



## **Sound Transit Long-Range Plan Update**

### **Issue Paper S.6: Potential Tacoma Link Extension - East**

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Sound Transit

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# **FINAL**

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## Foreword

This issue paper is part of a series of reports designed to inform the Sound Transit Board in its decision-making on the Regional Transit Long-Range Plan update for the Sound Transit service area. Each issue paper provides information about a specific element or area of the Long-Range Plan and potential options. These reports focus on issues such as costs, ridership, engineering feasibility and operations.

The environmental impacts of the updated Long-Range Plan and Options, as well as potential mitigation measures, are examined in the Draft Supplemental EIS for the Regional Transit Long-Range Plan (December 2004). The Draft SEIS supplements the 1993 EIS prepared on the Regional Transit System Plan, and it generally updates that information and analysis through the year 2030. Public and agency comments on the 2004 Draft Supplemental EIS have been received and will be responded to in a final SEIS to be issued in June 2005.

The Sound Transit Board anticipates identifying a draft updated Long-Range Plan in the spring of 2005. There will be an opportunity for public review and comment on the draft Plan. The Board will adopt a final updated Long-Range Plan after public comments are received on the draft plan and the final SEIS is issued.

References in these reports to Sound Transit's existing Long-Range Plan are to the 1996 Regional Transit Long-Range Vision, which functions as the agency's Long-Range Plan. Discussion of the updated Long-Range Plan refers to the Plan being developed by Sound Transit over the coming months.

The following issue papers are being prepared:

### East Corridor

*E.1 – I-90/East King County High-Capacity Transit (HCT) Analysis*

### North Corridor

*N.1 – Bus Rapid Transit (BRT) in SR 99 Corridor*

*N.2 – I-5 Corridor Northgate to Everett HCT Assessment*

*N.3 – Seattle Streetcar Options*

*N.4 – SR 522 Corridor HCT Assessment*

*N.5 – Convertibility of BRT to Light Rail*

### South Corridor

*S.1 – Tacoma Link Integration with Central Link*

*S.2 – Potential Rail Extensions to Frederickson and Orting*

*S.3 – HCT System Development Issues in the South Corridor*

*S.4 – Potential Tacoma Link Extension - West*

*S.5 – Rail between Burien and Renton*

*S.6 – Potential Tacoma Link Extension – East*

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## **1. Introduction and Purpose of the Issue Paper**

Sound Transit (ST) Tacoma Link rail service began operations in August of 2003. Service operates between the Tacoma Dome Station located on E 25<sup>th</sup> Street and E Street and the Theater District/9<sup>th</sup> Station located in the north end of downtown Tacoma. A potential extension of Tacoma Link to East Tacoma was included among various options identified in the Draft Supplemental Environmental Impact Statement (DSEIS) for the Regional Transit Long-Range Plan. ST's current Regional Transit Long-Range Plan also included potential light rail transit (LRT) service between Tacoma and Seattle.

This paper describes issues relating to a potential Tacoma Link extension to East Tacoma. For the purposes of this paper, this extension is similar to potential alignment options identified in a 2004 feasibility study prepared by ST for an extension of Tacoma Link to the Cascades Casino. The 2004 study included several findings relating to the feasibility of a potential Tacoma Link extension to East Tacoma. This issue paper provides further information on possible topics relating to an East Tacoma rail extension, including its relationship with other potential future LRT extensions affecting downtown Tacoma.

In addition to presenting key results of the 2004 feasibility study of Tacoma Link to the Cascades Casino site (Section 3), this issue paper evaluates the potential market for the service (Section 4). Section 5 identifies potential issues relating to the extension and joint operations with future downtown Tacoma service and presents information on how an East Tacoma rail extension would relate to potential future LRT service between downtown Tacoma and Federal Way. The paper concludes with an identification of potential costs for an East Tacoma extension, and major assumptions relating to these costs.

## **2. Key Findings**

Key findings in this issue paper include those identified in the 2004 feasibility study referred above. Additional findings focus on how a potential East Tacoma Extension would relate to long-term light rail service operating in the downtown Tacoma area.

### **2.1 Summary of Major Findings from the 2004 Feasibility Study**

Major items from the 2004 feasibility report include the following:

- No fatal flaws were identified for any alignment alternatives identified for the extension.
- All the potential alignment alternatives are feasible in terms of a stand-alone rail extension.
- Further traffic analysis would be required during project planning for the two options that would operate under I-5 (Bay Street or Portland Avenue).
- Alternatives using Portland Avenue under I-5 would require modifications to the under crossing configuration. These alternatives would also require widening of Portland Avenue between Puyallup Avenue and I-5. Such widening would require purchase of private property.

