ascend the falls. Fish passage facilities were constructed at the falls in the early 1900s, and were upgraded in 1971, however, the passage facilities are inefficient, and delay upstream migration.

The City of Portland and ODFW have completed a four-year study to evaluate relationships between fish communities and waterway developments. Three years of the collected data have been analyzed and are discussed here (ODFW 2003). Juvenile salmonids are present in the lower Willamette River during every month sampled. In both sampling years, the abundance of all juvenile salmonids increased beginning in November, peaked in April, and declined to near zero by July. Some of the larger juveniles may spend extended periods of time in off-channel habitat. Mean migration rates of juvenile salmonids ranged from 2.7 km/day for steelhead to 8.6 km/day for sub-yearling chinook salmon. Residence time in the lower Willamette River ranged from 4.9 days for chinook to 15.8 days for steelhead. Catch rates of juvenile salmonids were significantly higher at sites composed of natural habitat (*e.g.*, beach, rock) and alcoves. Juvenile salmonids tended to move along the east bank of the river.

Johnson Creek Watershed

Johnson Creeks flows 25 miles from the headwaters to its mouth at rivermile 18 of the Willamette River. The headwaters flow through undeveloped open space and agricultural lands before reaching the urbanized reaches of the lower river, including the project area. Factors that limits salmon use in Johnson Creek include siltation of spawning beds from construction and logging runoff, physical alteration of instream habitat, channelization, degradation of riparian

habitat, increased water temperatures, discharge of untreated or poorly treated stormwater runoff, changes to hydrology, and the presence of man-made fish passage barriers.

A major issue in this watershed has been flooding, which has been exacerbated by development in the floodplain, channelization of the river in the 1930s by public works projects, and increased imperviousness of the watershed. Riparian corridors are typically narrow and consist primarily of sapling trees, mature shrubs, and native and non-native herbaceous species. Large tracts of forested areas are uncommon and occur primarily in the upper watershed. Water quality in Johnson Creek is poor and the creek is water quality limited for fecal coliform, dichlorodiphenyltricholorethane (DDT), dieldrin, PCBs, and PAHs, chlordane and summer temperature (DEQ 2002). DEQ is developing a total maximum daily load (TMDL) for Johnson Creek. The TMDL is scheduled to be completed with the rest of the Willamette River TMDLs in 2004.

As a response to the 303(d) water quality listings and the ESA listings, the jurisdictions within this watershed have jointly developed a plan for restoration which includes removal of fill and structures in the floodplain and restoration of instream habitat. The plan identifies future remedial actions within each reach of Johnson Creek.

Within the project area, Johnson Creek is confined in its channel by steep banks that are fully lined with concrete. The concrete lining was placed in the 1930s for flood and erosion control and to 'fix' the channel location. The rebar-reinforced concrete appears to be four to six inches think, and soils have accumulated on top of the concrete lining at varying depths. Sparse willows are growing in some of the soils on top of the concrete lining. There is a bench of accumulated soil at top of the concrete bank that has developed some wetland characteristics. Native woody plants were recently installed and non-native species removed as part of the ongoing efforts by the City of Portland to restore functions to Johnson Creek.

The channel width in the project area is approximately 65 feet, with an average depth of 2 to 3 feet. Riparian vegetation is limited and provides no shade to the creek.

A tributary to Johnson Creek, Veterans Creek, would be intersected by the proposed rail alignment. Veterans Creek enters Johnson Creek just east of the I-205 bridge via a corrugated metal pipe culvert with an outfall approximately two feet above the streambed. Veterans Creek originates in springs and small ponds on Mt. Scott, less than 0.75 miles upstream from Johnson Creek.

Mt. Scott Creek Watershed

Phillips Creek is within the Mt. Scott Creek sub-watershed, entering Mt. Scott Creek after crossing under SE 82nd Avenue, just north of the Southern Pacific Railroad line. Mt. Scott Creek originates in an area known as the Boring Lava Domes. Mt. Scott and Mt. Talbert are prominent features of this geologic formation. The watershed drains 9.26 square miles of hilly terrain in the east and valley lowlands to the west. The upper half of the basin drains about

1,000 acres, which consists of a combination of private land, suburban greenspace, and some agricultural land. The lower half of the watershed is residential and heavy industrial, with a very narrow riparian fringe along Mt. Scott Creek.

Phillips Creek flows into Mt. Scott Creek just west of 82nd Ave. Between I-205 and 82nd Ave, one branch of Phillips Creek is in a culvert as it flows under the Clackamas Town Center. The main branch of Phillips Creek flows west of the Clackamas Town Center, and the creek is restricted from its floodplain by severe downcutting and impervious surfaces at or near the top of both sides of the creek bank in several areas. The active channel width is approximately 23 feet, with low to moderately graded banks that are reinforced at road crossings. Riparian vegetation upstream of SE McBride Street consists of young deciduous trees and shrubs extending less than half the active channel width that provide moderate shade, while downstream from SE McBride, vegetation is limited to shrubs and grass, Himalayan blackberry and other non-native species. Habitat quality is very poor with the gravels embedded with fine sediments, and few pools. Average water depth is less than one foot.

No passage barriers exist at the SE 80th and McBride Street crossing. However, low summer flow may impede fish passage. The culvert under SE 82nd Avenue downstream likely presents a barrier to fish passage. Phillips Creek was listed in 2002 for fecal coliform on the DEQ 303(d) List of Water Quality Limited Water Bodies.

Based on this information as well as information in the BA, the environmental baseline within the action area is not adequate to meet the needs of migrating or rearing salmonids.

2.1.5 Effects of Proposed Action

In step 3 of the jeopardy analysis, NOAA Fisheries evaluates the effects of the proposed action on listed fish and their habitat.

Effects to Chinook salmon are not expected. Chinook salmon have not been observed in the project reaches of Johnson Creek, Veterans Creek or Phillips Creek, and water temperature and low flows during the summer work period would likely preclude their presence. The greatest potential for effect is associated with the expected increased turbidity from in-water work at Johnson Creek (which may not be necessary); however, even this scenario is unlikely because turbidity would likely dissipate to background before reaching the lower reaches of Johnson Creek where Chinook salmon presence is more likely.

However, adverse effects to steelhead are expected because adult and juvenile steelhead have been observed in the project reach of Johnson Creek, and juveniles may be present during the summer work period. Effects to coho salmon are less likely because of their low level of occurrence in Johnson Creek and the other project streams. The proposed action is reasonably likely to cause take of ESA-listed species due to disturbance and an increase in turbidity during

in-water work or work beside Johnson Creek, Veterans Creek and Phillips Creek, and degraded water quality and hydrology through increased impervious area.

Short-Term Effects of Construction

Project activities in downtown Portland will not affect habitat in the lower Willamette River and will not affect water quality or hydrology over the short term. Project activities will not occur within the riparian area of the Willamette River, and erosion control strategies will be effective at keeping sediment out of the Willamette River including direct runoff and runoff through the City of Portland stormwater pipes.

The effects of the proposed construction activities on the Johnson Creek sub-watershed (including Veterans Creek) and the Mt. Scott Creek watershed (Phillips Creek) are expected to be limited to temporary, local, and will result in no long-term change to the environmental baseline.

At the current level of project design, FTA does not know whether in-water work will be required in Johnson Creek. The current plans show that the bridge bents are outside of the wetted channel but within the riparian zone. As the design develops, bridge bents may be required within the wetted channel. If this is needed, the in-water work area will be isolated and fish salvaged from the isolation area. Any listed fish that is salvaged would experience high stress with the possibility of up to 5% delayed mortality rate depending on the rescue method. Fish handling will only occur if in-water work is required, and will be very limited in spatial extent. Consequently, the effects are not expected to be significant over the long term.

The footprint of the proposed action is large and dispersed across the landscape. Most of the land-disturbing activities will take place away from creeks and riparian areas. For these areas, the likelihood of increased turbidity in streams would be low because of the incorporation of BMPs such as the development and implementation of an erosion control plan. However, in three locations the land-disturbing activities will be beside streams. For Veterans Creek and Phillips Creek, listed salmonids are not expected to be present in the action area, therefore the potential for turbidity effects is extremely low. The possibility for effects is much greater in Johnson Creek which provides habitat to listed LCR steelhead and LCR coho salmon within the project area, and habitat for LCR Chinook salmon downstream from the project area. Despite good erosion controls, increased turbidity in Johnson Creek is expected during project activities such as clearing and grubbing of vegetation in the riparian area, pile driving in the riparian area, and auguring of piles to support the pile cap, also in the riparian area. The risk of turbidity increases dramatically if in-water work in Johnson Creek is required to build the bridge. The downstream extent of increased turbidity will be limited because the low flow conditions will minimize the sediment transport capacity of the creek. Furthermore, the project design was developed to minimize turbidity increases through erosion control BMPs. Potential effects from project-related increases in turbidity on LCR steelhead and LCR coho salmon include, but are not limited to: (1) Reduction in feeding rates and growth; (2) increased mortality;

(3) physiological stress; (4) behavioral avoidance; (5) reduction in macroinvertebrate populations; and (6) temporary beneficial effects. Potential beneficial effects include a reduction in piscivorous fish/bird predation rates, enhanced cover conditions, and improved survival conditions.

At moderate levels, turbidity can reduce primary and secondary productivity and, at high levels, turbidity can interfere with feeding and can injure and kill both adult and juvenile fish (Spence *et al.* 1996, Bjornn and Reiser 1991). Other behavioral effects on fish, such as gill flaring and feeding changes, have been observed in response to pulses of suspended sediment (Berg and Northcote 1985). Fine, redeposited sediments can also reduce primary and secondary productivity (Spence *et al.* 1996), and reduce incubation success and interstitial rearing space for juvenile salmonids (Bjornn and Reiser 1991). Salmonids have been observed to move laterally and downstream to avoid turbid plumes (Sigler *et al.* 1984, Lloyd 1987, Servizi and Martens 1991). Juvenile salmonids tend to avoid streams that are chronically turbid, such as glacial streams or those disturbed by human activities, except when the fish must traverse these streams along migration routes (Lloyd *et al.* 1987). In contrast, turbid water can provide cover and refuge from predation from piscivorous fish and birds (Gregory and Levings 1998). In habitats with intense predation pressure, this provides a beneficial trade-off of enhanced survival in exchange for physical effects such as reduced growth.

Exposure duration is a critical determinant of whether turbidity causes physical or behavioral effects and the extent of those effects (Newcombe and MacDonald 1991). Salmonids have evolved in waters that periodically experience short-term pulses (days to weeks) of high suspended sediment loads, often associated with floods, and are adapted to such high pulse exposures. Adult and larger juvenile salmonids appear to be little affected by the high concentrations of suspended sediments that occur during storm and snowmelt runoff episodes (Bjornn and Resiser 1991). However, chronic exposure can cause physiological stress that can increase maintenance energy and reduce feeding and growth (Redding *et al.* 1987, Lloyd 1987, Servizi and Martens 1991).

Increases in suspended sediment can adversely affect filter-feeding macroinvertebrates and fish feeding. At concentrations of 53 to 92 parts per million (ppm) (24 hours) macroinvertebrate populations were reduced (Gammon 1970). Concentrations of 250 ppm (1 hour) caused a 95% reduction in feeding rates in juvenile coho salmon (Noggle 1978). Concentrations of 1200 ppm (96 hours) killed juvenile coho salmon (Noggle 1978). Concentrations of 53.5 ppm (12 hours) caused physiological stress and changes in behavior in coho salmon (Berg 1983, cited in Newcombe and Jensen 1996).

Johnson Creek is not properly functioning for sediment and turbidity. Over the long term, the proposed action will maintain this parameter. As stated above, elevated turbidity from construction activities is expected in the work area and downstream from the work area. The high clay content soils increase the likelihood that fine sediments would harm habitat in Johnson Creek. These increases in turbidity are likely to increase physiological stress and displace

rearing juveniles. Since salmon actively avoid waters that are chronically turbid, adverse effects are less likely after the initial exposure; however, repeated pulses of turbidity that persist over a period of days or weeks may displace rearing salmon for longer periods, possibly reducing survival. While Johnson Creek within the project area provides little in the way of habitat for LCR steelhead and LCR coho salmon, there is potential for yearling and sub-yearling steelhead and coho to be present. The sub-yearling fish are more vulnerable, because yearling fish are better at tolerating turbid water. Both are vulnerable to increased physiological stress and potentially physical injury such as gill abrasion. Therefore, adverse effects related to turbidity are more likely for juvenile LCR steelhead and LCR coho salmon. The effects would be in the form of physiological stress and displacement, with the potential for reduced survival.

As with all construction activities, accidental releases of fuel, oil, and other contaminants may occur. Operation of the excavators, back-hoes, and other equipment requires the use of fuel, lubricants, and other substances which, if spilled into a waterbody or in the adjacent riparian zone, can injure or kill aquatic organisms. Petroleum-based contaminants, such as fuel, oil, and some hydraulic fluids, contain polycyclic aromatic hydrocarbons (PAHs), which can be acutely toxic to salmonids at high levels of exposure and can also cause chronic lethal and acute and chronic sublethal effects to aquatic organisms (Neff 1985). Fresh concrete spilled into an aquatic environment can result in a dramatic shift in the pH, and can result in lethal exposures to aquatic organisms.

Long-Term Effects of the Proposed Action

The effects of the 15.8 acres of new impervious areas are likely to result in long-term effects to streams in the action area from untreated and unattenuated stormwater (Paul and Meyer 2001, Booth and Jackson 1997, Richey 1982). These effects include:

- Increased frequency and severity of flooding;
- accelerated channel erosion and rates of sediment transport;
- alteration of streambed substrate size and composition;
- reduced base flow;
- alteration of energy inputs to streams;
- alteration of the natural temperature regime; and
- increased level of pollutants.

The effects of increased impervious area are often exacerbated by the loss of riparian forests and floodplains, which cause a decrease in evapotranspiration and increased surface runoff (Schueler 1994). The physical and chemical changes result in declines in healthy microbial and invertebrate communities (Klein 1979), and a reduction in fish diversity (Lichatowich 1999). Even with adequate habitat, water quality may not be suitable for a healthy biological community. In the last decade, the scientific community has worked to devise strategies to minimize the effects of growth and development on urban streams and watersheds (Horner and May 1999, Hager 2003). Low-impact development (LID) approaches treat rainfall on-site by attempting to integrate stormwater treatment into the site and building design to maintain

hydrological function and water quality across the watershed. LID attempts to model nature and match predevelopment hydrology through infiltrating, storing, filtering, evaporation, and detaining runoff. Essentially, the pre-development patterns are matched after development for rainfall pathways for surface runoff and infiltration to supply low summer flows through increased vegetation and enhanced opportunities for infiltration.

FTA has incorporated LID design elements into the proposed action to avoid and minimize the effects caused by the new impervious areas (parking lots, access roads, stations). These include:

- Pre-treatment and infiltration of 100% of the new impervious areas.
- Where 100% infiltration is not possible because of physical limitations (*e.g.*, soil conditions, space constraints), stormwater will be pretreated and detained before release into the receiving water.
- Treatment of existing untreated impervious areas where practicable, which will amount to approximately 5.6 acres of existing pavement. Combined with proposed treatment of new impervious surface, FTA proposes to treat approximately 135% of the new impervious area.
- Planting trees and shrubs along Johnson Creek and within the proposed parking lots.

FTA has also committed to working with the City of Portland to improving water quality in downtown Portland, most likely through the implementation of innovative strategies for treating stormwater. The treatment of stormwater could occur along the light rail alignment, or in other parts of lower Willamette River watershed affected by stormwater.

The new park and ride lots will be constructed using LID design elements (pervious pavement, swales, trees and shrubs), which will significantly reduce the potential for effects to hydrology and waterquality. By treating 135% of the new impervious area and incorporating a large number of plantings into the design, FTA and their partners may have a net benefit to watershed function over the long term.

2.1.6 Cumulative Effects

Cumulative effects are defined in 50 CFR 402.02 as those effects of "future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation." This is step 4 in NOAA Fisheries' analysis process. Future Federal actions ongoing operation of hydropower systems, hatcheries, fisheries, and land management activities are being (or have been) reviewed through separate section 7 consultation processes. Therefore, these actions are not considered cumulative to the proposed action.

NOAA Fisheries is not aware of any specific future non-federal activities within the action area that would cause greater impacts to listed species than presently occurs. Current trends in land use will continue with population growth expected in the headwaters of Johnson Creek and Mt.

Scott Creek. The new residential developments will add to the total impervious area of the sub-watersheds, thus potentially contributing to declining water quality and altered hydrologic regimes. NOAA Fisheries assumes that future private and state actions will continue at similar intensities as in recent years.

2.1.7 Conclusion

The final step in NOAA Fisheries' approach to determine jeopardy is to determine whether the proposed action is likely to appreciably reduce the likelihood of species survival or recovery in the wild. NOAA Fisheries has determined that when the effects of the proposed action addressed in this Opinion are added to the environmental baseline and cumulative effects occurring in the action area, it is not likely to jeopardize the continued existence of listed LCR Chinook salmon and LCR steelhead, when analyzing the effects of the proposed action on the biological requirements of the species relative to the environmental baseline, together with cumulative effects.

These conclusions are based on the following considerations: (1) Any in-water work is expected to be minimal and conducted during the summer in-water work window when salmonid presence is low in the Johnson Creek project area; (2) performance standards are proposed to limit turbidity increases; (3) the project design includes elements that will treat and detain stormwater, thus minimizing the potential for affects due to increased impervious area; (4) the proposed plantings will help retain the natural hydrologic regimes in the streams crossed by the proposed light rail alignment; and (5) the proposed action is not likely to impair properly functioning habitat, or retard the long-term progress of impaired habitat toward proper functioning condition essential to the long-term survival and recovery at the population or ESU scale.

In this Opinion, NOAA Fisheries also concludes that the proposed action is not likely to jeopardize the continued existence of LCR coho salmon which are proposed for listing as threatened under the ESA. As required by section 7 of the ESA, NOAA Fisheries has included an incidental take statement with reasonable and prudent measures and nondiscretionary terms and conditions that are necessary to minimize the impact of incidental take associated with this action. However, the incidental take statement does not become effective for LCR coho salmon until NOAA Fisheries adopts this conference opinion as a biological opinion, after the listing is final. Until the time that the species is listed, the prohibitions of the ESA do not apply to this proposed species.

2.1.8 Conservation Recommendations

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of threatened and endangered species. Conservation recommendations are discretionary measures suggested to minimize or avoid adverse effects of a proposed action on listed species, minimize or avoid

adverse modification of critical habitat, and to develop additional information. NOAA Fisheries believes the following conservation recommendation is consistent with these obligations, and therefore should be carried out by FTA.

> The FTA should work with its partners, Metro and TriMet, and the City of Portland to provide stormwater treatment for water quality and water quantity in downtown Portland or other parts of the lower Willamette River watershed affected by stormwater. Although the downtown Portland segment of the proposed new rail alignment is within an already built corridor, existing stormwater facilities and treatments are not adequate to treat stormwater in the downtown sector. FTA can contribute to the City of Portland's ongoing wet weather program or develop alternative designs to treat stormwater.

To be kept informed of actions that benefit listed species or their habitats, NOAA Fisheries asks the FTA to notify us if it accomplishes any of these recommendations.

2.1.9 Reinitiation of Consultation

Consultation must be reinitiated if: (1) The amount or extent of taking specified in the incidental take statement is exceeded, or is expected to be exceeded; (2) new information reveals effects of the action may affect listed species in a way not previously considered; (3) the action is modified in a way that causes an effect on listed species that was not previously considered; or (4) a new species is listed or critical habitat is designated that may be affected by the action (50 CFR 402.16).

2.2 Incidental Take Statement

Section 9 of the ESA [16 USC 1538] prohibits take of endangered species. The prohibition of take is extended to threatened anadromous salmonids by section 4(d) rule [50 CFR 223.203]. Take is defined by the statute as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." [16 USC 1532(19)] Harm is defined by regulation as "an act which actually kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation which actually kills or injures fish or wildlife by significantly impairing essential behavior patterns, including, breeding, spawning, rearing, migrating, feeding or sheltering." [50 CFR 222.102] Harass is defined as "an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering." [50 CFR 17.3] Incidental take is defined as "takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or applicant." [50 CFR 402.02] The ESA at section 7(o)(2) removes the prohibition from any incidental taking that is in compliance with the terms and conditions specified in a section 7(b)(4) incidental take statement [16 USC 1536].

An incidental take statement specifies the impact of any incidental taking of threatened species. It also provides reasonable and prudent measures that are necessary to minimize impacts and sets forth terms and conditions with which the action agency must comply to implement the reasonable and prudent measures. However, the incidental take statement included in this conference opinion does not become effective until NOAA Fisheries adopts the conference opinion as a biological opinion, after the listing is final.

2.2.1 Amount or Extent of the Take

The proposed action is reasonably certain to result in incidental take of listed steelhead and Chinook because surveys show the listed species occur in the action area, the proposed action will result in a short-term increase in turbidity, and fish salvage may be required. Anywhere from zero to twenty juvenile salmonids may be present in the project reach during the in-water work. Five percent mortality is not uncommon for fish salvage activities. Consequently, two fish may die as a result of the fish salvage.

However, take associated with the habitat-related effects of actions such as increased turbidity are largely unquantifiable and are not expected to be measurable as long-term effects on populations. Therefore, NOAA Fisheries is unable to estimate a specific amount of incidental take attributable to those effects. In instances such as these, NOAA Fisheries designates the expected level of take as 'unquantifiable.' The extent of take will be limited to the action area, including the water column and streambed of Johnson Creek within the limits of the work area isolation and the downstream to the extent of visible turbidity resulting from construction activities, not to exceed 100 feet downstream from all construction activities.

2.2.2 Reasonable and Prudent Measures

NOAA Fisheries believes that the following reasonable and prudent measures are necessary and appropriate to avoid or minimize take of listed salmonid species resulting from the action covered by this Opinion. The FTA will:

1. Avoid or minimize incidental take from in-water work by applying project specifications that avoid or minimize adverse effects to riparian and aquatic systems.

2. Avoid or minimize incidental take from streambank and upland activities including grading, plantings, staging, and the addition of impervious surface by applying project specifications that provide the greatest degree of ecological function in the watershed.

3. Complete a comprehensive monitoring and reporting program to confirm this Opinion is meeting its objective of minimizing take from permitted activities.

2.2.4 Terms and Conditions

To be exempt from the prohibitions of section 9 of the ESA, the FTA must require that their partners, Metro and TriMet and/or their contractors comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary.

