Bridge Review Panel Presentation Columbia River Crossing Project

Report Overview
February 18, 2011

Bridge Review Panel Members

- Thomas R. Warne, PE, Chairman; Tom Warne & Associates
- Scott Ashford, PE, PhD; Oregon State University
- Benjamin Beerman, PE ; FHWA
- John Buchheit, PE, DBIA; FTA(PMOC)
- David Goodyear, PE, Chief Bridge Engineer; T.Y.Lin
- Siegfried Hopf, Chief Bridge Engineer; Leonhardt, Andra & Partners

Bridge Review Panel Members

- Bruce Johnson, PE; ODOT
- Jugesh Kapur, PE; WSDOT
- Wesley King, High Capacity Transit Project Mgr; C-TRAN
- Calvin Lee, PE; TriMet
- John McAvoy, Major Project Mgr; FHWA
- Mary Lou Ralls, PE; Ralls Newman, LLC

Bridge Review Panel Members

- Joe Showers, PE, Business Group Technical Mgr; CH2M Hill
- Steve Stroh, PE, Deputy Director of Surface Transportation, Major Bridges; URS
- Steve Thoman, PE, Principle Bridge Engineer; Independent Consultant
- Theodore Zoli, PE; HNTB

Panel Objectives

- Given the constraints imposed on the project evaluate possible bridge types that would meet these constraints
- If the constraints are modified, are there other bridge types that should be considered
- Given the outcomes of 1 and 2 evaluate cost, risk, constructability, and aesthetics for potential bridge types

Bridge Review Panel Process

- November 3-4, 2010
  - Orientation and workshop
  - Review of bridge types and other technical analysis
- December 15-16, 2010
  - Summarize work to date and possible bridge types
  - Perform the alternatives analysis on the agreed upon bridge types
- January 18-19, 2011
  - Constructability review
  - Risk review
- Final report-Delivered on February 3, 2011

Four Criteria to Achieve

- Technically Sound – Constructible
- Meets Environmental Commitments
- Cost Effective
- Achieves Aesthetic Goals

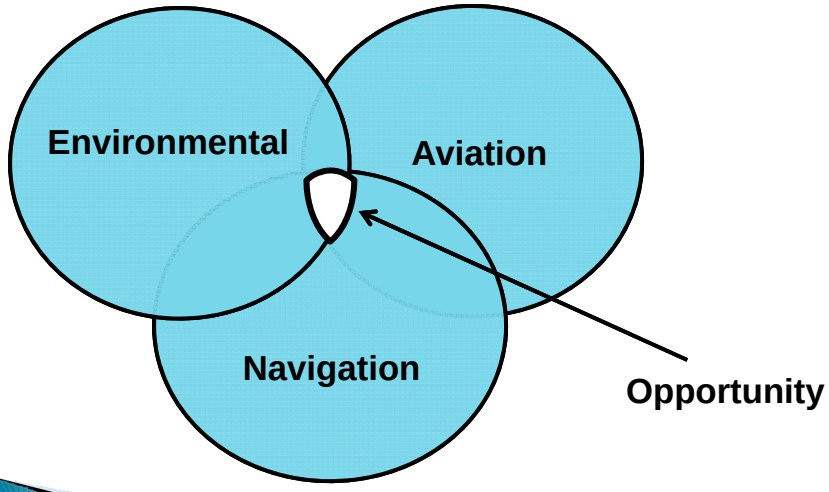
Constraints

- Air space
- Navigational Clearance
- Navigation Channel Location
- Minimized Footprint for Funding and Environmental
- Horizontal Alignment
- Staged Construction

Constraints, cont'd

- Vancouver Historic Preserve, including Appletree Park
- More in Water Impact
- Large Increase in Shadow Impact
- BNSF Railroad on North Side
- Traffic in Closed Box
- LRT

Cumulative Impact of Constraints



Other Challenges

- Operational Reliability
- Seismic Vulnerability
- Getting Buy-In From Political and Citizen Groups if changes are recommended to the Current Design Concept
- Maintenance and Inspection Challenges with the Currently Proposed Bridge Type
- Cost Uncertainty with Current Bridge Type

