

Sound Transit 3 Expert Review Panel

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BY BOARD ADMINISTRATION

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Acting Secretary Roger Millar
Washington State Department of
Transportation
310 Maple Park S.E.
Olympia, WA 98501

Dow Constantine
Board Chair
Sound Transit
401 South Jackson
Seattle, WA 98104-2826

Josh Brown
Executive Director
Puget Sound Regional Council
1011 Western Avenue, Suite 500
Seattle, WA 98104

Peter Rogoff
CEO
Sound Transit
401 South Jackson
Seattle, WA 98104-2826

Dear Sirs,

On February 8th and 9th we conducted our fourth meeting of the ST3 Expert Review Panel. We received presentations on a number of follow up issues from our previous meetings, heard a report from a consultant we hired to analyze the cost estimates for selected ST3 candidate projects, and had a good discussion with Sound Transit's new CEO Peter Rogoff.

This is our fourth letter to you. As you know, state law requires the creation of an expert review panel to "assure appropriate system plan assumptions and to provide for review of system plan results" in advance of placing a high capacity transit plan on the ballot. This panel continues to explore the key assumptions and methods being used by Sound Transit to prepare an ST3 proposal.

In this letter, as we have done in previous letters, we will provide our comments on the planning work that Sound Transit is doing, raise questions for your consideration, and ask for additional information.

Cost Effectiveness Evaluation

In two of our previous letters we have stated that we believe the Sound Transit Board should be reviewing cost effective measurements for individual projects before determining the configuration of a draft system plan. Sound Transit has responded by stating that they intend to prepare an evaluation of cost effectiveness ("such as annualized cost per annual project rider") for the major light rail corridors and extensions after the draft system plan is adopted by the board.

We have suggested that the Board consider at least two cost effectiveness measures for the ST3 candidate projects: cost per rider, and the cost per new rider. After our recent meeting we used information provided by Sound Transit regarding the anticipated annual operating cost and the ridership projections for various ST3 candidate projects to develop a cost per rider analysis. Our work is provided in Attachment 1. We offer this to the Board for its consideration because we believe it is good practice to review this data when comparing project options.

In addition, we suggest that the Board also request an analysis of cost per new rider, so it can compare the levels of investment needed to bring new riders into the high capacity transit system. We did not have the information available to conduct this analysis, as the total ridership estimates provided in the project descriptions do not differentiate existing transit system riders from new riders. We believe the methodology to do such an analysis is consistent with industry best practices, and with the approach advocated in the past by the Federal Transit Administration (FTA) for New Start proposals.

ST3 Financial Plan

Sound Transit Financial Model – In January several panel members spent time reviewing the Sound Transit financial model that is being used to prepare the ST3 finance plan. Because the finance plan won't be available until after the draft system plan is adopted by the board, we wanted to review the structure of the model that will produce that plan. We received a thorough review of the model construct and its capabilities. We found the model to be sound and consistent with good industry practice. It improves upon the model that was used to develop the ST2 finance plan. We were also pleased to note that Sound Transit staff will be asking an independent party to review all of the inputs and formulas in the model to make sure there are no errors.

Inflation Forecasts – Sound Transit is currently planning to apply a contingency to its inflation forecast indices. We have some question whether that additional level of conservatism is necessary given the contingencies and reserves built into the construction cost estimates (which we believe are appropriate). However, before providing you with our opinion about that approach we would like to see the results of the planned sensitivity analysis once the ST3 finance plan is developed.

Cost per Household – Our review of the Sound Transit financial model also included some discussion about the estimated cost per household. Of course, the final projected cost per household cannot be determined until the draft system plan, sources of funds and term of the ballot measure are determined. However, at our most recent meeting we requested information regarding the methodology for estimating the cost per household at this stage of planning. The panel was presented with estimates for the potential tax burden on a “typical” home, for sales and use tax, MVET, and property tax. For both the sales and use tax and MVET the panel was

presented with two cost per household figures, one showing the impact of just an ST3 ballot measure, and another showing the impact of an ST3 measure and the continuation of the taxes levied for the Sound Move and ST2 measures. When the draft system plan is developed, describing the anticipated projects and the estimated cost per household, the panel suggests that the potential tax burden be described for both the additional (ST3) and cumulative (the combined Sound Move, ST2 and ST3) tax impacts.

