2.0 Project Alternatives

2.1 Development Alternatives

ODOT worked with the CAG and PDT and considered public input to develop and evaluate ways to meet the project purpose and need. Because the project would replace existing bridges and only minor shifts in the I-5 alignment are possible, the development and evaluation of alternatives focused on bridge features, such as the bridge types, number of piers in or near the Willamette River, and cost. The following sections summarize the process of developing and evaluating possible alternatives.

All potential alternatives must be between the Glenwood Interchange on the south and MLK Centennial Boulevard overcrossing on the north. Any alternatives that would realign the bridges and roadway and that would not tie back into the existing I-5 alignment within those limits were not considered for the following reasons:

- Any realignment of I-5 north of the river would require acquisition of right-of-way from Alton Baker Park, which is located on both sides of the highway. Section 4(f) of the federal Department of Transportation Act of 1966 prohibits taking property from public parks for highway uses unless there is no prudent and feasible alternative. Because there are alternatives available that do not require use of park property, all alternatives that require buying park property for right of way were eliminated.
- The main purpose of this OTIA III project is to replace a structurally deficient bridge in the most cost-effective manner.
- It is not the purpose of the project to modernize I-5.
- A much longer section of I-5 would need to be reconstructed, which would include modifying the Glenwood Interchange and/or the Martin Luther King/Centennial Boulevard overcrossing, which would greatly increase the cost and require buying more right of way.
- Realignment of I-5 would place it closer to existing homes, resulting in higher noise and visual impacts.
- Existing high-tension power transmission lines on each side of the bridge would need to be relocated, which would be very costly.

For these reasons, no alignment options were considered that were not generally within the right of way of the existing bridges and roadway approaches.

In response to high public interest in visual quality and natural resource impacts, the focus of alternatives development was on the footprint and visual characteristics of the replacement bridges crossing the Willamette River. Key considerations included project cost, eliminating or minimizing the number of piers in the Willamette River, providing an aesthetically pleasing solution that recognizes the scenic beauty and community significance of the project area, and avoiding and minimizing park impacts. The following sections describe the process of screening alternatives, those alternatives that were dismissed from further consideration, and the No Build and Build Alternatives that are analyzed in this EA.

2.1.1 Initial Concepts Development and Screening Analysis

In early stages of project development, conceptual alternatives for bridge replacement were developed by ODOT. Given the surrounding land uses and sensitive environmental resources, alternatives that needed major realignment of the highway and bridges were eliminated from consideration early in the project development process.

After development of the project goals and objectives with the CAG and PDT, the project team developed a range of bridge types for the Willamette River crossing for more detailed consideration and screening. These concepts included:

- I-girder
- Box girder
- Deck arch
- Through arch
- Cable stayed
- Steel truss
- Extradosed

Example illustrations of these bridge types are provided in Appendix A. The Preliminary Bridge Concepts Report (OBDP 2007a) was developed to evaluate these bridge types. Early public involvement and coordination with natural resource agencies identified the need to minimize the number of bridge piers below the ordinary high water elevation. The analysis for the Bridge Concepts Report assumed for all bridge types that no more than three piers per bridge would be below ordinary high water of the Willamette River. Cost estimates were developed for each of these bridge types to determine which were within the project budget. The budget for the bridge crossing the Willamette River, Franklin Boulevard, and the UPRR is $70 million. The following bridge types were determined to exceed the available budget for the project: cable stayed, steel truss, and extradosed. The I-girder, box girder, through arch[1], and deck arch types were retained for further evaluation (OBDP, 2007a). The bridge types that can be constructed within the available budget have maximum span lengths of 350 to 400 feet. The Willamette River is about 800 feet wide at the bridge crossing, requiring a minimum of two bridge piers below ordinary high water.

The project team worked with CAG and PDT regarding bridge types, pier location options, and whether the crossing of the Willamette River, Franklin Boulevard, and UPRR should be with one bridge (carrying all travel lanes) or two bridges (carrying northbound and southbound traffic separately). The CAG reviewed the options and recommended to the PDT the bridge type and pier locations described in Section 2.3. The CAG also recommended two separate bridges, instead of a single bridge. The PDT reviewed the CAG's recommendation at their next meeting and decided to proceed with those options.