- The extension would require use of City of Tacoma and Washington State Department of Transportation rights-of-way.

## **2.2 Other Key Findings from this Issue Paper**

This section identifies findings relating to the relationship between a potential East Tacoma rail extension and long-term LRT development in the downtown Tacoma area.

- There is lack of information on potential ridership for an East Tacoma extension since no updated information is available on long-term development plans for the Cascades Casino site.
- Passenger demand levels for the service could require larger rail vehicles and stations than what was identified in the 2004 feasibility study.
- The range of costs is estimated at between \$38.0 million and \$71.5 million in 2004 dollars for an extension of Tacoma Link to the Cascades Casino.
- Due to the potential need for larger vehicles and stations than what was identified in the 2004 feasibility study, the estimated costs for the extension to the Cascades Casino should be regarded as low-end estimates.

## **3. 2004 Feasibility Study for Potential Tacoma Link Extension**

In 2004, ST commissioned a feasibility study for a potential Tacoma Link extension to the Puyallup Tribe of Indians' (Puyallup Tribe) Cascades Casino site<sup>1</sup>. The casino site is located southeast of downtown Tacoma, approximately 1.5 miles from the existing terminal for Tacoma Link located at E 25<sup>th</sup> Street and E Street.

The information below describes alignment alternatives evaluated in the 2004 feasibility study as well as other key features of the potential extension:

### **3.1 Alignment Alternatives**

Figure 1 identifies potential alignment options that were addressed in the 2004 feasibility study. These options include:

- |                                |                                    |
|--------------------------------|------------------------------------|
| • East 28 <sup>th</sup> Street | eastward from Portland Avenue      |
| • East 29 <sup>th</sup> Street | eastward from Portland Avenue      |
| • East 32 <sup>nd</sup> Street | eastward from Portland Avenue      |
| • Bay Street                   | southeastward from Portland Avenue |

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<sup>1</sup> *Tacoma Extension Feasibility Study*; prepared for Puyallup Tribe of Indians, prepared by Sound Transit (Puget Sound Transit Consultant, LTK Engineering Services, March 2004)

