

Chapter 2 –Puyallup River Crossing Design Changes

This chapter describes the previously proposed Puyallup River crossing portion of the 167 Extension project, the reasons for changing the design and the proposed new design.

2.1 What is the existing SR 167 Puyallup River crossing?

The existing SR 167 crossing of the Puyallup River is located at mile post 6.40, just outside the City of Puyallup. **(Exhibit 2 & Appendix C – Vicinity Map)** There are two southbound lanes on a concrete bridge constructed in 1970 (WSDOT Bridge number 167/20W), and two northbound lanes on a steel truss bridge, built in 1925 (WSDOT Bridge number 167/20E), known as the Meridian Street Bridge. **(Exhibit 3 – Aerial View of Existing SR 167 Puyallup River Bridges)** The Meridian Street Bridge is 371 feet long, with traveled lane widths of 21 feet from curb-to-curb, and has a 5-foot wide wooden sidewalk structure attached along the east side.

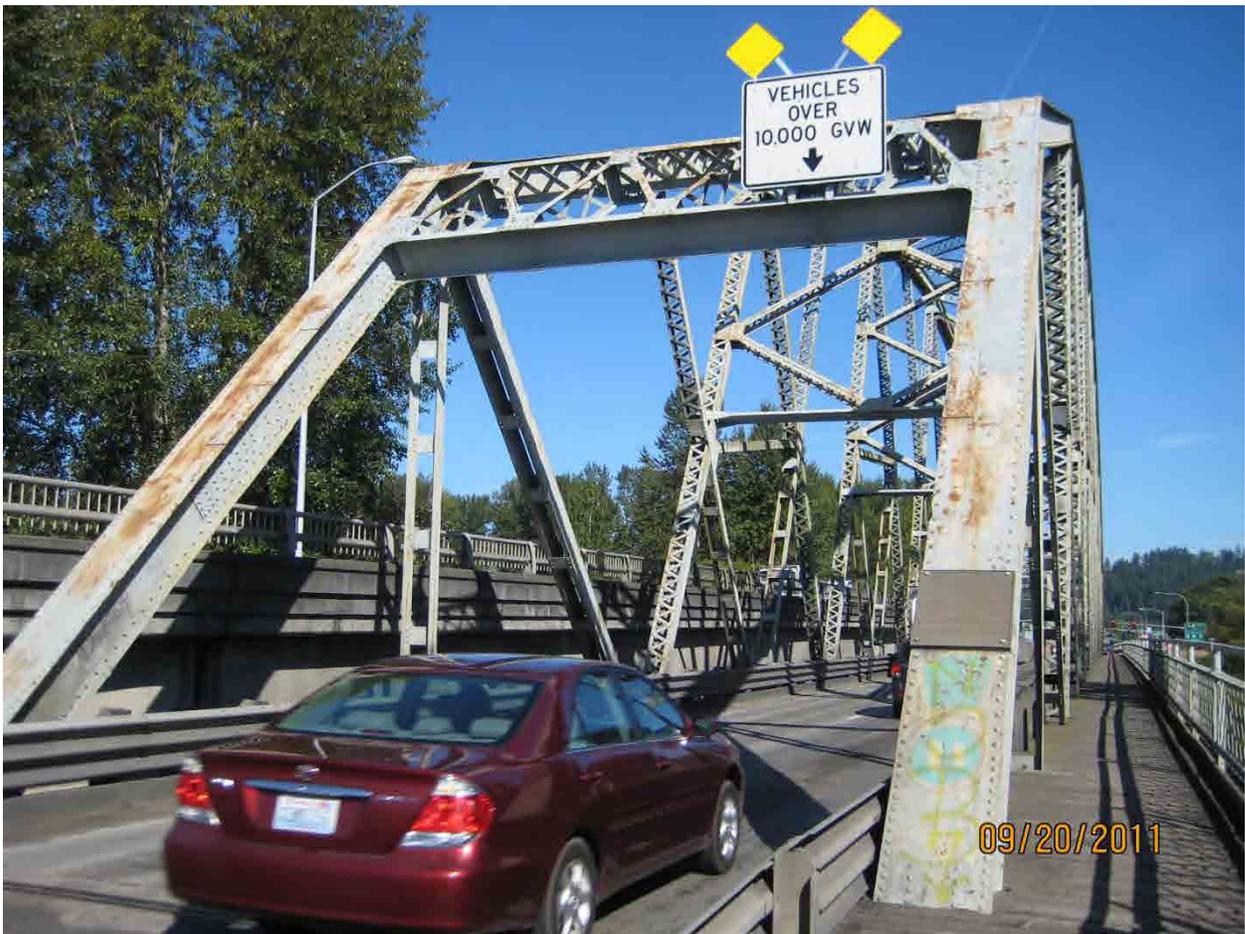


Exhibit 2 – SR 167 Historic Bridge

2.2 What design for the Puyallup River crossing was identified in the 2006 FEIS?

The preferred alternative for the SR 167 Puyallup River crossing as presented in the 2006 FEIS entailed removing the Meridian Street Bridge and constructing a new five-lane northbound bridge in its place. At the time, there was only a preliminary design for the new structure. The configuration of five-northbound lanes was determined necessary to safely allow traffic to weave into the correct lane as it approaches the proposed SR 167/SR 161 interchange. The proposal also included a small taper widening, and seismic retrofit on the

existing southbound 1970 bridge. The construction strategy would require the use of a detour structure on the east side of the Meridian Street Bridge. Traffic would be shifted off of the Meridian Street Bridge onto the temporary structure, and the Meridian Street Bridge would be removed. Then the new five-lane northbound bridge would be constructed, and the temporary structure would be removed. The final stages would be the seismic retrofit of the 1970 bridge, and the taper widening on its north end to match into the proposed SR 161/167 Interchange.

This design was supported by two key decisions. The first was that the 1970 bridge could be seismically retrofitted economically. The second was that the access from Levee Road to northbound SR 167 would be terminated in a cul-de-sac, and a new connection road would be built between Levee Road and Valley Avenue to provide access to the business to the northwest of the bridge. In addition, during a review of historic-era properties for the 2006 FEIS, the Meridian Street Bridge was not eligible for the NRHP.



Exhibit 3 – Aerial View of Existing SR 167 Puyallup River Bridges

2.3 What caused the Puyallup River crossing design to be reconsidered?

