
AACE
September 13
118A
Link
SoundTransit
SoundTransit
RIDE THE WAVE

Today's Presentation

- Overview of Sound Transit and East Link Project
- Work to date
- Challenges
- Track Bridge System

Sound Transit District

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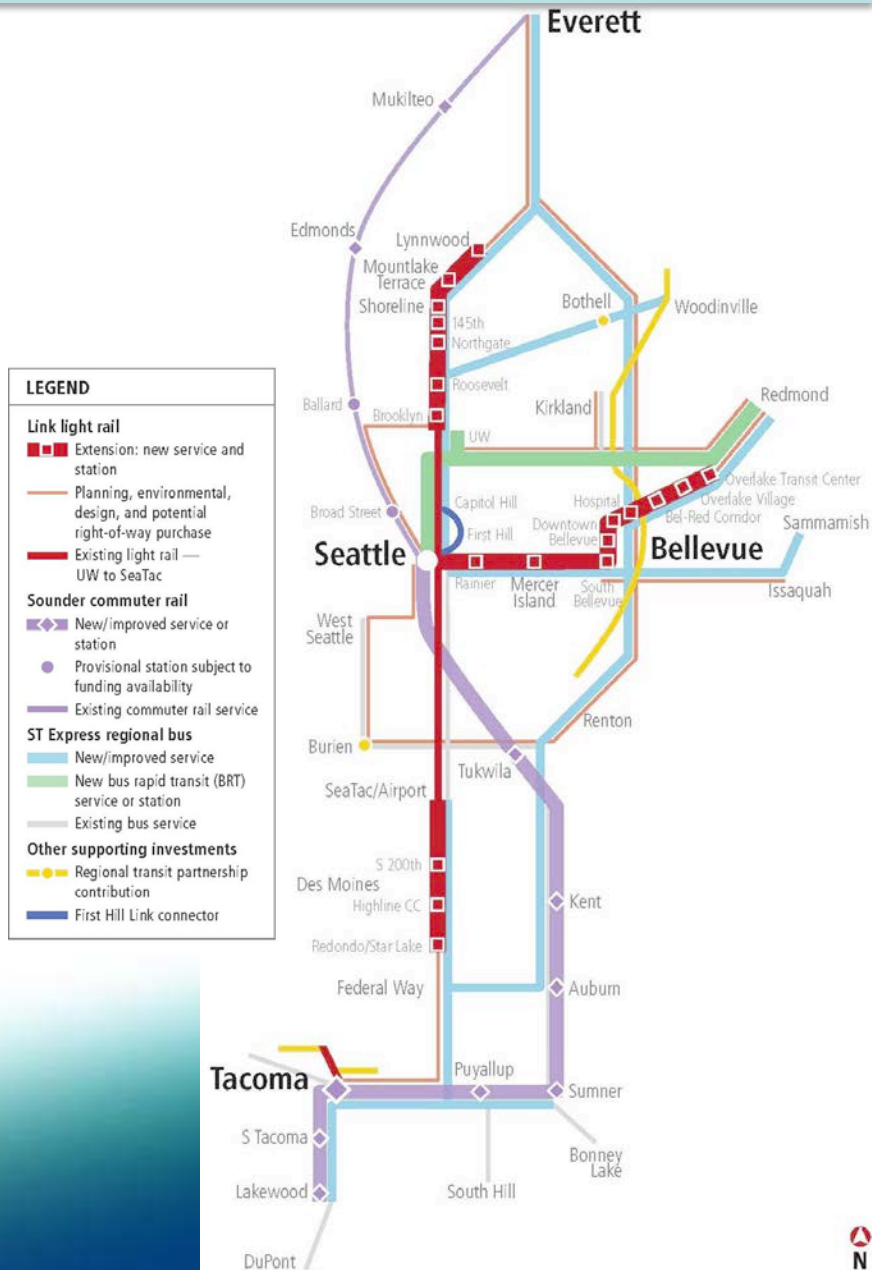
Sound Transit Program

- **Transit Investments (to date):**
  - 24 express bus projects completed
  - 75 miles of commuter rail service
  - 17.1 miles of light rail service

- **Additional Investments (2023)**
  - 17% express bus service increase
  - 8.2 miles of commuter rail service
  - 36 miles of light rail service



Extending the regional light rail system

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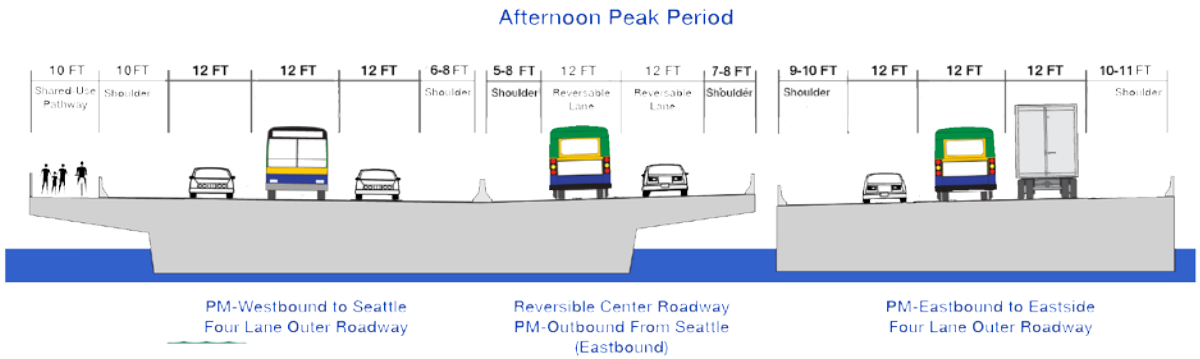
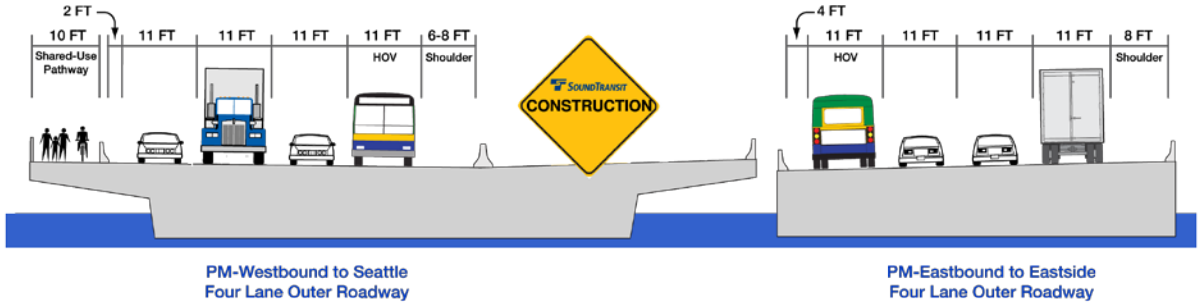
I-90 bridge lane configuration

