

# Memo

November 12, 2021

To:	Sound Transit Board of Directors
From:	Kimberly Farley, Sound Transit Deputy CEO
Subject:	Incorporating and Responding to Triunity's Recommendations

At the Board's direction, Sound Transit sought an independent review and analysis of its cost estimating methodology, procedures, and practices. This pertained to both capital (construction) and real estate cost estimation.

To complete this independent review and analysis, Sound Transit hired and the Board managed a consultant team led by Triunity, Inc. to complete three tasks:

- Task 1: Independent assessment of cost estimates developed to date for West Seattle & Ballard Link Extension (WSBLE), Tacoma Dome Link Extension (TDLE), Operations & Maintenance South (OMF South), and the Bus Rapid Transit (BRT) program.
- Task 2: Independent assessment of Sound Transit's cost estimating methodologies for construction and right-of-way.
- Task 3: Independent assessment of and recommendations for Sound Transit's project management oversight structure including project, design, and risk management, using WSBLE as a case study.

For each task, Triunity submitted a report to the Board that explained its independent assessment methodology and observations, including specific recommendations for agency action. In total, Triunity provided 55 recommendations across the three reports.

The main themes of the recommendations are:

- Advance project-specific recommendations for WSBLE, TDLE, OMF South, and BRT cost estimates
- Refine cost estimating methodology for construction costs and right-of-way acquisitions
- Update project management policies, procedures, and guidelines
- Refine risk management practices and tools
- Ensure adequate resourcing for program and project partners
- Refine reporting and internal governance

This memo summarizes for the Board the specific actions Sound Transit is taking in order to be responsive to Triunity's work. Some of these actions are complete, many are underway, and more will be implemented in the near future. The actions and timelines are staff's best estimate and are subject to change. All three reports can be found at this Sound Transit webpage:

[www.soundtransit.org/system-expansion/realignment](http://www.soundtransit.org/system-expansion/realignment).