[1] The original CAG recommendation and PDT decision did not include the through arch option because initial analysis showed it would not fit within the project budget. Later research and analysis showed that it may be possible to construct that style of bridge within budget.

2.1.2 Alternatives Eliminated from Further Consideration

The alternatives that were initially identified but not evaluated in detail are described below.

2.1.2.1 Repair the Existing Decommissioned Bridge

The decommissioned bridge, constructed in 1962, is structurally deficient and is cracked in many places. In addition the bridge was designed to standards that are no longer sufficient for today's freight movement. As noted in Section 1.2.2, the 2002 bridge inspection resulted in a sufficiency rating of 20 on a 100 point scale. A bridge qualifies for replacement funding from the Federal Highway Bridge Replacement and Rehabilitation Funding Program if it has a sufficiency rating of less than 50.

Repairing the decommissioned bridge would cost an estimated $50 million. The repairs would make the bridge useable for about 20 years, at which time it would have to be replaced. The bridge repair cost does not include widening and it would not meet projected traffic demands in 20 years. Future widening, if possible, would be very costly. Concrete box girder bridges like the decommissioned bridge are difficult and expensive to widen and could not be funded by the OTIA III program. The repaired bridge would require ongoing maintenance averaging $50,000 per year. Factors such as commitments to local agencies and stakeholders regarding eventual removal of the detour bridge, and the potential loss of $30 million in federal funds were also considered.

Although the short term cost savings of repairing the bridge are attractive, the other factors discussed above show that replacing the bridge has a greater value than repairing it. Therefore, repairing the decommissioned bridge was dropped from further consideration.

2.1.2.2 Remove the Decommissioned and Detour Bridges; do not Build a New Bridge

This would not meet the Purpose and Need of the project to maintain connectivity and mobility for all users of I-5 over the Willamette River.

2.1.2.3 Alignment Alternatives

Shifting the alignment was considered but not studied in detail for the following reasons:

- Right-of-way would need to be acquired from Alton Baker Park, which is prohibited under Section 4(f) of the federal Department of Transportation Act of 1966 unless there are no other prudent and feasible alternatives.
- Right-of-way would need to be acquired from homes and/or businesses on the south side of the river that would not be required if the highway remains on its current alignment.
- A shifted highway would be closer to existing homes, resulting in higher noise and visual impacts.
- Major high-tension power transmission lines are located on both sides of the bridge and one would need to be relocated if the alignment was shifted.

2.1.2.4 Bridge Alternatives

Bridge alternatives with the following features were considered but not studied in detail:

- More than three piers in or near the Willamette River. This alternative was dropped due to community and resource agency interests to eliminate or minimize piers in the Willamette River

- Bridge types that exceeded the project budget. The cable stayed, steel truss, and extradosed bridge types exceeded the budget for the portion of the bridge crossing the Willamette River.
- Single bridge carrying all traffic. Substantial CAG and PDT concerns regarding maintenance, visual impacts, and operational flexibility of one bridge led to this bridge alternative's removal from further consideration.

The Build Alternative described in Section 2.3 incorporates the bridge type and pier location options advanced by the PDT with the CAG's recommendation.

2.2 No Build Alternative

The No Build Alternative provides the basis for evaluating the environmental effects of the proposed project. For the I-5 Willamette River Bridge Project, the No Build Alternative would:

- Leave the existing I-5 detour bridge in place.
- Conduct necessary work, such as seismic upgrades, to allow traffic to use the I-5 detour bridge on a long-term basis.
- Remove the decommissioned bridge.

Approvals from agencies including the Willamalane Park and Recreation District would need to be obtained to allow the detour bridge to be left in place. The detour bridge was designed as a temporary bridge and commitments made by ODOT as part of the construction of the detour bridge require that it be removed after a permanent replacement is built. The upgraded detour bridge would have substandard shoulder widths. Removal of the decommissioned bridge and improvements to the detour bridge would occur during a construction period that would last about two years.

2.3 Build Alternative

The Build Alternative incorporates the bridge types and pier location options recommended by the CAG and PDT. The Build Alternative includes the following elements:

- Remove the existing decommissioned I-5 bridges and temporary detour bridges over the Willamette River (including Franklin Boulevard and the UPRR tracks) and over the Canoe Canal.
- Construct new I-5 bridges over the Willamette River. These bridges would cross the river, Franklin Boulevard, and UPRR. Parallel bridges would be constructed – one for northbound and one for southbound traffic – and would be about 1800 feet long.
- Construct new I-5 bridges over the Canoe Canal; the parallel bridges would each be about 200 feet long.
- Reconstruct highway approaches to the I-5 bridges
- Change the Franklin Boulevard on/off ramps.