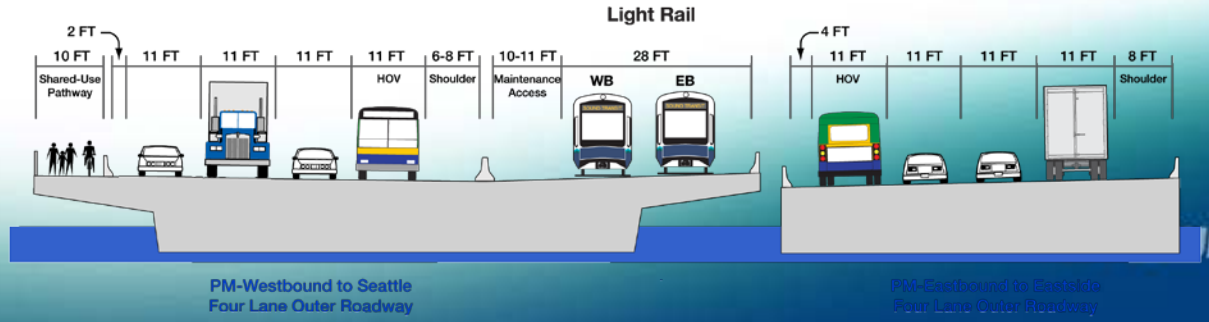
Existing I-90 floating bridge lane configuration



At completion of I-90 Two-Way Transit Project



At completion of East Link



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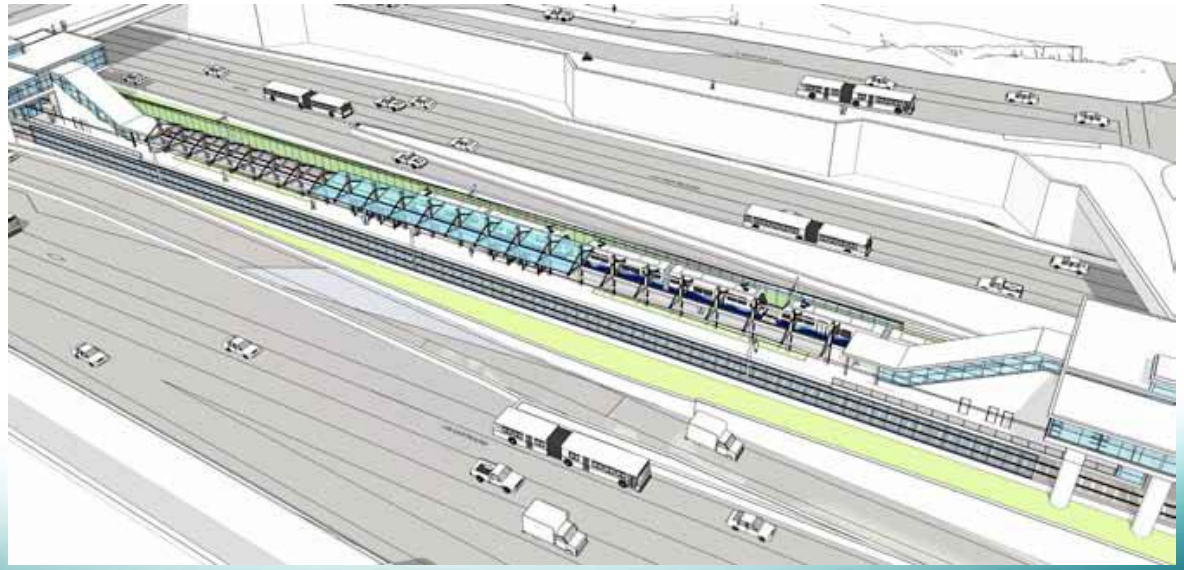
East Link Alignment