#	Recommendation	Staff Action	Accountable Department(s) for Implementation	Timeline for Implementation
1-1	"Recommend further investigation into bridge type assumptions for aerial guideway as a possible savings to the [WSBLE] project" (p. 3).	Include further investigation as part of Preliminary Engineering scope for West Seattle & Ballard Link Extension (WSBLE) and Tacoma Dome Link Extension (TDLE) projects.	PEPD Office of Capital Project Development (OCPD)	Q3 2022-Q2 2023
1-2	"Recommend further investigation into...sitework/ground conditions and tunneling as areas of potential cost increases" for the WSBLE project (p. 3).	Include further investigation as part of Preliminary Engineering scope for WSBLE project.	PEPD OCPD	Q3 2022-Q2 2023
1-3	"The Assessment Team recommends that the ST design team address the findings of this report and revise the [WSBLE] cost estimate, as necessary. While ranges will be explored in more detail during the methodology report, the design team should consider providing future revised estimates as a range of values for each project" (p. 3).	Cost estimate ranges will be provided for all project cost estimates moving forward for all pre-baselined projects. Duplicate with recommendation #2-11.	PSO Project Controls	Underway; Program Control Policies & Procedures (PCPPs) 02 & 13 have been revised to add this requirement for future estimates; WSBLE and TDLE are already using this protocol for providing ranges
1-4	"It is possible that the existing central control center will not be able to accommodate the [multiple] expansions. If that is the case, TDLE's estimate should reflect a portion of this expansion cost" (p. 4).	Staff have assessed the need for a new, larger Link control center (LCC) to accommodate the ST3 Link system build-out. Budget for a new LCC and other miscellaneous support facilities was added (in 2025-2035) to the ST financial plan during the Board's realignment action. This will be a new project.	Operations, PSO, PEPD	Initial assessment complete; funding to plan, design, and construct is currently funded for 2025-2035
1-5	"Recommend further investigation into ground conditions along the alignment as this appears to be the [OMF South] project's largest risk, particularly at Midway Landfill" (p. 4).	Include further investigation of ground conditions in the Preliminary Engineering phase of work for OMF South. Duplicate with recommendation #1-14.	PEPD OCPD	Q4 2022
1-6	"Recommend further investigation into...another risk...[which is] the [OMF South] building cost for Heavy Maintenance Facility" (p. 4).	Sufficient cost for heavy maintenance facilities is reflected in the current estimate. A bottoms-up cost estimate is scoped to be complete at the end of Preliminary Engineering to verify or adjust the current estimate.	PEPD OCPD	Q3 2022-Q2 2023
1-7	Recommend "a bottoms-up estimate be performed [for Bus Base North] utilizing the latest design and site investigation information" (p. 4).	A bottoms-up estimate is currently scheduled for completion following 30% design.	BRT Program	Q2-Q3 2022
1-8	"Recommend a more transparent way to assess indirect costs... (i.e. temporary facilities and other indirect costs during construction)" (p. 11).	An existing detailed breakdown is available to show how each Unit Cost Library assembly item developed from Labor, Materials, Equipment, Subcontractor, and Indirect markups. ST will add similar detail to the remaining lump sum items.	PSO Project Controls	Q4 2021-Q2 2022
1-9	"The Assessment Team performed an analysis of cost savings for Preferred Alternative (PA) 201 (Elevated), which is elevated in West Seattle and Ballard, and Preferred Alternative 2022 (Tunnel), which is tunneling in West Seattle and Ballard, and the results are as follows: <ul style="list-style-type: none"> <li>• "WSDOT I-Girders in lieu of standard Precast Segmental Box Girder: <ul style="list-style-type: none"> <li>○ "For PA 201 (elevated): Savings of \$200-\$210M</li> <li>○ "For PA 202 (tunnel): Savings of \$105-\$115M</li> </ul> </li> <li>• "WSDOT Precast Tub Girders in lieu of standard Precast Segmental Box Girder: <ul style="list-style-type: none"> <li>○ "For PA 201 (elevated): Savings of \$170-\$175M</li> <li>○ For PA 202 (tunnel): Savings of \$80-\$85M" (p. 11-12)</li> </ul> </li> </ul>	Include further investigation as part of Preliminary Engineering scope for WSBLE project.	PEPD OCPD	Q3 2022-Q2 2023