Figure 3: Location of Proposed Replacement Bridges illustrates the existing bridges, the proposed location of the replacement bridges, and the alignment of highway approaches (i.e., rebuilt roadway sections).

The elements of the Build Alternative are described in the following sections.

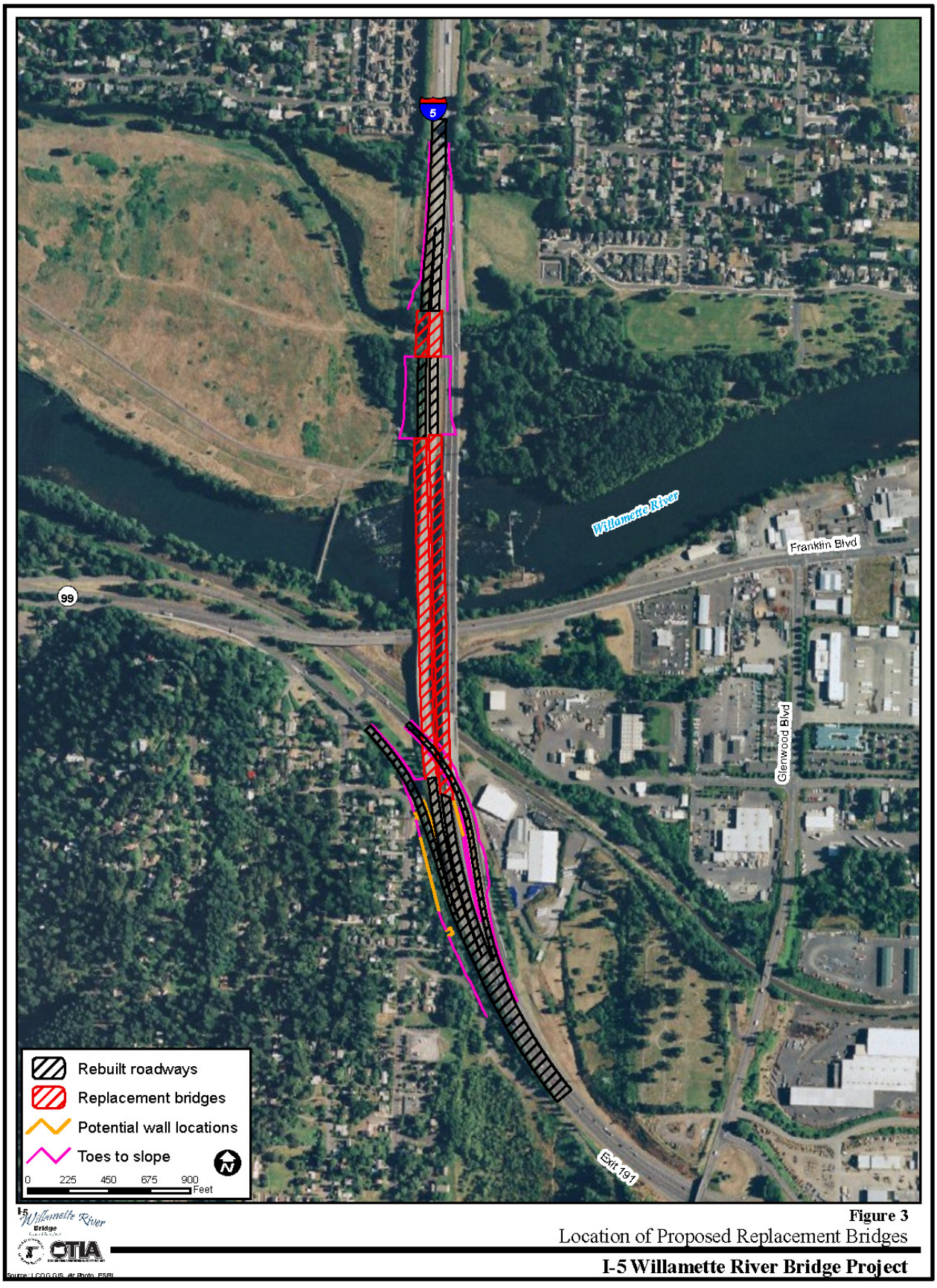

Figure 3
Location of Proposed Replacement Bridges

I-5 Willamette River Bridge Project

2.3.1 Removal of Existing Bridges

Four bridges would be removed: two over the river and two over the Canoe Canal. The decommissioned I-5 bridge and the detour bridge are each about 1,800 feet long and cross over environmentally-sensitive areas, They also cross Franklin Boulevard, UPRR tracks, and an off-ramp to Franklin Boulevard, all of which must be kept open during removal. Additionally, they cross bicycle/pedestrian paths that must remain open throughout construction.

The two shorter bridges over the Canoe Canal would also be removed: the decommissioned bridge and the detour bridge. The bicycle/pedestrian path under these bridges must be kept connected.

2.3.2 Construction of New I-5 Bridges over the Willamette River and Design Options

The Build Alterative would construct two new I-5 bridges over the Willamette River. One would carry northbound and the other southbound traffic. Each bridge would be 64 feet wide curb-to-curb. At the end of construction, each of these bridges would be striped for two lanes to match the I-5 lanes approaching each end of the bridge. The new bridges would be wider than needed to carry two lanes. The additional width would provide flexibility if I-5 is widened in the future to meet projected traffic growth; however, there are currently no plans to do so.

