West Seattle and Ballard
Link Extensions

Level 2 Alternatives Development and Screening

October 2018

Summary

Introduction

The *Level 2 Alternatives Development and Screening Technical Memorandum* documents the findings of the Level 2 Screening process for the West Seattle and Ballard Link Extensions (WSBLE) Project.

Preliminary Purpose and Need

The purpose of the WSBLE Project is to expand the Link light rail system from downtown Seattle to West Seattle and Ballard and to increase capacity and connectivity for regional connections.

Alternatives Development Process

The alternatives evaluation framework for the WSBLE Project is structured as a series of sequential evaluation levels, where increasingly detailed and comprehensive evaluation measures are applied to a decreasing number of alternatives at each level. Eventually, a Preferred Alternative will be identified by the Sound Transit Board for advancement into the environmental review phase, along with other alternatives to evaluate in an Environmental Impact Statement (EIS).

A variety of stakeholders are engaged in the WSBLE Project, and their input influences the decision-making process as the WSBLE Project advances during the Alternatives Development phase. The agency and external engagement process to actively seek input and involvement from stakeholders is being accomplished through multiple groups and forums, including an Elected Leadership Group (ELG), Stakeholder Advisory Group (SAG), Interagency Group (IAG) and the public.

A total of 28 alternatives were previously studied in Level 1 at a segment level. The Level 1 Screening was intended to screen out those alternatives that had limited potential to meet the Project's preliminary Purpose and Need and/or were deemed not practical. On May 17, 2018, the ELG recommended to carry forward 16 of the Level 1 alternatives into Level 2. Subsequently, on July 17, 2018, the ELG recommended to advance four additional alternatives into Level 2 for the South of Downtown (SODO) and Chinatown/International District Segment.

Level 2 Alternatives Evaluation and Findings

Level 2 also assessed alternatives within each study segment—West Seattle/Duwamish, SODO and Chinatown/International District, Downtown and Interbay/Ballard. The 20 alternatives carried forward from Level 1 were refined and optimized, leading to a total of 24 alternatives studied in Level 2. The Level 2 evaluation applied more quantitative criteria to measure the potential benefits and impacts and highlight differentiating characteristics among the alternatives. As such, the Level 2 Screening identified higher versus lower performing alternatives for each criterion.

Summary of Level 2 Screening Recommendations

Table S-1 (Summary of Elected Leadership Group Level 2 Screening Recommendations) lists the Level 2 alternatives that the ELG recommended be carried forward into the Level 3 Screening on October 5, 2018. The ELG recommended to carry forward 14 of the 24 Level 2 alternatives into Level 3.

Next Steps

As a next step, the Level 3 Screening will develop and evaluate in greater detail those alternatives carried forward from the Level 2 Screening. However, the segment-level alternatives will be pieced together from end-to-end, providing an evaluation of corridorwide alternatives from West Seattle to Ballard.

Table S-1 Summary of Elected Leadership Group Level 2 Screening Recommendations

Segment / Level 2 Alternative	Carry Forward into Level 3	Do Not Carry Forward into Level 3
West Seattle/Duwamish Segment		
ST3 Representative Project	✓	
Pigeon Ridge/West Seattle Tunnel		✓
Oregon Street/Alaska Junction/Elevated		✓
Golf Course/Alaska Junction/Tunnel	✓	
Oregon Street/Alaska Junction/Tunnel		✓
SODO and Chinatown/International District Segment		
ST3 Representative Project	✓	
Massachusetts Tunnel Portal	✓	
Surface E3	✓	
Occidental Avenue		✓
4th Avenue Cut-and-Cover Tunnel/Station	✓	
4th Avenue Bored Tunnel/Mined Station	✓	
5th Avenue Bored Tunnel/Mined Station	✓	
Downtown Segment		
ST3 Representative Project	✓	
5th/Harrison	✓	
6th/Boren/Roy		✓
5th/Terry/Roy/Mercer	✓	
Interbay/Ballard Segment		
ST3 Representative Project	✓	
15th/Fixed Bridge/15th		✓
20th/Fixed Bridge/17th		✓
20th/Tunnel/15th		✓
Central Interbay/Movable Bridge/14th		✓
Armory Way//Tunnel/14th	✓	
Central Interbay/Fixed Bridge/14th	✓	
Central Interbay/Tunnel/15th		✓

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Acronyms and Abbreviations

BNSF	Burlington Northern Santa Fe
CBD	Central Business District
DAHP	Department of Archaeology and Historic Preservation
DSTT	Downtown Seattle Transit Tunnel
EIS	Environmental Impact Statement
ELG	Elected Leadership Group
FTA	Federal Transit Administration
HCT	High-Capacity Transit
IAG	Interagency Group
KCM	King County Metro Transit
LEP	Limited English Proficiency
LRT	Light Rail Transit
MIC	Manufacturing and Industrial Center
N/A	Not Applicable
NRHP	National Register of Historic Places
O&M	Operations and Maintenance
OMF	Operations and Maintenance Facility
PSRC	Puget Sound Regional Council
RTLP	Regional Transit Long-Range Plan
SAG	Stakeholder Advisory Group
SCL	Seattle City Light
SEPA	State Environmental Policy Act
SLU	South Lake Union
SODO	South of Downtown
SR	State Route
ST3	Sound Transit 3
TNC	Transportation Network Companies
TPSS	Traction Power Substations
UPRR	Union Pacific Railroad
WSBLE	West Seattle and Ballard Link Extensions
WSDOT	Washington State Department of Transportation

1 INTRODUCTION

1.1 Overview

Sound Transit is advancing the West Seattle and Ballard Link Extensions (WSBLE) Project through the Alternatives Development phase. During Alternatives Development, Sound Transit is assessing the "representative project" included in the Sound Transit 3 (ST3) Plan, well as other alternatives developed from refining the ST3 Representative Project route, station locations and other project elements based on additional public engagement and technical analysis. The ST3 Representative Project itself is the result of extensive, yearslong planning and public involvement work, including high-capacity transit (HCT) studies, the process to update the agency's long-range plan, and the work that developed the *ST3 Plan* that voters approved financing for in 2016. Sound Transit is engaging the public and agencies in an intensive external engagement process that will lead to the Sound Transit Board identifying a Preferred Alternative, as well as other alternatives to evaluate in an Environmental Impact Statement (EIS).

The WSBLE Project would provide fast, reliable light rail connections to dense residential and job centers throughout the region and add a new downtown Seattle light rail tunnel to provide efficient operating capacity for the entire regional system. It would consist of two separate Link extensions: one to West Seattle and the other to Ballard. The extension to West Seattle would operate from downtown Seattle to West Seattle's Alaska Junction neighborhood. The Ballard extension would operate from downtown Seattle to Ballard's Market Street area and include a new rail-only tunnel from the Chinatown/ International District to South Lake Union and Seattle Center/Uptown.

The alternatives and analysis conducted during the Alternatives Development phase are generally focused within a 0.5-mile study area boundary around the ST3 Representative Project. A map of the study area for the WSBLE Project is shown on **Figure 1-1** (West Seattle and Ballard Link Extensions Study Area).

1.2 Purpose of Report

The *Level 2 Alternatives Development and Screening Technical Memorandum* documents the findings of the Level 2 Screening process for the WSBLE Project. This memorandum presents the evaluation criteria, measures and methods used to analyze the Level 2 alternatives, summarizes each alternative's performance relative to the evaluation criteria and measures, and provides conclusions about the alternative's relative performance. The memorandum concludes with identifying the alternatives that the Elected Leadership Group (ELG) recommended to be evaluated further in the Level 3 Screening and those alternatives not carried forward for further study.

Figure 1-1 West Seattle and Ballard Link Extensions Study Area

1.3 Report Organization

The *Level 2 Alternatives Development and Screening Technical Memorandum* is organized into the following sections:

- **Section 1 (Introduction):** Provides an overview of the WSBLE process and project, as well as purpose of this report.
- **Section 2 (Preliminary Purpose and Need):** Outlines the preliminary Purpose and Need for the WSBLE Project.
- **Section 3 (Alternatives Development Process):** Describes an overview of the process to develop, evaluate and screen alternatives, including the agency and community engagement efforts and previous Level 1 Screening.
- **Section 4 (Level 2 Alternatives Evaluation and Findings):** Defines the alternatives within each study segment and highlights the results and findings for each alternative's performance relative to the evaluation criteria and measures.
- **Section 5 (Summary of Level 2 Screening Recommendations):** Summarizes the alternatives to be evaluated in greater detail in the Level 3 Screening, and those alternatives not carried forward for further study.
- **Section 6 (Next Steps):** Addresses the next steps for the Level 3 Screening.
- **Section 7 (References):** Lists the references cited in this report.

2 PRELIMINARY PURPOSE AND NEED

Sound Transit developed the preliminary Purpose and Need Statement for the WSBLE Project with input from stakeholders during the early scoping period between February 2 and March 5, 2018. The preliminary Purpose and Need Statement provides the foundation for the alternatives defined in Level 2, as well as the evaluation criteria, measures and methods used for the Level 2 evaluation and screening.

2.1 Project Purpose

The purpose of the WSBLE Project is to expand the Link light rail system from downtown Seattle to West Seattle and Ballard and to increase capacity and connectivity for regional connections to:

- Provide high quality rapid, reliable, and efficient peak and off-peak light rail transit (LRT) service to communities in the project corridors as defined in ST3.
- Improve regional mobility by increasing connectivity and capacity through downtown Seattle to meet the projected transit demand.
- Connect regional centers as described in adopted regional and local land use, transportation, and economic development plans and *Sound Transit's Regional Transit Long-Range Plan* (RTLP) (2014).
- Implement a system that is consistent with the *ST3 Plan* (Sound Transit 2016) that established transit mode, corridor, and station locations and that is technically feasible and financially sustainable to build, operate, and maintain.
- Expand mobility for the corridor and region's residents, which include transit dependent, low-income and minority populations.
- Encourage equitable and sustainable urban growth in station areas through support of transit-oriented development, station access, and modal integration in a manner that is consistent with local land use plans and policies.
- Preserve and promote a healthy environment and economy by minimizing adverse impacts on the natural, built and social environments through sustainable practices.

2.2 Need for Proposed Action

The WSBLE Project is needed because:

- Increasing roadway congestion on transit routes between downtown Seattle, West Seattle, and Ballard will continue to degrade transit performance and reliability.
- Regional population and employment growth will increase operational demands on the Downtown Seattle Transit Tunnel (DSTT).
- Regional and local plans call for HCT in the corridor consistent with the Puget Sound Regional Council's (PSRC) *VISION 2040* (2009) and Sound Transit's RTLP (2014).
- The region's citizens and communities, including travel-disadvantaged residents and low-income and minority populations, need long-term regional mobility and multimodal connectivity.
- Regional and local plans call for increased residential and/or employment density at and around HCT stations, and increased options for multimodal access.
- Environmental and sustainability goals of the state and region include reducing total vehicles miles traveled and greenhouse gas emissions.

To help organize the content of this report, the Purpose statements were distilled into short themes that reflect the primary focus of the full statement. Accompanying these brief themes are symbols that generally match the spirit of the summarized Purpose statement, as shown in **Table 2-1** (Level 2 Screening Themes and Symbols). The report uses these themes and symbols to denote these Purpose statements throughout.

Table 2-1 Level 2 Screening Themes and Symbols

Purpose Statement	Theme	Symbol
Provide high quality rapid, reliable, and efficient peak and off-peak LRT service to communities in the project corridors as defined in ST3.	Service performance and reliability in project corridor	
Improve regional mobility by increasing connectivity and capacity through downtown Seattle to meet the projected transit demand.	Improve downtown capacity for regional connectivity	
Connect regional centers as described in adopted regional and local land use, transportation, and economic development plans and Sound Transit's RTLP.	Connect regional centers	
Implement a system that is consistent with the *ST3 Plan* that established transit mode, corridor, and station locations and that is technically feasible and financially sustainable to build, operate, and maintain.	Technically feasible and financially sustainable	
Expand mobility for the corridor and region's residents, which include transit dependent, low-income and minority populations.	Expand mobility for all	
Encourage equitable and sustainable urban growth in station areas through support of transit-oriented development, station access, and modal integration in a manner that is consistent with local land use plans and policies.	Encourage equitable and sustainable urban growth	
Preserve and promote a healthy environment and economy by minimizing adverse impacts on the natural, built and social environments through sustainable practices.	Promoting a healthy built, natural and social environment	

3 ALTERNATIVES DEVELOPMENT PROCESS

The alternatives evaluation framework for the WSBLE Project is structured as a series of sequential evaluation levels, where increasingly detailed and comprehensive evaluation measures are applied to a decreasing number of alternatives at each level. The screening process initially reviews a wide range of alternatives during the first screening level, evaluated against a select set of measures to identify fatal flaws or major deficiencies. As the evaluation process progresses, the most suitable alternatives will emerge and be subject to more rigorous and detailed analysis, with more quantitative evaluation criteria applied. The screening process has been designed to provide insight into how the alternatives may be refined or modified to improve their effectiveness in satisfying the preliminary Purpose and Need.

At each screening level, public input from neighborhood forums and station charrettes are incorporated, along with input from the Interagency Group (IAG), Stakeholder Advisory Group (SAG) and ELG. The ELG makes recommendations on the alternatives to carry forward for further study. See **Section 3.3** (Agency and Community Engagement) for a detailed description of the agency and community engagement process. Eventually, a Preferred Alternative will be identified by the Sound Transit Board for advancement into the environmental review phase, along with other alternatives to evaluate in an EIS.

The three levels of analysis for the WSBLE Project are depicted on **Figure 3-1** (Alternatives Development Process). More detailed information on the overall Alternatives Development process can be found in the *Alternatives Evaluation Framework and Methodology Technical Memorandum* (Sound Transit 2018a).

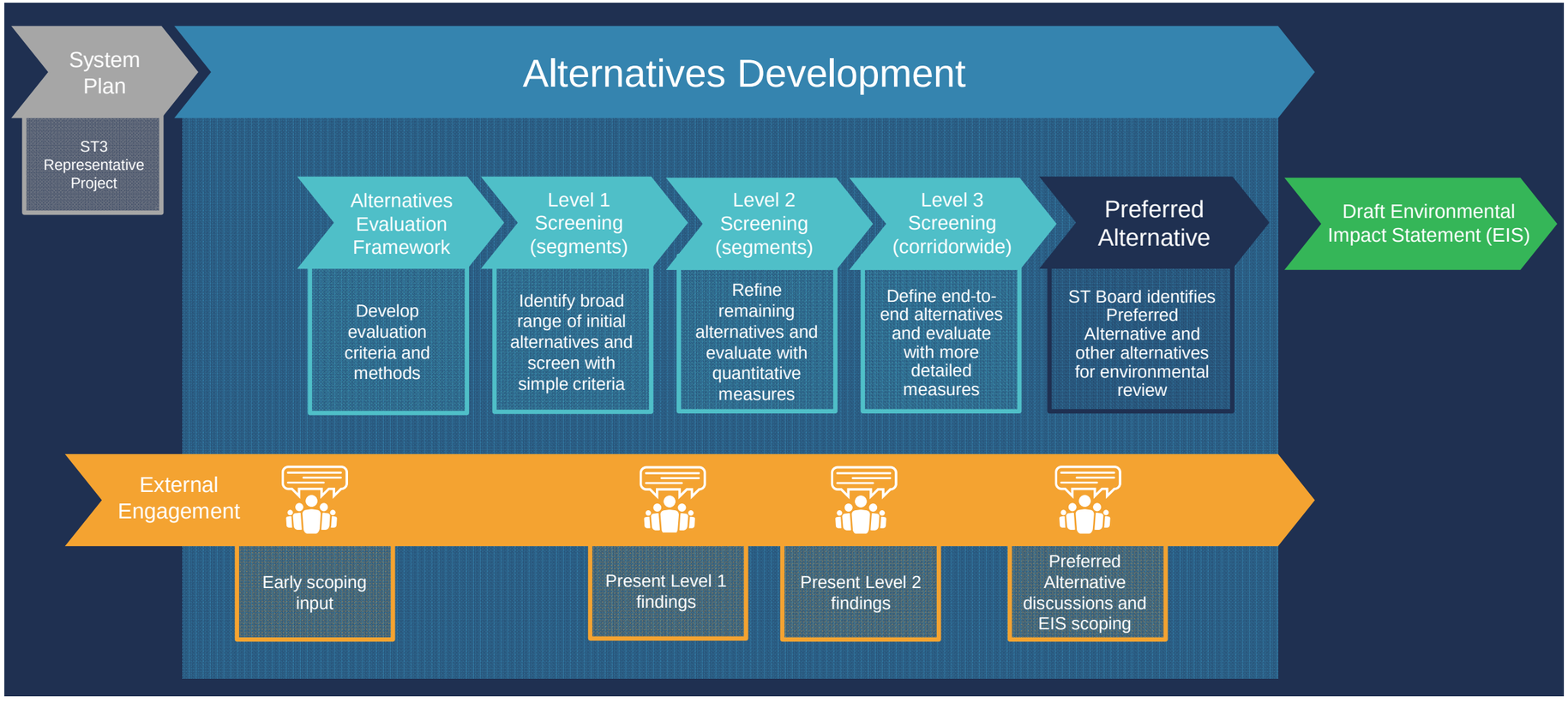


Figure 3-1 Alternatives Development Process

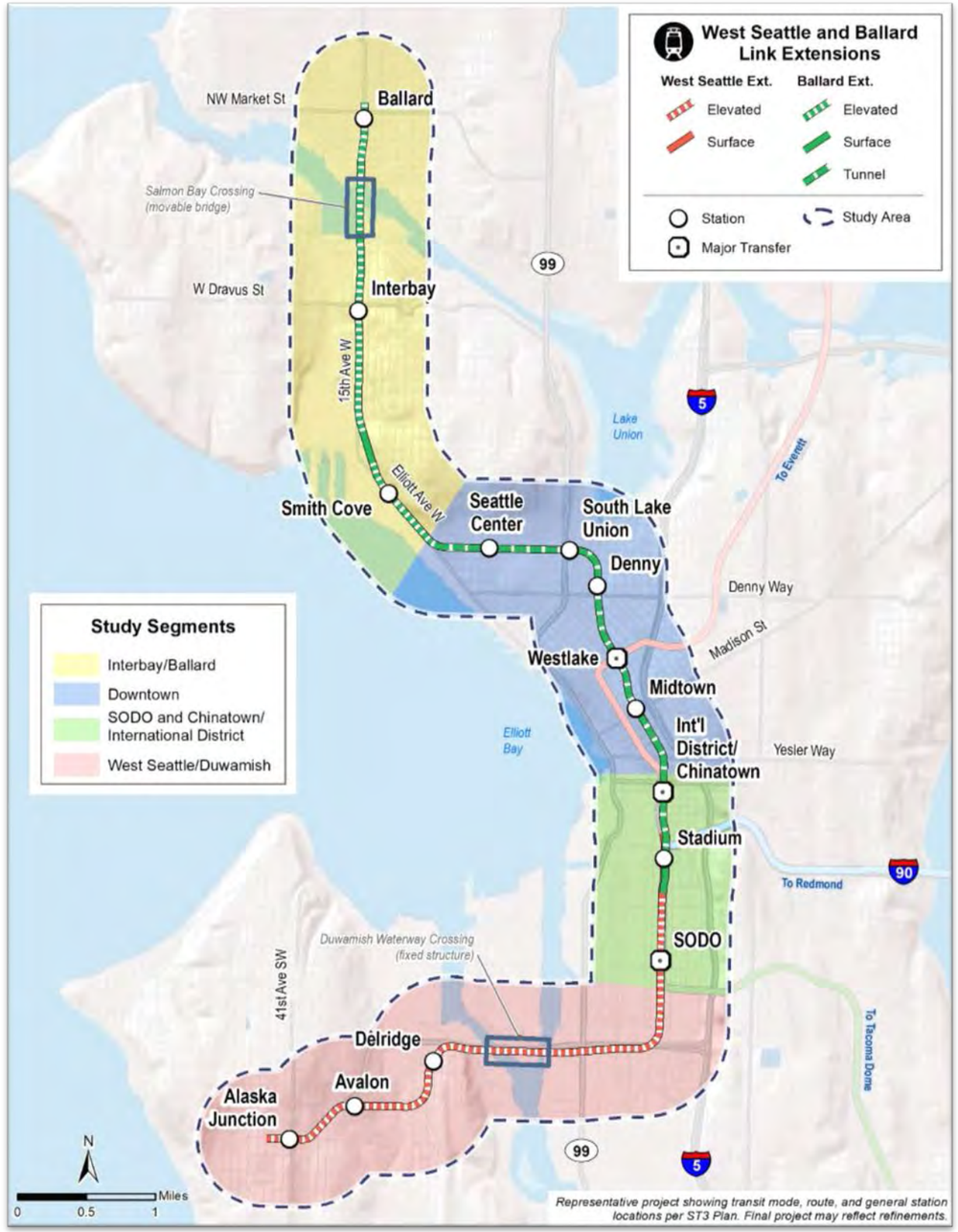


Figure 3-2 Study Segments for Alternatives Development Phase

3.1 Study Segments

Due to the unique characteristics of the study area for the WSBLE Project, the corridor was subdivided into four study segments for evaluation purposes in the Alternatives Development phase. Each study segment is oriented around the ST3 Representative Project and was geographically determined to provide logical end points and interfaces with the adjoining segments. These study segments allow for more detailed evaluation and analysis of specific planning, engineering or other issues. Following are the four study segments, as delineated on **Figure 3-2** (Study Segments for Alternatives Development Phase):

- West Seattle/Duwamish
- South of Downtown (SODO) and Chinatown/International District
- Downtown
- Interbay/Ballard

The first two screening levels were conducted within each of these study segments. After the alternatives are evaluated and screened down at a segment level, they will then be pieced together to define logical end-to-end alternatives from West Seattle to Ballard for Level 3. **Figure 3-3** (Alternatives Screening Process) illustrates the alternatives screening process. The process is designed to help the Sound Transit Board identify a Preferred Alternative and other alternatives to advance into the environmental review phase.

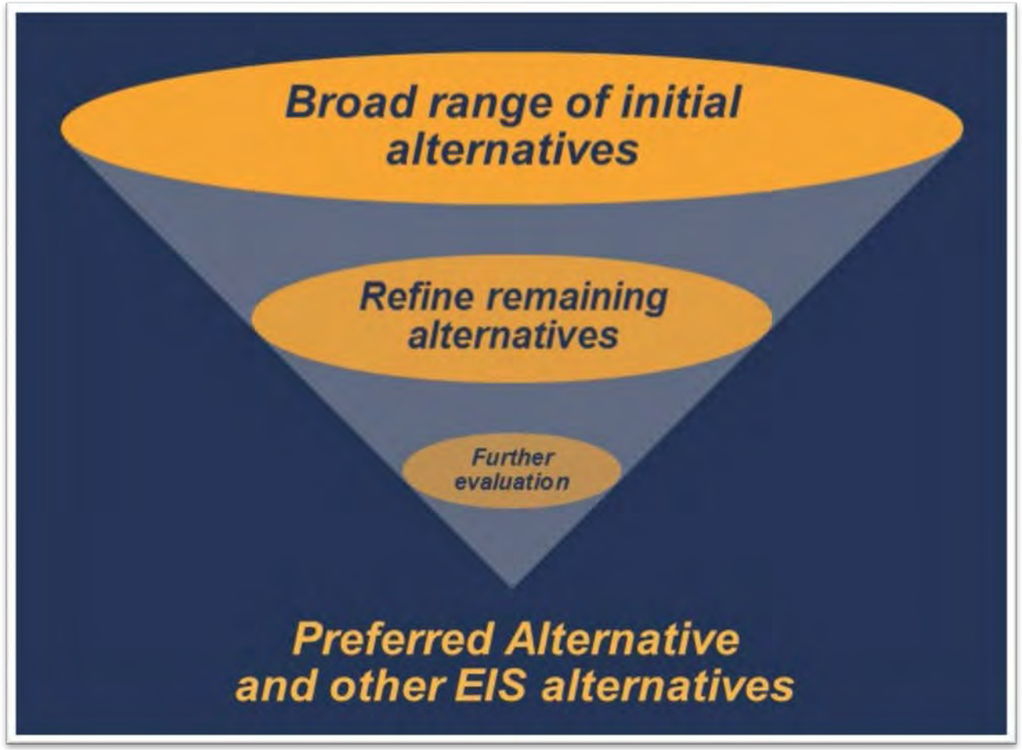


Figure 3-3 Alternatives Screening Process

3.2 Level 2 Screening Process

With a multi-tiered evaluation approach, each level of the screening analysis conforms to a level of detail necessary to make informed decisions about the alternatives considered. In this regard, different and increasingly detailed sets of evaluation criteria, measures and methods are used at each screening level. This approach allows alternatives to be narrowed from a wide range down to a select set of alternatives.

3.2.1 Evaluation Criteria, Measures and Methods

The Level 2 Screening relied on a set of evaluation criteria and measures that provided a consistent means of analysis among the study segments. Sound Transit developed evaluation criteria based on the WSBLE Project's preliminary Purpose and Need. Supporting measures were identified under each criterion. Qualitative and/or quantitative evaluation methods were then specified for each measure. These evaluation criteria, measures and methods were used to assess the performance of alternatives within each study segment for each criterion. **Figure 3-4** (Development of Evaluation Criteria, Measures and Methods) illustrates the relationship between the preliminary Purpose and Need statement and the evaluation criteria, measures and methods.

Figure 3-4 Development of Evaluation Criteria, Measures and Methods

Table 3-2 (Level 2 Screening Evaluation Criteria, Measures and Methods [by segment]) lists the detailed evaluation criteria, measures and methods used to evaluate the alternatives in Level 2. Each criterion has one or more quantitative or qualitative measures to differentiate between alternatives in terms of project performance and potential impacts. The Level 2 Screening process results in alternatives recommended by the ELG to be carried forward for further evaluation in a subsequent Level 3 Screening. In cases where there is not sufficient information to dismiss alternatives from further consideration, the ELG may recommend those alternatives be carried forward into the later screening phases.

3.2.2 Evaluation Rating Thresholds

The alternatives were evaluated and rated against each evaluation criterion and supporting measure, as shown in **Table 3-2**. Evaluation rating thresholds are established for each measure to differentiate higher versus lower performing alternatives within the segment. Three performance rating thresholds are used: High, Medium and Low. Measures are then rated High, Medium, or Low based on their anticipated performance relative to the other alternatives within the segment:

- **High:** Higher performing with respect to measure
- **Medium:** Moderate performing with respect to measure
- **Low:** Lower performing with respect to measure

Appendix A (Level 2 Screening Evaluation Criteria, Measures, Methods and Thresholds) describes the rating thresholds applied under the evaluation criteria, measures, and methods used in the Level 2 screening process. Color coding is also used to help distinguish the High, Medium and Low performance ratings within the evaluation matrices. **Table 3-1** (Alternative Performance Ratings) displays the performance ratings and their corresponding colors.