Marine Drive and Hayden Island

Crossing in Plan View

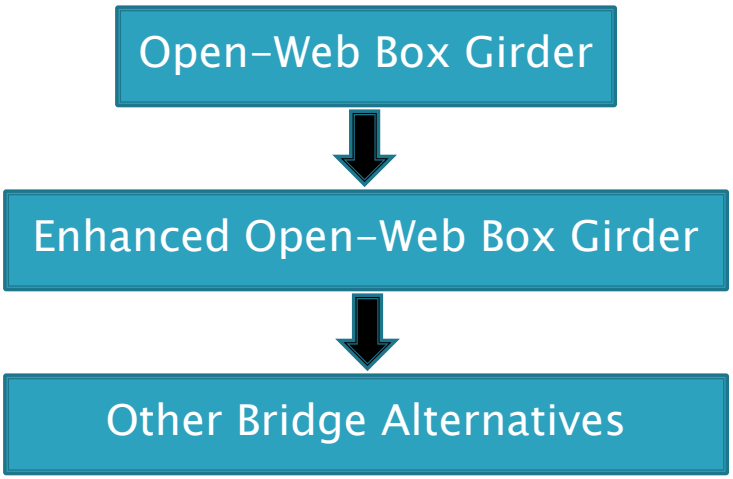
Current Project Cost Estimate*

- Total Estimated Cost: $3.2-3.55 billion
- Cost of LRT**: $830-920 million
- Cost of the bridge: $740-820 million
- Cost of roadway and interchanges: $1.63-1.81 billion

*Costs are for the 60% and 90% CEVP range

**Costs for LRT elements including track, electrification, stations, etc.

Review Process



Open-Web Box Girder

- Independent analysis performed to assess technical viability
- Explored options for resolving technical issues-unsatisfactory results
- BRP developed the enhanced open-web as an alternative-it was still unsatisfactory
- Led to the development of the composite deck truss

Open-Web Box Girder

- BRP recommends to discontinue further design on the Open-Web Box Girder because:
  - Of unresolved technical issues
  - Considerable risks associated with the design, construction and long-term performance
  - Too costly with potential for substantial cost overruns

Composite Deck Truss

Composite Deck Truss

Composite Deck Truss

Cable-Stayed Bridge

Cable-Stayed Bridge

Cable-Stayed Bridge

Tied-Arch Bridge

Tied-Arch Bridge

Tied-Arch Bridge

Comparative Costs*

- Open-web box girder $440,000,000
- Tied Arch $430,000,000
- Cable-Stayed $390,000,000
- Composite Deck Truss $340,000,000

*2011 dollars, no adjustments

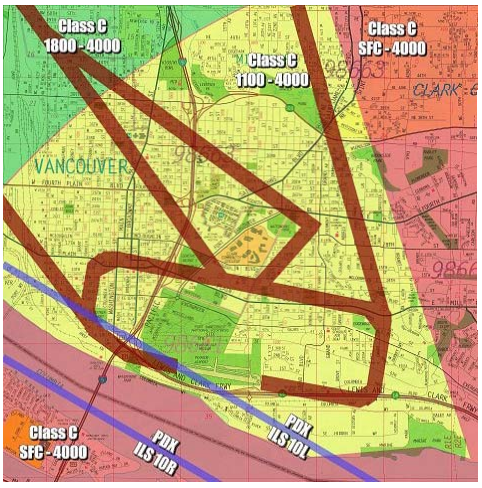
Aviation Issues

Olivia Bucks; The Oregonian, 2008; *Pilots at Pearson Field in Vancouver keep watch on new Interstate 5 bridge plans;* Nov. 11. 2010; OregonLive.com

Aviation Issues

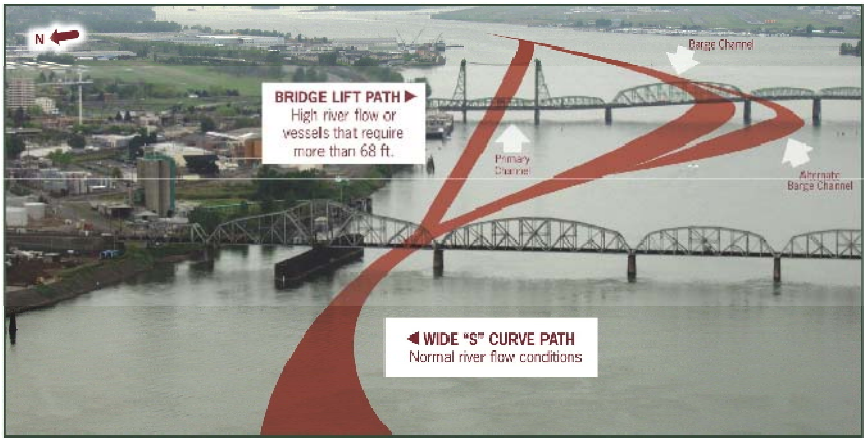
Dean Baker; Special to the Oregonian; *Pilots at Pearson Field in Vancouver keep watch on new Interstate 5 bridge plans;* Nov. 11. 2010; OregonLive.com