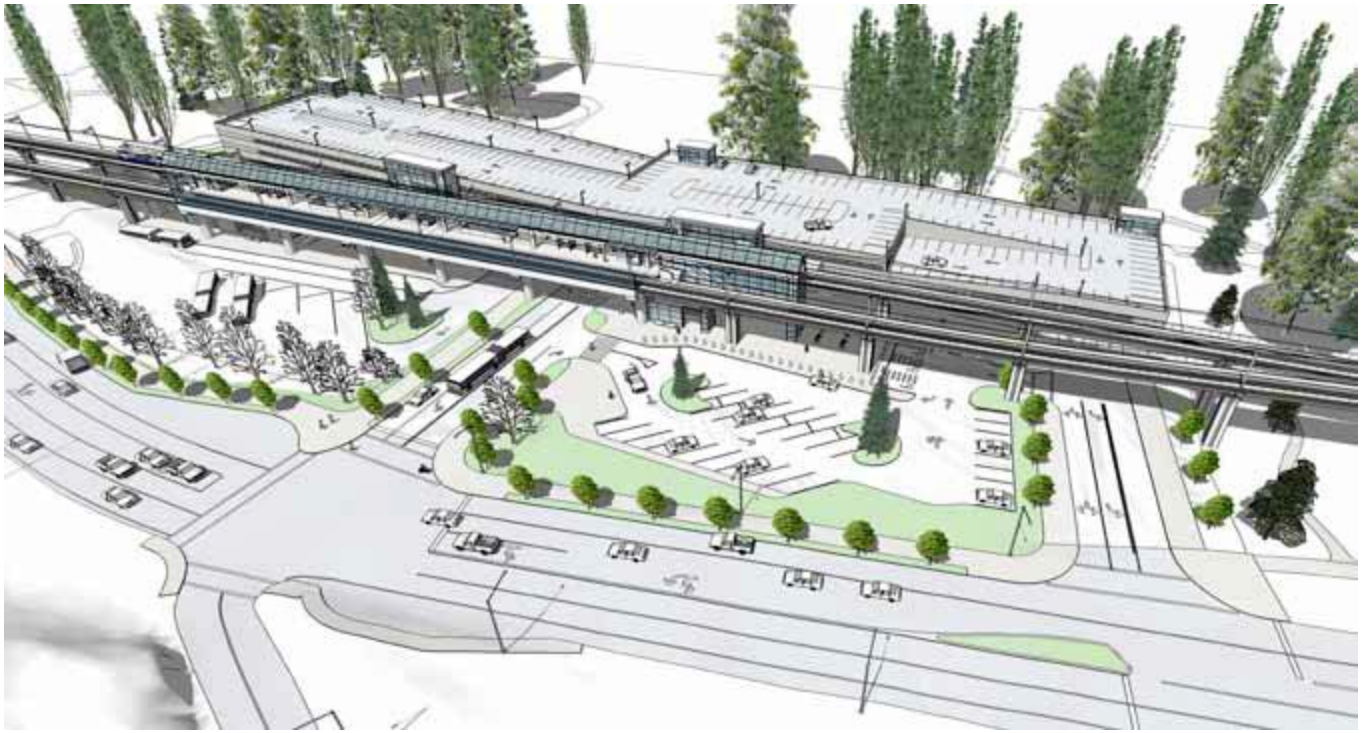
I-90 Stations

Rainier Station



Mercer Island Station

South Bellevue Station



Downtown Bellevue and Hospital

East Main Station

Hospital Station

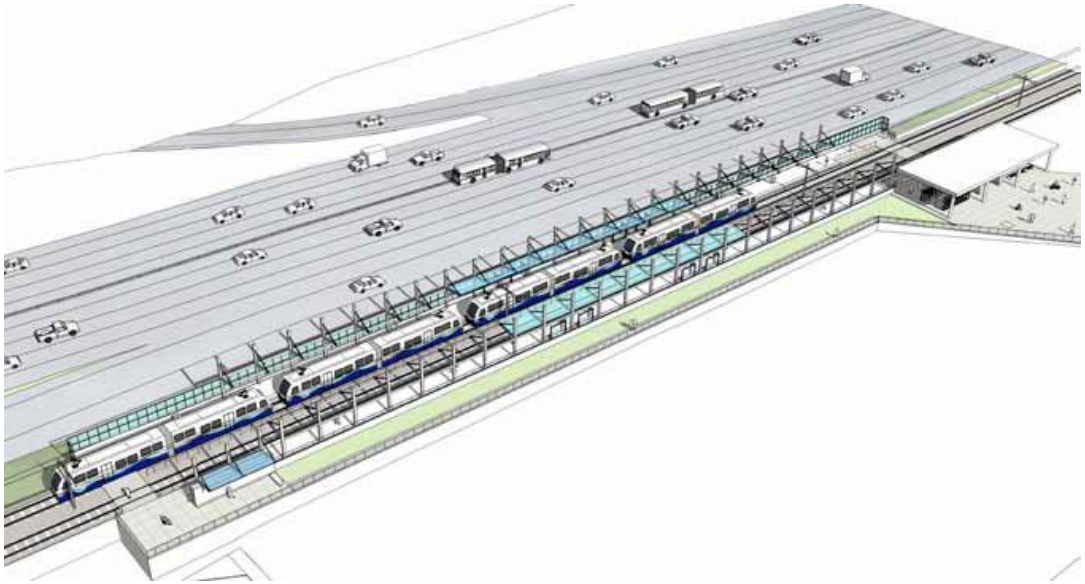
Bellevue Transit Center Station

Bel-Red Stations

120th Station

130th Station

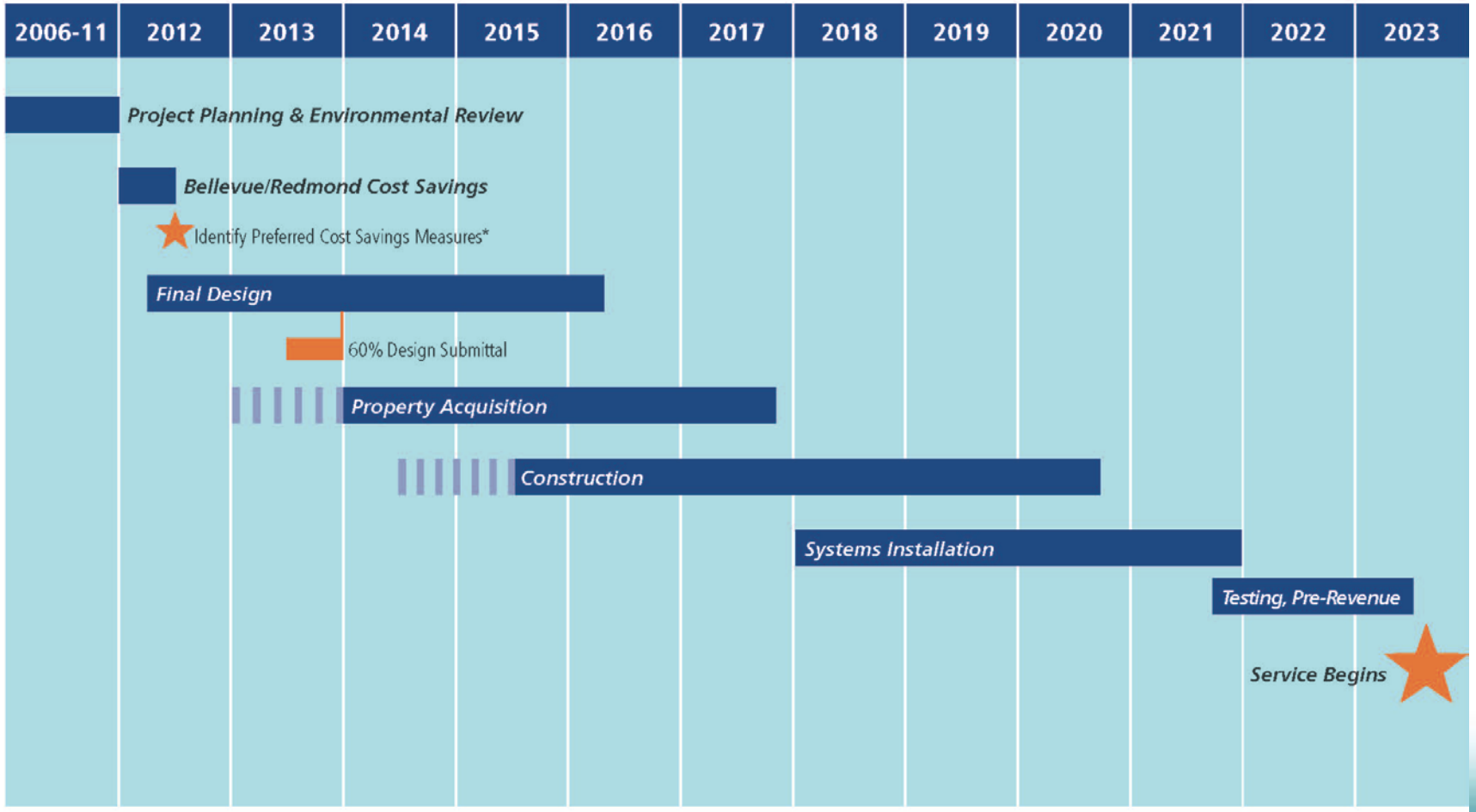
Redmond Stations



Overlake Village Station

Overlake Transit Center Station

East Link Working Schedule



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East Link Status

- Preliminary Engineering complete
- Final EIS published
- FTA and FHWA Records-of-Decision signed
- Final Design
  - Bellevue-Redmond underway
  - I-90 Fall 2012
- Baseline Scope, Schedule, and Budget 2014

I-90 Independent Review Team (IRT)

- 2008 State Transportation Budget Proviso
  - Up to $550,000 for an independent technical review, overseen by the Joint Transportation Committee (JTC), of light rail feasibility across the Interstate 90 - Homer Hadley Floating Bridge.
- September 15, 2008 IRT report concluded that:
  - All issues identified as potentially affecting feasibility can be addressed
  - Made recommendations for issues to address during design
- ST and WSDOT are implementing the IRT recommendations

IRT Classified 23 Issues into 6 Categories

- General
- Stray Current Mitigation Measures
- Impact of LRT Track System Installation on the Bridge
