

# N/NE Quadrant and I-5 Broadway/Weidler Plans

## Facility Plan

### I-5 Broadway/Weidler Interchange Improvements



June 7, 2012

*Informational/Discussion*  
**DRAFT**



**Facility Plan:  
I-5 Broadway/Weidler Interchange Improvements**

**The overall project purpose is to...**  
 Improve safety and operations on I-5  
 in the vicinity of the Broadway/Weidler  
 interchange.

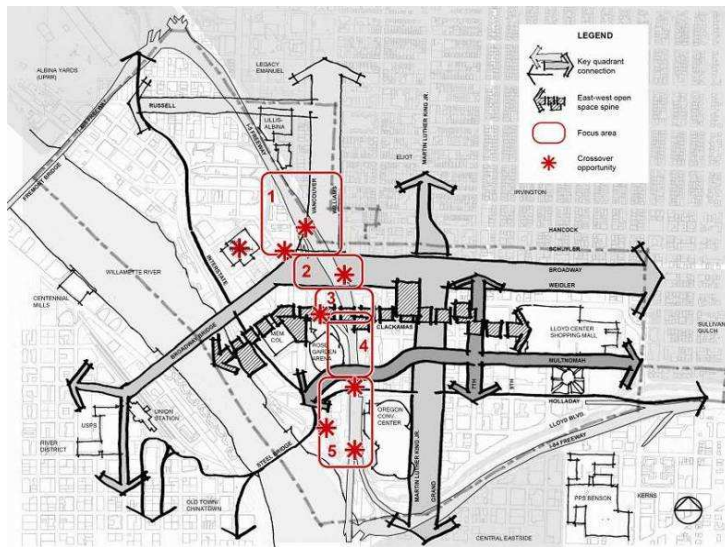
**OBJECTIVES:**

ODOT and the City, through the Stakeholder Advisory Committee (SAC) and extensive public outreach, explored and found solutions to meet the following objectives:

**EASE CONGESTION LEVELS AND IMPROVE SAFETY:**

**ENHANCE PEDESTRIAN AND BICYCLE ROUTES:**

**IMPROVE FREIGHT MOVEMENT:**



**Integration of Transportation and Land Use Concepts in the N/NE Quadrant Plan**

## The Facility Plan

### Study Area

The project study area is at the crossroads of the Portland freeway system, as shown in Figure 1. I-5 is the north-south freeway facility and extends through the metropolitan area, and it runs the full length of the west coast of the United States from Canada to Mexico. Within the project area, I-84 intersects I-5 and extends east across the U.S. a mile and a quarter north of I-84 and I-405 connects to I-5 at the Fremont Bridge interchange. This interchange is the northerly connection of the I-405 loop around the west side of downtown Portland, with the southerly connection at the west end of the Marquam Bridge. Within the overlap section, I-5 serves through traffic as well as connecting traffic between I-84 and I-405.



Figure 1: Study Area and Vicinity Map

### Facility Function

- I-5 is classified as an Interstate facility and is both a Freight Route and a Truck Route.
- I-84 is classified as an Interstate facility and is both a Freight Route and a Truck Route.
- I-405 is classified as an Interstate facility and is both a Freight Route and a Truck Route.

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### Interchange Function

The I-5 Broadway/Weidler Interchange is located on I-5, in between I-405 to the north and I-84 to the south. The function of the I-5 Broadway/Weidler Interchange is to serve the Portland central city, which includes the industrial area of Lower Albina and the commercial activity along the Broadway/Weidler corridor, regional attractions, such as the Rose Garden Arena and the Lloyd Center mall, and the surrounding community.

### Interchange Purpose

The purpose of the I-5 Broadway/Weidler Interchange Improvement Plan is to improve the safety and operations on I-5 in the vicinity of the I-5 Broadway/Weidler Interchange.

