

**From:** Beal, David [mailto:beald@soundtransit.org]  
**Sent:** Friday, July 07, 2006 4:04 PM  
**To:** John Howell  
**Cc:** Matsuoka, Paul; Dezarn, Sheila; Arnold, Paul  
**Subject:** Final ST2 Project and System/Scenario Evaluation Methodology

Hi John:

Attached is our Final ST2 Project and System/Scenario Evaluation Methodology, for distribution to the Expert Review Panel.

This version more formally separates the Project level criteria and measures from the System/Scenario level criteria and measures. It documents the criteria and measures used in Round 1, when the ST Board screened out 18 projects, leaving 63 for further evaluation. It then documents the start of Round 2, presenting not only the criteria and measures, but the evaluation results the Board saw in their initial review of system scenarios on 6/22/06.

Thank you.

David Beal

beald@soundtransit.org



**SOUND TRANSIT**  
**HCT Planning**

## **SOUND TRANSIT HCT PLANNING**

**Sound Transit Long-Range Plan/ST2 Planning:**

**Task 2.0 - Methodology Development and Documentation**

### **Subtask 2.1 – Project and System/Scenario Evaluation Methodology**

*Prepared for:*  
Sound Transit

*Prepared by:*  
Parsons Brinckerhoff Quade & Douglas, Inc.

**FINAL**

July 2006

## Table of Contents

Task 2 - Methodology Development and Documentation: Subtask 2.1 – Process for Evaluation .....	1
1. Background and Purpose.....	1
2. Project Goals and Guiding Principles .....	2
3. Decision Framework and Flow Process for Developing a ST2 Plan.....	3
4. Evaluation Measures .....	6

## List of Tables

Table 1- Project–Level Evaluation Criteria and Measures for ST2 Planning.....	8
Table 2 - ST2 Preliminary Scenario-Level Evaluation: Round 2.....	11

## **Task 2 - Methodology Development and Documentation: Subtask 2.1 – Process for Evaluation**

---

### ***1. Background and Purpose***

Sound Transit (ST) is currently implementing the *Sound Move* plan that includes the first phase of light rail, commuter rail, regional express bus and community connection projects, all part of the 1996 voter-approved plan. Subsequent project phases will fully implement ST's Long-Range Plan. The evaluation methodology presented in this report will serve to guide the selection and packaging of improvements to be included in the Sound Transit 2 (ST2) plan that ultimately will be presented to the voters for funding approval.

Unlike the original planning done for Sound Transit in the 1990's, which evaluated entire system alternatives (Transportation Systems Management, Rail, and Transitway), the planning work in ST2 will evaluate projects and project packages within the context of the agency's adopted Long-Range Plan and elements of *Sound Move* that are being or have been constructed.

### **Summary of Overall Evaluation and Screening Process**

The grouping and evaluation of projects to be included in ST2 will occur within the context of the overall Long-Range Plan. During the development and adoption of the Long-Range Plan, Sound Transit made a number of strategic decisions regarding topics such as the addition of new corridors, technology choices for critical corridors, the role of supporting facilities and projects, etc. These decisions shape the number and types of projects that will be carried forward into the ST2 evaluation process. During ST2, this initial list of projects will then be narrowed down to a set of new and enhanced existing facilities and services that meet the overall principles, goals and objectives of the agency.

As is the case with the process carried out in the 1990's for the Regional Transit Project (RTP), the ST2 evaluation effort will focus on alternatives within three corridors – North, South, and East of the Seattle Central Business District (CBD). Each of these corridors affects one or more of the five sub-areas that are within ST's boundary. These subareas are Snohomish County, North King County, East King County, South King County and Pierce County.

The purpose of this evaluation methods memorandum is to document the evaluation process that will be used primarily to guide the selection of a package of projects that will make up the ST2 plan. In addition, the evaluation methodology serves the following purposes:

- Provides structure to the overall evaluation process
- Establishes the method for evaluating projects and comparing different groups of projects.
- Develops a systematic process for organizing information regarding potential benefits, impacts and costs.
- Provides decision makers, the ST Board of Directors, with a procedure for identifying key differences among alternative packages.
- Ensures consistency in the evaluation of alternative packages.