- Seismic Vulnerability of Approach and Transition Spans
- Miscellaneous
- Rail Expansion Joint Design and Prototype Testing

General

- Criteria Established for Independent Review Team to Evaluate Numerous Issues
- Washington State DOT's and Sound Transit's Goal for the Life Expectancy of Bridge
- Additional Needs and Changes Required for LRT Installation to meet "Blue Ribbon Panel" Recommendations

Stray Current Mitigation Measures

- Sound Transit Adoption of North Link/Airport Link Stray Current Mitigation Design Criteria for Homer M. Hadley Floating Bridge Installation
- Stray Current and Cathodic Protection System Interference and compatibility
- Determining Strength and Electrical Resistance of Existing Concrete
- Modification of Current Bridge Inspection Procedures for LRT Installation
- Method for Identifying Stray Current Failure and Response/Repair Plan

Impact of LRT Track System Installation on the Bridge

- Need for Lightning Arrestors on Floating Bridge and Approaches
- Impact of Stray Current Dispersion in Lake Washington on Environment and Fish
- Attachment of OCS Supports to Edge of Homer M. Hadley Floating Bridge Deck Cantilevers
- Methods to be Utilized for Locating Rebar and Post Tensioning in Bridge Deck

Seismic Vulnerability of Approach Spans and Transition Span

- Seismic Vulnerability and Seismic Retrofit of Approach Spans and Transition Span