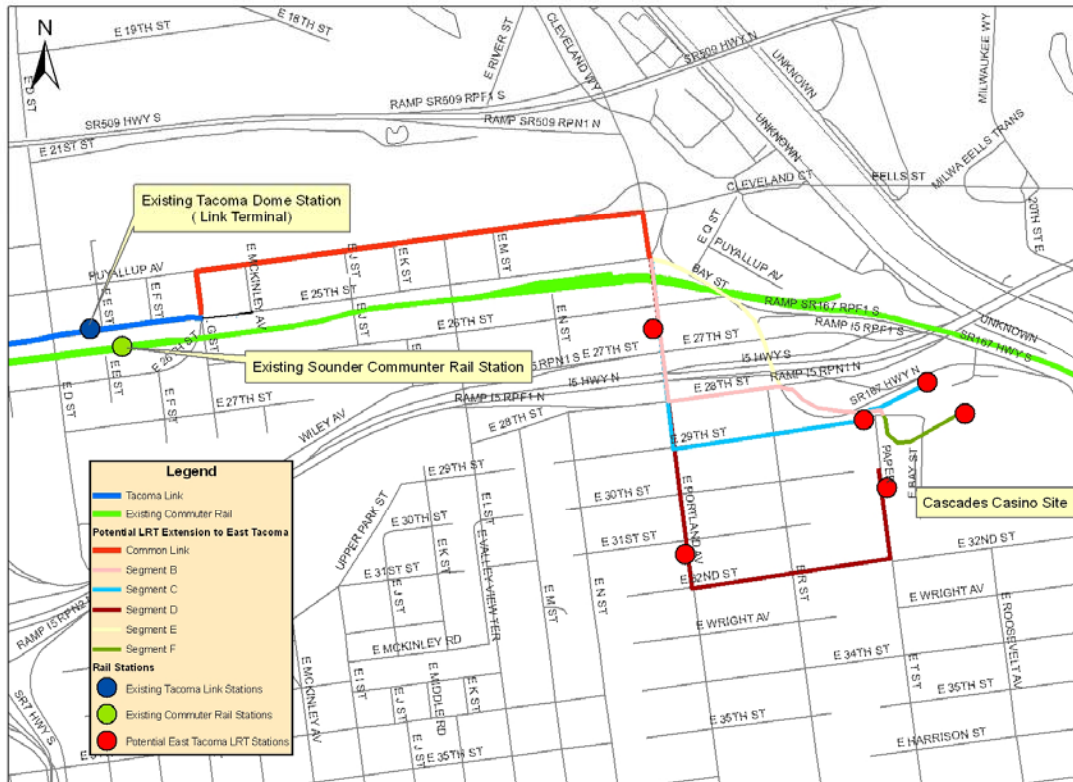


Figure 1 - Potential Tacoma Link Extension East

The length of these options would range from approximately 7,300 feet (Bay Street Alternative) to approximately 9,000 feet (E. 32<sup>nd</sup> Street Alternative). Each alternative would have a common alignment along Puyallup Avenue between the existing Tacoma Dome Station and Portland Avenue. After a right turn at Puyallup Avenue onto Portland Avenue, the extension would follow Portland Avenue. Before reaching the vicinity of the Cascades Casino site, the extension could follow one of the above-noted alignment alternatives.

Depending on the alignment alternative, some right-of-way (ROW) requirements would need to be addressed. For some segments, such as I-5 undercrossings, this ROW need would involve an airspace lease with Washington State Department of Transportation (WSDOT). In other segments, such as along Portland Avenue, additional ROW could be required to accommodate the extension. This additional ROW could be required to support the City of Tacoma's preference to maintain 12-foot general traffic lanes that support high traffic volumes operating at target levels of service.

### **3.2 Key Service Characteristics**

The 2004 feasibility study identified several key characteristics that should be considered as part of the potential extension. Along most of the extension, track segments and stations would be designed to accommodate vehicles that are comparable to existing Tacoma Link vehicles. The one exception is the route along Puyallup Avenue since any design for this segment may need to be consistent with vehicles/operation anticipated for future Central Link service. This exception for Puyallup Avenue is called out in the 2004 feasibility study since this street could be an alignment option for future LRT service between downtown Tacoma and Federal Way.

In the 2004 feasibility study, the rail extension was assumed to operate mostly along a single track with service operating every 20 minutes in each direction. Roundtrip travel times between the existing Tacoma Dome Station and East Tacoma would vary by alignment alternative, with a range between 18 and 25 minutes. With the estimated travel times and 20-minute headways, the extension would require one or two vehicles in addition to those currently operating on Tacoma Link, depending on the selected alignment alternative.

The 2004 feasibility study indicated that there is capacity at the existing Tacoma Link maintenance base to accommodate up to two additional vehicles. However, at a headway of 10-minutes, there would be a need for three additional vehicles above the existing fleet size under some operating scenarios. This level of increase would result in the need for storage and maintenance capacity beyond what is provided at the existing Tacoma Link maintenance and operations base.

### **3.3 Stations along the Extension**

The 2004 feasibility study for the casino extension identified a limited number of stations along the potential alternative alignments. On Portland Avenue, two station locations



were identified, between E 26<sup>th</sup> Street and E 27<sup>th</sup> Street and at E 31<sup>st</sup> Street. At the eastern terminus of the alignment, four alternative station locations were identified.

The 2004 feasibility study assumed that station platforms along the extension would accommodate a single Tacoma Link vehicle, with canopies of minimal extent, development, and identical design. The study also assumed that the stations primarily would consist of a basic shelter and a widened section of sidewalk.

#### **4. Potential Markets for the Rail Extension**

Using the alignments identified in the 2004 feasibility study, a Tacoma Link extension would serve several markets, including the central part of downtown Tacoma which is currently served by Tacoma Link. The extension would also connect to ST's Sounder commuter rail and ST Express bus services at the Tacoma Dome Station. Markets would also include residential areas located south and east of the existing Tacoma Dome station. However, the most significant market for the extension would be visitors and employees at the casino and related developments.

The 2004 feasibility study was based on existing development details for the casino, including square footage and estimated employment. These development plans are now being updated. Key information, particularly peak visitation levels and employee forecasts, would be required to develop a reasonable estimate of potential ridership and needed capacity.