1. To implement reasonable and prudent measure #1 (in-water activities), the FTA shall ensure that:

   a. Project Design. The design of this project must be reviewed to ensure that impacts to natural resources have been avoided, minimized and mitigated, and that the following overall project design conditions are met.
      i. Minimum area. Construction impacts will be confined to the minimum area necessary to complete the project.
      ii. In-water work. All work below the bankfull elevation[1] of Johnson Creek will be completed within the in-water work period (June 1 through August 31);
      iii. Work period extensions. Extensions of the in-water work period, including those for work outside the wetted perimeter of the river but below the ordinary high water mark must be approved in writing by biologists from NOAA Fisheries.
      iv. Cessation of work. Cease project operations under high flow conditions that may result in inundation of the project area, except for efforts to avoid or minimize resource damage.
      v. Fish screens. Have a fish screen installed, operated and maintained according to NOAA Fisheries' fish screen criteria[2] on each water intake used for project constructions, including pumps used to isolate an in-water work area. Screens for water diversions or intakes that will be used for irrigation, municipal, or industrial purposes, or any use besides project construction, are not authorized.
      vi. Fish passage. Provide passage for any adult or juvenile salmonid species present in the project area during construction, unless otherwise approved in writing by NOAA Fisheries, and after construction for the life of the project.

---

[1] 'Bankfull elevation' means the bank height inundated by a 1.5 to 2-year average recurrence interval and may be estimated by morphological features such as average bank height, scour lines and vegetation limits.

[2] National Marine Fisheries Service, *Juvenile Fish Screen Criteria* (revised February 16, 1995) and *Addendum: Juvenile Fish Screen Criteria* for Pump Intakes (May 9, 1996) (guidelines and criteria for migrant fish passage facilities, and new pump intakes and existing inadequate pump intake screens) (http://www.nwr.noaa.gov/1hydroweb.ferc.htm)

b. Water Quality Plan, Pollution and Erosion Control Plan. Increased turbidity associated with project activities within or beside Johnson Creek, Veterans Creek and Phillips Creek is a concern. Prepare and carry out a pollution and erosion control plan to prevent increased turbidity caused by such activities. The plan must be available for inspection on request by FTA or NOAA Fisheries. The pollution and erosion control plan will contain the pertinent elements listed below, and meet requirements of all applicable laws and regulations.

i. The names and address of the party(s) responsible for accomplishment of the water quality and pollution and erosion control plan.

ii. Describe methods or BMPs that will be used to minimize turbidity increases as a result of project activities including access roads, equipment and material storage, construction sites, fueling operations, and staging areas.

iii. Practices to confine, remove and dispose of excess concrete, cement, grout, and other mortars or bonding agents, including measures for washout facilities.

iv. A description of any regulated or hazardous products or materials that will be used, including procedures for inventory, storage, handling, and monitoring.

v. A spill containment and control plan with notification procedures, specific clean up and disposal instructions for different products, quick response containment and clean up measures will be available on site, proposed methods for disposal of spilled materials, and employee training for spill containment.

vi. Practices to prevent construction debris from dropping into any stream or water body, and to remove any material that does drop with minimum disturbance to the streambed and water quality.

c. Inspection of erosion controls. Inspection of erosion controls. During construction in upland and riparian areas, monitor shoreline turbidity and inspect all erosion controls daily, or more often as necessary, to ensure that erosion controls are working adequately.[3]

i. Erosion control devices will be inspected daily during the rainy season and weekly during the dry season until the site is permanently stabilized.

ii. If monitoring and inspection shows that the erosion controls are ineffective, mobilize work crews immediately, during working and off-hours, to make repairs, install replacements, or install additional controls as necessary.

iii. Erosion control measures will be judged ineffective when turbidity plumes are evident in waters occupied by listed salmonids during any part

[3] 'Working adequately' means that project activities do not increase ambient stream turbidity by more than 10% above background 50 feet below the discharge, when measured relative to a control point immediately upstream of the turbidity causing activity.

of the year. If soil erosion and sediment resulting from construction activities is not effectively controlled, the engineer will limit the amount of disturbed area to that which can be adequately controlled.

iv. Sediment will be removed from sediment controls once it has reached 1/3 of the exposed height of the control. Whenever straw bales are used, they will be staked and dug into the ground 5 inches (12 cm). Catch basins will be maintained so that no more than 6 inches (15 cm) of sediment depth accumulates within traps or sumps.

v. Sediment-laden water created by construction activity will be filtered before it leaves the right-of-way or enters any creek.

d. Isolation of in-water work area. If in-water work is required, isolation of the work area will be necessary. The work area will be isolated from the work area using inflatable bags, sandbags, sheet pilings, sediment curtains, or similar materials. All listed salmonids trapped within the isolation area will be removed and placed in the actively-flowing river using methods described in 1d.

e. Capture and release. If in-water work area isolation is required, attempt to capture and release fish from the isolated area using trapping, seining, electrofishing, or other methods as are prudent to minimize risk of injury.

i. The entire capture and release operation must be conducted or supervised by a fishery biologist experienced with work area isolation and competent to ensure the safe handling of all ESA-listed fish.

ii. Do not use electrofishing if water temperatures exceed 18°C.

iii. If electrofishing equipment is used to capture fish, comply with NOAA Fisheries' electrofishing guidelines.[4]

iv. Handle ESA-listed fish with extreme care, keeping fish in water to the maximum extent possible during seining and transfer procedures to prevent the added stress of out-of-water handling.

v. Transport fish in aerated buckets or tanks.

vi. Release fish into a safe release site as quickly as possible, and as near as possible to capture sites.

vii. Do not transfer ESA-listed fish to anyone except NOAA Fisheries personnel, unless otherwise approved in writing by NOAA Fisheries.

viii. Obtain all other Federal, state, and local permits necessary to conduct the capture and release activity.

ix. Allow NOAA Fisheries or its designated representative to accompany the capture team during the capture and release activity, and to inspect the team's capture and release records and facilities.

f. Construction discharge water. Treat all discharge water created by construction (*e.g.*, concrete washout, pumping for work area isolation, vehicle wash water, drilling fluids) as follows.

---

[4] National Marine Fisheries Service, *Backpack Electrofishing Guidelines* (December 1998) (http://www.nwr.noaa.gov/1salmon/salmesa/pubs/electrog.pdf).

i. Water quality. Design, build facilities to collect and treat all construction discharge water, including any contaminated water produced by drilling, using the best available technology applicable to site conditions. Provide treatment to remove debris, nutrients, sediment, petroleum hydrocarbons, metals and other pollutants likely to be present.

ii. Discharge velocity. If construction discharge water is released using an outfall or diffuser port, velocities may not exceed 4 feet per second, and the maximum size of any aperture may not exceed one inch.

iii. Pollutants. Do not allow pollutants including green concrete, contaminated water, silt, welding slag, sandblasting abrasive, or grout cured less than 24 hours to contact any wetland or the 2-year floodplain.

iv. Drilling discharge. All drilling equipment, drill recovery and recycling pits, and any waste or spoil produced, will be completely isolated to prevent drilling fluids or other wastes from entering the stream.

(1) All drilling fluids and waste will be completely recovered then recycled or disposed to prevent entry into flowing water.

(2) Drilling fluids will be recycled using a tank instead of drill recovery/recycling pits, whenever feasible.

(3) When drilling is completed, attempts will be made to remove the remaining drilling fluid from the sleeve (*e.g.*, by pumping) to reduce turbidity when the sleeve is removed.

g. Piling installation. Install temporary and permanent pilings as follows.

i. Minimize the number and diameter of pilings, as appropriate, without reducing structural integrity.

ii. Repairs, upgrades, and replacement of existing pilings consistent with these terms and conditions are allowed.

iii. In addition to repairs, upgrades, and replacements of existing pilings, up to five single pilings or one dolphin consisting of three to five pilings may be added to an existing facility per in-water construction period.

iv. Drive each piling as follows to minimize the use of force and resulting sound pressure.

(1) Hollow steel pilings greater than 24 inches in diameter, and H-piles larger than designation HP24, are not authorized under this Opinion.

(2) When impact drivers will be used to install a pile, use the smallest driver and the minimum force necessary to complete the job. Use a drop hammer or a hydraulic impact hammer, whenever feasible and set the drop height to the minimum necessary to drive the piling.

(3) When using an impact hammer to drive or proof steel piles, one of the following sound attenuation devices will be used to reduce sound pressure levels by 20 decibels. Place a block of wood or other sound dampening material between the hammer and the

piling being driven. If currents are 1.7 miles per hour or less, surround the piling being driven by an unconfined bubble curtain that will distribute small air bubbles around 100% of the piling perimeter for the full depth of the water column. If currents greater than 1.7 miles per hour, surround the piling being driven by a confined bubble curtain (*e.g.*, a bubble ring surrounded by a fabric or metal sleeve) that will distribute air bubbles around 100% of the piling perimeter for the full depth of the water column.

(4) Other sound attenuation devices as approved in writing by NOAA Fisheries.

h. Piling removal. If a temporary or permanent piling will be removed, the following conditions apply.

i. Dislodge the piling with a vibratory hammer.

ii. Once loose, place the piling onto the construction barge or other appropriate dry storage site.

iii. If a treated wood piling breaks during removal, either remove the stump by breaking or cutting 3 feet below the sediment surface or push the stump in to that depth, then cover it with a cap of clean substrate appropriate for the site.

iv. Fill the holes left by each piling with clean, native sediments, whenever feasible.

i. Treated wood. Use of lumber, pilings, or other wood products that are treated or preserved with pesticidal compounds (including, but not limited to, alkaline copper quaternary, ammoniacal copper arsenate, ammoniacal copper zinc arsenate, copper boron azole, chromated copper arsenate, copper naphthenate, creosote, and pentachlorophenol) may not be used below ordinary high water, or as part of an in-water or over-water structure, except as described below.

i. On-site storage. Treated wood shipped to the project area must be stored out of contact with standing water and wet soil, and protected from precipitation.

ii. Visual inspection. Each load and piece of treated wood must be visually inspected and rejected for use in or above aquatic environments if visible residues, bleeding of preservative, preservative-saturated sawdust, contaminated soil, or other matter is present.

iii. Pilings. Pilings treated with ammoniacal copper zinc arsenate, chromated copper arsenate, or creosote may installed below ordinary high water according to NOAA Fisheries' guidelines,[5] provided that no more than 50 piles are used. Note, also, that these guidelines do not apply to pilings

[5] Letter from Steve Morris, National Marine Fisheries Service, to W.B. Paynter, Portland District, U.S. Army Corps of Engineers (December 9, 1998) (transmitting a document titled Position Document for the Use of Treated Wood in Areas within Oregon Occupied by Endangered Species Act Proposed and Listed Anadromous Fish Species, National Marine Fisheries Service, December 1998).

treated with any other preservative, and do not authorize use of treated wood for any other purpose.

iv. Prefabrication and field preservative treatment. Use prefabrication to the extent feasible to ensure that cutting, drilling, and field preservative treatment is minimized. When field fabrication is necessary, all cutting and drilling of treated wood, and field preservative treatment of wood exposed by cutting and drilling, will occur above ordinary high water to minimize discharge of sawdust, drill shavings, excess preservative other debris in riparian or aquatic habitats. Use tarps, plastic tubs or similar devices to contain the bulk of any fabrication debris, and wipe off any excess field preservative.

v. Abrasion prevention. All treated wood structures, including pilings, must have design features to avoid or minimize impacts and abrasion by livestock, pedestrians, vehicles, vessels, floats, etc., to prevent the deposition of treated wood debris and dust in riparian or aquatic habitats.

vi. Waterproof coating. Treated wood may be used to construct a bridge, over-water structure or and in-water structure, provided that all surfaces exposed to leaching by precipitation or overtopping waves are coated with a water-proof seal or barrier that will be maintained for the life of the project. Coatings and any paint-on field treatment must be carefully applied and contained to reduce contamination. Surfaces that are not exposed to precipitation or wave attack, such as parts of a timber bridge completely covered by the roadway wearing surface of the bridge deck, are exempt from this requirement.

vii. Debris Removal. Projects that require removal of treated wood must use the following precautions.

(1) Ensure that, to the extent feasible, no treated wood debris falls into the water. If treated wood debris does fall into the water, remove it immediately.

(2) After removal, place treated wood debris in an appropriate dry storage site until it can be removed from the project area. Do not leave treated wood construction debris in the water or stacked on the streambank.

(3) Evaluate treated wood construction debris removed during a project, including treated wood pilings, to ensure that debris is properly disposed of.

j. Preconstruction activity. Complete the following actions before significant[2] alteration of the project area.

i. Marking. Flag the boundaries of clearing limits associated with site access and construction to prevent ground disturbance of critical riparian vegetation, wetlands and other sensitive sites beyond the flagged boundary.

ii. Emergency erosion controls. Ensure that the following materials for emergency erosion control are onsite.

(1) A supply of sediment control materials (*e.g.*, silt fence, straw bales. When available, certified weed-free straw or hay bales will be used to prevent introduction of noxious weeds.

(2) An oil-absorbing, floating boom whenever surface water is present.

(3) Temporary erosion controls. All temporary erosion controls will be in-place and appropriately installed downslope of project activity within the riparian area until site restoration is complete.

k. Temporary access roads and drilling pads. All temporary access roads and drilling pads will be constructed as follows.

i. Existing ways. Use existing roadways, travel paths, and drilling pads whenever possible, unless construction of a new way or drilling pad would result in less habitat take. When feasible, eliminate the need for an access road by walking a tracked drill or spider hoe to a survey site, or lower drilling equipment to a survey site using a crane.

ii. Steep slopes. Temporary roads or drilling pads built mid-slope or on slopes steeper than 30% are not authorized.

iii. Minimizing soil disturbance and compaction. Minimize soil disturbance and compaction whenever a new temporary road or drill pad is necessary within 150 feet^2 of a stream, water body or wetland by clearing vegetation to ground level and placing clean gravel over geotextile fabric, unless otherwise approved in writing by NOAA Fisheries.

iv. Temporary stream crossings.

(1) Minimize the number of temporary stream crossings.

(2) Design temporary road crossings as follows.

- Survey and map any potential spawning habitat within 300 feet downstream from a proposed crossing.
- Do not place a stream crossing at known or suspected spawning areas, or within 300 feet upstream of such areas if spawning areas may be affected.
- Design the crossing to provide for foreseeable risks (*e.g.*, flooding and associated bedload and debris, to prevent the diversion of streamflow out of the channel and down the road if the crossing fails). Vehicles and machinery will cross riparian areas and streams at right angles to the main channel wherever possible.

(3) Obliteration. When the project is complete, obliterate all temporary access roads that will not be in footprint of a new bridge or other permanent structure, stabilize the soil, and revegetate the site. Abandon and restore temporary roads in wet or flooded areas by the end of the in-water work period.

l. Heavy Equipment. Restrict use of heavy equipment as follows:

i. Choice of equipment. When heavy equipment will be used, the equipment selected will have the least adverse effects on the environment (*e.g.*, minimally-sized, low ground pressure equipment).

ii. Vehicle and material staging. Store construction materials, and fuel, operate, maintain and store vehicles as follows.

(1) To reduce the staging area and potential for contamination, ensure that only enough supplies and equipment to complete a specific job will be stored on-site.

(2) Complete vehicle staging, cleaning, maintenance, refueling, and fuel storage in a vehicle staging area placed 150 feet or more from any stream, water body or wetland, unless otherwise approved in writing by NOAA Fisheries.

(3) Inspect all vehicles operated within 150 feet of any stream, water body or wetland daily for fluid leaks before leaving the vehicle staging area. Repair any leaks detected in the vehicle staging area before the vehicle resumes operation. Document inspections in a record that is available for review on request by Corps or NOAA Fisheries.

(4) Before operations begin and as often as necessary during operation, steam clean all equipment that will be used below bankfull elevation until all visible external oil, grease, mud, and other visible contaminates are removed.

(5) Diaper all stationary power equipment (*e.g.*, generators, cranes, stationary drilling equipment) operated within 150 feet of any stream, waterbody or wetland to prevent leaks, unless suitable containment is provided to prevent potential spills from entering any stream or waterbody.

m. Site preparation. Conserve native materials for site restoration.

i. If possible, leave native materials where they are found.

ii. If materials are moved, damaged or destroyed, replace them with a functional equivalent during site restoration.

iii. Stockpile any large wood, native vegetation, weed-free topsoil, and native channel material displaced by construction for use during site restoration.

n. Earthwork. Complete earthwork (including drilling, excavation, dredging, filling and compacting) as quickly as possible.

i. Site stabilization. Stabilize all disturbed areas, including obliteration of temporary roads, following any break in work unless construction will resume within four days.

ii. Source of materials. Obtain boulders, rock, woody materials and other natural construction materials used for the project outside the riparian area.

2. To implement reasonable and prudent measure #2 (streambank and upland activities), the FTA shall ensure that:

a Plantings. Prepare and carry out a site restoration plan as necessary to ensure that the streambank is stable and appropriately planted. Make the written plan available for inspection on request by the FTA or NOAA Fisheries.

i. Pesticides. Take of ESA-listed species caused by pesticide use is not included in this consultation.

ii. Fertilizer. Do not apply fertilizer (including fertilizers within the hydroseed mix) within 50 feet of any waterbody.

iii. Fencing. Install fencing as necessary to prevent access to revegetated sites by unauthorized persons or by equipment during future construction.

iv. Plan Contents. Include each of the following elements.

(1) Responsible party. The name and address of the party(s) responsible for meeting each component of the planting requirements, including providing and managing any financial assurances and monitoring necessary to ensure planting success.

(2) Performance standards. Use these standards to help design the plan and to assess whether the planting goals are met. While no single criterion is sufficient to measure success, the intent is that these features should be present within reasonable limits of natural and management variation.

(a) Bare soil spaces are small and well dispersed.

(b) Soil movement, such as active rills or gullies and soil deposition around plants or in small basin, is absent or slight and local.

(c) Plant litter is well distributed and effective in protecting the soil with few or no litter dams present.

(d) Native woody and herbaceous vegetation, and germination microsites, are present and well distributed across the site.

(e) Vegetation structure is resulting in rooting throughout the available soil profile.

(f) Plants have normal, vigorous growth form, and a high probability of remaining vigorous, healthy and dominant over undesired competing vegetation.

(g) Streambanks have less than 5% exposed soils with margins anchored by deeply-rooted vegetation or coarse-grained alluvial debris.

(h) A continuous corridor of shrubs and trees provide shade for the entire streambank.

v. Long-term maintenance of the plants. The plan shall address roles and responsibilities associated with the long-term maintenance of the trees and shrubs. Because the trees and shrubs are being planted to mitigate

the long-term effects of the new impervious surface, the plan must address maintaining the plants in perpetuity.

b. Stormwater management. Prepare and carry out a stormwater managment plan to address the new impervious surfaces that will be constructed as part of the proposed action. The plan can use a variety of BMPs to treat water quality and alterations to natural hydrology, such as bioswales, mechanical devices, use of pervious surfaces, plantings, etc. The plan must be available for inspection on request by FTA or NOAA Fisheries.

i. Plan contents. The goal is to avoid and minimize adverse effects due to the quantity and quality of stormwater runoff for the life of the project by maintaining or restoring natural runoff conditions. The plan will meet the following criteria and contain the pertinent elements listed below, and meet requirements of all applicable laws and regulations.

(1) A system of management practices and, if necessary, structural facilities, designed to complete the following functions.

(a) Minimize, disperse and infiltrate stormwater runoff onsite using sheetflow across permeable vegetated areas to the maximum extent possible without causing flooding, erosion impacts, or long-term adverse effects to groundwater.

(b) Pretreat stormwater from pollution generating surfaces, including bridge decks, before infiltration or discharge into a freshwater system, as necessary to minimize any nonpoint source pollutant (*e.g.*, debris, sediment, nutrients, petroleum hydrocarbons, metals) likely to be present in the volume of runoff predicted from a 6-month, 24-hour storm.[6]

(c) Ensure that the duration of post project discharge matches the pre-developed discharge rates from 50% of the 2-year peak flow up to the 50-year peak flow.

(3) If engineered facilities are required to meet stormwater requirements, use a continuous rainfall/runoff model, if available for the project area, to calculate stormwater facility water quality and flow control rates.

(4) Use permeable pavements for load-bearing surfaces, including multiple-use trails, to the maximum extent feasible based on soil, slope, and traffic conditions.

[6]A 6-month, 24-hour storm may be assumed to be 72% of the 2-year, 24-hour amount.

(5) Install structural facilities outside wetlands or the riparian buffer area[7] whenever feasible, otherwise, provide compensatory mitigation to offset any long-term adverse effects.

(6) Document completion of the following activities according to a regular schedule for the operation, inspection and maintenance of all structural facilities and conveyance systems, in a log available for inspection on request by the Corps and NOAA Fisheries.

(a) Inspect and clean each facility as necessary to ensure that the design capacity is not exceeded, heavy sediment discharges are prevented, and whether improvements in operation and maintenance are needed.

(b) Promptly repair any deterioration threatening the effectiveness of any facility.

(c) Post and maintain a warning sign on or next to any storm drain inlet that says, as appropriate for the receiving water, 'Dump No Waste - Drains to Ground Water, Streams, or Lakes.'

(d) Only dispose of sediment and liquid from any catch basin in an approved facility.

ii. Runoffs/discharge into a freshwater system. When stormwater runoff will be discharged directly into fresh surface water or a wetland, or indirectly through a conveyance system, the following requirements apply.

(1) Maintain natural drainage patterns and, whenever possible, ensure that discharges from the project site occur at the natural location.

(2) Use a conveyance system comprised entirely of manufactured elements (*e.g.*, pipes, ditches, outfall protection) that extends to the ordinary high water line of the receiving water.

(3) Stabilize any erodible elements of this system as necessary to prevent erosion.

(4) Do not divert surface water from, or increase discharge to, an existing wetland if that will cause a significant adverse effect to wetland hydrology, soils or vegetation.

(5) The velocity of discharge water released from an outfall or diffuser port may not exceed 4 feet per second, and the maximum size of any aperture may not exceed one inch.

---

[7]For the purposes of this Opinion only, 'riparian buffer area' means land: (1) Within 150 feet of any natural water occupied by listed salmonids during any part of the year or designated as critical habitat; (2) within 100 feet of any natural water within 1/4 mile upstream of areas occupied by listed salmonids or designated as critical habitat and that is physically connected by an above-ground channel system; and (3) within 50 feet of any natural water upstream of areas occupied by listed salmonids or designated as critical habitat and that is physically connected by an above-ground channel system.

3. To implement reasonable and prudent measure #3 (monitoring and reporting), the FTA shall ensure that:

a. Construction Monitoring. Provide NOAA Fisheries with a monitoring report within 30 days of completing project construction describing FTA's success meeting these terms and conditions. Information on the riparian planting is required 30 days after planting, and all other monitoring information is required 30 days after project demobilization. This report will consist of the following information.

i. Project identification.

ii. Photographic documentation of environmental conditions at the project site before, during and after project completion. Each photograph will be labeled with the date, time, photo point, project name, the name of the photographer, and a comment describing the photograph's subject.

iii. Isolation of in-water work area, capture and release.

