

# I-405 Bus Rapid Transit

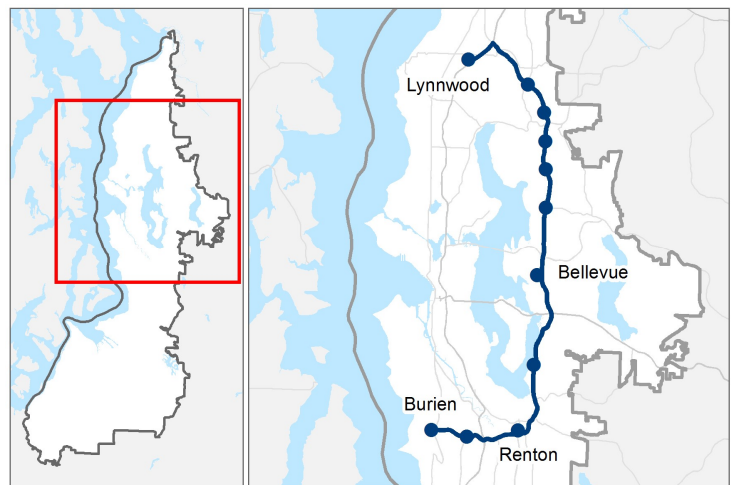
Subarea	East King
Primary Mode	BRT
Facility Type	Corridor
Length	38 miles
Date Last Modified	July 1, 2016

## SHORT PROJECT DESCRIPTION

This project would establish Bus Rapid Transit (BRT) that would operate primarily in the I-405 express toll system between Lynnwood and Renton and in I-405 high-occupancy vehicle (HOV) lanes between Renton and Tukwila. From Tukwila to Burien, BRT would operate in bus-only lanes on SR 518. Improvements include parking, stations, station access improvements, direct access ramps to facilitate the movement of buses, bus-only lanes on SR 518, and bus-only lanes on NE 85th Street in Kirkland from 6th Street to I-405 for other transit service.

*Note: The elements included in this representative project will be refined during future phases of project development and are subject to change.*

## PROJECT AREA AND REPRESENTATIVE ALIGNMENT



## KEY ATTRIBUTES

<b>REGIONAL LIGHT RAIL SPINE</b> <i>Does this project help complete the light rail spine?</i>	No
<b>CAPITAL COST</b> <i>Cost in Millions of 2014 \$</i>	\$812 — \$869
<b>RIDERSHIP</b> <i>2040 daily project riders</i>	15,000 — 18,000
<b>PROJECT ELEMENTS</b>	<ul style="list-style-type: none"> <li>• BRT station pair at the existing Lynnwood Transit Center: minor improvements including signage</li> <li>• BRT station pair at the Canyon Park Park-and-Ride using existing outside flyer stops on SR 527 ramps: improvements include signage, lighting, shelters and benches, off-board fare payment, and real-time bus arrival</li> <li>• BRT station pair in the vicinity of UW Bothell campus/NE 195th Street using outside flyer stops on NE 195th Street ramps: improvements include signage, lighting, shelters and benches, off-board fare payment, and real-time bus arrival</li> <li>• BRT station pair at the existing Brickyard Park-and-Ride using outside flyer stops on NE 160th Street ramps: improvements include signage, lighting, shelters and benches, off-board fare payment, and real-time bus arrival</li> <li>• BRT station pair at Totem Lake using existing in-line station stops on NE 128th Street direct access ramps: minor improvements including signage</li> <li>• 600-stall parking garage constructed at Kingsgate Park-and-Ride (removal of 200 surface stalls, 400 net new stalls)</li> <li>• BRT inline station at NE 85th Street in Kirkland with pedestrian access to bus stops along both directions of NE 85th Street</li> <li>• Two-way, outside bus-only lanes on NE 85th Street in Kirkland between 6th Street and I-405 for other transit service</li> <li>• BRT station pair at the Bellevue Transit Center: minor improvements including signage</li> <li>• BRT in-line station pair and direct access ramps at NE 44th Street in Renton</li> </ul>