The current condition of the Meridian Street Bridge has made replacement of the bridge a priority. During a routine maintenance inspection of the Meridian Street Bridge in January of 2011, extensive floor beam deterioration was detected. Based on this condition, the structure is now rated *structurally deficient*. It was necessary for WSDOT to implement a load restriction on the bridge, requiring vehicles larger than 10,000 pounds gross vehicle weight to use the right lane only. The steel members are exhibiting severe corrosion and the concrete deck and piers are delaminating. **(Exhibits 4 and 5: Examples of deterioration on Meridian Street Bridge)** In addition, the lane and shoulder widths do not meet current standards. With the high volume of truck traffic, this results in frequent damage to the structure.



Exhibit 4 – Example of concrete spalling on Meridian Street Bridge (Note exposed rebar)

Spalling (definition) – To chip or crumble.



Exhibit 5 – Example of rusted beams on Meridian Street Bridge

The following factors led the design team to revise the Puyallup River crossing as part of the 167 Extension project, and develop a construction strategy for the replacement of the Meridian Street Bridge, or the Puyallup River Bridge Replacement project (PRBR):

Exhibit 5 shows severe pack rust between a girder and bottom flange. This example is typical for the bridge, with some areas of pack rust up to 1-1/2” thick.

Funding

Replacement of the Meridian Street Bridge was made a priority due to its deteriorated condition, and funding was approved for the 2011-2013 biennium. The PRBR project funding is limited to providing a two-lane structure built to current design standards. Therefore, the Puyallup River crossing design needed to allow for the interim PRBR construction project to function as part of the future 167 Extension project. The limited funding also required the design team to come up with a revised delivery strategy that would reduce the cost and duration of the interim construction project.

Historic Meridian Street Bridge

Recent inspection of the Meridian Street Bridge found advanced deterioration which made replacing it a high priority. It also led to the reassessment of the bridge’s historic value, and it was ultimately determined to be eligible for listing on the NRHP. This meant that removing the bridge would be an adverse effect to a historic resource. Under Section 106 of the National Historic Preservation Act, and Section 4(f) of the Department of Transportation Act of 1966, such an affect must be avoided, minimized, or mitigated. This changed condition required the design team to examine alternatives to the Puyallup River crossing design in the 2006 FEIS, which had identified the need for demolition of the Meridian Street Bridge.

