

## Link LRT: Maintenance Bases, Vehicles and Operations for ST2 Expansion

Project Number	SYS-LRT
Subareas	All
Primary Mode Impacted	Link
Facility Type	Link Service
Version Number	4.0
Date Last Modified	7/24/2008

*Project Locator Map*



### Short Project Description

Construct new light rail maintenance and operations facility capacity to accommodate light rail vehicle fleet. Purchase vehicles for light rail operations. Operate and maintain expanded light rail service between Lynnwood Transit Center, Overlake Transit Center, and S 272nd Street.

**Project Purpose:** Provide systemwide elements to support expansion of Link light rail service.

### Cost

*in Millions of 2007 \$*

<b>Forest Street Facility</b>	<b>Low</b>	<b>High</b>
Agency Admin	\$1.0	\$1.2
Environmental Clearance and PE	\$0.0	\$0.0
Final Design, Specs, Permitting	\$0.4	\$0.5
ROW Acquisition	\$0.0	\$0.0
Construction	\$5.0	\$5.8
Contingency	\$2.2	\$2.5
<b>Total</b>	<b>\$8.7</b>	<b>\$10.0</b>

<b>End-of-the-Line Terminals</b>	<b>Low</b>	<b>High</b>
Agency Admin	\$1.1	\$1.3
Environmental Clearance and PE	\$0.8	\$0.9
Final Design, Specs, Permitting	\$1.9	\$2.2
ROW Acquisition	\$0.0	\$0.0
Construction	\$16.4	\$18.8
Contingency	\$1.5	\$1.7
<b>Total</b>	<b>\$21.7</b>	<b>\$24.9</b>

<b>South Base</b>	<b>Low</b>	<b>High</b>
Agency Admin	\$9.9	\$11.3
Environmental Clearance and PE	\$4.9	\$5.6
Final Design, Specs, Permitting	\$12.2	\$14.1
ROW Acquisition	\$40.8	\$46.9
Construction	\$106.3	\$122.3
Contingency	\$9.8	\$11.3
<b>Total</b>	<b>\$184.0</b>	<b>\$211.6</b>

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Total	Low	High
Agency Admin	\$12.0	\$13.8
Environmental Clearance and PE	\$5.7	\$6.5
Final Design, Specs, Permitting	\$14.6	\$16.8
ROW Acquisition	\$40.8	\$46.9
Construction	\$127.8	\$146.9
Contingency	\$13.5	\$15.5
<b>O&amp;M Facilities</b>	<b>\$214.4</b>	<b>\$246.5</b>
Vehicles for LRT System	\$506.7	
<b>Total Light Rail Systems Capital Costs</b>	<b>\$721.0</b>	<b>\$753.1</b>

<b>Annual Added O&amp;M*</b>	<b>\$78.4</b>	* Includes maintenance facility operations
<i>Design Basis</i>	Conceptual	

### Environmental Documentation Required

- Environmental Impact Statement Required
- Environmental Assessment Required
- Environmental Checklist Required

### Relationships to Other Projects

Relationship	Project
Dependent on	Link LRT extensions and all associated projects that they are dependent on or impacted by

### Project Partners

Agency	
King County jurisdictions	Bellevue, Redmond, SeaTac, Des Moines, Kent, Federal Way, Seattle, Shoreline and/or King County
Snohomish County jurisdictions	Mountlake Terrace, Lynnwood and/or Snohomish County
WSDOT	
KC Metro	

### Long Description

*This capital project scope, and the companion capital cost estimate, are intended to include the entire project development cycle (agency and project administration, environmental clearance, design, all aspects of property acquisition, permits, agreements, construction, testing, commissioning and contingencies) from project initiation through the start-up of the revenue operations.*

#### Description:

This project includes three systemwide components to support Link LRT system expansion:

- Purchase light rail vehicles (LRV) for service expansion.
- Ongoing operations and maintenance of expanded light rail service.
- Operations & maintenance facility capacity to support the future light rail vehicle fleet.

Vehicles: Purchase up to 106 new 90-foot low-floor light rail vehicles (includes spares) to support expanded service to Lynnwood Transit Center, Overlake Transit Center and S. 272nd Street (Redondo/Star Lake). Combined with the 74 vehicles being purchased under Sound Move, the light rail fleet will total up to 180 vehicles by 2030.

Operations: This project includes annual operating funds to operate and maintain all light rail system extensions to be built under the ST2 program. The operating plan supporting the light rail system in service between Lynnwood Transit Center, Overlake Transit Center and S 272nd Street at the completion of ST2 is anticipated to be as follows:

Line 1a – Lynnwood Transit Center to S 272nd Street: 4-car trains running every 7 minutes peak

Line 1b – Northgate Transit Center to S 272nd Street: 4-car trains running every 10 minutes off-peak

Line 2 – Lynnwood Transit Center to Overlake Transit Center: 3-car trains running every 7 minutes peak, 10 minutes off-peak

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### **Description (continued):**

#### End-of-the-Line Terminal Facilities

It is presumed that some vehicles will be stored overnight at the ends of the lines to provide operational flexibility and minimize the need for additional O&M facilities. Light rail vehicles will be stored at the terminal stations or on tail tracks adjacent to the stations at Lynnwood Transit Center, Overlake Transit Center, and S. 272nd Street. Up to 22 vehicles will be stored at these facilities. The costs of stations and tail track facilities are included in the light rail extension segment cost estimates. This project includes funds for terminal facilities such as, but not limited to, operator report/break space, security fencing to restrict access to parked LRT vehicles, and operator parking at the stations.

