
3.2 Aviation and Navigation

Two goals of the CRC project are to minimize hazards to Columbia River navigation and to minimize hazards to air navigation from Pearson Field. The LPA would improve safety for river navigation as well as aviation. However, these two goals partially conflict: recommended clear heights for river navigation intrude on recommended clear airspace for Pearson Field. Some obstruction of both river and air traffic is inevitable, but the LPA has been selected and refined to balance these two interests and provide overall improvements to both.

This section examines the beneficial and adverse effects of the various project alternatives on aviation and river navigation. There are no effects to aviation or navigation resulting from the expansion of the Ruby Junction Maintenance Facility, the modifications to the Steel Bridge, or the use of the casting and staging areas. A comparison of impacts from the LPA and the DEIS alternatives is summarized in Exhibit 3.2-6. A more detailed description of the impacts of the DEIS alternatives on aviation and navigation is in the DEIS starting on page 3-87.

The Federally Navigable Waterways designation of the Columbia River and North Portland Harbor signifies that all construction or alteration of bridges crossing these waterways must first be approved by the U.S. Coast Guard (USCG). The USCG is also responsible for the regulation of drawbridge operations to balance both land and marine transportation needs. The USCG is the permitting authority for all new bridge crossings. Agreements between the USCG and the Federal Highway Administration (FHWA) require that the potential effects of bridge projects on navigable waterways be evaluated through the National Environmental Policy Act (NEPA) process.

Long-term effects to aviation were evaluated using a combination of federal regulations and Federal Aviation Administration (FAA) procedures. To evaluate all obstructions that may be hazardous to aviation, the project relied primarily on Federal Aviation Regulation (FAR) 14 Code of Federal Regulations (CFR) Part 77 surfaces. The project also has worked to evaluate aviation safety through an assessment of Terminal Instrument Procedures (TERPS) Obstacle Clearance Surfaces and One Engine Operative Obstacle Identification Surfaces. Other criteria used for evaluation of effects to aviation included dust or emissions that may limit visibility, electronic interference to communication and navigation systems, lights or glare that may affect visibility, and fostering of wildlife that may increase the probability of aircraft strikes.

The information presented in this section is based on analyses found in the CRC Aviation Technical Report and CRC Navigation Technical Report; these technical reports are included as electronic appendices to this FEIS.

3.2.1 New Information Developed Since the Draft EIS

The FEIS includes refinements in design, impacts and mitigation measures. Where new information or design changes could potentially create new significant environmental impacts not previously evaluated in the DEIS, or could be meaningful to the decision-making process, this information and these changes were applied to all alternatives, as appropriate. However, most of the new information did not warrant updating analysis of the non-preferred alternatives because it would not meaningfully change the impacts, would not result in new significant impacts, and would not change other factors that led to the choice of the LPA. Therefore, most of the refinements were applied only to the LPA. As allowed under Section 6002 of SAFETEA-LU [23 USC 139(f)(4)(D)], to facilitate development of mitigation measures and compliance with other environmental laws, the project has developed the LPA to a higher level of detail than the other alternatives. This detail has allowed the project to develop more specific mitigation measures and to facilitate compliance with other environmental laws and regulations, such as Section 4(f) of the DOT Act, Section 106 of the National Historic Preservation Act, Section 7 of the Endangered Species Act, and Section 404 of the Clean Water Act. FTA and FHWA prepared NEPA re-evaluations and a documented categorical exclusion (DCE) to analyze changes in the project and project impacts that have occurred since the DEIS. Both agencies concluded from these evaluations that these changes and new information would not result in any new significant environmental impacts that were not previously considered in the DEIS. These changes in impacts are described in the re-evaluations and DCE included in Appendix O of this FEIS. Relevant refinements in information, design, impacts and mitigation are described in the following text.