Federal Grant Assumptions – In February we were briefed on the assumptions about federal grant funding that are being used to develop the ST3 finance plan, and about Sound Transit’s historic record of grant funding. Currently Sound Transit is assuming that 10% of the ST3 capital program will be funded by federal grants. Historically, Sound Transit has secured federal grants that amount to 18% of its capital program. Staff is doing an in-depth analysis of what assumption to incorporate into the final ST3 finance plan. Before we comment on this key assumption we want to review the ST3 draft system plan, the draft finance plan, and the sensitivity analysis on that plan.

Ridership Forecasts for ST3 Candidate Projects

The panel understands that Sound Transit is using an incremental model for estimating ridership. This is a reasonable approach, and makes the model sensitive to shifts in population and employment throughout the region. Our primary concern is not the accuracy of the model, but the lack of transparency in the ridership estimates being presented for the ST3 candidate projects. For example, for some projects ridership changes very little in the various north corridor options that go from Lynnwood to Everett, despite there being significant changes in travel time and alignment.

ST staff have explained that different riders are using the system under these different alternatives. For example, the slower travel times on options such as N-02a (Lynnwood to Everett Light Rail via SW Everett Industrial Center) are causing some riders in the N-02c option (Lynnwood to Everett Light Rail via I-5) to not ride the light rail system. But these riders are being replaced by new riders, with very different origin/destination patterns (e.g., the SW Everett Industrial Center). We think it is important that ST describe these changes in their summary documentation, as it is important that the Board understand which trips are being served, and who is benefiting from the system in order to make good decisions about which alignment is best for the region.

After being given added ridership detail, we believe the model is working as intended, but the current lack of transparency makes it easy for outside reviewers to call these ridership estimates into question. Without more detailed explanations, the lack of change in ridership appears to call into question the model’s performance. These same concerns are apparent when examining the ridership information for the I-405 BRT service options.

For the Ballard alternatives, projected ridership fluctuates dramatically in large part because some reported ridership estimates include ridership from the line to Tacoma, and others do not. These numbers hide the relative size of the Ballard markets being served, and thus limit the ability to judge the relative value of the alternative alignments serving Ballard and Queen Anne. The ridership and cost of the different Ballard/Queen Anne alignments need to be separated from the issue of alignment through downtown Seattle. Both are very important decisions, but the current ridership reporting process obscures the important details which will allow the Board to make informed decisions.

Lastly, the Panel is continuing to work with Sound Transit staff and PSRC to better understand the population and employment inputs into the ridership forecasting model, for both the base year, 2014 as well as 2040.

Cost Estimates for ST3 Candidate Projects

The panel previously reviewed and commented on the methodology used by Sound Transit to develop cost estimates for ST3 projects. We commented in our letter of November 25, 2015 that we found the capital cost estimating methodology “sound and consistent with good industry practice.”

We also wanted to review the details of the specific cost estimates for selected ST3 candidate projects. We wanted to see if the cost estimating methodology was applied appropriately and uniformly in developing the candidate project cost estimates. The panel hired Mike Morrison, of Value Management Consulting, to conduct an analysis of eleven potential ST3 projects. Mr. Morrison conducted a similar analysis for the ST2 package of projects. At our February meeting we heard a report from Mr. Morrison.

Mr. Morrison shared with the panel a number of conclusions he reached based on his review of the eleven representative ST3 projects. We have attached a copy of the executive summary of his report (see Attachment 2), but here are several summary points:

- The unit costs used to assemble the project cost estimates are reasonable and appropriate
- Sound Transit has made good use of its knowledge and experience with the Sound Move and ST2 project design and construction
- The cost estimating methodology provides excellent documentation and good references to industry standards.
- Consider using life-cycle cost analysis for conceptual value assessment, even at this early stage of program and project development.
- For the Basis of Estimates, consider eliminating the inclusion of risk in the Right-of-Way (ROW) cost estimate, and develop ROW risk analysis when work is done to analyze other risks in the program.

