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## ***Chapter 2***

### ***Alternatives/Options Including the Preferred Alternative***

Tier II Final EIS

**SR 167**

Puyallup to SR 509

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### 2.1 Introduction

The Tier I NEPA process selected a preferred corridor for meeting the purpose and need of the project that was adopted by the Secretary of Transportation in September 1999. The process examined both build and non-build alternatives. Build alternatives involved building a new highway while non-build alternatives involved operating the existing highways differently. Numerous corridor routes were compared as build alternatives while transportation systems management and transportation demand management were evaluated as non-build options. Ultimately, a build alternative in corridor 2 prevailed as the alternative with the least environmental impact while still meeting the purpose and need statement.

The build alternative selected in the Tier I Record of Decision (ROD) consists of a four-lane freeway with two High Occupancy Vehicle (HOV) lanes between I-5 and SR 161. It includes freeway-to-freeway connections with SR 509, SR 167, and I-5; new local access interchanges in the vicinity of 54th Avenue East and Valley Avenue; and completion of the SR 161 interchange. One bridge over the Puyallup River will be replaced and portions of Hylebos Creek and Surprise Lake Drain will be relocated. Non-structural alternatives will be included within this corridor to the extent possible.

The Tier II environmental analysis focuses on a refined corridor and interchange designs for SR 167. The result of the Tier II detailed studies and analysis is the designed interchange options for each of the preferred interchange locations along with supporting facilities.

The Alternatives/Options Analysis documents the selection of the alternatives within the preferred corridor that were evaluated in the Tier II NEPA process. This analysis covers the steps taken, including:

- Process followed to form the alternatives;
- Design and environmental criteria used to make the selections;
- Alternatives considered but rejected for various reasons;
- Alternatives selected for evaluation in the EIS;
- Interchange options selected for the Build Alternative.

## 2.2 Process to Form the Alternatives and Options

The purpose of an Environmental Impact Statement (EIS) is to evaluate a reasonable range of alternatives.

The Federal Highway Administration (FHWA), Washington State Department of Transportation (WSDOT), project partners, and the public engaged in a multi-year effort to evaluate and select the design alternatives to be included in the Tier II EIS. Because the Tier I EIS evaluated multiple corridors, the alternatives to be evaluated in the Tier II EIS were only those within the preferred corridor. A corridor width of 200 feet was selected to avoid and minimize any potential on existing surrounding land uses, specifically Tribal Trust land and wetlands. Because the Tier I preferred corridor is only 200 feet wide, only one build alternative design is proposed within the corridor. Within the 200-foot-wide “Preferred Alternative Corridor,” optional interchanges were evaluated. The benefits and impacts of the various interchange configurations are described and a comparison of each interchange option is also provided in the following discussion.

The Tier II build alternative includes interchange options at three locations. An option is defined as one of a set of design configurations within the build alternative against which screening criteria are applied. Because these options are different designs to address the same issue, they are not considered separate alternatives.

Figure 2-1 illustrates the major features of the project that emerged from this process. For design development purposes, the SR 167 mainline was divided into four segments (Table 2-1).

**Table 2-1: Mainline Segments and Limits**

Segment Title	Limits (Approximate)
SR 509	SR 509 to 8th Street East
I-5	8th Street East to 20th Street East
Valley Avenue	20th Street East to Freeman Road
SR 161	Freeman Road to SR 161

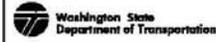
### 2.2.1 Mainline

The initial mainline alignment was developed from information contained in the Tier I EIS. After ensuring that the centerline met current design standards, mainline configuration was developed through a design/review coordination process with the Olympic Region Design office and the Olympic Region Environmental and Hydraulic Services office.

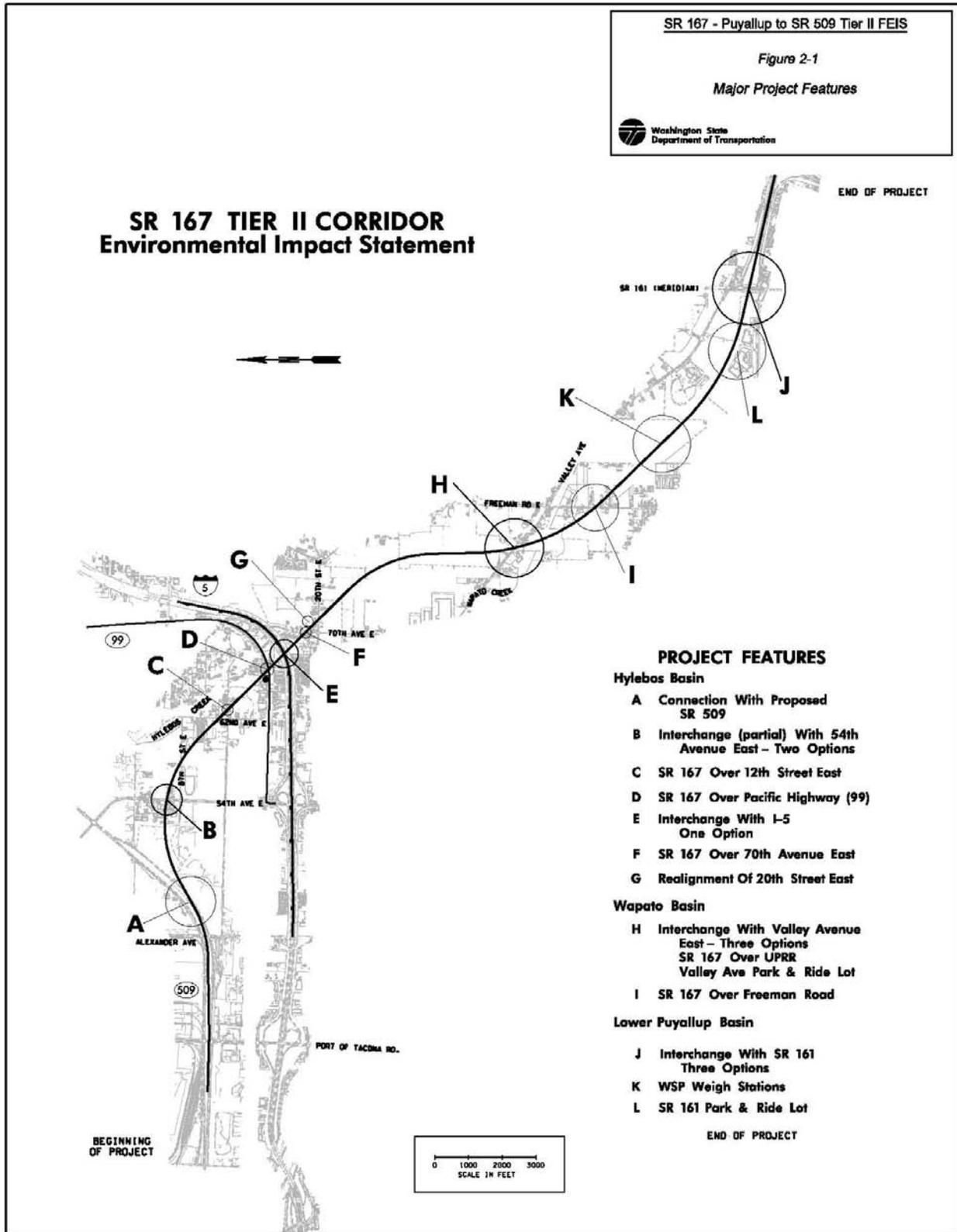
Minor adjustments of the SR 167 alignment over I-5 and in the vicinity of 54th Avenue East were made to meet geometric design standards for a freeway of this nature. These adjustments moved the mainline away from Hylebos Creek, provided additional buffer to the creek, and minimized floodplain impacts.

