SOUTH WILLAMETTE RIVER CROSSING STUDY
Findings and Recommendations Report

May 1999

Prepared by Metro's Transportation Department

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SOUTH WILLAMETTE
RIVER CROSSING STUDY

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INTRODUCTION

The South Willamette River Crossing Study was initiated to recommend multi-modal crossing improvements during the next 20 years for the Willamette River corridor between the Marquam Bridge in Portland and the I-205 Bridge in Oregon City. Metro's Joint Policy Advisory Committee on Transportation has developed recommendations for the South Willamette River Crossing Study for public comment. JPACT is a forum for local and regional elected officials and representatives of agencies involved in transportation to resolve transportation needs in this region.

This report summarizes the findings from the South Willamette River Crossing study and presents JPACT's recommendations for crossing improvements. After public review of the recommendations in this report, JPACT and the Metro Council will adopt final recommendations for inclusion into Metro's 20-year Regional Transportation Plan. Funding to implement South Willamette River Crossing Study recommendations will compete with funding for other projects in the plan.

Metro leads transportation planning studies that transcend local government boundaries and involve roadways owned by more than one jurisdiction or agency or in corridors that can be served by multiple modes of transportation. Metro's role in the study has been to bring jurisdictions and the public together to agree on crossing improvements that support regional growth management strategies.

During the course of this study, Metro has worked with the public and elected officials in jurisdictions most affected by existing crossing conditions. These include representatives from the cities of Gladstone, Lake Oswego, Milwaukie, Oregon City, Portland and West Linn; Multnomah and Clackamas counties; and Tri-Met and Oregon Department of Transportation.

The following sections in this report present a study summary and recommendations, describe the need for the South Willamette River Crossing Study, the study process, study assumptions, the evaluation methodology and the findings.
PRELIMINARY

INTRODUCTION

...
SUMMARY AND RECOMMENDATIONS

What is Metro’s role?

Metro leads transportation planning studies that transcend local government boundaries, involve roadways owned by more than one jurisdiction or agency and corridors that can be served by multiple modes of transportation. Metro’s role in this study is to bring jurisdictions and the public together to agree on crossing improvements that best support regional and local growth management and transportation strategies. During the course of this study, Metro has worked with the cities of Gladstone, Lake Oswego, Milwaukie, Oregon City, Portland and West Linn; Multnomah and Clackamas counties; Tri-Met and the Oregon Department of Transportation.

Why study crossing improvements?

The Sellwood Bridge is the only river crossing between the Ross Island and the I-205 bridges, a distance of 10 miles. As such, it plays a significant role in the transportation system.

Built in 1925, the Sellwood Bridge is nearing the end of its lifespan. For safety and service, the bridge needs to be upgraded or replaced. The lanes and sidewalks are too narrow, and the bridge requires increasingly more maintenance. The study has addressed the question of whether the cost to maintain the bridge will become more expensive in the long term than the cost to replace it.

The study also addressed whether the bridge should be widened to increase its capacity if it were replaced. Alternatively, should a new bridge be built at a different location?
**Recommendations**

1. Preserve existing Sellwood Bridge or replace it as a 2-lane bridge with better service for bike and pedestrian travel.
2. Consider improvements to the Ross Island and I-205 bridges in a different study.
3. Increase motor vehicle capacity on regional facilities, such as McLoughlin and Highway 224.
4. Mitigate traffic on Tacoma Street, Highway 99E in Milwaukie and on A Avenue and Highway 43 in Lake Oswego.

**Other recommendations**
- Increase transit services and improve bicycle and pedestrian facilities in the corridor.
- Bring more jobs to Clackamas County.

**Not recommended**

A. Replace the Sellwood Bridge with a 4-lane crossing.
B. Fully rehabilitate the existing Sellwood Bridge or use the bridge for bikes and pedestrians only.
C. 2- and 4-lane bridge crossings in Clackamas County at north Lake Oswego, Maryhurst or Milwaukie.

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**Figure 1 Recommended Crossing Improvements for the South Willamette River Corridor**
Who uses the Sellwood Bridge?

The Sellwood Bridge primarily serves Portland, Milwaukie and Lake Oswego, and other areas of Multnomah and Clackamas counties. The bridge provides little service to areas east of I-205. These cities and counties have grown significantly in the past 73 years since the bridge opened; bridge traffic and congestion have grown as the population increased. Clackamas County population, for example, has grown tenfold since the bridge was built, and Multnomah County population has doubled, as shown in Figure 2.

Trip destination studies show that half of the traffic on the bridge is going between Clackamas County and Portland. The rest of the traffic involves various destinations around the tricounty area, as shown in Figure 3.

What options in the Sellwood Bridge area did the study consider?

Metro initiated the South Willamette River Crossing Study in 1994 with a series of public meetings and workshops to solicit comments on the nature of the crossing problem and potential improvement options. The public identified more than 20 crossing options for consideration in the study. In 1997, the Joint Policy Advisory Committee on Transportation and Metro Council adopted a short list of options for evaluation that had the greatest potential to address the crossing problems at the Sellwood Bridge and support land-use goals.

Figure 2
Population Growth in Multnomah and Clackamas Counties

[Graph showing population growth]

Number of river crossings has not kept up with the population growth.

Figure 3
Sellwood Bridge Use

[Pie chart showing different traffic destinations]

Half the trips are between Clackamas County and Portland.
Options studied:

- Modifications to the existing Ross Island Bridge to reduce bottlenecks at its west end and to increase the bridge to three lanes each way.

- Alternative preservation strategies of the existing Sellwood Bridge:
  (1) in its current configuration
  (2) upgraded to meet seismic, bike and pedestrian standards
  (3) close it to traffic but leave it open as a bicycle and pedestrian-only facility.

- Replacement of the Sellwood Bridge as a two- or four-lane facility.

- A new crossing in Clackamas County in Milwaukie, North Lake Oswego or near Marylhurst College as a two- or four-lane facility.

- Additional transit services and programs that reduce travel demand.

Key crossing evaluation factors included the recognition of the need:

- for bridge alternatives to be sensitive to community needs within the study area. In particular, the need for Tacoma Street to support a mixed-use, pedestrian-friendly type of urban character through the Sellwood business district, for McLoughlin Boulevard to serve a similar function through downtown Milwaukie and Highway 43 and for A Avenue to serve this function through downtown Lake Oswego.

- to focus capacity investments in regional facilities (I-205, US 26, Highway 99E) to serve regional traffic in the Southeast Corridor rather than establishing a new cross-regional route between I-5 and I-205. Regional plans do not propose new regional routes between I-205 and I-5.

JPACT recommendations for further consideration

JPACT has developed a recommendation to address motor vehicle, transit, bicycle and pedestrian access across the river and is seeking public comment on them. The recommendations are:

- The region can best support growth management goals for Southeast Portland by either preserving the existing Sellwood Bridge in its current condition or replacing it as a two-lane bridge. If the bridge is replaced, it should be of high aesthetic quality. In either case, the bridge should be improved to better meet the needs of pedestrians and bicycles. Further assessment of costs versus impacts of replacement versus rehabilitation should be considered in the environmental impact statement phase. Further environmental analysis is required prior to a decision to build.