(1) Supervisory fish biologist – name and address.

(2) Methods of work area isolation and take minimization.

(3) Stream conditions before, during and within one week after completion of work area isolation.

(4) Means of fish capture.

(5) Number of fish captured by species.

(6) Location and condition of all fish released.

(7) Any incidence of observed injury or mortality of listed species.

iv. Provide a narrative that briefly discusses project implementation and consistency with the terms and conditions, with special attention to turbidity, plantings, and implementation of mitigation. Submit a copy of this report to the Oregon State Habitat Office of NOAA Fisheries.

Director, Oregon State Habitat Office
Habitat Conservation Division
National Marine Fisheries Service
Attn: 2004/00632
525 NE Oregon Street
Portland, OR 97232

b. Long-term Monitoring.
Plantings. A 5-year monitoring report that addresses planting success of the trees and shrubs planted along the Willamette River will be sent to NOAA Fisheries, Oregon State Habitat Office.

c. If a dead, injured, or sick endangered or threatened species specimen is found, initial notification must be made to the National Marine Fishery Service Law Enforcement Office, Vancouver Field Office, 600 Maritime, Suite 130, Vancouver, Washington 98661; telephone: 360.418.4246. Care should be taken

in handling sick or injured specimens to ensure effective treatment and care or the handling of dead specimens to preserve biological material in the best possible state for later analysis of cause of death. In conjunction with the care of sick or injured endangered and threatened species or preservation of biological materials from a dead animal, the finder has the responsibility to carry out instructions provided by Law Enforcement to ensure that evidence intrinsic to the specimen is not unnecessarily disturbed.

3. MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

3.1 Background

The MSA, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-297), requires the inclusion of EFH descriptions in Federal fishery management plans. In addition, the MSA requires Federal agencies to consult with NOAA Fisheries on activities that may adversely affect EFH.

EFH means those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA §3). For the purpose of interpreting the definition of essential fish habitat: "Waters" include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; "substrates" include sediment, hard bottom, structures underlying the waters, and associated biological communities; "necessary" means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle (50CFR600.110).

Section 305(b) of the MSA (16 U.S.C. 1855(b)) requires that:

- Federal agencies must consult with NOAA Fisheries on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH;

- NOAA Fisheries shall provide conservation recommendations for any Federal or state activity that may adversely affect EFH;

- Federal agencies shall within 30 days after receiving conservation recommendations from NOAA Fisheries provide a detailed response in writing to NOAA Fisheries regarding the conservation recommendations. The response shall include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with the conservation

recommendations of NOAA Fisheries, the Federal agency shall explain its reasons for not following the recommendations.

The MSA requires consultation for all actions that may adversely affect EFH, and does not distinguish between actions within EFH and actions outside EFH. Any reasonable attempt to encourage the conservation of EFH must take into account actions that occur outside EFH, such as upstream and upslope activities, that may have an adverse effect on EFH. Therefore, EFH consultation with NOAA Fisheries is required by Federal agencies undertaking, permitting or funding activities that may adversely affect EFH, regardless of its location.

3.2 Identification of EFH

The Pacific Fisheries Management Council (PFMC) has designated EFH for Federally-managed fisheries within the waters of Washington, Oregon, and California. The designated EFH for groundfish and coastal pelagic species encompasses all waters from the mean high water line and upriver extent of saltwater intrusion in river mouths, along the coasts of Washington, Oregon and California, seaward to the boundary of the U.S. exclusive economic zone (370.4 km)(PFMC 1998a, 1998b). Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other waterbodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable man-made barriers (as identified by the PFMC), and longstanding, naturally-impassable barriers (*i.e.*, natural waterfalls in existence for several hundred years) (PFMC 1999). In estuarine and marine areas, designated salmon EFH extends from the nearshore and tidal submerged environments within state territorial waters out to the full extent of the exclusive economic zone (370.4 km) offshore of Washington, Oregon, and California north of Point Conception to the Canadian border.

Detailed descriptions and identifications of EFH for the groundfish species are found in the Final Environmental Assessment/Regulatory Impact Review for Amendment 11 to *The Pacific Coast Groundfish Management Plan* (PFMC 1998a) and NOAA Fisheries' *Essential Fish Habitat for West Coast Groundfish Appendix* (Casillas *et al.* 1998). Detailed descriptions and identifications of EFH for the coastal pelagic species are found in Amendment 8 to the *Coastal Pelagic Species Fishery Management Plan* (PFMC 1998b). Detailed descriptions and identifications of EFH for salmon are found in Appendix A to Amendment 14 to the *Pacific Coast Salmon Plan* (PFMC 1999). The assessment of the potential adverse effects to these species' EFH from the proposed action is based on this information.

3.3 Proposed Action

The proposed action is detailed above in section 1.2. This area has been designated as EFH for various life stages of Chinook and coho salmon.

3.4 Effects of Proposed Action

As described in detail in section 2.1.5, the proposed activities may result in detrimental short-term direct impacts to coho salmon in Johnson Creek. During project construction, increased turbidity may alter the behavior of the fish as they avoid the disturbance associated with earth-moving activities. Additionally, the handling of coho salmon that may be needed during fish salvage will result in short-term effects to the species. No long-term effects to habitat are expected because all new impervious surfaces will have treatment facilities and plantings to treat stormwater runoff for water quality and water quantity. Since Chinook salmon are not in the project area, effects to EFH habitat for Chinook salmon are not expected.

3.5 Conclusion

NOAA Fisheries believes that the proposed action may adversely affect the EFH for Pacific salmon species.

3.7 EFH Conservation Recommendations

Pursuant to section 305(b)(4)(A) of the MSA, NOAA Fisheries is required to provide EFH conservation recommendations for any Federal or state agency action that would adversely affect EFH. The conservation measures proposed for the project by the FTA and all of the terms and conditions contained in section 2.2.3 are applicable to EFH. Therefore, NOAA Fisheries incorporates each of those measures here as EFH recommendations, except for those related to capture and release of individual fish during in-water work, and disposition of dead or injured specimens of ESA-listed species.

3.8 Statutory Response Requirement

Please note that the MSA (section 305(b)) and 50 CFR 600.920(j) require the Federal agency to provide a written response to NOAA Fisheries after receiving EFH conservation recommendations within 30 days of its receipt of this letter. This response must include a description of measures proposed by the agency to avoid, minimize, mitigate or offset the adverse impacts of the activity on EFH. If the response is inconsistent with a conservation recommendation from NOAA Fisheries, the agency must explain its reasons for not following the recommendation.

3.9 Supplemental Consultation

The FTA must reinitiate EFH consultation with NOAA Fisheries if the action is substantially revised or new information becomes available that affects the basis for NOAA Fisheries' EFH conservation recommendations (50 CFR 600.920).

4. LITERATURE CITED

Altman, B., C.M. Henson, and I.R. Waite. 1997. Summary of information on aquatic biota and their habitats in the Willamette Basin Oregon, through 1995. U.S. Geological Survey. Water Resources Investigations Report 97-4023. 85 pp.

Berg, L. and T.G. Northcote. 1985. "Changes In Territorial, Gill-Flaring, and Feeding Behavior in Juvenile Coho Salmon (Oncorhynchus kisutch) Following Short-Term Pulses of Suspended Sediment." Canadian Journal of Fisheries and Aquatic Sciences 42: 1410-1417.

Bjornn, T.C. and D.W. Reiser. 1991. Habitat requirements of salmonids in streams. *In:* W.R. Meehan (editor). Influences of forest and rangeland management on salmonid fishes and their habitats. Amer. Fish. Soc., Spec. Pub. 19, Bethesda, MD.

Booth, D.B. and C.R. Jackson. 1997. Urbanization of aquatic systems: degradation thresholds, stormwater detection, and the limits of mitigation. Am. Wat. Resour. Assoc. 33:1077-1090.

Busby, P., S. Grabowski, R. Iwamoto, C. Mahnken, G. Matthews, M. Schiewe, T. Wainwright, R. Waples, J. Williams, C. Wingert and R. Reisenbichler. 1995. Review of the status of steelhead (*Oncorhynchus mykiss*) from Washington, Idaho, Oregon, and California under the U.S. Endangered Species Act. 102 p. plus 3 appendices.

Busby, P.J., T.C. Wainwright, G.J. Bryant, L.J. Lierheimer, R.S. Waples, F.W. Waknitz and I.V. Lagomarsino. 1996. Status review of west coast steelhead from Washington, Idaho, Oregon, and California. U.S. Department of Commerce, NOAA Tech. Memo. NMFS-NWFSC-27, 261p.

Casillas, E., L. Crockett, Y. deReynier, J. Glock, M. Helvey, B. Meyer, C. Schmitt, M. Yoklavich, A. Bailey, B. Chao, B. Johnson and T. Pepperell. 1998. Essential Fish Habitat West Coast Groundfish Appendix. National Marine Fisheries Service Seattle, Washington. 778 p.

Gammon, J. R. 1970. The effect of inorganic sediment on stream biota. U.S. Environmental Protection Agency. Water Quality Office, Washington, DC. 18050 DWC 12/70, 141 pp.

Gregory, R. S., and C. D. Levings. 1998. Turbidity Reduces Predation on Migrating Juvenile Pacific Salmon. Transactions of the American Fisheries Society 127: 275-285.

Hager, M.C. 2003. Low-Impact Development- Lot-level approaches to stormwater management are gaining ground. The Journal for Surface Water Quality Professionals. January/February 2003.

Healey, M.C. 1991. Life history of chinook salmon (*Oncorhynchus tshawytscha*). Pages 311-393 *In:* Groot, C. and L. Margolis, (editors). Pacific Salmon Life Histories. Vancouver, British Columbia. University of British Columbia Press.

Horner, R.R. and C.W. May. 1999. Regional Study Supports Natural Land Cover Protections as Least Best Management Practice for Maintaining Stream Ecological Integrity. Proceedings of The Comprehensive Stormwater and Aquatic Ecosystem Management Conference. Auckland, N.Z.

Klein, R.D. 1979. Urbanization and stream quality impairment. Water Resources Bulletin 15(4):948-963.

Kruzynski, G.M., Birtwell, I.K., and G.L. Chew. 1994. Behavioral approaches to demonstrate the ecological significance of exposure of juvenile Pacific salmon (genus *Oncorhynchus*) to the antisapstain fungicide TCMTB. J. Aquat. Ecosyst. Health. 3:113-127.

Lichatowich, J. 1999. Salmon Without Rivers. Island Press, Washington, D.C.

Lloyd, D. S. 1987. Turbidity as a water quality standard for salmonid Habitats in Alaska. North American Journal of Fisheries Management 7:34-45.

Lloyd, D. S., J. P. Koenings and J. D. LaPerriere. 1987. Effects of turbidity in fresh waters of Alaska. North American Journal of Fisheries Management 7:18-33.

Myers, J.M., R.G. Kope, G.J. Bryant, D. Teel, L.J. Lierheimer, T.C. Wainwright, W.S. Grant, F.W. Waknitz, K. Neely, S.T. Lindley and R.S. Waples. 1998. Status review of chinook salmon from Washington, Idaho, Oregon, and California. U.S. Department of Commerce, NOAA Tech. Memo. NMFS-NWFSC-35, 443 p.

Neff, J.M. 1985. Polycyclic Aromatic Hydrocarbons. pp 416-454 in. Fundamentals of Aquatic Toxicology. G.M. Rand and S.R. Petrocelli eds. Mcgraw-Hill International Book Co., Washington. 666 pp.

Newcombe, C. P. and D. D. MacDonald. 1991. Effects of Suspended Sediments on Aquatic Ecosystems. North American Journal of Fisheries Management 11: 72-82.

Newcombe, C.P. and J.O.T. Jensen. 1996. Channel suspended sediment and fisheries: a synthesis for quantitative assessment of risk and impact. North American Journal of Fisheries Management 16(4):693-727.

NMFS (National Marine Fisheries Service). 1999. The Habitat Approach: Implementation of Section 7 of the Endangered Species Act for Actions Affecting the Habitat of Pacific Anadromous Salmonids. Guidance memorandum from Assistant Regional Administrators for Habitat Conservation and Protected Resources to Staff. 3 pages. August (Available @ www.nwr.noaa.gov, under Habitat Conservation Division, Habitat Guidance Documents).

NOAA Fisheries (*in review*). 2003. Preliminary conclusions regarding the updated status of listed ESUs of West Coast salmon and steelhead. February 2003. NOAA Fisheries, 525 NE Oregon Street, Suite 500, Portland, Oregon 97232-2737. (Available @ www.nwfsc.noaa.gov/)

Noggle, C.C. 1978. Behavioral, physiological and lethal effects of suspended sediment on juvenile salmonids. Master's Thesis. University of Washington, Seattle.

ODEQ. 2002. Oregon Department of Environmental Quality List of Water Quality Limited Streams. http://www.deq.state.or.us/wq/303dlist/303dpage.htm

ODFW (Oregon Department of Fish and Wildlife). 2003. Relationships between bank treatment/nearshore development and anadromous/resident fish in the lower Willamette River. Annual Progress Report. July 2001 - June 2002. February 2003.

Paul, M.J. and J.L. Meyer. 2001. Streams in the urban landscape. Annual Review of Ecology and Systematics 32:333-365.

PFMC (Pacific Fishery Management Council), 1998a. Final Environmental Assessment/Regulatory Review for Amendment 11 to the Pacific Coast Groundfish Fishery Management Plan. October 1998.

PFMC (Pacific Fishery Management Council), 1998b. The Coastal Pelagic Species Fishery Management Plan: Amendment 8. Portland, Oregon.

PFMC (Pacific Fishery Management Council). 1999. Amendment 14 to the Pacific Coast Salmon Plan. Appendix A: Description and Identification of Essential Fish Habitat, Adverse Impacts and Recommended Conservation Measures for Salmon. Portland, Oregon.

Redding, J. M., C. B. Schreck and F. H. Everest. 1987. Physiological Effects on Coho Salmon and Steelhead of Exposure to Suspended Solids. Transactions of the American Fisheries Society 116: 737-744.

Richey, J.S. 1982. Effects of Urbanization on a Lowland Stream in Western Washington. Doctoral Dissertation. University of Washington, Seattle. 248 pg.

Schueler, T.R. 1994. The importance of imperviousness. Watershed Prot. Tech. 1:100-111.

Servizi, J. A., and Martens, D. W. 1991. Effects of temperature, season, and fish size on acute lethality of suspended sediments to coho salmon. Canadian Journal of Fisheries and Aquatic Sciences 49:1389-1395.

Sigler, J. W., T. C. Bjornn and F. H. Everest. 1984. Effects of chronic turbidity on density and growth of steelhead and coho salmon. Transactions of the American Fisheries Society 113: 142-150. 1984.

Spence, B.C., G.A. Lomnicky, R.M. Hughes, and R.P. Novitzki. 1996. An Ecosystem Approach to Salmonid Conservation. TR-4501-96-6057.

DEPARTMENT OF THE ARMY
PORTLAND DISTRICT, CORPS OF ENGINEERS
POST OFFICE BOX 2946
PORTLAND, OREGON 97208-2946

November 19, 2004

REPLY TO
ATTENTION OF:
Operations Division
Regulatory Branch
Corps No.: 200400792

RECEIVED
FTA/TRO-10.
2004 NOV 24 P 1:14

Ms. Rebecca Reyes-Alicea
Federal Transit Administration
915 Second Avenue
Federal Building, Suite 3142
Seattle, Washington 98174-1002

Dear Ms. Reyes-Alicea:

The U.S. Army Corps of Engineers (Corps) has reviewed the *South Corridor Wetland Delineation and Determination Report*, dated April 16, 2004, and an October 29, 2004 memorandum to Mr. Jim Goudzwaard from Mr. Greg Mazer, URS, amending the April 2004 report. The following is provided regarding the jurisdiction of potential waters identified within these reports:

1) Wetland A is considered to be a Category 7 water of the United States (wetlands adjacent to other waters) as it is contiguous/adjacent to Ditch A which is a tributary (Category 5 water) to Johnson Creek.
2) The north and south concrete lined ditches are both considered Category 5 waters of the United States as they have an ordinary high water mark and drain into Johnson Creek, which drains into the Willamette River (a navigable water).

Because the above areas are considered to be waters of the United States, the placement of dredged or fill material into these areas will require a Department of the Army (DA) permit under Section 404 of the Clean Water Act (CWA). These waters are shown on Enclosure 1.

Wetland B (shown on Enclosure 2) is considered a Category 3 water of the United States. Regarding the jurisdictional status of Wetland B, the Supreme Court decision, Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers, No. 99-1178 (January 9, 2001) (SWANCC) involved the scope of the Corps' regulatory authority under Section 404 of the CWA. The court held that the Corps exceeded its statutory authority by asserting jurisdiction over "non-navigable, isolated, [and] intrastate" waters based solely on the use of such waters by migratory birds. Wetland B is considered isolated, as it has no direct connection to any other water and therefore, placement of dredged or fill material into Wetland B will not require a DA permit.

The Corps regulations have established a process through which you may appeal a jurisdictional determination. Please see Enclosure 3, Notification of Administrative Appeal Options and Process and Request for Appeal, for further information about that process.

Enclosure 4 is the Jurisdictional Determination form that identifies our basis for claiming jurisdiction.

If you have any questions about this decision, please contact Ms. Judy Linton at the letterhead address or telephone (503) 808-4382.

Sincerely,

Donald Borda

Donald Borda
Acting Chief, Regulatory Branch

Enclosures

Copy Furnished:

Metro (Dave Unsworth)
Federal Highways Administration (Elton Chang)
Tri-Met (Alonzo Wertz)
Environmental Protection Agency (Yvonne Vallette)

APPENDIX C. ENVIRONMENTAL JUSTICE COMPLIANCE

This appendix describes the South Corridor I-205/Portland Mall Project's compliance with Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations,* and the U.S. Department of Transportation (DOT), *Order to Address Environmental Justice in Minority Populations and Low-Income Populations.* The U.S. DOT offers the following definition of Environmental Justice:

> *"The term environmental justice was created by people concerned that everyone within the United States deserves equal protection under the country's laws. Executive Order 12898, issued in 1994, responded to this concern by organizing and explaining in detail the Federal government's commitment to promote environmental justice. Each Federal agency was directed to review its procedures and to make environmental justice part of its mission by identifying and addressing the impacts of all programs, policies, and activities on minority populations and low-income populations. The U.S. Department of Transportation (DOT) issued its DOT Order to Address Environmental Justice in Minority Populations and Low-Income Populations in 1997. The Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) have been working with their State and local transportation partners to make sure that the principles of environmental justice are integrated into every aspect of their transportation mission. Principles of Environmental Justice are to:*
>
> - *Ensure the full and fair participation by all potentially affected communities in the transportation decision-making process.*
> - *Avoid, mitigate, or minimize disproportionately high and adverse human health and environmental impacts, including social and economic impacts, on minority and low-income populations.*
> - *Prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations."*

C.1 Public Involvement and Decision-Making Processes

This section summarizes the Project's public involvement and decision-making processes addressing the project's effort to ensure "full and fair participation by all potentially affected communities." For additional information, refer to Appendix A, Community Participation

C.1.1 Public Involvement and Outreach Program

Including potentially impacted minority and low-income populations in meaningful public involvement activities has been an important consideration throughout all phases of the South Corridor Project. Identifying and involving minority and low-income populations was especially important in conducting outreach to support the selection of the Locally Preferred Alternative (LPA) and the subsequent completion of this FEIS and preliminary engineering and will continue through final design and construction. Throughout the project development process, staff refined public involvement plans to better include and involve low-income and minority populations by reviewing available demographic data to identify potentially affected minority or low-income populations throughout the corridor.

During each project phase, targeted outreach was conducted in areas thought to have a concentration of low-income or minority residents. Activities that supported the preparation of the South Corridor Supplemental Draft Environmental Impact Statement (SDEIS) and Downtown Amendment to the South Corridor SDEIS (ASDEIS) and the selection of the LPA are outlined in the Appendix A of the SDEIS and Appendix A of the ASDEIS. Outreach activities in these areas during the preparation of the FEIS included:

- The I-205 Citizen's Advisory Committee and the Downtown Citizen's Advisory Committee included representatives from communities and neighborhoods with concentrations of low-income and minority residents. All community members were encouraged to attend these meetings to share concerns and learn about the project. The committees also included disabled and minority members.
- Project staff canvassed neighborhoods in the I-205 segment with concentrations of low-income or minority residents. Staff used these visits to provide project information, encourage further involvement and build relationships with community members.
- Project staff met with residents of affordable housing developments in downtown Portland.
- Project staff appeared on the cable access program "Senior Showcase" to provide an overview of the project and encourage viewers to participate in upcoming meetings.
- Project staff attended Russian Speaking Community Forum events to provide project information, answer questions and encourage further participation.
- Project related-meetings were advertised in targeted and bilingual publications such as the Asian Reporter and El Hispanic News.
- Project information was translated as needed.
- Staff met with low-income housing providers.
- Staff developed a business support model program targeted at supporting businesses in low-income and minority neighborhoods during project construction.
- Staff participated in community events and festivals in low-income and minority neighborhoods.
- Staff provided project information at senior, disabled and minority business transit fairs.

C.1.2 Decision-Making Process

The LPA for the South Corridor Project includes construction of the Portland Mall/I-205 Light Rail Project as the first phase. The Project has a rich history of community involvement. Since the initial scoping notice for the South/North light rail project was given in late 1993, the project has hosted hundreds of community meetings. Decision-making at each step has engaged community members through citizen advisory committees, community working groups, local advisory groups, listening posts and policy or steering committee meetings. All decision-making meetings were open to the public and media.

Public comments on the South Corridor SDEIS and Downtown ASDEIS were accepted for a minimum of 45 days with opportunities for public hearings in the communities affected by the proposed alignments. The public also had opportunities to testify before each of the jurisdictions that supported the LPA: Metro Council, TriMet Board of Directors, Clackamas County Board of Commissioners, Milwaukie City Council, Portland City Council, Oregon City Board of Commissioners and the Multnomah County Board of Commissioners.

Refinements to the designs of the Portland Mall/I-205 light rail project made during the preliminary engineering/FEIS phase were approved by the I-205 Light Rail Steering Committee and the Mayor's Steering Committee on Portland Mall Revitalization and were informed by recommendations from citizen advisory committees and other public comment gathered at community open houses and neighborhood and business group meetings.