### Project Problem/Issues

#### Congestion and Bottleneck

In the context of the regional freeway network, the city's N/NE Quadrant sits at a crossroads of three regionally significant freight and commuter routes. As a result, the freeway interchanges experience some of the highest traffic volumes in the state. Table 1 shows the average daily traffic volumes entering and exiting I-5 over the two mile segment within the N/NE Quadrant.

**Table 1: Average Daily Traffic Volumes Entering and Existing I-5 in the Study Area**

I-5 Direction	Entering	Exiting
Northbound	24,660	37,530
Southbound	34,000	47,200

### Highest Accident Rate in the State of Oregon

An analysis of the reported crashes on I-5 in the study area was performed for the five-year period from 2005 through 2009. Both frequency (number of crashes) and crash rate (number of crashes per million vehicle miles) were calculated per 1/10 mile segments.

- I-5 S direction has more frequency of crashes than I-5 N
- The top three locations with highest frequency of crashes and crash rates are:
  - 1) I-5 S at N Holladay Street (weave between the Wheeler On-ramp and the I-84 E Off-ramp)
  - 2) I-5 N at Multnomah (weave between the I-84 W On-ramp and Weidler Off-ramp)
  - 3) I-5 S at Thompson Street (weave between the I-405 on-ramp and the Broadway St off-ramp)
- I-5 within the study area has the highest crash rate within the entire state
- Three times the crash rates at I-5 Terwilliger curves
- The type of crashes in order of ranking from highest are: rear-end, sideswipe, fixed and other.

The attributing factors to the high number of crashes and safety problems in the study area are:

- Heavy congestion
- Short weaving distances
- Lack of shoulders for accident/incident recovery

### **Operational Friction and Congestion Caused by Heavy Weaving**

Weaving analysis and field observations were performed for the four weaving sections on I-5 within the study area:

- I-5 N between I-84 W and Weidler Off-ramp
- I-5 N between Broadway On-ramp and I-405 Off-ramp
- I-5 S between I-405 On-ramp and Broadway Off-ramp
- I-5 S between Wheeler On-ramp and I-84 E Off-ramp



Two weaving sections currently perform at a failing level-of-service during the AM and PM Peak periods:

- I-5 S between Wheeler On-ramp I-84 E Off-ramp
- I-5 N between I-84 W to Broadway Off-ramp



The failing operations will be worsened in the future, with the most critical failure being the weave being the I-5 S weave from the Wheeler On-ramp to I-84 E Off-ramp. This bottleneck will cause queuing that extends across the weaving section to the north and onto Fremont Bridge.

### The Land Use-Transportation Connection

Land use and transportation are in balance. Proposed changes to land use designations will reduce auto demand and provide for a more mixed-use multimodal environment.

The N/NE Quadrant of the central city includes considerable multimodal infrastructure to support all types of travelers on all modes. In addition to the I-5 freeway and the local street network, four light rail transit (LRT) lines run through the area, converging on the Rose Quarter Transit Center next to the Rose Garden Arena. The City of Portland is constructing streetcar lines on Broadway/Weidler to connect with the Pearl District and the central east side of Portland. Eight TriMet bus lines also connect at the transit center.

The I-5 Broadway/Weidler Plan proposes many new crosswalks that will improve pedestrian safety and connections to and from these major transit amenities. Two major bicycle commute routes run through the area: 1) the major east-west route along Broadway and Weidler, and 2) the major north-south route along Williams and Vancouver. The plan also proposes a new east/west bicycle/pedestrian overcrossing at Clackamas to connect the Lloyd District with the Rose Quarter.

The Lloyd Transportation Management Area (TMA) is one of the most successful in the Portland metropolitan region. The area is currently predominantly commercial and industrial however, the proposed changes to land use designations in the city's N/NE Quadrant Plan will encourage a much greater mix of uses, especially in the central Lloyd District where significant density and mix of uses are anticipated.