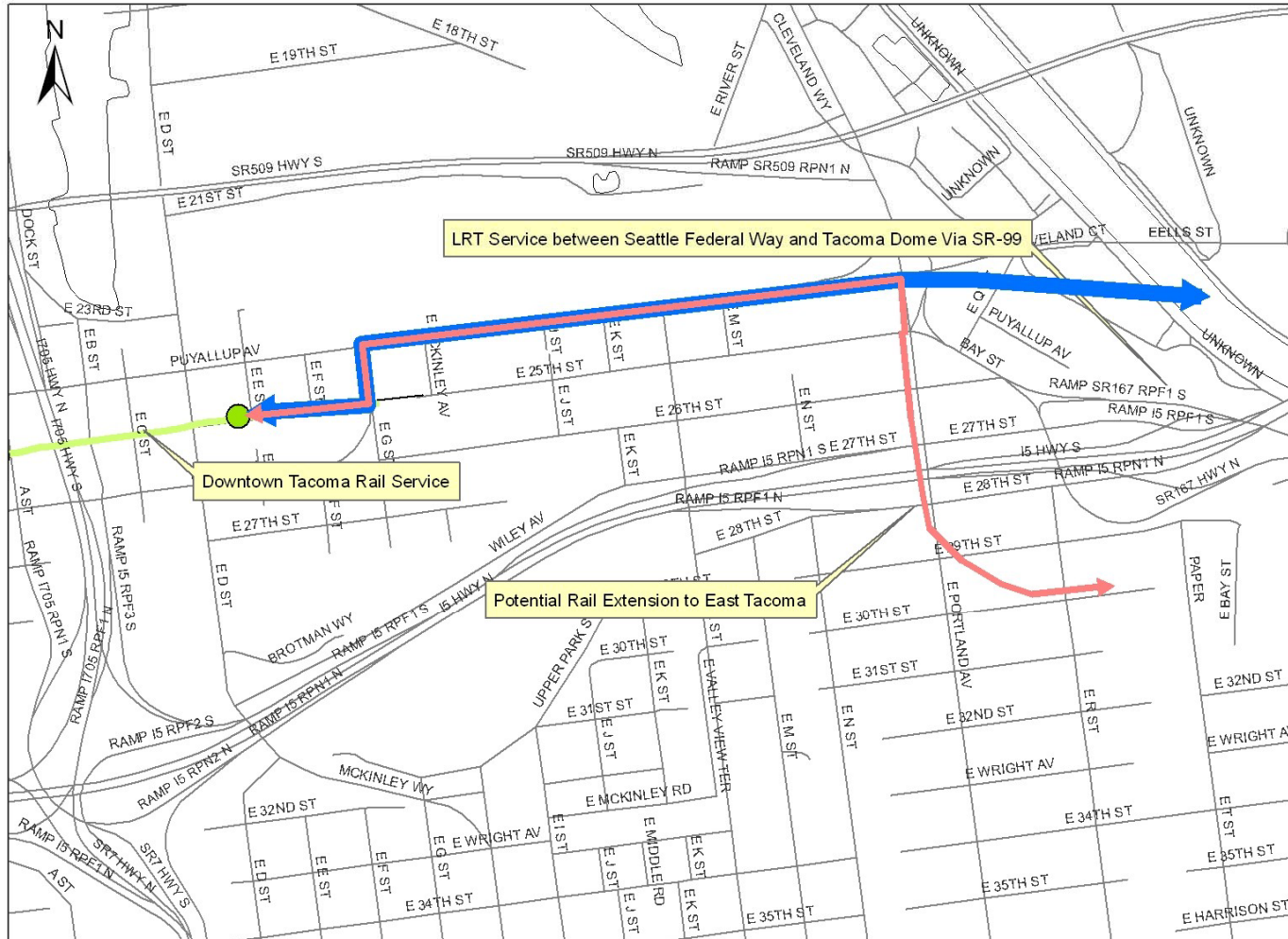
As noted in Section 3.2 of this Issue Paper, the 2004 feasibility study assumed 20-minute headways for the casino extension. However, a projection of ridership that is based on expected levels of visitors, workers, etc. could require a lower headway to meet demand. Until more definitive information is available on the type and extent of demand at the casino site, it would be difficult to determine potential demand levels for any rail extension.

#### **5. Potential Long-Term LRT Service between Downtown Tacoma and Federal Way**

This section describes potential rail operations in the downtown Tacoma area that could affect any East Tacoma extension of Tacoma Link. These operations involve potential long-term LRT service between downtown Tacoma, Federal Way, and downtown Seattle as well as the existing Link service operating in downtown Tacoma.

