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Rail Convertible BRT – Further Study Issue Paper Summary

What is the best HCT alternative to serve one of the region's most congested corridors?

In Spring 2005, Sound Transit's Board reviewed five high capacity transit (HCT) options to cross Lake Washington along the Interstate-90 corridor.[1] The Board narrowed the list to two scenarios that combine the best features of two technologies, bus or rail operating in a dedicated right-of-way. Two different combinations were carried forward:

- Light rail transit (LRT) service from Seattle to Overlake or Redmond, and HOV bus service transporting riders to Totem Lake and Issaquah.[2]
- Rail-convertible bus rapid transit (RC BRT) service along the same alignment and HOV bus service to Totem Lake and Issaquah. The busway would be built to allow conversion to light rail technology at some future time.

What was studied?

This issue paper further analyzes the assumption and issues related to RC BRT to help Sound Transit better compare it with LRT. Sound Transit identified a conceptual alignment to allow comparison of the two mode options. The map to the right illustrates the segment in question.

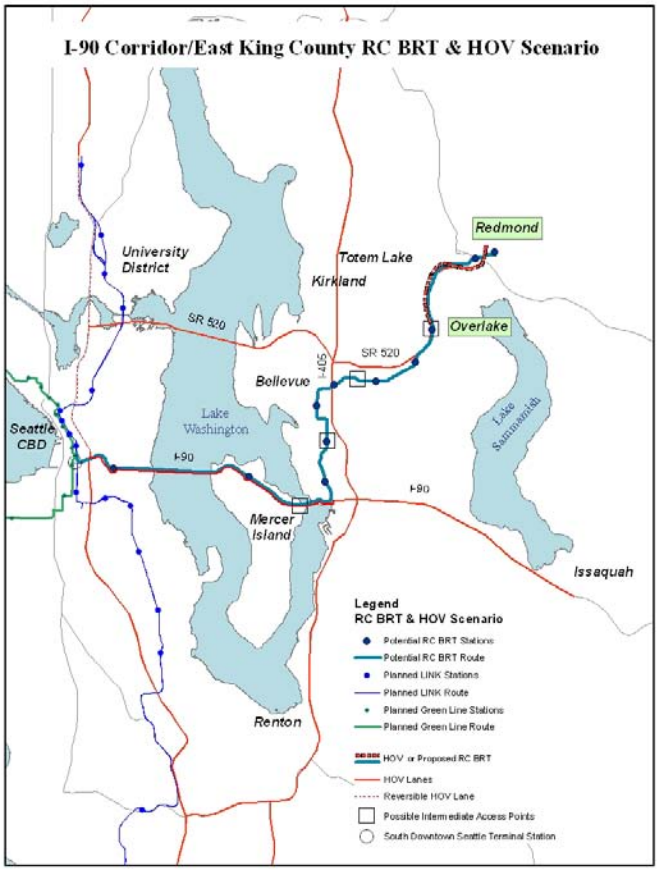
The conceptual alignment will allow side-by-side comparison of the modes in question while keeping other variables constant. After making a decision on the preferred mode, additional project-level design and environmental work will be needed to identify an actual alignment.

What assumptions make up the options?

- Both options use identical conceptual alignments following I-90 across Lake Washington from Seattle to Bellevue and beyond.
- Local bus service feeding the two HCT options would be identical. No existing bus routes would be altered to require riders to transfer onto the proposed system if a better direct bus route exists.
- Both options feature a bus or train traveling exclusively on the guideway from end to end, with no interference from other vehicles.
- Rail convertibility assumes the BRT system is engineered and built to LRT design standards. I-90's reversible center lanes would be converted to two-way transit-only lanes.

Issue Paper Snapshot

This issue paper describes the assumptions of the rail-convertible bus rapid transit (RC BRT) system that have been developed, summarizes key findings, and identifies issues to be considered in converting the bus guideway to light rail. Sound Transit will analyze cost and ridership differences between the two options, with results expected in December 2005. Together, this information, along with the environmental studies and the issue papers released to date, will provide a basis for objectively comparing the two modes.



What are the key findings?

Both scenarios improve future mobility on the I-90 bridge and on Seattle and Bellevue surface streets. In converting the I-90 center lanes to HCT, the people-moving capacity of the corridor is improved. Travel times from the East Channel Bridge on Mercer Island to Rainier Avenue in Seattle remain similar to today's duration of 9 to 13 minutes (rather than worsening as the region's population continues to grow).