Project Schedules and Capacity Issues

Panel members noted that if the board adopts a 20 or 25-year system plan, there could be an unprecedented level of construction activity for Sound Transit, and throughout the region. In addition to the planning, design and construction of ST3 projects, the agency will be completing work on a number of large and complex ST2 projects. At our February meeting we asked Sound Transit SFO Brian McCartan to talk with us about the projections for possible annual capital expenditure levels for Sound Transit if the ST3 measure is approved. Actual estimates cannot be made until a draft system plan is identified, but it is quite likely that Sound Transit would experience several years where annual expenditures would be at all-time highs.

With that level of likely activity, it raises questions for panel members about the capacity of the agency and the regional construction community to meet the demands of this program. The panel cannot reach any conclusions about issues of capacity until it reviews an overall project schedule, with project phasing plans. We understand this will not be completed until there is a draft system plan. The panel would like to receive the overall project schedule and phasing plan as soon as they are available. We encourage both the staff and the board to focus on questions about both the internal and external capacity needed to complete both ST2 and ST3 projects.

Least Cost Planning

The panel would like to understand both: 1) how the Puget Sound Regional Council (PSRC) will comply with its responsibility under RCW 47.80.030 regarding least cost planning when it reviews Sound Transit's proposals under RCW 81.104.080(5)(b); and 2) how and when Sound Transit will directly or indirectly take least cost planning into consideration when developing its proposals that are subject to this review.

Near-Term Investments

The panel was briefed on Sound Transit's plans to explore possible near-term investments if the board adopts a 20 or 25-year system plan. As we understand it, these would be investments that could be made relatively soon after approval of an ST3 measure, that would improve travel times and enhance high capacity transit services in corridors where an ST3 project is planned, but may take an extended period of time to design and construct. The panel was told that Sound Transit is considering potential capital improvements, although we did not receive information about the projects that are being considered. Panel members commented that near-term investments to improve travel in corridors prior to construction of ST3 projects would likely require expenditures for additional transit services, as well as capital investments.

Project Discussions with Outside Agencies

In our January 21st letter to you we suggested that Sound Transit would be well advised to engage with environmental regulators and local jurisdictions very early in the planning process to discuss potential regulatory issues, possible efficiencies, and strategic partnerships for ST3 projects. To the extent that current ST2 inter-agency engagements can be utilized to support early agency environmental coordination for ST3, such opportunities should be leveraged. At our recent meeting, new Sound Transit CEO Rogoff met with us and mentioned his interest in this approach, based on his experience with federal projects. We continue to encourage Sound Transit to bring regulatory authorities together early in the process, prior to initiating the project-level National Environmental Policy Act (NEPA) and State Environmental Policy Act (SEPA) processes. This can help with early identification of potential “red flags”, challenges, and controversial issues, as well as opportunities for strategic and coordinated conservation and mitigation efforts.

Requests for Information

The panel would like to request information on several topics that were discussed at our February meeting.

At our next meeting we would like to receive a briefing on how the Sound Transit long range plan serves as the foundation for ST3 projects from a NEPA/SEPA standpoint, and how the long range plan is consistent with local land use plans/visions, as well as federal, state and local environmental guidance and regulations. As part of this briefing, we would also like to hear about environmental issues related to ST3 that are already known, and those that are anticipated based on Sound Move and ST2 environmental processes.

Panel members continue to be very interested in how the ST3 projects will accommodate bus/rail integration for riders across the region. We believe the ability to provide a seamless connection for bus/rail riders will have an effect on ridership numbers and on the users experience with the system. As the draft system plan is prepared we'd like to know what assumptions are made about how and where bus/rail integration will occur and the reactions from transit agencies about the draft plan.

