PUBLIC COMMENTS FOR IBR PROGRAM EXECUTIVE STEERING GROUP

Received between January 19, 2022 – March 16, 2022

Brad Perkins

1/19/2022

IBR Team,

I hope all is well. Please place this info on the Public Record and send to The Joint Interim Committee On The Interstate 5 Bridge, the IBR Executive Steering, Community and Equity Groups. Also send to the IBR/EIS Team and other important staff members.

Thank you,
Brad Perkins
Pres./CEO CHSR

** ADA compliant versions of the attachments can be made available upon request*

Sean Philbrook

1/20/2022

Good morning --

I will provide testimony at the ESG meeting today regarding the Clark County Transportation Alliance. Recognizing the 48-hour window for providing information to the group, I submit the attached document in hopes that it will be distributed to members after today's meeting or ahead of their next discussion.

Many thanks. Please reply with questions.

Sean Philbrook

** ADA compliant versions of the attachments can be made available upon request*

Jill Mayberg

1/21/2022

Hello,

I own a house that abuts HWY 5 on the East side […]. Do you know if I will be affected by the bridge project?

Thank you,
Jill Mayberg

Bob Ortblad

3/15/2022

ESG please forgive my persistence and proliferation of analysis. Hope to fill a void of facts on IBR bridge options.

An immersed tunnel will be safer (kill and injury fewer people), have less impact on the environment, and cost less.

Bob Ortblad MSCE, MBA

** ADA compliant versions of the attachments can be made available upon request*

January 19, 2022

Federal Highway and Transportation Administrations
Joint Interim Committee On The Interstate 5 Bridge
IBR Executive Steering, Community and Equity Groups
Interstate Bridge Replacement/EIS Team

Re: Cascadia High Speed Rail Company's Four Part Bridge Plan Alternative to the IBR Program

I am writing because Cascadia High Speed Rail (CHSR) Company's Tier 1 Environmental Impact Statement (EIS) Study and Four Part Bridge Plan needs to be put on the public record and be analyzed as a viable alternative as part of the Interstate Bridge Replacement Program. This letter will be attached to these two CHSR studies we are sending to FHWA and FTA. As you are aware, FHWA and FTA have stated that "*any changes to the existing FEIS would render it a "revised FEIS" and necessitate a new ROD (Record of Decision) to effectuate it"*. Cascadia High Speed Rail Company has recently undertaken and completed Economic Feasibility and Tier 1 EIS studies that can make a significant change to traffic on I-5 and other bridge crossings over the Columbia River. It demonstrates how the CHSR project could make an effective contribution to travel in the I-5 corridor between Seattle, Portland and Eugene by meeting all the USDOT Cost Benefit requirements and generating enough positive cash flow to excite private investment and spur progress towards forming a private public partnership.

So far, the dozens of contacts by our team, since June 14, 2021, have not been responded to in writing by any IBR/EIS Program staff or committee members. It has become clear that they do not wish to consider viable options that include a different multi-modal bridge for high speed rail, freight rail, vehicles and requires seismically upgrading the existing I-5 Bridge. (See: Four Part Bridge Plan) Our assessment determines that the Four Part Bridge Plan better meets Purpose and Need requirements. If CHSR was included as a supplemental transit mode, it would dramatically improve the matrix results for social equity and climate. The recent Tier 1 EIS study for Cascadia High Speed Rail shows that the HSR option diverts 60 percent of its traffic from auto users and will divert over 5.6 million passenger trips per year from crossing the bridge in 2030. What's truly amazing is that this intentional avoidance of CHSR Company's viable bridge alternative for both bullet trains and vehicles is occurring while Governor Inslee, Governor Brown and Premier Horgan recently signed a Memorandum of Understanding in the Cascadia region in support of high-speed rail, which needs a Columbia River Crossing.

The benefits of a Cascadia High Speed Rail transportation system are multi-faceted. It provides significant improvements to conditions related to CO2 reductions, congestion, social justice, environment, green energy, speed, efficiency and costs compared to a highway alone solution. These are the important issues that the IBR/EIS Team should consider with high-speed rail's zero crashes, zero emissions, zero congestion and significant station centered private development opportunities.

The IBR/EIS Team has clearly misunderstood the nature of the Cascadia High Speed Rail option that has been proposed. The high-speed rail corridor has never been considered by the IBR/EIS Team as a 6 minute

Cascadia Commuter Express (C-CE) option between the proprosed Portland Rose Quarter and Vancouver's Waterfront Station. Instead, high-speed rail in general has been identified as a long distance only transit mode, not knowing that the CHSR double track, electrified corridor option is designed to transport both commuters and parcel freight as well. Yet the IBR/EIS Team still only considers the 30 minute, 9 stop light rail only option for their new bridge. It is discriminatory not to consider the more effective Cascadia High Speed Rail as a supplemental transit alternative mode since it will remove many I-5 trips from the capacity requirements of the IBR. Furthermore, it will do this at a much lower cost to the public sector than other transit options because of long term private investment opportunities.

As a result, to assess the IBR Program without including such an effective public transportation solution as high-speed rail would clearly bias the analysis, by not properly reflecting some of the most important benefits that need to be assessed for a major infrastructure project that is in the same traffic impact area, located only 1.3 miles west of the existing I-5 Bridge. The IBR Executive Steering Group members voiced appreciation and support for a continued emphasis on both social equity and climate benefits that high-speed rail provides. The IBR/EIS Team needs to play by the NEPA rules that require the study and comparison of viable alternatives to major transportation projects. The new Infrastructure Investment Jobs Act demands that DOT's must seriously study private alternatives to transportation projects that cost over $750 million. Environmentalists and the public demand social equity and climate justice goals be met by major projects such as this.

This was exactly the view of Vancouver, WA Mayor, Anne McEnerny-Ogle who has stated "*We're committed to a really strong transparent reevaluation of all those items that have changed in our region since that last project."* She is *"especially looking for that relevant data that we need for high-capacity transit, not just the mode, but the alignment and station location."* This is exactly what our CHSR Tier 1 EIS study provides.

In 2002, the Portland/Vancouver I-5 Transportation and Trade Partnership proposed a Columbia River bridge crossing near where the CHSR Multi-Modal Bridge is proposed. Clearly, they determined a new four lane bridge corridor was needed to supplement the I-5 corridor. Jamming more cars onto existing congested freeways through downtown Portland simply does not make sense when the CHSR Company proposes two new corridors, one for HSR and one for vehicles between Columbia Blvd. and NW 78th Street's I-5 interchange in Vancouver. This would be a great time saving alternative for both the Portland/ Vancouver Ports and for people living and working in North Portland and West Vancouver.