Table 3-1 Alternative Performance Ratings

Performance Rating	Color
Higher performing rating in comparison to other alternatives within the segment	High
Medium performing rating in comparison to other alternatives within the segment	Medium
Lower performing rating in comparison to other alternatives within the segment	Low

The performance ratings for each evaluation measure are accompanied by quantitative data where applicable. Some evaluation measures and methods are quantitative, while others are qualitative. An evaluation of the alternative also provides an explanation and rationale for the rating given to the measures. The evaluation, data and rationale for each rating give can be found in the detailed evaluation matrices in **Appendix B** (West Seattle/Duwamish Segment Level 2 Evaluation Matrices) through **Appendix E** (Interbay/Ballard Segment Level 2 Evaluation Matrices).

Table 3-2 Level 2 Screening Evaluation Criteria, Measures and Methods (by segment)

Purpose and Need [1]/ Evaluation Criteria [2]	Measure [3]	Quantitative or Qualitative [4]	Methods [5]
Provide high quality rapid, reliable, and efficient peak and off-peak light rail transit service to communities in the project corridors defined in ST3			
Reliable Service	Potential service interruptions and recoverability	Qualitative	Likelihood of service interruptions during peak and off-peak travel periods (e.g., frequency and duration of movable bridge openings, at-grade crossings, etc.) and redundancy and ability to reroute service
Travel Times	LRT travel times	Quantitative	Estimated travel times within segments based on alignment characteristics (minutes)
Improve regional mobility by increasing connectivity and capacity through downtown Seattle to meet projected transit demand			
Regional Connectivity	LRT network integration	Qualitative	Ability to accommodate spine segmentation for regional LRT system connectivity and operational flexibility to meet future demand
Transit Capacity	Passenger carrying capacity in downtown	Qualitative	Combined passenger carrying capacity of downtown transit tunnels
Projected Transit Demand	Ridership potential	Quantitative	Future PSRC forecasted 2040 total population and employment within 10-minute walkshed of WSBLE Project stations
Connect regional centers as described in adopted regional and local land use, transportation, and economic development plans and Sound Transit's Long-Range Plan			
Regional Centers Served	Station proximity to PSRC-designated regional growth centers	Quantitative	Number of PSRC-designated regional growth centers served by stations
	Station proximity to PSRC-designated manufacturing/industrial centers	Quantitative	Number of PSRC-designated manufacturing/industrial centers served by stations
Sound Transit Long-Range Plan Consistency	Accommodates future LRT extension beyond ST3	Qualitative	Ability to accommodate expansion potential of future LRT extensions identified in *Sound Transit Regional Transit Long-Range Plan*
Implement a system that is consistent with the ST3 Plan that established transit mode, corridor, and station locations and that is technically feasible and financially sustainable to build, operate, and maintain			
ST3 Consistency	Mode, route and general station locations per ST3	Qualitative	Consistency of mode, route and general station locations per ST3
	Potential ST3 implementation schedule effects	Qualitative	Constructability, environmental or other issues/challenges that may cause WSBLE Project schedule risks (e.g., right-of-way [ROW] acquisition needs, in-water work restrictions, regulatory compliance process, etc.)
	Potential ST3 operating plan effects	Qualitative	Integration of WSBLE Project into existing LRT spine and overall system (i.e., special trackwork, movable bridge implications, etc.)
Technical Feasibility	Engineering constraints	Qualitative	Compliance with *Sound Transit Design Criteria Manual*, design criteria from agencies with jurisdiction and federal regulations, and engineering obstacles associated with major infrastructure constraints
	Constructability issues	Qualitative	Constructability issues based on potential conflicts and technical challenges (e.g., utility conflicts, existing infrastructure, geotechnical, tunnel portals, etc.)
	Operational constraints	Qualitative	Assessment of operational constraints (e.g., access to maintenance facility, vertical grade, horizonal curvature, movable bridge, etc.)
Financial Sustainability	Conceptual capital cost comparison	Quantitative	ST3 cost consistency and conceptual capital cost (includes alignment and stations, but not for items such as rolling stock) comparison based on conceptual design quantities and current Sound Transit unit pricing (2017$)
	Operating cost impacts	Qualitative	Assessment of operations and maintenance (O&M) cost impacts, including annual and lifecycle costs
Expand mobility for the corridor and region's residents, which include transit dependent, low-income and minority populations			
Historically Underserved Populations	Opportunities for low-income and minority populations	Qualitative	Assessment of improved access to opportunities (activity nodes served, as described below) for low-income and minority populations within station areas and how the project would improve access for low-income and minority populations along the system to these nodes, as well as access for low-income and minority populations in the study area to major regional employment and educational destinations
		Quantitative	Percent of rent-restricted or subsidized rental units 10-minute walkshed (i.e., rent- and income-restricted housing units)
	Low-income population	Quantitative	Low-income population (i.e., households below 2 times the federal poverty level) within 10-minute walkshed and 15-minute ride on connecting high frequency transit
	Minority population [6]	Quantitative	Minority population within 10-minute walkshed and 15-minute ride on connecting high frequency transit
	Youth population (under 18)	Quantitative	Youth population (under 18) within 10-minute walkshed and 15-minute ride on connecting high frequency transit
	Elderly population (65 and over)	Quantitative	Elderly population (65 and over) within 10-minute walkshed and 15-minute ride on connecting high frequency transit
	Limited English Proficiency (LEP) population	Quantitative	LEP population within 10-minute walkshed and 15-minute ride on connecting high frequency transit
	Disabled population	Quantitative	Disabled population (includes those with hearing, vision, or ambulatory disability) within 10-minute walkshed and 15-minute ride on connecting high frequency transit
Encourage equitable and sustainable urban growth in station areas through support of transit-oriented development, station access, and modal integration in a manner that is consistent with local land use plans and policies			
Station Area Land Use Plan Consistency	Compatibility with Seattle designated Urban Centers and Villages	Quantitative	Percent of 10-minute station walkshed land area located within Seattle-designated Urban Centers and/or Villages

Table 3-2 Level 2 Screening Evaluation Criteria, Measures and Methods (by segment)

Purpose and Need [1]/ Evaluation Criteria [2]	Measure [3]	Quantitative or Qualitative [4]	Methods [5]
	Station locations consistent with current local land use plans	Qualitative	Compatibility and consistency of station locations with current local land use plans
	Activity nodes served	Quantitative	Number of activity nodes (e.g., points of interest, gathering spaces, food banks, educational institutions, parks and recreational resources) within 10-minute walkshed of stations
Modal Integration	Passenger transfers	Qualitative	Assessment of ease of passenger transfer for riders transferring between light rail lines, and between light rail and other motorized modes (i.e., bus, paratransit, drop-off/pick-up, transportation network companies [TNC]) at stations
	Bus/rail and rail/rail integration	Quantitative/ Qualitative	Assessment of peak-hour bus and rail trips that stop within one block of proposed station locations relative to the total number of peak-hour bus and rail trips within a reasonable walking distance (e.g., 700-foot-walk) of proposed stations
	Bicycle accessibility	Quantitative	Percent of bicycle facility miles (i.e., neighborhood greenways, bicycle lanes, protected bicycle lanes, and trails) to total roadway miles within 10-minute bikeshed of stations
	Pedestrian and persons with limited mobility accessibility	Quantitative/ Qualitative	Assessment of number of intersections, percent of sidewalk and trail miles to total roadway miles, and assessment of impediments to pedestrian and American with Disabilities Act (ADA) access (i.e., large intersections with signal delay, significant topography or grade challenges) within 10-minute walkshed of stations
Station Area Development Opportunities	Development potential	Quantitative	Development potential based on zoned capacity and market conditions within 10-minute walkshed of stations (5-minute walkshed in downtown)
	Equitable development opportunities	Qualitative	Assessment of unique opportunities for equitable development enabled by station location and/or conceptual configuration
Preserve and promote a healthy environment and economy by minimizing adverse impacts on the natural, built and social environments through sustainable practices			
Environmental Effects	National Register of Historic Places (NRHP) listed or eligible historic properties and Seattle Landmarks	Quantitative	Number of intersected or adjacent NRHP-listed, NRHP-eligible, and Seattle Landmark property impacts based on Department of Archaeology and Historic Preservation (DAHP) data and Seattle Landmark data
	Potential archaeological resources	Quantitative	Percent of alternative length within previously identified archaeologically sensitive areas that are 500 feet (or 0.5 miles at water crossings) from alignment
	Parks and recreational resources	Quantitative	Number of and estimated area of potential permanent impacts to parks and recreational resources
	Water resources	Quantitative	Estimated acres of potential permanent in-water impacts
	Fish and wildlife habitats	Quantitative	Estimated acres of potential permanent impact to fish and wildlife habitats using city of Seattle environmentally critical areas
	Hazardous materials	Quantitative	Number of contaminated properties potentially impacted, including Superfund sites
	Visual	Quantitative/ Qualitative	Assessment of the length of elevated guideway adjacent to residential or other visually sensitive areas, including parks and historic properties and an assessment of scale of elevated guideway in visually sensitive areas and potential impacts to State Environmental Policy Act (SEPA) Scenic Routes
	Noise and vibration	Quantitative/ Qualitative	Assessment of the number of potentially affected noise and vibration sensitive receivers, including residences, libraries, performance halls, schools, churches, and selected parks within 350 feet of alignment; presence of known noise and vibration sensitive facilities will be noted
	Property acquisitions and displacements	Quantitative	Number of properties potentially affected, including potential residential and business displacements; does not include potential permanent or temporary easements or area for construction tagging, traction power substations (TPSS) or underground station entrances
	Construction impacts	Qualitative	Assessment of temporary construction impacts to community, including potential for transportation, access, noise, vibration, and visual effects that could disrupt the community (e.g., existing residents, businesses, social service providers) and relative duration of construction and impacts to high volume traffic areas
	Burden on low-income and minority populations	Qualitative	Assessment of how potential acquisitions and displacements (residents and businesses) and visual, noise and construction impacts would affect minority and low-income populations relative to other communities and displacement risk from station area redevelopment
Traffic Operations	Traffic circulation and access	Qualitative	Effects on traffic and transit (i.e., bus and streetcar) operations, including potential lane restrictions, lane eliminations, turn restrictions, driveways impacted, and parking taken
	Transportation facilities	Qualitative	Effects on existing transportation facilities, including bicycle lanes, sidewalks, traffic interchanges and other transportation infrastructure as warranted, and compatibility with planned facilities
Economic Effects	Freight movement and access on land and water	Qualitative	Effects on existing and future freight mobility and future freight capacity expansion opportunities, including both on land and water
	Business and commerce effects	Qualitative	Effects on businesses, as well as commercial and industrial areas, including potential impacts during construction and operations from changes in access, travel patterns and displacements

Notes:
(1) Based on preliminary Purpose and Need Statement, with revisions incorporated from feedback received during the Level 1 evaluation.
(2) Criteria are subject to change as alternatives are refined and screened at each level, as well as to incorporate stakeholder input.
(3) Screening criteria and associated measures get progressively more detailed and quantitative as the alternatives are screened through Level 1, Level 2 and Level 3.
(4) Measures ranked from high to low based on anticipated ability to achieve evaluation measure; “High” = higher ability to achieve measure, “Medium” = moderate ability to achieve measure, “Low” = lower ability to achieve measure; no weighting will be applied.
(5) Agency and stakeholder input will be considered in the overall alternatives evaluation and screening process.
(6) Minority population is defined in U.S. DOT Updated Environmental Justice Order 5610.2(a) as persons belonging to any of the following groups: Black, Hispanic, Asian American, and American Indian and Alaska Native.

3.3 Agency and Community Engagement

A variety of stakeholders are engaged in the WSBLE Project, and their input helps inform the screening process as the WSBLE Project advances during the Alternatives Development phase. The agency and external engagement process actively seeks input and involvement from stakeholders through the following groups and forums:

- **Sound Transit Board:** Oversees implementation of WSBLE Project
- **Elected Leadership Group:** Elected officials who represent the project corridor and/or Sound Transit Board
- **Stakeholder Advisory Group:** Transit riders, residents, businesses, major institutional organizations, stakeholders, and members of the public
- **Interagency Group:** Senior staff from Sound Transit, city of Seattle and other partner agencies such as Port of Seattle, King County, Washington State Department of Transportation (WSDOT) and Federal Transit Administration (FTA)
- **Neighborhood Forums:** Community members interested in delving more deeply into issues specific to their neighborhood
- **Public:** People who live, work and commute in, through and around the Puget Sound region

These groups and forums supplement public engagement and outreach techniques already used by Sound Transit and offer opportunities for greater collaboration early in project development. This external engagement process is shown on **Figure 3-5** (Community Engagement and Collaboration Process).

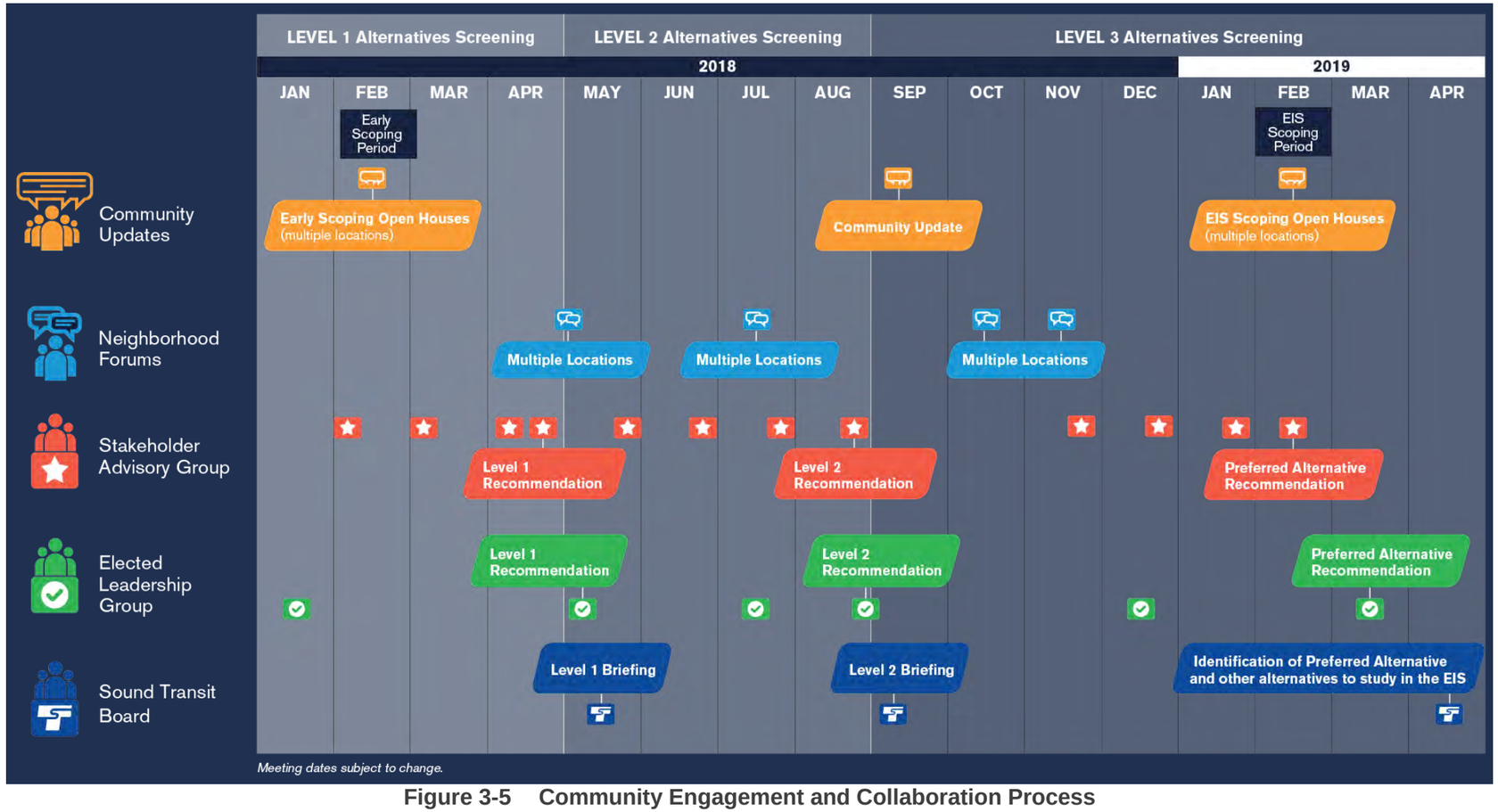


Figure 3-5 Community Engagement and Collaboration Process

3.3.1 Sound Transit Board

The Sound Transit Board oversees the implementation and delivery of the WSBLE Project, identifies the Preferred Alternative and other alternatives to study in the EIS, and makes other major project decisions. The Board considers recommendations and feedback from the ELG, SAG, IAG and public when making decisions about the project. The Sound Transit Board was briefed on the Level 2 evaluation and screening results on October 25, 2018, including the input received from the ELG, SAG, IAG and public.

3.3.2 Elected Leadership Group

The WSBLE Project's ELG is a group of elected officials that represent the service corridor and/or the Sound Transit Board. The purpose of this group is to reach consensus around key decisions and work through project issues as needed. ELG meetings are open to the public. The ELG:

- Appoints SAG members
- Works with project staff to understand and evaluate trade-offs
- Represents the communities they serve and shares community priorities
- Recommends a Preferred Alternative to study in the EIS to the Sound Transit Board based on the recommendations from the SAG, public input and the *ST3 Plan* project scope, schedule and budget

The ELG met on July 19, 2018 to review the Level 2 alternatives and screening criteria and then made their recommendations on the Level 2 Screening on October 5, 2018.

3.3.3 Stakeholder Advisory Group

The SAG provides a forum for community members to inform the development of alternatives for the project. Meetings are open to the public. The SAG:

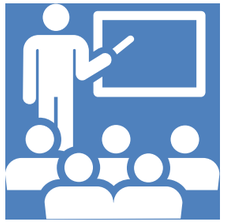
- Highlights potential issues and considers trade-offs in the corridor
- Makes recommendations on a Preferred Alternative to study in the EIS to the ELG

The SAG met on May 30, 2018 to go over the Level 2 alternatives development process. On June 20, 2018, they reviewed the Level 2 alternatives and screening criteria, as well as the new SODO and Chinatown/International District alternatives (see **Section 3.4** [Previous Level 1 Findings and Recommendations]). The SAG was then presented with the Level 2 evaluation and screening results at a meeting held on September 5, 2018, with a follow-up meeting on September 26, 2018 to provide their recommendations to the ELG on the alternatives to carry forward into the Level 3 Screening.

3.3.4 Interagency Group

The IAG is composed of senior staff from Sound Transit and partner city, county, and transit agencies empowered with technical decision-making authority. The IAG:

- Examines technical aspects and resolves issues at a staff level wherever possible
- Identifies issues to bring before the ELG and SAG
- Recommends subjects to address within partnering and permitting agreements



An IAG meeting was held on May 23, 2018 to discuss the Level 2 evaluation criteria, with a follow-up meeting on June 13, 2018 to review the Level 2 alternatives and changes made to criteria based on feedback from the SAG. The new SODO and Chinatown/International District alternatives were discussed with the IAG on July 16, 2018. Preliminary results of the Level 2 evaluation were presented at the IAG meeting on August 29, 2018.

3.3.5 Public

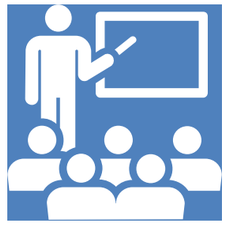
A variety of other public engagement activities complement all the engagement groups and forums including, but not limited to, open houses (in person and online), community briefings and meetings, e-newsletters, and attendance at fairs and festivals. The role of members of the public is to communicate ideas, concerns and questions about the project through a variety of communications channels to:

- Learn about the project and ask questions
- Provide feedback on topics and issues of interest
- Communicate to Sound Transit how the public wants to be engaged
- Share information and discuss the project with the community

The following public engagement activities occurred during the Level 2 evaluation from May to September 2018:

- 66 community briefings
- 11 festivals engaging more than 3,800 community members
- 9 email updates to more than 4,000 subscribers
- 7 Tweets to more than 82,000 users
- 5 Facebook posts to more than 30,000 users
- 67 comments and questions received via email
- 3,446 visits to an online open house from September 6 to 23, 2018

3.3.5.1 Neighborhood Forums



Neighborhood forum events provide an opportunity for community members to connect with their neighbors, follow the project's progress, delve more deeply into issues specific to their neighborhood, and voice their opinions at major decision points. At neighborhood forums, participants work together to:

- Examine and discuss area- and community-specific issues and concerns associated with the proposed alternatives
- Provide detailed feedback to inform alternatives development and decision-making, which is shared with the IAG, SAG, ELG and the Sound Transit Board

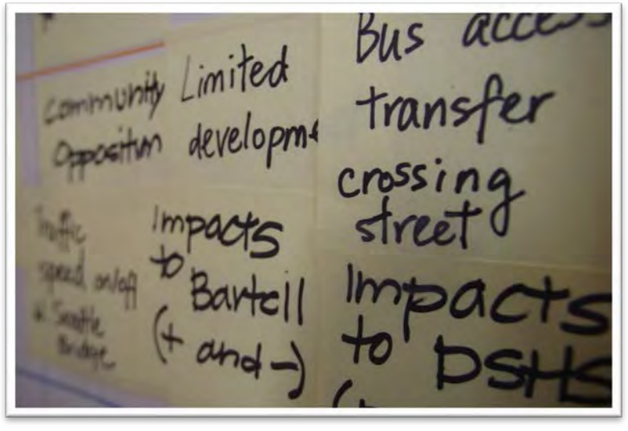
Sound Transit held a series of neighborhood forums in September 2019 to present the results of the Level 2 evaluation. Three neighborhood forums were conducted the following dates, times and locations during Level 2:

- **West Seattle:** Saturday, September 8, 2018 from 9 to 11:30 a.m. at the Seattle Lutheran High School Gym (4100 SW Genesee Street, Seattle)
- **Downtown Seattle:** Tuesday, September 11, 2018 from 5:30 to 8:00 p.m. at the Ruth Fisher Boardroom, Union Station (401 S Jackson Street, Seattle)
- **Ballard:** Monday, September 17, 2018 from 5:30 to 8:00 p.m. at Ballard Eagleson VFW (2812 NW Market Street, Seattle)

An online open house was also made available to the public for those who were unable to attend in person and/or wanted to review alternatives and provide comments online.

3.3.5.2 Station Charrettes

Eight station charrettes were held between June and September 2018 to review the stations associated with the Level 2 alternatives and begin discussing potential refinements for Level 3. Participants, including agency representatives and stakeholder groups, provided feedback on how stations could best serve the community with respect to transit integration, non-motorized access, and land use development. Sound Transit also conducted walking tours of the proposed station areas with the participants.



3.4 Previous Level 1 Findings and Recommendations

The previous Level 1 Screening began with an early scoping period held between February 2 and March 5, 2018. Early scoping provided agencies, tribes, and the public an opportunity to comment on the WSBLE Project. The ST3 Representative Project served as the starting point for this dialogue, and stakeholders were invited to offer their suggestions on possible alternatives. Stakeholders were also asked for their input on the preliminary Purpose and Need for the WSBLE Project, as well as potential community benefits and impacts, which provided feedback into the evaluation criteria, measures and methods used in the Alternatives Development process.

The Level 1 alternatives were developed within each of the four study segments—West Seattle/ Duwamish, SODO, Downtown and Interbay/Ballard. A total of 24 alternatives were studied in Level 1 at a segment level, with four additional alternatives for the International District/Chinatown Station in the Downtown Segment. The Level 1 alternatives were based on information from prior studies, technical analysis and considerations, and early scoping input from the agencies, public and stakeholders.

Level 1 relied on readily available information, with a high-level assessment of the alternatives within each of the study segments. The ST3 Representative Project served as the baseline alternative against which alternatives were compared during the Level 1 Screening. The Level 1 evaluation applied primarily qualitative criteria to measure the potential benefits and impacts and highlight differentiating characteristics among the alternatives relative to the ST3 Representative Project. The Level 1 Screening was intended to identify those alternatives that demonstrated the most promise, and to screen out those alternatives that had limited potential to meet the WSBLE Project's preliminary Purpose and Need and/or were deemed not practical.

Table 3-3 (Summary of Previous Elected Leadership Group Level 1 Screening Recommendations) lists the alternatives evaluated in Level 1 and highlights the alternatives that the ELG recommended be carried forward into the subsequent Level 2 Screening. It also lists the alternatives not carried forward into Level 2. On May 17, 2018, the ELG recommended to carry forward 16 of the Level 1 alternatives into Level 2.

At the meeting in May 2018, the ELG also requested additional study of alignments further west in SODO, as well as options for the International District/Chinatown Station. As such, the following additional Level 1 alternatives were evaluated:

- Occidental Avenue
- 6th Avenue
- 4th Avenue Cut-and-Cover Tunnel/Station
- 4th Avenue Bored Tunnel/Mined Station
- 5th Avenue Bored Tunnel/Mined Station
- Union Station Bored Tunnel/Mined Station

On July 17, 2018, the ELG recommended to advance the following four additional alternatives into Level 2 for the SODO and Chinatown/International District Segment:

- Occidental Avenue
- 4th Avenue Cut-and-Cover Tunnel/Station
- 4th Avenue Bored Tunnel/Mined Station
- 5th Avenue Bored Tunnel/Mined Station

More detailed information on Level 1 can be found in the *Level 1 Alternatives Development and Screening Technical Memorandum* (Sound Transit 2018).

Table 3-3 Summary of Previous Elected Leadership Group Level 1 Screening Recommendations

Segment / Level 1 Alternative	Carry Forward into Level 2	Do Not Carry Forward into Level 2
West Seattle/Duwamish Segment		
ST3 Representative Project	✓	
Pigeon Ridge/West Seattle Tunnel	✓	
West Seattle Bridge/Fauntleroy		✓
Yancy Street/West Seattle Tunnel		✓
Oregon Street/Alaska Junction	✓	
West Seattle Golf Course/Alaska Junction	✓	
SODO Segment		
ST3 Representative Project	✓	
Massachusetts Tunnel Portal	✓	
Surface E-3	✓	
Occidental Avenue	✓	
6th Avenue		✓
Downtown Segment		
ST3 Representative Project	✓	
5th/Harrison	✓	
5th/Mercer		✓
6th/Boren/Roy	✓	
8th/6th/Republican		✓
5th/Roy/Consolidated SLU Station (1)		✓
5th Avenue Bored Tunnel/Mined Station	✓	
4th Avenue Cut-and-Cover Tunnel/Station	✓	
4th Avenue Bored Tunnel/Mined Station	✓	
Union Station Bored Tunnel/Mined Station		✓
Interbay/Ballard Segment		
ST3 Representative Project	✓	
Elliott/15th/16th/Fixed Bridge	✓	
West of BNSF/20th/17th/Fixed Bridge (2)	✓	
West of BNSF/20th/17th/Tunnel	✓	
East of BNSF/14th/Movable Bridge	✓	
Elliott/Armory Way/14th/Tunnel	✓	
West of BNSF/20th/Tunnel		✓

NOTES: (1) SLU = South Lake Union; (2) BNSF = Burlington Northern Santa Fe

4 LEVEL 2 ALTERNATIVES EVALUATION AND FINDINGS

The Level 2 Screening developed and evaluated in greater detail those alternatives carried forward from the Level 1 Screening, including the additional alternatives for the SODO and Chinatown/International District Segment. However, the Level 2 evaluation employed a larger set of criteria and more use of quantitative measures. Like Level 1, the Level 2 Screening was conducted at the segment level.