Figure 2-1

Major Project Features



# SR 167 TIER II CORRIDOR Environmental Impact Statement



### PROJECT FEATURES

- Hylebos Basin**
  - A Connection With Proposed SR 509
  - B Interchange (partial) With 54th Avenue East - Two Options
  - C SR 167 Over Pacific Highway (99)
  - D SR 167 Over 12th Street East
  - E Interchange With I-5 One Option
  - F SR 167 Over 70th Avenue East
  - G Realignment Of 20th Street East
- Wapato Basin**
  - H Interchange With Valley Avenue East - Three Options
  - I SR 167 Over UPRR Valley Ave Park & Ride Lot
  - I SR 167 Over Freeman Road
- Lower Puyallup Basin**
  - J Interchange With SR 161 Three Options
  - K WSP Weigh Stations
  - L SR 161 Park & Ride Lot

## **2.2.2 Interchange Options**

At three interchanges, multiple design layouts (referred to as options in the Tier II EIS) emerged from the design process. The SR 509, Valley Avenue, and SR 161 segments of the project all went through a similar development process. For each segment, two one-day design workshops were held (see Section 1.4.1). Workshop attendees included members of the Olympic Region Design, Environmental, and Traffic offices. Also in attendance were officials from Pierce County, Port of Tacoma, the Puyallup Tribe of Indians and the cities of Fife, Tacoma, Puyallup, and Edgewood.

The initial workshops were brainstorming sessions to develop preliminary interchange options. Attendees were asked to develop design options based on local traffic and transportation needs. They were asked to defer to further review by FHWA and WSDOT the consideration of design standards, cost, and environmental impacts.

Following the workshops, the Olympic Region Design office applied design standards to the options. Any option that could not be designed to current standards was dropped from consideration. The remaining options were then forwarded to the region Traffic and Environmental offices for further review. Based on input from these offices, refinements were made to each option. A second workshop was held to review the design options with all participants. If applicable, further refinements or options were generated.

A full Value Engineering (VE) workshop was held for the I-5 interchange because of its complexity (Section 1.4.1). Participants included members of WSDOT Headquarters, Design, Bridge, and Traffic offices, Northwest Region Environmental office, Olympic Region Construction office, City of Fife, and FHWA. Final results were presented to the Olympic Region Project Development office on October 13, 2000.

Design options at the 54th Avenue East, Valley Avenue, and SR 161 interchanges that met design standards were forwarded for evaluation in the Tier II EIS. Recommendations from the VE study were incorporated in the I-5 interchange and also forwarded for evaluation in the Tier II EIS. Each design option was evaluated at the preliminary design level.

## **2.3 Design Evaluation and Selection Criteria**

All options that were initially under consideration were required to meet the project Purpose and Need and not have impact so great as to render them unreasonable. The options that passed this initial evaluation were determined to be in the “reasonable range of alternatives.” In the Tier II NEPA process, the reasonable range of alternatives are further narrowed to those within the corridor selected during Tier I that meet design and environmental criteria. Some criteria hold more weight than others and failure to meet these may be grounds for rejection of a design option. Design options that were considered but rejected are discussed in Section 2.4.

### 2.3.1 Technical Design Requirement

The technical design criteria contain both general and specific criteria. Tables 2-2 and 2-3 list the design criteria that were used in evaluating and selecting the alternatives. These tables also include the response of the evaluation process.

**Table 2-2: General Design Criteria**

General Criteria	Response
SR 167 will be based on WSDOT design standards for a Principal Arterial highway (P-1), with 70 mile per hour design speed and full access control.	WSDOT design STDs are applied: 70 mph design speed between I-5 and SR 161, 60 mph between SR 509 and I-5.
Reconstruction of local streets and roads will meet the design standards of the controlling jurisdiction.	Yes.
There will be at least three lanes in each direction, including future HOV lanes.	SR 167 extension will have at least 2 GP lanes in each direction. HOV lanes will be provided between I-5 and SR 161. Some roadway segments may have more or less lanes due to the need to avoid impacts to adjacent land uses or improve safety.
The I-5 interchange will include HOV-to-HOV ramps to allow all feasible Transportation Demand Management and Transportation System Management measures to be included.	The design includes direct HOV-HOV ramps.
Staged construction scenarios will be investigated. The criteria will be to provide usable and economically viable segments as early as possible, within funding limitations and with minimum congestion and safety impacts.	Preliminary staging is considered for funding concerns. Detailed staging will be developed during final design.
Planning for staging, detours, and temporary traffic control will be designed to maximize safety and the free flow of traffic during construction.	This is consistent with final design.
Areas subject to settlement under new embankment will be preloaded (preloading is the process of placing overburden above areas subject to subsidence to stabilize the soils as a precursor to construction).	Areas subject to preloading will be identified in the Geotechnical report.
Embankments and structures will be designed, to the extent practicable, to pass maximum flood flows without substantial change to that experienced today. If necessary, additional flood storage will be provided.	This will be addressed in final design. The Hylebos Creek and Surprise Lake Drain relocation will also provide additional flood storage.
A pedestrian overpass will be considered at the Puyallup Recreational Center. Further coordination with the City of Puyallup will be required.	A new separate Pedestrian overpass will be provided if it is determined that the need exists, and facilities to be provided by others, including developers and the City of Puyallup, do not fulfill the need at this location.
The design year for traffic studies is 2030.	Yes.