## ***2. Project Goals and Guiding Principles***

### **Guiding Principles**

The Long-Range Plan and resulting ST2 projects must:

- Be consistent with the State Growth Management Act
- Be consistent with Vision 2020, the region's adopted growth strategy
- Be consistent with Destination 2030, the region's Metropolitan Transportation Plan
- Be consistent with the State High Capacity Transportation Systems Act (81.104)
- Support City and County measures enacted to manage growth and reduce automobile use in major centers
- Support the regional economy and preserve a high quality of life
- Enjoy a high degree of public acceptance
- Advance the RTA District toward a fully developed regional HCT system in logical, stand-alone phases
- Increase the value of *Sound Move* investment in projects and services
- Present an effective HCT alternative to automobile use

## Goals and Objectives for Long-Range Plan and Resulting ST2 Projects

The goals and objectives for both the Long-Range Plan and ST2 projects are as follows. The Plan and ST2 planning process must:

- Provide citizens with strongly supported, improved and expanded alternatives to the automobile and traffic congestion
- Enhance system developed in *Sound Move*
- Continue complementary investment in *Sound Move*
- Link the region's designated urban centers
- Operate service principally in exclusive rights-of-way
- Implement HCT in high density corridors
- Focus investment within the RTA district
- Encourage and support future development inside the urban growth boundary
- Balance regional, corridor and subarea needs
- Respect subarea equity policies
- Return benefits in balance with subarea population, employment and needs
- Provide regional (not local) facilities and services
- Protect and enhances the natural environment in the central Puget Sound region
- Preserve transit right-of-way
- Influence future land use toward Transit Oriented Development (TOD)
- Avoid competitive, duplicative services
- Involve the public and key stakeholders in decision making
- Favor cities and counties with supportive land use plans

### ***3. Decision Framework and Flow Process for Developing a ST2 Plan***

#### **3.1 Generate List of Potential Projects**

ST has worked extensively to develop a list of candidate transit improvements to be included in the planning work. This list has also been amended to include improvements suggested by the ST Board and public input through the SEIS scoping process. Although the type of potential projects vary greatly (e.g., pedestrian bridges, expanded parking, LRT extensions) they can be grouped into two major categories; HCT projects and supporting projects.

***HCT Projects:*** this set of projects includes potential extensions from the lines in *Sound Move*. These are Central Link light rail transit (LRT),

Tacoma Link LRT, Sounder commuter rail and ST Express bus routes. Alternatives to rail extensions, in the form of Fixed Guideway Bus Rapid Transit (BRT), are also included in the list. A common theme of this group or **set of** projects is the linear physical connection of the guideway, stations, and facilities that comprise a corridor of investments.

***Supporting Projects:*** this group of projects and services includes enhancements to facilities, vehicles fleets, and services that support further development of ST's core programs such as pedestrian bridges, transit centers, HOV/BRT facilities, bus routes, park and ride lots, etc. Projects in this category are not linear, physically-connected project improvements. Some may contribute to a corridor of HOV/BRT improvements begun under *Sound Move* but not fully completed. Others may be simply discrete stand-alone capital projects.

During the planning and evaluation process, new projects may be added to the list as long as they are consistent with the adopted Long-Range Plan. Projects may also be suggested through the public involvement process. Unlike *Sound Move* planning, which began with a blank slate, ST2 will be building on an existing base of facilities and services.

HCT improvements that become part of the Long-Range Plan, as amended, will provide the basis for identifying candidate projects to be considered for ST2.

Three main corridors have been identified for ST2 planning:

- North Corridor – This corridor roughly comprises the area north of the Seattle CBD to the northern edge of the ST boundary in Snohomish County.
- South Corridor – This corridor includes the area south of the Seattle CBD to the southern edge of the Pierce County subarea.
- East Corridor – This corridor roughly includes the area east of the Seattle CBD, west of the western shore of Lake Washington, east to Issaquah, south to Renton and north to Bothell.

### **3.2 Phased Process of Project and System/Scenario Evaluation**

Following the adoption of the Long Range Plan (July 2005), ST began working with local jurisdictions to identify specific projects and services to evaluate for ST2. In October 2005, the ST Board agreed to a list of 81 candidate projects for

further study. As ST began developing the project scopes and other information required for the evaluation process, it also began detailing a three-part overall evaluation framework, described below.

**Round 1:** During this phase of evaluation, all the evaluation information was presented for the 81 projects. The ST Board focused their attention on a smaller set of prioritized evaluation criteria. These included:

- Ridership
- Capital Cost
- O&M Cost
- Connectivity, Mobility and System Integration
- Risk Avoidance

Following their evaluation, the Board eliminated 18 projects from further consideration, leaving 63 candidate projects for continued ST2 planning.

For greater information regarding *Round 1* see two related documents:

- Summary of ST2 Round 1 Project Evaluation (January 12, 2006)
- Sound transit Board of Directors Motion No. M2006-03, directing staff to set aside from further consideration those ST2 projects that do not perform well under the Board's initial screening criteria.

**Round 2:** This phase of analysis focuses on completing system-level ridership forecasting, the creation of several alternative ST2 systems (at varying levels of cost), and analysis of the resulting financial scenarios. It is expected that Round 2 will be completed when the Board identifies one or more scenarios as DRAFT ST2 Plan(s), and releases these for public comment.