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## KEY ATTRIBUTES

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<b>PROJECT ELEMENTS</b>	<ul style="list-style-type: none"> <li>• New 200-stall surface parking lot at NE 44<sup>th</sup> Street Station in Renton on west side of I-405</li> <li>• BRT station pair at South Renton with transit center/bus layover</li> <li>• New 700-stall garage constructed at South Renton</li> <li>• BRT station pair at the Tukwila International Boulevard Link Station: minor improvements including signage</li> <li>• BRT station pair at Burien Transit Center: minor improvements including signage</li> <li>• Bus-only lanes and transit signal priority on S. 154<sup>th</sup> Street from the Tukwila International Boulevard Station to the SR 518 on and off-ramps, on SR 518 from S. 154<sup>th</sup> Street to terminus of SR 518 at SR 509, and on SW 148<sup>th</sup> Street from SR 509 to the Burien Transit Center.</li> <li>• BRT vehicle fleet purchase of 34 coaches (3-door articulated coaches with ST BRT livery)</li> <li>• Peak headways: 10 minutes</li> <li>• 1 percent for art per Sound Transit policy</li> <li>• Non-motorized access facilities (bicycle/pedestrian) and transit-oriented development (TOD)/planning due diligence (see separate document titled “Common Project Elements”)</li> </ul>
<b>NOT INCLUDED</b>	<ul style="list-style-type: none"> <li>• Direct access ramps or HOV-to-HOV direct connector ramps, except at NE 44<sup>th</sup> Street</li> <li>• Enhanced aesthetic surface treatments on the retaining walls</li> <li>• Bus service on NE 85<sup>th</sup> Street</li> <li>• Temporary parking costs for Kingsgate Park-and-Ride stalls displaced by construction</li> <li>• Operations beyond the I-405 and SR 518 BRT corridor</li> <li>• Operations and maintenance facility not included</li> <li>• Sustainability measures and bus/rail integration facilities not included for BRT projects on WSDOT right-of-way</li> <li>• See separate documents titled “Common Project Elements” and “Bus Operations and Maintenance Facility”</li> </ul>
<b>ISSUES &amp; RISKS</b>	<ul style="list-style-type: none"> <li>• Relies on WSDOT to maintain adequate speed and reliability of I-405 express toll lane system</li> <li>• At the NE 85<sup>th</sup> Street inline station the posted speeds and curve radii of the interchange “loop” ramps would need to be reduced to avoid major interchange ramp reconstruction and right-of-way impacts; the reconstruction of the I-405 bridges over NE 85<sup>th</sup> Street would create construction staging challenges to maintain the movement of high volumes of traffic through this interchange</li> <li>• Construction of the bus-only lanes in the NE 85<sup>th</sup> Street corridor would require embankment widening and retaining walls on NE 85<sup>th</sup> Street, including substantial lengths between 114<sup>th</sup> Avenue NE and 6<sup>th</sup> Street, and widening of the NE 85<sup>th</sup> Street bridge over the Cross Kirkland Corridor.</li> <li>• Risk associated with construction of direct access ramps at NE 44<sup>th</sup> Street</li> <li>• Widening of three bridges that cross over major highways (SR 518, SR 509, and Des Moines Memorial Drive)</li> <li>• Construction of new retaining walls along SR 518</li> <li>• Remediation may be required for poor soil conditions and hazardous materials</li> <li>• Sound Transit will coordinate with WSDOT regarding implementation of the I-405 Master Plan, including additional capital projects to improve bus speed and reliability for high-capacity transit service, should funding become available.</li> </ul>

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Sound Transit developed a conceptual scope of work for this project for the purpose of generating a representative range of costs, both capital and operating; and benefits, including ridership forecasts, TOD potential, multi-modal access and others. This information was developed to assist the Sound Transit Board as it developed the ST3 system plan, including phasing of investments and financial plan, for voter consideration. Final decisions on project elements (e.g., alignment, profile, station locations, and number of parking stalls) will be determined after completion of system planning, project level environmental review, and preliminary engineering during which additional opportunities for public participation will be provided. Therefore, this scope definition should not be construed as a commitment that all representative features will be included in the final developed project.

