# Accelerated Bridge Design Using Performance Specifications (Mile Bridge) & Accelerated Construction

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# Original Design Bid Build Project

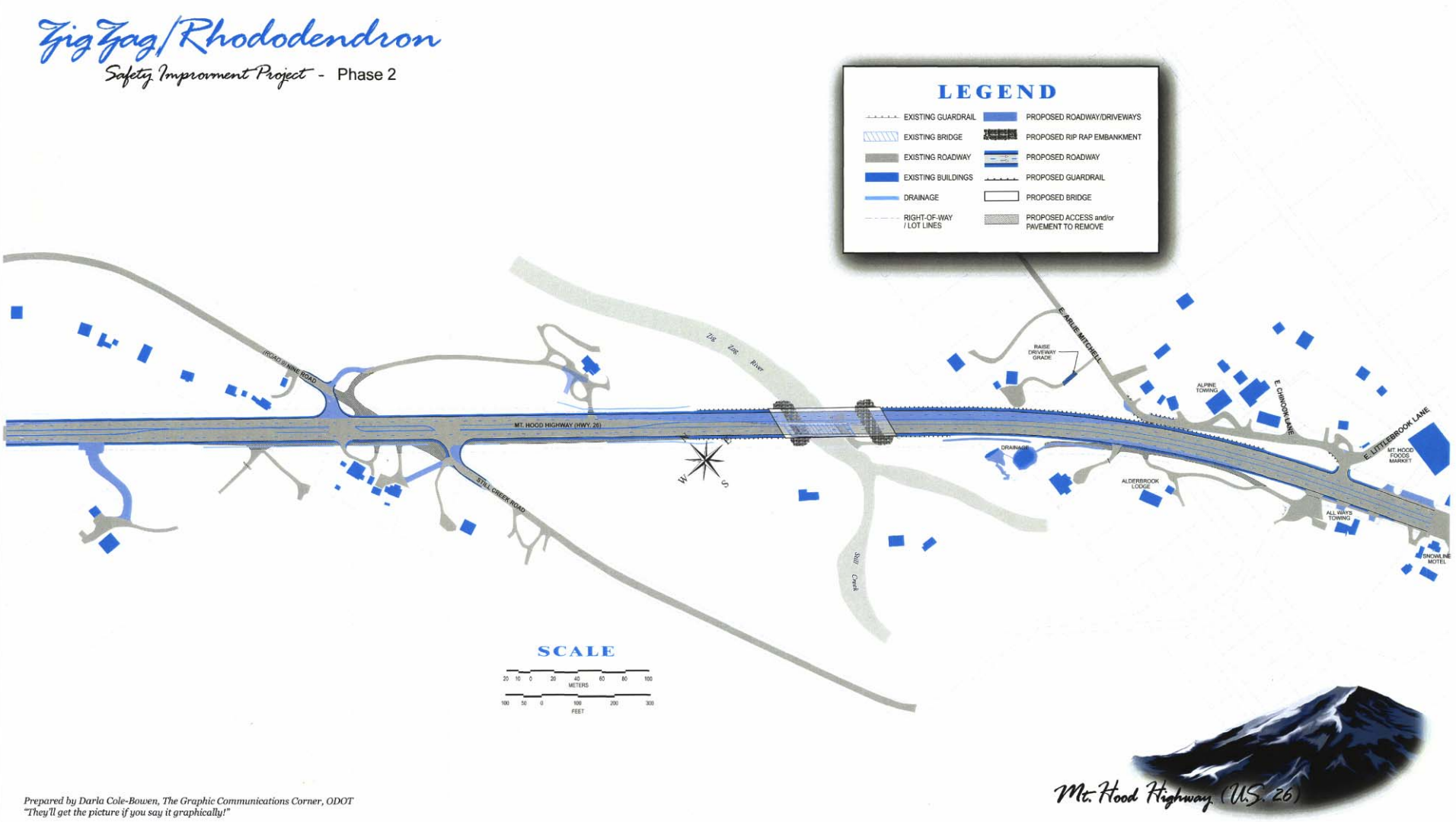
## Hwy 26: Zigzag to Rhododendron
## Phase II Project