- West Approach Tunnel Design Criteria Consistency

Miscellaneous

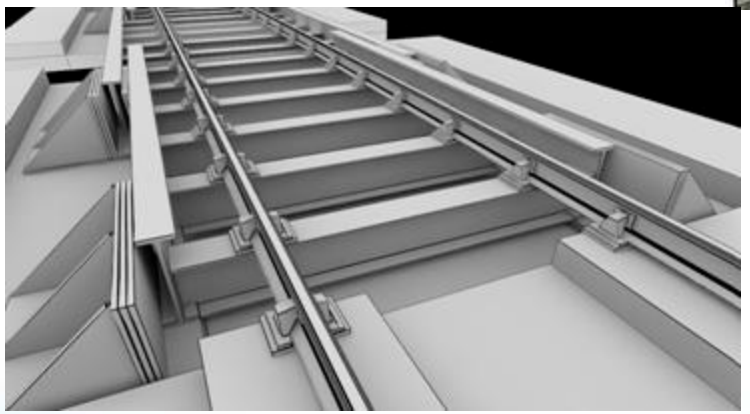
- Operational Restrictions for Combination of Train Loading and One - Year Storm Loading from North
- Analysis to Confirm Torsional Capacity of the Existing Bridge
- Analysis of “North Wind” Storm Effects on Homer M. Hadley Floating Bridge
- Operational and Maintenance Coordination Agreement between Sound Transit and Washington State DOT
- Median Barrier Relocation Design, Attachment, Maintenance and Drainage
- Effect of LRT Installation on Construction Operations Associated with Anchor Cable Replacement

Rail Expansion Joint Design and Prototype Testing

- Track Bridge/Expansion Joint Design and Performance Criteria
- Rider Comfort Performance for LRT Track Bridge at Expansion Joints
- Storm Water Drainage System Modifications under New LRT Track Bridge at Expansion Joints

Expert Review and Prototype Design

- "Since the track bridge is unique…design should be accelerated and [a] prototype tested…"

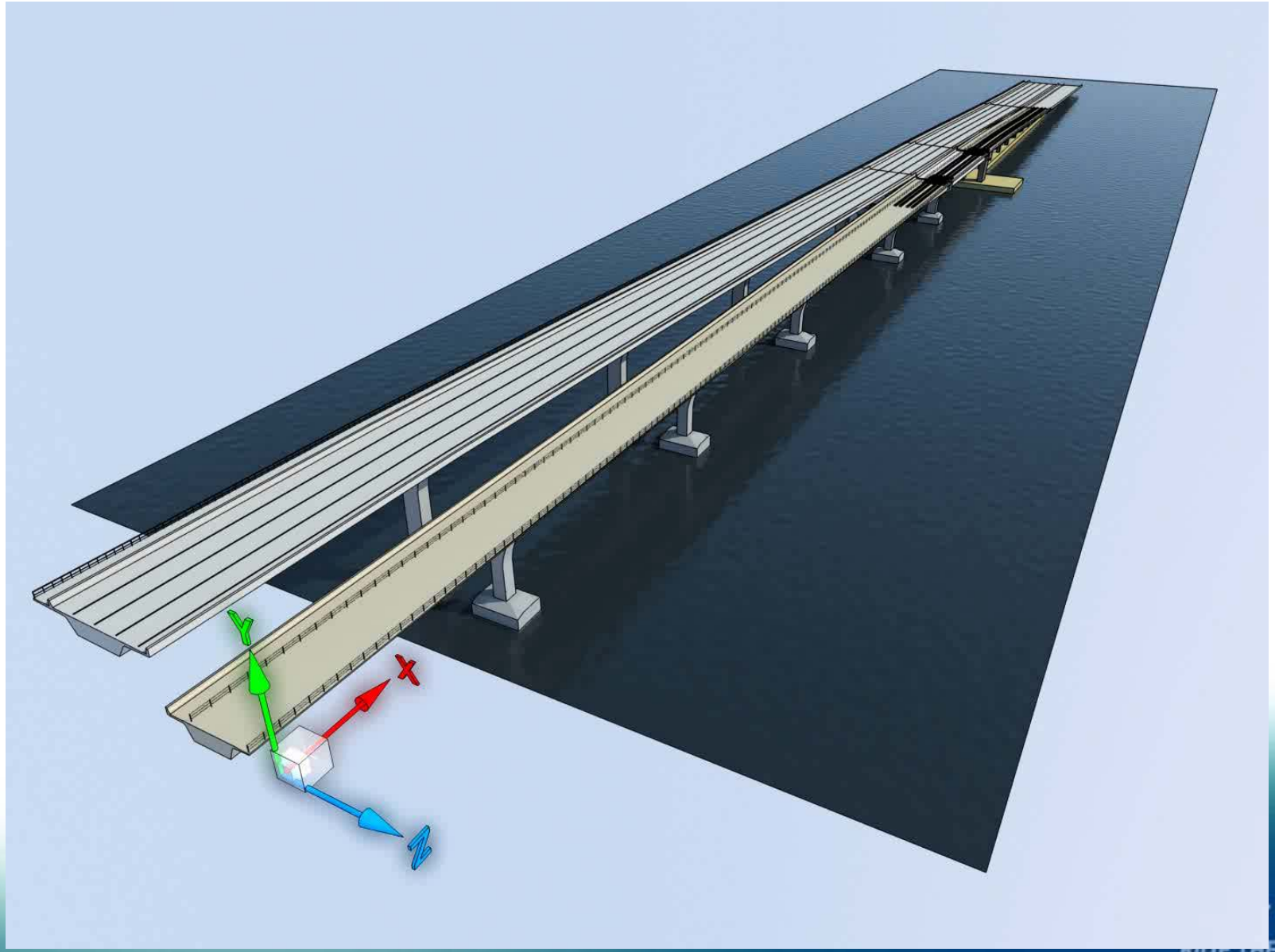


- Prototype design contract awarded in February 2011
- 90% Design in 2012
- Fabrication and testing in 2013