Seismic Standards

Since the 2006 FEIS was completed, seismic standards for highway bridges have been revised. When evaluated in light of these changes, it was determined that seismic retrofit of the 1970 bridge would be economically unfeasible. This change required an ultimate Puyallup River crossing configuration that allowed for construction of a new southbound bridge.

2.4 What other factors were considered in developing a new design?

Any revised bridge replacement design needed to connect to the proposed design for the remainder of the 167 Extension project, and accommodate the projected traffic. While two lanes are sufficient for current and future traffic volumes southbound, the northbound bridge will need an additional three lanes to provide necessary traffic capacity, and to safely connect to the proposed SR 167/SR 161 interchange that will be located just north of the bridge. The five northbound lanes will include two left-turn, one through, and two right-turn lanes. In order to allow traffic to weave/merge into the appropriate lanes in advance of the interchange, the new five-lane northbound bridge must be constructed over the footprint now occupied by the historic Meridian Street Bridge. In addition to the issues in Section 2.3, concerns regarding temporary and permanent impacts to the river, to private property and business operations, and to traffic operations, guided the development of a new design. The temporary detour structure which was necessary for the original bridge replacement design in the 2006 FEIS, would result in temporary right of way impacts, and would permanently impact access to the business located immediately northeast of the bridge. The Meridian Street Bridge could not be used for staging materials and equipment during construction because of the limited load capacity and limited clearance. Therefore, in the 2006 FEIS design, a substantial temporary work platform would have been constructed across the river. Those temporary structures would have resulted in temporary impacts to the river, with the installation and removal of pilings and approaches on the shoreline.



Exhibit 6: Aerial View of Proposed Puyallup River Bridge Replacement Alignment

2.5 What is the proposed revised design and delivery plan for the Puyallup River crossing?

Elements of the proposed revised design for the Puyallup River crossing as part of the 167 Extension project include:

- Reduce southbound traffic to one lane on the existing 1970 bridge.
- The 1970 bridge would then be used to stage materials and equipment for the construction of a new bridge to the west of the 1970 bridge for the southbound lanes. **(See Exhibit 6)**
- A temporary in water work trestle, approximately 30' x 100', would be constructed to build one in water pier for the new bridge.
- The new southbound bridge would have two 12-foot wide lanes, a 2-foot wide shoulder and an 8-foot wide sidewalk next to the outside lane, and a 4-foot wide shoulder next to the inside lane. **(See Exhibit 7)**
- Once the new bridge is completed, northbound traffic would shift to the 1970 bridge and southbound traffic would shift to the new bridge.
- The historic Meridian Street Bridge would then be removed along with the temporary work trestle.
- The 1970 bridge would be modified for interim use for two lanes of northbound traffic, by removing sidewalk, and removing and replacing traffic barriers, and re-striping lanes. **(See Exhibits 8 & 9)**
- The two northbound lanes are adequate until the SR 167/SR 161 Interchange is constructed as part of the larger 167 Extension project.
- Approach roads will be realigned to accommodate the new traffic pattern in this short segment.