#	Recommendation	Staff Action	Accountable Department(s) for Implementation	Timeline for Implementation
1-10	The Assessment Team analyzed discrepancies related to long-span bridges...“Based on the analysis from the Assessment Team, the missing items should be included in the current estimate and the results are as follows: <ul style="list-style-type: none"> <li>• “For PA 201 (elevated): Addition of \$70-\$75M is</li> <li>• “For PA 202 (tunnel): Addition of \$30-\$35M” (p. 12)</li> </ul>	Include further investigation as part of Preliminary Engineering scope for WSBLE project.	PEPD OCPD	Q3 2022-Q2 2023
1-11	“The Assessment Team performed the [WSBLE] tunneling analysis and...the results are as follows: <ul style="list-style-type: none"> <li>• “For PA 201 (elevated): Addition of \$170-\$175M</li> <li>• “For PA 202 (tunnel): Addition \$180-\$185M” (p. 12)</li> </ul>	Include further investigation as part of Preliminary Engineering scope for WSBLE project.	PEPD OCPD	Q3 2022-Q2 2023
1-12	“The Assessment Team recommends that [additional ground improvement items] be added, and the results are as follows: <ul style="list-style-type: none"> <li>• “For PA 201 (elevated): Addition of \$80-\$85M</li> <li>• “For PA 202 (tunnel): Addition of \$75-\$80M” (p. 12)</li> </ul>	Include further investigation as part of Preliminary Engineering scope for WSBLE project.	PEPD OCPD	Q3 2022-Q2 2023
1-13	The landfill is “possibly a higher risk area [and ST] may want to include more than the allowed Medium Risk in the historically industrial areas [for major removal of landfill material for the OMF South project]. Design analysis or pot holing studies for any potential risks at the Interbay Landfill site and vicinity would be recommend [sic] in identifying contamination” (p. 15).	Potholing will be included in the scope for the Preliminary Engineering phase of work, based on the Preferred Alternative identified by the Board.	PEPD OCPD	Begin Q3 or Q4 2022
1-14	“Recommend further investigation into ground conditions along the alignment as this appears to be [the] largest risk” for WSBLE and OMF South (p. 22 and 28).	Further investigation of ground conditions will occur in the Preliminary Engineering phase of work. Duplicate with Recommendations #1-2 and #1-5.	PEPD OCPD	WSBLE: Q2 2023 TDLE: Q4 2022
1-15	“Assessment Team recommends a review of the communications backbone unit cost scope of work and the interface to the guideway unit costs as it relates to the [WSBLE] ductbank” (p. 20).	Confirm the appropriate amount of unit costs for both communication backbone and guideway.	PSO Project Controls	Q1 2022
1-16	“Recommend analyzing the confidence of adhering to the [ground] settlement requirements for either the hybrid or full excavation operations” for OMF South at the landfill site (p. 29).	Current standard for settlement is conservative. Will need quality control and construction management to ensure that each layer of fill material meets or exceeds compaction requirements.	PEPD OCPD	TBD based on OMF South Preferred Alternative selection (currently targeted for late 2021)
1-17	Explore whether “...WSDOT has wetland/mitigation bank in the neighborhood [of OMF South] that can be used” (p. 32).	This has been considered as part of the TDLE project development assumption and will be further investigated in the Preliminary Engineering phase of work.	PEPD OCPD	Begin Q3 or Q4 2022
1-18	“The current approach to fiber connectivity is to use adjacent WSDOT infrastructure. A deeper look into the site interfaces between ST and WSDOT facilities is encouraged to define the fiber optic scope of work more and to limit project risk” (p. 40).	Currently, ST is refining systems and communications requirements to inform fiber needs.	BRT Program	Underway; by Q3 2022
1-19	“Recommend \$500K - \$1M be carried for wetland mitigation” for Bus Base North (p. 43).	The project’s revised cost estimate of \$290M includes this recommendation.	BRT Program	Complete
2-1	Integrate input from PSO’s programmatic level design team on decisions involving substantial cost and document and discuss these decisions with future projects.	ST understands this recommendation to mean that decisions made during design that could impact the cost estimate should be communicated to all impacted parties sooner than later. Staff will memorialize this expectation for project leaders in documents including but not limited to an agency-wide and/or project-specific project management manual, engineering procedure(s), and training program that will clarify roles and responsibilities.	PSO, PEPD, DECM	Q4 2022
2-2	Be transparent with what is included in the unit price in form or assemblies.	Staff will add additional clarity and transparency in the unit cost library, specifically to the Environmental Mitigation Lump Sum assemblies.	PSO Project Controls	Q4 2021-Q1 2022