## Mt. Hood Highway

# DBB to Construct Three Structures

- Zigzag River Bridge – replacement with 250’ long steel plate girders
- Bear Creek Woodlands Access Bridge – new 30’ long steel beam
- Variable message sign bridge – first cantilever truss sign bridge in the state

# Zigzag – Rhododendron, Phase 2




*Prepared by Darla Cole-Bowen, The Graphic Communications Corner, ODOT*
*"They'll get the picture if you say it graphically!"*

Parametrix

Oregon Department of Transportation

# Zigzag River Bridge

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# Bear Creek (Woodlands) Bridge

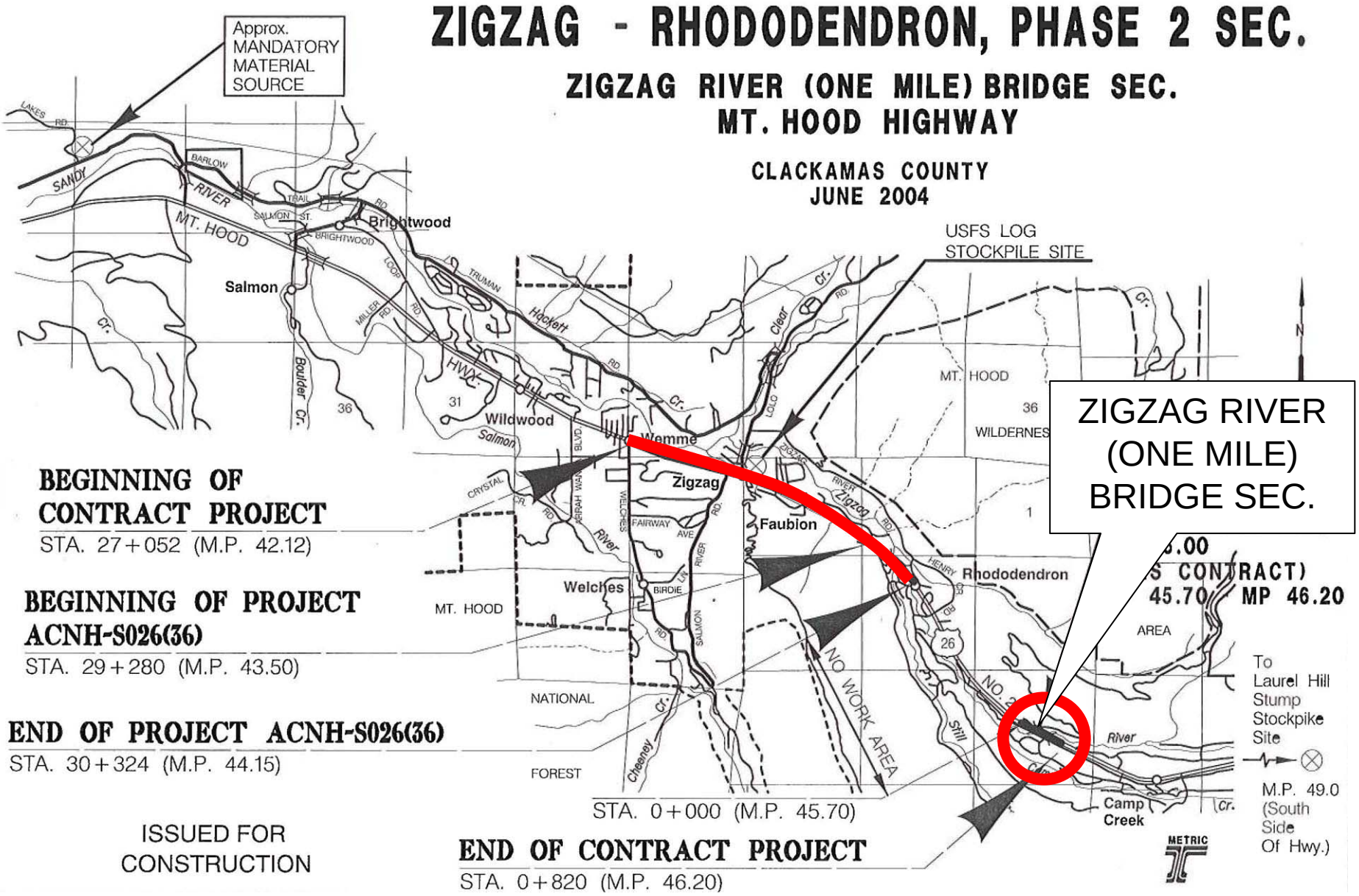
# Variable Message Sign Bridge

# Work Added Late in Project

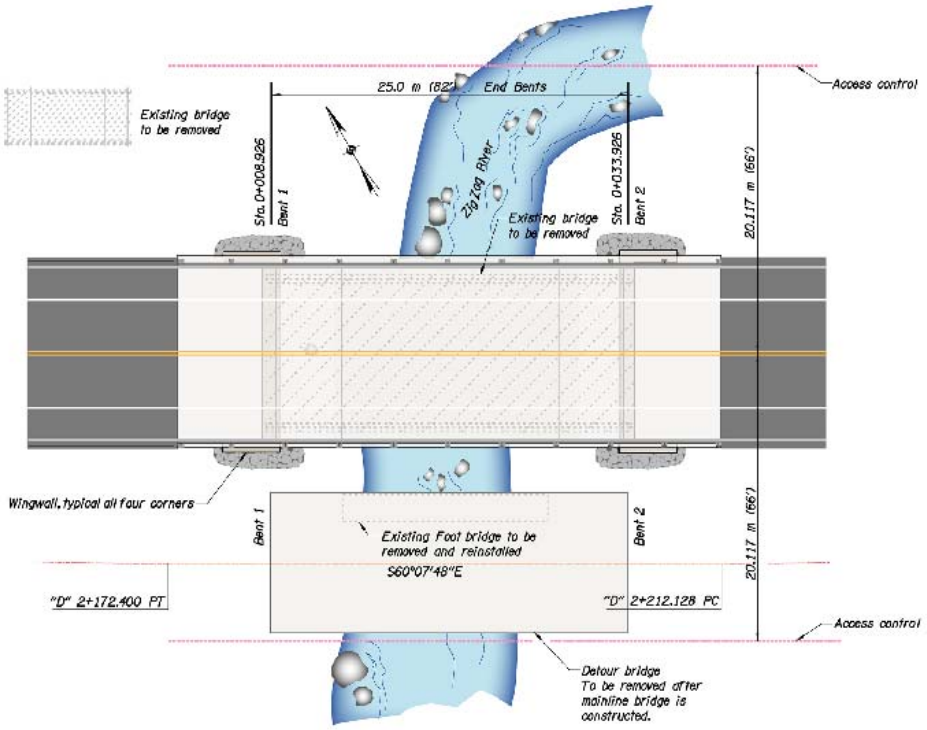
## Three Weeks Prior to Completion of PS&E for Zigzag – Rhododendron, Phase 2 Design Bid Build project

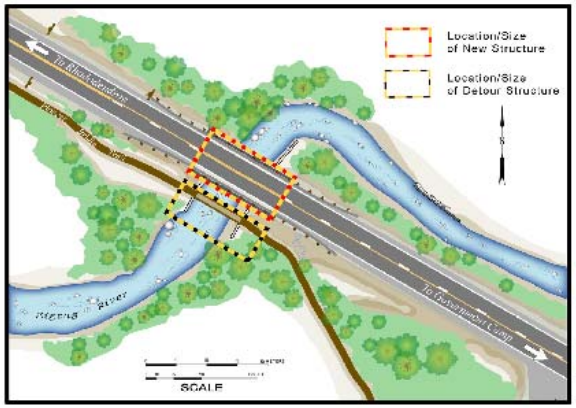
- Zigzag River (Mile Bridge) was added
- Pedestrian bridge added
- Mile Bridge project was expanded from two to three lanes