C.2 Analysis of Project Effects on Low-Income and Minority Populations

This section summarizes the analysis of impacts and benefits to low-income and minority populations that could occur with the I-205/Portland Mall Project (Project). The discussion begins with a definition of terms and thresholds used for analysis, followed by findings of impacts and benefits of the Project. This section concludes by identifying mitigation measures that could reduce or minimize impacts to low-income, Hispanic and minority populations.

Hispanic and minority populations are measured separately within this FEIS to maintain consistency with the Federal government's definitions used in the 2000 US Census. "The federal government considers race and Hispanic origin to be two separate and distinct concepts" and collects census data to reflect both race and ethnicity.[1] Under this definition, a person can be a member of any racial group while being of Hispanic origin.

C.2.1 Analysis Methods

The analysis methods used in this environmental justice analysis follow. These are based on guidelines for effective practices outlined by the U.S. DOT through the Federal Highway Administration and Federal Transit Administration. These guidelines do not specify the thresholds that should be used to determine the location of minority, Hispanic, or low-income populations or communities, but do recommend using census data especially if it represents the most up-to-date data available. In terms of size of population or community, the following guidance is given:

> "While the minority or low-income population in an area may be small, this does not eliminate the possibility of a disproportionately high and adverse effect of a proposed action. Environmental Justice determinations are made based on effects, not population size. It is important to consider the comparative impact of an action among different population groups.
>
> The threshold of *disproportionately high and adverse impacts* requires impacts to be greater in magnitude or appreciably more severe for a low-income or minority community than those suffered by non-low-income or non-minority populations/communities."

Minority and Hispanic populations that could be affected by the I-205/Portland Mall Project were identified by comparing the 2000 Census minority or Hispanic proportion of the population of each census block group with the minority or Hispanic proportion of the population for all census tracts within the Metro Urban Growth Boundary (UGB). Similarly, potential low-income populations or communities were identified by comparing the 2000 Census proportion of households below poverty level of each census block group within neighborhoods adjacent to the Project with the proportion of households below the poverty level within the Metro Urban Growth Boundary (UGB).

[1] US Census Bureau, "Overview of Race and Hispanic Origin 2000: Census 2000 Brief." www.census.gov, accessed on November 21, 2002.

In addition, the same 2000 Census data were used to estimate the likelihood of minority, Hispanic, and low-income displacements and the characteristics of neighborhoods receiving improved transit service. Additional information about the demographic characteristics of neighborhoods within the corridor can be found in Section 3.3 of this FEIS, Social and Neighborhood Impacts.

C.2.2 Demographics

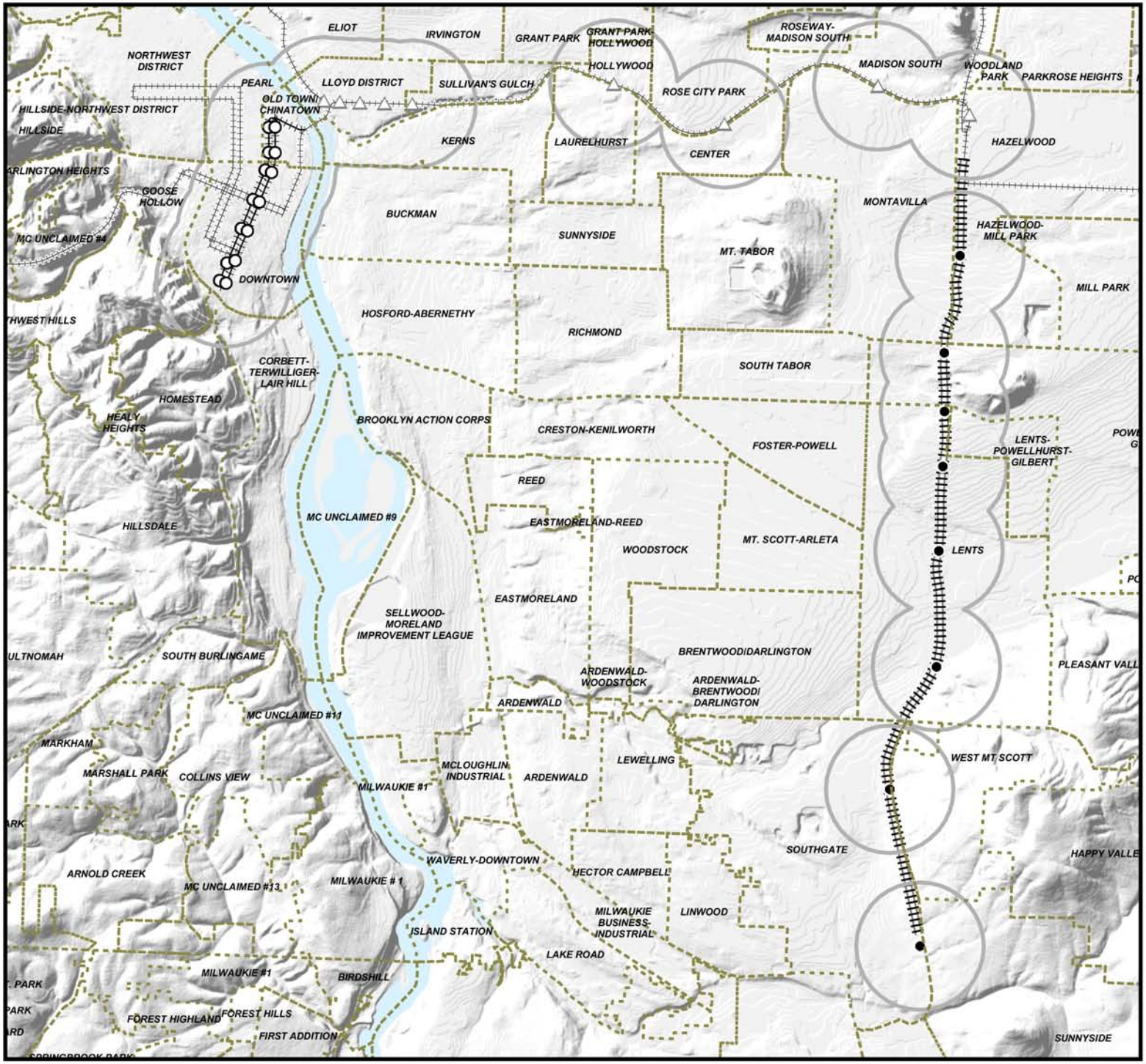
Table C.2-1 provides a summary of the minority, Hispanic and low-income populations of each neighborhood adjacent to the I-205/Portland Mall Project as well as the Tri-County region and the Metro UGB for comparison. Figure C.2-1 illustrates neighborhood boundaries in the study area. According to Metro Data Resource Center analysis of the 2000 US Census, the percentage of residents within neighborhoods adjacent to the Project (21.6%) who are members of a minority group exceeds the percentage of residents within the Metro UGB (18.7%) and the Tri-County region (17.1%) who are members of a minority group. The percentage of residents within neighborhoods adjacent to the Project who are of Hispanic origin (8.1%) is roughly equal to the percent within the Metro UGB (8.3%) and the Tri-County region (8.0%). The percentage of households with incomes below the federally-defined poverty level in neighborhoods adjacent to the Project (15.8%) exceeds the percent of in the Tri-County region (8.7%) or the Metro UGB (9.4%).

Table C.2-1
Minority, Low-Income and Hispanic Populations in Neighborhoods Adjacent to the I-205/Portland Mall Project

Neighborhood	Households	Population	% Minority[1]	% Hispanic[2]	% Poverty[3]	Access to LRT[4]
Downtown	6,488	10,225	**23.7%**	4.5%	**32.1%**	5 stations
Hazelwood	7,691	20,021	**22.7%**	**8.6%**	**12.5%**	1 station
Lents	6,676	18,358	**23.5%**	**10.4%**	**15.0%**	4 stations
Montavilla	6,109	16,193	**25.0%**	6.8%	**10.4%**	Walk to station
Old Town/ Chinatown	1,216	2,657	**22.6%**	4.9%	**49.2%**	2 stations
Pearl	746	1,117	15.9%	5.5%	**19.6%**	Walk to station
Powellhurst-Gilbert	6,294	17,973	**22.0%**	**8.6%**	**13.7%**	1 station
Southgate	6,089	14,599	17.6%	**11.8%**	**10.4%**	2 stations
Sunnyside	3,500	7,203	11.3%	3.7%	8.2%	Walk to station
West Mt. Scott	1,048	2,761	**20.5%**	3.4%	2.5%	Walk to station
Tri-County region	569,461	1,444,219	17.1%	8.0%	8.7%	
Adjacent neighborhoods	45,857	111,107	21.6%	8.1%	15.8%	
Metro UGB	538,415	1,190,993	18.7%	8.3%	9.4%	

Source: Data Resource Center; 2000 US Census; South Corridor SDEIS (Metro: December 2002); South Corridor ASDEIS (Metro: October 2003)
Note: **bold** indicates a proportion that exceeds that of the Metro UGB.
[1] Minority= Percentage of residents whose race is not white alone.
[2] Hispanic= Percentage of residents of Hispanic or Latino origin.
[3] Poverty= Percentage of households with incomes below the Federally specified poverty level. The threshold for a family of four in 2000 was $17,463.
[4] Station = a station within neighborhood boundaries; walk = a station outside neighborhood boundaries but within wa king distance of parts of the neighborhood.

Of the neighborhoods that would be adjacent to the proposed project, only the Sunnyside, Southgate and Pearl neighborhoods have a lower proportion of residents who are members of a minority group than the proportion within the Metro UGB. The Hazelwood, Lents, Powellhurst-Gilbert and Southgate neighborhoods all have proportions of residents of Hispanic origin that exceed the proportion within the Metro UGB. Only the Sunnyside and West Mt. Scott neighborhoods have a lower proportion of low-income households than the proportion within the Metro UGB.



South Corridor FEIS

NEIGHBORHOOD BOUNDARIES

FIGURE C.2-1

Neighborhood Boundaries

ALIGNMENTS

- Existing Light Rail
- Portland Mall Segment
- I-205 Segment

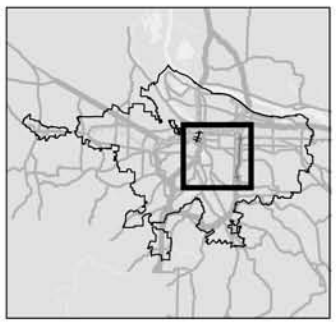
STATION LOCATIONS

- Stations: Portland Mall Segment
- Stations: I-205 Segment
- Existing Stations

Half-Mile Service Area

SOUTH CORRIDOR STUDY

METRO
PEOPLE PLACES • OPEN SPACES



0 0.3 0.6 0.9 1.2 Miles

04.22.04

C.2.3 Findings

The Portland Mall/I-205 light rail project was selected, in large part, because direct light rail service to the communities in this corridor would result in increased transit ridership and would be supportive of local and regional land use and transportation plans. The Project has been refined to minimize neighborhood impacts.

C.2.3.1 Distribution of Impacts

This section identifies minority, Hispanic and low-income populations within the segments of the I-205/Portland Mall light rail project and compares the adverse effects (including displacements, noise and vibration and neighborhood impacts) and the benefits as measured by access to transit service (the number of stations). Table C.2-2 summarizes the effects that would occur in neighborhoods with proportions of low-income households or Hispanic or minority residents that exceeds the proportion within the Metro UGB.

Table C.2-2
Summary of Effects on Adjacent Neighborhoods with Low-income, Minority or Hispanic Populations[1]

Neighborhood	Affected Groups	Neighborhood Impacts			Displacements			Access to Stations	
		Unmitigated noise/ vibration [2]	Traffic	Other Impacts	Institu-tional	Bus-iness	Resid-ential	Within NH	Walk to NH
Downtown	Minority Low-income	6 noise impacts	None	None	1	2	3	5	2
Hazelwood	Minority Hispanic Low-income	0	Main P&R, mitigated with turn lanes and relocation of driveway for school	None	0	0	0	1	1
Lents	Minority Hispanic Low-income	14 moderate level noise impacts	Holgate, Powell P&R, mitigated with improvements to 92nd Avenue	None	0	0	10	4	0
Montavilla	Minority Low-income	0	None	None	0	0	0	0	2
Old Town/ Chinatown	Minority Low-income	0	None	None	0	0	0	2	2
Pearl	Low-income	0	None	None	0	0	0	0	4
Powellhurst-Gilbert	Minority Hispanic Low-income	0	None	None	0	0	0	1	1
Southgate	Hispanic Low-income	13 noise impacts	Clackamas TC, Fuller P&R, mitigated with intersection improvements	None	0	1	21	2	0
West Mt. Scott	Minority	0	None	None	0	0	0	0	1

Source: Metro, July, 2004
Note: within NH = station located within neighborhood boundaries; wa k to NH = station located within 1/2 mile of any part of the neighborhood.
[1] Neighborhoods with proportions of low-income, minority or Hispanic populations that exceed the proportions of these groups in the Metro UGB.
[2] Moderate Noise impacts that cannot be fully mitigated.

A. I-205 Segment

All neighborhoods in the vicinity of the I-205 segment, except the Sunnyside Neighborhood, have a greater concentration of minority, low-income or Hispanic residents than the regional average. This section provides an analysis of the impacts and benefits to neighborhoods with higher proportions of minority, low-income or Hispanic residents than the regional average.

North of Foster Road, a transitway within the freeway right-of-way was established when the I-205 freeway was constructed. In this area, impacts from the light rail project would be minimal because light rail would be generally located at freeway level between existing sound walls or berms and the freeway. Between SE Washington Street and SE Market Street, the light rail track and the Main Street Station would be visible from the surrounding neighborhood, but the visual affect was would be low because it is located in a current highway corridor. In this area, park-and-ride lots at SE Holgate Boulevard, SE Powell Boulevard and SE Main Street would be located within existing freeway right-of-way. Traffic impacts at these park-and-rides may require some mitigation such as traffic signal modifications, roadway improvements and intersection improvements.

South of Foster Road, new transit right-of-way would be established through using excess freeway right-of-way and acquiring private property. About one mile of new noise wall should mitigate 40 moderate noise impacts and one severe noise impact in the I-205 segment. Twenty-seven moderate noise impacts in the Lents and Southgate neighborhoods would not be fully mitigated. All three vibration impacts in the I-205 segment could be mitigated. A noise wall will be built adjacent to many of the sites identified as unmitigated noise impacts but, due to the existing high levels of freeway noise, the total noise level will not drop below the impact range. Recently, in conjunction with a highway project between SE Otty Road and SE Sunnyside Road, ODOT constructed sound walls that would be relocated as part of the Project. The sound walls would be relocated in a way that, at a minimum, maintains the current level of noise mitigation.

South of Foster Road, 31 homes and one business would be displaced. TriMet would acquire these homes and businesses and relocate each household or business in accordance with state and federal law[2]. Some of these displacements could impact low-income, minority or Hispanic households given the presence of low-income, minority or Hispanic residents in the Lents and Southgate neighborhoods.

The Fuller Road Park-and-Ride is expected to have some traffic impacts on the surrounding neighborhood that would be mitigated through street improvements and traffic signal improvements.

Neighborhoods along the I-205 segment will benefit from increased access to transit and connections to the regional 44-mile light rail system that connects the central city with numerous regional and town centers. The Project passes through three urban renewal districts in the I-205 segment. Light rail would likely contribute to achieving urban renewal plans and goals in the Gateway, Lents and Clackamas Regional Center areas by spurring additional private-sector investment that would increase available tax increment.

[2] Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (42 USC 4601) and associated regulations contained in 40 CFR part 24.

B. Portland Mall Segment

Consistent with thirty years of planning, light rail would be constructed on the existing downtown transit mall or Portland Mall, within the street right-of-way in the Old Town/Chinatown and Downtown Portland neighborhoods. Given that the new light rail route will be constructed in existing transit right-of-way, impacts to minority, Hispanic and low-income communities related to light rail would be minimal. All of the neighborhoods in the Portland Mall Segment have concentrations of low-income, minority or Hispanic residents that exceed the regional average. This section provides an analysis of the impacts and benefits to these neighborhoods.

In the Portland Mall segment, six noise impacts resulting from rerouted buses cannot be mitigated. Two businesses, three housing units and one institution (sorority house) near Portland State University would be displaced.

Traffic patterns in downtown Portland will change with the construction of light rail on the Portland Mall. Current plans call for implementation of a through auto lane on 5th and 6th avenues in conjunction with the light rail project. Today, auto access on the Portland Mall is discontinuous. The through auto and bike lane would provide better access to downtown businesses and residents.

During construction, diesel emissions from construction vehicles could have intermittent adverse air quality impacts in the Portland Mall segment. TriMet is evaluating the feasibility of having contractors use low-sulfur or biodiesel for light construction vehicles in the Portland Mall Segment to reduce this impact. However, the current technology used in heavy construction vehicles does not appear to make feasible a commitment to use low-sulfur or biodiesel fuels for these vehicles.

Also during construction, buses that currently use the Portland Mall will be temporarily re-routed on other downtown streets. This re-routing could have traffic and noise impacts along the temporary routes and could increase travel time for some bus users on a temporary basis.

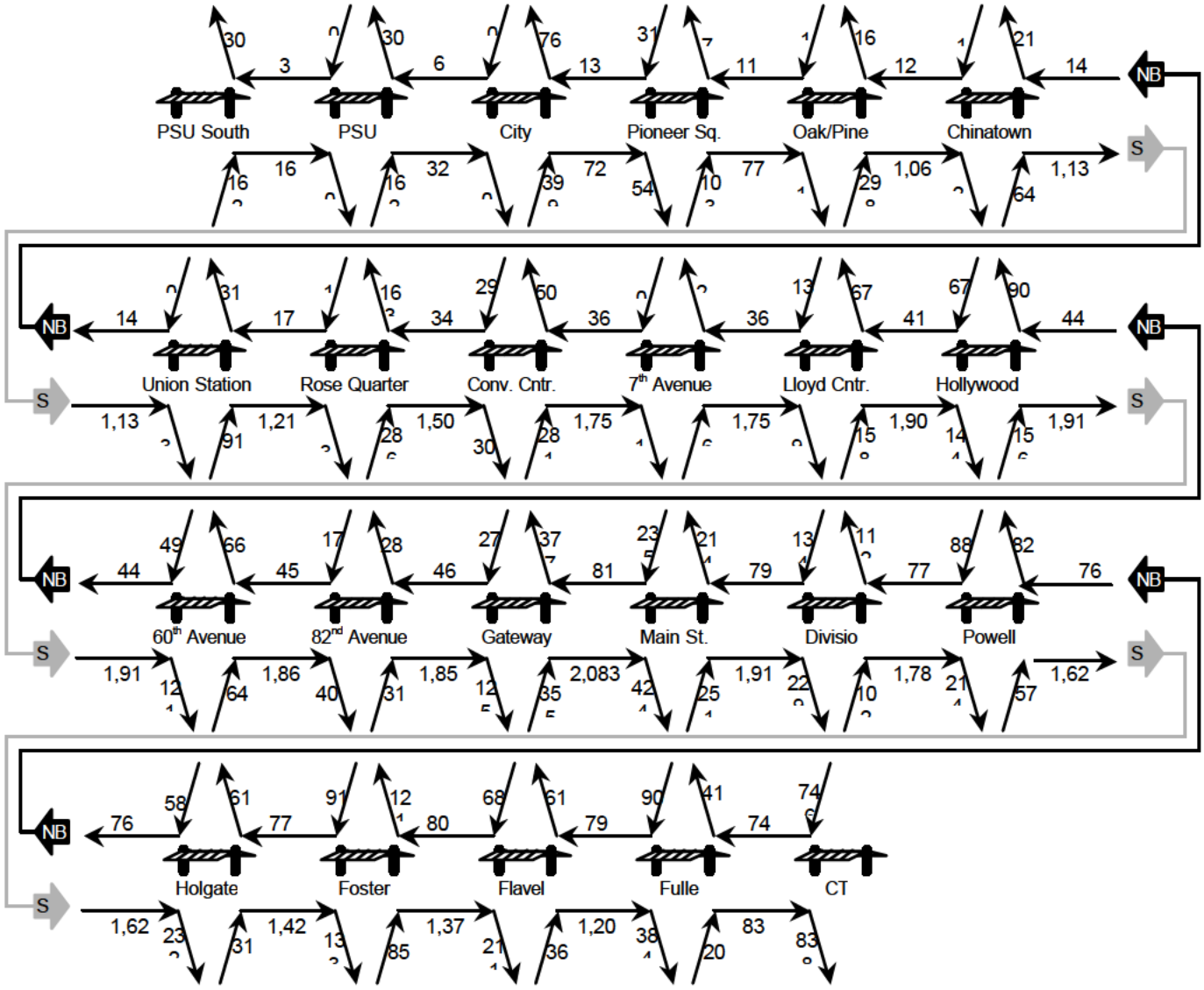
Upon completion of the Project, the Downtown, Pearl and Old Town/Chinatown neighborhoods will enjoy access to a new north-south light rail route in downtown Portland and realization of 30 years of downtown planning that call for light rail on the Portland Mall. In addition, light rail users on the cross-mall alignment will gain faster and more reliable service.

C.2.3.5 Conclusion

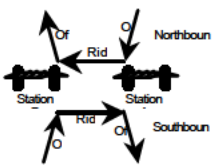
Based on the previous analysis, the I-205/Portland Mall Project is not expected to result in any disproportionately high and adverse human health affects on low-income or minority populations. The project could have small localized impacts on individuals within adjacent neighborhoods with concentrations of low-income or minority residents, but the negative impacts would be offset by the significant benefit of connecting these neighborhoods with the regional light rail system that would improve transit access and provide infrastructure that could spur redevelopment and improve the economic climate.

Appendix D, PM 1 hour station ons and offs

LPA Alternative, 2025 PM peak



* Peak Load Point



APPENDIX E. SUPPORTING DOCUMENTS

The following supporting documents are available for review at Metro's Transportation Planning Office, 600 NE Grand Avenue, Portland, OR 97232. Telephone inquiries can be made to (503) 797-1756.

1. **South Corridor I-205/Portland Mall Final Environmental Impact Statement**, November 2004.
   - Biological Assessment for ESA Species Under NOAA Fisheries Jurisdiction, for the South Corridor Project Portland Mall/I-205, May 2004.
   - Final Definition of Alternatives Report.
   - Draft Section 4(f) Report.
   - Final Section 4(f) Report.
   - Traffic Analysis Technical Documentation.
   - Hazardous Materials Technical Report.
   - Air Quality Analysis and Coordination.
   - Noise and Vibration Mitigation Plan.
   - Wetland Determination and Delineation Report.
   - Section 106 Documentation.
   - Compendium of Comments (SDEIS, ASDES and others).

2. **Portland Mall Revitalization Conceptual Design Report**, Public Discussion Draft, March 1, 2004.