#	Recommendation	Staff Action	Accountable Department(s) for Implementation	Timeline for Implementation
2-3	Estimate actual severance damages for a given parcel using qualified appraisers.	Staff will complete appraisals to supplement the ROW cost estimating process.	DECM Real Property	Underway for WSBLE and future project cost estimate updates
2-4	Use standard valuation techniques with individual properties in lieu of uniform adjustment factors.	Staff will incorporate the appraisal cost estimating method, no longer using the "adjustment factor" method. This will include an update to the estimating process and procedure.	DECM Real Property	Underway
2-5	Real Property has ultimate responsibility for ROW estimating including at early phases.	The timing of Real Property involvement in cost estimating has historically varied by project. Moving forward, Real Property staff will provide the final review of the ROW cost estimate. ST will document this expectation in internal procedures.	DECM Real Property	Will be incorporated for future project ROW cost estimates and updates
2-6	Develop standard reporting format for Annual Program Evaluation for communication with leadership and program stakeholders.	Develop and execute Annual Program Review to inform Board decision-making. Similar to Board direction in R2021-05.	PSO Project Controls	Inaugural Annual Program Review by Q2 2022
2-7	Include in Project Management Plans requirements for workshops with Operations to improve early cost estimates.	Incorporate this guideline in internal documents including but not limited to an agency-wide and/or project-specific project management manual, engineering procedure(s), and training program that will include roles and responsibilities.	PSO	Q4 2022
2-8	Incorporate constructability impacts into ROW analysis.	Temporary Construction Easements (TCEs) estimates were previously lumped into contingency. Moving forward, staff will separate that item in the cost estimates.	Real Property	Will be incorporated for future project ROW cost estimates and updates
2-9	Limit ROW contingency to actual unknowns.	For all future estimates, the ROW Contingency will only reflect the 30% contingency; the other categories will be split into component parts (e.g. Administration, Temporary Construction Easements, Relocations).	PSO Project Controls	Q4 2021
2-10	From preliminary stages, develop and maintain a fully developed risk register with associated cost implications.	Staff revised PCPP-13 to specify performing Quantitative Risk Assessments more consistently in early design.	PSO Project Controls	Q4 2021 PCPP-13 has been revised to include this language; will be reviewed for approval at November 2021 Capital Program Change Control Board.
2-11	Use estimate ranges as communication tool in early planning.	Estimates will be incorporated into project cost estimates that are developed prior to baseline. This is underway for WSBLE and TDLE cost estimates. Duplicate with recommendation #1-3.	PSO Project Controls	Underway; PCPPs 02 & 13 have been revised to add this requirement for future estimates; and WSBLE and TDLE are already using this protocol for providing ranges.
2-12	Use 1%-1.5% annually for contingency for changes to code, federal guideline, and federal administration changes for such changes over and beyond escalation.	Staff will review and separate the contingencies from other elements of the cost estimates.	PSO Project Controls and DECM Real Property	Q4 2021
2-13	Use Early Acquisition for Real Property.	Real Property encourages use of early acquisitions when possible as they help level the appraisal workload while also providing more time to appraise complicated acquisitions and acquire properties. ST will continue to seek early acquisitions whenever and wherever possible and when approved by the Federal Transit Administration (FTA).	DECM Real Property with individual project teams	Will consider for every project; dependent on FTA concurrence

