

RIVER NAVIGATION

Methods and Data Report

December 13, 2006





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1. River Navigation

1.1 Purpose

This Methods and Data Report describes the assessment method that will be used to identify and evaluate Columbia River Crossing (CRC) project alternatives on river navigation as they are evaluated in support of the Draft Environmental Impact Statement for the Columbia River Crossing project.

Vessels that currently travel this portion of the Columbia River pass three bridges. The two Interstate Bridges (northbound and southbound carrying I-5 traffic) each accommodate vessel traffic through three channels: vertical lift spans (primary channel), the bridge's "wide" spans (barge channel), and the "high" spans directly to the south (alternate barge channel).

The third bridge – the Burlington Northern Santa Fe Railroad (BNSF) Bridge – is located approximately one mile downstream from the Interstate Bridges. It accommodates vessels in excess of a height of 35 feet through a movable swing span. The swing span is aligned with the Interstate Bridges lift span.

The most direct vessel route through this river section is through the Interstate Bridges lift spans and the BNSF bridge swing span. This route is relatively straight and is preferred during times of high velocity river flow. It is, however, subject to lift span restriction¹ time periods, which can cause vessel travel delays.

As vertical clearance allows, vessel operators can avoid delays caused by the lift span restriction periods and opt to travel through the Interstate Bridges' wide or high spans. This path dictates a more complex maneuver than the route through the lift spans, requiring the vessel to navigate an "S" curve path between the Interstate Bridges and the BNSF bridge in order to pass through the BNSF swing span.

The river navigation issues to be considered include:

- Whether the vertical and horizontal clearances of a new bridge meet the needs of the vessel pilots.
- Whether the pier locations of a new bridge are conducive to safe river navigation.
- For supplemental bridge alternatives, whether seismic retrofitting of the existing bridges piers impact navigation.

¹ 33CFR117, "Drawbridge Operations Regulations."

1.2 Analysis Area

In general, the analysis area is limited to the primary Area of Potential Impact (API) which, for navigation, is the Columbia River section, bank to bank and between the BNSF bridge and the Interstate Bridges. As appropriate, the Project Team could expand or modify this area for situations where the impact to navigation extends beyond the primary API.

1.3 Relevant Laws and Regulations

The US Coast Guard (USCG) is responsible for approval of the location and plans of bridges and causeways constructed across navigable waters of the United States. They are also responsible for the regulation of drawbridge operations to balance both land and marine transportation needs.

Part of the USCG mission is to:

“Facilitate maritime commerce and eliminate interruptions and impediments to the efficient and economical movement of goods and people, while maximizing recreational access to and enjoyment of the water.”²

The USCG³ is the permitting authority for all new bridge crossings.

Appropriate federal laws will be examined as they relate to river navigation.

1.3.1 Federal Statutes

- 33 USC 21 et seq, “Waters Declared Non-Navigable: change of Name,” US Code.

Description: Waters listed in this sub-chapter are declared to be non-navigable waters of the United States and are exempt from the General Bridge Act of 1946. The Columbia River is not listed and therefore is subject to the General Bridge Act of 1946.

- Chapter 9 - Protection of navigable waters and of harbor and river improvements.

The Rivers and Harbors Act of 1890 (superseded) and 1899 is addressed by [33 USC 401, et seq].

- 33 USC 401, “Construction of bridges, causeways, dams or dikes generally; exemptions,” US Code.

Description: Construction of a bridge over a navigable river requires the submittal to, and approval of, the Secretary of Transportation.

- 33 USC 494, “Obstruction of navigation; alterations and removals; lights and signals; draws,” US Code.

² US Coast Guard Mission Statement: <http://www.uscg.mil/hq/g-cp/comrel/factfile/index.htm>

³ 13th Coast Guard District, Aids to Navigation and Waterway Management Branch, Seattle, WA.

Description: No bridge, erected or maintained can unreasonably obstruct the free navigation.

- 33 USC 502A, “Alteration, removal, or repair of bridge or accessory obstructions to navigation,” US Code.

Description: Secretary of Transportation can order a bridge owner to modify any unreasonable obstruction to free navigation.

- 33 USC 502B, “Alteration, removal, or repair of bridge or accessory obstructions to navigation,” US Code.