Expansion Joint Locations

Existing Expansion Joint

Range of Motion



Evaluation Criteria

Performance

- Operating speed
- Restricted speeds

System Parameters

- Reliability/ Maintainability/ Inspection ability
- Ease of fabrication

Life Cycle costs

- Initial costs
- Customer Impact/O&M

Track Bridge Project Team

- Parsons Brinckerhoff/Balfour Beatty Team selected on:
  - Approach
  - Experience
  - Expertise

Contracting Approach

Phase 1A (Completed November 2011)

- Develop Alternatives
- Evaluate Alternatives
- Select one alternative for Phase 1B

Phase 1B (Now through November 2012)

- Prepare 90% design document
- Develop the testing plan
- Component Testing

Phase 2 (ST's option)

- Build and test prototype in shop
- Full scale field test of prototype

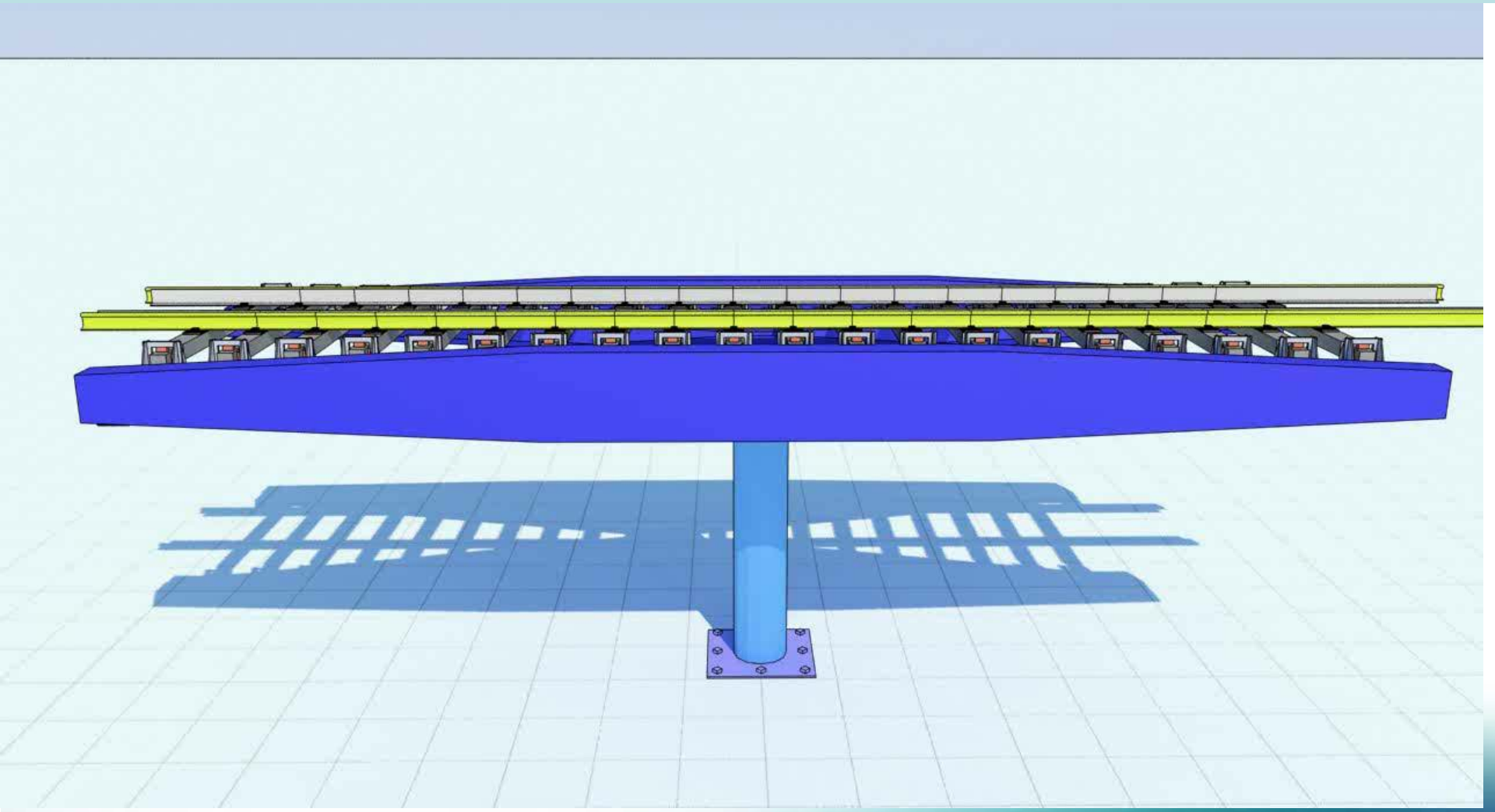
Phase 3

- ST's option
- Build actual

Key Contract Features

- Meets Independent Review Team Recommendations
- Design a prototype
- Develop a testing plan
- Incentive fee for exceeding goals and milestones
- Sound Transit option for awarding future phases
  - Phase 2 build and test the prototype
  - Phase 3 build the final track bridge