3.2.2 Existing Conditions

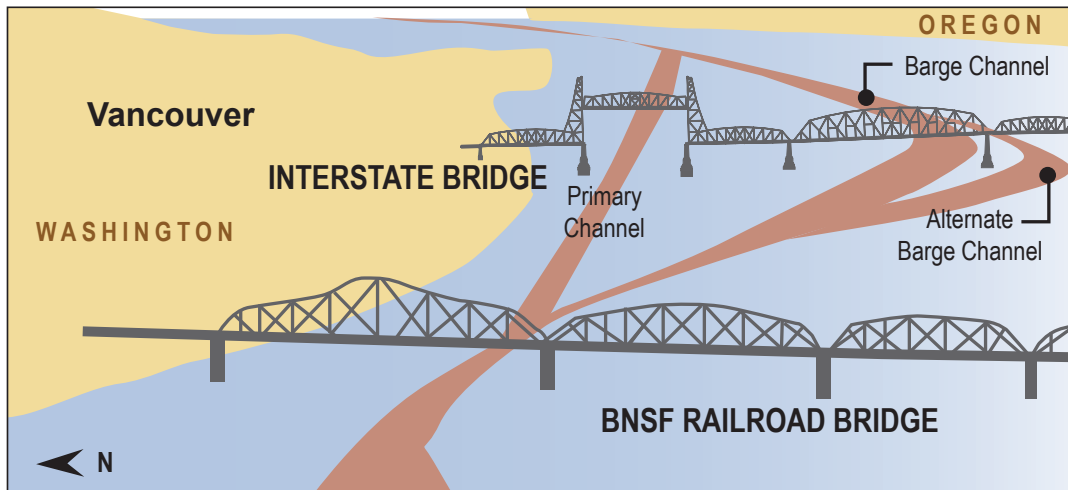
Existing River Navigation Safety

The I-5 bridges cross both the main channel of the Columbia River and a channel on the south side of Hayden Island known as North Portland Harbor. Because both channels are designated as Federal Navigable Waterways, the USCG must approve construction or alteration of bridges that cross either of them. Currently, navigation is limited for both waterways by the I-5 crossing and by a Burlington Northern Santa Fee (BNSF) railroad bridge located about 1 mile downstream from (to the west of) the I-5 crossing (Exhibit 3.2-1).

Near the CRC project area, on the south side of Hayden Island, North Portland Harbor supports marinas of floating homes and primarily non-commercial boats. West of the I-5 crossing and the BNSF railroad bridge, large ocean-going cargo ships use North Portland Harbor to reach Port of Portland Terminal 6. These ships operate only downstream of the I-5 crossing. The navigation channel beneath the existing North Portland Harbor Bridge has a width of 215 feet and a clearance height under the existing bridges of 35 to 40 feet, which limits the use of the channel to primarily recreational boats and smaller vessels.

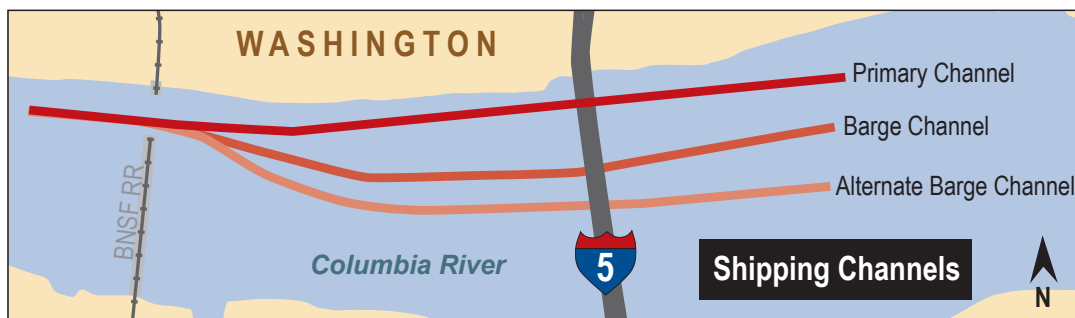
In the main Columbia River channel, large vessels must pass the railroad bridge at its opening span near the Washington shore (shown open in Exhibits 3.2-1 and 3.2-2). The lift spans of the I-5 crossing are also located

Exhibit 3.2-1

I-5 and BNSF Railroad Bridges

Not to scale.

Exhibit 3.2-2

Shipping Channels Under the I-5 and BNSF Railroad Bridges

Drawing not to scale.

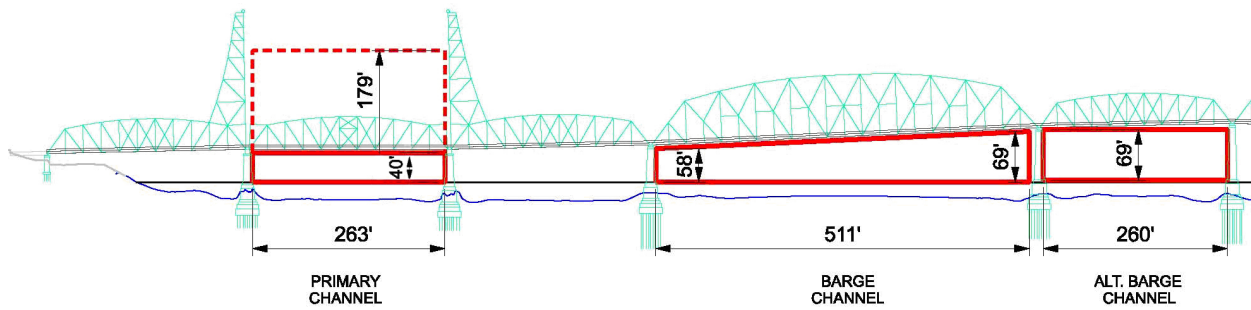
in the primary channel, near the Washington shore. During hours of lift span operation, vessels can pass the two bridges without navigating a complex route.