In this regard, the IBR/EIS Team is acting as if an existing I-5 highway corridor alternative alone is enough to fully satisfy Purpose and Need requirements without any support from fast transit alternative corridors. However, a more balanced multi-modal solution would promote a better outcome for the region for the next 100 years. To understand this type of planning CHSR Company has provided a development plan derived from a 30,000 foot view of transportation systems in the Pacific Northwest and how they can connect with fast transit alternatives. (See: cascadiahighspeedrail.com) This long term, broad scaled approach helps meet most important climate change, equity, bottle neck and congestion concerns of the public.

It is necessary to understand that the Cascadia HSR proposal would relieve a great deal of demand on the I-5 corridor which changes the nature of the engineering solution to the existing I-5 Bridge. For example, a large capacity expansion in the I-5 corridor and major highway improvements, as envisioned by the current IBR project, may no longer prove to be necessary. Instead, a simple seismic retrofit as proposed in CHSR Company's Four Part Bridge Plan may satisfy the Purpose and Need, given the level of support that the supplementary CHSR transit alternative can provide. Cascadia High Speed Rail Company has developed such an alternative and provided it to the IBR/EIS Team numerous times. It is not possible for the highway alternative alone to fully satisfy all the requirements of the project. Cascadia High Speed Rail

can contribute towards satisfying the Purpose and Need of the project by providing an alternative to moving parcel freight, intercity travelers and commuter passengers fast and without delay to transportation hubs.

We would therefore respectively request that the framework for assessing a new Columbia River Bridge be revised to eliminate bias, avoid legal challenges and ensure that a thorough comparable analysis of both the IBR Program and CHSR Company's Four Part Bridge Plan occurs. The DEQ also needs to carefully assess the full environmental impact of the I-5 Bridge demolition as compared to the CHSR Plan.

A major concern by the public is well stated by former Metro Counselor, Robert Liberty, who testified during public comment, believes that the current effort is on "*path five*" which will result in another failed project. "*Path five is project collapse, a repetition of what happened with the prior stage of this project, the Columbia River Crossing,"* Liberty said. "*The very same fundamental differences in opinion over tolling, demand management, and transit, that contributed to the collapse of the CRC persists today or perhaps are even sharper now."*

This is another high stakes gamble of billions of dollars and time delays on a long term project that ignores potentially better options. The IBR/EIS Team must understand that the highway alternatives currently under consideration have not been able to garner enough community or political support to allow the project to proceed to funding and construction because the project, as currently constituted, cannot meet long term equity and climate goal demands. It would be a waste of time and money for the IBR/EIS Team to press ahead without making significant changes to the project planning process.

The IBR/EIS Team and committees should therefore avail itself of the opportunity it now has to really listen to community input and allow alternatives to be judged fairly during the EIS process that truly reflects 2022 priorities.

Thank you for your reconsideration of this issue. We are available to meet to give a power point presentation of Cascadia High Speed Rail and the Four Part Bridge Plan for further elaboration and discussion. We look forward to hearing from you.

Yours Sincerely,

Brad Perkins, President/CEO
Cascadia High Speed Rail Company
perkins@cascadiahighspeedrail.com
cascadiahighspeedrail.com
503-317-6455

Dr. Alexander Metcalf, President
Transportation Economics &
Management Systems, Inc.
Frederick, Maryland
301-846-0700

Clark County Transportation Alliance
2022 Policy Statement

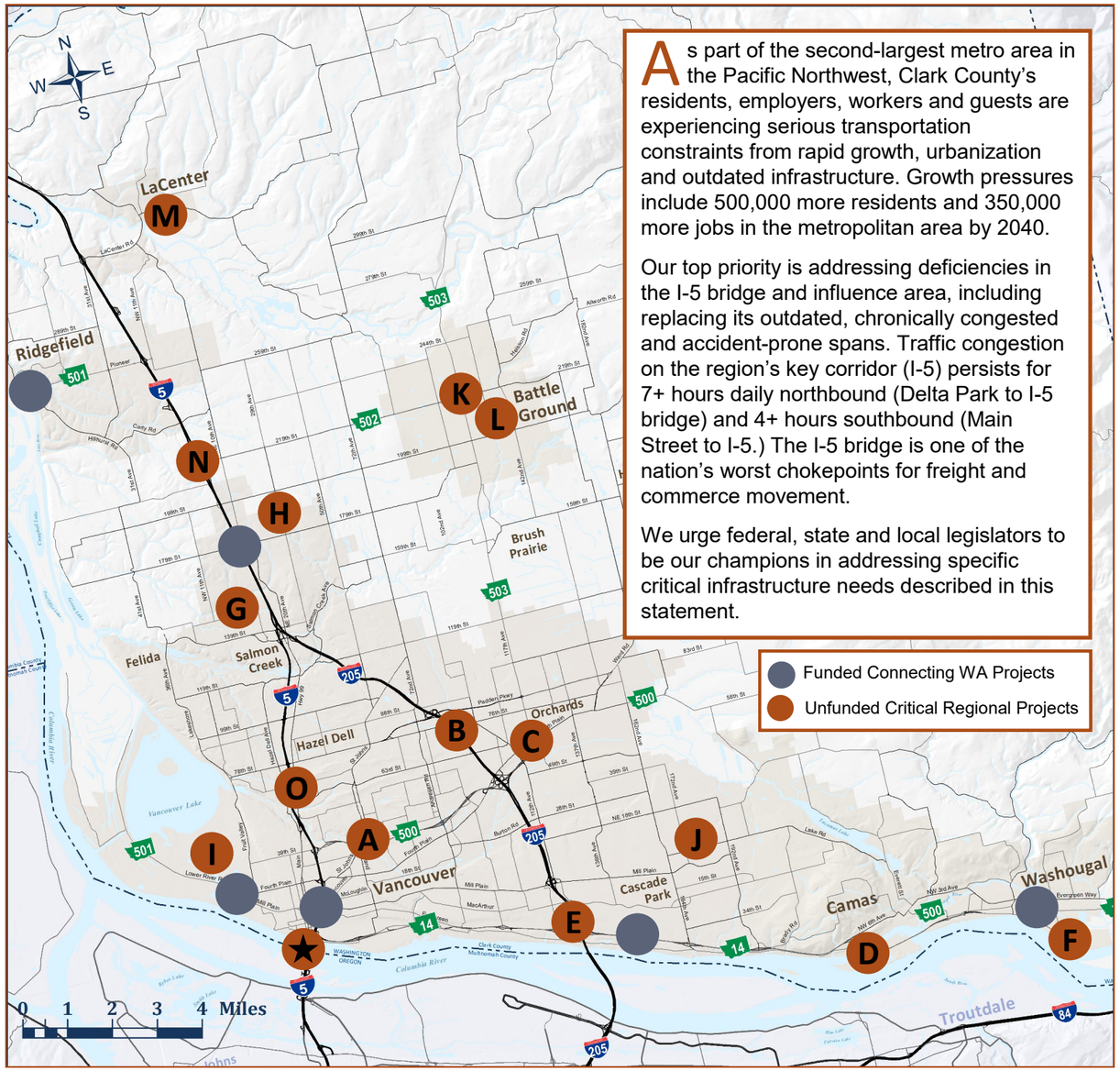
Sponsoring Organizations:

Amalgamated Transit Union 757
Association of Washington Business
Battle Ground Public Schools
Building Industry Association of Clark County
Camas School District
Camas-Washougal Chamber of Commerce
Career Connect Southwest
City of Battle Ground
City of Camas
City of La Center
City of Ridgefield
City of Vancouver
City of Washougal
Clark College
Clark County
Clark County Association of Realtors
Columbia Corridor Association
Columbia Pacific Building Trades Council
Columbia River Econ. Dev. Council
Columbia River Steamship Operators' Assn.
C-TRAN
East Vancouver Business Association
Evergreen Public Schools
Greater Portland, Inc.
Greater Vancouver Chamber
Hazel Dell/Salmon Creek Business Association
Hockinson School District
IBEW Local 48
Identity Clark County
Kaiser Permanente
Labor Roundtable of SW WA
Legacy Salmon Creek Medical Center
LiUNA Local 335
Neighborhood Traffic Safety Alliance
NW Utility Contractors Association
Oregon Business Council
Oregon Business & Industry
Pacific Northwest Waterways Association
Partners in Careers
PeaceHealth Columbia Network
Port of Camas-Washougal
Port of Portland
Port of Ridgefield
Port of Vancouver USA
Portland Business Alliance
Providence Health & Services
Regional Transportation Council
Ridgefield School District
Southwest Washington Central Labor Council
SW Washington Contractors Association
SW Washington High Technology Council
SW FACT
The Historic Trust
Vancouver Clinic
Vancouver Housing Authority
Vancouver Public Schools
Vancouver's Downtown Association
Visit Vancouver USA
Washington State University Vancouver
Washington Trucking Associations
Washougal School District

For more information, contact admin@iccbusiness.org or call 360.695.4116

As of 12/29/21

Clark County Transportation Alliance
2022 Policy Statement



As part of the second-largest metro area in the Pacific Northwest, Clark County's residents, employers, workers and guests are experiencing serious transportation constraints from rapid growth, urbanization and outdated infrastructure. Growth pressures include 500,000 more residents and 350,000 more jobs in the metropolitan area by 2040.

Our top priority is addressing deficiencies in the I-5 bridge and influence area, including replacing its outdated, chronically congested and accident-prone spans. Traffic congestion on the region's key corridor (I-5) persists for 7+ hours daily northbound (Delta Park to I-5 bridge) and 4+ hours southbound (Main Street to I-5.) The I-5 bridge is one of the nation's worst chokepoints for freight and commerce movement.

We urge federal, state and local legislators to be our champions in addressing specific critical infrastructure needs described in this statement.

A CALL TO FURTHER ACTION

I-5 Bridge Replacement and Influence Area Improvements

Action #1

Continue Support for I-5 Bridge Replacement Supplemental EIS Completion: continue to develop bi-state legislative consensus, complete environmental studies, and develop the funding plan.

Pursue Construction Funding Commitments: work with lawmakers and community leaders to identify and secure federal, state and local funding. State sponsors should pursue significant federal resources through bridge funding grants. We urge consensus on a balanced funding plan, which reflects the values of economic prosperity and equity for regional resident and business interests.

We fully support replacement of the I-5 bridges and related corridor improvements. The I-5 spans are functionally obsolete and over time will require substantial maintenance investments to remain operational. A bi-state approach focused on practical solutions which improves mobility within through this primary freight, commerce and commuter corridor is imperative, in keeping with the I-5 Corridor Strategic Plan (2002).

We also place high priority on long-range transportation corridor planning given steadily rising population and commerce forecasts.

Regional Maintenance and Operations Needs

Action #2

Pursue Funding to Advance State of Good Repair and Operations: carefully evaluate recommendations of the Joint Transportation Committee's Statewide Transportation Needs Assessment, and consider enhanced and new funding models (e.g. road-usage charge).

Fund Critical Area Operations: dedicate additional maintenance, planning and traffic operations funds for critical urban areas (SR-14, SR-500, I-5, I-205) to optimize safety and mobility on our existing system.

Catalytic Economic Development Investments

Action #3

Fund Job- and Employer-Enabling Improvements: support funding catalytic investments, which serve the objective of accelerating shovel-ready land for jobs and industry expansion. Several areas are primed for growth and need transportation system investments including the Discovery Corridor (I-5/179th interchange vicinity), Section 30 (SE 1st St), Washougal Town Center/Port (32nd St) and Port of Vancouver Industrial Corridor (NW 32nd Ave). Continue to fund statewide programs including the Public Works Trust Fund, CERB, FMSIB, TIB and FRAP.

Critical Regional Projects and Needs

Action #4

Fund Regionally Critical Projects to Address Immediate Needs: secure funding for priorities that reduce congestion hotspots, improve safety and deliver multi-modal investments. Each project has been vetted through the regional planning process.

Following are critical regional projects (*lead agency*):

A) SR-500 Intersections at 42nd Ave and 54th Ave ($6M): implement cost effective safety improvements from 2018 practical solutions study; additional investments including overpasses may be warranted *(WSDOT)*

B) I-205/SR-500 to Padden Exwy ($36M): add auxiliary lanes to address congestion hotspot *(WSDOT)*

C) SR-500/Fourth Plain/SR-503 ($15M): following recent planning study, provide funds for initial intersection improvement to address congestion hot spot *(WSDOT)*

D) West Camas Slough Bridge Widening ($45M): develop parallel bridge structure for westbound SR-14 traffic and added capacity *(WSDOT)*

E) SR-14/I-205 Interchange ($TBD): provide funds for interchange congestion relief; project study underway *(WSDOT)*

F) Washougal Town Center Transportation Access Improvement ($80M): improve corridors connecting Washougal including 32nd Street Rail Underpass; Town Center Connectors; 27th/Index Improvements for Port and SR-14 access *(City of Washougal)*

G) NE 10th Ave from 149th to 154th St/Whipple Creek ($13.0M): complete new north-south corridor for I-5 *(Clark County)*

H) NE 15th Ave from 179th St to NE 10th Ave/NE 189th St vicinity ($19M): add arterial connection to increase capacity in conjunction with 179th/I-5 interchange upgrade *(Clark County)*