The City of Portland and ODOT have jointly developed this freeway and local transportation plan, and have integrated the transportation and land use components. The transportation components were developed assuming existing zoning, except for changes at the Portland Public Schools (PPS) Blanchard site and some changes to allow more diverse uses in the central Lloyd District. The overall trip vehicle trip generation for the district is expected to be the same or lower than under previous zoning entitlements. The changes related to land use and the transportation improvements recommended by this plan have been analyzed and queues are not anticipated on the I-5 exit ramp deceleration areas (see Table 2).

**Table 2: Available Storage and Predicted Queues for Exit Ramps at I-5 Broadway/Weidler Interchange**

Direction	Storage Available	Predicted Queue
Southbound	955 feet	500 feet
Northbound	1130 feet	350 feet

### Multimodal Mixed-Use Area

The Broadway/Weidler interchange is within ¼-mile of an existing interchange. ODOT staff concurs that the Multimodal Mixed-use (MMA) designation is appropriate for the city's companion NNE Quadrant Plan and ODOT must be consulted prior to any future plan amendments within the MMA boundary.

## Summary of the Recommended Concept and Elements

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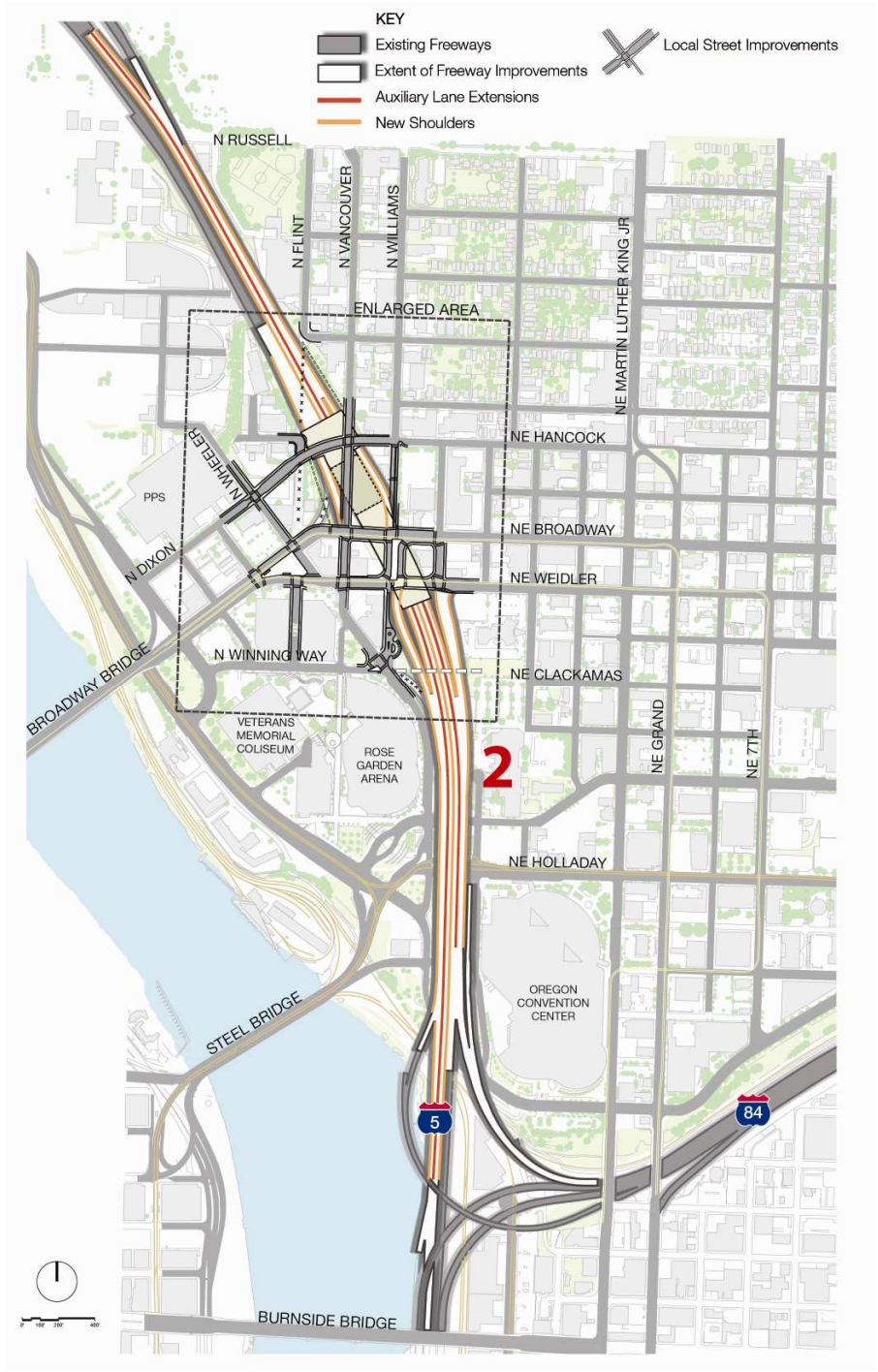
The Recommended Concept (supported by a consensus/ majority of the SAC) and Elements are based on technical assessments of bicycle and pedestrian operations, urban design/land use potential, traffic operations, and safety. Figures 2 and Figure 3 illustrate the Recommended Concept and Table 3 describes the facility plan elements and their outcomes.