3. **Downtown Portland Mall Segment Locally Preferred Alternative Report** for the South Corridor Project, Adopted by the Metro Council on January 15, 2004.

4. **2004 South/North Land Use Final Order Amendment** for the South Corridor Project, Adopted by the Metro Council on January 15, 2004.

5. **Downtown Amendment to the South Corridor Project Supplemental Draft Environmental Impact Statement**, October 2003.
   - Traffic Impacts Results Report, October 2003

6. **Air Quality Conformity Determination** for the South Corridor LRT Project, June 30, 2003.

7. **South Corridor Project Locally Preferred Alternative Report**, April 17, 2003.

8. **Public Comment Report** (for the South Corridor Project SDEIS), February 2003.

9. **South Corridor Project Supplemental Draft Environmental Impact Statement**, December 2002.
   - Executive Summary

10. **South Corridor Project Results Reports**, November 2002.
    - Air Quality Results Report
    - Capital Costs Results Report

- Community Impact Assessment Results Report (including displacement and relocation, social and neighborhoods and environmental justice)
- Ecosystems Impacts Results Report (Wetlands, Wildlife, Vegetation)
  Appendix C to the Ecosystems Report, Wetland Determination Report
- Energy Results Report
- Financial Analysis Results Report
- Geology, Soils and Seismic Impacts Results Report
- Hazardous Materials Results Report
- Historic, Archaeological and Cultural Impacts Results Report
- Land Use and Economic Activity Results Report
- Local Traffic Impacts Results Report
- Noise and Vibration Results Report
- Parklands, Recreation Areas, Wildlife and Waterfowl Refuges (Section 4(f)) Results Report
- Travel Forecasting and Transit Analysis Results Report
- Visual Quality and Aesthetics Results Report
- Water Quality and Hydrology Results Report

11. **South Corridor Project Methods Reports.**
    - Capital Cost Methods Report, April 2002
    - Evaluation and Financial Analysis Methods Report, April 2002
    - Operating and Maintenance Cost Methods Report
    - Social, Economic and Environmental Methods Report, February 2002
    - Transportation Analysis Methods Report, February 2002

12. **South Corridor Project Detailed Definition of Alternatives Report**, April 2002.
    - BRT and Busway Plan and Profile Drawings
    - Detailed Definition of Alternatives Report
    - Light Rail Plan and Profile Drawings

13. **South Corridor Transportation Alternatives Study**, October 2002.
    - Background Report
    - Capital Cost Report Refinement Study
    - Evaluation Report
    - Public Comments Report
    - Wide Range of Alternatives Report

14. **North Corridor Final Environmental Impact Statement**, October 1999.
    - North Corridor Public Comment Report

15. **North Corridor Supplemental Draft Environmental Impact Statement**, April 1999.

16. **South/North Draft Environmental Impact Statement**, February 1998.
    - Definition of Alternatives Report
    - Related Methods Reports
    - Related Results Reports

APPENDIX F. LIST OF PREPARERS

F.1 Public Agencies

Federal Transit Administration (FTA), Region X Seattle, Washington (Federal co-lead agency)

R.F. Krochalis, Regional Administrator
BS, Environmental Engineering Systems, Cornell University, 1972
MCRP, Harvard University, 1978

Linda Gehrke, Deputy Regional Administrator
BA, Geography, Western Washington University
MPA, Seattle University

Rebecca Reyes-Alicea, Community Planner
BS, Urban Planning, New Mexico State University, 2001

Michael J. Williams, Regional Engineer
BS, Civil Engineering, Morgan State University, 1995
MS, Construction Management, University of Washington, 2003

Federal Highway Administration (FHWA) Salem, Oregon (Federal co-lead agency)

David Cox, Division Administrator, P.E. (Louisiana)
B.S. Civil Engineering, Oregon State University, 1970.
M.S. Civil Engineering, Louisiana State University, 1984.

Elton Chang, Environmental Coordinator, P.E.
B.S. Civil Engineering, Washington State University-Pullman, 1971.

Jeff Graham, Operations Engineer, P.E.
B.S. Civil Engineering, University of Idaho, 1990.

Metro (Metropolitan Planning Organization) Portland, Oregon (Local lead agency for FEIS)

Richard Brandman, Deputy Planning Director (Project Director).
B.A., Economics, University of Maryland, 1972.

Ross Roberts, Transportation Planning Manager (South Corridor Project Manager).
M.U.P, Portland State University, 1985.
B.S. Environmental Science, Willamette University, 1980.

John Cullerton, Program Supervisor (Transportation Analysis, Traffic Impacts, Travel Demand Forecasting).
B.S. Geography, University of Oregon, 1977.

Sharon Kelly, Environmental and Land Use Project Manager (FEIS Manger, Land Use and Economics, Hazardous Materials, Historic and Cultural Resources, Parks, Visual, Geology, Soils and Seismic).
B.S., Geography, Oregon State University, 1979.

Dave Unsworth, Principal Transportation Planner (Conceptual Design, Noise and Vibration, Ecosystems, Water Quality, Visual, Capital Costs, Graphics) .
B.A., Urban Studies, College of Wooster, 1982.

Randy Parker, Senior Transportation Planner (Travel Demand Forecasting, Transit Impacts, Energy, Air Quality, Operations and Maintenance Costs).
B.S., Economics, Portland State University, 1990.

Mark Turpel, AICP, Principal Planner (Air Quality, Section 4(f)).
M.C.P., San Diego State, 1975.
B.A., Economics, University of California, Santa Barbara, 1971.

Kristin Hull, Senior Public Involvement Planner (Community Involvement, Social and Neighborhood Impacts, Environmental Justice, Response to Comments).
M.P.A., University of Texas at Austin, 2001.
B.S., Politics, Willamette University, 1999.
Nat Brown, Associate Transportation Planner (GIS, Document Graphics).
M.C.R.P., Planning, Public Policy and Management, University of Oregon, 2004.
B.A., Environmental Conservation, University of Colorado, Boulder,1994.
Jan Faraca, Administrative Secretary (Administrative Support, Printing, Distribution).
B.A., History, Pacific University, 1962.
Martha Richards, Planning Technician, (Historic Preservation).
M.A. Historic Preservation Planning, Cornell University, 2000.
B.A. Art History, Reed College, 1993.
Dick Walker, Manager, Travel Forecasting (Travel Demand Forecasting).
B.S., Civil Engineering, Montana State University, 1974.
Jennifer John, Senior Planner, Travel Forecasting (Travel Demand Forecasting).
B.S., Economics, Lewis and Clark College, 1991.
Jean Sumida, Travel Forecasting (Travel Demand Forecasting).
B.S., Economics, Massachusetts Institute of Technology, 1991.
Matt Bihn, Associate Transportation Planner (Travel Demand Forecasting).
B.A., Economics, Georgetown University, 1992.
Kyle Hauger, Associate Transportation Planner (Travel Demand Forecasting).
M.U.R.P., Portland State University 1998.
B.A., Economics, Willamette University, 1992.
Matthew Hampton, Associate Transportation Planner (GIS, Document Graphics)
M.S., Geography, Portland State University, pending.
B.S., Anthropology and Sociology, Lewis & Clark College, 1991.

Tri-County Metropolitan Transportation District of Oregon (TriMet), Portland, Oregon.
Neil McFarlane, Executive Director of Capital Projects and Facilities.
M.A., Urban Planning, University of California at Los Angeles, 1977.
B.S., California State Polytechnic University, 1975.
Alan Lehto, Manager Transit Corridor Planning (Transit Analysis).
M.U.R.P., Portland State University, 1997.
M.S., Psychology, University of Wisconsin – Madison, 1992.
B.A., Psychology, Cornell University, 1991.
Alonzo Wertz, Environmental Remediation (Environmental Review).
M.U.P., Urban Planning, University of Washington, 1972.
B.S., Urban Planning, University of Washington, 1970.
John Griffiths, Project Engineer (Maintenance Facility).
M.A., Civil Engineering, University of Virginia, 1979.
B.S., Transportation Engineering and Planning, Worcester Polytechnic, 1976.
Claire Potter (Financial Analysis).
B.A., Political Science, Lewis and Clark College, 1978.
Robert A. Dethlefs, P.E. (LRT Conceptual Design).
B.S., Civil Engineering, Portland State University, 1995.
David Chiara (LRT Conceptual Design and Cost Estimation).
American Society of Professional Estimators, Past-President.
Mark Rohden, (Transit Analysis).

M.U.R.P., Portland State University, 2001.
B.A., Geography, University of Iowa, 1993.
Elizabeth Davidson (Community Involvement).
B.A., Communications, University of Minnesota, 1995.

Oregon Department of Transportation (ODOT).
Ralph M. Drewfs, P.E. (Civil and Highway Engineering).
M.S., Engineering Management, University of Dayton, 1981.
B.S., Civil Engineering, U.S. Military Academy at West Point, 1963.

F.2 Consultants

URS
Terry Kearns, Consultant Project Manager.
B.S., Urban Planning and Design, University of Cincinnati, 1984.
Katie Mangle, Urban Planner.
B.A., Growth and Structure of Cities, Bryn Mawr College, 1994.
MCP with Certificate in Urban Design, Massachusetts Institute of Technology, 1996.
Jamie Snook, Transportation Planner.
B.S., Regional Planning, Westfield State College, 1994.
Shawn Williams, Senior Project Manager.
Apprenticeship Program, Portland Community College, 1984-1985.
Marine Biology, Oregon State University 1974-1976.
Rose Owens, Principal Environmental Scientist.
B.S. Biology, St. Mary's College of Notre Dame, 1973.
Dautis Pearson, Environmental Planner NEPA/ESA Compliance.
B.A., Biology, University of Idaho, 1994.
Kelley K. Jorgensen, Ecologist.
B.S., Ecology/Environmental Science, The Evergreen State College, 1993.
Jeremy Sikes, Fisheries Biologist.
B.S. Biology, Eastern Washington University 1994.
Bridget Canty, Ecologist.
B.S. Biology, Lewis & Clark College, 1991.
Sheila H. North, Ecologist/Environmental Planner.
B.S. Biological Sciences, Ohio University, 2000.
I.E.P. Marine/Fisheries Science, University of Wales Swansea, United Kingdom, 1999.
Jennifer Belknap, EIT, Water Resources Engineering.
B.S. Civil Engineering, University of Portland, 2001.
Anne MacDonald, Registered Professional Geologist, Senior Project Scientist.
B.S. Geological Sciences, University of Washington, 1978.
Heather Carlsson, Wetlands Scientist.
B.S. Environmental Science, Western Washington University, 2000.
M.S. Environmental Science and Engineering, OGI School of Science and Engineering, Oregon Health and Science University, 2001.
Sage Jensen, Habitat Ecologist.
B.S. Botany/Freshwater Ecology, The Evergreen State College, 1999.

Leon Skiles and Associates
Leon Skiles, (Executive Summary and Evaluation).

M.U.P., Urban Planning, University of Oregon, 1985.
B.A., History, University of Oregon, 1979.

Steven Siegel and Associates

Steve Siegel (Finance).
J.D., Northwestern School of Law at Lewis and Clark College, 1999.
M.S., Industrial Engineering, State University of New York, 1971.

TW Environmental, Inc.

Martha Moore, PE (Air Quality and Noise and Vibration).
B.S., Environmental Resources Engineering, Humboldt State University, 1985.
Francesa V. Sims, P.E. (Noise).
B.S., Chemical Engineering, Tulane University, 1994.
Carole M Newvine (Air Quality).
B.A., Arts and Letters, Portland State University, 1979.
M.S., Environmental Science ˆ Air Quality, Washington State University, 1994.

Earth Dynamics,

Michael L Feves (Vibration).
B.S., Physics, Reed College, 1973.
Ph.D., Geophysics, Massachusetts Institute of Technology, 1984.

Newlands & Company, Inc.

Donald Newlands, (Visual and Video Simulations).
B.A., Fine Arts, Oberlin College, 1986.

DKS and Associates, Inc.

Randy McCourt, PE, PTOE (Traffic Analysis).
M.S., Transportation Engineering, University of California Berkeley, 1979.
B.S., Civil Engineering, Oregon State University, 1978.
Alan Snook (Traffic Analysis).
B.A. Urban Planning, University of Washington, 1995.
B.A. Facilities Management, University of Washington, 1995.
Scott Mansur, PE (Traffic Analysis).
B.S., Civil Engineering, Portland State University, 1997.
B.S., Applied Science, George Fox University, 1997.
Colette Snuffin, PE.
B.S. Civil Engineering, Montana State University-Bozeman, 1997.

F.3 Project Advisory Groups

South Corridor Policy Committee

- Fred Hansen, General Manager, TriMet
- Councilor Brian Newman, Metro
- Commissioner Jim Francesconi, City of Portland
- Mayor James Bernard, City of Milwaukie
- Mayor Alice Norris, City of Oregon City
- Commissioner Bill Kennemer, Clackamas County

- Commissioner Maria Rojo de Steffey, Multnomah County
- Mathew Garrett, Region 1 Manager, Oregon Department of Transportation

I-205 Light Rail Project Steering Committee
- Fred Hansen, General Manager, TriMet
- Councilor Brian Newman, Metro
- Brant Williams, Director, Office of Transportation, City of Portland
- Mayor James Bernard, City of Milwaukie
- Mayor Alice Norris, City of Oregon City
- Commissioner Bill Kennemer, Clackamas County
- Commissioner Maria Rojo de Steffey, Multnomah County
- Mathew Garrett, Region 1 Manager, Oregon Department of Transportation
- Susan Aldrich, Senior Development Manager, Portland Development Commission

Mayor's Downtown Mall Steering Committee
- Mayor Vera Katz, chair, City of Portland
- Councilor David Bragdon, Metro
- Mark Dodson, President & Chief Operating Officer, NW Natural
- Commissioner Jim Francesconi, City of Portland
- Fred Hansen, General Manager, TriMet
- Jay Kenton, Vice President for Finance & Planning, Portland State University
- George Passadore, Regional President, Wells Fargo Bank
- John Russell, Russell Development

I-205 Citizen Advisory Committee
- Jerry Schmidt, chair, New Hope Community Church
- Beth Baltz, Gateway PAC
- Councilor Rob Wheeler, City of Happy Valley
- Ken Turner, Lents URAC
- Lieutenant Ron Schwartz, Portland Police, TriMet Division
- Wendell White, Generations
- Ted Gilbert, For-Profit Housing
- Paul DeMarco, Clackamas Town Center
- Wilda Parks, North Clackamas County Chamber
- Ruth Bade, Lents Neighborhood Association
- Sharon Owen, Hazelwood Neighborhood Association
- Jim Chasse, resident
- Dick Loffelmacher, PacTrust Development
- Debbie Black, Powellhurst-Gilbert Neighborhood Association
- Harry LawHing, resident
- Rick Roth, Montavilla Neighborhood Association
- Brenda Carlin, Southgate Community Planning Association

Downtown Community Advisory Committee
- Chris Kopca, chair, Downtown Development Group
- Lew Bowers, Portland Development Commission
- Trond Ingvaldsen, Standard Insurance
- Phil Kalberer, Old Town/Chinatown

- Janice Marquis, Russell Development
- Rod Merrick, Merrrick Architecture Planning
- Deborah Murdock, Portland State University
- Ann Niles, Pearl District Neighborhood Association
- Greg Peden, Portland Business Alliance
- Allyson Reed, Pioneer Place
- Mike Salsgiver, Portland Business Alliance
- Ellen Vanderslice, Willamette Pedestrian Coalition
- Dan Zalkow, Downtown Community Association

Portland Mall Revitalization Citizens' Advisory Committee Chair

- Phil Kalberer, chair, Old Town/Chinatown
- Linda Baker, Willamette Pedestrian Coalition
- Tom Carrollo, Downtown Developer
- Elaine Bothe, Bicycle Transportation Alliance
- Steve Fosler, TriMet Public Art
- Jan Campbell, Citizens for Accessible Transit
- Nilesh Dayal, South Mall Retailer
- Richard Harris, Central City Concern
- Ann Niles, Pearl District NA
- Michael Levine, Independent Living Resources
- Steve Karolyi, AIA
- Rod Merrick, Pedestrian Advisory Committee
- Janice Marquis, Russell Development
- Deborah Murdock, Portland State University
- Stan Lewis, Downtown NA
- Genny Nelson, Sisters of the Road Café
- Greg Peden, Portland Business Alliance
- John Warner, Urban Forestry Commission
- Allyson Reed, Pioneer Place
- Howard Weiner, Old Town/Chinatown NA
- Dan Zalkow, PSU Transportation
- Trond Ingvaldsen - Standard Insurance Co.

APPENDIX G. LIST OF RECIPIENTS

G.1 Federal Agencies

Department of the Army, Corps of Engineers
Federal Emergency Management Administration
Federal Highway Administration
Federal Railroad Administration
Federal Transit Administration
NOAA Fisheries
US Coast Guard
US Department of Agriculture
US Department of Commerce
US Department of Energy, Bonneville Power Administration
US Department of Interior
US Environmental Protection Agency
US Fish and Wildlife Service

G.2 Native American Tribes

Confederated Tribes of the Grand Ronde
Confederated Tribes of the Warm Springs
Confederated Tribes of Siletz
Columbia Inter-Tribal Fish Commission

G.3 Oregon State Agencies

Office of the Governor
Department of Energy
Department of Environmental Quality
Department of Fish and Wildlife
Department of Geology and Mineral Industries
Department of Land Conservation and Development
Department of Transportation
Department of Water Resources
Division of State Lands
Economic and Community Development Department
Public Utilities Commission
State Historic Preservation Office
State Parks and Recreation Department

G.4 Regional and Local Agencies

City of Portland
Clackamas County
Multnomah County
Portland Development Commission
TriMet

G.5 Libraries

Clackamas County Library
Multnomah County Library
Portland State University Library

G.6 Neighborhood Groups

Downtown Portland
Hazelwood
Lents
Old Town/Chinatown
Montavilla
Pearl
Powellhurst-Gilbert
Southgate
Sunnyside
West Mt. Scott

G.7 Miscellaneous

East Portland Chamber of Commerce
Foster Business Association
Lents Urban Renewal Advisory Committee
Milwaukie to Portland Light Rail Coalition
North Clackamas Chamber of Commerce
Opportunity Gateway Public Advisory Committee
Oregon Historical Society
Oregon League of Women Voters
Portland Business Alliance
Clackamas County Transportation Management Association
Gateway Area Business Association

Appendix H. Comment and Response Matrix

Note: This matrix includes comments received on both the South Corridor SDEIS and the South Corridor ASDEIS. A complete description of comments received is given in Chapter 8, Comments and Responses.

Comment page	Commentor	Response no.	Comment	Document
2-10	Liden, Keith	2.3I	Prefer right side or island platforms because they provide convenient, legal bike access	ASDEIS
2-10	Liden, Keith	3.2D	Bike routes on mall should be included in plans	ASDEIS
2-10	Liden, Keith	3.2D	City should continue to limit auto traffic on mall but should provide a continuous bike lane in the blocks without an auto lane	ASDEIS
2-10	Liden, Keith	3.3A	City should restrict parking on mall	ASDEIS
2-10	Liden, Keith	4.4C	Address safety hazard posed to cyclists by MAX rail flanges in the roadway	ASDEIS
2-10	Liden, Keith	4.4D	Bike parking on the mall should be considered throughout the design process	ASDEIS
2-11	Lewellan, Art	2.4A	Prefers frequent, low-floor trolley bus shuttles on mall	ASDEIS
2-15	Richardson, Bob	2.3L	Opposes island platforms	ASDEIS
2-27	Risher, Wes	3.2B	Opposes auto lane	ASDEIS
2-27	Risher, Wes	3.3C	Opposes adding auto pullouts on mall	ASDEIS
2-27, 2-6	Risher, Wes	2.3L	Opposes island platforms	ASDEIS
2-3	Courtney, John	2.3A	Do not locate a left side station in front of the Ambassador Condos	ASDEIS
2-3	Courtney, Phyllis	2.3A	Do not locate a left side station in front of the Ambassador Condos	ASDEIS
2-3	Lewis, Stan	2.1A	Supports light rail on Portland Mall	ASDEIS
2-3	Lewis, Stan	2.3H	Prefer left side platform	ASDEIS
2-3	Lewis, Stan	6.2A	Convene a broader CAC that includes disabled people before decisions are made	ASDEIS
2-34	AORTA	2.2A	Range of alternatives is inadequate because a subway in downtown Portland was not considered	ASDEIS
2-34	AORTA	2.2D	Other revitalization plans for the mall were not seriously considered	ASDEIS
2-34	AORTA	3.1B	The Steel Bridge and numerous track crossings needed to run light rail on the mall will actually limit downtown train capacity. In fact, because of likely delays caused by inbound and outbound trains having to cross paths as they proceed through downtown, fewer Westside trains will be able to operate on Morrison and Yamhill streets during the peak hours	ASDEIS
2-34	AORTA	3.1F	The current downtown LRT route would accommodate all trains for at least a decade	ASDEIS
2-34	AORTA	3.1H	LRT on the mall will degrade transit service because bus stops will be eliminated	ASDEIS
2-34	AORTA	3.2B	Opposes auto lane	ASDEIS
2-34	AORTA	5.1A	The only reason LRT is being considered on mall is to extract 60 percent of cost from federal government	ASDEIS
2-4	Bartles, John	2.1A	Supports light rail on Portland Mall	ASDEIS
2-4	Ingvaldsen, Trond	2.1A	Supports light rail on Portland Mall	ASDEIS
2-4	Ingvaldsen, Trond	2.3K	Prefers island platforms and continuous auto lane	ASDEIS
2-4	Ingvaldsen, Trond	3.2C	Supports auto lane	ASDEIS
2-4	Lewellen, Art	2.1A	Supports light rail on Portland Mall	ASDEIS
2-4	McHuff, Jason	2.2A	Light rail should be grade separated	ASDEIS
2-4	McHuff, Jason	3.1A	Improvements should be made to Steel Bridge to allow trains to cross faster	ASDEIS
2-4	McHuff, Jason	3.1E	Both LRT and buses will not fit on mall	ASDEIS
2-4	McHuff, Jason	4.2A	Preserve public art on mall	ASDEIS
2-4	Porter, Roy	3.1D	Light rail on the mall will move at walking speed and be jammed on opening day	ASDEIS
2-4	Richardson, Bob	2.1B	Supports light rail on the Portland Mall to PSU	ASDEIS
2-4	Richardson, Bob	3.1A	Improvements should be made to Steel Bridge to allow trains to cross faster	ASDEIS