I) NW 32nd Ave Industrial Corridor ($10M): planning, engineering, environmental review for new north-south freight arterial *(City of Vancouver)*

J) SE 1st St at 164th to 192nd Ave ($7M): arterial widening and multi-modal upgrade; leverages significant private sector investments *(City of Vancouver)*

K) SR-502/SR-503 Congestion Relief ($2.4M): complete community roadway and circulation enhancements to provide improved access and safety *(City of Battle Ground)*

L) SE Grace Ave at SE Rasmussen Blvd to E Main St ($4.5M): arterial street realignment and new signal for upgraded capacity *(City of Battle Ground)*

M) E 4th St Widening/Brezee Creek Culvert ($11.6M): complete street makeover with fish bearing culvert replacement for improved environmental outcomes *(City of La Center)*

N) NW 219th St Extension/I-5 to Hillhurst Rd ($5M): add western ramp access at I-5 and arterial street extension to Hillhurst Rd *(City of Ridgefield)*

O) Public Transit ($20M): help fund construction of C-TRAN's third Bus Rapid Transit (BRT) project from downtown Vancouver to Salmon Creek *(C-TRAN)*

104-year old I-5 Bridge

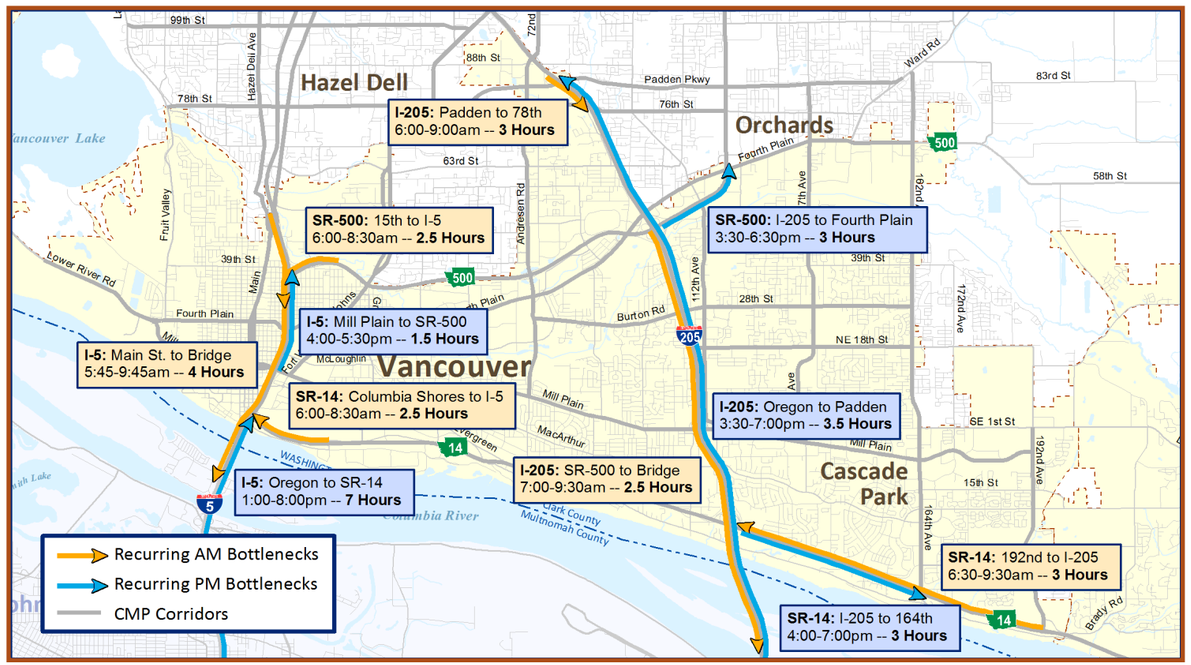
Facilitating Transportation Mobility, Economic Growth and Equity

We urge legislators to embrace the following priorities where possible:

- Support the evaluation of transportation investments to help ensure equity and climate goals
- Support broadband infrastructure to disperse economic opportunity, foster telecommuting and better compete in the evolving digital economy
- Fund regionally significant freight mobility improvements for river, road and rail for Ports, as well as track improvements for the county-owned Chelatchie Prairie Railroad
- Support the Port of Vancouver USA's Terminal 1 Waterfront development project for safety, commerce and tourism
- Enhance or expand funding programs to improve Complete Streets by promoting safety and accessibility for everyone, including increased funding for safe bike and pedestrian pathways, sidewalks and street crossings
- Actively embrace smart technologies to ease pressures on the transportation grid and improve safety for all users

Peak AM/PM Traffic Bottlenecks

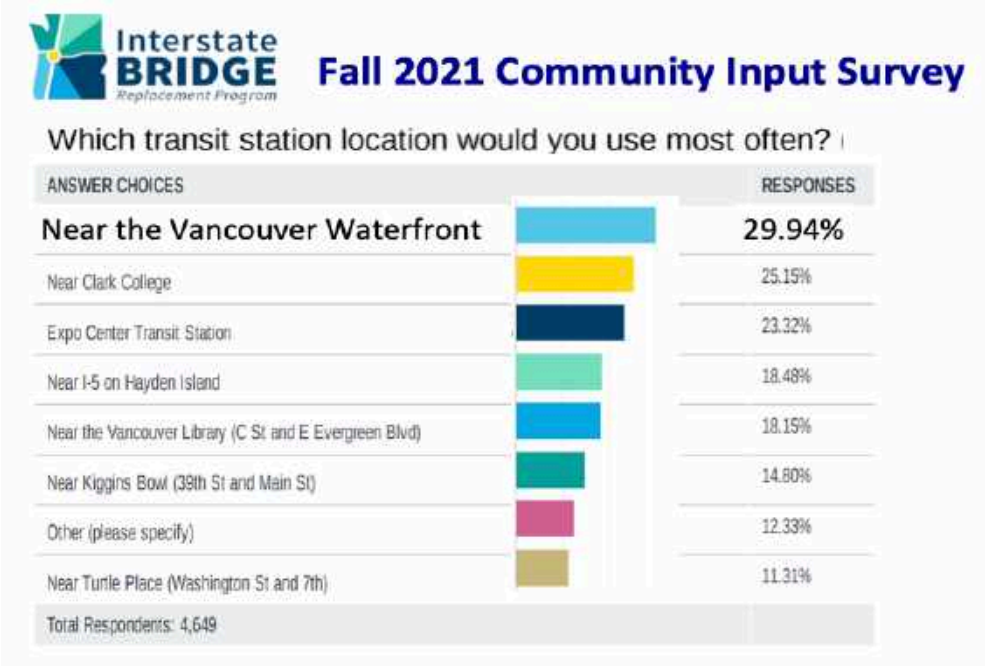
Expressed in hours of daily congestion (2019)