# Mile Bridge Added to DBB Project

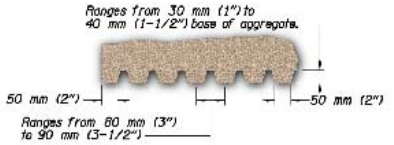


# Mile Bridge Simulations




**BRIDGE LOCATION**




**ARCHITECTURAL TREATMENT DETAIL**

*No Scale*


**ELEVATION VIEW**

0 10 25 50 Feet
SCALE

Note: All dimensions are in millimeters (mm) except as noted.

**ZIGZAG RIVER (MILE) BRIDGE #03026A**

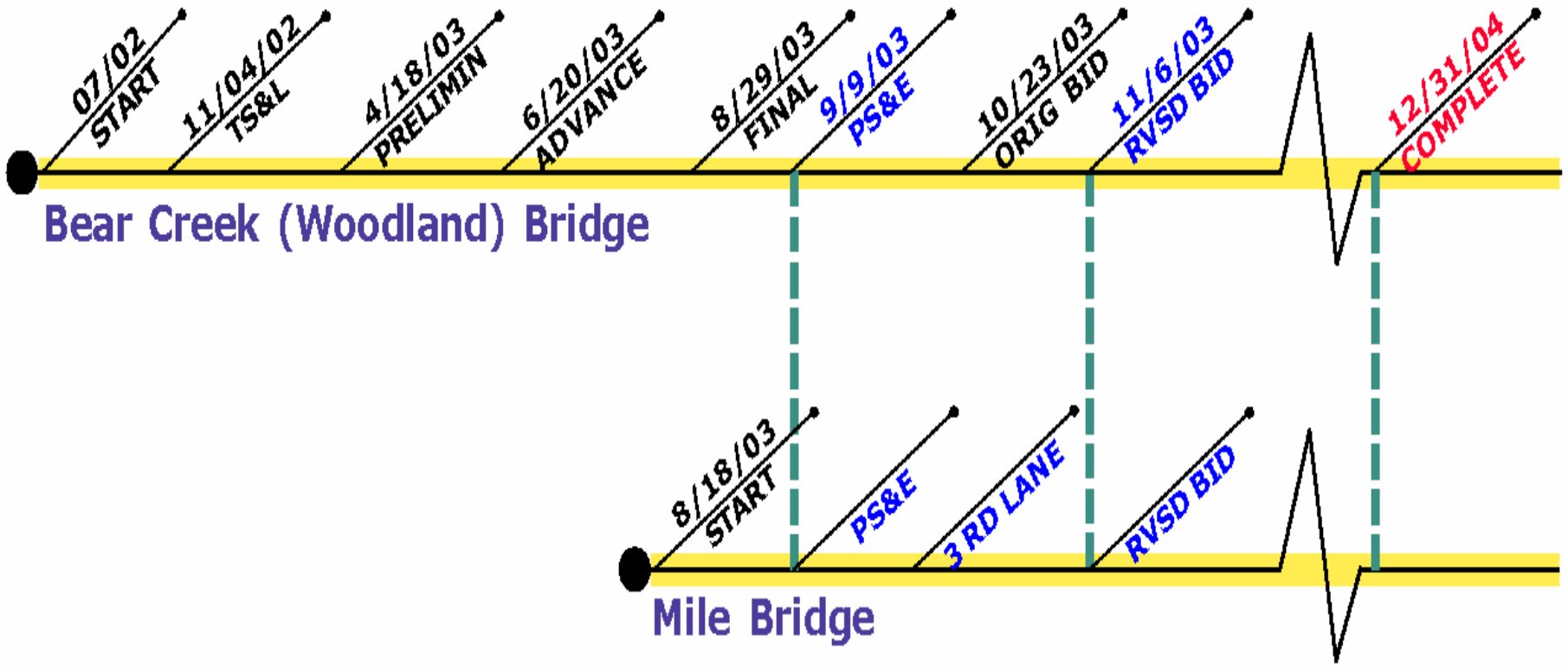
ZIGZAG - RHODODENDRON PHASE II SECTION
MT. HOOD HIGHWAY (MP 46.02)
CLACKAMAS COUNTY