Each of the interchanges, mainline segments, and bridges has site-specific design criteria. Table 2-3 lists these detailed requirements.

**Table 2-3: Specific Design Criteria**

<b>Specific Design Criteria</b>	<b>Response</b>
<b>SR 509 Interchange</b>	
The interchange will be between Alexander Road and Taylor Way.	The SR 509 connection will be between Alexander Rd and Taylor Way with ramp connections near Port of Tacoma Rd.
A directional interchange, at least to and from the south, will be designed.	Preliminary design completed.
The possibility of including ramps to and from the north will be considered; otherwise these movements will take place at the Taylor Way intersection.	Ramps are not included in design. The partial interchange at 54th Avenue East will have connections to and from the north.
It is assumed that the existing SR 509 roadways south of the SR 509/SR 167 interchange will become frontage roads, with SR 509 between them. It is also assumed the existing roadways can be moved outward if necessary to complement an optimum interchange design.	SR 167 will connect directly to the SR 509 mainline. The South Frontage Rd will stay in its original location. The North Frontage Rd will be relocated next to the South Frontage Rd.
<b>54th Avenue East Interchange</b>	
Both overcrossings and an undercrossing will be considered.	Both are currently being evaluated in the project design. The mode of crossing that best meets the need of the project will be proposed for construction.
A full interchange will not be considered; ramps to and from the west are precluded by the proximity of the SR 509 interchange. These movements will be accommodated at the Taylor Way intersection with SR 509.	Movement will be accommodated at the SR 509/SR 167 connection near Port of Tacoma Road.
Traffic signals and lighting will be considered at the ramp terminals.	These are considered as part of the preliminary design.
<b>Mainline Segment from 54th Avenue East to SR 99</b>	
Alignment shifts will be investigated that will minimize negative impacts to Hylebos Creek.	Mainline has been relocated away from Hylebos Creek due to bringing alignment up to design standards.
Alignment shifts will be investigated that will minimize negative impacts to adjacent homes (this criteria may not be compatible with the above).	The only alignment changes made were those necessary to accommodate design standards.
A frontage road will be considered between 8th Street East and 54th Avenue East.	The proposed Riparian Restoration Proposal removes 8th Street East and 62nd Avenue East.
<b>12th Street East Bridge</b>	
Both overcrossings and an undercrossing will be considered.	Both were evaluated in the project design. It was determined the crossing that best met the need of the project was that the mainline will cross over 12th Street East.
As in the case with all undercrossings, raising the grade of the local road over the freeway causes access problems to and from adjacent homes and farms. Owners must be contacted in order to work out optimum access for their particular situation.	The ongoing design process is considering the effect of raising the grade on all adjacent land uses, including homes and farms. Public and property owner input has been included in the project design.
<b>I-5 Interchange, including SR 99 and 70th Avenue East</b>	
The initial design will include provision for HOV-to-HOV and all movements, then investigate methods of improving design and minimizing environmental impacts. A VE study will determine if the optimum design has been selected.	A direct HOV connection will be provided south of I-5 between I-5 and SR 167. The VE study was completed and recommendations were incorporated into the design.

<b>Specific Design Criteria</b>	<b>Response</b>
Alignment of I-5 will remain the same except for median widening to accommodate HOV lanes and ramps, and the addition of collectors to effectively and safely distribute traffic.	The VE study recommended realigning I-5 southbound to the north to accommodate the SR 167 interchange and direct-connect HOV ramps.
Alignment of SR 167 and ramps will be adjusted, within the limits of prudent design and safety, to minimize detrimental impacts to habitat and adjacent homes and businesses.	The footprint of SR 167 has been minimized to minimize impacts.
Design of the I-5 interchange is likely to affect the existing interchange at 54th Avenue East, especially the above-mentioned collectors. However, the pending HOV construction as a separate WSDOT project will also affect that interchange. Design of the SR 167 project will be closely coordinated with the I-5 HOV project.	Coordination between the SR 167 extension and I-5 HOV continues.
Bridge lengths will be studied in an effort to minimize obstruction to floodwaters, improve stream and streamside habitat, and improve visual quality. Some bridges as visualized in Tier I may be combined to eliminate connecting embankments.	Impacts of fills and bridges are being studied as part of the Tier II EIS.
The above measures should eliminate increased flood levels. If not, this area will need additional flood storage.	The Hylebos Creek relocation and riparian restoration area will provide additional flood storage.
The possibility of improving overall design by rebuilding the existing 70th Avenue East crossing in a different location will be investigated.	The 70th Avenue East crossing will be relocated over I-5 to accommodate the I-5/SR 167 interchange.
Attempts will be made to upgrade existing alignments, cross sections, streambeds, and vegetation of Hylebos Creek and Surprise Lake Drain to improve habitat.	More natural alignments and riparian restoration are being proposed for Hylebos Creek, Surprise Lake Drain, and Wapato Creek.
<b>20th Street East Bridge</b>	
Both overcrossings and an undercrossing will be considered.	Both were evaluated in the project design. It was determined the crossing that best met the need of the project was that 20th Street East will be realigned to accommodate the I-5/SR 167 interchange.
As in the case with 12th Street East, optimum access to adjacent properties will be designed if an undercrossing is selected.	The ongoing design process is considering the effect of raising the grade to accommodate undercrossings on all adjacent land uses, including homes and farms. Access to properties not purchased during the right of way phase will be maintained.
<b>Mainline Segment from I-5 Interchange to Valley Avenue East Interchange</b>	
Alignments will be investigated that minimize impacts to farms and homes. Loss of farmland is a concern. As a result of recent zoning changes, farmland will gradually yield to other uses. If feasible, farms impacted by the project will be "made whole" by land trades, payment for additional equipment or sheds, or similar measures.	This is included in preliminary design and the Tier II FEIS.
A specific concern exists regarding the Tribal parcel just west of the alignment. It will be either avoided, or impacts will be mitigated to the satisfaction of the Tribe.	This parcel is not affected by the alignment and interchange options.
<b>Valley Avenue East Interchange</b>	
Only overcrossings will be investigated here because of the nearby railroad.	SR 167 will go over the railroad. Valley Avenue already crosses over the railroad.