#	Recommendation	Staff Action	Accountable Department(s) for Implementation	Timeline for Implementation
2-14	Put special efforts into the analysis of the high value acquisitions in order to thoroughly understand the relevant issues—both the causes of the issues and their financial impacts.	ST recently employed this on WSBLE and OMF South and will consider this on other projects when appropriate.	DECM Real Property	Will be incorporated for future projects when appropriate
2-15	Perform Value Engineering exercises (i.e., workshops) to compare locations and types of project improvements and construction methods related to ROW impacts and costs.	Staff recently employed this to a limited extent on WSBLE. Staff will also work to involve Real Property staff in very early planning for each project to identify land-related fatal flaws in design, which will be documented in project team expectations such as the project management playbook, unified internal governance framework, etc.	PSO Project Controls and Real Property	Underway for WSBLE; this practice will be incorporated in future projects when appropriate
3-1	Update, streamline, or eliminate all Program Control Policies and Procedures (PCPP) for optimization and to reflect the new organizational structure.	Project Controls staff is working in collaboration with respective departments to update all PCPPs with internal stakeholder input.	PSO Project Controls	Underway; by Q3 2022
3-2	Update or streamline the Design Criteria Manual and Standard Specifications where feasible to incorporate the latest operational requirements.	Targeted completion to align with ST3 program in order to impact WSBLE, TDLE, BRT, EVLE, etc. The changes will not be completed in time to be used in NE 130 <sup>th</sup> given that project's near-term timeline with LLE construction. Lessons learned are implemented across the program as identified and prioritized for implementation on the system expansion program. This effort includes developing station standardization.	PSO Engineering	Underway
3-3	Seek input from outside sister agencies, consultants, and contractors on new policies and procedures.	Staff will continue to engage with industry peers and experts, and expand engagement, as we develop the project management playbook, unify our internal governance framework, and leverage industry best practices in our cost savings efforts. Additionally, staff will be interested to see the ad-hoc technical advisory group's recommendations to accelerate the system expansion program, and stand ready to implement those recommendations.	PSO	Underway and ongoing
3-4	Develop dashboard reporting for all ST3 system expansion projects to communicate scope, schedule, budget, and risk with ST leadership and Board. Examples from LA Metro can be found at: <a href="https://mtadash.mlmprojectservices.com/">https://mtadash.mlmprojectservices.com/</a> .	Develop a program performance dashboard that transparently shows program performance against defined metrics. Phase 1: Initial version for distribution. Phase 2: Create online interface for dashboard. Phase 3: Update/add key performance indicators.	PSO Project Controls	Phase 1: Q4 2021 Phase 2: Q2 2022 Phase 3: Q3-Q4 2022
3-5	For each ST3 system expansion project, perform independent review of latest cost estimates, risk identification, and probabilistic modeling (described in Appendix C). Consistently apply to projects in early planning (less than 15% design).	PCPP-02 refers project teams to use subject matter experts and independent reviews of cost estimates; staff will work with project teams to follow through on this expectation for every project. ST is currently evaluating proposals for issuing contract(s) for these independent reviews for the ST3 program. Staff will work internally to ensure adequate funding for this work.	PSO Project Controls	Procurement underway; ongoing implementation for each project within the project schedule
3-6	All program reporting to ST leadership and the Board on scope, schedule, budget, and risk should be reported through PSO Project Controls' metrics and reporting materials (dashboard reporting) with leading indicators for project performance, to be reviewed regularly with agency executive leadership and the Board.	Include this recommendation as part of the effort to achieve recommendation #3-4.	PSO Project Controls	Q4 2021-Q4 2022
3-7	Utilize a single Project Director for the lifecycle of a project with a project director triangle supporting planning, design/construction, and operations. This individual should have planning, design & construction and operational experience to include practical, technical, managerial, and political expertise needed to guide these long-term projects.	Underway for BRT program; use lessons learned from this pilot for other projects.	PSO, PEPD, DECM, Operations	Implemented (complete) for BRT program
3-8	Employ Program Director, Program Management Team of Function responsible for the entire ST3 Program to serve as single source of accountability to the Board and executive leadership for the program.	Staff are implementing this recommendation differently than Triunity articulated. By restructuring the organization in 2019-2020 via Design for Growth, ST believes we are meeting the intent of this recommendation,	PSO, PEPD, DECM, and Operations with the Chief System Officer (DCEO)	Complete