The main design issues associated with the environmental impacts of the new bridges over the river are pier locations and the bridge type. One of the most important project development objectives identified through the public involvement process and coordination with natural resource agencies was to minimize the number of piers in the river and riparian area. In addition, the form and architectural aesthetics of the bridge are important project objectives. Consequently, multiple bridge type have been identified that can conform to the pier placement constraint.

Another feature of the proposed bridge design is avoiding or minimizing the need for new permanent right-of-way. Presently fill material that supports the roadway approaches to the detour bridges over the Canoe Canal and Willamette River occupies a portion of the Eastgate Woodlands under a temporary easement with the Willamalane Park and Recreation District. An objective of developing project concepts has been to fit the project's footprint within the permanent right-of-way, so that the fill for the detour bridge may be removed in accordance with the agreement establishing the temporary easement. To fit the bridges and roadway approaches within the existing, permanent ODOT right of way, relatively steep side slopes and retaining walls would be required for the portion of fill that supports I-5 between the Canoe Canal and Willamette River bridges.

2.3.2.1 Design Options - Pier Locations

Two design options for pier locations for the bridges over the Willamette River are included in the Build Alternative. Figure 4: Pier Location Options provides a conceptual illustration of the approximate location of the bridge piers. Both options seek to:

- Minimize the number of piers in the river and riparian areas to the extent possible within the project budget; and
- Retain design flexibility related to bridge type, materials, and aesthetic treatments.