<b>Specific Design Criteria</b>	<b>Response</b>
<b>Union Pacific Railroad (UPRR) Bridges</b>	
These will be overcrossings.	SR 167 will go over the UPRR.
Standard clearance over railroad dictates some of the highest embankments on the project. Consolidation of underlying soils and settlement of the embankments may be a problem. Geotechnical exploration will recommend how this can be done quickly and with negligible impact to adjacent structures such as the railroad. Preloading or an innovative concept such as stone columns may be needed.	A complete geotechnical investigation will be part of the final design of SR 167.
<b>Mainline Segment from UPRR to SR 161</b>	
With the exception of the approach embankments to the UPRR structures and to the SR 161 interchange, this portion of the mainline will be about six feet above the surrounding land.	Profiles of the embankments between the UPRR crossing and SR 161 will range from 4 to 8 feet above the existing valley floor.
There will be no physical impact to the Puyallup Recreation Center lands or to any area presently considered for expansion.	There will be no direct impact on Puyallup Recreation Center lands.
A pedestrian undercrossing will be considered at the Recreation Center, if local commitment can be obtained to provide pedestrian and bicycle access from the south end.	An undercrossing could be accommodated under the SR 161 interchange Urban Option. An overcrossing has been evaluated. Also, a developer is considering an overcrossing near the Recreation Center that could accommodate pedestrians and bicycles.
Attempts will be made to upgrade existing alignments, cross sections, streambeds, and vegetation of Wapato Creek to improve habitat. A large pipe-arch is assumed under SR 167, but bridges will be investigated.	SR 167 will be on structure over Wapato Creek near the Valley Ave interchange. Wapato Creek will be enhanced in the proposed Riparian Restoration Proposal.
A specific commitment has been made for noise abatement to protect Tribal property at 48th Street East.	Noise walls are evaluated as part of the Tier II FEIS and WSDOT is committed to providing noise abatement for Tribal properties if it is warranted from the results of the evaluations.
<b>Freeman Road (82nd Avenue East) Bridge</b>	
Both overcrossings and an undercrossing will be considered.	Both were considered.
As in the case with the 12th Street East, optimum access to adjacent properties will be designed if an undercrossing is selected.	SR 167 will go over, and Freeman Rd access will be maintained.
<b>SR 161 Interchange</b>	
Overcrossings will be used here because of the gradeline of existing SR 167 to the east.	The gradeline was evaluated and it was determined that an overcrossing was the best mode at this location.
It will be necessary to re-channelize the SR 161/Valley Avenue East intersection to better handle reduced future traffic.	Channelization will be modified to accommodate revisions to the SR 167/SR 161 interchange. Traffic is not reduced in 2030 vs. 2020.
The proximity of the Puyallup River Bridge and intersection with North Levee Road will pose a difficult design problem for the eastbound ramp terminals. A single point urban interchange may resolve this problem.	Three design options are under consideration, including an urban interchange. The Urban Interchange is the preferred option at SR 161.
The Carson chestnut tree, within this interchange, will be saved if possible within the limits of safe design.	All design options have been evaluated and have been designed to avoid impacts to the tree.

## **2.3.2 Environmental Protection Requirement**

The environmental criteria to evaluate interchange options consist of mitigation measures that apply to the project from the Tier I EIS, the Tier I ROD, and the Tier II process. The Tier I FEIS and ROD mitigation measures and the actions to be taken to implement them are listed in Table 1-2 – Tier I Commitments and Mitigations. The environmental screening criteria specifically applied to select the “Preferred Interchange options” in the Tier II process are described below and listed in Table 2-4. All interchange options that were evaluated in the Tier II process also met the overall project Purpose and Need as described in Chapter 1. Meeting the project Purpose and Need was the first screening criteria selected by the SAC committee. All evaluated interchange options received equal weighting for meeting the Purpose and Need (see tables 2-7, 2-8 & 2-9).

### **Environmental Screening Criteria**

The Tier II NEPA process assesses the impacts of the different interchange design options. To assist in the evaluation, FHWA and WSDOT developed a set of environmental screening criteria, the results of which produced a score for each option. The scores of each option at a particular interchange were compared.

Table 2-4 lists the criteria and the methods for measuring them. Section 2.6 describes how the screening criteria and other factors were used to select the preferred option. The environmental impacts of each option were thoroughly and independently evaluated as required by NEPA and SEPA.

Seven of the screening criteria are weighted. The weighting is accomplished by considering each of these seven criteria more than once. For example, Prime and Unique Farmland is included in both the “Farmland” and “Prime and Unique Farmland” criteria. The seven weighted criteria are:

- Wetland Impact to Category I and II Wetlands
- Threatened and Endangered Species
- Aquatic Priority Habitat and Life
- Prime and Unique Farmland
- Cultural Resource Properties of More Than Local Significance
- Environmental Justice Population
- High Clean-up Cost Hazardous Waste Sites

Measurement for some of the criteria incorporates relative importance factors. More importance was placed on impact for certain classifications within a criterion. For example, more importance was placed on a threatened or endangered species that is affected than on one that is not affected by the project. Some criteria do not require relative importance factors since all classifications

with the criteria have the same relative importance. For example, all displacements (business, residential, etc.) are considered to have the same impact for screening purposes.

The environmental screening criteria are evaluated under the applicable sections in Chapter 3.