- Instead of adding capacity in the Sellwood or Milwaukie/Lake Oswego area, actions to meet traffic needs should focus on:
  - Mitigating traffic growth on Tacoma Street, Highway 99E in Milwaukie and on State Street in Lake Oswego where traffic conflicts with land-use goals.
  - Increasing transit services and improving transit, bicycle and pedestrian facilities on either side of the river and across the river to support alternatives to driving. The region should consider investments in more east-west bus routes, bus priority treatment, improved transit between central Portland and Clackamas County to reduce traffic demand, and the potential use of the existing railroad bridge for passenger rail and/or bike/pedestrian improvements.
  - Increasing motor vehicle capacity on appropriate regional facilities in order to direct traffic away from areas of conflict with land-use goals, such as improvements to McLoughlin Boulevard, Highway 224 and I-205.
In the long term, efforts should focus on bringing more jobs to Clackamas County to reduce the need to travel across the river for work trips.

The region should further consider improvements to the Ross Island Bridge and to the I-205 Corridor/Oregon City Bridge but not as an alternative to addressing the needs of the Sellwood Bridge. Analysis showed that improvements to the Ross Island and I-205 bridges would not reduce travel demand on the Sellwood Bridge but could support other regional growth management goals.

**JPACT recommended options to be set aside**

JPACT has recommended that the following options be set aside and not considered further:

- Pursuit of crossings at North Lake Oswego or near Marylhurst as either two- or four-lane bridges as they do not address South Willamette River crossing needs or other land-use goals.

- A new river crossing in Milwaukie. Such a crossing would reduce demand at the Sellwood Bridge but would not be the best way to support Milwaukie's land-use goals and would significantly change the character of existing communities on both sides of the river.

- Full rehabilitation of the existing Sellwood Bridge to bring it to current design standards because the costs would be greater than replacement costs.

- Using existing Sellwood Bridge for bicycles and pedestrians only (i.e., closed to traffic) as it would not address South Willamette River crossing needs or support land-use goals.

**Next steps**

- **Adoption process:**
  JPACT is seeking public comment until June 15 on these recommendations. There will be a public hearing before JPACT and the Metro Council's Transportation Planning Committee on Monday, June 14. The Metro Council will adopt a final decision sometime in July and forward recommendations for inclusion into the Regional Transportation Plan (RTP) currently being developed.

- **Implementation:**
  Prior to any bridge replacement or major bridge improvements, additional environmental studies would be needed. Funding of the recommended options will need to compete for funding with other transportation projects in the region, as identified in Metro's Regional Transportation Plan.
THE NEED FOR THE SOUTH WILLAMETTE RIVER CROSSING STUDY

As defined in this study, the South Willamette River corridor extends for 12 miles between the Marquam Bridge (I-5) in Portland and I-205 Bridge in Oregon City. Located within this corridor are the cities of Portland, Milwaukie, Gladstone, Oregon City, West Linn and Lake Oswego, and Multnomah and Clackamas counties. The four-lane Ross Island, two-lane Sellwood and two-lane Oregon City bridges also cross the river in the corridor. The Sellwood Bridge is the only crossing in the corridor for approximately 10 miles between the Ross Island and I-205 bridges. Figure 4 illustrates the study corridor within the region.

2040 Growth Concept for the corridor

The 2040 Growth Concept is the adopted vision for accommodating population and employment growth in the metropolitan region. Within the South Willamette River corridor, the 2040 Growth Concept targets growth for the Portland central city, the Oregon City regional center and the Milwaukie regional center. Reducing speeds and increasing pedestrian crossings on McLoughlin Boulevard is a key part of Milwaukie regional center plans. The growth concept designates West Linn and Lake Oswego as town centers with a target for less intense development than regional centers.

The growth concept designates several areas in the corridor as main streets, a land-use designation that supports mixed-use development and a pedestrian-friendly character. Tacoma Street in the Sellwood community east of the Sellwood Bridge, A Avenue in downtown Lake Oswego and Nevada Street in the Johns Landing area are examples of main street land-use designations within the corridor.

Other portions of the corridor are targeted for less intense growth. On the east side of the river, the residential area along River Road and commercial area along McLoughlin Boulevard between Milwaukie and Gladstone are examples of areas planned for lower levels of density. On the west side of the river, the residential area along Highway 43 is an example of areas planned for lower density. The 2040 Growth Concept areas are shown on Figure 5 for the corridor.

Mobility needs generated by the 2040 Growth Concept

Bridges have played an important part in the development of downtown Portland, the Sellwood community and other parts of the region. The estimated population and employment growth accommodated in the 2040 Growth Concept will increase the demand to cross the river. On a daily basis, by 2015, people will cross the river more than 900,000 times in the metropolitan region. Metro expects about 79 percent of these trips to be made by people driving alone and the rest by walking, bicycling, sharing a ride or using transit.

In the South Willamette River corridor, travel demand to cross the river during peak hours exceeds the available crossing capacity for vehicles. As a result, the bridges are congested, particularly in the morning and afternoon peaks. In the coming years, Metro expects the congestion to extend over a longer time in the afternoon and affect both east and west bound traffic, not just traffic in the peak direction. The amount of delay for each vehicle will increase. Vehicle hours of delay in the afternoon peak is forecast to be 44 percent of the total vehicle hours traveled on the Sellwood Bridge.
Figure 5  2040 Growth Concept Areas in the Corridor
For the two-hour afternoon period, Metro projects that the South Willamette River bridges and many of the roads leading to them will be congested at levels that are unacceptable or grossly unacceptable in 2015 and exceed policy standards. Metro’s regional policies measure congestion during a two-hour afternoon period (between 4 and 6 p.m.). Different levels of congestion are acceptable in different areas. In the central city, regional centers, town centers and mixed-use areas, higher levels of congestion are accepted than in less dense areas because more travel alternatives are available. The Sellwood Bridge is expected to be at “grossly unacceptable” congestion levels for the peak two hours in both directions. Regional congestion thresholds are identified in the RTP as either preferred, acceptable or grossly unacceptable. The latter indicates essentially stop-and-go traffic during the two-hour afternoon peak. Conditions on both Highway 43 and Tacoma Street, leading to and from the Sellwood Bridge, are also expected to be congested, though largely in the peak direction. The other crossings are expected to be congested in the peak direction.

In addition to motor vehicle delay, congestion in the corridor creates conflicts with land-use goals. Congestion on Tacoma Street, A Avenue in Lake Oswego and McLoughlin Boulevard in downtown Milwaukie conflict with plans that reduce traffic flows with additional pedestrian crossings and more mixed-use development. Congestion also sends spillover traffic onto neighborhood streets that are not designed for through traffic leading to additional traffic and safety problems.

The Oregon State Land Conservation and Development Commission has established a goal for regions to reduce the vehicle miles traveled per capita during the next 20 years. Like other regions in the state, Metro has implemented policies to help reduce trip lengths and shift trips to other modes.