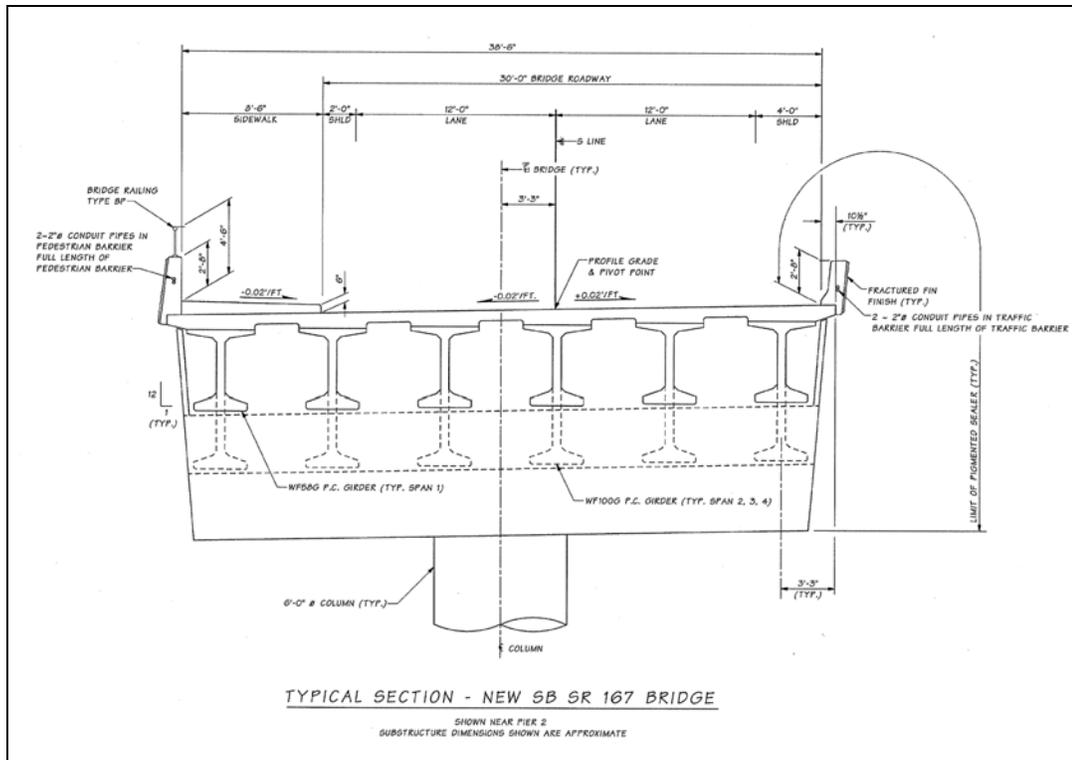


Exhibit 7 – Typical Cross Section of Proposed New SR 167 Southbound Bridge

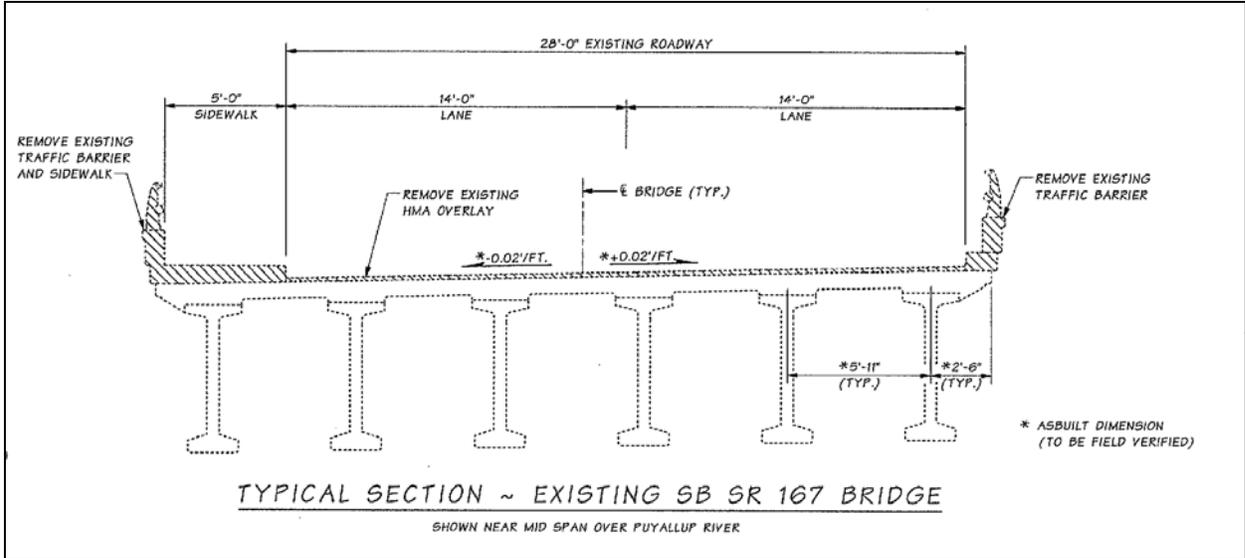


Exhibit 8 – Cross Section of Existing 1970 Bridge (currently southbound lanes)