Parametrix

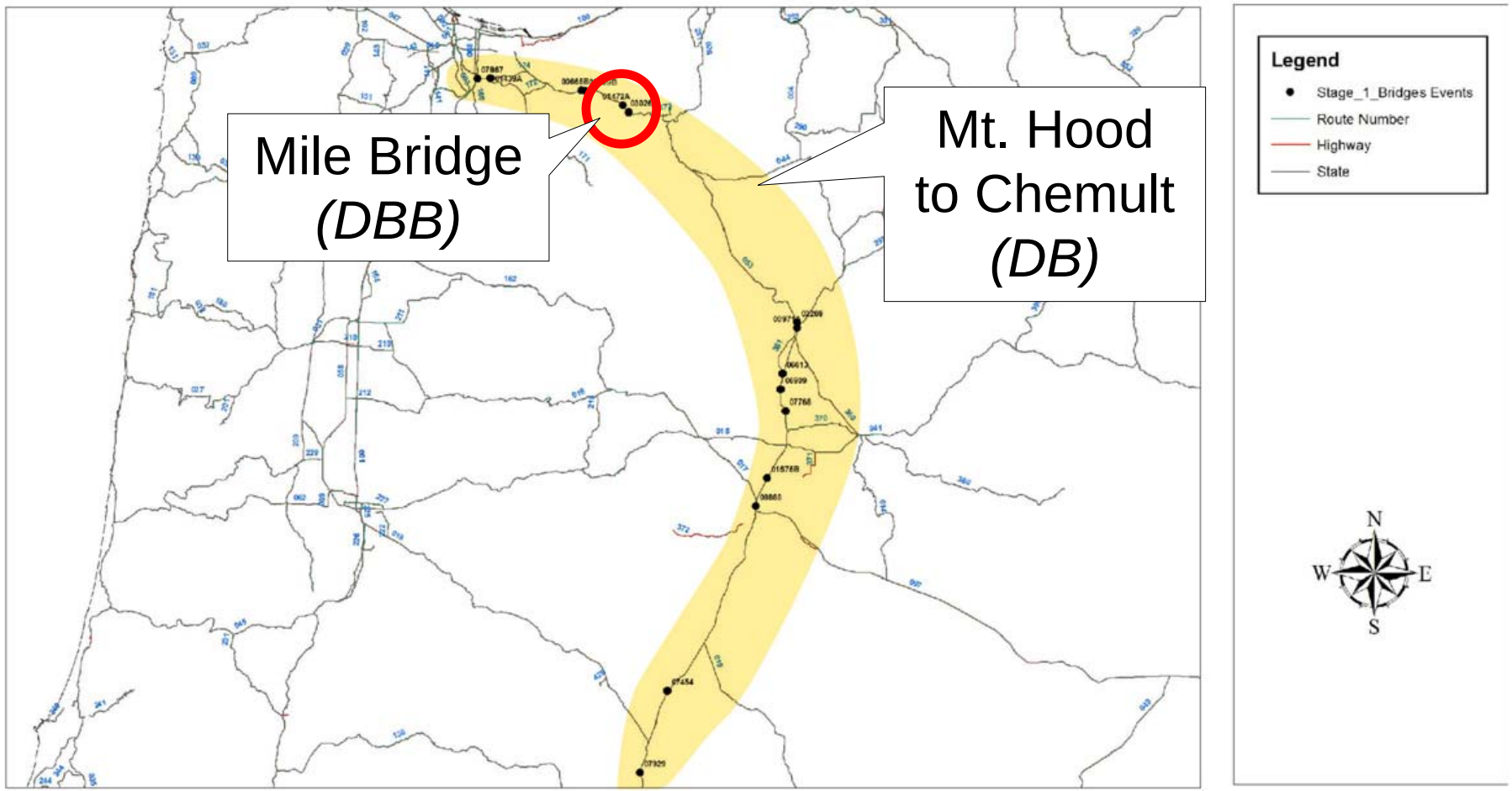
Oregon Department of Transportation

# Pedestrian and Mile Bridge

# Schedule Comparison



# Mt. Hood to Chemult Bridges DB



# Why Add This Work

- Located 2 Miles from the DBB Project
- Hwy 26 provides a parallel freight and emergency route to I-84
- Replaced substandard bridge to satisfy OTIA III Stage 1 capacity requirements
- Design resources and schedule were not available to meet construction Ad date
- Innovative project delivery method

# Project Challenges

- Adding construction work to a project 3 weeks prior to when Final Bid Documents were to be completed
- Selecting a Contractor and **DB** team as part of the traditional **DBB** Project

# Selection of Contractor & DB Team

- One contractor was selected for both **DBB** and **DB** components using a traditional Low Bid Process
- Did **not** include a Best Value component
- Parametrix was selected by Contractor based on Technical and Design Build experience
- One **Performance Specification** defined a list of Bid Items for design and construction of **DB** work

# Performance Specification

## Provided the Program Requirements

- Applicable design codes
- Performance parameters (loading, design speed, traffic volumes, etc.)
- Deliverables (list of required drawings and calculations)
- Quality Review Submittals

# Meeting Program Requirements

## Accelerated design schedule was met by

- Bridge was straightforward and low-risk to contractor with very few alternatives
- TS&L of Mile Bridge completed
- Technical studies/incidental tasks were in-progress or complete
- Contractor Designer collaboration provides efficiencies
- One major review by ODOT with verification submittals

# Incidental Tasks Completed

- Survey
- Geotechnical / Hydraulics
- Environmental Permits
  - Historical
  - Biological (Fish & Eagle)
- Public Outreach
- FHWA Coordination
- Utility Coordination
- Right-of-Way

# Design Build Schedule Benefits

- Shifts design detailing to the contractor
- Allows design to reflect Contractor operations
- A portion of design work is moved to after contract award
