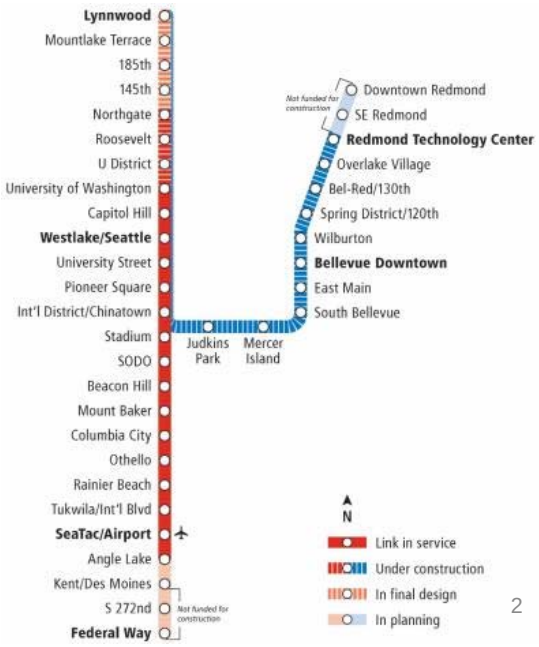
East Link Extension Project Update

Business Resource Forum
November 14, 2016

SOUNDTRANSIT
RIDE THE WAVE

Link light rail system

- 19 miles of light rail with 16 stations currently in service
- University Link and Angle Lake opened in 2016
- Northgate 2021
- Lynnwood 2023
- Kent / Des Moines 2023
- East Link 2023
- 50+ mile system



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SOUNDTRANSIT
RIDE THE WAVE

East Link overview

Length: 14 miles

Ride times:

- Mercer Island to UW: 20 min.
- S. Bellevue to Intl. District: 14 min.
- Overlake Transit Center to Bellevue Transit Center: 10 min.

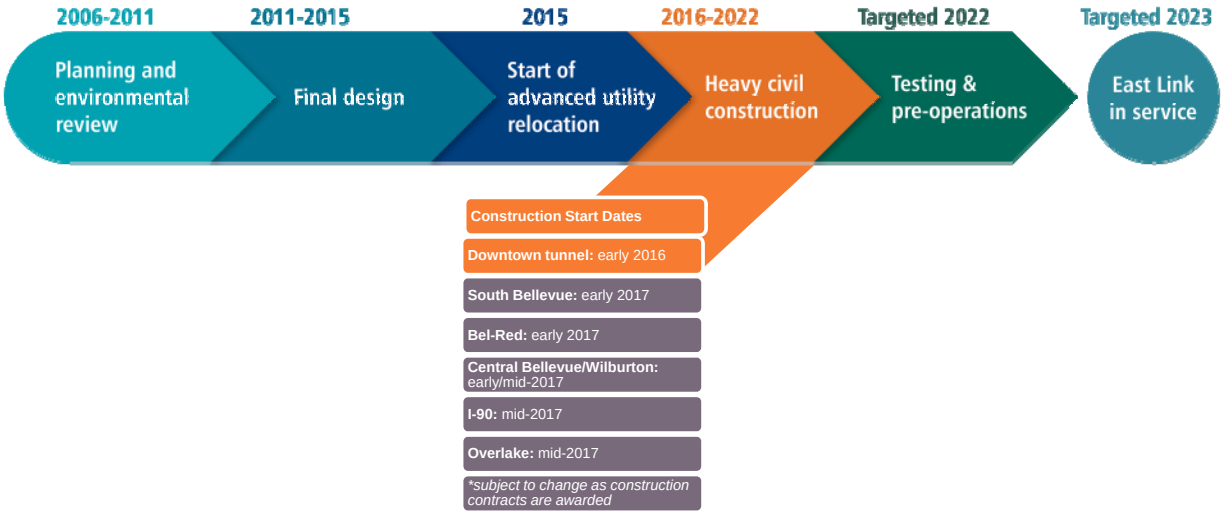
Rider projection: 50,000 daily by 2030

Budget: $3.7 billion (YOE $)