**Table 2-4: Environmental Screening Criteria**

<b>Criteria Description</b>	<b>Criteria Measurement</b>
Meets Purpose and Need (Freight Mobility and Accident Reduction)	<b>Options meeting all elements</b> of the Purpose and Need will receive a “higher” score than those meeting <i>most</i> elements.
Wetland Impact Category I and II	<b>Acres of impact</b> based on the following relative importance (multiplying) factor: <ul style="list-style-type: none"> <li>• Category I = 2.0 • Category II = 1.0</li> </ul>
Wetland Impact All Categories	<b>Acres of impact</b> based on the following relative importance (multiplying) factor: <ul style="list-style-type: none"> <li>• Category I = 5.0 • Category III = 1.5</li> <li>• Category II = 2.5 • Category IV = 1.0</li> </ul>
Wetland Buffer Impact All Categories	<b>Acres of impact</b> based on the following relative importance (multiplying) factor: <ul style="list-style-type: none"> <li>• Category I = 6.0 • Category III = 2.0</li> <li>• Category II = 4.0 • Category IV = 1.0</li> </ul>
Threatened and Endangered Species	<b>Number of federally listed species</b> based on the following relative importance (multiplying factor) <ul style="list-style-type: none"> <li>• may adversely effect = 10.0</li> <li>• may effect, not likely to adversely effect = 3.0</li> <li>• no effect = 1.0</li> </ul>
Aquatic Priority Habitat and Life	<b>Acres of impact</b> based on the following relative importance(multiplying) factor: <ul style="list-style-type: none"> <li>• impact to stream/creek plus buffer with more than 5 priority species = 5.0</li> <li>• impact to stream/creek plus buffer with 3 to 5 priority species = 3.0</li> <li>• impact to stream/creek plus buffer with less than 3 priority species = 2.0</li> </ul>
Wildlife Habitat	<b>Acres of impact</b> based on the following relative importance (multiplying) factor: <ul style="list-style-type: none"> <li>• unmitigated loss = 2.0 • mitigated loss = 1.0</li> </ul>
Prime and Unique Farmland	<b>Acres of impact</b>
Farmland	<b>Acres of impact</b>
Floodplain	<b>Acres of impact</b> based on the following relative importance (multiplying) factor: <ul style="list-style-type: none"> <li>• flood way impact = 5.0 • flood fringe impact = 1.0</li> </ul>
Noise (Design Year)	<b>No. of homes/ businesses impacted</b> (impact defined by FHWA Noise Abatement Criteria (NAC), i.e. decibel levels vary)
Air Quality (Design Year)	<b>Pollutant level better or worse than existing conditions</b> (pollutant level as per standards of National Ambient Air Quality Standards (NAAQS) for all prescribed elements)
Cultural Resource Properties of More Than Local Significance	<b>No. of properties</b> based on the following relative importance (multiplying) factor: <ul style="list-style-type: none"> <li>• adverse effect on properties eligible for NRHP = 5.0</li> <li>• no adverse effect to properties eligible for NRHP = 2.0</li> <li>• no effect to properties eligible for NRHP = 1.0</li> </ul>
Cultural Resources	<b>No. of properties</b> based on the following relative importance (multiplying) factor: <ul style="list-style-type: none"> <li>• effect to properties = 5.0 • no effect to properties = 1.0</li> </ul>
Environmental Justice Population	<b>Number of displacements</b>
Displacement	<b>Number of displacements</b>
Tribal Trust Land	<b>Number of parcels</b> impacted
Visual Quality	<b>General views</b> in vicinity (segment) will be enhanced/ maintained vs. degraded or blocked

<b>Criteria Description</b>	<b>Criteria Measurement</b>
Water Treatment (Ability to Treat Stormwater for Quality and Quantity)	<b>Ability to treat stormwater</b> , with infiltration as “best” vs. treating less than required as “worst”
High Clean-Up Cost Hazardous Waste Sites	<b>Cost</b> (clean-up cost above \$500,000)
Hazardous Waste	<b>Cost</b>
Pedestrian and Bicycle Access	<b>Route Continuity and Local Street access</b>

## **2.4 Description of Interchange Options Considered But Rejected**

The interchange options that were considered but rejected during the Tier II design development process are briefly described below; a reason why they were dropped from further consideration is also provided.

### **2.4.1 SR 509/SR 167 Interchange Options**

No design options were developed for this highway-to-highway connection. SR 167 would directly connect to and terminate at SR 509; therefore, the location of the connection and the design features are dictated by the location of the existing SR 509, the North and South Frontage Roads, and the SR 167 alignment as approved in the Tier I FEIS. Spacing between existing roadways and limited area for new highway right-of-way also allowed for no opportunity to locate an adequate highway-to-highway connection in this area.

### **2.4.2 54th Avenue East Full Interchange Option**

A full interchange option was rejected at this location because the Preferred partial interchange option for SR 167 and 54th Avenue provides a southbound off-ramp to the Port of Tacoma and a northbound on-ramp going away from the Port of Tacoma. No southbound on-ramp nor northbound off-ramp are necessary because the existing local street and state highway system would provide shorter and easier traffic connections southbound via mainline SR 509 to I-5 at Port of Tacoma Road and downtown Tacoma. Also, northbound connections coming into the Port of Tacoma area are better handled via SR 509 or exiting I-5 at the Port of Tacoma Road to the local street system. Because future traffic movements would be adequately accommodated by the existing local network, there would be a lack of traffic demand for southbound on- and northbound off-connections at a full interchange at 54th Avenue East. Implementing it as a part of the SR 167 project would not be a prudent use of funding and other transportation resources.

### **2.4.3 I-5 Interchange Options**

Due to the complexity of the SR 167/I-5 interchange ramp design and limited space to place a freeway-to-freeway connection amongst local streets and the existing I-5/54th Avenue East interchange, only one design option could be developed to reasonably meet the needs of the project at this location (see “I-5

Interchange Option” description on page 2-17 and Figure 2-5). A Value Engineering (VE) study was conducted to assist in identifying the best design and location for the SR 167/I-5 interchange. Several constraints to locating a large freeway-to-freeway connection in the area were identified during the VE study as follows: (1) minimizing impacts to the 241-unit Mountain View Apartment Complex, (2) avoiding the B&L Woodwaste Site (super fund hazardous waste site), (3) the interchange could be no more than three levels due to poor soil conditions and seismic risk factors, (4) avoiding the Fife Heights neighborhood, and (5) maintaining one-mile spacing between adjacent interchanges. After analyzing 67 different ramp configurations, the VE Team recommended one design option that met the Purpose and Need for the project, met design standards, and minimized conflicts with the constraints listed above. Other I-5 interchange options that were evaluated could not meet all of these conditions. Additional information concerning the I-5 Interchange option can be found on page 5-35 in Section 5.7.3.

#### **2.4.4 No Valley Avenue Interchange Option**

In July 2001, during Concurrence Point 2 (see section 1.4.2), the U.S. Environmental Protection Agency (EPA), the U.S. Fish and Wildlife Service (USFWS), and the Washington Department of Fish and Wildlife (WDFW) objected to the range of interchange options being studied and requested that an alternative that did not include an interchange at Valley Avenue also be evaluated. An evaluation by FHWA and WSDOT determined that excluding the Valley Avenue interchange did not meet the purpose and need of the project because it failed to improve regional mobility and failed to reduce congestion and improve safety on local roads. WSDOT assured EPA, USFWS, and WDFW that impacts to Wapato Creek would be avoided and minimized to the extent practicable; subsequently the agencies withdrew their comments in April 2002.