The Level 2 alternatives were based on the findings of the Level 1 Screening, incorporating refinements based on input from the stakeholder and community engagement efforts. The 20 alternatives recommended for Level 2 were subsequently refined and optimized, leading to a total of 24 alternatives ultimately studied among the four study segments in Level 2. **Figure 4-1** (Level 2 Alternatives by Study Segment) shows the study segments and lists the Level 2 alternatives within each segment.

This section of the report is organized by study segment—West Seattle/Duwamish, SODO and Chinatown/International District, Downtown and Interbay/Ballard. An overview map of the alternatives in the segment and an evaluation summary table are provided at the beginning of each segment. The alternatives within the four study segments are then defined independently, with a map of the alternative illustrating the route, basic characteristics and station locations. The evaluation of the alternative is summarized based on the criteria under each Purpose statement, with the detailed evaluation matrices for each alternative and segment found in the appendices. Finally, the ELG recommendations regarding whether the alternatives should be carried forward for further study in the Level 3 Screening are listed.

West Seattle/Duwamish	SODO and Chinatown/ International District	Downtown	Interbay/Ballard
• ST3 Representative Project	• ST3 Representative Project	• ST3 Representative Project	• ST3 Representative Project
• Pigeon Ridge/West Seattle Tunnel	• Massachusetts Tunnel Portal	• 5th/Harrison	• 15th/Fixed Bridge/15th
• Oregon Street/Alaska Junction/ Elevated	• Surface E-3	• 6th/Boren/Roy	• 20th/Fixed Bridge/17th
• Golf Course/Alaska Junction/ Tunnel	• Occidental Avenue	• 5th/Terry/Roy/Mercer	• 20th/Tunnel/15th
• Oregon Street/Alaska Junction/ Tunnel	• 4th Avenue Cut-and-Cover Tunnel/Station		• Armory Way/Tunnel/14th
	• 4th Avenue Bored Tunnel/ Mined Station		• Central Interbay/Movable Bridge/14th
	• 5th Avenue Bored Tunnel/ Mined Station		• Central Interbay/Fixed Bridge/14th
			• Central Interbay/Tunnel/15th

Figure 4-1 Level 2 Alternatives by Study Segment

4.1 West Seattle/Duwamish Segment Alternatives Evaluation

The West Seattle/Duwamish Segment included the following five alternatives during the Level 2 Screening:

- ST3 Representative Project
- Pigeon Ridge/West Seattle Tunnel
- Oregon Street/Alaska Junction/Elevated
- Golf Course/Alaska Junction/Tunnel
- Oregon Street/Alaska Junction/Tunnel

These alternatives are delineated on **Figure 4-2** (West Seattle/Duwamish Segment—Level 2 Alternatives), with **Table 4-1** (West Seattle/Duwamish Segment—Level 2 Alternatives Evaluation Summary) summarizing the evaluation results. Individual descriptions and evaluation of each alternative are provided in the pages that follow. Refer to **Appendix B** (West Seattle/Duwamish Segment Level 2 Evaluation Matrices) for the detailed findings of each evaluation measure in this segment.

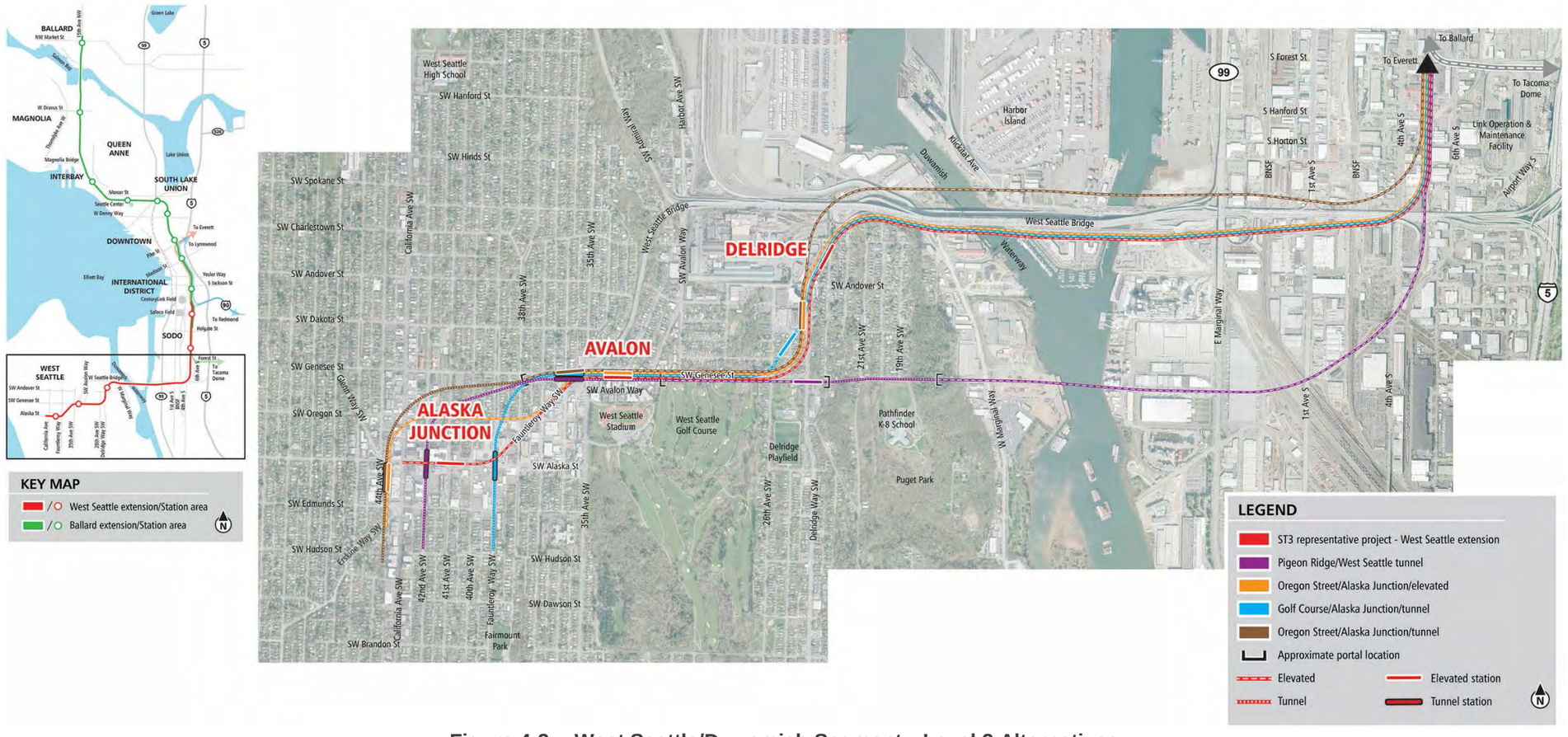


Figure 4-2 West Seattle/Duwamish Segment—Level 2 Alternatives

Table 4-1 West Seattle/Duwamish Segment Level 2 Alternatives Evaluation Summary

Purpose and Need / Evaluation Criteria	Alternatives				
	ST3 Representative Project	Pigeon Ridge/West Seattle Tunnel	Oregon Street/Alaska Junction/Elevated	Golf Course/Alaska Junction/Tunnel	Oregon Street/Alaska Junction/Tunnel
Provide high quality rapid, reliable, and efficient peak and off-peak light rail transit service to communities in the project corridors defined in ST3.					
Potential service interruptions and recoverability	High	High	High	High	High
LRT travel times (minutes)	7 to 8	7 to 8	7 to 8	7 to 8	7 to 8
Improve regional mobility by increasing connectivity and capacity through downtown Seattle to meet projected transit demand.					
LRT network integration	Medium	Medium	Medium	Medium	Medium
Passenger carrying capacity in downtown	Medium	Medium	Medium	Medium	Medium
Ridership potential (2040 population/employment) (1)	11,200	12,500	12,000	10,700	12,500
Connect regional centers as described in adopted regional and local land use, transportation, and economic development plans and Sound Transit's Regional Transit Long-Range Plan.					
Station proximity to PSRC-designated regional growth centers	N/A (3)	N/A	N/A	N/A	N/A
Station proximity to PSRC-designated manufacturing/industrial centers	1	1	1	1	1
Accommodates future LRT extension beyond ST3	Low	Medium	Low	High	Medium
Implement a system that is consistent with the ST3 Plan that established transit mode, corridor, and station locations and that is technically feasible and financially sustainable to build, operate, and maintain.					
Mode, route and general station locations per ST3	High	High	High	Medium	High
Potential ST3 implementation schedule effects	High	Low	High	Low	Low
Potential ST3 operating plan effects	High	High	High	High	High
Engineering constraints	Medium	Low	Medium	Medium	High
Constructability issues	Low	Low	Low	Low	Medium
Operational constraints	Medium	High	Medium	Medium	Medium
Conceptual capital cost comparison (2017$)	--	$1,200 million increase	Similar	$700 million increase	$500 million increase
Operating cost impacts	High	Medium	High	Medium	Medium
Expand mobility for the corridor and region's residents, which include transit dependent, low-income and minority populations.					
Opportunities for low-income and minority populations (activity nodes/subsidized rental units)	Medium	Medium	Medium	Medium	Medium
	15%	13%	14%	15%	13%
Low-income population (1/2)	25% / 21%	24% / 21%	23% / 21%	26% / 21%	23% / 21%
Minority population (1/2) (4)	22% / 26%	23% / 26%	21% / 26%	23% / 26%	21% / 26%
Youth population (under 18) (1/2)	13% / 17%	14% / 17%	14% / 17%	13% / 17%	14% / 17%
Elderly population (65 and over) (1/2)	16% / 13%	15% / 13%	15% / 13%	16% / 13%	15% / 13%
LEP population (1/2)	3% / 4%	3% / 4%	3% / 4%	3% / 4%	3% / 4%
Disabled population (1/2)	9% / 9%	9% / 9%	9% / 9%	9% / 9%	9% / 9%

Table 4-1 West Seattle/Duwamish Segment Level 2 Alternatives Evaluation Summary

Purpose and Need / Evaluation Criteria	Alternatives				
	ST3 Representative Project	Pigeon Ridge/West Seattle Tunnel	Oregon Street/Alaska Junction/Elevated	Golf Course/Alaska Junction/Tunnel	Oregon Street/Alaska Junction/Tunnel
Encourage equitable and sustainable urban growth in station areas through support of transit-oriented development, station access, and modal integration in a manner that is consistent with local land use plans and policies.					
Compatibility with Seattle designated Urban Centers and Villages (1)	34%	31%	31%	35%	29%
Station locations consistent with current local land use plans	High	High	High	High	High
Activity nodes served (1)	40	41	42	38	42
Passenger transfers	Medium	High	Medium	Medium	High
Bus/rail and rail/rail integration (1)	Medium	High	Medium	Medium	High
Bicycle accessibility (1)	14%	14%	15%	14%	15%
Pedestrian and persons with limited mobility accessibility (1)	Medium	High	High	High	High
Development potential (1)	13%	13%	13%	15%	12%
Equitable development opportunities	Low	Low	Medium	Medium	High
Preserve and promote a healthy environment and economy by minimizing adverse impacts on the natural, built and social environments through sustainable practices.					
NRHP listed or eligible historic properties and Seattle City Landmarks	1	1	1	1	2
Potential archaeological resources	Low	Low	Low	Low	Low
Parks and recreational resources effects (acres)	1.5	3.5	1.5	2.8	0.6
Water resources effects (acres)	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fish and wildlife habitat effects (acres)	3.7	5.3	3.7	3.7	1.9
Hazardous materials sites	11	7	8	14	14
Visual effects (miles)	1.3	0.6	1.5	0.9	0.7
Noise and vibration sensitive receivers	Low	Low	Low	Medium	Low
Number of properties potentially affected	High	High	Low	High	Low
Number of potential residential unit displacements	Medium	Low	Low	High	Low
Square feet of potential business displacements	High	Medium	Low	High	Medium
Construction impacts	Low	High	Low	Medium	Medium
Burden on minority and low-income populations	High	High	High	High	High
Traffic circulation and access	Low	High	Medium	High	Medium
Transportation facilities	Low	High	Medium	Medium	High
Freight movement and access on land and water	Medium	Medium	Medium	Medium	Low
Business and commerce effects	Medium	High	Low	Medium	Medium

Notes: (1) Within station walksheds; (2) Within 15-minute ride on connecting high frequency transit; (3) N/A = Measure not applicable to this segment; (4) Minority population is defined in U.S. DOT Updated Environmental Justice Order 5610.2(a) as persons belonging to any of the following groups: Black, Hispanic, Asian American, and American Indian and Alaska Native

ST3 REPRESENTATIVE PROJECT

ALTERNATIVE

SEGMENT
WEST SEATTLE/DUWAMISH

ROUTE DESCRIPTION

The ST3 Representative Project would begin in SODO, running along the E3 busway on an elevated structure. The route would then cross over the West Seattle Bridge and head west on an elevated structure over E Marginal Way. It would then continue onto a new high-level bridge spanning the Duwamish Waterway on the south side of the existing West Seattle Bridge. After crossing the river, the elevated route would round Pigeon Point, follow Delridge Way SW and run west along SW Genesee Street north of the West Seattle Golf Course. Continuing toward Alaska Junction, the elevated route would turn southwest on Fauntleroy Way SW, west on SW Alaska Street, and terminate at California Avenue SW.

STATIONS

Delridge	Elevated on Delridge Way SW just north of SW Andover Street
Avalon	Elevated on south side of SW Genesee Street between SW Avalon Way and 35th Avenue SW
Alaska Junction	Elevated on SW Alaska Street between 40th and 42nd avenues SW

REFINEMENTS TO ALTERNATIVE FROM LEVEL 1

- Shifted guideway south of existing West Seattle Bridge to accommodate bridge foundations
- Shifted guideway to south side of SW Genesee Street to reduce traffic impacts

Purpose and Need	Evaluation
Service performance and reliability in project corridor	• Fully grade separated alternative • Travel time estimate 7 to 8 minutes between Alaska Junction and SODO stations
Improve Downtown capacity for regional connectivity	• Facilitates regional connectivity • Approximately 11,200 forecasted population and employment served in 2040
Connect regional centers	• Delridge Station within reasonable walking distance of Duwamish Manufacturing and Industrial Center (MIC); no regional growth centers in segment • Alaska Junction Station east-west orientation difficult to turn south for future LRT extension
Technically feasible and financially sustainable	• Mode, route and general station locations consistent with *ST3 Plan* • Engineering constraints with long span bridges and straddle bents over S Spokane Street and SR 99 • Constructability issues associated with potential soil stabilization challenge at Pigeon Point • Relatively tight radius curves crossing West Seattle Bridge and around Pigeon Point would result in reduced speed • In-water construction activities would potentially impact vessel traffic in navigation channel, fish windows and tribal treaty fishing
Expand mobility for all	• All stations located in areas of moderate access to opportunity • Better access to opportunities provided for historically underserved populations on the greater Link system • Similar low-income populations as rest of the city and slightly lower minority populations • Similar youth, elderly, LEP and disabled populations as rest of the city
Encourage equitable and sustainable urban growth	• Local land use plans are supportive of all three stations • Alaska Junction and Avalon stations would serve rezoned West Seattle Triangle area • Adequate passenger transfer opportunities, but Avalon Station east of Fauntleroy Way SW more difficult to access • Limited equitable development opportunities at all three station locations
Promote a healthy built, natural, and social environment	• Potential permanent effects to steep slopes and wildlife habitat on Pigeon Point • Increased visual effects from high elevated guideway along SW Genesee Street, as well as Fauntleroy Way SW compared to tunnel alternatives in segment • Potential residential displacements in Delridge and Avalon neighborhoods • Potential permanent impacts on three parks, including Harbor Marina Corporate Center at Terminal 102, West Duwamish Greenbelt and West Seattle Golf Course • Temporary visual, noise, vibration and traffic impacts on residences in West Seattle during construction • Potential permanent impacts to traffic circulation and access, as well as to transportation facilities • Permanent in-water impacts from potential piers in the Duwamish Waterway

PIGEON RIDGE/WEST SEATTLE TUNNEL

ALTERNATIVE

SEGMENT
WEST SEATTLE/DUWAMISH

ROUTE DESCRIPTION

This alternative would start in SODO on an elevated structure running along the E3 busway, but it would continue further south after crossing over the West Seattle Bridge. The elevated route would then turn west over 4th Avenue S, 1st Avenue S, the Union Pacific Railroad (UPRR) yard, and E Marginal Way. It would then cross the Duwamish Waterway via a new high-level bridge, transition into a tunnel beneath Pigeon Ridge, and then emerge back onto an elevated structure paralleling SW Genesee Street. The elevated structure would travel along the northern edge of the West Seattle Golf Course. Approaching SW Avalon Way, the route would again transition into a tunnel to 42nd Avenue SW and then terminate in a tunnel near 42nd Avenue SW and SW Hudson Street.

STATIONS

Delridge	Elevated on SW Genesee Street spanning Delridge Way SW
Avalon	Tunnel south side of SW Genesee Street straddling Fauntleroy Way SW
Alaska Junction	Tunnel under 42nd Avenue SW straddling SW Alaska Street

REFINEMENTS TO ALTERNATIVE FROM LEVEL 1

- Shifted Duwamish Waterway crossing further south, closer to S Idaho Street
- Shifted Avalon Station west to straddle Fauntleroy Way SW for improved station access

Purpose and Need	Evaluation
Service performance and reliability in project corridor	• Fully grade separated alternative • Travel time estimate 7 to 8 minutes between Alaska Junction and SODO stations
Improve Downtown capacity for regional connectivity	• Facilitates regional connectivity • Approximately 12,500 forecasted population and employment served in 2040; greater than segment average due to well-spaced West Seattle stations and more southern Delridge Station
Connect regional centers	• Delridge Station within reasonable walking distance of Duwamish MIC; no regional growth centers in segment • Alaska Junction Station north-south orientation in tunnel accommodates future LRT extension
Technically feasible and financially sustainable	• Mode, route, and station locations generally consistent with *ST3 Plan* • Inclusion of tunnels could increase implementation schedule • Engineering constraints associated with unstable slopes at Pigeon Ridge, widest crossings over Duwamish Waterway and elevated structure over UPRR yard • Higher cost approximately $1,200 million more than ST3 Representative Project • Tunnel costs not included in ST3 financial plan or evaluation methodology • In-water construction activities would potentially impact vessel traffic in navigation channel, fish windows and tribal treaty fishing
Expand mobility for all	• All stations located in areas of moderate access to opportunity • Better access to opportunities provided for historically underserved populations on the greater Link system • Similar low-income populations as rest of the city and slightly lower minority populations • Similar youth, elderly, LEP, and disabled populations as rest of the city
Encourage equitable and sustainable urban growth	• Local land use plans are supportive of all three stations • Alaska Junction and Avalon stations would serve rezoned West Seattle Triangle area • Limited equitable development opportunities at Delridge and Avalon stations; some opportunities at Alaska Junction Station
Promote a healthy built, natural, and social environment	• Potential permanent impacts on four parks, including Delridge Playfield, Pigeon Point Park, West Duwamish Greenbelt and West Seattle Golf Course • Most potential permanent impact to wildlife habitat on the West Duwamish Greenbelt at Pigeon Ridge compared to other alternatives in segment • More potential residential displacements around Alaska Junction Station compared to other alternatives in segment • Least disruptive to Delridge and Pigeon Point neighborhoods during construction • Avoids disruption to freight movement on Harbor Island • Permanent in-water impacts from potential piers in the Duwamish Waterway

OREGON STREET/ALASKA JUNCTION/ELEVATED

ALTERNATIVE

SEGMENT
WEST SEATTLE/DUWAMISH

ROUTE DESCRIPTION

This alternative would run on an elevated structure along the E3 busway in SODO. The route would then cross over the West Seattle Bridge and head west on an elevated structure over E Marginal Way. It would then span the Duwamish Waterway on a new high-level bridge on the south side of the existing West Seattle Bridge. After crossing the river, the elevated route would round Pigeon Point and follow Delridge Way SW to SW Genesee Street. The elevated route would run along SW Genesee Street, turn southwest on Fauntleroy Way SW, then head west and follow SW Oregon Street toward California Avenue SW. The elevated route would turn southwest of California Avenue SW and end just beyond SW Edmunds Street near Erskine Way SW.

STATIONS

Delridge	Elevated on Delridge Way SW south of SW Andover Street
Avalon	Elevated on SW Genesee Street between SW Avalon Way and 35th Avenue SW
Alaska Junction	Elevated east of 44th Avenue SW south of SW Alaska Street

REFINEMENTS TO ALTERNATIVE FROM LEVEL 1

- Shifted guideway to south side of existing West Seattle Bridge (versus north side)

Purpose and Need	Evaluation
Service performance and reliability in project corridor	• Fully grade separated alternative • Travel time estimate 7 to 8 minutes between Alaska Junction and SODO stations
Improve Downtown capacity for regional connectivity	• Facilitates regional connectivity • Approximately 12,000 forecasted population and employment served in 2040
Connect regional centers	• Delridge Station within reasonable walking distance of Duwamish MIC; no regional growth centers in segment • Accommodates future southern LRT extension, but likely would require elevated structure along California Avenue SW to south or parallel facility
Technically feasible and financially sustainable	• Mode, route and general station locations consistent with *ST3 Plan* • Engineering constraints with long span bridges and straddle bents over S Spokane Street and SR 99 • Constructability issues associated with potential soil stabilization challenge at Pigeon Point • Relatively tight radius curves crossing West Seattle Bridge and around Pigeon Point would result in reduced speed • Cost similar to ST3 Representative Project • In-water construction activities would potentially impact vessel traffic in navigation channel, fish windows and tribal treaty fishing
Expand mobility for all	• All stations located in areas of moderate access to opportunity • Better access to opportunities provided for historically underserved populations on the greater Link system • Similar low-income populations as rest of the city and slightly lower minority populations • Similar youth, elderly, LEP and disabled populations as rest of the city
Encourage equitable and sustainable urban growth	• Local land use plans are supportive of all three stations • Alaska Junction and Avalon stations would serve rezoned West Seattle Triangle area • Equitable development opportunities near Delridge Station; limited opportunities at Avalon and Alaska Junction stations
Promote a healthy built, natural, and social environment	• Potential permanent effects to steep slopes and wildlife habitat on Pigeon Point • Potential for residential displacements in Delridge neighborhood and around Avalon and Alaska Junction stations • Potential business and industry displacements in Duwamish industrial areas and at the Junction as it crosses California Avenue SW • Potential permanent impacts on three parks, including Harbor Marina Corporate Center at Terminal 102, West Duwamish Greenbelt and West Seattle Golf Course • Increased visual effects from high elevated guideway along SW Genesee Street, as well as Fauntleroy Way SW compared to tunnel alternatives • Greatest potential for temporary disruption to Alaska Junction neighborhood during construction, compared to tunnel alternatives • Permanent in-water impacts from potential piers in the Duwamish Waterway

GOLF COURSE/ALASKA JUNCTION/TUNNEL

ALTERNATIVE

SEGMENT
WEST SEATTLE/DUWAMISH

ROUTE DESCRIPTION

Beginning on an elevated structure along the E3 busway in SODO, this route would then cross over and parallel the south side of the existing West Seattle Bridge. The route would then span the Duwamish Waterway on a new high-level bridge south of the existing bridge. Rounding Pigeon Point, the elevated route would continue south along Delridge Way SW and then turn on a diagonal heading southwest to SW Genesee Street. The route would operate on an elevated structure on the north edge of the West Seattle Golf Course before entering a tunnel near SW Avalon Way. The tunnel would then curve south on Fauntleroy Way SW and terminate near SW Hudson Street.

STATIONS

Delridge	Elevated on a diagonal between Delridge Way SW and 26th Avenue SW north of SW Genesee Street
Avalon	Tunnel beneath SW Genesee Street straddling Fauntleroy Way SW
Alaska Junction	Tunnel beneath Fauntleroy Way SW straddling SW Alaska Street

REFINEMENTS TO ALTERNATIVE FROM LEVEL 1

- Changed name of alternative; previously Modified Golf Course/Alaska Junction/Tunnel
- Shifted guideway south of existing West Seattle Bridge, on a diagonal to SW Genesee Street, and then north edge of Golf Course (versus through it)
- Added Avalon Station for improved access to community

Purpose and Need	Evaluation
Service performance and reliability in project corridor	• Fully grade separated alternative • Travel time estimate 7 to 8 minutes between Alaska Junction and SODO stations
Improve Downtown capacity for regional connectivity	• Facilitates regional connectivity • Approximately 10,700 forecasted population and employment served in 2040; lower than segment average due to closely spaced Avalon and Alaska Junction stations
Connect regional centers	• Delridge Station within reasonable walking distance of Duwamish MIC; no regional growth centers in segment • Better accommodates future light rail extension, with route alignment and terminal Alaska Junction Station closer to 35th Avenue SW
Technically feasible and financially sustainable	• Mode, route and general station locations consistent with *ST3 Plan* • Inclusion of tunnel could increase implementation schedule • Engineering constraints with long span bridges and straddle bents over S Spokane Street and SR 99 • Constructability issues associated with potential soil stabilization challenge at Pigeon Point • Higher cost approximately $700 million more than ST3 Representative Project • Tunnel costs not included in ST3 financial plan or evaluation methodology • In-water construction activities would potentially impact vessel traffic in navigation channel, fish windows and tribal treaty fishing
Expand mobility for all	• All stations located in areas of moderate access to opportunity • Better access to opportunities provided for historically underserved populations on the greater Link system • Similar low-income populations as rest of the city and slightly lower minority populations • Similar youth, elderly, LEP and disabled populations as rest of the city
Encourage equitable and sustainable urban growth	• Local land use plans are supportive of all three stations • Alaska Junction and Avalon stations would serve rezoned West Seattle Triangle area • Greatest redevelopment potential, with more redevelopable land within station areas than other alternatives in segment • Greater equitable development opportunities near Delridge Station; limited opportunities at Avalon and Alaska Junction stations
Promote a healthy built, natural, and social environment	• Potential permanent effects to steep slopes and wildlife habitat on Pigeon Point • Potential permanent impacts on three parks, including Harbor Marina Corporate Center at Terminal 102, West Duwamish Greenbelt and West Seattle Golf Course • Lesser visual effects from lower guideway along SW Genesee Street compared to elevated alternatives • Tunnel Alaska Junction Station at Fauntleroy Way SW would lessen residential and business effects at the Junction • Permanent in-water impacts from potential piers in the Duwamish Waterway

OREGON STREET/ALASKA JUNCTION/TUNNEL

ALTERNATIVE

SEGMENT
WEST SEATTLE/DUWAMISH

ROUTE DESCRIPTION

This alternative would run on an elevated structure along the E3 busway in SODO before heading west north of the existing West Seattle Bridge. The route would span the Duwamish Waterway on a new high-level bridge. It would then cross over the West Seattle Bridge ramp, pass the Nucor Steel property and run south adjacent to Delridge Way SW. The route would then turn west on SW Genesee Street before entering a tunnel near 37th Avenue SW. The tunnel would curve southwest heading south along 44th Avenue SW and terminate near SW Hudson Street.

