Ultra-High-Speed Ground Transportation Feasibility Study

Joint Transportation Committee

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CH2M HILL, INC

Roger Millar, Secretary of Transportation

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UHSGT study framework

Legislature funded $300,000 feasibility study to:

- Identify conceptual corridors to study
- Describe UHSGT technology options and pre-planning-level analysis inputs
- Evaluation (CONNECT):
  - Ridership and revenue analysis
  - Cost recovery
- Institutional/cross-border framework
- Potential funding and financing model/mechanisms
- Recommendations

Microsoft contributed $50,000 and the Trades contributed $10,000 for additional economic analysis still in progress to be completed by December 31

Advisory Group

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23-member non-voting advisory group assisted with study

Members represent economic, transportation and community interests

- Washington Governor's Office
- British Columbia Ministry of Transportation
- Oregon Department of Transportation
- Puget Sound Regional Council
- Utilities and Transportation Commission
- Washington Department of Commerce
- City of Seattle
- City of Portland
- Sound Transit
- Seattle Chamber of Commerce
- Snohomish County Executive
- Office of King County Executive
- Microsoft
- Alaska Airlines
- Fred Hutchinson Cancer Research Center
- Association of Washington Business
- Futurewise
- Prosper Portland
- Transportation Choices
- Washington CleanTech Alliance
- Portland Business Alliance
- Business Council of British Columbia
- FastTrackWa.org
- Washington Building Trades
- University of Washington
- Tourism Vancouver

Others interested in the topic signed up to receive email updates on the progress of the study

Where high-speed rail works best

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General criteria to evaluate:

- **In a mega-region** (*Cascadia*)
- **Cities/metro areas** - larger populations
  (Vancouver – Seattle – Portland)
- **100-500 mi travel distance**
  (Vancouver to Portland ~350 miles)
- Interconnected with **regional/local transit**
- Metropolitan **economic productivity**
- **Congested areas** *(autos and air)*

America 2050

Technology options

Three technologies reviewed

- High-speed rail
- Maglev
- Hyperloop



Technology Option	Current Maximum Speed	Maximum Design Speed	Maximum Seating Capacity	Minimum Horizontal Curve	Maximum Gradient
High-speed Rail	220 mph	250 mph	1,500	4.7 miles	4%
Maglev	270 mph	375 mph	824	5.7 miles	10%
Hyperloop	200 mph*	760 mph	28 per capsule	3.0 miles	n/a

***Test track speed, which was limited by length of test track.**

FRA's CONNECT modeling tool

- FRA modeling tool for high level intercity passenger rail pre-planning
- All CONNECT results presented in ranges
- Area representation of a rail corridor or network (Core-based statistical areas – not cities)
- Seattle and Tacoma in same CBSA - no trips under 50 miles captured
- Provides the ability to:
  - Describe a potential high-performance rail network – coarse level
  - Estimate the financial and operational performance of the network
  - Develop high-level service plans
  - Generate operational data

Focus of analysis

Primary corridor

- Between Vancouver, British Columbia and Portland, Oregon

Connecting corridors

- East-West via the Stampede Pass (possibly Ellensburg, Moses Lake, Spokane)
- South connection to California High Speed Rail

Passengers

- Number of seats filled
- Passenger miles
- Shift to rail from other modes

Cost recovery

- Fare box recovery
- Capital and maintenance costs

Potential funding and financing model/mechanisms

- Base year – 2015
- Forecast year – 2035
- Horizon year – 2055

Iterative analysis of corridors

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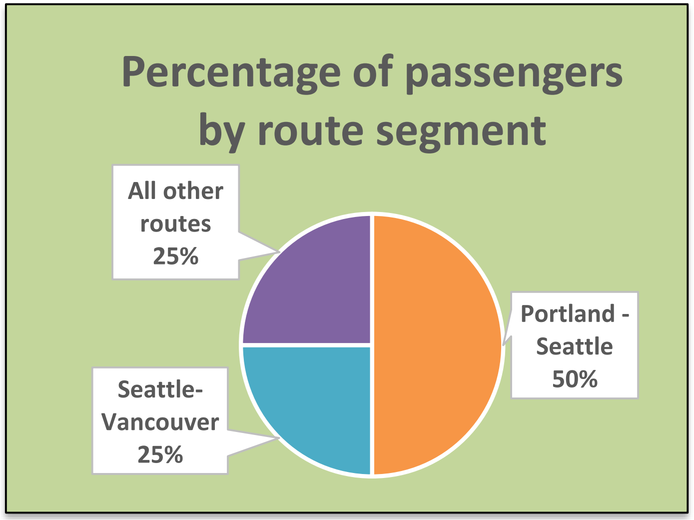
Conducted four rounds of analysis to determine most viable options