Local traffic accessing the freeway system would be forced to use either the SR167/SR 161 interchange or the existing I-5/54th Avenue East interchange. Traffic analysis for design year 2030 showed that intersections total delay (in hours/day) would be five times more without the Valley Avenue Interchange, while the system wide total delay (in hours/day) would be three times more (see Table 2-5). Further analysis showed an increase in delay from 6 seconds/vehicle (sec/veh) with Valley Avenue I/C to 127 sec/veh without the Valley Avenue I/C, impacting 17,167 vehicles per day at the intersection of 54th Avenue East and Valley Avenue.

The preliminary study on several intersections showed that they will fail operationally in the design year 2030 without the Valley Avenue interchange. The interchange is an important component of the project because of the expected growth in truck traffic as well. The area around the interchange continues to develop as a manufacturing, warehousing, and distribution center. Valley Avenue interchange will provide freight traffic an access to and from the Puyallup valley floor, thus reducing congestion on local streets.

Considering an alternative without Valley Avenue is not reasonable, as the existing roadway system will not be able to efficiently handle the projected

volumes of traffic after SR 167 is in operation. Without the proposed Valley Avenue Interchange the purpose and need of the project will not be met.

**Table 2-5: Puyallup Valley Delay Times**

	Intersections Total Delay (hrs/day)	Roadway Segments Total Delay (hrs/day)	System wide Total Delay (hrs/day)
2030 pm Build Valley I/C	303	1146	1449
2030 pm w/o Valley I/C	1548	3023	4571

### **2.4.5 Overcrossing at Puyallup Recreation Center**

Early in the development of the Tier II EIS, FHWA and WSDOT considered the feasibility of a new non-roadway overcrossing (autos and non-farm vehicles not allowed) at the Puyallup Recreation Center for pedestrians, bicycles, and farm equipment as identified in the Tier I FEIS and ROD. Demand for this type of overcrossing was analyzed and determined to be low. One of the reasons that demand was low was that other future access overcrossings in the immediate vicinity are presently being proposed. The City of Puyallup is working with a local developer-for a connection over the proposed SR 167 between Valley Avenue and North Levee Road, just west of the Recreation Center. Pedestrians, bicyclists, and farmers could use this facility to cross over SR 167. In addition, the preferred Urban Interchange Option at the SR 161/SR 167 interchange includes an overcrossing that the Recreation Center users could use. If these crossings are not built at the time of construction or do not provide adequate service, then FHWA and WSDOT will reconsider the feasibility of constructing the non-roadway overcrossing.

## **2.5 Detailed Description of Alternatives**

### **2.5.1 No Build Alternative**

Under the No Build Alternative, the SR 167 freeway will terminate at North Meridian (SR 161), and the non-freeway SR 167 will continue to I-5 via North Meridian and River Road where it will terminate at the Portland Avenue/Bay Street interchange in Tacoma. The corridor would remain in the present state except for minor improvements and maintenance. Hylebos Creek and Surprise Lake Drain will not be relocated. Riparian restoration will not occur on Hylebos Creek, Surprise Lake Drain, or Wapato Creek. Pierce County and the cities of Fife, Tacoma, Puyallup, Milton, and Edgewood will continue with their programmed and planned improvements to the local transportation system. Section 3.14, Transportation, identifies some of the roadway projects that are planned. The types of projects include widening roads, signaling intersections, adding bicycle and pedestrian facilities, developing park and ride facilities, and improving capacity.

WSDOT will also continue making improvements to its facilities in the study area under the No Build Alternative. These facilities include SR 509, SR 705, SR 99, SR 161, SR 512, the existing SR 167, and I-5. The types of improvements include adding HOV lanes, adding collector/distributor lanes, improving on and off ramps, adding transportation demand management systems, and upgrading drainage systems.

## **2.5.2 Build Alternative**

The Build Alternative mainline alignment generally consists of a four-lane freeway (four general purpose lanes, two lanes in each direction) with one HOV lane in each direction between I-5 and SR 161. However, there are some variations. The number of lanes and lane configurations throughout the 6-mile length of the project are not all consistent. The number of general purpose lanes varies in different segments of the project due to the need to avoid and minimize project impacts on surrounding land uses. Also, in the early phases for construction of the project, the number of lanes in any one particular roadway segment could be less to accommodate staged or phased development (i.e. the HOV lanes won't be added until the latter phases of the project). However, the ultimate condition or number of lanes is reflected in the descriptions contained herein for all project segments. This ultimate condition was used in the environmental analyses to determine the overall impacts of constructing SR 167.

Figure 2-1 illustrates the major components of the project. The Build Alternative includes freeway-to-freeway connections with SR 509, SR 167, and I-5. Also, it includes new local access interchanges at 54th Avenue East (partial interchange) and Valley Avenue and completion of the SR 161 interchange. As part of the SR 161 interchange, the existing eastern (northbound) bridge over the Puyallup River will be replaced and the existing western bridge will be widened. The Build Alternative also results in the relocation of a part of Hylebos Creek and Surprise Lake Drain. The relocated channel designs will reduce flooding and improve fish and wildlife habitat. A riparian restoration area is proposed for existing Hylebos Creek between SR 99 and 8th Street East, for the relocated Hylebos Creek and Surprise Lake Drain east of I-5, and at Wapato Creek near Freeman Road and Valley Avenue. A complete set of project plan figures are provided in Appendix A.

The Build Alternative also includes approximately one mile of separated multiuse path between SR 99 and 54th Avenue East. Freeway truck weigh station facilities are included for each direction of travel in the vicinity of the Puyallup Recreation Center (south of Valley Avenue East). Property acquisition for the park and ride facilities located at North Meridian and at the Valley Avenue interchange are included as part of the Build Alternative. Alternative design options have been developed for evaluation at three of the interchanges. There is only one design option proposed at the SR 509 and I-5 freeway-to-freeway connections. A detailed description of the proposed mainline and each interchange design option follows below.

A conceptual stormwater treatment plan has been developed for the project. Treatment types and discharge basins are identified on figures provided with the description of mainline and options that follow.