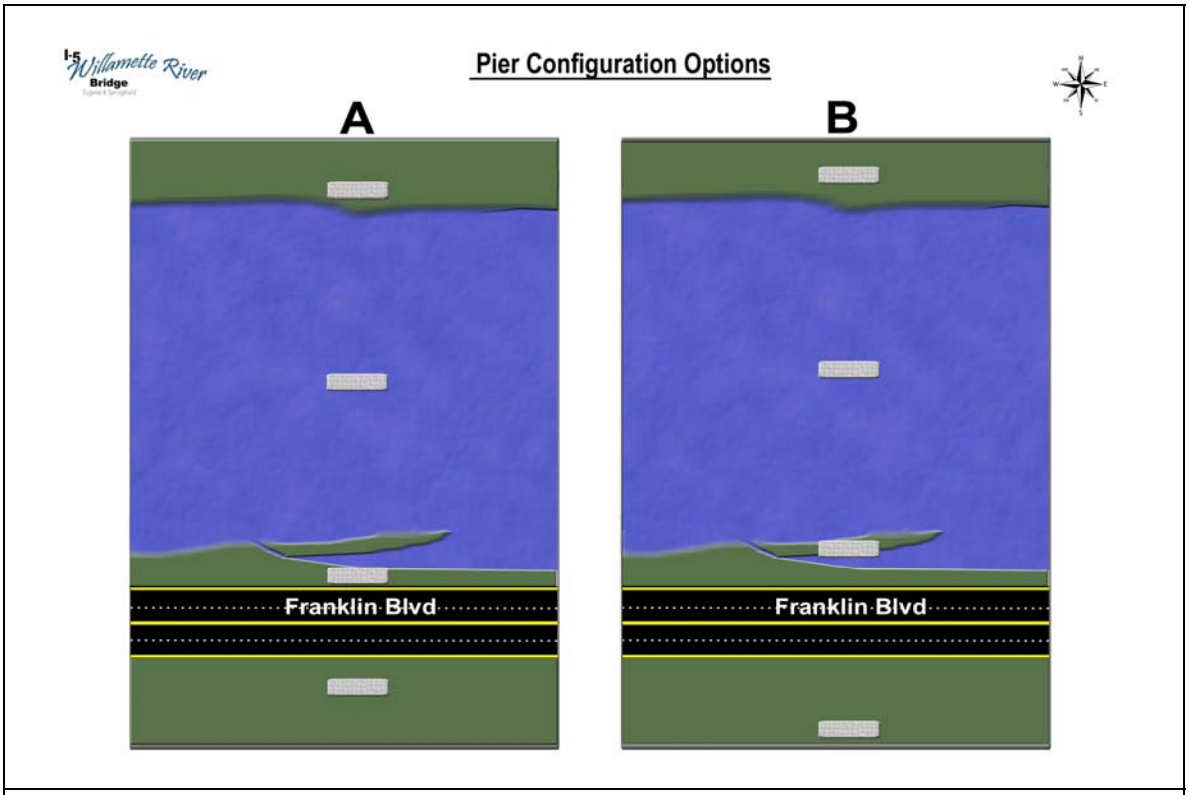

Figure 4: Pier Location Options

Pier Location Option A

Each bridge would have two main spans about 390 feet in length. For each bridge, one pier would be located on the north shore, one pier would be located near the middle of the river, and one pier would be on the south shore (close to Franklin Boulevard).

Pier Location Option B

Each bridge would have two main spans about 360 feet in length over the river. One pier for each of the bridges would be located on the north shore, one pier would be located near the middle of the river, and one pier would be in the river near the south shore area (near the existing power line tower).

As discussed below, some of the bridge types could be used with either pier location option, but it would not be possible with other bridge types.

The final location of the piers would depend on a number of factors, including aesthetics, hydraulics, bridge type, and other environmental considerations. The exact pier locations would be determined during final project design.

North of the river there would not be an additional pier between the pier located on the bank and the bridge abutment.

Piers south of the river would be positioned to accommodate possible future improvements to the Franklin Boulevard corridor and for potentially adding another railroad track (there are currently no plans to do either of these improvements). Piers would also be positioned to avoid the northbound I-5 off-ramp to Franklin Boulevard.

The pier size(s) would be determined during design; however, because of the long spans over the river, the pier footings, or foundations, would be quite large. For the environmental analysis, it is assumed the size of the footings in the river and on the banks would be the width of the bridge (68 feet) and 30 feet across. Footings for the through arch bridge would be about 80 feet wide. All footings are planned to be flush with the ground surface and river bottom. Above the footing, the pier itself would be much smaller. The pier would be no more than the width of the bridge and 8 feet across.

Footings south of Franklin Boulevard would be smaller because span lengths would be less. The footings likely could be set so the top of the footing is near the ground line. Pier sizes could also be smaller.

2.3.2.2 Design Options – Bridge Type

There are multiple design options for bridge types that could be constructed with the two pier location options. ODOT is developing the project to retain design flexibility related to bridge form, materials, and aesthetic treatments as well as to allow flexibility to the engineers to design an economical bridge that also meets community requirements. As such, a specific bridge design will not be selected in the NEPA process. ODOT prefers to have the bridge designer and contractor involved in the evaluation of bridge types. ODOT plans to have the designer and contractor on board by mid-summer of 2008 to allow for collaboration among the designer, construction contractor, ODOT and the community to select the bridge type. ODOT will continue to work closely with the local community to select the bridge type to be built.

Some of the bridge types under consideration could be used with either of the pier location options; however, certain bridge types could only be used with one of the pier location options. These are discussed below.