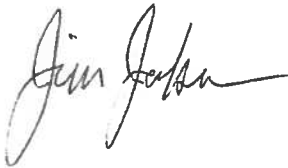
We were pleased to learn about Sound Transit's risk assessment workshops. We would like to see the results from those workshops.

Finally, we would like to request information about the original construction budget estimate and final cost for the maintenance base facility operating in South Seattle. At our November meeting we received information about original budget estimates vs. final or current estimated costs for seven Sound Transit projects, including the Link OMSF facility on Bellevue. The current cost estimate for the OMSF project is significantly higher than the original estimate. Given that the

ST3 draft system plan will likely include multiple maintenance base facilities, it would be helpful to compare the costs of the original maintenance base with original estimates, and to understand how Sound Transit is using its experience to estimate costs for the ST3 maintenance facilities.

Our next meeting will occur after the Sound Transit Board adopts a draft system plan for review by the public. We look forward to reviewing the details, assumptions and methodologies for that draft system plan.

Sincerely,

A handwritten signature in black ink, appearing to read "Jim Jacobson". The signature is fluid and cursive, with a long horizontal stroke at the end.

Jim Jacobson
Chair

Cc: Expert Review Panel Members
Ric Ilgenfritz, Sound Transit
Amy Scarton, WSDOT

Attachment 1

Analysis of Annual Cost per Rider for ST3 Candidate Projects

| <u>Projects North</u> | Annual Ridership * (Based on Daily <u>Mid-Range</u>) | Annual O&M <u>Costs</u> | Projected Cost <u>Per Rider</u> |
|--|---|-------------------------------|---------------------------------------|
| Lynnwood to Everett Light Rail | | | |
| N-02a Everett Industrial Center via Pacific Ave | 16,160,000 | \$83,420,000 | \$5.16 |
| N-02a Everett Industrial Center via 41st St. | 16,160,000 | \$77,930,000 | \$4.82 |
| N-02b SR 99/Evergreen Way via Pacific Ave. | 15,360,000 | \$75,570,000 | \$4.92 |
| N-02b SR 99/Evergreen Way via 41st St. | 15,360,000 | \$70,210,000 | \$4.57 |
| N-02c Via I-5 | 15,680,000 | \$58,070,000 | \$3.70 |
| 145th St. & SR 522 BRT | | | |
| Option 1: N-09a + N-10 | 2,250,000 | \$12,160,000 | \$5.40 |
| Option 2: N-09b + N-10 | 2,250,000 | \$12,240,000 | \$5.44 |
| N-01 Everett Station to North Everett LRT | 2,080,000 | \$11,110,000 | \$5.34 |
| N-04 Infill LRT Station at 130th St | 320,000 | \$1,960,000 | \$6.13 |
| N-05 Infill Station LRT Station at 220th St. | 320,000 | \$2,320,000 | \$7.25 |
| <u>Projects East</u> | | | |
| E-01 Overlake to Downtown Redmond Light Rail | 2,880,000 | \$11,830,000 | \$4.11 |
| E-03 Totem Lake to Issaquah Light Rail | 4,320,000 | \$42,180,000 | \$9.76 |
| I-405 Bus Rapid Transit | | | |
| E-02a + E-04 Lower Capital Option to Burien | 4,650,000 | \$43,020,000 | \$9.25 |
| E-02a + E-04 Lower Capital Option to Angle Lake | 4,650,000 | \$45,580,000 | \$9.80 |
| E02b + E-02c + E-04 Intensive Capital to Burien | 4,650,000 | \$45,680,000 | \$9.82 |
| E02b + E-02c + E-04 Intensive Capital to Angle Lake | 4,650,000 | \$48,240,000 | \$10.37 |
| E-06 Kirkland Totem Lake to Bellevue BRT | 900,000 | \$14,720,000 | \$16.36 |
| <u>Projects Central</u> | | | |
| Ballard to Downtown Seattle Light Rail | | | |
| C-01a Option 1: 15th Ave. At-Grade/At-Grade Downtown | 15,680,000 | \$34,880,000 | \$2.22 |
| C-01b Option 2: 15th Ave. Elevated/Tunnel Downtown | 37,600,000 | \$42,630,000 | \$1.13 |
| C-01c Option 3: Interbay West/Tunnel Downtown | 37,600,000 | \$45,170,000 | \$1.20 |
| C-01d Option 4: Westlake At-Grade/At-Grade Downtown | 13,920,000 | \$37,910,000 | \$2.72 |
| West Seattle to Downtown Seattle Light Rail | | | |
| C-03a Option 1: Tunnel Downtown/Elevated to W. Seattle | 14,240,000 | \$24,480,000 | \$1.72 |
| C-03b Option 2: At-Grade Downtown/Elevated to W. Seattle | 7,040,000 | \$20,810,000 | \$2.96 |
| C-03c Option 3: Tunnel Downtown/Delridge/White Center | 11,840,000 | \$33,540,000 | \$2.83 |
| C-01e LRT Station near SR99 and Harrison St. | 960,000 | \$2,370,000 | \$2.47 |
| C-01f LRT Station at Interbay | 320,000 | \$1,300,000 | \$4.06 |
| C-01g LRT Extension w/ station at Ballard High | 1,440,000 | \$2,530,000 | \$1.76 |
| C-02 Ballard to University District Light Rail | 6,880,000 | \$17,160,000 | \$2.49 |
| C-08 Infill LRT Station @ Graham St. | 1,120,000 | \$1,630,000 | \$1.46 |
| C-09 Infill LRT Station @ Boeing Access Rd. | 1,920,000 | \$1,630,000 | \$0.85 |
| C-10 Infill Sounder Station @ Boeing Access Rd. | 662,500 | \$610,000 | \$0.92 |
| C-13 Light Rail W. Seattle Junction to Burien Transit Center | 7,040,000 | \$28,820,000 | \$4.09 |