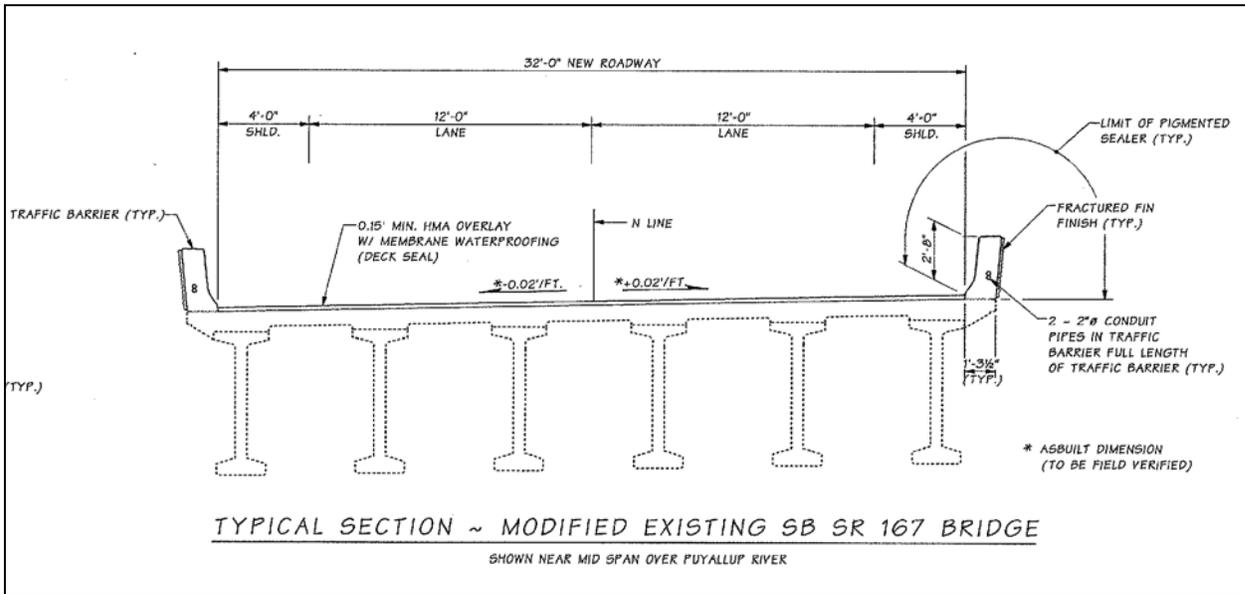


Exhibit 9 – Cross Section of Proposed 1970 Bridge (modified for northbound lanes)

This interim phase is the currently proposed Puyallup River Bridge Replacement project. (See Exhibit 10 – Completed Proposed Puyallup River Bridge Replacement project.)



Exhibit 10: Design Visualization of Completed Proposed Puyallup River Bridge Replacement project (PRBR)

Once funding is obtained for completion of the 167 Extension project, the Puyallup River crossing design would be finalized:

- Traffic would first be reduced to one lane in each direction and shifted onto the new bridge west of the 1970 bridge.
- The 1970 bridge would then be used to stage materials and equipment to construct the first two lanes of the proposed five-lane bridge to the east.

- Once the first two lanes of the five-lane bridge are constructed, materials and equipment would be staged there and the 1970 bridge would then be demolished to make room to finish construction of the remaining three lanes of the five-lane bridge.

Exhibit 11 below illustrates the final alignment of the Puyallup River crossing once the 167 Extension project is completed with future funding.