*Transportation Demand Management (TDM)* strategies are most effective in areas with high concentrations of employment and where a robust transit system exists. Generally, the strategies are easiest to implement where there are large employers or where a transportation management association (TMA) has been established to pool the efforts of many smaller employers. The Facility Plan Element 1, *Transportation Demand Management (TDM)* measures are designed to reduce vehicle demand, especially for commuter trips in the peak periods. TDM measures include strategies that: 1) shift modes for carpooling, vanpooling, transit, bicycling, and walking programs, 2) shift trips to non-peak periods, such as flexible work schedules and off peak shifts and 3) include telecommuting, which eliminates trips.

*Transportation System Management (TSM)* measures are designed to make maximum use of existing transportation facilities, and include:

- Traffic engineering measures (eg. signal timing changes, provision of turn lanes, turn restrictions, and restriction of on-street parking to increase the number of travel lanes without road widening) that improve the operations and efficiency of streets and intersections;
- System monitoring and traveler information systems (e.g., Intelligent Transportation Systems (ITS), variable message signs, etc.);
- Facility management systems (e.g., ramp meters, special use lanes, signal priority for special users such as transit); and
- Incident management systems (e.g., incident response and recovery teams).

Components of these TDM and TSM measures are in use today. The City of Portland and ODOT will continue to monitor, adjust, and implement the strategies as needed.