Comment page	Commentor	Response no.	Comment	Document
2-4	Richardson, Bob	3.1C	Reduce number of stations on cross mall	ASDEIS
2-4	Richardson, Bob	4.2A	Preserve public art on mall	ASDEIS
2-4	Richardson, Bob	4.2B	Preserve existing trees where possible or replace them	ASDEIS
2-4	Smith, Chris	2.2A	Prefer subway in downtown Portland for urban design reasons; streetcar should operate on surface	ASDEIS
2-4	Smith, Chris	3.2B	First priority on mall should be good pedestrian and transit experience	ASDEIS
2-4, 3-3	Lewellen, Art	3.2B	Opposes auto lane	ASDEIS
2-43	White, Robin (BOMA)	3.2E	Provide an auto lane north of Burnside	ASDEIS
2-43	White, Robin (BOMA)	3.3B	Support pullouts	ASDEIS
2-43	White, Robin (BOMA)	4.2C	Evaluate street trees	ASDEIS
2-43	White, Robin (BOMA)	5.1B	Share financial burden among all downtown businesses that benefit from the mall, not just those adjacent to it	ASDEIS
2-5	Carlson, Kim	2.3H	Prefer left side platform	ASDEIS
2-5	Carlson, Kim	4.2A	Preserve public art on mall	ASDEIS
2-5	Carlson, Kim	4.2B	Preserve existing trees where possible or replace them	ASDEIS
2-5	Groscup, Rob	2.1B	Supports light rail on the Portland Mall to PSU	ASDEIS
2-5	Groscup, Rob	3.2C	Supports auto lane	ASDEIS
2-5	Groscup, Rob	3.3B	Would like to have an auto pullout adjacent to Niketown	ASDEIS
2-5	Hanson, Andrew	3.2B	Concerned about auto lane	ASDEIS
2-5	Hanson, Andrew	4.3A	Concerned about safety impacts of having buses, light rail, autos and peds on 6th	ASDEIS
2-5	Howell, Jim	2.2A	Range of alternatives is inadequate because a subway in downtown Portland was not considered	ASDEIS
2-5	Jubinville, Vicky	2.1B	Supports light rail on the Portland Mall to PSU	ASDEIS
2-5	Jubinville, Vicky	3.2C	Supports auto lane	ASDEIS
2-5	Jubinville, Vicky	4.2E	Mall revitalization plan should address panhandlers	ASDEIS
2-5	Powell, Michael	2.1B	Supports light rail on the Portland Mall to PSU	ASDEIS
2-5	Powell, Michael	2.3K	Prefers island platforms and continuous auto lane	ASDEIS
2-5	Powell, Michael	3.2A	Mall project should be integrated with changes to Couch and Burnside	ASDEIS
2-5	Whisler, John	3.2C	Supports auto lane	ASDEIS
2-5	Whisler, John	6.1A	Project should focus on revitalizing mall	ASDEIS
2-5	White, Robin (BOMA)	2.1B	Supports light rail on the Portland Mall to PSU	ASDEIS
2-5	White, Robin (BOMA)	3.2C	Supports auto lane	ASDEIS
2-6	Bartlett, Molly	2.3A	Do not locate a left side station in front of the Ambassador Condos	ASDEIS
2-6	Bertelson, April	2.3H	Prefer left side platform	ASDEIS
2-6	Bertelson, April	3.2B	Concerned about auto lane	ASDEIS
2-6	Buel, Ronald	2.2A	Range of alternatives is inadequate because a subway in downtown Portland was not considered	ASDEIS
2-6	Cabral, Rey	2.3L	Opposes island platforms	ASDEIS
2-6	Fitzgerald, Marianne	2.3H	Prefer left side platform	ASDEIS
2-6	Fitzgerald, Marianne	3.2B	Opposes auto lane	ASDEIS
2-6	Fitzgerald, Marianne	4.2A	Preserve public art on mall	ASDEIS
2-6	Klotz, Doug	2.3H	Prefer left side platform	ASDEIS
2-6	Klotz, Doug	3.2B	Not convinced that an auto lane is a crucial element	ASDEIS
2-6	McEchron, James	2.2A	Prefer subway that begins east of the Willamette River	ASDEIS
2-6	Polani, Ray	2.2A	Prefer subway that begins east of the Willamette River	ASDEIS
2-6	Risher, Wes	2.1B	Supports light rail on the Portland Mall to PSU	ASDEIS
2-6	Risher, Wes	2.3H	Prefer left side platform	ASDEIS
2-6	Welch, Karin	2.2F	A light rail route that circumvents downtown should be considered	ASDEIS

Comment page	Commentor	Response no.	Comment	Document
2-6	Williams, Ross	3.2D	Create a shared auto and pedestrian lane on the mall	ASDEIS
2-6, 3-38	Polani, Ray	2.4A	Prefers frequent, low-floor trolley bus shuttles on mall	ASDEIS
2-6, 5-7	Perry, Mary Lou	2.3H	Prefer left side platform	ASDEIS
2-8	Porter, Roy	2.2A	Range of alternatives is inadequate because a subway in downtown Portland was not considered	ASDEIS
3-11	Cone, Paul	2.1B	Supports light rail on the Portland Mall to PSU	ASDEIS
3-11	Cone, Paul	3.2B	Opposes auto lane	ASDEIS
3-11	Cone, Paul	3.2D	Bike routes on mall should be included in plans	ASDEIS
3-13	Albright, Randy	2.1A	Supports light rail on Portland Mall	ASDEIS
3-13	Albright, Randy	2.3H	Prefer left side platform	ASDEIS
3-13	Albright, Randy	3.2B	Opposes auto lane	ASDEIS
3-13	Albright, Randy	3.2D	Bike routes on mall should be included in plans	ASDEIS
3-24	Bryant, Damani	2.3H	Prefer left side platform	ASDEIS
3-24	Bryant, Damani	3.2D	Limit car traffic on mall; no cars between Jefferson and Burnside during rush hour	ASDEIS
3-26	Campos, Laura	2.1B	Supports light rail on the Portland Mall to PSU	ASDEIS
3-26	Campos, Laura	4.3B	Bricks on mall are slippery	ASDEIS
3-28	Bunnell, John C	2.2B	If LRT is constructed on mall, consider eliminating bus mall altogether and creating three transit centers in downtown	ASDEIS
3-28	Bunnell, John C	2.2F	A light rail route that circumvents downtown should be considered	ASDEIS
3-28	Bunnell, John C	2.3K	Prefers island platforms and continuous auto lane	ASDEIS
3-30	LeClerc, Mauricio	2.1A	Supports light rail on Portland Mall	ASDEIS
3-30	LeClerc, Mauricio	2.3M	Prefers island platforms for blocks where there is currently auto access	ASDEIS
3-30	LeClerc, Mauricio	4.4G	Options where LRT weaves would be dangerous for bikes	ASDEIS
3-32	Kalin, Harper	2.1B	Supports light rail on the Portland Mall to PSU	ASDEIS
3-32	Kalin, Harper	2.3H	Prefer left side platform	ASDEIS
3-32	Kalin, Harper	3.2B	Opposes auto lane	ASDEIS
3-34	Lorenz, Katharina	2.3B	Locate a station pair at Flanders and Glisan rather than Hoyt and Glisan	ASDEIS
3-34	Lorenz, Katharina	2.3K	Prefers island platforms and continuous auto lane	ASDEIS
3-34	Lorenz, Katharina	4.8B	TriMet should use green practices in choosing landscaping and building materials	ASDEIS
3-36	VanWarmes, Tim	2.2B	There is currently not enough capacity on the mall and adding light rail will make it worse. Light rail should be in a separate right-of-way	ASDEIS
3-36	VanWarmes, Tim	2.3K	Prefers island platforms and continuous auto lane	ASDEIS
3-40	McFarling, Dan	2.2A	Range of alternatives is inadequate because a subway in downtown Portland was not considered	ASDEIS
3-42	Farrelly, Sean	2.1B	Supports light rail on the Portland Mall to PSU	ASDEIS
3-42	Farrelly, Sean	2.3H	Prefer left side platform	ASDEIS
3-44	Lindahl, Lance	2.1B	Supports light rail on the Portland Mall to PSU	ASDEIS
3-44	Lindahl, Lance	4.2C	Evaluate street trees	ASDEIS
3-46	Riesmeyer, Mark	2.1B	Supports light rail on the Portland Mall to PSU	ASDEIS
3-46	Riesmeyer, Mark	2.3H	Prefer left side platform	ASDEIS
3-46	Riesmeyer, Mark	4.4F	Opposed to cars and peds sharing space	ASDEIS
3-48	Lopresti, Kate	2.3H	Prefer left side platform	ASDEIS
3-49	Bonner, Carolyn	3.2B	Opposes auto lane	ASDEIS
3-50	Bonner, Carolyn	2.3H	Prefer left side platform	ASDEIS
3-52	Clark, Will	2.1B	Supports light rail on the Portland Mall to PSU	ASDEIS
3-52	Clark, Will	2.3E	Stations are too close together	ASDEIS
3-52	Clark, Will	2.3H	Prefer left side platform	ASDEIS
3-53	Carey, Nick	2.3H	Prefer left side platform	ASDEIS

Comment page	Commentor	Response no.	Comment	Document
3-54	Carey, Nick	2.1B	Supports light rail on the Portland Mall to PSU	ASDEIS
3-56	Manson, Paul	2.1B	Supports light rail on the Portland Mall to PSU	ASDEIS
3-56	Manson, Paul	2.3F	Relocate station at Taylor to between Morrison and Yamhill to facilitate transfers	ASDEIS
3-56	Manson, Paul	2.3G	Locate a station closer to Union Station and build a covered walkway from Union Station to MAX	ASDEIS
3-56	Manson, Paul	2.3H	Prefer left side platform	ASDEIS
3-58	Penney, Dianne	2.4B	Adding streetcar lines east and west from Goose Hollow to connect with 10th and 11th avenues would be better building light rail on the mall	ASDEIS
3-58	Penney, Dianne	2.6B	Why is light rail needed on the mall? Excellent bus service already exists	ASDEIS
3-58	Penney, Dianne	3.1L	Streetcars have trouble getting through the intersection of 5th and Market due to cross traffic. Won't light rail create more risk of accidents?	ASDEIS
3-6	Hansen, Brian	2.2G	Light rail should be constructed on Broadway and 4th	ASDEIS
3-6	Hansen, Brian	2.3H	Prefer left side platform	ASDEIS
3-6	Hansen, Brian	3.2B	Opposes auto lane	ASDEIS
3-6	Hansen, Brian	4.3C	To ensure pedestrian safety, all stops should be on same side of street	ASDEIS
3-60	Williams, Karen	2.1B	Supports light rail on the Portland Mall to PSU	ASDEIS
3-60	Williams, Karen	2.3H	Prefer left side platform	ASDEIS
3-60	Williams, Karen	3.2B	Opposes auto lane	ASDEIS
3-60	Williams, Karen	4.1A	Will turns at end of transit mall create continuous screeching	ASDEIS
3-60	Williams, Karen	4.2B	Preserve existing trees where possible or replace them	ASDEIS
3-62	Qureshi, Erin	2.3C	Too many stations located south of Pioneer Square	ASDEIS
3-62	Qureshi, Erin	2.3H	Prefer left side platform	ASDEIS
3-62	Qureshi, Erin	2.5A	Support LRT	ASDEIS
3-65	Zawacki, Bill	2.2A	Light rail should be grade separated	ASDEIS
3-65	Zawacki, Bill	6.1B	Provide restrooms on mall	ASDEIS
3-7	Smith, Chris	2.2A	Range of alternatives is inadequate because a subway in downtown Portland was not considered	ASDEIS
3-9	Christ, M'Lou	2.4A	Prefers frequent, low-floor trolley bus shuttles on mall	ASDEIS
4-15	Ginsburg, Andrew	4.7A	Concerned that the analysis for short term impacts neglects to consider the impacts for diesel particulate emitted from construction vehicles	ASDEIS
4-17	Skoglund, Roy	2.3E	Stations are too close together	ASDEIS
4-17	Skoglund, Roy	2.6A	Oppose LRT on mall	ASDEIS
4-17	Skoglund, Roy	2.6B	Why is light rail needed on the mall? Excellent bus service already exists	ASDEIS
4-18	Roy, Dick and Jeanne	2.3H	Prefer left side platform	ASDEIS
4-18	Roy, Dick and Jeanne	2.4A	Prefers frequent, low-floor trolley bus shuttles on mall	ASDEIS
4-18	Roy, Dick and Jeanne	2.6A	Oppose LRT on mall	ASDEIS
4-18	Roy, Dick and Jeanne	3.1H	Concerned about increasing bus stop spacing to every four blocks	ASDEIS
4-18	Roy, Dick and Jeanne	3.1I	Bus operations would be slowed with LRT given preference in middle lane	ASDEIS
4-18	Roy, Dick and Jeanne	3.2B	Opposes auto lane	ASDEIS
4-21	Saul, Raymond	2.2A	Range of alternatives is inadequate because a subway in downtown Portland was not considered	ASDEIS
4-21	Saul, Raymond	2.2C	Consider separating light rail from bus traffic on the mall by providing for bi-directional light rail traffic on 5th and bi-directional bus traffic on 6th	ASDEIS
4-21	Saul, Raymond	2.4A	Prefers frequent, low-floor trolley bus shuttles on mall	ASDEIS
4-21	Saul, Raymond	2.6C	Mall LRT will not be needed until phase 2 of South Corridor	ASDEIS
4-27	Peden, Greg	2.1B	Supports light rail on the Portland Mall to PSU	ASDEIS
4-27	Peden, Greg	3.2C	Supports auto lane	ASDEIS
4-27	Peden, Greg	3.3B	Support pullouts	ASDEIS
4-27	Peden, Greg	4.2C	Evaluate street trees	ASDEIS

Comment page	Commentor	Response no.	Comment	Document
4-27	Peden, Greg	4.2D	Develop cohesive mall management plan	ASDEIS
4-27	Peden, Greg	4.2F	Improve lighting on mall	ASDEIS
4-27	Peden, Greg	4.2G	Downtown retailers are concerned about creating a more inviting atmosphere on mall by improving design and condition and increasing activity including auto and truck access	ASDEIS
4-29	Bartlett, Thomas	2.1B	Supports light rail on the Portland Mall to PSU	ASDEIS
4-29	Bartlett, Thomas	2.3A	Do not locate a left side station in front of the Ambassador Condos	ASDEIS
4-35	Farkas, Abe	4.5A	PDC feels the ASDEIS inadequately addresses the impacts to two PDC owned properties and requests that impacts are addressed in FEIS	ASDEIS
4-40	AIA-Urban Design	2.3L	Opposes island platforms	ASDEIS
4-40	AIA-Urban Design	5.1C	Support strategy to pursue federal funds for extending LRT in downtown and mall revitalization	ASDEIS
4-44	Citizens for Better Transit	2.4A	Prefers frequent, low-floor trolley bus shuttles on mall	ASDEIS
4-5	Freund, Miriam	2.3D	Add another station pair between PSU and City Hall	ASDEIS
4-5	Freund, Miriam	2.3H	Prefer left side platform	ASDEIS
4-5	Freund, Miriam	2.6B	Why is light rail needed on the mall? Excellent bus service already exists	ASDEIS
4-5	Freund, Miriam	4.4A	Add a traffic light at 4th and College to help passengers safety cross 4th	ASDEIS
4-50	Bartlett, Mary L	2.3A	Do not locate a left side station in front of the Ambassador Condos	ASDEIS
4-53	BES	4.2B	Preserve existing trees where possible or replace them	ASDEIS
4-53	BES	4.6A	Collaborate with BES to manage stormwater issues and sustainable landscape design	ASDEIS
4-53	BES	4.8B	BES would like to see use of sustainable building practices	ASDEIS
4-54	Russell, Stephen P	2.3A	Relocate station in front of University Club one block south to a location between Columbia and Jefferson	ASDEIS
4-58	Stadry, Chris	2.1B	Supports light rail on the Portland Mall to PSU	ASDEIS
4-58	Stadry, Chris	2.2C	Consider separating light rail from bus traffic on the mall by providing for bi-directional light rail traffic on 5th and bi-directional bus traffic on 6th	ASDEIS
4-58	Stadry, Chris	2.3H	Prefer left side platform	ASDEIS
4-58	Stadry, Chris	3.2B	Opposes auto lane	ASDEIS
4-58	Stadry, Chris	4.2B	Preserve existing trees where possible or replace them	ASDEIS
4-60	Emlaw, Merry	2.2A	Range of alternatives is inadequate because a subway in downtown Portland was not considered	ASDEIS
4-60	Emlaw, Merry	2.3A	Do not locate a left side station in front of the Ambassador Condos	ASDEIS
4-63	Petrusich, Daniel J	2.1A	Supports light rail on Portland Mall	ASDEIS
4-63	Petrusich, Daniel J	4.2C	Evaluate street trees	ASDEIS
4-63	Petrusich, Daniel J	4.2D	Develop cohesive mall management plan	ASDEIS
4-63	Petrusich, Daniel J	4.2F	Improve lighting on mall	ASDEIS
4-63	Petrusich, Daniel J	4.4B	Creating a viable pedestrian environment on mall should be top priority	ASDEIS
4-63	Petrusich, Daniel J	5.1B	Share financial burden among all downtown businesses that benefit from the mall, not just those adjacent to it	ASDEIS
4-65	Taylor, Pete	2.2G	Light rail should be constructed on Broadway and 4th	ASDEIS
4-65	Taylor, Pete	3.1H	LRT on the mall will degrade transit service because bus stops will be eliminated	ASDEIS
4-65	Taylor, Pete	3.1I	Concerned about ability of buses to maneuver around LRT on mall	ASDEIS
4-7	Peters, Kenneth	2.2A	Prefer subway that begins east of the Willamette River	ASDEIS
4-7	Peters, Kenneth	2.3H	Prefer left side platform	ASDEIS
4-7	Peters, Kenneth	3.1B	The Steel Bridge will create a bottleneck creating scheduling problems and service issues when there is a breakdown or closure for maintenance	ASDEIS
4-9	Green, Ivan	2.4A	Prefer mall buses	ASDEIS

Comment page	Commentor	Response no.	Comment	Document
5-10	Blischke, Eric	2.2D	The range of alternatives is inadequate because it only examines options for placing bus, LRT and auto traffic on 5th and 6th. Other options should be considered	ASDEIS
5-11	Hulden, Deanne	2.3K	Prefers island platforms and continuous auto lane	ASDEIS
5-11	Hulden, Deanne	3.2C	Supports auto lane	ASDEIS
5-11	McOmber, James	2.3H	Prefer left side platform	ASDEIS
5-11	McOmber, James	3.2B	Opposes auto lane	ASDEIS
5-12, 2-4	Parker, T.R.	2.2A	Range of alternatives is inadequate because a subway in downtown Portland was not considered	ASDEIS
5-13	Baker, Steve	2.1A	Supports light rail on Portland Mall	ASDEIS
5-13	Baker, Steve	3.1G	Build LRT on mall and remove buses making buses a feeder system for LRT	ASDEIS
5-13	Lande, Gregg	2.3J	Prefer right side platforms	ASDEIS
5-13	Tarvin, Cynthia	2.1A	Supports light rail on Portland Mall	ASDEIS
5-14	Poling, Dan	2.2A	Range of alternatives is inadequate because a subway in downtown Portland was not considered	ASDEIS
5-15	Winslow, Jonathan	2.3F	Relocate station at Taylor to between Morrison and Yamhill to facilitate transfers	ASDEIS
5-17	Galazka, Jonathan	2.3H	Prefer left side platform	ASDEIS
5-17	Gorman, Eli	2.2A	Light rail should be grade separated	ASDEIS
5-17	Gorman, Eli	3.1B	The Steel Bridge will create a bottleneck creating scheduling problems and service issues when there is a breakdown or closure for maintenance	ASDEIS
5-17	Kahn, Stan	2.2A	Prefer subway in downtown Portland; streetcar should operate on surface	ASDEIS
5-17	Kahn, Stan	2.4A	Prefers frequent, low-floor trolley bus shuttles on mall	ASDEIS
5-18	Carey, Nick	3.2B	Opposes auto lane	ASDEIS
5-18	Carter, Jack	6.2C	Why weren't fliers advertising mall-related meetings put on buses	ASDEIS
5-19	Kleffner, Jerome	2.3H	Prefer left side platform	ASDEIS
5-19	Williams, Karen	2.3L	Opposes island platforms	ASDEIS
5-19	Williams, Karen	3.1H	Concerned about increasing bus stop spacing to every four blocks	ASDEIS
5-19	Williams, Karen	4.2B	Preserve existing trees where possible or replace them	ASDEIS
5-21	Cook, C	2.6A	Oppose LRT on mall	ASDEIS
5-21	Cook, C	4.2B	Preserve existing trees where possible or replace them	ASDEIS
5-21	Ellingson, Roger	4.1B	Bus noise on the mall should be evaluated and minimized	ASDEIS
5-22	Moore, Will	2.2E	Consider removing all buses from Irving to Jackson on the mall and creating transit centers on the north and south ends of the mall with light rail in between	ASDEIS
5-24	Grund, Ted	2.2H	Reconsider alignment coming off Glisan Street ramp from the Steel Bridge	ASDEIS
5-24	Grund, Ted	6.2D	Proposes that a discussion group, including major property owners and other stakeholders, be assembled to review these issues before final commitment is made to a particular configuration on Steel Bridge	ASDEIS
5-25	Jimenez, Bryan	2.1B	Supports light rail on the Portland Mall to PSU	ASDEIS
5-25	Jimenez, Bryan	2.2C	Consider separating light rail from bus traffic on the mall by providing for bi-directional light rail traffic on 5th and bi-directional bus traffic on 6th	ASDEIS
5-25	Jimenez, Bryan	2.3H	Prefer left side platform	ASDEIS
5-27	Finlayson, Leslie	4.5B	Page 3-43 states that "there are no Section 6(f) resources in close proximity to the study alternatives..." However, in Table 3.10-1, of the three parks listed within 150 feet of the South Corridor Project Alternatives, two of these parks have received LWCF grants and are therefore protect by 6(f): Governor Tom McCall Waterfront Park and Pioneer Park. The document should be corrected to reflect this	ASDEIS