### **Mainline Description**

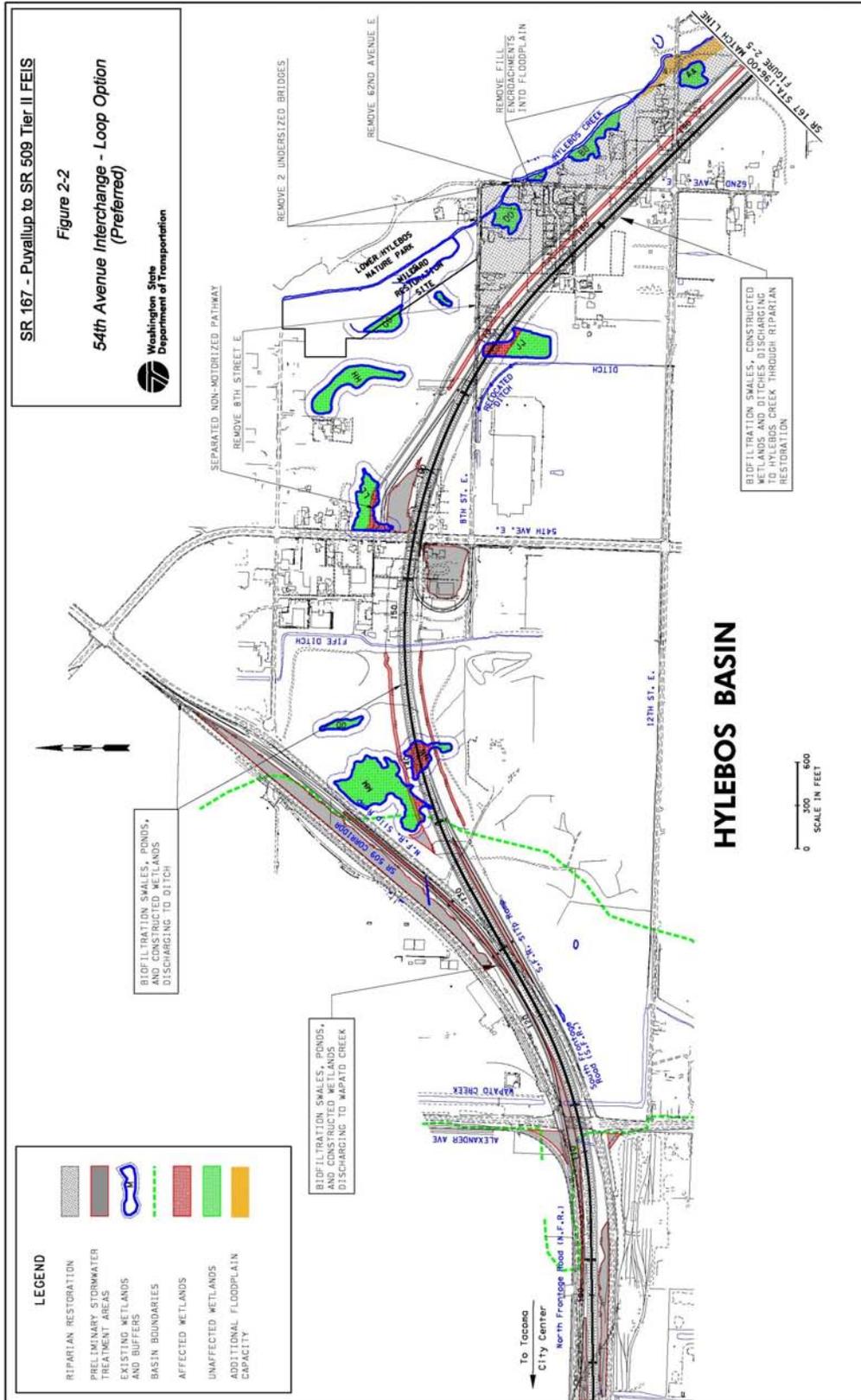
The initial mainline configuration was developed from information contained in the Tier I FEIS with slight modifications to meet roadway design standards and minimize impacts to Hylebos Creek and existing floodplains. For SR 167, traveling towards Puyallup from I-5 is considered traveling northbound on the state route even though the driver is actually traveling south in some locations.

The proposed SR 167 begins as a four-lane limited access highway where it connects to the existing SR 509 at the Port of Tacoma Road/SR 509 Interchange (Figure 2-2). The location of the connection and design features are dictated by the location of SR 509 and the SR 167 alignment as approved in the Tier I EIS. The two-lane southbound SR 167 will directly connect to the southbound lane of SR 509. The two-lane northbound SR 509 will directly connect to the two-lane northbound SR 167. There will be single-lane ramps from southbound SR 167 to SR 509 North Frontage Road and from SR 509 South Frontage Road to northbound SR 167.

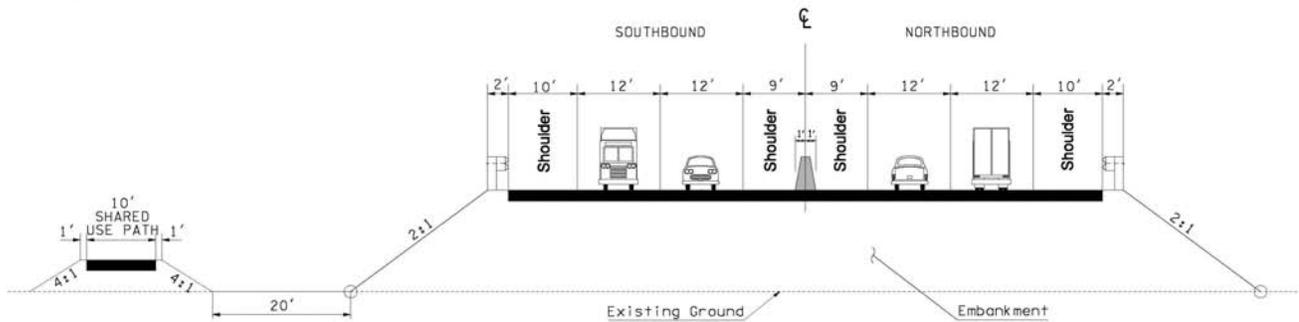
As part of the SR 509 connection, one new bridge over Alexander Avenue will be built. This bridge would span Wapato Creek and the South Frontage Road. The existing railroad crossing of SR 509 will be relocated. A new railroad bridge over Wapato Creek will be constructed south of the South Frontage Road. A new structure (potentially a bridge or three-sided culvert) may replace the existing 110-foot long by 8-foot diameter open bottom arched culvert over Wapato Creek on North Frontage Road. The need for a new bridge on North Frontage Road has not been determined. This structure will only be constructed if needed to support the new railroad crossing. At this time it is not anticipated that this structure will be replaced because it is not impacted.