The new Willamette River bridges would have three individual segments: (1) over the river; (2) over Franklin Boulevard; and (3) over the railroad. The segment over the railroad would include the recreation trail and the off-ramp to Franklin Boulevard. Each segment could have a different type of bridge. Selection of the bridge type for each segment is dependent primarily on aesthetic considerations and budget.

Segment over the Willamette River

The bridge type for the segment over the Willamette River could be an I-girder, box girder, through arch or deck arch. The I-girder and deck arch could be used with either Pier Location Option. A box girder or through arch bridge over the river that continues over Franklin Boulevard could only be used with Pier Location Option B. However Pier Location Option A could be used if a box girder or through arch over the river is combined with an I-girder bridge over Franklin Boulevard. This is due to depth of the box near the pier and the need to maintain a minimum vertical clearance over Franklin Boulevard. Because the arches would be located outside of the roadway portion, the through arch bridge type would be wider than the other bridge types. Each bridge would be about 80 feet wide, including the arch.

Each bridge type is illustrated (with computer renderings) in Figure 5: Potential Bridge Types.

I-GIRDER BRIDGE.

BOX GIRDER BRIDGE

DECK ARCH BRIDGE

THROUGH ARCH BRIDGE TYPE

Figure 5: Potential Bridge Types

Note: Pier options shown on Figure 4.

Segment over Franklin Boulevard

The new bridges would be about ten feet higher than the decommissioned bridge to provide more clearance over Franklin Boulevard. The additional clearance at Franklin Boulevard is to provide flexibility to local jurisdictions for future improvements to the Franklin Boulevard corridor. Additional clearance is also required to meet current vertical clearance requirements for state highways. Although there are no specific plans for future improvements to Franklin Boulevard, the proposed clearances (a maximum opening width of 104 feet) would allow the addition of turning or through lanes, sidewalks or bicycle/pedestrian paths, transit lanes, aesthetic treatments, or other improvements.

Any of the bridge types described for use over the river segment could be used over Franklin Boulevard except the deck arch because it would not provide the required vertical clearance over Franklin Boulevard. If a deck arch was used over the Willamette River, a different bridge type would need to be used over Franklin Boulevard and the railroad. A box girder bridge type could be used over Franklin Boulevard, but Pier Location Option B would have to be used.

Segment over the Railroad

The segment over the railroad would probably need to be an I-girder type or box girder due to budget constraints.

2.3.3 Construction of New I-5 Bridges over the Canoe Canal

The new bridges would use single spans to cross the Canoe Canal and the parallel bicycle/pedestrian path. Selection of the bridge type at this location would be based primarily on cost.

2.3.4 Roadway Elements

About 2,500 feet of I-5 would be reconstructed to connect with the new bridges. This would include minor horizontal realignment and raising the profile elevation of the roadway.

Roadway elements also include changes to the on- and off-ramps to Franklin Boulevard. These changes would be necessary to connect the ramps to the shifted alignment and raised elevation of I-5. The southbound on-ramp would be raised and would likely need a retaining wall on its west side to avoid impacts to adjacent power lines.

2.3.5 Duration and Sequence of Construction

Construction of the Build Alternative would take about four years. As planned, demolition would begin in 2009, and construction would begin in 2010 and continue through 2012. Demolition of the existing bridges and construction of the new facilities would require four summers of in-water work.

The actual sequence of construction has not been determined, but a likely sequence would be:

- Construct temporary work bridge(s) over the Willamette River (these bridges would be for construction activities only and would not carry traffic).
- Remove the decommissioned bridges (temporary work bridge would not be constructed for the Canoe Canal bridges).

- Construct new southbound bridges and connecting roadway.
- Temporarily put both directions of I-5 traffic on the new southbound bridge.
- Remove the detour bridges and construct temporary work bridge.
- Construct the new northbound bridges and connecting roadway.
- Remove the work bridge and restore the project area.

Traffic would be maintained on I-5, Franklin Boulevard, the railroad, and the bicycle/pedestrian paths throughout construction. Some short term road closures may be required, but these would be limited to a few hours. It may be necessary to close portions of the bicycle/pedestrian paths for longer periods (i.e., up to several days). A continuous route across ODOT right-of-way for the bicycle/pedestrian pathways would be maintained on both the north side and the south side of river during construction.