## Long Description:

This project would establish BRT that would operate primarily in the I-405 express toll system for approximately 30 miles between Lynnwood and Renton via I-405, in the HOV lanes for most of the 4 miles from Renton to Tukwila via I-405, and in new bus-only lanes on SR 518 for approximately 3 miles (37 total miles). Improvements include parking, stations, station access improvements and bus-only lanes. A 600-stall parking garage would be constructed at Kingsgate Park-and-Ride, 200 surface stalls would be constructed at NE 44<sup>th</sup> Street, and a 700-stall parking garage would be constructed at the South Renton Transit Center. The NE 85<sup>th</sup> Street BRT inline freeway station would include elevators to bus stops on NE 85<sup>th</sup> Street. Bus-only lanes would be constructed in Kirkland on NE 85<sup>th</sup> Street between 6<sup>th</sup> Street and I-405 for other transit service. Direct access ramps with BRT station stops would be constructed at NE 44<sup>th</sup> Street. Bus-only lanes would be constructed between the Tukwila International Boulevard Link Station and the Burien Transit Center on S. 154<sup>th</sup> Street, SR 518, and SW 148<sup>th</sup> Street. BRT would serve the Lynnwood Transit Center, Canyon Park, UW Bothell/NE 195<sup>th</sup> Street, Brickyard, Totem Lake, NE 85<sup>th</sup> Street, Bellevue Transit Center, NE 44<sup>th</sup> Street, South Renton Transit Center, Tukwila International Boulevard Link Station, and the Burien Transit Center.

## Assumptions:

- BRT would operate in general purpose lanes on I-5 (between the Lynnwood Transit Center and I-405)
- BRT would operate in general purpose lanes on I-405 between I-5 and Brickyard (using shoulder bus lanes in southbound direction in two segments)
- Leaving Brickyard, BRT would transition from general purpose lanes to I-405 express toll lanes, continuing to Totem Lake freeway station
- BRT would operate in I-405 express toll lanes between Totem Lake and South Renton, accessing the Bellevue Transit Center from the NE 6<sup>th</sup> Street HOV direct access ramp and serving NE 44<sup>th</sup> Street from in-line station stops on the direct access ramps
- To access the South Renton transit center, buses would weave out of the express toll lanes and use the general purpose off-ramp to Rainier Avenue
- From the South Renton transit center, southbound BRT buses would enter I-405 on the Rainier Avenue general purpose on-ramp and weave over to the inside HOV lanes towards I-5. Close to I-5, buses would weave over to general purpose lanes continuing to SR 518 and the Tukwila International Boulevard Link Station. Northbound BRT buses would follow this routing in the reverse direction.
- The Tukwila International Boulevard station to the Burien Transit Center section would include new bus-only lanes on SR 518
- For the UW Bothell/NE 195<sup>th</sup> Street station, pedestrian improvements are included for access to the BRT stations along the NE 195<sup>th</sup> corridor; in addition, the design estimate includes station/system access allowance costs for additional access improvements, possibly connecting to the existing North Creek trail
- Construction of a parking garage at Kingsgate will displace parking; costs for temporary parking replacement have not been included in the cost estimate for this project
- At the Brickyard Park-and-Ride, the new northbound flyer stop will be served by a braided ramp that connects directly to I-405 and SR 522; this braided ramp is currently under construction; buses using the northbound flyer station stop and continuing north on I-405 will need to weave across general purpose traffic
- New or upgraded traffic signals would be provided along NE 85<sup>th</sup> Street for the bus-only lanes
- Multiple retaining walls along the north and south sides of NE 85<sup>th</sup> Street in Kirkland to accommodate bus-only lanes
- Widening of the NE 85<sup>th</sup> Street bridge over the Cross Kirkland Corridor to accommodate bus-only lanes
- At NE 44<sup>th</sup> Street, Sound Transit is funding the new direct access ramps and in-line station stops, minor rebuilding of the I-405 southbound off- and on-ramps, rebuilding of I-405 northbound on- and off-ramps, relocation of the NE 44<sup>th</sup> Street intersection with I-405 northbound on- and off-ramps, realignment of Lake Washington Boulevard SE, realignment of SE 76<sup>th</sup> Street, and the new parking lot and driveway as these improvements are not part of WSDOT's current funded program
- At NE 44<sup>th</sup> Street, the representative design assumes that the NE 44<sup>th</sup> Street bridge over I-405 will be rebuilt by WSDOT to accommodate dual express toll lanes in each direction; Sound Transit is funding widening of the NE 44<sup>th</sup> Street bridge on the north side to the width specified in the WSDOT I-405 Master Plan
- At NE 44<sup>th</sup> Street, the representative design assumes that Sound Transit will rebuild the I-405 northbound on- and off-ramps at the location specified by the WSDOT I-405 Master Plan, but the I-405 northbound on-ramp is being realigned due to a change in the WSDOT I-405 Master Plan (direct access ramp location)