The four-lane mainline alignment continues easterly on embankment until it crosses 54th Avenue East in the vicinity of 8th Street East. An interchange providing access to and from the east is proposed at 54th Avenue East. Two interchange options were developed and are discussed below. The mainline continues on an embankment (Figure 2-3) from 54th Avenue East until just past 8th Street East where the mainline separates and northbound lanes ascend on an elevated structure while southbound lanes remain on embankment until after crossing 12th Street East. Local access is maintained as mainline SR 167 crosses 12th Street East on structure.

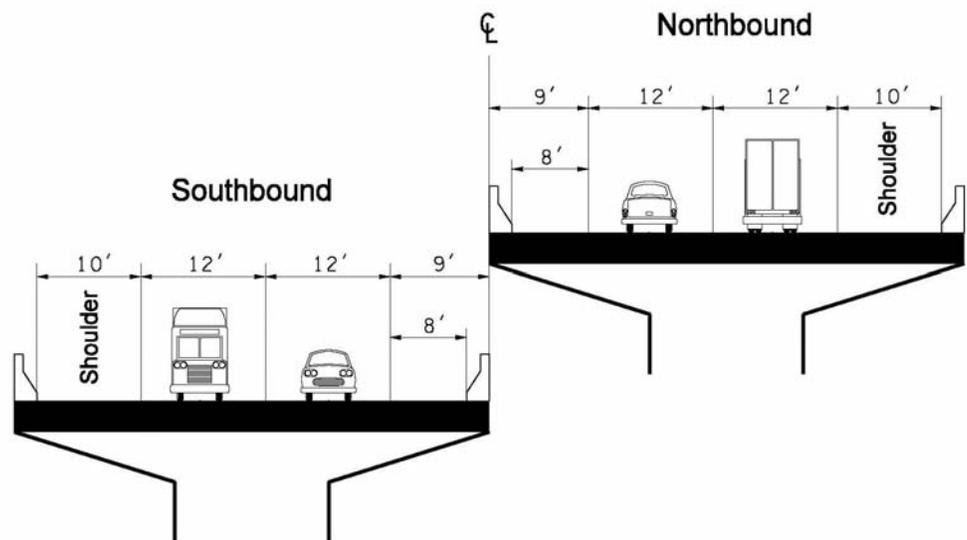
Both northbound and southbound lanes cross SR 99 on separate elevated structures continuing on to the freeway-to-freeway connection with I-5. A cross-sectional view of the structures is shown in Figure 2-4.



**Figure 2-3: SR 167 on Fill between 54th Avenue East and 12th Street East**



**Figure 2-4: SR 167 on Structure between 12th Street East and I-5 Interchange**



Bridges over 54th Avenue East and 12th Street East will be constructed. An existing culvert at the 12th Street East crossing of Hylebos Creek will be replaced with a structure. Riparian restoration along Hylebos Creek will also occur. It will include the removal of residential and commercial buildings near 8th Street East and 62nd Avenue East, the removal of 8th Street East and 62nd Avenue East, east of the new alignment, and the relocation of a drainage ditch.

### **I-5 Interchange Option**

Due to complexity of I-5 interchange and limited solutions for these freeway-to-freeway connections, only one design option could be developed to meet the needs at this location (Figure 2-5). The interchange will consist of three elevated levels of roadway structures extending up to 80 feet above ground. The SR 167 mainline will be elevated on structure over 12th Street East, Pacific Highway (SR 99), Interstate 5, 20th Street East and 70th Avenue East. This interchange will provide all freeway connections except the connection from northbound SR 167 to southbound I-5 and the connection from northbound I-5 to southbound SR 167, which are being accommodated by existing interchanges and the local network.



The HOV direct access ramps will be provided for four movements:

- Southbound I-5 to northbound SR 167
- Northbound I-5 to northbound SR 167
- Southbound SR 167 to northbound I-5
- Southbound SR 167 to southbound I-5

To minimize costs and other impacts, only one lane in each direction on SR 167 is proposed for the bridge across I-5. A WSDOT traffic study conducted for peak traffic volumes in design year 2030 justifies one lane in each direction on SR 167 across I-5 as it will continue to operate below its projected capacity. SR 167 between I-5 and SR 509 interchange is a spur route and will experience far less traffic volumes than the rest of the freeway. I-5 will be shifted to the west between the 54th Avenue East interchange and the Porter Way Bridge overcrossing. A collector-distributor (C-D) road will be provided for the northbound I-5 off ramp to northbound SR 167. North of the interchange, the I-5 mainline will be widened to accommodate the on and off ramps to SR 167.

Hylebos Creek will be relocated as part of the I-5 interchange improvements (Figure 2-5). The creek will be relocated to the field east of I-5 from its current location adjacent to I-5. Relocation will begin where the creek enters the current I-5 right-of-way (ROW) upstream from the proposed interchange and will extend downstream to where it passes underneath SR 99, approximately 4,010 linear feet of channel. The baseline habitat conditions will be improved by constructing meandering channels, resulting in increased channel capacities and lengths. The new stream banks will be revegetated with native saplings to provide further shading and bank stabilization.

A riparian restoration proposal has been developed as part of the project's conceptual stormwater treatment plan that will provide a riparian buffer area around the existing and relocated Hylebos Creek. The existing Hylebos Creek between SR 99 and 8th Street East will be restored with a riparian buffer under the riparian restoration proposal (Figures 2-2 and 2-5). East of I-5, the riparian restoration proposal will restore the area east, adjacent to relocated Hylebos Creek, from Porter Way to I-5 interchange with native riparian vegetation (Figure 2-5). The plan proposes to use bioswales and natural vegetation for enhanced stormwater treatment and also restores wildlife and fish habitat. It will also provide a separated non-motorized path from 54th Avenue East to SR 99 (Figure 2-3).

Surprise Lake Drain will also be relocated as part of the I-5 interchange improvements. South of I-5, Surprise Lake Drain will be relocated and restored to a more natural alignment (Figures 2-5 and 2-6). The channel will move to agricultural fields east of the new SR 167 mainline. The new Hylebos Creek and Surprise Lake Drain stream banks will be revegetated and the channels will have meanders, resulting in increased capacity and length.

