



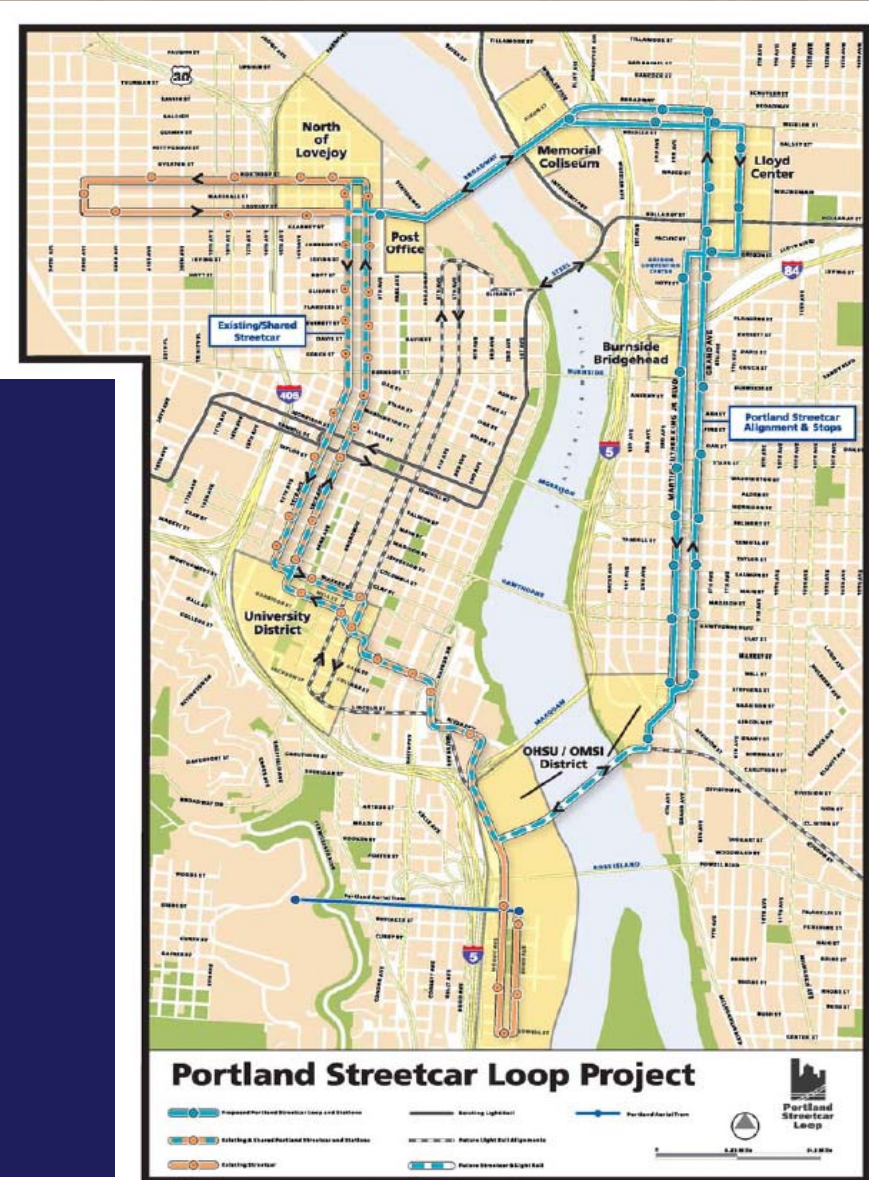
# Streetcar on the Bridge: Old and New Bridges Crossed in the Portland Streetcar Loop Project

Presented by  
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# Background – Portland Streetcar Loop Project

- **Portland Streetcar system**
  - \$150 Million Loop project cost
  - Project adds 3.3 Miles to existing system
  - Broadway Bridge is northern river crossing
  - Future lighttrail bridge will be southern river crossing