Attachment 1

Projects South

Kent-Des Moines to Tacoma Dome Light Rail

| | | | |
|--|------------|--------------|---------|
| S-01 + S-02 + S-03 Option 1: Via I-5 | 18,880,000 | \$49,170,000 | \$2.60 |
| S-01 + S-02 + S-04 Option 2: Via SR 99 | 18,880,000 | \$49,440,000 | \$2.62 |
| S-05 Tacoma Dome to Tacoma Mall LRT | 4,480,000 | \$11,800,000 | \$2.63 |
| S-06 Expand Sounder South Platforms to 8 Cars | 265,000 | \$2,490,000 | \$9.40 |
| S-07 Addtl Sounder South Platform Extensions (beyond S-06) | 265,000 | \$4,530,000 | \$17.09 |
| S-11 Tacoma Link Extension to Tacoma CC | 3,840,000 | \$11,160,000 | \$2.91 |
| S-16 Sounder Extension from Puyallup to Orting | 265,000 | \$4,440,000 | \$16.75 |
| S-17 Sounder Extension to DuPont | 795,000 | \$4,000,000 | \$5.03 |

Current Operations **

| | | | |
|-------------------------------|--|--|---------|
| Jan-Sept 2015 ST Express bus | | | \$6.14 |
| Jan-Sept 2015 Commuter rail | | | \$10.99 |
| Jan-Sept 2015 ST Tacoma Link | | | \$4.09 |
| Jan-Sept 2015 ST Central Link | | | \$5.72 |

* Estimates based on mid-point of daily ridership estimates x multiplier for different types of service (320 for light rail, 300 for BRT, and 265 for commuter rail)

** Based on Sound Transit year-to-date quarterly report from 3rd quarter 2015. NOTE: The Current Operations cost per rider numbers are based on 2015 data, while the estimates for the potential ST3 projects listed above are based on 2040 ridership forecasts.

I. EXECUTIVE SUMMARY

VALUE MANAGEMENT CONSULTING, INC (VMC) was engaged by the Sound Transit 3 Expert Review Panel, in December, 2015 to conduct an independent assessment of the cost estimating for up to ten (10) potential Sound Transit ST3 capital projects. This work is undertaken to support the work of the Expert Review Panel for the ST3 capital projects.