However, during restricted hours (weekdays, between 6:30 and 9:00 a.m. and between 2:30 and 6:00 p.m.), many vessels use one of the alternate channels under the I-5 crossing rather than waiting to pass during unrestricted hours when the lift span is allowed to operate. This results in more complex navigation for vessels, which must make a relatively sharp S-curve maneuver in a short stretch of river and use channels that have lower height clearance than the primary channel. These alternate routes present potential safety hazards for marine traffic.

Exhibit 3.2-3 illustrates the navigation constraints posed by the existing I-5 crossing. The primary channel lies between piers set 263 feet apart, and has a vertical clearance of 40 feet when the lift spans are down. When fully raised, the vertical clearance is 179 feet. The barge channel lies under the wide spans of the bridge, and has a horizontal clearance of 511 feet and a vertical clearance ranging from 58 to 69 feet. The alternate barge channel occupies the span directly to the south of the wide span, and has a horizontal clearance of 260 feet and a vertical clearance of 69 feet.

Exhibit 3.2-3

Existing I-5 Columbia River Crossing Navigation Clearances



Source: CRC Navigation Technical Report 2008. Drawing not to scale.

With the exception of some specialized vessels that use the river infrequently, the majority of vessels require vertical clearances of less than 90 feet from the surface of the water to the bottom of the bridge deck (Exhibit 3.2-4). The project team, in consultation with the USCG and industry representatives, established a vertical minimum of 95 feet clearance for the new bridge, so that the new structure could be built without a lift span. Higher vertical clearances beneath the bridge would require raising the bridge structure further into restricted airspace for flight navigation above the bridge.

Exhibit 3.2-4

Summary of Vertical Clearance Requirements and Frequency of Use

Vessel Type	Vertical Clearance Requirement	Approximate Annual Frequency
Tugs and Tows	49 feet to 58 feet	> 500 trips
Sailboats/Recreation	76 feet to 88 feet	24 trips
Marine Contractors	100 feet to 110 feet	Infrequent
Marine Industrial	65 feet	6 trips
Cruise/Passenger	50 feet to 60 feet	25 trips

Source: Parsons Brinckerhoff 2004.

The USCG, which would approve construction or alteration of the bridges, has stated that navigation conditions cannot be made worse than existing conditions if the CRC project designs are to receive permitting. They have requested at least a 300-foot navigation clearance between bridge piers, which would require bridge spans greater than 400 feet. The LPA design includes spans of 465 feet.

The North Portland Harbor does not include a designated shipping channel, and is largely travelled by recreational boaters and those accessing the water-oriented uses along the Harbor.

Existing Aviation Safety

Two airports are located near the CRC project area. Portland International Airport (PDX) is located about 3 miles southeast of the project on the Oregon side of the Columbia River. It is the major regional airport and serves large commercial passenger and freight service, private aircraft, and the Air National Guard. Planned expansions include both potential runway extensions and the addition of a new runway.

Pearson Field is located directly east of the project on the Washington side of the Columbia River. It serves primarily small piston-engine aircraft weighing 10,000 pounds or less. Because it is surrounded by developed urban uses and the Vancouver National Historic Reserve (VNHR), there are no plans to expand facilities or operations at this airfield.