#### Operations & Maintenance Facilities

The Forest Street LRT O&M facility will provide light rail vehicle maintenance and storage capacity for up to 108 vehicles. Forest Street base expansion to accommodate and service the first 80 LRVs is already programmed in *Sound Move*. ST2 project N6 to extend the Central Link system from the University of Washington to Northgate includes budget to complete the deferred maintenance-of-way (MOW) building. This ST2 project (SYS-LRT) will fund four additional storage tracks and associated electrical system expansion to build out Forest Street to its 108-vehicle design capacity.

Link LRT system expansion beyond 108 vehicles requires new maintenance base capacity, which will be provided at a new O&M facility to be built along the south corridor between SeaTac and S 272nd Street. That facility will be sized to store, operate and maintain at least 50 vehicles and, when combined with the Forest Street O&M facility and end-of-the-line terminal facilities, will provide sufficient capacity to operate and maintain the entire LRT fleet of 180 cars through at least 2030. A representative site was used to develop cost estimates for the new maintenance facility. The final site would be determined through project level design and environmental review. The basic cost estimate includes design allowance contingency, construction change order contingency, and unallocated contingency.

#### Project Elements Included in New O&M Facility:

- Site centrally located within the South light rail corridor, large enough to accommodate the maximum foreseeable vehicle storage capacity necessary during ST2, and to provide room to expand storage and/or maintenance facilities during possible future phases of Sound Transit light rail expansion.
- Lead track to/from the LRT guideway
- Service and storage track and switches
- Vehicle barn
- Train washer
- Maintenance-of-way facilities
- Administration offices
- Operator reporting, dispatching and break areas
- LRV parking and storage area
- Employee/visitor parking
- Environmental mitigation
- 1 percent for art per ST policy
- Allowances for:
  - Site circulation
  - Site landscaping / setbacks
  - Stormwater detention

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### Project Elements Included in New O&M Facility (cont.):

- Equipment: based on the following types of equipment (includes "heavy" equipment) that are provided at Sound Transit's Forest Street Link Base:
  - Underfloor wheel profiling system
  - Jib cranes
  - Rail yard shuttle
  - Turntables - 60,000 lbs.
  - Turntables - 16,000 lbs.
  - Monorail cranes system
  - Compressed air equipment
  - Vehicle lifts
  - Truck lift with turntable
  - Truck repair lift
  - Bridge crane - 10 ton (for maintenance of equipment)
  - Bridge crane - 2 ton (for maintenance of way)
  - Dock lifts
  - LRV washer system
  - Sand distribution equipment
  - Industrial waste system
  - Parking control equipment
  - Spray paint booth
  - Portable rail car lifts
- Maintenance base program contingency to provide flexibility to respond to specific site constraints and unforeseen risks in locating, permitting and building these large industrial facilities.

### Utilities:

Utility investigations have not yet been carried out. Relocation of standard utilities along the alignment has been assumed as part of the scope and has been estimated using an average per route foot allowance. Standard public utilities will be provided at each base.

### Right-of-Way and Property Acquisition:

Property interests required for the prototypical alignment include fee acquisitions, partial takes, easements and interagency agreements. Right-of-way requirements include construction staging and contractor laydown areas. No specific provisions are made for contractor parking. Cost estimates include associated relocation, administration and legal costs, and contingency.

### Mitigation:

The final project scope will include all mitigation(s) committed to by ST in pertinent, future project-level environmental documents.

### Exclusions:

- Maintenance base capacity necessary to serve the light rail system between UW and SeaTac Airport.
- Maintenance of Way building (included in project N6).

### Permits Required:

- Building, electrical, mechanical, utility, construction-related, and land use permits by local jurisdictions
- BNSF permits / easements for access to the East base

### Agreements Required:

- Transitway agreements with jurisdictions in east and south King County
- Potential operating agreement with King County Metro

*ST has developed scope definitions for ST2 project proposals for the purposes of developing cost estimates, phasing of investments, a financial plan, and the estimation of project benefits. This scope definition should not be construed as a commitment that all defined features will be included in the final developed project.*

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### Evaluation Measures

<b>Measure</b>	<b>Measurement/ Rating</b>	<b>Notes</b>
Average Weekday Ridership	N/A	
Capital Cost	\$721.0 - \$753.1	in Millions of 2007 \$
Annual Added O&M Costs	\$78.4	in Millions of 2007 \$
Travel Time & Reliability	N/A	
Connectivity & Integration	N/A	
Land Use & Development	N/A	
Customer Experience	N/A	
Risk Avoidance	Low	

### Key Issues and Benefits

**Issues:**

- There is limited availability of land parcels in south King County near the light rail corridors to accommodate new LRT maintenance facilities.

**Benefits:**

- Facilities and additional fleet are necessary to support the light rail service expansion under ST2
- Additional maintenance facilities increase light rail operations efficiency and flexibility