Comment page	Commentor	Response no.	Comment	Document
5-27	Finlayson, Leslie	4.5C	Page 3-45 states that "cumulative impacts to parklands could include improved public access (such as to Tom McCall Waterfront Park and Pioneer Park) due to the increased access from the proposed transit improvements and other projects identified in the RPT. However, no cumulative impacts are expected to occur that would constitute a "use" or "constructive use" as defined in Section 4(f)." We suggest that it would be valuable to provide more information regarding expected increase of use and possible impacts to these parks. For example, a 5% increase of use most likely will not have a significant impact on recreation resources; a 50% increase of use, however, may indeed have an adverse affect that may require mitigation	ASDEIS
5-28	Achenbach, Lois	2.2A	Range of alternatives is inadequate because a subway in downtown Portland was not considered	ASDEIS
5-28	Achenbach, Lois	3.1H	LRT on the mall will degrade transit service because bus stops will be eliminated	ASDEIS
5-28	Achenbach, Lois	4.8A	It will be difficult for pedestrians and buses to maneuver on mall during construction	ASDEIS
5-28	Kailikea, Margaret Joann	3.1G	Build LRT on mall and remove buses making buses a feeder system for LRT	ASDEIS
5-29	Heydt, Marie K	2.6A	Oppose LRT on mall	ASDEIS
5-29	Holtz, Andrew and Kelly	2.3H	Prefer left side platform	ASDEIS
5-3	Moore, Will	3.1J	Concerned about having only one bus lane on mall	ASDEIS
5-3	Moore, Will	6.2B	Disappointed that public meetings were not held on weekends	ASDEIS
5-3	Townsend, Mike	5.1D	Opposes any new taxes in Multnomah County to pay for LRT	ASDEIS
5-30	West, Jonathan	2.2A	Light rail should be grade separated	ASDEIS
5-31	Roberts, Susan M	3.1G	Build LRT on mall and remove buses making buses a feeder system for LRT	ASDEIS
5-31	Soderberg, Anna	2.6A	Oppose LRT on mall	ASDEIS
5-4	Batten, Jim	2.1B	Supports light rail on the Portland Mall to PSU	ASDEIS
5-4	Hamm, Robert	2.1A	Supports light rail on Portland Mall	ASDEIS
5-4	Laubaugh, Glenn	2.6B	LRT on 5th and 6th avenues is not the best way to meet study goals	ASDEIS
5-5	Freund, Miriam	2.6B	Why is light rail needed on the mall? Excellent bus service already exists	ASDEIS
5-5	Freund, Miriam	3.2B	Opposes auto lane	ASDEIS
5-5	Freund, Miriam	4.4E	The mall should be reserved for peds only. Do not allow bikes, skateboards or cars	ASDEIS
5-6	Freund, David	4.4B	Mall should be reserved for peds and mass transit	ASDEIS
5-7	Brown, Roger	2.1A	Supports light rail on Portland Mall	ASDEIS
5-7	Brown, Roger	3.2B	Opposes auto lane	ASDEIS
5-7	Perry, Mary Lou	2.1A	Supports light rail on Portland Mall	ASDEIS
5-7	Perry, Mary Lou	3.2B	Opposes auto lane	ASDEIS
5-7	Perry, Mary Lou	4.4F	Opposed to cars and peds sharing space	ASDEIS
5-7	Winslow, Jonathan	2.2A	Range of alternatives is inadequate because a subway in downtown Portland was not considered	ASDEIS
5-8	Levine, Ann	2.1A	Supports light rail on Portland Mall	ASDEIS
5-8	Levine, Ann	2.3H	Prefer left side platform	ASDEIS
5-8	Levine, Ann	3.2B	Opposes auto lane	ASDEIS
5-8	Levine, Ann	4.2B	Preserve existing trees where possible or replace them	ASDEIS
5-9	Bell, Janice	3.1K	Will people be forced to transfer to light rail from buses?	ASDEIS
1	Nordberg, Dave	1.1A	LRT would produce the largest environmental benefits because it best serves the region's land use goals. LRT is the most promising way to foster compact mixed-use development and lessen dependence on the automobile	Other comments
12	US Department of Interior/Taylor, Willie	1.1I	Complete surveys for threatened and endangered plants in compliance with guidance from the US Department of the Interior and Fish and Wildlife Service to ensure compliance with ESA	Other comments
12	US Department of Interior/Taylor, Willie	1.1J	Recommend that the FEIS consider fish and wildlife corridor enhancement along drainages such as Johnson Creek	Other comments

Comment page	Commentor	Response no.	Comment	Document
12	US Department of Interior/Taylor, Willie	1.1K	Provide more thorough description of compensatory mitigation alternatives for the LPA in the FEIS. Allow FWA an opportunity to review a general description of the mitigation sites conservation easement	Other comments
12	US Department of Interior/Taylor, Willie	1.1L	Favor an approach that avoids Section 4(f) resources, or, if there are no prudent and feasible alternatives to avoid them, an approach that minimizes harm	Other comments
12	US Department of Interior/Taylor, Willie	1.1M	Add the following to the Purpose and Need Statement: Avoid, minimize, and restore habitat for fish and wildlife in order to promote no-net-loss of habitat function in the affected transportation corridor; where feasible and practicable, improve fish and wildlife habitat beyond what is required for compensatory mitigation	Other comments
12	US Department of Interior/Taylor, Willie	1.1N	On page 3-225, in the second paragraph, 3rd sentence, recommend adding the phrase "of equal or greater fair market value" at the end of the sentence to more clearly spell out the true cost under Section 6(f)(3) of taking parklands acquired or developed with Land and Water Conservation Fund money	Other comments
12	US Department of Interior/Taylor, Willie	1.1O	Include discussion that outlines the potential short and long-term impacts to birds protected under the Migratory Bird Treaty Act (MBTA) and procedures for assuring compliance under the MBTA during project construction or operation	Other comments
12	US Department of Interior/Taylor, Willie	1.1P	Use numeric thresholds to designate high, medium and low functions for wetlands affected by the LPA in Table 3.11-3. For comparison purposes, include wetland fill impacts in Table 3.11-3 under the row currently displaying hydrogeomorphic classes	Other comments
12	US Department of Interior/Taylor, Willie	1.1Q	Follow FWS stormwater guidance and recommendations for the LPA in the FEIS	Other comments
12	US Department of Interior/Taylor, Willie	1.1R	Balanced cuts should generally not be combined with excavation associated with compensatory mitigation for impacts to fish and wildlife habitat	Other comments
12	US Department of Interior/Taylor, Willie	1.1S	Recommend using pervious materials for parking areas and access roads associated with construction, operation and maintenance of the proposed transportation project	Other comments
2	Joe, Paul	1.1B	Include detailed information about contaminated sites identified in the SDEIS hazardous materials chapter in the FEIS. The FEIS should address each contaminated site by documenting the nature and extent of contamination, planned mitigation measures, steps that will be followed to protect workers and the public, the preparation of site safety plans, sampling and testing strategies and plans for final site cleanup certification	Other comments
3	Merchant, Michael	2.1A	Support both I-205 and Milwaukie light rail but believe Milwaukie light rail should be constructed first	Other comments
4	Schwab, Mary Ann	2.2A	Provide lift service from CTC to Kaiser Sunnyside	Other comments
6	Jawarsky, Simon	2.1A	Prefer Milwaukie LRT	Other comments
6	Rarick, Janie	2.1A	Prefer Milwaukie LRT with bus service to CTC	Other comments
8	US EPA Region 10/ Lee, Judith	1.1C	Prefer Combined Light Rail Alternative because it provides for the most multi-modal choices and focused redevelopment potential to serve Portland and its southeastern communities	Other comments
8	US EPA Region 10/ Lee, Judith	1.1D	The FEIS should improve disclosure of current wetlands conditions, current wetland buffer conditions, projected impacts to wetlands and their buffers, and proposed mitigation efforts	Other comments

Comment page	Commentor	Response no.	Comment	Document
8	US EPA Region 10/ Lee, Judith	1.1E	Rather than characterizing the long-term impacts to wetlands based on, for example, area of potential fill, recommend that the FEIS utilize and appropriate methodology to assess post-construction conditions of wetlands relative to their potential change in function. Concerned about applying HGM to assess wetlands function for all wetland types in project area	Other comments
8	US EPA Region 10/ Lee, Judith	1.1G	The FEIS should disclose any accessibility impacts caused by physical barriers due to transportation corridors and what mitigation might be applied to maintain community cohesion	Other comments
8	US EPA Region 10/ Lee, Judith	1.1H	The FEIS should illustrate potential beneficial impacts from the South Corridor Project on hazardous materials sites and brownfield sites and community redevelopment opportunities. The FEIS should identify partnership opportunities to coordinate with TriMet Brownfields Assessment Pilot, the Portland Brownfields Showcase Program and the Clackamas County Brownfields Assessment Pilot. The FEIS should incorporate information from TriMet's *Application for Demonstration Pilot for the South/North Transit Corridor Brownfields Economic Development Initiative,* submitted to FTA on March 23, 1998	Other comments
8	US EPA Region 10/ Lee, Judith	1.2A	Provide a definition and clearer discussion of "cutline vehicle volume"	Other comments
8	US EPA Region 10/ Lee, Judith	1.3A	The FEIS should provide further discussion of potential environmental health impacts from construction activity within or near hazardous material sites that may affect both the natural and human health environment	Other comments
1-10	Aho, Diane	3.4A	Light rail promotes crime	SDEIS
1-10	Aho, Diane	5.2B	Oppose I-205 LRT	SDEIS
1-10	Nussbaum, Fred	1.2A	Favors Milwaukie light rail	SDEIS
1-10	White, Amber	1.2E	Construct I-205 LRT on the east side of I-205	SDEIS
1-10	White, Amber	3.3D	Elevate LRT south of Crystal Springs Rd	SDEIS
1-10	White, Amber	5.2B	Oppose LRT on I-205	SDEIS
1-10	White, Amber	5.3C	Requests that comment period be extended	SDEIS
1-14	Stearns, Nick	1.4D	Build BRT between Portland and Milwaukie	SDEIS
1-14	Stearns, Nick	3.7C	Other ways to achieve bigger improvements to air quality	SDEIS
1-14	Stearns, Nick	4.1C	The cost per ride for I-205 light rail is high and a Bus Rapid Transit alternative could have a lower cost per ride. The percentage reduction in vehicle miles traveled, traffic delay, and air pollution are so tiny they are less than the margin of error.	SDEIS
1-3	Aschenbrenner, David	1.2C	Construct Milwaukie light rail first because opening day ridership will be higher. Begin operating buses on I-205 to develop ridership for future light rail.	SDEIS
1-3	DeMarco, Paul	1.1A	Favors I-205 as phase 1 and Milwaukie as phase 2.	SDEIS
1-3	Parker, Terry	1.1D	Supports I-205 and Milwaukie light rail without rail on the Portland Mall	SDEIS
1-3	Parker, Terry	4.2E	Riders should pay cost of 205 LRT	SDEIS
1-4	Jannuzzi, Joseph B	1.2B	Milwaukie light rail should be constructed first to minimize inflation.	SDEIS
1-4	Salsgiver, Mike	1.1C	Favors I-205 as phase 1 with a new route on the Portland Mall and Milwaukie as phase 2	SDEIS
1-4	Salsgiver, Mike	1.3F	Consider LRT on the mall	SDEIS
1-4	Satterlee, Steve	1.2C	Construct Milwaukie light rail first because opening day ridership will be higher. Begin operating buses on I-205 to develop ridership for future light rail.	SDEIS
1-4	Smith, Joe	1.3D	Supports a subway	SDEIS
1-6, 1-18	Wyse, Aloha	1.3D	Supports a subway	SDEIS
3-19	Goff, Phil	3.8C	Complete a thorough analysis of TOD potential at all stations	SDEIS
1-6	Jawarsky, Simon	1.3D	Supports a subway	SDEIS
1-8	Polani, Ray	1.3D	Supports a subway	SDEIS

Comment page	Commentor	Response no.	Comment	Document
3-19	Goff, Phil	1.3D	Supports a subway	SDEIS
1-10	Nussbaum, Fred	1.3D	Supports a subway	SDEIS
1-4	Stone, Karen (Clackamas Community College)	1.1A	Favors I-205 as phase 1 and Milwaukie as phase 2.	SDEIS
1-40	Norris, Alice	1.1B	Favors I-205 as phase 1 and Milwaukie as phase 2 with an extension to Oregon City	SDEIS
1-41	Aho, Diane	2.2C	Park-and-rides will increase traffic on 92nd and block fire station access	SDEIS
1-5	Kennemer, Bill	1.1A	Favors I-205 as phase 1 and Milwaukie as phase 2.	SDEIS
1-5	Schwab, Mary Ann	2.1D	Guarantee lift service from Clackamas TC to Kaiser Sunnyside	SDEIS
1-5, 1-14	Stearns, Nick	1.3G	Build HOT lanes	SDEIS
1-5	Zumwalt, Ed	1.2A	Favors Milwaukie light rail	SDEIS
1-50	Nelson, Kris	1.3I	Consider personal rapid transit	SDEIS
1-51	Parecki, Ed	1.2A	Favors Milwaukie light rail	SDEIS
1-51	Posner, Dustin	1.2A	Favors Milwaukie light rail with I-205 following	SDEIS
1-6	Christ, M'Lou	1.2A	Favors Milwaukie light rail	SDEIS
1-6	Christ, M'Lou	1.2C	Construct Milwaukie light rail first because opening day ridership will be higher. Begin operating buses on I-205 to develop ridership for future light rail.	SDEIS
1-6	Hunt, Bill	1.1A	Supports I-205 light rail	SDEIS
1-6	Hunt, Jonathan	1.1A	Supports I-205 light rail first	SDEIS
1-6	Jawarsky, Simon	1.2C	Construct Milwaukie light rail first because opening day ridership will be higher. Begin operating buses on I-205 to develop ridership for future light rail.	SDEIS
1-6	Jawarsky, Simon	1.4C	Begin bus service on I-205 to build ridership rather than building LRT	SDEIS
1-6	Jawarsky, Simon	4.2A	Fund Milwaukie and I-205 LRT and downtown subway with bonds	SDEIS
1-6	Tillstrom, Marilee	1.2A	Favors Milwaukie light rail	SDEIS
1-6	Wyse, Aloha	1.2C	Construct Milwaukie light rail first because opening day ridership will be higher. Begin operating buses on I-205 to develop ridership for future light rail.	SDEIS
1-6	Wyse, Aloha	1.4C	Begin bus service on I-205 to build ridership rather than building LRT	SDEIS
1-6	Wyse, Aloha	4.2A	Fund Milwaukie and I-205 LRT and downtown subway with bonds	SDEIS
1-7	Berliner, Steve	1.1A	Favors I-205 as phase 1 and Milwaukie as phase 2.	SDEIS
1-7	Chung, Kenneth	1.1A	Favors I-205 as phase 1 and Milwaukie as phase 2.	SDEIS
1-7	Chung, Kenneth	2.1G	Improve neighborhood bus service to connect to I-205 LRT	SDEIS
1-7	Flynn, Craig	2.2E	LRT will not alleviate congestion	SDEIS
1-7	Flynn, Craig	3.7B	LRT will not improve air quality	SDEIS
1-7	Flynn, Craig	4.3C	Ridership estimates are not viable unless bus service is removed	SDEIS
1-7	Williams, Ross	1.2A	Favors Milwaukie light rail	SDEIS
1-7, 6-64	Phillipi, Marie	1.2A	Favors Milwaukie light rail	SDEIS
1-8	Charles, John	4.1A	LRT is too expensive	SDEIS
1-8	Charles, John	4.2B	A realistic funding plan for the project has not been presented	SDEIS
1-8	Charles, John	4.3A	Clackamas County is not dense enough to support LRT	SDEIS
1-8	Charles, John	5.2A	Oppose LRT	SDEIS
6-65	Fagereng, Per	4.1A	LRT is too expensive	SDEIS
1-8	Holenstein, Cherie	1.3H	LRT will not solve congestion and environmental problems	SDEIS
1-8	Holenstein, Cherie	5.2A	Oppose LRT	SDEIS
1-8	Howell, Jim	1.2C	Construct Milwaukie light rail first because opening day ridership will be higher. Begin operating buses on I-205 to develop ridership for future light rail.	SDEIS
1-8	Howell, Jim	4.3B	I-205 ridership numbers are too high because of faulty modeling assumptions	SDEIS

Comment page	Commentor	Response no.	Comment	Document
1-8	Schoop, Steve	5.2A	Oppose LRT	SDEIS
1-8, 3-4	Polani, Ray	1.2C	Construct Milwaukie light rail first because opening day ridership will be higher. Begin operating buses on I-205 to develop ridership for future light rail.	SDEIS
1-9	Bailey, Bob	1.1B	Favors I-205 as phase 1 and Milwaukie as phase 2 with an extension to Oregon City	SDEIS
2-29	Zoltansky, Peter	2.3B	Too many park-and-ride spaces are located at Powell and Holgate	SDEIS
2-10	Clackamas County Business Alliance	1.1A	Favors I-205 as phase 1 and Milwaukie as phase 2.	SDEIS
2-12	Sunnyside United Neighbors	1.1A	Favors I-205 as phase 1 and Milwaukie as phase 2.	SDEIS
2-12	Waldermar, Martha	2.1G	Improve neighborhood bus service to connect to I-205 LRT	SDEIS
2-12	Waldermar, Martha	2.3D	Ensure safety at park-and-rides	SDEIS
2-12	Waldermar, Martha	2.3E	Build park-and-ride structures to be as unobtrusive as possible	SDEIS
2-12	Waldermar, Martha	2.3F	Implement fines to discourage neighborhood parking	SDEIS
2-12	Waldermar, Martha	3.1A	Protect privacy	SDEIS
2-12	Waldermar, Martha	3.3A	Treat displaced residents fairly	SDEIS
2-12	Waldermar, Martha	3.4D	Build a fence between freeway and bike paths	SDEIS
2-12	Waldermar, Martha	3.4E	Build a fence between LRT and homes	SDEIS
2-12	Waldermar, Martha	3.4F	Install lighting along bike path	SDEIS
2-12	Waldermar, Martha	3.4G	Install lighting at park and rides and station	SDEIS
2-12	Waldermar, Martha	3.8B	Provide lifetime LRT passes for impacted residents	SDEIS
2-14	Clackamas County Economic Development Commission	1.1A	Favors I-205 as phase 1 and Milwaukie as phase 2.	SDEIS
2-16	Howell, Jim	1.2C	Construct Milwaukie light rail first because opening day ridership will be higher. Begin operating buses on I-205 to develop ridership for future light rail.	SDEIS
2-16	Howell, Jim	1.4C	Begin bus service on I-205 to build ridership rather than building LRT	SDEIS
2-16	Howell, Jim	4.1A, 4.1B	Capital costs will be as high as Milwaukie LRT; operating costs for I-205 are higher than for Milwaukie LRT	SDEIS
2-16	Howell, Jim	4.2H	205 LRT cannot be built without going to voters	SDEIS
2-16	Howell, Jim	4.3B	I-205 ridership numbers are too high because of faulty modeling assumptions	SDEIS
2-16	Howell, Jim	4.3D	I-205 LRT encourages auto dependence	SDEIS
2-20	Williams, Karen	1.4C	Begin bus service on I-205 to build ridership rather than building LRT	SDEIS
2-20, 2-5	Williams, Karen	1.2C	Construct Milwaukie light rail first because opening day ridership will be higher. Begin operating buses on I-205 to develop ridership for future light rail.	SDEIS
2-24	Peek, Cindy (Lents URAC)	3.3C	Locate a parking structure in Lents	SDEIS
2-24	Peek, Cindy (Lents URAC)	5.3A	Project needs to ensure that those affected by LRT are informed	SDEIS
2-24, 6-27	Peek, Cindy (Lents URAC)	2.1E	Concerned that I-205 LRT will reduce bus service	SDEIS
2-24, 6-27	Peek, Cindy (Lents URAC)	2.2B	Improve traffic conditions in Lents	SDEIS
2-24, 6-27	Peek, Cindy (Lents URAC)	2.2D	Increased traffic on 92nd could impair fire station	SDEIS

Comment page	Commentor	Response no.	Comment	Document
2-24, 6-27	Peek, Cindy (Lents URAC)	2.3A	LRT will create on-street parking problems in Lents	SDEIS
2-24, 6-27	Peek, Cindy (Lents URAC)	2.3D	Ensure safety at park-and-rides	SDEIS
2-24, 6-27	Peek, Cindy (Lents URAC)	3.1A	Protect privacy	SDEIS
2-24, 6-27	Peek, Cindy (Lents URAC)	3.4B	Concerned about security at stations and protecting bikes and peds	SDEIS
2-24, 6-27	Peek, Cindy (Lents URAC)	4.2C	Concerned that Lents TIFF will be used to fund LRT	SDEIS
2-32	Dorman, Cheryl	2.1C	Expand Gateway to accommodate 205 LRT?	SDEIS
2-32	Dorman, Cheryl	2.1H	Will more trains run between Gateway and downtown Portland to accommodate additional riders from the I-205 line?	SDEIS
2-25	Johnson, Travis and Kelly	1.1A	Supports I-205 light rail	SDEIS
2-26	Dorman, Rob	1.3B	Prefer busway	SDEIS
2-26	Gethoefer, John	1.1A	Supports I-205 light rail	SDEIS
2-27	Jannuzzi, Joseph B	1.2B	Milwaukie light rail should be constructed first to minimize inflation.	SDEIS
2-27	Welch, Judy	3.1A	Protect privacy	SDEIS
2-27	Welch, Judy	3.3A	Treat displaced residents fairly	SDEIS
2-27	Welch, Judy	3.4C	Address concerns about safety from Lents	SDEIS
2-28	Zoltansky, J	1.1A	Favors I-205 as phase 1 and Milwaukie as phase 2.	SDEIS
2-28	Zoltansky, J	2.3B	Too many park-and-ride spaces are located at Powell and Holgate	SDEIS
2-29	Zoltansky, Peter	1.2C	Construct Milwaukie light rail first because opening day ridership will be higher. Begin operating buses on I-205 to develop ridership for future light rail.	SDEIS
2-29, 2-6	Zoltansky, Peter	1.2A	Favors Milwaukie light rail	SDEIS
2-3	Marks, David	1.1A	Favors I-205 as phase 1 and Milwaukie as phase 2.	SDEIS
2-3	Miles, Lowel	1.1A	Favors I-205 as phase 1 and Milwaukie as phase 2.	SDEIS
2-3	Stickley, Barbara	1.1A	Favors I-205 as phase 1 and Milwaukie as phase 2.	SDEIS
2-32, 6-64	Stephens, Don	1.2A	Favors Milwaukie light rail	SDEIS
2-4	Gethoefer, John	5.1A	Support LRT	SDEIS
2-4	Martinez, Louis	3.3A	Treat displaced residents fairly	SDEIS
2-4	Turner, Ken	3.3A	Treat displaced residents fairly	SDEIS
2-4	Tzantarmus, John	1.1A	Supports I-205 light rail	SDEIS
2-4	Waldermar, Martha	1.1A	Supports I-205 light rail	SDEIS
2-5	Doherty, Mary	1.1A	Supports I-205 light rail	SDEIS
2-5	Howell, Jim	1.2C	Construct Milwaukie light rail first because opening day ridership will be higher. Begin operating buses on I-205 to develop ridership for future light rail.	SDEIS
2-5	Mullins, Mike (CRC TMA)	1.1A	Favors I-205 as phase 1 and Milwaukie as phase 2.	SDEIS
2-5	Orton, Lee	2.1G	Improve neighborhood bus service to connect to I-205 LRT	SDEIS
2-5	Smith, Jerry	1.1A	Favors I-205 as phase 1 and Milwaukie as phase 2.	SDEIS
2-6	Cooley, Dick	1.1A	Supports I-205 light rail	SDEIS
2-6	Everhart, Gregg	3.5A	Grade separate Springwater Trail crossing	SDEIS
2-6	Hites, Ray	3.3A	Treat displaced residents fairly	SDEIS
2-6	Hites, Ray	4.2C	Concerned that Lents TIFF will be used to fund LRT	SDEIS