**Round 3:** This phase will focus on refining promising projects and systems, and collecting and responding to public comment. It is expected that Round 3 will culminate in ST Board approval of a Final ST2 Plan for submittal to the voters within the Sound Transit district.

### **3.3 Sound Transit Board of Directors' Input to Evaluation**

All relevant project information will be summarized in a manner to provide transparency throughout the evaluation process. The structure of the evaluation

will provide visibility to all levels of aggregation and will allow the “mix and match” of package components in order to illustrate benefits and impacts.

The ST Board will have significant direct involvement in the project-, system- and scenario-level evaluation process. Potential key milestones for Board involvement and decisions include:

- Board of Directors’ agreement on evaluation criteria (July 2005)
- Presentation of Round 1 Evaluation materials to Board of Directors: 81 projects (December 2005)
- Round 1 evaluation and project screening: 63 projects (January 2005)
- Assessment of financial capacity and alternative funding scenarios
- Initial review of project packages at various funding levels, including a low capital option
- Transit technology comparisons for I-90 Corridor
- Iterative ST2 package/project evaluations
- Round 2 evaluation and development of DRAFT ST2 Plan(s)
- Results of public review of DRAFT ST2 Plan(s)
- Round 3 evaluation and development of a Final ST2 Plan

### **3.4 Evaluation Results**

The output of the project development, evaluation and ST Board decision processes will be a final package of HCT/supporting project improvements, organized into DRAFT and Final ST2 Plans.

## ***4. Evaluation Measures***

Table 1 presents a comprehensive listing of the measures used in the ST2 project-level evaluation process. The measures are organized within a framework of evaluation criteria that was selected by the ST Board of Directors during the summer of 2005, for the purposes of ST2 project evaluation. These criteria and measures were applied in January 2006 when the ST Board of Directors evaluated eighty-one (81) potential ST2 projects. That process resulted in the Board setting aside eighteen (18) projects from any further evaluation work by staff, resulting in a short-list of sixty-three (63) remaining ST2 candidate projects (Board motion no. M2006-03).

Table 2 presents the criteria and measures for the ST2 preliminary scenario-level evaluation, conducted during June 2006. This table also presents the results of the evaluative analysis conducted by staff on five representative scenarios, showing the results for all but one of the measures. This presents a significant portion of the information available to the ST Board of Directors while they considered, for the first time, the relative performance of various combinations of capital and operating projects (scenarios) at different incremental costs and taxation levels.

**Table 1 -- Project-Level Evaluation Measures and Measures for ST2 Planning**

<b>Project-level evaluation measures</b>		
<b>CRITERIA</b>	<b>MEASURES</b>	<b>NOTES</b>
Ridership	Daily transit volumes across a specific screenline	ST riders per day and per year
	Boardings	Per day and per year
Capital Cost	Capital cost	Current-year dollars
O&M Cost	Annual O&M cost	Current-year dollars
	Total O&M cost over ST2 duration	Current-year dollars
Travel Time and Reliability	Travel time between centers served	Minutes in ST2 horizon year
	Percentage of project/route length in exclusive right-of-way	Percent
System Integration	Does the project extend the reach of ST service by extending or connecting to a <i>Sound Move</i> investment?	Yes/No
	Does ST directly serve or use the facility?	Yes/No
Connectivity and Mobility	Percentage of all PSRC-endorsed centers directly served	Percent in ST2 horizon year
Customer Experience	Convenience, Ease of use	Qualitative Description. <i>May be keyed to percentage of project/route length in exclusive right-of-way.</i>
Environmental Benefits	Selected quantified measures (e.g., air quality)	TBD
	Acres of property acquisition outside of public right-of-way	Acres

Public Support	List of project Sponsors	
Risk Avoidance	Does the project include any high-risk components, including construction risks (e.g., tunnels, bridges)	High, Medium or Low (Explain)
	Partner risks including dependencies, expectations and/or funding	High, Medium or Low (Explain)
	Does project require any unusual/special permits?	High, Medium or Low (Explain)
	Environmental clearance	High, Medium or Low (Explain)
	Policy risk(s)	High, Medium or Low (Explain)

**Table 2 -- ST2 Preliminary Scenario-Level Evaluation: Round 2**

Note: The table on the following page is an exact replica of an evaluation matrix presented by staff to the Sound Transit Board of Directors on June 22, 2006. This was the first detailed, scenario-level evaluation information presented to the Board.