#	Recommendation	Staff Action	Accountable Department(s) for Implementation	Timeline for Implementation
		which will need time to fully actualize the outcomes. We are therefore hesitant to make another major organizational change so soon after the recent changes, for the time being.		
3-9	Coordinate Board acceptance of a Preferred Alternative with any third-party funding agreements.	As part of implementing the System Expansion Implementation Plan, project teams work with stakeholders and the Board to identify/confirm the preferred alternative as soon as possible in the process. Staff will continue this practice for all projects.	PEPD OCPD	Ongoing implementation for each project within the project schedule
3-10	Implement any accepted modifications from VE studies (structure types, station locations, construction sequencing, staging, etc.). Evaluate for consistency with environmental approvals.	Underway; staff will continue to coordinate between PSO, PEPD, DECM, and Operations to implement these modifications.	PSO Project Controls	Underway; ongoing implementation for each project within the project schedule
3-11	Complete evaluation of project risk-based validated cost estimates for each remaining ST3 project alternative currently under consideration to aid in selection of preferred alternatives.	Staff revised PCPP-13 to clarify that each phase in early planning must include a Quantitative Risk Assessment to help inform the cost estimate.	PSO Project Controls	Q4 2021 PCPP-13 has been revised to include this direction; will be reviewed for approval at November 2021 Capital Program Change Control Board
3-12	Memorialize project permitting plan with the local jurisdiction for the ST3 projects as early as possible.	Continue ongoing joint efforts with authorities having jurisdiction (AHJ) to develop Preliminary Permitting Plan for WSBLE. Staff is working on developing early permitting plans for other ST3 projects.	PEPD, DECM	Ongoing, based on individual project development schedule; will be completed by the Project to be Built decision
3-13	Allocate funding for a permitting manager (and assign) for the jurisdictions associated with the various ST3 projects.	Continue to fund AHJ permitting staff as part of staffing agreements for WSBLE project. ST provides funding for designated representatives to support jurisdictional staff and help advance project elements.	PEPD OCPD	Underway for existing projects with target to complete for each project by the end of the Final EIS
3-14	Complete an early acquisition plan for each ST3 project and deploy all available resources in pursuit of early acquisitions including seeking any necessary approvals from the Board and FTA.	Staff will submit potential early acquisitions for Board and FTA consideration in Phase 3 for each project. Internal coordination is ongoing between PEPD and Real Property for other projects beyond WSBLE. For future projects, staff will involve Real Property staff in very early planning to help identify potential early acquisitions.	DECM Real Property and project teams	WSBLE: Q3 2022-Q2 2023 Other Projects: Varies
3-15	Ensure adequate Real Property staff resources are in place to support timely acquisition of real property (including early acquisitions) for the ST3 Program. This includes additional staff and support consultants with ROW expertise.	Real Property will continue to utilize existing on-call consultant contracts to support this recommendation.	DECM Real Property	Current on-call contracts in place and renewals anticipated going forward
3-16	ST executive leadership should solidify and communicate Agency wide PSO's role and mission.	PSO refined its purpose, vision, mission, and long-term goals in 2021 and is sharing that internally. Staff will use agency-wide and targeted communications from executive leaders to reinforce PSO's purpose and authority. HR led an effort to assess impacted staff in 2021; PSO and HR leadership will collaborate in 2022 to design a survey to assess how PSO is being incorporated into the broader agency.	PSO Executive Director and Leadership Team, as well as CEO's Office	Underway and through Q4 2022
3-17	Consider implementation of the team alignment process for ST3 Program (focused on goals and clarity of roles, responsibilities, communications and working relationships) as described in Appendix C.	Beginning with the Design for Growth initiative, staff have been clarifying and continue to clarify roles and responsibilities through a number of internal structure documents. We will continue to monitor progress towards this improved alignment through 2022.	DCEO in close coordination with PSO, PEPD, DECM, Operations, and Passenger Experience	Initial framework complete; continued assessment through 2022

#	Recommendation	Staff Action	Accountable Department(s) for Implementation	Timeline for Implementation
3-18	Update and develop risk mitigation matrix for each ST3 project including assignment of ST staff for each risk mitigation item.	The previous risk mitigation procedure required assigning a Risk Owner and Risk Manager to each risk; the new PCPP-13 now also includes a Project Team Owner.	PSO Project Controls	Underway PCPP-13 has been revised to include direction; will be reviewed for approval at the November 2021 Capital Program Change Control Board
3-19	Develop a risk allocation matrix for ST3 projects that summarizes risks being assumed by Sound Transit and those being assigned to other parties, particularly contractors. Identify responsible staff for management and mitigation of each individual risk item and regularly monitor and report on status.	Staff revised PCPP-13 and the latest Risk Register to include this requirement.	PSO Project Controls	Underway PCPP-13 has been revised to include direction; will be reviewed for approval at the November 2021 Capital Program Change Control Board
3-20	Streamline CCB to optimize efficiencies and remove redundancies with the Phase Gate process and clarify decision-making.	Staff are developing a unified governance framework that streamlines multiple venues and decision points. This streamlining will include a relationship between the framework and the new program performance dashboard and other reporting. There will be a multi-phase approach to achieving this.	PSO Portfolio Management & Integrity	Q1 2022 presentation to Board on approach, principles, and framework; additional refinements and enhancements to project and program governance frameworks will be ongoing through 2022
3-21	Maximize change authority financial thresholds delegated to Project Directors to improve ST3 program management.	Staff will collaborate to analyze project director thresholds and incorporate changes as the framework for our unified internal governance structure is developed.	PSO	Q4 2022 – Q1 2023