There are a number of good practices that have been identified and mentioned in this report. Some of them include the following:

- Sound Transit has made good utilization of their historic knowledge and experience with the design and construction of Sound Move and the ST2 projects to plan for the projects in the ST3 Program. In particular the development of a Unit Cost Library to provide a consistent basis for cost estimates is a superior practice.
- The unit costs used to develop assemblies are reasonable and the assembly costs are appropriate for these planning level cost estimates.
- The document "System Plan Development (ST3) Capital Cost Estimating Methodology" provides excellent documentation for how Sound Transit's Unit Cost Library was developed. There are references made to industry standards including AACEI, ANSI, CSI and FTA. Providing references to industry standards is a good practice.
- The use of allowance, contingency and management reserve are good practices. Citing the AACEI definitions and then how Sound Transit has modified their use for their program would be advisable to strengthen the tie to industry standards. This clarification can and should be documented in the System Plan Development (ST3) Capital Cost Estimating Methodology as well as documents that present the cost estimates to the staff, the Sound Transit Board of Directors and the public.
- The inclusion of provisions for "soft costs" within the System Plan Development (ST3) Capital Cost Estimating Methodology is a good practice, since it avoids the undisciplined approach of every project development team using their own assumptions.
- We understand that risk assessment/risk analysis is planned for this program.
- Using FTA cost codes is a very good practice that avoids considerable costs for Sound Transit and/or the FTA independently contracted auditor converting costs from another coding system.
- Sound Transit gets a good value from the use of expert review panels and peer reviews. We recommend continuing the use of experts to review your work.
- We recognize that there are many changes occurring at a rapid pace at this time. The effort to maintain consistent descriptions and clarity in documentation is commended. The current definition for the projects can be changed through the evolution of the design, such as geotechnical investigations, obtaining permits and other factors. It appears that you have good practice for version definition in place with your Excel Tracking file.
- It is a good practice to have the unit costs in the Unit Cost Library set at a fixed reference date, which is currently the 4th Quarter, 2014. It is a good practice that the Unit Cost Library has component costs for labor, materials, and equipment. Updating the component costs in the future by updating this component costs is a superior technique than updating by using a cost index, such as ENR.

- In the Cost Estimate Methodology there is a statement that planning level estimates will have "*varying degrees of design*". This statement is correct and cannot be overstated.
- Our review of the cost estimates prepared has shown that Sound Transit has used the procedures that they have developed and produced credible cost estimates for planning purposes.

We also suggest your consideration of the following, which are explained in greater detail within this report:

- The System Plan Development (ST3) Capital Cost Estimating Methodology might be a good place to explain how other tasks that examine factors that can impact the total costs for projects will be completed and when the results of such tasks will be included in the project costs. Such factors include risk analysis; escalation to year of expenditure dollars; contract packaging that may require stages or phasing; and any other costs that may impact the complete cost.
- Clear up-to-date definitions of the assumptions and exclusions should exist only in the Basis of Estimate document and mentioned in the Methodology document (but not duplicated there). When assumptions and exclusions are put into more than one document they are not always updated in all places where they exist.
- The term range should not be used when only a single point number, usually a percentage to be added, is used.
- It is not possible to develop a comprehensive program schedule at this time. We recommend that a schedule be developed as soon as possible. However, any requirements to phase or stage one or more parts of the program could add costs.
- Consider using life-cycle cost analyses for conceptual value assessment (a term used when the program and projects are at a very preliminary stage of evolution. This can be a powerful tool and could be used as an additional analytical tool to assist in decision making.
- There are two topics listed with bullets on page 4-2 of the Methodology document that need further explanation. They are "Integration" and "Innovation".
- In the Basis of Estimate consider eliminating the inclusion of risk in the ROW and develop the ROW risks when the work is done to analyze the other risks in the program.
- Value Planning or Value Analysis, which is similar to Value Engineering, but done early in the evolution of major programs, could be used to provide an additional tool for the decision makers. We urge Sound Transit to consider the use of this tool.