Criteria	Measure	Do Nothing	Low (Bus Emphasis)	Medium (Bus/Rail)	Med-High (Rail Emphasis w/ Bellevue aerial)	High (Rail Emphasis w/ Bellevue tunnel)	
Ridership	Annual ST transit trips (millions, 2030)	58	61	92	104	105	
	Annual new riders (millions, 2030)	0.0	1.7	10.6	17.4	19.0	
	Daily transit volumes across specific screenlines (2030)						
	Ship Canal	122,000	124,000	135,000	137,000	138,000	
	Cross-Lake	31,000	31,000	41,000	45,000	45,000	
	South Seattle	75,000	76,000	82,000	87,000	86,000	
Capital Cost	Percentage of ST2 costs dedicated to capital (2030)	N/A	79%	83%	86%	87%	
	Capital costs through ST2 horizon year (2005 \$M)	0	1,513	5,800	7,500	8,400	
	Added HCT capital cost per added HCT boarding (2005 \$)	\$0.00	\$0.00	\$4.64	\$5.49	\$5.65	
O&M Cost	Percentage of ST2 costs dedicated to O&M (2030)	N/A	21%	17%	14%	13%	
	Added annual O&M cost in ST2 horizon year (2005 \$M)	\$0	\$9	\$62	\$70	\$91	
	Added HCT O&M cost per added HCT boarding (2005 \$)	\$0.00	\$0.00	\$1.47	\$1.64	\$1.66	
Connectivity, Mobility and Integration	Opportunities to restructure <i>ST Express</i> bus routes (2030)	Low (3 routes)	Low (3 routes)	Medium (6 to 7 routes)	High (13 to 15 routes)	High (13 to 15 routes)	
	2030 Percentage of low-income households (i.e., lowest income quartile) within 1/2 mile of an exclusive right of way HCT station (actual number)		6% (24,000)	10% (39,000)	9% (36,000)	11% (44,000)	
	Percentage of minority households within 1/2 mile of an exclusive right-of-way station (2000)		<i>information to follow</i>	<i>information to follow</i>	<i>information to follow</i>	<i>information to follow</i>	
	2030 Percentage of population within 1/2 mile of an exclusive right-of-way HCT station (actual number)		3% (95,000)	5% (184,000)	5% (182,000)	7% (229,000)	
	2030 Percentage of employment within 1/2 mile of an exclusive right-of-way HCT station (actual number)		8% (183,000)	15% (335,000)	15% (345,000)	17% (398,000)	
Risk Avoidance	<b>OVERALL RISK AVOIDANCE</b>	N/A	High	Low	Low	Low	
	Avoidance of high risk components, including construction risks (e.g., tunnels, bridges)	N/A	High	Low	Low	Low	
	Avoidance of partner risks (e.g., co-funding availability, partner projects that must precede, multi-party agreements required)	N/A	High	Medium	Low	Low	
	Avoidance of unusual/special permits and environmental clearances	N/A	Medium	Low	Low	Low	
	User Benefit -- Annual Travel Time Savings (millions of hours, 2030)	0.0	1.4	9.9	16.5	17.5	
Travel time and reliability	Percentage of PSRC-designated centers directly connected by exclusive right-of-way HCT (2030)	35%	35%	42%	48%	48%	
	PSRC-designated centers connected by exclusive right-of-way HCT (2030)		Auburn, Everett, Kent, Lakewood, Puyallup, Seattle, First/Capitol Hill, UW, Tacoma and Tukwila	Auburn, Everett, Kent, Lakewood, Puyallup, Seattle, First/Capitol Hill, UW, Tacoma and Tukwila	Auburn, Everett, Kent, Lakewood, Puyallup, Seattle, First/Capitol Hill, UW, Tacoma, Tukwila, Bellevue and Northgate	Auburn, Everett, Kent, Lakewood, Puyallup, Seattle, First/Capitol Hill, UW, Tacoma, Northgate, Federal Way and Redmond-Overlake	Auburn, Everett, Kent, Lakewood, Puyallup, Seattle, First/Capitol Hill, UW, Tacoma, Tukwila, Bellevue, Northgate, Redmond-Overlake, Lynnwood (and potentially to downtown Redmond)
	Percent of all centers' employment connected/served by exclusive right-of-way HCT (2030)	50%	50%	60%	65%	67%	
	Coordination of existing land uses, ST2 services & facilities, and projected future development	N/A	Low	Medium	High	High	
	Estimated acreage of property acquisition outside of public rights-of-way -- <i>Opportunities for transit and pedestrian friendly land development</i>	0	30	90	180	200	
Land Use and Development	Hydrocarbons reduced annually (tons, 2030)	N/A	98	537	883	927	
	Carbon monoxide reduced annually (tons, 2030)	N/A	754	4,110	6,763	7,102	
	Gasoline consumption reduced annually (millions of gallons, 2030)	N/A	1	8	13	14	
	Annual highway vehicle miles of travel saved (millions, 2030)	N/A	29	158	260	273	
	Percentage of ST boardings occurring at HCT stations (e.g., experience of short wait times, reliability of boarding time, high awareness of schedule, lighting, security, comfort)	73%	70%	85%	88%	89%	
Environmental Benefits							
Customer Experience							