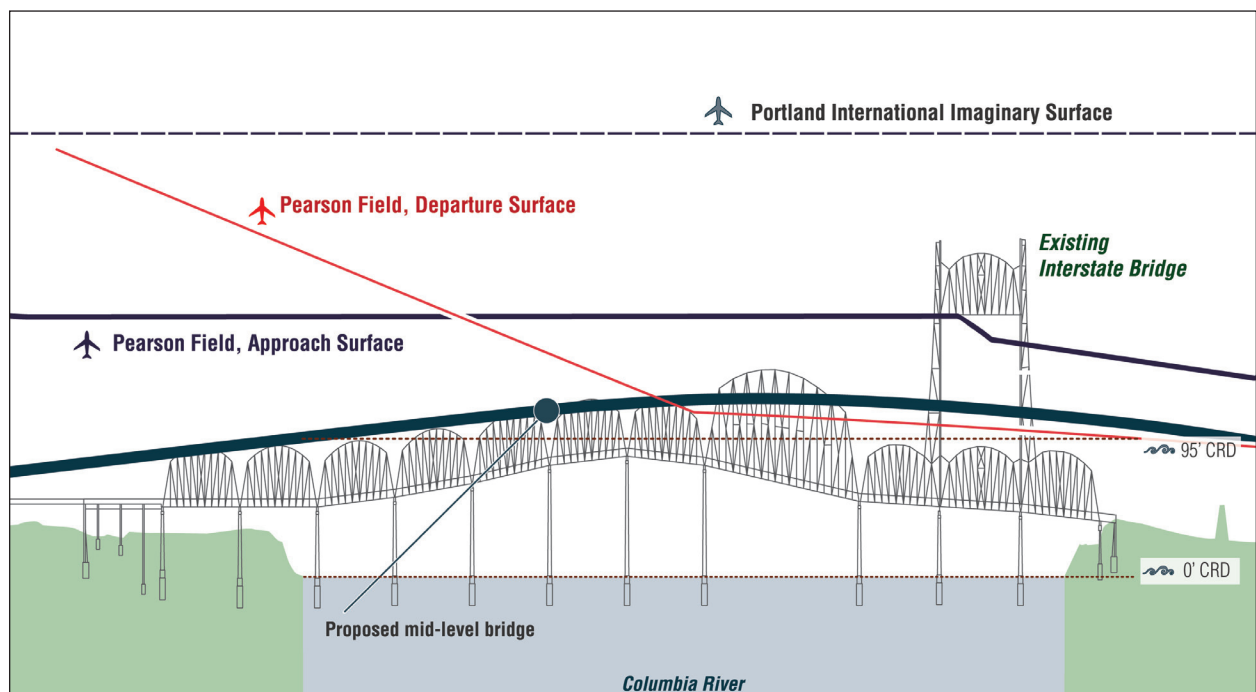
The lift towers of the existing bridge currently intrude 98 vertical feet into protected airspace for Pearson Field and are an aviation hazard. To avoid the towers, aircraft must use special departure and arrival procedures. Exhibit 3.2-5 shows the design constraints posed by both PDX imaginary surface and Pearson Field approach and departure clearance surfaces.

If the lift towers were removed, Pearson aviation safety would be improved and the departure and arrival procedures may be relaxed.

An important goal of the CRC project is to minimize effects of any new or modified crossing to both river navigation and air traffic from Pearson Field.

Exhibit 3.2-5

Pearson Field and Portland International Airport Aviation Constraints



Note: CRD = Columbia River Datum; see glossary.
Not to scale.

3.2.3 Long-term Effects

This section summarizes the impacts on navigation and aviation associated with the project alternatives.

Because it would not include a lift span, the LPA would reduce the maximum available vertical clearance under the bridge from 179 feet to 95 feet. The CRC project team collected information on vessels traveling this river section to assess the vertical and horizontal clearance needs of river users (PB 2004). Results were discussed and verified with vessel operators and the USCG. As shown in Exhibit 3.2-4, only marine contractors, which travel this portion of the river infrequently, may have vertical height requirements greater than the available clearance.

Limitations to marine contractors would be offset by substantially improved navigational safety and elimination of river traffic delays. Tall loads would need to partially disassemble for those infrequent trips upriver of the LPA.

With the No-Build Alternative the current lift span towers would continue to represent an aviation hazard for Pearson Field. The lift span restrictions would continue to cause delays to river traffic, while the continuing need to navigate around the lift spans and the relatively narrow width between existing bridge piers would continue to represent potential hazards to navigation. In addition, without the seismic upgrades included in the build alternatives, a major earthquake could collapse or seriously damage one or both of the bridges, creating an adverse impact to navigation.

Exhibit 3.2-6 compares the impacts of the LPA to the DEIS alternatives and No-Build Alternative. The values presented for the other alternatives are relative to the LPA.

Exhibit 3.2-6

Comparison of Direct Effects to Aviation and Navigation

Environmental Metric	Locally Preferred Alternative ^a		No-Build	Alt 2: Repl Crossing with BRT	Alt 3: Repl Crossing with LRT	Alt 4: Suppl Crossing with BRT	Alt 5: Suppl Crossing with LRT
	LPA Option A	LPA Option B					
River Navigation Safety and Security	Improved by eliminating S-curve maneuver and reducing number of piers.	Same as Option A	S-curve maneuver more difficult than with LPA, with more piers and narrower channels.	Same as LPA	Same as LPA	S-curve maneuver more difficult than with LPA or No-Build, with more piers and narrower channels.	S-curve maneuver more difficult than with LPA or No-Build, with more piers and narrower channels.
Aviation Safety and Security	Less intrusion into Pearson Field airspace.	Same as Option A	Existing lift span towers would remain a hazard to aviation at Pearson Field.	Same as LPA	Same as LPA	Existing lift spans would remain a hazard to aviation at Pearson Field.	Existing lift spans would remain a hazard to aviation at Pearson Field.