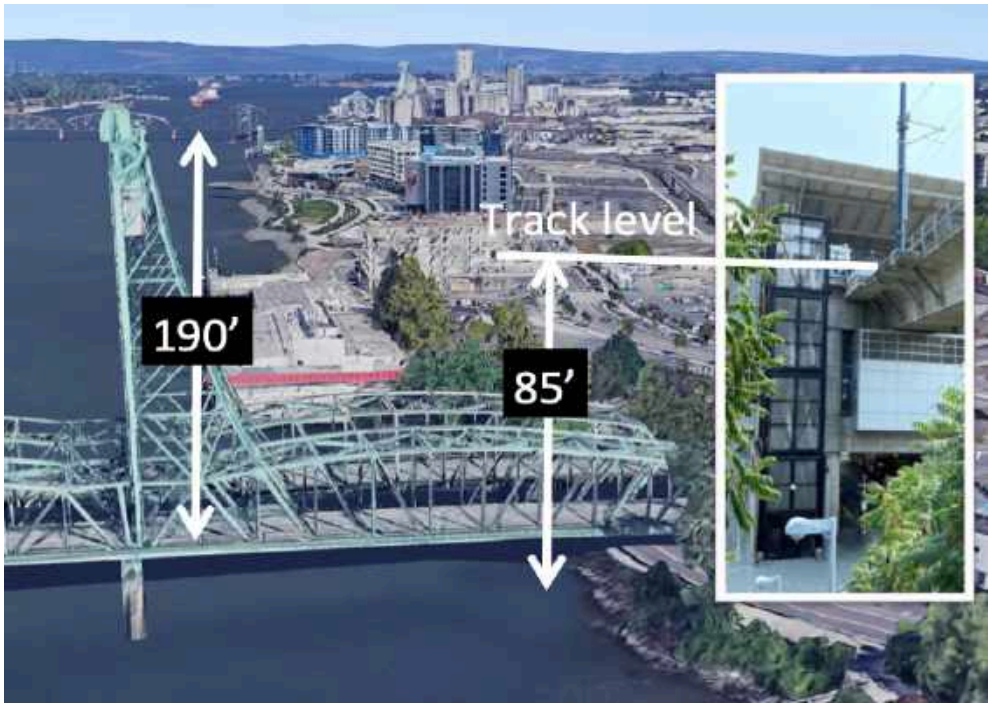


Courtesy SW Regional Transportation Council

The IBR's "Fall 2021 Community Input Survey" showed the most desired light rail station is on the Vancouver waterfront. Unfortunately, a high bridge will have the station tracks about 85 feet above the riverbank. This will require a costly station with elevators and escalators that are frequently out of service.

An immersed tunnel will have a station just below ground about few hundred feet from the riverfront.





Bob Ortblad MSCE, MBA

IBRprogram
@IbrProgram

The community has told us that a safe, reliable transportation system with a variety of multimodal choices is important.

We want to improve the experience and travel reliability for all travelers—including those who drive, walk, roll, or use public transit.

Bob Ortblad @BOrtblad · Feb 17
Replying to @IbrProgram
Getting on a high bridge to walk or cycle will be a challenge.
The IBR gives no estimated elevations!
Vancouver "Shared Use Path"

The IBR's stacked alignment requires a new $500 million interchange on Vancouver. It will be ugly, loud, polluting, and totally unnecessary. An immersed tunnel can connect at ground level to the current interchange.

Past stacked mistakes.

Bob Ortblad MSCE, MBA

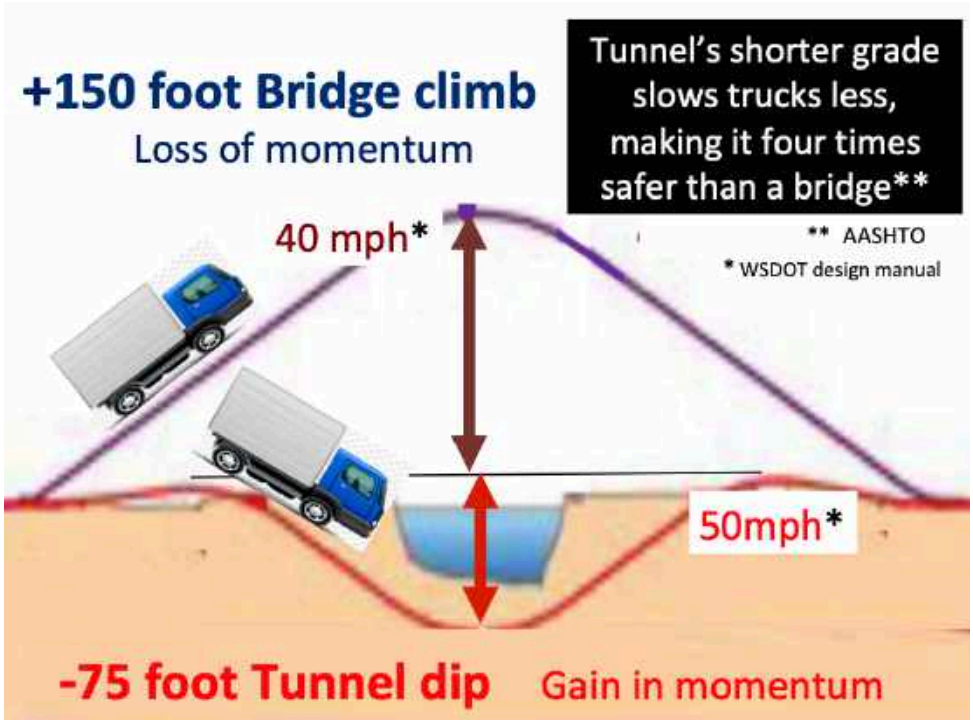
The IBR's stacked option will rain down noise and pollution on Vancouver's city center and historic Fort Vancouver for a hundred years. The Columbia River Crossing designed a useless 12-foot sound wall.

WSDOT spent $2.3M in a failed attempt to silence Seattle's I-5 bridge.

Bob Ortblad MSCE, MBA

Using a WSDOT design manual will show trucks will slow by 20 mph on a high bridge but only 10 mph in a shorter immersed tunnel.

An American Assoc. of State Highways (AASHTO) manual shows this 10 mph difference will make tunnel traffic four times safer than a high bridge.