Description: No owner or operator of any bridge, drawbridge, or causeway shall endanger, unreasonably obstruct, or make hazardous the free navigation of any navigable water of the United States by reason of the failure to keep the bridge, drawbridge, or causeway and any accessory works in proper repair.

- 33 USC 525, “Construction and Operation of Bridges,” US Code.

Description: The General Bridge Act of 1946, as amended (60 Stat. 847; 33 U.S.C. 525 et seq), states that the location and plans for bridges shall be approved by the Secretary of Transportation before construction. The Secretary may impose any specific conditions relating to the maintenance and operation of the structure which the Secretary may deem necessary in the interest of public navigation.

1.3.2 Federal Regulations

- 33 CFR 114, “General,” and 33 CFR 115, “Bridge Locations and Clearances; Administrative Procedures,” Code of Federal Regulations.

Description: Rules and regulations governing the USCG bridge permit program are listed in Parts 114 and 115.

- 33 CFR 116, “Alteration of Unreasonably Obstructive Bridges,” Code of Federal Regulations.

Description: This section describes the process taken to alter obstructive bridges. It also includes the application process for funding under the Truman-Hobbs Act.

- 33 CFR 117, “Drawbridge Operation Regulations,” Code of Federal Regulations.

Description: [33 CFR 117.869] Columbia River.

(a) The draws of the Interstate 5 Bridges, mile 106.5, between Portland, OR, and Vancouver, WA, shall open on signal except that the draws need not be opened for the passage of vessels from 6:30 a.m. to 9 a.m. and from 2:30 p.m. to 6 p.m. Monday through Friday except federal holidays.

- 33 CFR 118.140, “Painting bridge piers,” Code of Federal Regulations.

Description: The District Commander may require painting the sides of bridge channel piers below the superstructure facing traffic white or yellow when they are significantly darkened by weathering or other causes so as to be poorly visible against a dark background.

- 33 CFR 118.160, “Vertical clearance gauges,” Code of Federal Regulations.

Description:

(a) When necessary for reasons of safety of navigation, the District Commander may require or authorize the installation of clearance gauges.

(b) Clearance gauges must indicate the vertical distance between “low steel” of the bridge channel span and the level of the water, measured to the bottom of the foot marks, read from top to bottom. Each gauge must be installed on the end of the right channel pier or pier protection structure facing approaching vessels and extend to a reasonable height above high water so as to be meaningful to the viewer. Other or additional locations may be prescribed by the District Commander if particular conditions or circumstances warrant.

1.4 Data Sources and Data Collection Methods

1.4.1 General Methods

An assessment of the impacts to river navigation for each Alternative will be performed using the river navigation data collected. This includes supplemental crossing alternatives and the impact of river navigation through the additional bridge.

This assessment includes an evaluation of the location of new bridge piers and whether they maintain or enhance the navigation and safety levels for vessels. It also includes an evaluation of the impact that the new pier locations have on the “S” curve maneuver, between the Interstate Bridges and the BNSF bridge.

Additionally, there will be an evaluation on the new bridge’s vertical clearances and any possible impact to vessels.

To aid in the assessment, each river crossing alternative (bridge) will be developed using MicroStation (a computer-aided drafting [CAD] software program) and presented on a Plan and Elevation plot. The Plan view will be overlaid on a color ortho-rectified aerial photograph showing existing pertinent features such as highways, existing bridges, and the proposed bridge plan. The corresponding Elevation view will show features such as the proposed roadway profile, and vertical and horizontal navigation clearances and pier locations.

1.4.2 Physical Data

1.4.2.1 Vertical clearance

A list of vessels traveling this river section was assembled, analyzed, and summarized in the Boat Survey Technical Memorandum.⁴ This study provides valuable information on the type of vessels traveling this river section and their clearance requirements and was used as a basis for determining vertical clearances for new bridge proposals. The data in this Technical Memorandum were verified in 2006 through a series of agency led discussions with vessel operators.

The primary sources of data that will be used for the assessment of each proposed bridge includes vertical clearance data gathered from the Boat Survey and Boat Survey validation meetings and telephone calls conducted by the agencies with key stakeholders, such as vessel operators and the US Coast Guard.