**Figure 2: Overall Project Extent of the Recommended Concept**

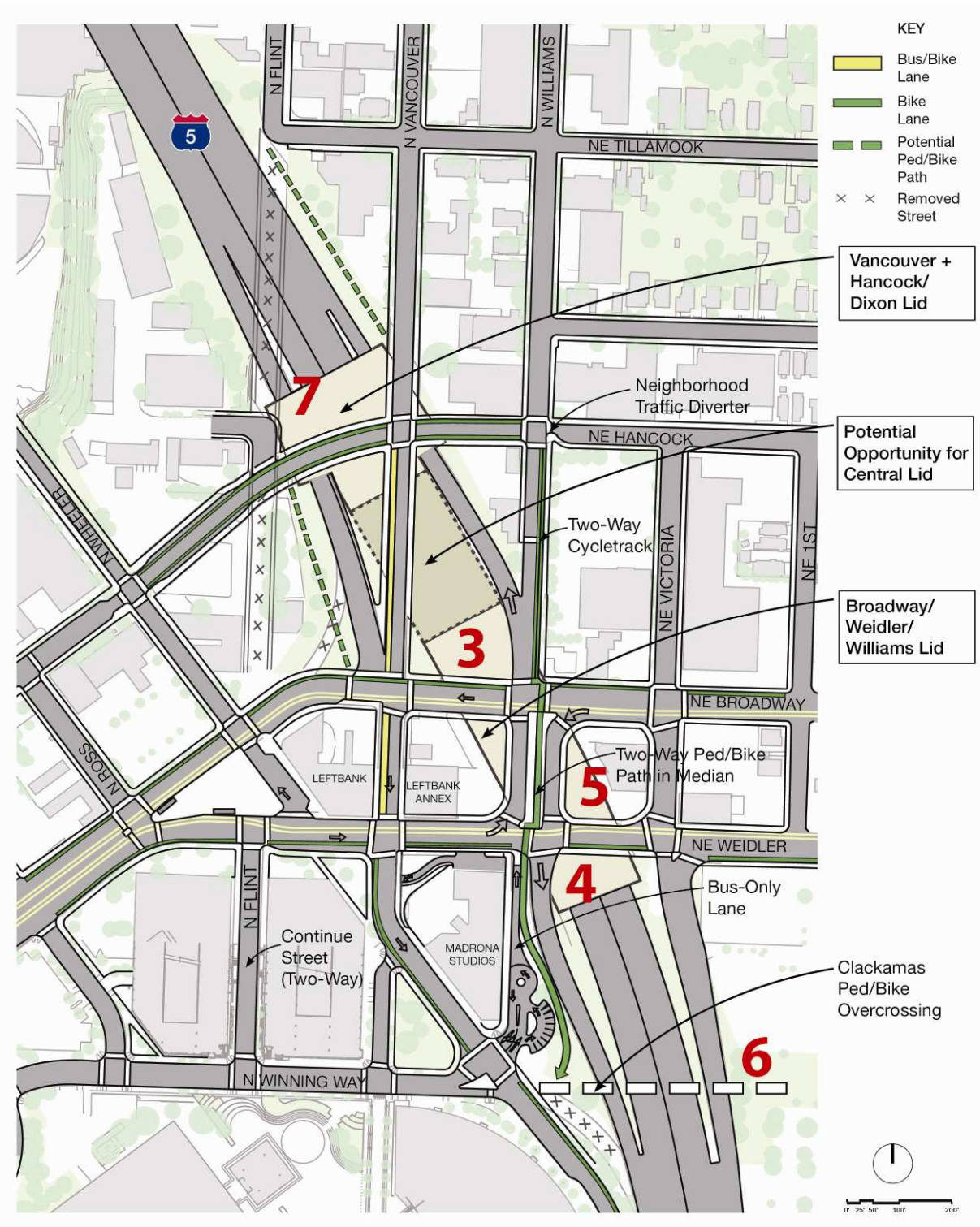


**Table 3: I-5 Broadway/Weidler Interchange Recommended Alternative**

**Facility Plan Elements**

Facility Plan Elements	Outcome
<b>1. Implement Transportation System Management (TSM) and Transportation Demand Management (TDM) Strategies</b>	Improve freeway operations and reduce automobile trips.
<b>2. Construct Mainline Freeway Safety Elements</b> a. Extend auxiliary lanes in both directions. b. Add full-width shoulders in both directions.	Improve freeway operations and reduce accidents 30-50 percent.
<b>3. Reconstruct Three Freeway Structures and Lid</b> The Mainline Freeway Safety Elements require rebuilding the Weidler, Broadway, and Williams structures over I-5; the new structures will be designed to meet seismic and clearance standards.	The new structures improve facilities for all modes; the lid allows for more effective construction staging, improves the urban design of the interchange area and improves the areas development potential.
<b>4. Relocate Southbound I-5 On-Ramp to Weidler/Williams</b> (from current location at Wheeler/Winning Way/Williams)	Increases weave distance, removes ramp traffic from local streets, Wheeler and Winning Way. Allows bike-ped only overcrossing at Clackamas.
<b>5. Convert Williams to a Reverse Traffic-Flow Connection between Broadway and Weidler</b> Includes a barrier-separated bike-pedestrian path in the middle.	Allows more efficient signal timing, improves bike and pedestrian connections through interchange and simplifies vehicular movements.
<b>6. Construct Clackamas Bike-Pedestrian Overcrossing</b> Establishes connection over I-5 from Winning Way to Clackamas.	Increases multi-modal connectivity across I-5, links central Lloyd District to the Rose Quarter and forms the south side of “box-around-the-box.”
<b>7. Re-construct the Vancouver Structure; Remove the Flint Structure; Reconfigure Streets North of Broadway to Include Hancock/Dixon Structure and Lid</b>  North of Broadway elements (Figure 3) include: 1. Rebuild Vancouver 2. Implement traffic calming at Williams/Hancock 3. Remove Flint between Tillamook and Broadway 4. Maintain Wheeler as a two-way street north of Broadway 5. Maintain Wheeler in front of Left Bank as one-way 6. Connect Flint as a two-way street south of Weidler 7. Add signals at Broadway/Wheeler and Broadway/Ross	Vancouver structure must be replaced to accommodate mainline freeway improvements. The Hancock and freeway lid allow for effective construction staging, improve viability of Blanchard site and form the north side of “box-around-the-box.”

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**Figure 3: Enlarged "Box" Area of the Recommended Concept**

**Project Monitors and Future Project Development**

The Facility Plan elements of the recommended alternative (Table 3) are expected to significantly improve I-5 mainline operations and safety as well as improve interchange operations at Broadway/Weidler. Once the Facility Plan elements are completed, ODOT and City of Portland will continue to monitor the freeway operations in the I-5 Broadway/Weidler Interchange area (Table 4).