Aviation Issues



Aviation Issues

Navigation Issues



In Water Impacts–Piers

- Open-web box girder 12
- Cable-Stayed Bridge 3
- Tied Arch Bridge 4
- Composite Deck Truss 10

In Water Impacts–Footprint

- Open-web box girder 58,500 SF
- Cable-Stayed Bridge 52,500 SF
- Tied Arch Bridge 60,000 SF
- Composite Deck Truss 44,000 SF

Risk Rankings–Cost Growth

- Open–Web Box Girder 4
- Cable–Stayed Bridge 2
- Tied Arch Bridge 3
- Composite Deck Truss 1

Risk Rankings–Schedule (ROD)

- Open–Web Box Girder 1
- Cable–Stayed Bridge 2
- Tied Arch Bridge 2
- Composite Deck Truss 1

Risk Rankings–Schedule (Design)

- Open–Web Box Girder 4
- Cable–Stayed Bridge 2
- Tied Arch Bridge 2
- Composite Deck Truss 1

Risk Rankings–Schedule (Const.)

- Open–Web Box Girder 4
- Cable–Stayed Bridge 1
- Tied Arch Bridge 2
- Composite Deck Truss 1

Risk Rankings–Procurement

- Open–Web Box Girder 3
- Cable–Stayed Bridge 3
- Tied Arch Bridge 3
- Composite Deck Truss 1

Risk Rankings–Construction Claims

- Open–Web Box Girder 4
- Cable–Stayed Bridge 2
- Tied Arch Bridge 3
- Composite Deck Truss 1

Risk Rankings–Summary

- Open–Web Box Girder (4, 1, 4, 4, 3, 4)
- Cable–Stayed Bridge (2, 2, 2, 1, 3, 2)
- Tied Arch Bridge (3, 2, 2, 2, 3, 3)
- Composite Deck Truss (1, 1, 1, 1, 1, 1)

Marine Drive and Hayden Island

Crossing in Plan View

Recommendations

- Recommendation 1: Discontinue any further design or planning work on the open-web box girder bridge alternative.
- Recommendation 2: Select a new bridge type from among three feasible alternatives: cable-stayed, tied arch and composite deck truss.

Recommendations

- Recommendation 3: Proceed with further analysis and public review of recommended alternatives in order to select a preferred bridge type.
- Recommendation 4: Work with the Federal Aviation Administration to resolve airspace issues with Pearson Field relating to either the cable-stayed or arch bridge designs.

Recommendations

- Recommendation 5: Develop a tangent (straight) alignment for the main river crossing downstream of the existing bridges.
- Recommendation 6: Replace the North Portland Harbor Bridge.

Other Recommendations

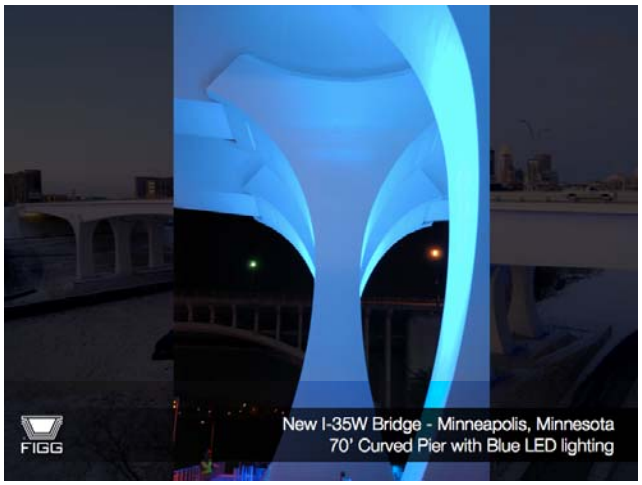
- Review interchanges and ramps throughout the corridor
- Review the schedule to avoid impacting the Record of Decision
- Address seismic design criteria for the new I-5 bridge and the North Portland Harbor Bridge
- Address other design standards for all elements of the corridor

Report Status

- Submitted on February 3, 2011
- Governors Gregoire and Kitzhaber remain strong advocates of the project
- They have accepted the report and have directed the DOTs as follows:
  - Discontinue design work on the Open-Web Box Girder
  - Conduct an expedited review of the three recommended bridge types

Report Status–Continued

- The review should consider the following and recommend a bridge type by the week of February 21:
  - Is the most affordable,
  - Maintains the project schedule,
  - Minimizes environmental impacts,
  - Honors commitments to stakeholders, and
  - Provides the least risk.


FIGG
New I-35W Bridge - Minneapolis, Minnesota
70' Curved Pier with Blue LED lighting


FIGG
New I-35W Bridge - Minneapolis, Minnesota
Open to Traffic September 18, 2008

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Report Overview
February 17, 2011