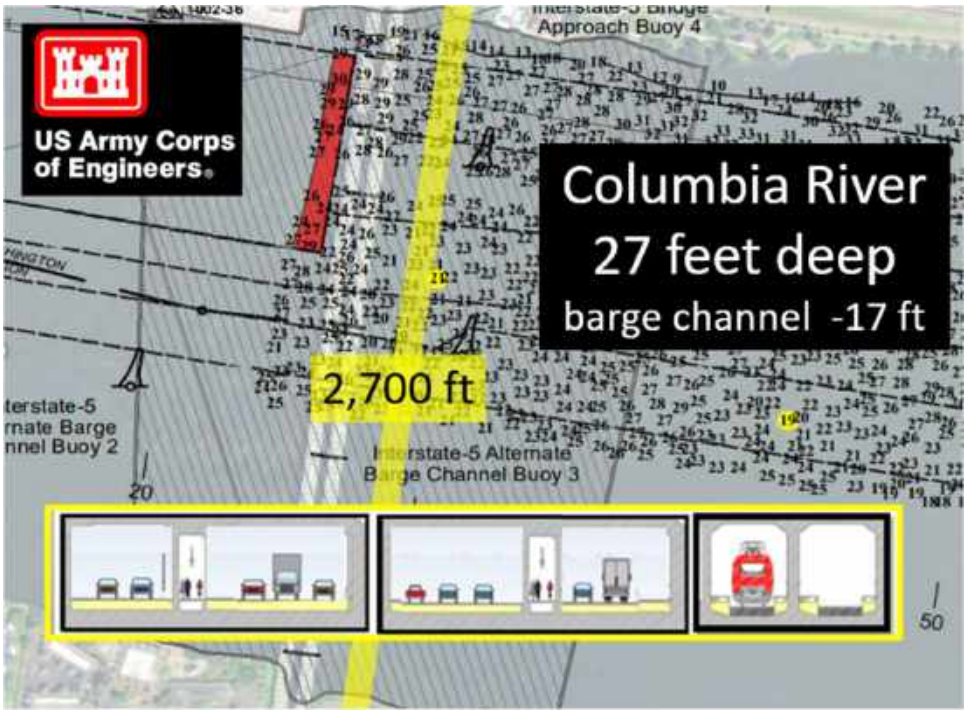


Bob Ortblad MSCE, MBA

British Columbia rejected a bridge and is building a new 8-lane immerse tunnel to replace the 4-lane Massey Tunnel (Fraser River) built in 1959.

British Columbia found a tunnel to be less costly, have less visual, noise, land, and navigation impacts; best facilitates the movement of trucks and cyclists with a much lower overall elevation change; and provides protection from inclement weather for everyone who uses this crossing. It also meets regional vision/interests, as endorsed by the Metro Vancouver Board.

A Columbia River immersed tunnel would have all the same advantages. Plus, the Columbia River is 10-feet shallower than the Fraser River, an ideal site for an immersed tunnel.



Bob Ortblad MSCE, MBA

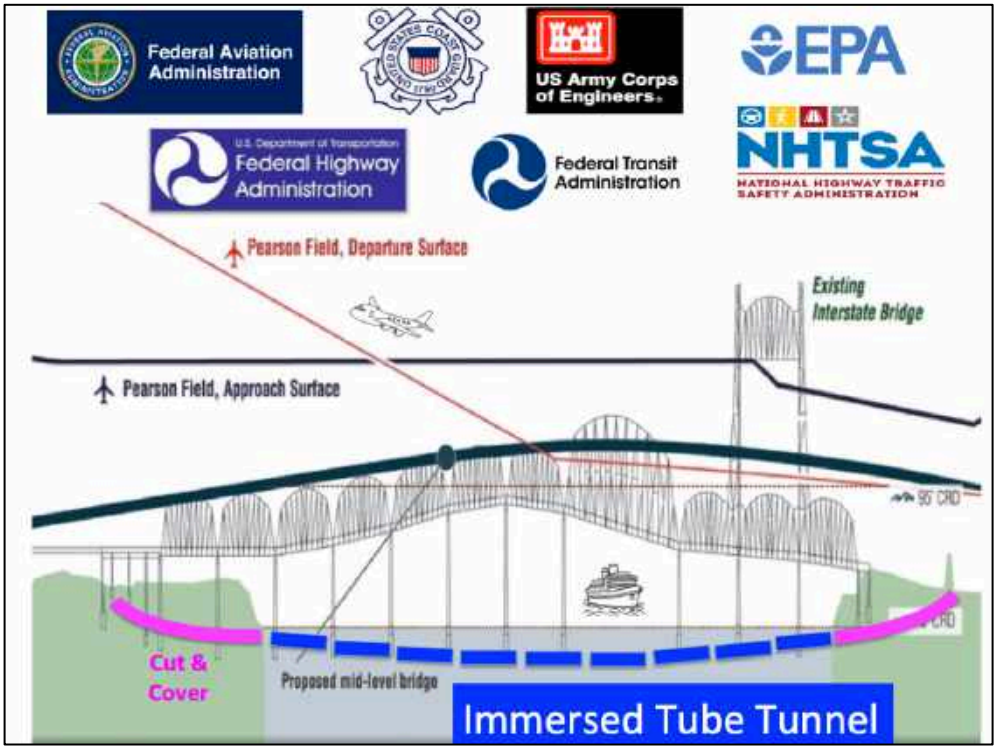
Bridges were originally designed for both the Fraser River and the Fehmarn Baltic Sea crossing. However, after a second analysis by international immersed tunnel engineers, tunnels are now being built.

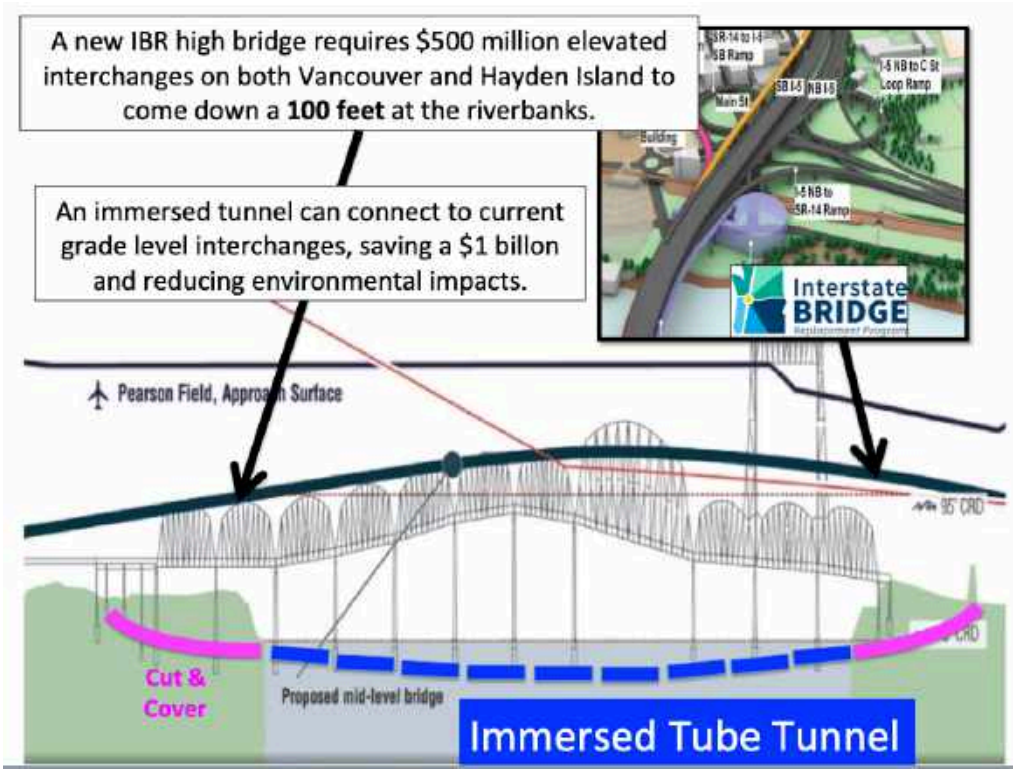
The IBR's bridge designs will change Fort Vancouver's view and Vancouver's waterfront view.