**Table 4: Project Monitors and Future Project Development**

Project Monitors	Notes
<p><b>1. Safety and Operational Performance</b>  <b>- Southbound Braided Ramp or other freeway safety improvement</b></p>	<p>Upon completion of the recommended alternative Facility Plan elements, ODOT and the City of Portland will monitor the performance of the completed project to address achievement of the safety and operational goals. If safety and operational issues remain on the freeway after construction of the recommended alternative Facility Plan elements, ODOT will work with the City of Portland to initiate a public process to consider additional measures such as a southbound braided ramp from Broadway to I-84 or other options developed through a public process. A southbound braided ramp should not be precluded by the construction of the recommended alternative Facility Plan elements.</p>

## Implementation Actions

### Project Development and Project Management

1. Proceed with next phase of project development and complete Preliminary Engineering and environmental phases for federal funding.
2. Continue project management partnership between the City of Portland and ODOT.
  - Develop work scope and schedule.
  - Define environmental process
  - Develop inter-governmental agreement for completion of PE/Environmental Studies.
3. Develop public involvement process for PE/Environmental phase and actions to resolve remaining issues identified in the I-5: Broadway-Weidler Interchange Improvement Plan.
4. Special considerations will be discussed and identified during Preliminary Engineering and recommended as part of the Final Design/Engineering.
  - Construction management strategies that can provide incentives to minimize construction periods, impacts and costs;
  - Incentives for minority hiring and
  - Strategies to support local businesses

### Preliminary Engineering (PE)

The following are key products at the completion of Preliminary Engineering:

1. Complete PE level of engineering:
  - Develop project cost estimates
  - Complete environmental documentation
  - Identify potential construction phasing
  - If phasing is required, the City and ODOT will work together to match phases to the funding sources available
2. Project agreements at the completion of PE:
  - Signals will continue to be timed so as to avoid queues backing up into the deceleration area of the I-5 SB exit ramp at Broadway.
  - Crosswalks will be provided at all signalized locations and should be provided at all safe and feasible locations.
  - The Rose Quarter Traffic Management Plan (TMP) should be updated with the participation of ODOT, City of Portland, and the Rose Garden Arena prior to construction.
  - Develop preliminary construction mitigation plan that would include efforts to minimize impacts, support local businesses, and support minority hiring.