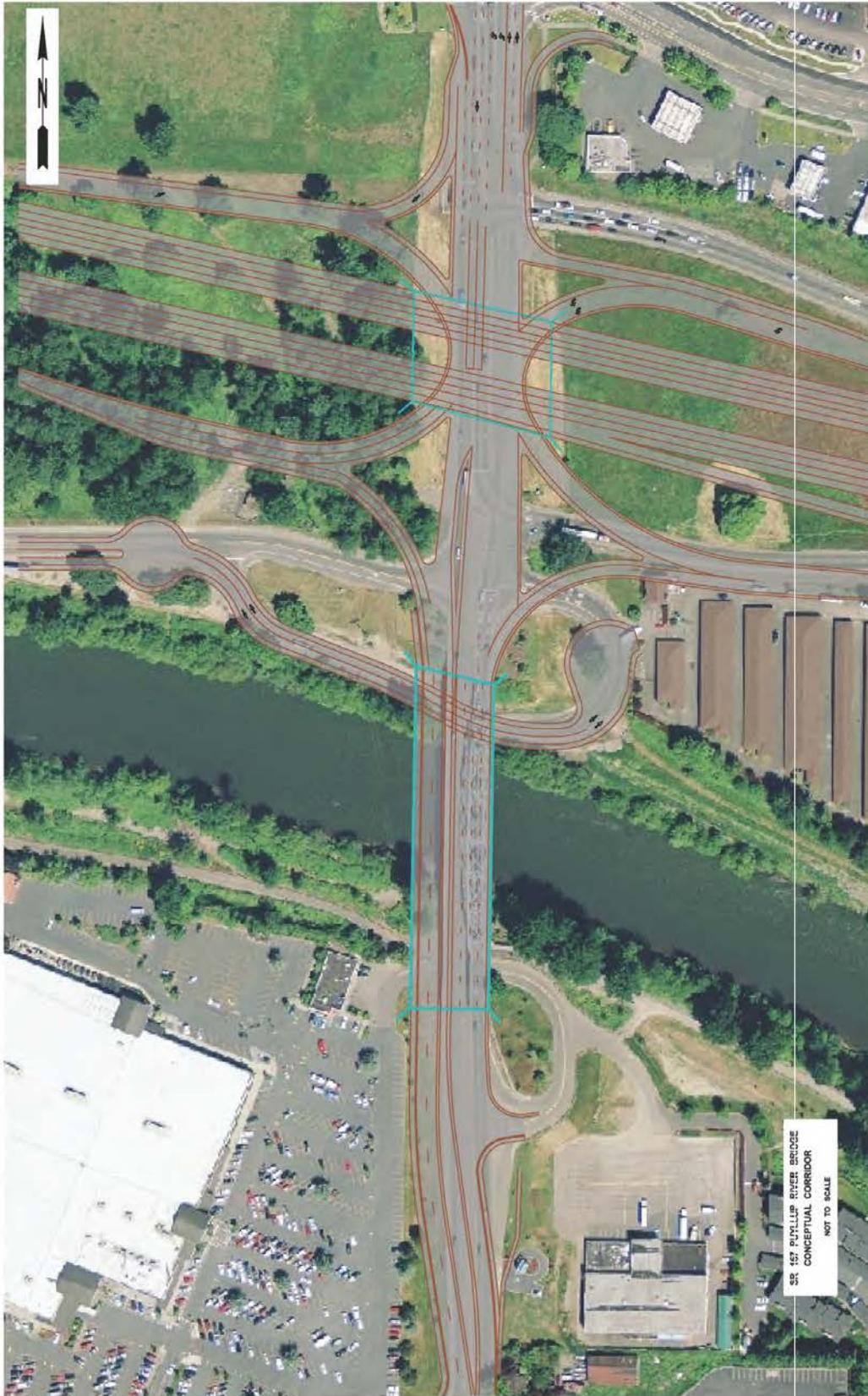


Exhibit 11 – Proposed Final SR 167 Extension Puyallup River Crossing Alignment

2.6 What are the benefits of the proposed revisions to the Puyallup River crossing design?

With the proposed changes to the design and construction plan, the Meridian Street Bridge will not need to be demolished in order to initiate construction. This will allow more time for WSDOT to finalize plans or advertise the availability of the historic steel truss structure for use off site and preserved as a part of a pedestrian and bicycle trail system.

Shifting the crossing structures to the west removes the impact to roads accessing the business northeast of the bridge, and allows for the preservation of the parking lot southwest of the bridge, with the construction of a retaining wall.

The proposed PRBR design will serve existing traffic, and will better accommodate the ultimate configuration of the proposed SR 167/SR 161 interchange and proposed five-lane northbound bridge of the 167 Extension project. When funding becomes available to complete the 167 Extension project at a later date, construction crews will be able to utilize the footprint of the Meridian Street Bridge to construct the first two lanes of the five-lane northbound bridge. By building a new two-lane southbound bridge as a part of the PRBR project as opposed to building two lanes of a future five-lane northbound bridge, the risk of future design and constructability issues are reduced. If the proposed PRBR project constructed only two lanes of a future five-lane northbound bridge, the design would have to be compatible with expansion to a future five-lane configuration. Widening a structure often presents design and constructability challenges, in addition to managing the ongoing revisions to structural design standards and changes to seismic code. The proposed PRBR design is the best solution with the current preservation funding, in terms of engineering feasibility, traffic operation, and environmental impacts.