##### **5.1 – Operating Scenarios for East Tacoma Extension**

Figure 2 illustrates potential operating scenarios for a future East Tacoma extension and other rail services affecting downtown Tacoma. The alignment of any East Tacoma extension would likely follow Puyallup Avenue between the existing Tacoma Dome Station and Portland Avenue. Potential future LRT service between Federal Way and downtown Tacoma could include an SR 99 alignment. With an SR 99 alignment, the service would likely be on Puyallup Avenue as it approaches downtown Tacoma. Also, the service would likely use Central Link-type light rail vehicles. The 2004 feasibility



**Figure 2 - Tacoma Link East Extension and Potential LRT Alignment via SR 99**

study assumed future track construction along Puyallup Avenue would use Central Link vehicle design standards.

The light rail service in East Tacoma could be part of an eventual rail connection between downtown Tacoma, Federal Way and locations to the north. If this occurs, a bridge would likely have to be built over the Puyallup River to allow the rail to serve East Tacoma. Since, at some point in the future, 4-car light rail service could operate between Tacoma, Federal Way and locations to the north, stations in East Tacoma would have to be larger than what is discussed in the following sections. Also, if the East Tacoma service is part of the Tacoma/Federal Way light rail, stopping at the stations in East Tacoma could increase travel time versus a scenario that has the service operating as a separate extension from the Tacoma Dome Station.

## **5.2 – Potential Transfers at Tacoma Dome Station**

At the Tacoma Dome Station, transfers would likely occur between LRT trains from Federal Way and Tacoma Link trains using either Central Link vehicles or Tacoma Link vehicles. Existing stations in downtown Tacoma can accommodate either type of vehicle with some modifications to platforms for 2-car Central Link vehicles. As demand grows, particularly as a result of future LRT service between Tacoma, Federal Way, and downtown Seattle, use of two-car trains with Central Link vehicles will likely be required for the downtown Tacoma service.

Under the long-term service scenario described above, East Tacoma LRT service would likely involve an extension of multi-car LRT from downtown Tacoma. This would provide a continuous, no transfer connection between the central part of downtown Tacoma and the casino. Another scenario would involve a transfer at the Tacoma Dome Station between the downtown Link service and the extension to East Tacoma.

## **5.3 – Sharing Track Capacity**

With downtown Tacoma/East Tacoma service, additional light rail operations may need to share track capacity with potential future Central Link service. This track sharing would occur between the Tacoma Dome Station and Portland Avenue. Multiple rail operations converging on the Tacoma Dome station would add a level of complexity for operations and facilities, including accommodating passenger transfers. Further analysis of operations and access would be needed to determine possible platform locations and other facility needs at the Tacoma Dome Stations under a multiple rail line scenario.

## **5.4 – Size of Stations in East Tacoma**

Another potential issue involving service south of Puyallup Avenue is the size of passenger facilities. If the East Tacoma light rail extension is part of larger downtown Tacoma service, there could be a need for Central Link-type vehicles and stations. Ridership demand levels for service without a transfer, particularly within downtown Tacoma, could require Central Link type vehicles. With this operating scenario, larger stations along the extension would be necessary as compared to those identified in the

2004 feasibility study. These larger stations would be similar to existing Tacoma Link stations and would accommodate 2-car trains.

## **6. Estimated Costs**

The 2004 feasibility study identified estimated capital costs of between \$38.0 million and \$71.5 million depending on the alignment<sup>2</sup>. These costs are in 2004 dollars with an added factor for potential contingences. The costs include Tacoma Link low-floor vehicles, construction, right-of-way acquisition, administrative items, and third party agreements such as those necessary with utilities.

While vehicle requirements are included in the cost estimates, costs for new or expanded capacity for maintenance and operations were not included. With service operating every 20-minutes, additional vehicles could be accommodated at the existing Tacoma Link facility. However, the 2004 feasibility study noted that service operating every 10 minutes would require up to three additional vehicles. These additional vehicles would trigger the need for additional maintenance and operations capacity beyond what is available at the existing Tacoma Link facility.

Estimated costs for the East Tacoma extension would also be affected by potentially higher outlays for stations. As noted above in Section 5.2, operations for the extension could require 2-car light rail trains. Two-car trains would require more extensive station development and would result in higher costs than what was identified in the 2004 feasibility study.

It is important to note that the capital cost estimates presented in the 2004 feasibility study should be regarded as low-end estimates since they did not include expanded maintenance capacity or expanded station costs. Further, the study did not address higher operating costs. More refined cost estimates could be prepared as part of future phase project planning.

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<sup>2</sup> *Tacoma Extension Feasibility Study; Section 3.12 – Cost Estimates* (Prepared for Puyallup Tribe of Indians; prepared by Sound Transit, Puget Sound Transit Consultants, LTK Engineering Services; March 2004)