**The Sellwood Bridge condition and use**

The Sellwood Bridge is safe today but is nearing the end of its planned life span. Built in 1925, the bridge is considered structurally old and the lanes and sidewalks are narrow. The two 11-foot travel lanes on the bridge do not meet today’s standards for vehicular traffic. In addition to routine deck replacement, painting and repair, the bridge needs to be upgraded to meet seismic standards. Although the bridge is currently stable, Multnomah County, which owns and maintains the bridge, monitors conditions at the west end of the bridge as a result of a shift in the piers that occurred in the 1960s. These conditions raise the question of the cost-effectiveness of continuing to preserve the existing bridge compared to the cost of replacing it.

In 1985, Multnomah County imposed weight restrictions as a means to extend the life of the bridge. Prohibiting trucks weighing more than 26,000 pounds from using the bridge limits commercial vehicle use of the Sellwood Bridge. The restriction is not as significant as it could be because the bridge is not part of a key freight route. The bridge lacks direct access to industrial areas and the steep grade on Southwest Taylors Ferry Road from Highway 43 to I-5 is difficult for large trucks to negotiate.

The single 4-foot, 3-inch sidewalk on the north side of the bridge does not meet today’s standards for bicycle and pedestrian traffic. The significance of this limitation for bicycles and pedestrians has increased as the bicycle and pedestrian system has become more developed on both sides of the river, including improvements to the region’s Springwater Corridor trail. Previous studies have
Figure 6  Average Trip Lengths for Crossings in the Corridor (2015)
looked for low-cost opportunities to improve pedestrian and bicycle conditions on the bridge. None have been found. The only recommendation that has emerged from previous studies was to relocate and consolidate the light standards. This would free six more inches of sidewalk space at a few spots on the bridge.

The Sellwood Bridge is used by people from throughout the region. About half of the use of the bridge in the afternoon peak is for trips between Portland and Clackamas County. Another 17 percent is for trips between the east and west side of the river in Portland, 7 percent between the east and west sides of the river in Clackamas County and 26 percent between either Portland or Clackamas and Washington counties.

The areas that use the bridge fall primarily between I-205 on the east, Highway 217 on the west, Tualatin and West Linn on the south and downtown Portland on the north. Figure 7 illustrates the origin and destination zones for people who use the Sellwood Bridge. The figure illustrates the concentration of bridge use that is higher in the areas closest to the bridge.

The role of the Sellwood Bridge in meeting regional travel demands conflicts with the role of Tacoma Street in meeting its main street land-use designation. With traffic volumes of about 3,500 vehicles per hour on the two-lane bridge, traffic on Tacoma Street is higher than for other main streets in the region. Tacoma Street is not designed for high traffic volumes. Its 60-foot width includes sidewalks on both sides of the street, two traffic lanes and two parking lanes, which are used for traffic during peak hours. Plans for Tacoma Street call for reducing its capacity to encourage additional pedestrian crossings and mixed-use development.
THE STUDY PROCESS

The South Willamette River Crossing Study process has included several levels of screening and analysis with opportunities for public comment at each stage. These stages are illustrated in Table 1. The major stages were identifying the problem and options, screening and evaluating the options.

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<th>Table 1 – South Willamette River Crossing Study Timeline</th>
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<tr>
<td><strong>1999 (anticipated)</strong></td>
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**Initial problem and option identification**

In 1989, the Metro Council adopted recommendations of the Southeast Corridor Study that called for an examination of travel constraints across the Willamette River and the need for new bridge capacity. The Southeast Corridor Study, led by Metro, analyzed the growth in east/west traffic in lower Southeast Portland and in Milwaukie and evaluated the need for additional arterial capacity between Highway 99 and I-205. During the study, analysis revealed that travel across the river affected arterial congestion levels throughout the southeast corridor.

The Interim Federal Regional Transportation Plan, adopted by the Metro Council in 1995, identified the need for additional study in the southeast corridor to evaluate the adequacy of Willamette River crossings. Metro began the current study of the South Willamette River crossings in September 1994.

Metro initiated the South Willamette River Crossing Study with a series of public meetings and workshops to identify crossing problems and possible solutions. This process identified more than 20 possible options for consideration in the study. Initial review of the options identified those that had potential to meet crossing de-
mands and that avoided directly affecting park lands, a cemetery or national historic site, did not require tunneling or had multi-modal elements. Table 2 and Figure 8 describe these options and their merit for further consideration in the study. A public comment report, released in 1995, summarizes public comments on these initial issues.

Screening process

JPACT and the Metro Council screened the remaining options from the initial outreach effort to select a set of options for evaluation in the study. The screening process considered the potential of the option to meet the river crossing demands in the corridor. Options that had potential to meet travel demand were further evaluated in terms of how well they could meet demand and how well they could support the 2040 Growth Concept in the full evaluation.

The screening process analyzed travel sheds in the corridor. A travel shed identifies the area of the majority of bridge use. Options that had potential to compete with the Sellwood Bridge travel shed were considered to have potential to help meet crossing demand in the corridor. The analysis showed that the I-205 travel shed had very little overlap with the Sellwood Bridge travel shed, while the Ross Island and Sellwood Bridge travel sheds overlapped to a greater extent. This suggested that many I-205 improvements would serve a different market than the Sellwood Bridge and would have little effect on Sellwood Bridge traffic. The full evaluation of the options confirmed this theory by documenting that options farthest to the north and south of the Sellwood Bridge had little effect on Sellwood Bridge traffic. Figures 9 and 10 illustrate the travel shed, or the areas that predominately use, the different bridges.

The screening process also considered the opportunity for the crossings to connect with regional instead of local streets and to avoid designated parklands or sensitive environmental areas. The National Environmental Policy Act requires all prudent and feasible options be considered before recommending an alternative that impacts parks and other environmental areas. In anticipation of conducting a NEPA analysis on any of the options, options with direct impacts to parklands were set aside. Figure 11 summarizes options JPACT and the Metro Council recommended for further analysis and to be set aside as a result of the screening process (Resolution 97-2529). Public comments on these options and on the issues in the South Willamette River Crossing Study are included in a public comment report published in 1997.

As part of the screening process, JPACT and Metro Council recommended that the I-205 corridor should not be studied in the context of the study. Instead they recommended that I-205 should be studied in the context of supporting Oregon City and West Linn development and access plans and in terms of meeting long-distance state and regional travel needs. In addition, the Metro Council requested that the study consider the effect of adding a southbound lane on I-205 west of the river on the demand for a crossing in the South Willamette River corridor. A sensitivity test revealed that the additional lane on I-205 west of the bridge did not affect demand for crossings farther to the north.