Bob Ortblad MSCE, MBA

Federal agencies will see the advantages of immerse tunnel.

FAA clear air path
USCG navigation clearance
USACE center channel, no piers
EPA restored river, riverbank
FHWA $1 billion saved on interchanges
FTA riverbanks rail stations NHTSA protection from weather, safer grades





Bob Ortblad @BOrtblad · 17h

@IbrProgram An investigation by the Dept. of Transpiration Office of Inspector General @DOTInspectorGen of the IBR's "Tunnel Concept Assessment" will reveal several false claims. This could delay or cancel federal funding from FWHA & FTA.

The IBR must retract this report now.

U.S. Department of Transportation

Office of Inspector General

Issues that should be reported

- False Statements and False Claims

https://www.oig.dot.gov/fraud-hotline#:~:text=An-,official,-website%20of%20the

Interstate BRIDGE Replacement Program

March News Letter

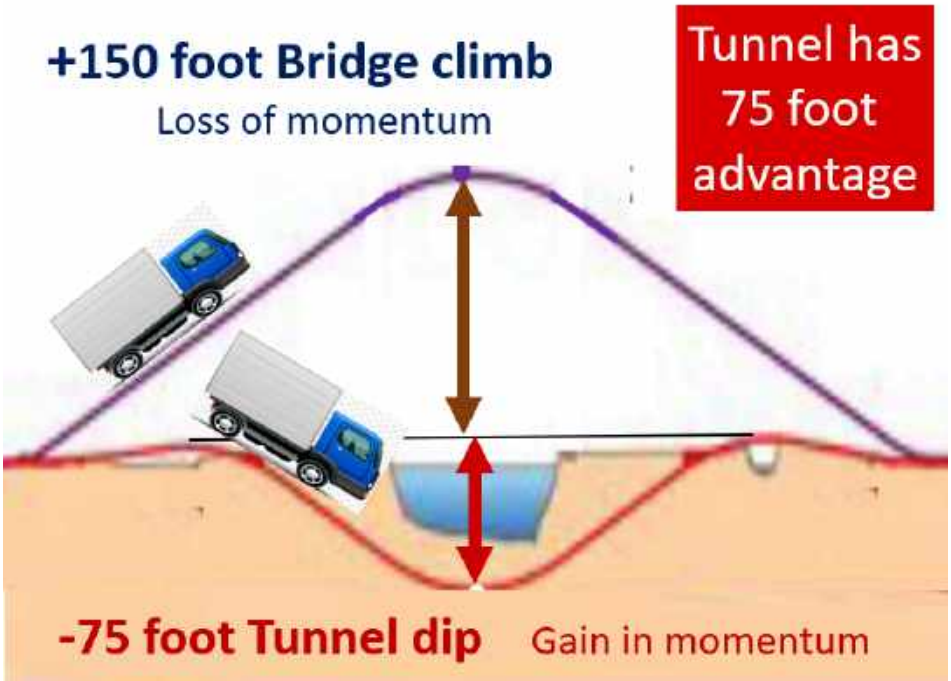
Myth vs Fact

Myth: A tunnel can solve the Interstate Bridge problems just as easily as a bridge.

Fact: A tunnel cannot be feasibly built within the footprint of I-5 without eliminating important connections to Hayden Island, downtown Vancouver, and SR-14. It also comes with significantly more operational, environmental, and historical resource impacts, and would cost more than a replacement bridge.

https://www.interstatebridge.org/media/msamswzd/2021-03-03-final-itt-v2-48-_remediated.pdf

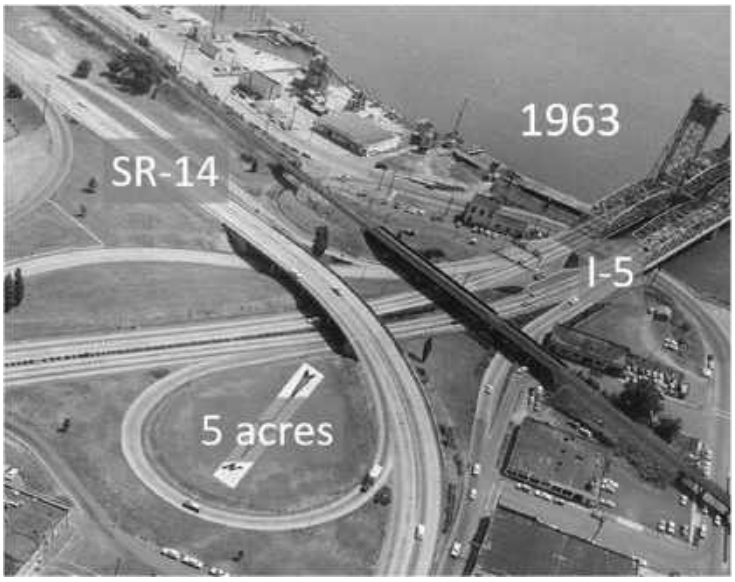
An immersed tunnel compared to a high bridge will annually save about 1.3 million gallons of carbon fuel and reduce greenhouse gases by 13 tons. An immersed tunnel will be almost half as long and have half the total grade of a new high bridge. A high bridge has a long momentum killing uphill climb. A tunnel dip under the river adds momentum for a short climb. A shorter tunnel with less grade and downhill momentum, equals less total energy consumption, carbon or future kilowatt.



Bob Ortblad MSCE, MBA

In the 1960's land was cheap and traffic light, so WSDOT connected SR-14 to I-5 with a 270-degree cloverleaf with a -1.5% downhill grade that covers 5 acres.