Note: The impacts for the LPA are relative to No-Build and existing conditions.

a The LPA with highway phasing performs the same as the LPA Full Build.

The LPA would improve both navigation and aviation safety and efficiency. The new crossing would require fewer piers, creating less of an obstacle to river navigation than either the No-Build Alternative or a supplemental crossing. Taller vessels would not be restricted by the hours of lift span operation. In addition, the new primary channel under the I-5 crossing would have a better alignment with the channel through the BNSF railroad bridge, and this would improve navigation even though the two crossings would be slightly closer together. With the LPA, the available clearance of the primary channel would be a minimum of 95 feet above 0 on the Columbia River Datum (CRD), over a 300-foot width.

The impacts to the shipping channel with Alternatives 4 and 5 would be substantially different. For Alternatives 4 and 5, because of seismic retrofits required to the piers of the existing bridges, the available clearance of the primary channel would be reduced to 200 feet. Based on discussions with the USCG, the permitting agency, all new piers would be aligned with the piers on the existing I-5 bridges.

The new bridge designs will not include lift towers. The bridges would be located slightly farther from the airfield, and so would intrude less into Pearson Field airspace.

The new LPA structures over the North Portland Harbor would not reduce navigation clearance from current conditions, and will not affect aviation.

The expansion of the TriMet Ruby Junction Maintenance Facility and slight modification of the light rail guideway on the Steel Bridge would not affect navigation or aviation.

3.2.4 Temporary Effects

On-site Construction

RIVER NAVIGATION EFFECTS

Construction activities would result in temporary effects to river navigation. Construction would be staged so that at least one navigation channel would be open at most times. However, there could be some temporary restrictions due to blockages from barges and cranes used to construct piers and lift bridge segments into place. Most vessels that currently use the navigation channel would be able to continue to use the channel throughout most of the construction period.

During construction of the LPA, some of the new bridge piers, outside of the navigation channel, would not line up with the existing bridge piers. While the new crossing is under construction and the existing crossing is still operational, this would result in more obstacles in the river and more difficulty in navigation. Also during construction, the project will establish navigational haul routes, on the river, for the movement of construction materials and equipment.

AVIATION EFFECTS

Tall cranes used during construction may be a hazard to aviation. Equipment used to remove the existing lift span towers would likely be the tallest construction equipment and therefore the most likely to present a hazard to aviation. Cranes used to remove the existing lift towers would need to be taller than the existing structures, and would temporarily affect Pearson Field airspace more than under existing conditions. Construction activities are not anticipated to affect PDX. The Federal Aviation Administration (FAA) would review construction plans to determine potential effects.

Construction dust or emissions from construction equipment could pose a short-term hazard to aviation by reducing visibility. Dust could result when wind disturbs uncovered fill or open excavations. Trucks and equipment traveling on unimproved construction roads could also stir up dust, impairing visibility.

Off-site Construction

Activities at the staging and casting yards would not affect aviation or river navigation.

3.2.5 Mitigation or Compensation

Long-term Mitigation

The FAA has established a 5,000-foot zone around runways where features attractive to birds, such as open water ponds, should not be created. For Pearson Field, this zone extends across the CRC area. Stormwater ponds constructed by the project in this area would include features to discourage birds from utilizing the ponds. To improve safety at Pearson Field, structures

in this zone would be designed to minimize locations for birds to roost, nest, or feed.

The LPA would include obstruction marking and lighting to make the river crossing structures and any construction equipment visible to aircraft. Roadway or accent lighting on the bridge and surrounding interchanges would be designed to limit light or glare that could affect air navigation.

Short-term Mitigation

Construction staging would be planned to minimize adverse effects to river navigation. In-water work would likely occupy only part of the river at any given time, maintaining a minimum channel for navigation. Closures or restrictions on river traffic would be communicated in advance, enabling river users to accommodate their schedules without undue interruption. Additional tugs may be needed to assist vessels through areas of reduced clearances, especially during times of high water. The USCG would review construction plans to determine potential effects.

During construction, public involvement and education programs would be used to provide information to tug operators, pilots, and the general public. Additional tugs may be needed to aid in temporary navigational challenges. Construction materials and activities would be managed so as to minimize dust, glare, and smoke.

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