# Portland Streetcar Loop – Bridges Crossed



Lovejoy Ramp

Weidler/Williams /Broadway over I-5

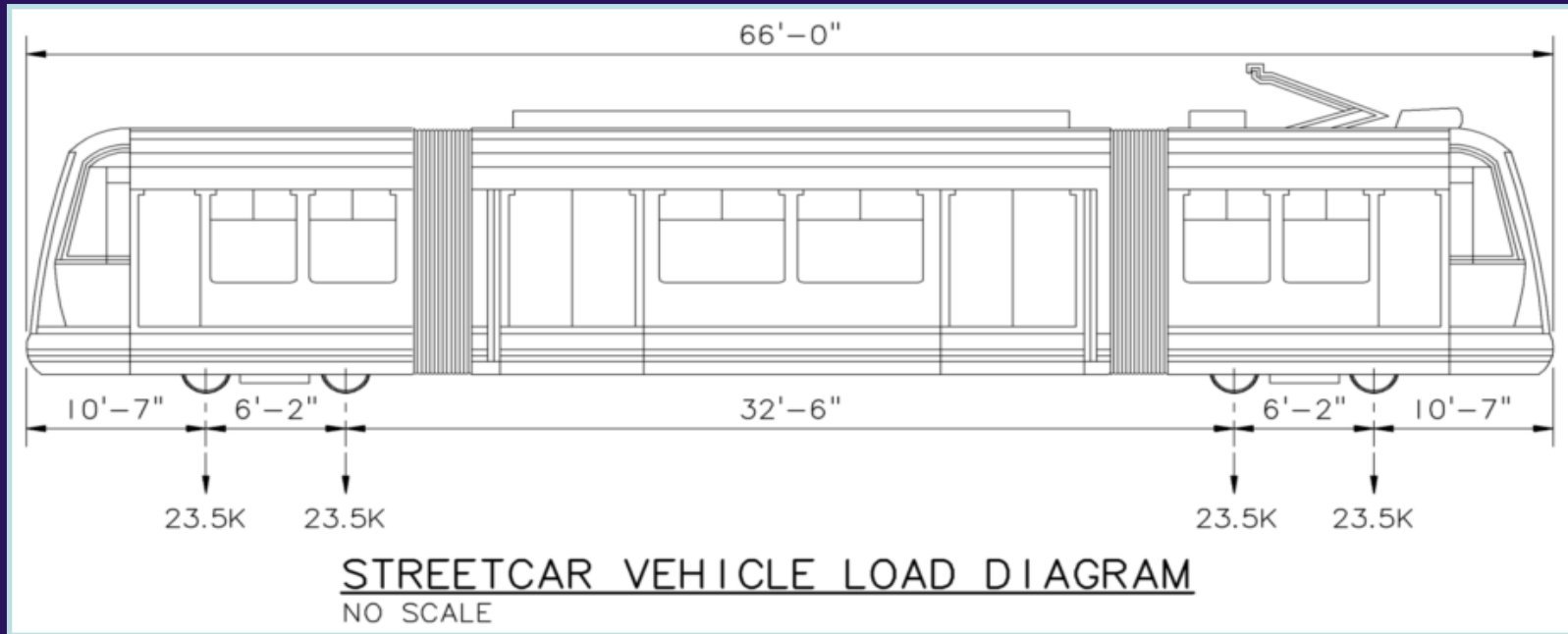
Grand and MLK over I-84

Broadway Bridge over Willamette River

OMSI Viaduct



# Streetcar Vehicle Loading



- 94k vehicle
- Multiple vehicle
- Trimet Lightrail design criteria
  - Horizontal / Vertical impact
  - Derailment load case where applicable





# What method to use for attaching rails?

- Will the streetcar be sharing the lane with cars?
- Does the bridge have any existing structural deficiencies?
- Can we adjust the grades on the bridge and approaches?