[1] See *Issue Paper E.1: I-90 Corridor/East King County High Capacity Transit Analysis* (March 2005)
[2] For results of the LRT/HOV hybrid analysis, see *Issue Paper E.1.S: Hybrid Scenarios Supplement to Issue Paper E.1: I-90/East King County HCT Analysis* (May 2005)

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Local street networks in Seattle and Bellevue will also experience decreased bus volumes: approximately 46 fewer buses per hour in Seattle, and 14 fewer buses per hour in Bellevue, as compared to a future baseline condition.[3]

LRT is expected to have faster travel times and higher ridership than RC BRT. The LRT option would integrate with Link service through the Downtown Seattle Transit Tunnel to the north, providing one-seat light rail service between the eastside and downtown Seattle and points north. For RC BRT operation, riders would need to transfer at the south downtown transit station to access light rail service in the tunnel or buses operating on surface streets.

In prior studies, estimated capital costs for the RC BRT guideway and the LRT guideway have been relatively close. However, the cost of the RC BRT guideway will depend on the extent of rail system infrastructure included in the initial RC BRT guideway construction. This will also determine the subsequent work needed and the cost to convert the guideway to LRT operations.

South Downtown Seattle Transfer Station. A transfer station in south downtown Seattle is needed to connect the RC BRT system with light rail operating in the Downtown Seattle Transit Tunnel and with bus routes serving Seattle and other destinations. This will require riders to transfer, which will increase travel time. The facility would not be needed after converting the guideway to light rail and would have to be removed. Upon conversion, Eastside light rail would operate directly into the downtown tunnel

Converting the RC BRT facility to LRT would create transportation impacts. Conversion would require shutting down the guideway for a period of time, disrupt transit service, and most likely affect the performance of nearby roadways. Impacts would depend on a variety of factors during the conversion period, including alternative bus routing, initial guideway design elements, construction phasing opportunities, and service levels made available.

For example, the Downtown Seattle Transit Tunnel is being closed for two years to convert it to light rail operation. It is 1.3 miles long, compared to 10 miles between Seattle and Bellevue and 18 miles between Seattle and Redmond. In Seattle, $16 million is being spent on downtown street and operational improvements to accommodate the additional bus traffic during the closure. The closure of the RC BRT guideway would result in slower bus operations on adjacent streets during the conversion period, which increases bus operations costs.

There is a tradeoff between initial capital costs and the period of disruption. To minimize the conversion time, rail and electrical ducting could be installed in the guideway (except in the I-90 roadway) when the RC BRT system is constructed. This would increase the initial capital costs of RC BRT.

Intermediate bus access to the RC BRT guideway could be provided prior to conversion to LRT. Preliminary analysis indicates that providing intermediate access points at the eastern end of Mercer Island and at the Overlake Transit Center (intersection of NE 40th Street and State Route 520) appear to be the most feasible options. Two other access points were also analyzed: the intersection of SE 8th Street and Bellevue Way and east of Overlake Hospital via 124th Avenue NE. If provided for bus operations, these bus access facilities would be abandoned upon conversion to LRT.

Need for special buses. To avoid platform reconfiguration, buses with left and right side doors will be needed to operate the RC BRT option. This is a unique component that will result in higher bus costs. Because the stations would be designed for ultimate conversion to light rail and because of potential constraints along the corridor, stations would be a mix of center and side locations, necessitating doors on both sides of the buses.

Time adds uncertainty. The length of time between building the RC BRT infrastructure and converting the system to LRT could be substantial. There is also a risk of technology and regulatory changes, which could add costs and delays to the conversion of the system. It is not possible to anticipate these potential changes.

As issue papers are presented to the Sound Transit Board, they will be available at: www.soundtransit.org/projects/longrange/issuepapers.asp

See other Long-Range Plan Issue Papers

- I-90 Corridor/East King County High Capacity Transit Analysis
- SR-522 Corridor HCT Assessment
- I-5 Corridor Northgate to Everett HCT Assessment
- Convertibility of BRT to Light Rail
- Seattle Streetcar Options
- Rail between Burien and Renton
- HCT System Development Issues in the South Corridor
- Potential Rail Extensions to Frederickson and Orting
- Potential Tacoma Link Extensions – East
- Potential Tacoma Link Extensions – West
- Tacoma Link Integration with Central Link

[3] The future baseline scenario includes the region's existing transportation system, all projects included in Sound Transit's *Sound Move* Phase 1 plan, and WSDOT projects with committed funding.