- Started with 5 conceptual corridors
- Narrowed to three primary corridor options (1A, 2 and 4)
- Determined 12 daily round trips appear to be optimal number before diminishing return
- Evaluated the effect of connecting to new east-west route to Spokane and viability of connecting to California High Speed rail in Sacramento

Corridor	Nearest Station Locations	
1	Pacific Central Station – Vancouver, B.C. Fairhaven Station – Bellingham, WA Everett Station (new station near Delta Yard) – Everett, WA Stadium Station – Seattle, WA Tacoma Dome Station – Tacoma, WA Centennial Station – Lacey, WA Rose Quarter Station (TriMet Max station) – Portland, OR	
1A	Vancouver International Airport – Vancouver, B.C. Fairhaven Station – Bellingham, WA Everett Station – Everett, WA Stadium Station – Seattle, WA Tacoma Dome Station – Tacoma, WA Centennial Station – Lacey, WA Rose Quarter Station – Portland, OR	**All seven cities identified in legislation**
2	Pacific Central Station – Vancouver, B.C. Stadium Station - Seattle, WA Tacoma Dome Station – Tacoma, WA Portland International Airport – Portland, OR	**Four largest cities**
3	Pacific Central Station – Vancouver, B.C. Stadium Station - Seattle, WA Rose Quarter Station – Portland, OR	
4	King George Station – Surrey, B.C. Tukwila Station – Seattle, WA Expo Center Station – Portland, OR	**Outside city core of three largest cities**

Key findings - ridership

- Corridor 1A with 7 stations has highest ridership (2 million with high-speed rail and 2.1 million with MagLev)
- Corridor 4 with three stations outside city cores has lowest capital costs, but also lowest ridership
- Between 13% and 17% of travelers might use high speed trains in 2035 (highest mode share under Corridor 2)
- In 2035, projected annual ridership ranges from 1.7 to 2.1 million for primary corridor options
- In 2055, projected annual ridership ranges from 2.8 to 3.2 million for primary corridor options



Key findings – cost recovery

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Capital costs

- Range from $24 to $42 billion* (assumptions include all three technologies and tunneling)
- Maglev has higher capital costs (need straighter route and more costly technology)
- High speed rail has wider range of capital costs (depending on alignment, tunnels, bridges, ROW)

Operating costs

- Maglev has potential to cover operating costs by 2035
- High-speed rail has potential to cover operating costs by 2055
- Hyperloop's operational model is still under development (data not readily available)

* Range of $24-$42 billion encompasses the needs of all three technologies, including some that require very straight routes with minimal curvature and/or subgrade development with tunneling. When these capital parameters are narrowed down following a more detailed analysis, cost range could be reduced by 25 percent or more.

Overview of results

Geography

- Seattle to Portland connection is critical to any future UHSGT options
- Additional service increases on existing Amtrak Cascades corridor as interim steps could build greater demand and market share
- New east-west corridor could add 15 to 25% to network ridership, but would require subsidies through at least 2035
- Connecting corridor from Portland to Sacramento should be planned beyond the 2055 time horizon

Overview of results

Technology differentiation

- In 2035, Mag-Lev has potential to cover O&M costs in most alternatives
- In 2035, costs may not be completely covered for HSR
- By 2055, all technologies cover O&M and to varying degrees cover further development costs

Demand shares

- For these technologies at 12 daily round trips, 12-17% of the travel market is diverted to UHSGT mode by 2035
- Preliminary data indicate maximum passenger loads might double between 2035 and 2055

Next steps – recommendations

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- Perform a next phase **corridor planning/business case study**
- Enhance **ridership evaluation** to inform and support the corridor planning study
- Evaluate **governance and economic framework**
- Further evaluate **funding and financing mechanisms**
- Strengthen focused involvement of **key stakeholders in BC, WA and OR**
- Conduct further **rail planning** consistent with needs of a **UHSGT** program

Questions?

For more information, please contact:

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