CESURA



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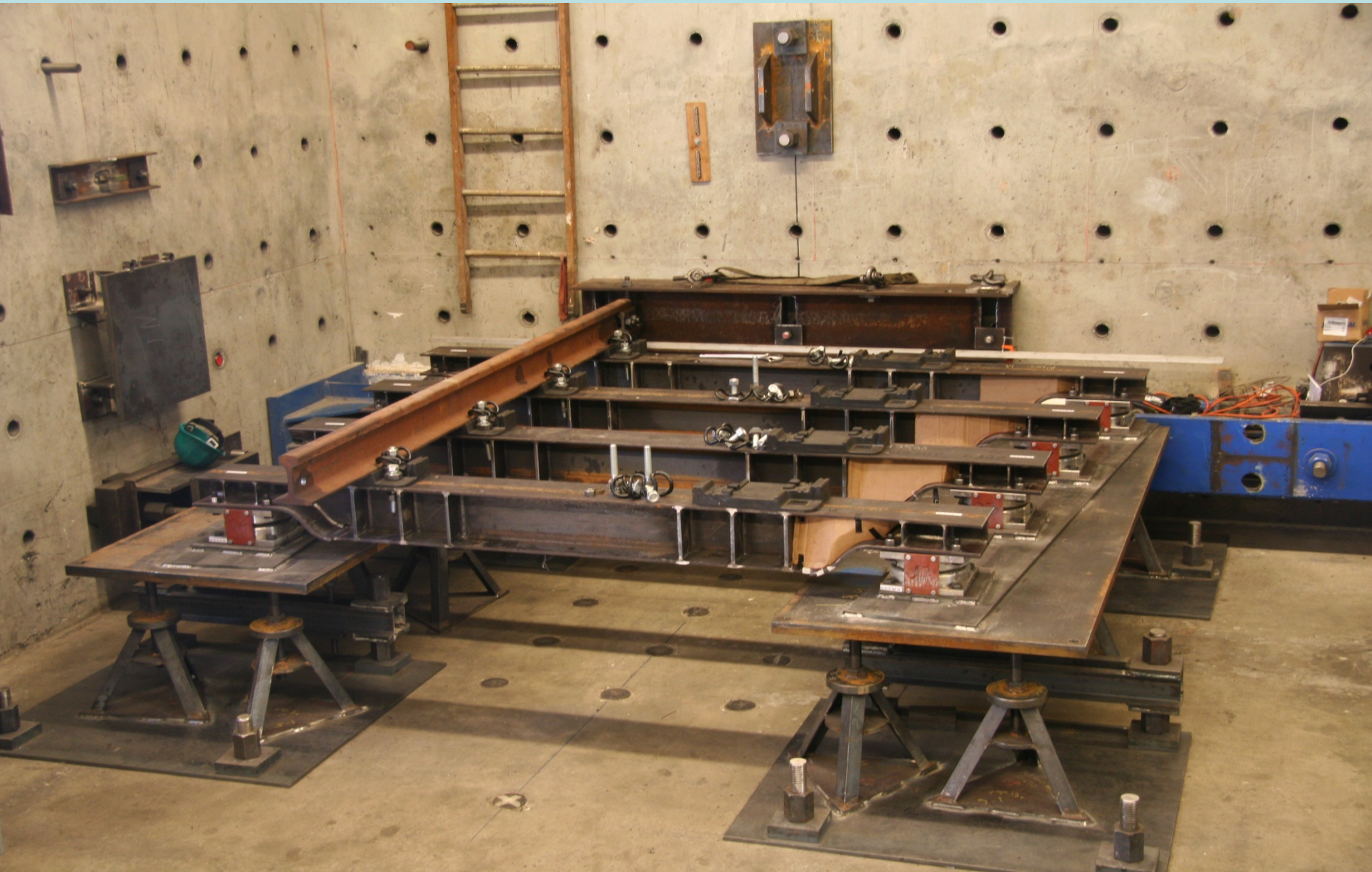
Where are we now?

- Preferred alternative selected
- Working towards 90% design
- UW testing under way
- Full scale testing contract will be considered by ST Board October