# Lovejoy Ramp

- **Built: 2002**
- **Owner: City of Portland**
- **Type: Composite Steel I-girder construction**
- **Length: 3 spans 131'-131'-126'**
- **Rails: Dual track up center of bridge**



# Lovejoy Ramp



# Broadway Bridge over Willamette River



- **Built: 1913**
- **Owner: Multnomah County**
- **Type: Steel Truss main spans + Bascule Span**
- **Length: 1738' Total**
- **Rails: Dual track up center of bridge**





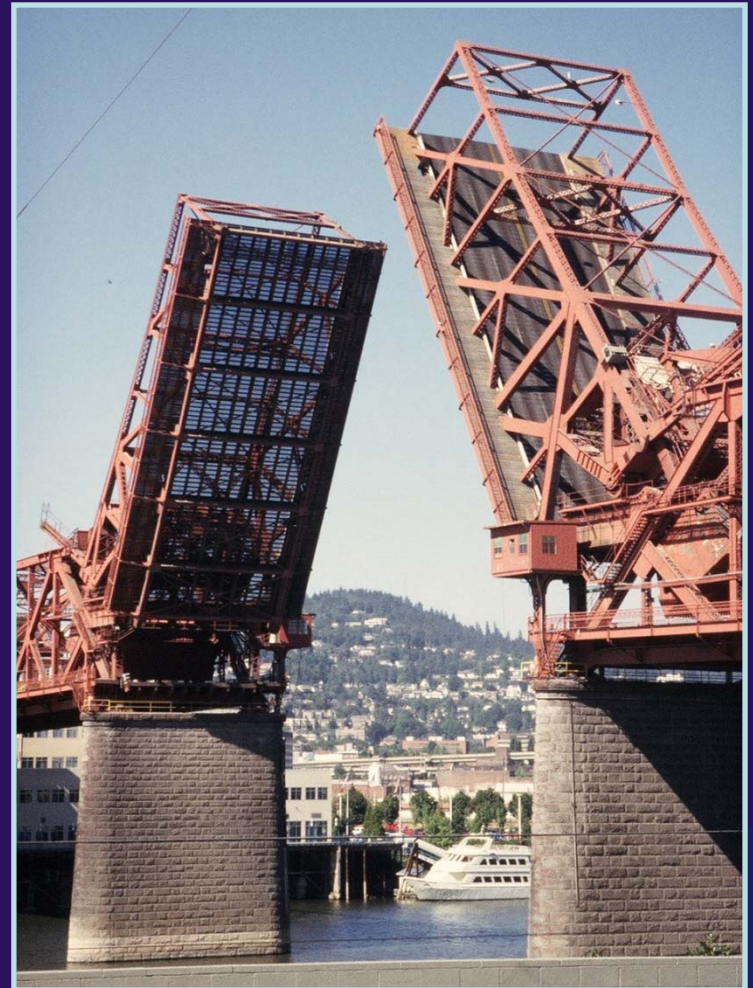