Description of the options evaluated in the study

Options approved by JPACT and the Metro Council for further study included modifications to the Ross Island Bridge, replacement and rehabilitation of the existing Sellwood Bridge, and new crossings in Clackamas County. In addition, JPACT and the Metro Council adopted an option for further study that would reduce the need for crossing improvements by reducing vehicular crossing demand. The study refined the options based on engineering feasibility and the need for connections to Highway 99E on the east and Highway 43 on the west. Figure 12 shows the options evaluated in the study as described below:

(A) Improve approaches to the west end of the Ross Island Bridge. This option reduces the
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<td>1. Remove bottlenecks at bridgeheads at existing Ross Island Bridge</td>
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<tr>
<td>2. Remove bottlenecks at bridgeheads at existing Ross Island Bridge and add auto capacity</td>
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<td>✓</td>
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<tr>
<td>3. New Caruthers Bridge south of Marquam Bridge</td>
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<td>✓</td>
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<tr>
<td>4. New bridge near Holgate</td>
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<tr>
<td>5. Replace Sellwood Bridge</td>
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<td>6. New bridge along Ochoco rail alignment</td>
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<td>7. New bridge between Milwaukie and Riverwood</td>
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<td>8a. New bridge parallel to (former) Southern Pacific alignment</td>
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<td>8b. New bridge south of (former) Southern Pacific alignment</td>
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<tr>
<td>9. New bridge between South Lake Oswego and Oak Grove</td>
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<tr>
<td>10a. Add auto capacity and improve bicycle and pedestrian facilities on I-205 bridge</td>
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</tr>
<tr>
<td>10b. Add new capacity to Oregon City Bridge in addition to adding auto capacity and improving bicycle and pedestrian facilities on I-205 bridge</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>11. Expand bicycle, pedestrian and vehicle capacity on Sellwood Bridge, improve westside approaches and connect Sellwood to I-5 north of Terwilliger via tunnel</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>12. New bridge between Highway 43 and the Waverly County Club, then via tunnel to Highway 224</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>13. New bridge between A Avenue in Lake Oswego to River Road in Oak Grove</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>14. New bridge from Highway 43 through George Rogers Park to River Road in Oak Grove and upgrade McVey Avenue to a Parkway</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>15. New bicycle and pedestrian-only bridge from Mary S. Young State Park in West Linn to the Jennings Lodge area</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>16. New road through Tryon Creek State Park from Highway 43 to Boones Ferry Road</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>17. New road between Highway 99E and I-205 along Tideman Johnson Park and Johnson Creek</td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>
Figure 8  Potential River Crossings
Figure 11 JPACT/Metro Council Adopted Screening Recommendations
Figure 12 Study Options
bottleneck at the west end of the bridge and reroutes traffic around the Corbett/Lair Hill neighborhood.

(B) Improve approaches to the Ross Island Bridge (as in option A) and additional lanes on a new parallel bridge. Ramps from the Ross Island crossing connect to I-405 directly on the west and to Highway 99E on the east.

(C) Replace or rehabilitate the existing Sellwood Bridge. Replacement options include a two-lane and four-lane bridge. On the west, the replacement options shift the interchange with Highway 43 to the north and straighten the ramps. For the four-lane bridge, one variation widens Highway 43 to six lanes between Taylors Ferry Road and the bridge and widens Tacoma Street from the bridge to Highway 99E with on street parking, wider sidewalks, bike lanes, traffic lanes and turn lanes. Another variation does not widen Highway 43 and widens Tacoma Street only at Southeast 17th for a turn lane. Rehabilitation options include: maintain the bridge in its current configuration; maintain to meet today's seismic, vehicle, pedestrian and bicycle standards; and close it to traffic but leave it open as a bicycle and pedestrian-only facility.

(D) Add a new two or four-lane crossing between Highway 43 on the west and Milwaukie on the east. Variations of this option include direct access to Highway 224 and access to Highway 99E only.

(E) Add a new two- or four-lane crossing north of Lake Oswego between Highway 43 and Highway 99E via Courtney Road. To accommodate demand, cost estimates for the four-lane bridge option include widening Courtney Road to four lanes, grade separating Courtney Road at River Road and an interchange with Courtney Road at Highway 99E.

(F) Add a new two- or four-lane crossing near Marylhurst College between Highway 43 and Highway 99E via Concord Road. To accommo-
STUDY ASSUMPTIONS

The evaluation year for the South Willamette River Crossing Study is 2015, a 20-year planning horizon from the initial year of the study. The study made several assumptions about population and employment, the future transportation network and transit services and about factors that affect the potential for bicycling and walking trips for year 2015.

Population and employment forecasts

The study used regional population and employment allocations developed for the year 2015.

Within the Portland/Vancouver urbanized area, the population forecast for 2015 is 2.2 million and the employment forecast is 1.5 million. Figure 13 and Table 3 show the population and employment forecasts for areas in the region. The population growth for the corridor, in districts 1 and 4 on the map, average 20 percent between 1994 and 2015, which is lower than the regional average growth of 46 percent. The employment in the corridor increases 60 percent between 1994 and 2015, which is about average for the region.

<table>
<thead>
<tr>
<th>District</th>
<th>Population</th>
<th>Employment</th>
<th>Increase</th>
<th>Employment</th>
<th>Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1994</td>
<td>2015</td>
<td></td>
<td>1994</td>
<td></td>
</tr>
<tr>
<td>1. Close in Clackamas County (Lake Oswego, West Linn, Milwaukie, Gladstone)</td>
<td>129,850</td>
<td>160,580</td>
<td>23.7%</td>
<td>63,220</td>
<td>120,980</td>
</tr>
<tr>
<td>2. Washington County and NW Portland west of I-405</td>
<td>383,675</td>
<td>639,175</td>
<td>65.7%</td>
<td>269,420</td>
<td>462,805</td>
</tr>
<tr>
<td>3. Outer Clackamas County (east of I-205), East Multnomah County (east of I-205 and south of I-84), Oregon City</td>
<td>290,195</td>
<td>458,455</td>
<td>58.0%</td>
<td>124,915</td>
<td>203,070</td>
</tr>
<tr>
<td>4. SW Portland and SE Portland (south of Holgate and west of I-205)</td>
<td>150,410</td>
<td>175,095</td>
<td>16.4%</td>
<td>66,980</td>
<td>86,845</td>
</tr>
<tr>
<td>5. N/NE/SE Portland and Clark County (includes N. Portland, Vancouver and SE Portland north of Holgate)</td>
<td>540,035</td>
<td>753,300</td>
<td>39.5%</td>
<td>423,115</td>
<td>621,850</td>
</tr>
<tr>
<td>Totals</td>
<td>1,496,165</td>
<td>2,186,605</td>
<td>46.1%</td>
<td>947,650</td>
<td>1,497,550</td>
</tr>
</tbody>
</table>
Figure 13: Five Districts for Population and Employment Forecasts

1. Close in Clackamas County and NW Portland
2. Washington County and outer Clackamas County
3. County, Oregon City and East Multnomah County
4. Southeast and Southwest Portland
5. Downtown, SE, NE, N. Portland and Clark County, Wash.


Transportation system

The study assumed transportation system improvements as specified in the Interim Federal Regional Transportation Plan (1995). For the South Willamette River corridor by 2015, these include:

- Turn lanes on Johnson Creek Boulevard as needed from Southeast 45th to Southeast 82nd and traffic management on Johnson Creek Boulevard from Southeast 36th to Southeast 45th
- New traffic signal and intersection improvements at Highway 43 and Terwilliger Boulevard, at A Avenue and at McVey Avenue
- I-5/217 interchange and ramp reconstruction
- New interchange at I-205/Highway 224 as the first part of the Sunrise Corridor
- Additional auxiliary lanes from Southeast Powell to Southeast Foster on I-205
- New Sunnybrook extension road from Southeast 82nd to Sunnyside Road at 108th
- New I-205 frontage road from Sunnyside Road to Southeast 92nd
- New Monterey overpass over I-205 to the frontage road

Transit service levels

For transit, the study assumed an increase in service hours beyond the currently funded level. Consistent with RTP objectives, the study assumed an average annual increase of 2.5 percent service hours compared to a currently funded annual increase of 1.5 percent service hours. Within the corridor, the additional service hours support more east-west service, service in areas currently without service and increases in service frequency on other routes. The study assumed that transit would shift to use the new crossing options. In addition, the study assumed that light-rail transit will extend from Clackamas Town Center in the south to Vancouver, Wash., in the north by 2015. Figure 14 illustrates the regional transit service network that the study assumed as a base for all of the options.