Start of Service: Targeted 2023

SOUNDTRANSIT RIDE THE WAVE

East Link timeline



SOUNDTRANSIT RIDE THE WAVE

90% DESIGN

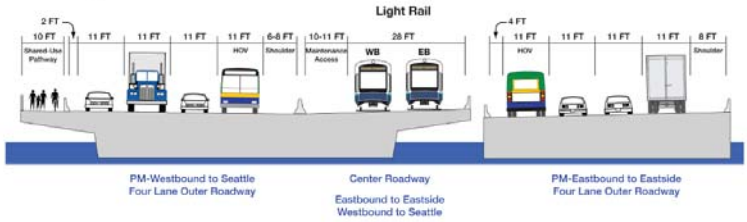
Judkins Park Station

Platform view looking west

Preparing I-90 for light rail

At completion of I-90 Two-Way Transit Project

At completion of East Link



Getting Across the Expansion Joints

Unprecedented Connections

As part of the light-rail extension program known as the East Link Extension Project, Sound Transit, which plans, builds, and operates express bus, light-rail, and commuter train services for the urban areas of King, Pierce, and Snohomish counties, proposes to install light-rail tracks on the Homer M. Hadley Memorial Bridge, the widest and fifth-longest floating bridge in the world. Owned and operated by the Washington State Department of Transportation, the floating structure currently carries westbound and reversible lanes of Interstate 90 across Lake Washington between Seattle and Mercer Island. The approximately 5,700 ft long bridge includes concrete box girder approach spans supported by deep foundations, a floating span supported by pontoons, and transition spans connecting the approach and floating spans. Since there is no precedent in civil engineering practice, the placement of light-rail across the floating bridge presents unique challenges, including the design of a novel track bridge system to accommodate multidimensional movements at the existing expansion joints at which transition spans are connected to approach and floating spans. While all of the types of movement required have been accommodated on other structures, no structure has had to accommodate all of these movements together in the magnitudes required on this bridge.

In view of the importance of the floating bridge, the design requirements to ensure passenger comfort, and the complex design of the track bridge system, a robust program was developed to evaluate concepts, prepare detailed designs, conduct physical tests, and procure a system to carry light-rail vehicles from the fixed structures to the floating structure while meeting the necessary specifications for rider comfort and structural behavior. The work to evaluate and confirm the proposed concept designs included nonlinear finite-element analysis, detailed design, component testing, and full-scale prototype testing. These steps were required to evaluate the dynamic response of both the floating bridge and the track bridge under moving train loads and typical and extreme bridge movements.

Sound Transit's plan to operate light-rail vehicles on one of the longest floating bridges in the world has no precedent. But that did not stop an intrepid team of designers from developing and testing a novel system for ensuring the safe passage of light-rail vehicles across Lake Washington on the moveable joints of the 5,700 ft long Homer M. Hadley Memorial Bridge.

By Thomas Cooper, P.E., P.Eng., M.ASCE, John Sleavin, P.E., Andy Foan, CEng, and Travis Thonstad

For this turnkey research, development, and demonstration project, Sound Transit required the services of an integrated team that would include experienced structural, civil, and track engineers, as well as fabricators and constructors. This approach provides Sound Transit with the full resources of an integrated project team in which each member is ideally suited for its task on each phase of this unique, complex, and technically challenging assignment.

Seeking an innovative contracting method to develop this unique track bridge system, Sound Transit modeled its approach on the contracts used by the National Aeronautics and Space Administration. In the first phase of the

As part of plans to install light-rail transit tracks on the Homer M. Hadley Memorial Bridge, Sound Transit hired a design team to develop a novel track bridge system to accommodate multidimensional movements at certain expansion joints on the floating structure, opposite. Full-scale prototype testing of the track bridge system included the use of actual Sound Transit light-rail vehicles to verify the performance of such elements as track bridge components, track fasteners, and rail expansion joints.