1.4.2.2 Navigation Path

There are many factors that must be evaluated in determining the “S” curve path that a vessel pilot will take between the Interstate Bridges and the BNSF bridge. Some of these factors include the gross weight and dimensions of his vessel, river water elevation, and river velocity. As such, there isn’t an exact path that vessel pilots use to traverse the “S” curve and they must rely primarily on their experience.

“As-Built” drawings of the Interstate Bridges were furnished by the agencies and will be used to accurately locate the new bridge piers in relation to the existing bridge piers for those new river crossing options that would retain any of the existing I-5 Bridges.

The evaluation of the impact of new bridge pier locations on river navigation will, to a large part, depend on the anecdotal input provided by vessel pilots.

1.4.2.3 US Coast Guard

As previously mentioned, the US Coast Guard is the permitting agency, and they have stated that piers for all adjacent new structures must align with the piers on the existing I-5 Columbia River and Oregon Slough bridges.⁵

Their review comments will provide key input and aid in the evaluation of a proposed bridge’s effect on river navigation.

1.5 Significance Thresholds

Significance thresholds that will be used to evaluate a proposed bridge’s impact on river navigation include:

⁴ Parsons Brinckerhoff, Inc., “I-5 Columbia River Crossing Partnership: Conceptual Engineering & Environmental Analysis, Boat Survey,” Technical Memorandum No. B.3.4, Portland, OR (December 2004), pp 1-10.

⁵ BRW Inc., “I-5 Trade Corridor Project, Design Criteria, Data Collection,” June 2001.

- Providing bridge vertical clearances that adversely impact a substantial vessel population.
- Providing bridge vertical clearances that require a movable span that would increase navigational restriction periods through the movable span.
- Providing proposed bridge pier locations that would have severe adverse impacts on the size of the vessel that can traverse between existing and new pier locations.
- Providing proposed bridge pier locations that would have severe, adverse impacts to the route that vessel pilots must take to traverse this river section.
- Providing proposed bridge types that would have severe adverse impacts on river navigation during construction.

1.6 Long-Term Operational Impacts Approach

1.6.1 Benefits to Navigation

Increasing the existing vertical clearance with a new bridge will increase navigational safety through this river section by making the vessel pilot's decision on which path to traverse less dependent on the river elevation at the time.

Additionally, increased vertical clearance could increase vessel operational periods by reducing the necessity for lift span operation and the navigational constraint of lift span restriction periods.

For a new bridge that replaces the existing Interstate Bridges, lengthening the spans and increasing the existing horizontal clearance would increase navigational safety by reducing the number of piers in the river.

1.6.2 Adverse Impacts to Navigation

For a new bridge that supplements one or both of the existing Interstate Bridges, piers placed within the "S" curve maneuver could adversely impact the navigational safety through this river section.

1.7 Short-Term Construction Impacts Approach

The River Crossing components contain a full range of options, including components that retain one or both of the existing Interstate Bridges as well as components that replace the Interstate Bridges.

The amount of impact to river navigation that will be allowed during construction has been identified as a Significant Threshold in Section 1.5 above. Potential construction means and methods will be evaluated for each proposed bridge. The benefits or adverse impacts to river navigation due to construction will be noted for each proposed bridge.

1.8 Cumulative and Indirect Impacts Analysis Approach

The approach to cumulative impacts analysis is described in a separate Methods and Data Report.

The project has no reasonable potential to indirectly impact navigation, and therefore the project does not intend to conduct any specific indirect impact.

1.9 Mitigation Measures Approach

The horizontal alignment and the conceptual pier locations for each River Crossing option will be compared to the No-Build Alternative to determine whether any mitigation measures could be required.

Impact areas that will be examined for each River Crossing Alternative include:

- Vertical and horizontal clearance envelopes.
- Typical navigation paths for vessels.

Some examples of potential mitigation measures to reduce the navigational impact of a River Crossing Alternative include making adjustments to the proposed clearance envelopes, adjusting the conceptual pier locations, or modifying the conceptual construction sequencing.

If mitigation measures for a River Crossing Alternative do not reduce the impact to navigation to acceptable levels, then decision-makers must factor this into their decision on whether or not to advance this alternative, weighing its other benefits against the impact to navigation.

1.10 Appendix

Not applicable.