Mixed-use and intersection density factors

Metro’s regional travel forecasting model projects the number of walking and bicycling trips based on the type and density of land uses and intersection density. Based on policy direction in adopted plans, this study assumed mixed-use development as proposed in the 2040 Growth Concept and a greater level of intersection densities than currently exist. As a result, this study assumed a greater share of bicycling and walking trips than currently exist.
Figure 14 Base Transit Assumptions

* The 2015 Base Transit Network includes a 2.5% annual increase in transit service hours over 1994 levels.
EVALUATION METHODOLOGY

In the evaluation, the study considered travel demand forecasts, engineering feasibility and cost estimates, and the effect of the crossing and its impacts on the 2040 Growth Concept. This section describes the evaluation measures that JPACT considered in developing its recommendation and the methodology for forecasting travel demand, impacts and costs for the options.

**Evaluation measures**

The evaluation considered how well the crossing options would meet demand for travel across the river and how well they would support land-use plans and policies. Measures that JPACT considered in developing recommendations include:

- **The effect on daily river crossings for all modes.** This measure illustrates the effect that the crossing option would have on meeting the demand for crossing the river. It is a measure of daily crossings on all bridges from the St. Johns Bridge to the Oregon City Bridge and includes all modes.

- **The effect on vehicle miles traveled (VMT) per capita.** This measure illustrates how bridge options would result in more or less personal travel.

- **Access to 2040 Growth Concept areas targeted for growth.** Improving vehicular access could support development in areas that are or are not targeted for growth in the 2040 Growth Concept. This measure considers the potential for the options to serve the 2040 Growth Concept areas in the corridor based on their effect on vehicular access.

- **Effect on community and development plans.** This measure considers the effect of the crossing option on community and development plans. The measure considers the effects of the crossing structure itself and the additional traffic volumes on existing neighborhoods and planned development. This measure shows that options that improve vehicular access, even to areas targeted for growth, may conflict with specific community and development plans by increasing traffic volumes.

- **Effect on Sellwood and other bridge traffic.** This measure considers how effective the options would be on reducing the demands on the existing Sellwood Bridge and directly serving the crossing needs in the corridor. The evaluation also considered the effect on other bridges in the region.

- **Other traffic impacts.** This measure identifies the potential changes in traffic volumes on other roads in the corridor and identifies impacts that would require mitigation if the option were eventually constructed. The evaluation identified traffic volume and levels of service changes on Highway 43 and Highway 99E and on east and west roads leading to each crossing. This study did not identify modifications needed to meet additional traffic demand on these roads. Such analysis would be needed in the next stage of study for the recommended options.

- **Costs.** This measure includes capital costs for different bridge types and approaches for those options that add capacity and preservation or replacement costs for those options that do not add new capacity. Costs are presented in 1998 dollars.

**Travel forecasting methods**

The study used Metro’s regional travel forecasting model to estimate the changes in travel demand and travel patterns with the options. The travel forecasting model forecasts trip generation based on the population and employment forecasts and estimates a mode share for each trip. The model assigns vehicle trips to the transportation network based on the shortest travel times. The assignment reflects the availability of cross-
ings and congestion on the system. The model reflects the shifts in travel patterns that people would make if new capacity were available. More people would cross the river if a crossing were available. Similarly, the model estimates a greater share of travel on transit in corridors with improved service, thereby reflecting a reduction in traffic.

In the 1990s, Metro conducted a regional travel behavior survey and used the information to update the model. This information helps Metro forecast how people link different trip purposes together into one trip and shift travel patterns due to changes in congestion, parking prices and other factors. Travel forecasts for the South Willamette River Crossing Study used this updated travel behavior information.

The travel forecasts were used to assess how well the option would meet the crossing demand and support land-use plans and policies. The Travel Forecast Results Report is available that summarizes, for each option, the effect of the options on:

- person trips crossing the river
- mode share
- transit ridership
- bridge traffic volumes
- trip distribution for people using the bridges and other streets
- vehicle miles traveled per capita
- vehicle hours of delay on the bridges and other facilities
- traffic levels of service on bridges and other facilities
- travel demand across screenlines to the east and west of the river and on Highways 43 and 99E
- accessibility

The travel forecasts assumed that a two-lane Sellwood Bridge would exist in combination with all other options except for the option that converts the Sellwood Bridge to bicycle and pedestrian access only and that replaces the existing bridge with a four-lane bridge. The crossing recommendation could include any combination of the options for further study.

Costing estimates

Engineers from David Evans and Associates, on contract for this study, assessed the feasibility of and developed costs for the crossing options. Feasible crossing locations were defined as those that would meet design standards, including grades for the crossing and ramp connections at bridge ends. The analysis assumed the minimum amount of street closures and property acquisitions for each crossing while still avoiding environmentally sensitive properties, including schools, parks, historic sites and cemeteries. The cost estimates reflect a range of widths and ramp design on crossing approaches and different bridge construction styles. Cost estimates were developed for a cable-stayed bridge on the high end of costs and a post-tensioned segmental concrete box girder bridge at the low end. Figures 15 and 16 illustrate standard cross sections and the different bridge construction styles used in the cost estimates. For more information on cost estimates, the Engineering Summary Report prepared by Evans and Associated, is available for the South Willamette River Crossing Study.

The capital cost estimates include the crossing itself and the approaches and connections at either end from the bridge structure west to Highway 43 and east to Highway 99E. The cost estimates also include pedestrian and bicycle facilities on the crossing and connections with these facilities onto the highways. The cost estimates do not include improvements on other roads that would be needed to accommodate additional traffic due to the crossing. Measures to mitigate impacts from additional traffic would be developed if the crossing were recommended for further study.

For the options that preserve the existing Sellwood Bridge, the estimated life-cycle costs include non-routine costs associated with older steel truss bridges. Routine costs, which would be common to any bridge new or old, such as deck cleaning, bridge inspections and similar work, are not included. The 100-year period reflects the expected life span of modern concrete bridges. The costs were developed with the assistance of
The cost to rehabilitate the existing bridge to meet current standards includes the costs of preserving the bridge in its current condition plus the cost to widen the bridge in addition to the cost to replace the east approach spans. The bridge would have the same cross-section as the other two-lane crossings studied, including two 14-foot traffic lanes, two 6-foot bicycle lanes and two 6-foot sidewalks. The full rehabilitation costs also assume Phase 2 seismic upgrade, which strengthens the footings and columns to prevent failure of the supports in a major earthquake. The full rehabilitation would allow trucks to use the bridge.