# Broadway Bridge – Back to the Future



*The Broadway Bridge opened in 1913 with streetcar tracks.*



# Broadway Bridge – Rall Wheel Bascule Span







# Fixed Spans





# Weight and Balance

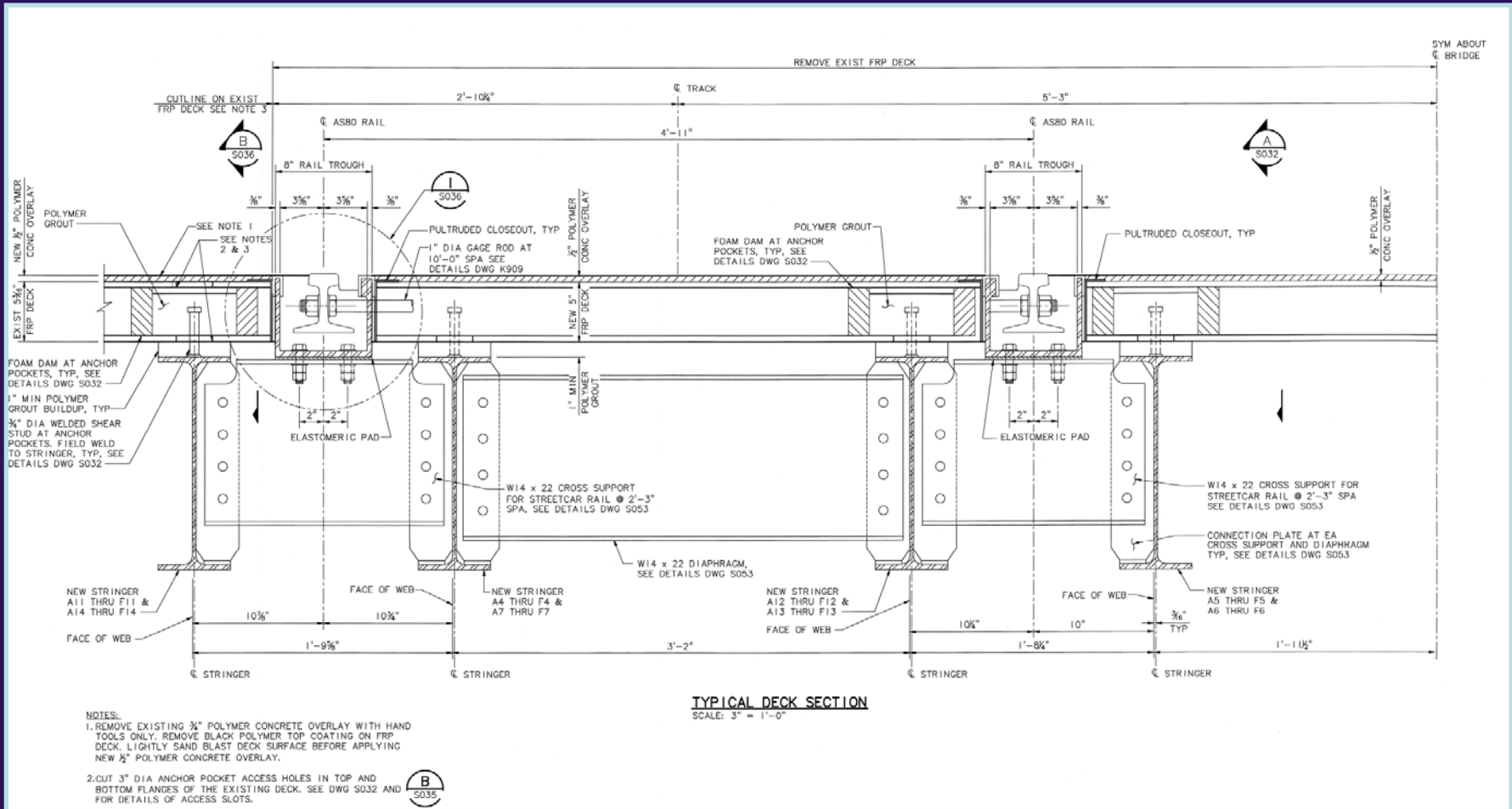


# Tip Alignment – Rail Joints





# Rail Support and FRP Deck



# Rail Support and FRP Deck





# Rail Support and FRP Deck





# Rail Support and FRP Deck





# Rail Support and FRP Deck



# Rail Support and FRP Deck



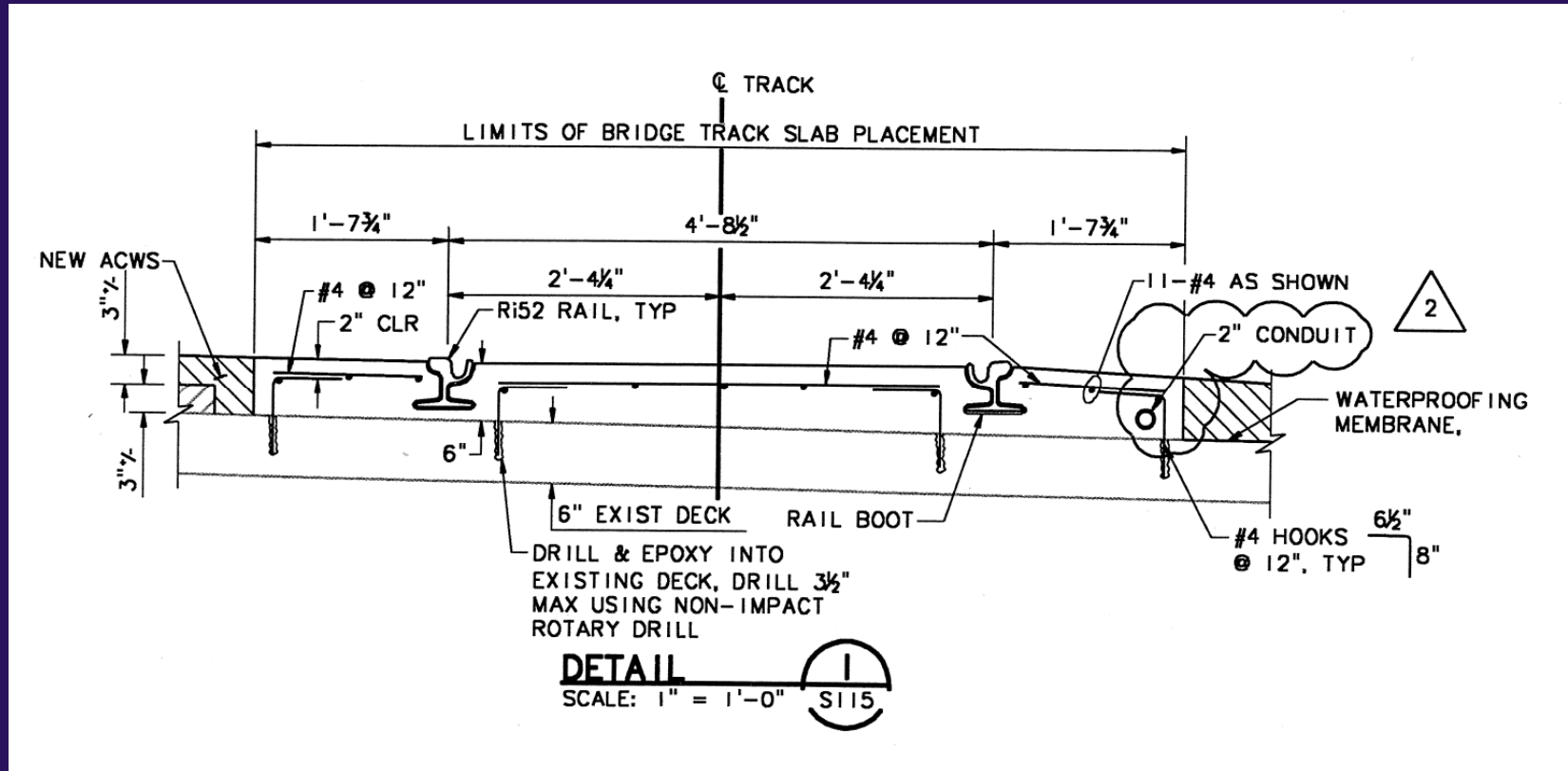


# Weidler/Williams/Broadway over I-5

- **Built: 1963**
- **Owner: ODOT**
- **Type: RCDG and Multicell CIP Box**
- **Lengths: Broadway – 106'**
  - **Williams – 188'**
  - **Weidler – 148'**
- **Rails: Single track**



# Weidler/Williams/Broadway over I-5



# Grand and MLK over I-84

- **Built:** 1908, 1937, 1956, 1959, etc
- **Owner:** ODOT
- **Type:** Mostly Steel Girders
- **Lengths:** Grand over I-84 : 350'
  - MLK over I-84 : 467'
- **Rails:** Grand over I-84 : Single track in slow lane
  - MLK over I-84 : Single track in streetcar only lane