STATIONS

Delridge	Elevated along Delridge Way SW south of SW Andover Street
Avalon	Elevated along SW Genesee Street straddling Fauntleroy Way SW
Alaska Junction	Tunnel at 44th Avenue SW south of SW Alaska Street

REFINEMENTS TO ALTERNATIVE FROM LEVEL 1

- New alternative in Level 2

Purpose and Need	Evaluation
Service performance and reliability in project corridor	• Fully grade separated alternative • Travel time estimate 7 to 8 minutes between Alaska Junction and SODO stations
Improve Downtown capacity for regional connectivity	• Facilitates regional connectivity • Approximately 12,500 forecasted population and employment served in 2040; greater than segment average due to well-spaced West Seattle stations
Connect regional centers	• Delridge Station within reasonable walking distance of Duwamish MIC; no regional growth centers in segment • Tunnel route beneath Alaska Junction accommodates future southern LRT extension, but west of California Avenue SW
Technically feasible and financially sustainable	• Mode, route and general station locations consistent with *ST3 Plan* • Inclusion of tunnel could increase implementation schedule • Fewer engineering constraints and constructability issues compared to other alternatives by avoiding steep and unstable slope at Pigeon Point • Higher cost approximately $500 million more than ST3 Representative Project • Tunnel costs not included in ST3 financial plan or evaluation methodology • In-water construction activities would potentially impact vessel traffic in navigation channel, fish windows and tribal treaty fishing
Expand mobility for all	• All stations located in areas of moderate access to opportunity • Better access to opportunities provided for historically underserved populations on the greater Link system • Similar low-income populations as rest of the city and slightly lower minority populations • Similar youth, elderly, LEP and disabled populations as rest of the city
Encourage equitable and sustainable urban growth	• Local land use plans are supportive of all three stations • Alaska Junction and Avalon stations would serve rezoned West Seattle Triangle area • Equitable development opportunities near Delridge and Alaska Junction stations; tunnel configuration at Alaska Junction Station provides greater opportunities than elevated configuration in similar location
Promote a healthy built, natural, and social environment	• Fewest park and wildlife habitat impacts compared to other alternatives • Visual effects from high elevated guideway along SW Genesee Street, as well as along Fauntleroy Way SW due to elevated Avalon Station • Greater number of residential displacements would occur in Delridge neighborhood, for tunnel portal west of Fauntleroy Avenue SW, and around Avalon and Alaska Junction stations compared to other alternatives • Elevated guideway on north side of West Seattle Bridge would reduce temporary construction impacts on Pigeon Point neighborhood, but potentially affect freight and Port of Seattle terminal facilities, especially during construction • Permanent in-water impacts from potential piers in the Duwamish Waterway

4.1.1 West Seattle/Duwamish Segment Summary Findings

The extension of LRT to West Seattle has several design and construction challenges, particularly associated with the Duwamish Waterway crossing, including effects to water resources and tribal treaty fishing from permanent in-water piers in the Duwamish Waterway, and steep slope/terrain issues in the Delridge and Alaska Junction neighborhoods. The alternatives developed and considered during the Level 2 Screening attempted to address a variety of different challenges and community concerns, and the evaluation sought to highlight potential benefits or impacts associated with each alternative.

The Level 2 Screening also shed light on key themes and issues to consider as the alternatives carried forward into the Level 3 Screening are refined and then pieced together from end-to-end. In the West Seattle/Duwamish Segment, neighborhood impacts, environmental conditions and construction complexity issues emerged as key themes for future consideration.

General discussion and feedback from the public, SAG and ELG included the following common themes for the Level 2 alternatives evaluation and screening:

- Interest in good transfer environment and TOD opportunities at Delridge Station
- Concern with location of station on Fauntleroy; does not serve Alaska Junction well and too close to Avalon Station
- Concern with potential state freight mobility impacts of construction of Duwamish crossing north of West Seattle Bridge
- Modify the ST3 Representative Project by shifting the Delridge Station further south and the Alaska Junction Station east and oriented north-south
- Explore tradeoffs with 44th Avenue SW Alaska Junction Station location in comparison to 41st and 42nd avenues SW
- Continued interest in Alaska Junction Station at 42nd Avenue SW

For the alternatives advanced to the Level 3 Screening, additional design efforts will be conducted to refine those alternatives, and to provide additional detail on potential benefits or impacts of the end-to-end alternatives.

Table 4-2 (West Seattle/Duwamish Segment ELG Screening Recommendations) identifies the alternatives that the ELG recommended be carried forward for additional design refinement and evaluation as part of the Level 3 Screening. Additional evaluation information and results for the West Seattle/Duwamish alternatives are found in **Appendix B** (West Seattle/Duwamish Segment Level 2 Evaluation Matrices).

Table 4-2 West Seattle/Duwamish Segment ELG Screening Recommendations

Level 2 Alternative	Key Findings	Public Feedback and Common Themes	Carry Forward into Level 3	With Suggested Refinements for Level 3
ST3 Representative Project	• Carries forward into Level 3 as ST3 Representative Project	• Explore moving Delridge Station further south • Explore Alaska Junction Station east and oriented north-south	Yes	• Shift Delridge Station further south • Shift Alaska Junction Station east and oriented north-south
Pigeon Ridge/West Seattle Tunnel	• Most engineering constraints • Most effects on Duwamish Greenbelt • Low guideway along SW Genesee Street • Fewer residential and business effects in Delridge • Costs approximately $1,200 million more than ST3 Representative Project; tunnel costs not included in ST3 financial plan or evaluation methodology and requires funding partnerships • Increases schedule risk compared to ST3 Representative Project	• Concern about overall cost and environmental effects • Support for lower guideway along SW Genesee Street and fewer residential effects in Delridge • Support for Alaska Junction Station at 42nd Avenue NW	No	--
Oregon Street/Alaska Junction/Elevated	• Increases residential and business effects at Alaska Junction • Complicates a future extension to the south • High guideway along SW Genesee Street • Cost would be similar to ST3 Representative Project	• Concern about elevated guideway across California Avenue SW • If elevated, explore locating terminus station east of Junction	No	--
Golf Course/Alaska Junction/Tunnel	• Fewer residential and business effects at Alaska Junction • Low guideway along SW Genesee Street • Costs approximately $700 million more than ST3 Representative Project; tunnel costs not included in ST3 financial plan or evaluation methodology and requires funding partnerships • Increases schedule risk compared to ST3 Representative Project	• General support for this alternative, with development opportunities at Delridge Station location to serve neighborhood • Support for lower guideway along SW Genesee Street • Explore Alaska Junction Station location at 41st and 42nd avenues NW • Explore north crossing of Duwamish Waterway	Yes	• Shift Alaska Junction Station locations to 41st and 42nd avenues NW • North crossing of Duwamish Waterway
Oregon Street/Alaska Junction/Tunnel	• High guideway along SW Genesee Street • Fewer engineering constraints • Affects freight and port terminal facilities during construction • Costs approximately $500 million more than ST3 Representative Project; tunnel costs not included in ST3 financial plan or evaluation methodology and requires funding partnerships • Increases schedule risk compared to ST3 Representative Project	• General support for north crossing of Duwamish Waterway due to less environmental effects, but interest in minimizing freight effects • Concern about Alaska Junction Station locations at 44th Avenue NW • Concern with higher guideway along SW Genesee Street • Explore Alaska Junction Station location at 41st and 42nd avenues NW	No	--

4.2 SODO and Chinatown/International District Segment Alternatives Evaluation

The SODO and Chinatown/International District Segment included the following seven alternatives during the Level 2 Screening:

- ST3 Representative Project
- Massachusetts Tunnel Portal
- Surface E3
- Occidental Avenue
- 4th Avenue Cut-and-Cover Tunnel/Station
- 4th Avenue Bored Tunnel/Mined Station
- 5th Avenue Bored Tunnel/Mined Station

These alternatives are delineated on **Figure 4-3** (SODO and Chinatown/International District Segment—Level 2 Alternatives), with **Table 4-3** (SODO and Chinatown/International District Segment—Level 2 Alternatives Evaluation Summary) summarizing the evaluation results. Individual descriptions and evaluation of each alternative are provided in the pages that follow. Refer to **Appendix C** (SODO and Chinatown/International District Segment Level 2 Evaluation Matrices) for the detailed findings of each evaluation measure in this segment.

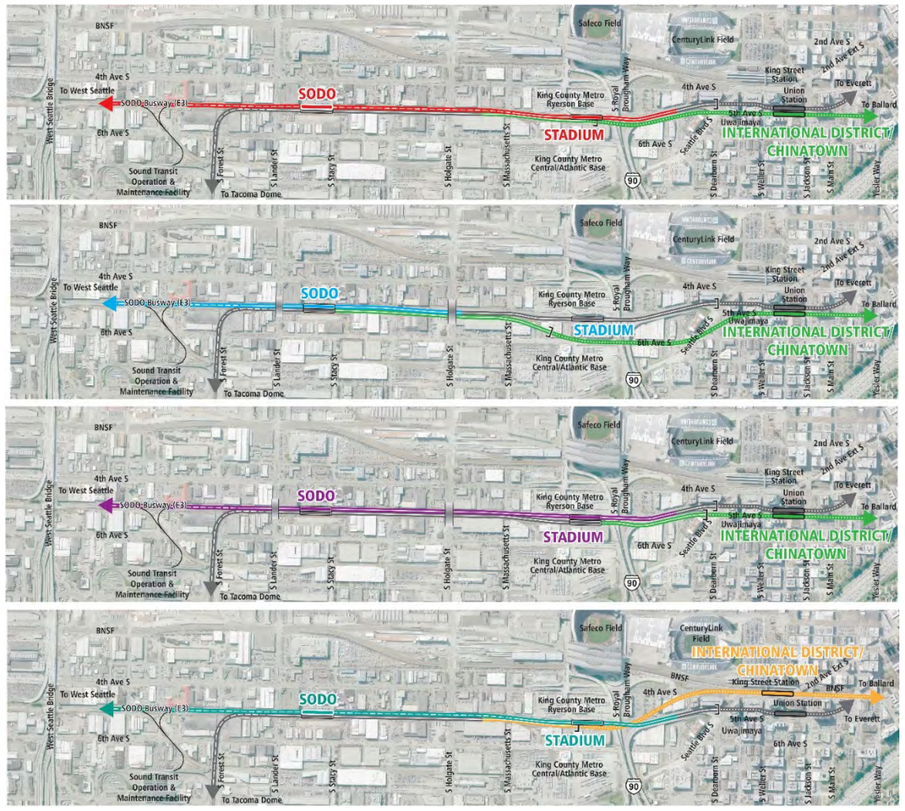


Figure 4-3 SODO and Chinatown/International District Segment—Level 2 Alternatives

Table 4-3 SODO and Chinatown/International District Segment—Level 2 Alternatives Evaluation Summary

Purpose and Need / Evaluation Criteria	Alternatives						
	ST3 Representative Project	Massachusetts Tunnel Portal	Surface E3	Occidental Avenue	4th Avenue Cut-and-Cover Tunnel/Station	4th Avenue Bored Tunnel/Mined Station	5th Avenue Bored Tunnel/Mined Station
Provide high quality rapid, reliable, and efficient peak and off-peak light rail transit service to communities in the project corridors defined in ST3.							
Potential service interruptions and recoverability	Low	Medium	High	High	Low	Low	Medium
LRT travel times (minutes)	3 to 4	3 to 4	3 to 4	3 to 4	3 to 4	3 to 4	3 to 4
Improve regional mobility by increasing connectivity and capacity through downtown Seattle to meet projected transit demand.							
LRT network integration	Medium	Medium	High	Medium	Medium	Medium	Medium
Passenger carrying capacity in downtown	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Ridership potential (2040 population/employment) (1)	35,900	35,900	35,900	37,100	35,300	35,300	35,900
Connect regional centers as described in adopted regional and local land use, transportation, and economic development plans and Sound Transit's Regional Transit Long-Range Plan.							
Station proximity to PSRC-designated regional growth centers	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Station proximity to PSRC-designated manufacturing/industrial centers	1	1	1	1	1	1	1
Accommodates future LRT extension beyond ST3	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Implement a system that is consistent with the ST3 Plan that established transit mode, corridor, and station locations and that is technically feasible and financially sustainable to build, operate, and maintain.							
Mode, route and general station locations per ST3	High	High	High	Medium	High	High	High
Potential ST3 implementation schedule effects	High	High	High	High	Low	Low	Medium
Potential ST3 operating plan effects	Medium	Medium	High	High	High	Low	Medium
Engineering constraints	Medium	Medium	Medium	Low	Low	Low	Medium
Constructability issues	Medium	Medium	Medium	Low	Low	Low	Medium
Operational constraints	Medium	Medium	High	Medium	Medium	Low	Medium
Conceptual capital cost comparison (2017$)	--	$200 million decrease	$400 million decrease	Similar (+$200 million in SODO)	$600 million increase	$500 million increase	Similar
Operating cost impacts	Medium	Medium	High	Medium	Medium	Medium	Medium
Expand mobility for the corridor and region's residents, which include transit dependent, low-income and minority populations.							
Opportunities for low-income and minority populations (activity nodes/subsidized rental units)	High	High	High	High	High	High	High
	80%	80%	80%	73%	75%	75%	80%
Low-income population (1/2)	59% / 49%	59% / 49%	59% / 49%	58% /49%	57% / 49%	57% / 49%	59% / 49%
Minority population (1/2) (4)	65% / 54%	65% / 54%	65% / 54%	65% / 53%	63% / 54%	63% / 54%	65% / 54%
Youth population (under 18) (1/2)	7% / 7%	7% / 7%	7% / 7%	7% / 8%	6% / 7%	6% / 7%	7% / 7%
Elderly population (65 and over) (1/2)	20% / 19%	20% / 19%	20% / 19%	20% / 19%	20% / 19%	20% / 19%	20% / 19%
LEP population (1/2)	30% / 19%	30% / 19%	30% / 19%	30% / 18%	28% / 19%	28% / 19%	30% / 19%
Disabled population (1/2)	24% / 19%	24% / 19%	24% / 19%	24% / 19%	25% / 19%	25% / 19%	24% / 19%

Table 4-3 SODO and Chinatown/International District Segment—Level 2 Alternatives Evaluation Summary

Purpose and Need / Evaluation Criteria	Alternatives						
	ST3 Representative Project	Massachusetts Tunnel Portal	Surface E3	Occidental Avenue	4th Avenue Cut-and-Cover Tunnel/Station	4th Avenue Bored Tunnel/Mined Station	5th Avenue Bored Tunnel/Mined Station
Encourage equitable and sustainable urban growth in station areas through support of transit-oriented development, station access, and modal integration in a manner that is consistent with local land use plans and policies.							
Compatibility with Seattle designated Urban Centers and Villages (1)	41%	41%	41%	37%	41%	41%	41%
Station locations consistent with current local land use plans	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Activity nodes served (1)	57	57	57	56	54	54	57
Passenger transfers	High	Medium	Medium	Medium	Medium	Low	Low
Bus/rail and rail/rail integration (1)	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Bicycle accessibility (1)	21%	21%	21%	21%	21%	21%	21%
Pedestrian and persons with limited mobility accessibility (1)	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Development potential (1)	14%	14%	14%	15%	13%	13%	14%
Equitable development opportunities	Low	Medium	Low	High	Medium	Low	Medium
Preserve and promote a healthy environment and economy by minimizing adverse impacts on the natural, built and social environments through sustainable practices.							
NRHP listed or eligible historic properties and Seattle City Landmarks	3	2	3	3	5	2	3
Potential archaeological resources	Low	Low	Low	Low	Low	Low	Low
Parks and recreational resources effects (acres)	0	0	0	0	0	0	0
Water resources effects (acres)	0	0	0	0	0	0	0
Fish and wildlife habitat effects (acres)	0	0	0	0	0	0	0
Hazardous materials sites	4	9	4	6	5	9	9
Visual effects (miles)	0	0	0	0	0	0	0
Noise and vibration sensitive receivers	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Number of properties potentially affected	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Number of potential residential unit displacements	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Square feet of potential business displacements	High	Low	High	Low	Low	High	Low
Construction impacts	Low	High	Medium	Medium	Low	Low	High
Burden on minority and low-income populations	Medium	Medium	Medium	Medium	Low	Low	High
Traffic circulation and access	Medium	High	Medium	Medium	Low	Medium	High
Transportation facilities	Low	High	Medium	Medium	Low	Low	High
Freight movement and access on land and water	Medium	High	Medium	Low	Low	Low	High
Business and commerce effects	Medium	Medium	Medium	Low	Medium	Medium	High

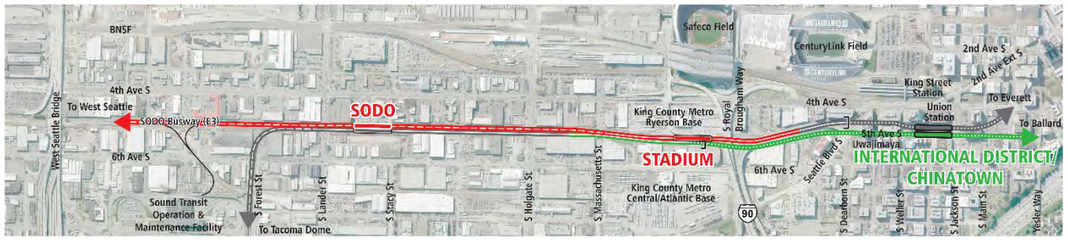
Notes: (1) Within station walksheds; (2) Within 15-minute ride on connecting high frequency transit; (3) N/A = Measure not applicable to this segment; (4) Minority population is defined in U.S. DOT Updated Environmental Justice Order 5610.2(a) as persons belonging to any of the following groups: Black, Hispanic, Asian American, and American Indian and Alaska Native

ST3 REPRESENTATIVE PROJECT

ALTERNATIVE

SEGMENT

SODO AND CHINATOWN/ID



ROUTE DESCRIPTION

After crossing over the Spokane Street Viaduct (i.e., the approach to the West Seattle Bridge), this alternative would run on an elevated guideway along the E3 busway to a new elevated SODO Station adjacent to the existing at-grade SODO Station. The route would continue north along the SODO E3 busway in an elevated configuration. At approximately SW Massachusetts Street, the route would transition down to existing grade, then continue to a rebuilt, at-grade Stadium Station, which would serve the West Seattle to Everett line. The route would then continue at-grade across S Royal Brougham Way and tie into the existing light rail line to Everett and DSTT.

At approximately the location of the existing Stadium Station, the existing light rail line from Tacoma would transition into a new cut-and-cover tunnel that would continue under S Royal Brougham Way. The existing Stadium Station would be demolished and rebuilt to accommodate the new tunnel portal. The tunnel route would continue north along the east side of the D-2 ramps carrying the East Link light rail line into a new International District/Chinatown tunnel station under 5th Avenue S, which would be constructed via cut-and-cover methods.

STATIONS

SODO (new)	New elevated immediately west of existing station for West Seattle line
Stadium (rebuilt existing)	Rebuilt existing at-grade and relocated on West Seattle line
International District/ Chinatown (existing)	Existing tunnel on West Seattle line
SODO (existing)	Existing at-grade on Ballard line
International District/ Chinatown (new)	New cut-and-cover tunnel station adjacent to existing station under 5th Avenue S for Ballard line

REFINEMENTS TO ALTERNATIVE FROM LEVEL 1

- None

Purpose and Need	Evaluation
Service performance and reliability in project corridor	• At-grade crossings for existing Link light rail at S Lander Street, S Holgate Street and Royal Brougham Way S • Travel time estimate 3 to 4 minutes between SODO and International District/ Chinatown stations
Improve Downtown capacity for regional connectivity	• Facilitates spine segmentation • Does not preclude new light rail tunnel through downtown • Approximately 35,900 forecasted population and employment served in 2040
Connect regional centers	• SODO and Stadium stations located in Duwamish MIC; no regional growth centers in segment • Compatibility with future LRT extensions consistent with Sound Transit's RTLP
Technically feasible and financially sustainable	• May not facilitate all desired special trackwork for track interconnections • Route could require WSDOT/East Link structure modifications • Elevated guideway would likely require greatest amount of ground improvements • Could require "S" development encroachment and right-of-way needs • Limited area for construction staging may result in increased service disruption
Expand mobility for all	• All stations located in areas of moderate access to opportunity • Better access to opportunities provided for historically underserved populations on the greater Link system • Higher low-income and minority populations than rest of the city • Higher elderly, LEP and disabled populations than rest of the city, with lower youth populations
Encourage equitable and sustainable urban growth	• Strong local land use plans in International District/Chinatown Station area, including rezoning around historic Chinatown • Equitable development opportunities south of Airport Way S between International District/Chinatown and Stadium stations east of I-90 bus lane
Promote a healthy built, natural, and social environment	• No identified potential impacts to protected natural resources • Disruptive cut-and-cover methods on 5th Avenue S would cause periodic closures, greater noise, vibration, and visual effects to Chinatown/International District during construction • Transportation facilities affected include WSDOT ramps, Ryerson Base, E3 busway and Seattle Boulevard S

MASSACHUSETTS TUNNEL PORTAL

ALTERNATIVE

SEGMENT
SODO AND CHINATOWN/ID

ROUTE DESCRIPTION

Once across the Spokane Street Viaduct (i.e., the approach to the West Seattle Bridge) via an elevated guideway, this route would travel along the SODO E3 busway to S Forest Street and transition to existing grade south of S Lander Street. It would then enter a new at-grade SODO Station and tie into the existing light rail line to Everett at S Holgate Street.

North of the existing SODO Station, the existing light rail line from Tacoma would transition to a new Ballard line to the east. The route would transition into a retained cut configuration and then into a bored tunnel. The tunnel portal for the new downtown transit tunnel would be located near SW Massachusetts Street between the SODO busway and 6th Avenue S. The route would then continue north beneath 6th Avenue S, then transition to 5th Avenue S into a new International District/ Chinatown tunnel station under 5th Avenue S, which would be constructed via cut-and-cover methods.

STATIONS

SODO (new)	New at-grade immediately west of existing station for West Seattle line
Stadium (existing)	Existing at-grade remains on West Seattle line
International District/ Chinatown (existing)	Existing tunnel remains on West Seattle line
SODO (existing)	Existing at-grade remains on Ballard line
International District/ Chinatown (new)	New cut-and-cover tunnel station adjacent to existing station under 5th Avenue S for Ballard line

REFINEMENTS TO ALTERNATIVE FROM LEVEL 1

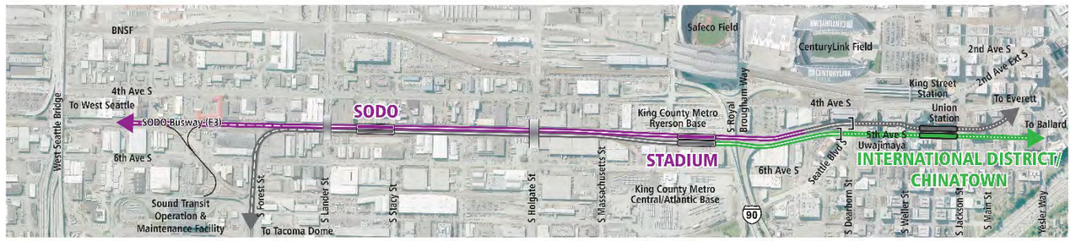
- Changed alignment profile from elevated to at-grade between S Forest and S Holgate streets
- Changed SODO Station from elevated to at-grade configuration
- Added grade separation of S Lander Street

Purpose and Need	Evaluation
Service performance and reliability in project corridor	• New grade separated roadway crossings of S Lander Street and S Holgate Street • Travel time estimate 3 to 4 minutes between SODO and International District/ Chinatown stations
Improve Downtown capacity for regional connectivity	• Facilitates spine segmentation • Does not preclude new light rail tunnel through downtown • Approximately 35,900 forecasted population and employment served in 2040
Connect regional centers	• SODO and Stadium stations located in Duwamish MIC; no regional growth centers in segment • Compatibility with future LRT extensions consistent with Sound Transit's RTLP
Technically feasible and financially sustainable	• May not facilitate all desired special trackwork for track interconnections, but more opportunities than ST3 Representative Project • Proximity issue to foundations of WSDOT/East Link structures • Minimizes elevated guideway and associated ground improvements • Least impact to King County Ryerson Base compared to other alternatives • Bored tunnel and portal in poor soils and high-water table • Lower cost approximately $200 million less than ST3 Representative Project
Expand mobility for all	• All stations located in areas of moderate access to opportunity • Better access to opportunities provided for historically underserved populations on the greater Link system • Higher low-income and minority populations than rest of the city • Higher elderly, LEP and disabled populations than rest of the city, with lower youth populations
Encourage equitable and sustainable urban growth	• Strong local land use plans in International District/Chinatown Station area, including rezoning around historic Chinatown • Equitable development opportunities south of Airport Way S between International District/Chinatown and Stadium stations east of I-90 bus lane; property acquisitions along 6th Avenue S could create additional opportunities
Promote a healthy built, natural, and social environment	• Greater potential for business displacements around S Massachusetts Street tunnel portal and International District/Chinatown Station compared to other alternatives • Less disruptive construction impacts compared to other alternatives because of bored tunnel south of International District/Chinatown Station • Grade separations of S Lander and S Holgate streets would improve east-west mobility, including truck freight mobility • No impacts to Royal Brougham Way S expected

SURFACE E3

ALTERNATIVE

SEGMENT
SODO AND CHINATOWN/ID



ROUTE DESCRIPTION

Once across the Spokane Street Viaduct (i.e., the approach to the West Seattle Bridge) via an elevated guideway, this route would travel along the SODO E3 busway to S Forest Street and transition to grade south of S Lander Street. It would then enter a new at-grade SODO Station and continue north to a new Stadium Station serving the West Seattle to Everett line. The route would continue at-grade across S Royal Brougham Way and tie into the existing light rail line to Everett and DSTT.

The existing Stadium Station would remain to serve the Ballard to Tacoma line. North of the Stadium Station, the Ballard to Tacoma line would transition to a new at-grade line across S Royal Brougham Way and along the east side of the D-2 ramps carrying the East Link light rail line. The route would then enter a cut-and-cover tunnel portal located south of Seattle Boulevard into a new International District/Chinatown tunnel station under 5th Avenue S, which would be constructed via cut-and-cover methods.