2.3.6 Temporary Construction Facilities

Specific construction operations will be determined by the contractor hired by ODOT. However, restrictions would be placed on their operations to minimize environmental impacts, meet regulatory requirements, and meet commitments made during the public involvement process. These restrictions would include keeping bicycle/pedestrian paths open, noise restrictions, etc. Staging areas and haul roads would be designated for the CM/GC. For the purpose of this environmental analysis, the following assumptions were used regarding staging areas and haul routes:

- Two staging areas would be required for construction: one on the north side of the river and one on the south side.
- Haul routes and staging areas used for construction of the detour bridge would be available for this project.
- The northern staging area would be located on ODOT right of way and in Alton Baker Park just off the bicycle/pedestrian paths and to the east and west of the existing decommissioned and detour bridges. This site would be accessed via the North Walnut Path off of Leo Harris Parkway southeast of Autzen Stadium in Eugene and the path leading to the area (this is the same path that was used for access during construction of the detour bridge).
- The southern staging area would be located in a clearing adjacent to the pedestrian trail east of the detour bridge. The southern location is currently clear and unoccupied. Franklin Boulevard would be used for access to the southern staging area.

2.3.7 Context Sensitive and Sustainable Solutions

Context Sensitive and Sustainable Solutions (CS^3) is the project delivery approach used by ODOT for the OTIA III bridge program. CS^3 grew out of the principles of "context sensitive solutions," which the Federal Highway Administration defines as "an interdisciplinary approach that involves all stakeholders to develop transportation solutions that:

- Fit the physical setting.
- Preserve or enhance scenic, aesthetic, historic, environmental resources, and community values.
- Maintain safety and mobility.

Community participation is a critical element of developing context sensitive solutions.

Sustainable design essentially means taking a long-term view. It is defined as using, developing, and protecting resources at a rate and in a manner that allows people to meet their needs today, while ensuring that future generations can meet their own needs (OBDP, 2007b). Sustainability also includes reuse and recycling of materials from the removal of the decommissioned and detour bridges.

ODOT took these innovative concepts a step further, and has become the first department of transportation in the nation to merge them into the Context Sensitive and Sustainable Solutions approach and apply this process to a large transportation program – the OTIA III program. The CS^3 process is designed to meet traditional ODOT goals of maintaining safety and mobility while reflecting community values, supporting economic prosperity, achieving responsible stewardship of the natural environment and facilitating cost-effective solutions.

In practice, CS^3 is a way of delivering projects that consider the community values, economic development potential, long-term sustainability, environmental impacts, and other key factors in decision-making and design. ODOT will continue to employ specific CS^3 procedures throughout the environmental, design, and construction processes for the I-5 Willamette River Bridge Project.

2.4 Required Permits and Planning Actions

Table 2 presents the likely permits and planning actions that would be required for the I-5 Willamette River Bridge Project. Because the project is part of the OTIA III program, the project is covered under the programmatic environmental permits that have been established for the program. Key to coverage under the programmatic permits is meeting the OTIA III Environmental Performance Standards (EPS). These performance standards define the level of effect that a project may have on the environment, thereby limiting or avoiding impacts to the environment through the use of proper planning, design, and construction activities. To meet the performance standards, projects must meet the terms and conditions specified in the relevant performance standards unless approved by ODOT and Oregon Bridge Delivery Partners (OBDP), the organization managing the implementation of the OTIA III program.

Performance standards are goal-oriented, and offer flexibility in implementing context-sensitive environmental protection measures. Rather than prescribe how an activity must be done, performance standards set the thresholds for an activity's effects, leaving room for flexibility and creativity in how the standards are met.

Table 2: Permits and Planning Actions

Permit/Planning Action	Issuing Agency
Amendments to Metro Plan, Willakenzie Area Plan, and exceptions to Statewide Planning Goals 5 and 15	Cities of Eugene and Springfield; Lane County
Local development permits	Cities of Eugene and Springfield
National Pollutant Discharge Elimination System 1200 C or 1200-CA	Oregon Department of Environmental Quality
Clean Water Act Section 404 Permit	U.S. Army Corps of Engineers
Fill and Removal Permit	Oregon Department of State Lands
Clean Water Act Section 401 Water Quality Certification	Oregon Department of Environmental Quality
National Historic Preservation Act Section 106 Consultation	Oregon State Historic Preservation Office
Endangered Species Act	National Marine Fisheries Service; US Fish and Wildlife Service