90% DESIGN

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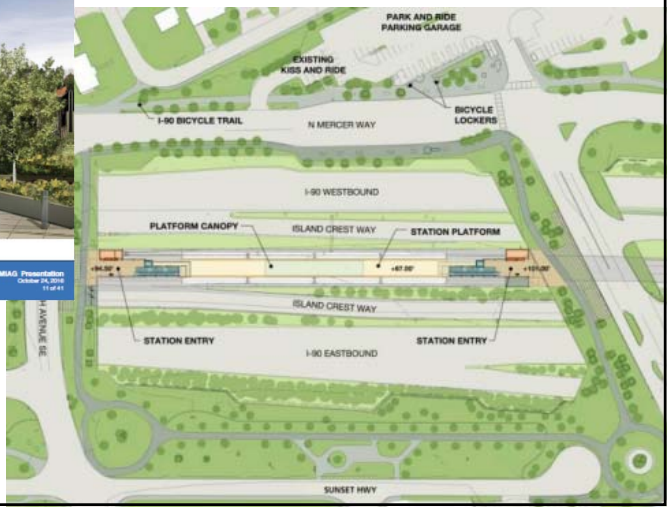
WEST HEADHOUSE - PERSPECTIVE @ 77TH AVE ENTRY

Mercer Island Station - MIAG Presentation
October 24, 2016
11 of 41



Mercer Island Station

FINAL DESIGN

SOUNDTRANSIT RIDE THE WAVE

View of station looking east

South Bellevue Station

FINAL DESIGN

SOUNDTRANSIT RIDE THE WAVE

Station plaza looking west from 112th Ave. SE

East Main Station

UNDER CONSTRUCTION

SOUNDTRANSIT RIDE THE WAVE

Downtown Tunnel

UNDER CONSTRUCTION

SOUNDTRANSIT RIDE THE WAVE

Downtown Bellevue Tunnel & SEM

What is it?

- This tunneling method removes soil slowly, in small sections using an excavator and cutting equipment. The ground is quickly supported by spraying concrete on the face of the excavation.

Why this method?

- The downtown Bellevue tunnel is approximately 2,000 feet long. The length of the tunnel, along with soil conditions and location of the Bellevue Downtown Station at the northern portal make this location suitable for SEM tunneling method.

Benefits

- Less disruption to surface streets means fewer traffic impacts
- Fewer noise and vibration impacts than cut-and-cover
- Less soil is removed from the ground, resulting in fewer dust impacts and construction traffic

FINAL DESIGN

Bellevue Transit Center

SOUNDTRANSIT RIDE THE WAVE

Aerial View From BTC

FINAL DESIGN

SOUNDTRANSIT RIDE THE WAVE

I-405 crossing

FINAL DESIGN

SOUNDTRANSIT RIDE THE WAVE

Aerial station view looking northwest

Wilburton Station

FINAL DESIGN

SOUNDTRANSIT RIDE THE WAVE

Entrance from 120th Ave. NE

Platform view looking west

Spring District/120th Station

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SOUNDTRANSIT RIDE THE WAVE

Platform view looking east

Bel-Red/130th Station

30% DESIGN

SOUNDTRANSIT RIDE THE WAVE

Station aerial view looking toward SR 520

Overlake Village Station

30% DESIGN

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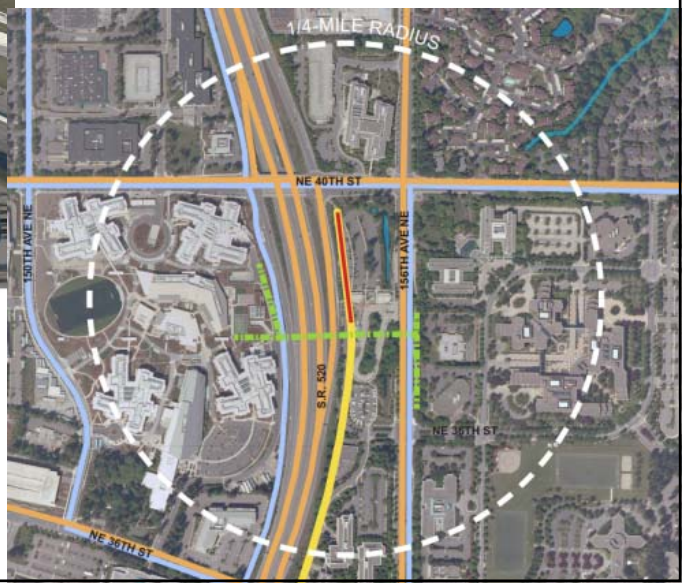
Station aerial view from north



Redmond Technology Center Station