The cost estimate to preserve the bridge as a bicycle- and pedestrian-only facility does not include any seismic work on the bridge or major rehabilitation items and would involve closing the bridge to motor vehicle traffic.
Cable-stayed bridge

Post-tensioned segmental concrete box girder bridge

Figure 16 Bridge Construction Styles Assumed for the Cost Estimates
FINDINGS

This section presents the South Willamette River Crossing Study findings for options that offer no new river crossing capacity and options that add river crossing capacity. This section also presents the findings for the transportation demand management strategies and additional transit service option. The section analyzes how the options support land-use and transportation goals using the travel forecasts and engineering feasibility study. More information on the travel forecast results and the engineering feasibility is available in separate reports. All comparisons are to a 2015 “no-build” condition. The “no-build” assumes only projects identified in the 1995 RTP as previously described.

Findings for no new river crossing capacity options

Options that offer no additional river crossing capacity include the preservation options for the existing Sellwood Bridge, replacement of the Sellwood Bridge as two-lane bridge and modifications to the west ramps of the existing Ross Island Bridge. Key findings for these options are summarized in Table 4 and are:

Daily river crossings (St. Johns to I-205)

• Use of the Sellwood Bridge for bicycles and pedestrians only would not help meet the vehicular crossing demand in the corridor. The lack of a crossing would result in 5 percent fewer trips across the river daily. The other options that do not add capacity would not affect the number of people crossing the river daily in the region.

Vehicle miles traveled (VMT) per capita

• Use of the Sellwood Bridge for bicycles and pedestrians only would slightly increase the vehicle miles traveled per capita. The longer trip lengths that would result from the loss of the Sellwood Bridge to vehicular traffic would slightly increase VMT per capita. The other options that do not add capacity would not affect VMT.

Access to 2040 Growth Concept areas targeted for growth

• Options that do not add capacity would not increase vehicular access to 2040 Growth Concept areas targeted for growth. Without additional capacity, relative vehicular access to 2040 growth concept areas would not change. Closing the Sellwood Bridge to vehicle traffic would reduce relative access to targeted areas.

Effect on community and development plans

• The two-lane Sellwood Bridge, either replaced or rehabilitated, would better support plans for mixed-use development and pedestrian-friendly environment on Tacoma Street than a four-lane bridge. Even with a two-lane bridge, forecast traffic volume increases on Tacoma Street will conflict with community and development plans for the Sellwood area. A four-lane bridge would attract even more traffic. Because of this, the two-lane crossing would be more compatible with Tacoma Street plans than a four-lane crossing.

• The replacement of the existing Sellwood Bridge would require additional right-of-way, primarily west of the bridge. The engineering analysis assumed that if the bridge were replaced, the west ramps would be realigned. If the recommendation is to replace the bridge, additional analysis of community and environmental impacts would be required.

• Use of the Sellwood Bridge for bicycles and pedestrians only would not help meet goals for increasing mixed-use development on Tacoma Street. Without vehicular access on the bridge, traffic volumes would decrease by 80 percent on Tacoma Street, reducing the access this area
<table>
<thead>
<tr>
<th></th>
<th>Effect on daily river crossings (St. Johns to I-205)</th>
<th>Effect on VMT per capita</th>
<th>Auto access to 2040 Growth Concept areas targeted for growth</th>
<th>Effect on community and development plans</th>
<th>Effect on Sellwood Bridge traffic</th>
<th>Other traffic impacts</th>
<th>Preservation or replacement costs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sellwood Bridge for bike/ pedestrian use only</strong></td>
<td>Reduces river crossings by 5 percent</td>
<td>Increases VMT/capita by .48 percent</td>
<td>Reduces access to Tacoma St. and Macadam area main streets</td>
<td>Lower traffic levels may affect Sellwood development</td>
<td>No cars on bridge, reduces traffic on Tacoma Street to 82 percent of existing traffic. Improves bike/ pedestrian access</td>
<td>Increases traffic at other crossings</td>
<td>$23 million</td>
</tr>
<tr>
<td><strong>Preserve Sellwood Bridge to maintain current use</strong></td>
<td>No change</td>
<td>No change</td>
<td>No change</td>
<td>No change</td>
<td>No change</td>
<td>No change</td>
<td>$40 million</td>
</tr>
<tr>
<td><strong>Improve Sellwood Bridge to current standards</strong></td>
<td>No change</td>
<td>No change</td>
<td>No change</td>
<td>No change</td>
<td>No change</td>
<td>No change</td>
<td>$72 million</td>
</tr>
<tr>
<td><strong>Replace Sellwood Bridge with 2-lane bridge</strong></td>
<td>No change</td>
<td>No change</td>
<td>No change</td>
<td>Affects community at east and west bridge ends; no change on Tacoma main street</td>
<td>Allows truck use, improves bike/ pedestrian access</td>
<td>No change</td>
<td>$45-59 million</td>
</tr>
<tr>
<td><strong>Modify West-end Ramps at Ross Island Bridge (No Sellwood Bridge changes)</strong></td>
<td>No change</td>
<td>No change</td>
<td>No change</td>
<td>Supports plan for Corbett/Lair Hill/Terwilliger neighborhood; no change on Tacoma main street</td>
<td>No change</td>
<td>No change</td>
<td>$11 million</td>
</tr>
</tbody>
</table>

*Comparisons are to the “no-build” condition with a 2-lane Sellwood Bridge*
needs to maintain business and provide for desired development. Businesses in the Sellwood area indicate a severe drop in business would likely result from closure to traffic.

- Modifying the west approach to the Ross Island Bridge would support community development plans in the Corbett and Lair Hill neighborhoods. The option would redirect traffic west of the bridge away from the Corbett and Lair Hill neighborhood and support land-use plans for this area. The city of Portland is evaluating the costs and benefits of various design options for these modifications.

**Effect on Sellwood and other bridge traffic**

- Modifying the west approach to the Ross Island Bridge would have little effect on meeting river crossing demand in the corridor. The traffic flow improvements, though helpful in reducing delay at the Ross Island Bridge, would not shorten travel times enough to shift traffic from the Sellwood Bridge to the Ross Island Bridge.

- Use of the Sellwood Bridge for bicycles and pedestrians only would increase demand on other crossings. Without the Sellwood Bridge, other Willamette River bridges would carry slightly more traffic, adding to congestion elsewhere.

**Other traffic impacts**

- These options will not improve roadway levels of service on the crossings or on other roads leading to the crossings. Forecasts show that congestion on roadways in the corridor will increase over time.

**Costs (in 1998 dollars)**

- The cost to preserve the existing Sellwood Bridge in its current condition during the next 100 years would be comparable to the costs of replacing it as a two-lane bridge. The cost estimate is $40 million to preserve the bridge in its current condition and $45 to $59 million to replace it as a two-lane bridge. Replacement of the existing Sellwood Bridge would bring the pedestrian and bicycle facilities up to current standards and allow trucks to use the bridge while preserving the bridge would not. Improving the bicycle and pedestrian facilities on the existing bridge may be possible but it would add to the cost. Previous analyses have not identified any easy low-cost bicycle/pedestrian improvements.

- The cost to preserve the existing Sellwood Bridge to meet current standards would be greater than replacement costs. The cost would be $72 million to rehabilitate the Sellwood Bridge to meet current standards. Full rehabilitation of the existing bridge would bring the pedestrian and bicycle facilities up to current standards and allow trucks to use the bridge.