The IBR's bridge design will rebuild this antiquated cloverleaf with a +5% uphill grade to reached an elevated (60 feet) bridge approach. This switch in grade from -1.5% to +5% will slow on-ramp traffic, increase accidents, and continue to waste 5 acres in the center of downtown Vancouver.



Cloverleaf 270-degree ramps are unsafe and are being replaced in New Jersey, Ohio, Texas, and California with 90-degree stacked ramps. An immersed tunnel comes up at ground level and offers an easy connection to a safer stacked ramp and a reduce ramp footprint.

Bob Ortblad MSCE, MBA

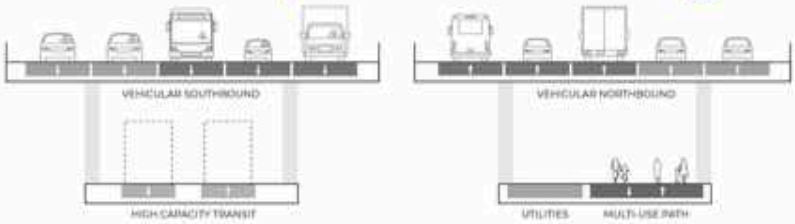
Interstate BRIDGE Replacement Program

Fall 2021 Community Input Survey

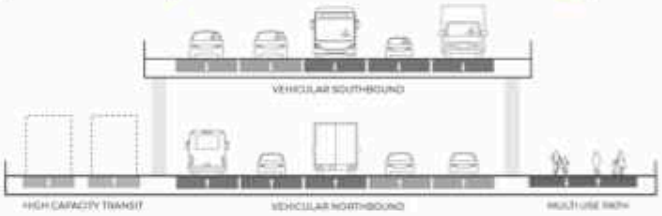
Only options 1 & 2 considered

Columbia River CROSSING

Option 1: Two Bridge



Option 2: One Bridge



Best Option not considered: Immersed Tunnel

A few Immersed Tunnel advantages vs. Bridge

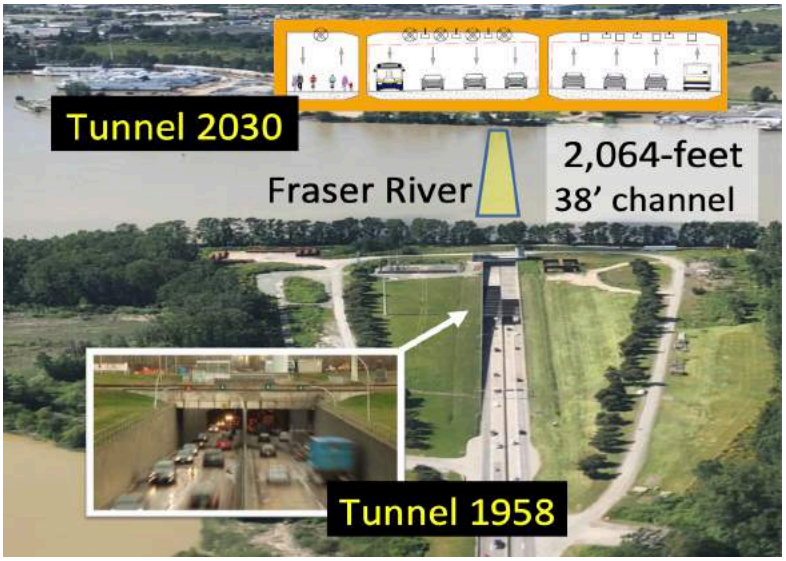
Half as long and the half total grade
Natural earthquake resistance, buoyancy during liquefaction
Simpler and more flexible design, number of lanes
More local labor, materials, and technology, similar to floating bridge construction
Can be built at shipyard (steel shell - Vigor) or graving yard (concrete)
Better freight mobility, half as much grade
Safer, less grade and weather protected
Better access for walkers and cyclists
Less noise, air pollution, and visual impacts
Allows waterfronts for parks
Less energy consumption and green house gases
Better light rail station locations, near Vancouver & Hayden Island riverfronts
Less cost, see Vancouver and Denmark immersed tunnel vs. bridge studies
Better connections to current interchanges at grade level, SR-14 & Hayden island
No need for massive elevated interchanges on Vancouver & Hayden Island, $1 billion savings
No need for expensive drilled shafts, bridge piers, and 500-ton trusses
No air space conflict with FAA
No navigation conflict with USCG
Allows barge channel in center of river, required by USACE

Bob Ortblad MSCE, MBA

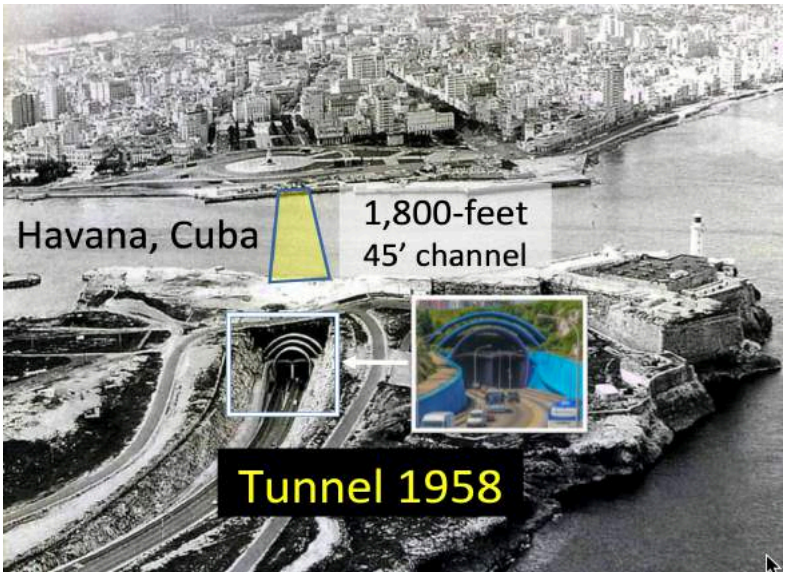
The shallow Columbia River is an ideal immersed tunnel site.

In **1958** Washington and Oregon celebrated the opening of the second Columbia River Bridge, a twin of the first 1917 steel-truss bridge. (**27-foot** river depth)

In **1958** British Columbia opened a four-lane immersed tunnel under the **38-foot** deep Frasier River ship channel. A new eight-lane tunnel (two for BRT) will replace this tunnel in 2030.



In **1958** Havana, Cuba opened a four-lane immersed tunnel under its **45-foot** deep port channel.



*Note both 1958 tunnels are much deeper than the Columbia River's **27-foot** depth.*

Bob Ortblad MSCE, MBA