STATIONS

SODO (new)	New at-grade immediately west of existing station for West Seattle line
Stadium (new)	New at-grade immediately west of existing station for West Seattle line
International District/ Chinatown (existing)	Existing tunnel remains on West Seattle line
Stadium (existing)	Existing at-grade remains on Ballard line
International District/ Chinatown (new)	New cut-and-cover tunnel station adjacent to existing station under 5th Avenue S for Ballard line

REFINEMENTS TO ALTERNATIVE FROM LEVEL 1

- None

Purpose and Need	Evaluation
Service performance and reliability in project corridor	• New grade separated roadway crossings of S Lander Street and S Holgate Street and closure of vehicle traffic on Royal Brougham Way S • Travel time estimate 3 to 4 minutes between SODO and International District/ Chinatown stations
Improve Downtown capacity for regional connectivity	• Facilitates additional connectivity and operational flexibility beyond spine segmentation • Does not preclude new light rail tunnel through downtown • Approximately 35,900 forecasted population and employment served in 2040
Connect regional centers	• SODO and Stadium stations located in Duwamish MIC; no regional growth centers in segment • Compatibility with future LRT extensions consistent with Sound Transit's RTLP
Technically feasible and financially sustainable	• Facilities special trackwork and provides reliable system operations • Minimizes potential impacts to WSDOT/East Link structures • Minimizes elevated guideway and associated ground improvements • Reduced design of cut-and-cover tunnel in poor soils and high-water table • Roadway overcrossings in poor soils, with protection of existing utilities required • Lower cost approximately $400 million less than ST3 Representative Project
Expand mobility for all	• All stations located in areas of moderate access to opportunity • Better access to opportunities provided for historically underserved populations on the greater Link system • Higher low-income and minority populations than rest of the city • Higher elderly, LEP and disabled populations than rest of the city, with lower youth populations
Encourage equitable and sustainable urban growth	• Strong local land use plans in International District/Chinatown Station area, including rezoning around historic Chinatown • Equitable development opportunities south of Airport Way S between International District/Chinatown and Stadium stations east of I-90 bus lane
Promote a healthy built, natural, and social environment	• No identified potential impacts to protected natural resources • Less disruptive construction impacts than ST3 Representative Project because of reduced cut-and-cover south of International District/Chinatown Station • Grade separations of S Lander and S Holgate streets would improve east-west mobility, including truck freight mobility • Closes Royal Brougham Way S to vehicle traffic

OCCIDENTAL AVENUE

ALTERNATIVE

SEGMENT
SODO AND CHINATOWN/ID

ROUTE DESCRIPTION

This alternative would cross over the Spokane Street Viaduct (i.e., the approach to the West Seattle Bridge) near 1st Avenue S and then head north along the east side of Occidental Avenue S on an elevated structure. A new elevated SODO Station would be located just east of Occidental Avenue S, straddling S Lander Street. The route would then turn northeast over the Burlington Northern-Santa Fe (BNSF) Railway tracks and 4th Avenue S before merging into the SODO E3 busway. It would then transition to existing grade along the SODO E3 busway just south of S Holgate Street and continue north to a new Stadium Station serving the West Seattle to Everett line. The route would continue at-grade across S Royal Brougham Way and tie into the existing light rail line to Everett and DSTT.

The existing Stadium Station would remain to serve the Ballard to Tacoma line. North of the Stadium Station, the Ballard to Tacoma line would transition to a new at-grade line across S Royal Brougham Way and along the east side of the D-2 ramps carrying the East Link light rail line. The route would then enter a cut-and-cover tunnel portal located south of Seattle Boulevard into a new International District/Chinatown tunnel station under 5th Avenue S, which would be constructed via cut-and-cover methods.

REFINEMENTS TO ALTERNATIVE FROM LEVEL 1

- None

STATIONS

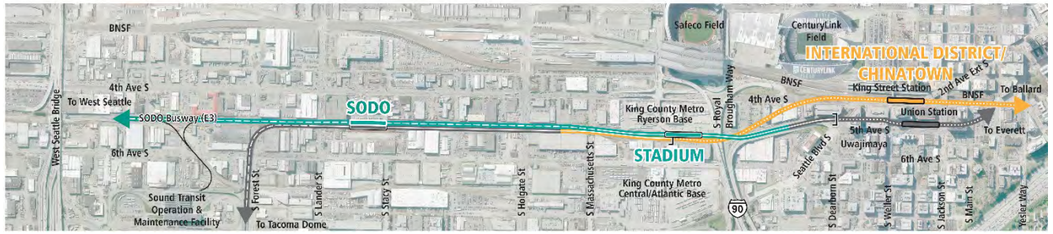
SODO (new)	New elevated at Occidental Avenue S and S Lander Street for West Seattle line
Stadium (new)	New at-grade immediately west of existing station for West Seattle line
International District/ Chinatown (existing)	Existing tunnel remains on West Seattle line
SODO (existing)	Existing at-grade remains on Ballard line
Stadium (existing)	Existing at-grade remains on Ballard line
International District/ Chinatown (new)	New cut-and-cover tunnel station adjacent to existing station under 5th Avenue S for Ballard line

Purpose and Need	Evaluation
Service performance and reliability in project corridor	• New grade separated roadway crossings of S Lander Street and S Holgate Street and closure of vehicle traffic on Royal Brougham Way S • Travel time estimate 3 to 4 minutes between SODO and International District/ Chinatown stations
Improve Downtown capacity for regional connectivity	• Facilitates spine segmentation • Does not preclude new light rail tunnel through downtown • Approximately 37,100 forecasted population and employment served in 2040
Connect regional centers	• SODO and Stadium stations located in Duwamish MIC; no regional growth centers in segment • Compatibility with future LRT extensions consistent with Sound Transit's RTLP
Technically feasible and financially sustainable	• Mode, route, and general station locations moderately consistent with *ST3 Plan* due to location of SODO Station and degraded transfer with existing SODO Station assumed in *ST3 Plan* • Increases long-span elevated guideway structure compared to other alternatives, including over BNSF tracks, light rail mainline and operations and maintenance facility (OMF) connection; degraded connection to OMF • Reduces interference to E3 busway and overhead transmission lines compared to other alternatives along E3 busway • Cost similar to ST3 Representative Project, but $200 million increase in SODO
Expand mobility for all	• All stations located in areas of moderate access to opportunity • Better access to opportunities provided for historically underserved populations on the greater Link system • Higher low-income and minority populations than rest of the city • Higher elderly, LEP and disabled populations than rest of the city, with lower youth populations
Encourage equitable and sustainable urban growth	• Strong local land use plans in International District/Chinatown Station area, including rezoning around historic Chinatown • Greatest amount of potential equitable development opportunities compared to other alternatives due to greatest amount of property acquisitions; however, most zoned for manufacturing/ industrial uses, which may impact types of opportunities
Promote a healthy built, natural, and social environment	• No identified potential impacts to protected natural resources • Greatest potential for business displacements primarily in SODO and around International District/Chinatown Station compared to other alternatives • Closes Royal Brougham Way S to vehicle traffic • Freight access potentially affected by elevated guideway between 1st Avenue S and Occidental Avenue S

4TH AVENUE CUT-AND-COVER TUNNEL/STATION

ALTERNATIVE

SEGMENT
SODO AND CHINATOWN/ID



ROUTE DESCRIPTION

After crossing over the Spokane Street Viaduct (i.e., the approach to the West Seattle Bridge), this alternative would run on an elevated guideway along the E3 busway to a new elevated SODO Station adjacent to the existing at-grade SODO Station. The route would continue north along the SODO E3 busway in an elevated configuration. At approximately SW Massachusetts Street, the route would transition down to existing grade, then continue to a rebuilt, at-grade Stadium Station, which would serve the West Seattle to Everett line. The route would then continue at-grade across S Royal Brougham Way and tie into the existing light rail line to Everett and DSTT.

At approximately the location of the existing Stadium Station, the existing light rail line from Tacoma would transition into a new cut-and-cover tunnel that would continue under S Royal Brougham Way. The existing Stadium Station would be demolished and rebuilt to accommodate the new tunnel portal. The tunnel route would continue northwest under the West Seattle line at S Royal Brougham Way and then head north under 4th Avenue S. A new International District/ Chinatown Station would be constructed under 4th Avenue S via cut-and-cover methods. The tunnel would then continue in a cut-and-cover configuration along 4th Avenue S and transition to 5th Avenue S near James Street.

STATIONS

SODO (new)	New elevated immediately west of existing station for West Seattle line
Stadium (rebuilt existing)	Rebuilt existing at-grade and relocated on West Seattle line
International District/ Chinatown (existing)	Existing tunnel remains on West Seattle line
SODO (existing)	Existing at-grade remains on Ballard line
International District/ Chinatown (new)	New cut-and-cover tunnel station west of existing station under 4th Avenue S for Ballard line

REFINEMENTS TO ALTERNATIVE FROM LEVEL 1

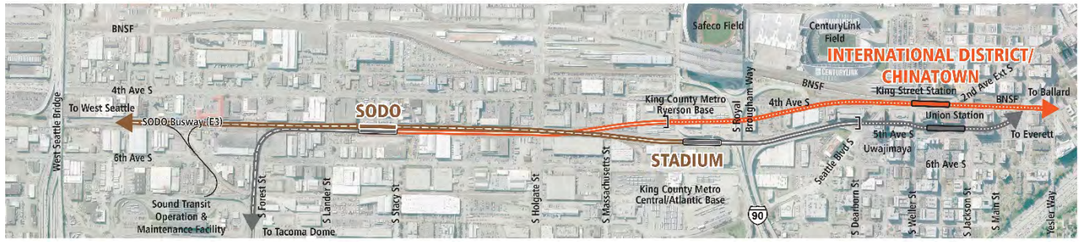
- None

Purpose and Need	Evaluation
Service performance and reliability in project corridor	• At-grade crossings for existing Link light rail at S Lander Street, S Holgate Street and Royal Brougham Way S • Travel time estimate 3 to 4 minutes between SODO and International District/ Chinatown stations
Improve Downtown capacity for regional connectivity	• Facilitates spine segmentation • Does not preclude new light rail tunnel through downtown • Approximately 35,300 forecasted population and employment served in 2040
Connect regional centers	• SODO and Stadium stations located in Duwamish MIC; no regional growth centers in segment • Compatibility with future LRT extensions consistent with Sound Transit's RTLP
Technically feasible and financially sustainable	• 4th Avenue S viaduct rebuild could increase implementation schedule • Substantial engineering and constructability constraints caused by rebuilding 4th Avenue S viaduct adjacent to BNSF Railway and existing transit tunnel • Yesler Bridge and King County Administration Building likely to be impacted • Higher cost approximately $600 million more than ST3 Representative Project • 4th Avenue S viaduct rebuild costs not included in ST3 financial plan or evaluation methodology
Expand mobility for all	• All stations located in areas of moderate access to opportunity • Better access to opportunities provided for historically underserved populations on the greater Link system • Higher low-income and minority populations than rest of the city • Higher elderly, LEP and disabled populations than rest of the city, with lower youth populations
Encourage equitable and sustainable urban growth	• Strong local land use plans in Pioneer Square and International District/Chinatown Station areas, including rezoning around historic Chinatown • Some equitable development opportunities south of Airport Way S between International District/Chinatown and Stadium stations; property acquisitions along 4th Avenue S could create additional opportunities
Promote a healthy built, natural, and social environment	• No identified potential impacts to protected natural resources • Cut-and-cover construction would affect traffic on 4th Avenue S and require periodic closures and detours on other roadways • Temporary noise, vibration, and visual impacts on Chinatown/International District neighborhood would be reduced compared to other alternatives on 5th Avenue S • Higher potential for business displacements along 4th Avenue S, including King County Administration Building and social services facility compared to other alternatives

4TH AVENUE BORED TUNNEL/MINED STATION

ALTERNATIVE

SEGMENT
SODO AND CHINATOWN/ID



ROUTE DESCRIPTION

After crossing over the Spokane Street Viaduct (i.e., the approach to the West Seattle Bridge), this alternative would run on an elevated guideway along the E3 busway to a new elevated SODO Station adjacent to the existing at-grade SODO Station. The route would continue north along the SODO E3 busway in an elevated configuration. At approximately SW Massachusetts Street, the route would transition down to existing grade, then continue to the existing Stadium Station, which would serve the West Seattle to Everett line.

The existing at-grade SODO Station would serve the Ballard to Tacoma line. From there, the route would continue at grade, crossing under the elevated West Seattle line between S Holgate and S Massachusetts streets. It would then head into a bored tunnel, with the tunnel portal at the King County Metro Ryerson Base. The deep bored tunnel would then traverse under S Royal Brougham Way to 4th Avenue S. A new International District/Chinatown Station would be constructed under 4th Avenue S via mined methods. The tunnel would then continue in a bored configuration along 4th Avenue S and transition to 5th Avenue S near James Street.

STATIONS

SODO (new)	New elevated immediately west of existing station for West Seattle line
Stadium (existing)	Existing at-grade remains on West Seattle line
International District/ Chinatown (existing)	Existing tunnel remains on West Seattle line
SODO (existing)	Existing at-grade remains on Ballard line
International District/ Chinatown (new)	New mined tunnel station west of existing station under 4th Avenue S for Ballard line

REFINEMENTS TO ALTERNATIVE FROM LEVEL 1

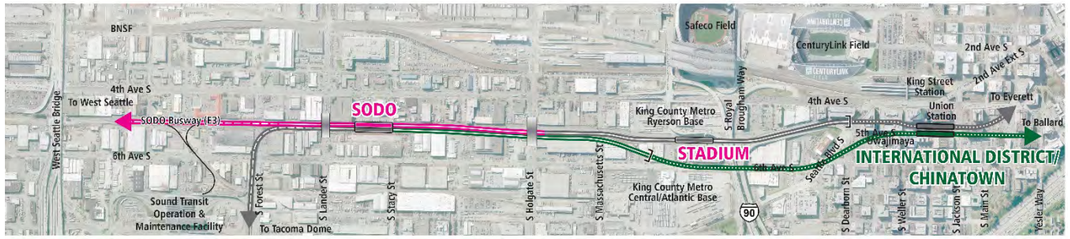
- Shifted Ballard line west of Stadium Station to avoid impacts to roadway ramp foundations

Purpose and Need	Evaluation
Service performance and reliability in project corridor	• At-grade crossings for existing Link light rail at S Lander Street, S Holgate Street and Royal Brougham Way S • Travel time estimate 3 to 4 minutes between SODO and International District/ Chinatown stations
Improve Downtown capacity for regional connectivity	• Facilitates spine segmentation • Does not preclude new light rail tunnel through downtown • Approximately 35,300 forecasted population and employment served in 2040
Connect regional centers	• SODO and Stadium stations located in Duwamish MIC; no regional growth centers in segment • Compatibility with future LRT extensions consistent with Sound Transit's RTLP
Technically feasible and financially sustainable	• Partial 4th Avenue S viaduct rebuild and very deep mined International District/ Chinatown Station could increase implementation schedule • Does not facilitate special trackwork or provide reliable system operations • Substantial engineering and constructability constraints caused by partial rebuild of 4th Avenue S viaduct adjacent to BNSF Railway and existing transit tunnel • Higher cost approximately $500 million more than ST3 Representative Project • 4th Avenue S viaduct rebuild costs not included in ST3 financial plan or evaluation methodology
Expand mobility for all	• All stations located in areas of moderate access to opportunity • Better access to opportunities provided for historically underserved populations on the greater Link system • Higher low-income and minority populations than rest of the city • Higher elderly, LEP and disabled populations than rest of the city, with lower youth populations
Encourage equitable and sustainable urban growth	• Strong local land use plans in Pioneer Square and International District/Chinatown Station areas, including rezoning around historic Chinatown • Deeper mined station not as convenient for ease of access and passenger transfers in comparison to shallower cut-and-cover stations • Equitable development opportunities south of Airport Way S between International District/Chinatown and Stadium stations east of I-90 bus lane
Promote a healthy built, natural, and social environment	• No identified potential impacts to protected natural resources • Most disruptive construction methods and partial replacement of viaduct structure compared to other alternatives, which would result in full closure of 4th Avenue S and traffic impacts on other roadways including displacement of Ryerson Bus Base • Temporary noise, vibration, and visual impacts on Chinatown/International District neighborhood would be reduced compared to other alternatives on 5th Avenue S

5TH AVENUE BORED TUNNEL/MINED STATION

ALTERNATIVE

SEGMENT
SODO AND CHINATOWN/ID



ROUTE DESCRIPTION

Once across the Spokane Street Viaduct (i.e., the approach to the West Seattle Bridge) via an elevated guideway, this route would travel along the SODO E3 busway to S Forest Street and transition to existing grade south of S Lander Street. It would then enter a new at-grade SODO Station and tie into the existing light rail line to Everett at S Holgate Street.

North of the existing SODO Station, the existing light rail line from Tacoma would transition to a new line to the east. The route would then enter a deep bored tunnel, with the portal for the new downtown transit tunnel located near SW Massachusetts Street between the SODO E3 busway and 6th Avenue S. The route would then continue north beneath 6th Avenue S, then transition to 5th Avenue S into a new International District/ Chinatown tunnel station that would be mined under 5th Avenue S.

STATIONS

SODO (new)	New at-grade immediately west of existing station for West Seattle line
Stadium (existing)	Existing at-grade remains on West Seattle line
International District/ Chinatown (existing)	Existing tunnel remains on West Seattle line
SODO (existing)	Existing at-grade remains on Ballard line
International District/ Chinatown (new)	New mined tunnel station adjacent to existing station under 5th Avenue S for Ballard line

REFINEMENTS TO ALTERNATIVE FROM LEVEL 1

- None

Purpose and Need	Evaluation
Service performance and reliability in project corridor	• New grade separated roadway crossings of S Lander Street and S Holgate Street • Travel time estimate 3 to 4 minutes between SODO and International District/ Chinatown stations
Improve Downtown capacity for regional connectivity	• Facilitates spine segmentation • Does not preclude new light rail tunnel through downtown • Approximately 35,900 forecasted population and employment served in 2040
Connect regional centers	• SODO and Stadium stations located in Duwamish MIC; no regional growth centers in segment • Compatibility with future LRT extensions consistent with Sound Transit's RTLP
Technically feasible and financially sustainable	• Very deep mined International District/Chinatown Station could increase ST3 implementation schedule • May not facilitate all desired special trackwork for track interconnections, but more opportunities than ST3 Representative Project • Bored tunnel and mined International District/Chinatown Station likely minimizes impacts to 5th Avenue S • Bored tunnel and portal in poor soils and high-water table • Cost similar to ST3 Representative Project
Expand mobility for all	• All stations located in areas of moderate access to opportunity • Better access to opportunities provided for historically underserved populations on the greater Link system • Higher low-income and minority populations than rest of the city • Higher elderly, LEP and disabled populations than rest of the city, with lower youth populations
Encourage equitable and sustainable urban growth	• Strong local land use plans in International District/Chinatown Station area, including rezoning around historic Chinatown • Deeper mined station not as convenient for ease of access and passenger transfers in comparison to shallower cut-and-cover stations • Equitable development opportunities south of Airport Way S between International District/Chinatown and Stadium stations east of I-90 bus lane; property acquisitions along 6th Avenue S could create additional opportunities
Promote a healthy built, natural, and social environment	• No identified potential impacts to protected natural resources • Greater business displacements would occur primarily around the S Massachusetts Street tunnel portal compared to other alternatives • Least disruptive construction effects and lane closures of 5th Avenue S alignments and stations compared to other alternatives • Grade separations of S Lander and S Holgate streets would improve east-west mobility, including truck freight mobility • No impacts to Royal Brougham Way S expected

4.2.1 SODO and Chinatown/International District Segment Summary Findings

The SODO and Chinatown/International District Segment has several unique transit operational challenges for both bus and rail services that directly influence the design of the WSBLE Project. These operational challenges include how the WSBLE Project would connect with Sound Transit's OMF, the convergence of the current Link LRT line, the addition of the future East Link LRT line, and the switching requirements (referred to as spine segmentation) that would enable the West Seattle line to operate north to Everett, and the Ballard line to run south to Tacoma. Furthermore, while the new downtown transit tunnel is being constructed, the SODO and Chinatown/International District Segment is a potential interim terminus for the LRT line to West Seattle. In addition to the existing and future light rail lines, King County Metro Transit's (KCM) E3 busway in SODO is an important operational component for the region's bus network, particularly bus routes serving southern King County. The strategic importance of the SODO E3 busway as a north-south transit spine is further emphasized by the connection to KCM's Ryerson Base.

Utilities also present several challenges in the SODO and Chinatown/International District Segment. Seattle City Light (SCL), the primary electrical power provider to the region, has high-voltage transmission lines and transmission substations in the SODO and Chinatown/International District Segment. The SCL South Service Center on 4th Avenue S is immediately south of the West Seattle Bridge/Spokane Street Viaduct. In addition to electrical transmission, several high-pressure gas mains, consolidated sewers, and water mains are found throughout the SODO region to serve the Port of Seattle and auxiliary businesses and services.

Finally, the SODO and Chinatown/International District Segment has experienced rapid land use change over the past two decades, with the expansion of the stadium district and growth of commercial enterprises converting manufacturing, industrial, and warehouse buildings into mixed-use development. The city of Seattle has enacted zoning classifications and special districts (most notably the MICs) to preserve and protect industrial lands in SODO and Interbay. The SODO and Chinatown/International District Segment continues to see a heavy volume of daily freight traffic, both multiaxle trucks and freight railroad activity, serving the Port of Seattle. Maintaining freight movement and commerce activities during and after construction of the WSBLE Project will be an important consideration in the refinement of alternatives during the Level 3 Screening.

General discussion and feedback from the public, SAG and ELG included the following common themes for the Level 2 alternatives evaluation and screening:

- Continued interest in analysis of interim terminus options to avoid short-term forced transfer at SODO Station, if possible
- Interest in improved mobility options in SODO
- Strong interest in resolving limited bus base capacity
- Desire to recognize historical context of impacts to community
- Interest in interaction with community about short-term versus long-term impacts and benefits
- Interest in activating Union Station
- Concern with effects of displacing Ryerson Bus Base and effects on bus use of E3 busway
- Concern with poor transfer environment and customer experience with deep mined stations
- Desire for additional engagement with the community on options for the Chinatown/International District Station

Table 4-4 (SODO and Chinatown/International District Segment ELG Screening Recommendations) identifies the alternatives carried forward for additional design refinement and evaluation as part of the Level 3 Screening. Additional evaluation information and results for the SODO alternatives may be found in **Appendix C** (SODO and Chinatown/International District Segment Level 2 Evaluation Matrices).

Table 4-4 SODO and Chinatown/International District Segment ELG Screening Recommendations

Level 2 Alternative	Key Findings	Public Feedback and Common Themes	Carry Forward into Level 3	Suggested Refinements for Level 3
ST3 Representative Project	• Carries forward into Level 3 as ST3 Representative Project	• Concern about cut-and-cover tunnel construction effects	Yes	--
Massachusetts Tunnel Portal	• Shallow cut-and-cover station under 5th Avenue with easy rider access/transfers • Construction effects and parking lane closures on 5th Avenue in station area • Costs approximately $200 million less than ST3 Representative Project • New at-grade SODO Station on E3 busway at Lander • Transfer at existing SODO Station • Bus operations on E3 busway displaced • New grade separated roadway crossings (Lander, Holgate) improve existing rail/traffic/freight operations • Property effects at tunnel portal site • Avoids impacts to Ryerson Base	• General support for surface alignment • Support for new roadway overpasses at Lander and Holgate • Explore shifting existing and new SODO stations closer to Lander • Support for reduced construction effects and shallower station	Yes	--
Surface E3	• Shallow cut-and-cover station under 5th Avenue and easy rider access/transfers • Construction effects and parking lane closures on 5th Avenue in station area • Costs approximately $400 million less than ST3 Representative Project • New at-grade SODO Station on E3 busway at Lander • Transfer at existing SODO Station • Bus operations on E3 busway displaced • New grade separated roadway crossings (Lander, Holgate) improve existing rail/traffic/freight operations • Avoids impacts to Ryerson Base	• General support for surface alignment • Support for new roadway overpasses at Lander and Holgate • Some support for second Stadium Station • Explore shifting existing and new SODO stations closer to Lander • Concern about cut-and-cover tunnel construction effects	Yes	--
Occidental Avenue	• New elevated SODO Station on Occidental Avenue at Lander Street • Transfer at existing Stadium Station • Long span bridges over BNSF tracks and longer track connection to maintenance facility • Bus operations on E3 busway partially displaced • Property effects along Occidental, BNSF crossings and maintenance facility connection • Costs approximately $200 million more than ST3 Representative Project	• Some support for locating new SODO Station further west • Some concern about freight mobility and property effects that would result from a long, elevated structure over the BNSF railroad	No	--
4th Avenue Cut-and-Cover Tunnel/Station	• Shallow cut-and-cover station under 4th Avenue with easy rider access/transfers • Major engineering/constructability constraints (4th Avenue viaduct demolition/rebuild, active BNSF railway, existing transit tunnel, etc.) • Large property effects (King County Administration Building) • Costs approximately $600 million more than ST3 Representative Project; requires funding partnerships for 4th Avenue Viaduct re-build costs Increased schedule risk compared to ST3 Representative Project	• Support for closer proximity to King Street Station, reduced Chinatown/International District effects along 5th Avenue and shallower station • Concern about traffic detours	Yes	--

Table 4-4 SODO and Chinatown/International District Segment ELG Screening Recommendations

Level 2 Alternative	Key Findings	Public Feedback and Common Themes	Carry Forward into Level 3	Suggested Refinements for Level 3
4th Avenue Bored Tunnel/Mined Station	• Deep mined station (approximately 200 feet) under 4th Avenue with poor rider access/transfers • Major engineering/constructability constraints (4th Avenue viaduct demolition/rebuild, active BNSF railway, existing transit tunnel, etc.) • Large property effects (Ryerson Base for tunnel portal site) • Results in very deep Midtown Station (approximately 250 feet) • Costs approximately $500 million more than ST3 Representative Project; requires funding partnerships for 4th Avenue Viaduct re-build costs • Increased schedule risk compared to ST3 Representative Project	• Support for closer proximity to King Street Station and reduced Chinatown/International District effects along 5th Avenue • Concern about traffic detours and access due to deep station	Yes	--
5th Avenue Bored Tunnel/Mined Station	• Deep mined station (approximately 200 feet) under 5th Avenue with poor rider access/transfers • Less construction effects, parking closures on 5th Avenue with mined station • Some property effects (for mined station access shaft) • Results in very deep Midtown Station (approximately 250 feet) • Cost similar to ST3 Representative Project • Somewhat higher schedule risk compared to ST3 Representative Project	• Support for reduced construction effects • Concern about access due to deep station	Yes	--

4.3 Downtown Segment Alternatives Evaluation

The Downtown Segment contained the following four alternatives during the Level 2 Screening:

- ST3 Representative Project
- 5th/Harrison
- 6th/Boren/Roy
- 5th/Terry/Roy/Mercer

These alternatives are delineated on **Figure 4-4** (Downtown Segment—Level 2 Alternatives), with **Table 4-5** (Downtown Segment—Level 2 Alternatives Evaluation Summary) summarizing the evaluation results. Individual descriptions and evaluation of each alternative are provided in the pages that follow. Refer to **Appendix D** (Downtown Segment Level 2 Evaluation Matrices) for the detailed findings of each evaluation measure in this segment.