- Allows some construction activities to proceed (survey, clearing and earthwork etc.) while design is finalized
- Obligates funds quicker – increases project velocity

# ODOT Quality Reviews

## Performance Specification Required Review Submittals

- Plan review submittal requirements
  - First submittal 90%
  - ODOT approval of 90% plans
- Final submittal to ODOT
  - Incorporated ODOT's comments

# Agency Perspective

- Less control than traditional design
- ODOT used the same construction management approach as conventional **DBB**
- Difficult to incorporate requested changes
- Cost effective contractor details not readily approved by ODOT

# A Contractor's Perspective

- Overall process was very appealing
- Flexibility to design and construct details suited to the contractor
- Construction services roles and responsibilities were not properly defined
- Contractor needed more deviation from typical ODOT details

# A Consultant's Perspective

- No construction services budget and no mechanism for additional funds
- Consultant at times was placed between opposing sides—ODOT requested changes and contractor's unwillingness to make them
- ODOT personnel had difficulty letting go of the normal role that they have on DBB projects
- During design, roles and responsibilities were not always clear

# Lessons Learned

- Provide ODOT personnel a greater understanding of the unusual contracting mechanism
- Clearly define the roles and responsibilities of the agency/contractor/engineer in the Performance Specification
- On future projects, if ODOT requires the same level of detail, more time should be allocated for document preparation

# ODOT's Future DB Low-Bid

## Lessons Learned provides input to future Design Build Low-Bid Process

- To be used on $1M to $20M projects (signals, intersection improvements, widening)
- Regions can use the process to deliver projects themselves
- Risk analysis approach used to determine level of pre-work
- EOR information submitted with bid package
- Selection based strictly on low bid

# Pedestrian and Mile Bridges

# Mile Bridge

# Questions?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