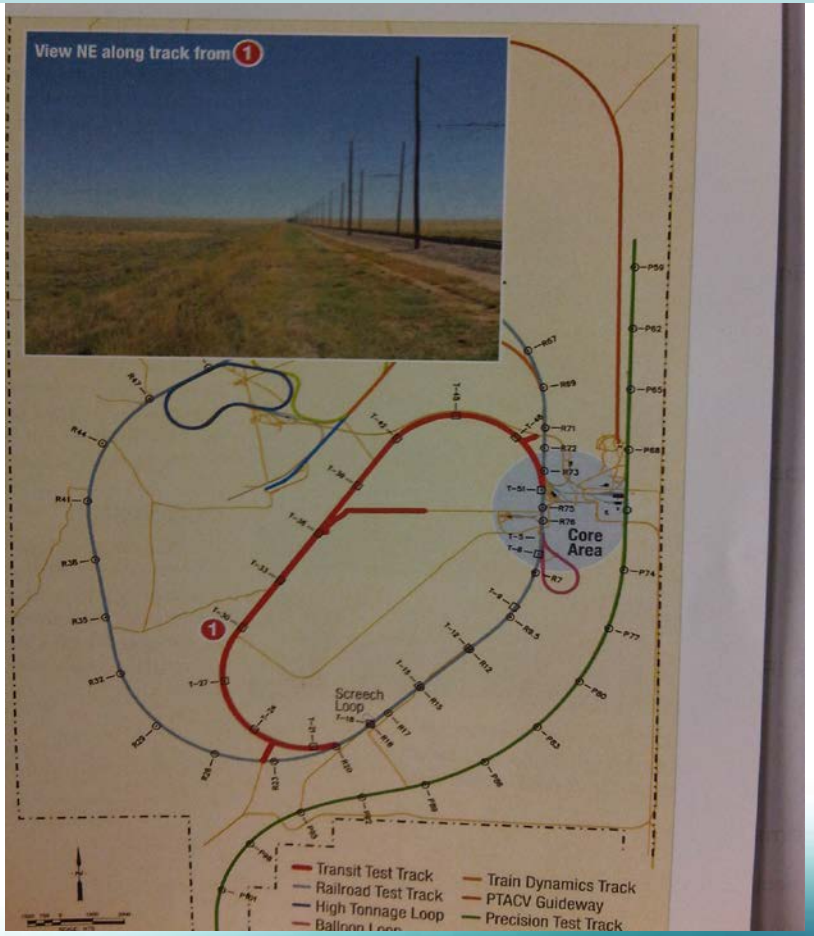
UW Lab



Friction
Pendulum Bearing

Engineering Challenge
Expansion Joints Prototype Testing

- Test Facility in Colorado
- Initial proposal
  - Replicate all movements of Transition Span in Colorado
  - Ship Sound Transit train to Colorado for testing
- Test joint through all movements; service movement and extreme movement
- Redesign, fabricate, retest, if required



Testing Program

Lateral acceleration on each axle box

Car body roll

Truck rotation

Wheel forces

Rail movement and stresses

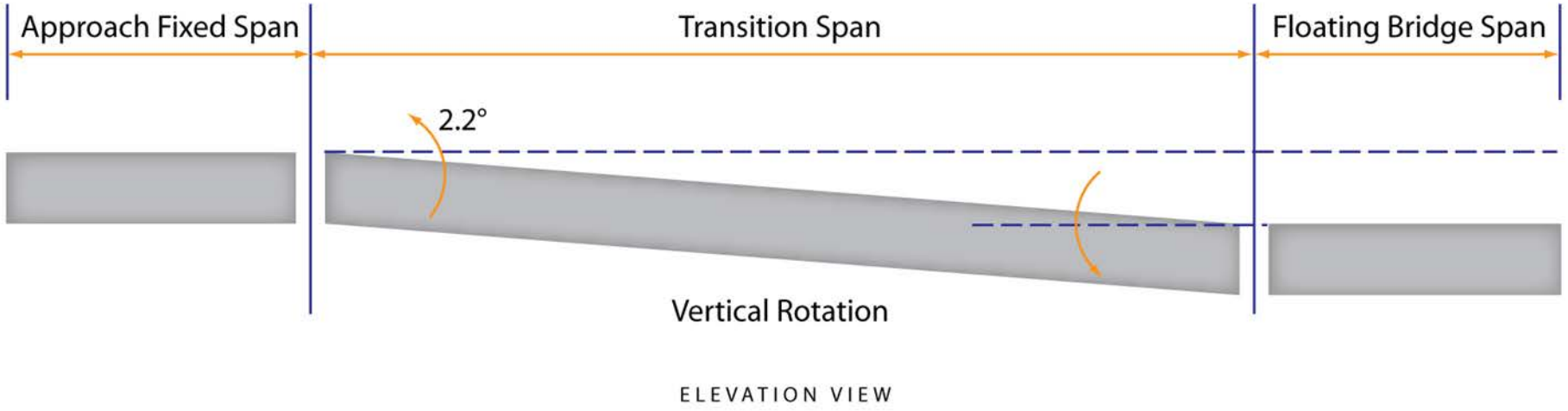
Track bridge stresses

Bearing loads rotations, and displacements

Questions

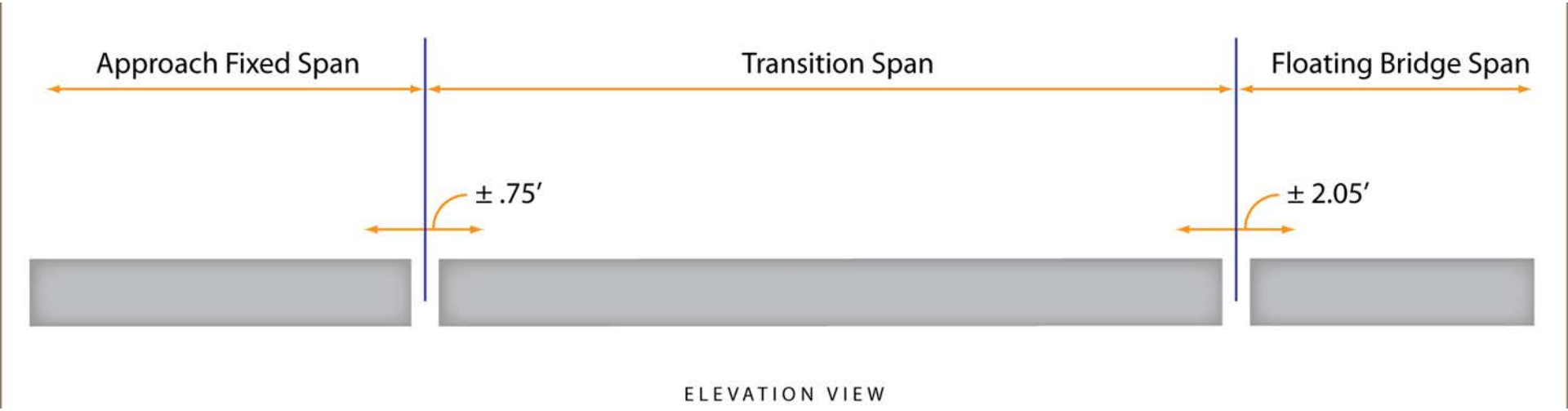
Movements Per WSDOT - Vertical

- Vertical 2.2 degrees



Movements Per WSDOT - Longitudinal

- Longitudinal – Floating +/- 2.05 feet
- Longitudinal – Approach +/- .75 feet



ELEVATION VIEW

Movements Per WSDOT - Horizontal