Comment page	Commentor	Response no.	Comment	Document
2-6	Schmidt, Jerry	1.1A	Favors I-205 as phase 1 and Milwaukie as phase 2.	SDEIS
2-6	Woodruff, Aleta	1.1A	Supports I-205 light rail	SDEIS
2-6, 3-35, 6-62	Orton, Kathy and Lee	1.2A	Favors Milwaukie light rail	SDEIS
2-6, 6-26, 2-24	Peek, Cindy (Lents URAC)	3.3A	Treat displaced residents fairly	SDEIS
2-7, 4-11	Aschenbrenner, David	1.2C	Construct Milwaukie light rail first because opening day ridership will be higher. Begin operating buses on I-205 to develop ridership for future light rail.	SDEIS
2-8	Clackamas County Business and Neighborhood Leaders	1.1A	Favors I-205 as phase 1 and Milwaukie as phase 2.	SDEIS
2-8	Clackamas County Business and Neighborhood Leaders	2.1G	Improve neighborhood bus service to connect to I-205 LRT	SDEIS
3-12	Cherry, Jonathan	1.2A	Favors Milwaukie light rail	SDEIS
3-13	Gibbs, Peter	1.2A	Favors Milwaukie light rail	SDEIS
3-14	Downing, Kevin	1.2A	Favors Milwaukie light rail	SDEIS
3-14	Kirk, Phyllis	1.1A	Favors I-205 as phase 1 and Milwaukie as phase 2.	SDEIS
3-14	Kirk, Phyllis	5.1A	Support LRT	SDEIS
3-15	Cotton, Marilyn	1.1A	Supports I-205 light rail	SDEIS
3-16, 1-5	Baltz, Beth	1.1A	Supports I-205 light rail	SDEIS
3-16	Shannon, P	1.4B	Buses are less expensive and more flexible than LRT	SDEIS
3-17	Falkenstein, Marten	1.3J	Build another lane on McLoughlin and add a bus during peak	SDEIS
3-17	Shannon, Bob	1.4B	Buses are less expensive and more flexible than LRT	SDEIS
3-18	Wax, Stan	5.2A	Oppose LRT	SDEIS
3-20	Abeling, Steve	1.1A	Supports I-205 light rail	SDEIS
3-20	McGall, Kevin	1.1A	Favors I-205 as phase 1 and Milwaukie as phase 2.	SDEIS
3-21	Kinser, P	1.1A	Supports I-205 light rail	SDEIS
3-21	Kinser, P	2.3C	Construct a long-term, paid parking structure at CTC	SDEIS
3-21	Turner, Tim	1.1A	Favors I-205 as phase 1 and Milwaukie as phase 2.	SDEIS
3-22	August, David	1.1A	Favors I-205 as phase 1 and Milwaukie as phase 2.	SDEIS
3-22	Vargas, D	4.2F	Why can't transit money be used to fund schools?	SDEIS
3-23	Beadle, Kristin	1.2A	Favors Milwaukie light rail	SDEIS
3-23	Kamp, Gustaf	1.2A	Favors Milwaukie light rail followed by I-205 light rail	SDEIS
3-24	LeClerc, Mauricio	1.1A	Supports I-205 light rail	SDEIS
3-24	Lyon, Laurel	1.2A	Favors Milwaukie light rail	SDEIS
3-25	Corr, Chris	1.2C	Construct Milwaukie light rail first because opening day ridership will be higher. Begin operating buses on I-205 to develop ridership for future light rail.	SDEIS
3-25	Orton, Lee	1.2C	Construct Milwaukie light rail first because opening day ridership will be higher. Begin operating buses on I-205 to develop ridership for future light rail.	SDEIS
3-26	Southerland, Karen	1.1A	Favors I-205 as phase 1 and Milwaukie as phase 2.	SDEIS
3-27	Merrick, Meg	1.2A	Favors Milwaukie light rail	SDEIS
3-27	Norberg, Eric	1.2A	Favors Milwaukie light rail	SDEIS
3-28	Kelly, James	1.2A	Favors Milwaukie light rail	SDEIS
3-29	McKinnon, Emily	1.2A	Favors Milwaukie light rail	SDEIS

Comment page	Commentor	Response no.	Comment	Document
3-3	Howell, Jim	1.2C	Construct Milwaukie light rail first because opening day ridership will be higher. Begin operating buses on I-205 to develop ridership for future light rail.	SDEIS
3-3	Howell, Jim	2.1F	I-205 LRT assumes truncation of Airport MAX at Gateway	SDEIS
3-30	Febel-Azcarate, Pedro	1.2A	Favors Milwaukie light rail	SDEIS
3-31	Civas, James	1.2A	Favors Milwaukie light rail	SDEIS
3-31	Merrick, Rod	1.2A	Favors Milwaukie light rail followed by I-205 light rail	SDEIS
3-32	Anderson, Lenny	1.2A	Favors Milwaukie light rail	SDEIS
3-32, 4-61	Lindahl, Lance	1.2A	Favors Milwaukie light rail followed by I-205 light rail	SDEIS
3-33	Klotz, Doug	1.2C	Construct Milwaukie light rail first because opening day ridership will be higher. Begin operating buses on I-205 to develop ridership for future light rail.	SDEIS
3-34	Bushco, R.W.	4.2G	Will voter approval be required for 205 LRT?	SDEIS
3-34	Stewart, Mary	5.3B	The project should meet with the business community to show them how LRT can provide opportunities	SDEIS
3-36	Jones, Gordon	2.1C	I-205 LRT should include improvements to Gateway TC	SDEIS
3-36	Jones, Gordon	1.1A	Supports I-205 light rail	SDEIS
3-37	McFarling, Ken	1.2A	Favors Milwaukie light rail	SDEIS
3-38, 4-32	Weislogel, David	1.2A	Favors Milwaukie light rail	SDEIS
3-4	Degon, Bob	1.2A	Favors Milwaukie light rail followed by I-205 light rail	SDEIS
3-5	Nussbaum, Fred	2.1B	Cross-mall will not be able to handle I-205 LRT	SDEIS
3-5, 6-69	Lewellen, Art	1.1A	Favors I-205 as phase 1 and Milwaukie as phase 2.	SDEIS
3-6	Simpson, Jack	1.1E	Supports I-205 light rail with an extension to Tualatin	SDEIS
3-6	Simpson, Jack	2.3D	Ensure safety at park-and-rides	SDEIS
3-6	Simpson, Jack	5.1A	Support LRT	SDEIS
3-6	Toler, Ruth	1.1A	Supports I-205 light rail	SDEIS
3-6	Toler, Ruth	4.2E	Riders should pay cost of 205 LRT	SDEIS
3-7	Kerbaugh, Edie	1.1A	Supports I-205 light rail	SDEIS
3-7	Simpson, Julia	1.1A	Supports I-205 light rail	SDEIS
3-7	Simpson, Julia	1.1B	Favors I-205 as phase 1 and Milwaukie as phase 2 with an extension to Oregon City	SDEIS
3-9	Averill, Roxy Hilton	1.3C	Support BRT from Milwaukie to Oregon City	SDEIS
4-10	Johnson, Mary	1.3C	Support BRT from Milwaukie to Oregon City	SDEIS
4-14	Bingham. George	1.3K	Prefer river transit	SDEIS
4-15	Bittler, Kerry and Virginia	1.4B	Buses are less expensive and more flexible than LRT	SDEIS
4-16	Bitz, Gerald and Carol Ann	1.2A	Favors Milwaukie light rail followed by I-205 light rail	SDEIS
4-17	Osterman, James	1.1A	Favors I-205 as phase 1 and Milwaukie as phase 2.	SDEIS
4-19	Birkett, Craig	1.3A	Prefer BRT; more cost effective	SDEIS
4-20	Dahl, Christine	1.4B	Buses are less expensive and more flexible than LRT	SDEIS
4-21	Fuglister, Jill	1.2A	Favors Milwaukie light rail	SDEIS
4-22	Macken-Hambright, Dolly	1.2A	Favors Milwaukie light rail	SDEIS
4-23	Ghormley Jr., John	1.1A	Favors I-205 as phase 1 and Milwaukie as phase 2.	SDEIS
4-25	Highfield, Karen	1.1A	Supports I-205 light rail	SDEIS
4-26	Highfield, Karen	1.3A	Prefer BRT and I-205 LRT	SDEIS
4-28	Johnson, Earl	1.1A	Favors I-205 as phase 1 and Milwaukie as phase 2.	SDEIS
4-29	Rubin, Judith	1.1A	Supports I-205 light rail	SDEIS
4-30	Scher, Linda	1.1A	Favors I-205 as phase 1 and Milwaukie as phase 2.	SDEIS

Comment page	Commentor	Response no.	Comment	Document
4-31	Swanson, Andrew and Michelle	1.1A	Favors I-205 as phase 1 and Milwaukie as phase 2.	SDEIS
4-33	Wood, Clinton	1.1A	Favors I-205 as phase 1 and Milwaukie as phase 2.	SDEIS
4-34	Seaman, Varner	1.1A	Favors I-205 as phase 1 and Milwaukie as phase 2.	SDEIS
4-34	Tolentino, Narda	1.1A	Supports I-205 light rail	SDEIS
4-36	Pierson, Teri	1.3A	Prefer BRT; more cost effective	SDEIS
4-38	Buss, Kathy	1.2C	Construct Milwaukie light rail first because opening day ridership will be higher. Begin operating buses on I-205 to develop ridership for future light rail.	SDEIS
4-39	Laubaugh. Glenn	1.3L	Prefer commuter rail	SDEIS
4-4	McManamon, Ann	1.2C	Construct Milwaukie light rail first because opening day ridership will be higher. Begin operating buses on I-205 to develop ridership for future light rail.	SDEIS
4-40	Thorton, Nancy	1.1A	Favors I-205 as phase 1 and Milwaukie as phase 2.	SDEIS
4-41	Jette, Melinda Marie	5.1A	Support LRT	SDEIS
4-42	Gronke, Ed	1.3C	Support BRT from Milwaukie to Oregon City	SDEIS
4-43	Frishberg, Leo	1.2A	Favors Milwaukie light rail	SDEIS
4-45	Kimura, Arlene	2.3D	Ensure safety at park-and-rides	SDEIS
4-45	Kimura, Arlene	4.2D	Gateway TIFF should not be used for I-205 LRT	SDEIS
4-46	Nordberg, Dave	3.7A	LRT offers greatest air quality and environmental benefits	SDEIS
4-47	Kazen, Sonia	3.3B	Displace homes instead of businesses	SDEIS
4-47	Walker, Barbara	3.5A	Grade separate Springwater Trail crossing	SDEIS
4-49	Baucom, Jim	1.2A	Favors Milwaukie light rail	SDEIS
4-49	Helm, Wallace and Marilyn	1.4B	Buses are less expensive and more flexible than LRT	SDEIS
4-5	Tong, Susan	1.2A	Favors Milwaukie light rail	SDEIS
4-50	Gallant, Seth	1.2C	Construct Milwaukie light rail first because opening day ridership will be higher. Begin operating buses on I-205 to develop ridership for future light rail.	SDEIS
4-50	Kodlin, Dan	1.2D	Construct I-205 LRT in the median	SDEIS
4-51	Barber, Gregory	1.3A	Prefer BRT; more cost effective	SDEIS
4-52	Camp, Tracy	1.1A	Favors I-205 as phase 1 and Milwaukie as phase 2.	SDEIS
4-52	Roland, Waybe	1.1A	Supports I-205 light rail	SDEIS
4-53	Cornilsen, Todd	1.2A	Favors Milwaukie light rail	SDEIS
4-53	Sharp, Robert	1.1A	Favors I-205 as phase 1 and Milwaukie as phase 2.	SDEIS
4-54	Berkowitz, Hannah	5.1A	Support LRT	SDEIS
4-54	Kloster, Susan	1.1B	Favors I-205 as phase 1 and Milwaukie as phase 2 with an extension to Oregon City	SDEIS
4-55	Pennington, Darren	1.1A	Favors I-205 as phase 1 and Milwaukie as phase 2.	SDEIS
4-55	Pennington, Darren	5.1A	Support LRT	SDEIS
4-56	Hamm, Robert	1.2A	Favors Milwaukie light rail	SDEIS
4-57	Denburg, S.R.	1.3B	Prefer busway	SDEIS
4-57	Kazen, Sonia	1.3E	Do not build LRT on the mall	SDEIS
4-57	Kazen, Sonia	2.2A	Grade-separate road crossings	SDEIS
4-58	Berry, Rick	1.2A	Favors Milwaukie light rail followed by I-205 light rail	SDEIS
4-58	Fowler, Dan	1.1B	Favors I-205 as phase 1 and Milwaukie as phase 2 with an extension to Oregon City	SDEIS
4-59	Grelle, Jim	1.2A	Favors Milwaukie light rail	SDEIS
4-59	Liljeholm, Anders	1.2A	Favors Milwaukie light rail followed by I-205 light rail	SDEIS
4-6	Banks, Rhonda	1.2C	Construct Milwaukie light rail first because opening day ridership will be higher. Begin operating buses on I-205 to develop ridership for future light rail.	SDEIS

Comment page	Commentor	Response no.	Comment	Document
4-60	Dahlen, Kimberly	1.2A	Favors Milwaukie light rail	SDEIS
4-60	Pardes, Matthew	1.2A	Favors Milwaukie light rail	SDEIS
4-61	Bresky, Robert	1.1A	Supports I-205 light rail	SDEIS
4-62	Thorton, Margaret	1.2A	Favors Milwaukie light rail followed by I-205 light rail	SDEIS
4-65	Poole, Scott	1.1A	Supports I-205 light rail	SDEIS
4-65	Quackenbush, Rick	1.1A	Supports I-205 light rail	SDEIS
4-66	Moore, Linda	1.2A	Favors Milwaukie light rail	SDEIS
4-66	Saltenberger, John	1.1B	Favors I-205 as phase 1 and Milwaukie as phase 2 with an extension to Oregon City	SDEIS
4-67	Jensen, Nancy	1.1A	Favors I-205 as phase 1 and Milwaukie as phase 2.	SDEIS
4-67	Stone, Eileen	1.2C	Construct Milwaukie light rail first because opening day ridership will be higher. Begin operating buses on I-205 to develop ridership for future light rail.	SDEIS
4-7	Banks, Mike	1.2C	Construct Milwaukie light rail first because opening day ridership will be higher. Begin operating buses on I-205 to develop ridership for future light rail.	SDEIS
4-73	Schmidt, Robert	1.2C	Construct Milwaukie light rail first because opening day ridership will be higher. Begin operating buses on I-205 to develop ridership for future light rail.	SDEIS
4-75	Davis, Anthony Darryl	1.2A	Favors Milwaukie light rail followed by I-205 light rail	SDEIS
4-76	Padres, M	1.2C	Construct Milwaukie light rail first because opening day ridership will be higher. Begin operating buses on I-205 to develop ridership for future light rail.	SDEIS
4-8	Howe, Katherine	1.1A	Supports I-205 light rail	SDEIS
4-9	Rodeman, David	5.2A	Oppose LRT	SDEIS
5-3	Skelton, Judy Blue Horse	1.1A	Supports I-205 light rail	SDEIS
5-3	White, Gavin	1.2A	Favors Milwaukie light rail	SDEIS
5-4	Joynt, Noreen	1.4A	Instead of I-205 LRT, reroute buses to I-205	SDEIS
5-4	Larkin, Mary Rose	1.2A	Favors Milwaukie light rail	SDEIS
6-10	Wentworth, Laurel	1.3F	Consider LRT on the mall	SDEIS
6-10	Wentworth, Laurel	3.3A	Treat displaced residents fairly	SDEIS
6-10	Wentworth, Laurel	3.3E	Issues raised by Lents should be addressed	SDEIS
6-10	Wentworth, Laurel	3.5A	Grade separate Springwater Trail crossing	SDEIS
6-10	Wentworth, Laurel	3.6A	BES prefers relocation of Flavel Station outside of Floodplain	SDEIS
6-11	Dotterrer, Steve	3.3F	Locate platforms to encourage ped and community orientation	SDEIS
6-18	Marriot, Dean	3.6A	BES prefers relocation of Flavel Station outside of Floodplain	SDEIS
6-18	Marriot, Dean	3.6B	Minimize impacts to Johnson Creek	SDEIS
6-18	Marriot, Dean	3.6C	Floodplain fill amounts in SDEIS are lower than amount likely to impacted	SDEIS
6-18	Marriot, Dean	3.6D	Impacts to soils and vegetation during construction are not adequately disclosed	SDEIS
6-20	Grant, Eugene	1.1A	Favors I-205 as phase 1 and Milwaukie as phase 2.	SDEIS
6-22	Hammerstad, Julie	1.1A	Favors I-205 as phase 1 and Milwaukie as phase 2.	SDEIS
6-23	Lehan, Charlotte	1.1A	Favors I-205 as phase 1 and Milwaukie as phase 2.	SDEIS
6-24	Jordan, Michael	1.1A	Favors I-205 as phase 1 and Milwaukie as phase 2.	SDEIS
6-25	Kingsley, Wayne (CEIC)	1.2A	Favors Milwaukie light rail	SDEIS
6-27	Peek, Cindy (Lents URAC)	2.1A	Build fewer stations in Lents	SDEIS
6-28	Mathiesen, Johan (Brooklyn NA)	1.2A	Favors Milwaukie light rail	SDEIS
6-29	Cooley, Dick	2.1I	Do not preclude a Stark/Washington Station	SDEIS

Comment page	Commentor	Response no.	Comment	Document
6-29	Cooley, Dick	2.3D	Ensure safety at park-and-rides	SDEIS
6-29	Cooley, Dick	4.2D	Any Gateway TIFF funds should benefit Gateway	SDEIS
6-29	Opportunity Gateway PAC	1.1A	Supports I-205 light rail	SDEIS
6-29	Opportunity Gateway PAC	3.8A	Consider restrooms at stations	SDEIS
6-32	Bradley, David	2.3D	Ensure safety at park-and-rides	SDEIS
6-34	Stueber, Nancy	1.2C	Construct Milwaukie light rail first because opening day ridership will be higher. Begin operating buses on I-205 to develop ridership for future light rail.	SDEIS
6-35	Parks, Wilda	1.1A	Favors I-205 as phase 1 and Milwaukie as phase 2.	SDEIS
6-37	Butler, Karen	1.1A	Favors I-205 as phase 1 and Milwaukie as phase 2.	SDEIS
6-38	Hoggard, Blaine	1.1A	Supports I-205 light rail	SDEIS
6-39	Smith, Craig	1.1A	Supports I-205 light rail	SDEIS
6-41	Bold, Chris	1.1A	Favors I-205 as phase 1 and Milwaukie as phase 2.	SDEIS
6-43	Ling, Chris	1.1A	Supports I-205 light rail	SDEIS
6-45	Gilbert, Ted	1.1A	Supports I-205 light rail	SDEIS
6-47	Carter J.M.	1.2F	Construct light rail along 82nd Avenue	SDEIS
6-49	Seagraves, Jim	1.1A	Supports I-205 light rail	SDEIS
6-49	Seagraves, Jim	2.3G	Build secure parking for cars and bikes at Powell, Foster, Sunnyside, Hwy 217 and Hwy 213	SDEIS
6-5	Clackamas County Traffic Safety Commission	1.1A	Favors I-205 as phase 1 and Milwaukie as phase 2.	SDEIS
6-5	Clackamas County Traffic Safety Commission	3.4H	Give attention to safety matters such as at-grade crossings, ped and bike access and properly designed park-and-rides	SDEIS
6-50	Stolt, Mary	1.1A	Supports I-205 light rail	SDEIS
6-52	Mathiesen, Johan (Brooklyn NA)	1.2C	Construct Milwaukie light rail first because opening day ridership will be higher. Begin operating buses on I-205 to develop ridership for future light rail.	SDEIS
6-54	Christenson, Thomas	1.2A	Favors Milwaukie light rail	SDEIS
6-58	Baugher, Carla and David	1.1A	Supports I-205 light rail	SDEIS
6-59	Eastbank Park PAC	1.2A	Favors Milwaukie light rail	SDEIS
6-60	Dudman, Barbara	1.2A	Favors Milwaukie light rail followed by I-205 light rail	SDEIS
6-61	Lake, Jay	1.2A	Favors Milwaukie light rail	SDEIS
6-61	Lake, Susan	1.2A	Favors Milwaukie light rail	SDEIS
6-66	Allwardt, Alys	1.2A	Favors Milwaukie light rail	SDEIS
6-67	Wade, Dan	1.2A	Favors Milwaukie light rail	SDEIS
6-68	Banyas, Rebecca	1.2A	Favors Milwaukie light rail	SDEIS
6-68	Kobernick, Mark	1.2A	Favors Milwaukie light rail followed by I-205 light rail	SDEIS
6-70	Lund, Wayne	5.2C	Oppose LRT because it could be disrupted by terrorism or natural disasters	SDEIS
6-70	Rathburn, Lisa	1.1A	Supports I-205 light rail	SDEIS
6-71	Walker, Jerri	1.1A	Supports I-205 light rail	SDEIS
6-72	Gibson, Bryna	1.1A	Supports I-205 light rail	SDEIS
6-72	Harris, Michael	1.1A	Supports I-205 light rail	SDEIS
6-73	Kniefel, Krystal	1.1A	Supports I-205 light rail	SDEIS

Comment page	Commentor	Response no.	Comment	Document
6-73	Warnila, Connie	2.3H	Build enough park-and-ride spaces to meet demand	SDEIS
6-74	Acheson, Ryan	1.1A	Supports I-205 light rail	SDEIS
6-74	Esmond, John	1.1A	Supports I-205 light rail	SDEIS
6-75	Archer, L	1.1A	Supports I-205 light rail	SDEIS
6-92	Seagler, Gregory	1.2A	Favors Milwaukie light rail	SDEIS
6-92	Taylor, Glenn	2.3D	Ensure safety at park-and-rides	SDEIS