### Specific Design Coordination

Property impacts are of great concern to the neighborhoods, businesses and agencies working in the study area. The following issues will require further examination by ODOT and the City of Portland, with community involvement as part of Preliminary Engineering:

1. Seek a viable single lid design solution over I-5 between Weidler and Hancock by exploring mitigation measure for freeway noise and vehicle emissions, and address the need for open space and economic development.

2. Develop specific measures to address property and parking impacts to the Paramount and Portland Public School, and other sites related to the proposed Hancock to Dixon connections. The number of parking spaces should be the same or more than current conditions at Paramount Apartments, Left Bank, Left Bank Annex and Madrona.
3. Develop alternative safe and convenient bicycle/pedestrian connections to include:
  - a. Enhanced facilities (bicycle lanes, two way cycle track, sidewalks, protected marked crossings) along Broadway, Weidler, Vancouver, and Williams with a wide, grade separated, multi-use path for Williams between Broadway and Weidler.
  - b. The development of a new pedestrian/bicycle connection between the Flint/Tillamook intersection to the proposed Vancouver/Hancock overcrossing.
  - c. The development of a new bike/pedestrian connection from N. Hancock St. to N. Broadway, while providing for potential parking mitigation , open space, and redevelopment opportunities
4. Define Eliot neighborhood traffic mitigation measures for the recommended N. Hancock St. connection between N. Vancouver Ave. and N. Dixon St to discourage cut-through traffic.
5. Refine a street design and circulation plan for the area in the vicinity of the Broadway-Weidler interchange. The refined street design and circulation plan should address the following issues:
  - a. Develop design elements that provide for safe and convenient access to the Left Bank and Left Bank Annex.
  - b. Develop and evaluate circulation alternatives and design elements for the area north of Broadway, south of N. Wheeler Place and West of I-5 to:
    1. Address the changes to access and circulation around the Paramount Apartments by investigating treatments for the N. Wheeler Ave, between Broadway and Hancock, in order to minimize cut-through traffic at the west side of the Paramount , but maintain access to the Lower Albina industrial district;
    2. Enhance bicycle access and safety to the proposed Hancock/Dixon connection over I-5 to the Broadway Bridge; and
    3. Determine appropriate multimodal access and circulation to this area and Lower Albina.
  - c. Develop and evaluate circulation alternatives for N. Wheeler Avenue, N Winning Way, N Center Ct, N Flint and N Williams to:
    1. Enhance circulation in the area for all modes
    2. Provide flexibility to manage event ingress and egress; and
    3. Open up opportunities for redevelopment and placemaking
  - d. Develop design elements that address the changes to access and circulation to the Madrona:
    1. Refine street design for N. Williams Avenue between N. Weidler and N. Wheeler to address access, circulation and on-street parking needs for the Madrona while also providing for bus, bike and pedestrian circulation.
    2. Provide for sufficient pedestrian and vehicle access to the N Williams entrance to Madrona; and
    3. Prepare design treatment for the Weidler /Williams intersection for safe pedestrian and bicycle crossing.
6. Develop design plans with TriMet for safe transit operation through the I-5 interchange.
7. Refine and finalize design for Clackamas Overcrossing Structure.
  - a. Coordinate design with future access connections east of I-5.
  - b. Coordinate design with future changes to traffic circulation west of I-5 and the relocation of the southbound on-ramp.
8. Evaluate visual and environmental impacts of the proposed widening of the elevated segment of I-5 freeway, including the segment over the Rose Quarter Transit Center and Peace Park, and identify mitigation measures as needed.