# Grand over I-84





# MLK over I-84



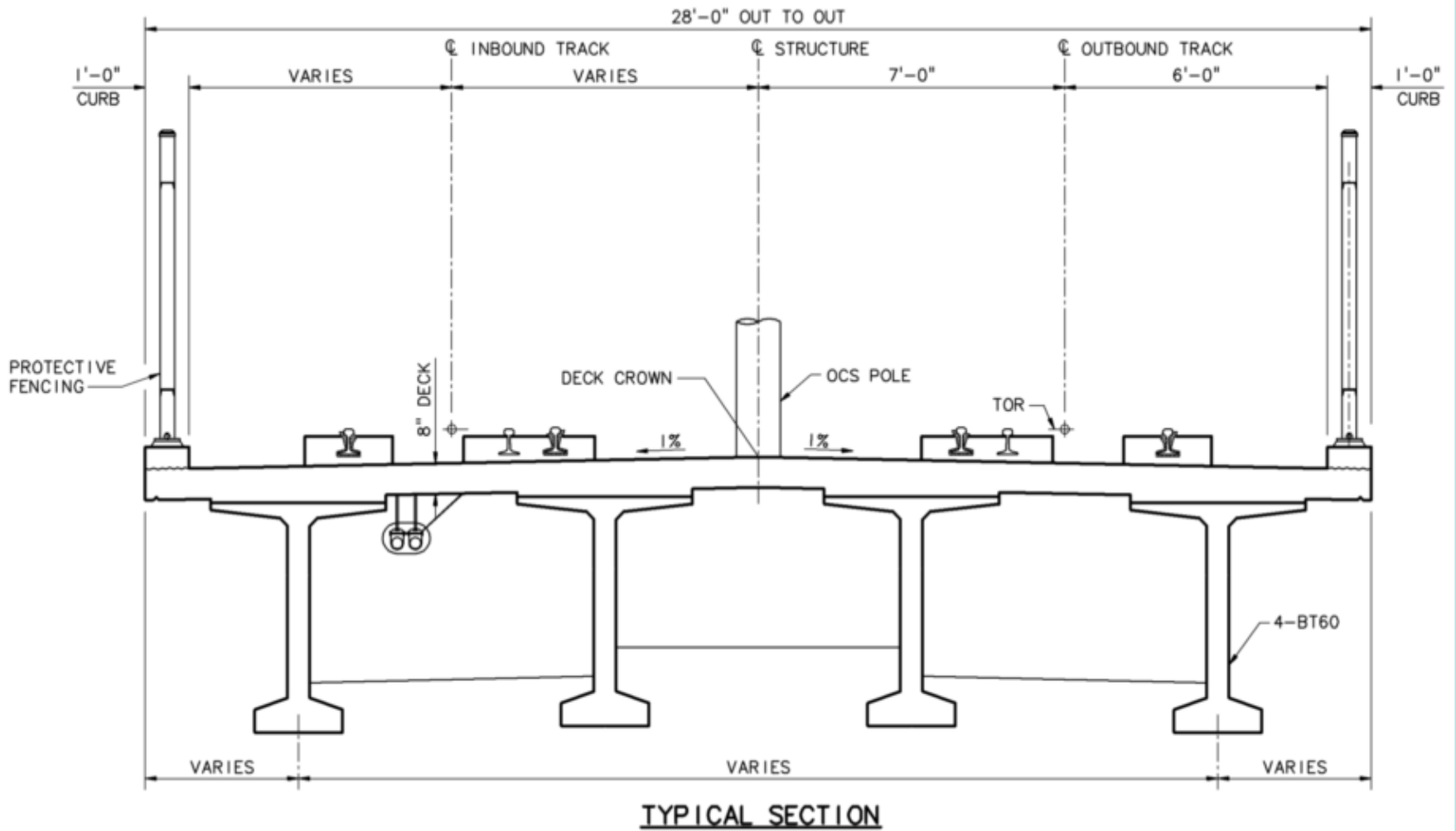
# OMSI Viaduct

- **Built: 2011**
- **Owner: City of Portland**
- **Type: Precast Bulb-T girders**
- **Length: 4 spans 118'-115'-125'-67'**
- **Rails: Dual track centered on bridge**





# OMSI Viaduct



# OMSI Viaduct



# OMSI Viaduct





# Streetcar on the Bridge

## Questions

- **Photo Credits:**
  - Multnomah County Bridge Section - Mark Knieriem
  - Hamilton Construction - Joe Hampton
  - Zellcomp Deck Systems – Dan Richards
  - Sharon Wood Wortman
  - DEA – Kelly Burnell, Amanda Blankenship



# Streetcar Project Parties Involved