Figure 4-4 Downtown Segment—Level 2 Alternatives

Table 4-5 Downtown Segment—Level 2 Alternatives Evaluation Summary

Purpose and Need / Evaluation Criteria	Alternatives			
	ST3 Representative Project	5th/Harrison	6th/Boren/Roy	5th/Terry/Roy/Mercer
Provide high quality rapid, reliable, and efficient peak and off-peak light rail transit service to communities in the project corridors defined in ST3.				
Potential service interruptions and recoverability	High	High	High	High
LRT travel times (minutes)	8 to 9	8 to 9	8 to 9	8 to 9
Improve regional mobility by increasing connectivity and capacity through downtown Seattle to meet projected transit demand.				
LRT network integration	Medium	Medium	Medium	Medium
Passenger carrying capacity in downtown	Medium	Medium	Medium	Medium
Ridership potential (2040 population/employment) (1)	167,800	163,300	176,700	176,700
Connect regional centers as described in adopted regional and local land use, transportation, and economic development plans and Sound Transit's Regional Transit Long-Range Plan.				
Station proximity to PSRC-designated regional growth centers	3	3	3	3
Station proximity to PSRC-designated manufacturing/industrial centers	N/A	N/A	N/A	N/A
Accommodates future LRT extension beyond ST3	Medium	Medium	Medium	Medium
Implement a system that is consistent with the ST3 Plan that established transit mode, corridor, and station locations and that is technically feasible and financially sustainable to build, operate, and maintain.				
Mode, route and general station locations per ST3	High	High	High	High
Potential ST3 implementation schedule effects	High	High	High	High
Potential ST3 operating plan effects	High	High	High	High
Engineering constraints	Low	Low	Medium	Low
Constructability issues	Low	Low	Low	Low
Operational constraints	Medium	Medium	High	Medium
Conceptual capital cost comparison (2017$)	--	$200 million increase	Similar	$200 million increase
Operating cost impacts	Medium	Medium	Medium	Medium
Expand mobility for the corridor and region's residents, which include transit dependent, low-income and minority populations.				
Opportunities for low-income and minority populations (activity nodes/subsidized rental units)	Medium 27%	Medium 29%	Medium 24%	Medium 26%
Low-income population (1/2)	28% / 30%	29% / 30%	28% / 30%	28% / 30%
Minority population (1/2) (4)	36% / 36%	36% / 36%	34% / 36%	35% / 36%
Youth population (under 18) (1/2)	4% / 4%	4% / 4%	4% / 4%	4% / 4%
Elderly population (65 and over) (1/2)	14% / 13%	14% / 13%	15% / 13%	14% / 13%
LEP population (1/2)	5% / 5%	5% / 5%	5% / 5%	5% / 5%
Disabled population (1/2)	12% / 12%	12% / 12%	12% / 12%	12% / 12%

Table 4-5 Downtown Segment—Level 2 Alternatives Evaluation Summary

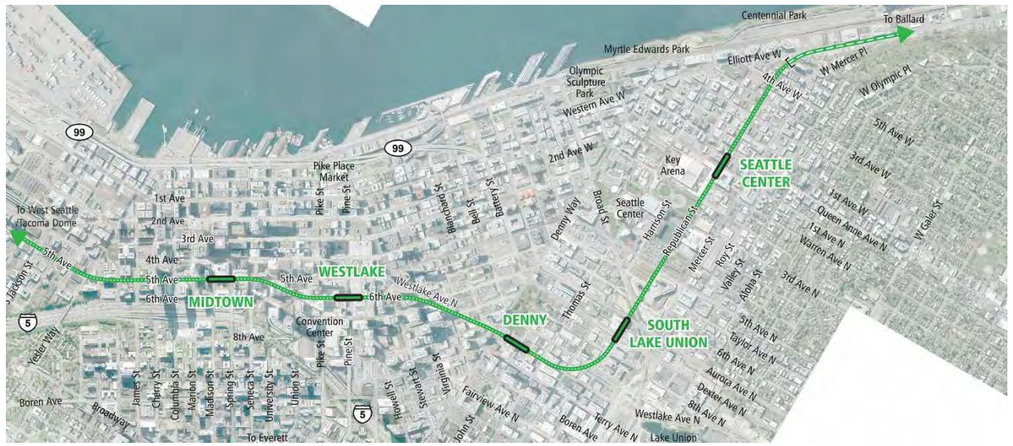
Purpose and Need / Evaluation Criteria	Alternatives			
	ST3 Representative Project	5th/Harrison	6th/Boren/Roy	5th/Terry/Roy/Mercer
Encourage equitable and sustainable urban growth in station areas through support of transit-oriented development, station access, and modal integration in a manner that is consistent with local land use plans and policies.				
Compatibility with Seattle designated Urban Centers and Villages (1)	95%	96%	91%	92%
Station locations consistent with current local land use plans	High	High	High	High
Activity nodes served (1)	171	171	169	168
Passenger transfers	Low	Medium	Medium	Medium
Bus/rail and rail/rail integration (1)	Low	Medium	Low	Medium
Bicycle accessibility (1)	23%	24%	23%	23%
Pedestrian and persons with limited mobility accessibility (1)	High	High	High	High
Development potential (1)	12%	12%	12%	12%
Equitable development opportunities	Low	High	Medium	Medium
Preserve and promote a healthy environment and economy by minimizing adverse impacts on the natural, built and social environments through sustainable practices.				
NRHP listed or eligible historic properties and Seattle City Landmarks	31	35	23	34
Potential archaeological resources	Low	Low	Low	Low
Parks and recreational resources effects (acres)	0	0	1.1	0
Water resources effects (acres)	0	0	0	0
Fish and wildlife habitat effects (acres)	0	0	1.1	0
Hazardous materials sites	18	12	23	18
Visual effects (miles)	0	0	< 0.1	0
Noise and vibration sensitive receivers	High	Medium	Medium	High
Number of properties potentially affected	Medium	Medium	Medium	Medium
Number of potential residential unit displacements	Medium	High	Low	Low
Square feet of potential business displacements	High	Low	High	High
Construction impacts	Medium	Low	Medium	High
Burden on minority and low-income populations	Medium	Medium	Medium	Medium
Traffic circulation and access	High	High	High	High
Transportation facilities	Medium	Low	High	Medium
Freight movement and access on land and water	High	High	High	High
Business and commerce effects	High	Low	Medium	Medium

Notes: (1) Within station walksheds; (2) Within 15-minute ride on connecting high frequency transit; (3) N/A = Measure not applicable to this segment; (4) Minority population is defined in U.S. DOT Updated Environmental Justice Order 5610.2(a) as persons belonging to any of the following groups: Black, Hispanic, Asian American, and American Indian and Alaska Native

ST3 REPRESENTATIVE PROJECT

ALTERNATIVE

SEGMENT
DOWNTOWN



ROUTE DESCRIPTION

The ST3 Representative Project would operate in a new rail-only tunnel from the International District/Chinatown District to Lower Queen Anne in downtown Seattle. The tunnel route would travel beneath 5th Avenue to Seneca Street, transition to 6th Avenue at University Street, and then turn under Westlake Avenue to John Street. From there, the tunnel route would turn west under Republican Street to Elliott Avenue W. The north tunnel portal would be located near Republican Street and Elliott Avenue W.

CHANGES TO ALTERNATIVE FROM LEVEL 1

- Shifted South Lake Union Station east and refined route alignment to avoid SR 99 and sewer conflict
- Shifted Denny Station south to increase station spacing

STATIONS

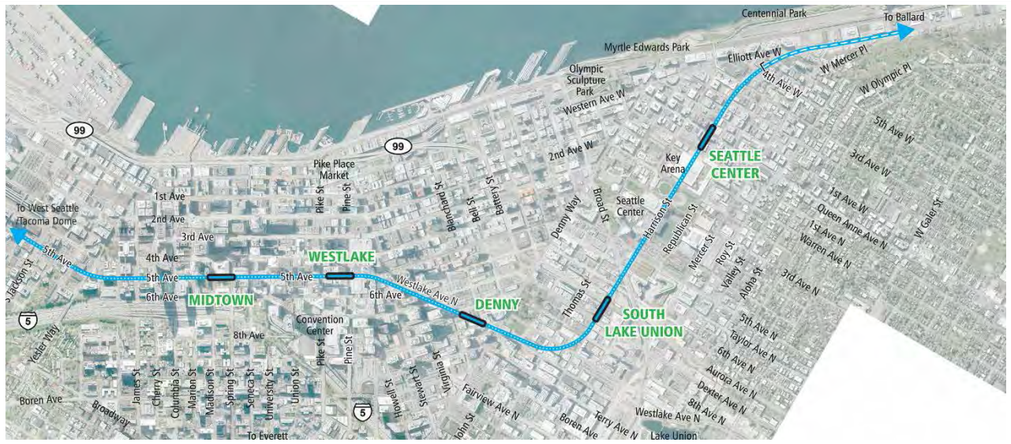
Midtown	Tunnel beneath 5th Avenue between Madison and Spring streets
Westlake	Tunnel beneath 6th Avenue connecting with existing Westlake Station at Pine Street
Denny	Tunnel beneath Westlake Avenue and John Street
South Lake Union	Tunnel beneath Republican Street between Dexter and Aurora avenues N
Seattle Center	Tunnel beneath Republican Street at 1st Avenue N

Purpose and Need	Evaluation
Service performance and reliability in project corridor	• Fully grade separated • Travel time estimate between 8 and 9 minutes for route between International District/Chinatown and Smith Cove stations
Improve Downtown capacity for regional connectivity	• Facilitates regional connectivity • Includes new light rail tunnel through downtown • Approximately 167,800 forecasted population and employment served in 2040
Connect regional centers	• Serves three regional growth centers (Seattle Central Business District [CBD], South Lake Union, Uptown Queen Anne); no reginal MICs in segment • Compatibility with future LRT extensions consistent with Sound Transit's RTLP
Technically feasible and financially sustainable	• Mode, route and general station locations consistent with *ST3 Plan* • Tunneling under buildings would likely require measures to control ground settlement, as well as foundation tiebacks of existing buildings • Tunneling may affect abandoned UPRR and sewer tunnels • Challenging construction of large span, mined Midtown and Westlake stations
Expand mobility for all	• All stations located in areas of moderate access to opportunity • Better access to opportunities provided for historically underserved populations on the greater Link system • Similar low-income and minority populations as rest of the city • Similar elderly, LEP and disabled populations as rest of the city, with lower youth populations
Encourage equitable and sustainable urban growth	• All five stations located in areas with supportive local land use plans • South Lake Union Station at Republican Street/SR 99 creates difficult passenger transfer environment with restricted bus access • Limited equitable development opportunities near all downtown stations
Promote a healthy built, natural, and social environment	• Potential impacts to historic properties in downtown • No identified potential impacts to protected natural resources • Potential residential and business displacements likely for north tunnel portal and entrances to underground stations • Temporary traffic, visual, noise and vibration construction impacts limited to areas around tunnel portal and stations

5TH AVENUE/HARRISON

ALTERNATIVE

SEGMENT
DOWNTOWN



ROUTE DESCRIPTION

This alternative would also operate in a new rail-only tunnel from the International District/ Chinatown District to Lower Queen Anne in downtown Seattle. The tunnel route would run north under 5th Avenue to Westlake Avenue. From there, it would head north along Westlake Avenue to John Street and then turn west beneath Harrison Street to Elliott Avenue W. The north tunnel portal would be located near Harrison Street and Elliott Avenue W.

CHANGES TO ALTERNATIVE FROM LEVEL 1

- Shifted South Lake Union Station east and refined route alignment to avoid SR 99 and sewer conflict
- Shifted Denny Station south to increase station spacing

STATIONS

Midtown	Tunnel beneath 5th Avenue between Madison and Spring streets
Westlake	Tunnel beneath 5th Avenue connecting with existing Westlake Station between Pike and Pine streets
Denny	Tunnel beneath Westlake Avenue south of Denny Way
South Lake Union	Tunnel beneath Harrison Street between Dexter and Aurora avenues N
Seattle Center	Tunnel beneath Harrison Street between 1st and Queen Anne avenues N

Purpose and Need	Evaluation
Service performance and reliability in project corridor	• Fully grade separated • Travel time estimate between 8 and 9 minutes for route between International District/Chinatown and Smith Cove stations
Improve Downtown capacity for regional connectivity	• Facilitates regional connectivity • Includes new light rail tunnel beneath downtown • Approximately 163,300 forecasted population and employment served in 2040
Connect regional centers	• Serves three regional growth centers (Seattle CBD, South Lake Union, Uptown Queen Anne); no reginal MICs in segment • Compatibility with future LRT extensions consistent with Sound Transit's RTLP
Technically feasible and financially sustainable	• Mode, route and general station locations consistent with *ST3 Plan* • Fewer utility crossings than ST3 Representative Project, but likely more building tieback conflicts • Crosses under prominent buildings such as Seattle Center and Key Arena • Tight radius curve between Denny and South Lake Union stations, resulting in reduced speed • Higher cost approximately $200 million more than ST3 Representative Project
Expand mobility for all	• All stations located in areas of moderate access to opportunity • Better access to opportunities provided for historically underserved populations on the greater Link system • Similar low-income and minority populations as rest of the city • Similar elderly, LEP and disabled populations as rest of the city, with lower youth populations
Encourage equitable and sustainable urban growth	• All five stations located in areas with supportive local land use plans • Better bus/rail integration opportunities at South Lake Union Station on Harrison Street compared to other alternatives, but more limited for Seattle Center Station • Equitable development opportunities primarily at north end of segment with more land potentially available for development
Promote a healthy built, natural, and social environment	• Potential impacts to historic properties in downtown • No identified potential impacts to protected natural resources • Highest square footage of potential business displacements along Harrison Street compared to other alternatives • Most disruptive temporary construction impacts in residential neighborhoods • Temporary traffic, visual, noise and vibration construction impacts limited to areas around tunnel portal and stations

6TH AVENUE/BOREN/ROY

ALTERNATIVE

SEGMENT
DOWNTOWN

ROUTE DESCRIPTION

This alternative would also operate in a new rail-only tunnel from the International District/ Chinatown District to Lower Queen Anne in downtown Seattle. The tunnel route would run under 5th Avenue and transition to 6th Avenue at Yesler Way. It would then continue north under 6th Avenue to Pine Street. The tunnel route would transition to Boren Avenue to John Street and then turn west and follow Roy Street to Elliott Avenue W. The north tunnel portal would be in Kinnear Park near Elliott Avenue W.

CHANGES TO ALTERNATIVE FROM LEVEL 1

- Shifted South Lake Union Station east and refined route alignment to avoid SR 99 and sewer conflict

STATIONS

Midtown	Tunnel beneath 6th Avenue between Madison and Spring streets
Westlake	Tunnel beneath 6th Avenue connecting with existing Westlake Station at Pine Street
Denny	Tunnel beneath Boren Avenue at John Street
South Lake Union	Tunnel beneath Roy Street between Dexter and Aurora avenues N
Seattle Center	Tunnel beneath Roy Street between 1st and Queen Anne avenues N

Purpose and Need	Evaluation
Service performance and reliability in project corridor	• Fully grade separated • Travel time estimate between 8 and 9 minutes for route between International District/Chinatown and Smith Cove stations
Improve Downtown capacity for regional connectivity	• Facilitates regional connectivity • Includes new light rail tunnel beneath downtown • Approximately 176,700 forecasted population and employment served in 2040
Connect regional centers	• Serves three regional growth centers (Seattle CBD, South Lake Union, Uptown Queen Anne); no reginal MICs in segment • Compatibility with future LRT extensions consistent with Sound Transit's RTLP
Technically feasible and financially sustainable	• Mode, route and general station locations consistent with *ST3 Plan* • North portal located in landslide prone topography with potentially unstable slopes • Avoids building foundation tiebacks on 5th Avenue S • Largest radius curve compared to other alternatives, resulting in potentially higher speeds • Cost similar to ST3 Representative Project
Expand mobility for all	• All stations located in areas of moderate access to opportunity • Better access to opportunities provided for historically underserved populations on the greater Link system • Similar low-income and minority populations as rest of the city • Similar elderly, LEP and disabled populations as rest of the city, with lower youth populations
Encourage equitable and sustainable urban growth	• All five stations located in areas with supportive local land use plans • Lower bus/rail integration opportunities with Denny Station on Boren Avenue and Seattle Center Station on Roy Street compared to other alternatives • Equitable development opportunities near South Lake Union Station
Promote a healthy built, natural, and social environment	• Potential impacts to historic properties in downtown • Potential permanent park and wildlife habitat impacts to Kinnear Park at north tunnel portal • Higher potential residential displacements around north tunnel portal compared to other alternatives • Temporary traffic, visual, noise and vibration construction impacts limited to areas around tunnel portal and stations

5TH/TERRY/ROY/MERCER

ALTERNATIVE

SEGMENT
DOWNTOWN

ROUTE DESCRIPTION

This alternative would also operate in a new rail-only tunnel from the International District/ Chinatown District to Lower Queen Anne in downtown Seattle. The tunnel route would run north under 5th Avenue to Westlake Avenue. From there, it would transition to Terry Avenue N to Republican Street and then turn west and follow Roy Street. The tunnel would then transition to Mercer Street at around 5th Avenue N and then follow Mercer Street to Elliott Avenue W. The north tunnel portal would be on the western edge of Kinnear Park near Elliott Avenue W.

CHANGES TO ALTERNATIVE FROM LEVEL 1

- New alternative in Level 2

STATIONS

Midtown	Tunnel beneath 5th Avenue between Madison and Spring streets
Westlake	Tunnel beneath 5th Avenue connecting with existing Westlake Station between Pike and Pine streets
Denny	Tunnel beneath Terry Avenue N at John Street
South Lake Union	Tunnel beneath Roy Street between Dexter and Aurora avenues N
Seattle Center	Tunnel beneath Mercer Street between 1st and Queen Anne avenues N

Purpose and Need	Evaluation
Service performance and reliability in project corridor	• Fully grade separated • Travel time estimate between 8 and 9 minutes for route between International District/Chinatown and Smith Cove stations
Improve Downtown capacity for regional connectivity	• Facilitates regional connectivity • Includes new light rail tunnel beneath downtown • Approximately 176,700 forecasted population and employment served in 2040
Connect regional centers	• Serves three regional growth centers (Seattle CBD, South Lake Union, Uptown Queen Anne); no reginal MICs in segment • Compatibility with future LRT extensions consistent with Sound Transit's RTLP
Technically feasible and financially sustainable	• Mode, route and general station locations consistent with *ST3 Plan* • North portal located in landslide prone topography with potentially unstable slopes • Likely requires measures to control ground settlement, as well as foundation tiebacks of existing buildings on 5th Avenue S • Fewer vertical profile changes compared to ST3 Representative Project • Higher cost approximately $200 million more than ST3 Representative Project
Expand mobility for all	• All stations located in areas of moderate access to opportunity • Better access to opportunities provided for historically underserved populations on the greater Link system • Similar low-income and minority populations as rest of the city • Similar elderly, LEP and disabled populations as rest of the city, with lower youth populations
Encourage equitable and sustainable urban growth	• All five stations located in areas with supportive local land use plans • Average to good transportation integration opportunities, but more limited for Denny Station on Terry Avenue than on Westlake Avenue • Equitable development opportunities near South Lake Union Station
Promote a healthy built, natural, and social environment	• Potential impacts to historic properties in downtown • No identified potential impacts to protected natural resources • Higher potential residential displacements around north tunnel portal compared to other alternatives • Temporary traffic, visual, noise and vibration construction impacts limited to areas around tunnel portal and stations

4.3.1 Downtown Segment Summary Findings

Constructability, construction complexity, and transit connectivity are three key themes that emerged from the Level 2 Screening. The construction of any new transit project beneath downtown Seattle presents substantial challenges given the dense development patterns and land use intensities. Different tunnel types, structural elements of existing buildings (particularly high-rise office buildings but also retaining walls and tiebacks), soil conditions, utilities, passenger transfers, and maintaining accessibility to downtown during construction of the WSBLE Project are difficult challenges for any alternative. These and other challenges will be evaluated further during the Level 3 Screening.

General discussion and feedback from the public, SAG and ELG included the following common themes for the Level 2 alternatives evaluation and screening:

- Transfers at Westlake Station will be critical to serve region well
- Consider pedestrian safety upgrades, especially at South Lake Union Station near Mercer Street

Table 4-6 (Downtown Segment ELG Screening Recommendations) identifies the alternatives carried forward for additional design refinement and screened as part of the Level 3 Screening. Additional evaluation information and results for the Downtown alternatives may be found in **Appendix D** (Downtown Segment Level 2 Evaluation Matrices).

Table 4-6 Downtown Segment ELG Screening Recommendations

Level 2 Alternative	Key Findings	Public Feedback and Common Themes	Carry Forward into Level 3	Suggested Refinements for Level 3
ST3 Representative Project	• Carries forward into Level 3 as ST3 Representative Project	--	Yes	--
5th Avenue/Harrison	• Better bus/rail integration opportunity at South Lake Union Station on Harrison Street • Higher property effects due to tunnel portal location on Harrison Street west of Seattle Center • Engineering challenges with tunneling under Key Arena • Approximately $200 million more than ST3 Representative Project	• Support for this alternative with Seattle Center Station located at Republican Street	Yes	• Seattle Center Station located at Republican Street
6th Avenue/Boren/Roy	• Avoids building tie-backs on 5th Avenue, SR 99 portal and large sewer pipes in the vicinity of SR 99 • More constrained Denny Station location on Boren Avenue • Seattle Center station location on Roy is two blocks from Key Arena • Lower bus/rail integration opportunity at Seattle Center Station on Roy Street • Comparable cost to ST3 Representative Project	• Limited support for Denny Station at Boren (due to steep grade) • Limited support for South Lake Union Station at Roy Street due to access restrictions to east • Interest in maintaining 6th Avenue route through Downtown	No	--
5th/Terry/Roy/Mercer	• Avoids SR 99 portal and large sewer pipes in the vicinity of SR 99 • Seattle Center Station location on Mercer Street is one block from Key Arena • Approximately $200 million more than ST3 Representative Project	• Some support for Denny Station at Terry • Interest in 6th Avenue route through Downtown	Yes	• 6th Avenue route through Downtown

4.4 Interbay/Ballard Segment Alternatives Evaluation

The Interbay/Ballard Segment contained the following eight alternatives during the Level 2 Screening:

- ST3 Representative Project
- 15th/Fixed Bridge/15th
- 20th/Fixed Bridge/17th
- 20th/Tunnel/15th
- Central Interbay/Movable Bridge/14th
- Armory Way/Tunnel/14th
- Central Interbay/Fixed Bridge/14th
- Central Interbay/Tunnel/15th

These alternatives are delineated on **Figure 4-5** (Interbay/Ballard Segment—Level 2 Alternatives), with **Table 4-7** (Interbay/Ballard Segment—Level 2 Alternatives Evaluation Summary) summarizing the evaluation results. Individual descriptions and evaluation of each alternative are provided in the pages that follow. Refer to **Appendix E** (Interbay/Ballard Segment Level 2 Evaluation Matrices) for the detailed findings of each evaluation measure in this segment.