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- At NE 44th Street, the representative design assumes that Sound Transit will realign approximately 0.3 mile of Lake Washington Boulevard SE and realign approximately 0.1 miles of SE 76th Street to the location specified in the WSDOT I-405 Master Plan and tie it into the WSDOT I-405 dual-express toll lane plan.
- Sound Transit will coordinate with WSDOT regarding implementation of the I-405 Master Plan, including additional capital projects to improve bus speed and reliability for high-capacity transit service, should funding become available.
- Multiple bridge widenings and retaining walls for the BRT-only lanes along S. 154th Street, SR 518, and SW 148th Street.
- For non-motorized station access allowances, the Lynnwood Transit Center and Bellevue Transit Center stations are categorized as urban stations and intermodal transit centers, and the Canyon Park, UW Bothell/NE 195th Street, Brickyard, Totem Lake, NE 85th Street, NE 44th Street and South Renton stations are characterized as suburban stations. The Tukwila International Boulevard station is categorized as a suburban station and an intermodal transit center. The Burien Transit Center station is categorized as an urban station.

## Environmental:

Sound Transit will complete project-level state and federal environmental reviews as necessary; provide mitigation for significant impacts; obtain and meet the conditions of all required permits and approvals; and strive to exceed compliance and continually improve its environmental performance.

## Utilities:

Utility relocation as needed to complete the project, including fiber optics, sewer, water, overhead electric/communications, etc.

## Right-of-Way and Property Acquisition:

- Right-of-way acquisition and easements as needed to complete the project
- For the NE 85th Street inline station, property acquisition will be needed along both on-ramps to I-405 for the widening of the mainline required by the inline station in the I-405 median
- For the bus-only lanes in the NE 85th Street corridor in Kirkland, property acquisition will be needed along both sides of NE 85th Street between 120th Avenue NE and 6th Street.
- The new and improved flyer stops at Canyon Park, UW Bothell/NE 195th Street, and Brickyard, and the new Kingsgate parking garage will be constructed on WSDOT-owned property
- Right-of-way acquisition for parking lot and realigned Lake Washington Boulevard NE, I-405 southbound on-ramp, and I-405 northbound on- and off-ramps at NE 44th Street in Renton will be coordinated with WSDOT
- Right-of-way acquisition for parking garage and bus layover/circulation at South Renton as needed

## Potential Permits/Approvals Needed:

- FHWA approval for modifications to interchanges and ramps
- WSDOT and FHWA approvals for use of and/or crossings of I-5, I-405, SR 518 and SR 509 rights-of-way
- FHWA approval for new direct access ramps and in-line station stops at NE 44th Street
- Agreements with WSDOT and King County Metro for use of park-and-rides, outside flyer stops, and in-line stations
- Building permits: Electrical, Mechanical, Plumbing
- Utility connection permits
- Construction-related permits (clearing and grading, stormwater management, street use, haul routes, use of city right-of-way)
- Land use approvals (Conditional use, design review, site plans, Comprehensive Plan or development code consistency, Special Use Permits)
- All required local, state, and federal environmental permits
- NEPA/SEPA and related regulations

## Project Dependencies:

- WSDOT I-405 Master Plan widening projects
- New operations and maintenance facility to serve BRT buses

## Potential Project Partners:

- WSDOT
- Cities of Lynnwood, Bothell, Kirkland, Bellevue, Renton, Tukwila, SeaTac, and Burien
- UW Bothell, Cascadia College
- Transit partners serving project: Community Transit & King County Metro
- King County, Snohomish County
- FHWA, FTA

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## Cost:

Sound Transit developed a conceptual scope of work for this project for the purpose of generating a representative range of costs, both capital and operating; and benefits, including ridership forecasts, TOD potential, multi-modal access and others. This information was developed to assist the Sound Transit Board as it developed the ST3 system plan, including phasing of investments and financial plan, for voter consideration. Final decisions on project elements (e.g., alignment, profile, station locations, and number of parking stalls) will be determined after completion of system planning, project level environmental review, and preliminary engineering during which additional opportunities for public participation will be provided. Therefore, this scope definition should not be construed as a commitment that all representative features will be included in the final developed project.