- Using the Sellwood Bridge for bicycles and pedestrians would cost less than other options. The cost to retain the Sellwood Bridge for 100 years as a bicycle- and pedestrian-only facility is estimated at $23 million. As noted, vehicular crossing demands however, would not be met.

**Findings for new river crossing capacity options**

Options that would add river crossing capacity include addition of two lanes on the existing Ross Island Bridge, replacement of the Sellwood Bridge as a four-lane bridge and new crossings in Clackamas County. Key findings for these options are summarized in Table 5 and are:

**Daily river crossings (St. Johns to I-205)**

- All crossings with additional capacity would increase travel across the river and help meet crossing demand in the corridor. New crossings in Clackamas County would attract more new trips across the river than options that add capacity to existing crossings. The crossing at North Lake Oswego would attract the most new daily crossings with an increase of 5 percent. The crossings at Marylhurst and Milwaukie would attract 3 percent more new crossings daily. Adding capacity at Ross Island
<table>
<thead>
<tr>
<th></th>
<th>Effect on daily river crossings (all modes) St. Johns to I-205</th>
<th>Effect on VMT per capita</th>
<th>Auto access to 2040 Growth Concept areas targeted for growth</th>
<th>Effect on community and development plans</th>
<th>Effect on Sellwood Bridge traffic</th>
<th>Other traffic impacts</th>
<th>Capital costs for different bridge types and approaches</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>6-lane Ross Island Bridge</strong></td>
<td>Increases daily crossings by 2 percent</td>
<td>Increases VMT/capita by .4 percent</td>
<td>Serves Central Eastside industrial area and Central city</td>
<td>Conflicts with North Macadam district plans. Supports plan for Corbett/Lair Hill/Terwilliger neighborhood</td>
<td>Reduces traffic by 2 percent</td>
<td>I-405, Powell Boulevard</td>
<td>$113 to $131 million</td>
</tr>
<tr>
<td><strong>4-lane Sellwood Bridge</strong></td>
<td>Increases daily crossings by less than 1 percent</td>
<td>Increases VMT/capita by .1 percent</td>
<td>Serves Tacoma St. and Macadam area main streets</td>
<td>Conflicts with Sellwood Moreland plans for Tacoma Street and impacts existing neighborhoods on east and some businesses on west</td>
<td>Increases traffic by 15 percent but reduces delay on bridge from 44 percent of vehicle hours to 6 percent</td>
<td>Tacoma Street, Highway 43</td>
<td>$59 to $106 million</td>
</tr>
<tr>
<td><strong>4-lane Milwaukie crossing</strong></td>
<td>Increases daily crossings by 3 percent</td>
<td>Increases VMT/capita by .7 percent</td>
<td>Serves Milwaukie regional center. Supports Tacoma Main Street</td>
<td>Conflicts with Milwaukie TSP policies and waterfront plans. Impacts existing east and west neighborhoods.</td>
<td>Reduces traffic by 44 percent</td>
<td>Highway 224, Highway 43, Highway 99E, Taylors Ferry Rd, A Ave. Reduces traffic on Tacoma and SE 17th</td>
<td>$114 to $157 million</td>
</tr>
<tr>
<td><strong>4-lane North Lake Oswego crossing</strong></td>
<td>Increases daily crossings by 5 percent</td>
<td>Increases VMT/capita by .4 percent</td>
<td>Serves Lake Oswego town center on the west. Serves areas not targeted for growth in 2040 on the east.</td>
<td>Conflicts with Lake Oswego town center Plans and Tryon Creek State Park policies. Impacts existing east and west neighborhoods.</td>
<td>Reduces traffic by 16 percent</td>
<td>Courney Rd., River Rd., Highway 99E, A Ave., B Ave., Country Club, Terwilliger Blvd.</td>
<td>$122 to $145 million</td>
</tr>
<tr>
<td><strong>4-lane Marylhurst crossing</strong></td>
<td>Increases daily crossings by 3 percent</td>
<td>No change</td>
<td>Serves Lake Oswego and West Linn town centers on the west. Serves areas not targeted for growth in 2040 on the east.</td>
<td>Conflicts with Mary's Woods development plans. Impacts existing east and west neighborhoods.</td>
<td>Reduces traffic by 6 percent</td>
<td>Concord Rd., River Rd., Highway 99E, Highway 43, A Ave.</td>
<td>$119 to $137 million</td>
</tr>
</tbody>
</table>

*Comparisons are to the “no-build” condition with a 2-lane Sellwood Bridge*
Bridge would attract 2 percent new crossings; adding capacity at Sellwood Bridge would attract 1 percent new crossings. These percentages translate into 42,300 additional daily trips across the river with the North Lake Oswego crossing and 3,200 additional daily trips with the added capacity at the existing Sellwood Bridge. They include walk, bike, transit and shared ride trips as well as single-occupant vehicles.

**Vehicle miles traveled per capita**

- The additional capacity options would marginally increase vehicle miles traveled per capita in the region even though the options would reduce average lengths for trips within the corridor. For the region, VMT/capita would increase less than 1 percent from 14.15 to 14.25 compared to the 2015 “no-build.” Average trip length within the corridor would shorten from 4 percent to 6 percent, depending on the option. Options with additional capacity would attract some longer cross-regional trips that would counter the effect of the shorter trips in the corridor.

**Access to 2040 Growth Concept areas targeted for growth**

- The added capacity at Ross Island Bridge and the new crossings at Milwaukie would improve access to areas targeted for growth while other new bridge options would improve access to areas not targeted for growth by the 2040 Growth Concept. Adding capacity at the Ross Island Bridge would increase access to the central city, including the Central Eastside industrial district, which is targeted for growth by the 2040 Growth Concept. The Milwaukie crossings would increase access to the Milwaukie regional center, an area targeted for growth. The other new crossing options would improve access to Tacoma main street, Lake Oswego and West Linn town centers and to outer neighborhoods and other areas targeted for less growth, or generally not target for growth.

**Effect on community and development plans**

- Additional traffic would increase the conflict between designing streets to accommodate greater traffic demand and designing streets to allow for more pedestrian use of the street and crossings. Traffic conflicts with plans to increase mixed-use development and pedestrian crossings on Tacoma Street in Sellwood particularly during peak hours. These traffic volumes are projected to increase 20 percent between 1994 and 2015. With a four-lane bridge, these traffic volumes would increase an additional 10 percent in the peak hours by 2015.

Additional traffic volumes with a Milwaukie crossing would have a similar effect on achieving development plans in downtown Milwaukie. A new crossing in Milwaukie would increase traffic volumes on roads in Milwaukie. Plans to connect the waterfront area with downtown and reconnect the community north and south of Highway 224 are already impacted by traffic volumes. Additional traffic volumes with a new crossing would increase the difficulty of achieving development goals for downtown Milwaukie.

On the west, Lake Oswego plans to mitigate the impact of traffic demand on Highway 43 and A Avenue through the downtown area. The new capacity crossing options would increase traffic volumes on these roads, further increasing the conflicts between designing the streets for traffic flow and designing the streets for greater pedestrian use and in support of mixed-use development.