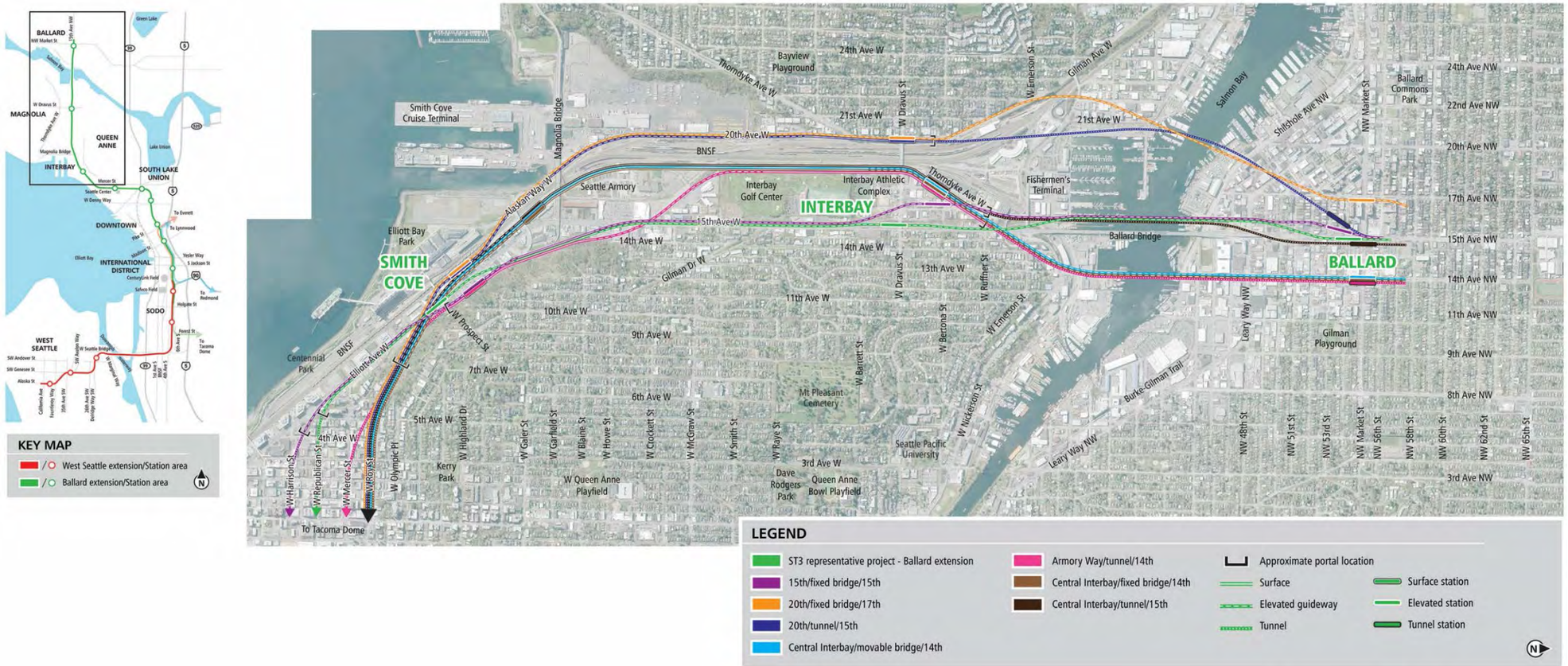


Figure 4-5 Interbay/Ballard Segment—Level 2 Alternatives

Table 4-7 Interbay/Ballard Segment—Level 2 Alternatives Evaluation Summary

Purpose and Need / Evaluation Criteria	Alternatives							
	ST3 Representative Project	15th/Fixed Bridge/15th	20th/Fixed Bridge/17th	20th/Tunnel/15th	Central Interbay/ Movable Bridge/14th	Armory Way/ Tunnel/14th	Central Interbay/ Fixed Bridge/14th	Central Interbay/ Tunnel/15th
Provide high quality rapid, reliable, and efficient peak and off-peak light rail transit service to communities in the project corridors defined in ST3.								
Potential service interruptions and recoverability	Low	High	High	High	Low	High	High	High
LRT travel times (minutes)	5 to 6	5 to 6	5 to 6	5 to 6	5 to 6	5 to 6	5 to 6	5 to 6
Improve regional mobility by increasing connectivity and capacity through downtown Seattle to meet projected transit demand.								
LRT network integration	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Passenger carrying capacity in downtown	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Ridership potential (2040 population/employment) (1)	17,200	16,700	19,000	17,800	15,400	16,400	15,400	16,500
Connect regional centers as described in adopted regional and local land use, transportation, and economic development plans and Sound Transit's Regional Transit Long-Range Plan.								
Station proximity to PSRC-designated regional growth centers	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Station proximity to PSRC-designated manufacturing/industrial centers	1	1	1	1	1	1	1	1
Accommodates future LRT extension beyond ST3	Medium	Medium	Low	High	Medium	High	Medium	High
Implement a system that is consistent with the ST3 Plan that established transit mode, corridor, and station locations and that is technically feasible and financially sustainable to build, operate, and maintain.								
Mode, route and general station locations per ST3	High	High	High	High	High	High	High	High
Potential ST3 implementation schedule effects	High	High	High	High	High	High	High	High
Potential ST3 operating plan effects	Low	High	High	High	Low	High	High	High
Engineering constraints	Medium	Medium	Medium	Low	High	Low	High	Low
Constructability issues	Medium	Medium	Medium	Low	High	Low	High	Low
Operational constraints	Low	High	High	High	Low	High	High	High
Conceptual capital cost comparison (2017$)	--	$200 million increase	$500 million increase	$700 million increase	$200 million increase	$300 million increase	$100 million increase	$500 million increase
Operating cost impacts	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Expand mobility for the corridor and region's residents, which include transit dependent, low-income and minority populations.								
Opportunities for low-income and minority populations (activity nodes/subsidized rental units)	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
	8%	9%	8%	8%	8%	8%	8%	9%
Low-income population (1/2)	19% / 18%	20% / 18%	20% / 18%	20% / 18%	19% / 18%	19% / 18%	19% / 18%	19% / 18%
Minority population (1/2) (4)	21% / 20%	21% / 20%	21% / 20%	21% / 20%	21% / 20%	21% / 20%	21% / 20%	21% / 20%
Youth population (under 18) (1/2)	9% / 12%	11% / 12%	11% / 12%	11% / 12%	12% / 12%	11% / 12%	12% / 12%	10% / 12%
Elderly population (65 and over) (1/2)	10% / 10%	10% / 10%	10% / 10%	10% / 10%	9% / 10%	9% / 10%	9% / 10%	10% / 10%
LEP population (1/2)	4% / 3%	4% / 3%	4% / 3%	4% / 3%	3% / 3%	3% / 3%	3% / 3%	3% / 3%
Disabled population (1/2)	9% / 8%	9% / 8%	9% / 8%	9% / 8%	8% / 8%	8% / 8%	8% / 8%	9% / 8%

Table 4-7 Interbay/Ballard Segment—Level 2 Alternatives Evaluation Summary

Purpose and Need / Evaluation Criteria	Alternatives							
	ST3 Representative Project	15th/Fixed Bridge/15th	20th/Fixed Bridge/17th	20th/Tunnel/15th	Central Interbay/ Movable Bridge/14th	Armory Way/ Tunnel/14th	Central Interbay/ Fixed Bridge/14th	Central Interbay/ Tunnel/15th
Encourage equitable and sustainable urban growth in station areas through support of transit-oriented development, station access, and modal integration in a manner that is consistent with local land use plans and policies.								
Compatibility with Seattle designated Urban Centers and Villages (1)	35%	34%	38%	31%	26%	28%	26%	36%
Station locations consistent with current local land use plans	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Activity nodes served (1)	26	32	36	33	24	23	24	35
Passenger transfers	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Bus/rail and rail/rail integration (1)	High	Medium	Medium	High	High	High	High	High
Bicycle accessibility (1)	19%	19%	19%	19%	17%	19%	17%	18%
Pedestrian and persons with limited mobility accessibility (1)	Low	Medium	High	High	Low	Medium	Low	Medium
Development potential (1)	34%	34%	37%	35%	33%	33%	33%	34%
Equitable development opportunities	Low	High	Low	Low	Medium	Medium	Medium	High
Preserve and promote a healthy environment and economy by minimizing adverse impacts on the natural, built and social environments through sustainable practices.								
NRHP listed or eligible historic properties and Seattle City Landmarks	5	7	3	3	3	2	3	3
Potential archaeological resources	Low	Low	Low	Low	Low	Low	Low	Low
Parks and recreational resources effects (acres)	0.2	1	0.9	0.9	4.2	3.9	4.2	3.9
Water resources effects (acres)	0.7	0.6	0	0	0.7	0	0.4	0
Fish and wildlife habitat effects (acres)	11	11	0.5	0.5	0.5	11.4	0.5	0.5
Hazardous materials sites	11	15	11	11	16	12	16	12
Visual effects (miles)	1.2	0.3	0.6	0.1	0.7	0.8	0.7	0.6
Noise and vibration sensitive receivers	High	High	Low	Medium	High	High	High	High
Number of properties potentially affected	Medium	Low	Low	High	High	High	High	High
Number of potential residential unit displacements	High	Low	Low	Medium	Medium	High	Medium	High
Square feet of potential business displacements	Medium	Medium	Medium	High	Medium	High	Medium	Low
Construction impacts	Low	Medium	Low	Medium	High	High	High	Medium
Burden on minority and low-income populations	High	High	High	High	High	High	High	High
Traffic circulation and access	Low	Medium	Medium	High	Medium	High	Medium	High
Transportation facilities	Medium	High	Low	Medium	Medium	High	Medium	Medium
Freight movement and access on land and water	Low	Medium	Medium	Medium	Medium	High	Medium	High
Business and commerce effects	Low	Low	Medium	High	Medium	High	Medium	Medium

Notes: (1) Within station walksheds; (2) Within 15-minute ride on connecting high frequency transit; (3) N/A = Measure not applicable to this segment; (4) Minority population is defined in U.S. DOT Updated Environmental Justice Order 5610.2(a) as persons belonging to any of the following groups: Black, Hispanic, Asian American, and American Indian and Alaska Native

ST3 REPRESENTATIVE PROJECT

ALTERNATIVE

SEGMENT
INTERBAY/BALLARD

ROUTE DESCRIPTION

The ST3 Representative Project would emerge from the downtown tunnel at Republican Street in an elevated structure. The elevated route would then transition to an at-grade guideway between the Queen Anne hillside and Elliott Avenue W, to 15th Avenue W at W Armory Way. North of W Armory Way, it would transition to an elevated structure, travel down 15th Avenue W and cross over Salmon Bay via a movable bridge west of the existing Ballard Bridge. Once across Salmon Bay, the elevated route would follow 15th Avenue NW and end near 15th Avenue NW and NW Market Street.

STATIONS

Smith Cove	Elevated on Elliott Avenue W
Interbay	Elevated on 15th Avenue W straddling W Dravus Street Bridge
Ballard	Elevated on 15th Avenue NW south of NW Market Street

REFINEMENTS TO ALTERNATIVE FROM LEVEL 1

- Shifted movable bridge west further away from existing bridge

Purpose and Need	Evaluation
Service performance and reliability in project corridor	• Movable bridge openings would interrupt LRT operations and recoverability could be challenging • Travel time estimate 5 to 6 minutes for route between Smith Cove and Ballard stations; a speed reduction was assumed for crossing movable bridge
Improve Downtown capacity for regional connectivity	• Facilitates regional connectivity • Approximately 17,200 forecasted population and employment served in 2040
Connect regional centers	• All stations within reasonable walking distance of Ballard-Interbay MIC; no regional growth centers in segment • Elevated terminal station on north-south alignment south of NW Market Street; a connected eastward extension per Sound Transit's RTLP feasible and includes surface disruptions, while an independent extension could cause less disruption
Technically feasible and financially sustainable	• Mode, route and general station locations consistent with *ST3 Plan* • Movable bridge openings would impact and degrade systemwide operations • Engineering and constructability constraints with long span structures over existing interchanges, roadways, railroads and Salmon Bay • In-water construction activities would potentially impact vessel traffic in navigation channel, fish windows and tribal treaty fishing • Large diameter utility constraints and overhead power line conflicts
Expand mobility for all	• All stations located in areas of moderate access to opportunity • Better access to opportunities provided for historically underserved populations on the greater Link system • Similar low-income populations as rest of the city and lower minority populations • Similar youth, elderly, LEP and disabled populations as rest of the city
Encourage equitable and sustainable urban growth	• Urban Design and Transportation Framework and multimodal transportation plan (*Move Ballard*) both anticipated light rail in Ballard • Adequate passenger transfer and transportation integration opportunities, but pedestrian access would be challenging • Limited equitable development opportunities near all three station locations
Promote a healthy built, natural, and social environment	• Permanent in-water impacts from piers in Salmon Bay • Permanent wildlife habitat impacts to SW Queen Anne Greenbelt for construction and slope stabilization • Most disruptive temporary construction impacts to neighborhoods • Traffic and circulation impacts on high volume streets, including Elliott Avenue W, 15th Avenue W and 15th Avenue NW • Freight and commerce effects, including truck movements, BNSF Railway and Fishermen's Terminal

15TH/FIXED BRIDGE/15TH

ALTERNATIVE

SEGMENT
INTERBAY/BALLARD

ROUTE DESCRIPTION

This alternative would emerge from the downtown tunnel at Harrison Street on an elevated structure and run along the east side of Elliott Avenue W (out of the roadway). It would then transition to an at-grade guideway between the Queen Anne hillside and Elliott Avenue W and the cross over to the west side of 15th Avenue W. North of W Armory Way, the route would continue on an elevated structure on the west side of 15th Avenue W to W Barrett Street. From there, it would turn west over W Dravus Street and 16th Avenue W and then span Salmon Bay on a fixed bridge west of the existing Ballard Bridge. North of Salmon Bay, the elevated route would parallel 15th Avenue NW and end near 15th Avenue NW and NW Market Street.

STATIONS

Smith Cove — Elevated east of Elliott Avenue W

Interbay — Elevated at 16th Avenue W and W Bertona Street

Ballard — Elevated west of 15th Avenue NW south of NW Market Street

REFINEMENTS TO ALTERNATIVE FROM LEVEL 1

- Changed name of alternative; previously Elliott/15th/16th/Fixed Bridge
- Moved route alignment east, out of the roadway, on Elliott Avenue W from Mercer Street to N Armory Way (including Smith Cove Station) to reduce traffic impacts
- Moved route alignment to west side of 15th Avenue W, out of the roadway, from N Armory Way to vicinity of W Dravus Street to reduce traffic impacts
- Realigned Ballard Station west of 15th Avenue NW south of NW Market Street

Purpose and Need	Evaluation
Service performance and reliability in project corridor	• Fully grade separated with no movable bridge • Travel time estimate 5 to 6 minutes for route between Smith Cove and Ballard stations
Improve Downtown capacity for regional connectivity	• Facilitates regional connectivity • Approximately 16,700 forecasted population and employment served in 2040
Connect regional centers	• All stations within reasonable walking distance of Ballard-Interbay MIC; no regional growth centers in segment • Elevated terminal station on north-south alignment south of NW Market Street; a connected eastward extension per Sound Transit's RTLP feasible and includes surface disruptions, while an independent extension could cause less disruption
Technically feasible and financially sustainable	• Mode, route and general station locations consistent with *ST3 Plan* • Engineering and constructability constraints with long span structures over existing interchanges, roadways, railroads and Salmon Bay • In-water construction activities would potentially impact vessel traffic in navigation channel, fish windows and tribal treaty fishing • Large diameter utility constraints and overhead power line conflicts • Higher cost approximately $200 million more than ST3 Representative Project
Expand mobility for all	• All stations located in areas of moderate access to opportunity • Better access to opportunities provided for historically underserved populations on the greater Link system • Similar low-income populations as rest of the city, with lower minority populations • Similar youth, elderly, LEP and disabled populations as rest of the city
Encourage equitable and sustainable urban growth	• Urban Design and Transportation Framework and *Move Ballard* both anticipated light rail in Ballard; Interbay Station in area zoned industrial • Adequate passenger transfer and transportation integration opportunities • Equitable development opportunities near all three station locations, with more land potentially available for development
Promote a healthy built, natural, and social environment	• Permanent in-water impacts from piers in Salmon Bay; lesser than movable bridge in same location • Permanent wildlife habitat impacts to SW Queen Anne Greenbelt for construction and slope stabilization • Elevated guideway on west side of 15th Avenue NW reduces traffic impacts, but results in greater potential residential displacements compared to other alternatives • Business and commerce effects, including Fishermen's Terminal and small maritime and other businesses along elevated guideway

20TH/FIXED BRIDGE/17TH

ALTERNATIVE

SEGMENT
INTERBAY/BALLARD

ROUTE DESCRIPTION

This alternative would emerge from the downtown tunnel on an elevated guideway at Roy Street and then span over Elliott Avenue W. It would continue north, crossing over to the west side of the BNSF Railway tracks and above Magnolia Bridge. Paralleling 20th and Gilman avenues W, the elevated route would eventually turn northeast and cross over the BNSF Railway tracks near 22nd Avenue W. South of Salmon Bay, the elevated route would transition to a fixed bridge near NW Dock Place. Once across Salmon Bay, the elevated route would end near 17th Avenue NW and NW Market Street.

STATIONS

Smith Cove — Elevated immediately northeast of BNSF Railway tracks

Interbay — Elevated on 20th Avenue W straddling W Dravus Street

Ballard — Elevated east of 17th Avenue NW straddling NW Market Street

REFINEMENTS TO ALTERNATIVE FROM LEVEL 1

- Changed name of alternative; previously West of BNSF/20th/17th/Fixed Bridge
- Shifted Interbay Station north to straddle W Dravus Street to improve access

Purpose and Need	Evaluation
Service performance and reliability in project corridor	• Fully grade separated with no movable bridge • Travel time estimate 5 to 6 minutes for route between Smith Cove and Ballard stations
Improve Downtown capacity for regional connectivity	• Facilitates regional connectivity • Approximately 19,000 forecasted population and employment served in 2040; greater than segment average due to Interbay Station capturing more population west of 20th Avenue W and Ballard Station on 17th Avenue NW also serving larger market to west
Connect regional centers	• All stations within reasonable walking distance of Ballard-Interbay MIC; no regional growth centers in segment • Elevated terminal station on north-south alignment straddling NW Market Street; a connected eastward extension per Sound Transit's RTLP more challenging due to greater surface disruptions in higher residential and business densities at 17th Avenue NW, while an independent extension could cause less disruption
Technically feasible and financially sustainable	• Mode, route and general station locations consistent with *ST3 Plan* • Long span structures over BNSF Railway and Magnolia Bridge • Constrained column placement adjacent to existing infrastructure • Potential relocation of large diameter sewer, utilities and roadways • Long construction duration of fixed long span bridge over Salmon Bay; could include in-water construction activities that would potentially impact vessel traffic in navigation channel, fish windows and tribal treaty fishing • Higher cost approximately $500 million more than ST3 Representative Project
Expand mobility for all	• All stations located in areas of moderate access to opportunity • Better access to opportunities provided for historically underserved populations on the greater Link system • Similar low-income populations as rest of the city, with lower minority populations • Similar youth, elderly, LEP and disabled populations as rest of the city
Encourage equitable and sustainable urban growth	• Urban Design and Transportation Framework and *Move Ballard* both anticipated light rail in Ballard • Adequate passenger transfer and transportation integration opportunities • Limited equitable development opportunities near all station locations
Promote a healthy built, natural, and social environment	• No permanent in-water impacts with fixed bridge spanning Salmon Bay • Potentially higher potential residential displacements compared to other alternatives, with terminal station and tail track near 17th Avenue NW and NW Market Street • Greater potential for temporary visual, noise, vibration and traffic impacts on residences during construction compared to other alternatives • Major transportation facilities affected, including existing streets and trails

20TH/TUNNEL/15TH

ALTERNATIVE

SEGMENT
INTERBAY/BALLARD

ROUTE DESCRIPTION

This alternative would emerge from the downtown tunnel at Roy Street and then transition to an elevated structure. The elevated route would cross Elliott Avenue W and run west of the BNSF Railway tracks. It would then cross over Magnolia Bridge and continue adjacent to 20th Avenue W. North of W Dravus Street, the route would transition into a tunnel under Salmon Bay. The tunnel route would head east on the north shoreline of the bay and end near 15th Avenue NW and NW Market Street.

STATIONS

Station	Description
Smith Cove	Elevated immediately northeast of BNSF Railway tracks
Interbay	Retained cut (trench) on 20th Avenue W straddling of W Dravus Street
Ballard	Tunnel east of 17th Avenue NW south of NW Market Street

REFINEMENTS TO ALTERNATIVE FROM LEVEL 1

- Changed name of alternative; previously West of BNSF/20th/17th/Fixed Bridge
- Shifted Interbay Station north straddling W Dravus Street to improve access

Purpose and Need	Evaluation
Service performance and reliability in project corridor	• Fully grade separated with no movable bridge • Travel time estimate 5 to 6 minutes for route between Smith Cove and Ballard stations
Improve Downtown capacity for regional connectivity	• Facilitates regional connectivity • Approximately 17,800 forecasted population and employment served in 2040' greater than segment average due to Interbay Station capturing more population west of 20th Avenue W
Connect regional centers	• All stations within reasonable walking distance of Ballard-Interbay MIC; no regional growth centers in segment • Tunnel terminal station on north-south alignment south of NW Market Street; a connected eastward extension per Sound Transit's RTLP more feasible and direct with potentially less surface disruptions, and an independent extension also feasible
Technically feasible and financially sustainable	• Mode, route and general station locations consistent with *ST3 Plan* • Long span structures over BNSF Railway and Magnolia Bridge • Constrained column placement adjacent to existing infrastructure • Tunnel under Salmon Bay avoids in-water construction associated with bridge activities that would potentially impact vessel traffic in navigation channel, fish windows and tribal treaty fishing • Engineering and constructability constraints with tunnel portal, cross passages and deep cut-and-cover Ballard Station • Highest cost approximately $700 million more than ST3 Representative Project • Tunnel costs not included in ST3 financial plan or evaluation methodology
Expand mobility for all	• All stations located in areas of moderate access to opportunity • Better access to opportunities provided for historically underserved populations on the greater Link system • Similar low-income populations as rest of the city, with lower minority populations • Similar youth, elderly, LEP and disabled populations as rest of the city
Encourage equitable and sustainable urban growth	• Urban Design and Transportation Framework and *Move Ballard* both anticipated light rail in Ballard • Adequate passenger transfer and transportation integration opportunities • Limited equitable development opportunities near all station locations
Promote a healthy built, natural, and social environment	• Least visual effects with low profile or tunnel alignment in visually sensitive areas • Minimal traffic circulation and access effects, with limited permanent roadway or property access impacts • Lowest square footage of potential business displacements compared to other alternatives; tunnels could avoid impacts to maritime businesses • No permanent in-water impacts with tunnel under Salmon Bay

CENTRAL INTERBAY/MOVABLE BRIDGE/14TH

ALTERNATIVE

SEGMENT
INTERBAY/BALLARD

ROUTE DESCRIPTION

This alternative would emerge from the downtown tunnel at Roy Street and then cross Elliott Avenue W via an elevated structure. The route would transition to existing grade, traveling under the W Galer and Magnolia bridges, eventually heading north to the east side of the BNSF Railway tracks. The route would again transition to an elevated structure passing above W Dravus Street. It would continue north, cross over the 15th Avenue W and W Emerson Street intersection and align with 14th Avenue NW to span Salmon Bay via a movable bridge. North of Salmon Bay, the elevated route would continue along 14th Avenue NW, ending south of NW Market Street.

STATIONS

Smith Cove — At-grade immediately northeast of BNSF Railway tracks south of Magnolia Bridge

Interbay — Elevated on Thorndyke Avenue W north of W Dravus Street

Ballard — Elevated on 14th Avenue straddling NW Market Street

REFINEMENTS TO ALTERNATIVE FROM LEVEL 1

- Changed name of alternative; previously East of BNSF/14th/Movable Bridge
- Shifted Smith Cove Station south, just north of W Galer Street overpass to improve access and provide more distance between pump station south of Magnolia Bridge
- Shifted Ballard Station north straddling NW Market Street to improve access

Purpose and Need	Evaluation
Service performance and reliability in project corridor	• Movable bridge openings would interrupt LRT operations and recoverability could be challenging • Travel time estimate 5 to 6 minutes for route between Smith Cove and Ballard stations; a speed reduction was assumed for crossing movable bridge
Improve Downtown capacity for regional connectivity	• Facilitates regional connectivity • Approximately 15,400 forecasted population and employment served in 2040; lower than segment average due to Ballard Station on 14th Avenue NW further from center of Ballard hub urban village
Connect regional centers	• All stations within reasonable walking distance of Ballard-Interbay MIC; no regional growth centers in segment • Elevated terminal station on north-south alignment straddling NW Market Street; a connected eastward extension per Sound Transit's RTLP feasible and includes surface disruptions, while an independent extension could cause less disruption
Technically feasible and financially sustainable	• Mode, route and general station locations consistent with *ST3 Plan* • Movable bridge openings would impact and degrade systemwide operations • Long section of at-grade guideway potentially less challenging • Engineering and constructability constraints with long span structures over existing interchanges, roadways, railroads and Salmon Bay • In-water construction activities would potentially impact vessel traffic in navigation channel, fish windows, tribal treaty fishing and maintain access to 14th Avenue NW boat ramp • Higher cost approximately $200 million more than ST3 Representative Project
Expand mobility for all	• All stations located in areas of moderate access to opportunity • Better access to opportunities provided for historically underserved populations on the greater Link system • Similar low-income populations as rest of the city, with lower minority populations • Similar youth, elderly, LEP and disabled populations as rest of the city
Encourage equitable and sustainable urban growth	• Least amount of station walksheds within urban centers and villages • Ballard Station in area on 14th Avenue NW planned for commercial uses; Interbay Station in area zoned industrial • Adequate passenger transfer and transportation integration opportunities, but pedestrian and bicycle access would be limited • Equitable development opportunities near Smith Cove and Interbay stations
Promote a healthy built, natural, and social environment	• Potential permanent impacts on four parks, including 14th Avenue NW Boat Ramp, Interbay Athletic Field, Interbay Golf Course and Kinnear Park • Permanent in-water impacts from piers in Salmon Bay • Potential disturbance of old Interbay landfill, as well as 16 contaminated sites of higher concern

ARMORY WAY/TUNNEL/14TH

ALTERNATIVE

SEGMENT
INTERBAY/BALLARD

ROUTE DESCRIPTION

This alternative would emerge from the downtown tunnel at Mercer Street, paralleling Elliott Avenue W at grade. The route would transition to an elevated structure along the Queen Anne hillside to 15th Avenue W and W Armory Way, crossing over the intersection. It would then run on the east side of the BNSF Railway tracks, pass under W Dravus Street and then curve east between the railroad tracks and 15th Avenue W. The route would then descend into a tunnel beneath Salmon Bay and continue to a terminus near 14th Avenue NW and NW Market Street.

STATIONS

Smith Cove — At-grade east of Elliott Avenue W

Interbay — Retained cut (trench) on Thorndyke Avenue W north of W Dravus Street

Ballard — Tunnel under 14th Avenue NW straddling NW Market Street

REFINEMENTS TO ALTERNATIVE FROM LEVEL 1

- Changed name of alternative; previously East of BNSF/14th/Tunnel
- Shifted Ballard Station north straddling NW Market Street to improve access

Purpose and Need	Evaluation
Service performance and reliability in project corridor	• Fully grade separated with no movable bridge • Travel time estimate 5 to 6 minutes for route between Smith Cove and Ballard stations
Improve Downtown capacity for regional connectivity	• Facilitates regional connectivity • Approximately 16,400 forecasted population and employment served in 2040
Connect regional centers	• All stations within reasonable walking distance of Ballard-Interbay MIC; no regional growth centers in segment • Tunnel terminal station on north-south alignment at NW Market Street; a connected eastward extension per Sound Transit's RTLP more feasible and direct with potentially less surface disruptions, and an independent extension also feasible
Technically feasible and financially sustainable	• Mode, route and general station locations consistent with *ST3 Plan* • Tunnel under Salmon Bay avoids in-water construction associated with bridge activities that would potentially impact vessel traffic in navigation channel, fish windows and tribal treaty fishing • Engineering and constructability constraints with tunnel portal, cross passages and deep cut-and-cover Ballard Station • Higher cost approximately $300 million more than ST3 Representative Project • Tunnel costs not included in ST3 financial plan or evaluation methodology
Expand mobility for all	• All stations located in areas of moderate access to opportunity • Better access to opportunities provided for historically underserved populations on the greater Link system • Similar low-income populations as rest of the city and lower minority populations • Similar youth, elderly, LEP and disabled populations as rest of the city
Encourage equitable and sustainable urban growth	• Least amount of station walksheds within urban centers and villages • Ballard Station in area on 14th Avenue NW planned for commercial uses; Interbay Station in area zoned industrial • Adequate passenger transfer and transportation integration opportunities • Equitable development opportunities near Smith Cove and Interbay stations
Promote a healthy built, natural, and social environment	• Potential permanent impacts on three parks, including Interbay Athletic Field, Interbay Golf Course and Kinnear Park • Permanent wildlife habitat impacts to SW Queen Anne Greenbelt for construction and slope stabilization • Least disruptive temporary construction impacts to neighborhoods compared to other alternatives • Lowest square footage of potential business displacements compared to other alternatives; tunnels could avoid impacts to maritime businesses • No permanent in-water impacts with tunnel under Salmon Bay

CENTRAL INTERBAY/FIXED BRIDGE/14TH

ALTERNATIVE

SEGMENT
INTERBAY/BALLARD

ROUTE DESCRIPTION

This alternative would emerge from the downtown tunnel at Roy Street and then cross Elliott Avenue W via an elevated structure. The route would transition to existing grade, traveling under the W Galer and Magnolia bridges, eventually heading north to the east side of the BNSF Railway tracks. The route would again transition to an elevated structure passing above W Dravus Street. It would continue north, cross over the 15th Avenue W and W Emerson Street intersection and align with 14th Avenue NW to span Salmon Bay via a fixed bridge. North of Salmon Bay, the elevated route would continue along 14th Avenue NW, ending north of NW Market Street.