In Millions of 2014\$

ITEM	COST	COST WITH RESERVE
Agency Administration	\$43.27	\$46.30
Preliminary Engineering & Environmental Review	\$24.59	\$26.31
Final Design & Specifications	\$47.30	\$50.62
Property Acquisition	\$55.41	\$59.28
Construction	\$482.51	\$516.28
Construction Management	\$42.57	\$45.55
Third Parties	\$10.86	\$11.62
Vehicles	\$57.97	\$62.03
Contingency	\$47.30	\$50.62
<b>Total</b>	<b>\$811.78</b>	<b>\$868.61</b>

Design Basis:













Conceptual

The costs expressed above include allowances for TOD planning and due diligence, Sustainability, Bus/rail integration facilities, and Non-Motorized Access. These allowances, as well as the costs for Parking Access included above, are reflected in the following table. Property acquisition costs are not included in the table below, but are included within the total project cost above. For cost allowances that are not applicable for this project, "N/A" is indicated.

ITEM	COST	COST WITH RESERVE
TOD planning and due diligence	\$2.33	\$2.50
Sustainability	N/A	N/A
Parking access	\$70.06	\$74.97
Non-motorized (bicycle/pedestrian) access	\$7.91	\$8.46
Bus/rail integration facilities	N/A	N/A

# I-405 Bus Rapid Transit

## Evaluation Measures:

MEASURE	MEASUREMENT/RATING	NOTES
 <b>Regional Light Rail Spine</b> <i>Does project help complete regional light rail spine?</i>	No	
 <b>Ridership</b> <i>2040 daily project riders</i>	15,000 — 18,000	The I-405 BRT project definition includes separate operating lines north and south connecting in downtown Bellevue and does not double count the transfers between the two lines at Bellevue.
 <b>Capital Cost</b> <i>Cost in Millions of 2014 \$</i>	\$812 — \$869	
 <b>Annual O&amp;M Cost</b> <i>Cost in Millions of 2014 \$</i>	\$26	
 <b>Travel Time</b> <i>In-vehicle travel time along the project (segment)</i>	87 min	Travel time between Lynnwood TC and Burien TC
 <b>Reliability</b> <i>Quantitative/qualitative assessment of alignment/route in exclusive right-of-way</i>	Medium	Operates in express toll lanes, HOV lanes, bus-only lanes and general purpose lanes Relies on WSDOT to manage the express toll lanes to provide speed and reliability
 <b>System Integration</b> <i>Qualitative assessment of issues and effects related to connections to existing local bus service and potential future integration opportunities</i>	Medium	Low to medium-high number of existing daily transit connections and future integration opportunities with light rail service
 <b>Ease of Non-motorized Access</b> <i>Qualitative assessment of issues and effects related to non-motorized modes</i>	Medium-Low	Low to medium intersection densities with freeways and large parcels as barriers to nonmotorized access at some stations
 <b>Percent of Non-motorized Mode of Access</b> <i>Percent of daily boardings</i>	20-85%	
 <b>Connections to PSRC-designated Regional Centers</b> <i>Number of PSRC-designated regional growth and manufacturing/industrial centers served</i>	7 centers	Lynnwood, Bothell Canyon Park, Kirkland Totem Lake, Bellevue Downtown, Renton, SeaTac, Burien
 <b>Land Use and Development/TOD Potential</b> <i>Quantitative/qualitative assessment of adopted Plans &amp; Policies and zoning compatible with transit-supportive development within 0.5 mile of potential stations</i>  <i>Qualitative assessment of real estate market support for development within 1 mile of potential corridor</i>  <i>Density of activity units (population and employment for 2014 and 2040) within 0.5 mile of potential station areas</i>	Medium  Medium  Pop/acre = 2014: 7; 2040: 12 Emp/acre: 2014: 12; 2040: 21 Pop+Emp/acre: 2014: 19; 2040: 33	Moderate support in local and regional plans; approx. 45% land is compatibly zoned  Moderate market support
 <b>Socioeconomic Benefits</b> <i>Existing minority / low-income populations within 0.5 mile of potential station areas</i>  <i>2014 and 2040 population within 0.5 mile of potential station areas</i>  <i>2014 and 2040 employment within 0.5 mile of potential station areas</i>	39% Minority; 12% Low-Income  Pop: 2014: 37,400; 2040: 65,800  Emp: 2014: 66,300; 2040: 111,000	

For additional information on evaluation measures, see <http://soundtransit3.org/document-library>