- The added capacity to the Ross Island Bridge and new crossings near Marylhurst options would conflict with specific development plans. The North Macadam development project is a part of the Portland’s plans to meet 2040 growth targets. The additional structure that would be required to add capacity to the Ross Island Bridge would conflict with these development plans. Similarly, a residential development is planned near Marylhurst that would
help Lake Oswego meet its growth targets. The Marylhurst crossing option near the development site would conflict with the project's feasibility.

- In areas not targeted for growth, the added capacity options would conflict with the character of existing neighborhoods. For example, the new crossings in Clackamas County would conflict with the existing neighborhoods to the west and east of the river. Bridge and ramp structures and increased traffic on Concord, Courtney, River Road and other roads leading to the new crossing would affect the character of these residential neighborhoods.

**Effect on Sellwood and other bridge traffic**

- The Milwaukie crossing would reduce traffic volumes on the Sellwood Bridge and improve the level of service on the bridge. The Milwaukie crossing would reduce demand for the Sellwood Bridge by 44 percent and reduce congestion levels on the Sellwood Bridge and Tacoma Street from grossly unacceptable to preferred. Other crossing options to the north and south would have less effect on the Sellwood Bridge. The North Lake Oswego crossing would reduce demand on the Sellwood Bridge by 16 percent and improve the level of service on Sellwood Bridge in the off-peak direction only. The Marylhurst crossing would reduce demand on the bridge by 6 percent and the Ross Island Bridge option would reduce it by 2 percent. Neither would improve level of service on the Sellwood Bridge.

- The Marylhurst and Ross Island crossings would reduce traffic demand on other bridges. The Marylhurst crossing would reduce demand on the I-205 Bridge by 6 percent to 8 percent and the Ross Island crossing option would reduce demand on other crossings in downtown Portland by less 1 percent.

- The two-lane crossings in Clackamas County would operate at unacceptable levels of service.

Demand for a new crossing is strong enough that a new two-lane crossing in Clackamas County would operate at unacceptable levels of service in the peak hours in 2015. This forecast assumes a new two-lane crossing in addition to the existing two-lane Sellwood Bridge.

- The four-lane Sellwood Bridge would reduce delay for vehicles on the bridge but would increase delay on Highway 43, Tacoma Street and other roads leading to the bridge. With the added Sellwood Bridge capacity, the percent of bridge vehicle hours of delay would drop from 44 percent to 6 percent of vehicle hours during the afternoon peak two hours on the bridge. The option would increase traffic by 15 percent on the bridge, which would increase delay on other roads.

- The new crossings in Clackamas County would serve Clackamas County trips, primarily west of I-205. For the Milwaukie crossing, peak hour trips that start and end in Clackamas County would be 17 percent of the total crossing traffic. This percentage would increase with the crossings to the south. For the crossing near Marylhurst, 55 percent of the peak trips would start and end in Clackamas County west of I-205.

**Other traffic impacts**

- The added capacity options would increase traffic volumes on roads leading to the crossing in proportion to the amount of new crossing trips they would attract. Because adding river crossing capacity would shift use of other bridges, not all trips on the new bridge would be new trips. Travel demand would be greatest for roads leading to the crossings for the crossings that add the most new trips. At the high end, in the afternoon peak two hours, the four-lane North Lake Oswego crossing would add about 2,800 new vehicles eastbound on roads leading to Highway 43, or about a 33 percent increase on these roads. East of Highway 99E and River Road, this option would add 3,500 new vehicles in the peak two hours or an increase of 23 percent. At the low end, the
four-lane Sellwood Bridge would add about 1 percent to the existing volumes both east of Highway 99E and west of the Highway 43. With the exception of Highway 224, these roads are not designated for increasing traffic capacity and if any of the options that add capacity were carried forward for further study, these traffic impacts would need to be addressed.

- The added capacity options would increase traffic volumes and shift congested locations on Highway 43 and Highway 99E. For example, the Milwaukie crossing would increase southbound traffic on McLoughlin Boulevard in Milwaukie by 7 percent but reduce volumes on Highway 99E south of Tacoma Street by 16 percent. Likewise, the North Lake Oswego crossing would increase traffic on Highway 43 near Terwilliger by 75 percent but decrease southbound traffic on Highway 43 further to the south.

Costs (in 1998 dollars)

- The four-lane Sellwood Bridge cost would range from a low of $59 million to a high of $106 million. The lower cost reflects the least expensive bridge style and addition of a turn lane on Tacoma Street at Southeast 17th to accommodate increased turning movements. The higher cost reflects the more aesthetic bridge style and widening on both Highway 43 between the bridge and Taylors Ferry and on Tacoma Street between the bridge and Highway 99E.

- The four-lane Clackamas County crossings would range from $114 million to $157 million. In addition, funding would be needed to preserve or replace the existing Sellwood Bridge. The costs reflect a full interchange with the crossing at Highway 43. The range reflects various ramp connections to Highway 224 in the Milwaukie crossing, widening of Courtney Road and an interchange with Courtney Road at Highway 99E in the north Lake Oswego crossing and widening Concord Road with the Marylhurst crossing. The ranges also reflect the two bridge styles.

- The Ross Island Bridge with added capacity option would range from $113 million to $131 million. The cost includes ramp connections between the crossing and Highway 99E on the east and connections between the crossing and I-405/US 26 on the west. In addition, funding would be needed to preserve or replace the existing Sellwood Bridge.

**Transportation demand management and additional transit services**

This option was developed to determine how much of the river crossing demand could be met by increasing efforts to reduce vehicular demand. This option assumed increased transit services and other programs that reduce vehicular use beyond that which was included with the other options. These assumptions included:

- Additional transit service hours that would result in a 3.8 percent annual increase in service hours or about two and one-half times the level currently funded.

- Higher parking prices throughout the region to encourage transit use.

- Lower transit fares through employersponsored transit pass programs.

- Additional east-west transit services and more frequent service on other routes.

- Passenger rail service on the existing freight rail bridge between Lake Oswego and Milwaukie and along the Lake Oswego trolley line.

- Extension of the South/North light-rail line from Clackamas Town Center to Oregon City.

- Success in the ECO rule resulting in reduction of trips in the peak hours.
Key findings from this option are:

- The option would increase transit ridership by 10 percent, including a 10 percent increase for trips across the river. This would increase the daily transit use for trips across the river from 91,000 to 99,500 from the Fremont to I-205 bridges. In the afternoon peak two hours, this would add about 370 transit riders westbound and 1,730 riders eastbound across the river.

- The increase in transit use would reduce the auto mode share by less than 1 percent and would not change the level of service at the river crossings. Though important in increasing the number of trips across the river without the cost of a new crossing, the shift would be less than 1 percent of the total of the single-occupant vehicle mode share. The increase in transit use would occur over all crossings and not reduce the vehicle demand at any one crossing enough to affect level of service measures.

- The demand management efforts and additional transit services alone would not improve crossing facilities for bicycle and pedestrian use. This study did not assess the feasibility or cost of a stand-alone pedestrian and bicycle structure. It is possible that a bicycle- and pedestrian-only facility could be developed in conjunction with other options.

The demand management efforts and additional transit services option would contribute to meeting the crossing demand and support the 2040 Growth Concept. It would not require new structures or generate new traffic demand. The crossing recommendation combines elements of this option with other options.