STATIONS

Smith Cove — At-grade immediately northeast of BNSF Railway tracks south of Magnolia Bridge

Interbay — Elevated on Thorndyke Avenue W north of W Dravus Street

Ballard — Elevated under 14th Avenue NW straddling NW Market Street

REFINEMENTS TO ALTERNATIVE FROM LEVEL 1

- New alternative in Level 2

Purpose and Need	Evaluation
Service performance and reliability in project corridor	• Fully grade separated with no movable bridge • Travel time estimate 5 to 6 minutes for route between Smith Cove and Ballard stations
Improve Downtown capacity for regional connectivity	• Facilitates regional connectivity • Approximately 15,400 forecasted population and employment served in 2040; lower than segment average due to Ballard Station location on 14th Avenue NW further from center of Ballard hub urban village
Connect regional centers	• All stations within reasonable walking distance of Ballard-Interbay MIC; no regional growth centers in segment • Elevated terminal station on north-south alignment straddling NW Market Street; a connected eastward extension per Sound Transit's RTLP feasible and includes surface disruptions, while an independent extension could cause less disruption
Technically feasible and financially sustainable	• Mode, route and general station locations consistent with *ST3 Plan* • Long section of at-grade guideway potentially less challenging • Engineering and constructability constraints with long span structures over existing interchanges, roadways, railroads and Salmon Bay • In-water construction activities would potentially impact vessel traffic in navigation channel, fish windows, tribal treaty fishing and maintain access to 14th Avenue NW boat ramp • Higher cost approximately $100 million more than ST3 Representative Project
Expand mobility for all	• All stations located in areas of moderate access to opportunity • Better access to opportunities provided for historically underserved populations on the greater Link system • Similar low-income populations as rest of the city and lower minority populations • Similar youth, elderly, LEP and disabled populations as rest of the city
Encourage equitable and sustainable urban growth	• Least amount of station walksheds within urban centers and villages • Ballard Station in area on 14th Avenue NW planned for commercial uses; Interbay Station in area zoned industrial • Adequate passenger transfer and transportation integration opportunities, but pedestrian and bicycle access would be limited • Equitable development opportunities near Smith Cove and Interbay stations
Promote a healthy built, natural, and social environment	• Potential permanent impacts on four parks, including 14th Avenue NW Boat Ramp, Interbay Athletic Field, Interbay Golf Course and Kinnear Park • Permanent in-water impacts from piers in Salmon Bay; lesser than movable bridge in same location • Potential disturbance of old Interbay landfill, as well as 16 contaminated sites of higher concern

CENTRAL INTERBAY/TUNNEL/15TH

ALTERNATIVE

SEGMENT
INTERBAY/BALLARD

ROUTE DESCRIPTION

This alternative would emerge from the downtown tunnel at Roy Street and then cross Elliott Avenue W via an elevated structure. The route would transition to existing grade, traveling under the W Galer and Magnolia bridges, eventually heading north to the east side of the BNSF Railway tracks. The route would then descend into a tunnel beneath Salmon Bay on the west side of the existing Ballard Bridge. It would continue in a tunnel to a terminus just east of 15th Avenue NW and NW Market Street.

STATIONS

Smith Cove — At grade immediately northeast of BNSF Railway tracks south of Magnolia Bridge

Interbay — Retained cut (trench) on Thorndyke Avenue W north of W Dravus Street

Ballard — Tunnel east of 15th Avenue NW straddling NW Market Street

REFINEMENTS TO ALTERNATIVE FROM LEVEL 1

- New alternative in Level 2

Purpose and Need	Evaluation
Service performance and reliability in project corridor	• Fully grade separated with no movable bridge • Travel time estimate 5 to 6 minutes for route between Smith Cove and Ballard stations
Improve Downtown capacity for regional connectivity	• Facilitates regional connectivity • Approximately 16,500 forecasted population and employment served in 2040
Connect regional centers	• All stations within reasonable walking distance of Ballard-Interbay MIC; no regional growth centers in segment • Tunnel terminal station on north-south alignment straddling NW Market Street; a connected eastward extension per Sound Transit's RTLP feasible and direct with potentially less surface disruptions, and an independent extension also feasible
Technically feasible and financially sustainable	• Mode, route and general station locations consistent with *ST3 Plan* • Long section of at-grade guideway potentially less challenging • Tunnel under Salmon Bay avoids in-water construction associated with bridge activities that would potentially impact vessel traffic in navigation channel, fish windows and tribal treaty fishing • Engineering and constructability constraints with tunnel portal, cross passages and deep cut-and-cover Ballard Station • Major utility constraints would require deeper tunnel and Ballard Station • Higher cost approximately $500 million more than ST3 Representative Project • Tunnel costs not included in ST3 financial plan or evaluation methodology
Expand mobility for all	• All stations located in areas of moderate access to opportunity • Better access to opportunities provided for historically underserved populations on the greater Link system • Similar low-income populations as rest of the city and lower minority populations • Similar youth, elderly, LEP and disabled populations as rest of the city
Encourage equitable and sustainable urban growth	• Urban Design and Transportation Framework and *Move Ballard* both anticipated light rail in Ballard; Interbay Station in area zoned industrial • Adequate passenger transfer and transportation integration opportunities • Equitable development opportunities near all three station locations, with more land potentially available for development
Promote a healthy built, natural, and social environment	• Potential permanent impacts on three parks, including Interbay Athletic Field, Interbay Golf Course and Kinnear Park • Greatest square footage of potential business displacements compared to other alternatives, but tunnel could avoid impacts to maritime businesses • Minimal traffic circulation and access effects, with limited or no permanent roadway or property access impacts • No permanent in-water impacts with tunnel under Salmon Bay

4.4.1 Interbay/Ballard Segment Summary Findings

While construction complexity is a unifying theme across each segment, the key themes that emerged from the Level 2 Screening in the Interbay/Ballard Segment also included property acquisition, mobility, and economic effects. Environmental effects, particularly around land uses associated with commercial fishing, the Interbay industrial lands, and tribal treaty fishing, are also themes for certain alternatives based on their locations and water crossing types. As the evaluation of alternatives advances to the Level 3 Screening, additional design work and investigation into these and other themes or specific issues will provide greater detail on the feasibility of each alternative.

General discussion and feedback from the public, SAG and ELG included the following common themes for the Level 2 alternatives evaluation and screening:

- Concern with ST3 Representative Project, movable bridge and anything on 15th Avenue W
- Consider pedestrian bridge if Smith Cove Station located east of 15th Avenue W
- Concern with effects on Fishermen's Terminal

Table 4-8 (Interbay/Ballard Segment ELG Screening Recommendations) identifies the alternatives carried forward for additional design refinement and screened as part of the Level 3 Screening. Additional evaluation information and results for the Interbay/Ballard alternatives may be found in **Appendix E** (Interbay/Ballard Segment Level 2 Evaluation Matrices).

Table 4-8 Interbay/Ballard Segment ELG Screening Recommendations

Level 2 Alternative	Key Findings	Public Feedback and Common Themes	Carry Forward into Level 3	Suggested Refinements for Level 3
ST3 Representative Project	• Carries forward into Level 3 as ST3 Representative Project	• Concern about poor transit reliability with a movable bridge • Concern with route on 15th Avenue W due to traffic and business effects	Yes	--
15th/Fixed Bridge/15th	• Maritime business effects at Fishermen's Terminal • Elevated guideway along west side of 15th Avenue W affects more residences • Costs approximately $200 million more than ST3 Representative Project	• Concern about Fishermen's Terminal effects	No	--
20th/Fixed Bridge/17th	• Long span bridge over the BNSF tracks adds complexity • Ballard terminus/crossing location at 17th Avenue NW affects more residences • Costs approximately $500 million more than ST3 Representative Project	• Concern about overall cost • Concern about Ballard Station property, construction and visual effects, but support for location	No	--
20th/Tunnel/15th	• Long span bridge over the BNSF tracks, constrained tunnel portal location, and deeper tunnel station at 15th Avenue NW add complexity • Avoids in-water construction associated with bridge activities that would potentially impact vessel traffic in navigation channel, fish windows and tribal treaty fishing • Tunnel station along west side of 15th Avenue W affects residences • Costs approximately $700 million more than ST3 Representative Project; tunnel costs not included in ST3 financial plan or evaluation methodology and requires funding partnerships	• Concern about tunnel cost versus Armory Way/ Tunnel/14th Alternative	No	--
Central Interbay/Movable Bridge/14th	• Potential service interruptions due to movable bridge • Maritime business and potential vessel navigation effects • Affects fewer parcels in Ballard because of wider available right-of-way along 14th Avenue NW • Costs approximately $200 million more than ST3 Representative Project	• Concern about poor transit reliability with a movable bridge	No	--
Armory Way/Tunnel/14th	• Fewer environmental and maritime business/navigation effects; avoids in-water construction associated with bridge activities that would potentially impact vessel traffic in navigation channel, fish windows and tribal treaty fishing • Affects fewer parcels in Ballard because of wider available right-of-way along 14th Avenue NW • Approximately $300 million more than ST3 Representative Project; tunnel costs not included in ST3 financial plan or evaluation methodology and requires funding partnerships	• General support for more cost-effective tunnel crossing • Support for Ballard Station with fewer property effects • Explore Ballard Station access at 15th Avenue NW, closer to center of urban village	Yes	• Ballard Station access at 15th Avenue NW, closer to center of urban village
Central Interbay/Fixed Bridge/14th	• Maritime business effects, but less than with movable bridge • Affects fewer parcels in Ballard because of wider available right-of-way along 14th Avenue NW • Costs approximately $100 million more than ST3 Representative Project	• Some support for fixed bridge and Ballard Station, with fewer property effects	Yes	--
Central Interbay/Tunnel/15th	• Fewer environmental and maritime business/navigation effects; avoids in-water construction associated with bridge activities that would potentially impact vessel traffic in navigation channel, fish windows and tribal treaty fishing • Tunnel station along the east side of 15th Avenue W affects businesses • Costs approximately $500 million more than ST3 Representative Project; tunnel costs not included in ST3 financial plan or evaluation methodology and requires funding partnerships	• Concern about tunnel cost versus Armory Way/ Tunnel/14th Alternative • Concern about Ballard Station business effects, but support for 15th Avenue NW station location	No	--

5 SUMMARY OF LEVEL 2 SCREENING RECOMMENDATIONS

In summary, the Level 2 alternatives addressed different challenges and opportunities, and the evaluation highlighted potential benefits or impacts associated with each alternative. The Level 2 Screening also identified key themes and issues to consider moving forward into Level 3. For the Level 3 Screening, additional design efforts will refine those alternatives that remain to develop end-to-end alternatives from West Seattle to Ballard.

This technical memorandum presents the Level 2 Screening recommendations that the ELG made on October 5, 2018. The ELG's recommendations include the Level 2 alternatives carried forward into Level 3 for further refinement and evaluation, as well as the Level 2 alternatives not carried forward into Level 3.

5.1 Alternatives Carried Forward into Level 3

Table 5-1 (Summary of Level 2 Alternatives Carried Forward into Level 3) lists the ELG's recommended Level 2 alternatives carried forward into the Level 3 Screening process. The ELG recommended 14 of the 24 alternatives advance into Level 3. In all cases, the ST3 Representative Project is carried forward into Level 3 to continue to serve as the baseline alternative from the *ST3 Plan*. The remaining alternatives in each of the study segments will be refined to address the comments discussed with the SAG, ELG and other stakeholders, as listed in **Table 5-1**.

5.2 Alternatives Not Carried Forward into Level 3

Table 5-2 (Summary of Level 2 Alternatives Not Carried Forward into Level 3) shows the 10 Level 2 alternatives and other suggestions that the ELG recommended not be carried forward into Level 3. Many of these alternatives did not adequately serve the community in comparison to the other alternatives and/or were anticipated to have greater potential impacts to the community and environment. In addition, some alternatives were not carried forward into Level 3 because of major engineering constraints and constructability issues.

Table 5-1 Summary of Level 2 Alternatives Carried Forward into Level 3

Segment / Level 2 Alternative	Key Findings	Public Feedback and Common Themes	Suggested Refinements for Level 3
West Seattle/Duwamish Segment			
ST3 Representative Project	• Carries forward into Level 3 as ST3 Representative Project	• Explore moving Delridge Station further south • Explore Alaska Junction Station east and oriented north-south	• Shift Delridge Station further south • Shift Alaska Junction Station east and oriented north-south
Golf Course/Alaska Junction/ Tunnel	• Fewer residential and business effects at Alaska Junction • Low guideway along SW Genesee Street • Costs approximately $700 million more than ST3 Representative Project; tunnel costs not included in ST3 financial plan or evaluation methodology and requires funding partnerships • Increases schedule risk compared to ST3 Representative Project	• General support for this alternative, with development opportunities at Delridge Station location to serve neighborhood • Support for lower guideway along SW Genesee Street • Explore Alaska Junction Station location at 41st and 42nd avenues NW • Explore north crossing of Duwamish Waterway	• Shift Alaska Junction Station locations to 41st and 42nd avenues NW • North crossing of Duwamish Waterway
SODO and Chinatown/International District Segment			
ST3 Representative Project	• Carries forward into Level 3 as ST3 Representative Project	• Concern about cut-and-cover tunnel construction effects	--
Massachusetts Tunnel Portal	• Shallow cut-and-cover station under 5th Avenue with easy rider access/transfers • Construction effects and parking lane closures on 5th Avenue in station area • Costs approximately $200 million less than ST3 Representative Project • New at-grade SODO Station on E3 busway at Lander • Transfer at existing SODO Station • Bus operations on E3 busway displaced • New grade separated roadway crossings (Lander, Holgate) improve existing rail/traffic/freight operations • Property effects at tunnel portal site • Avoids impacts to Ryerson Base	• General support for surface alignment • Support for new roadway overpasses at Lander and Holgate • Explore shifting existing and new SODO stations closer to Lander • Support for reduced construction effects and shallower station	• Shift existing and new SODO stations closer to Lander
Surface E3	• Shallow cut-and-cover station under 5th Avenue and easy rider access/transfers • Construction effects and parking lane closures on 5th Avenue in station area • Costs approximately $400 million less than ST3 Representative Project • New at-grade SODO Station on E3 busway at Lander • Transfer at existing SODO Station • Bus operations on E3 busway displaced • New grade separated roadway crossings (Lander, Holgate) improve existing rail/traffic/freight operations • Avoids impacts to Ryerson Base	• General support for surface alignment • Support for new roadway overpasses at Lander and Holgate • Some support for second Stadium Station • Explore shifting existing and new SODO stations closer to Lander • Concern about cut-and-cover tunnel construction effects	• Shift existing and new SODO stations closer to Lander
4th Avenue Cut-and-Cover Tunnel/Station	• Shallow cut-and-cover station under 4th Avenue with easy rider access/transfers • Major engineering/constructability constraints (4th Avenue viaduct demolition/rebuild, active BNSF railway, existing transit tunnel, etc.) • Large property effects (King County Administration Building) • Costs approximately $600 million more than ST3 Representative Project; requires funding partnerships for 4th Avenue Viaduct re-build costs • Increased schedule risk compared to ST3 Representative Project	• Support for closer proximity to King Street Station, reduced Chinatown/ International District effects along 5th Avenue and shallower station • Concern about traffic detours	--
4th Avenue Bored Tunnel/ Mined Station	• Deep mined station (approximately 200 feet) under 4th Avenue with poor rider access/transfers • Major engineering/constructability constraints (4th Avenue viaduct demolition/rebuild, active BNSF railway, existing transit tunnel, etc.) • Large property effects (Ryerson Base for tunnel portal site) • Results in very deep Midtown Station (approximately 250 feet) • Costs approximately $500 million more than ST3 Representative Project; requires funding partnerships for 4th Avenue Viaduct re-build costs • Increased schedule risk compared to ST3 Representative Project	• Support for closer proximity to King Street Station and reduced Chinatown/ International District effects along 5th Avenue • Concern about traffic detours and access due to deep station	--

Table 5-1 Summary of Level 2 Alternatives Carried Forward into Level 3

Segment / Level 2 Alternative	Key Findings	Public Feedback and Common Themes	Suggested Refinements for Level 3
5th Avenue Bored Tunnel/ Mined Station	• Deep mined station (approximately 200 feet) under 5th Avenue with poor rider access/transfers • Less construction effects, parking closures on 5th Avenue with mined station • Some property effects (for mined station access shaft) • Results in very deep Midtown Station (approximately 250 feet) • Cost similar to ST3 Representative Project • Somewhat higher schedule risk compared to ST3 Representative Project	• Support for reduced construction effects • Concern about access due to deep station	--
Downtown Segment			
ST3 Representative Project	• Carries forward into Level 3 as ST3 Representative Project	--	--
5th Avenue/Harrison	• Better bus/rail integration opportunity at South Lake Union Station on Harrison Street • Higher property effects due to tunnel portal location on Harrison Street west of Seattle Center • Engineering challenges with tunneling under Key Arena • Approximately $200 million more than ST3 Representative Project	• Support for this alternative with Seattle Center Station located at Republican Street	• Seattle Center Station located at Republican Street
5th/Terry/Roy/Mercer	• Avoids SR 99 portal and large sewer pipes in the vicinity of SR 99 • Seattle Center Station location on Mercer Street is one block from Key Arena • Approximately $200 million more than ST3 Representative Project	• Some support for Denny Station at Terry • Interest in 6th Avenue route through Downtown	• 6th Avenue route through Downtown
Interbay/Ballard Segment			
ST3 Representative Project	• Carries forward into Level 3 as ST3 Representative Project	• Concern about poor transit reliability with a movable bridge • Concern with route on 15th Avenue W due to traffic and business effects	--
Armory Way/Tunnel/14th	• Fewer environmental and maritime business/navigation effects; no permanent in-water impacts with tunnel under Salmon Bay • Affects fewer parcels in Ballard because of wider available right-of-way along 14th Avenue NW • Approximately $300 million more than ST3 Representative Project; tunnel costs not included in ST3 financial plan or evaluation methodology and requires funding partnerships	• General support for more cost-effective tunnel crossing • Support for Ballard Station with fewer property effects • Explore Ballard Station access at 15th Avenue NW, closer to center of urban village	• Ballard Station access at 15th Avenue NW, closer to center of urban village
Central Interbay/Fixed Bridge/14th	• Maritime business effects, but less than with movable bridge • Affects fewer parcels in Ballard because of wider available right-of-way along 14th Avenue NW • Costs approximately $100 million more than ST3 Representative Project	• Some support for fixed bridge and Ballard Station, with fewer property effects	--

Table 5-2 Summary of Level 2 Alternatives Not Carried Forward into Level 3

Segment / Level 2 Alternative	Key Findings	SAG and ELG Screening Reasoning
West Seattle/Duwamish Segment		
Pigeon Ridge/West Seattle Tunnel	• Most engineering constraints and effects on Duwamish Greenbelt • Low guideway along SW Genesee Street • Fewer residential and business effects in Delridge • Costs approximately $1,200 million more than ST3 Representative Project; tunnel costs not included in ST3 financial plan or evaluation methodology and requires funding partnerships • Increases schedule risk compared to ST3 Representative Project	• SAG recommended this alternative be carried forward because of fewer residential and business impacts in Delridge area and lower guideway on SW Genesee Street • ELG recommended this alternative not be carried forward due to high cost and engineering constraints
Oregon Street/Alaska Junction/Elevated	• Increases residential and business effects at Alaska Junction • Complicates a future extension to the south • High guideway along SW Genesee Street • Cost would be similar to ST3 Representative Project	• Property effects of an elevated guideway along California Avenue SW
Oregon Street/Alaska Junction/Tunnel	• High guideway along SW Genesee Street • Fewer engineering constraints • Affects freight and port terminal facilities during construction • Costs approximately $500 million more than ST3 Representative Project; tunnel costs not included in ST3 financial plan or evaluation methodology and requires funding partnerships • Increases schedule risk compared to ST3 Representative Project	• Concern about Alaska Junction Station location at 44th Avenue SW and higher guideway along SW Genesee Street
SODO and Chinatown/International District Segment		
Occidental Avenue	• New elevated SODO Station on Occidental Avenue at Lander Street and transfer at existing Stadium Station • Long span bridges over BNSF tracks and longer track connection to maintenance facility • Bus operations on E3 busway partially displaced • Property effects along Occidental, BNSF crossings and maintenance facility connection • Costs approximately $200 million more than ST3 Representative Project	• SAG recommended this alternative be carried forward due to support for locating a station further west in SODO area • ELG recommended this alternative not be carried forward due to concerns about property effects and freight mobility that would result from a long, elevated structure over the BNSF railroad
Downtown Segment		
6th Avenue/Boren/Roy	• Avoids building tie-backs on 5th Avenue, SR 99 portal and large sewer pipes in the vicinity of SR 99 • More constrained Denny Station location on Boren Avenue • Seattle Center Station location on Roy Street is two blocks from Key Arena • Lower bus/rail integration opportunity at Seattle Center Station on Roy Street • Comparable cost to ST3 Representative Project	• Steep grade on Denny Way at Boren Avenue and limited support for South Lake Union Station at Roy Street due to access restrictions to east
Interbay/Ballard Segment		
15th/Fixed Bridge/15th	• Maritime business effects at Fishermen's Terminal • Elevated guideway along west side of 15th Avenue W affects more residences • Costs approximately $200 million more than ST3 Representative Project	• Concern about effects on Fishermen's Terminal
20th/Fixed Bridge/17th	• Long span bridge over the BNSF tracks adds complexity • Ballard terminus/crossing location at 17th Avenue NW affects more residences • Costs approximately $500 million more than ST3 Representative Project	• Overall cost and property, construction, and visual effects of the 17th Avenue NW Ballard Station location
20th/Tunnel/15th	• Long span bridge over the BNSF tracks, constrained tunnel portal location, and deeper tunnel station at 15th Avenue NW add complexity; no permanent in-water impacts with tunnel under Salmon Bay • Tunnel station along west side of 15th Avenue W affects residences • Costs approximately $700 million more than ST3 Representative Project; tunnel costs not included in ST3 financial plan or evaluation methodology and requires funding partnerships	• Concern about the high cost relative to other tunnel options and construction complexity associated with major structures
Central Interbay/Movable Bridge/14th	• Potential service interruptions due to movable bridge • Maritime business and potential vessel navigation effects • Affects fewer parcels in Ballard because of wider available right-of-way along 14th Avenue NW • Costs approximately $200 million more than ST3 Representative Project	• Concern about poor transit reliability with a movable bridge

Table 5-2 Summary of Level 2 Alternatives Not Carried Forward into Level 3

Segment / Level 2 Alternative	Key Findings	SAG and ELG Screening Reasoning
Central Interbay/Tunnel/15th	• Fewer environmental and maritime business/navigation effects; no permanent in-water impacts with tunnel under Salmon Bay • Tunnel station along the east side of 15th Avenue W affects businesses • Costs approximately $500 million more than ST3 Representative Project; tunnel costs not included in ST3 financial plan or evaluation methodology and requires funding partnerships	• SAG recommended this alternative be carried forward because of desire to locate the Ballard Station at 15th Avenue NW • ELG recommended this alternative not be carried forward due to concerns about the high cost relative to other tunnel options and business effects associated with Ballard Station

6 NEXT STEPS

The Level 3 Screening is the next step of the Alternatives Development process for the WSBLE Project, as shown on **Figure 6-1** (Next Steps in Alternatives Development Phase). A more refined definition of alternatives and evaluation process will be used, with additional engineering, travel forecasting and other information. At this stage, the segment-level alternatives will be pieced together from end-to-end, providing corridorwide alternatives from West Seattle to Ballard. Eventually, a Preferred Alternative will be identified by the Sound Transit Board for advancement into the environmental review phase, along with other alternatives to evaluate in an EIS.

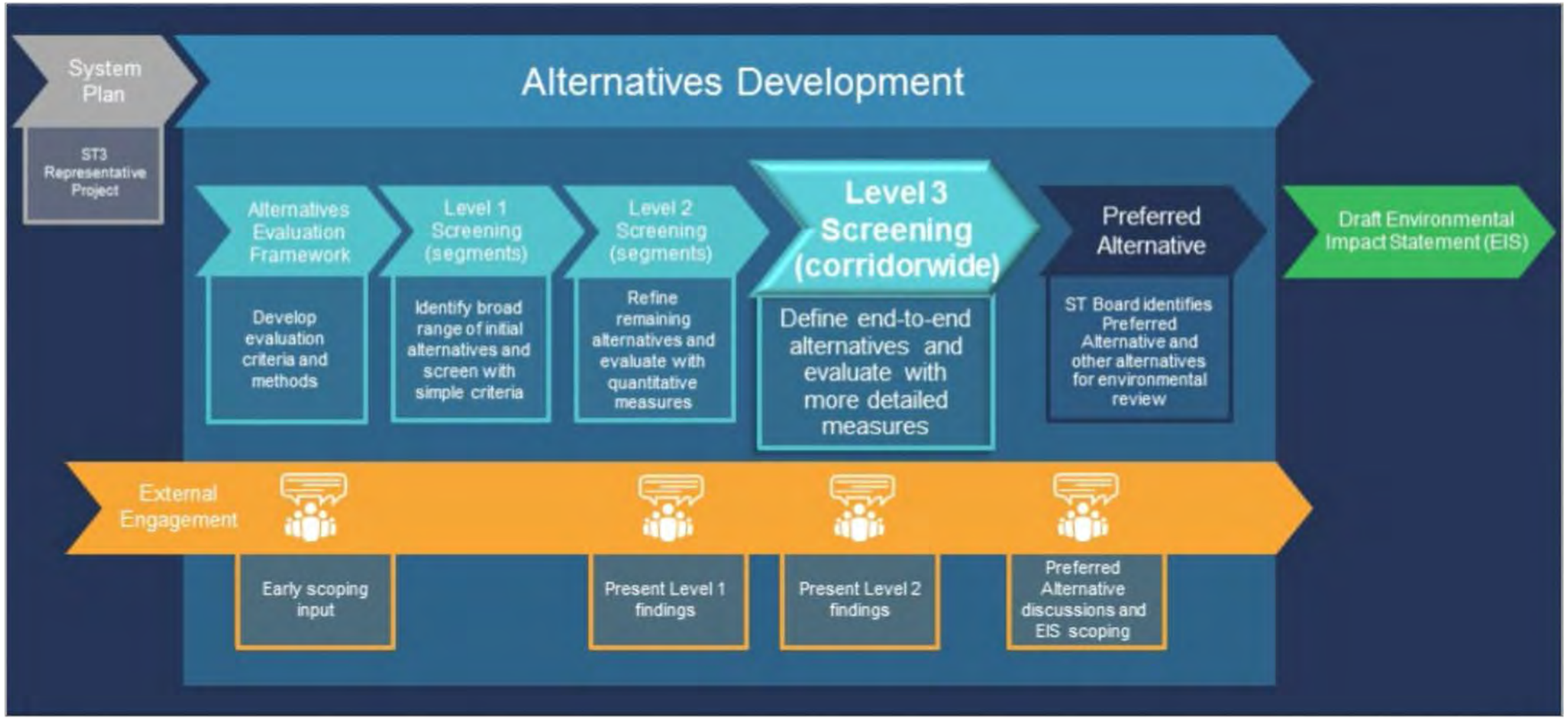


Figure 6-1 Next Steps in Alternatives Development Phase

7 REFERENCES

7.1 GIS Data References

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